UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

LIGNITE DRILLING DURING 1979

IN WARD, MOUNTRAIL, AND DIVIDE COUNTIES, WESTERN NORTH DAKOTA

By

U.S. Geological Survey

and

North Dakota Geological Survey

Open-File Report 80-867

1980

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

CONTENTS

	Page
Introduction and acknowledgments	1
Lithologic and geophysical logs	8

ILLUSTRATIONS

Figure 1. Index map showing areas of drilling activity	2
2-4. Drill-hole location maps:	
2. Area A, Ward County	4
3. Area B, Mountrail County	5
4. Area C, Divide County	6

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Introduction and acknowledgments

A drilling program was conducted in western North Dakota by the North Dakota Geological Survey (NDGS) under Grant No. 14-08-0001-G-551 from the U.S. Geological Survey. The drilling was done as part of the U.S. Geological Survey's program to evaluate and classify mineral lands in the public domain. The purpose of the program was to gather data on the thickness, quality, extent, and recoverability of lignite beds and the lithologic characteristics of the coal-bearing Paleocene Fort Union Formation.

This report includes geophysical logs, descriptions of samples, and locations of the test holes. The lignite beds shown at the top of each log include most of the beds more than 2 ft thick and were generally determined from the density logs, but where there were depth discrepancies, sample depths were used to determine which log to use.

Test holes were drilled in three general areas between June 13, 1979, and September 26, 1979, with the first hole in Ward County (Area A) and the last hole in Divide County (Area C). For convenience of reference, the areas are designated A-C, with the general locations shown on figure 1. Test-hole locations are shown on the area maps (figs. 2-4), and specific locations are on the log headings using the system of land survey in use by the U.S. Bureau of Land Management. The distances from section lines are approximate. Elevations are also approximations taken from topographic quadrangle sheets or,

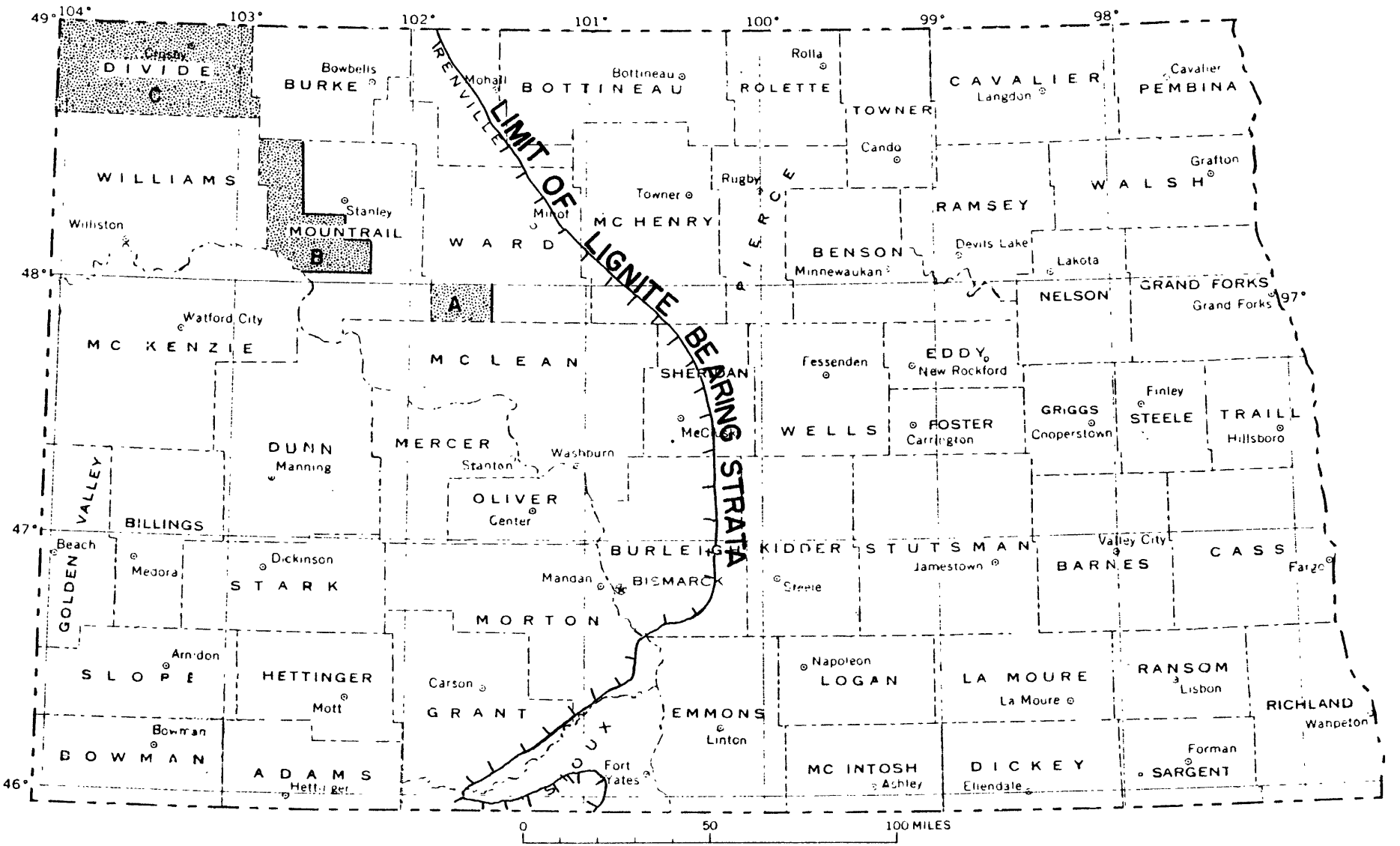


Figure 1.--Index map showing areas of drilling activity: (A) Ward County, (B) Mountrail County, and (C) Divide County, N. Dak. Lignite-bearing strata are west of hachured line.

where topographic coverage was lacking, from altimeter surveys.

The total number of test holes and the area in which they were drilled are as follows: Area A, Ward County, 17 holes; Area B, Mountrail County, 31 holes; and Area C, Divide County, 69 holes. Total drilling was 44,688 ft.

Fieldwork was carried out by the following NDGS personnel: Clarence G. Carlson, Thomas Delling, Gary Stefanovsky, and David Lechner. Coordination and technical guidance were provided by Clarence G. Carlson, NDGS, and Susan Cook and John Spencer, U.S. Geological Survey.

A forward rotary drill was used with water as the drilling fluid. Continuous 5-ft samples were collected, except where circulation was difficult to maintain and sample returns were not satisfactory, no samples were collected. Samples were logged by the geologist in the field and then bagged and placed in the storage facilities of the NDGS, Grand Forks, N. D. A driller's log for each test hole was obtained, and these logs are on open file at the NDGS Grand Forks office.

The logging procedure was to run the gamma-ray, self-potential (SP), and resistivity probes, followed by the density probe. Where only glacial drift was penetrated, no density log was run. Owing to mechanical failure, no gamma-ray logs were obtained for a few holes in Mountrail County.

Test holes were given letter and number designations prior to the drilling season. One site (79D62) was later deleted, but to avoid the confusion of renumbering subsequent holes, the original designations were retained.

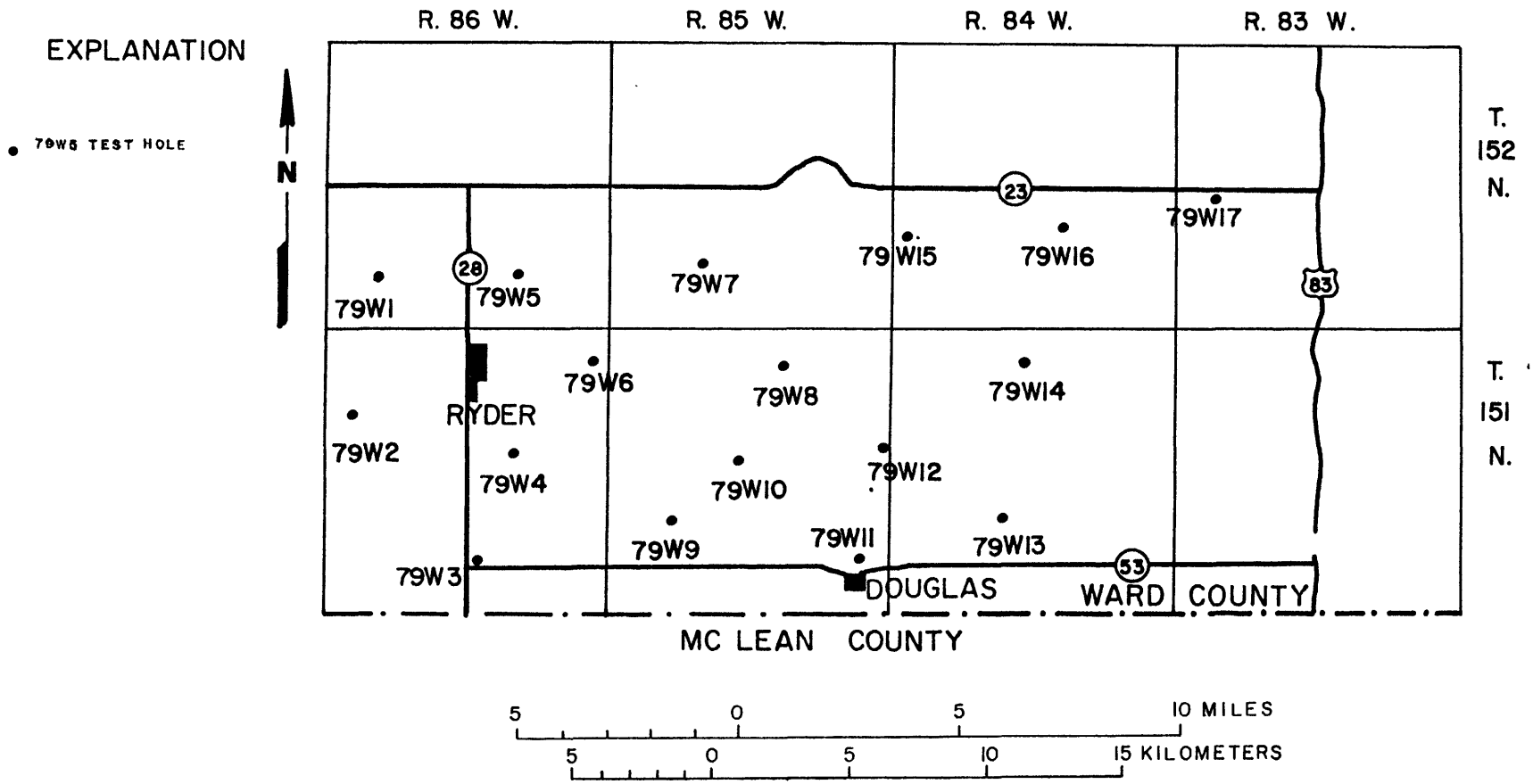


Figure 2.--Drill-hole locations in Area A, Ward County, N. Dak.

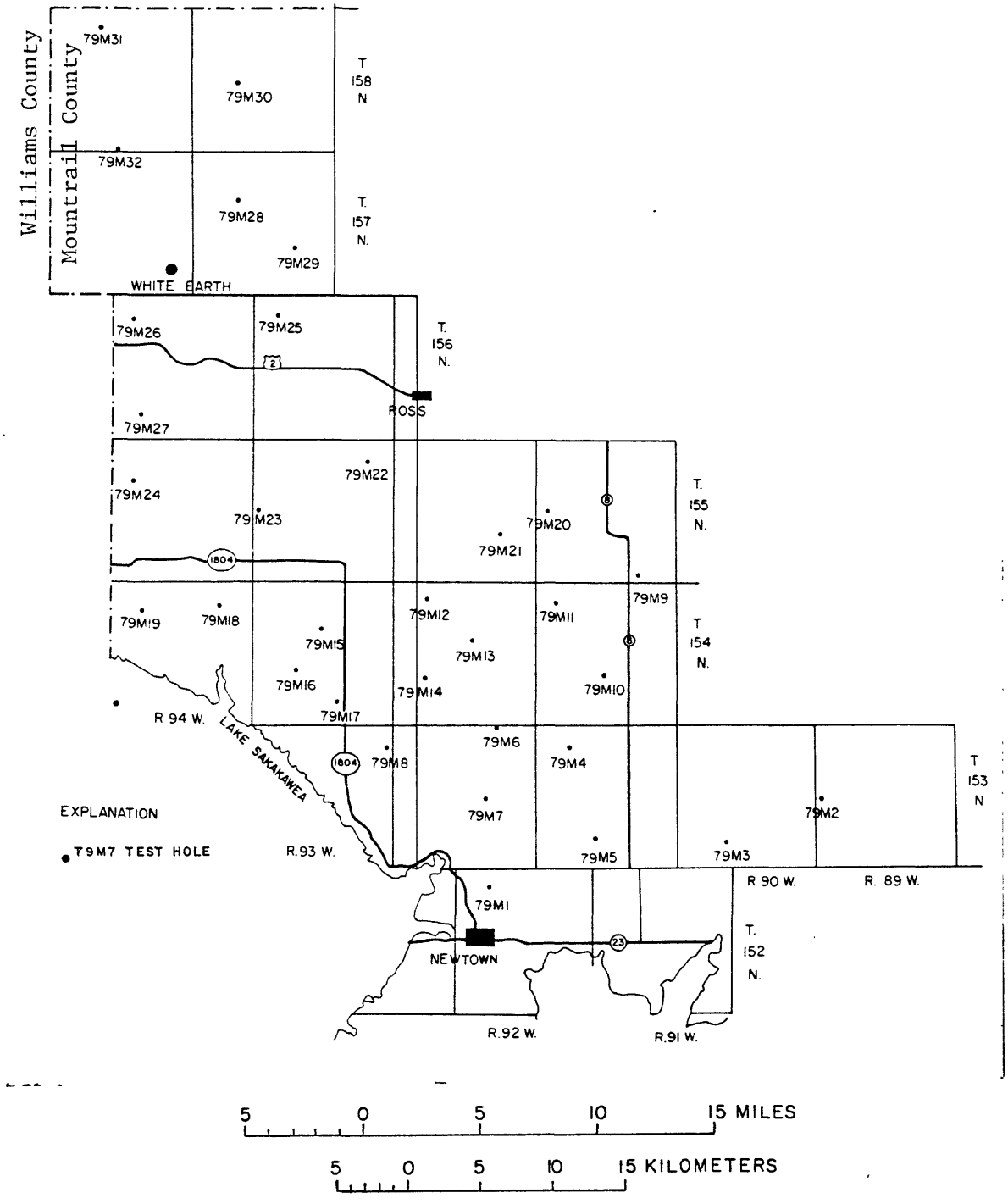


Figure 3.--Drill-hole locations in Area B, Mountrail County, N. Dak.

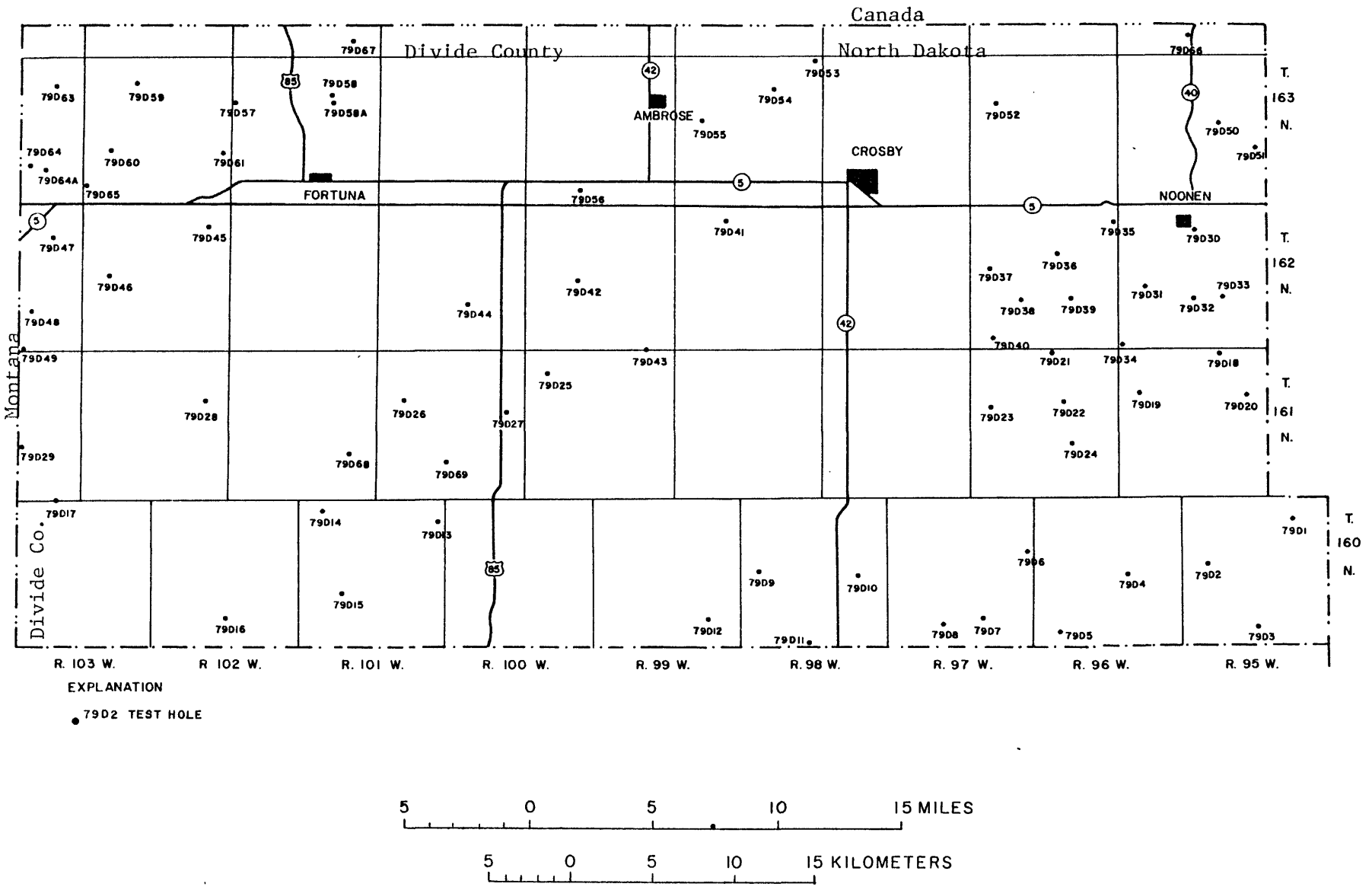


Figure 4.--Drill-hole locations in Area C, Divide County, N. Dak.

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W1 Map: No Topo Date: 6-26-79 State: ND County: Ward

Elev.: 2103 feet Location: T. 152 N, R. 86 W, Sec. 32, Tract: baaa Drilled depth: 523 feet

Measured: 20 ft. FNL, 2600 ft FWL, Hole size: 4-3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 297-302; 328-330; 401-406; 490-492

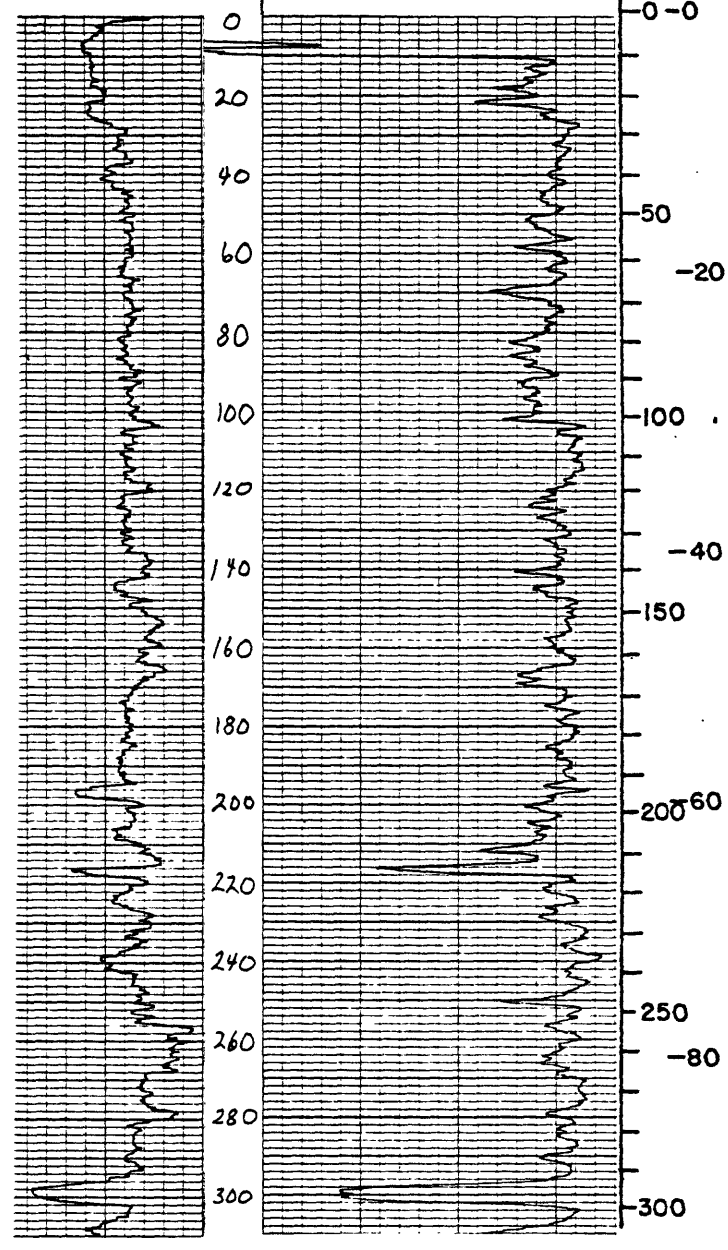
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 17	Gravel, brown, sandy
17- 20	Gravel, brown
20- 50	Till, gray, silty
50- 90	Till, brown, silty
90-135	Till, gray, silty
135-190	Claystone, grayish-brown, carbonaceous, silty
190-193	Lignite
193-203	Claystone, grayish-green
203-204	Lignite
204-207	Claystone, grayish-green, silty
207-208	Lignite
208-211	Claystone, grayish-green, carbonaceous
211-213	Lignite
213-245	Claystone, grayish-green, carbonaceous
245-247	Lignite
247-293	Claystone, grayish-green, carbonaceous
293-297	Lignite
297-320	Siltstone, grayish-green, carbonaceous, sandy

Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 523 feet

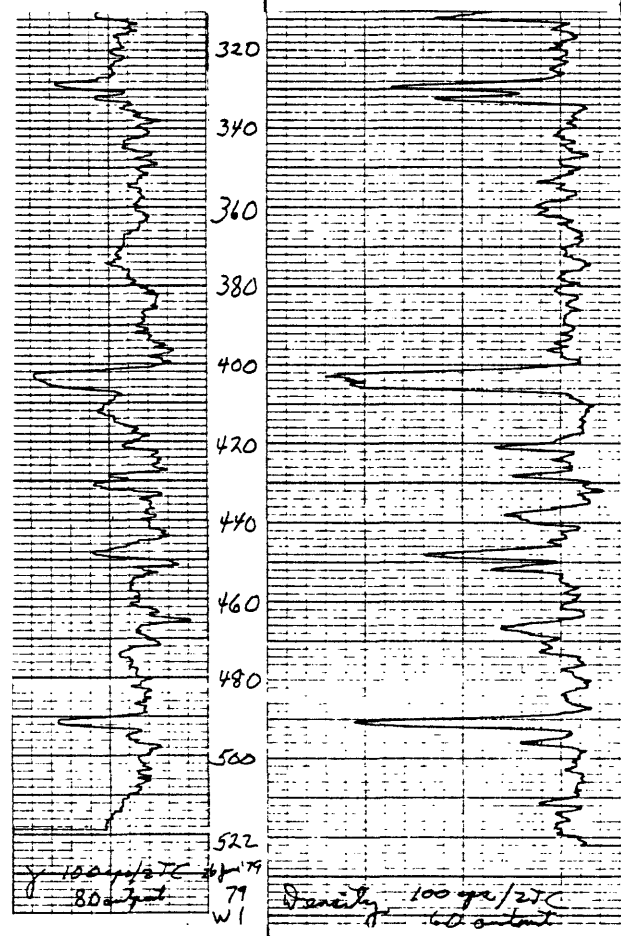
Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 523 feet

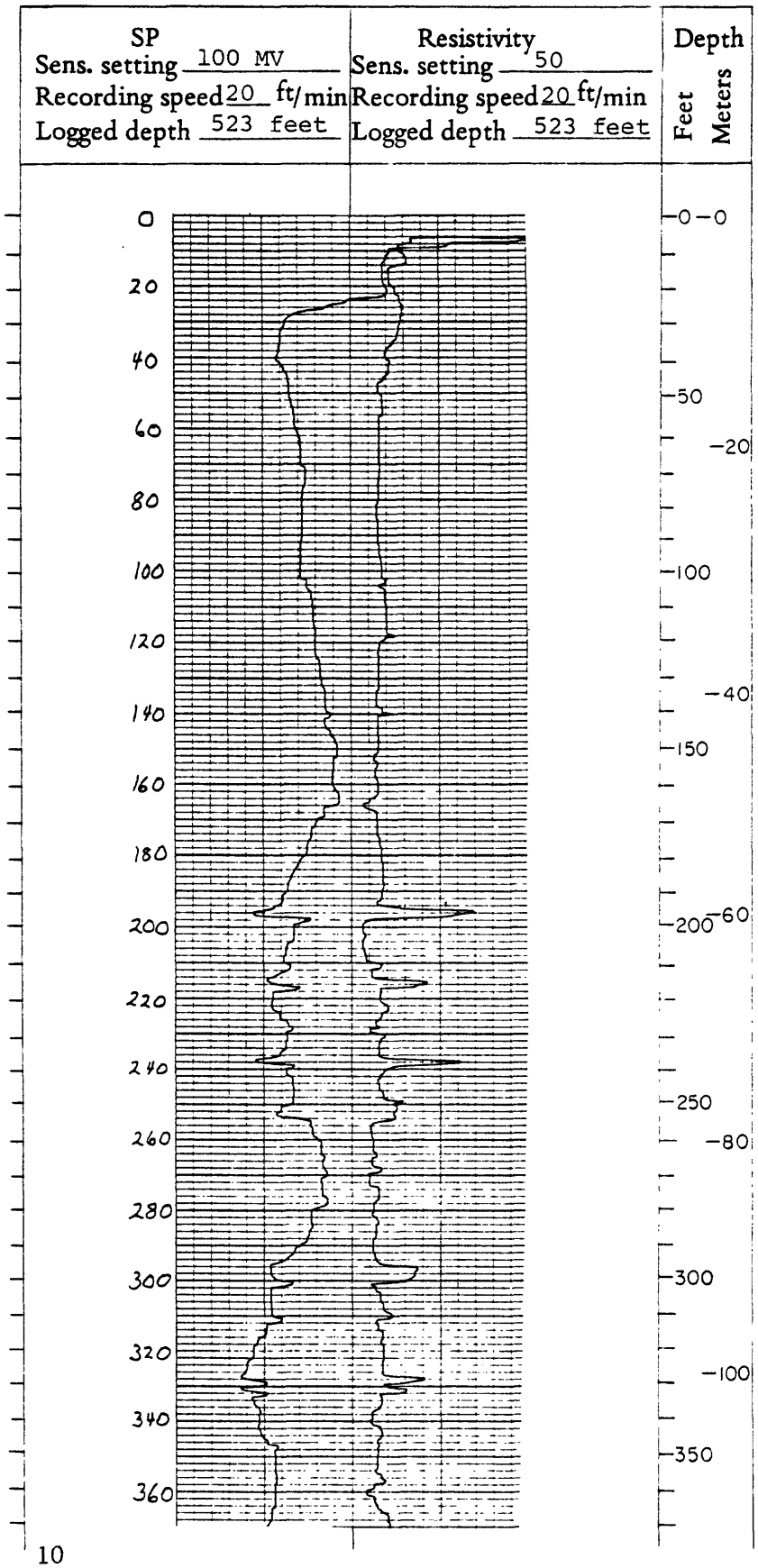


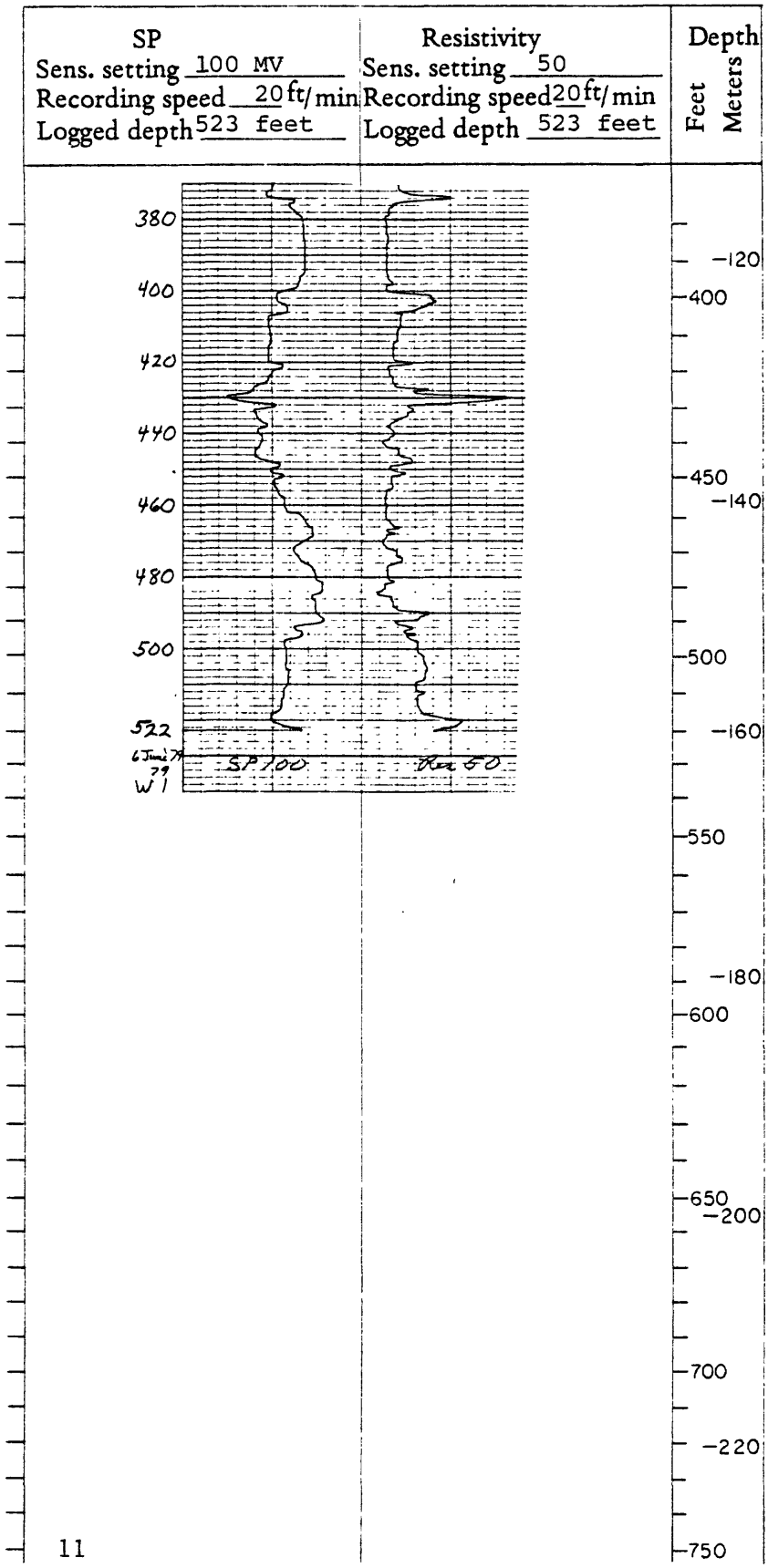
Hole number—continued

79 W1

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 523 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 523 feet	Depth Feet / Meters
320-330	Lignite			
330-340	Claystone, grayish-brown, silty			
340-345	Siltstone, grayish-brown, clayey			
345-377	Claystone, grayish-green, silty			
377-380	Lignite			
380-397	Claystone, grayish-brown, carbonaceous			
397-405	Lignite			
405-420	Sandstone, grayish-green, medium grained silty			
420-520	Claystone, grayish-brown, carbonaceous			




SP
Sens. setting 100 MV
Recording speed 20 ft/min
Logged depth 523 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 523 feet
Depth
Feet
Meters
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
0
50
100
150
200
250
300
350
0
20
40
60
80
100


SP
Sens. setting 100 MV
Recording speed 20 ft/min
Logged depth 523 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 523 feet
Depth
Feet
Meters
380
400
420
440
460
480
500
522
6 June 79
W1
SP 100
Res 50
400
450
500
550
600
650
700
750
120
140
160
180
200
220

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W2 Map: No Topo Date: 6-21-79 State: ND County: Ward

Elev.: 2140 ft. Location: T. 151 N, R. 86 W, Sec. 7, Tract: dccc Drilled depth: 584 feet

Measured: 30 ft. FSL, 2586 ft FEL, Hole size: 4-3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 188-192; 226-228; 358-364; 375-380; 446-452; 484-486; 518-520; 554-559; 573-576

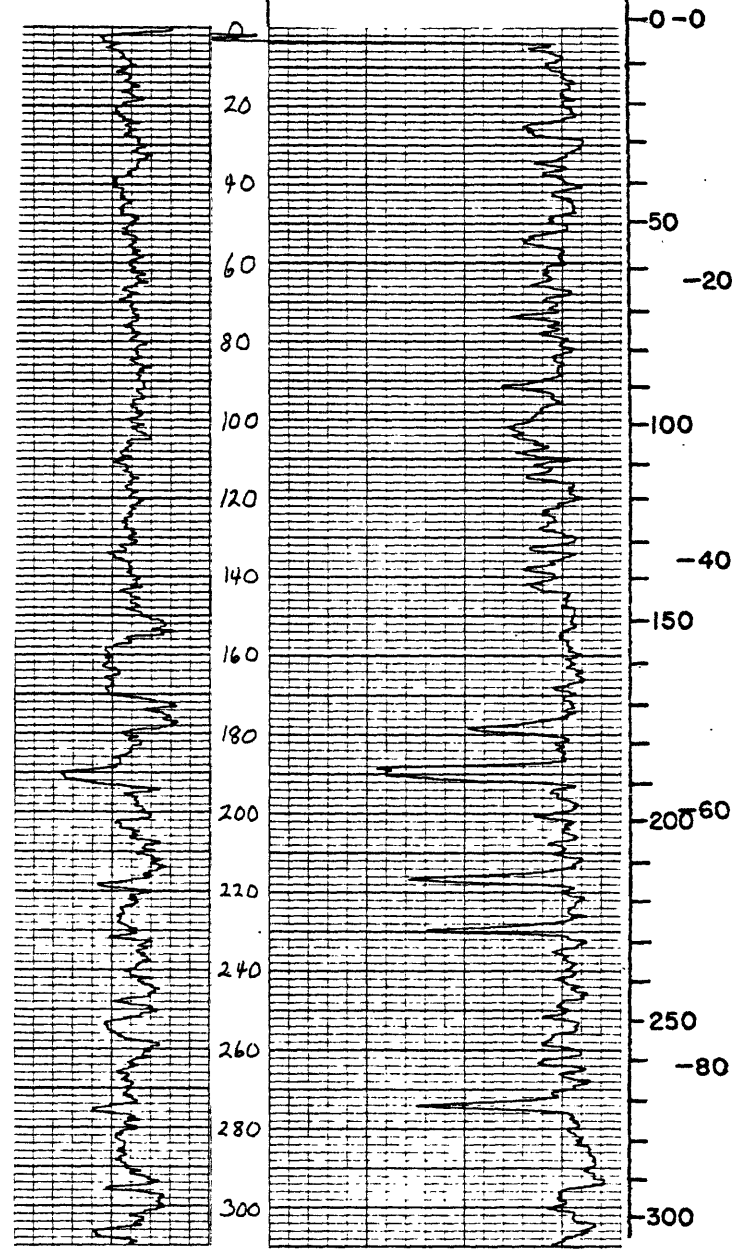
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 1	Gravel, brown, sandy
1- 7	Till, brown, sandy
7- 27	Till, brown, clayey, silty
27- 40	Till, gray, clayey, silty
40- 52	Till, gray, silty, clayey
52- 60	Till, brown, silty, clayey
60- 80	Till, brown, silty, clayey
80- 90	Till, brownish-gray, clayey, silty
90-103	Till, gray, clayey, silty
103-106	Gravel, brown, sandy
106-130	Till, gray, clayey, silty
130-131	Lignite
131-153	Till, gray, clayey, silty
153-167	Sandstone, bluish-green, very fine-grained, silty
167-174	Claystone, gray, carbonaceous
174-175	Lignite
175-180	Siltstone, bluish-green, clayey
180-182	Siltstone, bluish-green, clayey
182-184	Claystone, brownish-gray, carbonaceous
184-186	Lignite
186-200	Claystone, bluish-green, carbonaceous, silty
200-213	Claystone, bluish-green, carbonaceous, silty
213-215	Lignite
215-220	Sandstone, greenish-gray, fine-grained, silty
220-224	Siltstone, greenish-gray, clayey
224-225	Lignite
225-240	Claystone, grayish-brown, silty, carbonaceous

Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 580 ft.

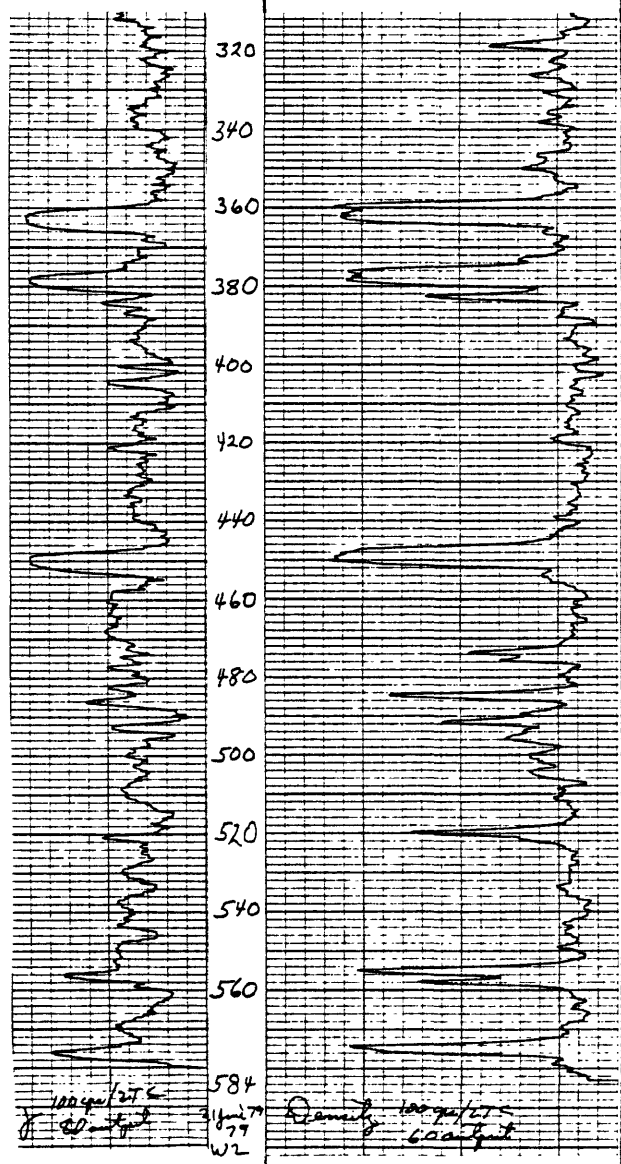
Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 584 ft.



Hole number—continued

79W2

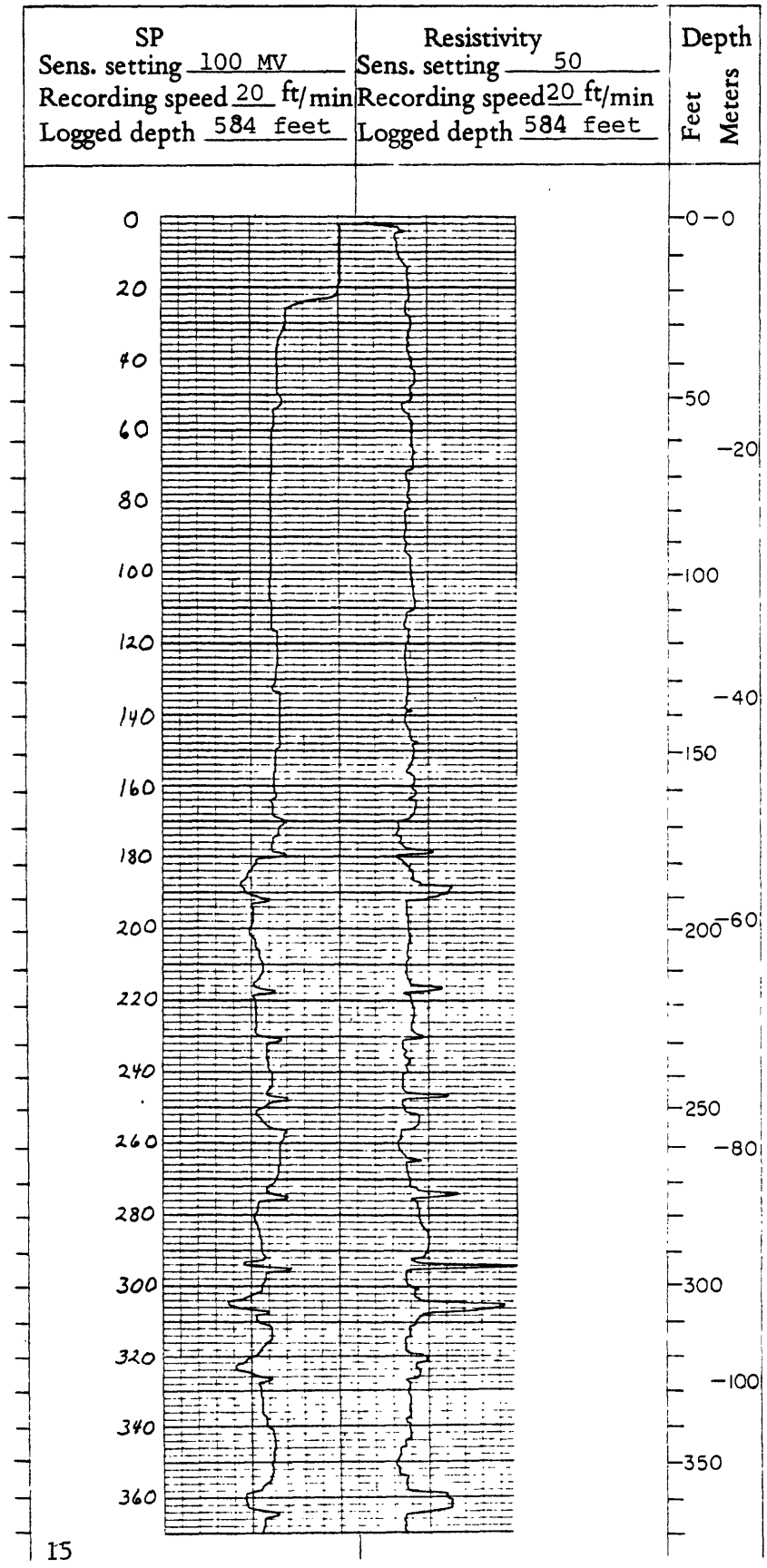
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 580 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 584 feet	Depth Feet / Meters
240-248	Claystone, grayish-brown, silty, carbonaceous			
248-253	Sandstone, greenish-blue, fine-grained, silty			
253-260	Claystone, grayish-brown, silty, carbonaceous			
260-273	Claystone, grayish-brown, silty, carbonaceous			
273-275	Lignite			
275-280	Claystone, brownish-gray, carbonaceous, silty			
280-287	Sandstone, blue-green, fine-grained, silty			
287-300	Claystone, brownish-gray, silty			
300-318	Sandstone, greenish-blue			
318-320	Claystone, grayish-brown, silty			
320-357	Claystone, grayish-brown, carbonaceous			
357-360	Lignite			
360-361	Lignite			
361-370	Siltstone, grayish-brown, carbonaceous, clayey			
370-381	Lignite			
381-385	Siltstone, grayish-brown, carbonaceous, clayey			
385-400	Claystone, grayish-brown, carbonaceous, silty			
400-415	Claystone, grayish-brown, carbonaceous, silty			
415-438	Siltstone, grayish-brown, carbonaceous			
438-443	Claystone, greenish-blue			
443-446	Lignite			
446-451	Claystone, greenish-blue, silty			
451-470	Siltstone, greenish-blue, sandy			
470-472	Lignite			
472-479	Siltstone, bluish-gray, sandy			

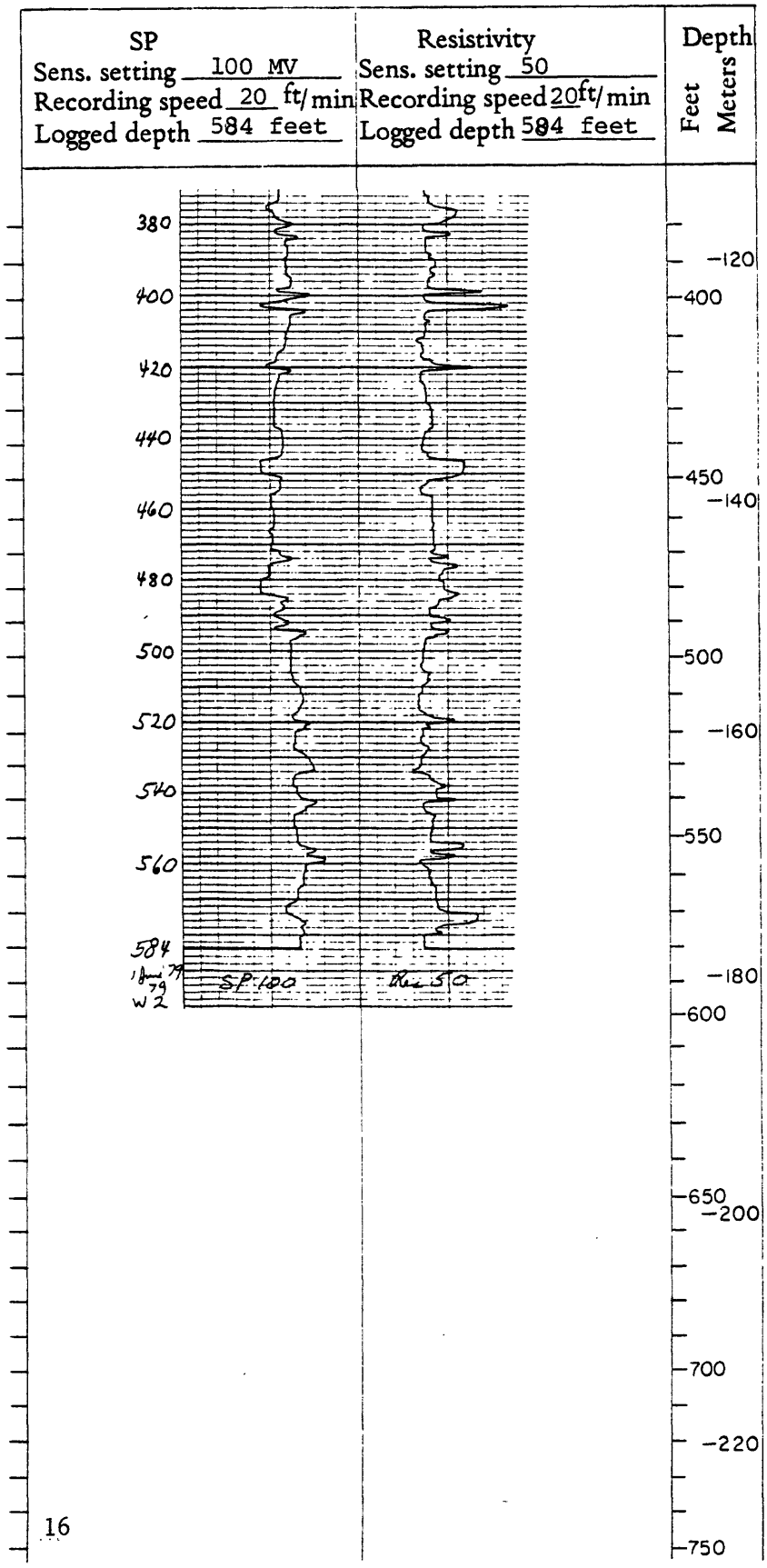


79W2 Hole number—continued

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 580 ft	Density T.C. 2 Range 100 Cps Recording speed 20 ft/min Logged depth 584 ft	Depth Feet Meters
479-481 Lignite 481-485 Siltstone, bluish-gray, clayey 485-516 Claystone, grayish-brown, carbonaceous, silty 516-518 Lignite 518-549 Claystone, grayish-brown, carbonaceous, silty 549-551 Lignite 551-580 Claystone, grayish-brown, carbonaceous, silty			

79W2 Hole number




SP
Sens. setting 100 MV
Recording speed 20 ft/min
Logged depth 584 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 584 feet
Depth
Feet
Meters
380
400
420
440
460
480
500
520
540
560
584
SP 100
Res 50
120
400
450
140
500
160
550
180
600
650
200
700
220
750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W3 Map: No Topo Date: 6-21-79 State: ND County: Ward

Elev.: 2140 feet Location: T. 151 N, R. 86 W, Sec. 22, Tract: cccb Drilled depth: 564 feet

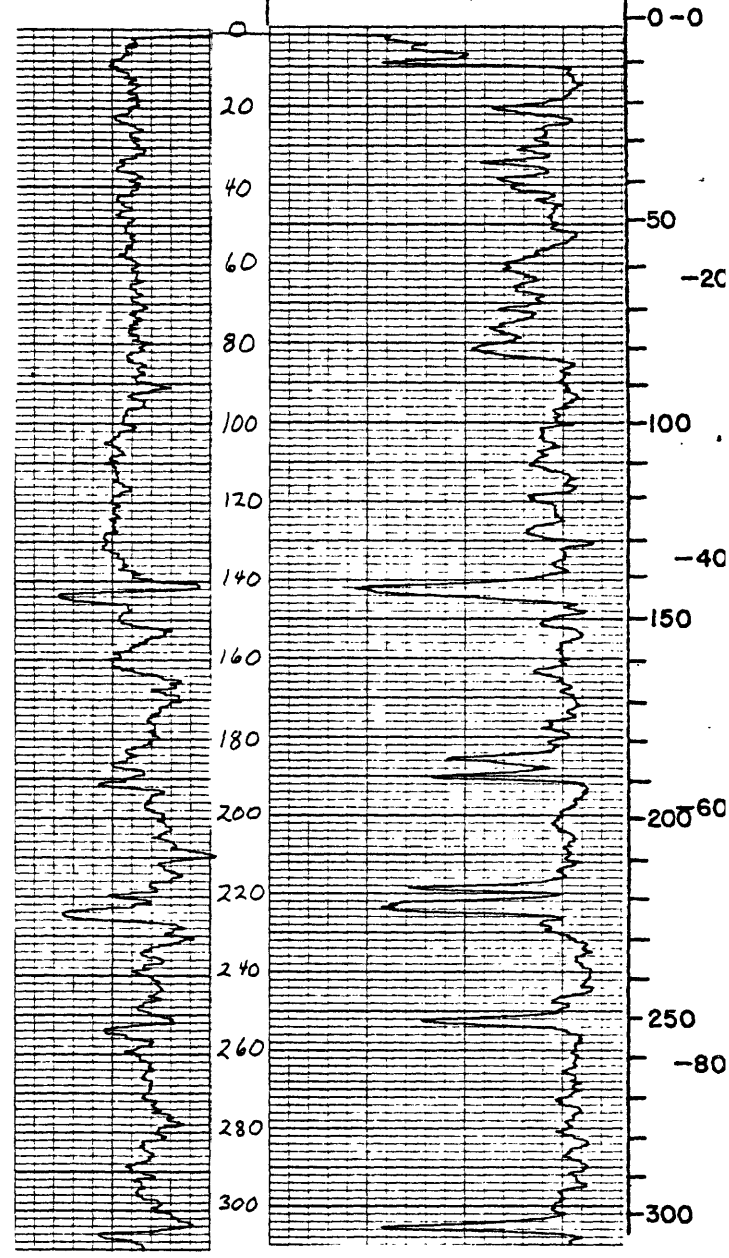
Measured: 471 FSL, 117 FWL, Hole size: 4-3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 140.5-144; 222-225; 252-254; 304-306; 390-402; 456-460

Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

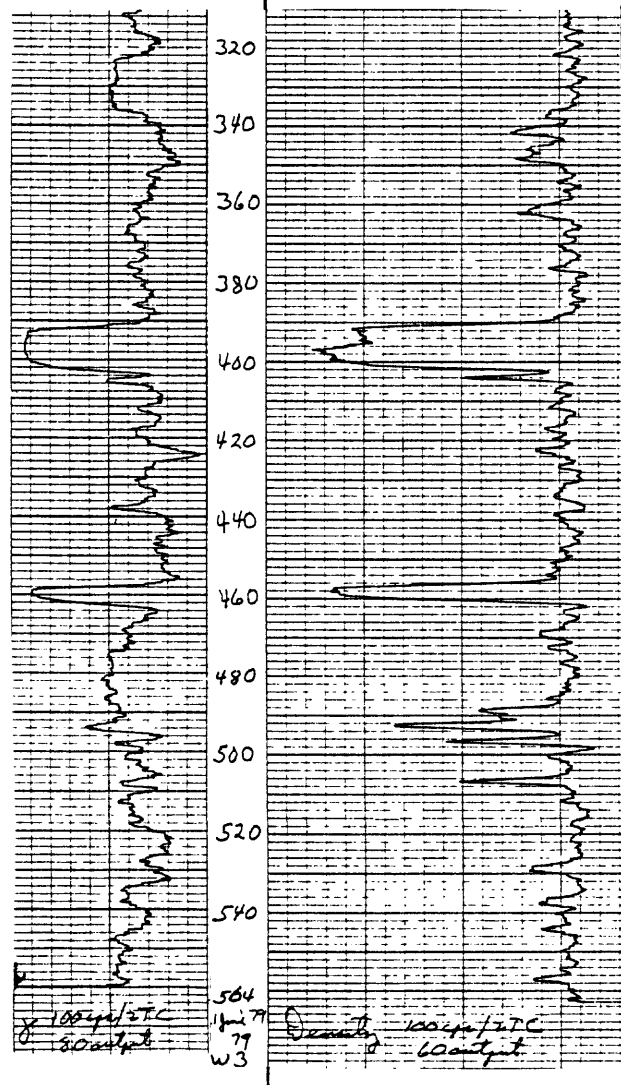
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 564 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 564 feet	Depth Feet	Depth Meters
0- 1	Silt, black			0	0
1- 44	Till, brown, sandy, clayey silty, gravelly			50	
44- 84	Till, gray, sandy, clayey, silty, gravelly				20
84- 86	Claystone, bluish-green,				
86-100	Claystone, gray, silty			100	
100-136	Sandstone, grayish-green, medium-grained, silty				40
136-139	Claystone, gray				
139-141	Lignite				
141-160	Sandstone, green, medium-grained, silty			150	
160-164	Claystone, brown				
164-169	Claystone, bluish-green				
169-183	Claystone, light-brown, silty				60
183-185	Lignite				
185-188	Claystone, brown, silty			200	
188-190	Lignite				
190-212	Claystone, grayish-brown, silty				
212-213	Claystone, dark-brown				
213-217	Claystone, grayish-brown				
217-218	Lignite				
218-220	Claystone, brown				
220-222	Lignite				
222-226	Claystone, brown				
226-239	Claystone, grayish-brown, sandy			250	
239-242	Lignite				
242-301	Claystone, light-brownish-gray, silty				80
				300	

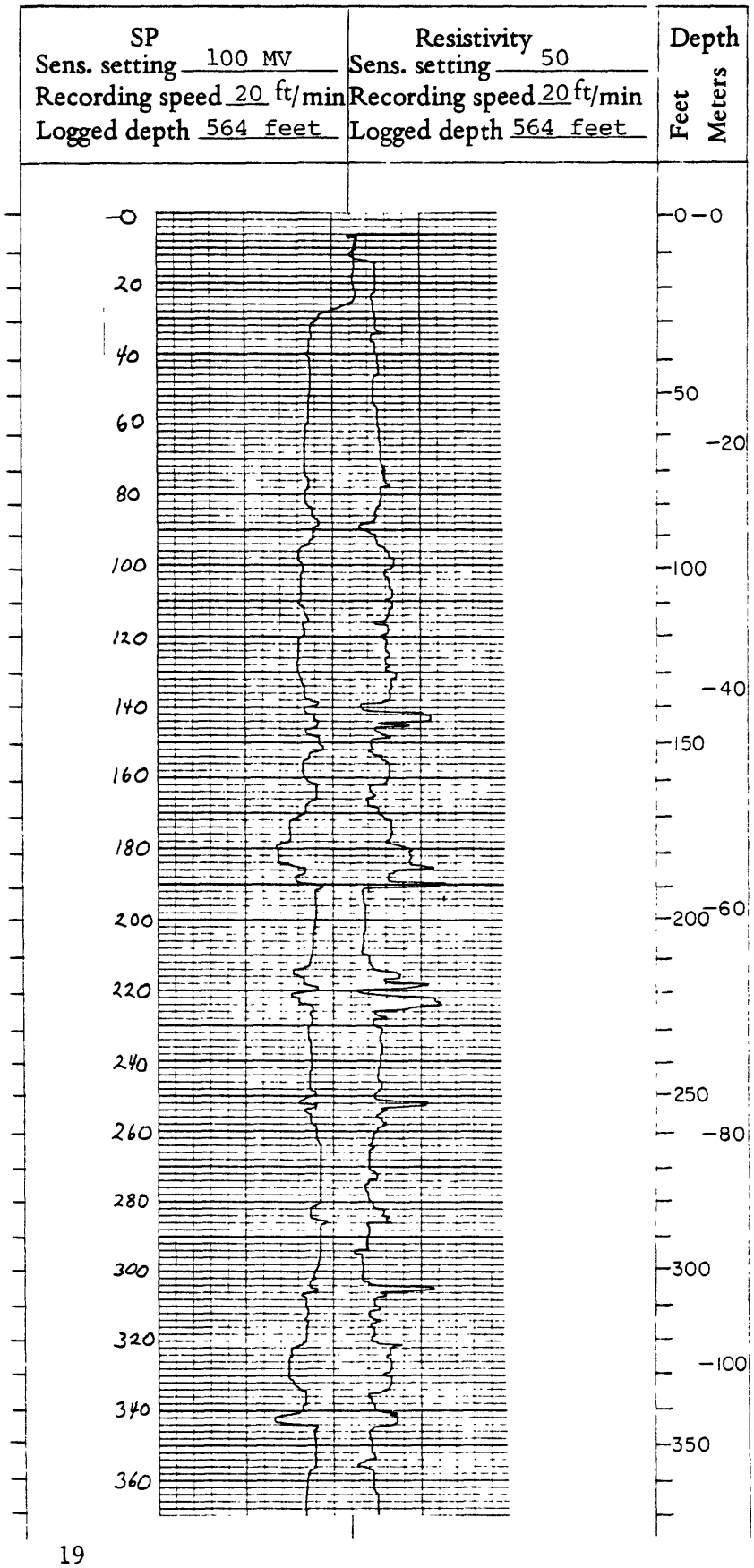


Hole number—continued

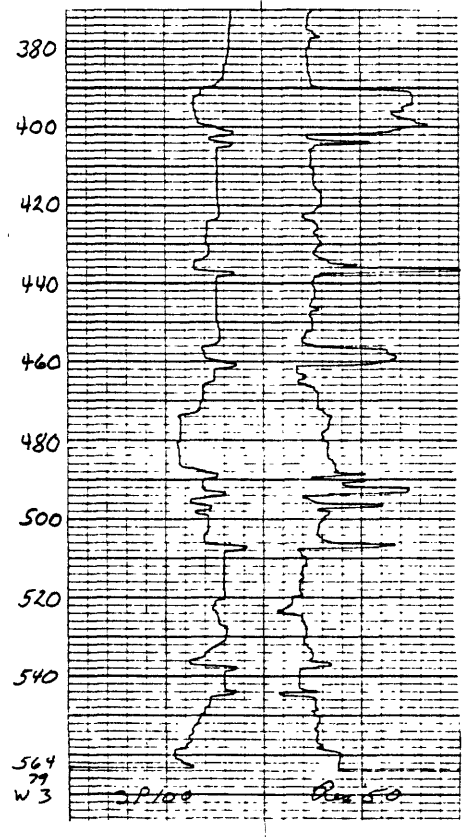
79W3

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 564 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 564 feet	Depth Feet / Meters
301-308	Siltstone, greenish-brown, clayey			300
308-322	Claystone, grayish-brown, silty			
322-343	Sandstone, grayish-green, medium-grained, clayey			100
343-362	Claystone, brown			350
362-384	Claystone, brown, silty			
384-388	Lignite			
388-394	Claystone, brown, silty			120
394-401	Lignite			
401-426	Claystone, brown			400
426-453	Claystone, gray			
453-456	Lignite			
456-463	Claystone, grayish-brown			
463-474	Claystone, brown			
474-486	Siltstone, greenish-gray, clayey			450
486-487	Claystone, dark-brown			140
487-488	Lignite			
488-491	Siltstone, grayish-green, clayey			
491-533	Claystone, grayish-brown, silty			500
533-536	Siltstone, grayish-green, clayey			160
536-542	Claystone, brown			
542-551	Claystone, green			550
551-560	Claystone, grayish-brown, silty			180
				600




SP
Sens. setting 100 MV
Recording speed 20 ft/min
Logged depth 564 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 564 feet
Depth
Feet
Meters
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
0
50
100
150
200
250
300
350
0
20
40
60
80
100

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 564 feet	Logged depth 564 feet	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W4 Map: No Topo Date: 6-20-79 State: ND County: Ward

Elev.: 2131 feet Location: T. 151 N, R. 86 W, Sec. 14, Tract: bcbb Drilled depth: 502 feet

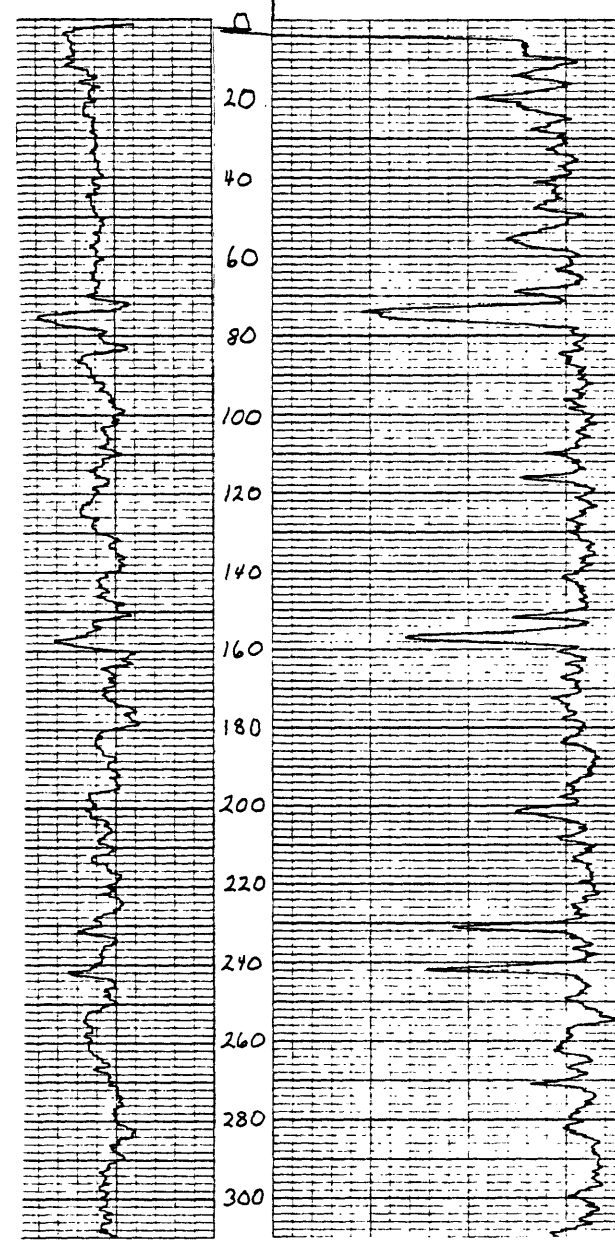
Measured: 1584 ft FNL, 22 ft FWL, Hole size: 4-3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 72-76; 230-232; 240-242; 326-332; 340-346; 410-413; 446-448

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

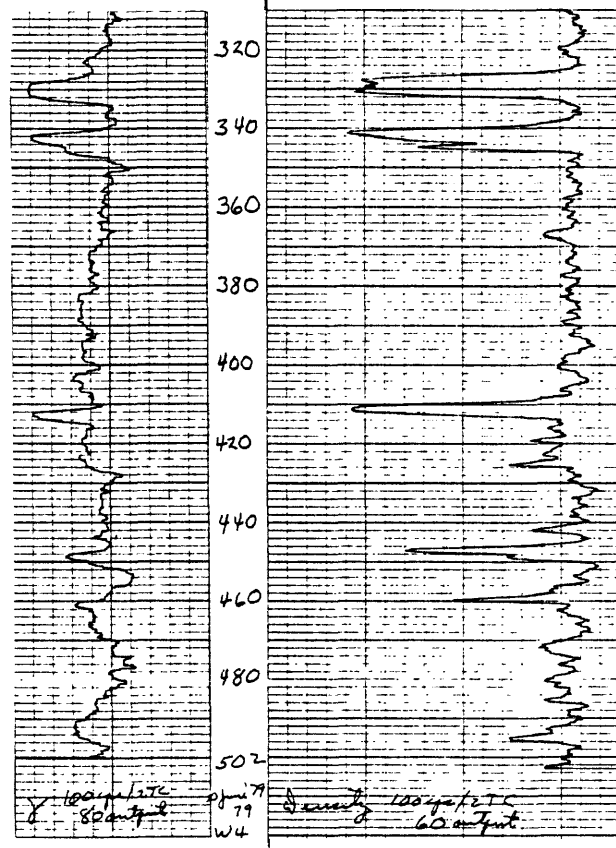
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 502 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 502 feet	Depth Feet	Depth Meters
0- 4	Gravel, brown			0	0
4- 12	Till, brown, gravelly				
12- 30	Till, gray, silty			20	
30- 40	Till, brown, silty				
40- 64	Till, gray, clayey			40	
64- 65	Lignite			50	
65- 68	Till, gray, clayey			60	20
68- 72	Lignite				
72- 96	Claystone, bluish-gray, silty			80	
96-102	Claystone, bluish-green				
102-106	Claystone, gray, carbonaeous			100	100
106-107	Lignite			120	
107-113	Claystone, gray, carbonaeous			140	40
113-126	Siltstone, grayish-blue, sandy			150	
126-140	Claystone, grayish-blue,			160	
140-152	Claystone, grayish-blue, carbonaeous			180	
152-153	Lignite				
153-160	Claystone, grayish-blue			200	200 60
160-178	Claystone, gray, silty				
178-180	Siltstone, gray			220	
180-189	Claystone, grayish-blue				
189-190	Claystone, bluish-green			240	
190-200	Sandstone, bluish-green, medium-grained, silty			250	
200-225	Claystone, grayish-blue silty			260	80
225-226	Lignite				
226-236	Claystone, grayish-blue, silty			280	
236-237	Lignite				
237-247	Claystone, gray			300	300
247-258	Sandstone, bluish-green, fine-grained, silty				



Hole number—continued

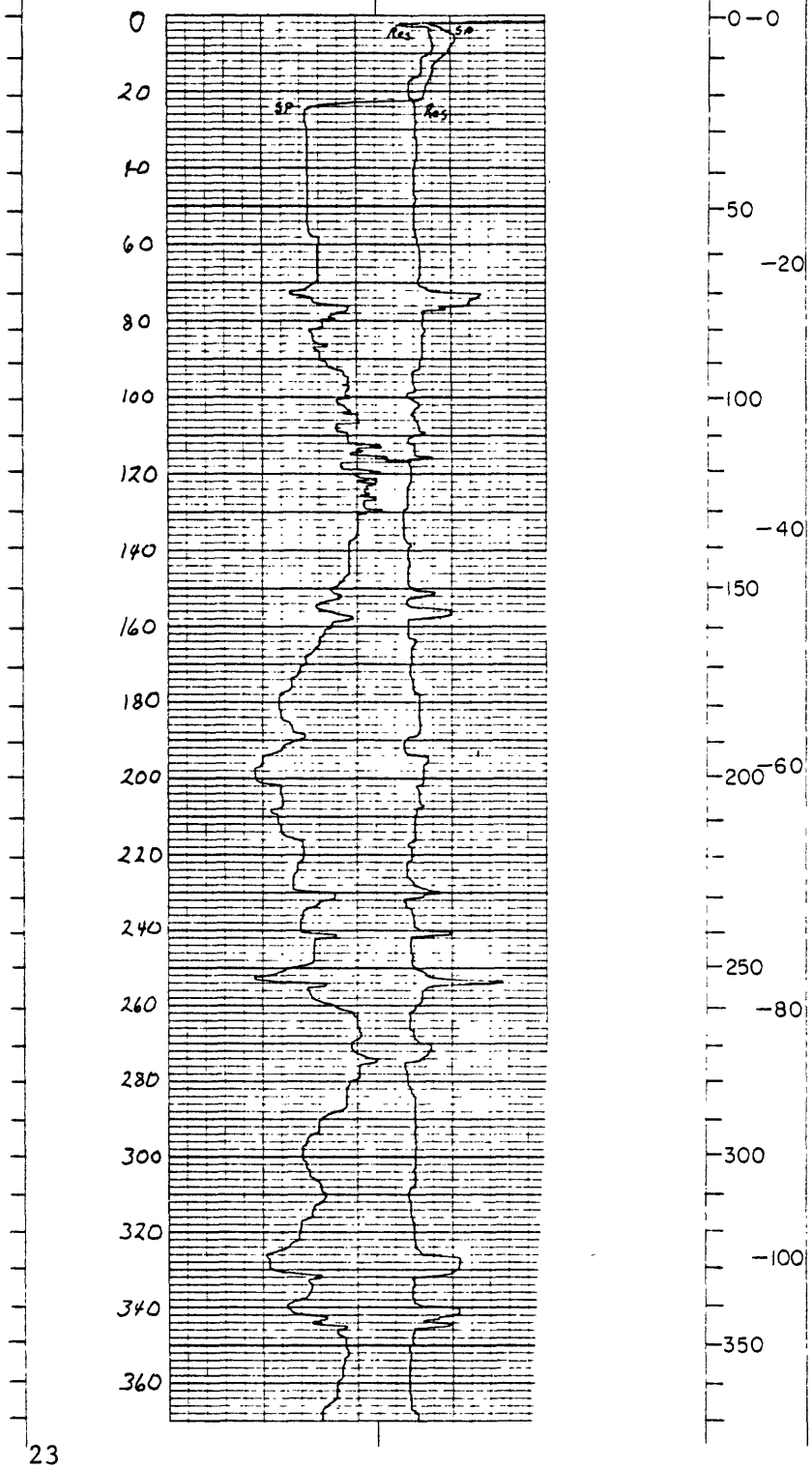
79W4

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 502 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 502 feet	Depth Feet / Meters
258-260	Claystone, bluish-green			300
260-265	Claystone, grayish-blue, carbonaceous			
265-267	Lignite			−100
267-280	Claystone, bluish-green			
280-322	Claystone, bluish-green, silty			350
322-326	Lignite			
326-335	Claystone, brownish-gray, carbonaceous			
335-346	Lignite			−120
346-366	Claystone, brownish-gray, carbonaceous			400
366-380	Claystone, brownish-gray, carbonaceous			
380-399	Siltstone, gray, carbonaceous, clayey			
399-400	Lignite			
400-409	Siltstone, grayish-blue, carbonaceous, clayey			450
409-411	Lignite			−140
411-435	Siltstone, grayish-brown, carbonaceous, clayey			
435-445	Claystone, grayish-brown, carbonaceous			500
445-450	Lignite			
450-480	Claystone, grayish-brown, carbonaceous, silty			−160
480-490	Siltstone, grayish-brown, clayey			
490-495	Claystone, grayish-brown, silty			550
495-500	Siltstone, grayish-brown, sandy			
				−180
				600

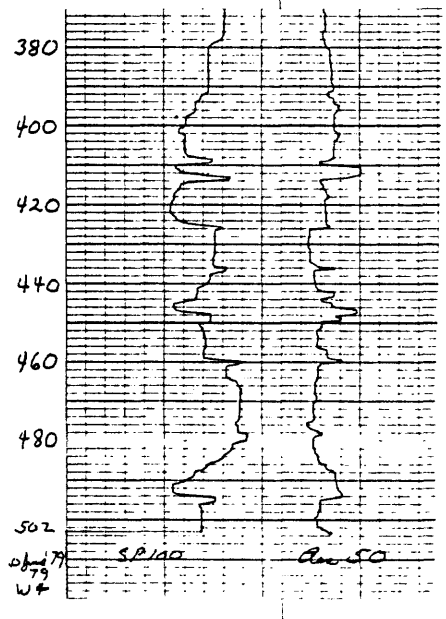


79W4 Hole number

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 502 feet	Logged depth 502 feet	



SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 502 feet	Logged depth 502 feet	



Feet: 400, 450, 500, 550, 600, 650, 700, 750
Meters: 120, 140, 160, 180, 200, 220

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W 5 Map: No Topo Date: 6-27-79 State: ND County: Ward

Elev.: 2129 feet Location: T. 152 N, R. 86 W, Sec. 26, Tract: cccb Drilled depth: 504 feet

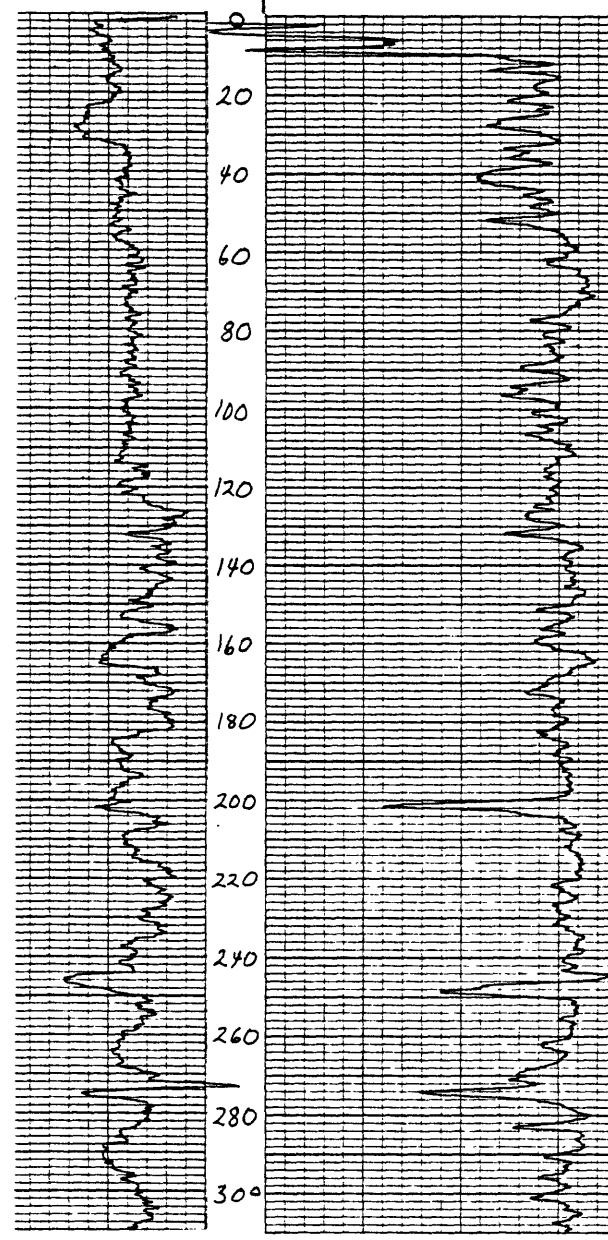
Measured: 459 ft. FSL, 15 ft. FWL, Hole size: 4-3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 200-202; 369-372; 402-406.5; 470-473

Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

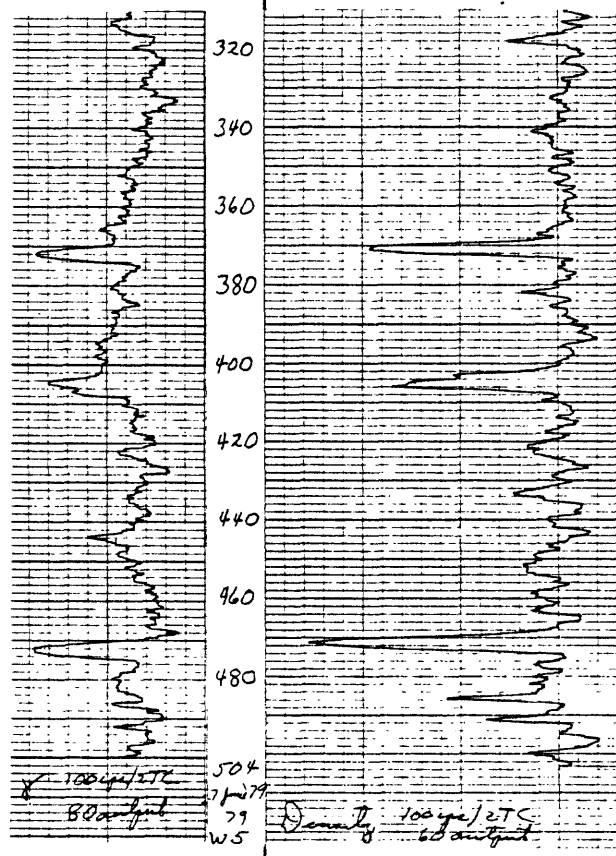
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 504 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 503 feet	Depth Feet	Depth Meters
0- 12	Gravel, brown, sandy			0	0
12- 19	Till, brown, silty				
19- 41	Gravel, brown				
41- 54	Till, gray, silty, gravelly			20	
54- 72	Till, yellowish-brown, silty, gravelly			40	
72-102	Till, brown, silty, gravelly			50	
102-121	Till, gray, silty, gravelly			60	20
121-127	Claystone, gray			80	
127-129	Claystone, dark-brown				
129-132	Claystone, gray			100	100
132-140	Claystone, blue, silty				
140-145	Claystone, gray			120	
145-146	Claystone, brown, carbonaceous				40
146-148	Claystone, green			140	
148-157	Claystone, gray, silty				150
157-161	Sandstone, grayish-white, fine-grained			160	
161-165	Siltstone, gray, sandy				
165-174	Claystone, gray			180	
174-175	Claystone, brown, carbonaceous				
175-177	Claystone, gray			200	200 60
177-178	Claystone, brown, carbonaceous			220	
178-180	Claystone, gray				
180-197	Sandstone, brown, medium-grained, clayey			240	
197-198	Lignite				250
198-201	Claystone, brown, carbonaceous			260	80
201-214	Claystone, brown, silty			280	
214-217	Claystone, gray				
217-237	Claystone, gray, silty				
237-242	Claystone, gray			300	300



Hole number—continued

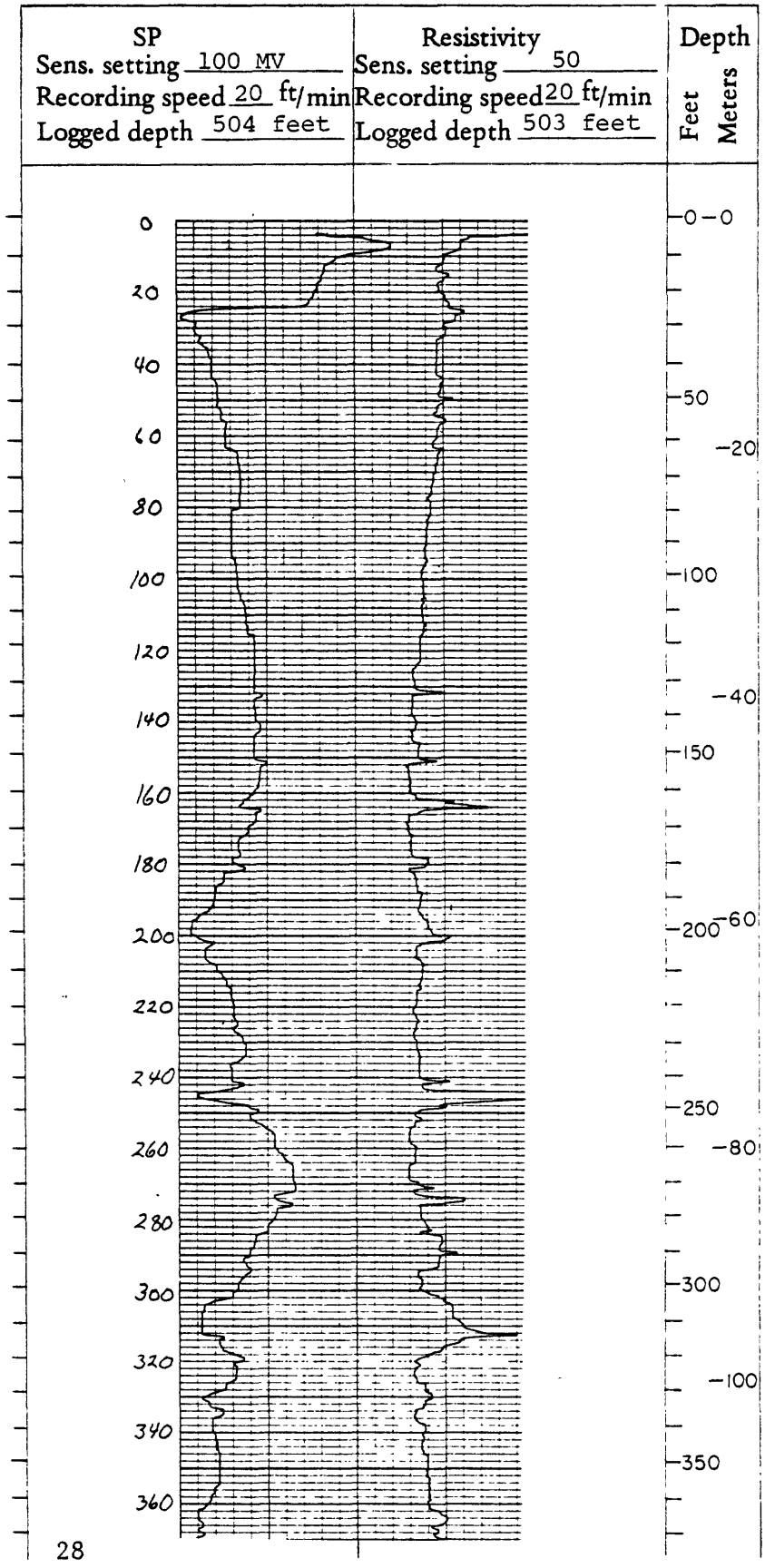
79 W5

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 504 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 504 feet	Depth Feet / Meters
242-243	Lignite			
243-246	Claystone, gray, silty			
246-248	Siltstone, gray, clayey			
248-256	Claystone, gray, silty			
256-262	Siltstone, gray, clayey			
262-269	Claystone, gray, silty			
269-272	Lignite			
272-276	Claystone, gray-brown, silty			
276-279	Claystone, brown			
279-280	Lignite			
280-282	Claystone, gray			
282-296	Sandstone, gray, medium-grained			
296-300	Claystone, brown			
300-314	Sandstone, gray, fine-grained			
314-317	Claystone, light-brown, silty			
317-318	Claystone, dark-brown, carbonaceous			
318-321	Claystone, light-grayish-green, silty			
321-326	Claystone, bluish-green			
326-329	Claystone, dark-brown			
329-335	Claystone, greenish-brown			
335-340	Claystone, brown			
340-355	Claystone, greenish-brown, small yellow inclusions			
355-363	Sandstone, greenish-gray, medium-grained			
363-368	Lignite			
368-374	Claystone, green, silty			
374-380	Siltstone, gray, sandy			
380-384	Lignite			
384-398	Sandstone, greenish-gray, medium-grained, silty			
398-407	Lignite			
407-408	Sandstone, greenish-gray, medium-grained, clayey			
408-419	Claystone, gray			
419-420	Sandstone, greenish-gray, medium-grained, clayey			
420-438	Claystone, gray, silty			
438-440	Siltstone, white			

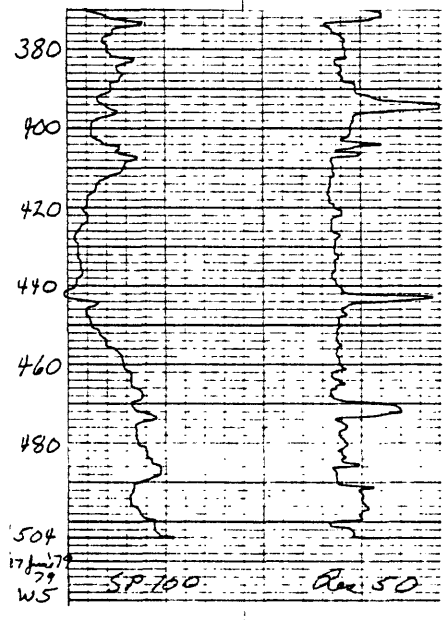


79W5 Hole number—continued

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 504	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 503	Depth Feet Meters
440-460 Claystone, grayish-brown, silty			
460-467 Lignite			
467-480 Claystone, brown, silty			
480-484 Lignite			
484-487 Claystone, brown			
487-496 Claystone, gray			
496-500 Claystone, brown			


SP
Sens. setting 100 MV
Recording speed 20 ft/min
Logged depth 504 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 503 feet
Depth
Feet
Meters
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
0
50
100
150
200
250
300
350
0
20
40
60
80
100

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 504 feet	Logged depth 504 feet	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750 Feet; 120, 140, 160, 180, 200, 220 Meters

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W6 Map: No Topo Date: 6-19-79 State: ND County: Ward

Elev.: 2144 feet Location: T. 151 N, R. 86 W, Sec. 6, Tract: ccdc Drilled depth: 522 feet

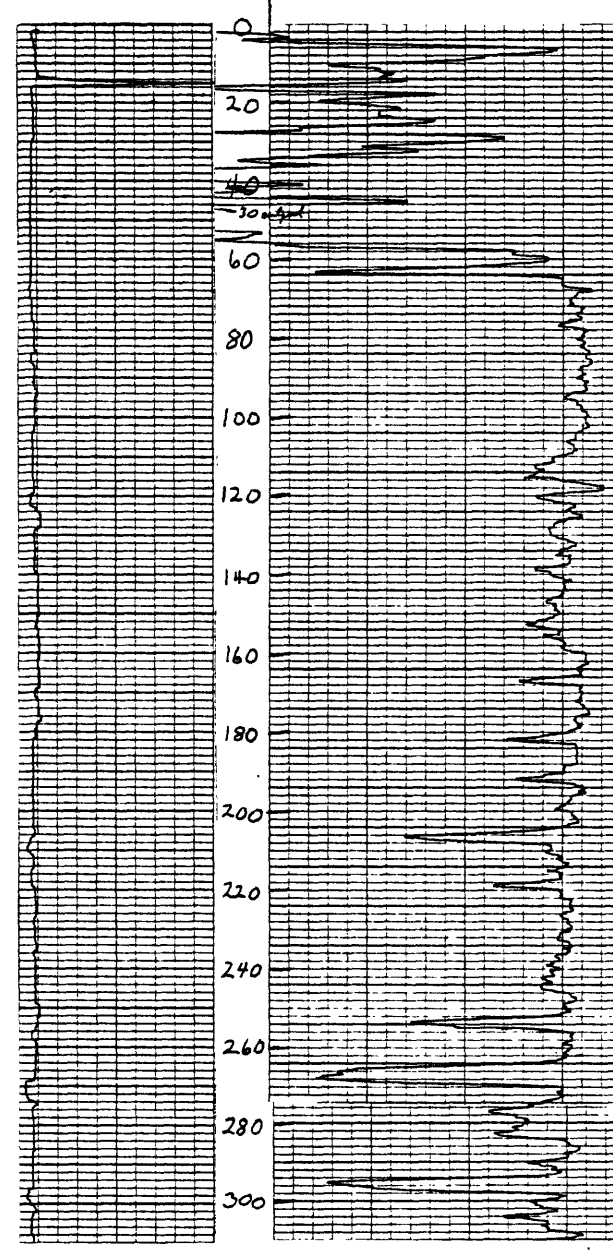
Measured: 34 ft. FSL, 756 ft FWL, Hole size: 4-3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 254-256; 266-270; 294-298; 356-360; 394-396; 476-482

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

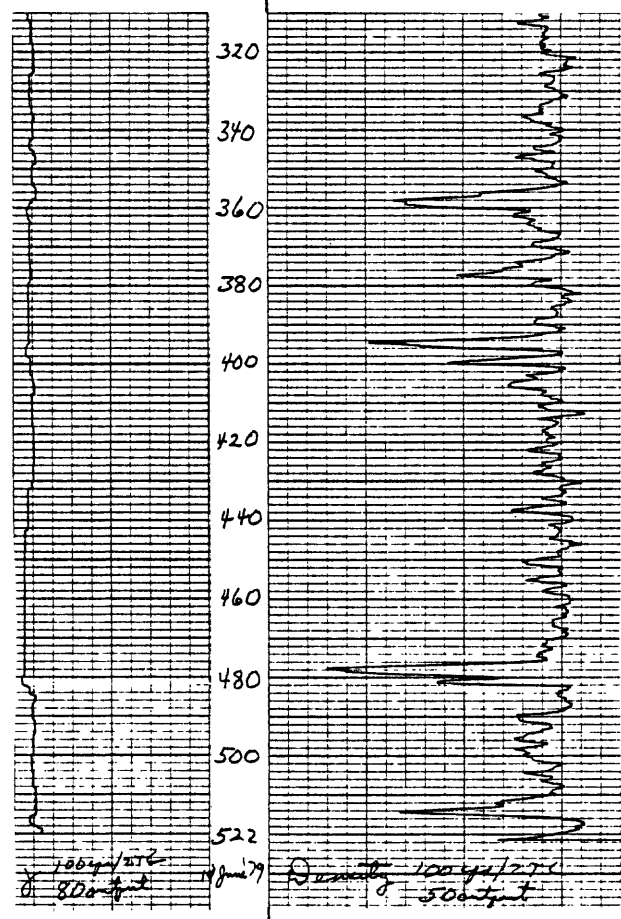
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 522 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 522 feet	Depth Feet	Depth Meters
0- 3	Gravel, brown, medium			0	0
3- 12	Till, brown, gravelly, silty				
12- 17	Till, brown, silty, clayey				
17- 51	Till, gray, clayey				
51- 63	Till, brown, clayey				
63- 67	Gravel, brown				
67- 73	Till, brownish-gray, clayey			50	
73- 92	Claystone, brownish-gray, clayey				20
92- 95	Claystone, gray				
95- 98	Claystone, bluish-green				
98-105	Siltstone, gray, clayey			100	
105-112	Claystone, gray				
112-115	Lignite				
115-130	Claystone, bluish-gray				
130-135	Siltstone, bluish-gray, clayey				40
135-152	Claystone, gray			150	
152-157	Claystone, bluish-green				
157-160	Sandstone, gray, fine-grained, silty				
160-166	Claystone, gray				
166-167	Lignite				
167-177	Claystone, gray			200	60
177-181	Claystone, bluish-green				
181-182	Lignite				
182-202	Siltstone, gray, clayey				
202-203	Lignite				
203-227	Claystone, gray				
227-237	Sandstone, bluish-green, fine-grained, silty			250	80
237-246	Claystone, gray				
246-250	Claystone, brownish-gray, carbonaceous				
250-253	Claystone, greenish-blue				
253-255	Lignite				
255-260	Claystone, greenish-blue			300	

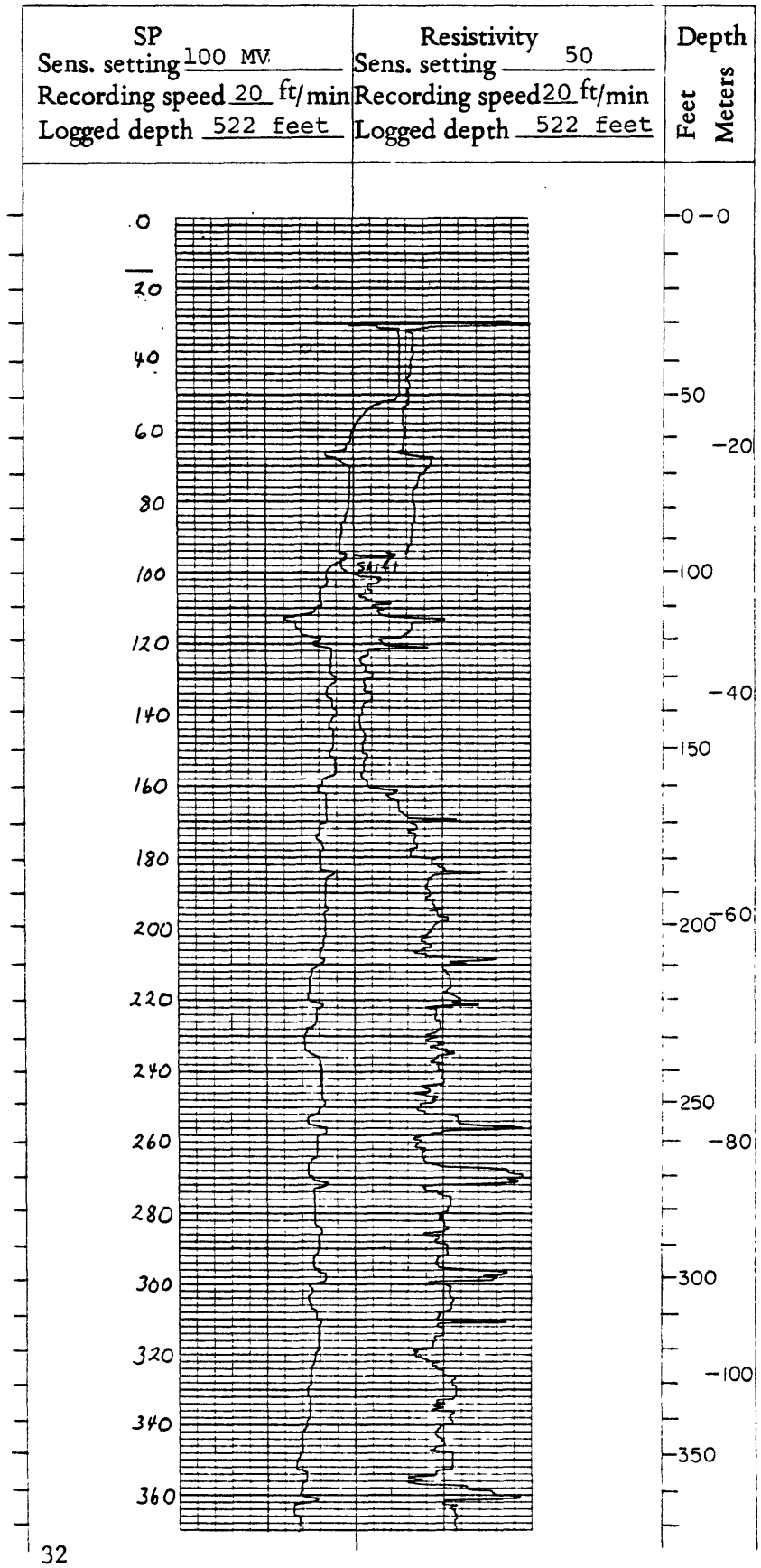


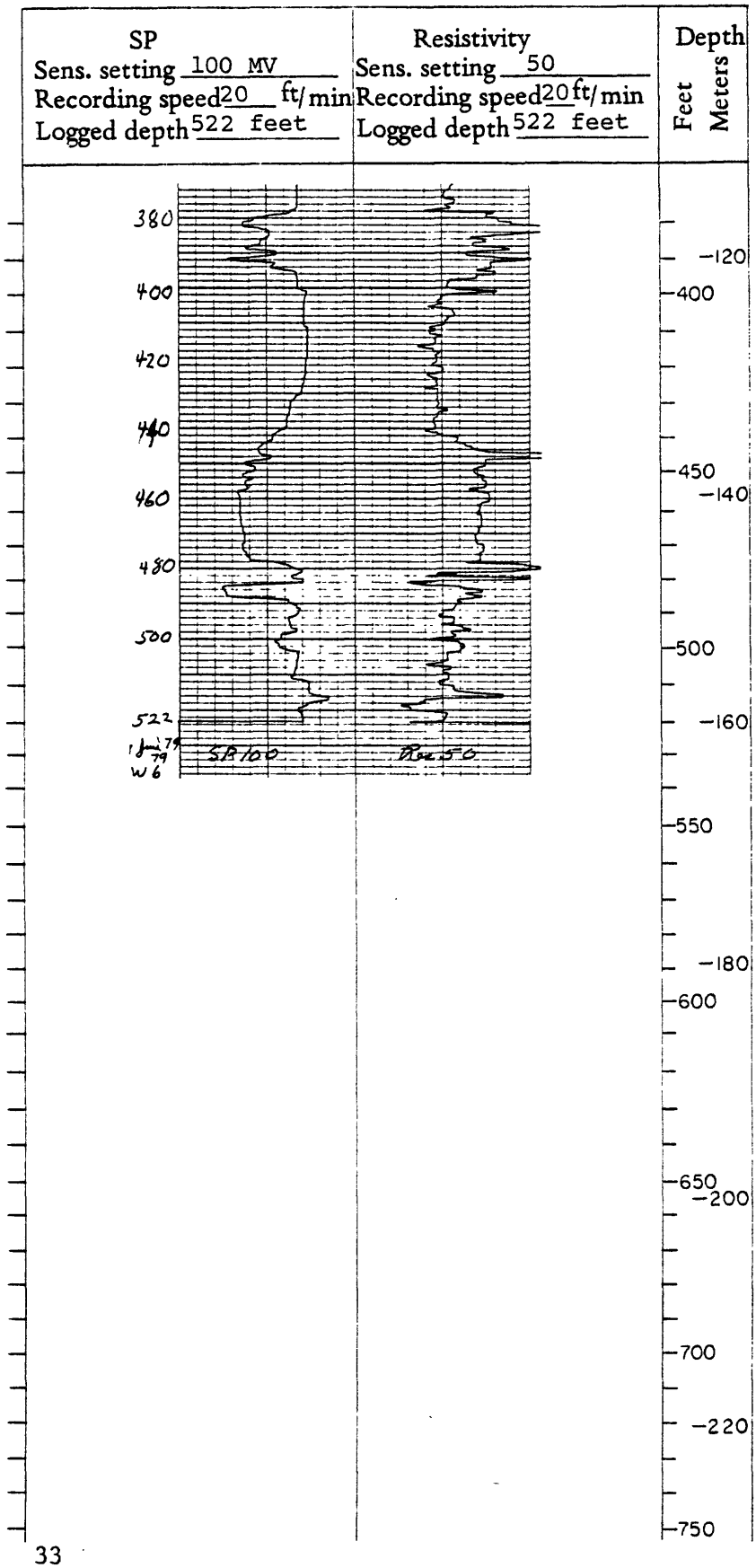
Hole number—continued

79W6

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 522 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 522 feet	Depth Feet / Meters
260-263	Claystone, gray			300
263-271	Lignite			
271-273	Claystone, greenish-blue			
273-280	Sandstone, greenish-blue, fine-grained, silty			100
280-293	Siltstone, greenish-blue, sandy			350
293-296	Lignite			
296-300	Claystone, greenish-blue			
300-320	Sandstone, greenish blue, fine-grained, silty			120
320-342	Siltstone, gray, clayey			400
342-353	Claystone, greenish-blue, silty			
353-359	Claystone, gray, carbonaceous			
359-360	Lignite			
360-379	Claystone, gray, carbonaceous			450
379-380	Lignite			140
380-397	Claystone, gray, carbonaceous			
397-400	Lignite			
400-420	Claystone, gray			
420-440	Claystone, greenish-blue			500
440-450	Claystone, greenish-blue, silty			
450-473	Siltstone, greenish-blue, sandy			160
473-480	Lignite			
480-500	Siltstone, greenish-blue, sandy, carbonaceous			550
500-516	Claystone, greenish-blue, silty, carbonaceous			
516-518	Lignite			
518-520	Claystone, greenish-blue, carbonaceous			180 600




SP
Sens. setting 100 MV
Recording speed 20 ft/min
Logged depth 522 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 522 feet
Depth
Feet
Meters
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
0
50
100
150
200
250
300
350
20
40
60
80
100


SP
Sens. setting 100 MV
Recording speed 20 ft/min
Logged depth 522 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 522 feet
Depth
Feet
Meters
380
400
420
440
460
480
500
522
SP 100
Res 50
120
400
450
140
500
160
550
180
600
650
200
700
220
750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W7 Map: No Topo Date: 6-19-79 State: ND County: Ward

Elev.: 2106 feet Location: T. 152 N, R. 85 W, Sec. 28, Tract: cbbb Drilled depth: 522 feet

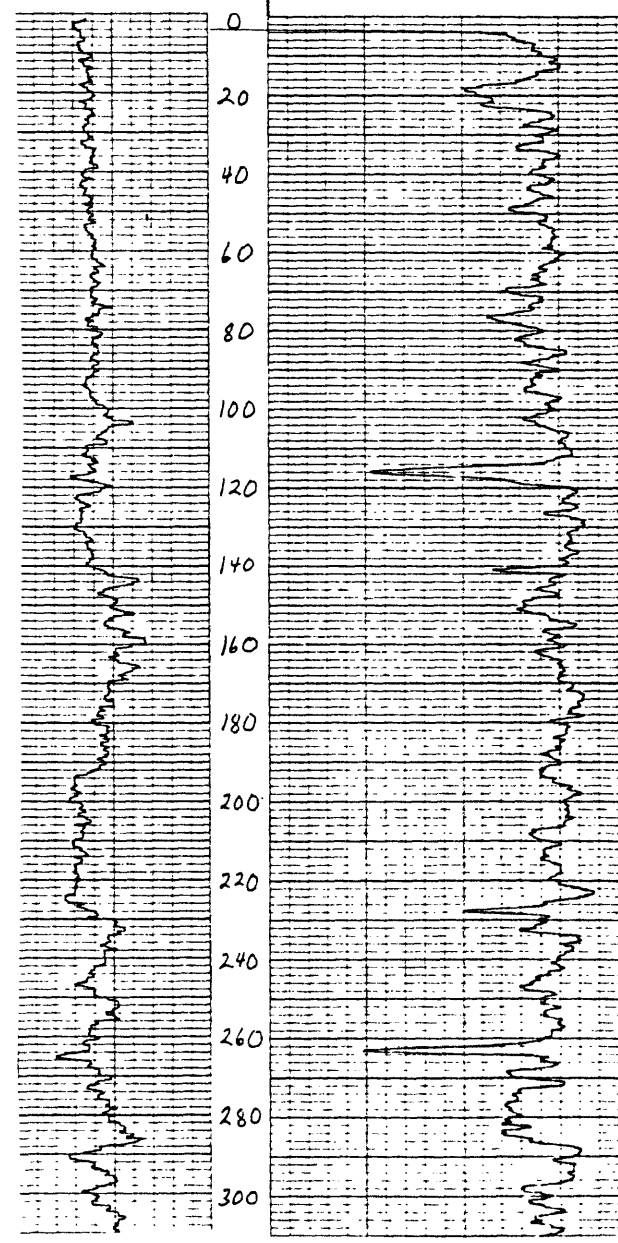
Measured: 2552 ft. FSL, 15 ft. FWL, Hole size: 4-3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 114-117; 262-264; 322-324; 445-449; 495-501

Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

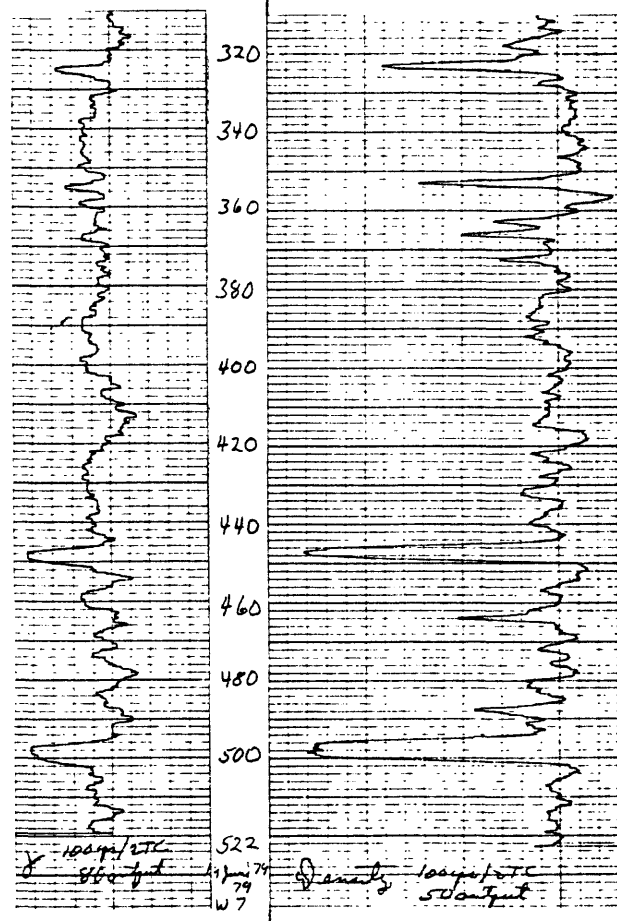
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 522 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 522 feet	Depth Feet	Depth Meters
0- 24	Till brown, sandy, silty, clayey, gravelly			0	0
24- 62	Till gray, sandy, silty, clayey, gravelly			20	
62- 97	Till brown, sandy, silty, clayey, gravelly			40	
97-112	Claystone, light-blue			50	
112-118	Lignite			60	20
118-121	Claystone, light-blue			80	
121-132	Sandstone, light-blue, medium grained, clayey			100	
132-135	Claystone, light-blue, sandy			120	
135-136	Claystone, dark-brown, sandy			140	40
136-137	Lignite			150	
137-142	Claystone, brown, silty			160	
142-147	Claystone, gray			180	
147-150	Claystone, dark-brown			200	60
150-166	Claystone, bluish-green, sandy			220	
166-182	Claystone, brown, silty			240	
182-187	Claystone, bluish-green, sandy			250	
187-191	Claystone, brown, silty			260	80
191-201	Claystone, bluish-green, sandy			280	
201-222	Sandstone, bluish-green, medium-grained			300	
222-223	Claystone, dark-brown				
223-224	Lignite				
224-240	Claystone, brown, silty				
240-247	Sandstone, gray, medium-grained, silty				
247-254	Claystone, brown				
254-257	Sandstone, brown, fine- to medium grained, clayey				
257-260	Claystone, brown, sandy				
260-261	Lignite				

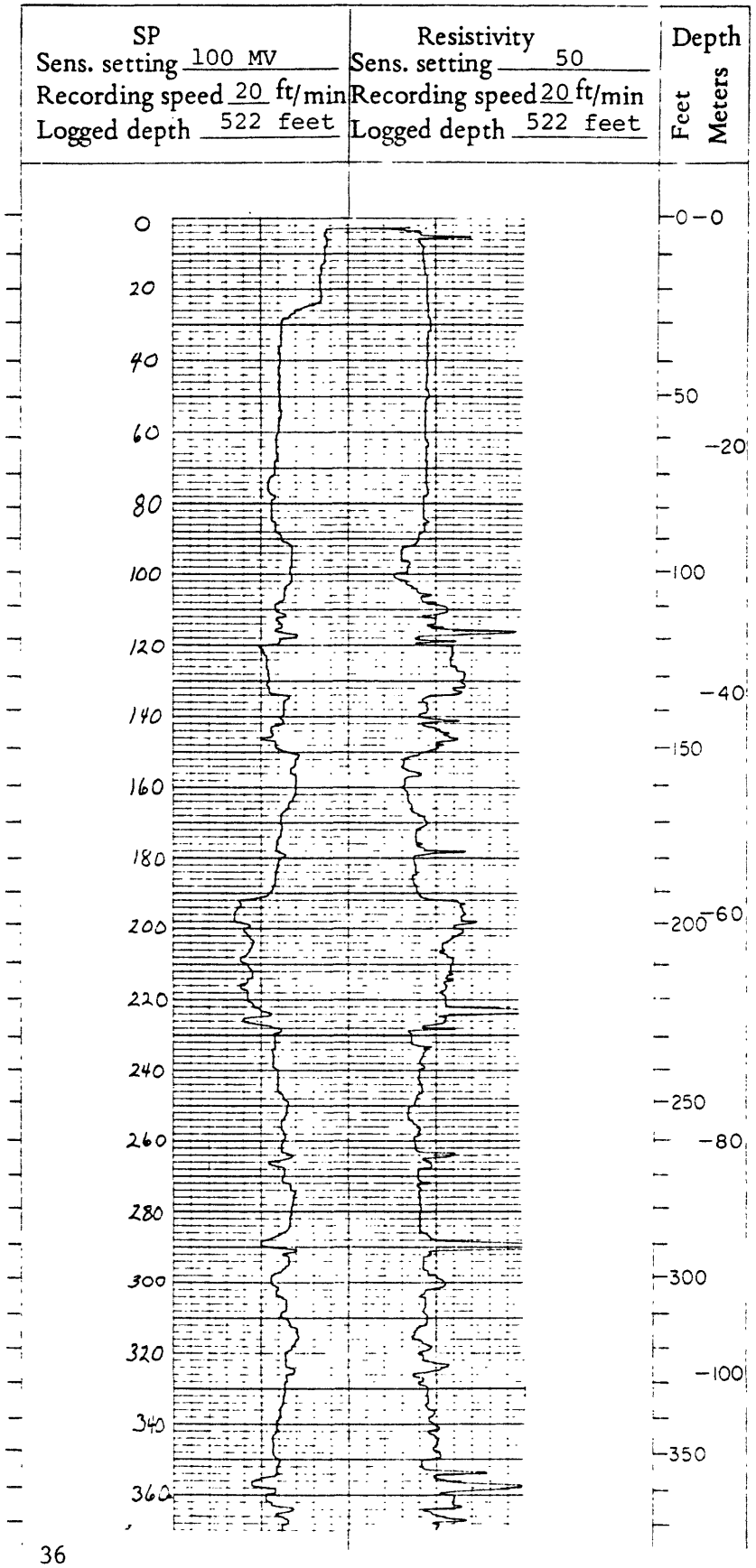


Hole number—continued

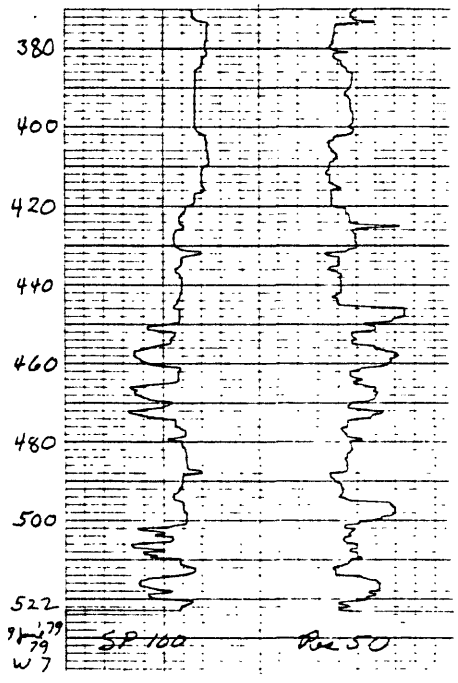
79W7

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 522 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 522 feet	Depth Feet / Meters
261-265	Sandstone, gray, medium-grained			
265-280	Claystone, gray, sandy silty			
280-288	Sandstone, gray, fine-to medium-grained, clayey			
288-312	Claystone, gray			
312-316	Claystone, dark-brown, lignitic			
316-320	Claystone, brown			
320-345	Claystone, gray, silty			
345-347	Sandstone, grayish-green, medium-grained			
347-360	Claystone, brown, sandy			
360-380	Claystone, grayish-green, sandy			
380-400	Sandstone, gray, medium-grained, clayey			
400-404	Claystone, gray, silty			
404-424	Claystone, bluish-green			
424-428	Sandstone, bluish-green, medium-grained			
428-441	Claystone, brown, silty			
441-444	Claystone, bluish-green, sandy			
444-446	Lignite			
446-493	Claystone, brown			
493-500	Lignite			
500-502	Claystone, brown			




SP
Sens. setting 100 MV
Recording speed 20 ft/min
Logged depth 522 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 522 feet
Depth
Feet
Meters
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
0
50
100
150
200
250
300
350
0
20
40
60
80
100

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 522 feet	Logged depth 522 feet	



Depth: 400, 450, 500, 550, 600, 650, 700, 750

Meters: 120, 140, 160, 180, 200, 220

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W8 Map: No Topo Date: 6-18-79 State: ND County: Ward

Elev.: 2110 ft. Location: T. 151 N, R. 85 W, Sec. 2, Tract: cbcc Drilled depth: 504 ft.

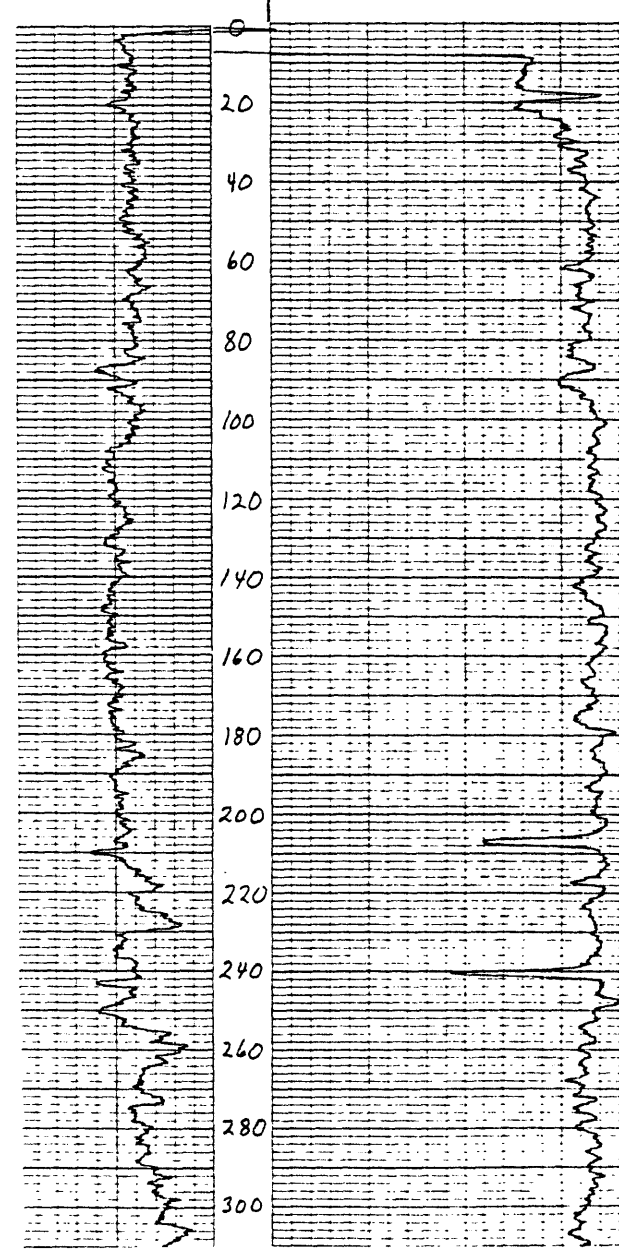
Measured: 1551 ft. FSL, 18 ft. FWL, Hole size: 4-3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 206-208; 348-353; 360-362; 374-376; 402-408; 446-450

Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

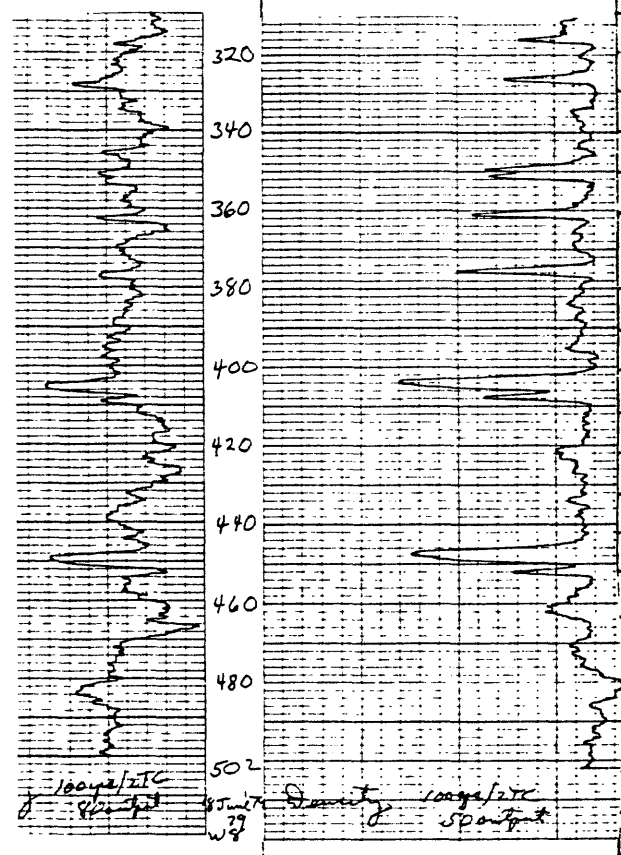
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 504 ft.	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 504 ft.	Depth Feet	Depth Meters
0- 27	Till, brown, silty, sandy, gravelly			0	0
27- 82	Till, gray, silty, sandy, gravelly, carbonaceous			50	20
82- 84	Gravel, brown				
84-107	Till, gray, silty, gravelly				
107-191	Sandstone, green, fine-grained				
191-200	Sandstone, green, medium-grained, silty				
200-212	Sandstone, green, medium-grained			100	40
212-216	Lignite				
216-239	Claystone, green				
239-240	Lignite				
240-270	Sandstone, green, fine-grained			150	60
270-274	Claystone, green, sandy				
274-275	Lignite				
275-280	Claystone, greenish-brown, sandy			200	80
280-300	Claystone, green, sandy			250	100

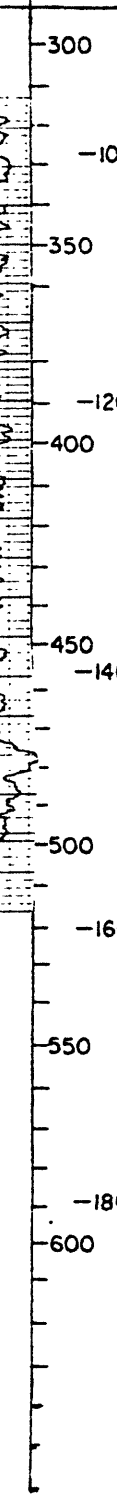


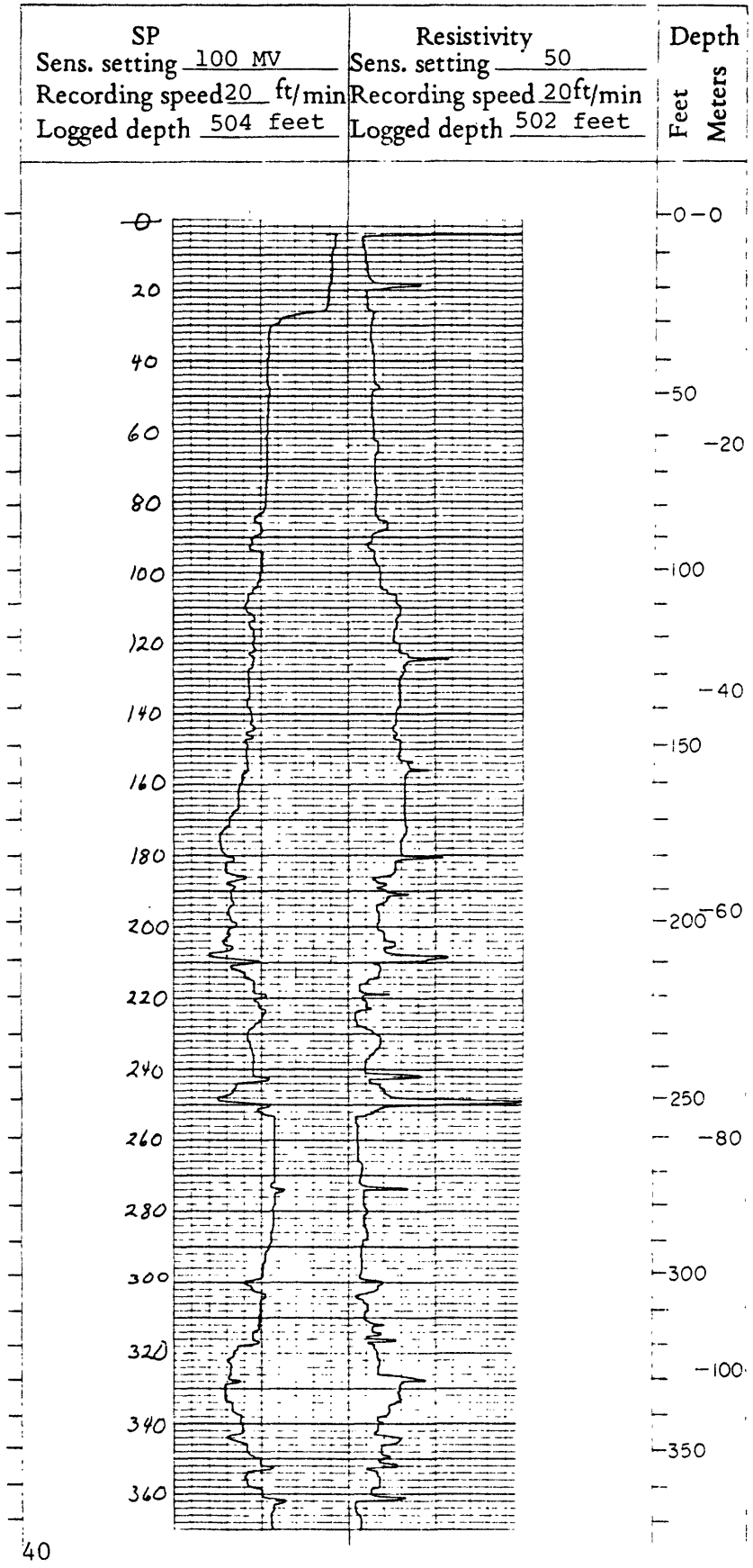
Hole number—continued

79W8

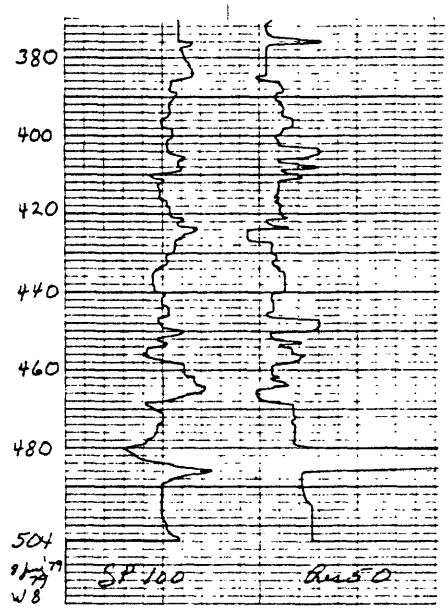
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 504 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 504 feet	Depth Feet Meters
300-312	Claystone, brown, lignitic			
312-314	Lignite			
314-316	Claystone, brown, lignitic			
316-364	Claystone, green, sandy			
364-365	Lignite			
365-371	Claystone, green			
371-372	Lignite			
372-391	Claystone, green, sandy			
391-400	Sandstone, green, medium-grained, clayey			
400-407	Sandstone, green, medium-grained			
407-434	Claystone, green, sandy, silty			
434-460	Sandstone, green, medium-grained, clayey			
460-464	Claystone, green			
464-500	Sandstone, green, medium-grained, clayey			






SP
Sens. setting 100 MV
Recording speed 20 ft/min
Logged depth 504 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 502 feet
Depth
Feet
Meters
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
0
50
100
150
200
250
300
350
20
40
60
80
100

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 504 feet	Logged depth 504 feet	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W9 Map: West Douglas Date: 6-17-79 State: ND County: Ward

Elev.: 2135 feet Location: T. 151 N, R. 85 W, Sec. 29, Tract: acda Drilled depth: 482 feet

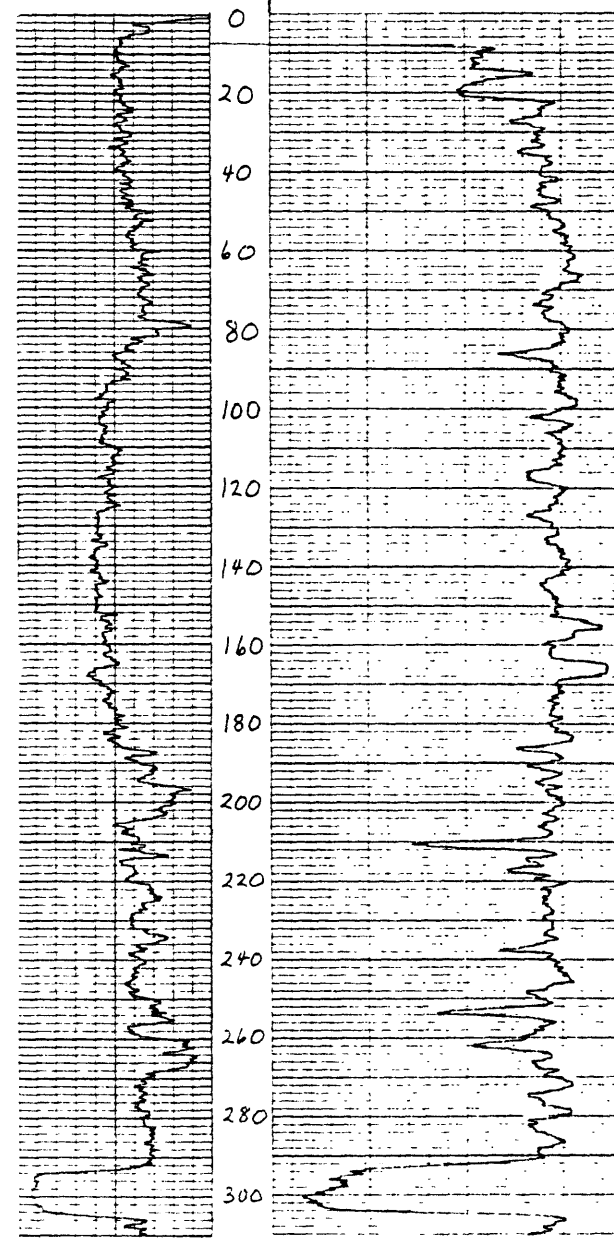
Measured: 2180 ft FNL 1500 ft FEL Hole size: 4-3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 210-212; 252-254; 292-305; 404-406; 415-422.

Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

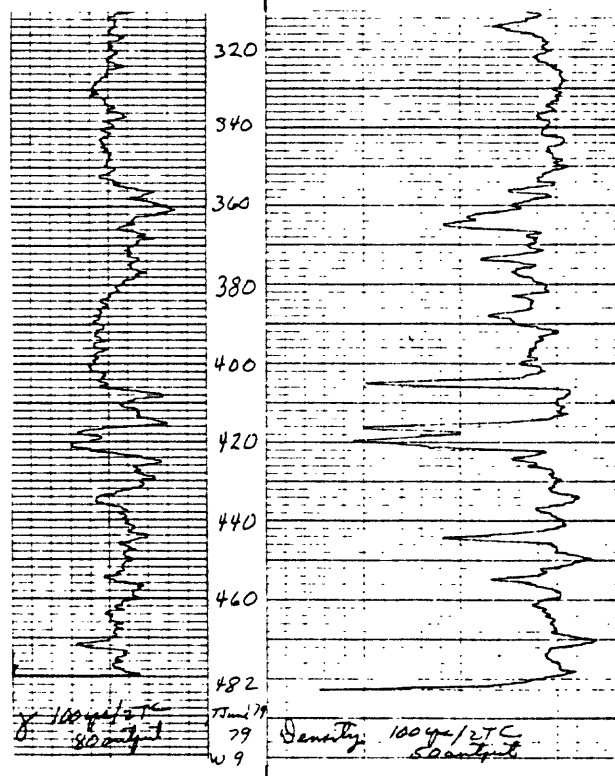
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 482 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 482 feet	Depth Feet	Depth Meters
0- 20	Till, yellowish-brown, silty, gravelly			0	0
20- 69	Till, gray, silty, gravelly			20	
69- 80	Sandstone, yellow, medium-grained			40	
80-152	Sandstone, brown, medium-grained			50	
152-181	Sandstone, green, medium-grained			60	20
181-182	Lignite			80	
182-200	Siltstone, green, sandy			100	100
200-203	Sandstone, green, medium-grained			120	
203-206	Lignite			140	40
206-214	Siltstone, green			150	
214-216	Lignite			160	
216-221	Claystone, brown			180	
221-224	Sandstone, green, medium-grained			200	200 60
224-231	Claystone, brown			220	
231-233	Lignite			240	
233-237	Claystone, brown,			250	
237-242	Sandstone, green, medium-grained			260	80
242-256	Claystone, brown			280	
256-260	Lignite			300	300
260-277	Claystone, brown				
277-280	Lignite				
280-283	Siltstone, green				
283-300	Lignite				



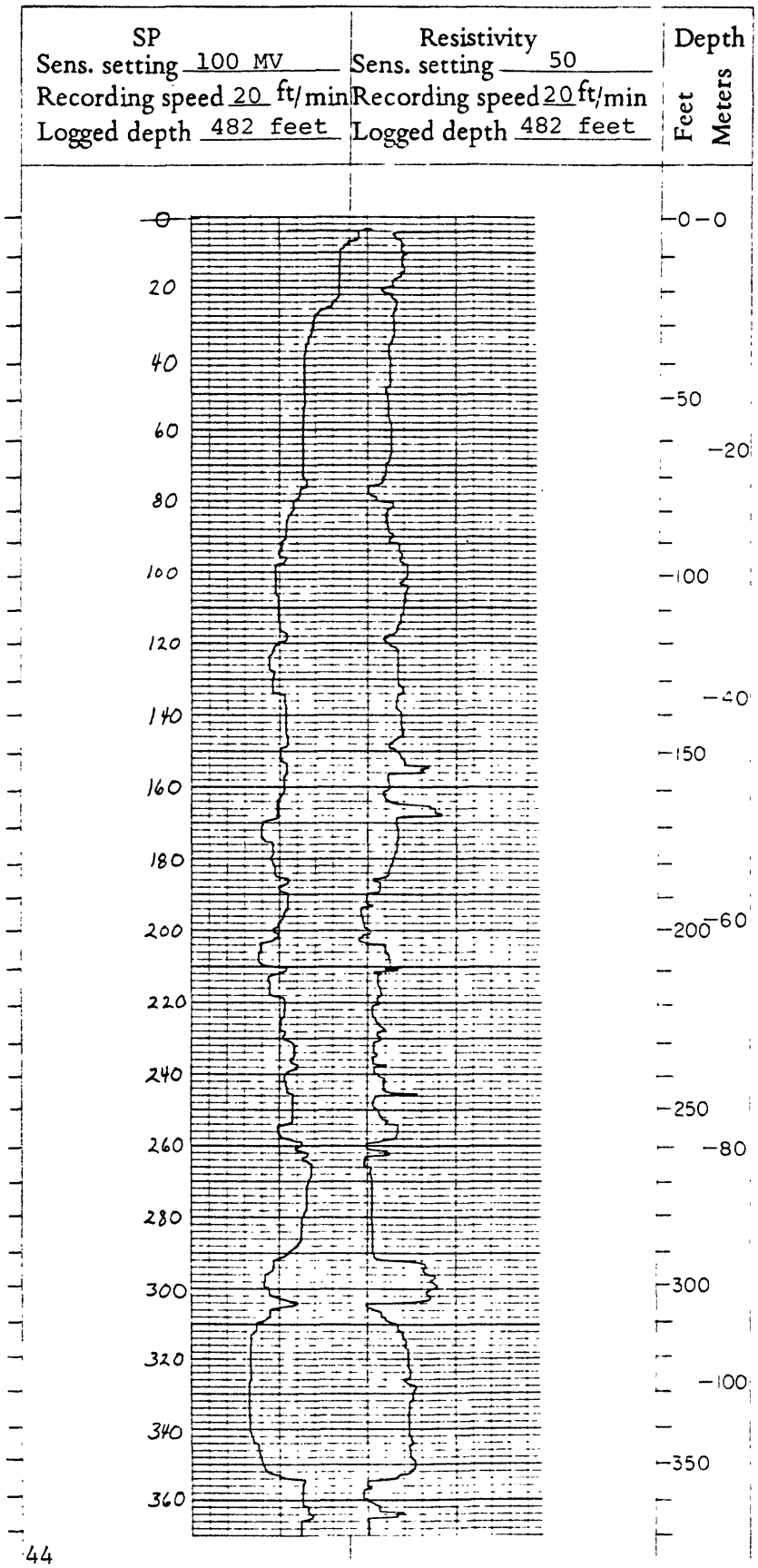
Hole number—continued

79W9

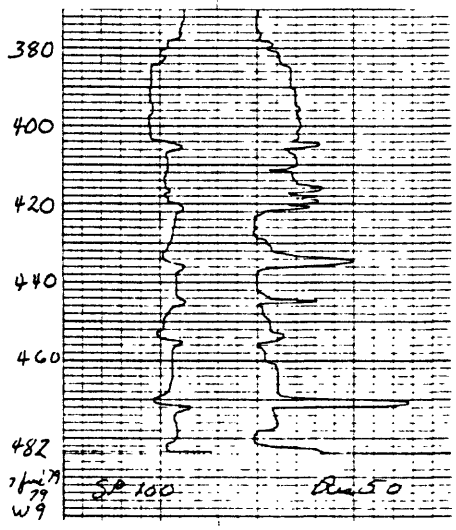
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 482 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 482 feet	Depth Feet / Meters
300-400	Sandstone, green, medium-grained, clayey			
400-409	Claystone, green			
409-416	Lignite			
416-427	Claystone, green			
427-436	Sandstone, green, medium-grained, clayey			
436-444	Claystone, green			
444-445	Lignite			
445-480	Sandstone, green, medium-grained, clayey			



300
100
350
120
400
450
140
500
160
550
180
600


SP
Sens. setting 100 MV
Recording speed 20 ft/min
Logged depth 482 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 482 feet
Depth
Feet
Meters
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
0
50
100
150
200
250
300
350
0
20
40
60
80
100

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 482 feet	Logged depth 482 feet	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750 (Feet); 120, 140, 160, 180, 200, 220 (Meters)

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W 10 Map: No Topo Date: 6-17-79 State: ND County: Ward

Elev.: 2070 feet Location: T. 151 N, R. 85 W, Sec. 27, Tract: aaaa Drilled depth: 402 feet

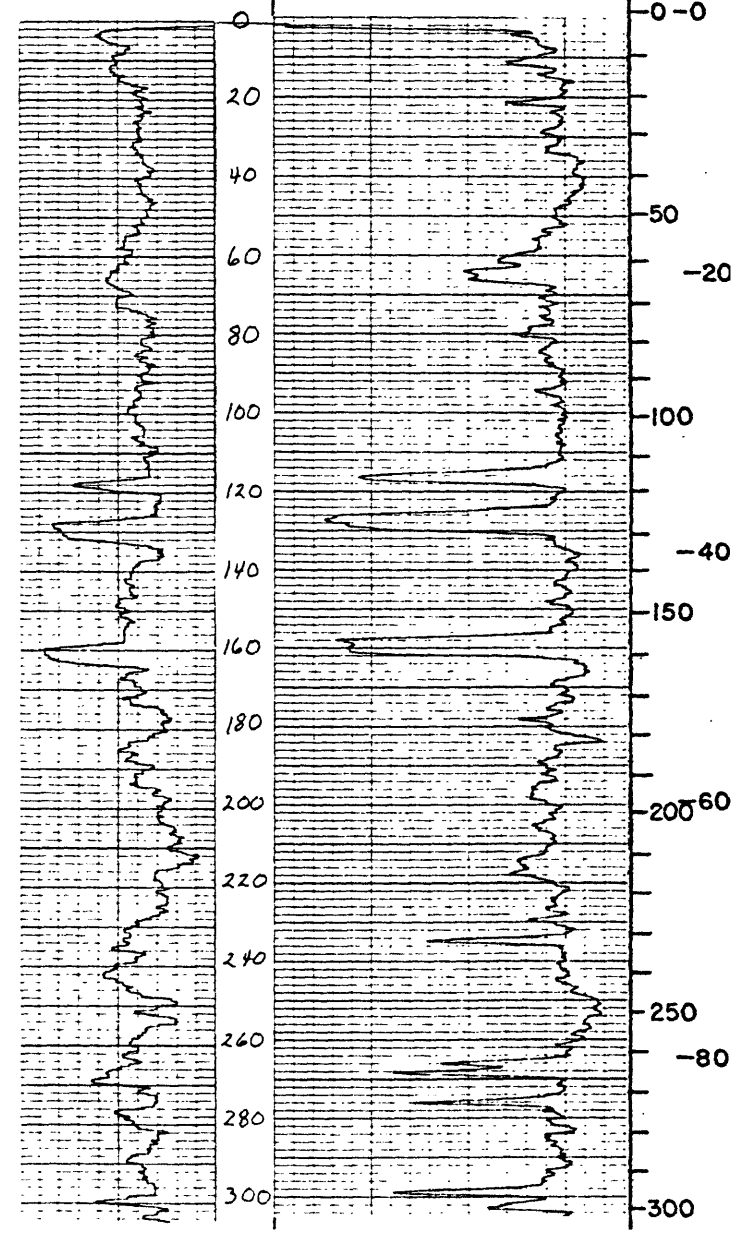
Measured: 42 ft. FNL, 180 ft. FEL, Hole size: 4-3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 115-118; 125-139; 157-162; 265-269; 298-300; 309-313

Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

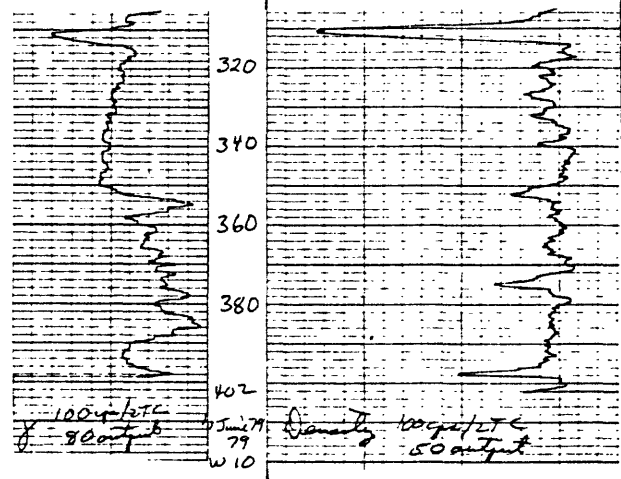
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 feet	Depth Feet	Depth Meters
0- 10	Till, brown, sandy, gravelly			0	0
10- 20	Till, brown and gray, sandy, gravelly				
20- 32	Till, brown, sandy, gravelly			20	
32- 40	Till, grayish-brown, sandy, gravelly			40	
40- 48	Till, gray, sandy, gravelly			50	
48- 50	Lignite			60	20
50- 58	Till, gray, sandy, gravelly				
58- 63	Gravel, brown			80	
63- 80	Sand, brown, medium to fine-grained			100	
80-170	No samples			120	
170-180	Siltstone, green, sandy			140	40
180-204	Claystone, green			150	
204-220	Claystone, brown			160	
220-240	No samples			180	
240-261	Claystone, brown			200	60
261-262	Lignite			220	
262-290	Sandstone, green, medium-grained, clayey			240	
290-296	Claystone, green, sandy			250	
296-297	Lignite			260	80
297-304	Claystone, green, silty, sandy			280	
				300	300

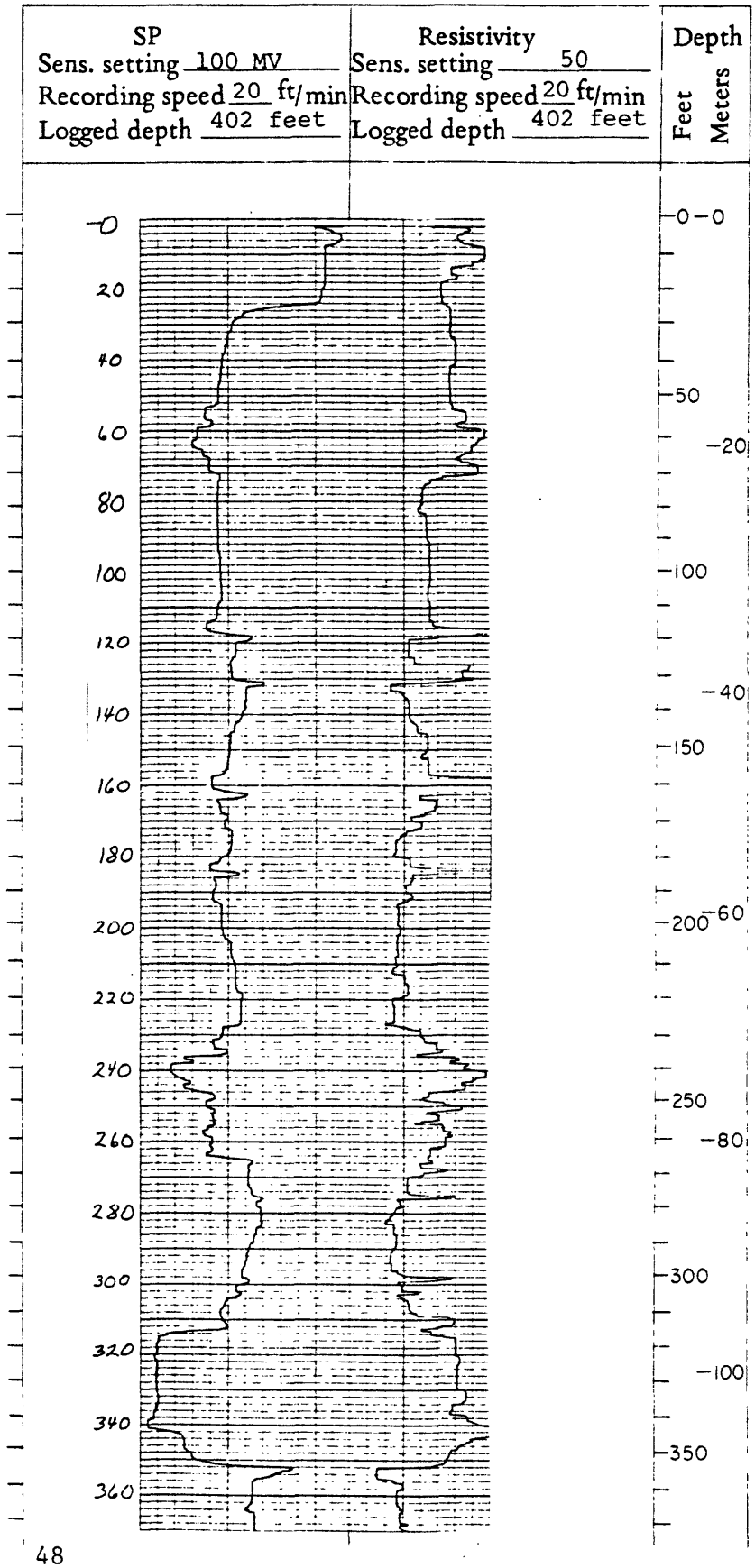


Hole number—continued

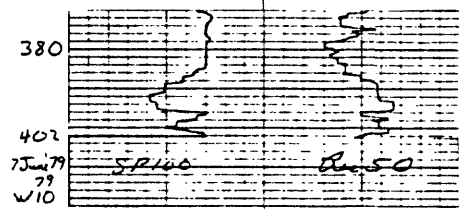
79W10

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Depth Feet / Meters
304-308	Lignite			
308-355	Sandstone, green, fine-grained, clayey			
355-367	Claystone, green, sandy			
367-379	Claystone, brown,			
379-380	Lignite			
380-386	Claystone, green			
386-391	Sandstone, green, medium-grained			
391-400	Claystone, green			




SP
Sens. setting 100 MV
Recording speed 20 ft/min
Logged depth 402 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 402 feet
Depth
Feet
Meters
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
0
50
100
150
200
250
300
350
0
20
40
60
80
100

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 feet	Logged depth 402 feet	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W11 Map: Douglas West Date: 6-16-79 State: ND County: Ward
Elev.: 2050 feet Location: T. 151 N, R. 85 W, Sec. 25, Tract: cdca Drilled depth: 402 feet
Measured: 390 ft. FNL FSL, 1700 ft FEL FWL, Hole size: 4-3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds: 36-28; 98-100; 128-133; 222-226; 276-282

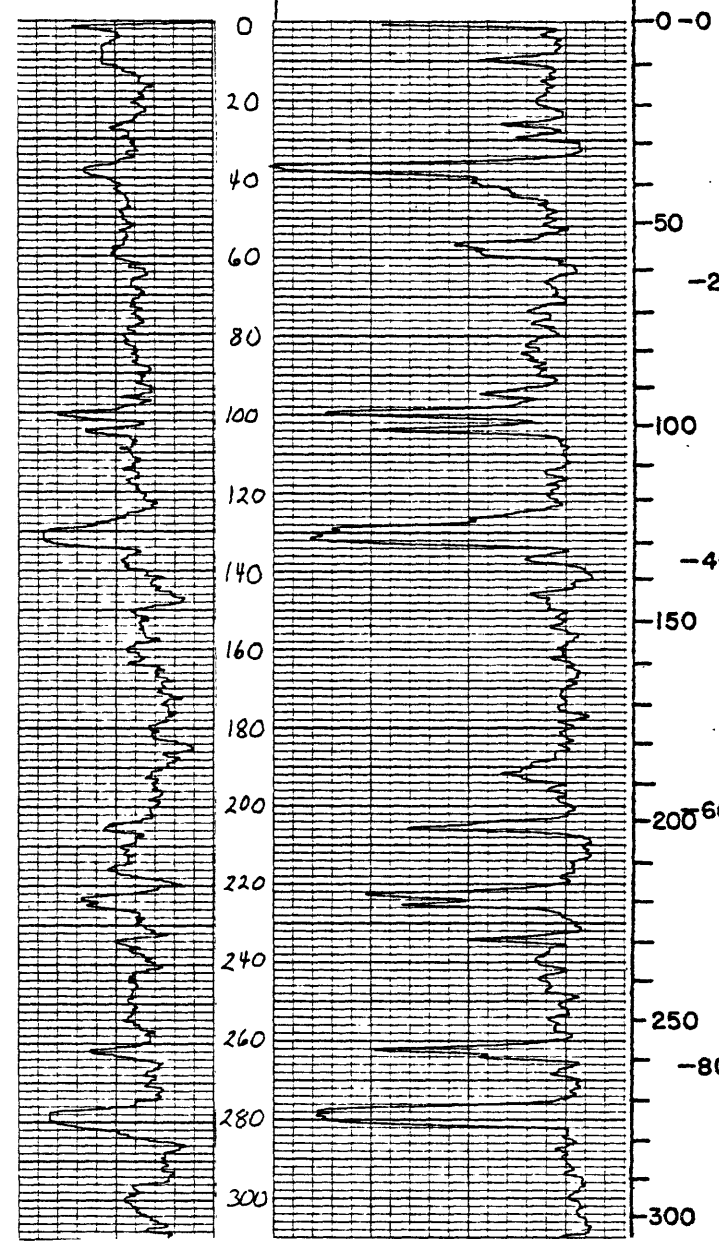
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		
0- 2	Silt, black	
2- 7	Gravel, brown, sandy, pebbles	
7- 15	Till, brown, silty	
15- 20	Till, gray	
20- 30	Gravel, sandy	
30- 32	Lignite	
32-100	Sandstone, bluish-gray,	
100-402	No samples	

Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 feet

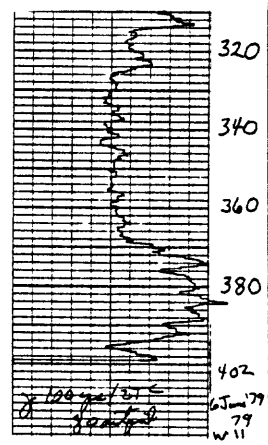
Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 feet

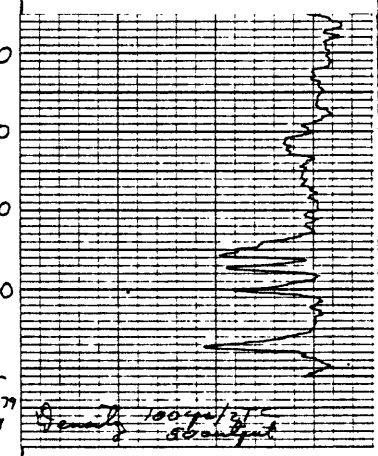


Hole number—continued

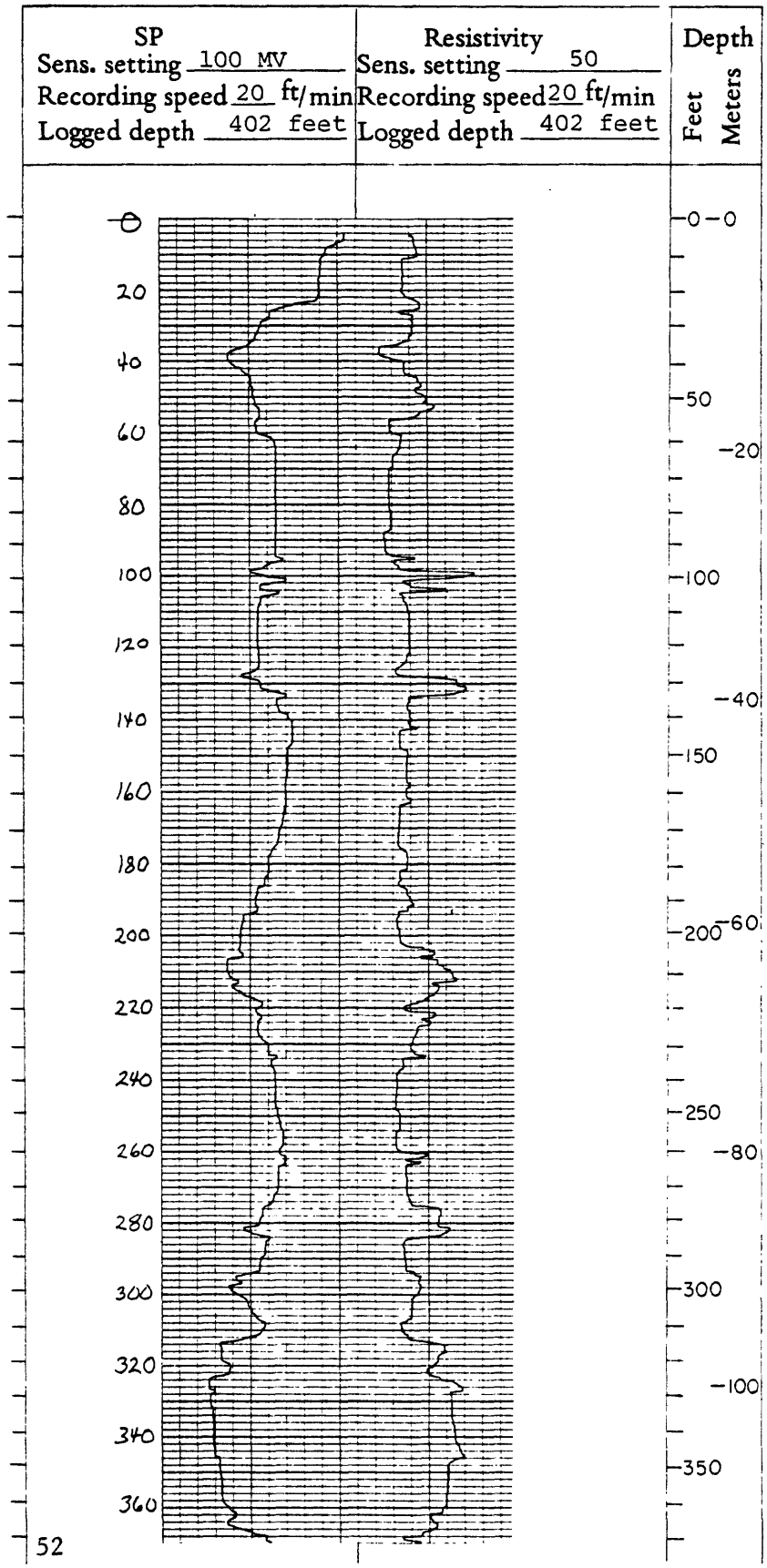
79W11

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Depth Feet Meters

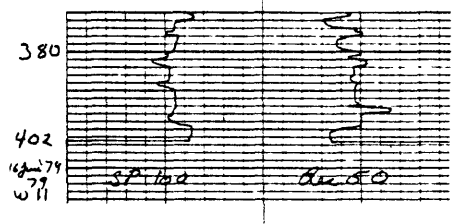




300
100
350
120
400
450
140
500
160
550
180
600


SP
Sens. setting 100 MV
Recording speed 20 ft/min
Logged depth 402 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 402 feet
Depth
Feet
Meters
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
0
50
100
150
200
250
300
350
20
40
60
80
100

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 feet	Logged depth 402 feet	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W12 Map: No Topo Date: 6-16-79 State: ND County: Ward

Elev.: 2116 feet Location: T. 151 N, R. 85 W, Sec. 13, Tract: daad Drilled depth: 462 feet

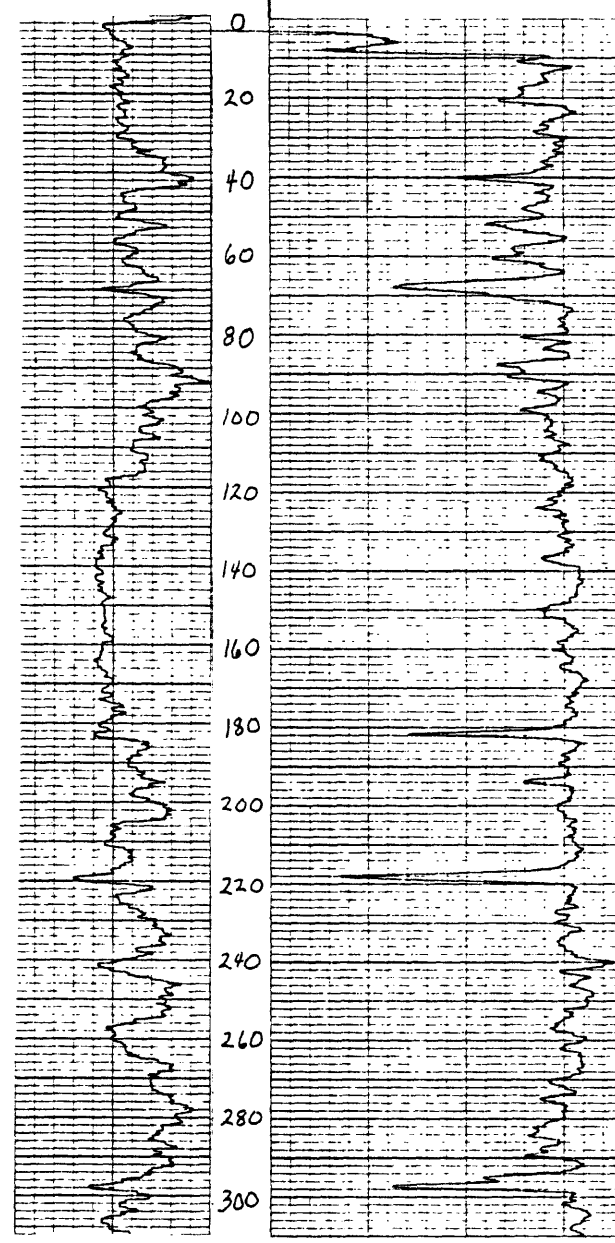
Measured: 2110 ft. FNL FSL, 12 ft. FEL FWL, Hole size: 4-3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 66-69; 217-219; 296-298; 336-338; 350-352; 376-382; 416-418

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

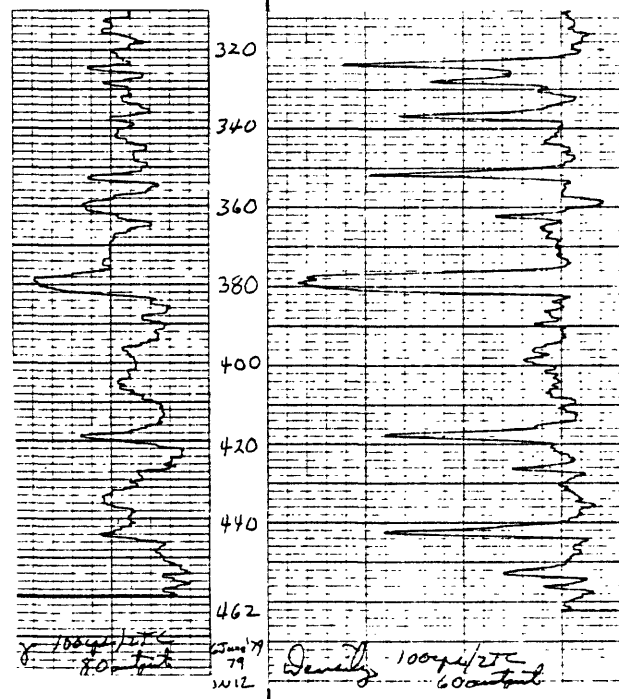
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 462 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 462 feet	Depth Feet	Depth Meters
0- 15	Till, brown, clayey, pebbly			0	0
15- 25	Till, gray, clayey, pebbly			20	
25- 37	Siltstone, brown			40	
37- 40	Claystone, gray, silty			60	20
40- 45	Siltstone, brownish-gray, clayey			80	
45- 46	Lignite			100	40
46- 61	Claystone, gray, silty			120	
61- 64	Lignite			140	60
64- 87	Claystone, gray, silty			160	
87- 88	Lignite			180	
88-110	Claystone, green			200	80
110-115	Siltstone, green			220	
115-125	Siltstone, green, sandy			240	
125-140	Sandstone, green, silty			260	100
140-176	Sandstone, greenish-blue			280	
176-180	Lignite			300	
180-187	Claystone, gray, silty				
187-188	Lignite				
188-205	Claystone, gray, silty				
205-214	Siltstone, gray				
214-216	Lignite				
216-235	Claystone, gray, silty				
235-240	Siltstone, gray				
240-250	Claystone, gray				
250-260	Sandstone, gray, very fine grained, silty				
260-275	Claystone, gray				
275-292	Claystone, brownish-gray, carbonaceous				
292-295	Lignite				
295-300	Claystone, gray				

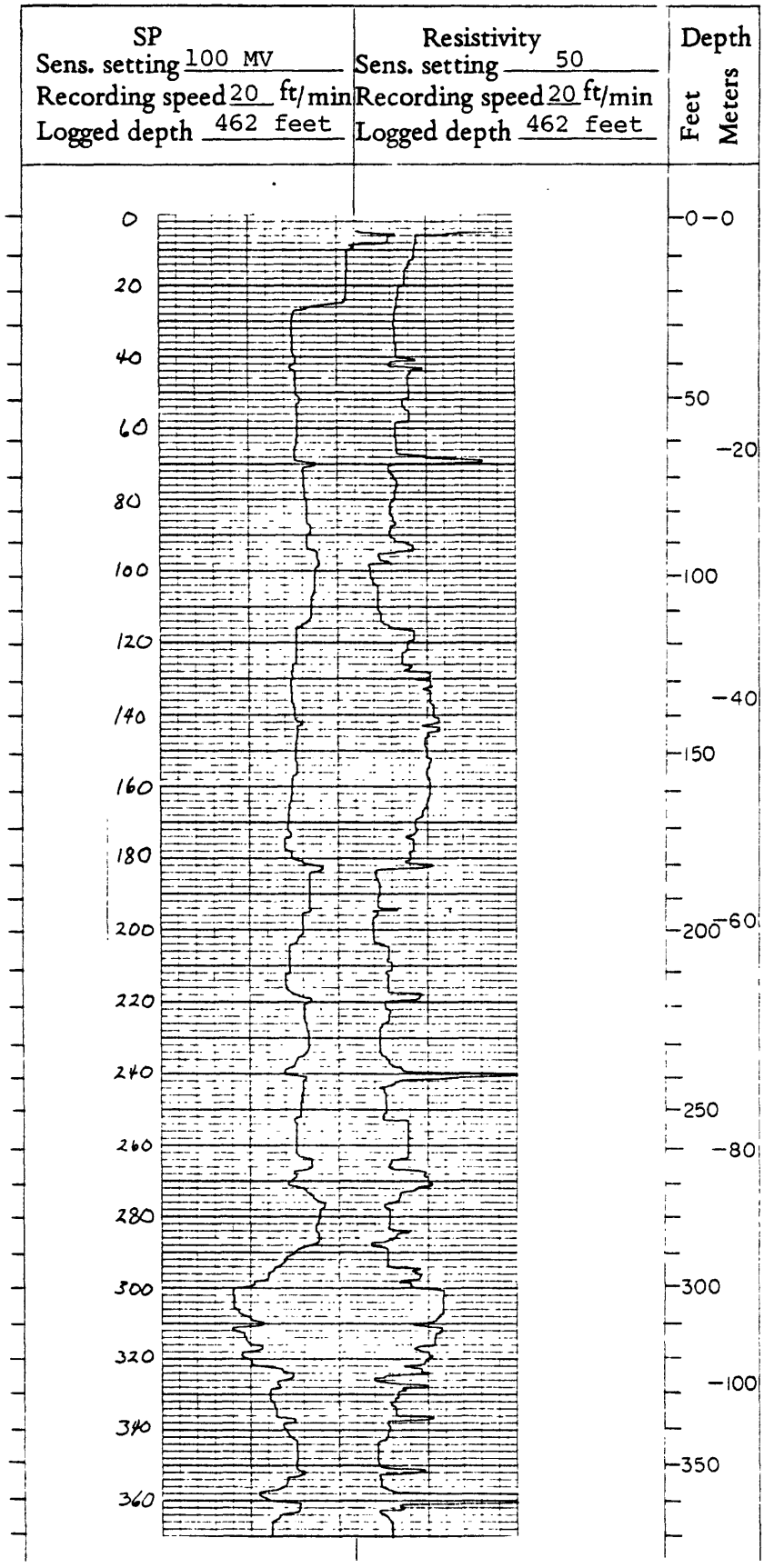


Hole number—continued

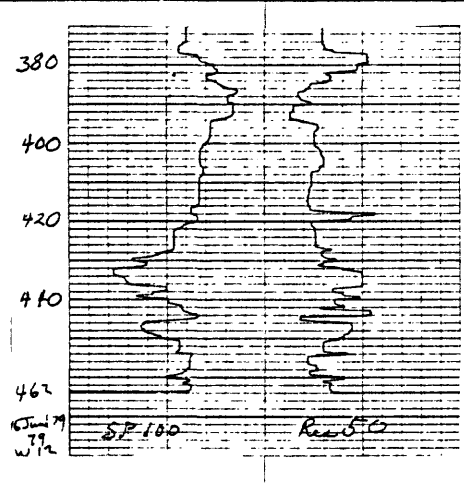
79W12

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 462 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 462 feet	Depth Feet / Meters
300-318	Clay, gray, with very thin lignite seam			300
318-325	Lignite			
325-333	Claystone, gray			100
333-334	Lignite			
334-336	Claystone, gray			350
336-337	Lignite			
337-340	Claystone, gray			
340-344	Claystone, gray			
344-345	Lignite			
345-355	Claystone, gray			120
355-357	Lignite			
357-373	Claystone, gray			400
373-378	Lignite			
378-380	Claystone, gray			
380-384	Lignite			
384-400	Claystone, brownish-gray, carbonaceous, silty			
400-438	Sandstone			450
438-441	Lignite			140
441-446	Claystone, brownish-gray, carbonaceous			
446-448	Lignite			
448-460	Claystone, brownish-gray, carbonaceous			500
				160
				550
				180
				600




SP
Sens. setting 100 MV
Recording speed 20 ft/min
Logged depth 462 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 462 feet
Depth
Feet
Meters
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
0
50
100
150
200
250
300
350
0
20
40
60
80
100

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 462 feet	Logged depth 462 feet	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W-13 Map: No Topo Date: 6-15-79 State: ND County: Ward

Elev.: 2124 feet Location: T. 151 N, R. 84 W, Sec. 27, Tract: bbbb Drilled depth: 464 feet

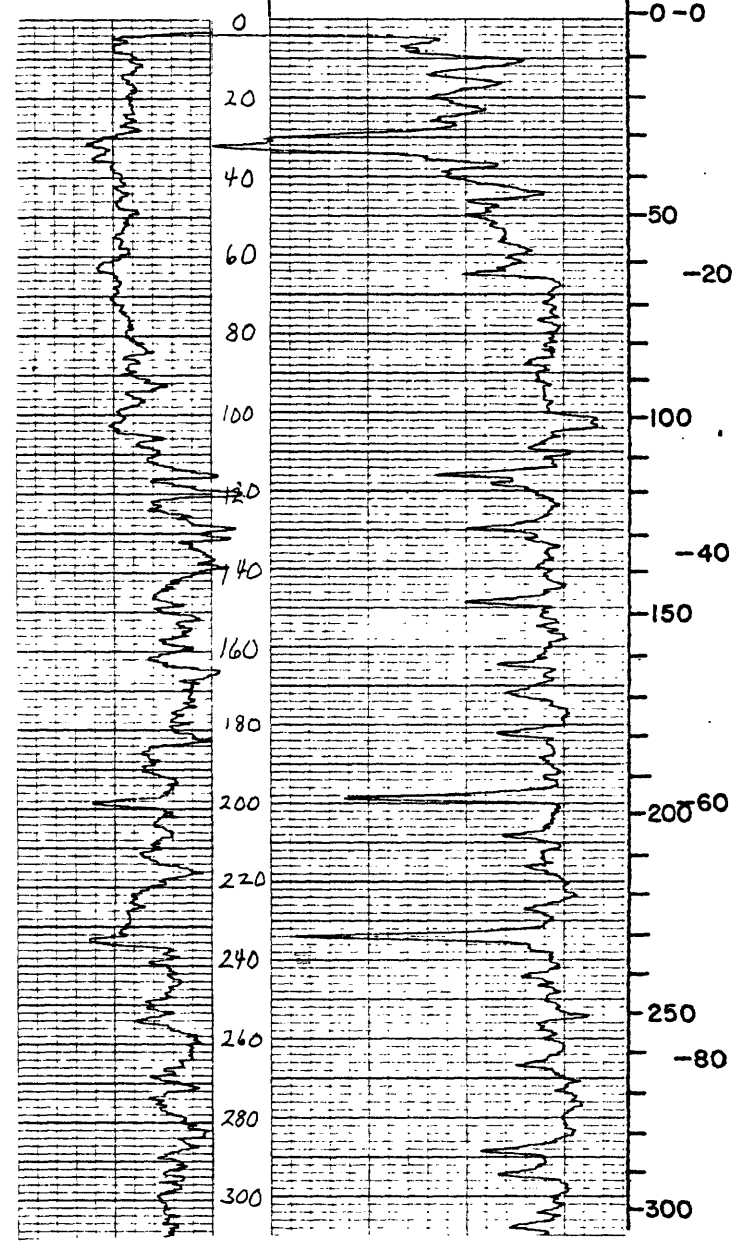
Measured: 108 ft FNL, 15 ft FWL, Hole size: 4-3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 197-199; 233-235; 312-314; 326-332; 342-344; 363-365; 378-383

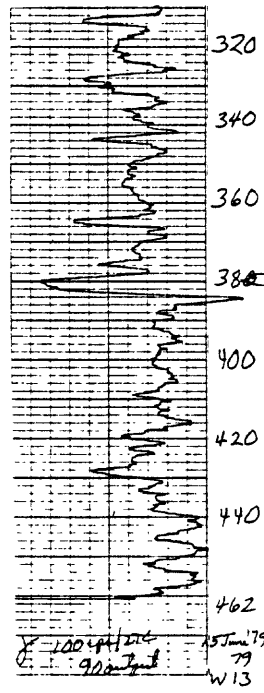
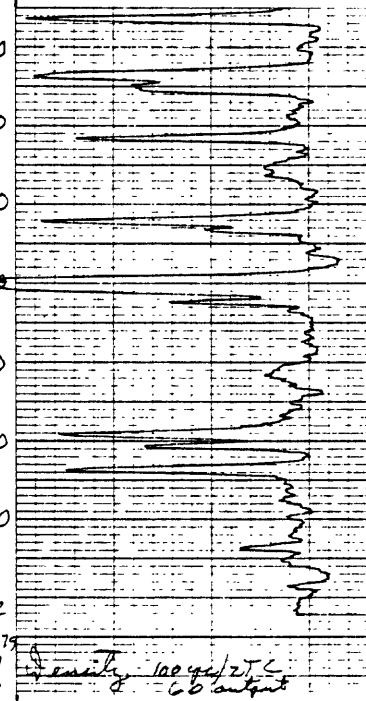
Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

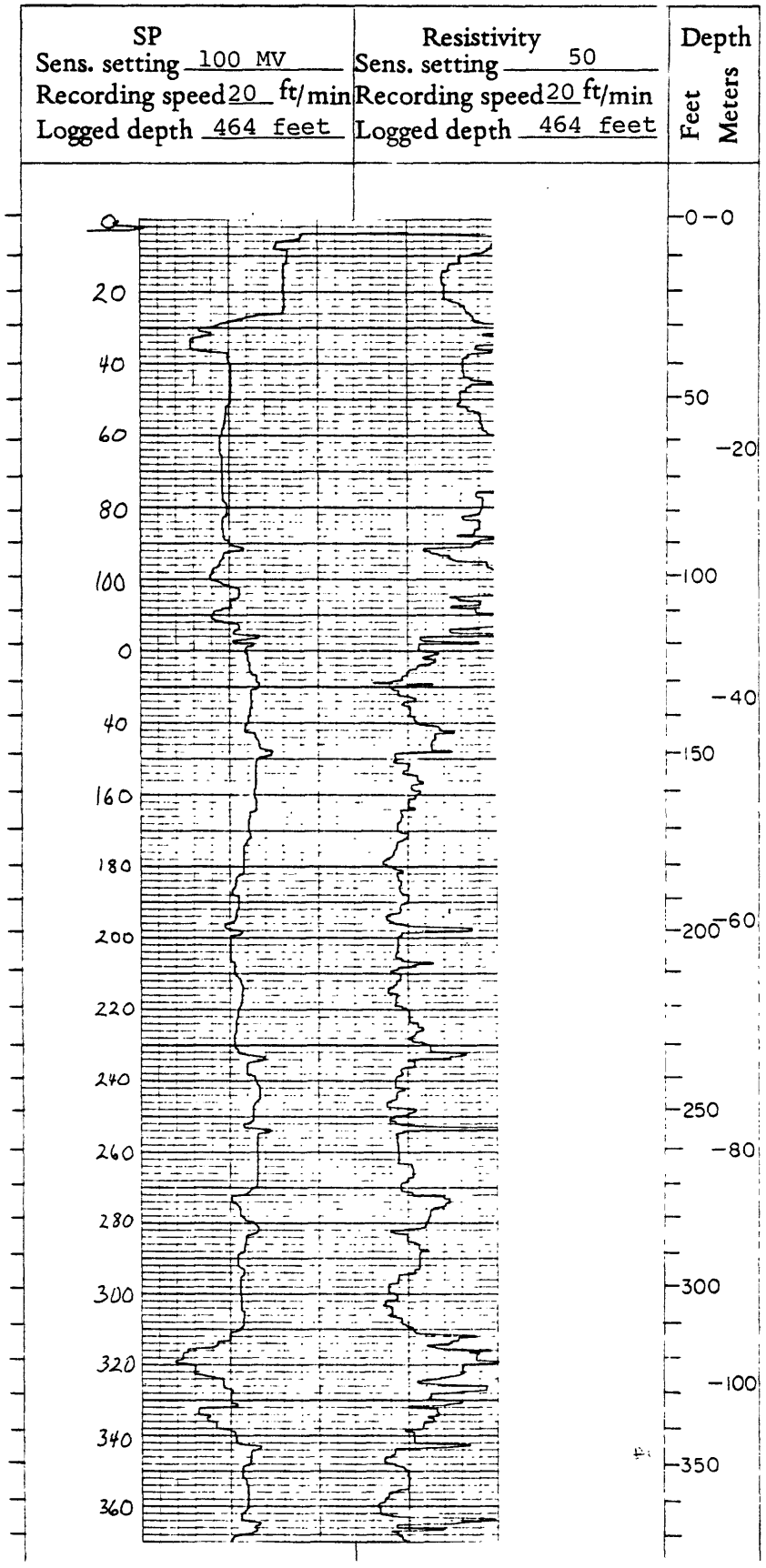
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 464 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 464 feet	Depth Feet	Depth Meters
0- 20	Till, brown, sandy, silty				
20- 26	Till, gray, sandy, silty				
26- 36	Gravel, brown, sandy				
36- 60	Till, gray, silty, sandy, gravelly				
60- 88	Sandstone, grayish-brown, medium-grained, silty				
88-109	Siltstone, brown, sandy				
109-110	Lignite				
110-113	Claystone, brown				
113-115	Lignite				
115-145	Claystone, gray, silty				
145-146	Lignite				
146-190	Claystone, gray, silty				
190-193	Lignite				
193-215	Claystone, gray, very silty				
215-229	Siltstone, gray				
229-230	Lignite				
230-278	Claystone, gray, silty				
278-294	Claystone, brown, lignitic				
294-304	Siltstone, gray, sandy				



Hole number—continued
79W13

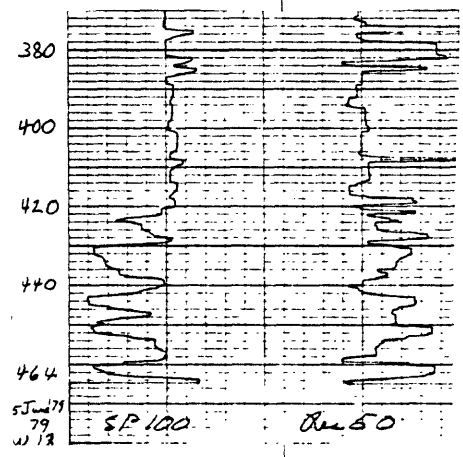
Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 464 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 464 feet	Depth Feet / Meters
304-307 Lignite 307-321 Siltstone, gray 321-327 Lignite 327-335 Siltstone 335-338 Lignite 338-340 Siltstone, gray, sandy 340-360 No samples 360-363 Claystone, gray, silty 363-365 Lignite 365-380 Claystone, gray, silty 380-460 No samples			300 100 350 120 400 450 140 500 160 550 180 600

79W13 Hole number- continued



79W13 Hole number—continued

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 464 feet	Logged depth 464 feet	



Depth: 400, 450, 500, 550, 600, 650, 700, 750

Meters: 120, 140, 160, 180, 200, 220

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W14 Map: No Topo Date: 6-14-79 State: ND County: Ward

Elev.: 2139' Location: T. 151 N, R. 84 W, Sec. 4, Tract: dddd Drilled depth: 482 feet

Measured: 96 ft FSL, 22 ft FEL, Hole size: 4 3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 320-323; 343-348; 386-390; 434-436; 451-453

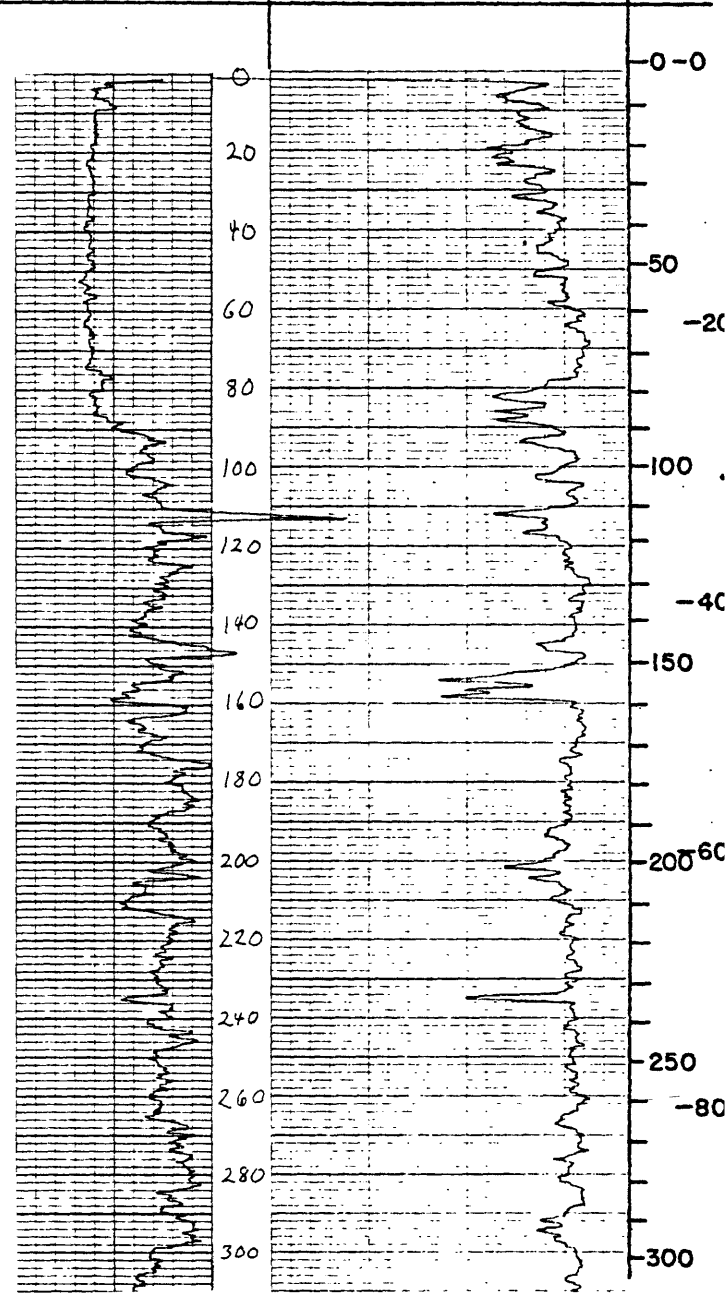
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 94	Sand and gravel
94-120	Till
120-140	Claystone, gray, sandy, silty
140-150	Claystone, greenish-gray, silty, sandy
150-153	Lignite
153-185	Claystone, gray, silty
185-187	Lignite
187-200	Siltstone, gray, clayey
200-203	Lignite
203-305	Claystone, gray, silty

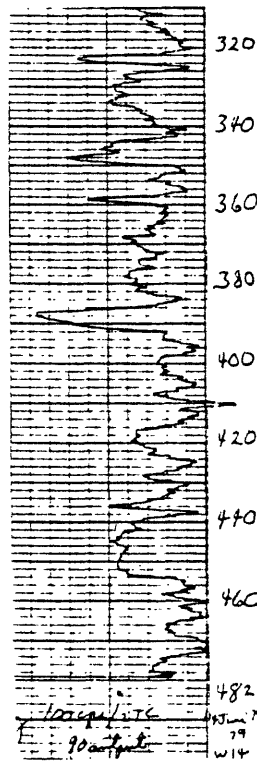
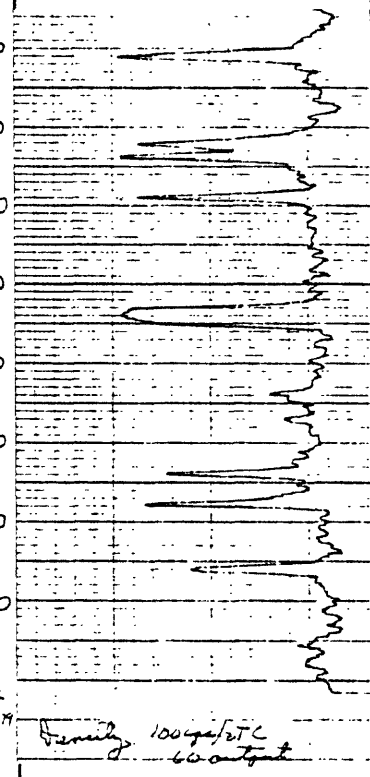
Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 482 feet

Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 482 feet

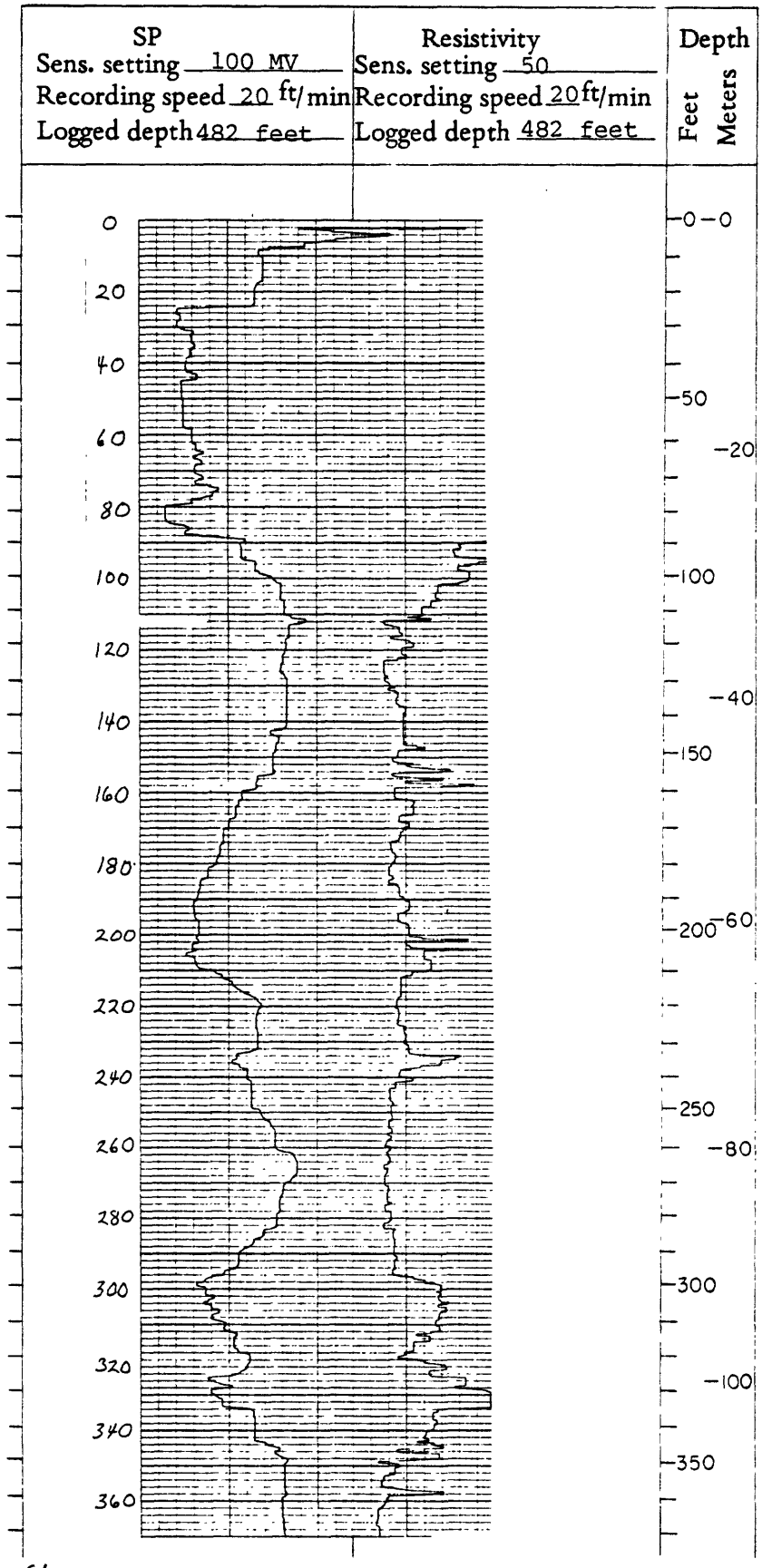


Hole number—continued

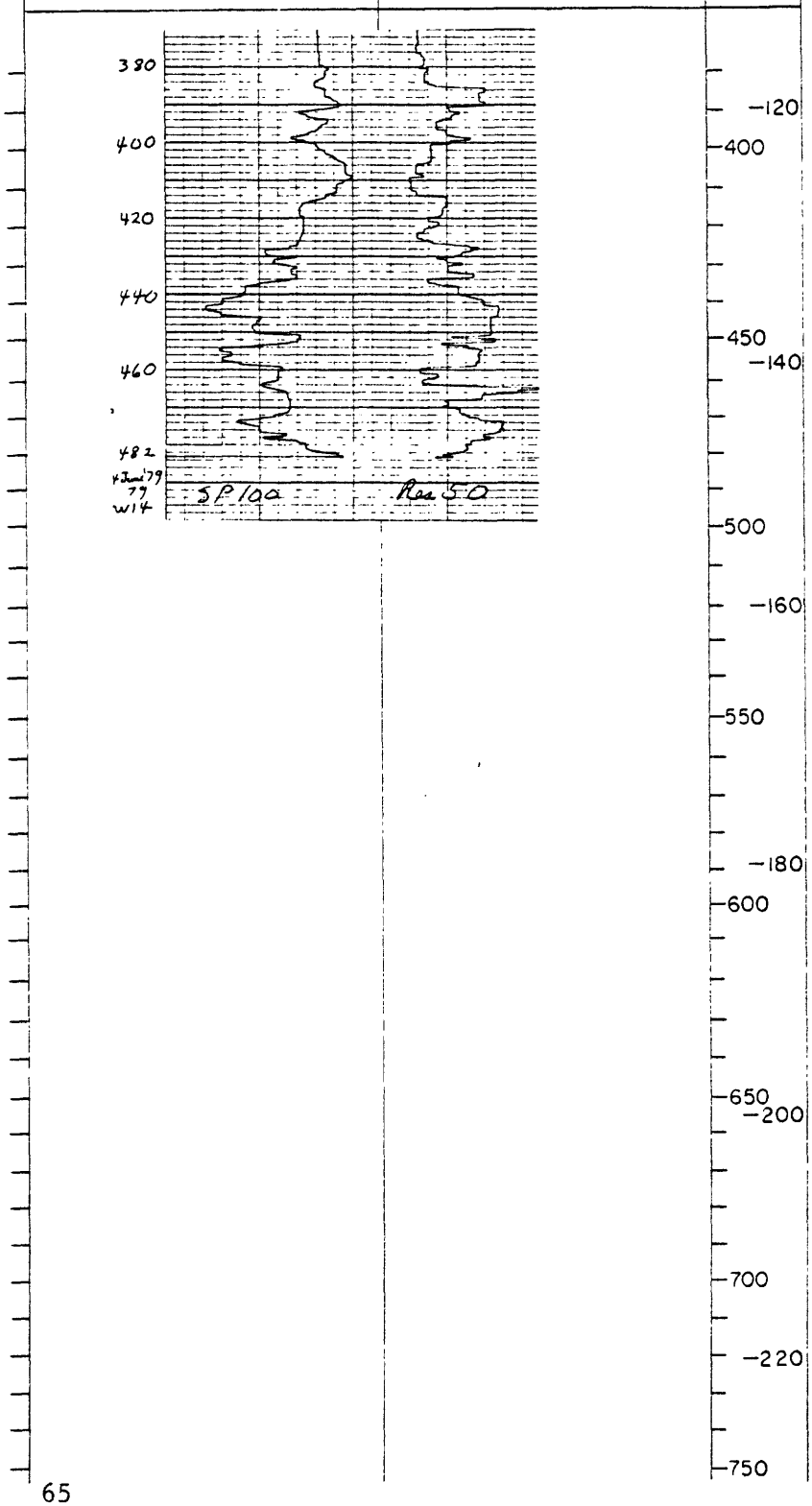
79W14

Lithology	Gamma T.C. 2 Range 100 cps Recording speed ___ ft/min Logged depth 482 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 482 feet	Depth Feet / Meters
305-307 Lignite 307-320 Siltstone, gray, clayey 320-325 Lignite 325-335 Siltstone, clayey 335-345 Lignite 345-350 Siltstone, clayey 350-355 Lignite 355-360 Siltstone, clayey			

79W14 Hole number - continued



SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 482 feet	Logged depth 482 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W15 Map No Topo Date: 6-14-79 State: ND County: Ward

Elev.: 2107 feet Location: T. 152 N, R. 84 W, Sec. 30, Tract: aaaa Drilled depth: 442'

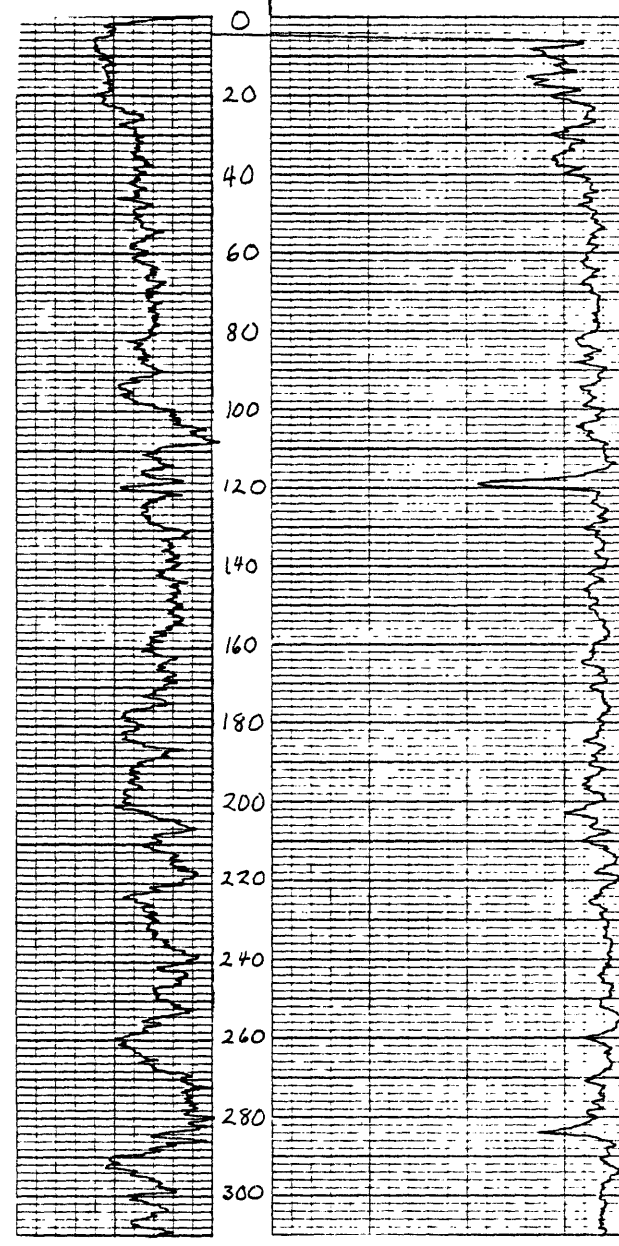
Measured: 190 ft FNL, 22 ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 118-120; 354-357

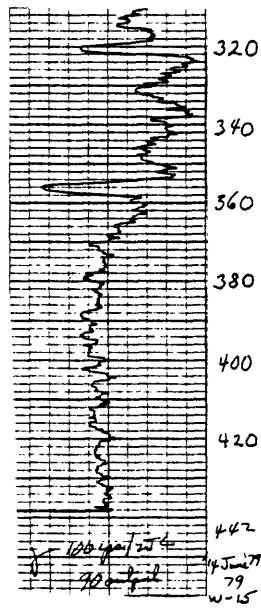
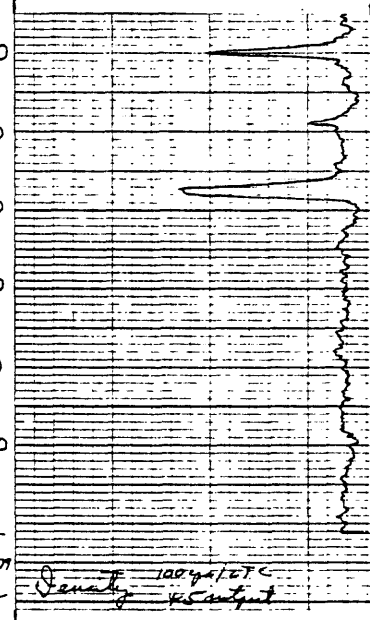
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

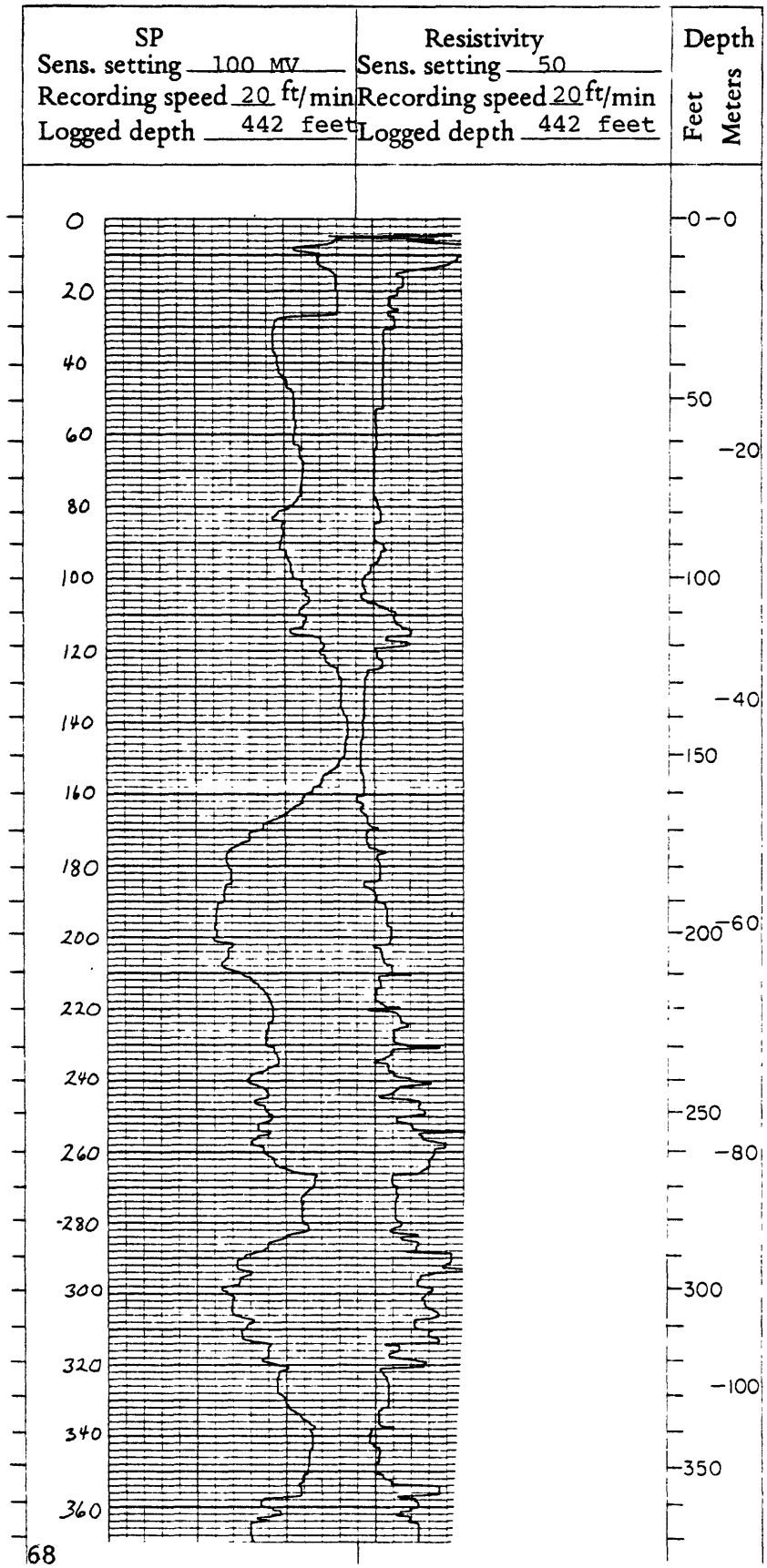
Lithology	Gamma: T.C. 2 Range 100cps, Recording speed 20 ft/min, Logged depth 442 feet	Density: T.C. 2 Range 100 cps, Recording speed 20 ft/min, Logged depth 442 feet	Depth Feet	Depth Meters
0- 35 Gravel, brown, sandy			0	0
35- 70 Till, brown, silty, sandy, gravelly			20	
70- 82 Till, yellow, clayey, sandy			40	50
82- 85 Lignite			60	20
85- 95 Claystone			80	
95-100 Lignite			100	100
100-115 Siltstone			120	
115-130 Claystone, gray, sandy, silty			140	40
130-160 Siltstone, gray, sandy			160	150
160-235 Sandstone, gray, silty			180	
235-260 Claystone, gray, silty, sandy			200	200 60
260-280 Lignite			220	
280-315 No samples			240	250
			260	80
			280	
			300	300



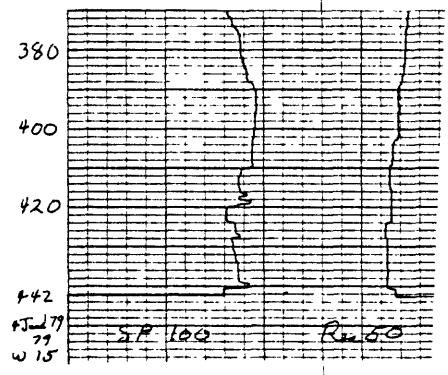
Hole number—continued
79W15

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 442 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 442 feet	Depth Feet / Meters
315-320 Claystone, gray 320-340 No samples 340-380 Claystone, gray, silty 380-442 No samples			

79W15 Hole number - continued



SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 442 feet	Logged depth 442 feet	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W16 Map: No topo Date: 6-13-79 State: ND County: Ward

Elev.: 2178 feet Location: T. 152 N, R. 84 W, Sec. 22, Tract: ddcc Drilled depth: 502 feet

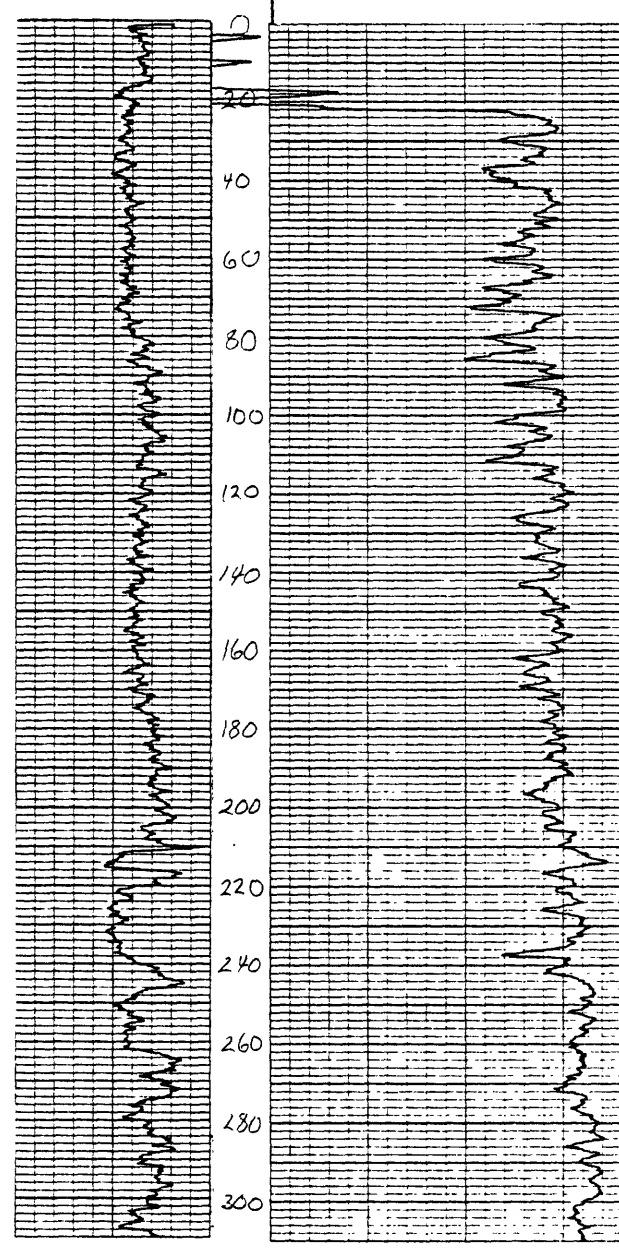
Measured: 22 ft FSL, 1050 ft FEL, Hole size: 4 3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 316-319; 340-346; 376-380; 412-414

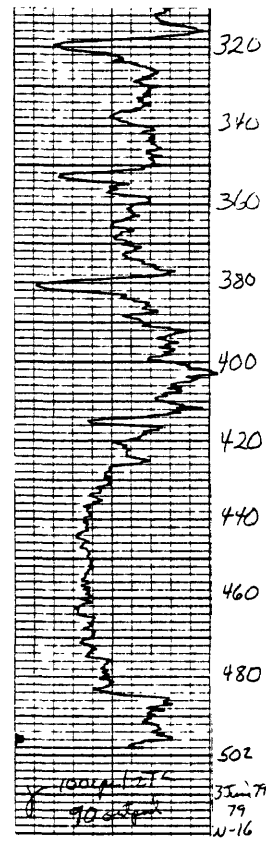
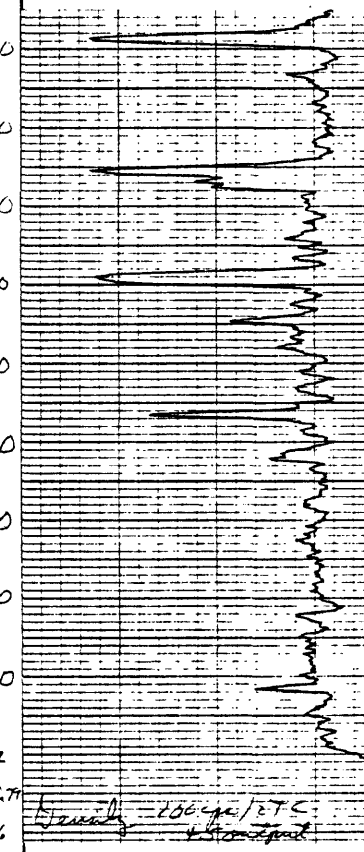
Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

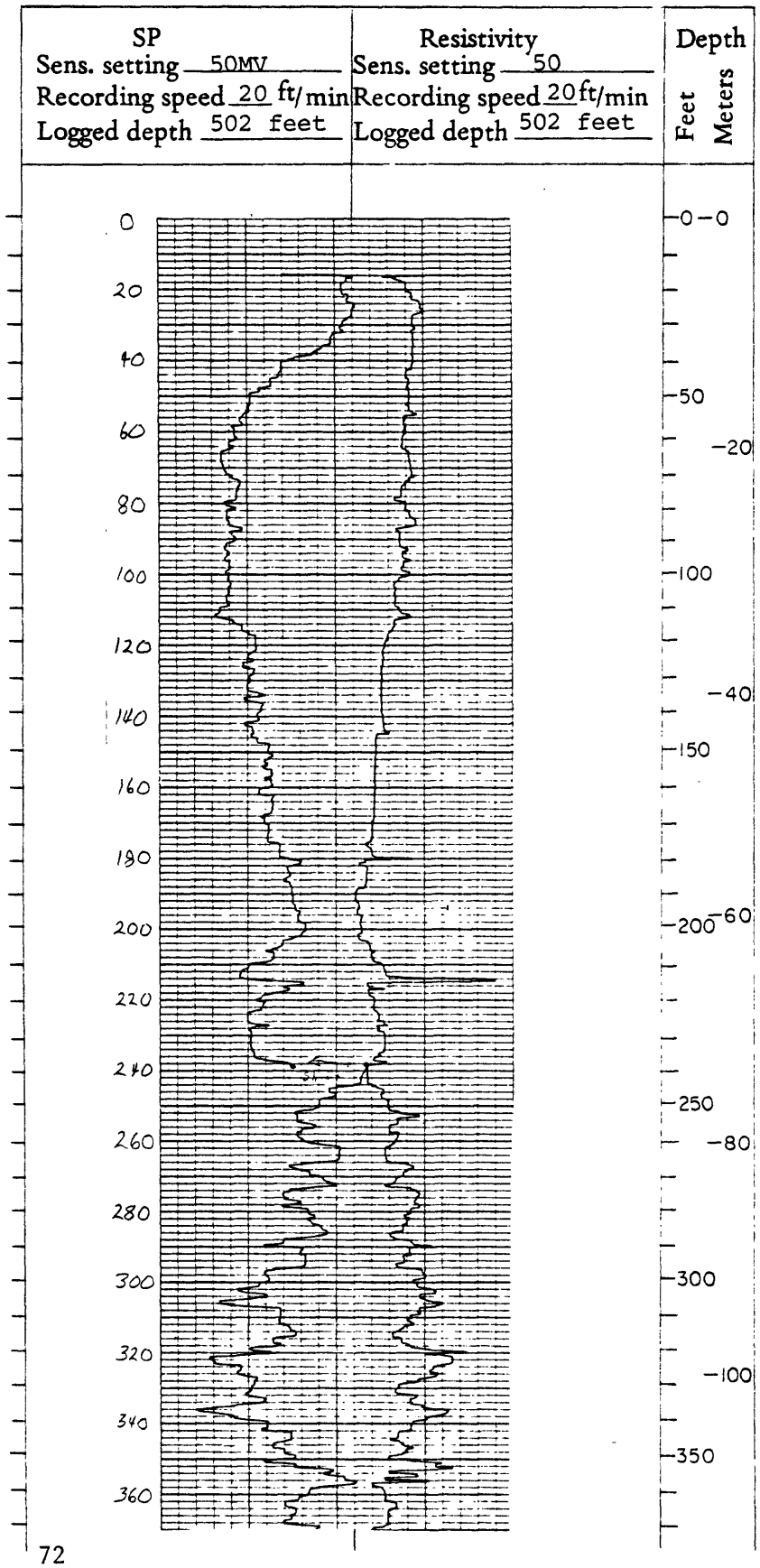
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 502 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 502 feet	Depth Feet	Depth Meters
0- 16	Till, yellow; gravel			0	0
16-120	Till, gray; gravel				
120-173	Till, yellowish-brown				
173-179	Claystone, yellowish-brown				
179-180	Lignite				
180-200	Claystone, gray, silty				
200-209	Sandstone, gray, fine-grained			50	20
209-212	Shale, light-gray				
212-236	Sandstone, gray, fine-grained				
236-237	Lignite				
237-260	Sandstone, gray, fine-grained			100	40
260-311	Claystone, gray, silty				
				150	
				200	60
				250	80
				300	



Hole number—continued
79W16

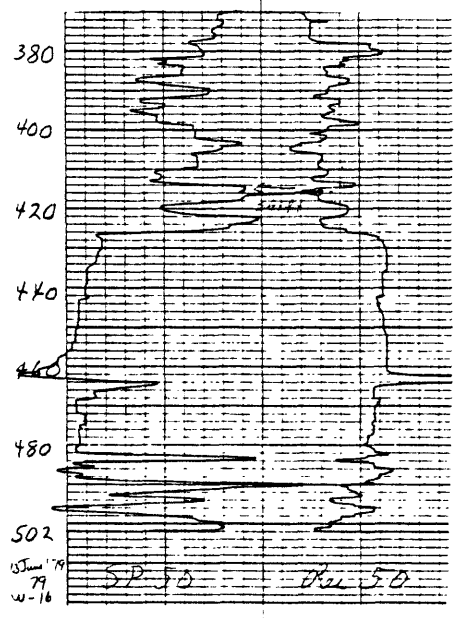
Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 502 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 502 feet	Depth Feet / Meters
311-318 Lignite 318-347 Claystone, gray 347-355 Lignite 355-360 Claystone, gray, silty 360-367 Lignite 367-378 Claystone, gray, silty 378-380 Lignite 380-387 Claystone, gray 387-391 Lignite 391-400 Sandstone, gray, fine-grained 400-415 Claystone, gray 415-416 Lignite 416-420 Claystone, gray 420-500 No samples			300 100 350 120 400 450 140 500 160 550 180 600

79W16 Hole number - continued



79W16 Hole number—continued

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 502 feet	Logged depth 502 feet	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79W17 Map: No Topo Date: 6-13-79 State: ND County: Ward

Elev.: 2186' Location: T. 152 N, R. 83 W, Sec. 20, Tract: bbcb Drilled depth: 542'

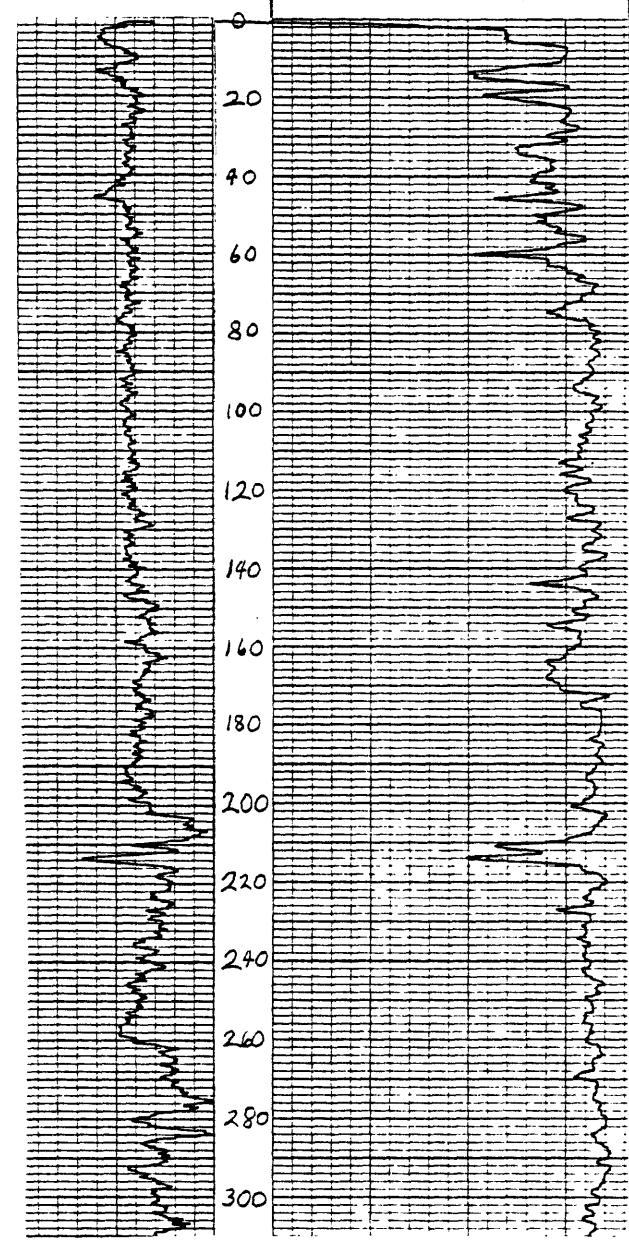
Measured: 792 ft FNL, 15 ft FWL, Hole size: 4 3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 210-215; 380-382; 386-387; 417-419; 424-428; 460-462

Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

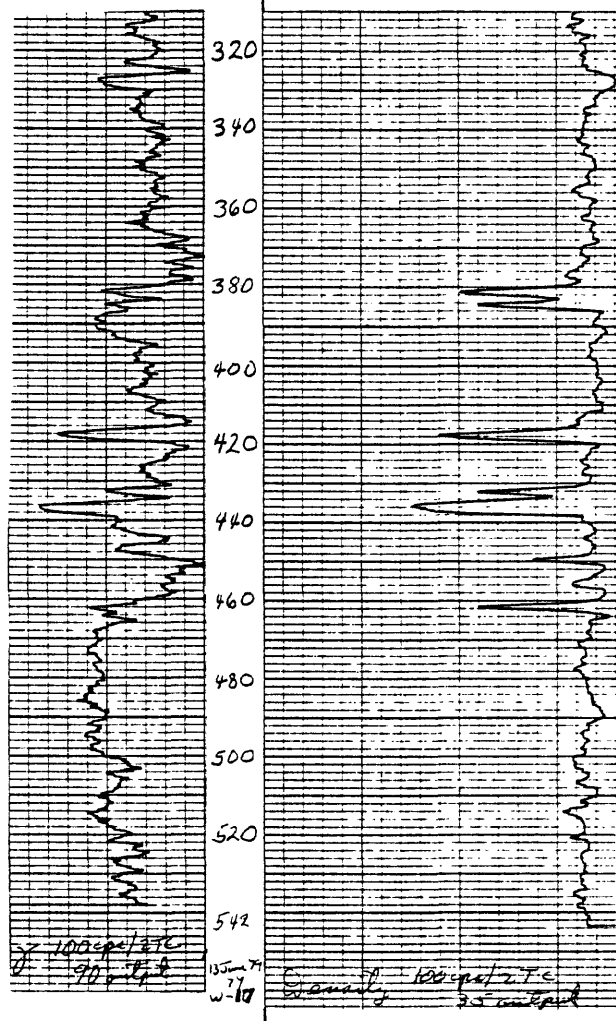
Lithology	Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 542 feet	Density: T.C. 2 Range 100; Recording speed 20 ft/min; Logged depth 542 feet	Depth Feet	Depth Meters
0- 5 Sand, dark-brown, medium-grained			0	0
5- 10 Sand, dark-brown, medium- to course-grained				
10- 15 Gravel, brown				
15- 20 Till, yellow				
20- 23 Gravel, brown				
23- 40 Till, gray			50	
40- 50 Till, gray; with gravel, brown				20
50- 60 Till, gray				
60- 65 Till gray; with gravel, brown				
65- 80 Till, gray			100	
80- 85 Till gray; with gravel, brown				
85- 90 Till gray				
90-100 Till gray; with gravel, brown				40
100-140 Till, gray			150	
140-150 Till (mixed) gray to yellow				
150-160 Till, yellow				
160-175 Till, yellow; with gravel, brown				
175-193 Till, yellow			200	60
193-201 Till, gray				
201-208 Lignite				
208-220 Claystone, brown				
220-221 Lignite				
221-240 Claystone, brown				
240-262 Sandstone, brown, fine-grained			250	
262-278 Claystone, brown				80
278-290 Sandstone, grayish-brown, fine-grained				
290-310 Claystone, gray, sandy			300	



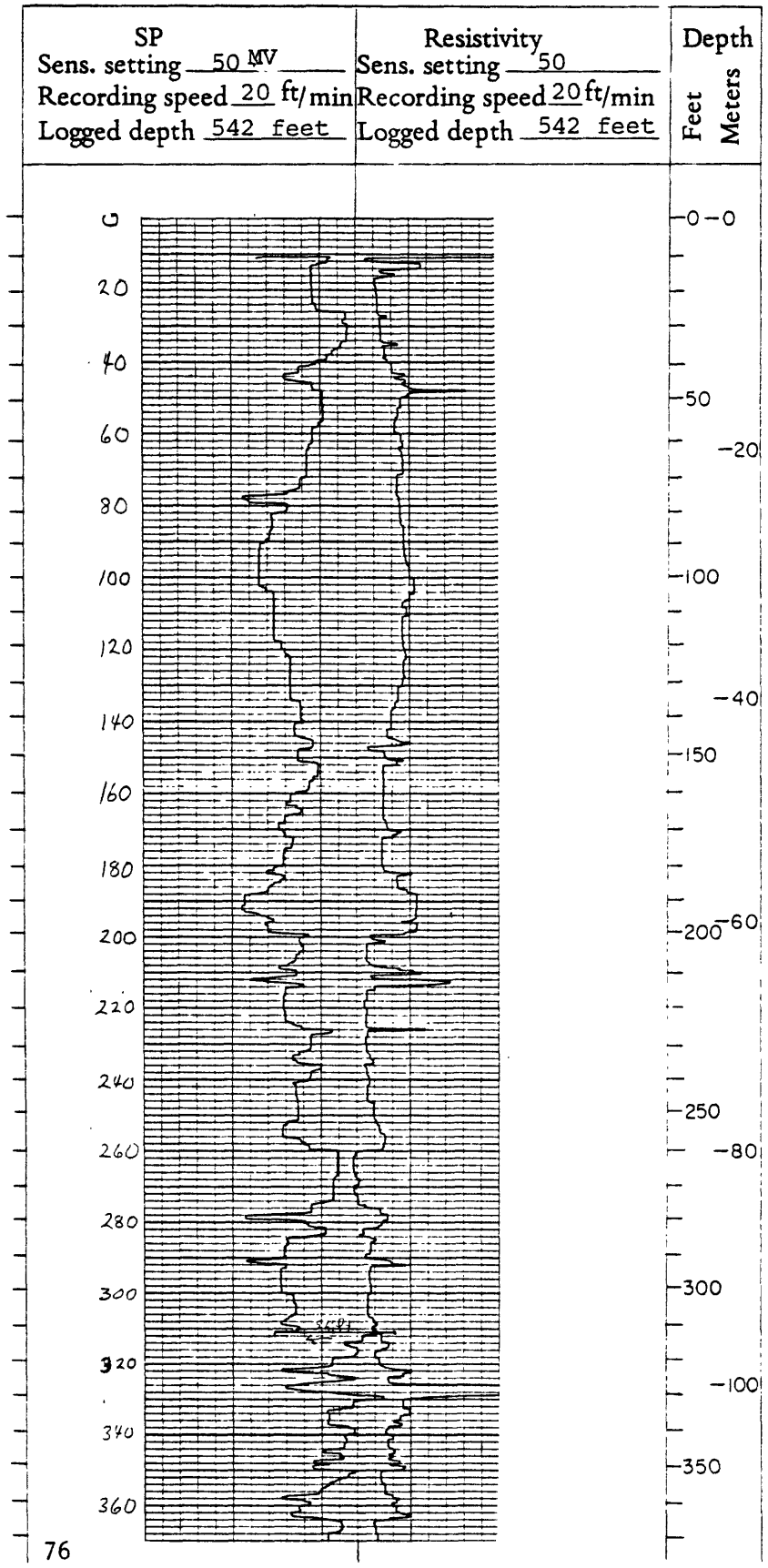
Hole number—continued

79W17

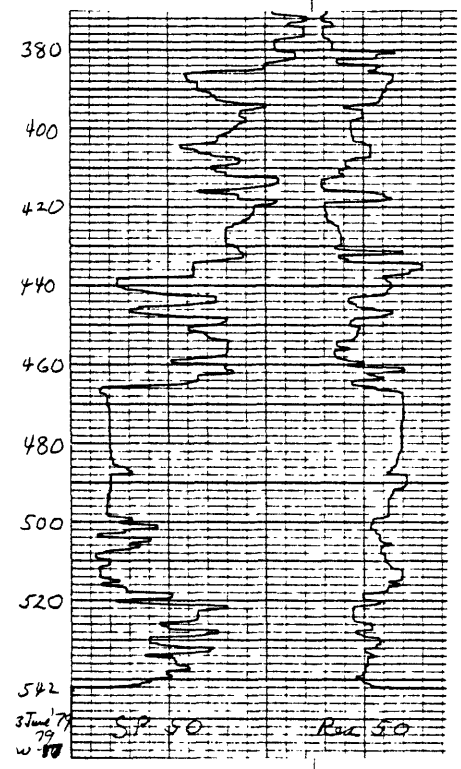
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 542 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 542 feet	Depth Feet / Meters
310-320	Sandstone, gray, fine-grained			300
320-323	Claystone, gray			
323-360	Claystone, gray			−100
360-377	Claystone, gray			
377-382	Lignite			350
382-407	Claystone, gray			
407-416	Lignite			
416-420	Claystone, gray			−120
420-520	Sandstone			400
520-540	No samples			
				450
				−140
				500
				−160
				550
				−180
				600



79W17 Hole number – continued



SP	Resistivity	Depth
Sens. setting 50 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 542 feet	Logged depth 542 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M1 Map: No Topo Date: 7-11-79 State: ND County: Mountrail

Elev.: 2156 feet Location: T. 152 N, R. 92 W, Sec. 5, Tract: cccd Drilled depth: 302 feet

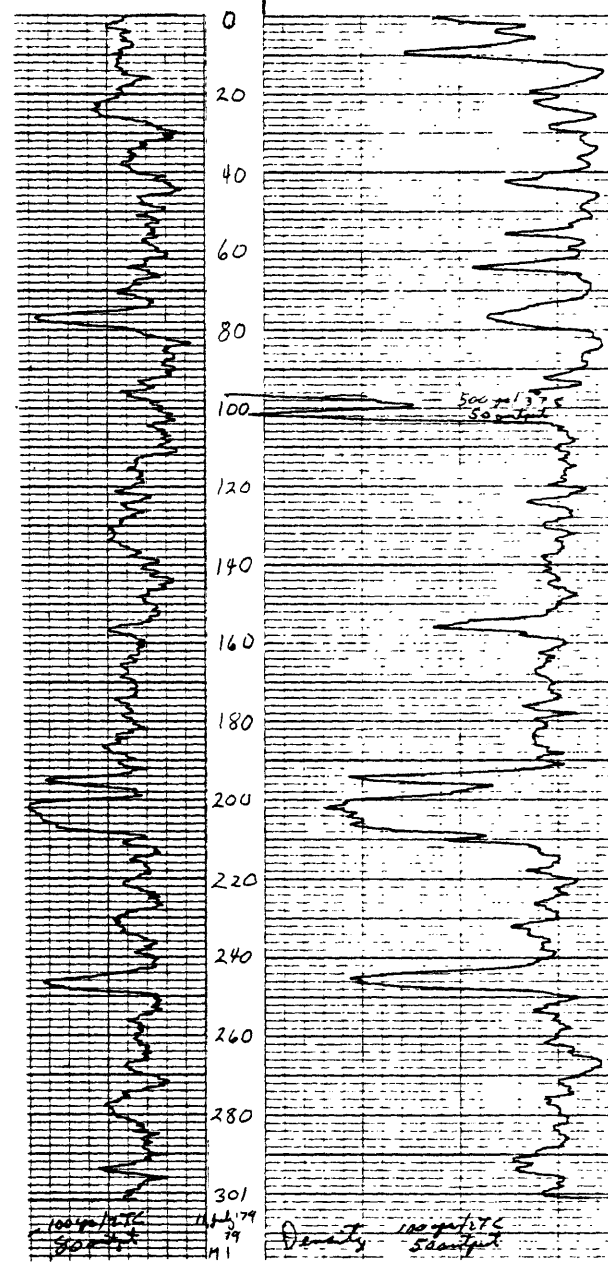
Measured: 82 ft FSL, 480 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 193-196; 199-208; 243-248

Remarks:

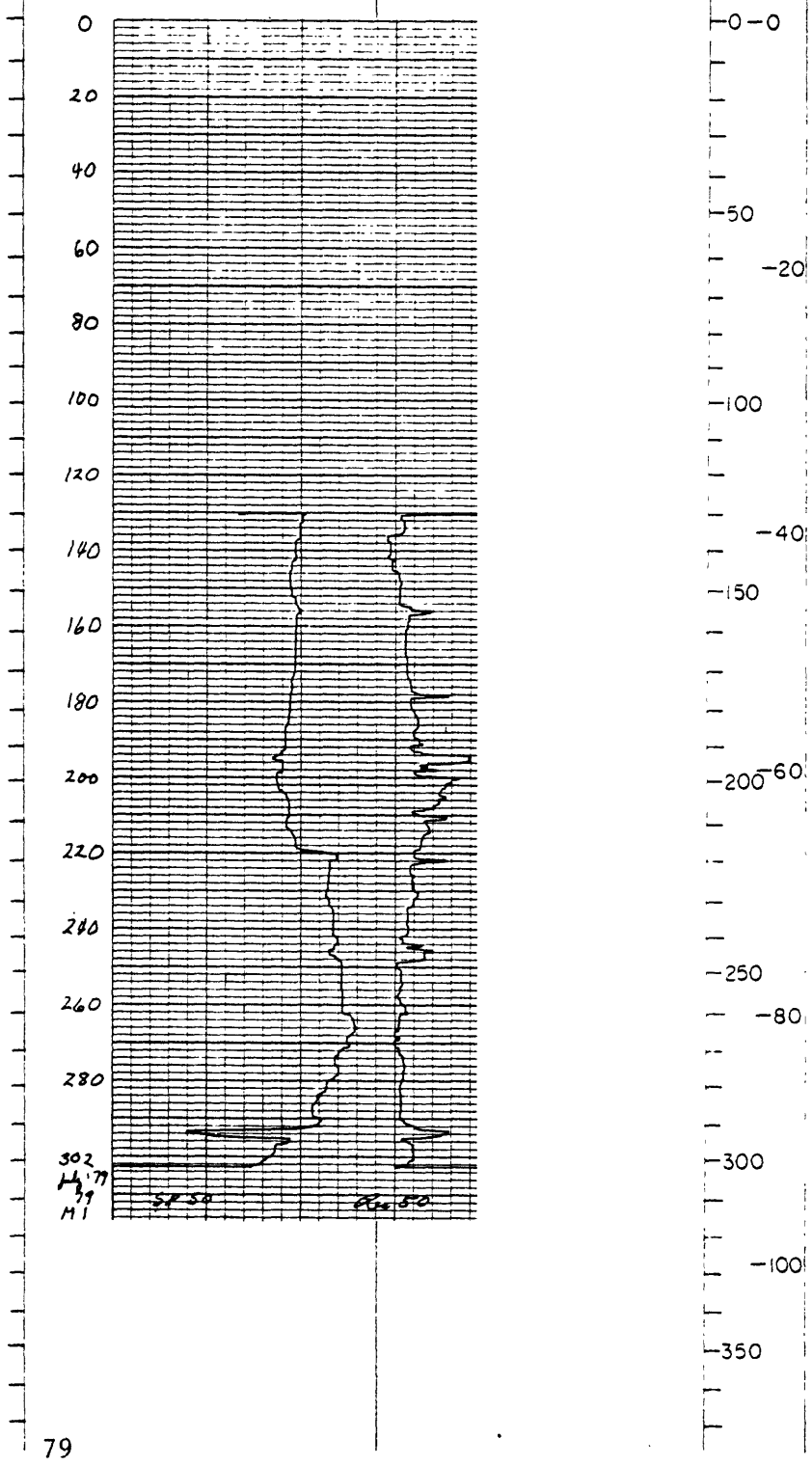
Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet	Depth Feet	Depth Meters
0- 8	Clay, brown, sandy, silty			0	0
8- 15	Till, brown, silty, sandy				
15- 19	Till, gray, silty, sandy				
19- 22	Claystone, gray, silty			50	
22- 25	Siltstone, brown, sandy				
25- 27	Claystone, dark-brown, lignitic				
27- 31	Claystone, gray				
31- 40	Claystone, brown			100	
40- 41	Claystone, dark-brown, lignitic				
41- 57	Claystone, gray				
57- 64	Claystone, bluish-green, sandy			150	
64- 70	Siltstone, gray				
70- 72	Claystone, gray, silty				
72- 74	Claystone, brown				
74- 77	Lignite				
77- 92	Claystone, gray			200	
92- 95	Siltstone, green				
95-100	Claystone, gray				
100-120	Sandstone			250	
120-300	No samples				
				300	



79M1 Hole number – *continued*

SP	Resistivity	Depth
Sens. setting 50 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 302 feet	Logged depth 302 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M2 Map: No Topo Date: 6-27-79 State: ND County: Mountrail

Elev.: 2128 Location: T. 153 N, R. 89 W, Sec. 19, Tract: bbbb Drilled depth: 303 feet

Measured: 356 ft FNL, 30 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 33.5-40; 65-67; 256-259

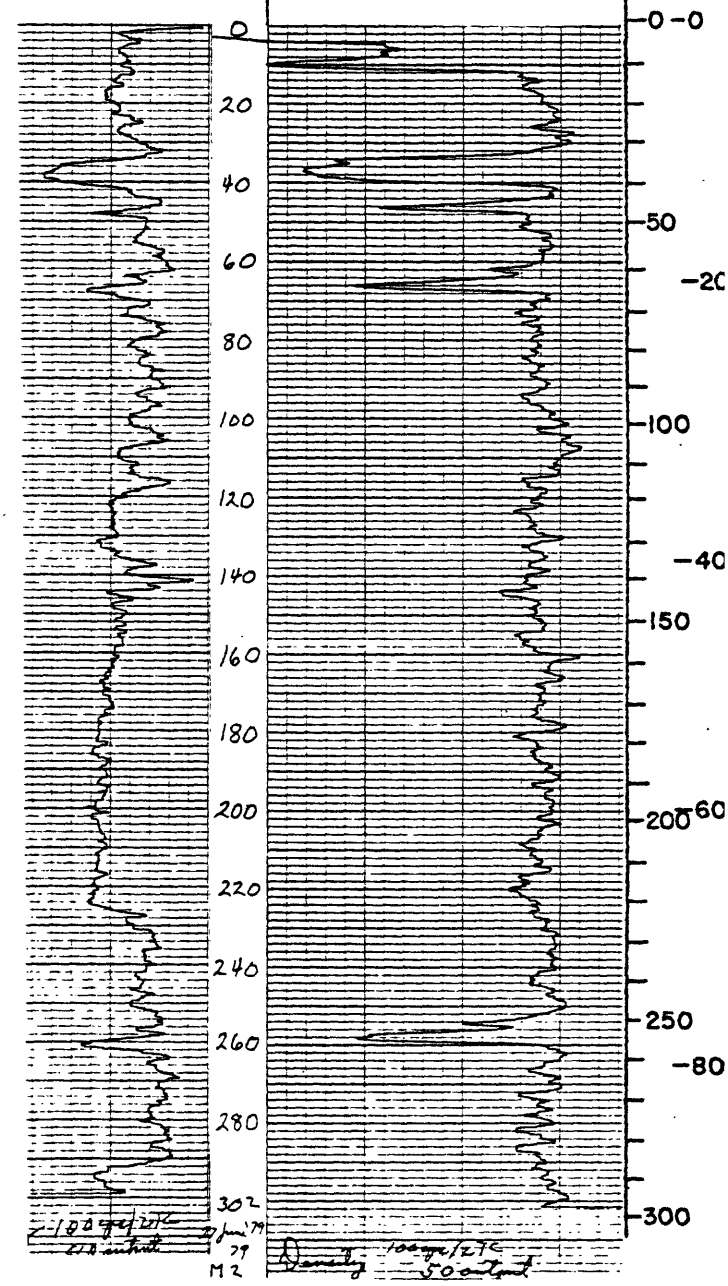
Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 1	Silt, black
1- 5	Clay, brown, gravelly
5- 14	Claystone, gray, very silty
14- 20	Siltstone, brown
20- 24	Claystone, brown, silty
24- 29	Claystone, gray
29- 31	Lignite
31- 32	Claystone, gray
32- 37	Lignite
37- 42	Claystone, grayish-brown
42- 44	Lignite
44- 48	Claystone, green
48- 52	Claystone, gray
52- 55	Claystone, green
55- 58	Claystone, gray
58- 59	Claystone, brown
59- 60	Lignite
60- 62	Claystone, brown
62- 63	Lignite
63- 70	Claystone, green
70- 80	Claystone, brown
80- 91	Claystone, gray
91-101	Claystone, brown
101-108	Claystone, light-green, silty
108-119	Claystone, dark-green
119-134	Sandstone, green, medium- to fine-grained
134-164	Sandstone greenish-gray, medium- to fine-grained
164-178	Sandstone, greenish-gray, fine-grained, clayey
178-180	Siltstone, greenish-gray, sandy
180-197	Sandstone, greenish-gray, very fine grained, clayey
197-200	Lignite
200-221	Sandstone, greenish-gray, fine-grained, clayey

Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 303 feet

Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 303 feet



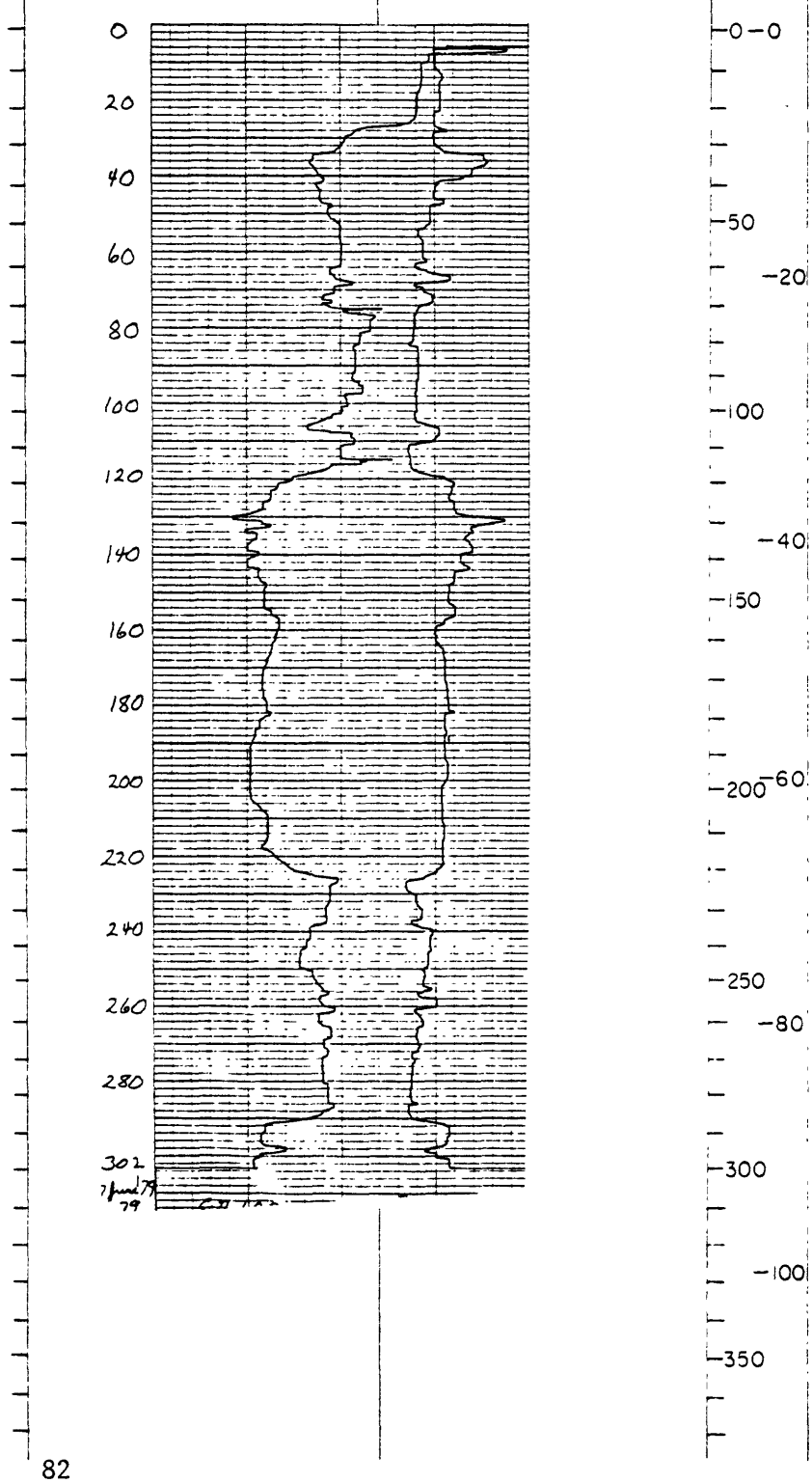
Hole number—continued

79M2

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 303 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 303 feet	Depth Feet / Meters
221-224	Claystone, brown			300
224-240	Claystone, green			
240-253	Claystone, grayish-brown, silty			100
253-255	Lignite			
255-257	Claystone, gray			
257-258	Lignite			350
258-260	Claystone, light-green, sandy			
260-263	Claystone, brown			
263-280	Claystone, green			
280-289	Claystone, gray			120
289-300	Sandstone, grayish-green, medium-grained, clayey			400
				450 140
				500
				160
				550
				180
				600

79M2 Hole number-continued

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 303 feet	Logged depth 303 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M3 Map: No Topo Date: 6-28-79 State: ND County: Mountrail

Elev.: 2048 feet Location: T. 153 N, R. 90 W, Sec. 28, Tract: cccc Drilled depth: 303 feet

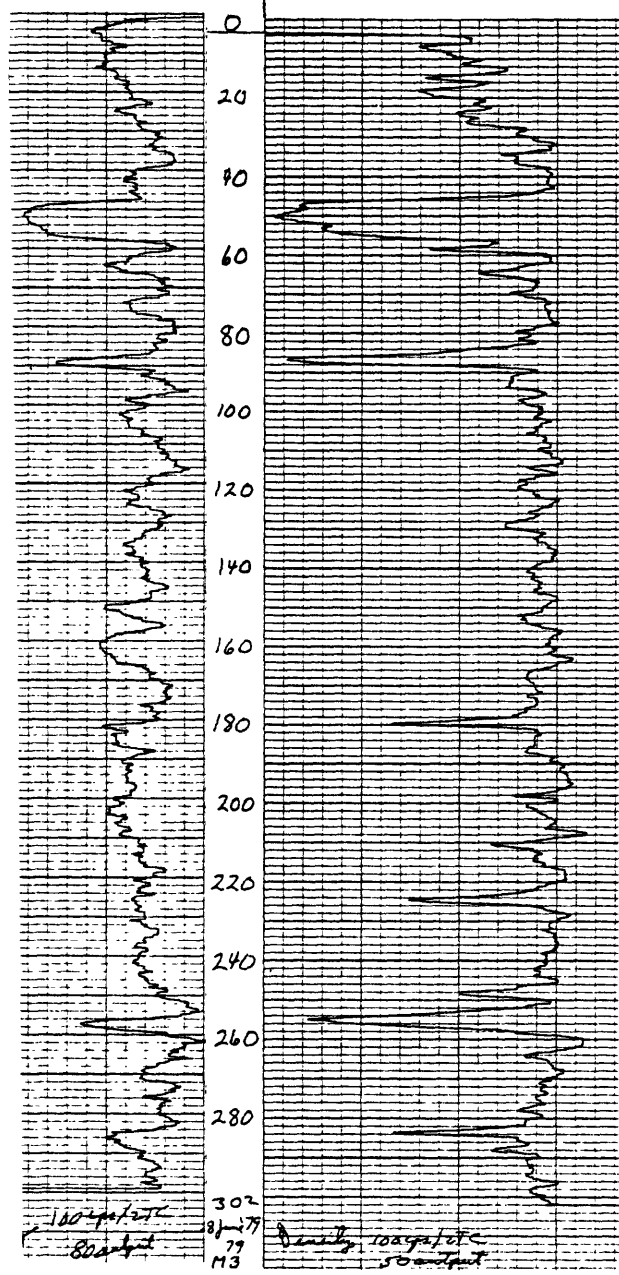
Measured: 45 ft FSL, 147 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds. 46-56; 85-88; 253-257

Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 303 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 303 feet	Depth Feet	Depth Meters
0- 1	Silt, black				
1- 3	Gravel, brown				
3- 16	Till, brown, silty, clayey, pebbly				
16- 17	Lignite				
17- 20	Claystone, grayish-brown				
20- 23	Siltstone, grayish-brown				
23- 44	Claystone, gray				
44- 51	Lignite				
51- 52	Claystone, brown				
52- 55	Claystone, green				
55- 56	Lignite				
56- 61	Claystone, green, sandy				
61- 65	Claystone, gray				
65- 68	Claystone, grayish-brown				
68- 76	Claystone, green				
76- 83	Claystone, gray				
83- 84	Claystone, brown				
84- 85	Lignite				
85- 86	Claystone, brown				
86- 90	Claystone, dark-green				
90- 95	Claystone, grayish-green, silty				
95-103	Siltstone, grayish-brown, clayey				
103-106	Claystone, gray				
106-110	Claystone, dark-brown, carbonaceous				
110-112	Claystone, green				
112-116	Claystone, light-green				
116-122	Claystone, grayish-white, silty				
122-128	Claystone, dark-brown, carbonaceous				
128-143	Claystone, grayish-brown, silty				
143-145	Claystone, green, silty				
145-147	Claystone, dark-brown, carbonaceous				



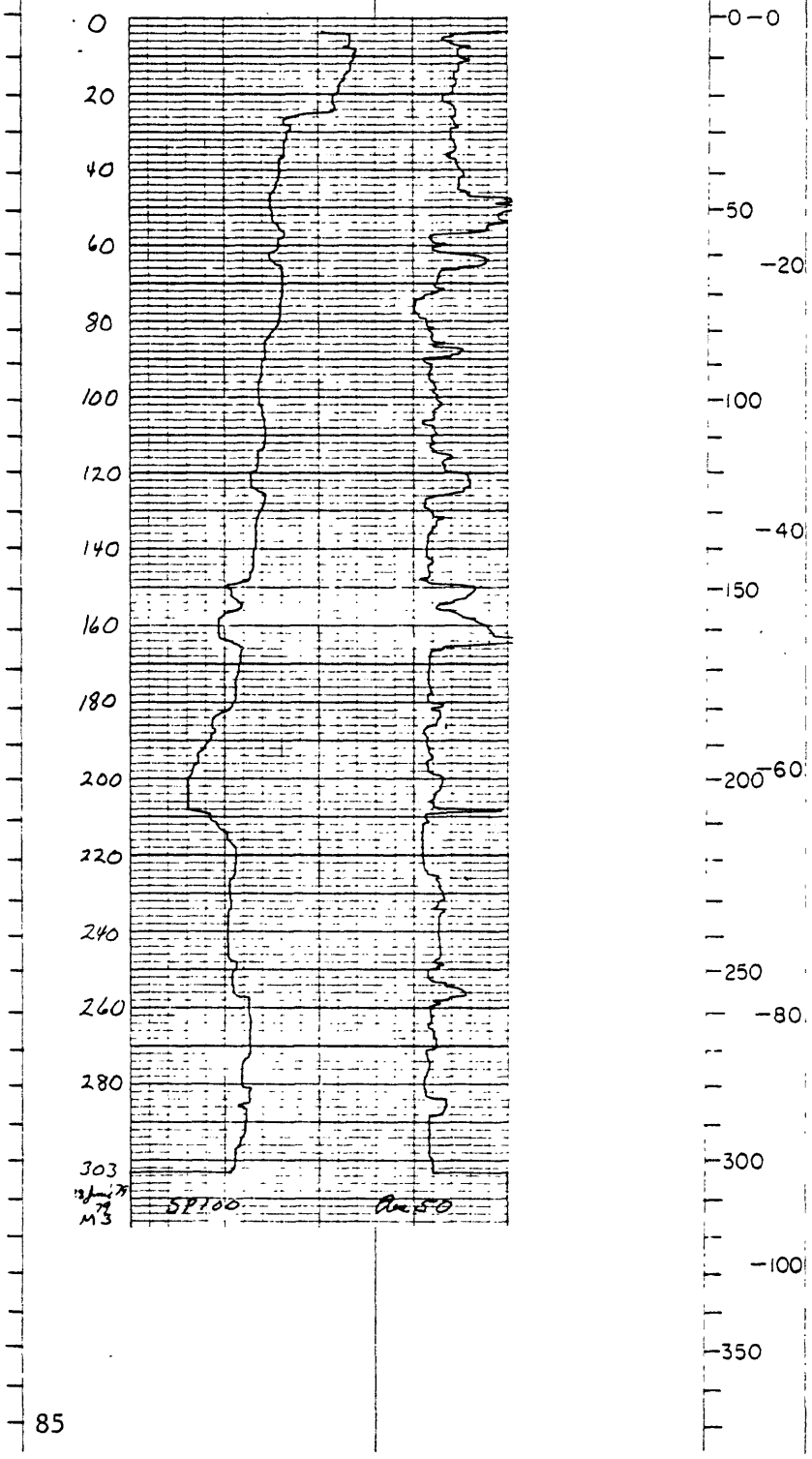
Hole number—continued

79M3

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 303 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 303 feet	Depth Feet / Meters
147-148	Claystone, brown			300
148-157	Claystone, grayish-brown, silty			
157-163	Claystone, light-tan, silty			—100
163-178	Claystone, gray			
178-182	Sandstone, gray, fine-grained, clayey			350
182-194	Claystone, gray, silty			
194-201	Sandstone, gray, fine grained, clayey			
201-207	Claystone, gray, silty			—120
207-208	Claystone, dark-brown, carbonaceous			400
208-221	Claystone, gray			
221-222	Claystone, dark-brown, carbonaceous			
222-227	Sandstone, gray, fine-grained, clayey			450
227-243	Claystone, gray, silty			—140
243-246	Claystone, brown			
246-250	Claystone, green, silty			
250-251	Claystone, brown			
251-253	Lignite			
253-268	Claystone, grayish-brown, silty			500
268-271	Claystone, brown, carbonaceous			—160
271-282	Claystone, green, sandy			
282-291	Sandstone, green, medium-grained, clayey			550
291-300	Claystone, grayish-green, silty			
				—180
				600

79M3 Hole number - continued

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 303 feet	Logged depth 303 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M4 Map: No Topo Date: 6-28-79 State: ND County: Mountrail

Elev.: 2364feet Location: T. 153 N, R. 91 E W, Sec. 5, Tract: dccc Drilled depth: 303 feet

Measured: 24 ft FSL, 2571ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

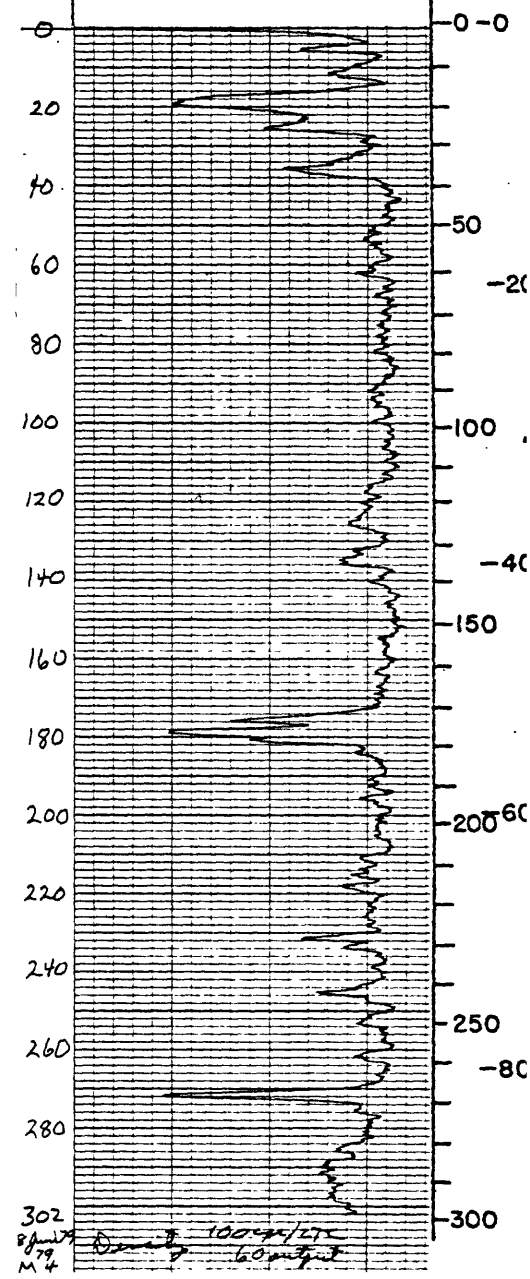
Lignite beds: 178-180; 270-272.5

Remarks: No gamma log run

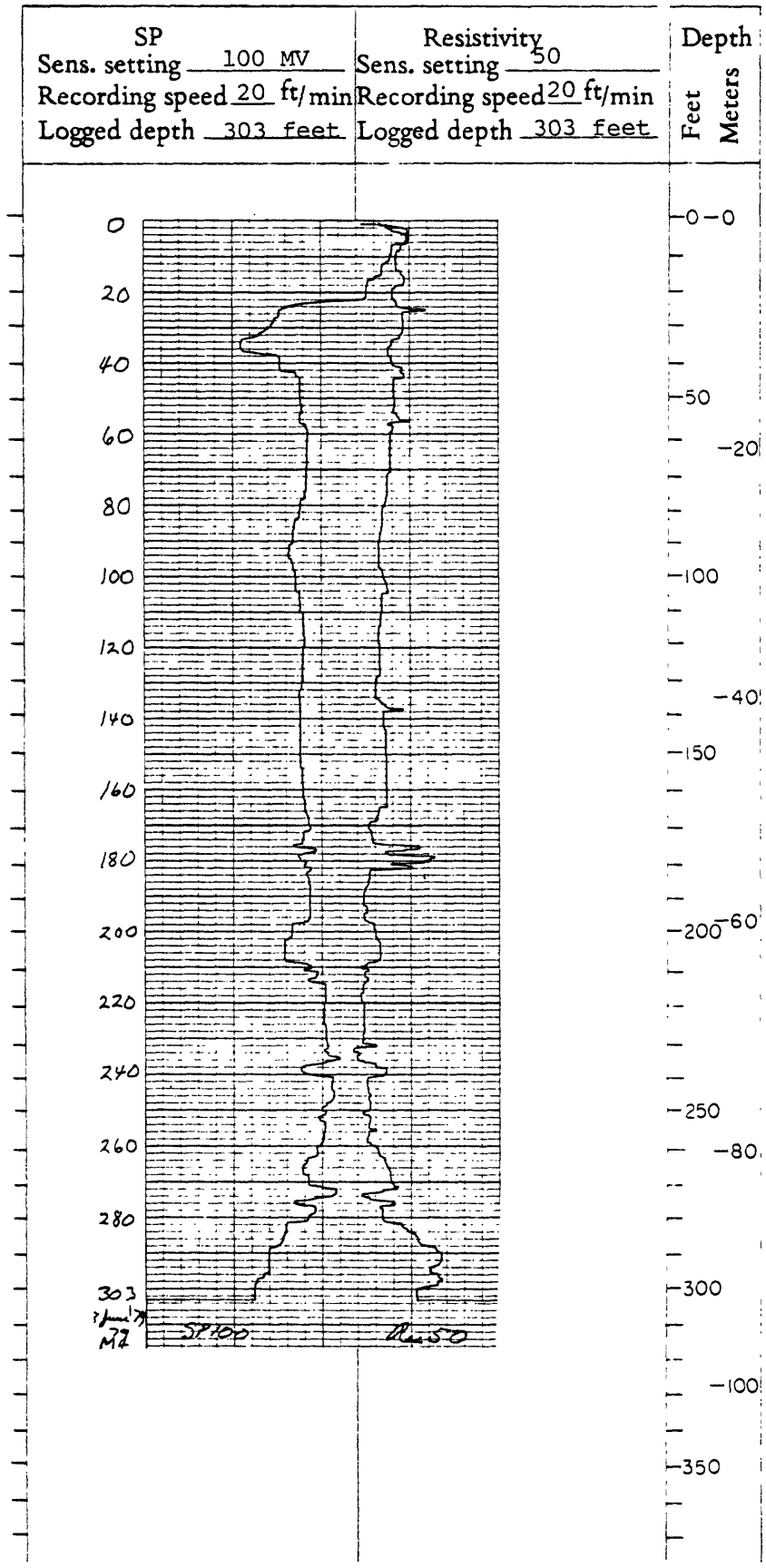
Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma	Density	Depth
		T.C. ___ Range ___	T.C. 2 Range 100 cps	Feet / Meters
		Recording speed ___ ft/min	Recording speed 20 ft/min	
		Logged depth ___	Logged depth 303 feet	

0- 2	Clay, brown, sandy, gravelly
2- 24	Till, brown, sandy, pebbly
24- 30	Till, gray, sandy, gravelly
30- 40	Sand, gray, fine-grained
40- 42	Gravel, brown
42- 61	Till, grayish-brown, clayey, gravelly
61-160	Till, gray, clayey, sandy, gravelly
160-175	Claystone, gray
175-176	Lignite
176-194	Claystone, gray
194-198	Siltstone, gray
198-236	Claystone, gray
236-243	Siltstone, grayish-green
243-258	Claystone, grayish-green
258-273	Sandstone, grayish-green, clayey
273-290	Claystone, grayish-brown, carbonaceous
290-300	Sandstone, grayish-green, fine-grained, clayey



79M4 Hole number - continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M5 Map: No Topo Date: 6-28-79 State: ND County: Mountrail

Elev.: 2002 feet Location: T. 153 N, R. 91 W, Sec. 27, Tract: cccb Drilled depth: 303 feet

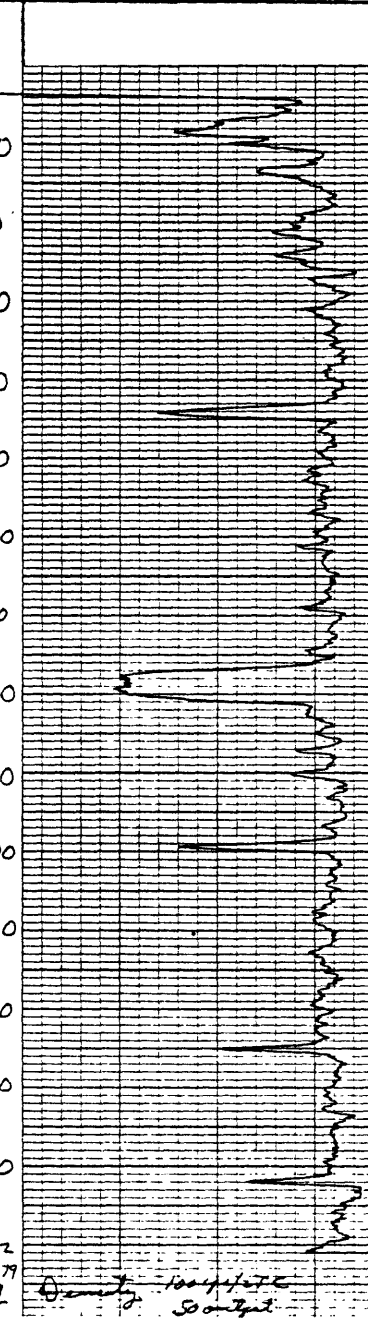
Measured: 381 ft FSL, 48 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 87-90; 154-162

Remarks: no gamma log run

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Density: T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 303 feet	Depth Feet	Depth Meters
0- 1	Silt, black				
1- 4	Gravel, brown, sandy			0	0
4- 28	Till, brownish-orange, silty, clayey, gravelly			20	
28- 47	Sandstone, brown, fine grained			40	
47- 48	Lignite				
48- 89	Sandstone, gray, very fine-grained			50	
89- 90	Lignite			60	20
90-101	Sandstone, gray, very fine-grained			80	
101-121	Siltstone, gray, clayey				
121-145	Sandstone, gray, medium-to fine grained			100	100
145-146	Claystone, dark-brown			120	
153-157	Lignite				
157-162	Claystone, brownish-tan				40
162-166	Siltstone, green			140	
166-171	Claystone, gray, silty				150
171-172	Claystone, brown			160	
172-181	Claystone, green, silty				
181-197	Claystone, gray			180	
197-198	Lignite				
198-201	Claystone, green, silty				
201-209	Claystone, grayish-brown			200	200 60
209-216	Siltstone, gray				
216-222	Claystone, grayish-brown, silty			220	
222-223	Claystone, dark-brown				
223-234	Claystone, pale-green			240	
234-238	Claystone, dark-brown				250
238-243	Siltstone, gray, clayey			260	80
243-246	Claystone, gray				
246-247	Lignite				
247-260	Claystone, tan, silty			280	
260-263	Sandstone, brown, fine grained				
263-266	Sandstone, brown, very fine-grained			302	300



8-29-79 MS

88

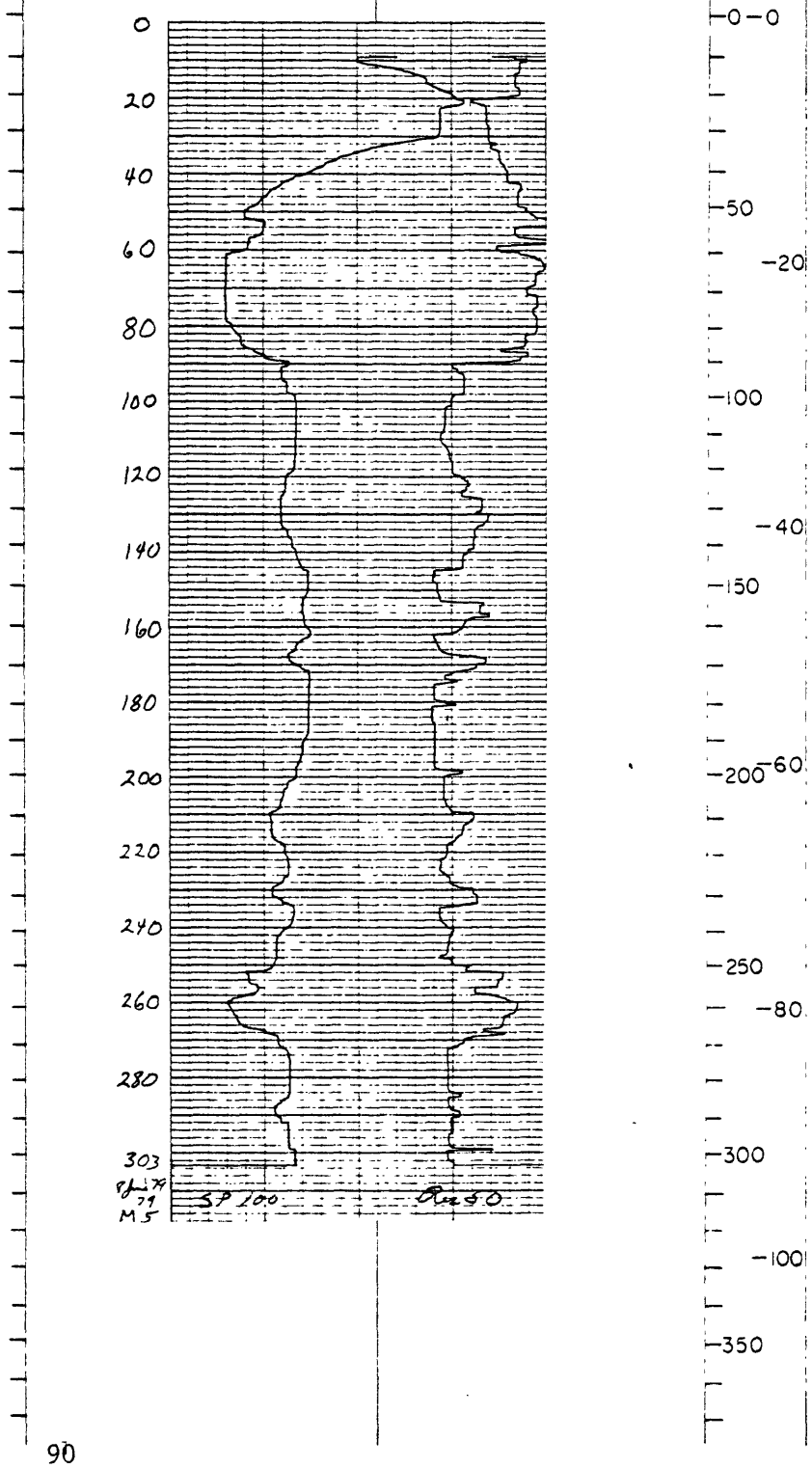
Hole number—continued

79M5

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 303 feet	Depth Feet / Meters
266-267 Claystone, brown 267-271 Claystone, tan 271-288 Claystone, gray 288-289 Lignite 289-300 Claystone, greenish-gray, silty			300 100 350 120 400 450 140 500 160 550 180 600

79M5 Hole number – Continued

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 303 feet	Logged depth 303 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M6 Map: No Topo Date: 7-01-79 State: ND County: Mountrail

Elev.: 2394 feet Location: T. 153 N, R. 92 W, Sec. 2, Tract: aada Drilled depth: 303 feet

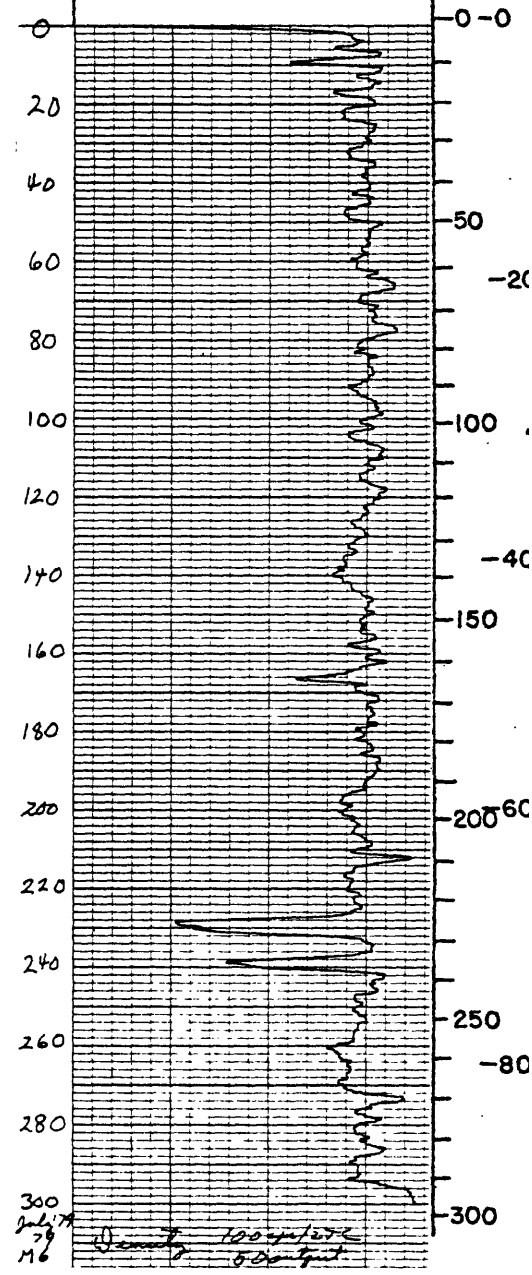
Measured: 700 ft FNL, 105 ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 228-232; 238-240.5

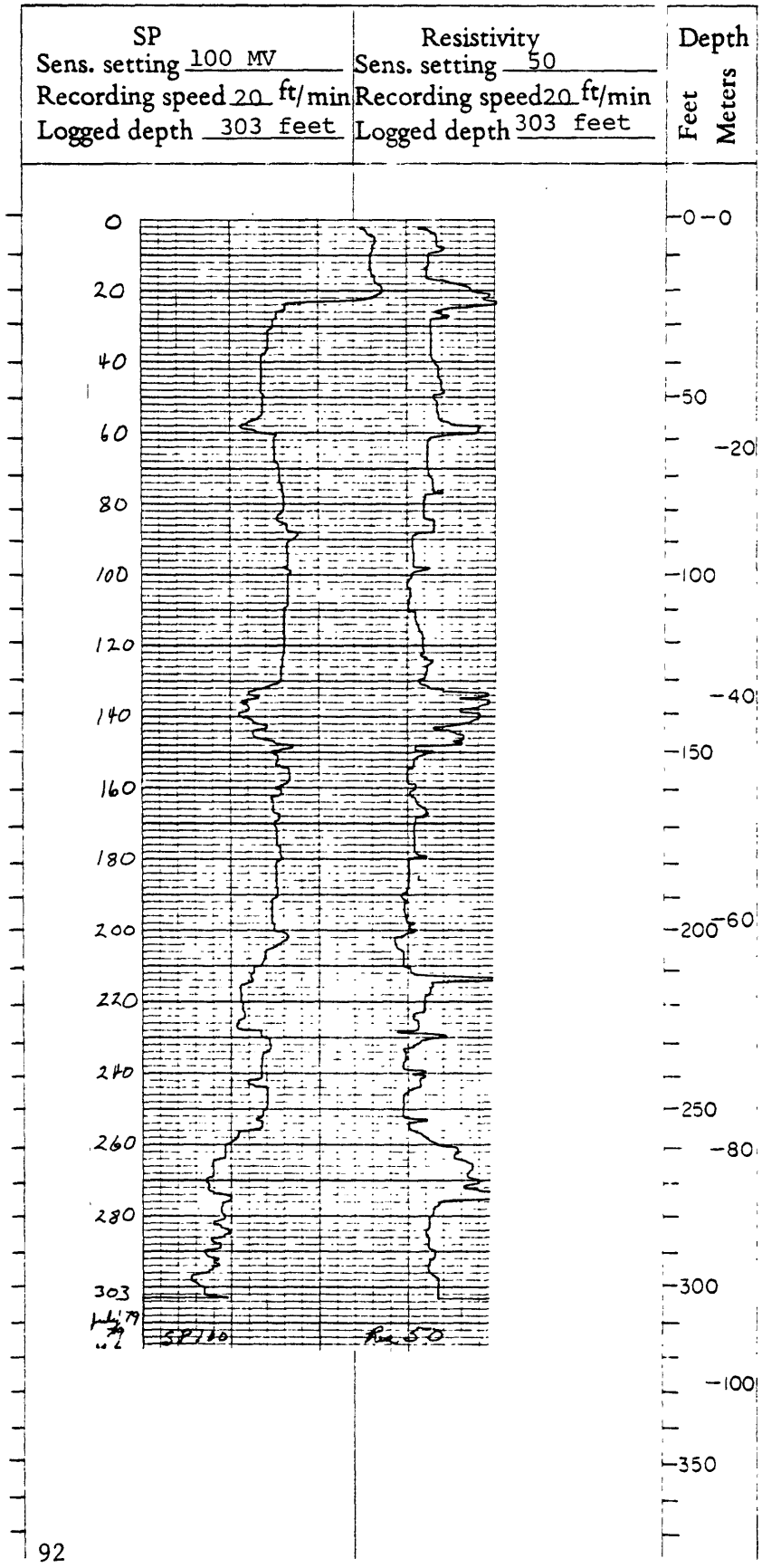
Remarks: No gamma log run

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma	Density	Depth
		T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 303 feet	Feet / Meters
0- 18	Silt, brown, sandy			
18- 22	Gravel, brown, sandy			
22- 30	Till, brown, silty			
30- 65	Till, brownish-gray, silty			
65- 82	Till, gray, clayey			
82- 87	Siltstone, gray, clayey			
87-106	Claystone, bluish-gray, silty			
106-109	Claystone, gray			
109-128	Siltstone, gray			
128-144	Sandstone, gray, fine-grained, silty			
144-156	Claystone, gray			
156-163	Claystone, bluish-gray			
163-165	Lignite			
165-168	Claystone, gray			
168-172	Siltstone, gray			
172-196	Claystone, gray			
196-201	Claystone, bluish-gray			
201-208	Claystone, gray			
208-215	Siltstone, greenish-blue, sandy			
215-225	Sandstone, gray, fine-grained, silty			
225-230	Lignite			
230-234	Claystone, gray			
234-237	Lignite			
237-242	Siltstone, gray, clayey			
242-250	Claystone, gray, silty			
250-256	Siltstone, gray, clayey			
256-300	Sandstone, gray, medium-grained, silty			



79M6 Hole number - continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M7 Map: No Topo Date: 7-10-79 State: ND County: Mountrail

Elev.: 2250 feet Location: T. 153 N, R. 92 W, Sec. 23, Tract: bbbb Drilled depth: 302 feet

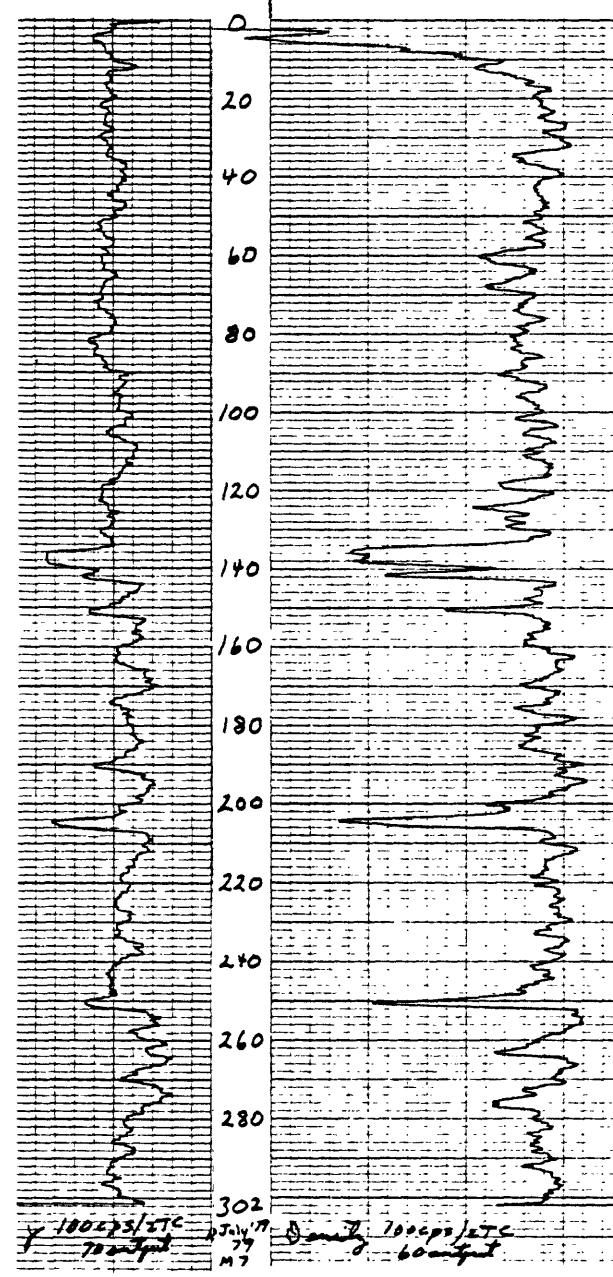
Measured: 30 ft FNL, 35 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 134-139; 203-206

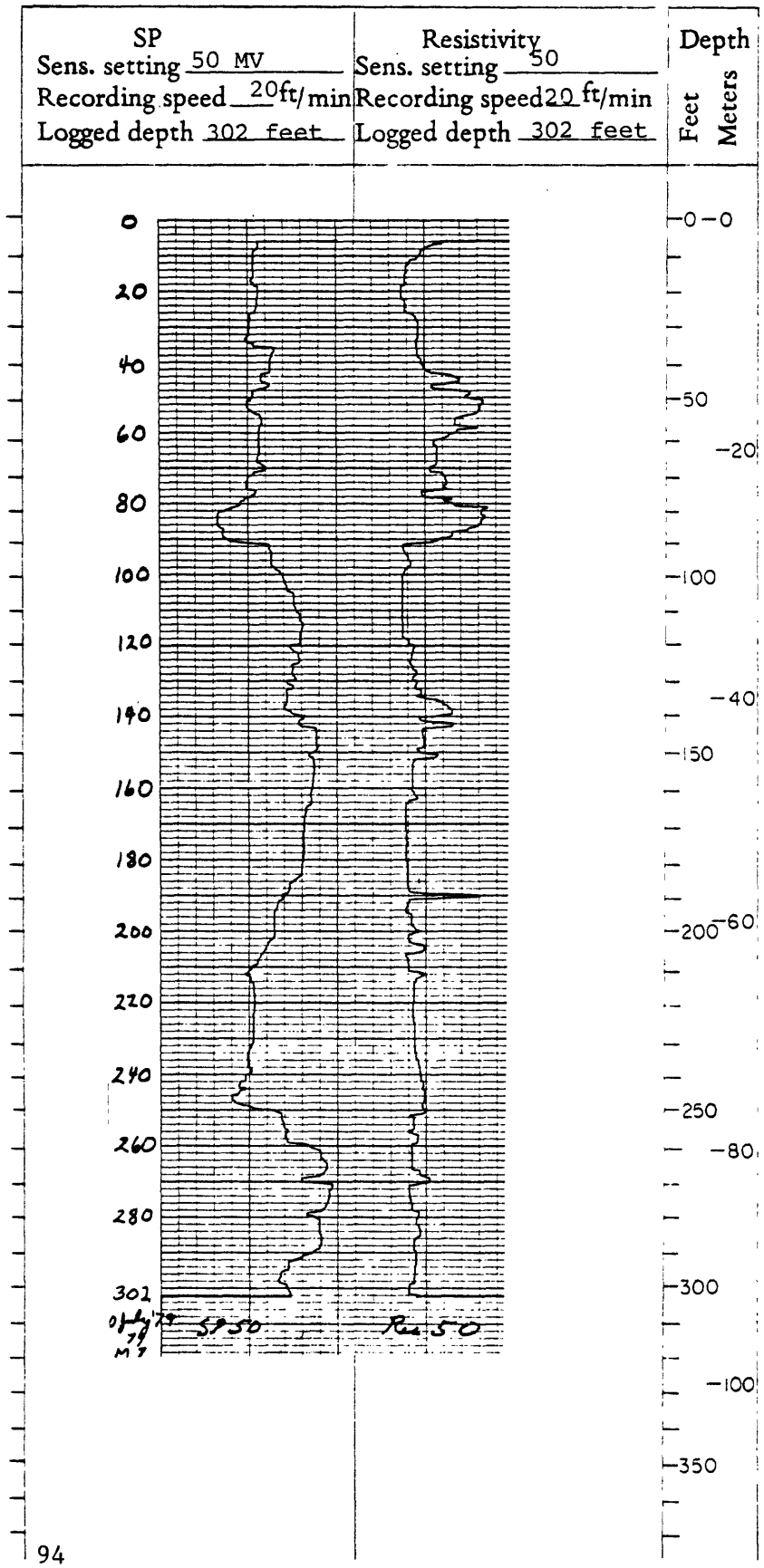
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet	Depth Feet	Depth Meters
0- 1	Silt, black				
1- 34	Till, brown, clayey				
34- 60	Silt, gray, clayey				
60- 63	Till				
63- 64	Lignite				
64- 77	Sandstone, gray, fine-grained, silty				
77- 87	Siltstone, brown, clayey				
87- 88	Claystone, bluish-green				
88-101	Siltstone, gray, clayey				
101-111	Claystone, gray				
111-127	Siltstone, gray, sandy				
127-131	Claystone, grayish-brown, carbonaceous				
131-135	Lignite				
135-157	Claystone, gray				
157-170	Sandstone, gray, fine-grained				
170-300	No samples				



79M7 Hole number - continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M8 Map: No Topo Date: 7-12-79 State: ND County: Mountrail

Elev.: 2136 feet Location: T. 153 N, R. 93 W, Sec. 1, Tract: dddd Drilled depth: 302 feet

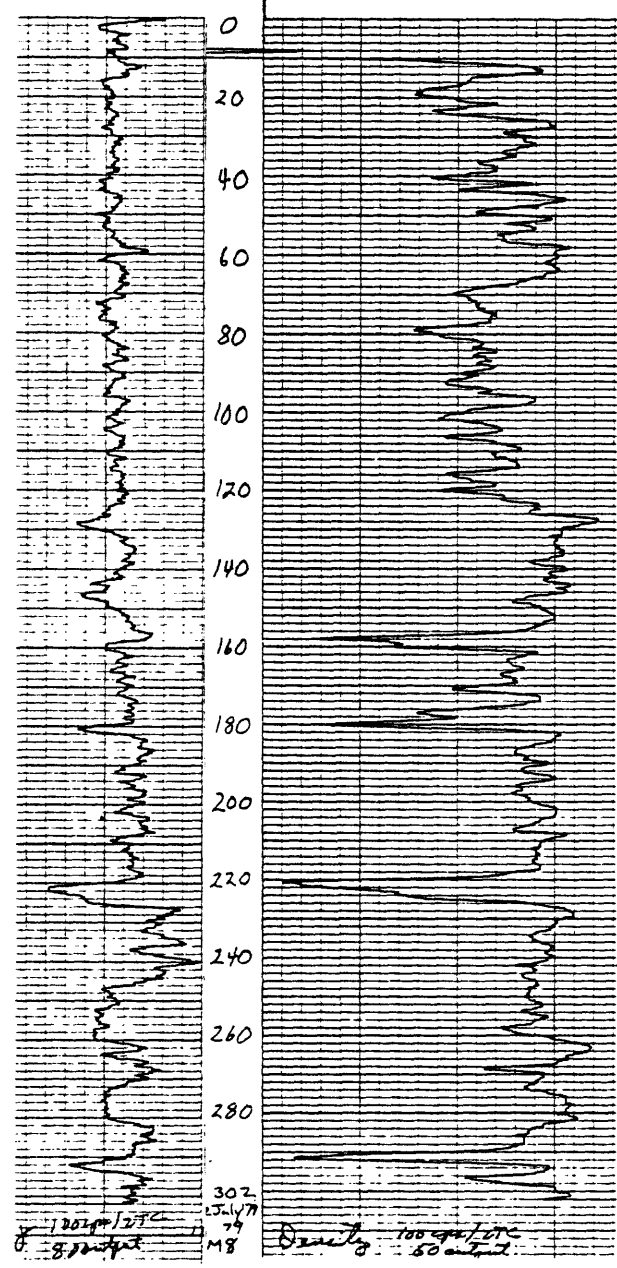
Measured: 27 ft FSL, 41 ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 157-160; 179-181; 220-225; 290-292

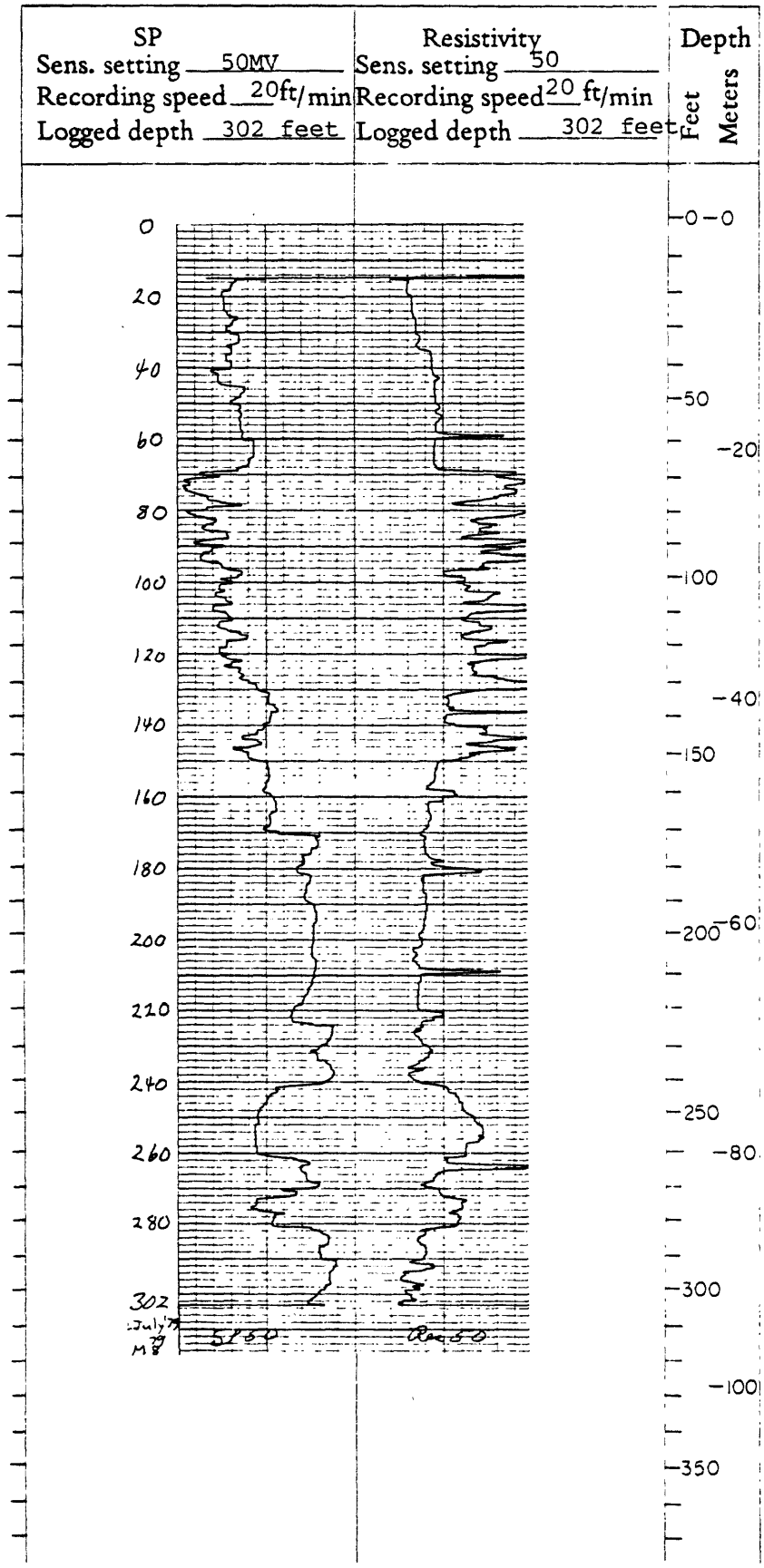
Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma: T.C. 2 Range 100 cps, Recording speed 20 ft/min, Logged depth 302 feet	Density: T.C. 2 Range 100 cps, Recording speed 20 ft/min, Logged depth 302 feet	Depth Feet	Depth Meters
0- 1 Silt, black				
1- 29 Till, brown, clayey, sandy, gravelly				
29- 34 Till, grayish-brown, clayey, sandy, gravelly, pebbly				
34- 60 Till, gray, silty, sandy, gravelly, pebbly				
60- 61 Gravel, brown, pebbly				
61- 62 Lignite, no samples				
62-180 Sandstone, brown, fine-grained				
180-300 No samples				



79M8 Hole number - continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M9 Map: No Topo Date: 6-29-79 State: ND County: Mountrail

Elev.: 2284 feet Location: T. 155 N, R. 91 W, Sec. 35, Tract: cccd Drilled depth: 303 feet

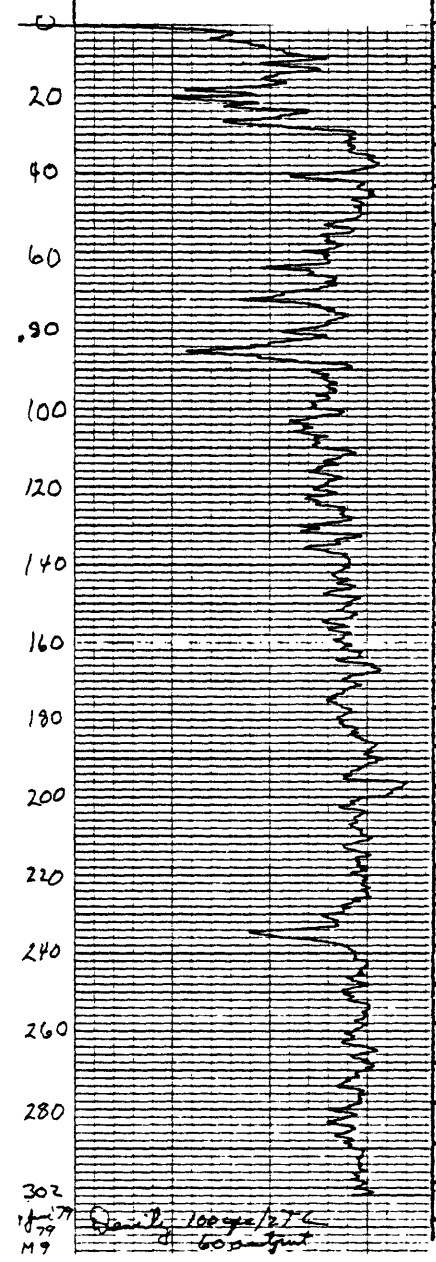
Measured: 18 ft FSL, 495 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 234-236

Remarks: No gamma log run

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma: T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Density: T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 303 feet	Depth Feet	Depth Meters
0- 6 Gravel, brown, sandy			0	0
6- 18 Till, brown, clayey				
18- 19 Gravel				
19- 26 Till, brownish-gray				
26- 27 Gravel, brown, sandy				
27- 65 Till, gray, clayey				
65- 88 Till, brown, clayey			50	
88- 91 Gravel, brown, sandy				
91-110 Till, dark-brown, clayey				20
110-114 Gravel, brown, clayey				
114-116 Till, brown, clayey				
116-122 Till, dark-brown, clayey				
122-175 Till, gray, clayey			100	
175-180 Sand, brown, fine-grained				
180-187 Till, gray, clayey				
187-190 Gravel, brown, sandy				
190-202 Till, gray, sandy				
202-225 Sandstone, greenish-blue, medium-grained, silty				40
225-230 Claystone, grayish-brown, carbonaceous			150	
230-235 Siltstone, grayish-brown, carbonaceous, clayey				
235-246 Claystone, grayish-brown, carbonaceous				
246-258 Siltstone, grayish-brown, clayey			200	60
258-280 Sandstone, greenish-gray, fine-grained, silty				
280-300 Claystone, gray, silty			250	
				80
			300	

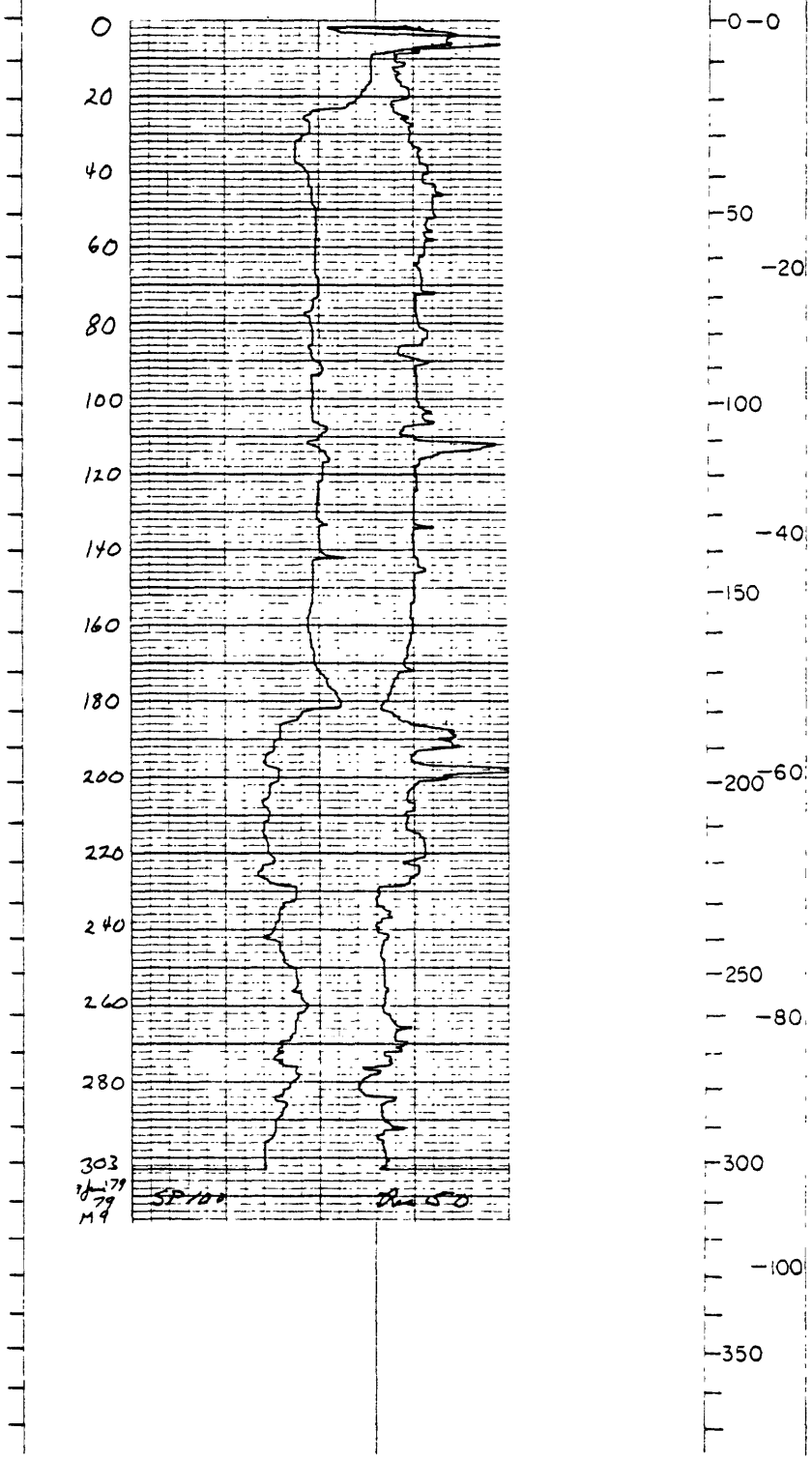


97

79M9

Hole number - continued

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 303 feet	Logged depth 303 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M10 Map No Topo Date: 6-29-79 State: ND County: Mountrail

Elev.: 2268 feet Location: T. 154 N, R. 91 W, Sec. 22, Tract: CCCC Drilled depth: 303 feet

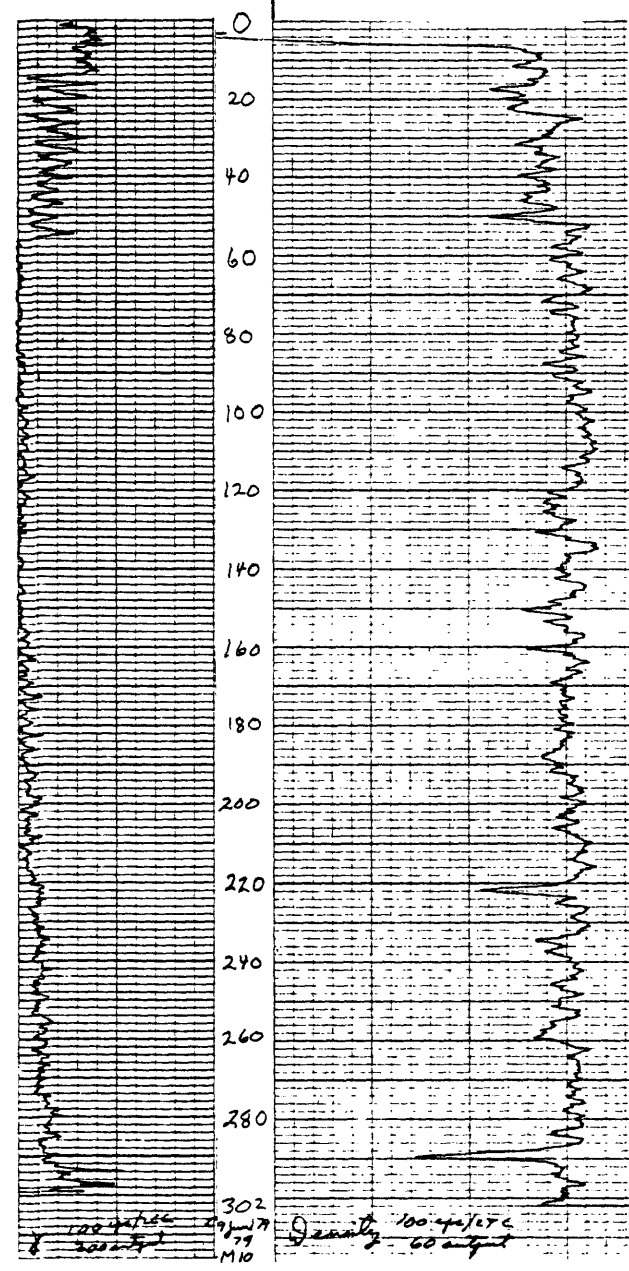
Measured: 59 ft FSL, 66 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 288-290

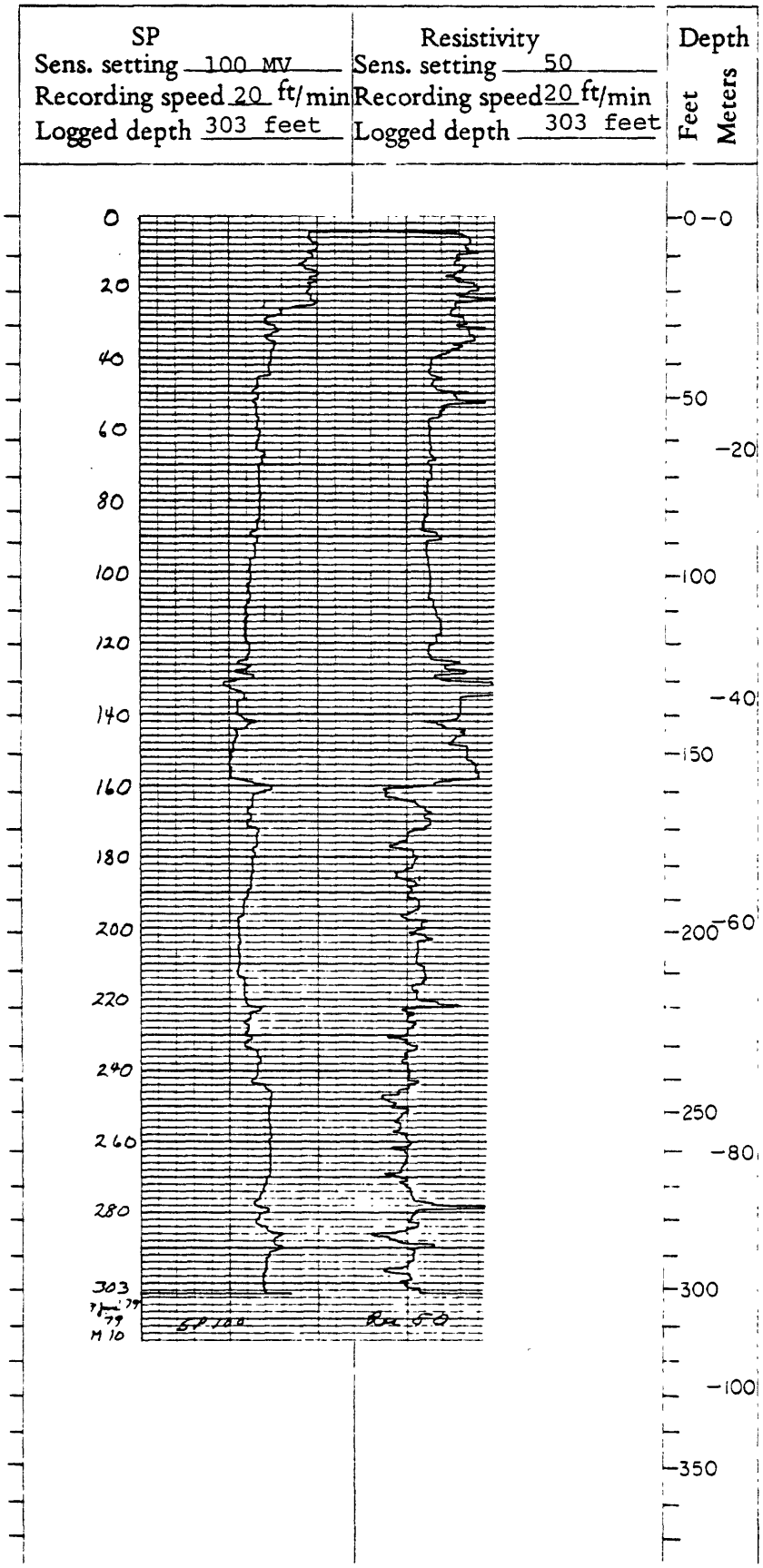
Remarks: No gamma log run

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Density: T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 303 feet	Depth Feet	Depth Meters
0- 5	Gravel, brown, sandy			0	0
5- 20	Till, brown, silty				
20- 44	Till, gray, clayey				
44- 51	Gravel, brown, sandy				
51- 80	Till, brown, clayey			50	
80-130	Till, gray, clayey				20
130-132	Gravel, brown, sandy				
132-156	Sandstone, brown, fine-grained			100	
156-157	Lignite				
157-158	Claystone, dark-brown, carbonaceous				
158-160	Siltstone, greenish-blue, clayey				40
160-183	Claystone, gray, silty			150	
183-210	Siltstone, gray, clayey				
210-216	Claystone, gray				
216-217	Claystone, brown, carbonaceous			200	60
217-218	Lignite				
218-257	Claystone, gray, silty			250	
257-289	Siltstone, gray, clayey				80
289-291	Lignite				
291-300	Siltstone, gray, clayey			300	



79M10 Hole number - continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M11 Map: No Topo Date: 6-30-79 State: ND County: Mountrail

Elev.: 2326 feet Location: T. 154 N, R. 91 W, Sec. 5, Tract: cccd Drilled depth: 303 feet

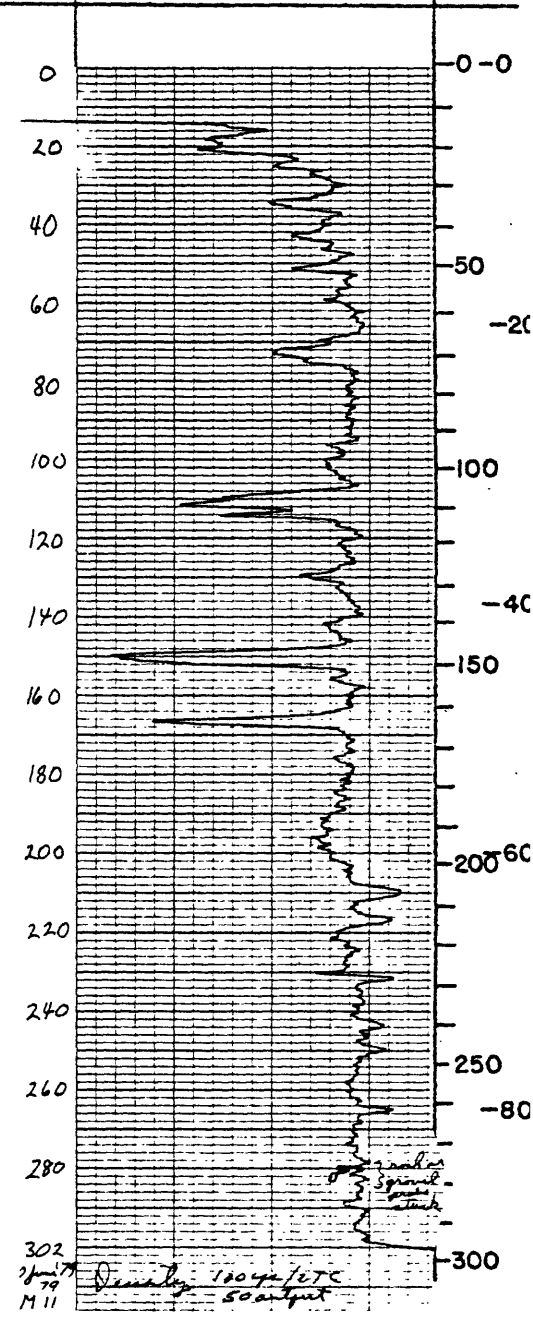
Measured: 22 ft FSL, 470 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

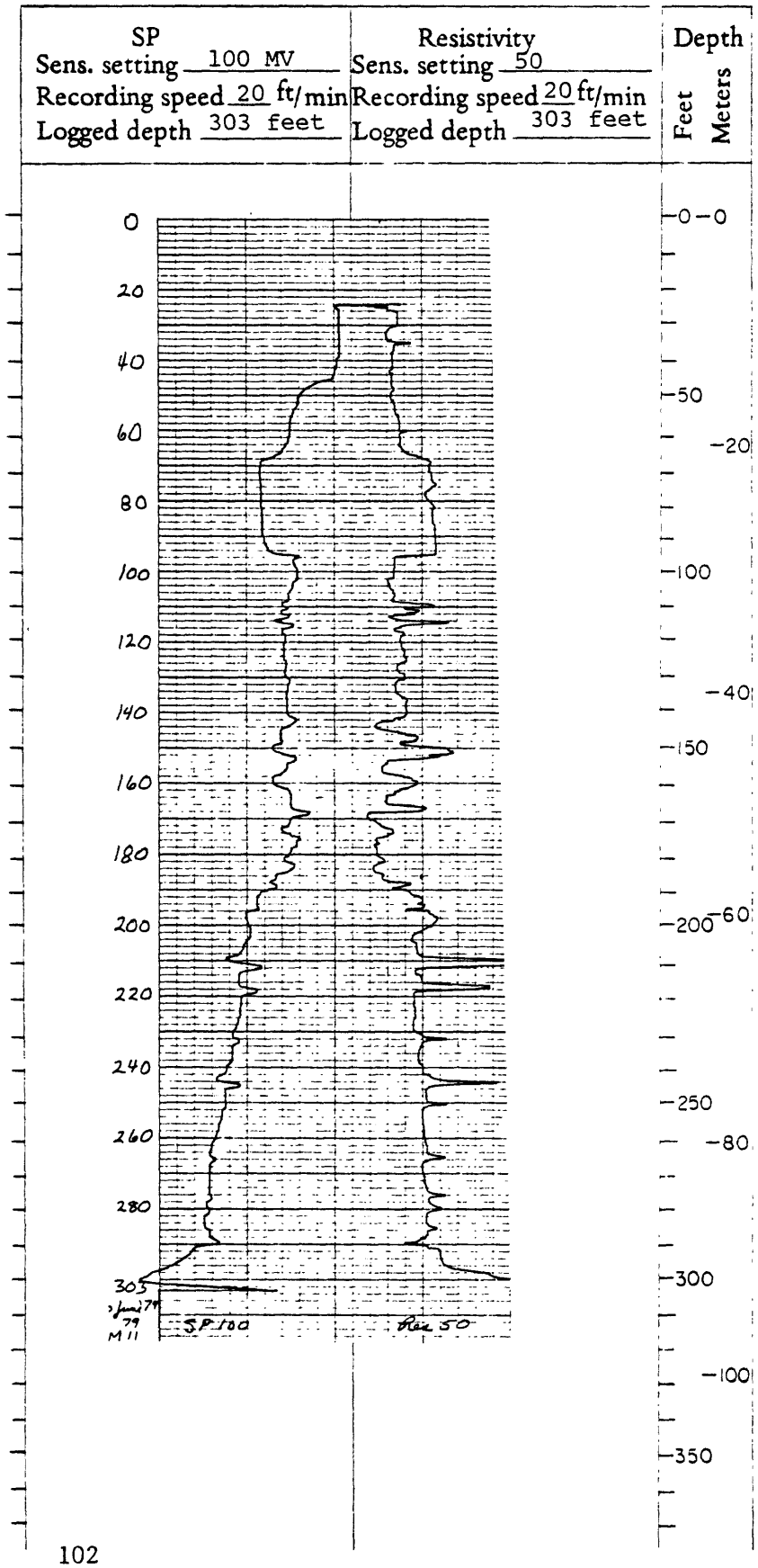
Lignite beds: 109-112; 148-152

Remarks: No gamma log run

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Density: T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 303 feet	Depth Feet	Depth Meters
0- 17	Clay, brown, silty, gravelly			0	0
17- 67	Till, brown, silty, gravelly				
67- 95	Sandstone, brown, medium- to fine-grained			50	20
95- 97	Claystone, brown				
97-105	Claystone, gray				
105-108	Lignite				
108-109	Claystone, gray				
109-110	Lignite				
110-120	Claystone, bluish-green, silty			100	40
120-133	Claystone, gray, silty				
133-139	Siltstone, gray				
139-140	Claystone, brown				
140-145	Siltstone, gray, clayey			150	60
145-148	Lignite				
148-149	Claystone, green, silty				
149-151	Claystone, tan				
151-154	Claystone, gray, silty			200	80
154-158	Siltstone, gray				
158-163	Claystone, gray, silty				
163-165	Lignite				
165-172	Claystone, bluish-green, silty			250	100
172-176	Claystone, grayish-brown				
176-180	Claystone, light-green, silty				
180-182	Claystone, gray, silty				
182-222	Siltstone, gray, sandy			300	
222-300	Sandstone, gray, medium-grained				




SP
Sens. setting 100 MV
Recording speed 20 ft/min
Logged depth 303 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 303 feet
Depth
Feet
Meters
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
303
79 M11
SP 100
Res 50
0
50
100
150
200
250
300
350
0
20
40
60
80
100

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M12 Map: No Topo Date: 7-13-79 State: ND County: Mountrail

Elev.: 2284 feet Location: T. 154 N, R. 92 W, Sec. 5, Tract: dcda Drilled depth: 342 feet

Measured: 552 ft FSL, 1426 ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

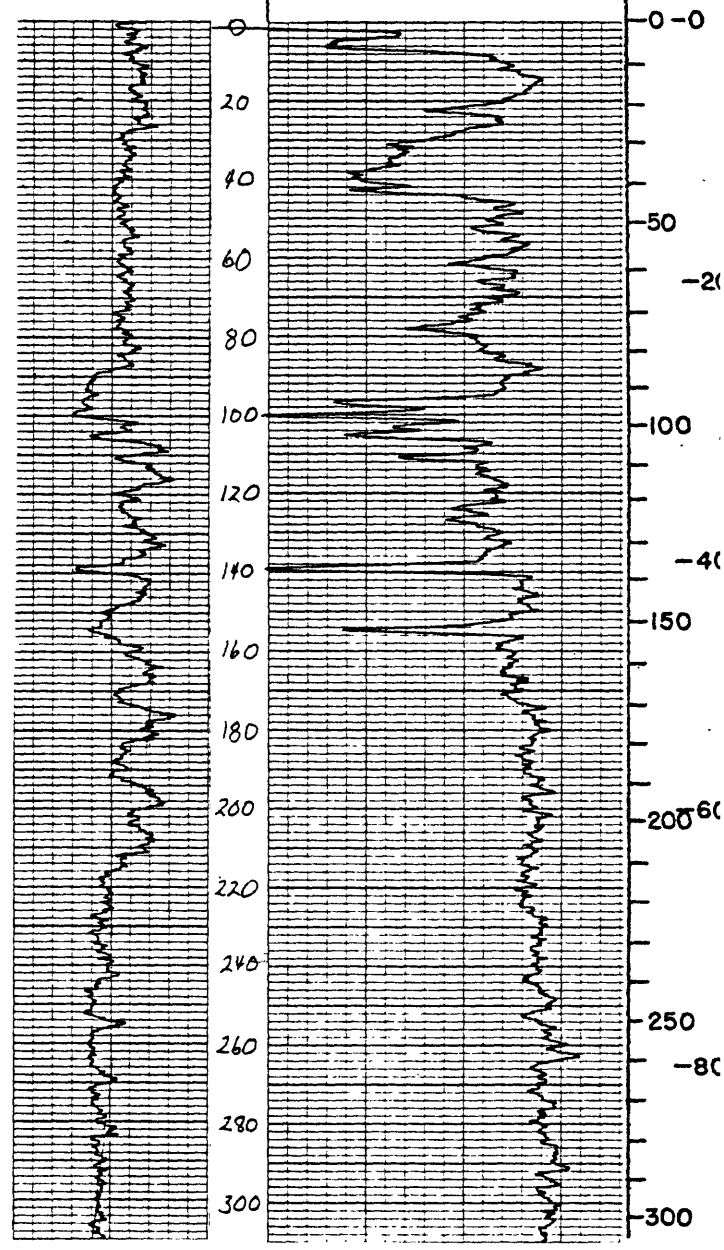
Lignite beds: 96-98; 99-101; 104-106; 138-140

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma	Density	Depth
		T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 341 feet	T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 341 feet	Feet / Meters

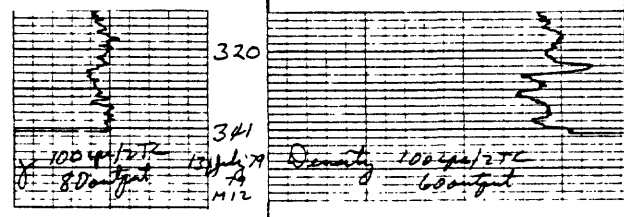
0- 12	Silt, brown
12- 38	Till, brown, silty
38- 47	Till, grayish-brown, silty
47- 87	Till, gray, silty
87- 97	Sandstone, gray, medium-grained, silty
97- 99	Lignite
99-101	Siltstone, gray, clayey
101-105	Lignite
105-220	No samples
220-340	Sandstone, bluish-green, medium-grained, silty



Hole number—continued

79W12

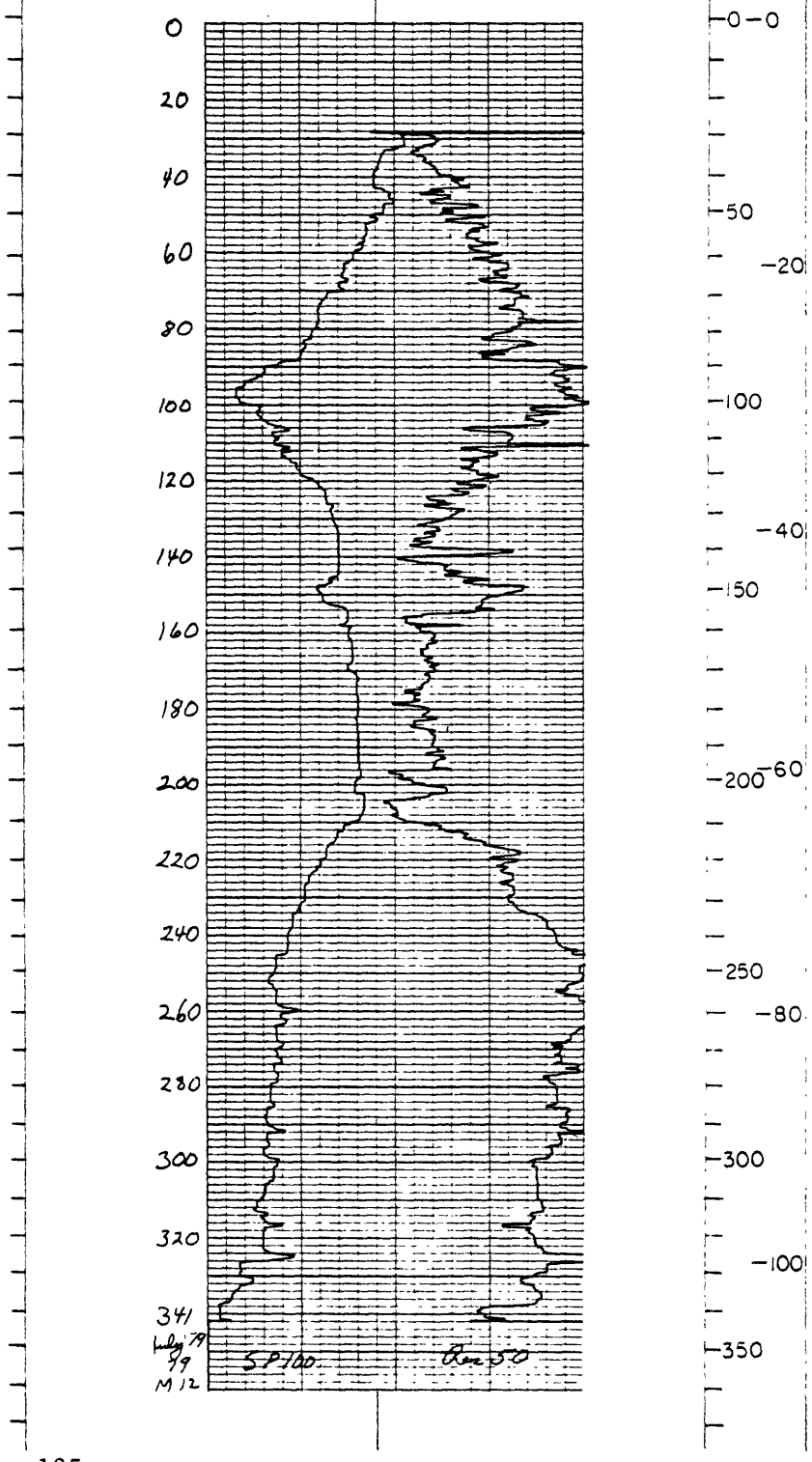
Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 341 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 341 feet	Depth Feet / Meters



300
100
350
120
400
450
140
500
160
550
180
600

79M12 Hole number - continued

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 341 feet	Logged depth 341 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M13 Map: No Topo Date: 7-01-79 State: ND County: Mountrail

Elev.: 2364 feet Location: T. 154 N, R. 92 W, Sec. 15, Tract: daab Drilled depth: 303 feet

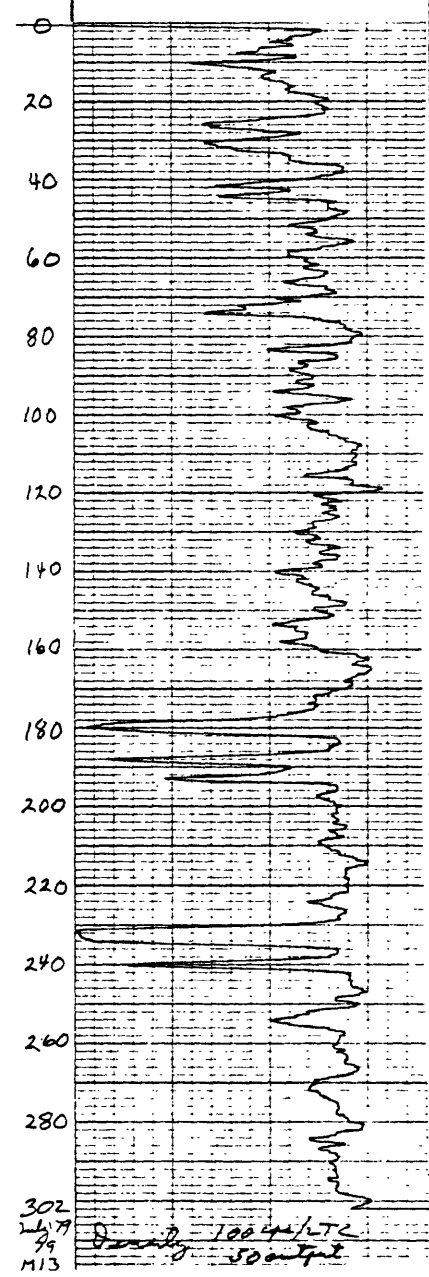
Measured: 2628 ft FSL, 483 ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 178-182; 187-189; 192-194; 230-235; 239-241

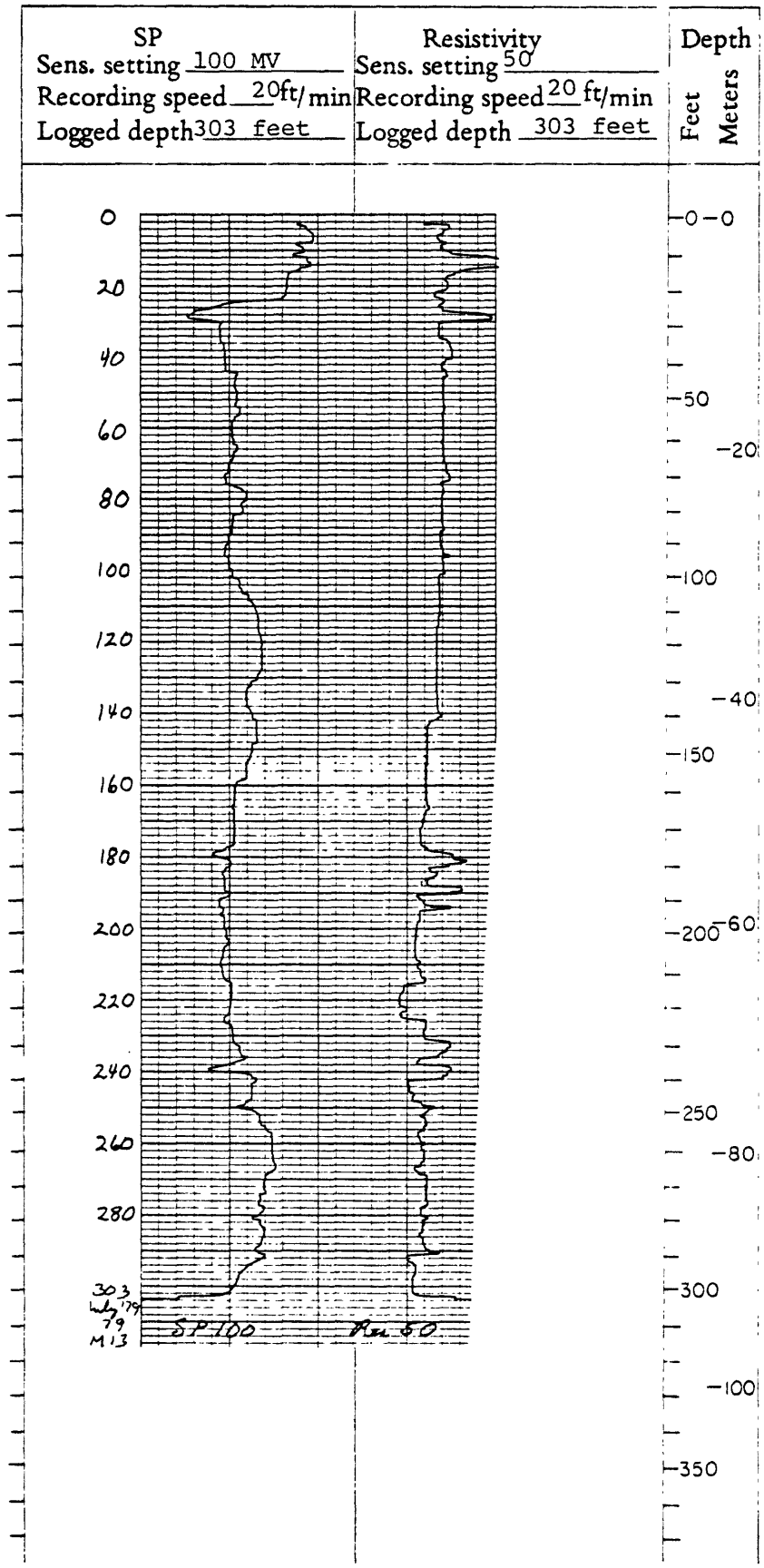
Remarks: No gamma log run

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Density: T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 303 feet	Depth Feet	Depth Meters
0- 10	Silt, brown, clayey				
10- 17	Gravel, brown, sandy				
17- 23	Silt, brown				
23- 28	Gravel, brown, sandy				
28- 65	Till, grayish-brown, clayey				
65- 92	Till, gray, clayey				
92- 93	Lignite				
93-162	Till, gray, clayey				
162-174	Siltstone, gray, sandy, clayey				
174-176	Lignite				
176-183	Claystone, gray, carbonaceous				
183-186	Lignite				
186-188	Claystone, gray, carbonaceous				
188-190	Lignite				
190-198	Claystone, gray, carbonaceous				
198-205	Siltstone, gray				
205-212	Claystone, gray				
212-221	Claystone, greenish-blue				
221-227	Claystone, gray				
227-231	Lignite				
231-235	Siltstone, grayish-brown, carbonaceous				
235-236	Lignite				
236-251	Claystone, greenish-gray				
251-255	Claystone, grayish-brown, carbonaceous				
255-265	Claystone, greenish-blue				
265-278	Siltstone, gray, sandy				
278-299	Claystone, gray				
299-300	Sandstone, gray, medium-grained, silty				



79M13 Hole number - continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M14 Map: No Topo Date: 7-13-79 State: ND County: Mountrail

Elev.: 2432 feet Location: T. 154 N, R. 92 W, Sec. 30, Tract: aaaa Drilled depth: 164 feet

Measured: 70 ft FNL, 10 ft FEL Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 84-87; 99-102

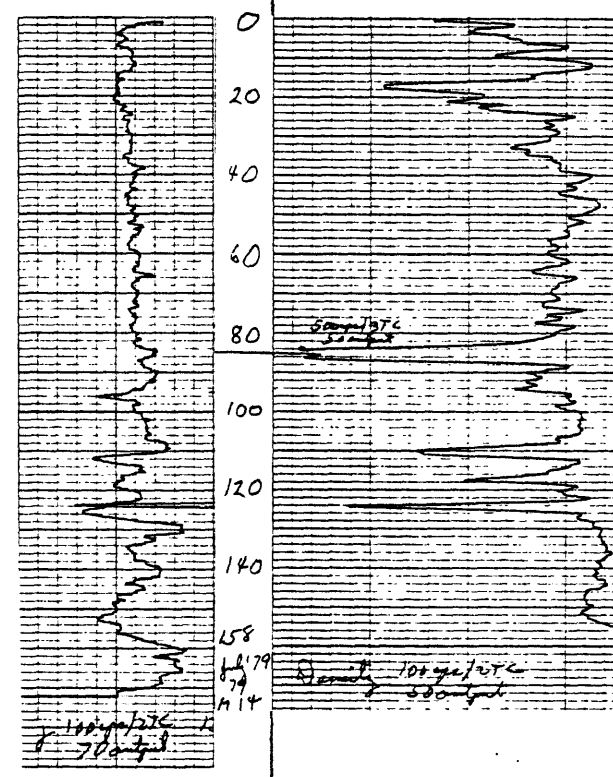
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 1	Silt, black
1- 5	Silt, brown
5- 6	Gravel, brown, sandy
6- 10	Till, brown, silty
10- 15	Till, gray, clayey
15- 18	Till, brown, silty
18- 21	Gravel, brown, sandy
21- 38	Till, brown, silty
38- 42	Till, gray, clayey
42- 46	Till, brown, silty
46- 82	Till, gray, clayey
82- 99	Siltstone, gray
99-109	Claystone, gray
109-112	Lignite
112-125	Siltstone, bluish-green
125-134	Claystone, grayish-brown
134-143	Claystone, very light-gray
143-160	Siltstone, light-gray, clayey
160-169	Siltstone, gray, clayey
169-180	Sandstone, bluish-green, fine-grained

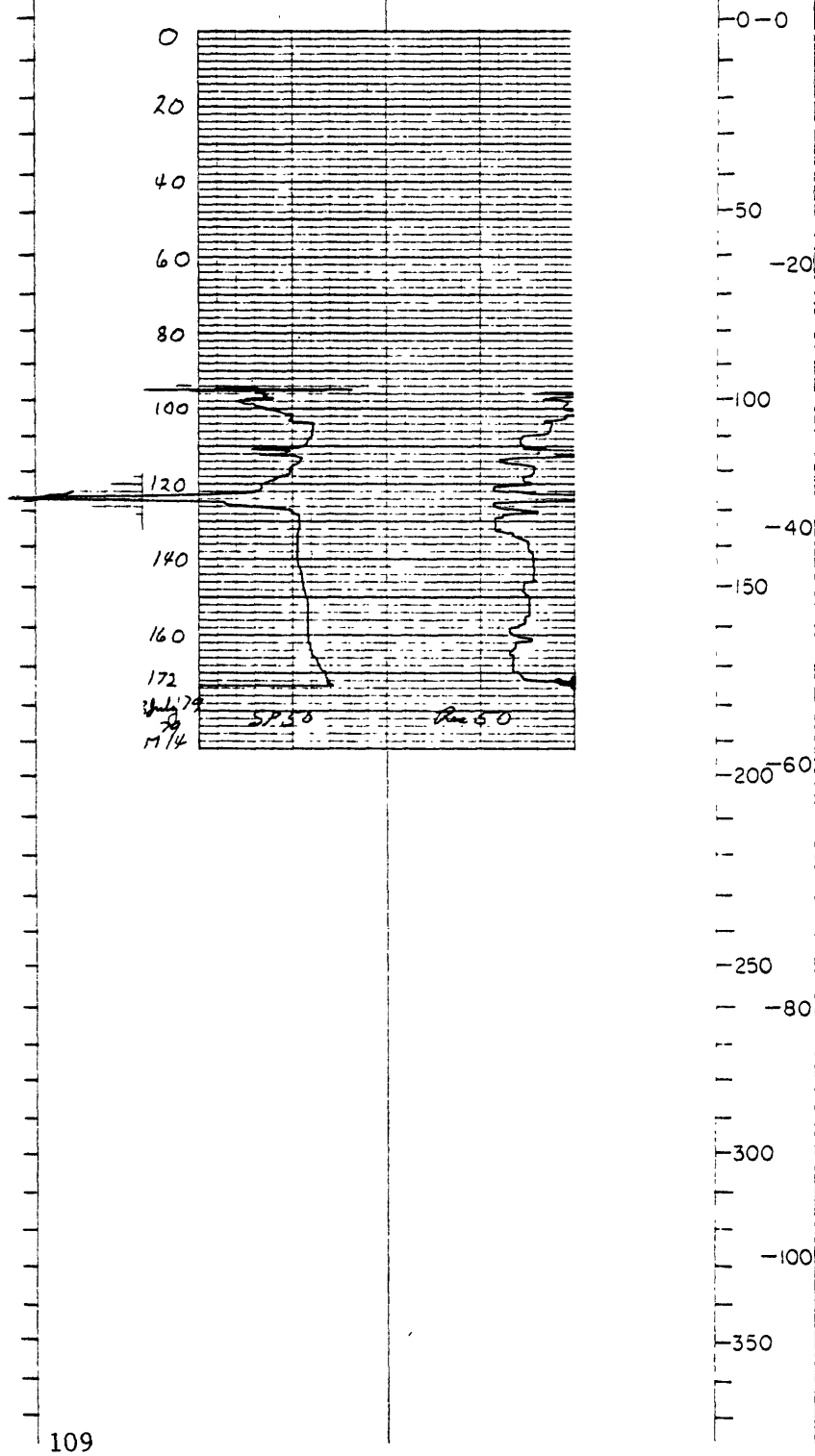
Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 164 feet

Density: T.C. 3 Range 500 cps; Recording speed 20 ft/min; Logged depth 158 feet



79M14 Hole number – continued

SP	Resistivity	Depth
Sens. setting 50 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 173 feet	Logged depth 173 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M15 Map: No Topo Date: 7-13-79 State: ND County: Mountrail

Elev.: 2258 feet Location: T. 154 N, R. 93 W, Sec. 15, Tract: aaab Drilled depth: 302 feet

Measured: 18 ft FNL, 471 ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

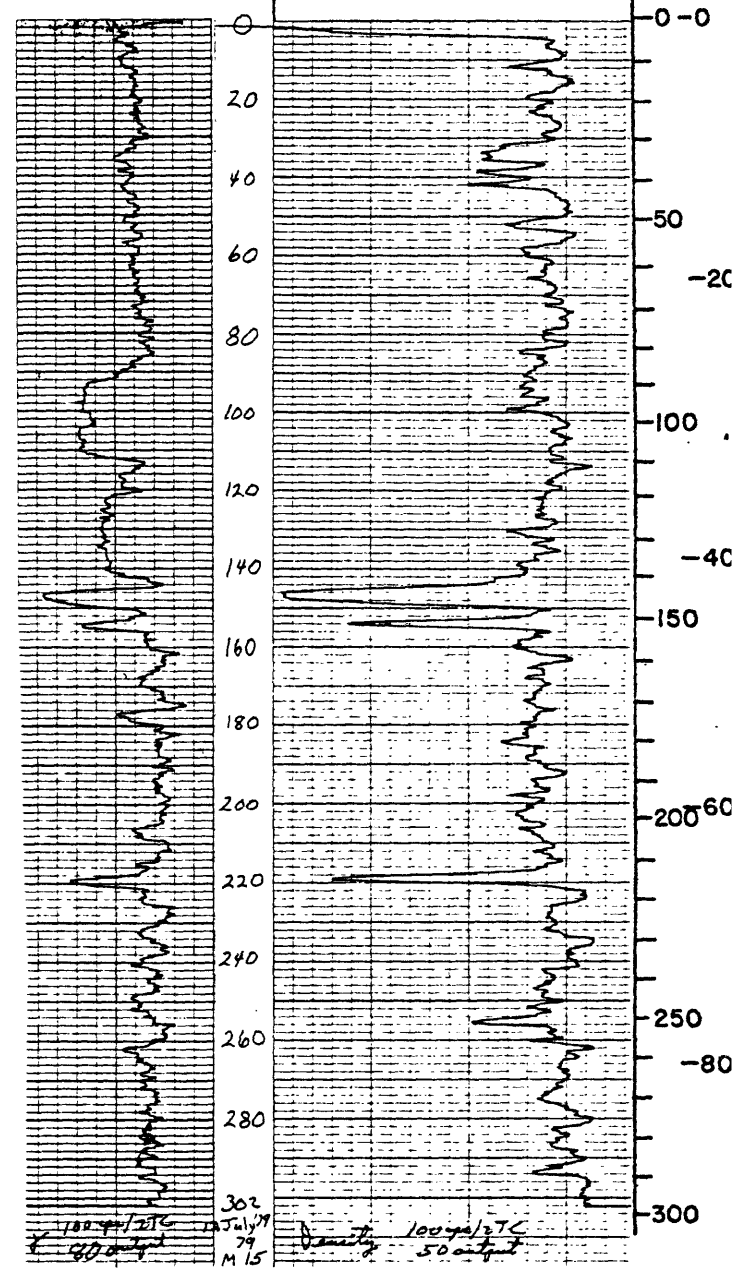
Lignite beds: 144-149; 153-155; 218-220

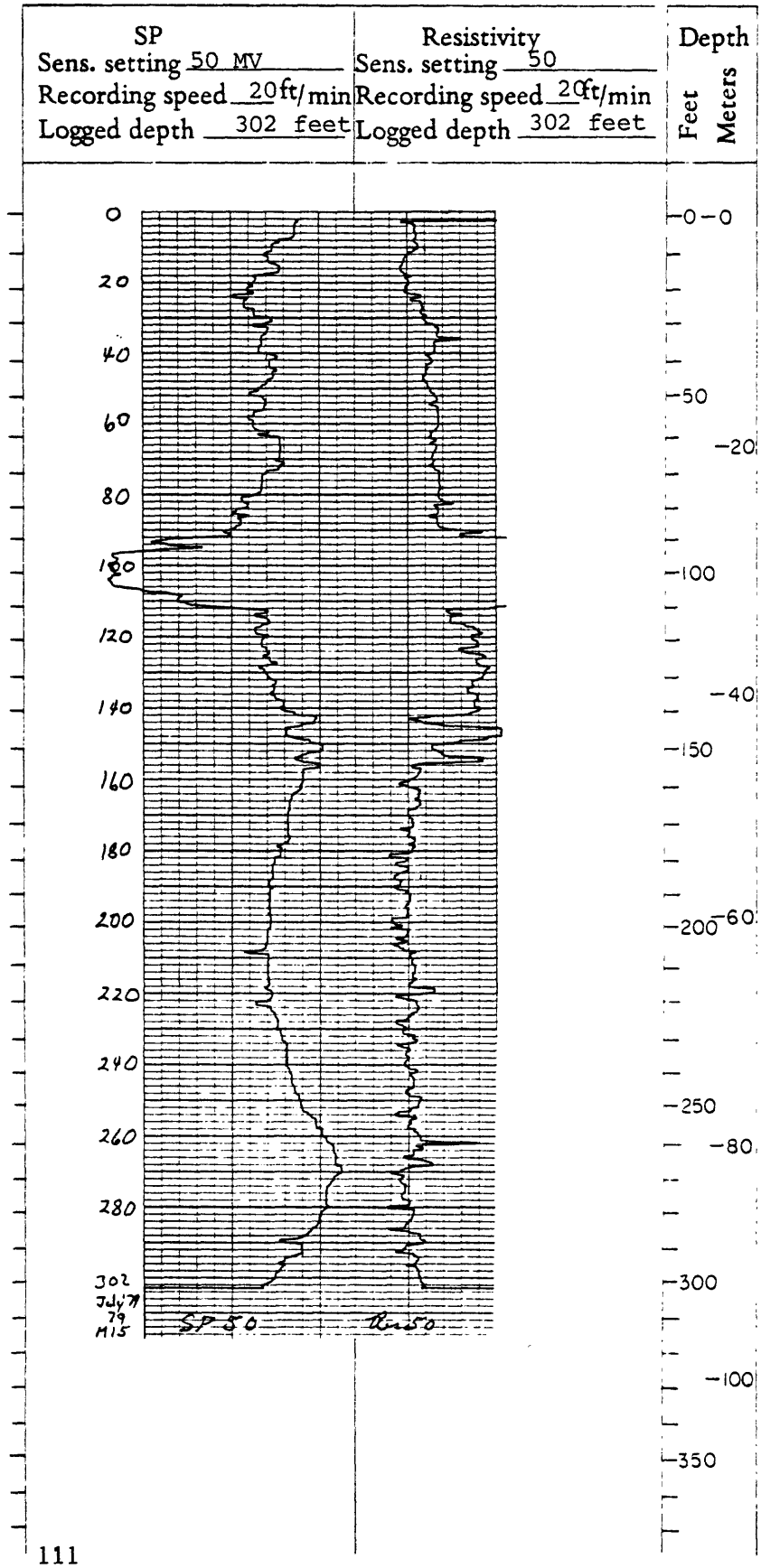
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma	Density	Depth
	T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 302 feet	T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 302 feet	Feet / Meters

0- 1 Silt, black, clayey
1- 7 Silt, brown, clayey
7- 40 Till, brown, silty
40-300 No samples




SP
Sens. setting 50 MV
Recording speed 20 ft/min
Logged depth 302 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 302 feet
Depth
Feet
Meters
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
302
July 7
79
M15
SP 50
Res 50
0
50
100
150
200
250
300
350
20
40
60
80
100

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M16 Map: No Topo Date: 7-12-79 State: ND County: Mountrail

Elev.: 2272 feet Location: T. 154 N/S, R. 93 E/W, Sec. 21, Tract: cccb Drilled depth: 301 feet

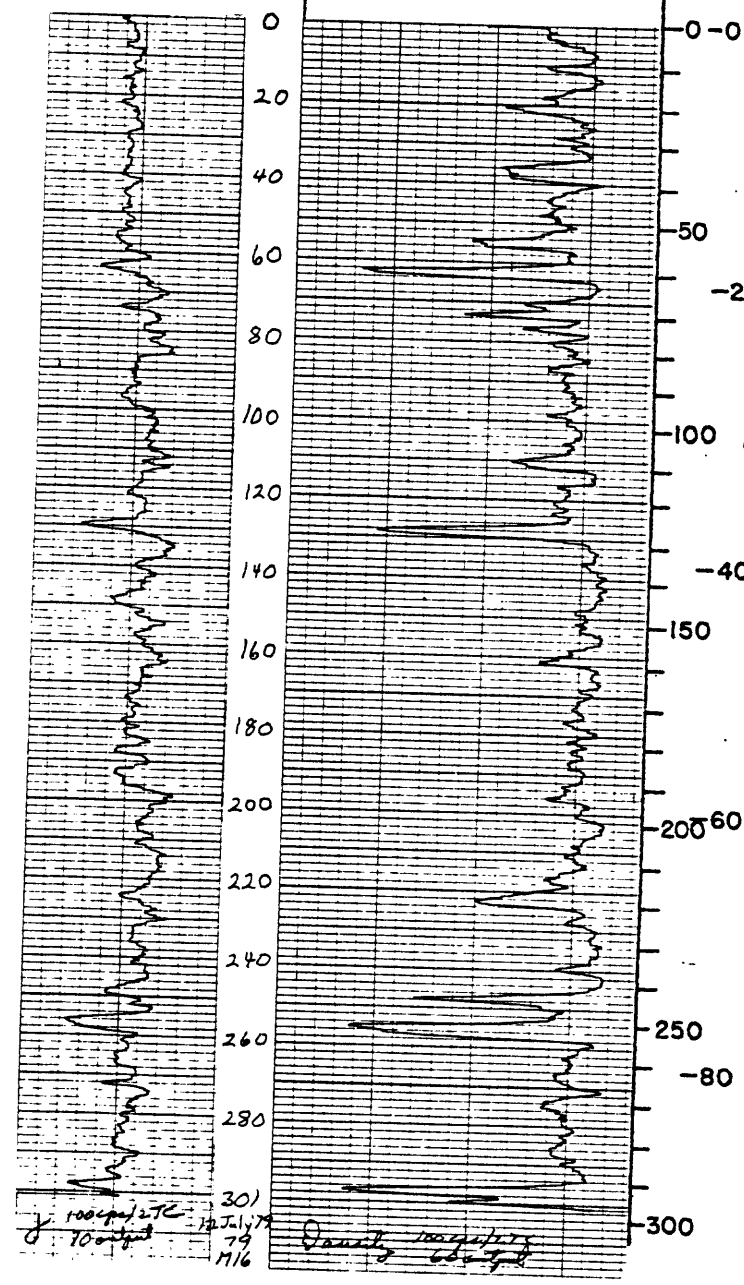
Measured: 1056 ft FSL, 18 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 62-64; 127-130; 254-257.5; 296-298

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

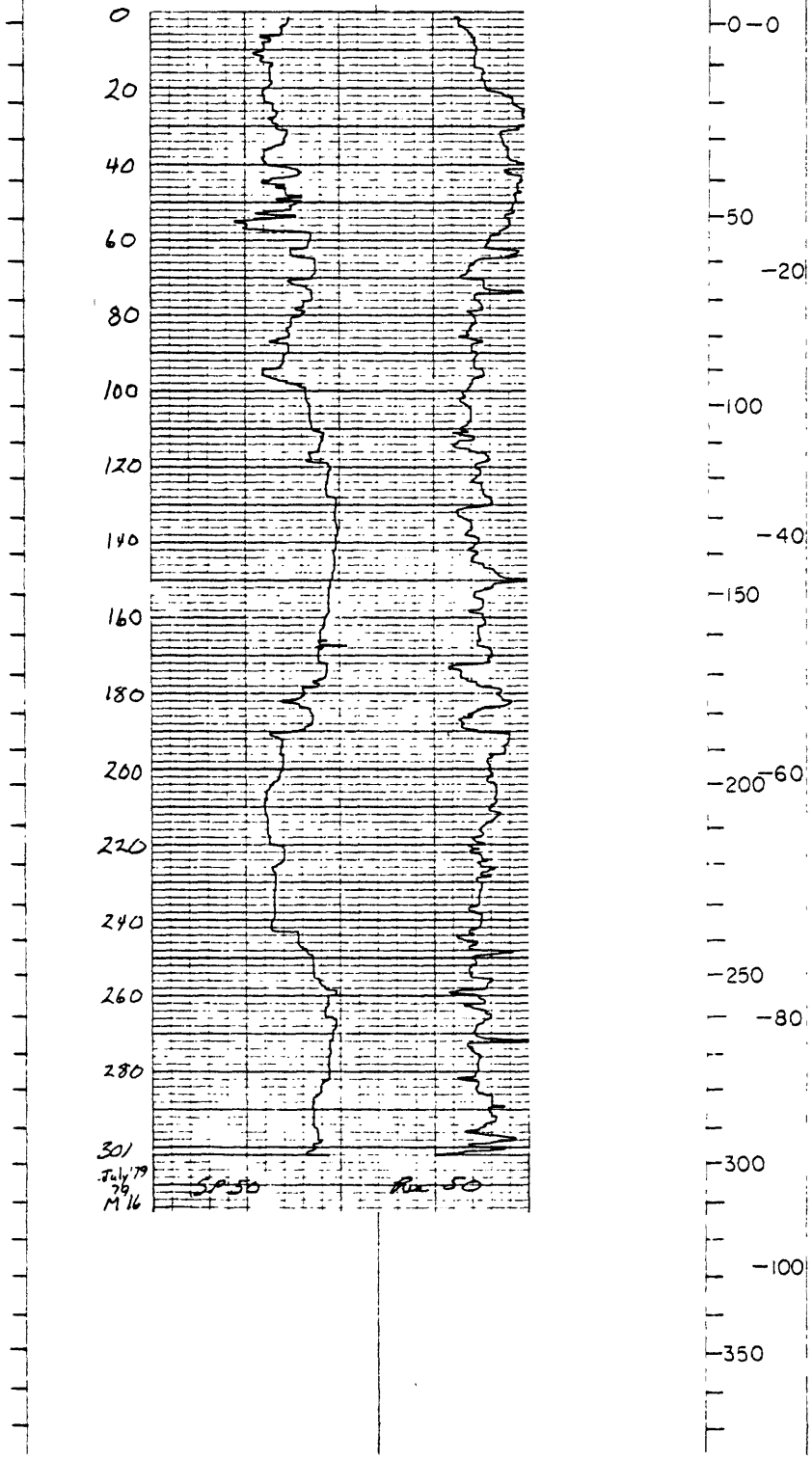
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 301 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 301 feet	Depth Feet	Depth Meters
0- 26	Till, brown, clayey				
26- 40	Till, gray, clayey				
40- 45	Sandstone, brown, medium-grained				
45- 58	Siltstone, gray, sandy				
58- 62	Sandstone, gray, fine-grained				
62- 65	Lignite				
65- 74	Claystone, gray				
74- 75	Lignite				
75- 85	Claystone, gray				
85- 95	Siltstone, gray				
95-115	Claystone, gray				
115-126	Siltstone, gray				
126-128	Claystone, gray				
128-130	Lignite				
130-136	Claystone, gray				
136-139	Siltstone, gray				
139-145	Claystone, gray				
145-151	Sandstone, gray, medium-grained, clayey				
151-173	Claystone, gray				
173-176	Claystone, bluish-green				
176-181	Siltstone, gray				
181-185	Claystone, gray				
185-190	Claystone, dark-greenish-blue				
190-195	Sandstone, gray, medium-grained, clayey				
195-200	Claystone, gray				
200-203	Sandstone, gray, medium-grained				
203-244	Claystone, gray				
244-246	Lignite				
246-254	Claystone, gray				
254-256	Lignite				
256-260	Siltstone, gray, clayey, sandy				



Hole number—continued
79M16

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 301 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 301 feet	Depth Feet / Meters
260-290 Sandstone, gray, medium-grained 290-297 Siltstone, gray 297-298 Lignite 298-300 Claystone, grayish-brown			300 100 350 120 400 450 140 500 160 550 180 600

SP	Resistivity	Depth
Sens. setting 50 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 301 feet	Logged depth 301 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M17 Map: No Topo Date: 7-12-79 State: ND County: Mountrail

Elev.: ~~2317 feet~~ Location: T. 154 N, R. 93 W, Sec. 34, Tract: aaab Drilled depth: 302 feet

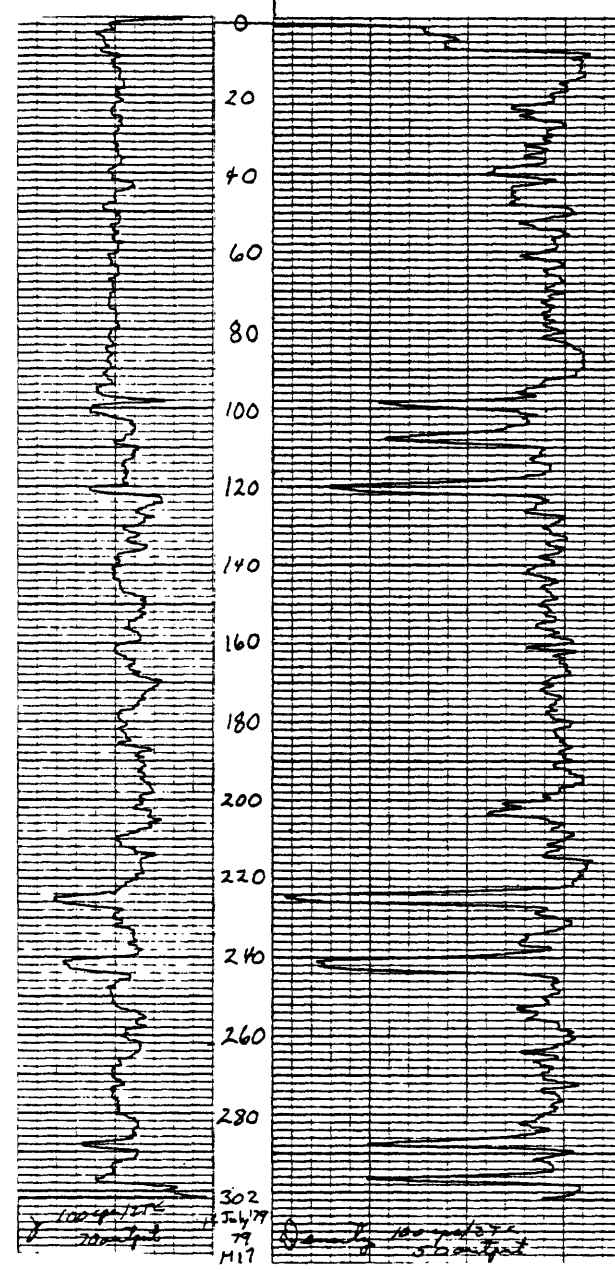
Measured: 21 ft FNL, 480 ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 98-100; 106-109; 118.5-122; 223-226; 240-244; 286-288

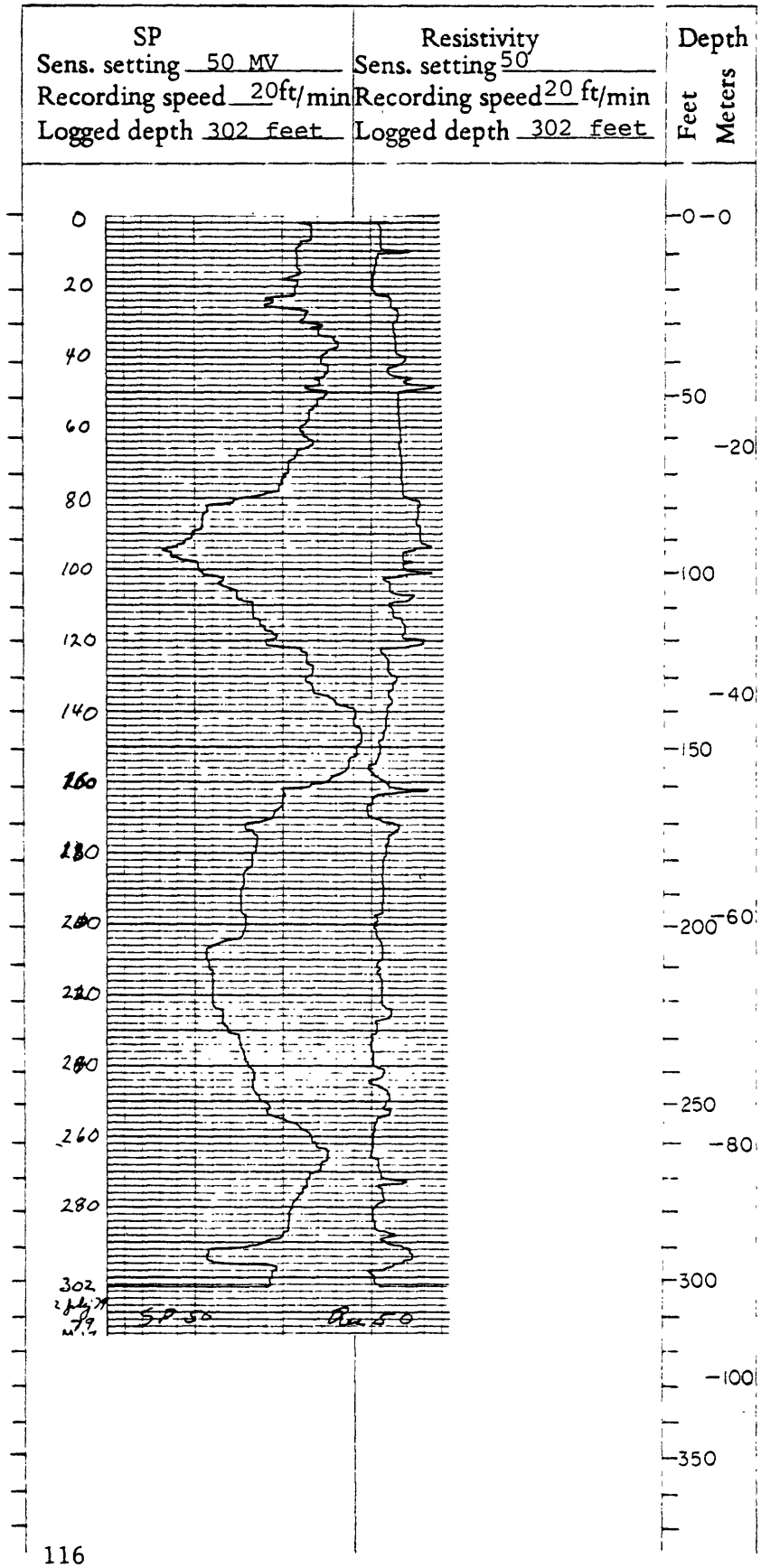
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet	Density: T.C. 2 Range 100; Recording speed 20 ft/min; Logged depth 302	Depth Feet	Depth Meters
0- 2	Silt, gray			0	0
2- 4	Silt, brown, pebbly				
4- 37	Till, brown, sandy, pebbley, clayey				
37- 45	Till, brown, silty			50	
45- 49	Gravel, brown				
49- 53	Till, brown, silty				
53- 94	Till, gray, clayey				
94- 96	Gravel, brown,				
96-103	Claystone, gray, carbonaceous				20
103-104	Lignite				
104-116	Claystone, gray, carbonaceous			100	
116-118	Lignite				
118-125	Claystone, gray, carbonaceous				
125-140	Siltstone, gray, sandy				
140-145	Sandstone, brown, medium-grained				40
145-152	Claystone, gray, carbonaceous			150	
152-168	Claystone, bluish-green				
168-174	Claystone, gray				
174-185	Siltstone, gray, sandy				
185-195	Claystone, gray			200	60
195-201	Claystone, brownish-gray, carbonaceous				
201-222	Claystone, gray				
222-228	Lignite				
228-233	Siltstone, gray, clayey			250	
233-238	Claystone, gray				
238-239	Lignite				80
239-244	Claystone, gray				
244-246	Lignite				
246-257	Sandstone, gray, fine-grained, clayey				
257-275	Claystone, gray			300	
275-281	Siltstone, gray, clayey				
281-300	Claystone, gray, carbonaceous				



79M17 Hole number – continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M18 Map: No Topo Date: 7-14-79 State: ND County: Mountrail

Elev.: 2218 feet Location: T. 154 N, R. 94 W, Sec. 11, Tract: baaa Drilled depth: 302 feet

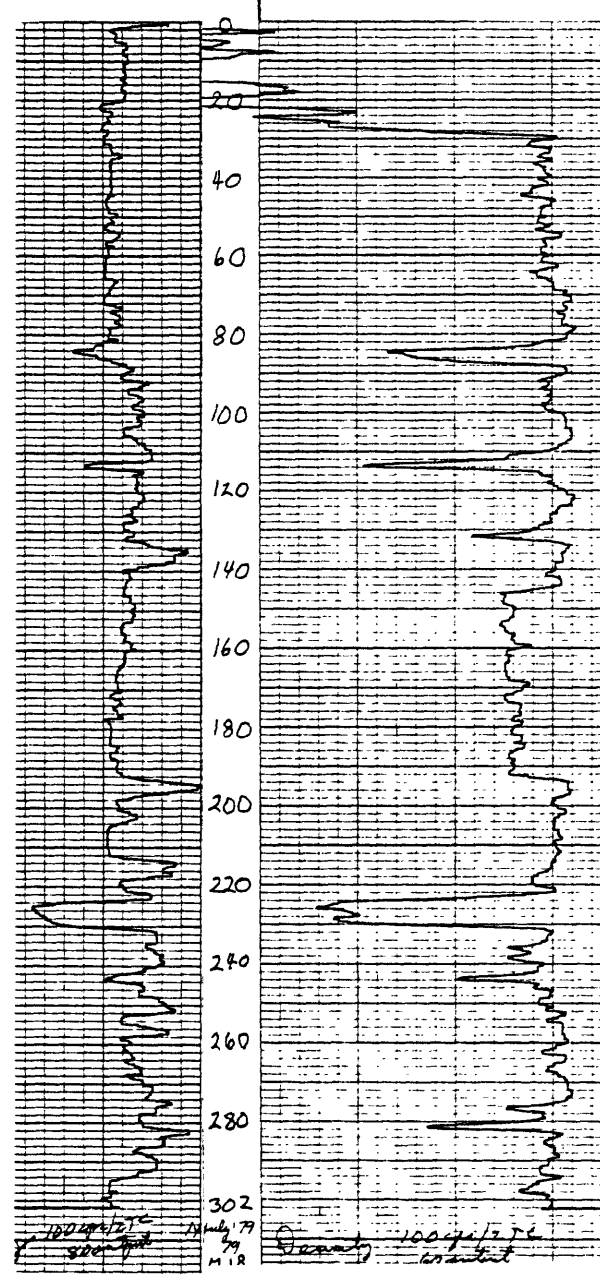
Measured: 23 ft FNL, 2621 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 84-87; 112-114; 224-230;

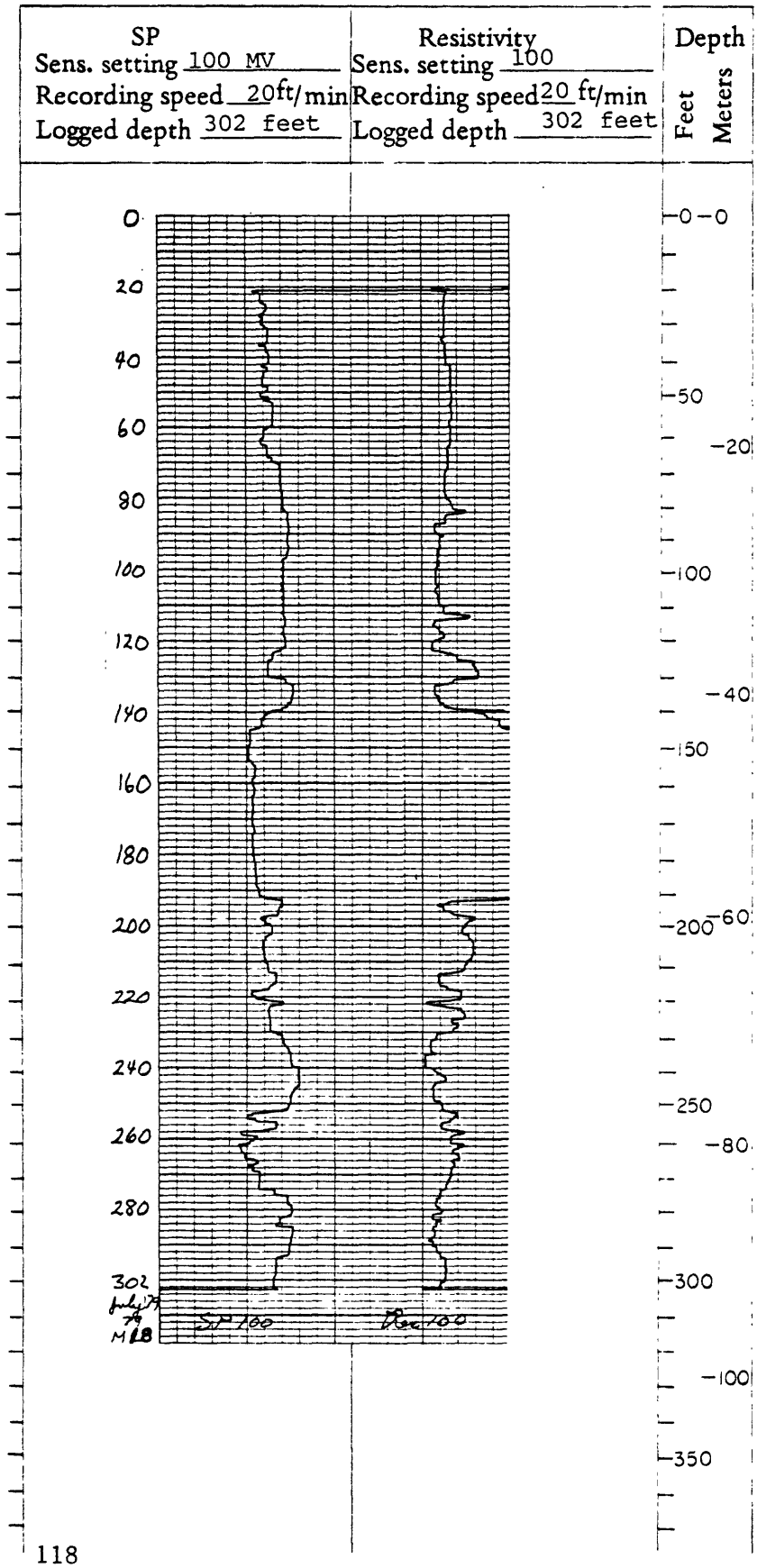
Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet	Depth Feet	Depth Meters
0- 2	Clay, brown				
2- 18	Till, brown, clayey, sandy, pebbly			0	0
18- 66	Till, grayish-brown, clayey, silty, sandy			20	
66- 82	Till, gray, silty, clayey, pebbly			40	
82- 83	Lignite			50	
83- 86	Claystone, brown, silty			60	20
86- 87	Lignite				
87- 91	Claystone, green, silty			80	
91-108	Claystone, gray, silty				
108-110	Lignite			100	100
110-112	Claystone, brown				
112-113	Claystone, gray, silty			120	
113-117	Siltstone, gray				
117-118	Claystone, light-green, silty			140	40
118-123	Claystone, green				
123-127	Siltstone, gray			150	
127-128	Lignite			160	
128-130	Claystone, brown				
130-134	Claystone, light-green			180	
134-138	Claystone, bluish-green				
138-147	Siltstone, gray			200	200 60
147-193	Sandstone, gray, fine-grained				
193-197	Claystone, gray			220	
197-198	Siltstone, gray				
198-202	Claystone, gray, silty			240	
202-218	Sandstone, gray, fine-grained			250	
218-222	Siltstone, dark-brown, clayey			260	80
222-227	Lignite				
227-242	Claystone, greenish-gray			280	
242-265	No samples				
265-285	Siltstone, gray			302	300
285-289	Claystone, gray				
289-300	Claystone, green				



79M18 Hole number - continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M19 Map: Charlson NE Date: 7-15-79 State: ND County: Mountrail

Elev.: 2180 feet Location: T. 154 N, R. 94 W, Sec. 8, Tract: baab Drilled depth: 402 feet

Measured: 78 ft FNL, 2200 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

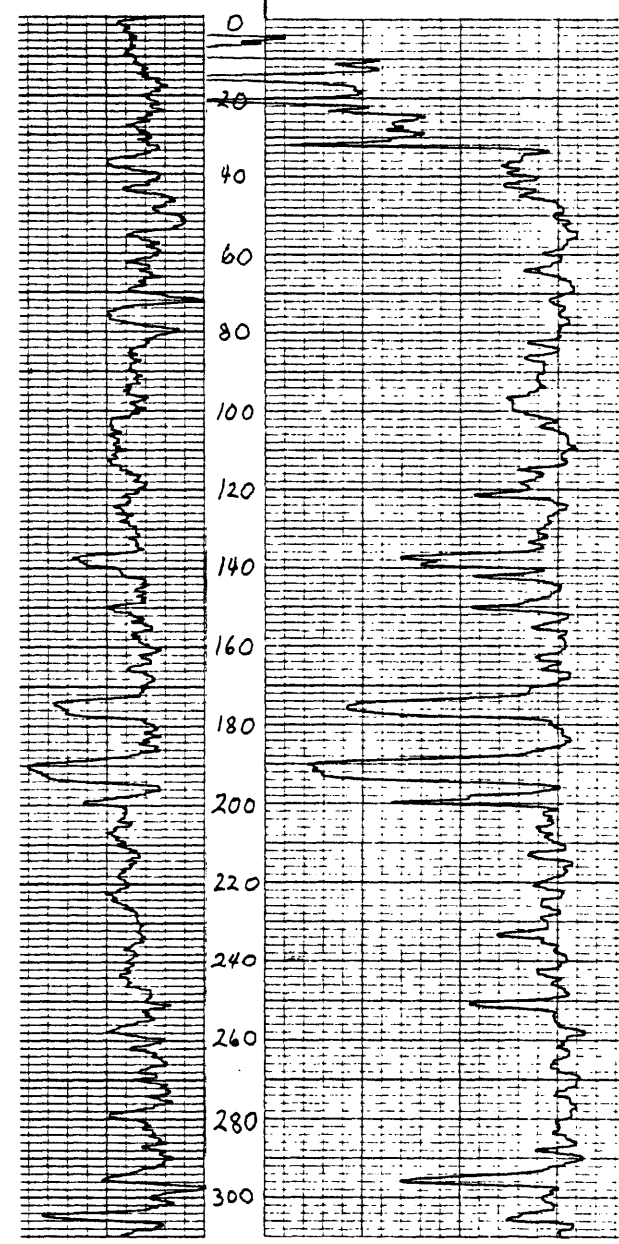
Lignite beds: 136-140; 173-178; 188-194; 294-297; 324- 38; 364-375; 399-40

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes

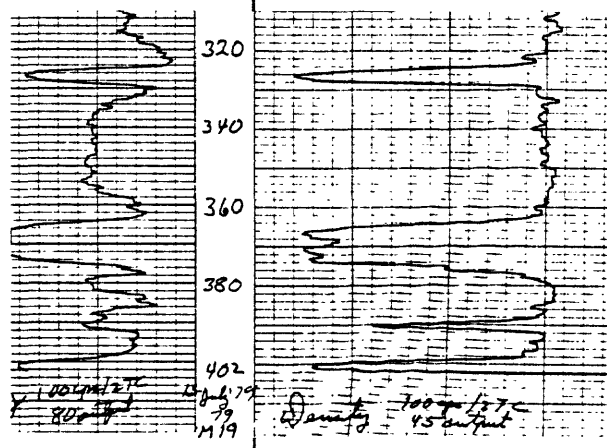
Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 feet	Depth Feet	Depth Meters
0- 1	Silt, black				
1- 10	Silt, brown, clayey			0	0
10- 13	Silt, brown, sandy				
13- 20	Claystone, dark-brown			20	
20- 25	Siltstone, dark-green, sandy				
25- 26	Claystone, gray			40	
26- 35	Claystone, brown				
35- 42	Siltstone, brown, sandy			50	
42- 55	Claystone, gray, silty			60	20
55- 57	Claystone, greenish-gray				
57- 65	Siltstone, greenish-gray			80	
65- 70	Claystone, gray				
70- 77	Siltstone, gray			100	100
77- 84	Claystone, gray				
84- 87	Claystone, greenish-gray, silty			120	
87-103	Claystone, gray				
103-112	Siltstone, gray, clayey			140	40
112-125	Claystone, dark-brown, carbonaceous				150
125-132	Claystone, gray			160	
132-135	Claystone, dark-brown, carbonaceous				
135-139	Lignite			180	
139-141	Claystone, light-brown				
141-142	Claystone, dark-brown			200	200 60
142-146	Claystone, gray				
146-147	Lignite			220	
147-148	Claystone, cark-brown, carbonaceous				
148-153	Claystone, brown			240	
153-170	Claystone, gray				250
170-175	Claystone, dark-brown, carbonaceous			260	80
175-179	Lignite				
179-187	Claystone, gray			280	
187-190	Lignite				
190-220	Claystone, gray			300	300
220-227	Siltstone, gray				



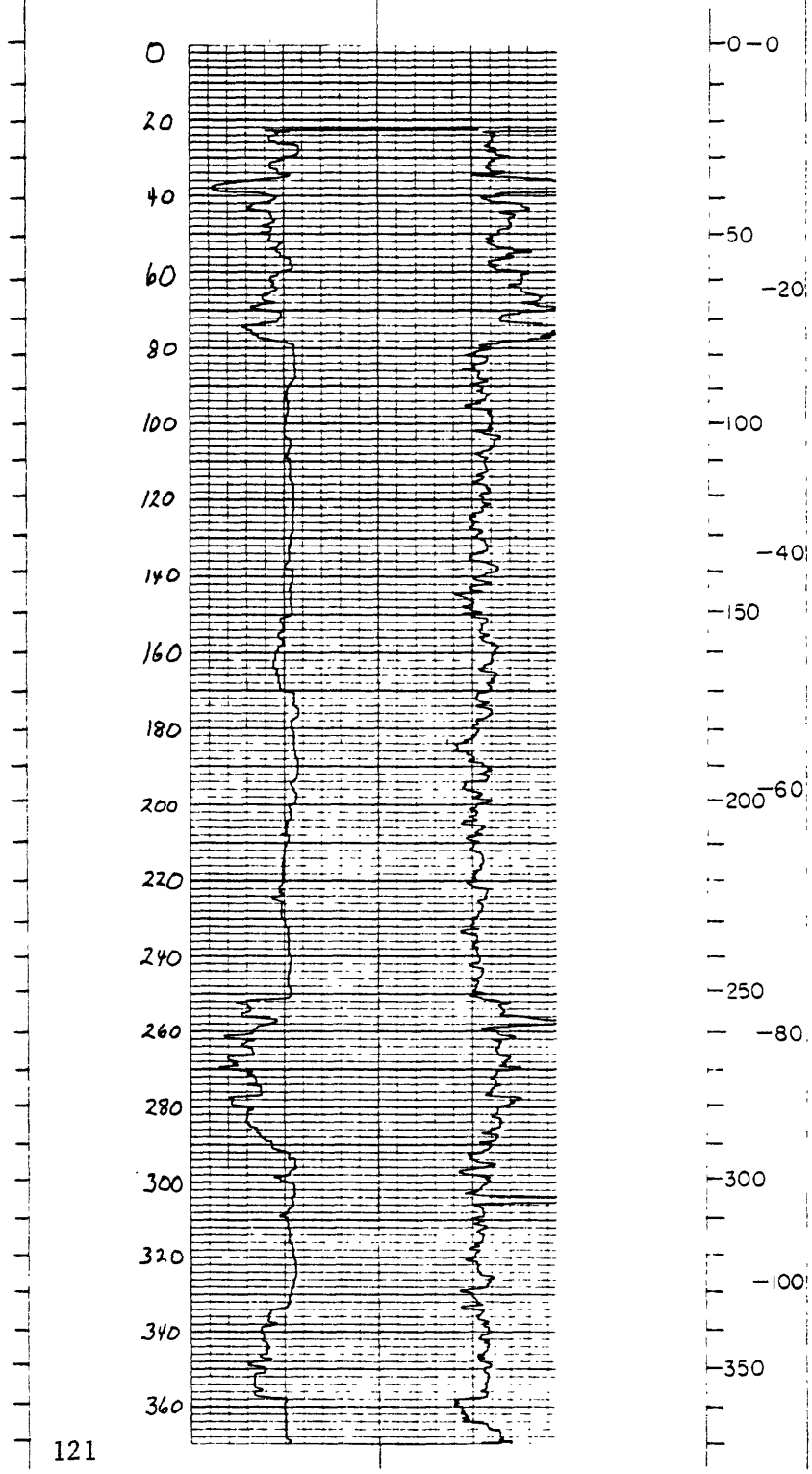
Hole number—continued
79M19

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Depth Feet / Meters
227-293	Claystone, gray			300
293-297	Claystone, dark-brown, carbonaceous			
297-299	Lignite			
299-304	Claystone, dark-brown, carbonaceous			100
304-332	Sandstone, brown, medium-grained			350
332-337	Claystone, gray			
337-342	Siltstone, bluish-green			
342-350	Sandstone, bluish-green, medium-grained, silty			120
350-354	Claystone, gray			400
354-360	Lignite			
360-364	Claystone, grayish-green			
364-369	Lignite			
369-400	Sandstone, grayish-green, medium-grained			
				450
				140
				500
				160
				550
				180
				600

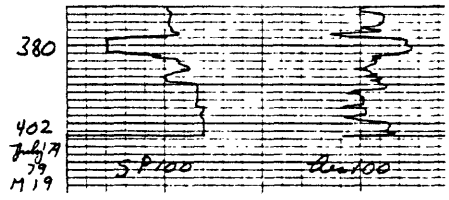


79M19 Hole number – continued

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 100	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 feet	Logged depth 402 feet	



SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 100	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 feet	Logged depth 402 feet	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M20 Map: No Topo Date: 6-29-79 State: ND County: Mountrail

Elev.: 2184 feet Location: T. 155 N, R. 91 W, Sec. 19, Tract: adbb Drilled depth: 304 feet

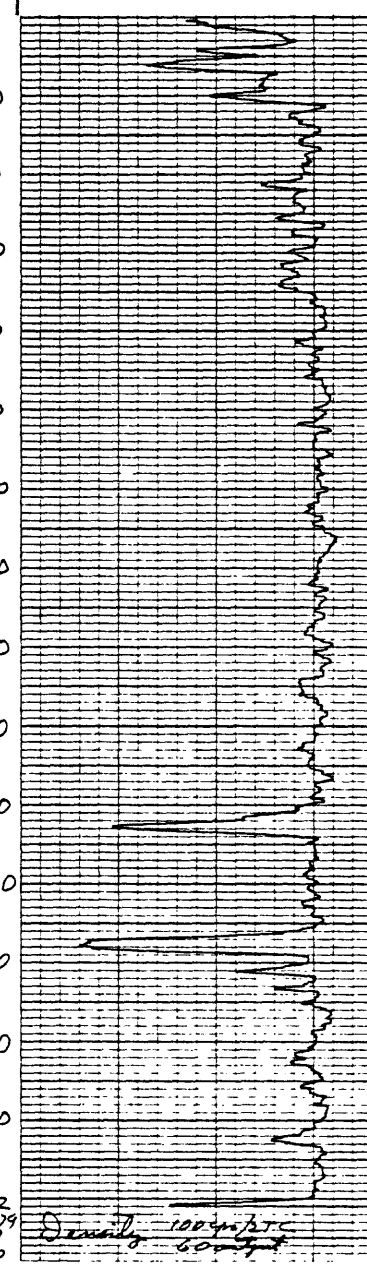
Measured: 1365 ft FNL 1275 FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 204-207; 233-237

Remarks: No gamma log run

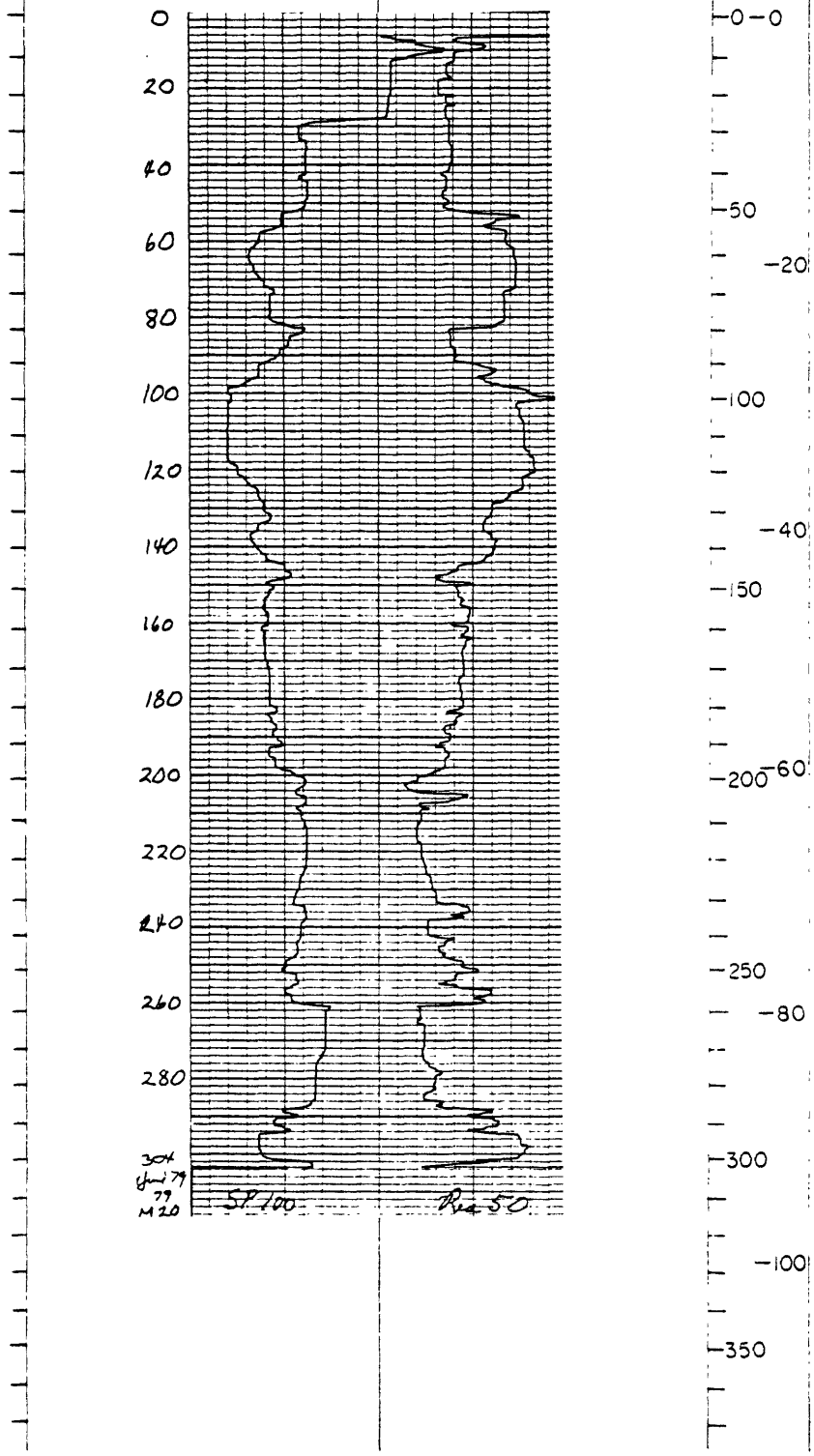
Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma: T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Density: T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 304 feet	Depth Feet	Depth Meters
0- 1 Silt, black, clayey				
1- 5 Silt, brown, clayey			0	0
5- 11 Gravel, brown, sandy				
11- 16 Till, brown, clayey, silty			20	
16- 54 Till, gray, clayey, silty				
54- 80 Sandstone, brown, medium-grained			40	
80- 95 Siltstone, gray			50	
95-100 Siltstone, gray, sandy			60	
100-142 Sandstone, brown, medium-grained				20
142-158 Siltstone, gray, clayey			80	
158-185 Sandstone, brown, medium-grained			100	100
185-199 Sandstone, gray, medium-grained, clayey			120	
199-202 Claystone, grayish-brown, carbonaceous				
202-205 Lignite			140	40
205-231 Siltstone, gray, very clayey			150	
231-238 Lignite			160	
238-245 Claystone, brown, carbonaceous				
245-259 Siltstone, gray, clayey, carbonaceous			180	
259-262 Claystone, greenish-gray			200	200 60
262-264 Lignite				
264-296 Claystone, gray			220	
296-298 Lignite				
298-300 Siltstone, gray			240	
			250	
			260	80
			280	
			302	300



79M20 Hole number - continued

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 304 feet	Logged depth 304 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M21 Map: No Topo Date: 6-30-79 State: ND County: Mountrail

Elev.: 2352 feet Location: T. 155 N, R. 92 W, Sec. 26, Tract: abbb Drilled depth: 303 feet

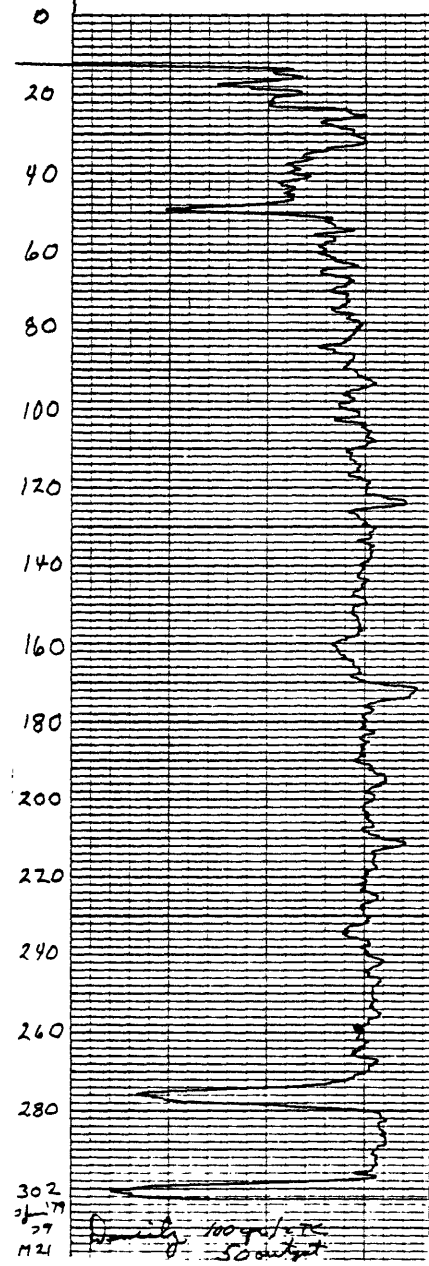
Measured: 72 ft FNL 2630 ft FEL Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 274-278; 298-302

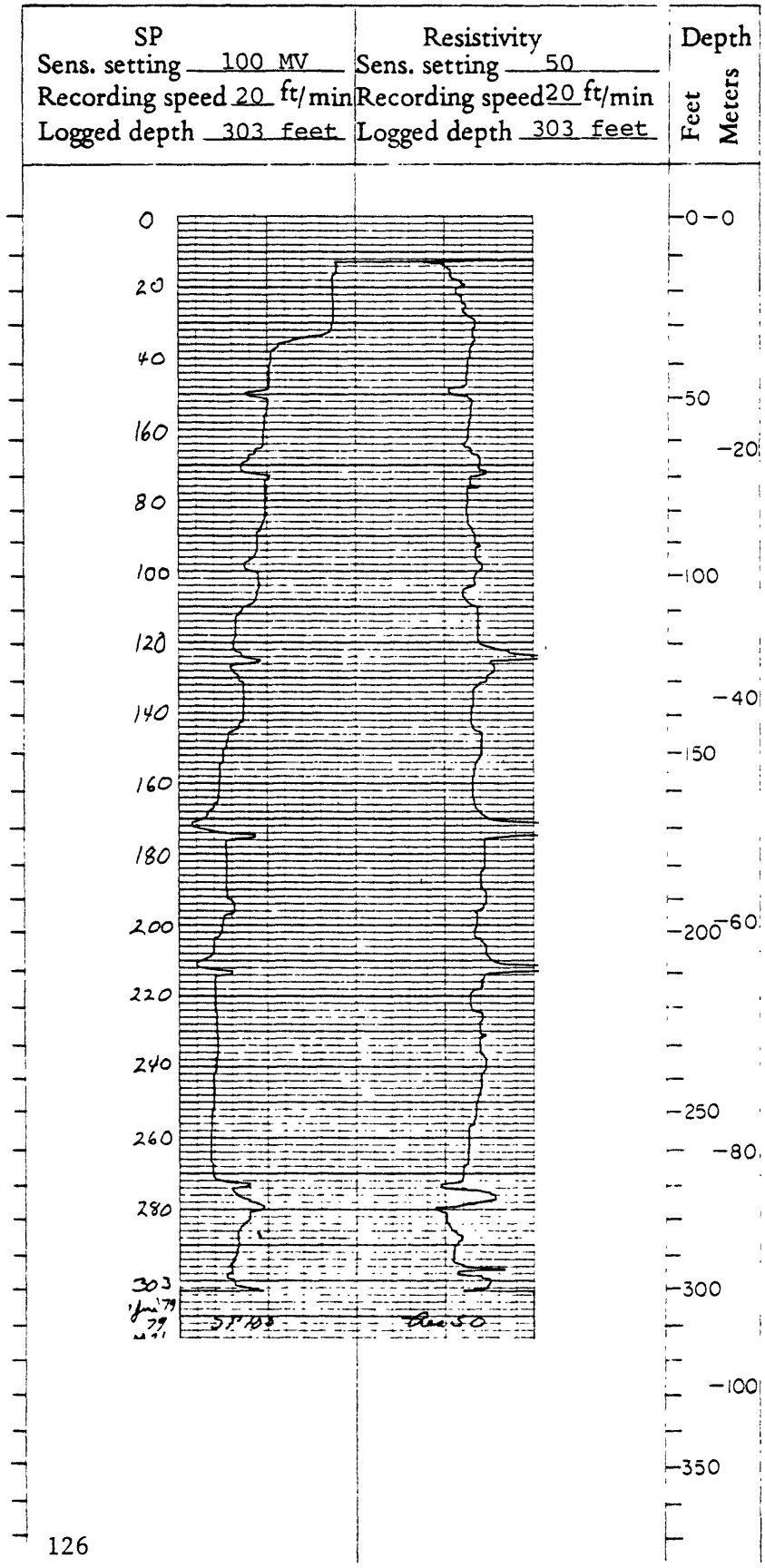
Remarks: No gamma log run

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Density: T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 303 feet	Depth Feet	Depth Meters
0- 5	Sand, brown, coarse grained				
5- 13	Clay, brown, sandy			0	0
13- 21	Sand, brown, coarse-to very coarse grained			20	
21- 22	Gravel, brown, sandy			40	
22- 46	Till, gray, silty, sandy, clayey			50	
46- 49	Sand, brown, very course grained			60	20
49- 59	Till, gray, silty, clayey, sandy			80	
59- 65	Till, brown			100	100
65- 66	Sand, gray, fine-grained			120	
66- 70	Sand, brown, coarse-grained			140	40
70- 82	Till, grayish-brown, clayey, silty, sandy			150	
82- 85	Gravel, gray			160	
85-110	Till, gray, clayey, silty, sandy			180	
110-120	Silt, gray			200	200 60
120-132	Till, gray, silty, sandy			220	
132-160	Sandstone, gray, fine-grained, silty			240	
160-300	Sandstone, gray, fine-grained			250	80
				260	
				280	
				300	300



79M21 Hole number – continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M22 Map: No Topo Date: 7-14-79 State: ND County: Mountrail

Elev.: 2358 feet Location: T. 155 N, R. 93 W, Sec. 1, Tract: cccc Drilled depth: 302 feet

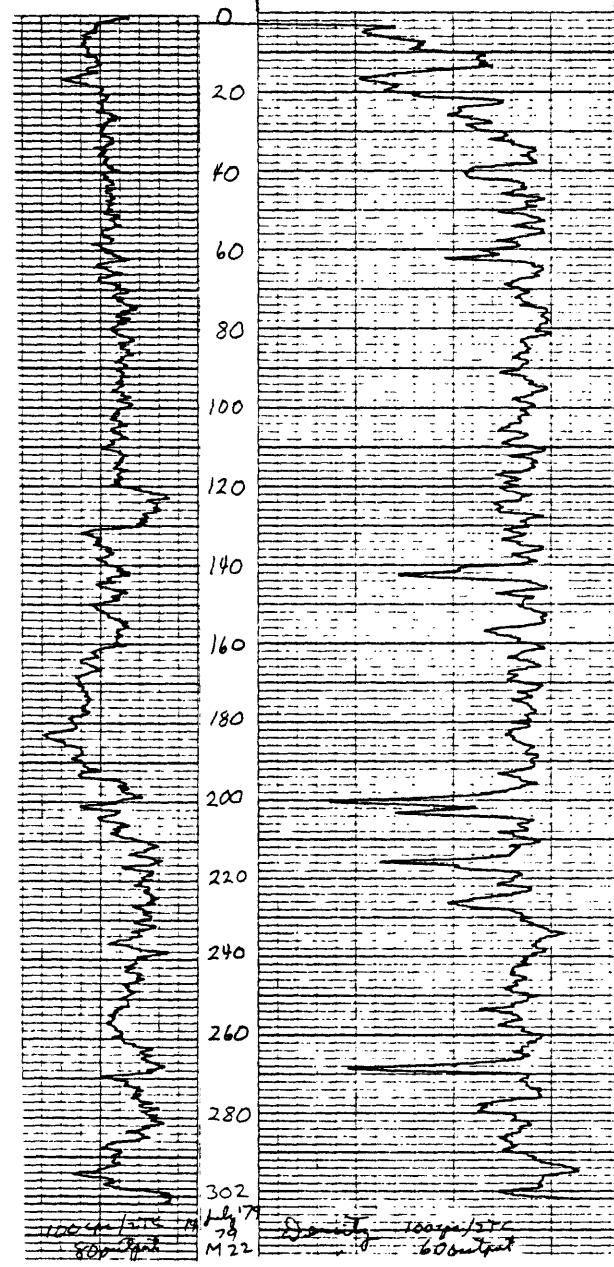
Measured: 228 ft FSL, 21 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 199-201; 268-270

Remarks:

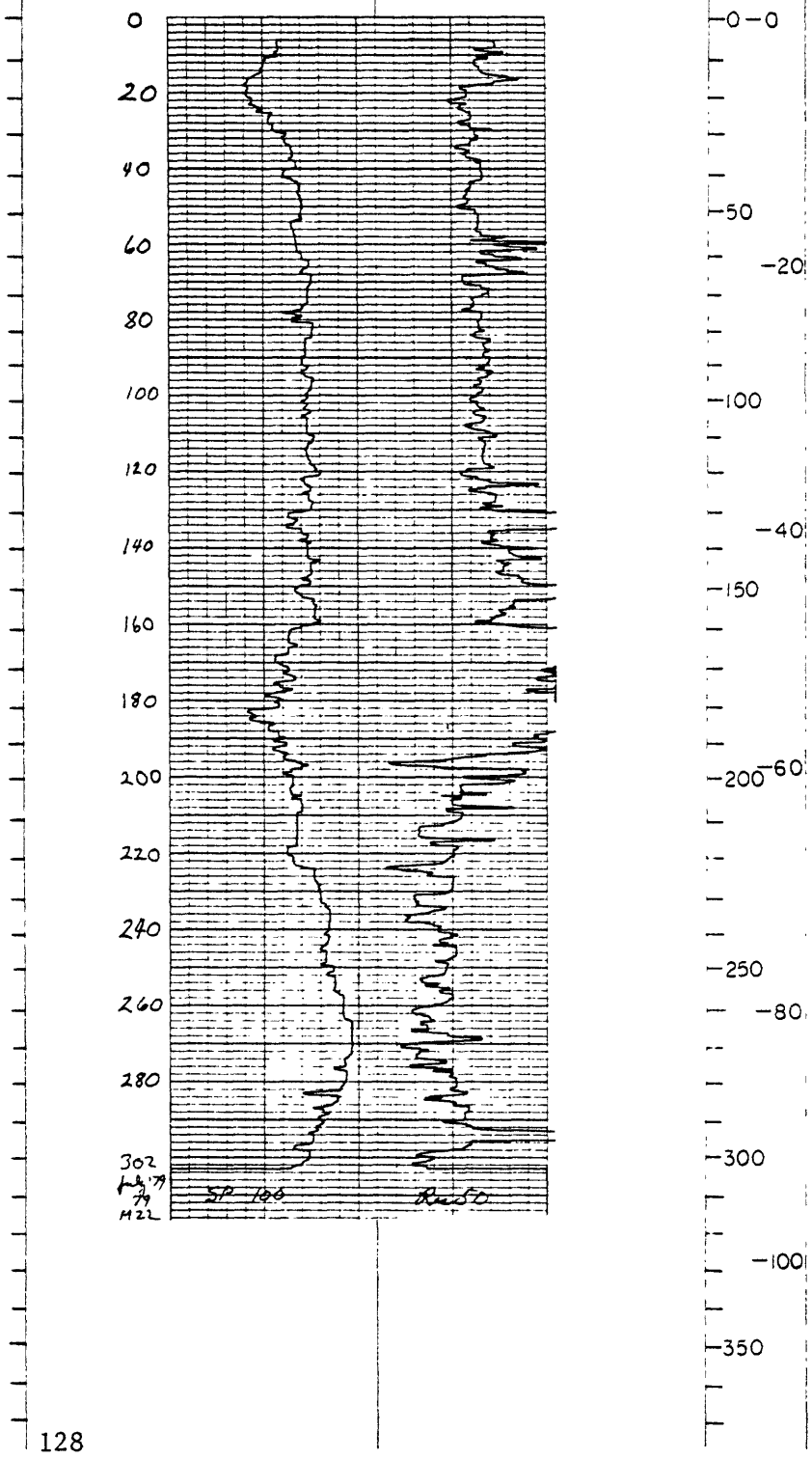
Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet	Depth Feet	Depth Meters
0- 1	Silt, brown, sandy				
1- 6	Gravel, brown			0	0
6- 9	Till, brown				
9- 15	Gravel, brown			20	
15- 33	Till, brown, clayey, silty, pebbly				
33- 62	Till, gray, silty, clayey, pebbly			40	
				50	
62- 75	Till, brown, clayey, silty, pebbly			60	20
75- 83	Till, grayish-brown, silty, clayey, pebbly, lignitic			80	
83-122	Till, gray, silty, sandy, lignitic			100	100
122-132	Claystone, gray				
132-139	Claystone, tan			120	
139-142	Claystone, dark-brown				
142-143	Lignite			140	40
143-144	Claystone, brown, lignitic				
144-149	Claystone, tan				150
149-154	Siltstone, tan			160	
154-159	Claystone, brown, lignitic				
159-162	Siltstone, light-brown			180	
162-182	Siltstone, light-gray				
182-192	Claystone, tan, silty				
192-199	Claystone, bluish-green			200	200 60
199-200	Lignite				
200-202	Claystone, brown			220	
202-203	Lignite				
203-222	Claystone, grayish-brown, silty			240	
222-249	Claystone, gray				250
249-256	Siltstone, bluish-green			260	
256-262	Siltstone, brown, clayey				80
262-266	Siltstone, bluish-green, sandy			280	
266-267	Lignite				
267-300	No samples			302	300



79M22 Hole number – Continued

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 302 feet	Logged depth 302 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M23 Map: No Topo Date: 6-14-79 State: ND County: Mountrail

Elev.: 2242 feet Location: T. 155 N, R. 93 W, Sec. 18, Tract: cccc Drilled depth: 302 feet

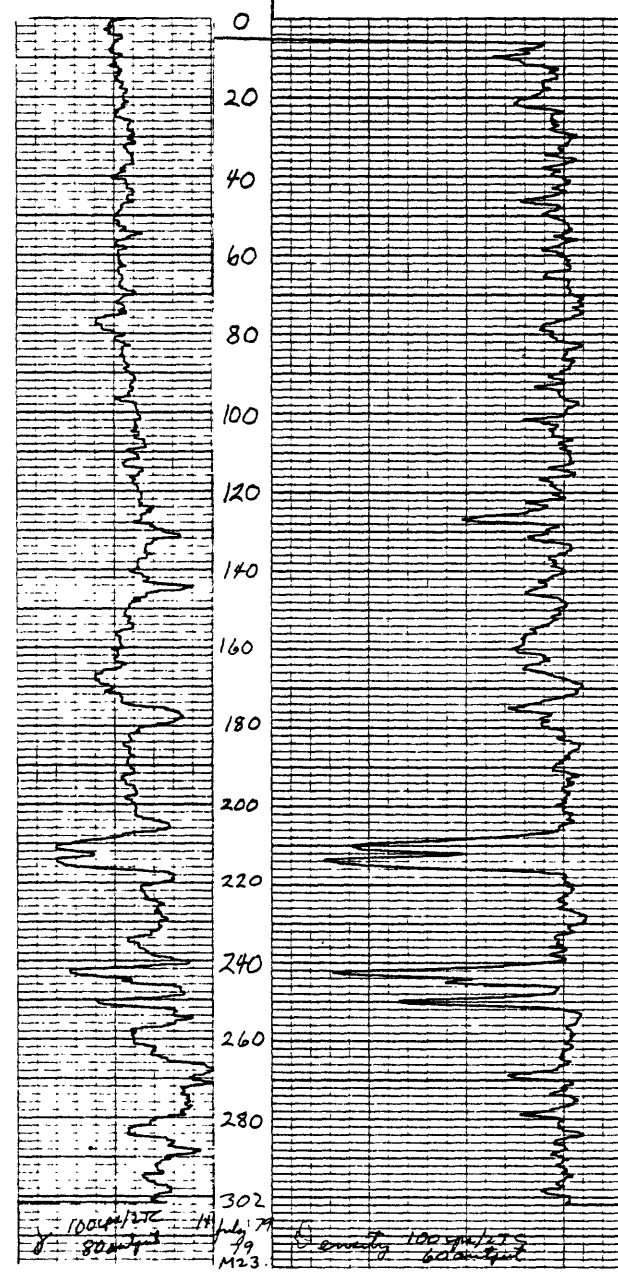
Measured: 22 ft FSL, 162 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 208-216; 241-244; 249-251

Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet	Depth Feet	Depth Meters
0- 1	Silt, black				
1- 2	Till, tan, clayey, sandy			0	0
2- 17	Till, yellowish-brown, clayey, sandy, pebbly			20	
17- 27	Till, brown, clayey, sandy, pebbly			40	50
27- 52	Till, gray, silty, sandy, pebbly			60	20
52- 57	Till, brown, silty, clayey, sandy			80	
57- 76	Till, gray, silty, sandy, gravelly			100	100
76- 79	Gravel, brown			120	
79-103	till, gray, silty, sandy, pebbly			140	40
103-115	Siltstone, brown			160	150
115-117	Siltstone, orange			180	
117-119	Siltstone, brown			200	200 60
119-122	Claystone, brown, silty			220	
122-126	Siltstone, brown			240	
126-127	Lignite			260	250 80
127-128	Claystone, grayish-brown, silty			280	
128-133	Claystone, gray, silty			302	300
133-152	Siltstone, gray				
152-174	Sandstone, gray, fine-grained, silty				
174-175	Lignite				
175-182	Claystone, gray				
182-203	Siltstone, gray				
203-207	Claystone, gray, silty				
207-210	Claystone, bluish-green				
210-211	Lignite				
211-214	Claystone, dark-brown, lignitic				
214-215	Lignite				
215-217	Claystone, dark-brown, lignitic				
217-222	Siltstone, grayish-brown, clayey				

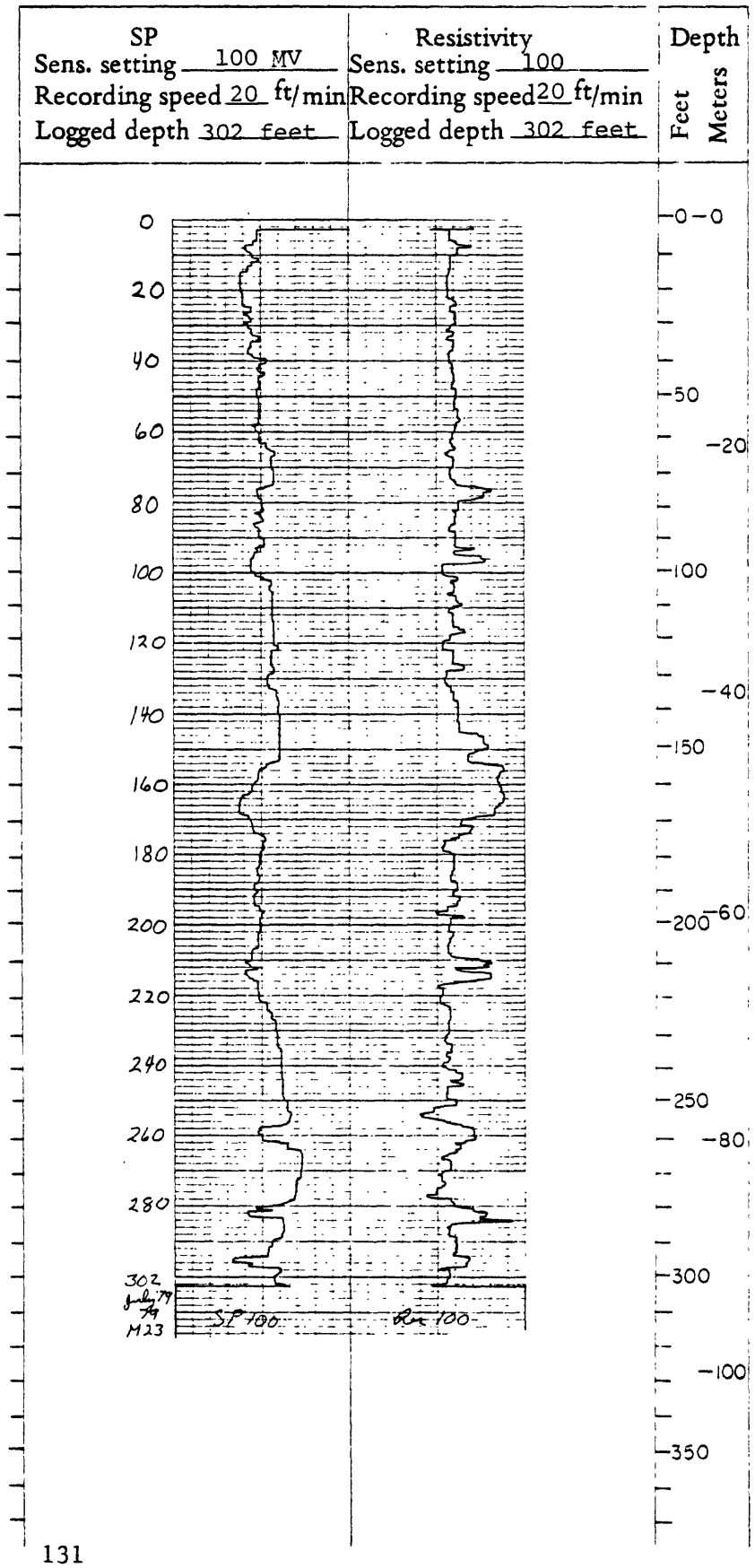


Hole number—continued

79M23

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 302 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 302 feet	Depth Feet / Meters
222-242 Claystone, gray			300
242-244 Lignite			
244-250 Claystone, gray			
250-254 Claystone, dark-brown			100
254-262 Claystone, bluish-green			
262-271 Claystone, grayish-brown, silty			350
271-285 Claystone, bluish-green			
285-290 Claystone, brown, silty			
290-296 Siltstone, light-brown, clayey			
296-300 Claystone, brown, silty			120
			400
			450 140
			500
			160
			550
			180
			600

79M23 Hole number – continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M24 Map: White Earth 2 SE Date: 7-15-79 State: ND County: Mountrail

Elev.: 2382 feet Location: T. 155 N, R. 94 W, Sec. 7, Tract: ccbc Drilled depth: 362 feet

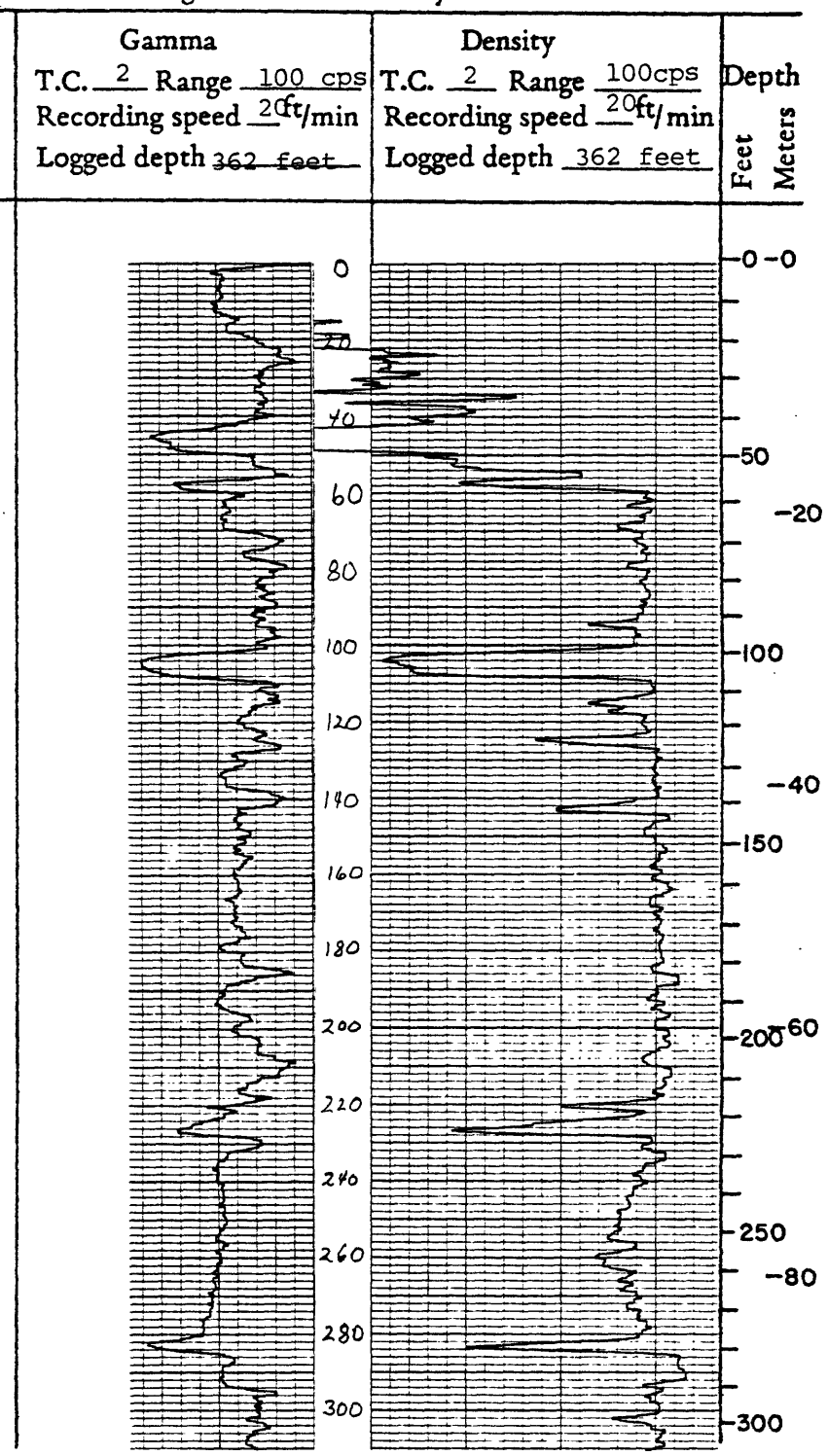
Measured: 702 ft FSL, 16 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 44-49; 57-60; 102-108; 225-228; 282-284

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

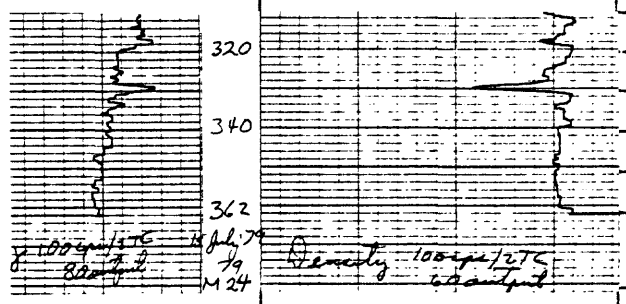
Lithology	
0- 1	Silt, black
1- 4	Silt, brown, sandy
4- 18	Till, brown, silty, pebbly
18- 27	Claystone, brownish-gray
27- 34	Claystone, brown
34- 42	Claystone, dark-gray
42- 45	Lignite
45- 54	Claystone, dark-gray
54- 56	Lignite
56- 57	Claystone, brown, carbonaceous
57- 62	Claystone, greenish-gray
62- 77	Claystone, medium-gray
77- 86	Claystone, greenish-gray
86- 90	Claystone, medium-gray
90- 91	Lignite
91- 99	Claystone, medium-gray
99-103	Lignite
103-112	Claystone, medium-gray
112-113	Lignite
113-115	Claystone, grayish-brown
115-120	Siltstone, greenish-gray
120-122	Claystone, medium-gray
122-123	Lignite
123-125	Claystone, medium-gray
125-138	Claystone, gray, silty
138-140	Claystone, dark-gray, carbonaceous
140-141	Lignite
141-153	Claystone, greenish-gray, silty
153-175	Claystone, medium gray, silty
175-177	Siltstone, medium-gray, clayey
177-182	Sandstone, greensih-gray, medium-grained, silty
182-185	Claystone, dark-brown, carbonaceous



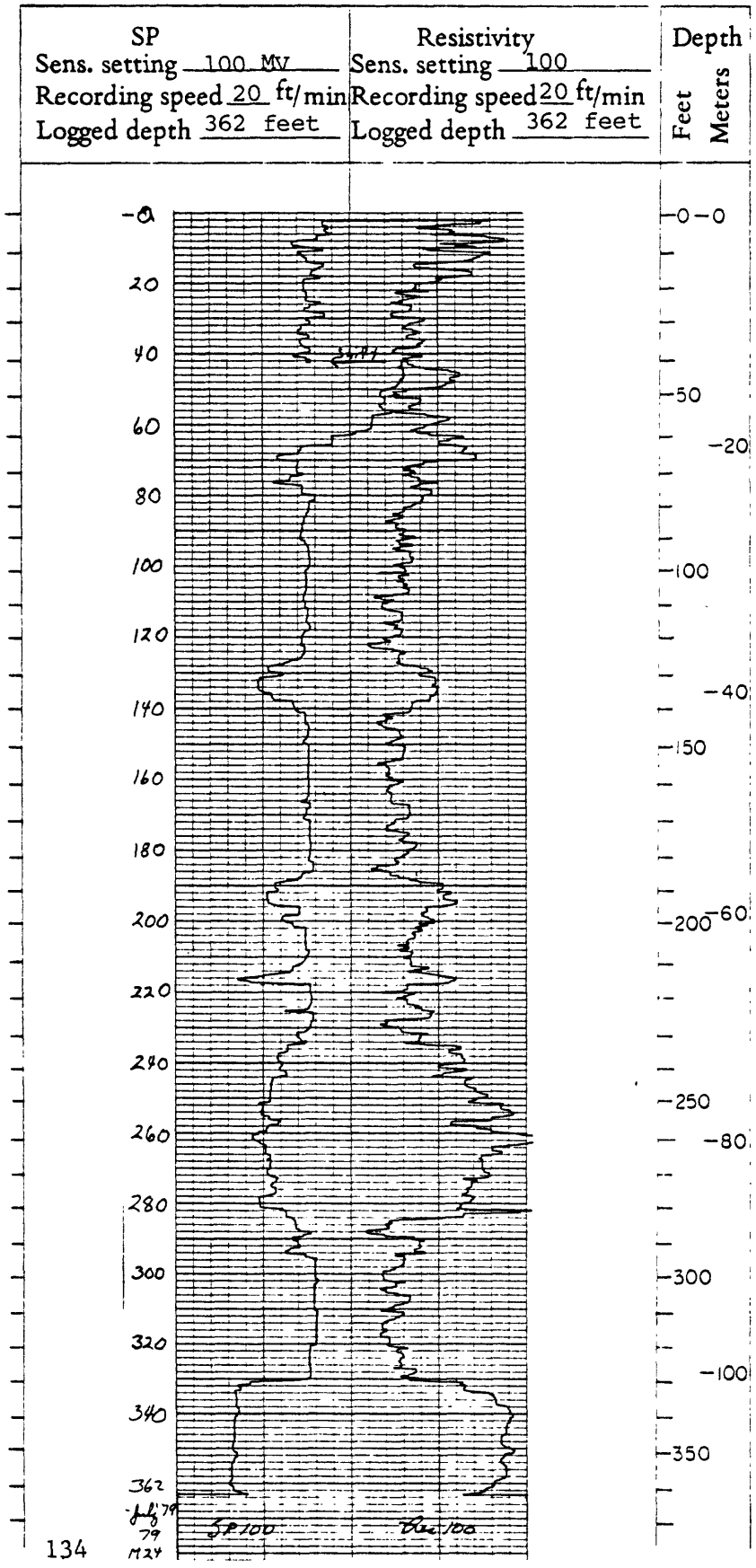
Hole number—continued

79M24

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 362 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 362 feet	Depth Feet / Meters
185-190	Claystone, gray			300
190-195	Sandstone, greenish-gray, medium-grained			
195-217	Claystone, gray			100
217-224	Claystone, dark-brown, carbonaceous			
224-226	Lignite			350
226-230	Claystone, medium-gray			
230-247	Sandstone, medium-gray, medium-grained, silty			
247-248	Claystone, medium-gray, silty			120
248-280	Sandstone, greenish-gray, medium-grained			400
280-281	Lignite			
281-282	Claystone, dark-brown			
282-315	Sandstone, greenish-gray, medium-grained, silty			
315-325	Claystone, medium-gray			450
325-326	Lignite			140
326-335	Siltstone, medium-gray			
335-362	Sandstone, greenish-gray, medium-grained			
				500
				160
				550
				180
				600



79M24 Hole number – continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M25 Map: No Topo Date: 7-17-79 State: ND County: Mountrail

Elev.: 2272 feet Location: T. 156 N, R. 93 W, Sec. 6, Tract: ddad Drilled depth: 302 feet

Measured: 798 ft PSL, 15 ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

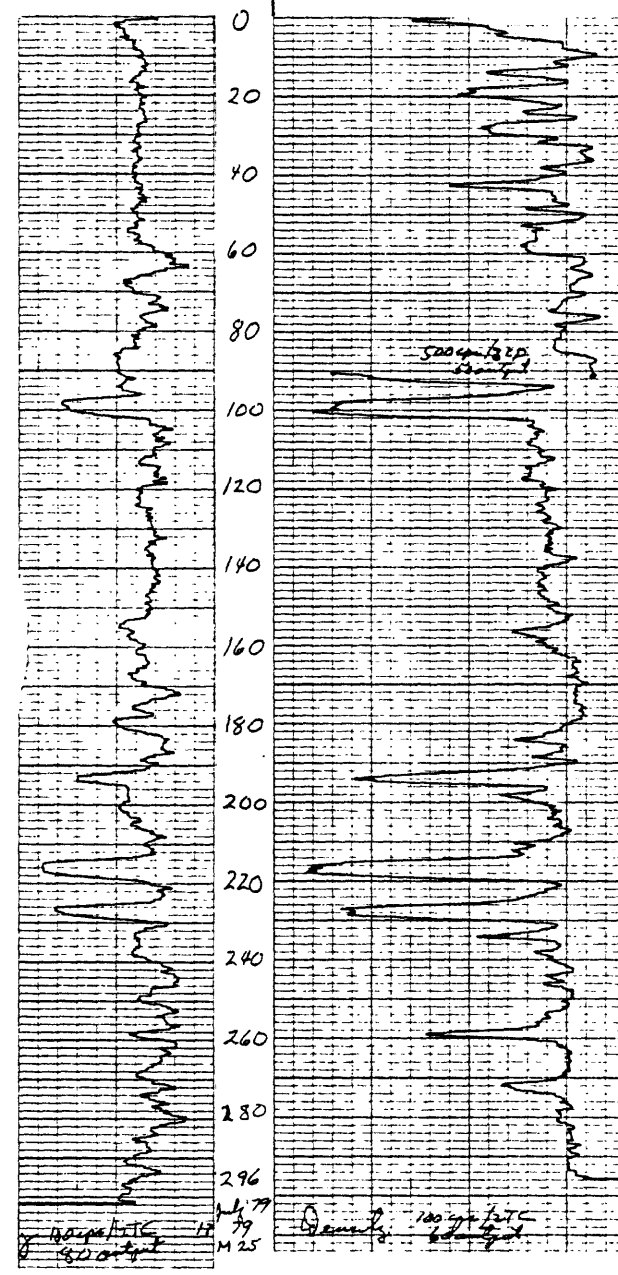
Lignite beds: 97-102; 192-195.5, 214-219; 226-230

Remarks:

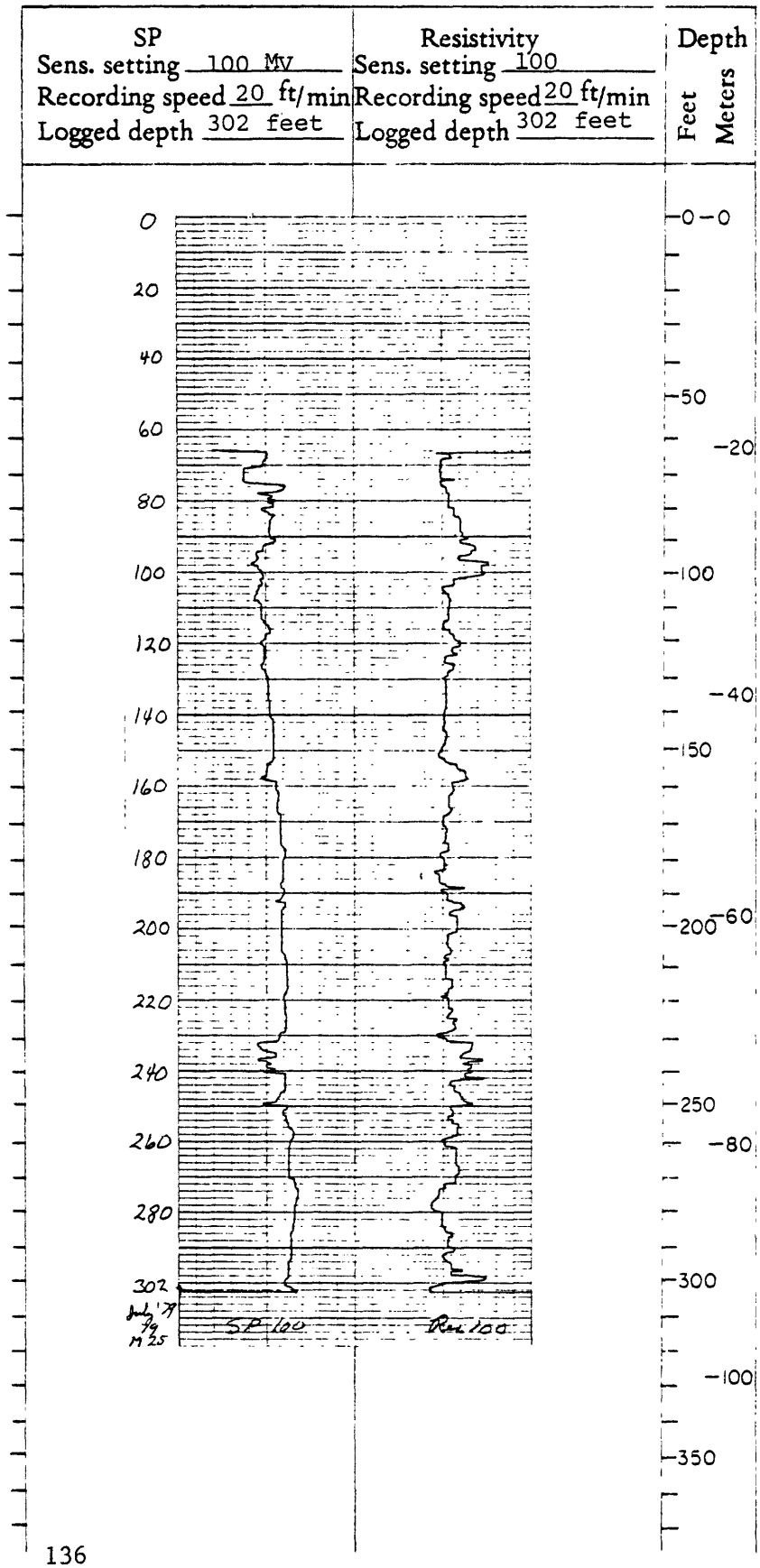
Lithology Recorded by: Gary Stefanovsky Geologist Yes

Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet	Depth Feet	Depth Meters
0- 1	Silt, black				
1- 5	Silt, light-brown			0	0
5- 15	Till, brownish-gray, silty, pebbley			20	
15- 60	Till, dark-gray, silty, pebbley			40	
60- 62	Claystone, medium-gray			50	
62- 67	Siltstone, light-brown, clayey			60	20
67- 73	Claystone, medium-gray, silty			80	
73- 95	Siltstone, medium-gray, clayey			100	100
95- 98	Claystone, dark-gray, carbonaceous			120	
98-101	Lignite			140	40
101-155	Claystone, dark-gray, silty			150	
155-170	Siltstone, greenish-gray, clayey			160	
170-177	Claystone, dark-gray			180	
177-181	Claystone, greenish-gray			200	200 60
181-191	Claystone, dark-gray			220	
191-194	Claystone, dark-brownish-gray, carbonaceous			240	
194-196	Lignite			250	
196-210	Claystone, dark-gray, silty			260	80
210-214	Claystone, dark-brownish-gray, carbonaceous			280	
214-217	Lignite			296	
217-223	Claystone, greenish-gray			300	
223-226	Lignite				
226-255	Claystone, medium-gray				
255-257	Lignite				
257-285	Claystone, medium-gray				
285-290	Claystone, greenish-gray				
290-302	Siltstone, greenish gray, clayey				



79M25 Hole number - continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M26 Map: White Earth 2 SE Date: 7-16-79 State: ND County: Mountrail

Elev.: 2305 feet Location: T. 156 N, R. 94 W, Sec. 6, Tract: dccc Drilled depth: 362 feet

Measured: 76 ft FSL, 2586 ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 72-80; 124-127; 238-241; 268-270.5; 304-307

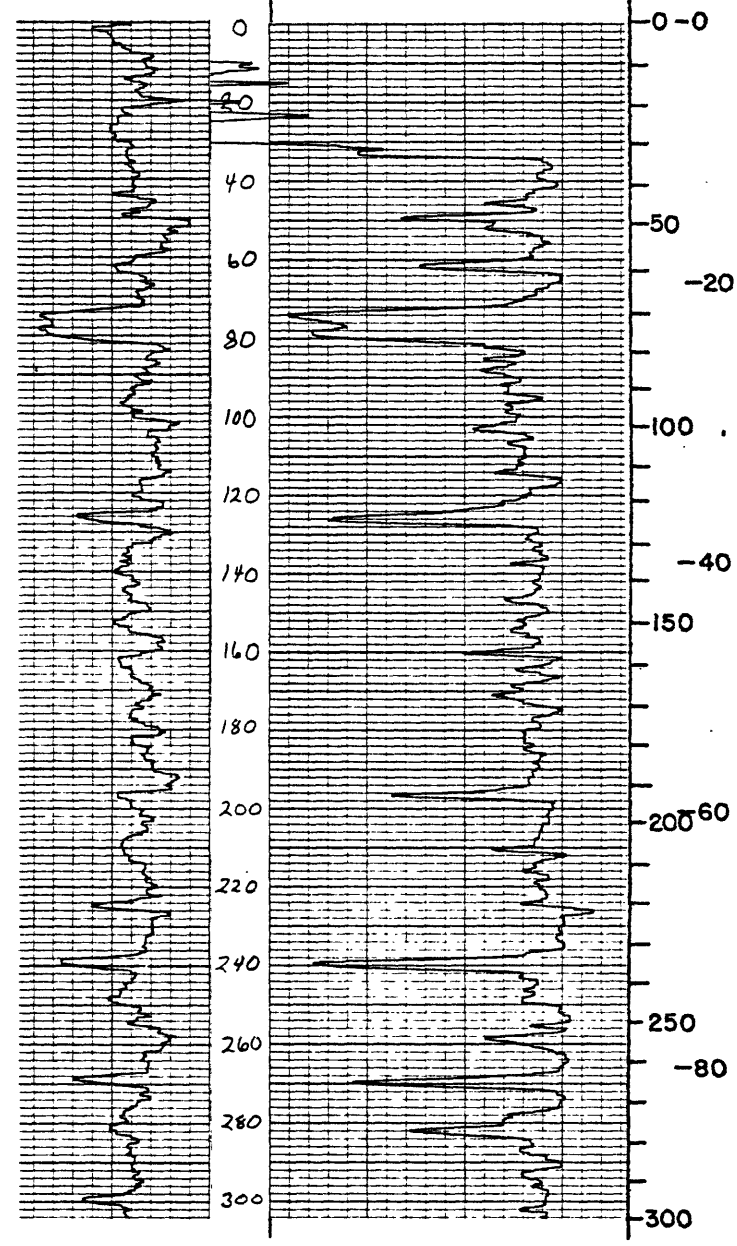
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 1	Silt, black, gravelly
1- 7	Till, yellowish-brown, silty
7- 13	Siltstone, yellowish-brown, clayey
13- 15	Lignite
15- 17	Claystone, medium-brown, carbonaceous
17- 18	Siltstone, yellowish-brown
18- 22	Claystone, gray, carbonaceous
22- 27	Claystone, yellowish-brown
27- 33	Claystone, light-brownish-gray, silty
33- 37	Claystone, yellowish-brown
37- 42	Claystone, light-gray
42- 44	Claystone, medium-gray, carbonaceous
44- 46	Lignite
46- 56	Claystone, greenish-gray, silty
56- 70	Siltstone, medium-gray, clayey
70- 71	Claystone, brownish-black, silty
71- 76	Lignite
76- 77	Claystone, brownish-black, silty
77- 84	Claystone, greenish-gray
84- 85	Lignite
85- 95	Claystone, greenish-gray, silty
95- 98	Siltstone, greenish-gray, clayey
98-122	Claystone, light-gray
122-125	Lignite
125-159	Claystone, medium-gray
159-160	Lignite
160-162	Claystone, medium-gray
162-167	Sandstone, medium-gray

Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 362 feet

Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 362 feet

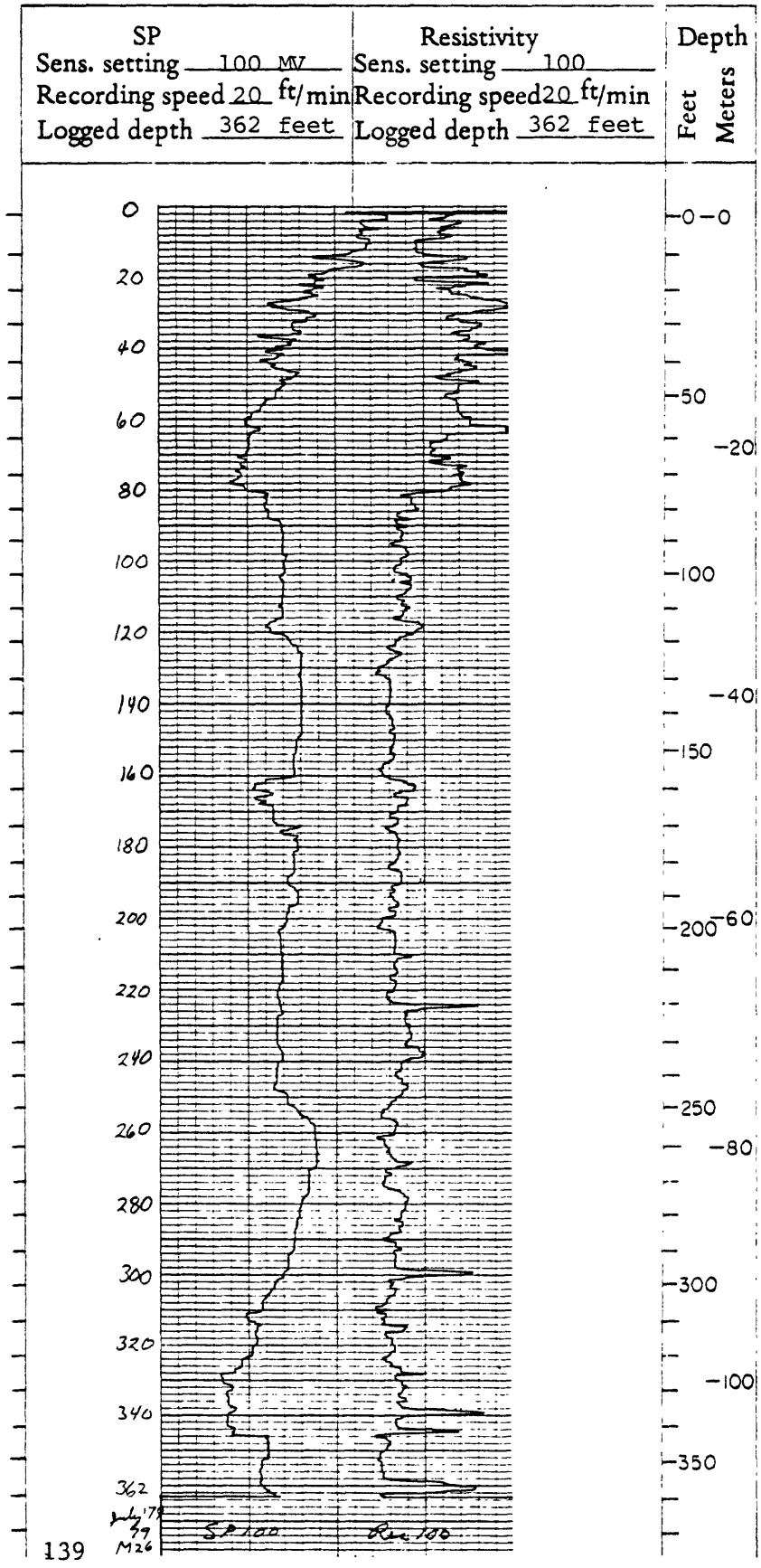


Hole number—continued

79M26

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 362 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 362 feet	Depth Feet / Meters
167-193	Claystone, light-gray			300
193-196	Lignite			
196-201	Siltstone, light-gray, clayey, sandy	320		100
201-207	Sandstone, light-gray, medium-grained	340		
207-212	Siltstone, light-gray, clayey	362		350
212-236	Claystone, light-gray			
236-238	Lignite			
238-250	Siltstone, medium-gray, clayey			120
250-264	Claystone, medium-gray			400
264-266	Lignite			
266-278	Siltstone, greenish-gray, clayey			
278-295	Claystone			
295-323	Sandstone, greenish-gray, medium-grained			450
323-335	Siltstone, greenish-gray, clayey			140
335-340	Claystone, greenish-gray			
340-350	Sandstone, medium-gray, medium-grained			
350-362	Claystone, medium-gray			500
				160
				550
				180
				600

79M26 Hole number - continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M27 Map: White Earth 2SE Date: 7-16-79 State: ND County: Mountrail

Elev.: 2342 feet Location: T. 156 N, R. 94 W, Sec. 29, Tract: cbbc Drilled depth: 362 feet

Measured: 2000 ft FSL, 62 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 168-170.5; 236-238; 257-260.5; 290-293

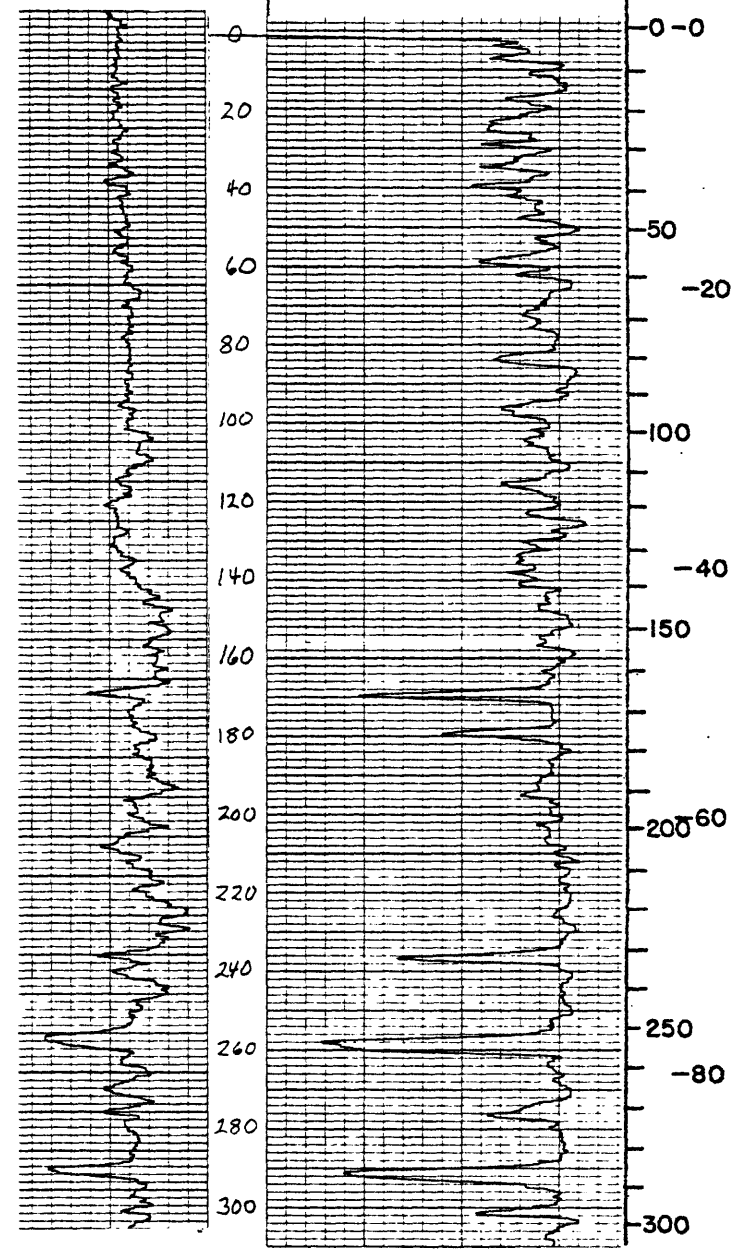
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 1	Silt, black, pebbly
1- 5	Silt, brown, gravelly
5- 18	Till, brown, clayey, pebbly
18- 25	Gravel, brown
25-123	Till, gray, clayey, pebbly
123-141	Gravel, brown, sandy
141-147	Sandstone, brown, medium-grained
147-158	Claystone, medium-gray
158-161	Claystone, dark-gray
161-173	Claystone, medium-gray
173-176	Lignite
176-182	Claystone, dark-gray, carbonaceous
182-183	Lignite
183-195	Sandstone, gray, medium-grained
195-237	Claystone, dark-gray, carbonaceous
237-255	Claystone, greenish-gray, carbonaceous
255-259	Siltstone, greenish-gray, carbonaceous
259-262	Claystone, greenish-gray, carbonaceous
262-263	Lignite
263-266	Claystone, greenish-gray, carbonaceous
266-267	Lignite
267-270	Claystone, greenish-gray
270-285	Claystone, dark-gray, carbonaceous, silty
285-296	Claystone, greenish-gray, carbonaceous
296-297	Lignite
297-307	Claystone, greenish-gray, carbonaceous
307-310	Sandstone, greenish-gray, medium-grained

Gamma: T.C. 2 Range 100; Recording speed 20 ft/min; Logged depth 362 feet

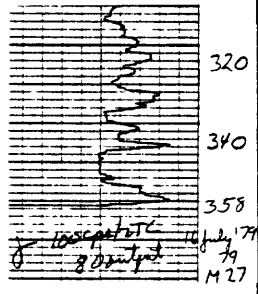
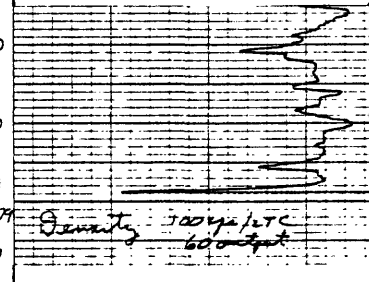
Density: T.C. 2 Range 100; Recording speed 20 ft/min; Logged depth 362 feet



Depth Feet Meters

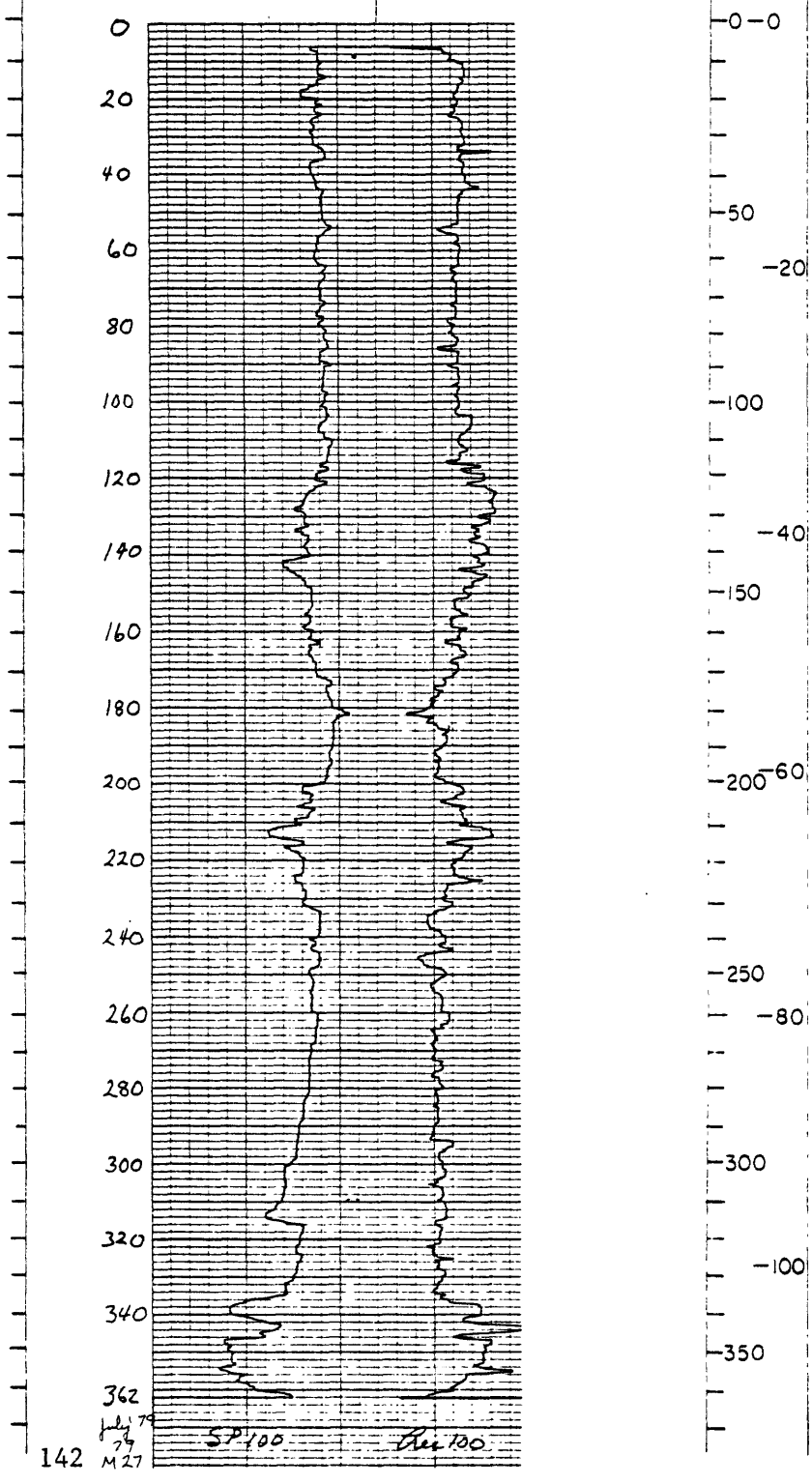
Hole number—continued

79M27

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 362 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 362 feet	Depth Feet / Meters
310-330	Siltstone, greenish-gray, clayey			300
330-360	Sandstone, greenish-gray, medium-grained			100
				350
				120
				400
				450 / 140
				500
				160
				550
				180
				600

79M27 Hole number – continued

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 100	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 362 feet	Logged depth 362 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M28 Map: Ross NW Date: 7-17-79 State: ND County: Mountrail

Elev.: 2300' Location: T. 157 N, R. 93 W, Sec. 16, Tract: bbbb Drilled depth: 402 feet

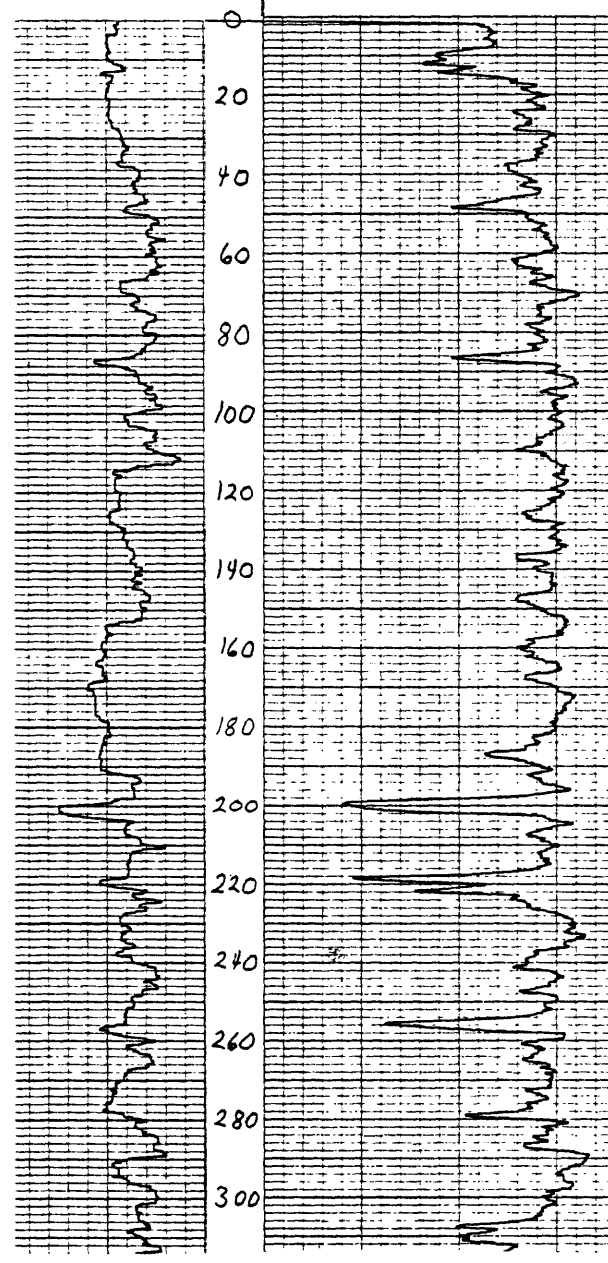
Measured: 36 ft FNL, 60 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 198-202; 218-220; 253-255; 326-331

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

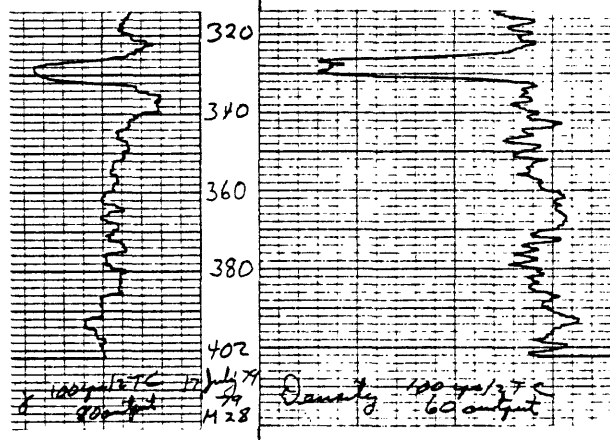
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 feet	Depth Feet	Depth Meters
0- 5	Silt, black, clayey				
5- 36	Till, light-brownish-gray, silty, pebbley, sandy			0	0
36- 46	Claystone, grayish-brown			20	
46- 49	Lignite				
49- 65	Claystone, medium-dark-gray, carbonaceous, silty			40	
65- 72	Siltstone, medium-dark-gray, clayey			50	
72- 85	Claystone, medium-dark-gray			60	20
85- 86	Claystone, brownish-black, carbonaceous			80	
86- 87	Lignite				
87- 88	Claystone, brownish-black, carbonaceous			100	100
88- 93	Claystone, greenish-gray, silty			120	
93- 98	Claystone, medium-dark-gray				
98-102	Siltstone, medium-dark-gray, clayey			140	40
102-111	Claystone, medium-dark-gray			150	
111-114	Claystone, brownish-black, carbonaceous			160	
114-130	Siltstone, greenish-gray, clayey			180	
130-153	Claystone, greenish-gray, silty			200	200 60
153-193	Sandstone, greenish-gray, medium-grained, silty, clayey			220	
193-199	Claystone, medium-dark-gray			240	
199-201	Lignite				
201-217	Siltstone, greenish-gray, clayey			250	80
217-218	Lignite			260	
218-220	Claystone, medium-dark-gray			280	
220-221	Lignite				
221-242	Claystone, medium-dark-gray			300	300
242-257	Siltstone, greenish-gray, clayey				



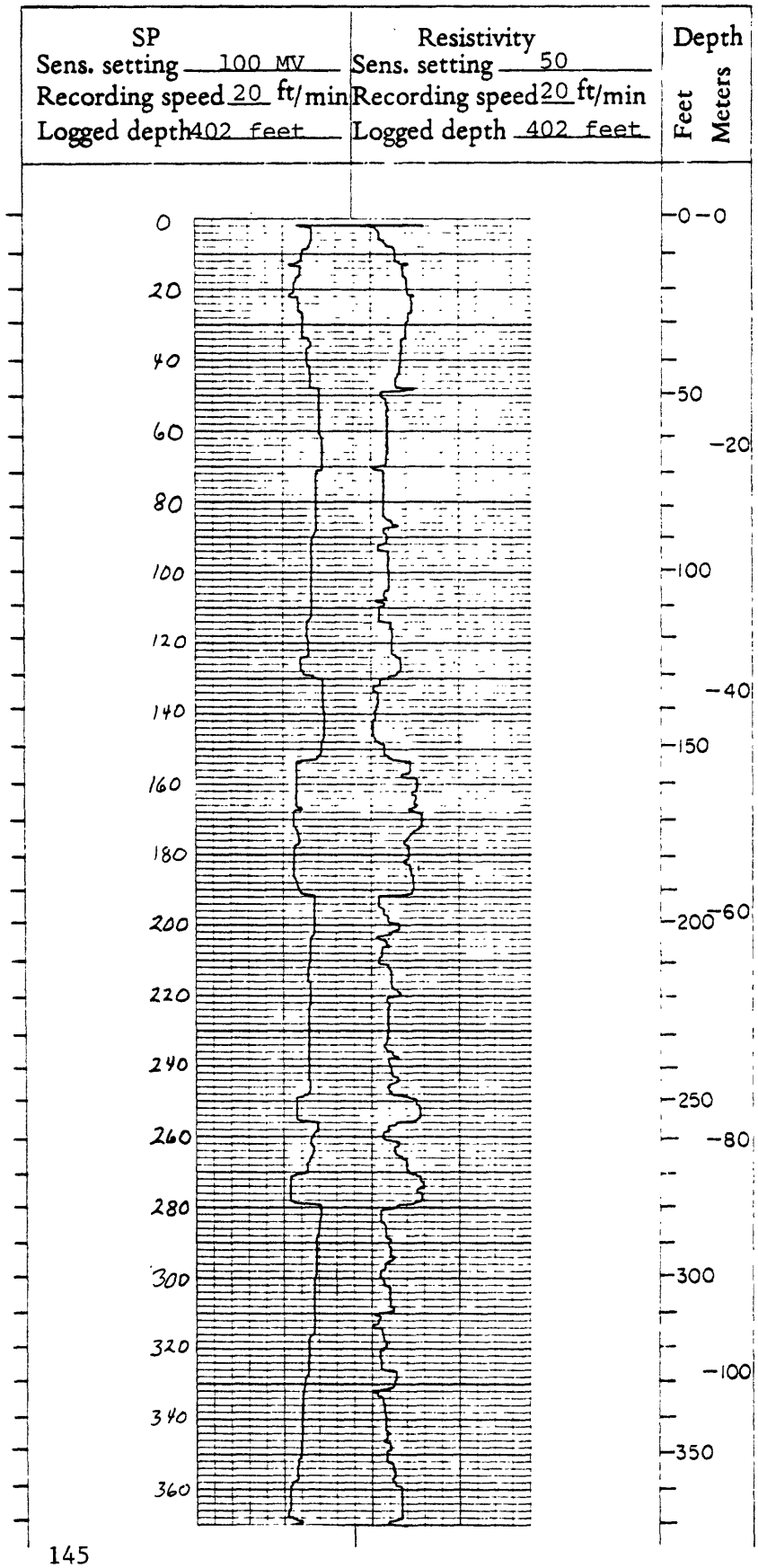
Hole number—continued

79M28

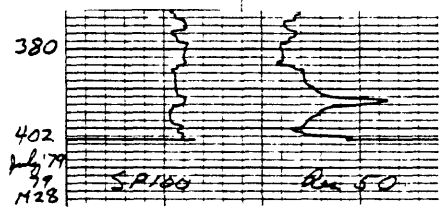
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Depth Feet / Meters
257-258	Lignite			300
258-277	Claystone, greenish-gray			
277-278	Lignite			
278-282	Claystone, brownish-black, carbonaceous			100
282-285	Claystone, greenish-gray			
285-290	Sandstone, greenish-gray, medium-grained			350
290-305	Siltstone, greenish-gray, clayey			
305-312	Claystone, brownish-black			
312-327	Siltstone, greenish-gray, clayey			120
327-329	Lignite			400
329-343	Claystone, brownish-black			
343-358	Claystone, greenish-gray, silty			
358-400	Siltstone, greenish-gray			
				450
				140
				500
				160
				550
				180
				600



79M28 Hole number - continued



SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 feet	Logged depth 402 feet	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750; Meters: 120, 140, 160, 180, 200, 220

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M29 Map: Ross NW Date: 7-17-79 State: ND County: Mountrail

Elev.: 2455' Location: T. 157 N, R. 93 W, Sec. 23, Tract: dddd Drilled depth: 422 feet

Measured: 160 ft FSL, 16 ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 205-207; 240-245; 384-387; 398.5-403

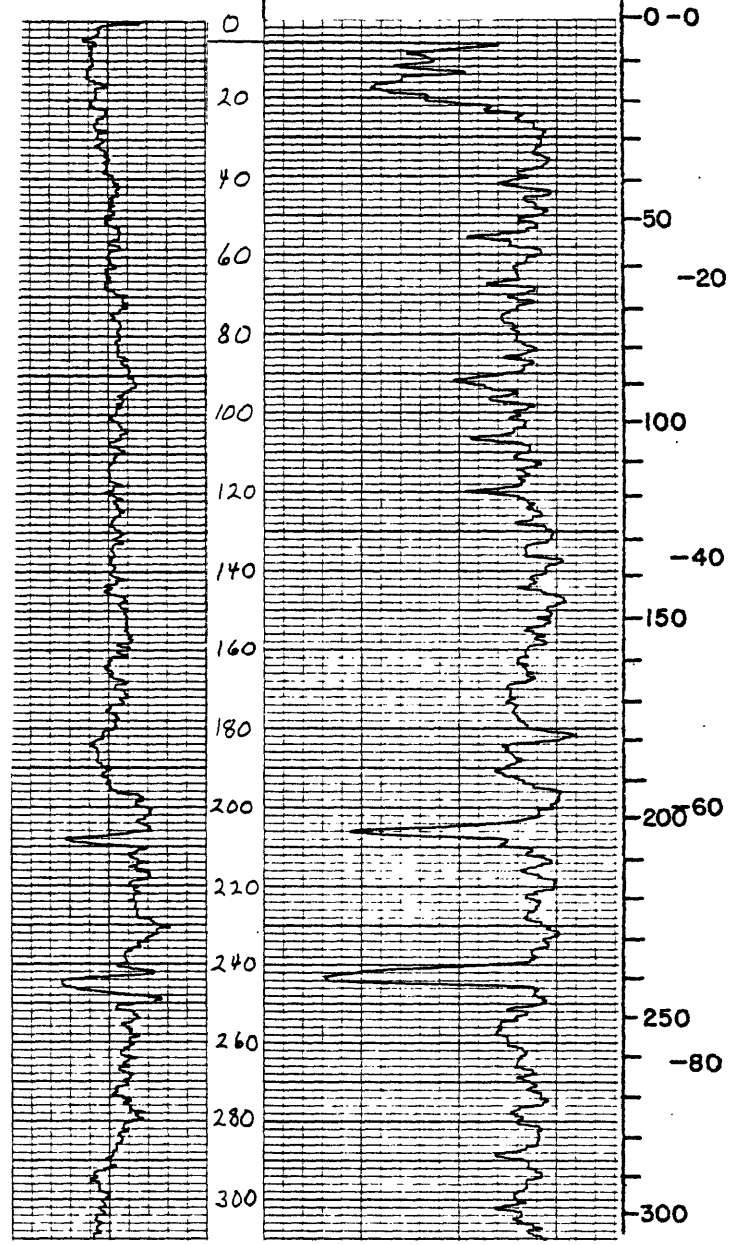
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 1	Clay, brown
1- 5	Gravel, brown
5- 14	Till, brown, clayey, sandy, pebbly
14- 15	Gravel, brown
15- 29	Till, brown, clayey, sandy, pebbly
29-162	Till, gray, silty, sandy, pebbly
162-194	Sandstone, brown, medium-grained, silty
194-203	Claystone, medium-gray
203-207	Lignite
207-211	Claystone, greenish-gray
211-233	Sandstone, greenish-gray, medium-grained, silty
233-240	Claystone, medium-gray, silty, carbonaceous
240-241	Lignite
241-244	Claystone, dark-greenish-gray, silty
244-250	Lignite
250-280	Siltstone, greenish-gray, clayey, sandy
280-300	Sandstone, greenish-gray, medium-grained, silty
300-340	Siltstone, green-gray, clayey, sandy
340-360	Sandstone, greenish-gray, medium-grained, silty
360-385	Claystone, greenish-gray, silty
385-388	Lignite
388-397	Claystone, greenish-gray
397-402	Lignite
402-422	Claystone, dark-grayish-brown, carbonaceous

Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 422 feet

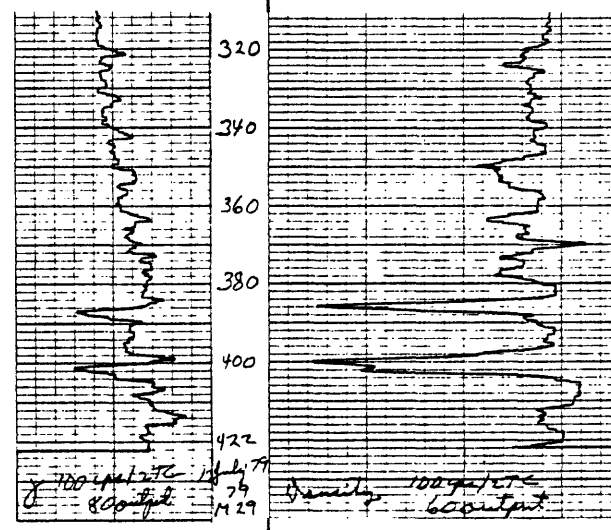
Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 422 feet



Hole number—continued

79M29

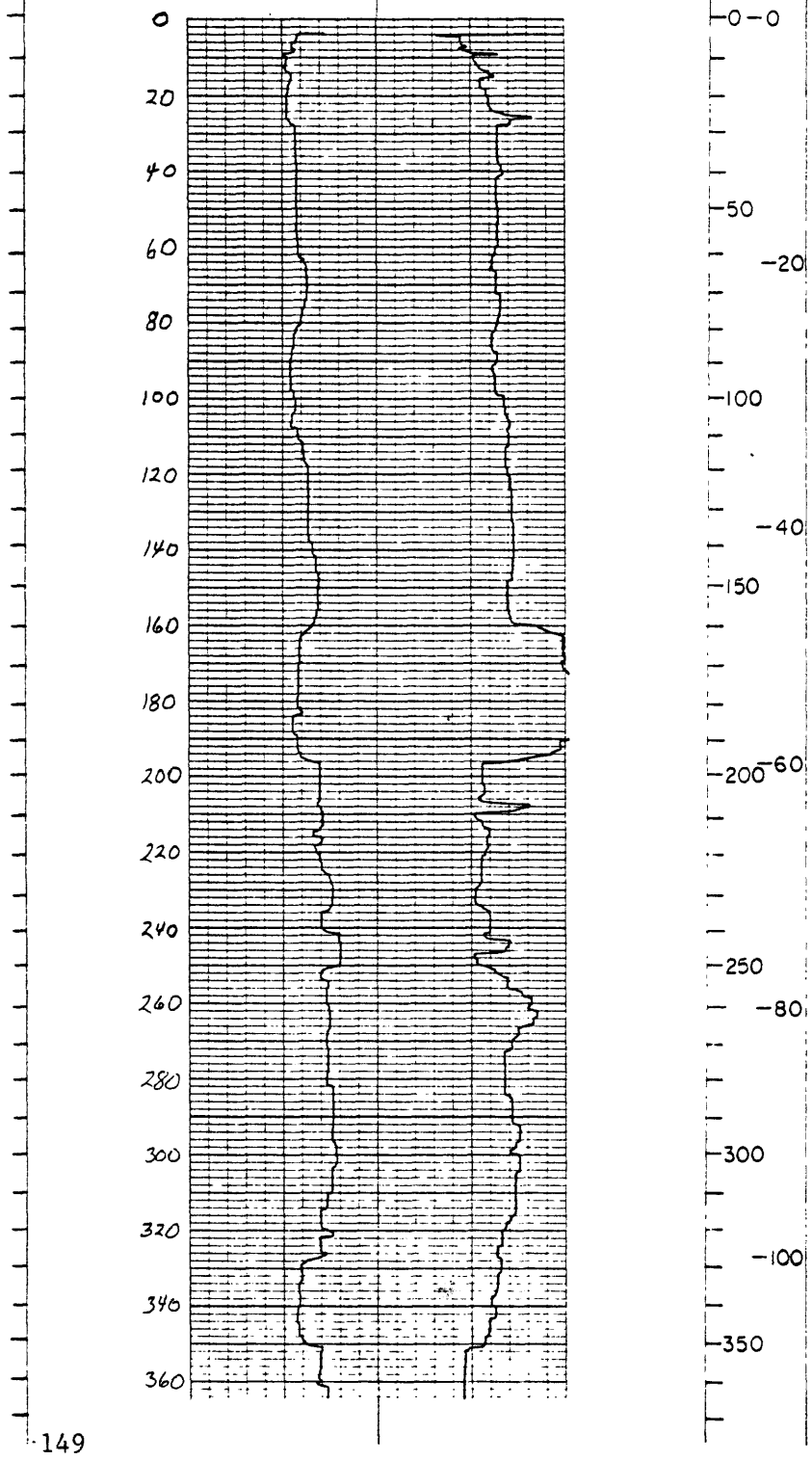
Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 422 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 422 feet	Depth Feet / Meters



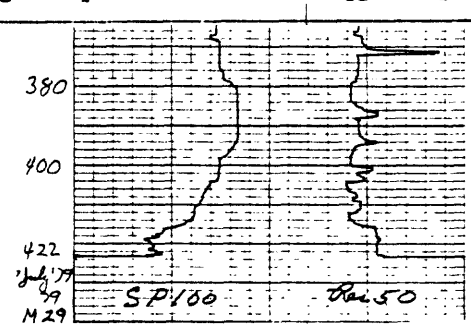
300
100
350
120
400
450
140
500
160
550
180
600

79M29 Hole number - Continued

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 422 feet	Logged depth 422 feet	



SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 422 feet	Logged depth 422 feet	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M30 Map: Powers Lake Date: 7-18-79 State: ND County: Mountrail

Elev.: 2398 feet Location: T. 158 N, R. 93 W, Sec. 20, Tract: aaaa Drilled depth: 400 feet

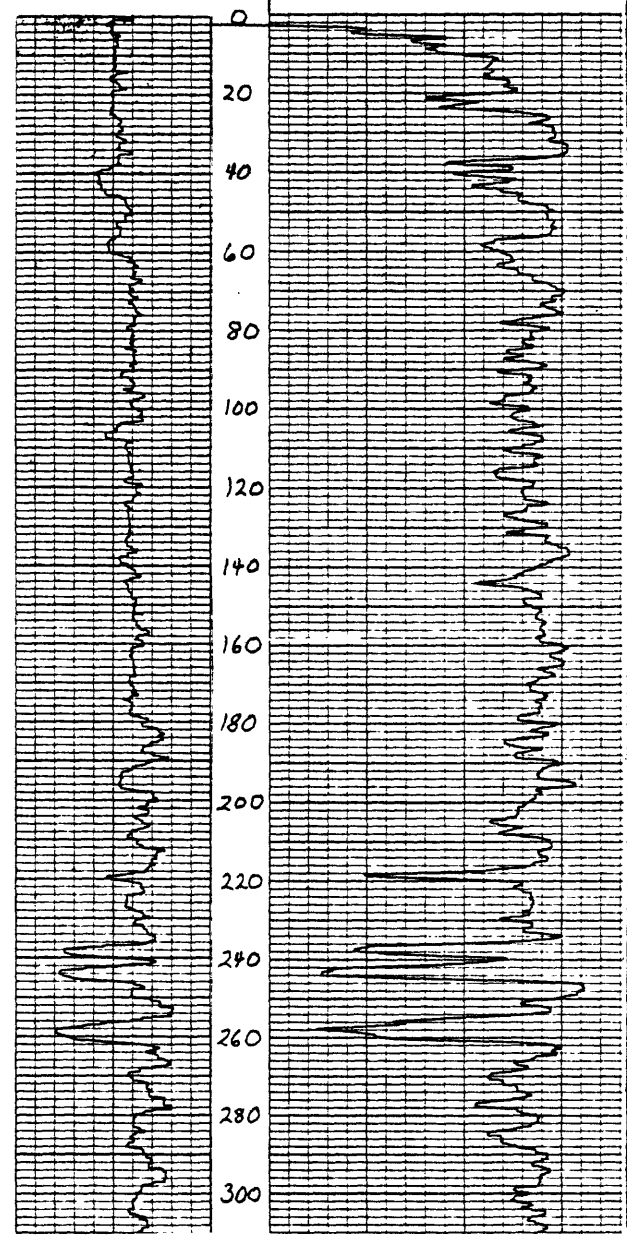
Measured: 100 ft FNL, 270 ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 236-239; 241-245; 255-260.5

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

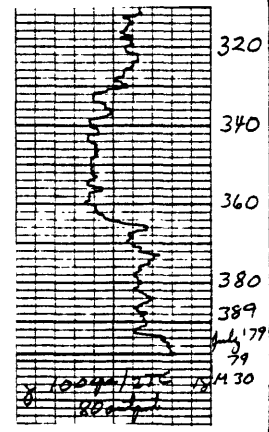
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 398 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 389 feet	Depth Feet	Depth Meters
0- 1	Silt, black, clayey			0	0
1- 4	Silt, dark-reddish-brown, clayey			20	
4- 15	Till, dark-reddish-brown, silty, pebbly			40	
15- 26	Till, brownish-gray, silty, pebbly			50	20
26- 40	Till, dark-gray, clayey, pebbly			60	
40- 42	Gravel, brownish-gray			80	
42- 59	Till, dark-gray, clayey, pebbly			100	100
59- 79	Till, dark-brownish-gray, silty, sandy			120	
79-170	Till, dark-gray, silty, pebbly			140	40
170-185	Siltstone, dark-gray, clayey			150	
185-194	Claystone, dark-gray, carbonaceous			160	
194-203	Siltstone, greenish-gray, clayey			180	
203-213	Sandstone, greenish-gray, medium-grained			200	60
213-217	Siltstone, greenish-gray, clayey			220	
217-218	Lignite			240	
218-236	Claystone, brownish-gray, carbonaceous			250	80
236-238	Lignite			260	
238-244	Claystone, dark-gray			280	
244-246	Lignite			300	
246-250	Siltstone, greenish-gray, clayey				
250-255	Claystone, dark-brownish-gray, carbonaceous				
255-257	Lignite				
257-275	Siltstone, greenish-gray, clayey				

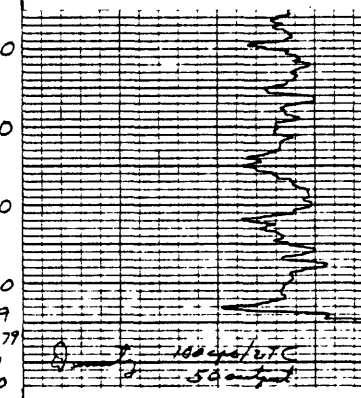


Hole number—continued

79M30

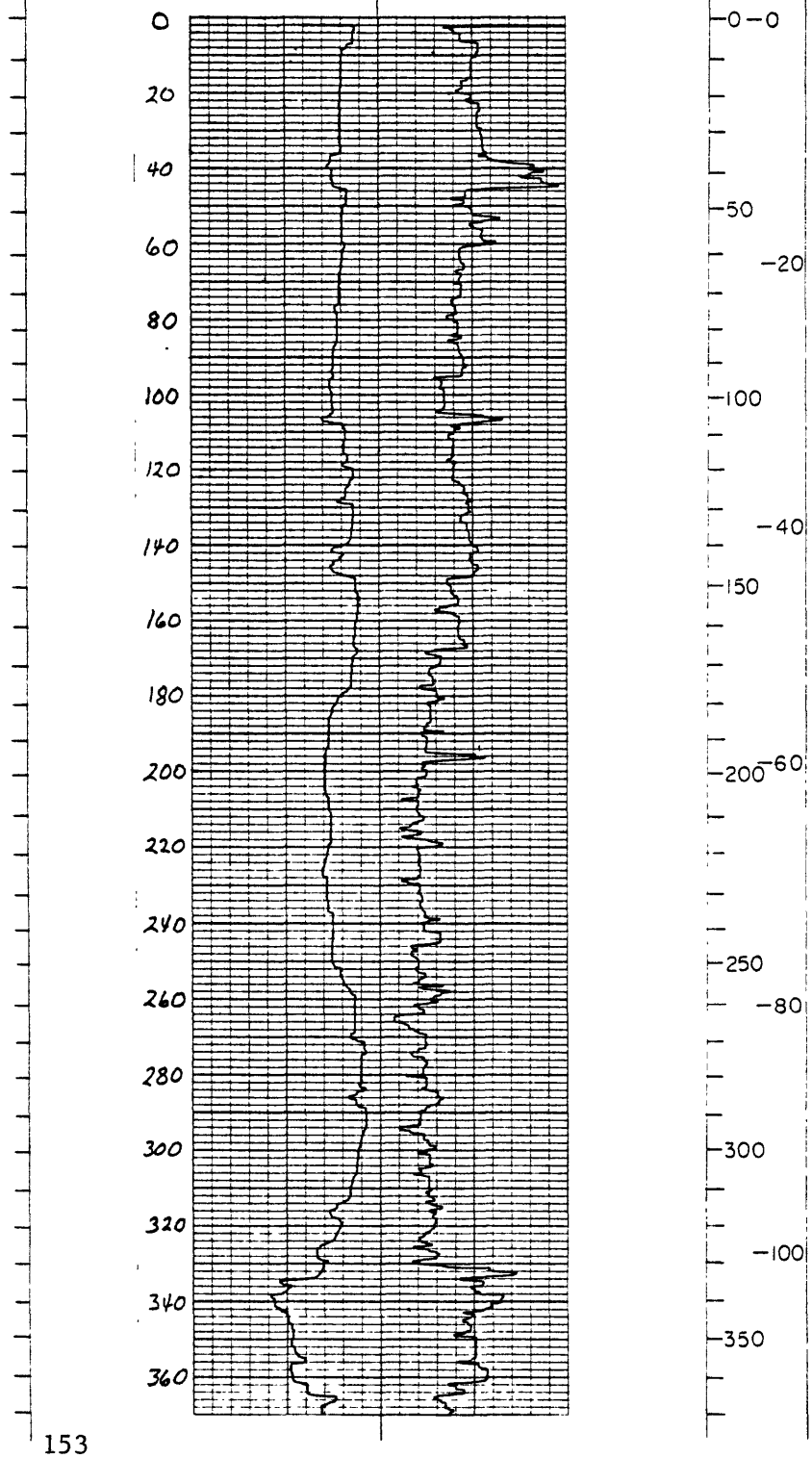
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 398 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 389 feet	Depth Feet / Meters
275-285	Claystone, greenish-gray, silty			300
285-300	Siltstone, greenish-gray, clayey			100
300-310	Claystone, greenish-gray			
310-320	Siltstone, greenish-gray			350
320-330	Claystone, greenish-gray			
330-345	Siltstone, greenish-gray, clayey			
345-350	Siltstone, greenish-gray, sandy			
350-369	Sandstone, greenish-gray, medium-grained, clayey, silty			120 400
369-370	Lignite			
370-386	Siltstone, greenish-gray, clayey			
386-387	Lignite			
387-402	Claystone, greenish-gray			450 140
				500
				160
				550
				180 600



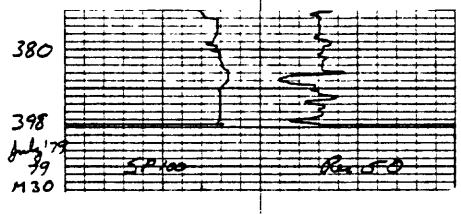


79M30 Hole number - continued

SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 398 feet	Logged depth 398 feet	



SP	Resistivity	Depth
Sens. setting 100 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 398 feet	Logged depth 398 feet	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750 (Feet); 120, 140, 160, 180, 200, 220 (Meters)

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M31 Map: No Topo Date: 7-18-79 State: ND County: Mountrail

Elev.: 2420 feet Location: T. 158 N, R. 94 W, Sec. 3, Tract: ccbb Drilled depth: 302 feet

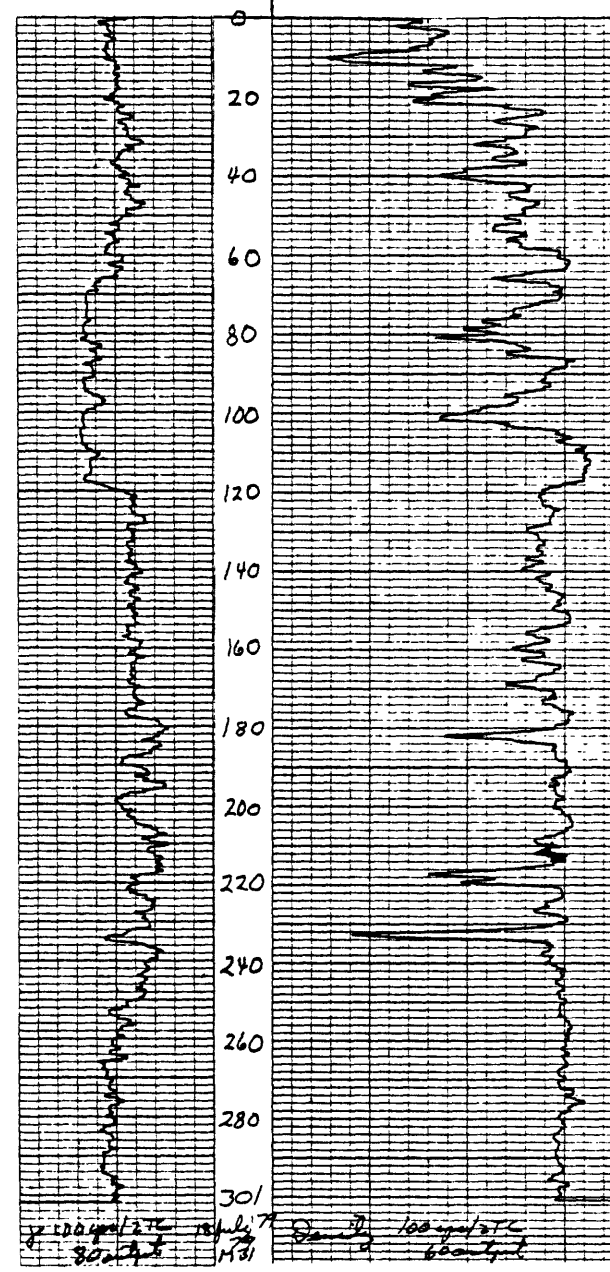
Measured: 1220 ft FSL, 15 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 232-234

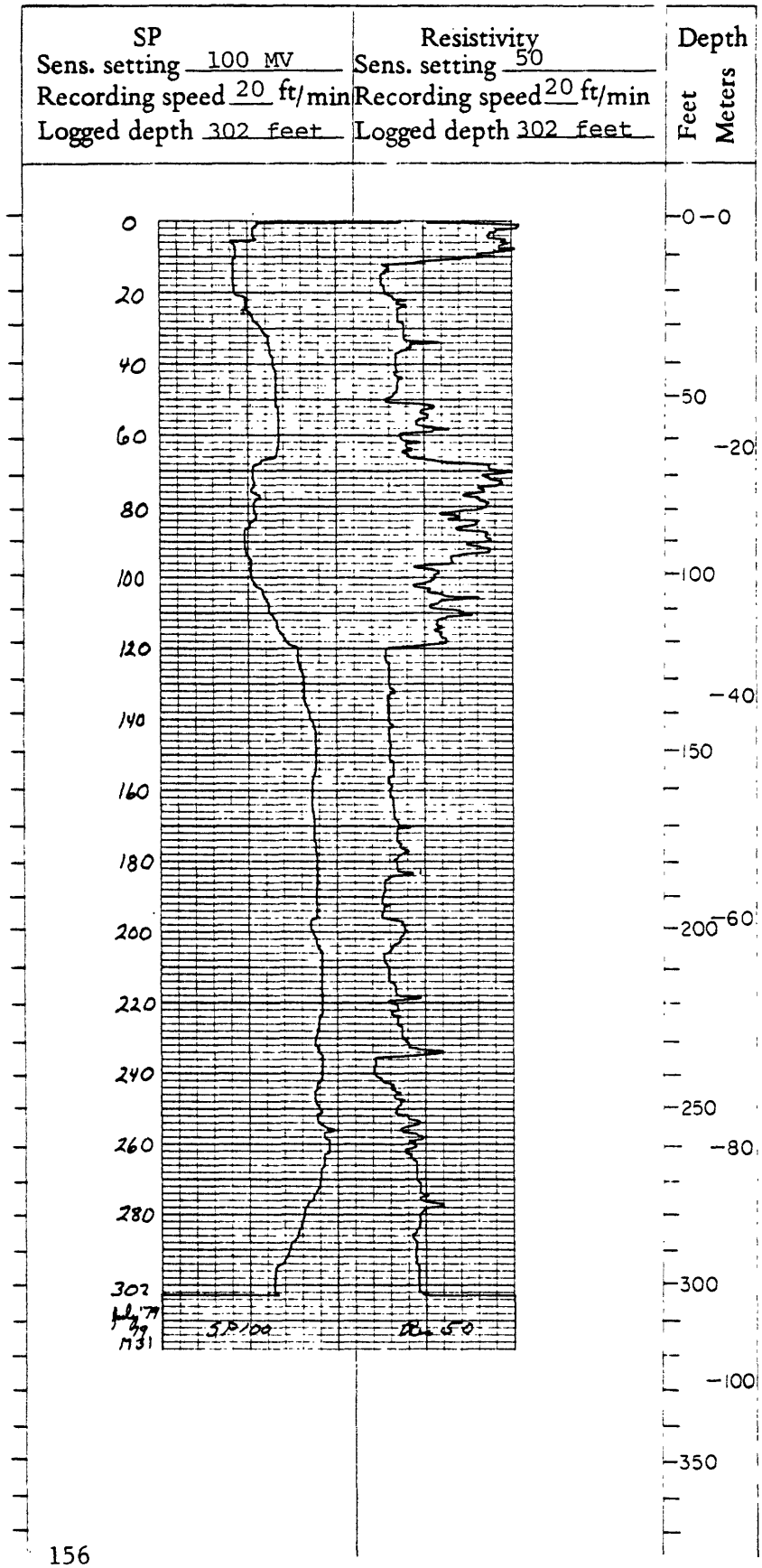
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet	Depth Feet	Depth Meters
0- 1	Silt, black				
1- 53	Till, dark-reddish-brown, clayey, pebbly				
53- 55	Gravel, reddish-brown				
55- 66	Till, reddish-brown, clayey, pebbly				
66-118	Gravel, reddish-brown				
118-182	Till, dark-gray, clayey, pebbly				
182-192	Claystone, dark-gray				
192-220	Claystone, greenish-gray, silty				
220-240	Sandstone, dark-gray, medium-grained				
240-267	Siltstone, dark gray, silty				
267-300	Sandstone, gray, fine-grained				



79M31 Hole number – continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79M32 Map: White Earth Date: 7-18-79 State: ND County: Mountrail

Elev.: 2330 feet Location: T. 158 N, R. 94 W, Sec. 34, Tract: cccc Drilled depth: 302 feet

Measured: 36 ft FSL, 150 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 138-140

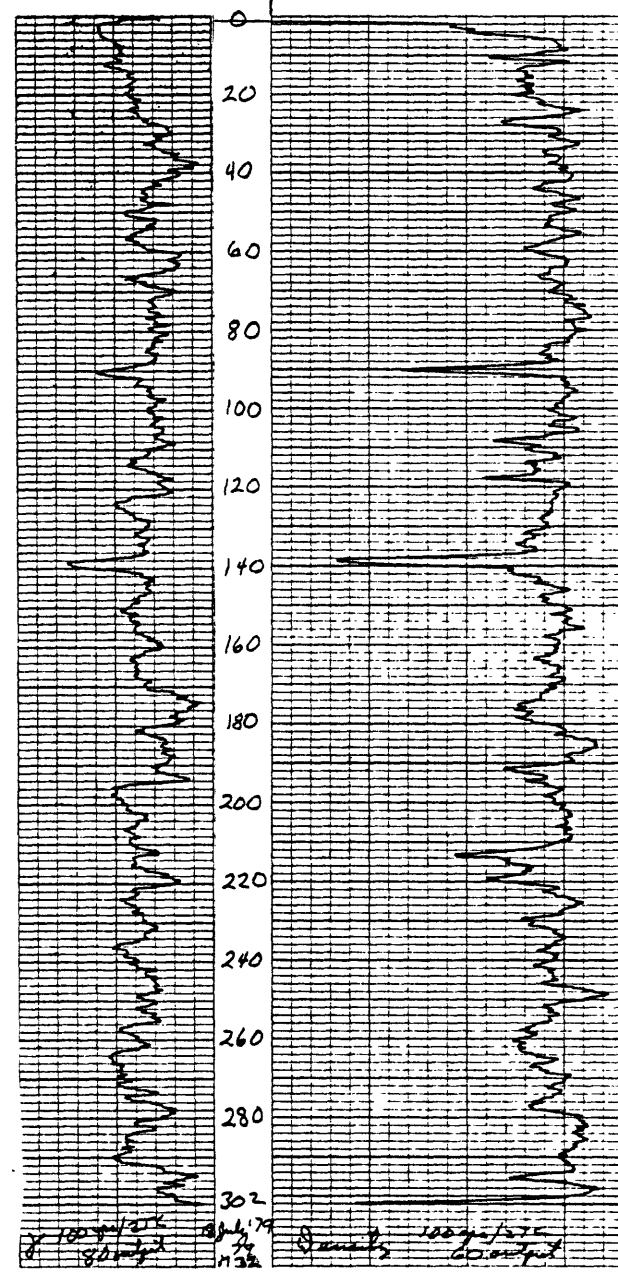
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 1	Silt, black, gravelly
1- 5	Gravel, brown, sandy
5- 27	Till, dark-reddish-brown, clayey, pebbly
27- 31	Claystone, dark-greenish-gray
31- 41	Claystone, bluish-gray, silty
41- 42	Claystone, light-olive, silty
42- 47	Claystone, greenish-gray, silty
47- 61	Claystone, dark-gray
61- 66	Claystone, bluish-gray
66- 68	Claystone, dark-gray
68- 78	Claystone, bluish-gray
78- 82	Claystone, dusky-brown, carbonaceous
82- 83	Lignite
83- 87	Claystone, bluish-gray
87-112	Claystone, medium-gray
112-113	Lignite
113-115	Claystone, medium-gray
115-116	Lignite
116-118	Claystone, medium-gray
118-127	Sandstone, bluish-gray, medium-grained, clayey, silty
127-136	Claystone, medium-gray
136-138	Lignite
138-177	Claystone, greenish-gray
177-187	Claystone, medium-gray
187-194	Claystone, greenish-gray
194-201	Sandstone
201-217	Claystone, medium-gray, silty
217-220	Claystone, greenish-gray
220-240	Siltstone, greenish-gray, clayey

Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet

Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 302 feet

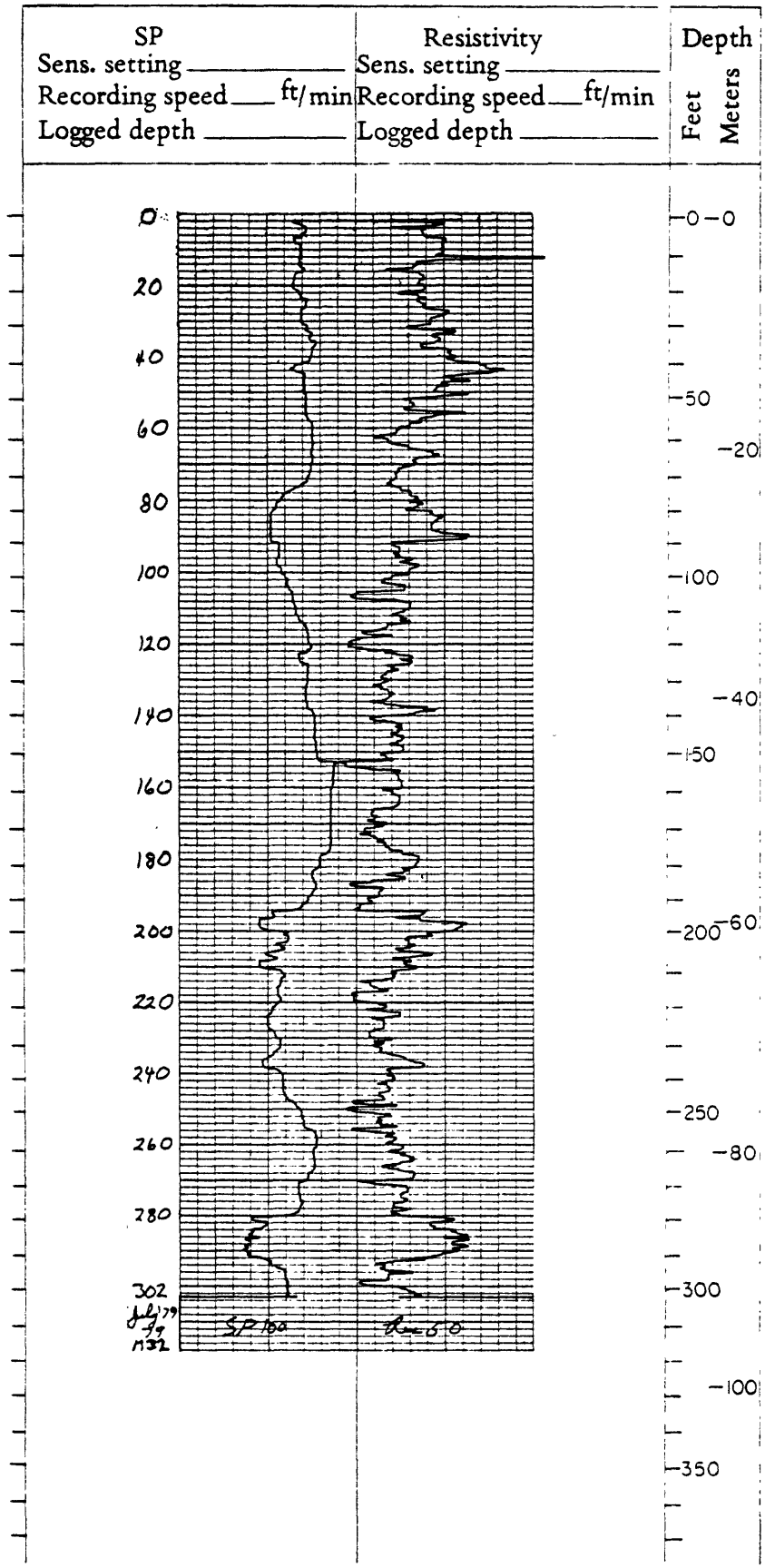


Hole number—continued

79M32

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 302 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 302 feet	Depth Feet / Meters
240-256 Claystone, greenish-gray 256-262 Siltstone, greenish-gray 262-267 Claystone, greenish-gray 267-283 Sandstone, greenish-gray, medium-grained, clayey, silty 283-291 Siltstone, greenish-gray, clayey 291-298 Claystone, greenish-gray 298-300 Lignite 300-302 Claystone, dusky-brown			300 100 350 120 400 450 140 500 160 550 180 600

Hole number - continued
79 M 32



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D1 Map: Bush Lake Date: 7-26-79 State: ND County: Divide

Elev.: 2353 ft Location: T. 160 N, R. 95 E, Sec. 2, Tract: dcca Drilled depth: 703 ft

Measured: 400 ft FNL FSL, 2100 ft FEL FWL Hole size: 4 3/4 in. Air ☐ Water ☒ Cored: Yes ☐ No ☒

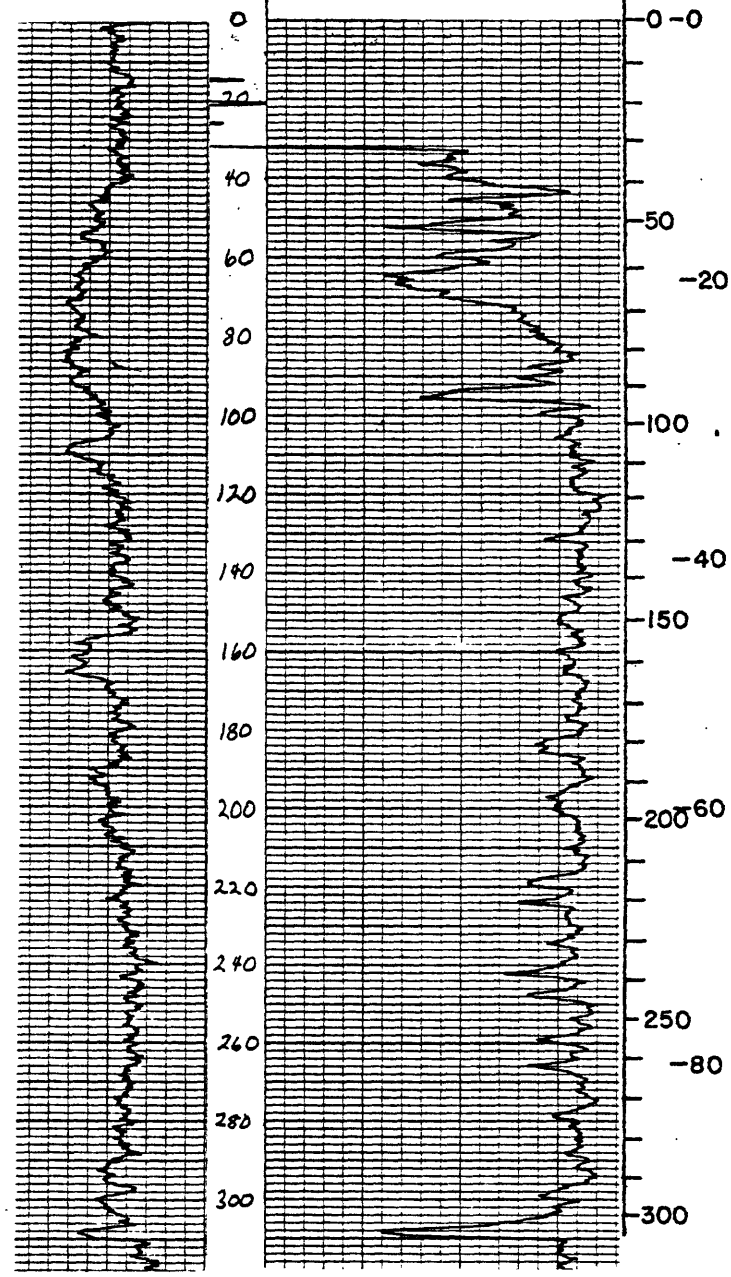
Lignite beds: 307-310; 359-363; 379-383; 427-433

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma	Density	Depth
		T.C. 2 Range 100cps Recording speed 20 ft/min Logged depth 703 ft	T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 703 ft	Feet / Meters

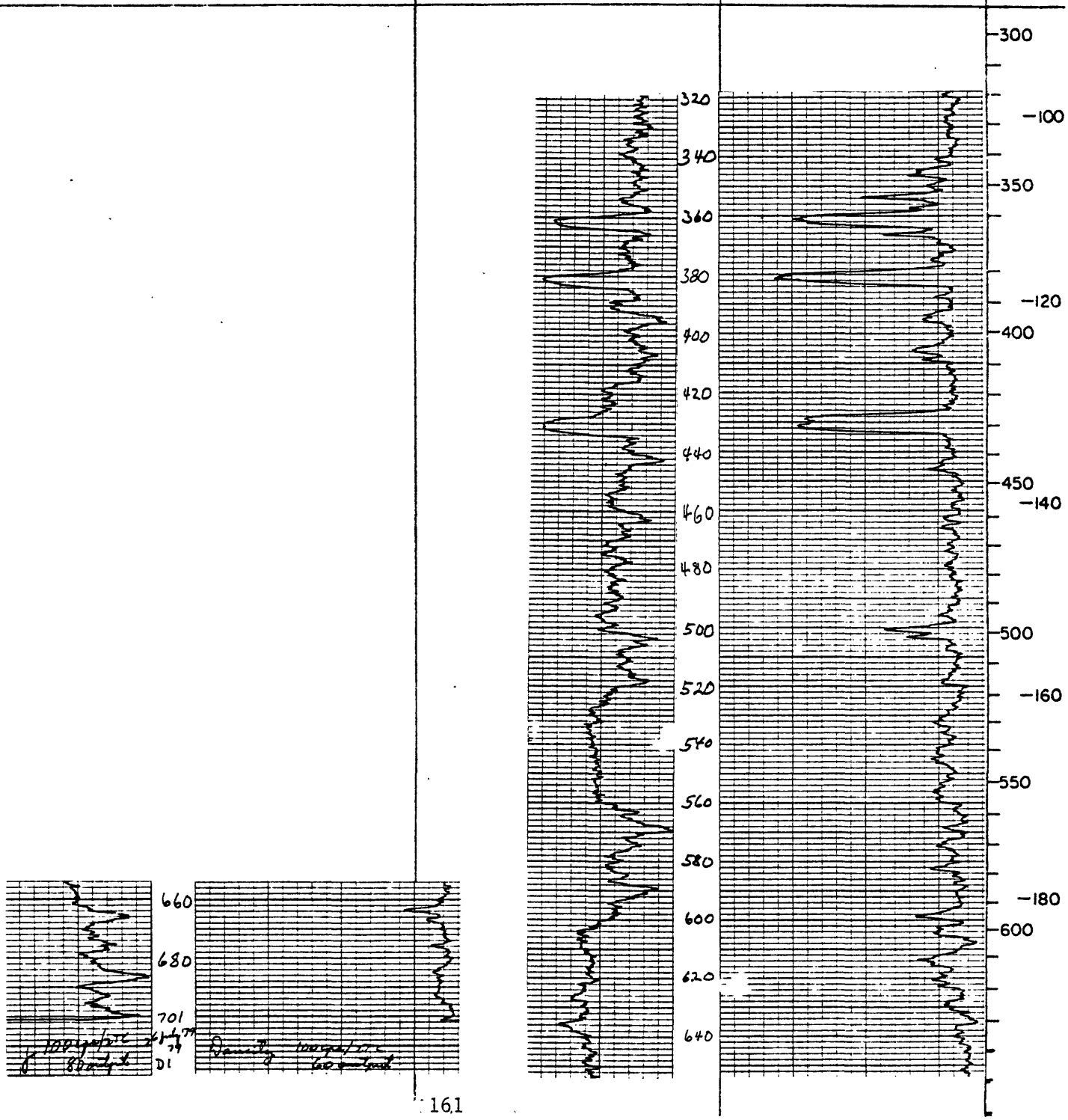
0- 3	Silt, black, clayey
3- 7	Silt, brownish-gray, clayey
7- 22	Till, brownish-gray, clayey pebbly
22- 24	Till, dark-gray, clayey, pebbly
24- 50	Gravel, brownish-gray, coarse grained, pebbly
50-122	Till, dark-gray, sandy, pebbly, silty
122-130	Sand, dark-gray, medium grained
130-200	Till, dark-gray, clayey, pebbly
200-700	No samples



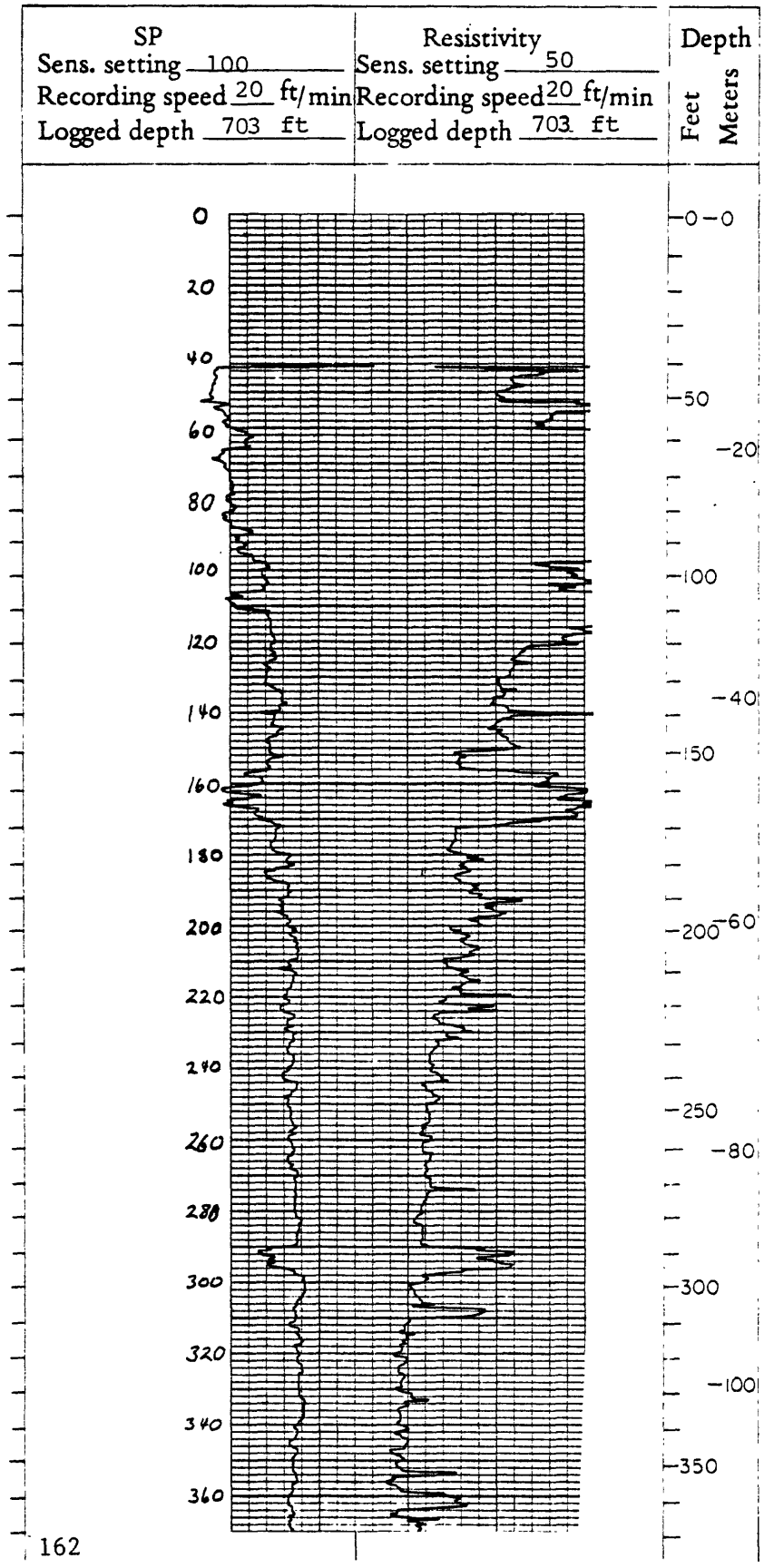
Hole number—continued

79D1

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 703 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 703 ft	Depth Feet / Meters



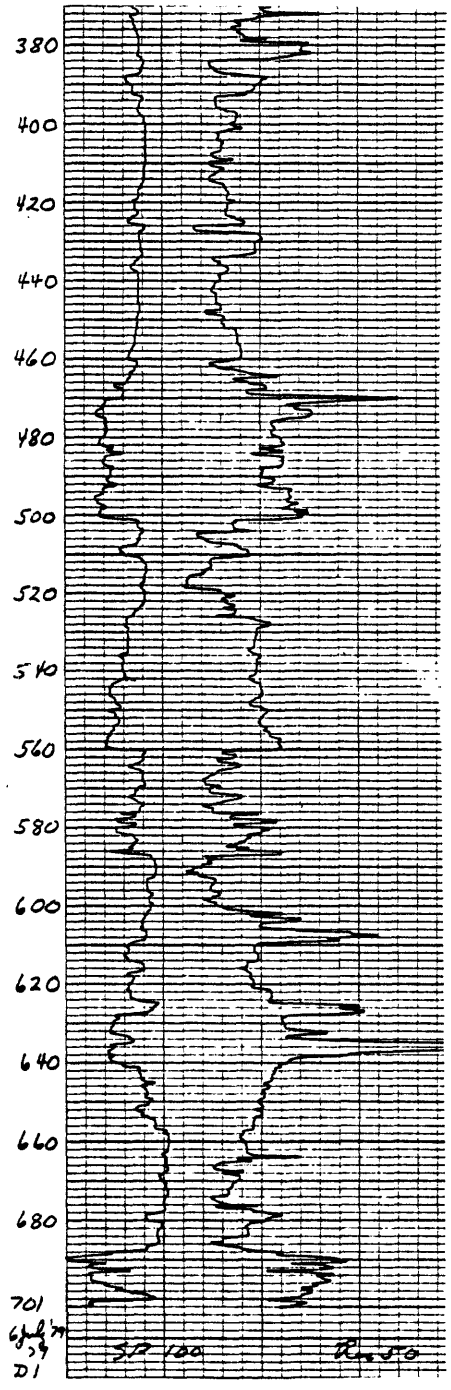
79D1 Hole number – continued



Hole number—continued

79D1

SP	Resistivity	Depth
Sens. setting 100	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 703 ft	Logged depth 703 ft	



Feet: 400, 450, 500, 550, 600, 650, 700, 750

Meters: 120, 140, 160, 180, 200, 220

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D2 Map: Bush Lake Date: 7-26-79 State: ND County: Divide

Elev.: 2338 ft Location: T. 160 N, R. 95 W, Sec. 17, Tract: ccbb Drilled depth: 402 feet

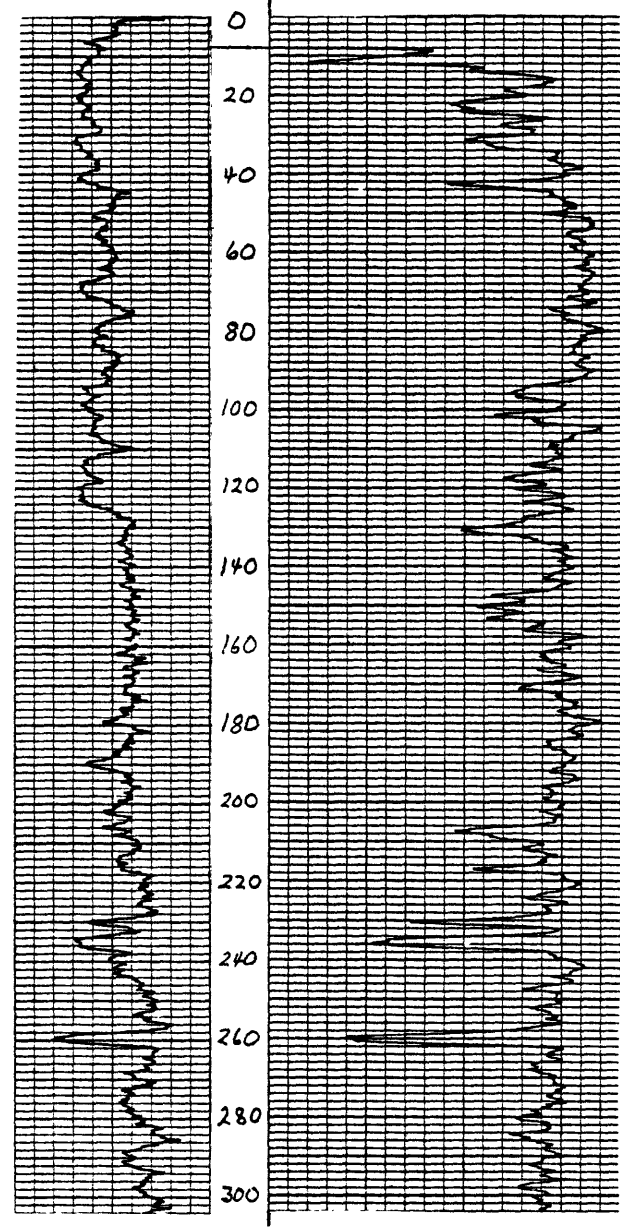
Measured: 1091 FSL, 66 FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 234-237; 258-261; 314-319; 337-342

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

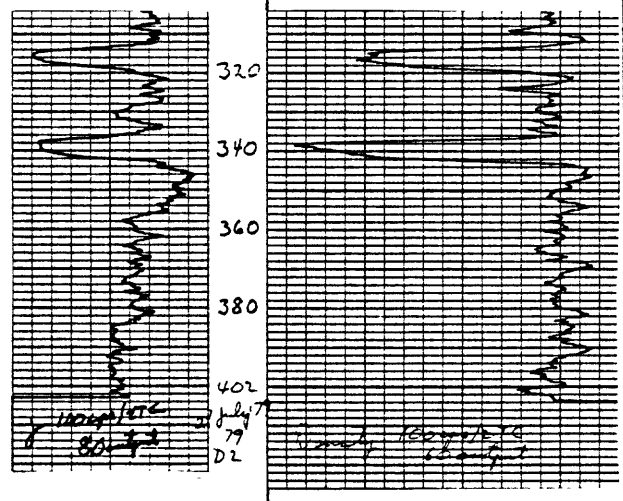
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 ft	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 ft	Depth Feet	Depth Meters
0- 1	Silt, black, clayey			0	0
1- 4	Silt, reddish-brown, sandy				
4- 24	Gravel, reddish-brown, coarse-grained, pebbly			20	
24- 25	Lignite				
25- 27	Till, reddish-brown, sandy, pebbly			40	50
27- 43	Gravel, reddish-brown, coarse-grained			60	20
43- 75	Silt, dark-gray, sandy				
75- 93	Till, dark-gray, clayey, pebbly			80	
93-131	Gravel, reddish-brown, coarse-grained, pebbly			100	100
131-133	Till, dark-gray, clayey, pebbly			120	
133-136	Gravel, reddish-brown, coarse-grained			140	40
136-138	Till, dark-gray, clayey, pebbly				150
138-143	Gravel, reddish-brown, coarse grained, pebbly			160	
143-163	Till, reddish-brown, clayey, pebbly			180	
163-197	Gravel, reddish-brown, coarse grained, pebbly			200	200 60
197-216	Till, dark-gray, clayey, pebbly			220	
216-231	Claystone, medium-gray, carbonaceous			240	
231-234	Lignite				250
234-243	Siltstone, medium-gray, clayey			260	80
243-245	Lignite				
245-254	Sandstone, medium-gray, medium-grained			280	
254-259	Claystone, dark-gray, carbonaceous			300	300
259-262	Lignite				



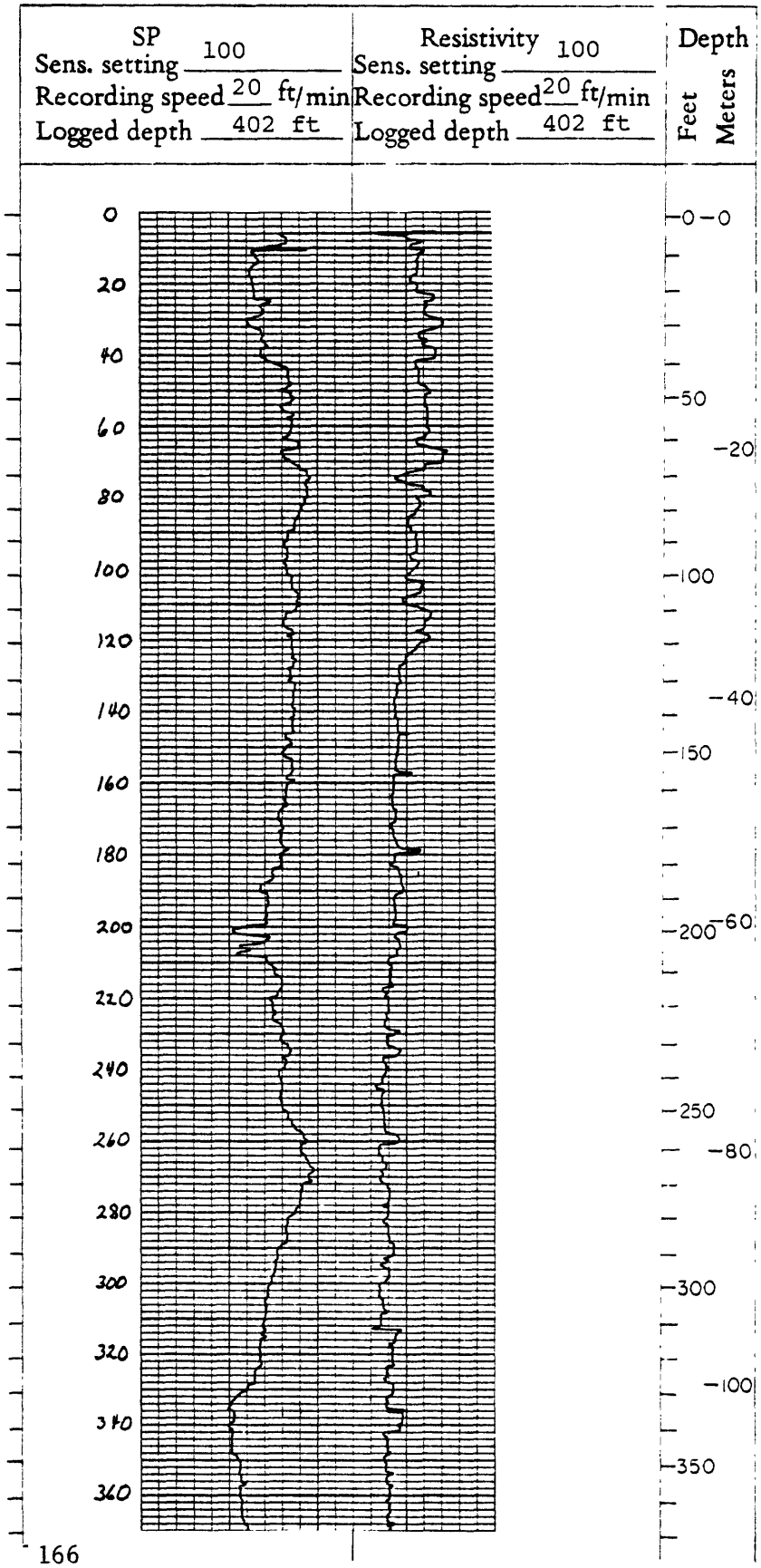
Hole number—continued

79D2

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Depth Feet / Meters
262-290	Claystone, dark-gray			300
290-303	Siltstone, dark-gray, clayey, sandy			
303-313	Sandstone, medium-gray, medium-grained			100
313-316	Lignite			
316-330	Sandstone, medium-gray, medium-grained, silty			350
330-334	Claystone, dark-gray			
334-345	Lignite			
345-389	Claystone, dark-gray			120
389-400	Siltstone, medium-gray			400
				450 / 140
				500
				160
				550
				180
				600

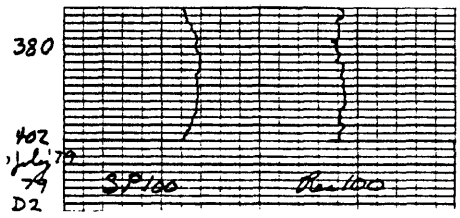


79D2 Hole number - Continued



Hole number—continued
79D2

SP	Resistivity	Depth
Sens. setting 100	Sens. setting 100	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 ft	Logged depth 402 ft	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750 (Feet); 120, 140, 160, 180, 200, 220 (Meters)

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D3 Map: Bush Lake Date: 7-19-79 State: ND County: Divide

Elev.: 2327 ft Location: T. 160 N, R. 95 W, Sec. 34, Tract: bbcb Drilled depth: 422 feet

Measured: 432 ft FNL, 10 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

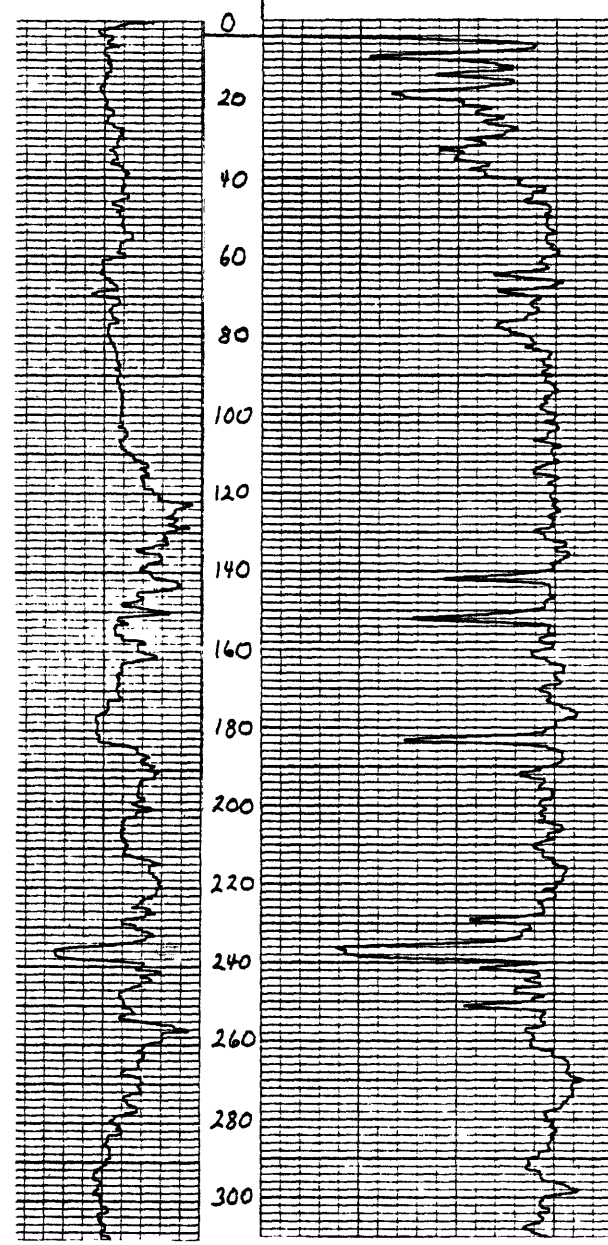
Lignite beds: 182-184; 235-239; 393-400; 412-414

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes

Geophysical logs recorded by: Lechner

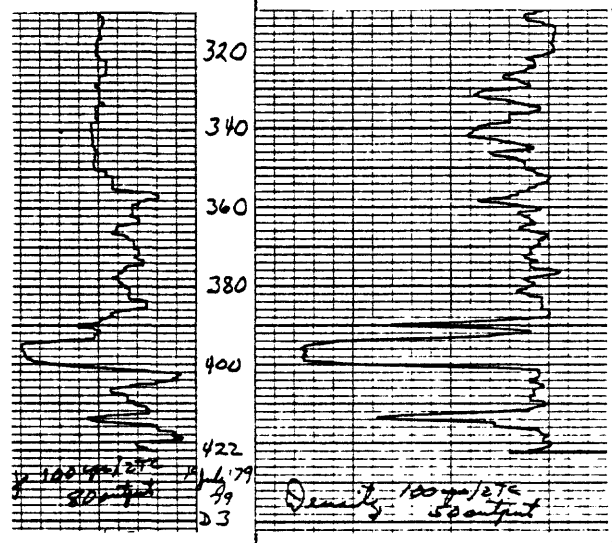
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 422 ft	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 422 ft	Depth Feet	Depth Meters
0- 2	Silt, light-olive-gray, clayey			0	0
2- 6	Silt, olive-gray, clayey			20	
6- 19	Till, brownish-gray, clayey pebbly			40	50
19- 23	Till, dark-gray, clayey, pebbly			60	20
23- 60	Till, brownish-gray, clayey pebbly			80	
60- 70	Siltstone, light-olive-gray, clayey			100	100
70- 90	Sandstone, light-olive-gray, medium-grained			120	
90-100	Till, brownish-gray, clayey, pebbly			140	40
100-110	Till, dark-gray, clayey, pebbly			160	150
110-113	Claystone, dark reddish-brown			180	
113-117	Claystone, dark-gray			200	200 60
117-122	Siltstone, dark-gray, clayey			220	
122-133	Claystone, dark-gray			240	
133-141	Claystone, bluish-gray			260	250 80
141-142	Lignite			280	
142-148	Claystone, bluish-gray			300	300
148-150	Lignite				
150-157	Sandstone, bluish-gray, medium-grained, clayey				
157-162	Claystone, bluish-gray				
162-167	Claystone, bluish-gray, silty				
167-175	Siltstone, bluish-gray				
175-182	Sandstone, greenish-gray, medium-grained, clayey				
182-183	Lignite				
183-230	Claystone, dark-gray				
230-231	Lignite				
231-235	Claystone, dark-gray, carbonaceous				



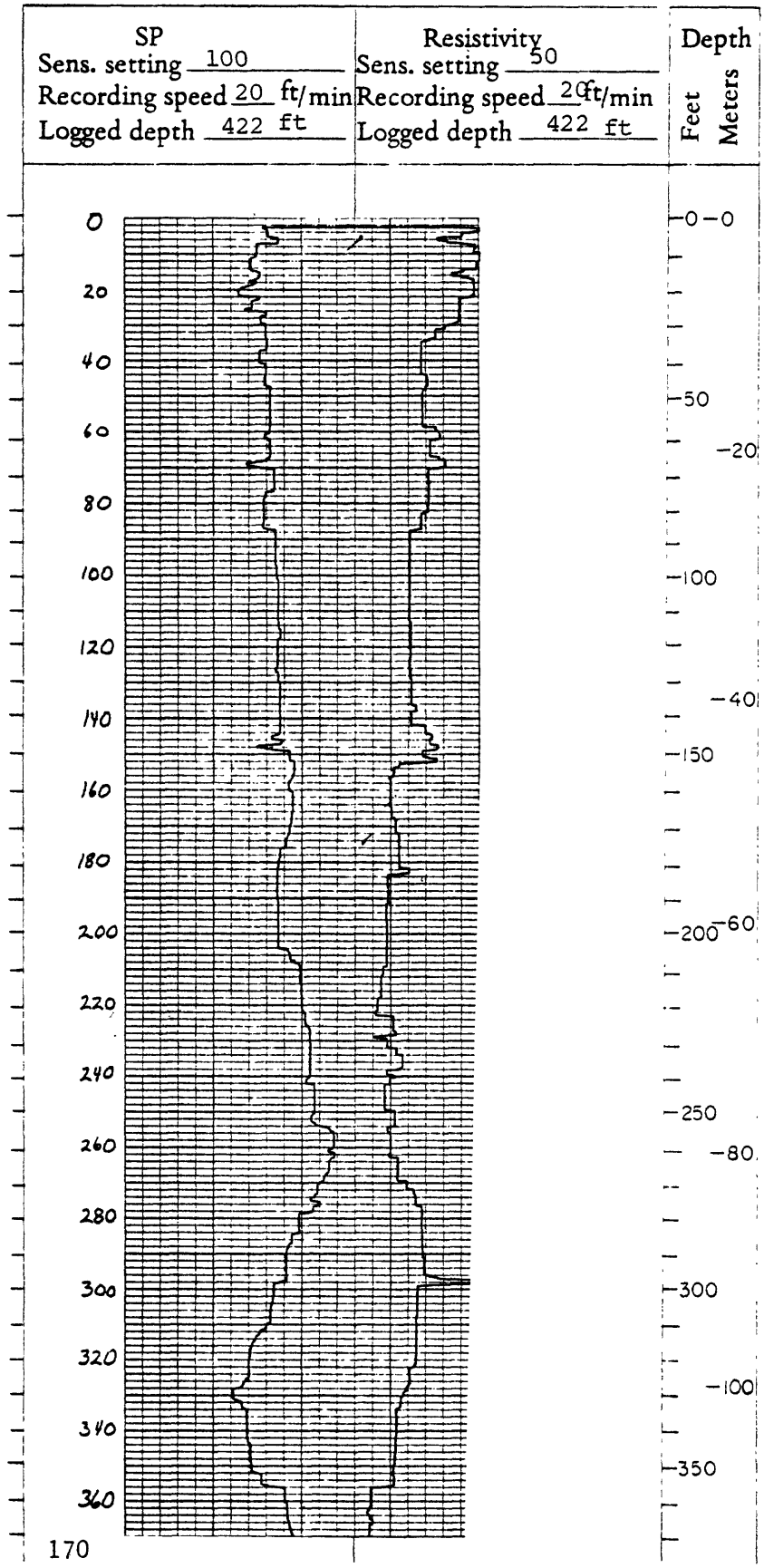
Hole number—continued

79D3

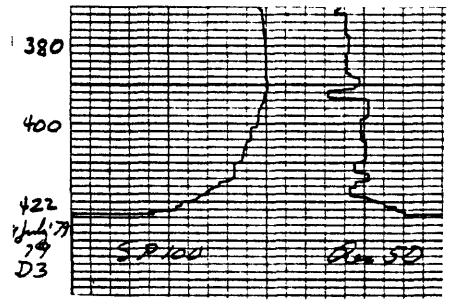
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 422 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 422 ft	Depth Feet / Meters
235-237	Lignite			300
237-243	Claystone, dark-gray, carbonaceous			
243-250	Lignite			100
250-251	Claystone, dark-gray			
251-253	Lignite			
253-263	Claystone, dark-gray, carbonaceous			350
263-270	Sandstone, greenish-gray, medium-grained			
270-284	Siltstone, greenish-gray, clayey			120
284-335	Sandstone, greenish-gray, medium-grained, silty			400
335-345	Sandstone, greenish-gray, medium-grained, clayey			
345-350	Lignite			
350-355	Sandstone, greenish-gray, medium-grained, clayey			450
355-385	Siltstone, greenish-gray, clayey			140
385-404	Lignite			
404-422	Claystone, greenish-gray			
				500
				160
				550
				180
				600



79D3 Hole number - continued



SP	Resistivity	Depth
Sens. setting 100	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 422 ft	Logged depth 422 ft	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D4 Map: Hamlet Date: 7-28-79 State: ND County: Divide

Elev.: 2315 ft Location: T. 160 N, R. 96 W, Sec. 22, Tract: aaaa Drilled depth: 422 ft

Measured: 33 ft FNL, 264 FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 268-273; 294-297; 316-318; 393-405

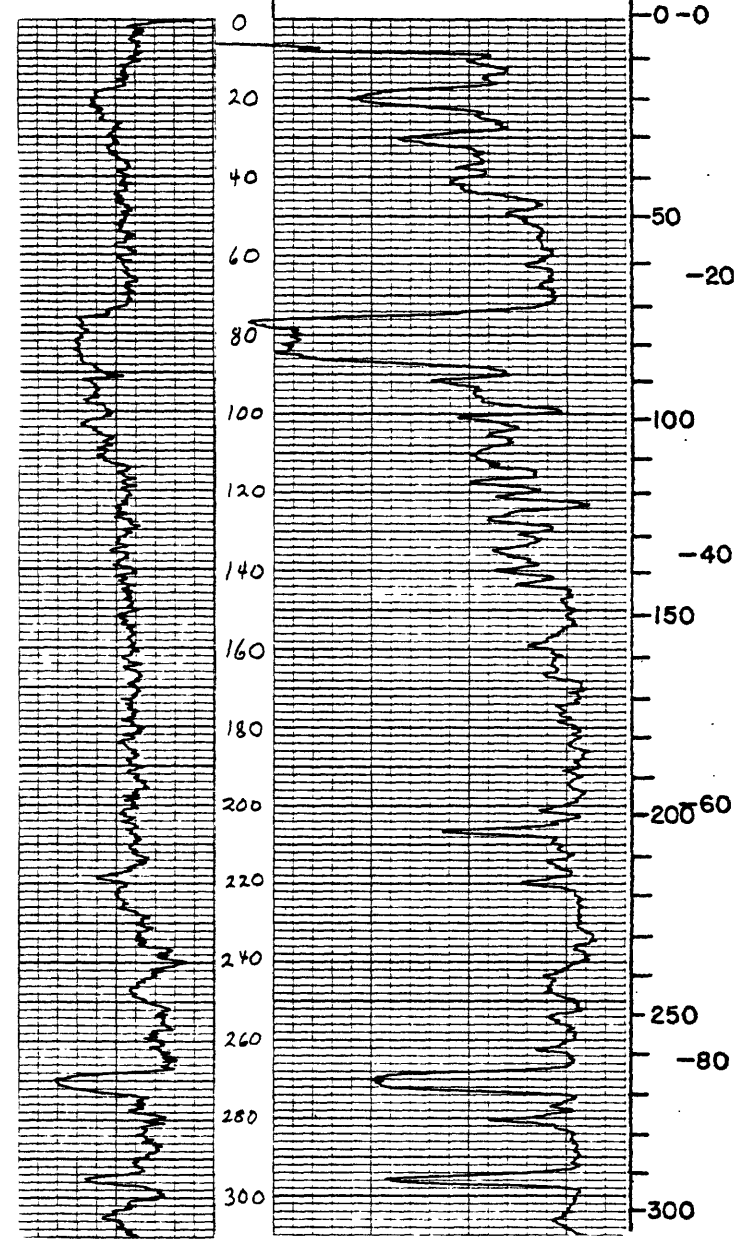
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes

Geophysical logs recorded by: Lechner

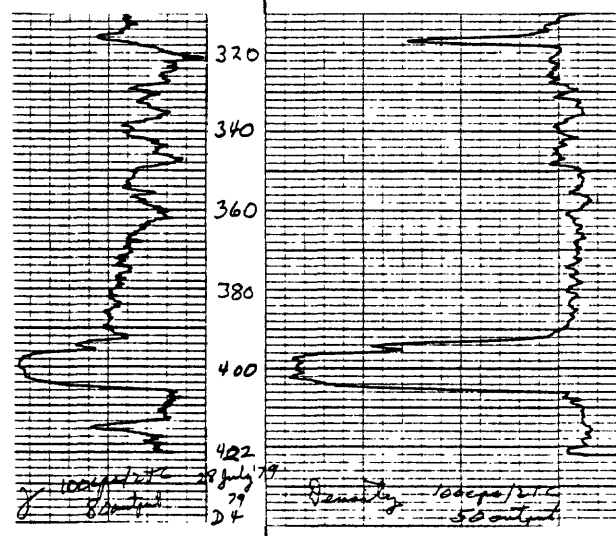
Lithology		Gamma	Density	Depth
		T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 422 ft	T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 422 ft	Feet / Meters

0- 3	Silt, reddish-brown, clayey
3- 17	Till, reddish-brown, clayey, pebbly
17- 24	Gravel, reddish-brown, coarse grained, sandy
24- 65	Till, dusky-brown, clayey, pebbly
65- 75	Till, dark-gray, clayey, pebbly
75- 94	Gravel, reddish-brown, coarse-grained, sandy
94-130	Silt, dark-gray, clayey, sandy
130-240	Till, dusky-brown, clayey, pebbly
240-269	Claystone, dark-gray
269-272	Lignite
272-280	Claystone, dark-gray
280-420	No samples



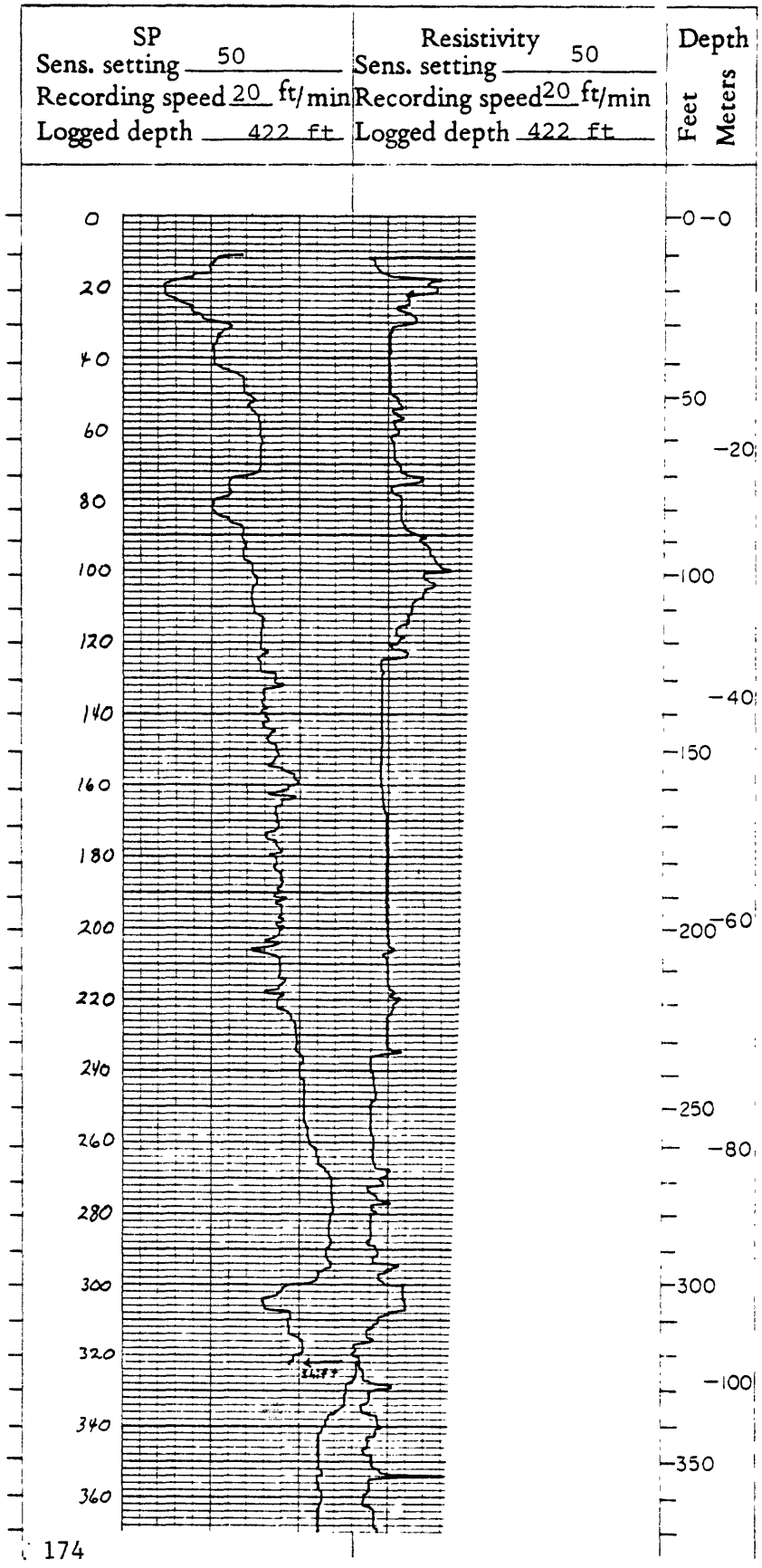
Hole number—continued
79D4

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 422 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 422 ft	Depth Feet / Meters

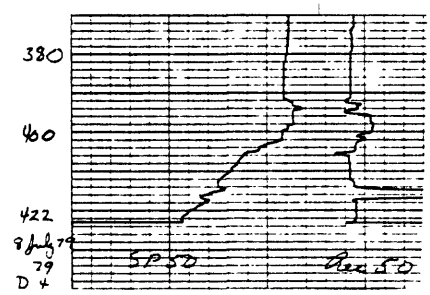


300
100
350
120
400
450
140
500
160
550
180
600

79D4 Hole number - continued



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 422 ft	Logged depth 422 ft	



Depth: 400 (−120), 450 (−140), 500 (−160), 550 (−180), 600, 650 (−200), 700 (−220), 750

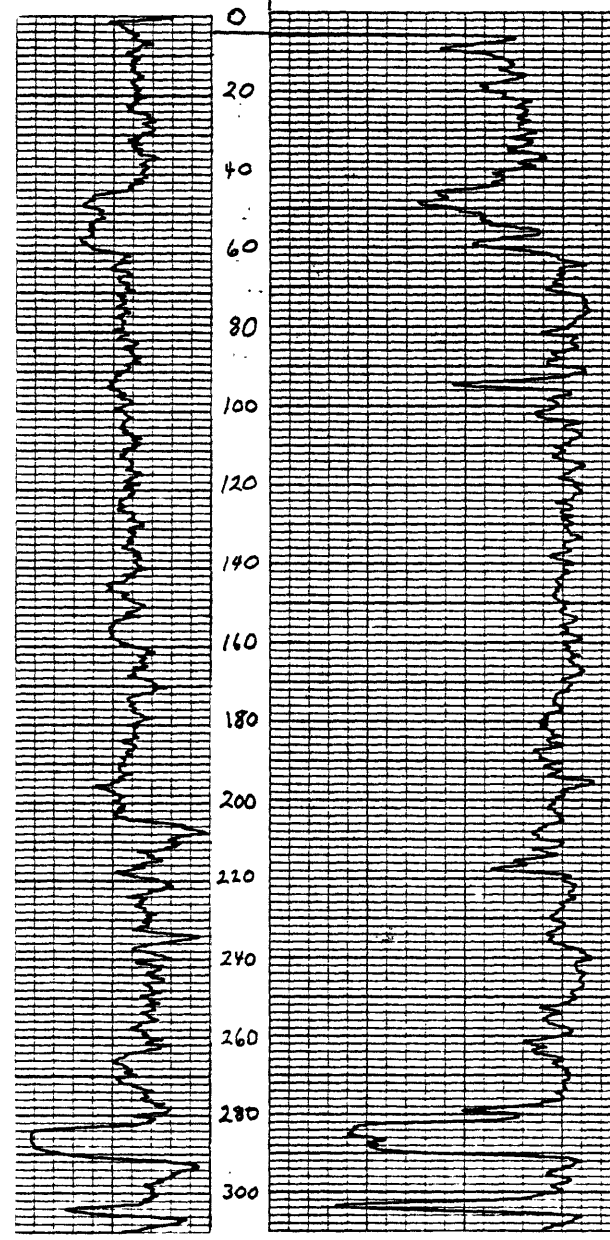
NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D5 Map: Hamlet Date: 7-28-79 State: ND County: Divide
Elev.: 2225 ft Location: T. 160 N, R. 96 W, Sec. 32, Tract: bccc Drilled depth: 402 feet
Measured: 2569 ft FNL, 30 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds: 282-290; 302-305

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

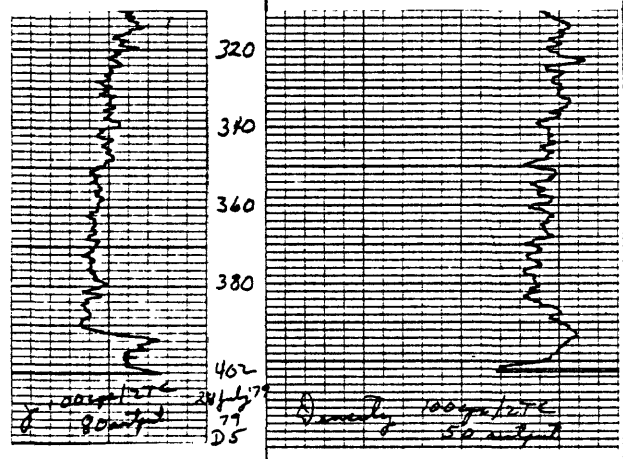
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 ft	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 ft	Depth Feet	Depth Meters
0- 10	Silt, grayish-red, clayey			0	0
10- 36	Clay, olive-gray				
36- 43	Clay, dark-gray				
43- 64	Gravel, reddish-brown, coarse-grained, sandy			50	
64- 75	Silt, dark-gray, clayey, sandy				
75-142	Till, dark-gray, clayey, pebbly				20
142-147	Gravel				
147-160	Till, dark-gray, clayey, pebbly			100	
160-171	Gravel				
171-179	Till, medium-gray, clayey				
179-185	Claystone, dark-gray, silty				
185-205	Sandstone, medium-gray, medium-grained, clayey, silty				40
205-213	Claystone, medium-gray			150	
213-215	Claystone, dark-gray, carbonaceous				
215-216	Lignite				
216-231	Claystone, greenish-gray				
231-234	Siltstone, greenish-gray, clayey				
234-265	Claystone, dark-gray,			200	60
265-275	Siltstone, medium-gray, clayey, sandy				
275-277	Claystone, dark-gray, carbonaceous				
277-278	Lignite				
278-283	Claystone, dark-gray, carbonaceous			250	80
283-290	Lignite				
290-294	Claystone, dark-gray, carbonaceous				
294-296	Lignite				
296-300	Claystone, dark-gray, carbonaceous	176		300	



Hole number—continued

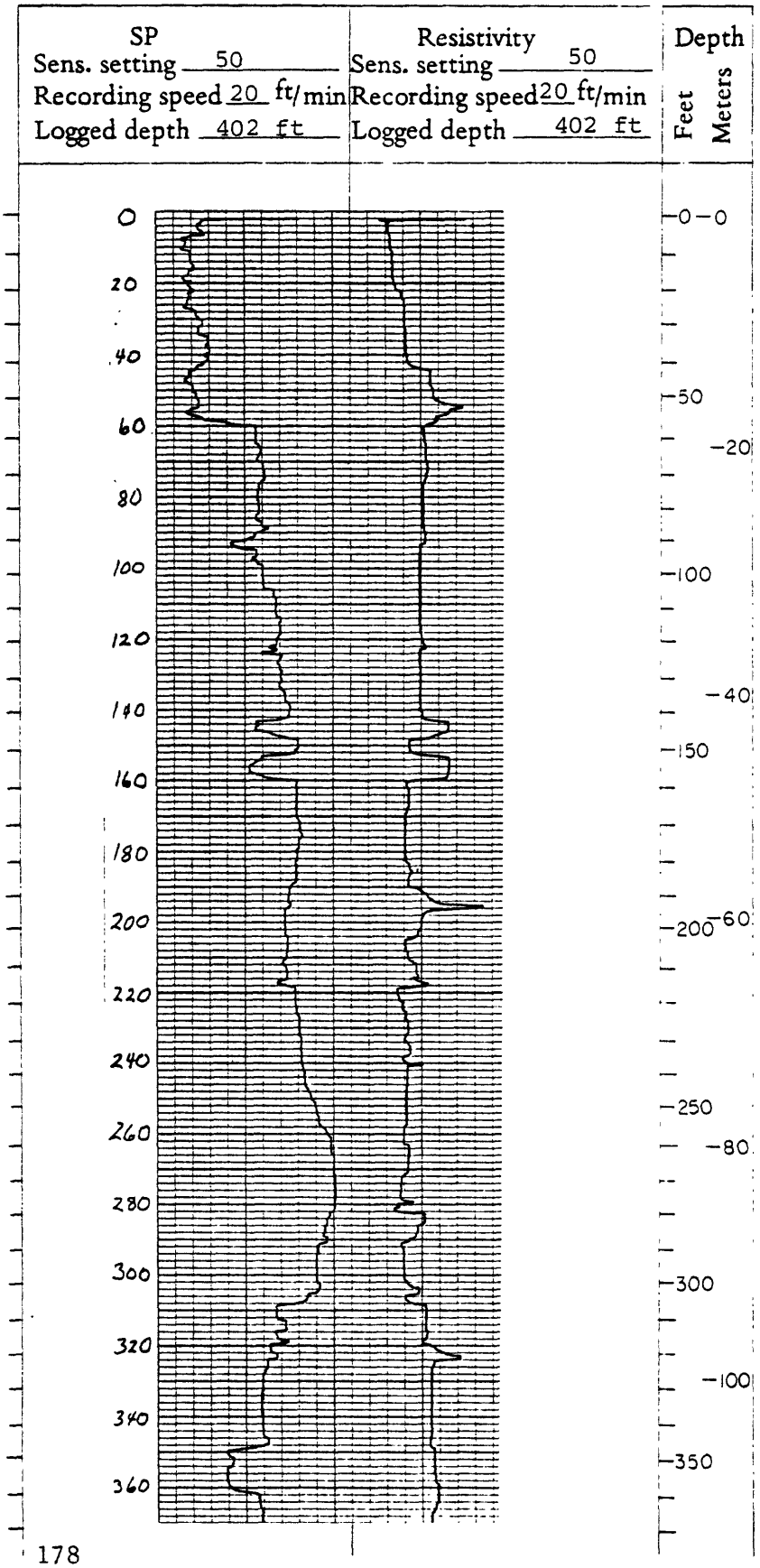
79D5

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Depth Feet Meters



300
100
350
120
400
450
140
500
160
550
180
600

79D5 Hole number – continued



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 ft	Logged depth 402 ft	

Depth scale: 400, 450, 500, 550, 600, 650, 700, 750 Feet; 120, 140, 160, 180, 200, 220 Meters

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D6 Map: Wildrose Date: 7-29-79 State: ND County: Divide

Elev.: 2268 ft Location: T.160 N, R. 97 W, Sec. 13, Tract: aaab Drilled depth: 703 feet

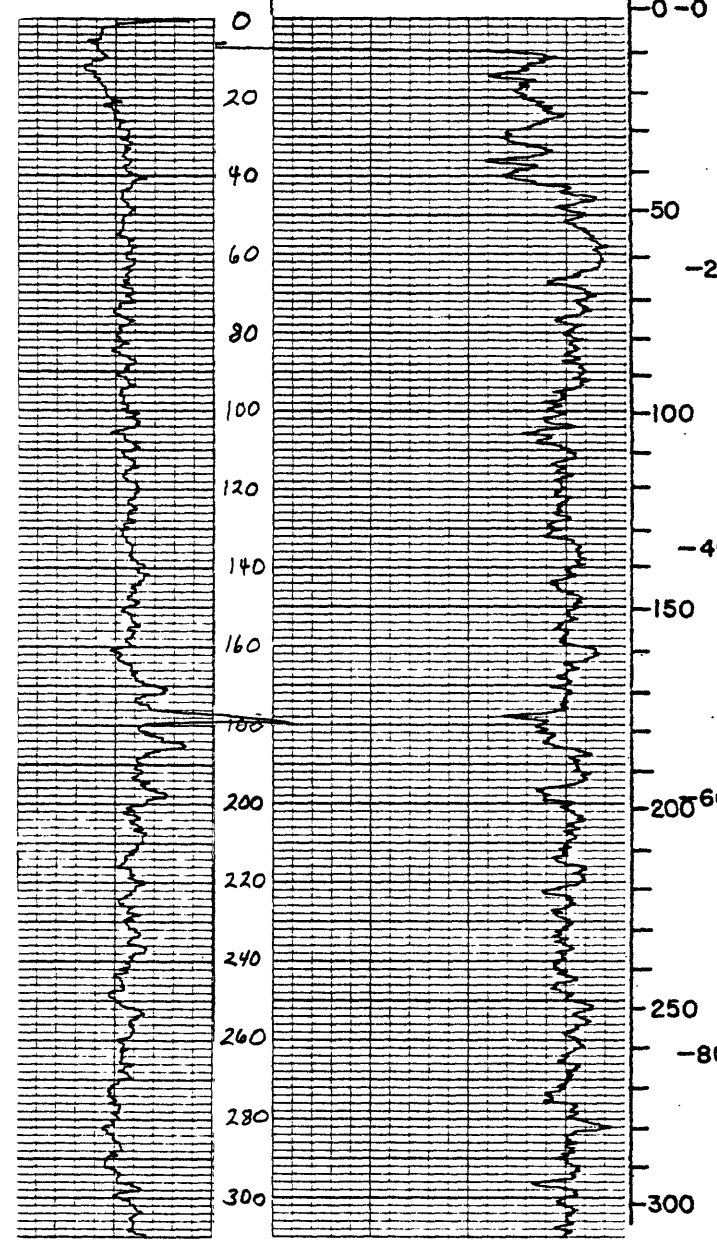
Measured: 32 ft FNL, 528 ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 331-342; 356-358; 610-612; 683-688

Remarks:

Lithology Recorded by Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

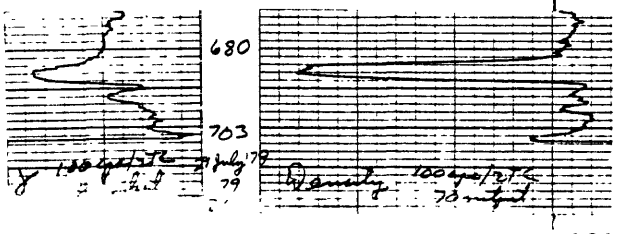
Lithology	Gamma: T.C. 2 Range 100 cps, Recording speed 20 ft/min, Logged depth 703 feet	Density: T.C. 2 Range 100 cps, Recording speed 20 ft/min, Logged depth 703 feet	Depth Feet	Depth Meters
0- 1 Silt, reddish-brown gravelly			0	0
1- 25 Gravel, coarse-grained, sandy			50	20
25- 40 Clay, dark-gray			100	40
40-110 Till, dark-gray, clayey, pebbly			150	60
110-145 Till, reddish-brown, clayey, pebbly			200	80
145-155 Till, dark-gray, clayey, pebbly			250	100
155-200 Gravel			300	120
200-312 Siltstone, medium-gray, sandy				140
				160
				180
				200
				220
				240
				260
				280
				300

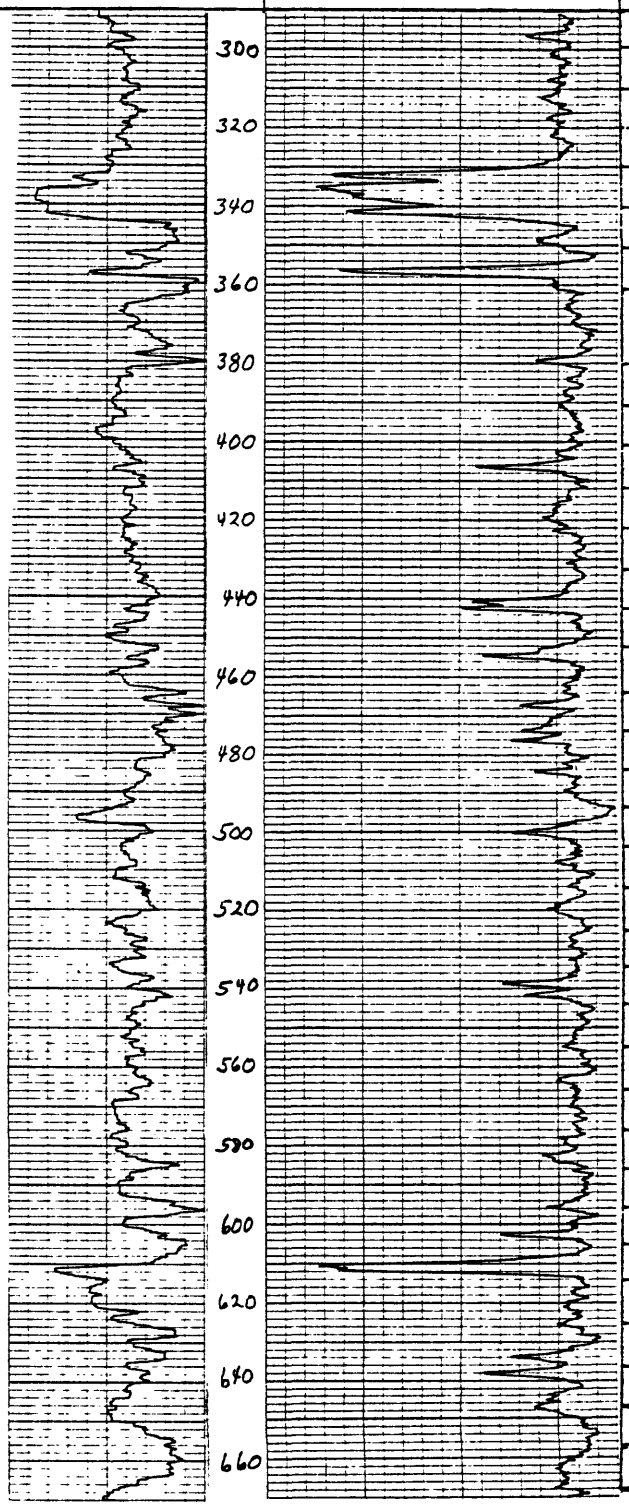


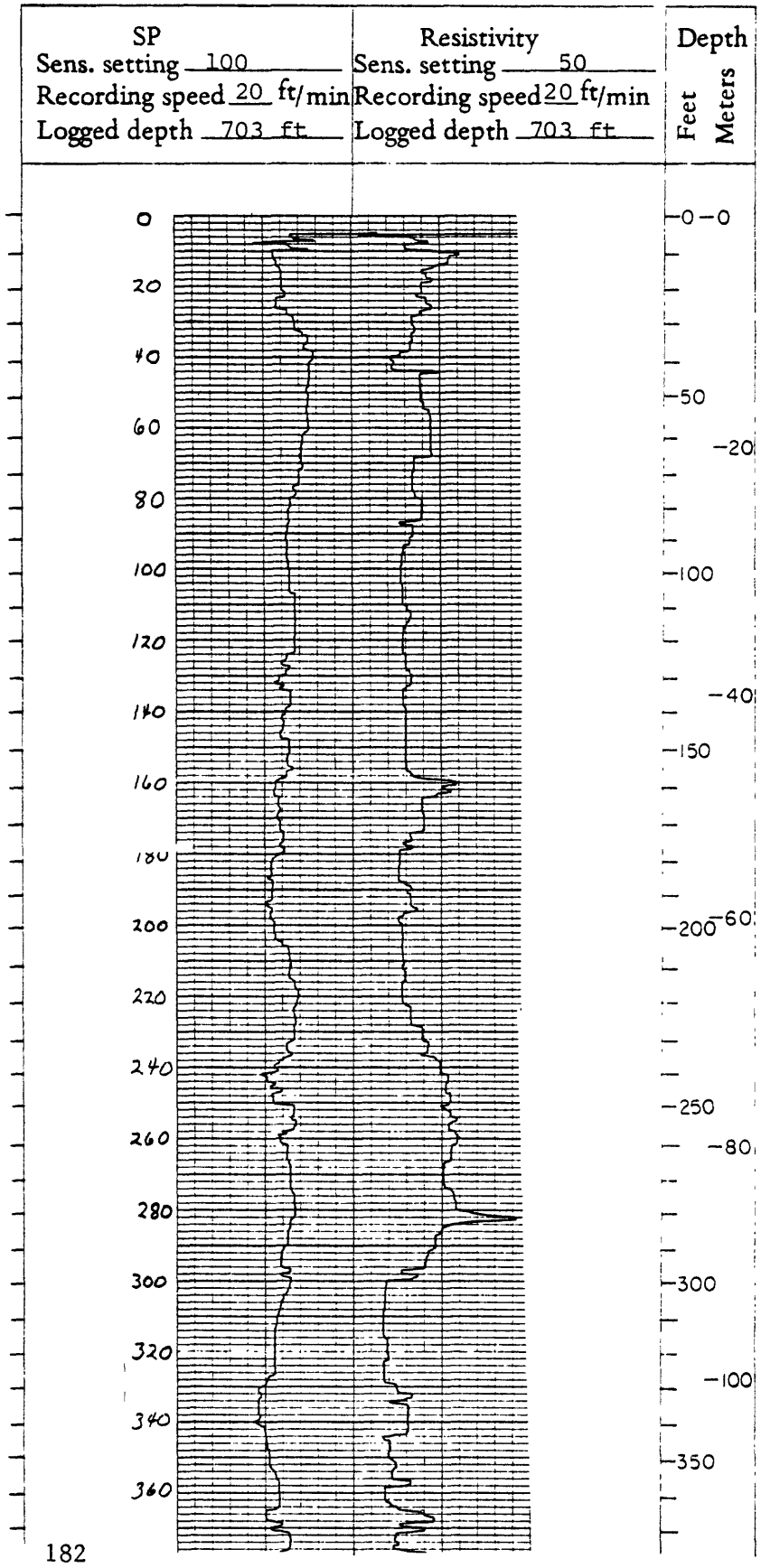
Hole number—continued

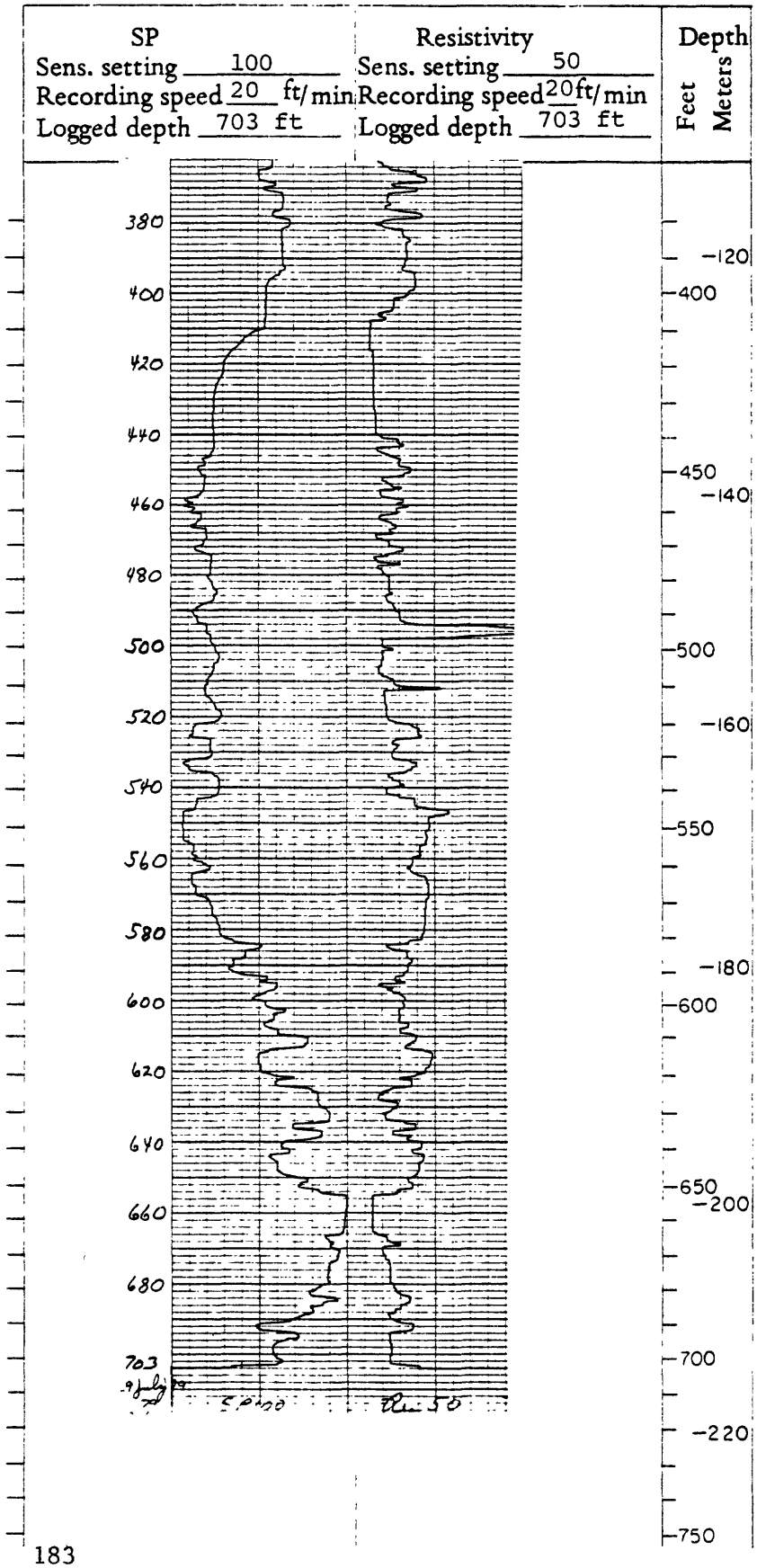
79D6

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 703 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 703 ft	Depth Feet / Meters
312-323	Claystone, medium-gray, silty			
323-340	Lignite			
340-360	Claystone, medium-gray			
360-375	Siltstone, medium-gray, fine-grained, clayey			
375-412	Claystone, medium-gray			
412-413	Lignite			
413-439	Claystone, greenish-gray			
439-440	Lignite			
440-455	Claystone, greenish-gray			
455-456	Lignite			
456-475	Claystone, greenish-gray			
475-476	Lignite			
476-500	Claystone, greenish-gray			
500-539	Claystone, medium-gray			
539-540	Lignite			
540-560	Claystone, medium-gray			
560-595	Siltstone, medium-gray, fine-grained, clayey			
595-596	Lignite			
596-612	Claystone, medium-gray			
612-614	Lignite			
614-635	Claystone, medium-gray			
635-636	Lignite			
636-638	Claystone, medium-gray, carbonaceous			
638-640	Lignite			
640-682	Claystone, medium-gray			
682-683	Lignite			
683-686	Claystone, dark-gray carbonaceous			
686-690	Lignite			
690-700	Claystone, medium-gray			






SP
Sens. setting 100
Recording speed 20 ft/min
Logged depth 703 ft
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 703 ft
Depth
Feet
Meters
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
0
50
100
150
200
250
300
350
0
20
40
60
80
100


SP
Sens. setting 100
Recording speed 20 ft/min
Logged depth 703 ft
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 703 ft
Depth
Feet
Meters
380
400
420
440
460
480
500
520
540
560
580
600
620
640
660
680
703
-120
-400
-450
-140
-500
-160
-550
-180
-600
-650
-200
-700
-220
-750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D7 Map: Wildrose Date: 7-30-79 State: ND County: Divide

Elev.: 2245 feet Location: T. 160 N, R97 W, Sec. 27, Tract: dddd Drilled depth: 402 feet

Measured: 22 ft FSL, 120 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

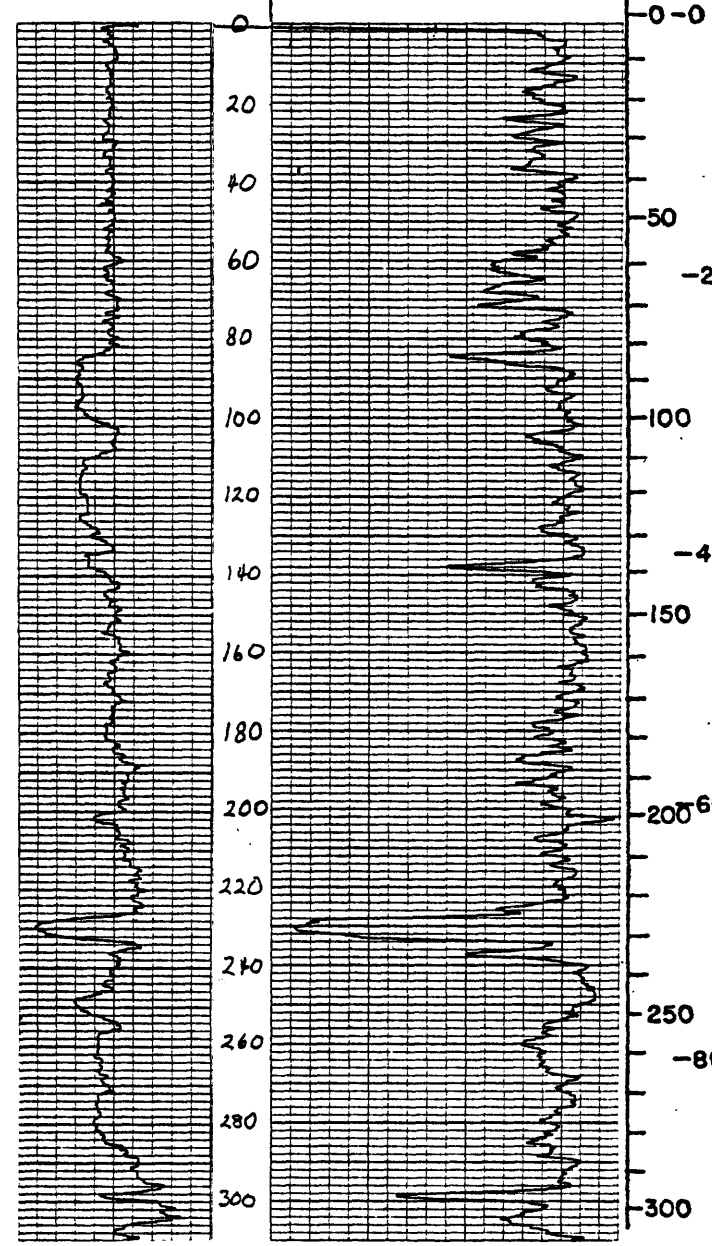
Lignite beds: 228-233.5;298-300; 348-359

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

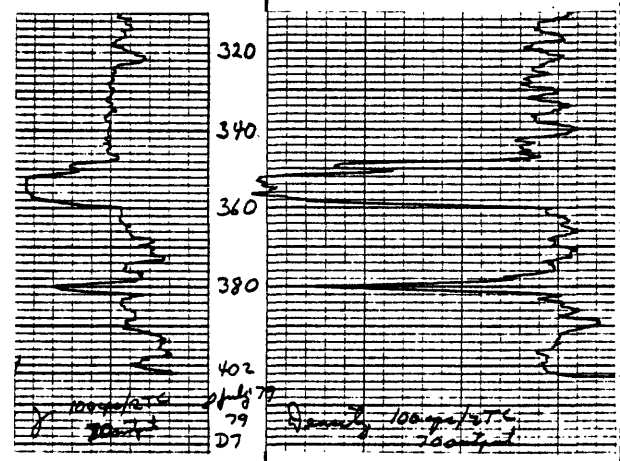
Lithology	Gamma: T.C. 2 Range 100 cps, Recording speed 20 ft/min, Logged depth 402 feet	Density: T.C. 2 Range 100 cps, Recording speed 20 ft/min, Logged depth 402 feet	Depth Feet	Depth Meters

0- 4 Silt, olive-gray, fine-grained, clayey
4- 22 Till, olive-gray, clayey, sandy
22- 87 Till, dark-gray, clayey, pebbly
87-101 Gravel, coarse-grained, sandy
101-110 Till, dark-gray, clayey, pebbly
110-132 Gravel
132-133 Till, dark-gray, clayey, pebbly
133-141 Gravel, coarse-grained, sandy
141-189 Till, dark-gray, clayey, pebbly
189-196 Siltstone, olive-gray, clayey
196-210 Siltstone, medium-gray, clayey
210-226 Claystone, dark-gray
226-234 Lignite
234-245 Claystone, dark-gray, silty
245-250 Siltstone, dark-gray, clayey, sandy
250-294 Sandstone, medium-gray, fine-grained, clayey, silty
294-295 Lignite
295-303 Sandstone, medium-gray, fine grained, clayey, silty

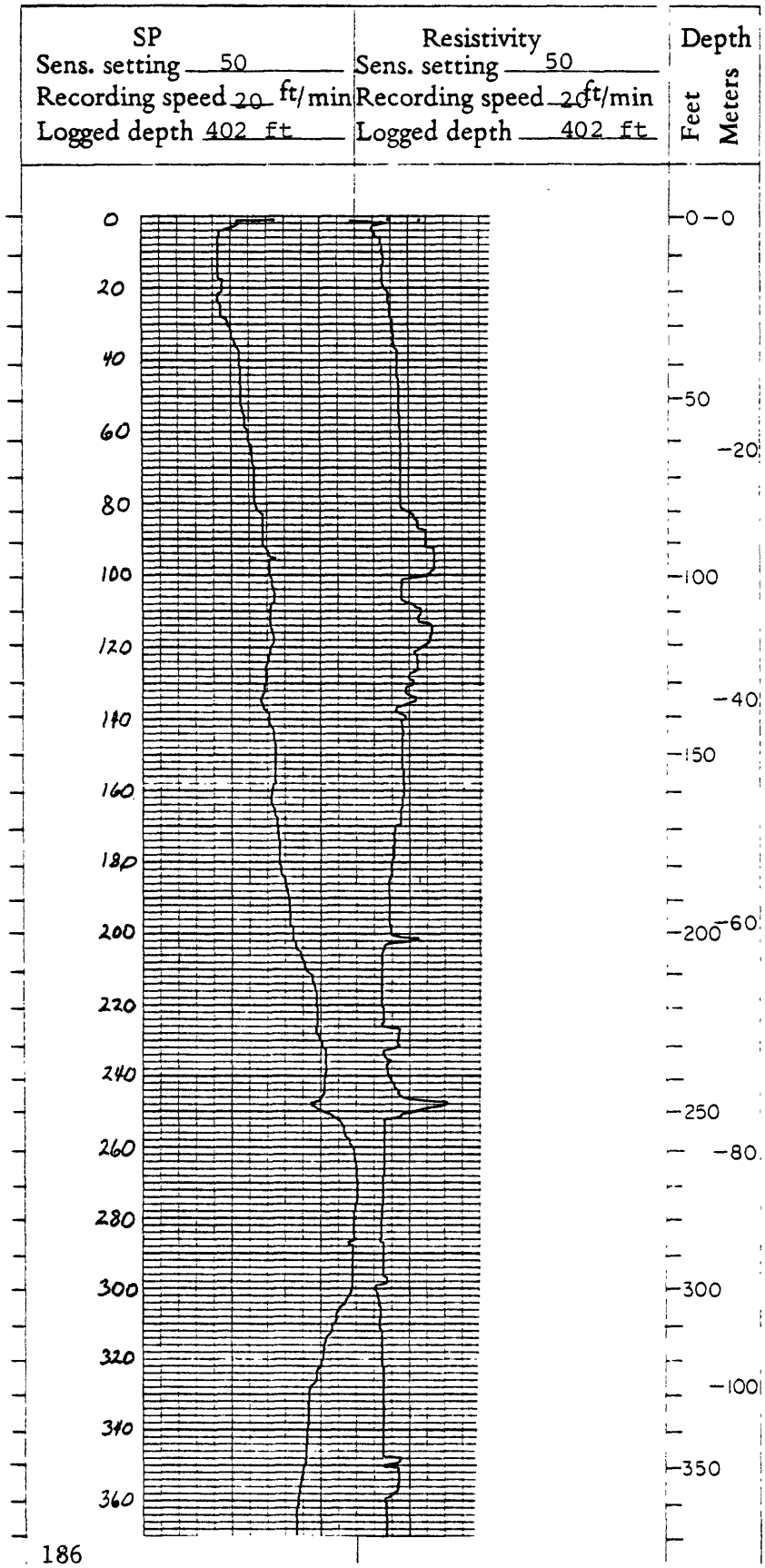


79D7

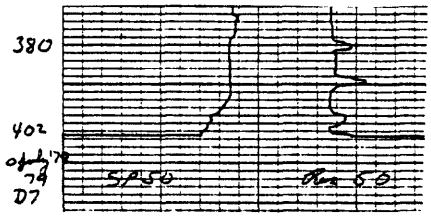
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Depth Feet / Meters
303-334	Claystone, dark-gray, silty			300
334-346	Claystone, dark-gray, carbonaceous			−100
346-356	Lignite			
356-360	Siltstone, medium-gray, clayey			350
360-372	Claystone, dark-gray, carbonacoues			
372-374	Lignite			
374-400	Claystone, bluish-gray			−120
				400
				450
				−140
				500
				−160
				550
				−180
				600



79D7 Hole number — continued



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 ft	Logged depth 402 ft	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750 Feet; 120, 140, 160, 180, 200, 220 Meters

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D8 Map: Wildrose Date: 7-30-79 State: ND County: Divide

Elev.: 2245 feet Location: T. 160 N, R 97 E, Sec. 33, Tract: babb Drilled depth: 402 feet

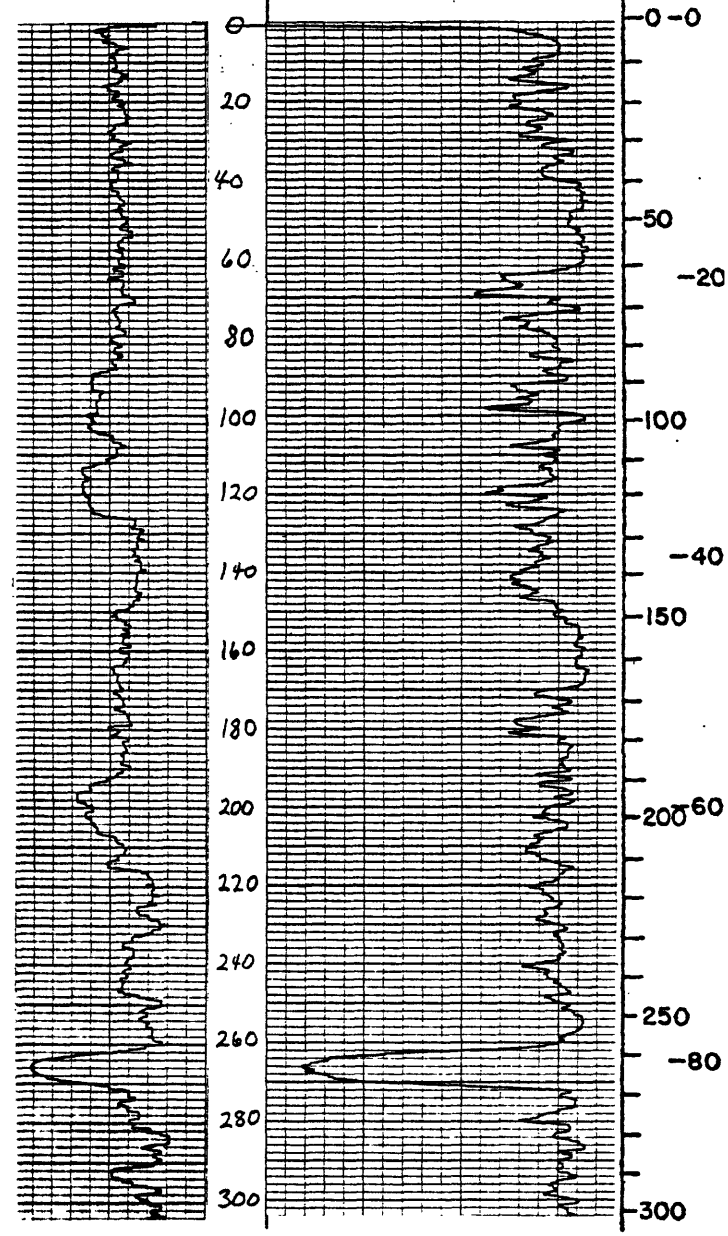
Measured: 45 ft FNL, 1334 FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 262-271; 312-314; 368-382;

Remarks:

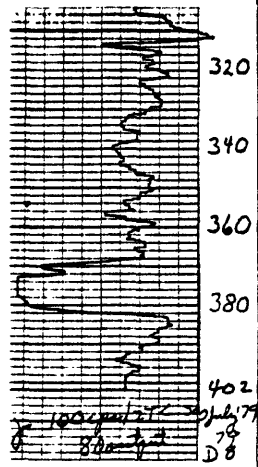
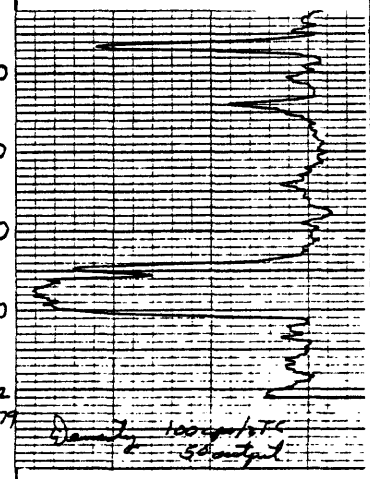
Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100 cps, Recording speed 20 ft/min, Logged depth 402 feet	Density: T.C. 2 Range 100 cps, Recording speed 20 ft/min, Logged depth 402 feet	Depth Feet	Depth Meters
0- 3	Silt, olive-gray, clayey			0	0
3- 16	Till, olive-gray, clayey, pebbly			50	20
16- 17	Gravel, coarse-grained, sandy, pebbly			100	40
17- 92	Till, dark-gray, clayey, pebbly			150	60
92-104	Gravel, coarse-grained, sandy, pebbly			200	80
104-110	Till, dark-gray, clayey, pebbly			250	100
110-126	Gravel, coarse-grained, sandy			300	120
126-194	Till, dark-gray, clayey, pebbly				
194-210	Gravel, coarse-grained, sandy, pebbly				
210-215	Till, dark-gray, clayey, pebbly				
215-260	Claystone, dark-gray				
260-270	Lignite				
270-280	Siltstone, medium-gray, clayey				
280-290	Sandstone, medium-gray fine-grained, clayey, silty				
290-295	Siltstone, medium-gray, clayey				
295-310	Claystone, dark-gray				

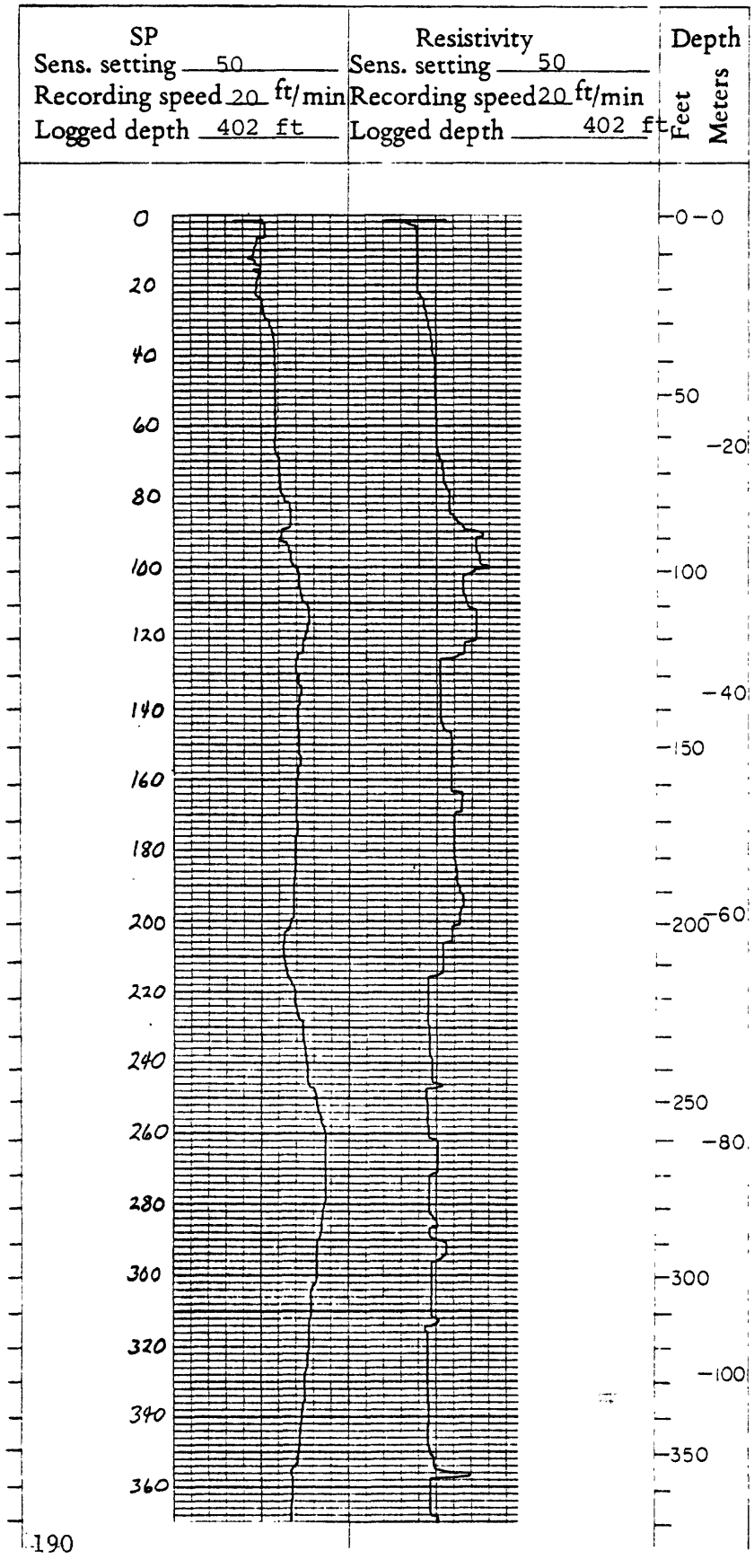


Hole number—continued

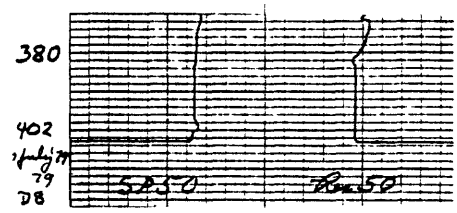
79D8

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Depth Feet / Meters
310-311 Lignite 311-330 Claystone, dark-gray 330-368 Siltstone, medium-gray, clayey 368-378 Lignite 378-400 Claystone, dark-gray			300 100 350 120 400 450 140 500 160 550 180 600

79D8 Hole number– continued



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 ft	Logged depth 402 ft	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D9 Map: Bright Water Lake Date: 8-01-79 State: ND County: Divide

Elev.: 2208 ft Location: T. 160 N, R. 98 W, Sec. 18, Tract: dddd Drilled depth: 402 ft

Measured: 184 ft FSL, 154 ft FEL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 269-274

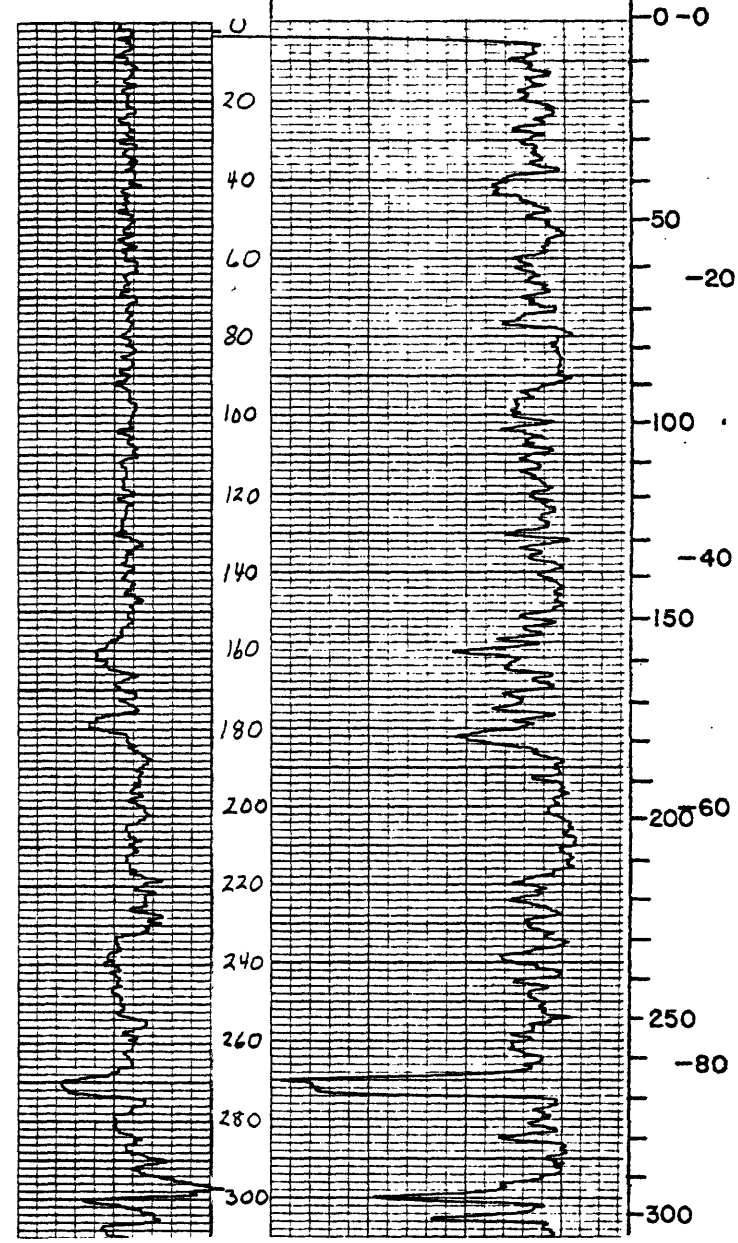
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by:

Lithology	
0- 3	Silt, olive-gray, clayey
3- 46	Till, olive-gray, clayey sandy
46-157	Till, dark-gray, clayey, pebbly
157-166	Gravel, coarse-grained, sandy
166-170	Till, dark-gray, clayey, pebbly
170-173	Gravel, coarse-grained, sandy
173-175	Till, dark-gray, clayey, pebbly
175-178	Gravel, coarse-grained, sandy
178-182	Till, dark-gray, clayey, pebbly
182-230	Sandstone, brownish-gray, medium-grained, silty
230-244	Sandstone, brownish-gray, medium-grained, clayey
244-252	Lignite
252-273	Claystone, dark-gray, carbonaceous
273-277	Lignite
277-298	Claystone, dark-gray, carbonaceous
298-300	Lignite

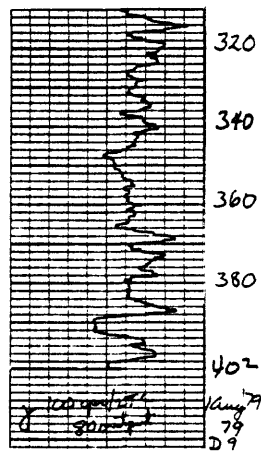
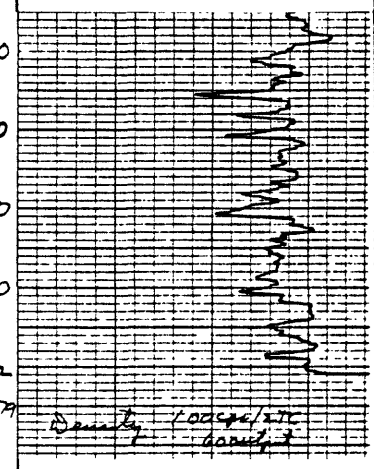
Gamma: T.C. 2 Range 100 Recording speed 20 ft/min Logged depth 402 ft

Density: T.C. 2 Range 100 Recording speed 20 ft/min Logged depth 402 ft

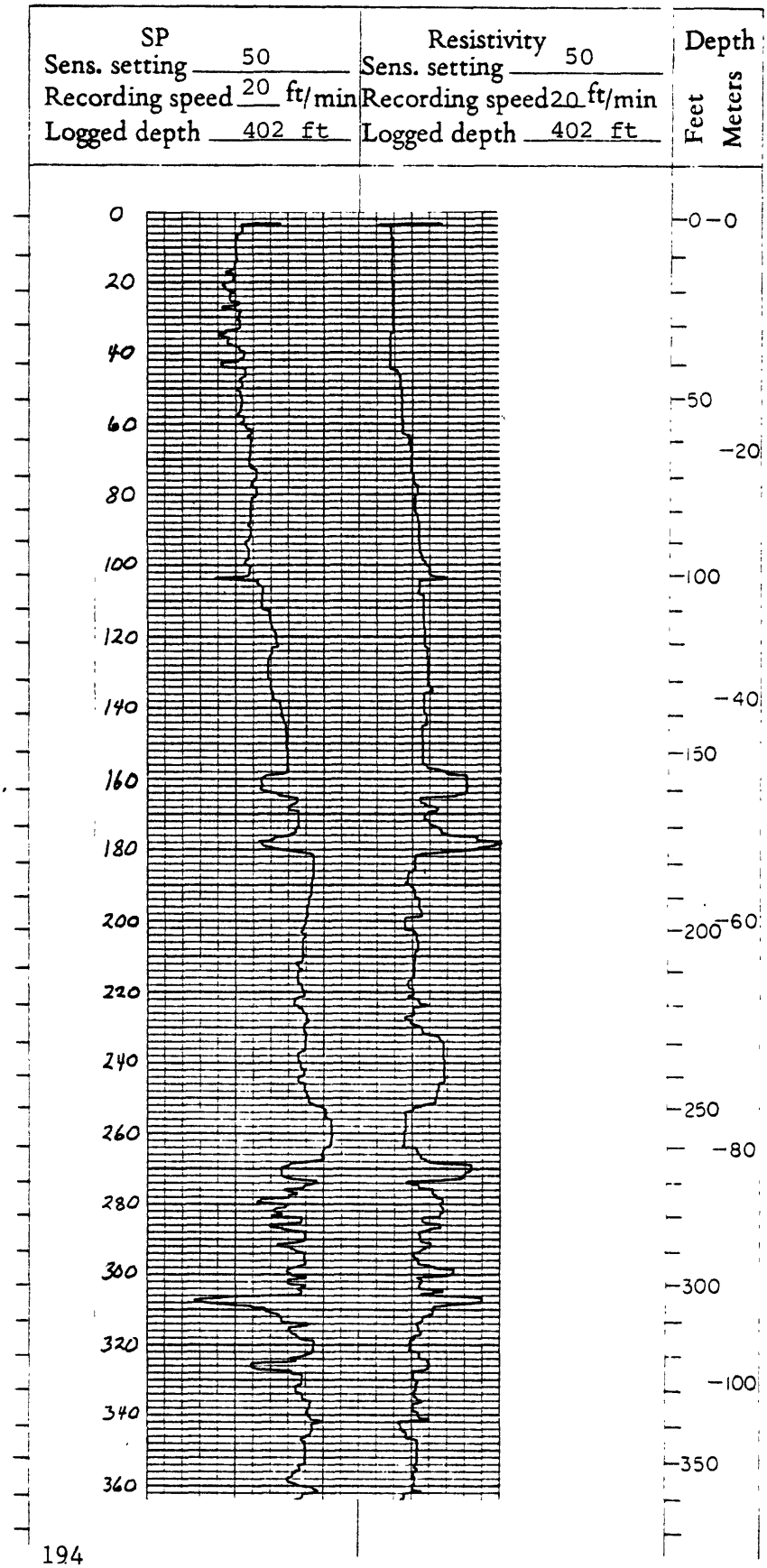


Hole number—continued

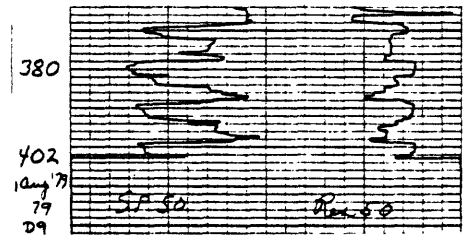
79D9

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Depth Feet / Meters
300-341 Claystone, dark-gray 341-360 Sandstone, greenish-gray, medium-grained, clayey 360-375 Claystone, greenish-gray 375-380 Siltstone, greenish-gray 380-391 Claystone, greenish-gray 391-396 Lignite 396-400 Claystone, greenish-gray			300 100 350 120 400 450 140 500 160 550 180 600

79D9 Hole number - *continued*



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 ft	Logged depth 402 ft	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

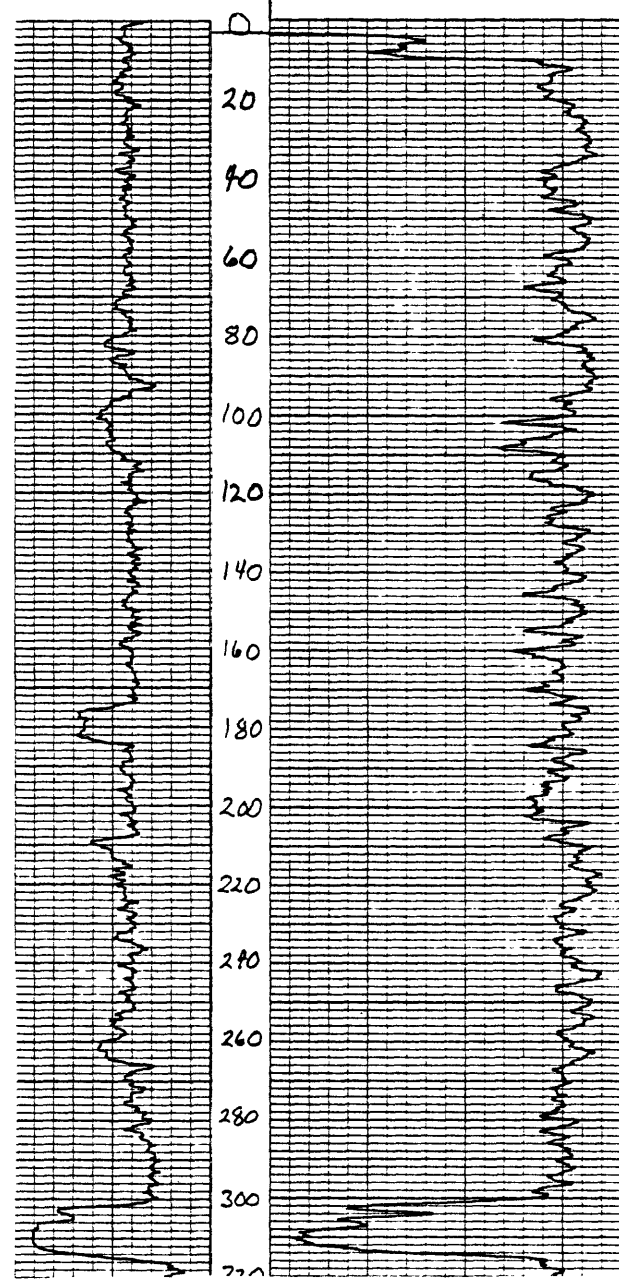
NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D10 Map: Alamo NE Date: 8-01-79 State: ND County: Divide
Elev.: 2300 Location: T. 160 N/S, R. 98 E/W, Sec. 23, Tract: aaaa Drilled depth: 682 ft
Measured: 175 ft FNL, 15 ft FEL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds: 301-314; 332-335; 433-437; 608-610; 645-647

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

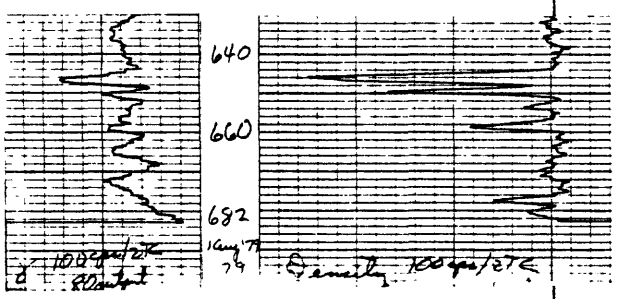
Lithology	Gamma T.C. 2 Range 100cps Recording speed 20 ft/min Logged depth 682 ft	Density T.C. 2 Range 100cps Recording speed 20 ft/min Logged depth 682 ft	Depth Feet	Depth Meters
0- 4 Silt, medium-brown, clayey			0	0
4- 26 Till, medium-brown, clayey, sandy			20	
26- 52 Till, olive-gray, clayey, pebbly			40	
52- 80 Till, dark-gray, clayey, pebbly			50	
80- 82 Gravel, coarse-grained, sandy, pebbly			60	20
82- 84 Till, dark-gray, clayey, pebbly			80	
84- 86 Gravel, coarse-grained, sandy, pebbly			100	100
86- 99 Till, dark-gray			120	
99-102 Gravel			140	40
102-130 Till, dark-gray, sandy, pebbly			150	
130-140 Sand, dark-gray, medium-grained, gravelly			160	
140-150 Gravel, coarse-grained, sandy, pebbly			180	
150-298 Till, dark-gray, gravelly			200	200 60
298-310 Lignite			220	
			240	
			250	
			260	80
			280	
			300	300

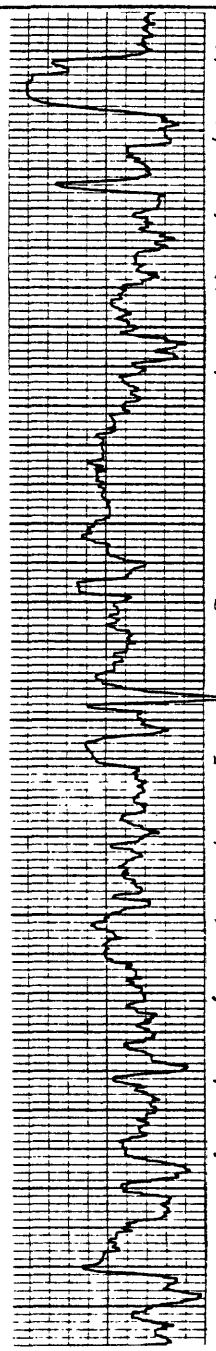


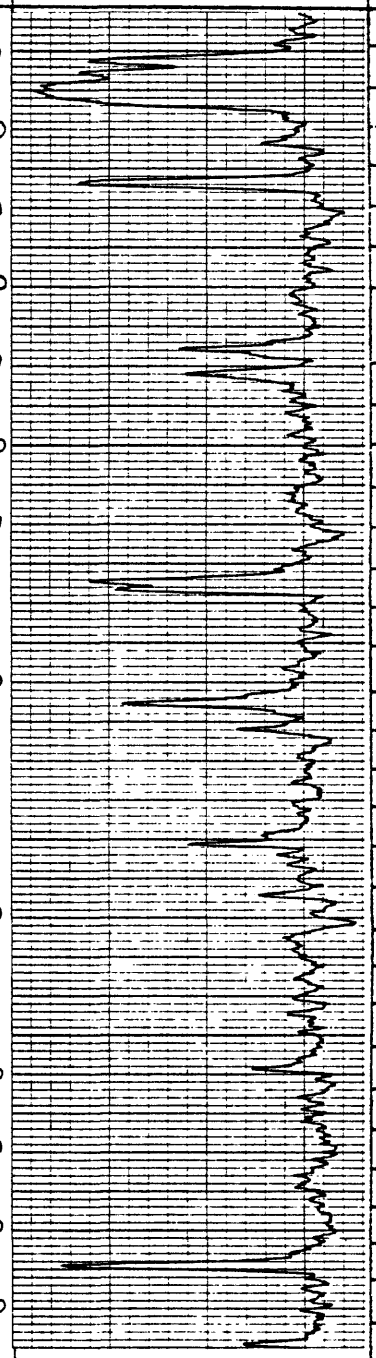
Hole number—continued

79D10

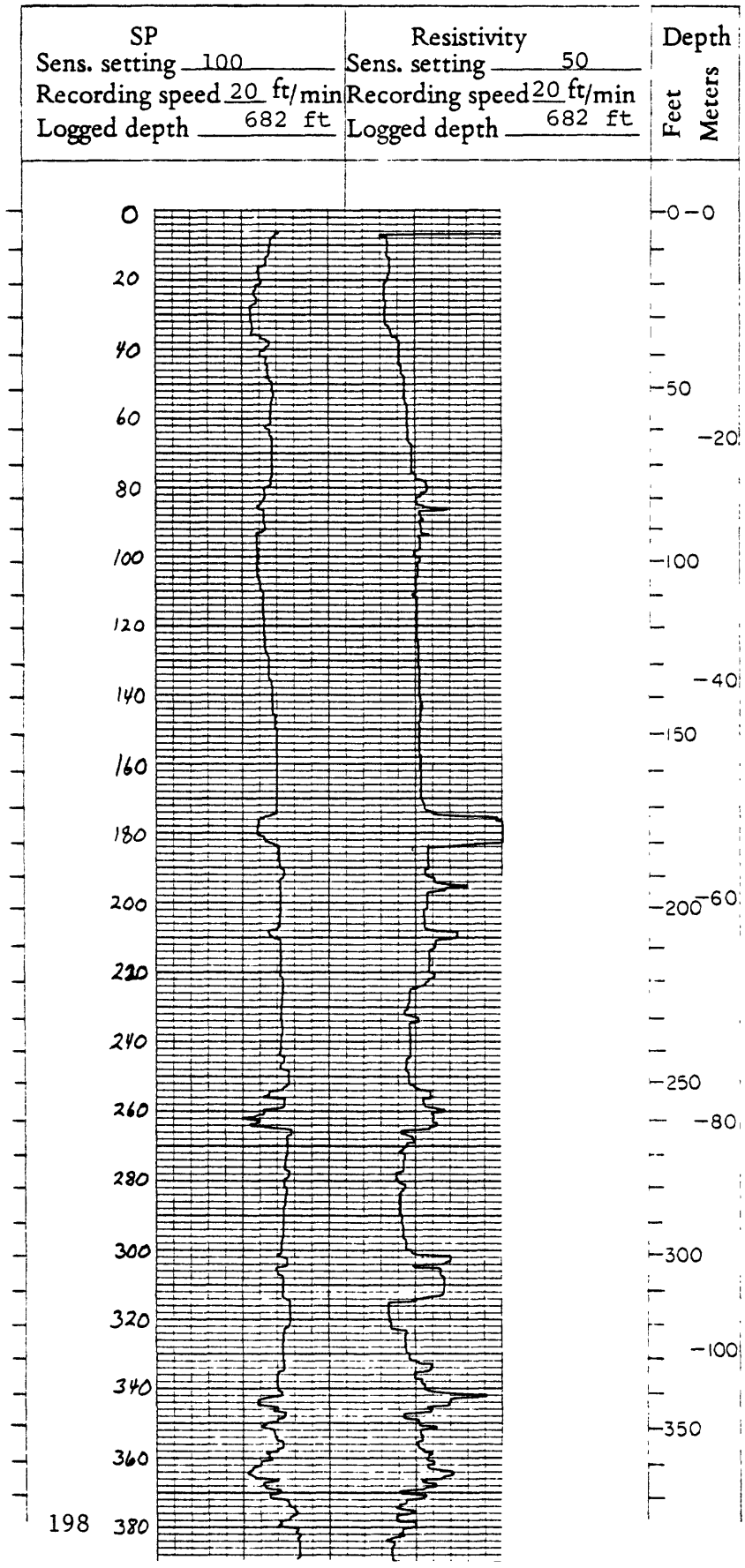
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 682 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 682 ft	Depth Feet / Meters
310-320	Claystone, dark-gray, carbonaceous			
320-325	Lignite			
325-350	Claystone, greenish-gray			
350-360	Siltstone, greenish-gray, clayey			
360-375	Claystone, medium-gray			
375-385	Siltstone, greenish-gray			
385-450	Sandstone, greenish-gray, medium-grained, silty			
450-468	Siltstone, greenish-gray, clayey			
468-472	Lignite			
472-500	Claystone, greenish-gray			
500-680	No samples			

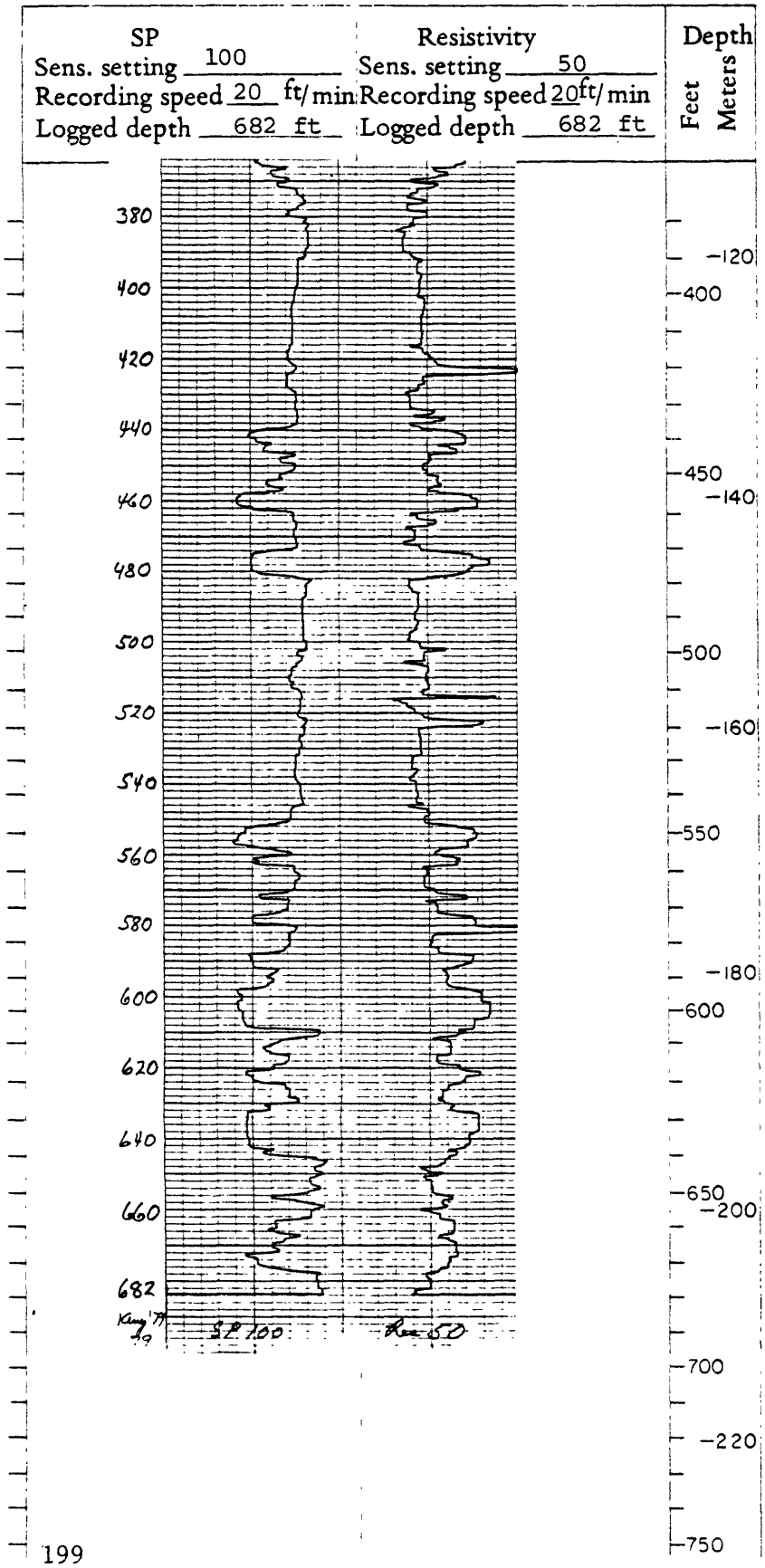






79D10 Hole number - continued




SP
Sens. setting 100
Recording speed 20 ft/min
Logged depth 682 ft
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 682 ft
Depth
Feet
Meters
380
400
420
440
460
480
500
520
540
560
580
600
620
640
660
682
SP 100
Res 50
-120
-400
-450
-140
-500
-160
-550
-180
-600
-650
-200
-700
-220
-750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D11 Map: Alamo NE Date: 7 31 79 State: ND County: Divide

Elev.: 2225 Location: T. 160 N/S, R. 98 E/W, Sec. 33, Tract: dddd Drilled depth: 402 ft

Measured: 30 ft FSL, 216 ft FEL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 235-247; 285-288; 344-349; 384-388

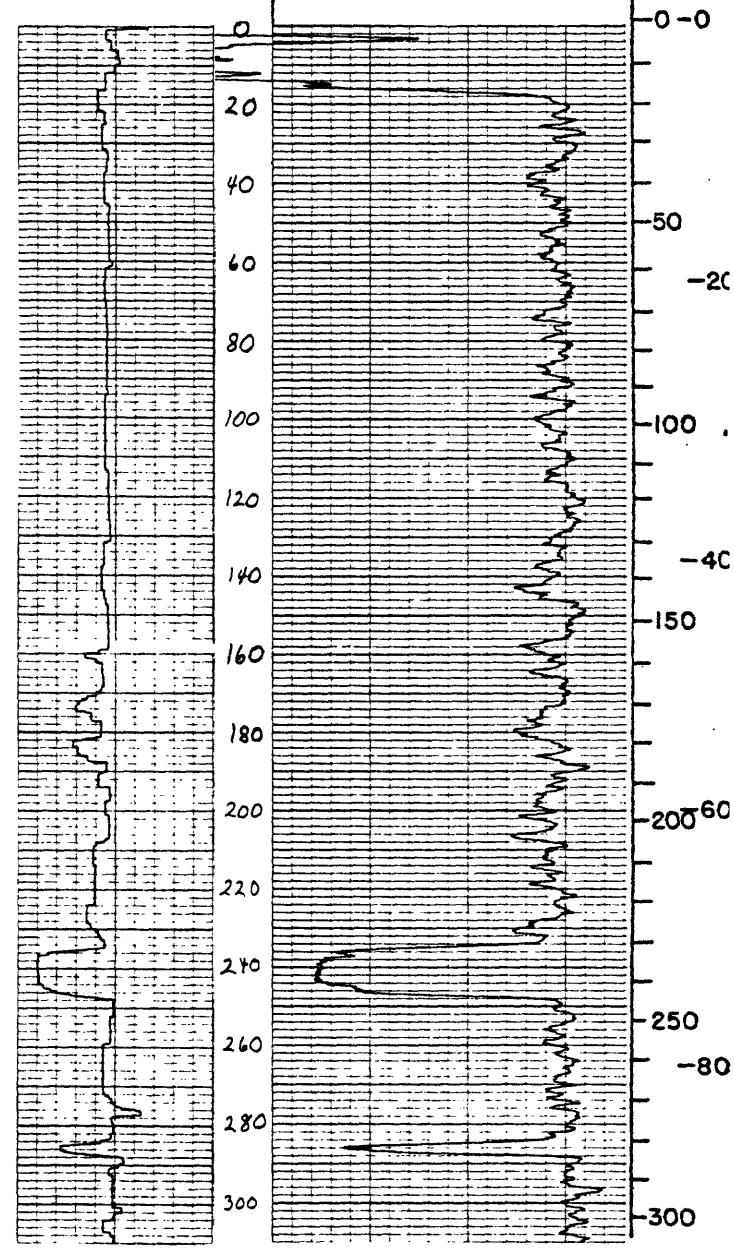
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 1	Silt, black, clayey
1- 5	Silt, olive-gray, clayey
5- 30	Till, olive-gray, clayey, pebbly
30-135	Till, dark-gray, clayey, pebbly
135-150	Till, dark-gray, clayey, sandy
150-160	Till, dark-gray, clayey, pebbly
160-182	Till, dark-gray, clayey, sandy
182-187	Gravel, coarse-grained, sandy
187-210	Till, dark-gray, clayey, pebbly
210-234	Siltstone, medium-gray, clayey, sandy
234-248	Lignite
248-255	Siltstone, greenish-gray, clayey
255-262	Sandstone, medium-gray, fine-grained, silty, clayey
262-327	Claystone, medium-gray

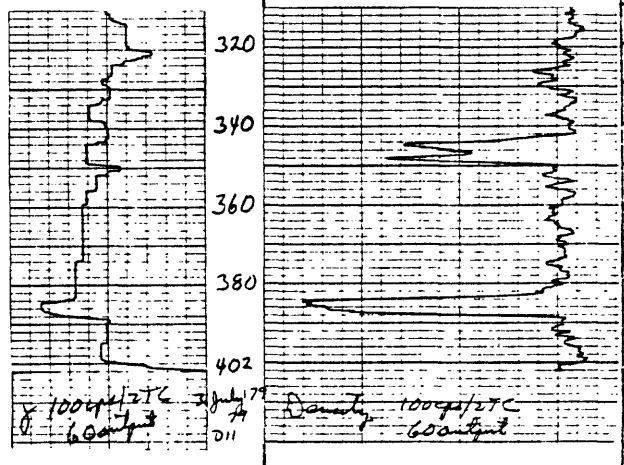
Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 ft

Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 ft

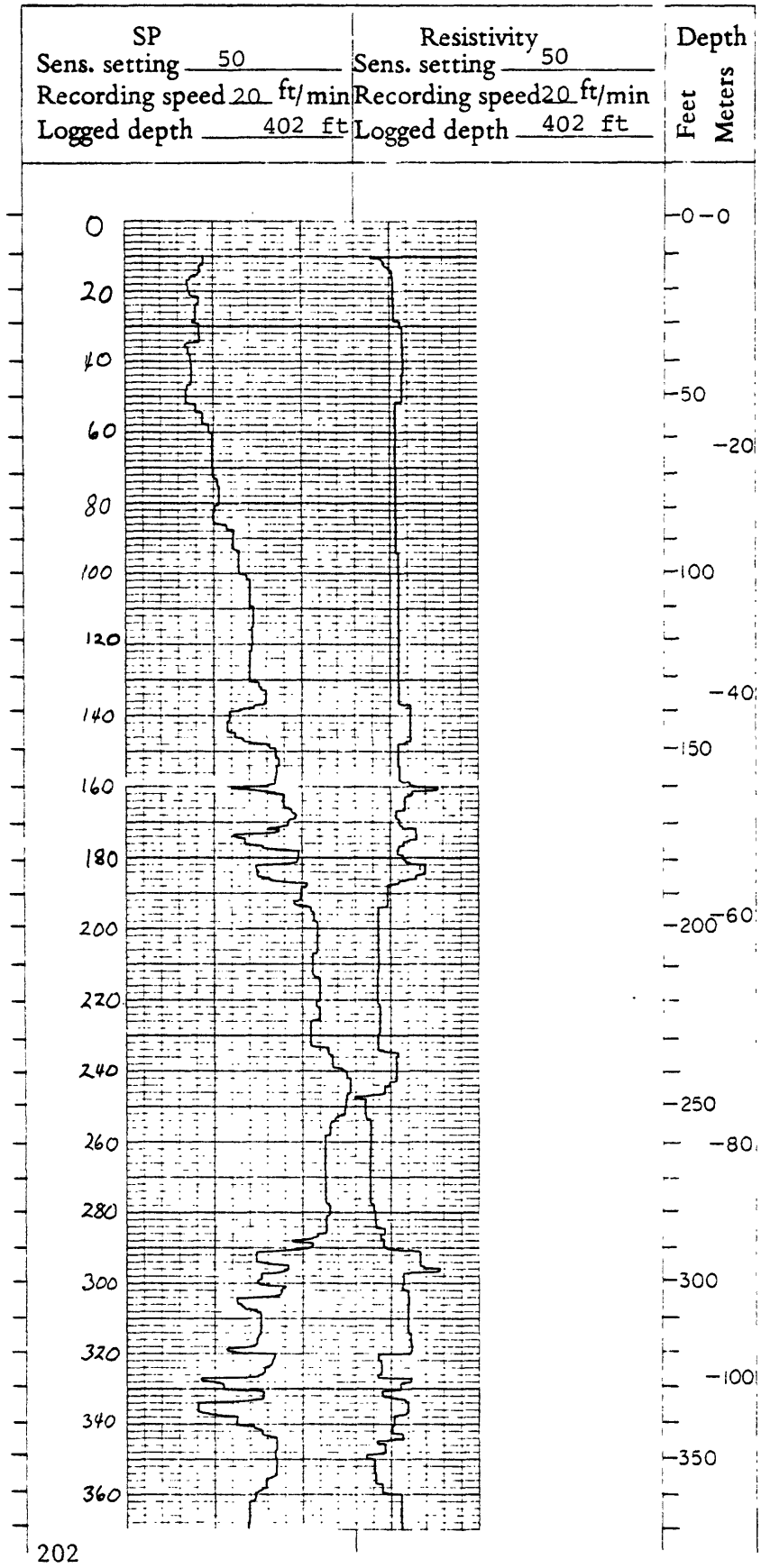


Hole number—continued
79D11

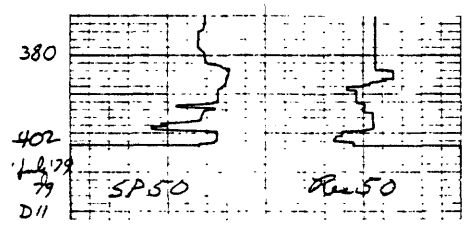
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Depth Feet / Meters
327-331	Siltstone, dark-gray clayey			300
331-336	Claystone, greenish-gray, silty			−100
336-343	Claystone, medium-gray, silty, carbonaceous			350
343-345	Lignite			
345-350	Claystone, dark-gray, carbonaceous			−120
350-362	Siltstone, dark-gray, clayey			400
362-381	Sandstone, medium-gray, fine-grained, silty			
381-389	Lignite			
389-392	Siltstone, medium-gray, clayey			450
392-394	Claystone, medium-gray, silty			−140
394-395	Lignite			
395-400	Siltstone, medium-gray, clayey			500
				−160
				550
				−180
				600



79D11 Hole number – Continued



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 ft	Logged depth 402 ft	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

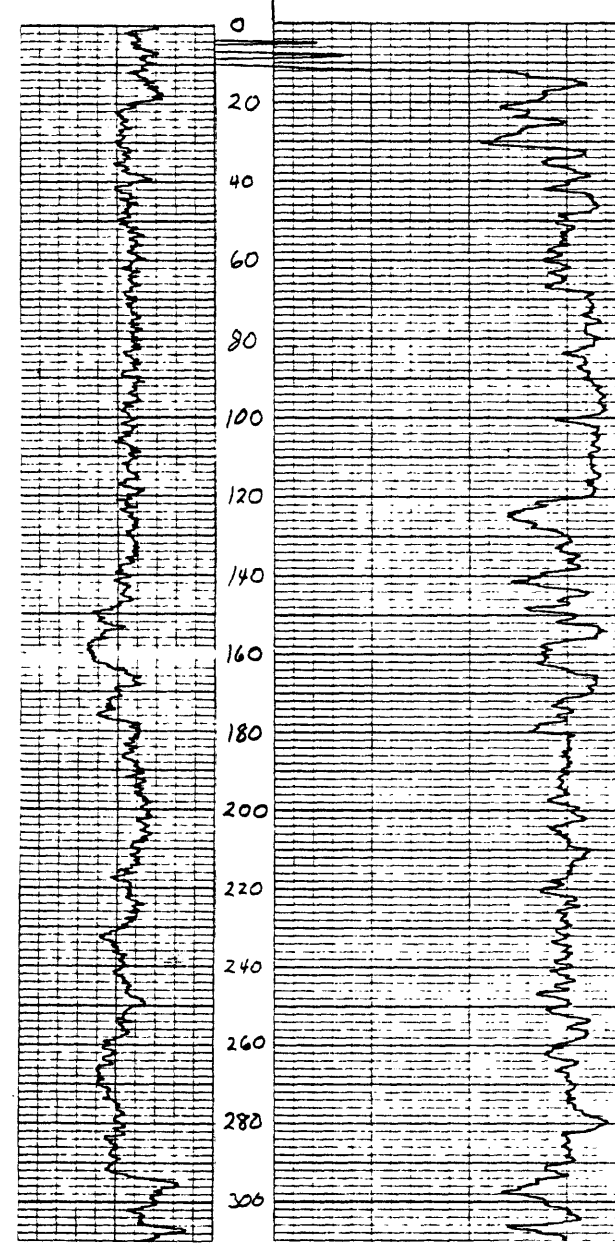
NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D12 Map: Bright Water Lake Date: 7, 31, 79 State: ND County: Divide
Elev.: 2230 Location: T. 160 N/S, R. 99 E/W, Sec. 26, Tract: ddcc Drilled depth: 402 ft
Measured: 54 ft FSL, 1000ft FEL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds: 336-341; 370-372.5

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

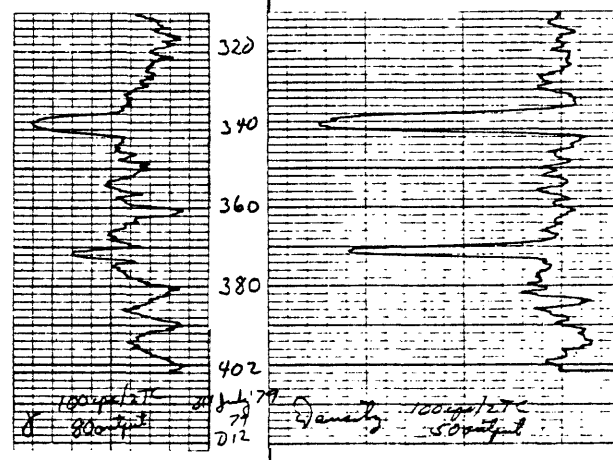
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 ft	Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 402 ft	Depth Feet	Depth Meters
0- 11	Silt, pale yellowish-brown, sandy			0	0
11- 22	Till, medium-brown, clayey, sandy			20	
22- 49	Till, medium-brown, clayey, pebbly			40	
49-148	Till, dark-gray, clayey, pebbly			50	
148-156	Gravel, coarse-grained, sandy			60	20
156-158	Till, dark-gray, clayey, pebbly			80	
158-164	Gravel			100	100
164-166	Till, dark-gray, clayey, pebbly			120	
166-167	Gravel			140	40
167-170	Till, dark-gray, clayey, pebbly			150	
170-175	Gravel			160	
175-180	Till, dusky-brown, clayey, pebbly			180	
180-250	Till, dark-gray, clayey, pebbly			200	200 60
250-285	Gravel			220	
285-294	Siltstone, medium-gray, clayey, sandy			240	
294-334	Claystone, medium-gray			250	80
				260	
				280	
				300	300



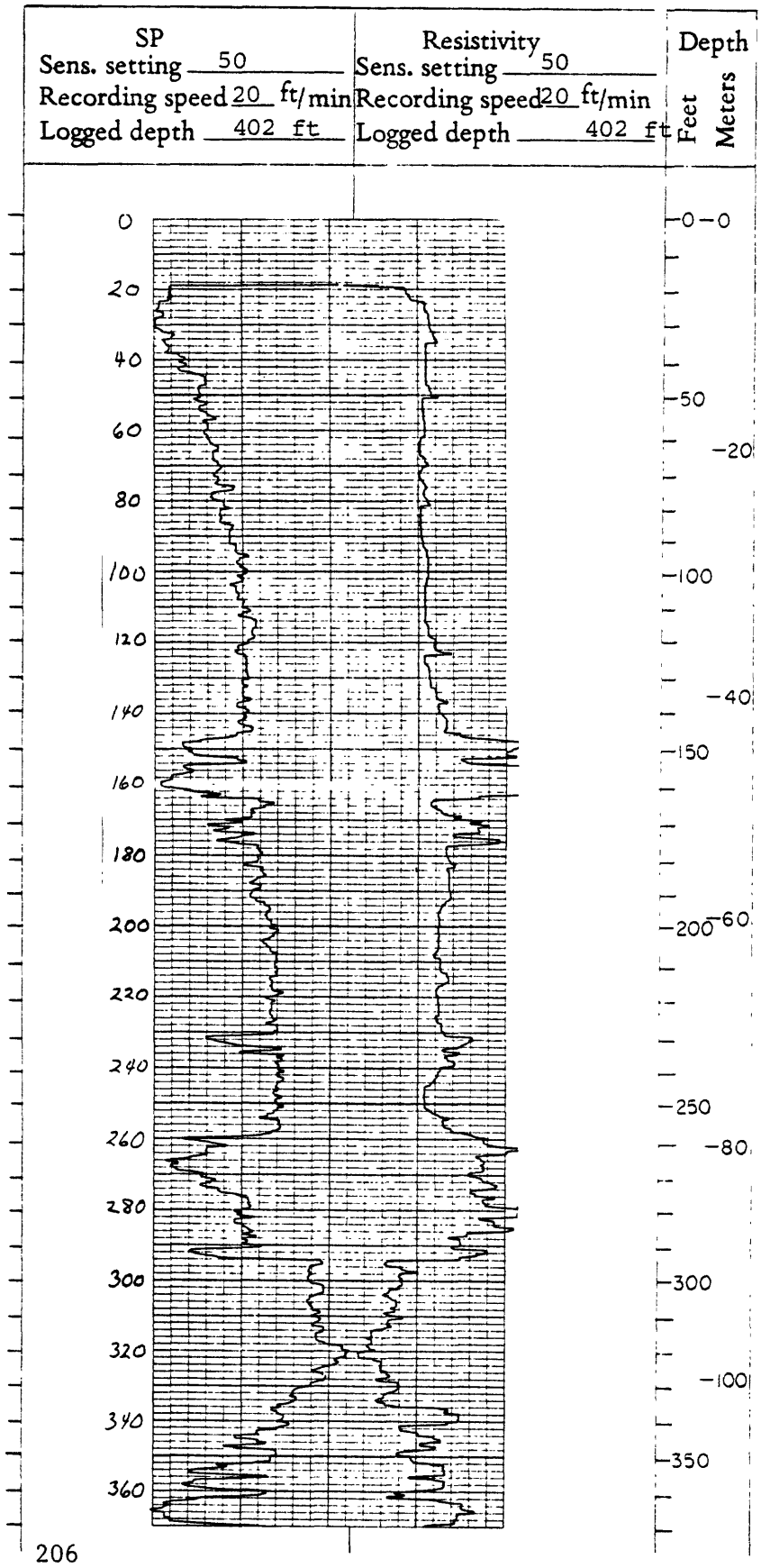
Hole number—continued

79D12

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Depth Feet / Meters
334-341	Lignite			300
341-373	Claystone, dark-gray, carbonaceous			−100
373-377	Lignite			350
377-380	Claystone, dark-gray, carbonaceous			−120
380-381	Lignite			400
381-402	Claystone, dark-gray			450 −140
				500
				−160
				550
				−180
				600

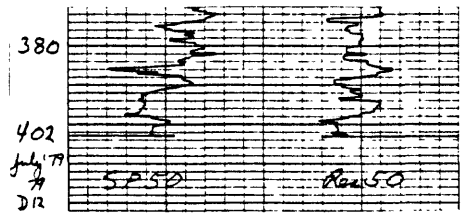


79D12 Hole number - continued



79D12 Hole number—continued

SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 ft	Logged depth 402 ft	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750 (Feet); 120, 140, 160, 180, 200, 220 (Meters)

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D13 Map: Stady Date: 8-25-79 State: ND County: Divide

Elev.: 2210 Location: T. 160 N, R. 101 W, Sec. 1, Tract: dddc Drilled depth: 144 ft

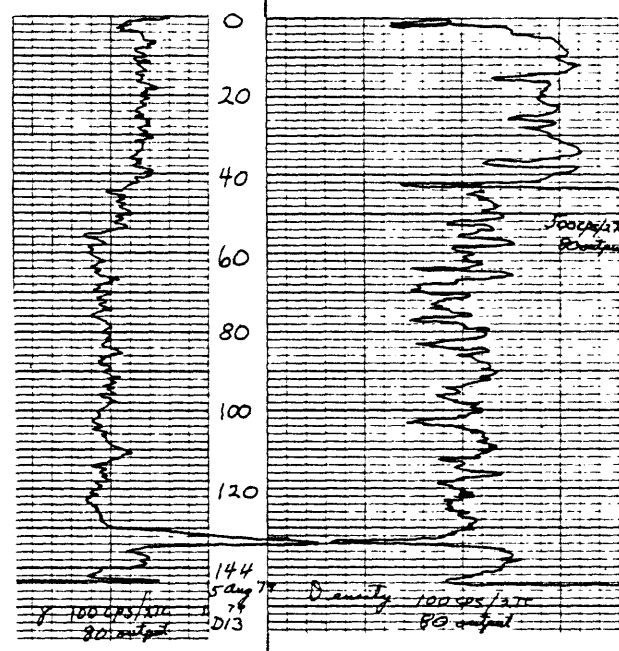
Measured: 42 ft FSL, 611 ft FEL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds:

Remarks:

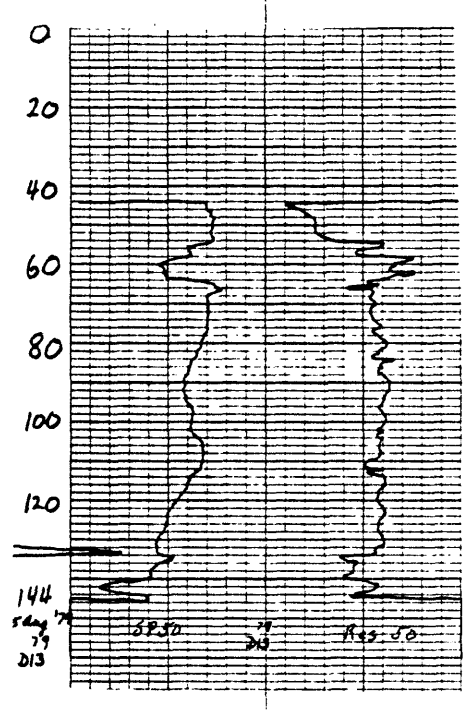
Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 144 ft	Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 144 ft	Depth Feet	Depth Meters
0- 4	Silt, dusky-brown, clayey, pebbly			0	0
4- 53	Till, dusky-brown, silty, pebbly			20	
53- 65	Gravel, coarse-grained, sandy			40	
65- 85	Till, dusky-brown, sandy, silty, pebbly			50	
85- 93	Sand, dusky-brown, medium grained, silty			60	20
93-100	Till, medium-gray, sandy, pebbly			80	
100-124	Sandstone, medium-gray, medium-grained			100	100
124-135	Siltstone, medium-gray, clayey			120	
135-136	Lignite				
136-145	Siltstone, medium-gray, clayey, sandy			144	40
145-146	Lignite, lost circulation				150
				200	60
				250	80
				300	



79D13 Hole number – continued

SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 144 ft	Logged depth 144 ft	



0 – 0
50 – 20
100 – 40
150
200 – 60
250 – 80
300 – 100
350

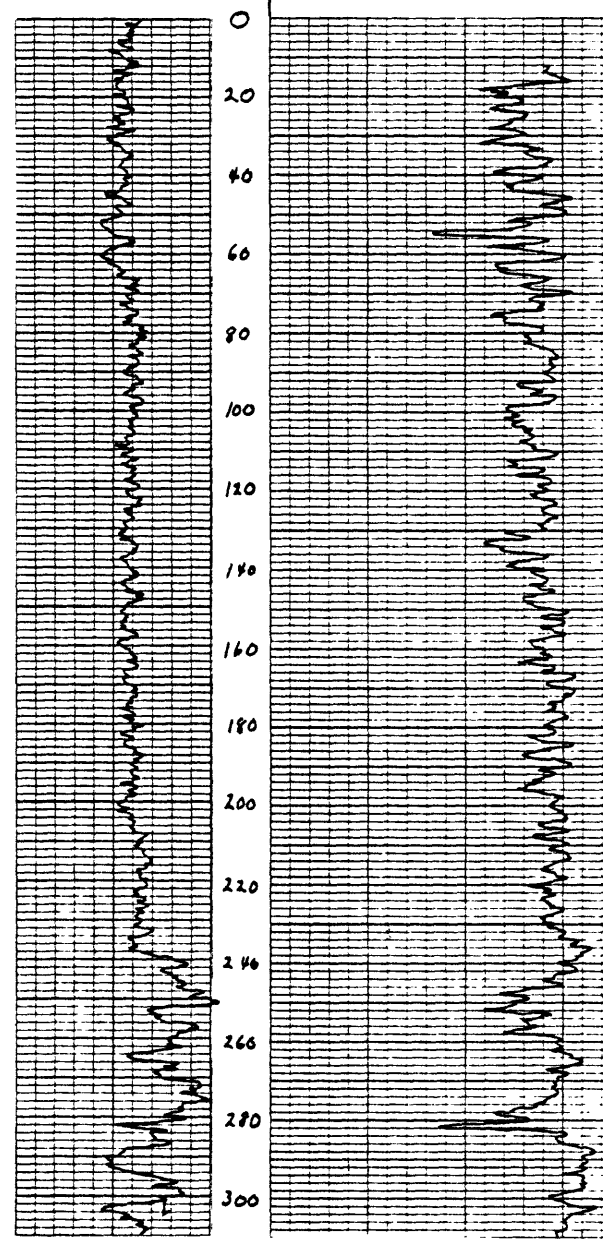
NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D14 Map: None Date: 8-25-79 State: ND County: Divide
Elev.: 2184 Location: T. 160 N/S, R. 101 E/W, Sec. 5, Tract: bccc Drilled depth: 462
Measured: 2520 ft FNL, 51 ft FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds: 347-359; 424-429

Remarks:

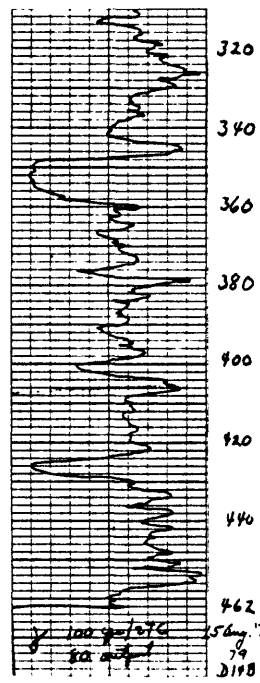
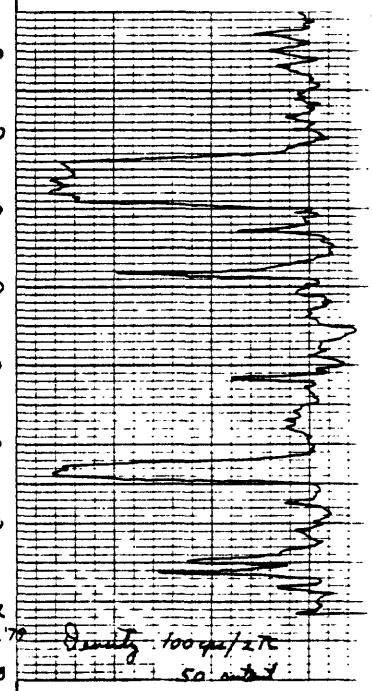
Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma: T.C. 2 Range 100cps, Recording speed 20 ft/min, Logged depth 462 ft	Density: T.C. 2 Range 100cps, Recording speed 20 ft/min, Logged depth 462 ft	Depth Feet	Depth Meters
0- 5 Silt, dusky-brown, clayey			0	0
5- 28 Till, dusky-brown, silty, pebbly			20	
28- 33 Sand, dusky-brown, medium-grained			40	
33- 42 Silt, dark-gray			50	
42- 50 Till, olive-gray, clayey, pebbly			60	20
50- 60 Sand			80	
60- 205 Till, dark-gray, clayey, pebbly			100	
205-222 Claystone, dark-gray, silty			120	
222-233 Sandstone, dark-gray, medium-grained			140	40
233-240 Siltstone, dark-gray, clayey			150	
240-348 Claystone, dark-gray, silty			160	
			180	
			200	60
			220	
			240	
			250	
			260	80
			280	
			300	

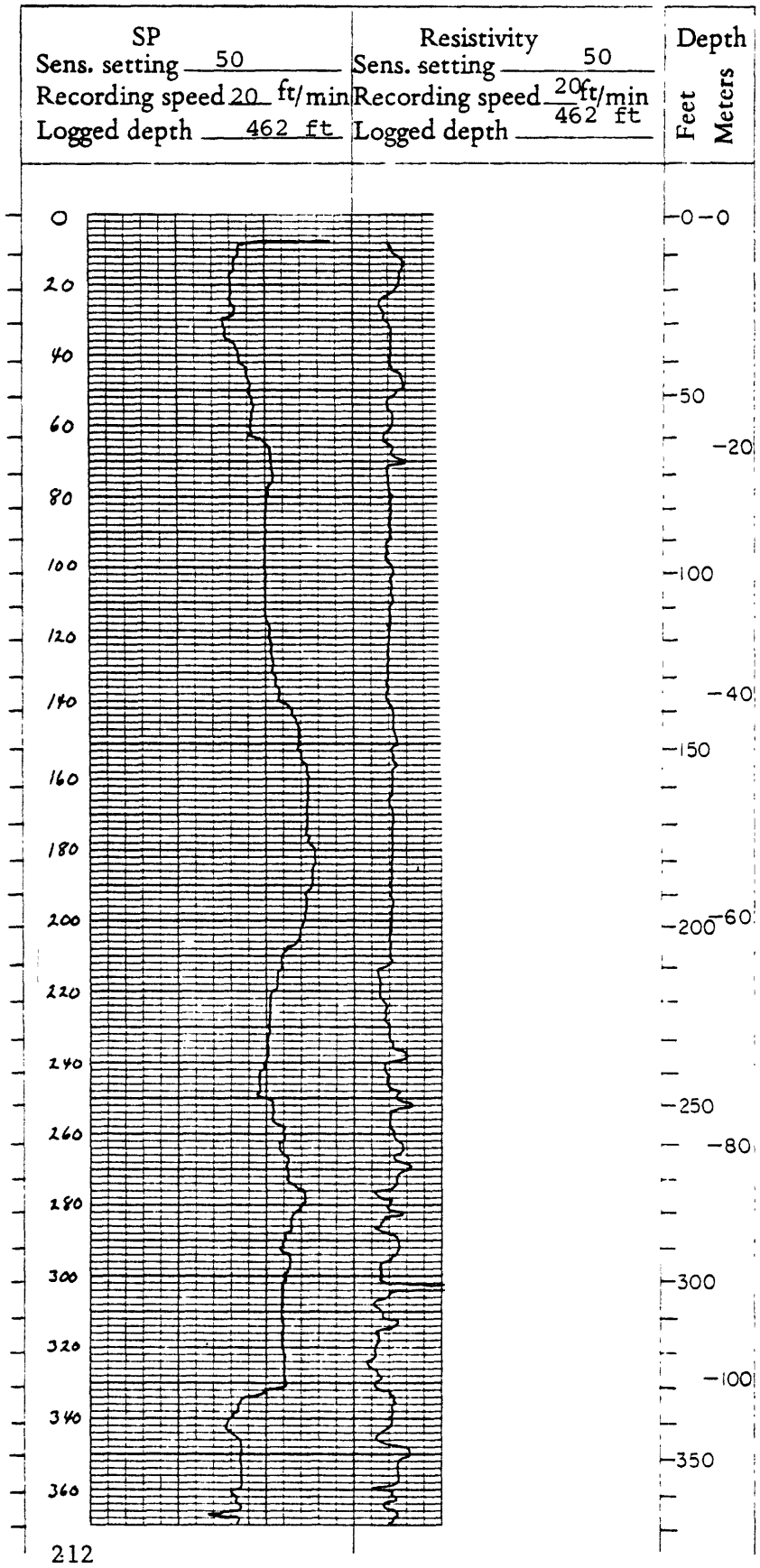


Hole number—continued

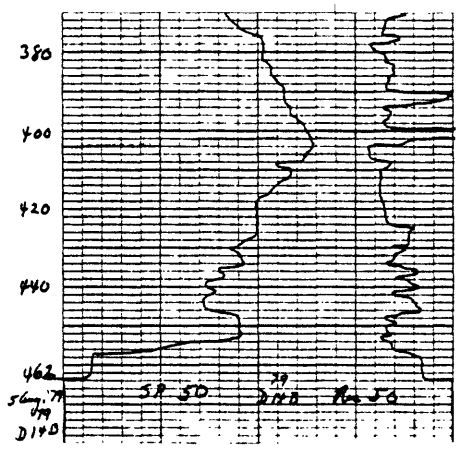
79D14

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 462 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 462 ft	Depth Feet / Meters
348-358 Lignite 358-421 Claystone, dark-gray 421-424 Lignite 424-426 Claystone, dark-gray 426-430 Lignite 430-460 Claystone, dark-gray			300 100 350 120 400 450 140 500 160 550 180 600

79D14 Hole number – continued



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 462 ft	Logged depth 462 ft	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D15 Map: None Date: 8-26-79 State: ND County: Divide

Elev.: 2285 Location: T. 160 N, R. 101 W, Sec. 20, Tract: ddda Drilled depth: 702 ft

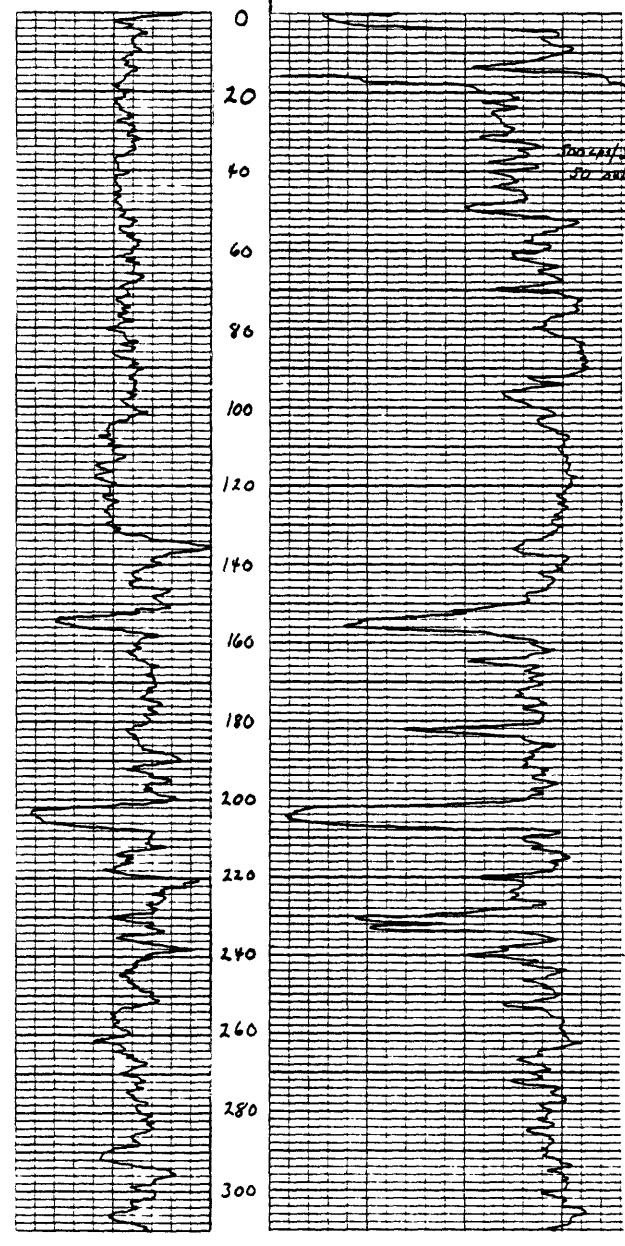
Measured: 600 ft FSL, 45 ft FEL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 153-157; 202-207; 230-234; 472-483; 530-532; 552-559; 606-611; 689-701

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

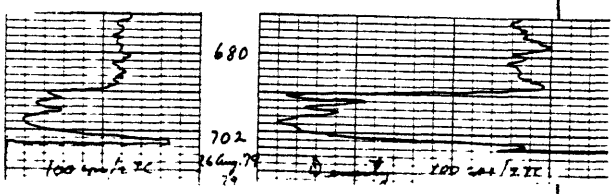
Lithology		Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 702 ft	Density: T.C. 2 Range 100; Recording speed 20 ft/min; Logged depth 702 ft	Depth Feet	Depth Meters
0- 5	Silt, dusky-brown, clayey			0	0
5- 30	Till, dusky-brown				
30- 33	Silt, medium-gray, clayey				
33- 47	Till, dusky-brown			20	
47- 50	Gravel, coarse-grained, sandy				
50- 80	Till, dusky-brown, clayey, pebbly			40	
80-100	Till, dark-gray, silty, pebbly			50	
100-115	Till, dusky-brown, sandy			60	20
115-133	Sandstone, dusky-brown, medium-grained, clayey			80	
133-145	Claystone, olive-gray			100	100
145-150	Claystone, medium-gray				
150-153	Claystone, dark-gray, carbonaceous			120	
153-156	Lignite				
156-180	Siltstone, greenish-gray, clayey			140	40
180-181	Lignite			150	
181-188	Claystone, dark-gray			160	
188-199	Claystone, greenish-gray				
199-206	Lignite			180	
206-226	Claystone, dark-gray				
226-228	Lignite			200	200 60
228-255	Claystone, dark-gray				
255-258	Siltstone, greenish-gray			220	
258-260	Lignite				
260-280	Siltstone, greenish-gray			240	
280-352	Claystone, dark-gray			250	
				260	80
				280	
				300	300

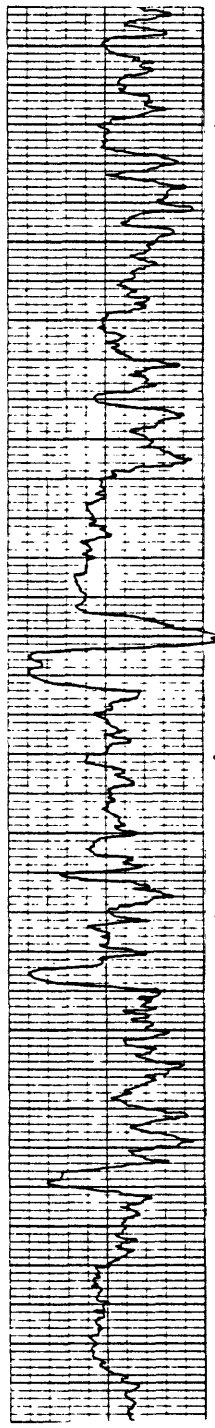


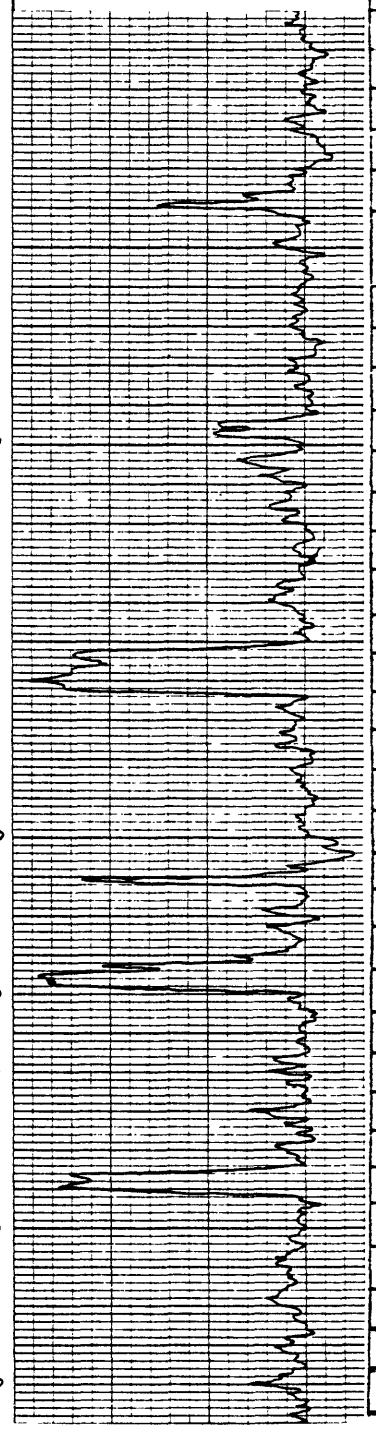
Hole number—continued

79D15

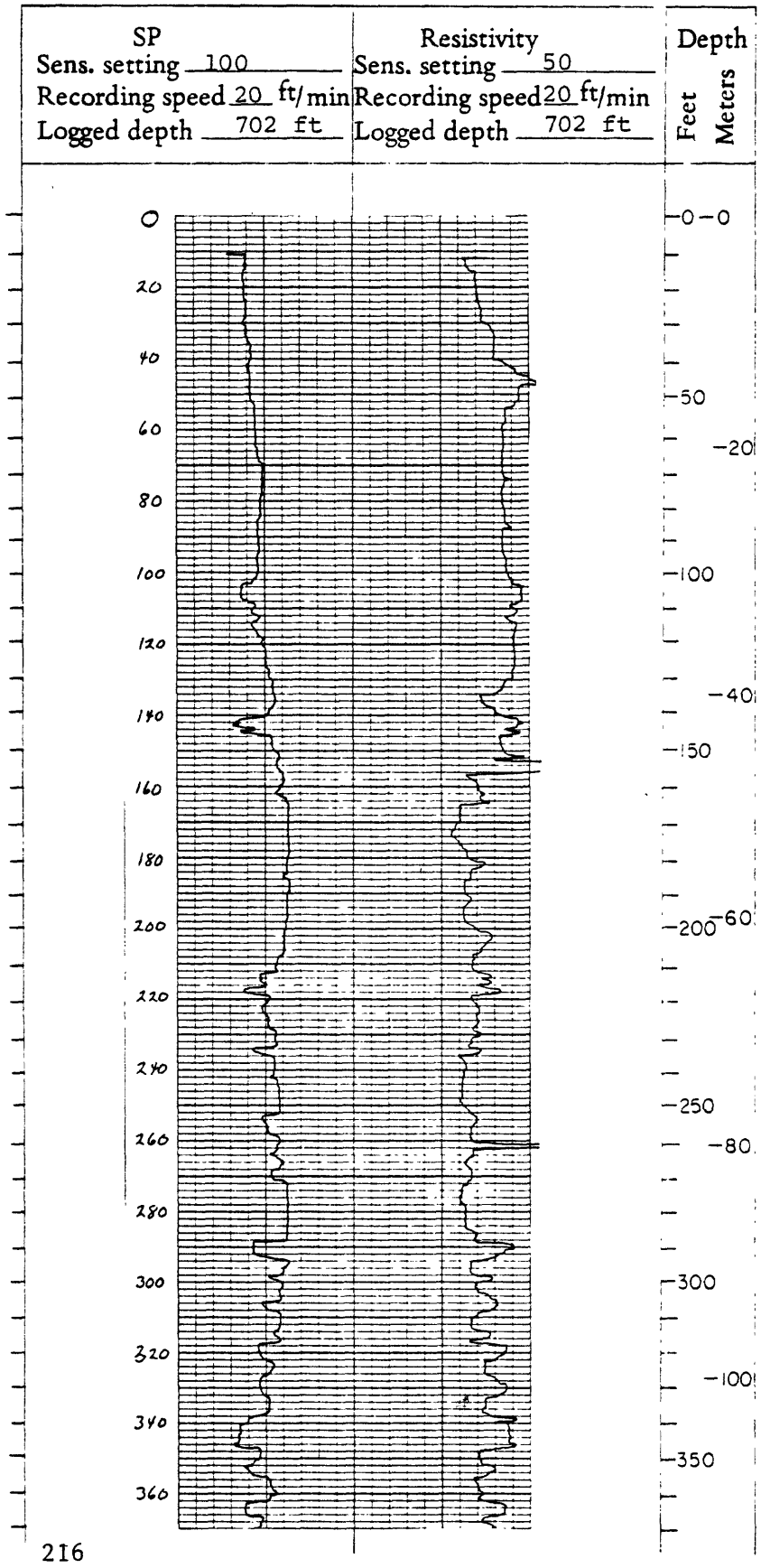
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 702 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 702 ft	Depth Feet / Meters
352-353	Lignite			
353-375	Claystone, dark-gray, carbonaceous			
375-380	Siltstone, medium-gray			
380-414	Claystone, medium-gray			
414-416	Lignite			
416-437	Claystone, dark-gray			
437-445	Siltstone, medium-gray, clayey			
445-460	Claystone, dark-gray			
460-463	Lignite			
463-465	Claystone, dark-gray, carbonaceous			
465-473	Lignite			
473-477	Siltstone, greenish-gray, clayey			
477-524	Claystone, dark-gray			
524-525	Lignite			
525-539	Claystone, dark-gray			
539-540	Lignite			
540-548	Claystone, dark-gray			
548-555	Lignite			
555-557	Siltstone, medium-gray, clayey			
557-598	Claystone, dark-gray			
598-615	Siltstone, greenish-gray, clayey, sandy			
615-619	Lignite			
619-660	Sandstone, greenish-gray, medium-grained, clayey			
660-683	Siltstone, greenish-gray, clayey			
683-697	Lignite			
697-702	Siltstone, greenish-gray, clayey			



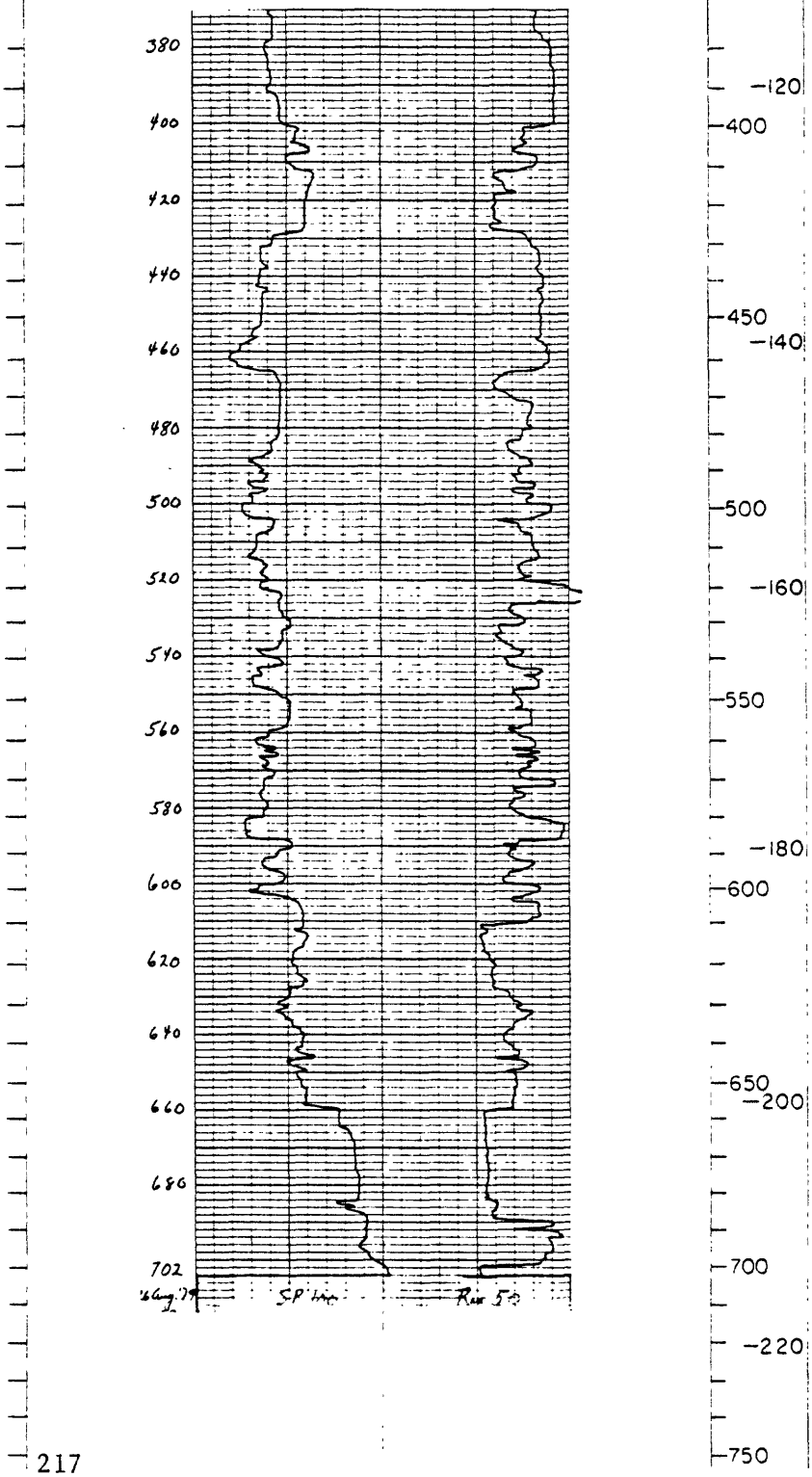




79D15 Hole number – continued



SP	Resistivity	Depth
Sens. setting 100	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 702 ft	Logged depth 702 ft	



NORTH DAKOTA GEOLOGICAL SURVEY

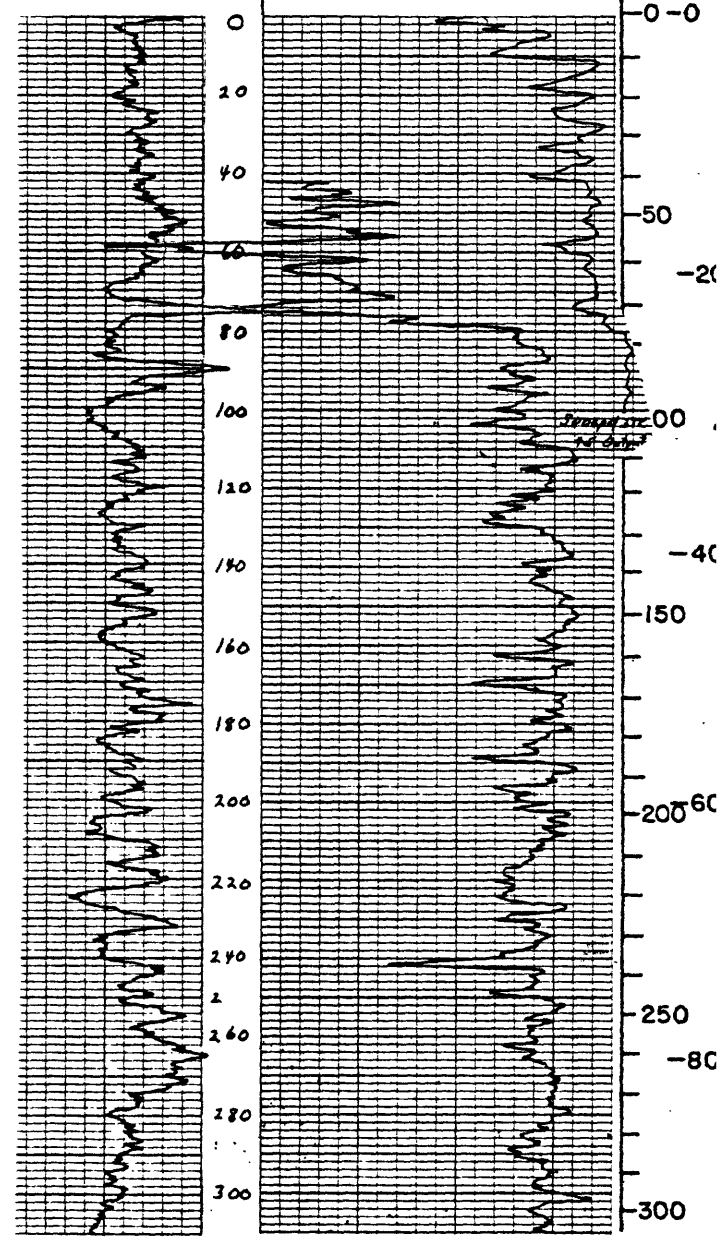
Hole No: 79D16 Map: None Date: 8-27-79 State: ND County: Divide
Elev.: 2210 Location: T. 160 N, R. 102 W, Sec. 27, Tract: cccc Drilled depth: 402 ft
Measured: 36 ft FSL, 66 ft FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds: 365-382

Remarks:

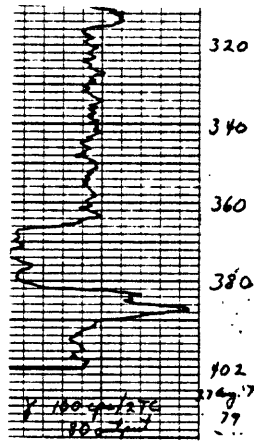
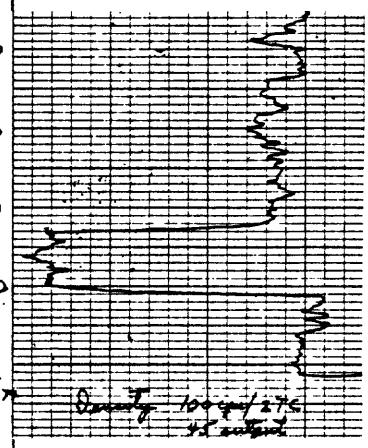
Lithology Recorded by: Gary Stefanovsky Geologist Yes
Geophysical logs recorded by: Lechner

Lithology		Gamma	Density	Depth
		T.C. 2 Range 100 Recording speed 20 ft/min Logged depth 402 ft	T.C. 2 Range 100 Recording speed 20 ft/min Logged depth 402 ft	Feet / Meters

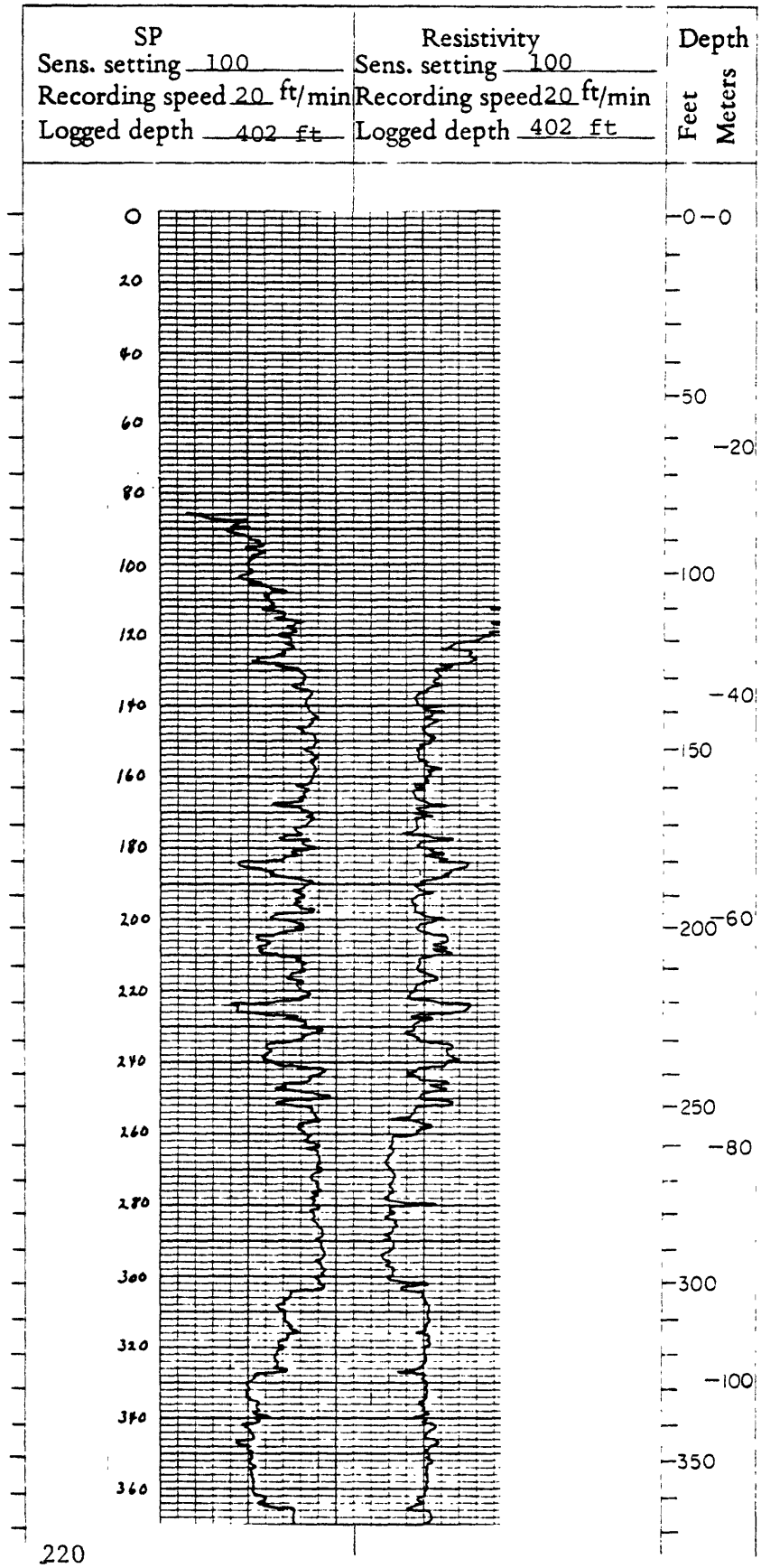
0- 2	Silt, black, clayey
2- 6	Silt, dusky-brown, clayey
6- 46	Till, dusky-brown, silty, pebbly
46- 56	Claystone, light-olive-gray, silty
56- 70	Siltstone, light-olive-gray, clayey
70-122	Claystone, light-olive-gray
122-145	Siltstone, medium-gray, sandy
145-155	Claystone, medium-gray
155-157	Sandstone, medium-gray, medium-grained, clayey
157-158	Lignite
158-160	Sandstone, medium-gray, medium-grained
160-167	Claystone, grayish-blue
167-168	Lignite
168-174	Claystone, grayish-blue
174-175	Lignite
175-225	Claystone, grayish-blue
225-226	Lignite
226-236	Claystone, grayish-blue
236-237	Lignite
237-243	Claystone, grayish-blue
243-244	Lignite
244-265	Claystone, grayish-blue
265-287	Claystone, dark-gray
287-295	Siltstone, medium-gray, clayey
295-307	Claystone, medium-gray, silty



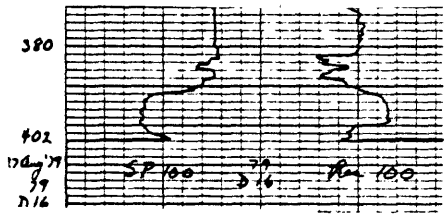
Hole number—continued
79D16

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Depth Feet / Meters
307-362	Sandstone, greenish-gray, medium-grained clayey			300
362-382	Lignite			100
382-390	Claystone, medium-gray			350
390-402	Sandstone, medium-gray, medium-grained			120
				400
				450
				140
				500
				160
				550
				180
				600

79D16 Hole number – *continued*



SP	Resistivity	Depth
Sens. setting 100	Sens. setting 100	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 ft	Logged depth 402 ft	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750 Feet; 120, 140, 160, 180, 200, 220 Meters

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D17 Map: None Date: 8-28-79 State: ND County: Divide
Elev.: 2120 Location: T. 160 N/S, R. 103 E/W, Sec. 4, Tract: bbba Drilled depth: 402 ft
Measured: 40 ft FNL/FSL, 556 ft FEL/FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds: 200-204.5; 318-342; 354-356; 383-387.5

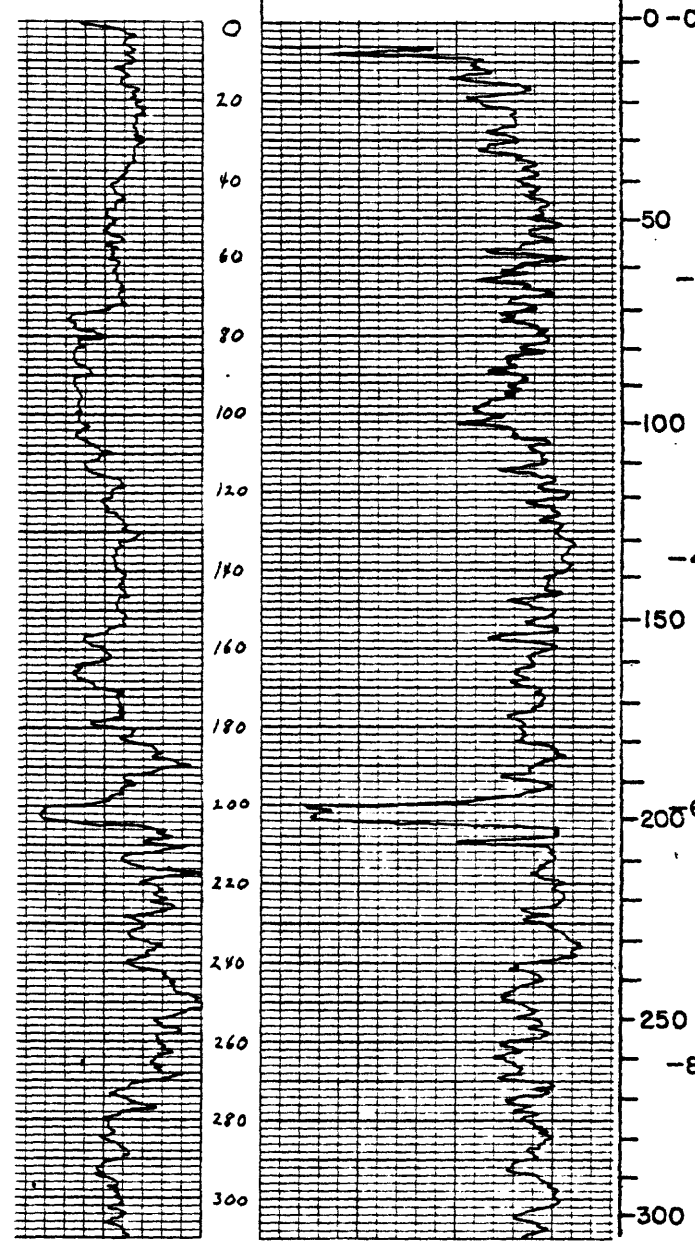
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 5	Silt, olive-gray, clayey, pebbly
5- 42	Till, olive-gray, clayey, pebbly
42- 53	Till, dusky-brown, clayey, pebbly
53- 80	Till, dark-gray, silty, pebbly
80-100	Sand, medium-gray, medium-grained, gravelly
100-156	Till, dark-gray, clayey, pebbly
156-157	Gravel, coarse-grained, sandy
157-200	Till, dark-gray, clayey, pebbly
200-205	Claystone, greenish-gray, silty
205-215	Siltstone, greenish-gray, clayey
215-217	Claystone, dark-gray, silty, carbonaceous
217-225	Lignite
225-310	Claystone, bluish-gray, silty

Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 402 ft

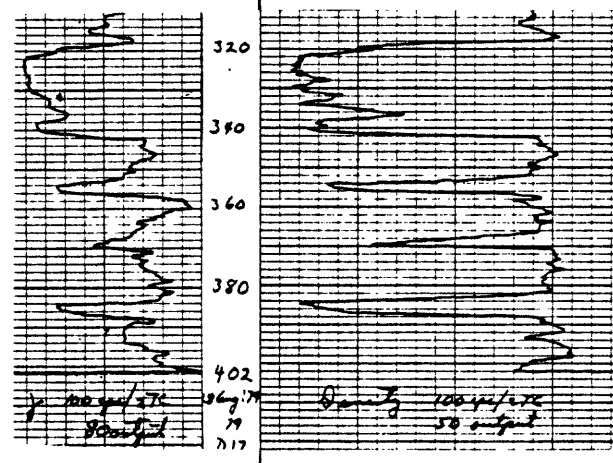
Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 402 ft



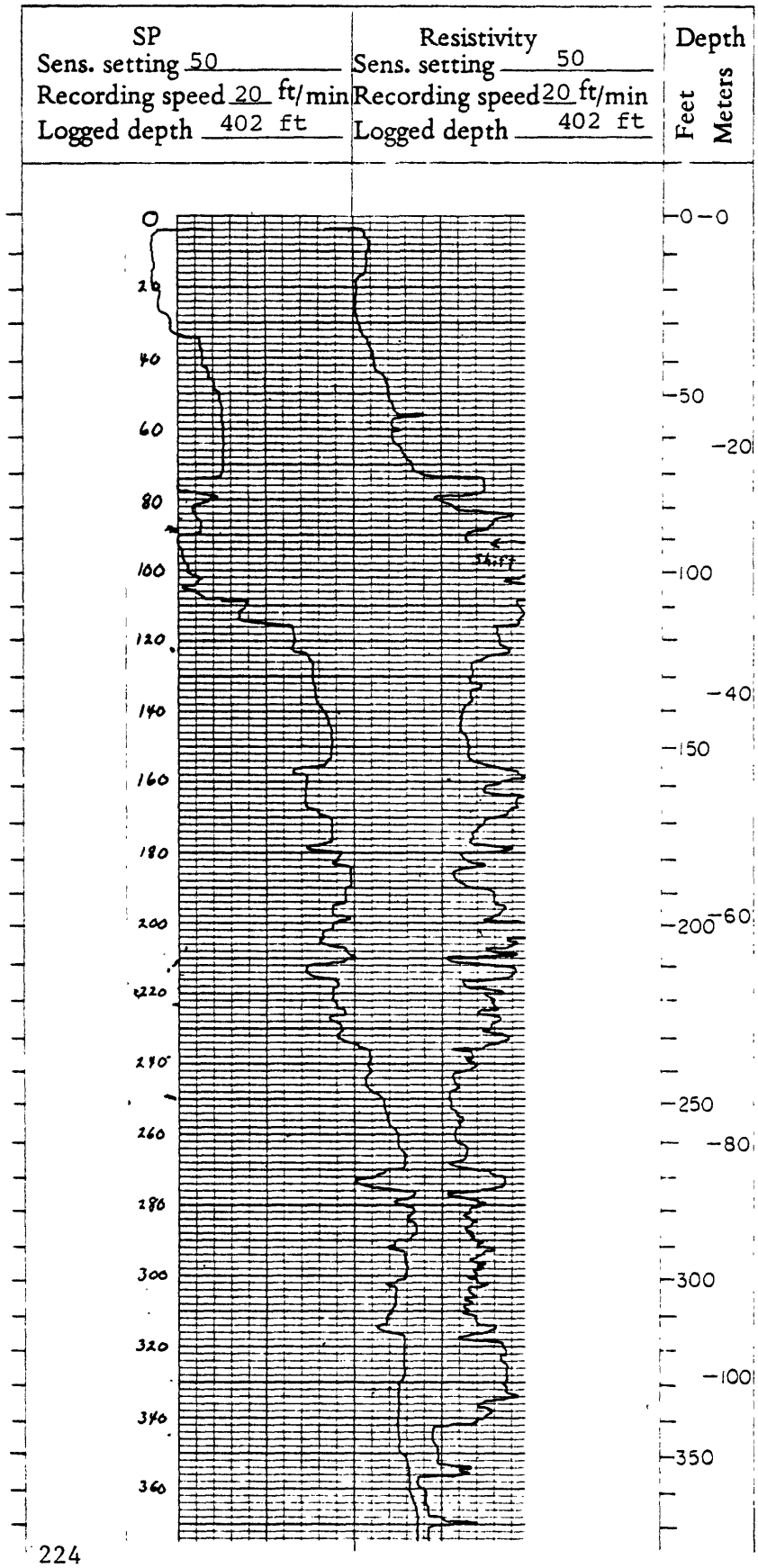
Hole number—continued

79D17

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 ft	Depth Feet / Meters
310-313	Lignite			300
313-317	Claystone, dark-gray			
317-342	Lignite			−100
342-350	Claystone, dark-gray			350
350-402	No samples			−120
				400
				450 −140
				500
				−160
				550
				−180
				600

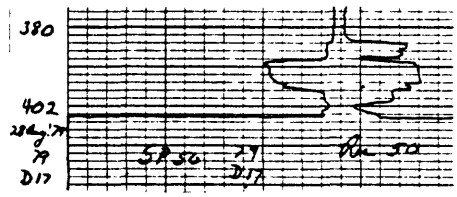


79D17 Hole number – continued



79D17 Hole number—continued

SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 ft	Logged depth 402 ft	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750

Meters: 120, 140, 160, 180, 200, 220

225

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D18 Map: Columbus SW Date: 8-11-79 State: ND County: Divide

Elev.: 2328 ft Location: T. 161 N, R. 95 W, Sec. 2, Tract: bbbb Drilled depth: 342 ft

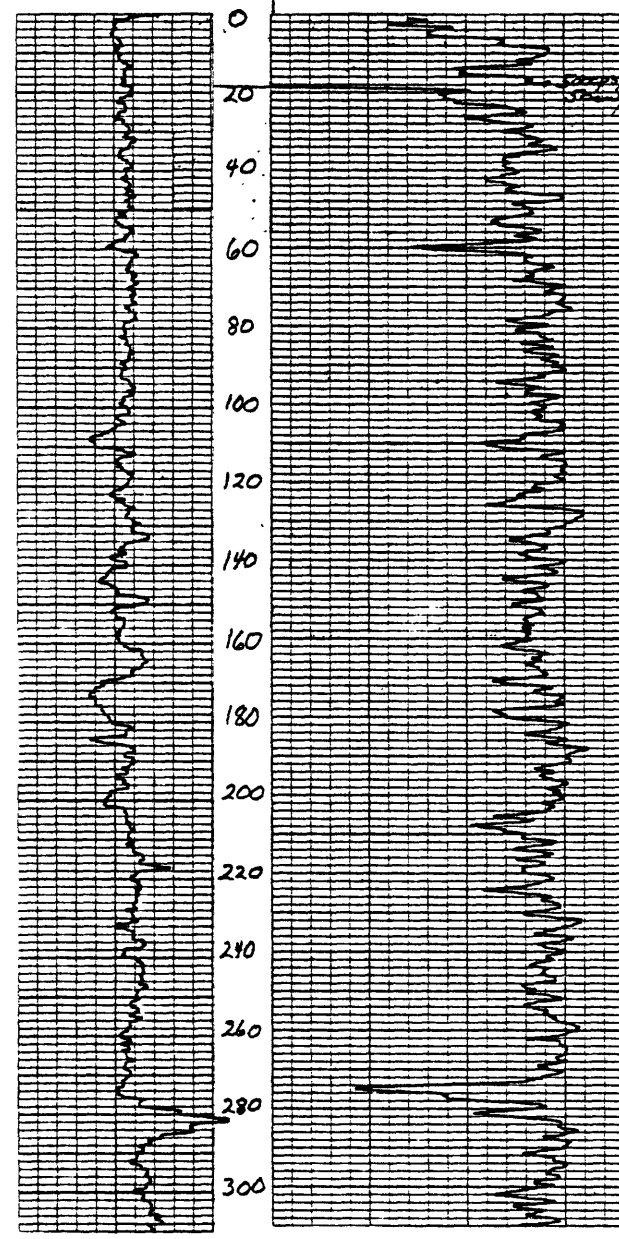
Measured: 106 ft FNL, 15 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 274-276; 332-337

Remarks:

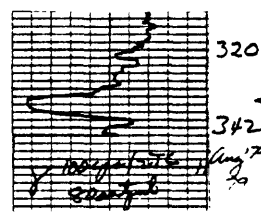
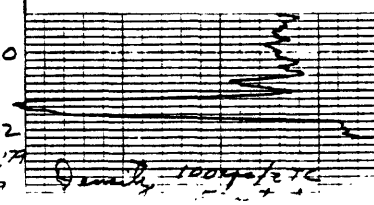
Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 342 ft	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 342 ft	Depth Feet	Depth Meters
0 -37	Till, brown, clayey, sandy, pebbly			0	0
37- 62	Till, medium dark-brown, clayey, sandy, pebbly			20	
62-105	Till, medium-gray, clayey, silty, pebbly			40	
105-108	Gravel, coarse-grained			50	
108-150	Till, medium-gray, clayey, sandy, pebbly			60	20
150-161	Till, medium-gray, clayey, sandy, pebbly			80	
161-171	Till, medium dark-gray, clayey, silty			100	100
171-173	Sand, brown, very coarse grained			120	
173-180	Till, medium dark-gray, clayey, silty			140	40
180-186	Gravel, coarse-grained			150	
186-197	Till, brown-gray, clayey, sandy, pebbly			160	
197-201	Gravel, coarse-grained			180	
201-210	Till, medium-brown, clayey, silty, pebbly			200	200 60
210-222	Till, dark grayish-brown, clayey, silty, pebbly			220	
222-240	Till, medium brownish-gray, sandy, silty, pebbly			240	250
240-270	Sandstone, gray, fine-grained			260	80
270-272	Lignite			280	
272-328	No samples			300	300



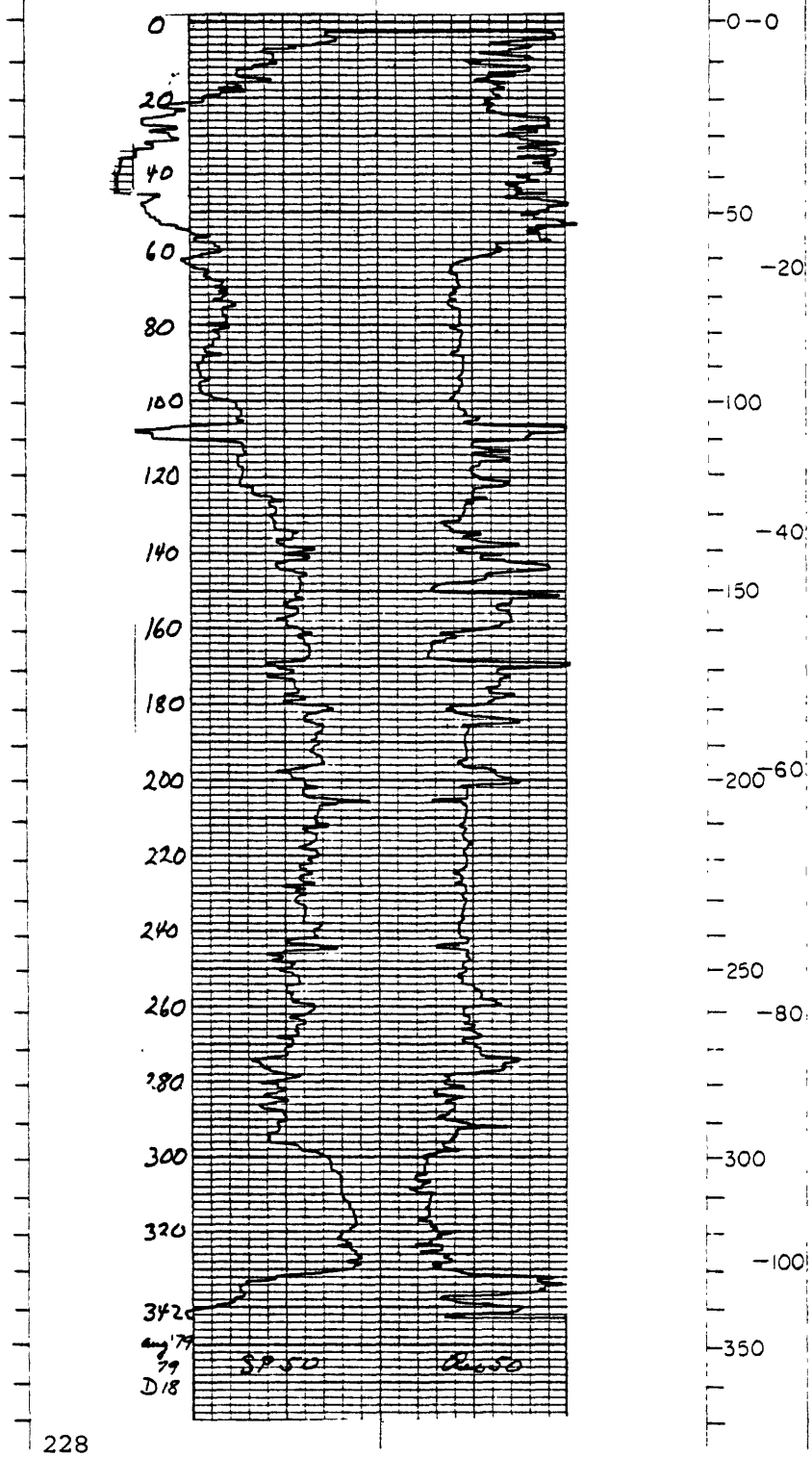
Hole number—continued

79D18

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 ft	Depth Feet / Meters
328-331 Lignite 331-340 Sandstone, gray, fine-grained, clayey			300 100 350 120 400 450 140 500 160 550 180 600

79D18 Hole number – continued

SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 342 ft	Logged depth 342 ft	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D19 Map: Noonan SE Date: 8-11-79 State: ND County: Divide

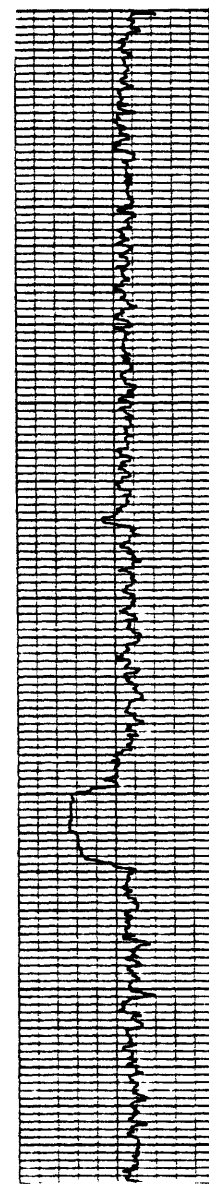
Elev.: 2355 Location: T. 161 N/S, R. 95 E/W, Sec. 7, Tract: ddaa Drilled depth: 342 ft

Measured: 1000 ft FNL/FSL 25 ft FEL/FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds:

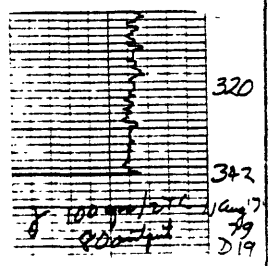
Remarks: No density log run

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 342 ft	Density: T.C. ___ Range ___; Recording speed ___ ft/min; Logged depth ___ ft	Depth Feet	Depth Meters
0- 44 Till, brown, clayey, silty, sandy			0	0
44-105 Till, gray, silty, sandy, clayey, pebbly			50	20
105-108 Gravel				
108-195 Till, medium dark-gray, clayey, silty				
195-215 Gravel				
215-229 Till, medium-brown, clayey, silty				
229-241 Till, dark gray-brown, clayey, silty, sandy				
241-310 Till, medium light-gray, sandy, clayey, pebbly			100	40
310-340 Till, medium dark-gray, clayey, sandy, silty			150	
			200	60
			250	80
			300	

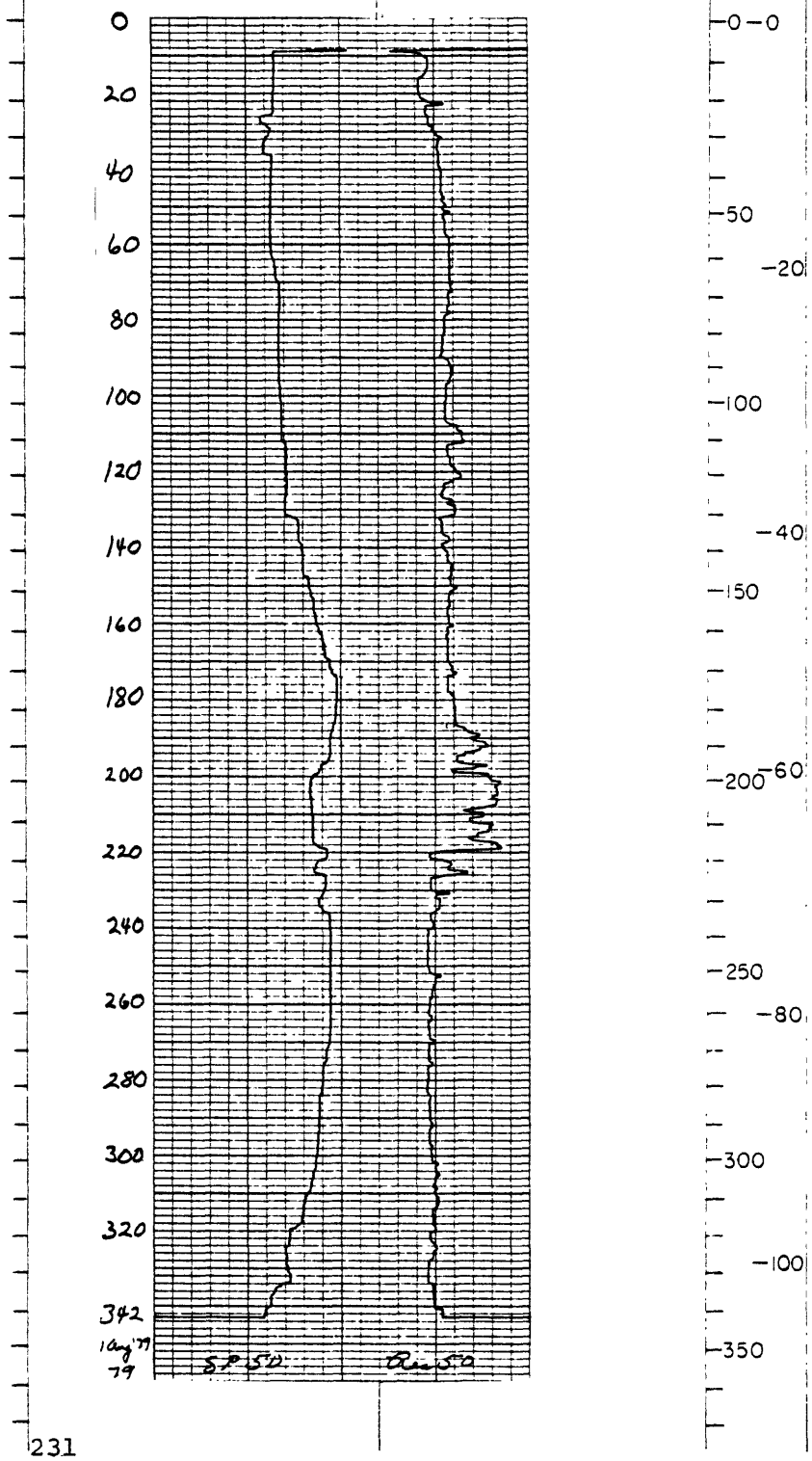
Hole number—continued

79D19

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 ft	Density T.C. ____ Range ____ cps Recording speed ____ ft/min Logged depth ____ ft	Depth Feet / Meters
			300
			−100
			350
			−120
			400
			450
			−140
			500
			−160
			550
			−180
			600

79D19 Hole number -continued

SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 342 ft	Logged depth 342 ft	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D20 Map: Columbus SW Date: 8 11 79 State: ND County: Divide

Elev.: 2395 Location: T. 161 N/S, R. 95 E/W, Sec. 12, Tract: cdcc Drilled depth: 60 feet

Measured: 17 ft FSL, 900 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds:

Remarks: No log runs

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by:

Lithology	Gamma T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Density T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Depth Feet / Meters
0- 8 Till, yellowish-brown, clayey, sandy, pebbly			0 - 0
8- 23 Till, dark-brown, clayey, sandy, pebbly			
23- 60 Till, gray, silty, clayey, pebbly			
50- 60 No samples			50
			- 20
			100
			- 40
			150
			200 60
			250
			- 80
			300

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D21 Map: Noonan SW Date: 8-10-79 State: ND County: Divide

Elev.: 2285 ft Location: T. 161 N, R 96 W, Sec. 3, Tract: babb Drilled depth: 703 ft

Measured: 22 ft FNL, 1500ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 631-634; 676-679

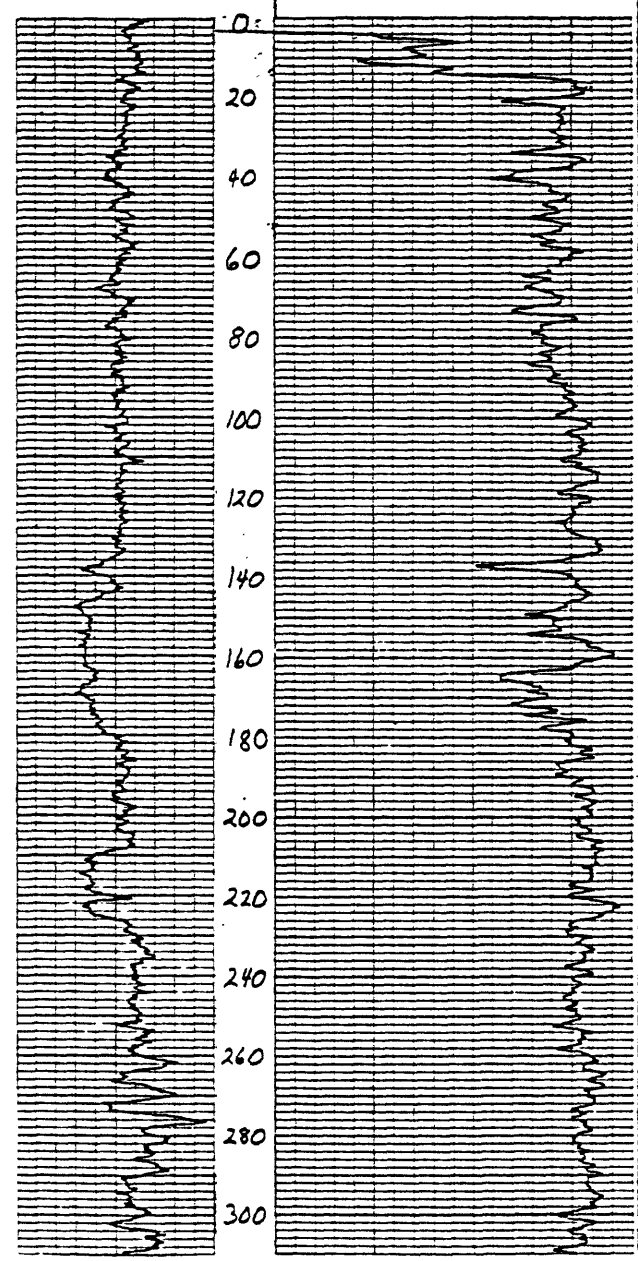
Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 3	Clay, light-brown, sandy
3- 19	Till, brown, clayey, sandy, silty
19- 36	Till, gray, silty, sandy, pebbly
36- 39	Gravel, brown, coarse-grained
39- 64	Till, gray, silty, clayey, sand, pebbly
64- 68	Gravel, brown, coarse-grained
68-120	Till, gray, silty, clayey, sandy, pebbly
120-121	Gravel, brown, coarse-grained
121-136	Till, gray, silty, sandy, pebbly
136-139	Gravel, brown, coarse-grained
139-143	Till, gray, silty, sandy, pebbly
143-175	Gravel, brown, coarse-grained
175-212	Till, gray, silty, sandy, pebbly
212-227	Gravel, brown, coarse-grained
227-258	Till, gray, silty, sandy, pebbly
258-267	Siltstone, gray
267-282	Siltstone, yellow, clayey
282-310	Siltstone, gray
310-323	Claystone, gray, silty
323-327	Lignite
327-335	Claysotne, light-green, silty
335-342	Claystone, light-green, silty
342-351	Siltstone, light-green
351-366	Siltstone, gray,
366-374	Claystone, gray, silty
374-388	Claystone, bluish-green
388-392	Siltstone, gray
392-395	Claystone, bluish-green
395-402	Sandstone, gray, medium- to fine-grained
402-403	Lignite
403-413	Sandstone, greenish-gray, medium-grained, clayey

Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 703 ft

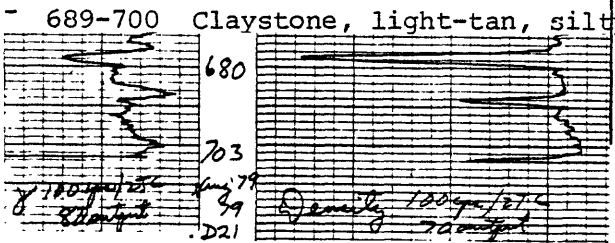
Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 703 ft

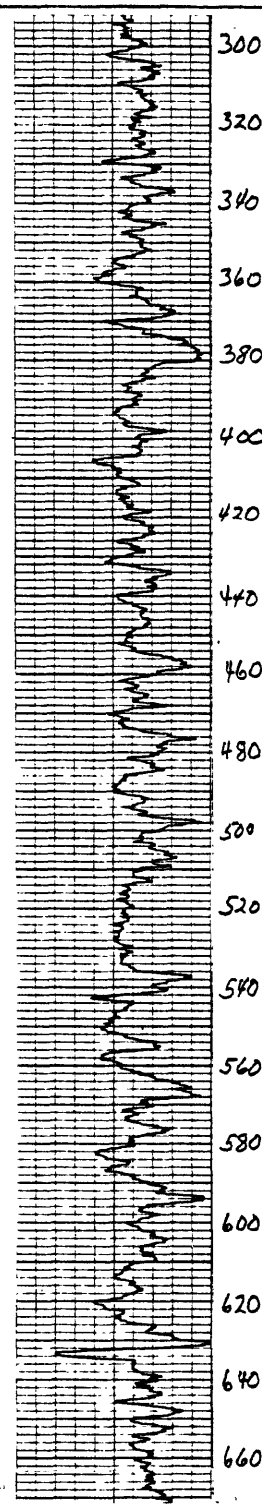


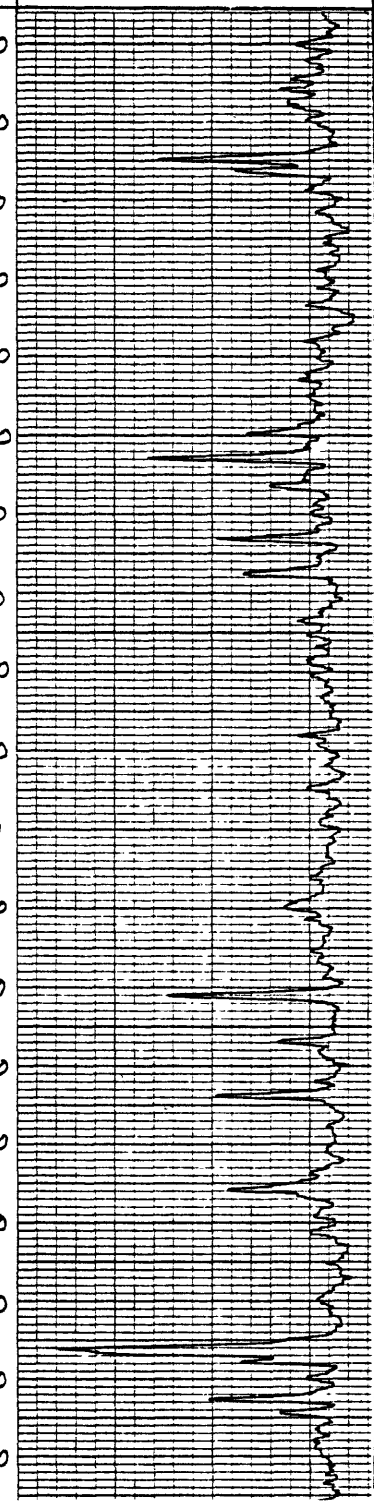
Hole number—continued

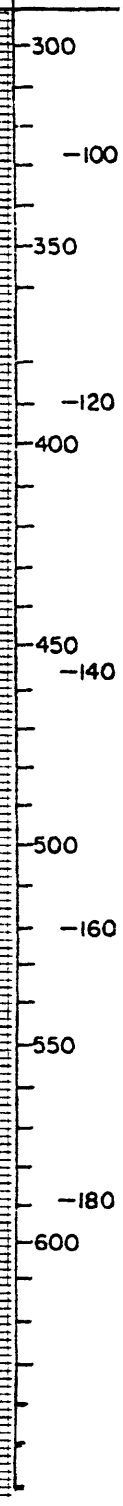
79D21

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 703 ft	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 703 ft	Depth Feet Meters
413-421	Sandstone, gray, medium-grained, clayey			
421-423	Claystone, blue-green			
423-440	Siltstone, light-brown			
440-448	Claystone, gray, silty			
448-452	Sandstone, gray			
452-463	Claystone, gray, silty			
463-469	Siltstone, gray			
469-480	Claystone, gray, silty			
480-492	Siltstone, gray			
492-507	Claystone, light-green			
507-540	Sandstone, green-brown, fine-to medium-grained			
540-547	Siltstone, light-brown			
547-552	Claystone, light-green, silty			
552-562	Siltstone, light-brown			
562-563	Lignite			
563-569	Siltstone, light-brown, clayey			
569-580	Claystone, light-brown, silty			
580-590	Sandstone, blue-green, medium-grained			
590-593	Lignite			
593-612	Claystone, light-brown			
612-621	Claystone, light-brown, silty			
621-628	Claystone, gray			
628-631	Lignite			
631-641	Claystone, olive-brown			
641-642	Lignite			
642-647	Claystone, light-green, silty			
647-658	Siltstone, light-green			
658-668	Claystone, light-tan,			
668-672	Siltstone, light-tan			
672-678	Lignite			
678-684	Claystone, light-tan, silty			
684-689	Sandstone			
689-700	Claystone, light-tan, silty			

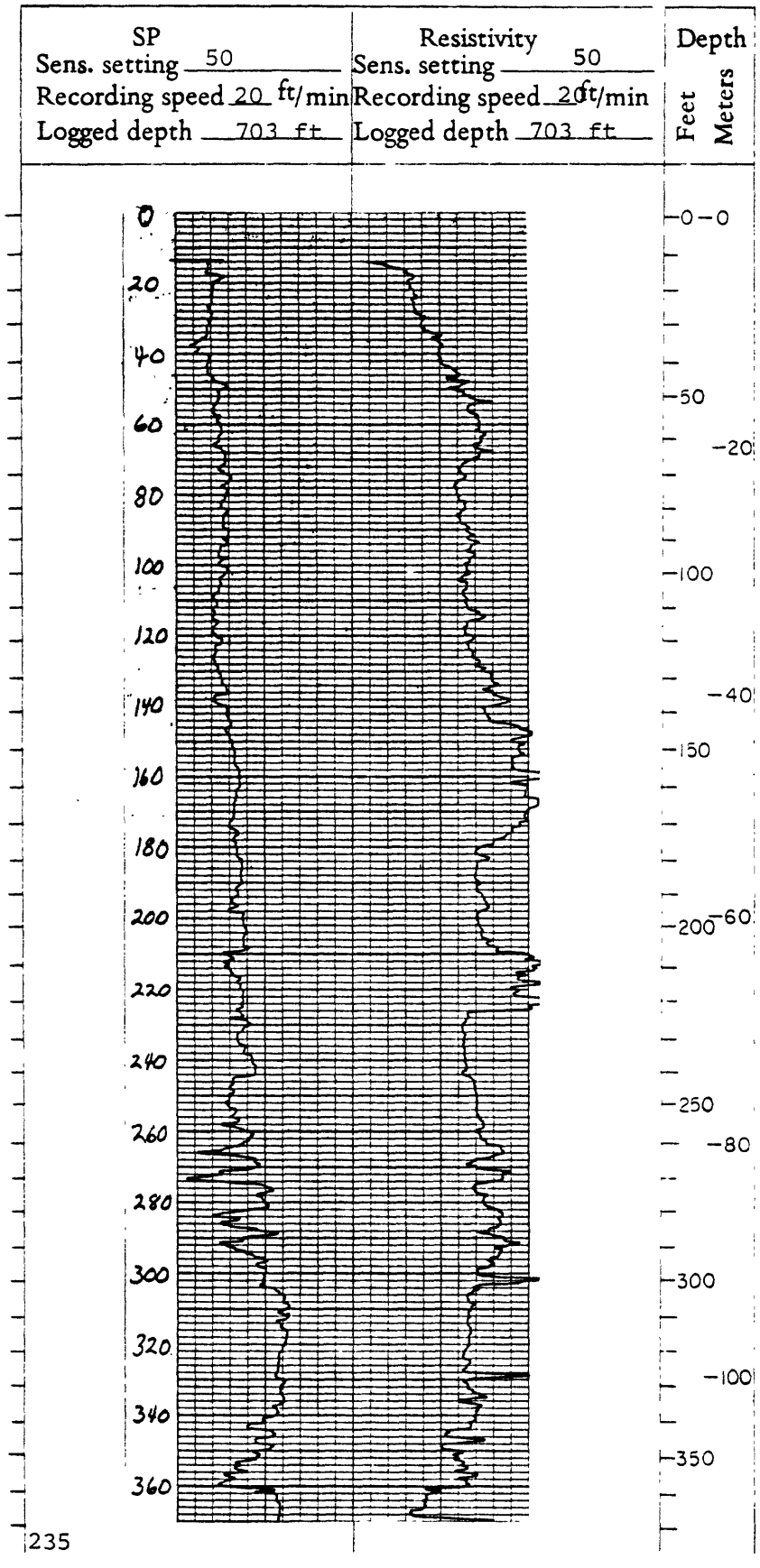


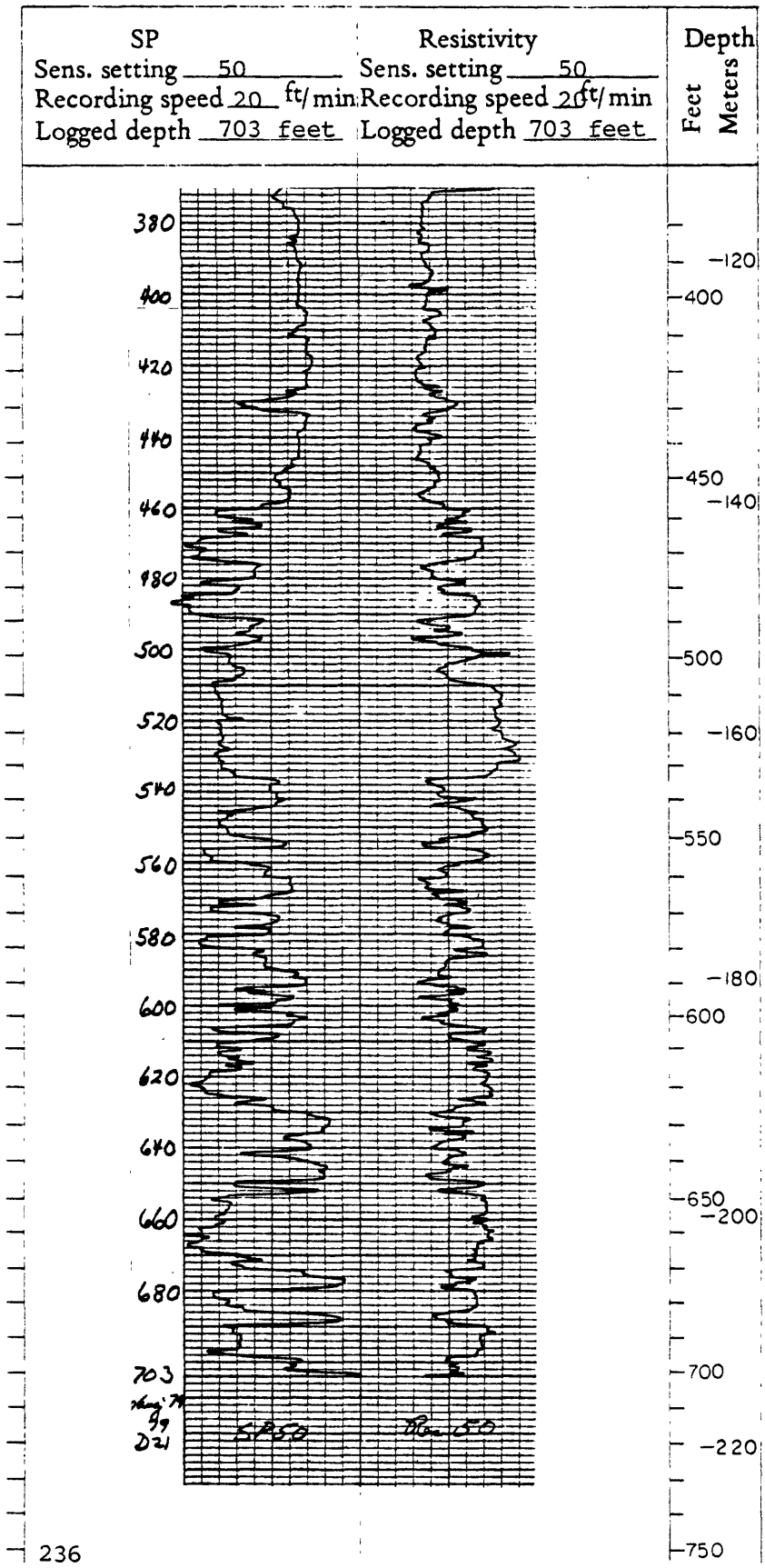






79D21 Hole number – continued




SP
Sens. setting 50
Recording speed 20 ft/min
Logged depth 703 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 703 feet
Depth
Feet
Meters
380
400
420
440
460
480
500
520
540
560
580
600
620
640
660
680
703
79
D21
SP 50
Res. 50
120
400
450
140
500
160
550
180
600
650
200
700
220
750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D22 Map: Noonen SE Date: 8-10-79 State: ND County: Divide

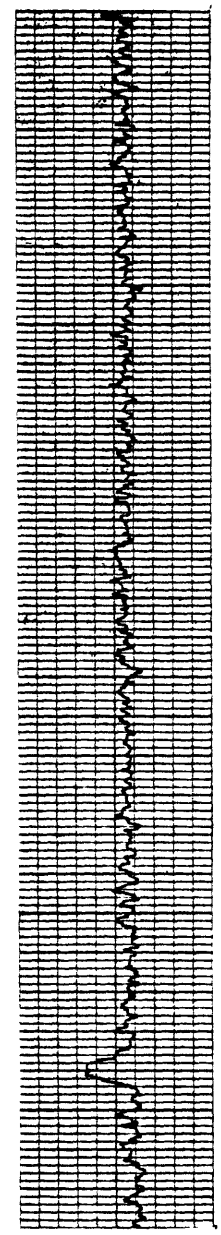
Elev.: 2378 Location: T. 161 N/S, R. 96 E/W, Sec. 15, Tract: aaab Drilled depth: 382 ft

Measured: 100 ft FNL/FSL, 640 ft FEL/FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds:

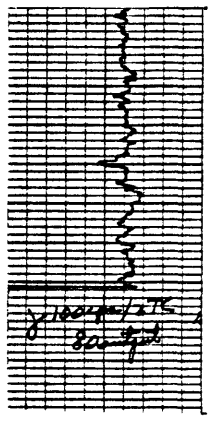
Remarks: No density log run

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma T.C. 2 Range 100cps Recording speed 20 ft/min Logged depth 382 ft	Density T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Depth Feet / Meters
0- 4 Till, yellowish-brown, clayey, sandy, pebbly 4- 27 Till, gray-brown, clayey, sandy, pebbly 27-263 Till, gray, silty, sandy, clayey, pebbly 263-277 Gravel, brown, coarse-grained 277-321 Till, brown, sandy, clayey, pebbly			0 - 0 50 -20 100 -40 150 200 60 250 -80 300

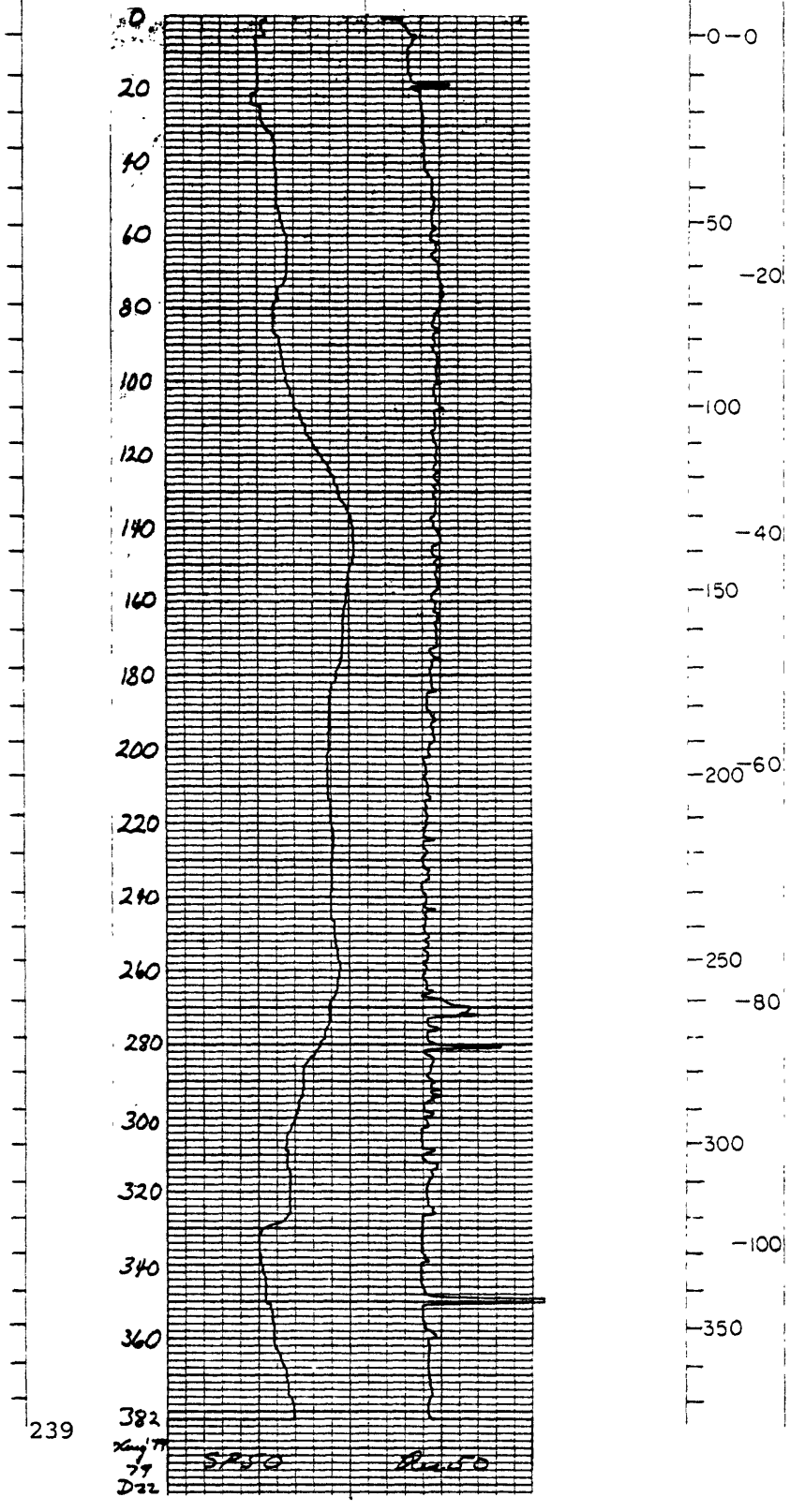
Hole number—continued

79D22

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 382 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth _____	Depth Feet / Meters
321-380 Till, dark brownish-gray, sandy, clayey			300 100 350 120 400 450 140 500 160 550 180 600

79D22 Hole number – continued

SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 382 ft	Logged depth 382 ft	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D23 Map: Noonen SW Date: 8-2-79 State: ND County: Divide

Elev.: 2325 Location: T. 161 N/S, R. 96 E/W, Sec. 18, Tract: adaa Drilled depth: 462

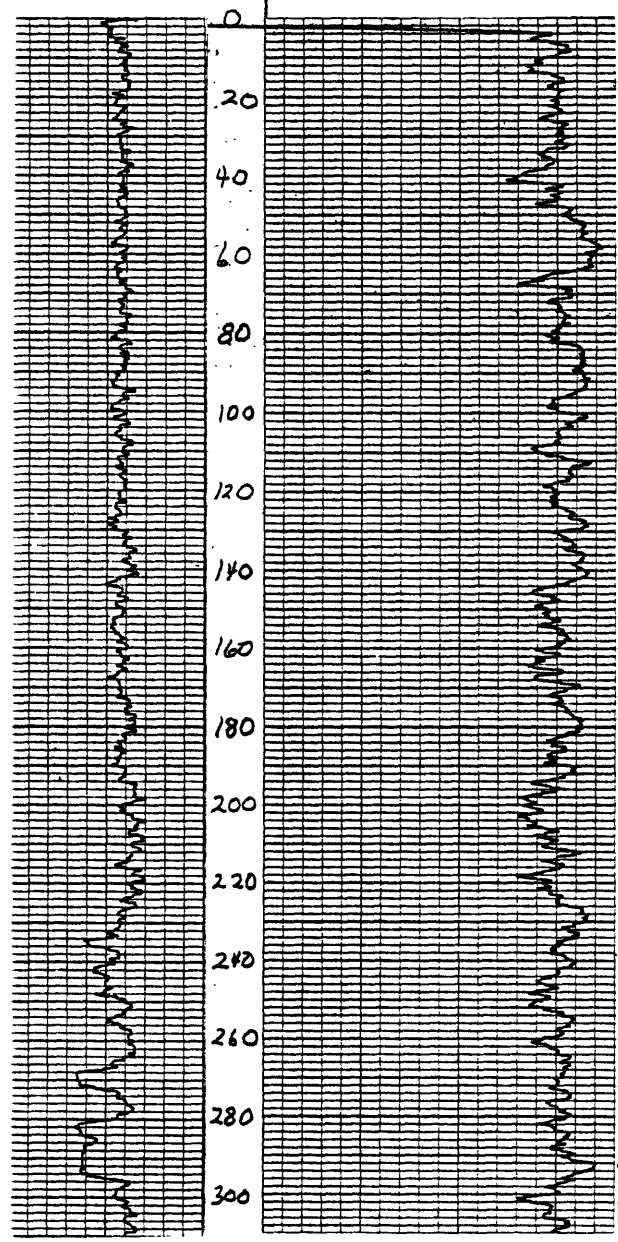
Measured: 1372 ft FNL/FSL, 23 ft FEL/FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds:

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

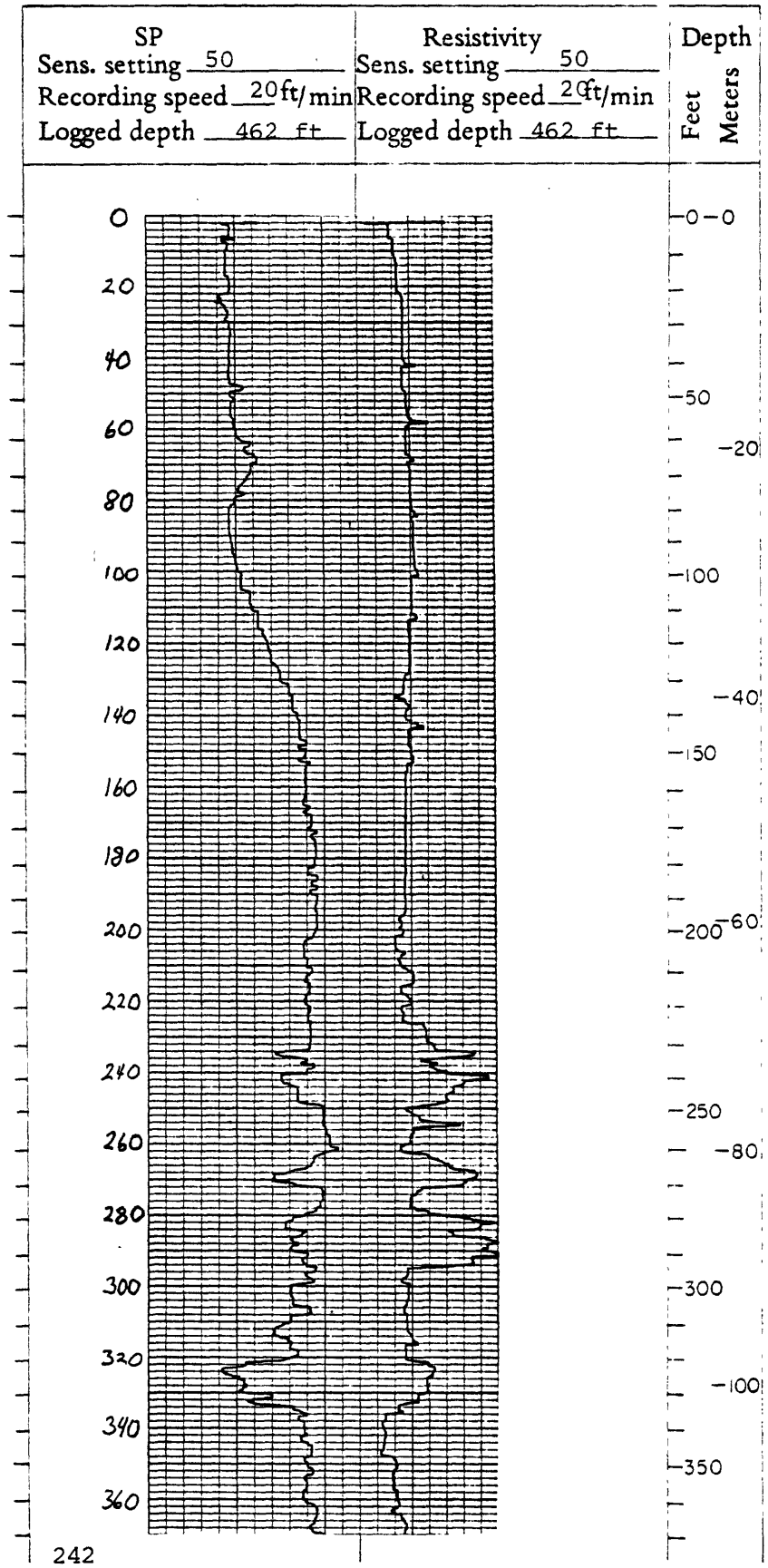
Lithology	Gamma: T.C. 2 Range 100cps, Recording speed 20 ft/min, Logged depth 462 ft	Density: T.C. 2 Range 100cps, Recording speed 20 ft/min, Logged depth 462 ft	Depth Feet	Depth Meters
0- 5 Silt, medium-brown, gravelly			0	0
5- 25 Till, olive-gray, silty, pebbly				
25-278 Till, dark-gray, clayey, pebbly			50	
278-285 Gravel				20
285-305 Till, dark-gray, clayey, pebbly			100	
				40
			150	
			200	60
			250	
				80
			300	



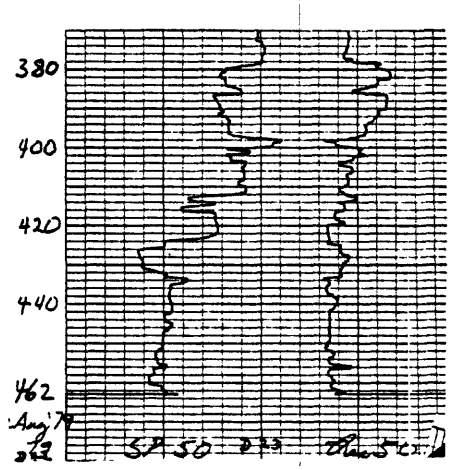
Hole number—continued
79D23

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 462 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 462 feet	Depth Feet / Meters
305-322	Claystone, dark-gray			300
322-330	Siltstone, brownish-yellow, clayey	320		−100
330-420	Claystone, greenish-gray	340		350
420-435	Siltstone, greenish-gray	360		
435-440	Claystone	380		−120
440-450	Siltstone, greenish-gray	400		400
450-460	Claystone, dark-gray, carbonaceous	420		
		440		450 −140
		462		
				500
				−160
				550
				−180
				600

79D23 Hole number – continued



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 462 feet	Logged depth 462 feet	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750 Feet; 120, 140, 160, 180, 200, 220 Meters

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D24 Map: Noonen SE Date: 8-11-79 State: ND County: Divide

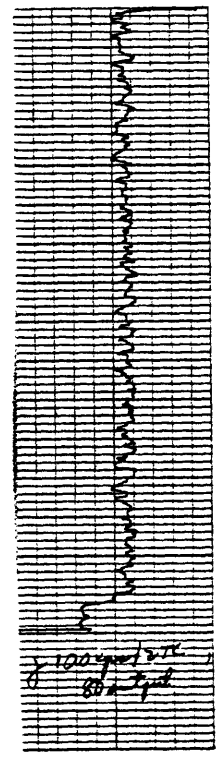
Elev.: 2338 Location: T. 161 N/S, R. 96 E/W, Sec. 23, Tract: cccb Drilled depth: 160 ft

Measured: 446 ft FNL/FSL, 32 ft FEL/FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds:

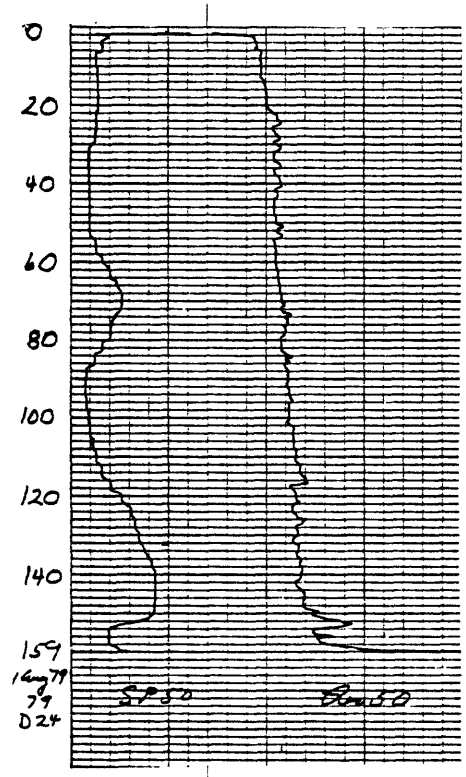
Remarks: No density log run

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma T.C. 2 Range 100cps Recording speed 20 ft/min Logged depth 159 ft	Density T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Depth Feet / Meters
0- 10 Till, brown, clayey, sandy 10- 35 Till, gray-brown, clayey, silty, sandy 35-150 Till, gray, silty, sandy, clayey, pebbly 150-180 Gravel, brown, coarse-grained			0 -0 50 -20 100 -40 150 200 -60 250 -80 300

79D24 Hole number— continued

SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 159 ft	Logged depth 159 ft	



0 – 0
50
– 20
100
– 40
150
200 – 60
250
– 80
300
– 100
350

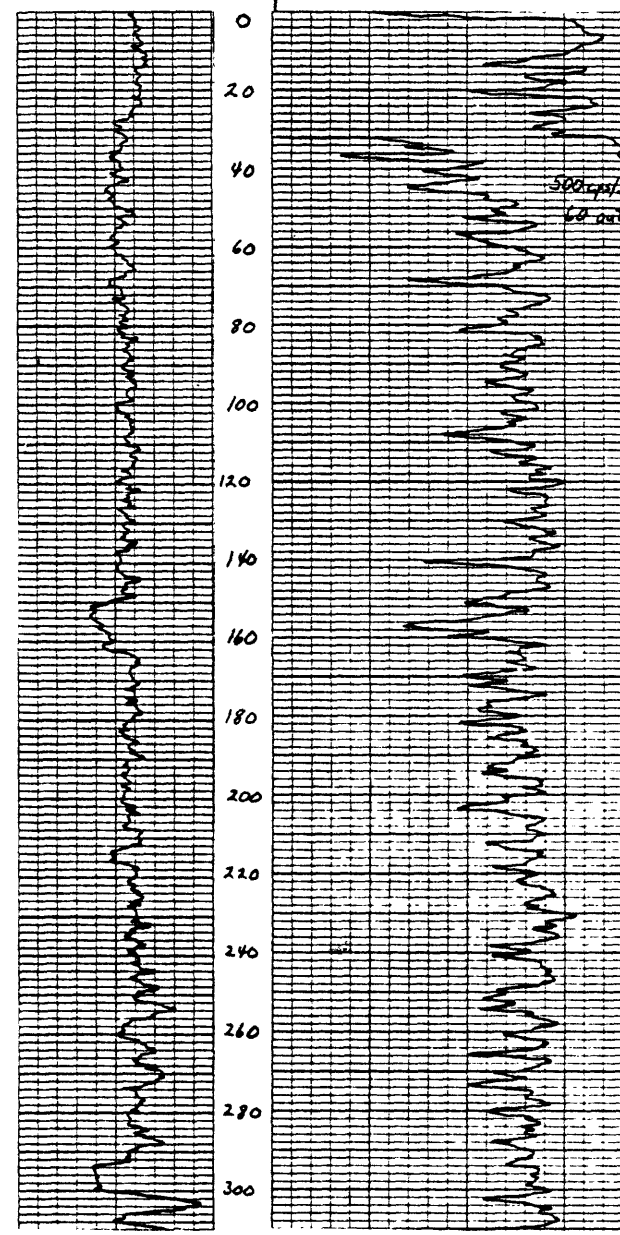
NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D25 Map: None Date: 8-23-79 State: ND County: Divide
Elev.: 2287 Location: T. 161 N/S, R. 99 E/W, Sec. 6, Tract: ddda Drilled depth: 442 ft
Measured: 390 ft FSL, 13 ft FEL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds:

Remarks:

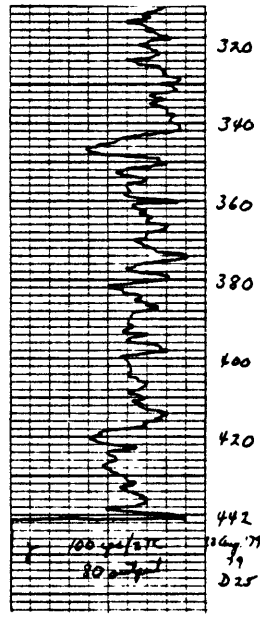
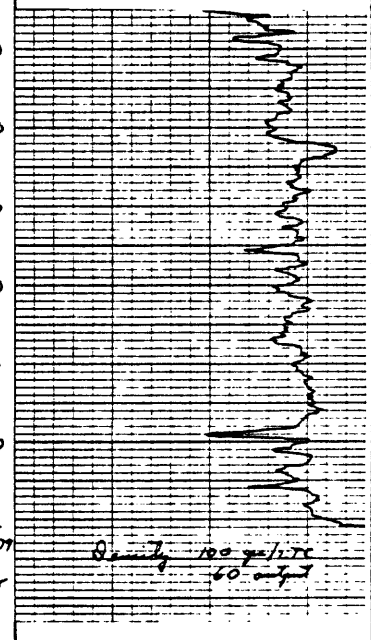
Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 442 ft	Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 442 ft	Depth Feet	Depth Meters
0- 2 Silt, reddish-brown, clayey			0	0
2- 3 Gravel, coarse-grained				
3- 65 Till, dusky-brown, clayey, pebbly			50	20
65-225 Till, dark-gray, clayey, pebbly				
225-369 Claystone, dark-gray			100	40
			150	
			200	60
			250	80
			300	

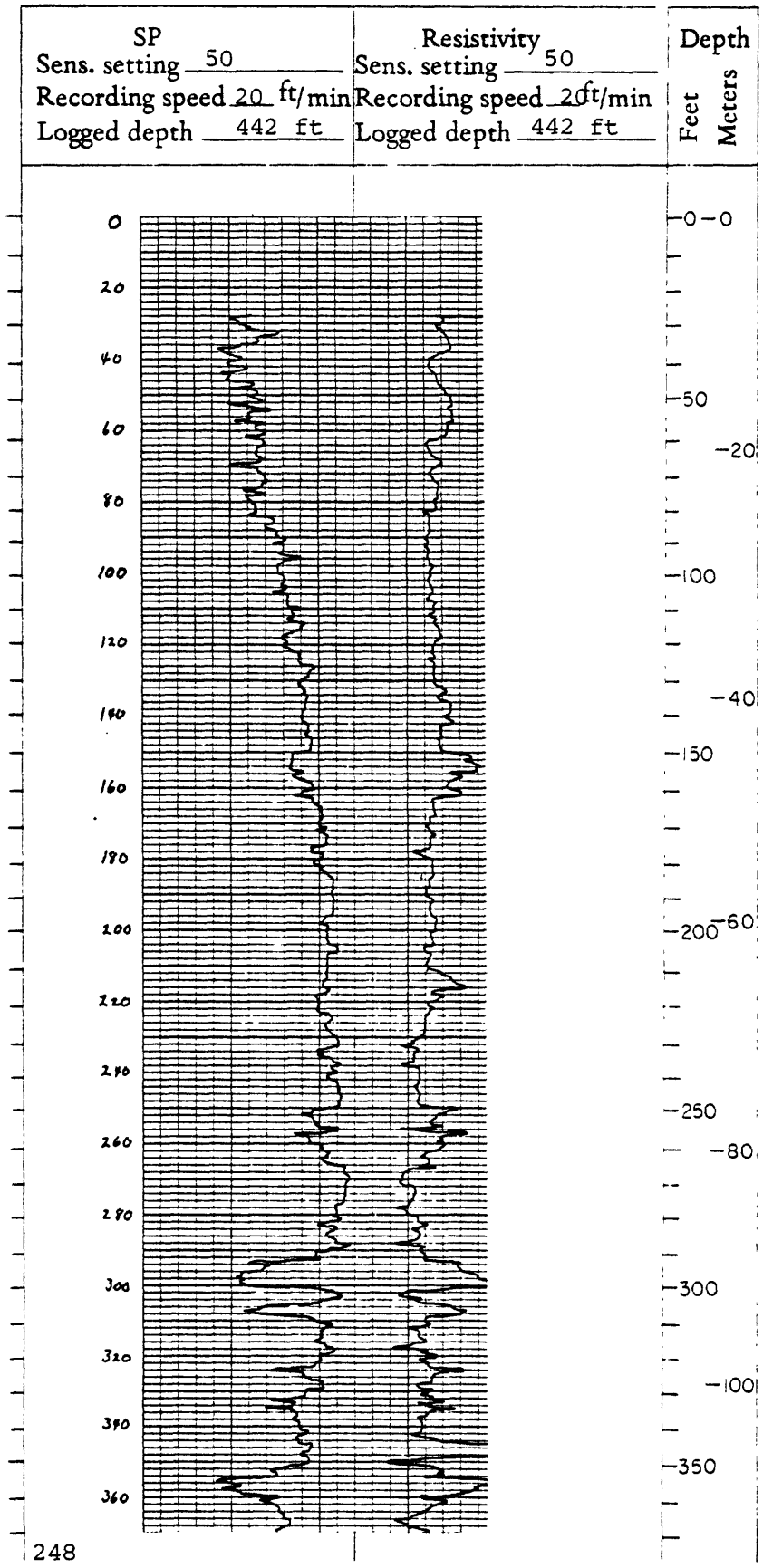


Hole number—continued

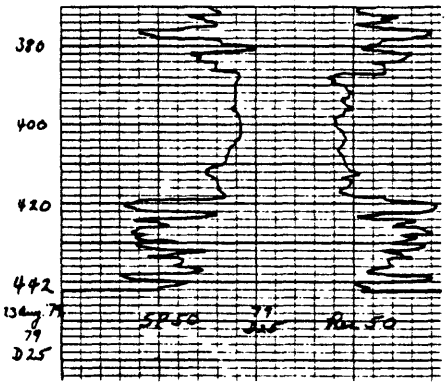
79D25

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 442 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 442 feet	Depth Feet / Meters
369-370 Lignite 370-440 Claystone, dark-gray			300 -100 350 -120 400 450 -140 500 -160 550 -180 600

79D25 Hole number – continued



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 442 feet	Logged depth 442 feet	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

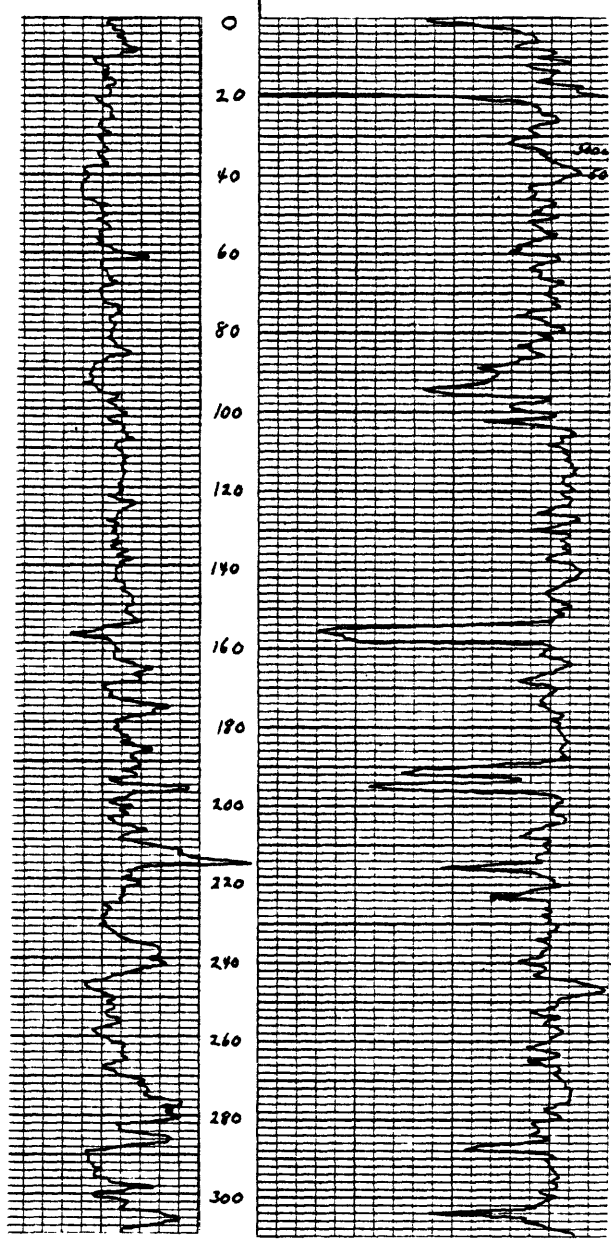
NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D26 Map: None Date: 8-24-79 State: ND County: Divide
Elev.: 2247 Location: T. 161 N/S, R. 100 E/W, Sec. 8, Tract: cccc Drilled depth: 442 ft
Measured: 123 ft FNL/FSL, 36 ft FEL/FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds: 154-158; 190-192; 196-198; 416.5-425; 433-436

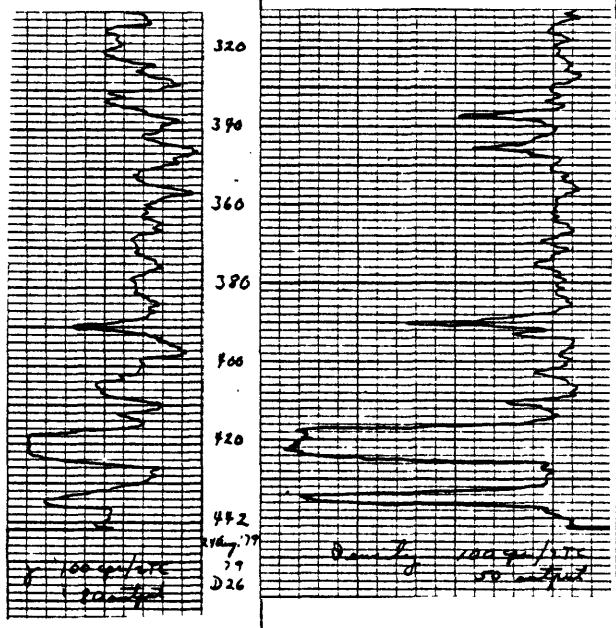
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

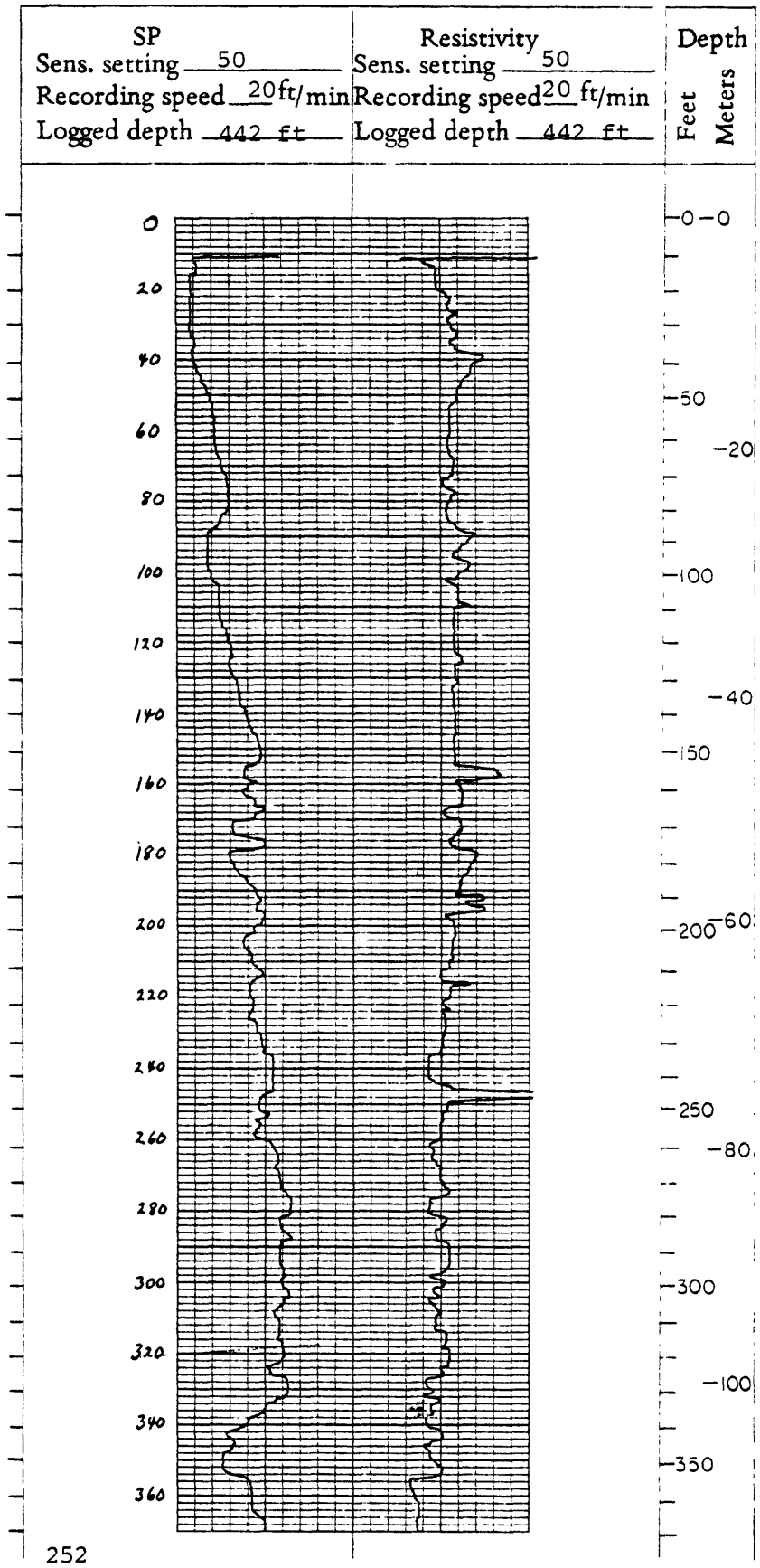
Lithology		Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 442 ft	Density: T.C. 2 Range 100; Recording speed 20 ft/min; Logged depth 442 ft	Depth Feet	Depth Meters
0- 4	Silt, dusky-brown, clayey, pebbly			0	0
4- 35	Till, dusky-brown, silty, pebbly			20	
35- 42	Gravel, coarse-grained, sandy			40	
42- 47	Till, dusky-brown, silty, pebbly			50	
47- 62	Till, dark-gray, clayey, pebbly			60	20
62- 72	Gravel, coarse-grained, sandy			80	
72-148	Till, reddish-brown, silty			100	100
148-151	Siltstone, medium-gray, clayey			120	
151-155	Lignite				
155-164	Siltstone, medium-gray, clayey			140	40
164-184	Claystone, dark-gray, carbonaceous			150	
184-187	Lignite			160	
187-189	Claystone, dark-gray, carbonaceous			180	
189-191	Lignite				
191-210	Claystone, dark-gray, carbonaceous			200	200 60
210-212	Lignite			220	
212-220	Claystone, dark-gray, silty				
220-225	Siltstone, greenish-gray, clayey			240	
225-230	Sandstone, greenish-gray medium-grained, silty			250	250
230-240	Siltstone, greenish-gray, clayey			260	80
240-260	Sandstone, greenish-gray, medium-grained, silty			280	
260-265	Siltstone, greenish-gray, clayey	250		300	300



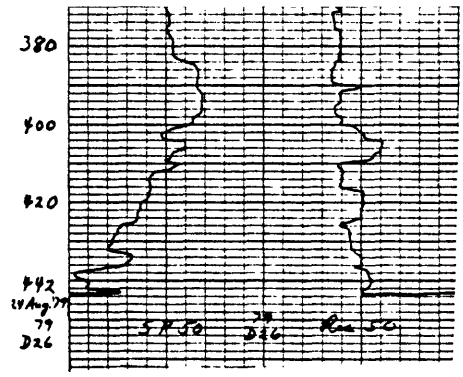
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 442 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 442 feet	Depth Feet / Meters
265-284	Claystone, medium-gray			300
284-286	Lignite			
286-297	Claystone, medium-gray, silty			100
297-298	Lignite			
298-324	Claystone, medium-gray, silty			350
324-325	Lignite			
325-342	Claystone, medium-gray, silty			
342-343	Lignite			120
343-384	Claystone, greenish-gray, silty			400
384-386	Lignite			
386-415	Claystone, dark-gray, carbonaceous			
415-422	Lignite			
422-429	Claystone, dark-gray, carbonaceous			450
429-432	Lignite			140
432-440	Claystone, dark-gray			
				500
				160
				550
				180
				600



79D26 Hole number – continued



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 442 feet	Logged depth 442 feet	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

NORTH DAKOTA GEOLOGICAL SURVEY

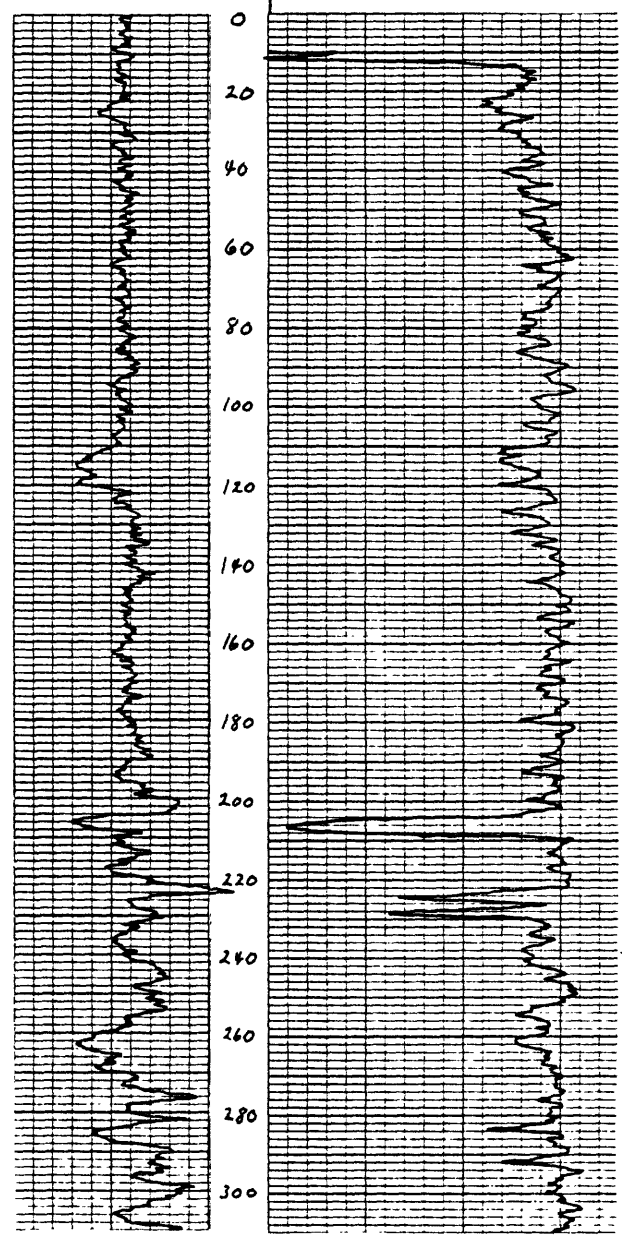
Hole No: 79D27 Map: None Date: 8-24-79 State: ND County: Divide
Elev.: 2229 Location: T. 161 N/S, R. 100 E/W, Sec. 13, Tract: bcdd Drilled depth: 462 ft
Measured: 2610ft FNL/~~FSL~~, 1056 ft ~~FEL~~/FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds: 204-208.5

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes ~~No~~ Geophysical logs recorded by: Lechner

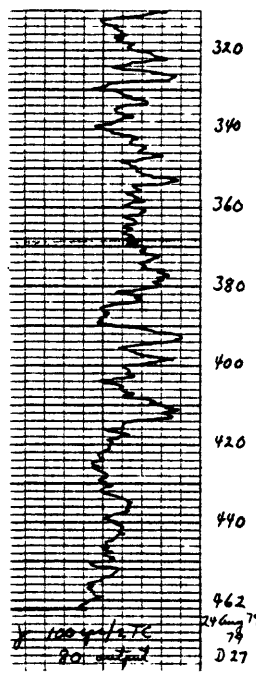
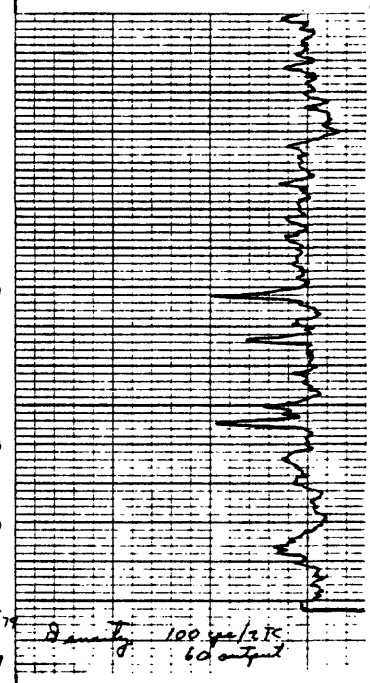
Lithology		Gamma	Density	Depth
		T.C. 2 Range 100cps Recording speed 20 ft/min Logged depth 462 ft	T.C. 2 Range 100cps Recording speed 20 ft/min Logged depth 462 ft	Feet / Meters

0- 4	Silt, dusky-brown, clayey
4- 25	Till, dusky-brown, silty, pebbly
25- 26	Gravel, coarse grain
26- 37	Till, dusky-brown, silty, pebbly
37-115	Till, dark-gray, silty, pebbly
115-120	Gravel, coarse-grained
120-188	Till, dark-gray, clayey, pebbly
188-192	Claystone, dark-gray
192-202	Claystone, medium-gray
202-206	Lignite
206-218	Claystone, dark-gray
218-223	Lignite
223-410	Claystone, dark-gray, silty



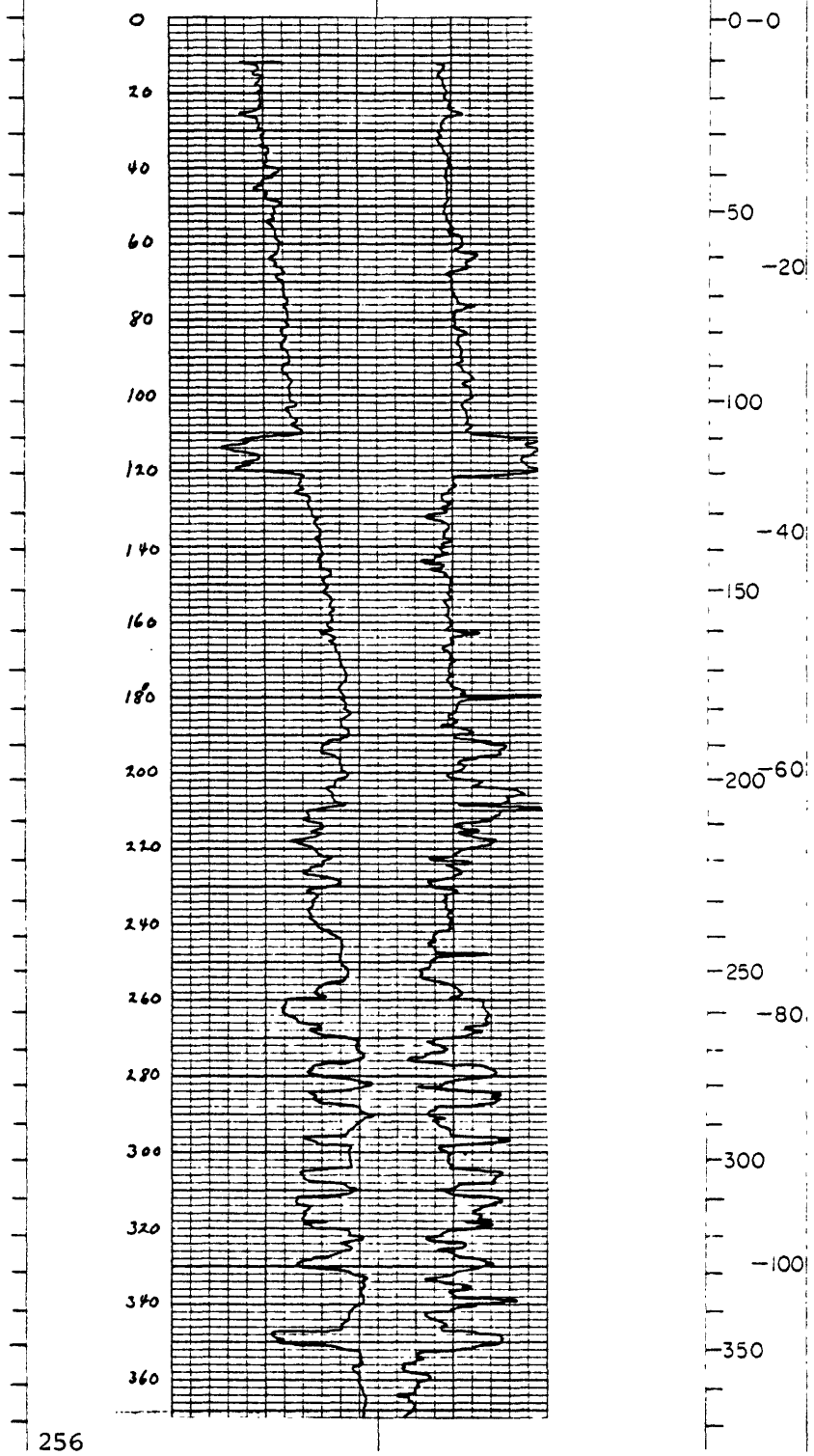
Hole number—continued

79D27

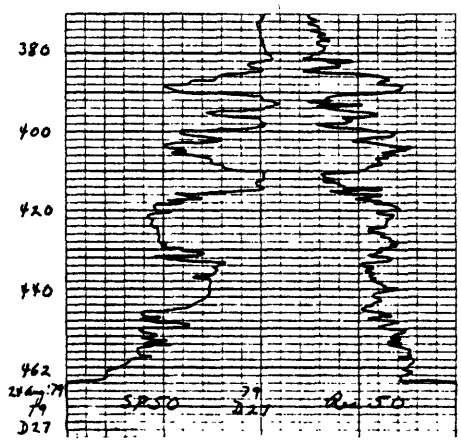
Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 462 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 462 feet	Depth Feet / Meters
410-411 Lignite 411-460 Claystone, dark-gray, silty			300 100 350 120 400 450 140 500 160 550 180 600

79D27 Hole number— continued

SP	Resistivity	Depth
Sens. setting 50 4	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 462 ft	Logged depth 462 ft	



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 462 feet	Logged depth 462 feet	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

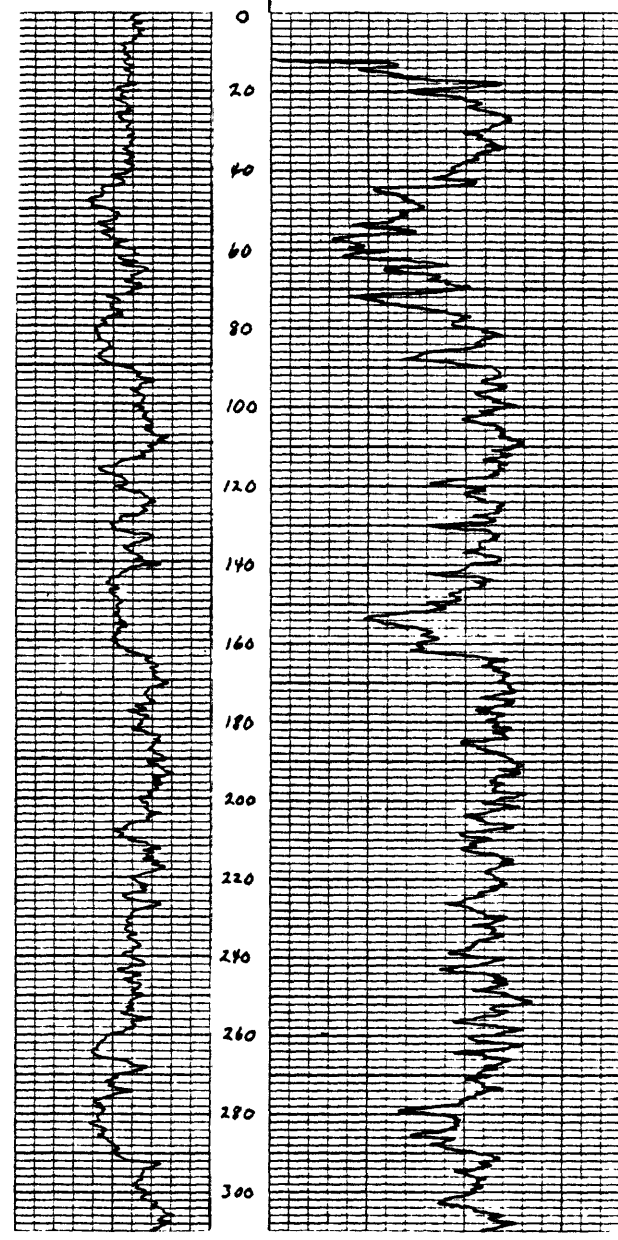
NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D28 Map: None Date: 8-27-79 State: ND County: Divide
Elev.: 2329 Location: T. 161 N/S, R. 102 E/W, Sec. 12, Tract: cccc Drilled depth: 402 ft
Measured: 250 ft FSL, 30 ft FWL Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds:

Remarks:

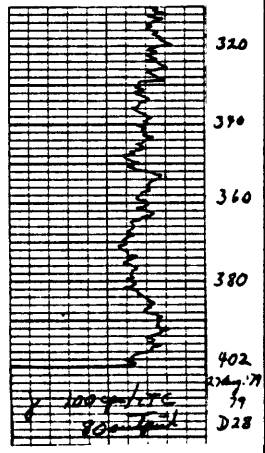
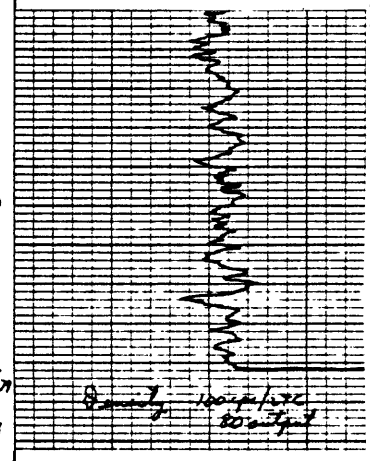
Lithology Recorded by Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 402 ft	Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 402 ft	Depth Feet	Depth Meters
0- 5	Silt, dusky-brown, clayey, pebbly			0	0
5- 43	Till, dusky-brown, silty, pebbly			50	20
43- 57	Sand				
57- 60	Till, dusky-brown, silty, pebbly				
60- 72	Siltstone, dusky-brown, clayey, sandy				
72- 73	Lignite				
73-102	Till, dusky-brown, sandy, clayey			100	40
102-140	Claystone, dark-gray				
140-160	No samples			150	60
160-200	Till, dark-gray, silty, clayey			200	80
200-300	No samples			250	100
				300	

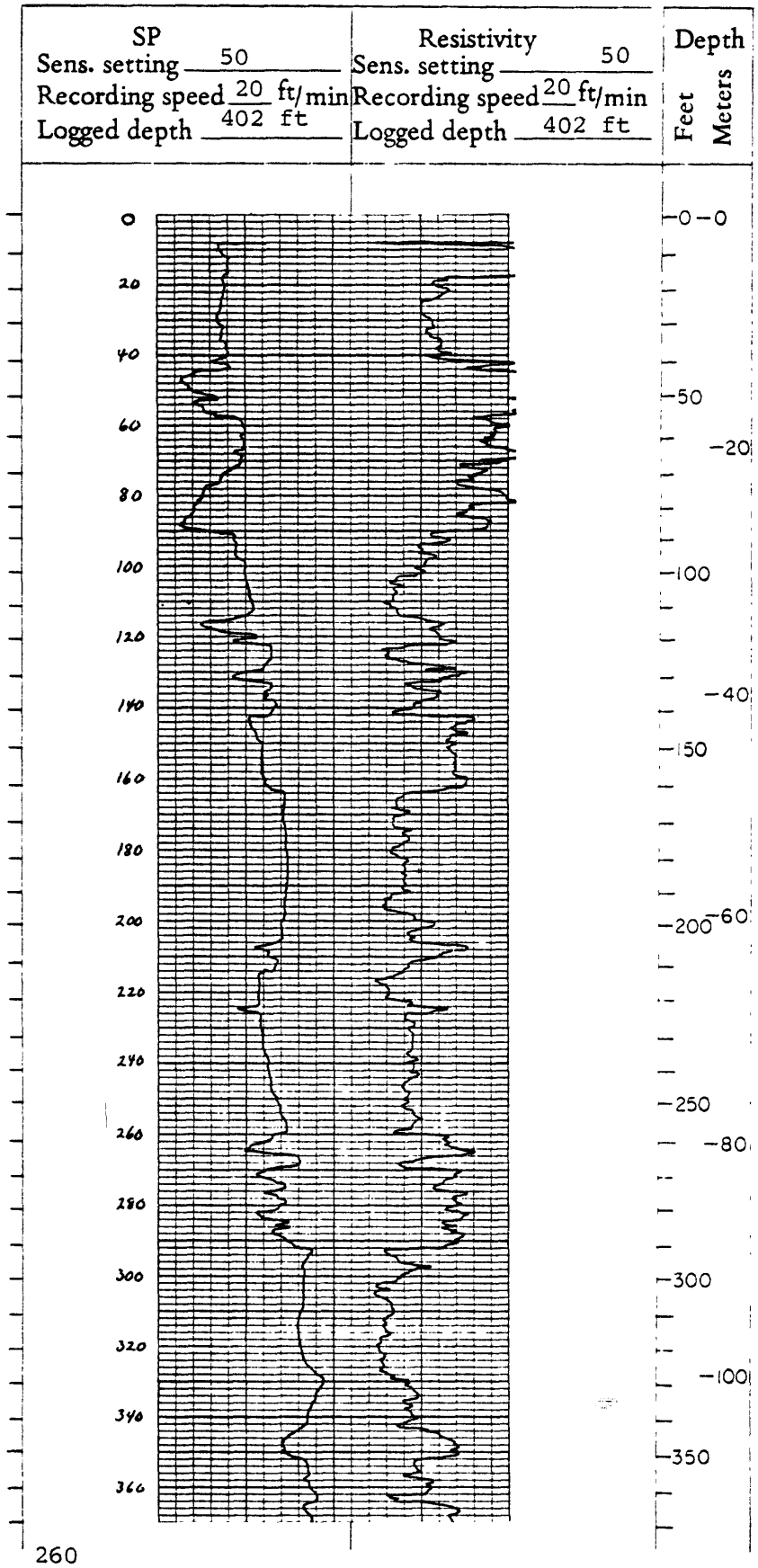


Hole number—continued

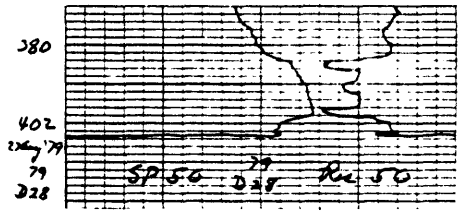
79D28

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Depth Feet / Meters
300-370 Till, dark-gray, clayey, silty 370-400 Siltstone, medium-gray, clayey			300 100 350 120 400 450 140 500 160 550 180 600

79D28 Hole number – continued



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 feet	Logged depth 402 feet	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750 (Feet); 120, 140, 160, 180, 200, 220 (Meters)

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D29 Map: None Date: 8-28-79 State: ND County: Divide

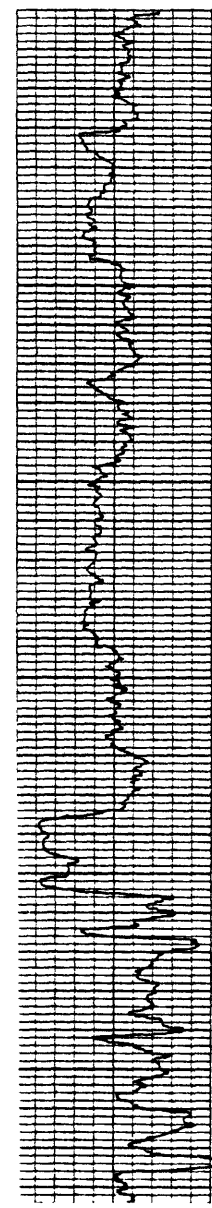
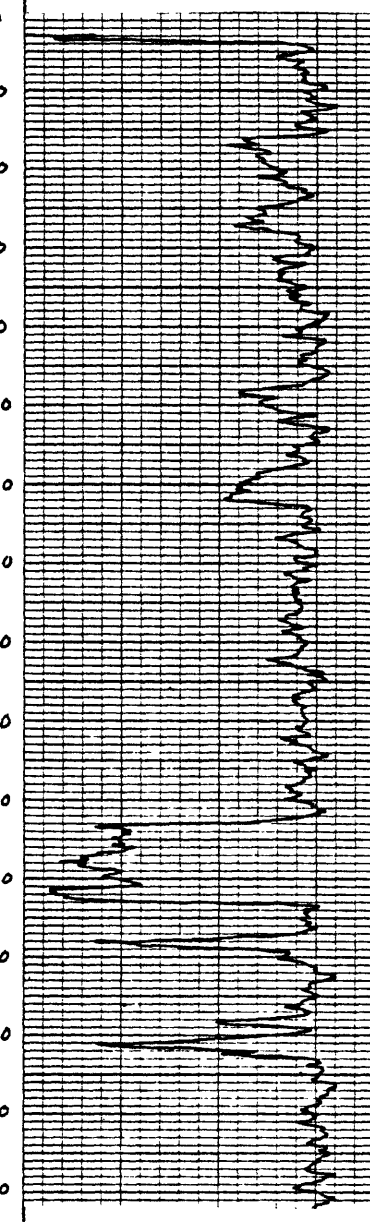
Elev.: 2094 Location: T. 161 N, R. 103 W, Sec. 22, Tract: cdcc Drilled depth: 402 ft

Measured: 300 ft FSL, 1722 ft FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 206-226; 235-238; 261-263; 311-316

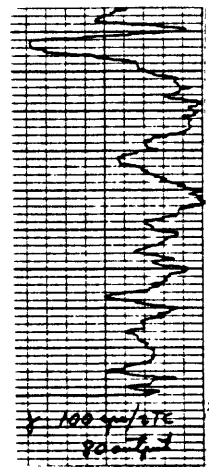
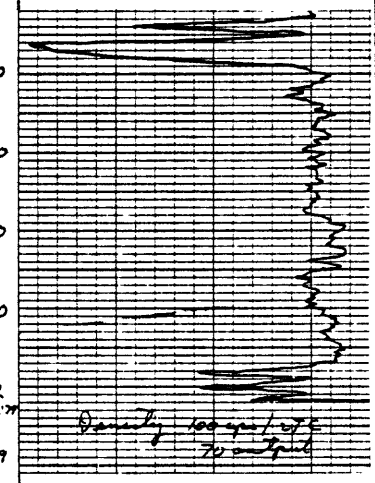
Remarks:

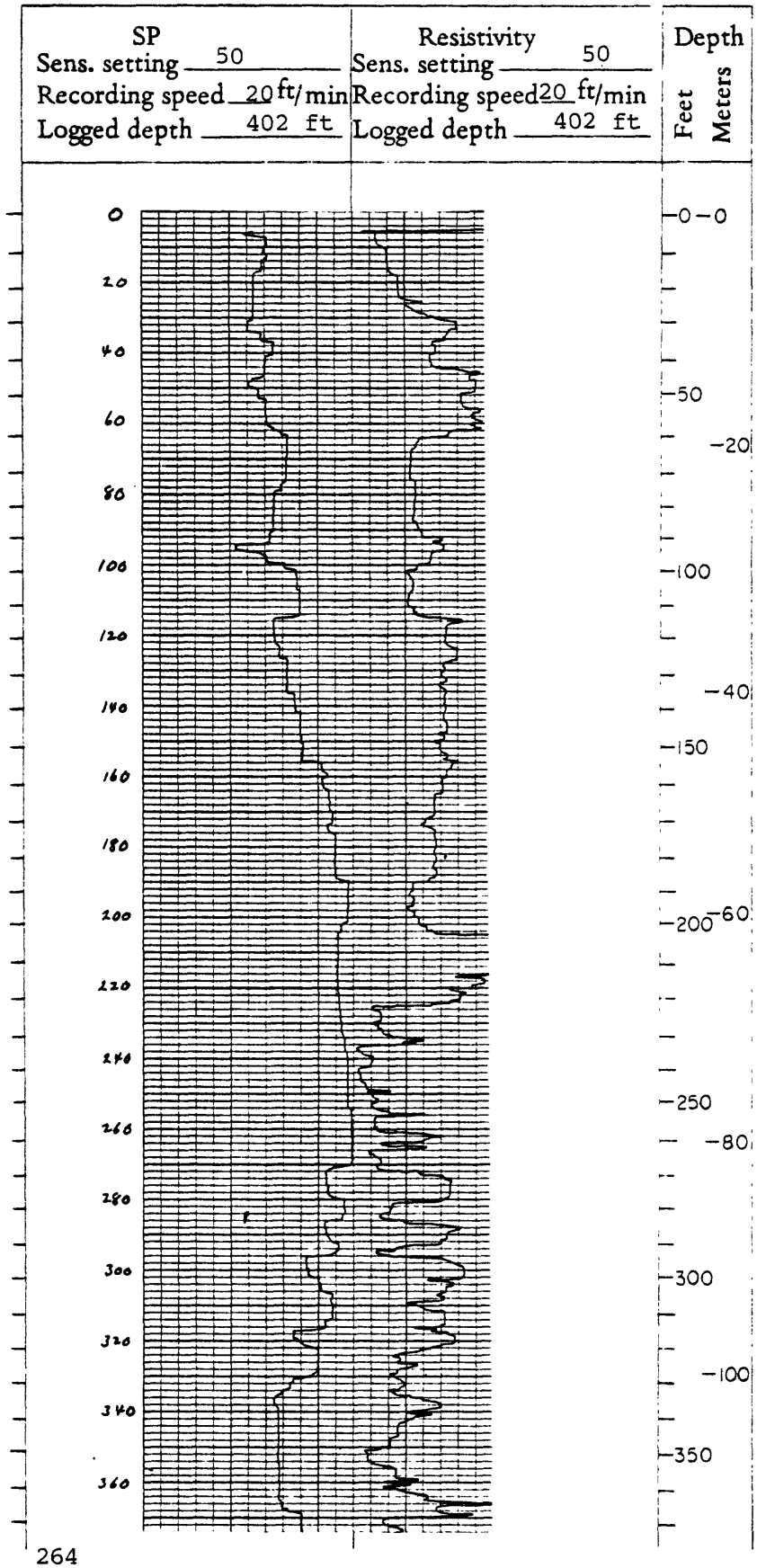
Lithology Recorded by: Clarence Carlson Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma: T.C. 2 Range 100cps, Recording speed 20 ft/min, Logged depth 402 ft	Density: T.C. 2 Range 100cps, Recording speed 20 ft/min, Logged depth 402 ft	Depth Feet	Depth Meters
0- 2 Gravel			0	0
2- 17 Till, yellowish-brown, silty, sandy			20	
17- 23 Till, brownish-gray, silty, sandy			40	
23- 28 Till, medium-gray, clayey			50	
28- 60 Sand, light-gray, fine-grained with large lignite chunks			60	20
60- 92 Till, medium-gray, clayey			80	
92-100 Gravel, sandy			100	100
100-112 Till, medium-gray, clayey			120	
112-182 Gravel, sandy			140	40
182-202 Till, medium-gray, sandy			150	
202-223 Lignite			160	
223-227 Claystone, brownish-gray			180	
227-230 Claystone, light-gray			200	200 60
230-235 Siltstone, brownish-gray			220	
235-240 Claystone, brownish-gray			240	
240-260 Claystone, light-gray			250	
260-263 Lignite			260	80
263-275 Claystone, light-gray			280	
275-290 Sandstone			300	300
290-307 Claystone, very light-gray				

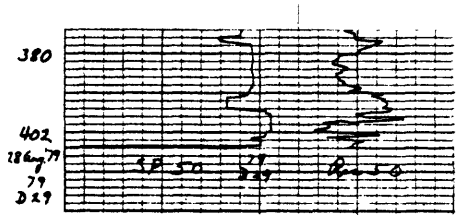
Hole number—continued

79D29

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Depth Feet / Meters
307-315	Lignite			300
315-320	Siltstone, light-gray			
320-330	Claystone, light-gray			100
330-332	Siltstone, light-gray			350
332-337	Claystone, light-gray,			
337-345	Claystone, brownish-gray, carbonaceous			120
345-347	Lignite			400
347-360	Claystone, light-gray			
360-365	Sandstone			
365-380	Claystone, light-gray			
380-385	Sandstone			450
385-394	Siltstone, light-gray			140
394-396	Lignite			
396-400	Siltstone, light-gray			
				500
				160
				550
				180
				600


SP
Sens. setting 50
Recording speed 20 ft/min
Logged depth 402 ft
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 402 ft
Depth
Feet
Meters
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
0
50
100
150
200
250
300
350
0
20
40
60
80
100

SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 feet	Logged depth 402 feet	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D30 Map: Noonen Date: 8- 13-79 State: ND County: Divide

Elev.: 2022 Location: T. 162 N/S, R. 95 E/W, Sec. 10, Tract: bbbb Drilled depth: 342 ft

Measured: 155 ft FNL/FSL, 84 ft FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 22-29; 293-296

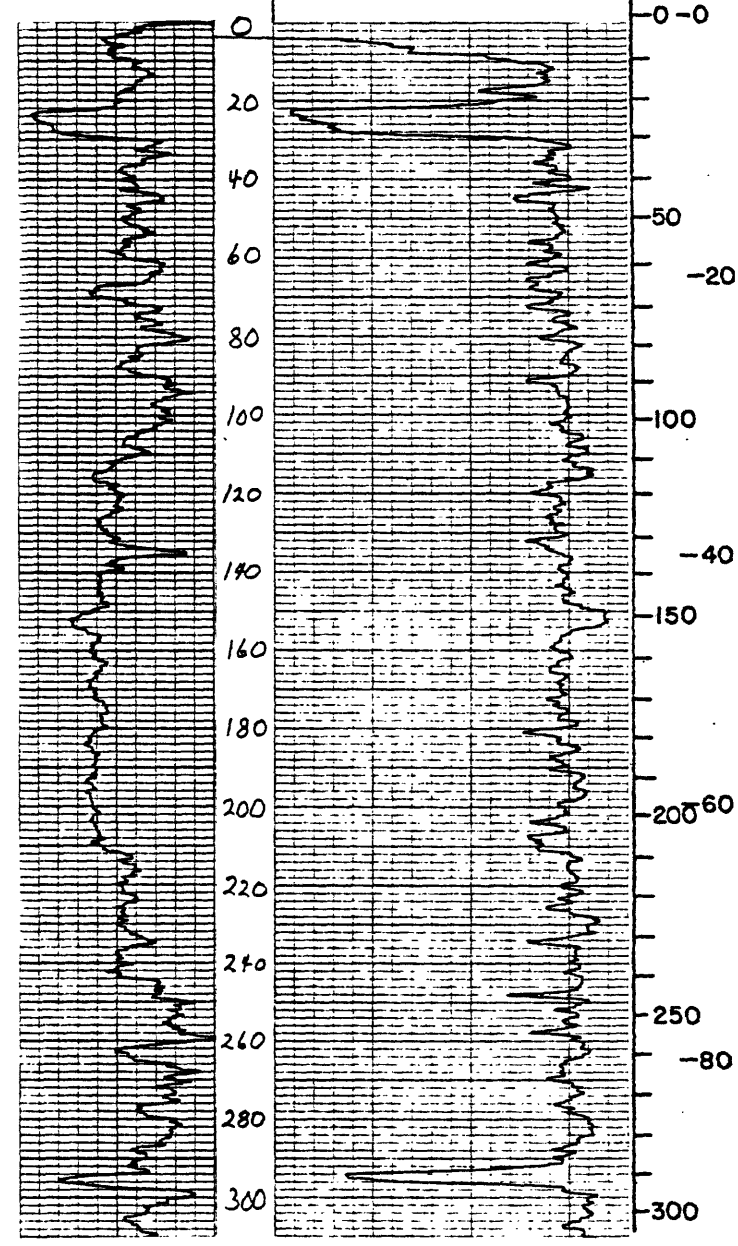
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 3	Silt, brownish-gray, clayey, pebbly
3- 6	Till, brownish-gray, silty. pebbly
6- 7	Gravel, coarse grained, sandy
7- 22	Sandstone, brownish-gray, medium-grained, clayey
22- 30	Lignite
30- 60	Siltstone, medium-gray, clayey
60- 77	Claystone, dark-gray
77- 87	Claystone, medium-gray
87-105	Siltstone, medium-gray, clayey
105-123	Siltstone, medium-gray, sandy
123-207	Sandstone, medium-gray, medium-grained, silty
207-233	Siltstone, medium-gray, clayey
233-257	Claystone, medium-gray
257-271	Siltstone, dark-gray, clayey
271-290	Siltstone, medium-gray, clayey
290-330	Claystone, medium-gray, silty

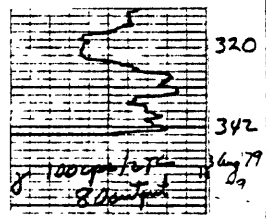
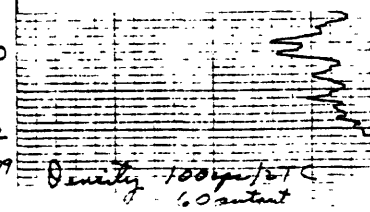
Gamma: T.C. 2 Range 100cps Recording speed 20 ft/min Logged depth 342 ft

Density: T.C. 2 Range 100cps Recording speed 20 ft/min Logged depth 342 ft



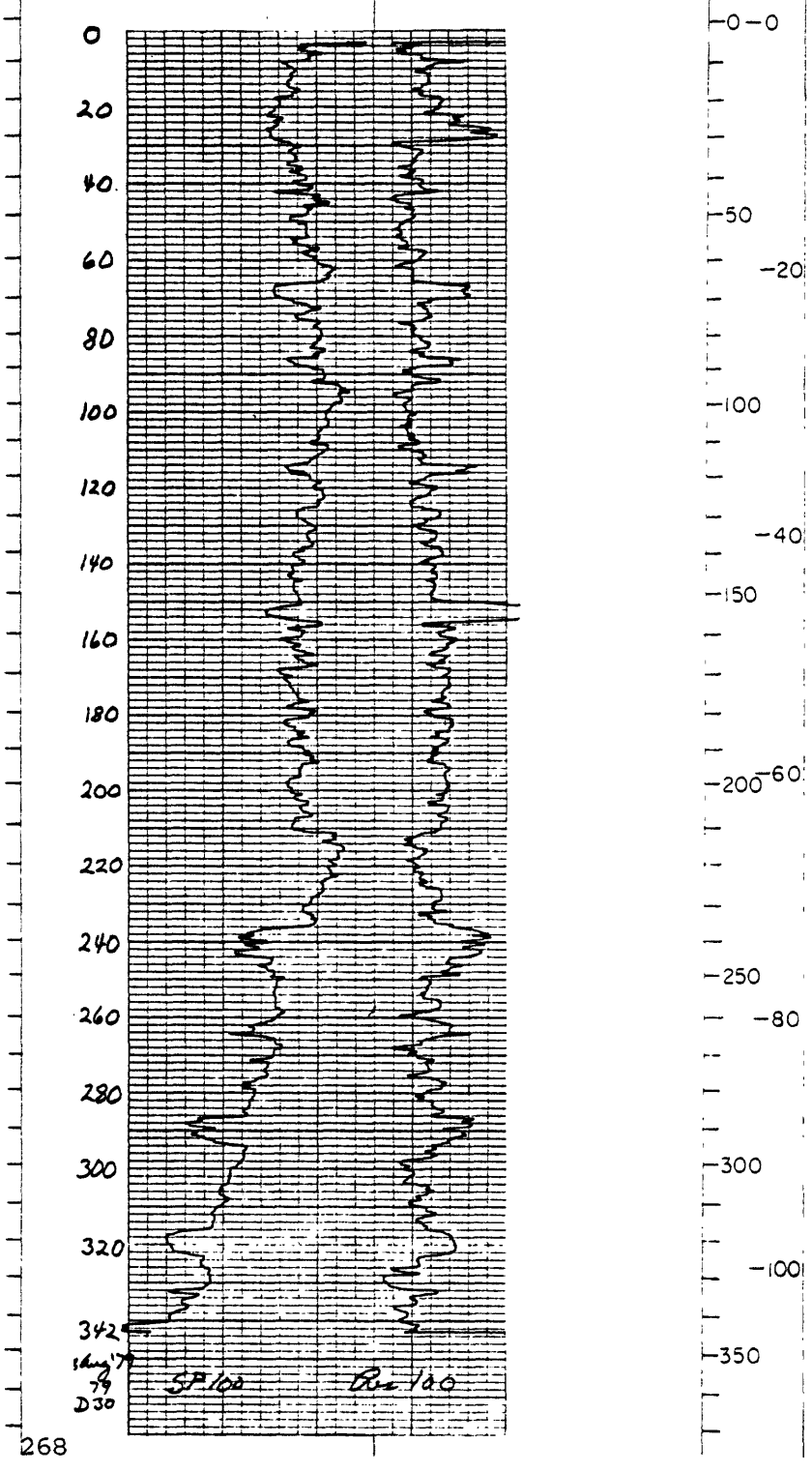
Hole number—continued

79D30

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Depth Feet / Meters
330-331 Lignite 331-340 Siltstone, medium-gray, clayey			300 100 350 120 400 450 140 500 160 550 180 600

79D30 Hole number — continued

SP	Resistivity	Depth
Sens. setting 100	Sens. setting 100	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 342 ft	Logged depth 342 ft	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D31 Map: Noonen SE Date: 8-9-79 State: ND County: Divide

Elev.: 2160 Location: T. 162 N/S, R. 95 E/W, Sec. 20, Tract: bccc Drilled depth: 342 ft

Measured: 2549 ft FNL, 28 ft FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds:

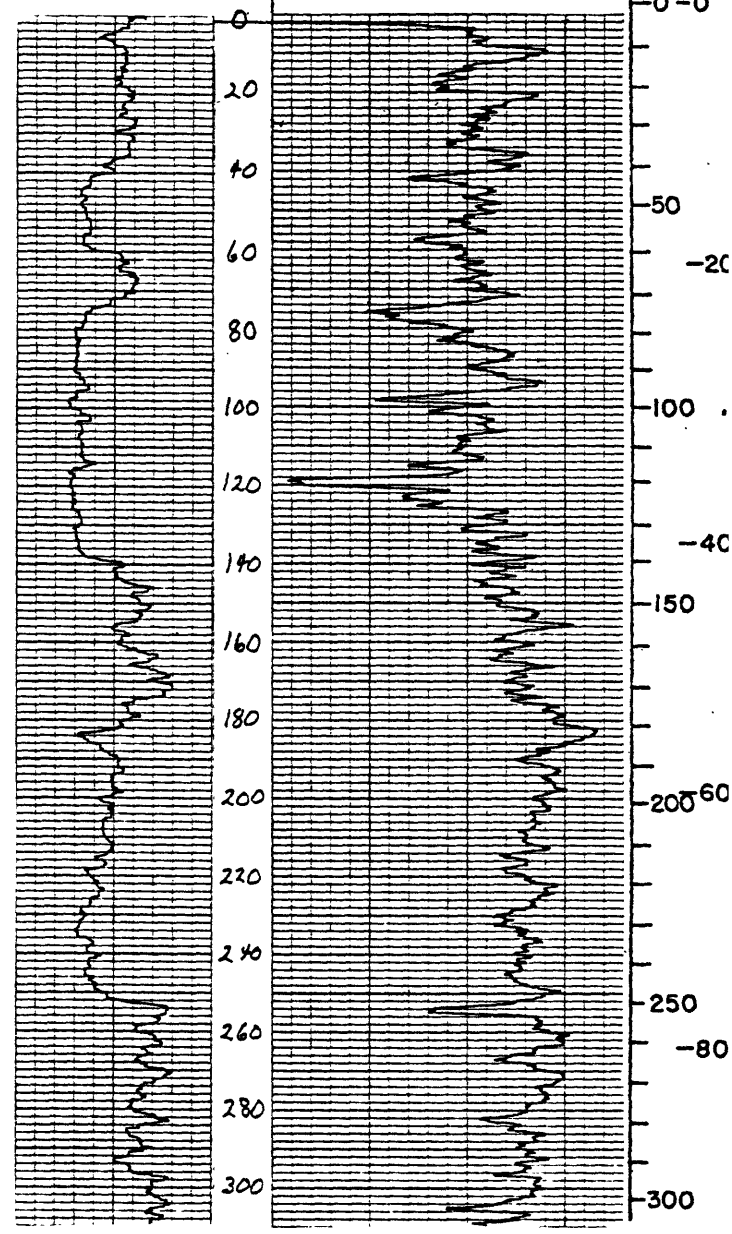
Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 1	Clay, yellowish-brown, sandy
1- 3	Sand, brown, coarse-grained
3- 13	Till, yellowish-brown, clayey, sandy, pebbly
13- 26	Till, grayish-brown, clayey, silty, sandy
26- 30	Till, gray, silty, clayey, sandy
30- 32	Gravel, brown, coarse-grained
32- 40	Till, gray, silty, sandy, pebbly
40-142	Gravel, brown, coarse-grained
142-154	Claystone, gray
154-160	Sandstone, gray, medium-grained
160-166	Claystone, gray
166-167	Lignite
167-176	Siltstone, light tan
176-180	Claystone, gray, silty
180-207	Siltstone, gray, clayey
207-220	Claystone, gray, silty
220-260	Sandstone
260-280	Claystone, gray
280-289	Siltstone, gray, clayey
289-295	Claystone, gray, silty
295-302	Claystone, grayish-green

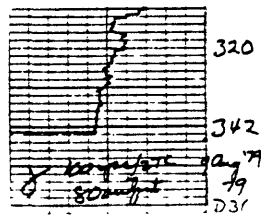
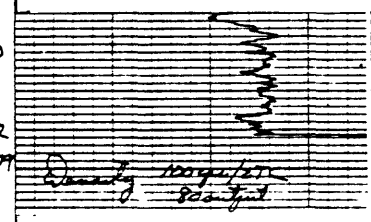
Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 342 ft

Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 342 ft

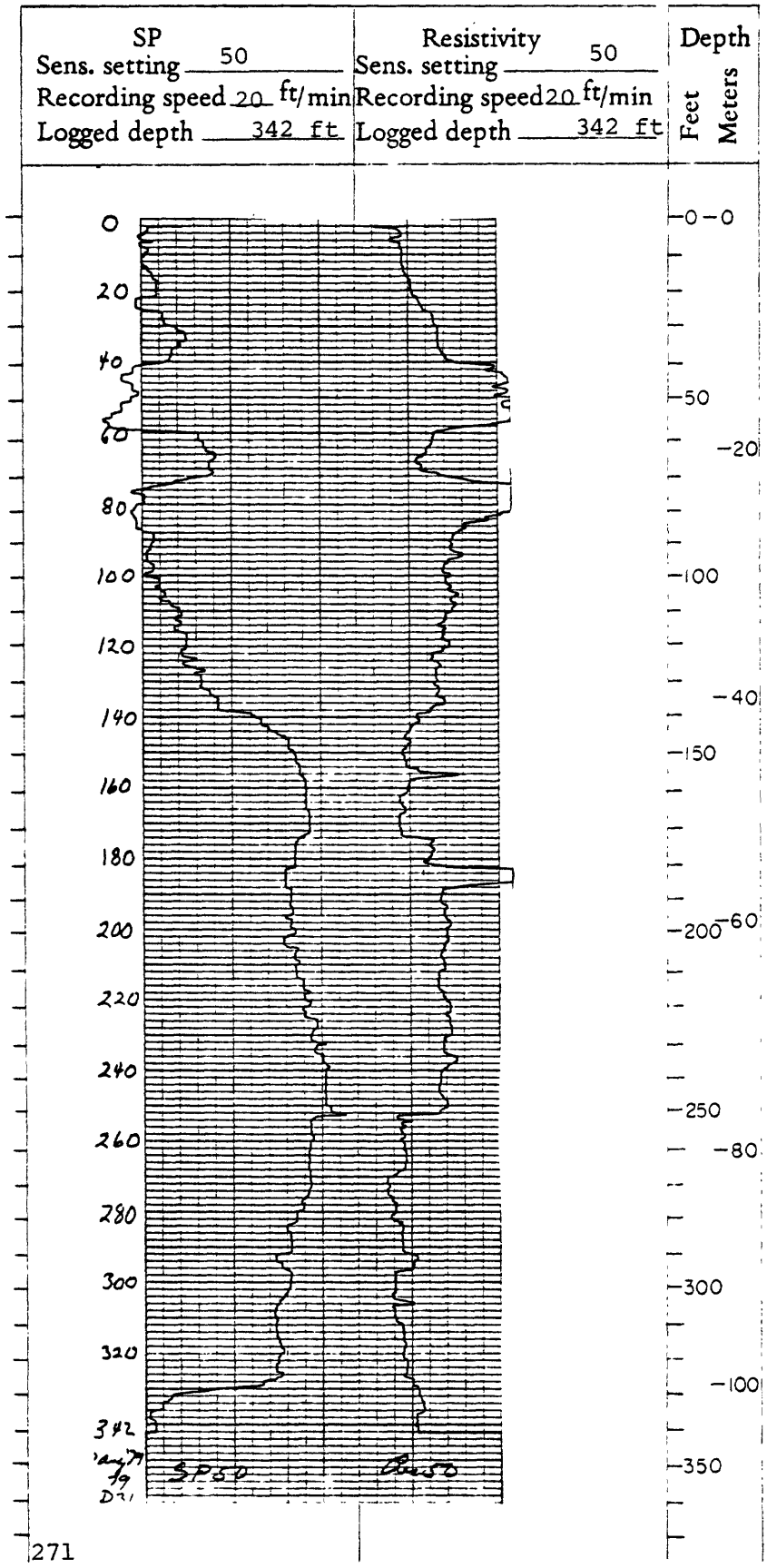


Hole number—continued

79D31

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Depth Feet / Meters
302-303 Lignite 303-308 Claystone, light greenish-gray 308-324 Claystone, gray, silty 324-340 Sandstone, gray, medium-grained			300 100 350 120 400 450 140 500 160 550 180 600

79D31 Hole number – continued



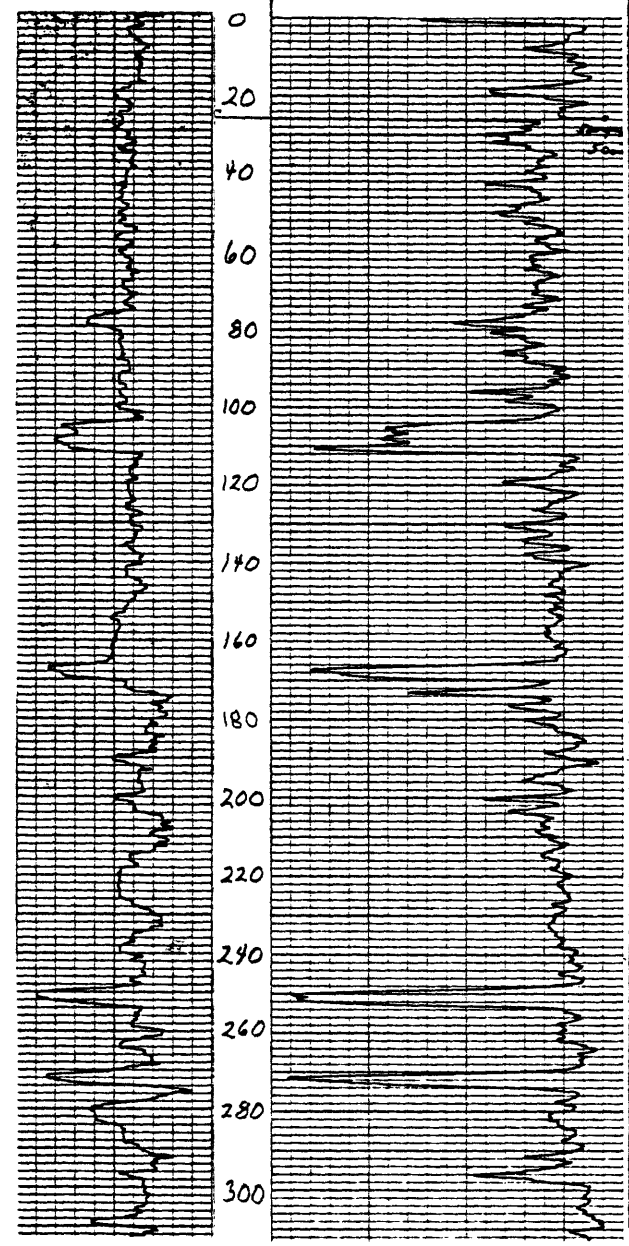
NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D32 Map: Noonen SE Date: 8-12-79 State: ND County: Divide
Elev.: 2202 Location: T. 162 N/S, R. 95 E/W, Sec. 22, Tract: cccc Drilled depth: 342 ft
Measured: 201 ft FSL, 45 ft FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds: 104-112; 166-170; 249-253; 270-274

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

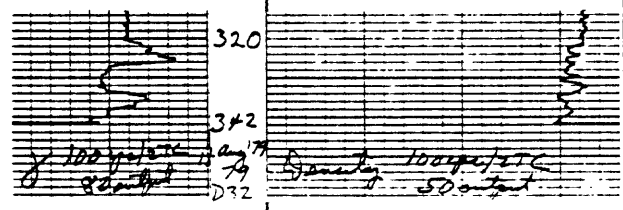
Lithology		Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 342 ft	Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 342 ft	Depth Feet	Depth Meters
0- 1	Silt, black, clayey				
1- 3	Silt, dark brownish-gray, clayey			0	0
3- 25	Till, dark brownish-gray, silty, pebbly			20	
25- 55	Till, olive-black, silty, pebbly			40	
55- 79	Till, dark-gray, clayey, pebbly			50	
79- 80	Gravel			60	20
80-100	Till, dark-gray, clayey, pebbly			80	
100-104	Claystone, dark-gray			100	100
104-112	Lignite				
112-127	Claystone, dark-gray			120	
127-155	Siltstone, medium-gray, clayey				
155-163	Sandstone, medium-gray, medium-grained, silty			140	40
163-166	Lignite			150	
166-169	Sandstone, medium-gray, medium-grained, silty			160	
169-170	Lignite			180	
170-198	Sandstone, medium-gray, medium-grained, silty				
198-215	Claystone, medium-gray			200	200 60
215-225	Siltstone, medium-gray				
225-235	Claystone, dark-gray			220	
235-245	Siltstone, dark-gray				
245-250	Claystone, dark-gray			240	
250-251	Lignite				
251-265	Siltstone, dark-gray			250	
265-270	Sandstone, medium-gray, medium-grained, clayey			260	80
270-275	Siltstone, medium-gray			280	
275-285	Claystone, dark-gray				
285-290	Siltstone, medium-gray				
290-300	Claystone, medium-gray			300	300
300-340	Siltstone, medium-gray				



Hole number—continued

79D32

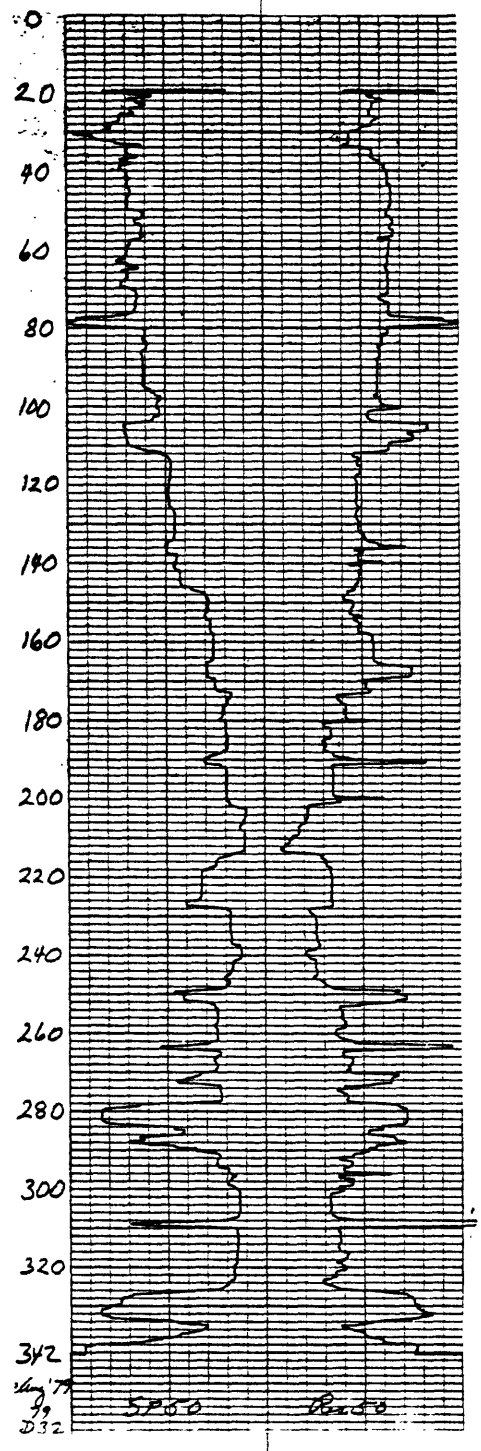
Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Depth Feet / Meters



Depth: 300, 100, 350, 120, 400, 450, 140, 500, 160, 550, 180, 600

79D32 Hole number - continued

SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 342 ft	Logged depth 342 ft	



Feet: 0, 50, 100, 150, 200, 250, 300, 350
Meters: 0, 20, 40, 60, 80, 100

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D33 Map: Columbus SW Date: 8-12-79 State: ND County: Divide
Elev.: 2215 Location: T. 162 N/S, R. 95 E/W, Sec. 23, Tract: cdcc Drilled depth: 342 ft
Measured: 30 ft FSL, 1000 ft FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds: 112-122; 130-137; 187-190.5; 260-265; 288-291.5

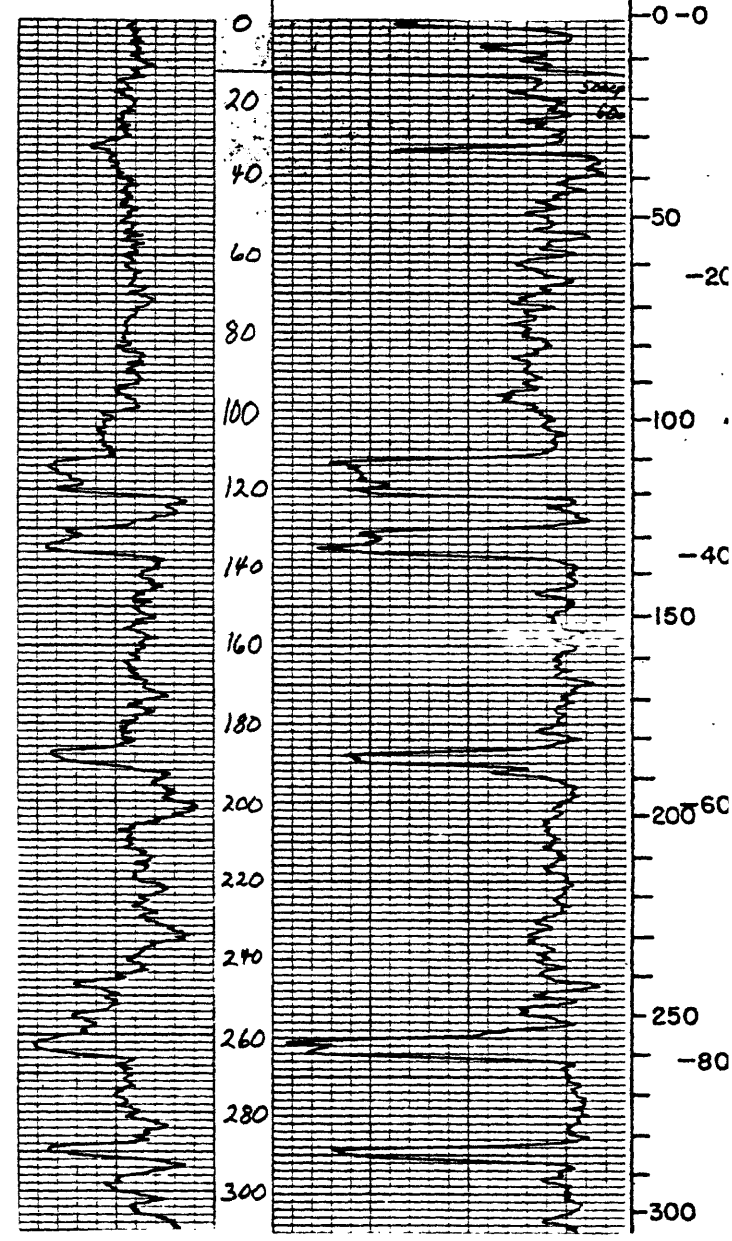
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		
0- 2	Silt, dusky-brown, silty, clayey	
2- 28	Till, dusky-brown, silty, pebbly	
28- 32	Gravel	
32- 52	Till, dusky-brown	
52- 80	Till, dark-gray, silty, pebbly	
80-112	Siltstone, dusky-brown, sandy	
112-118	Lignite	
118-130	Claystone, dark-gray, carbonaceous	
130-136	Lignite	
136-150	Siltstone, dark-gray, clayey	
150-188	Sandstone, greenish-gray, medium grained, silty	
188-190	Lignite	
190-205	Claystone, greenish-gray, silty	
205-230	Sandstone, greenish-gray	
230-250	Claystone, greenish-gray	
250-253	Sandstone, greenish-gray	
253-261	Lignite	
261-280	Sandstone, greenish-gray	
280-285	Claystone	
285-290	Lignite	
290-311	Claystone, silty	

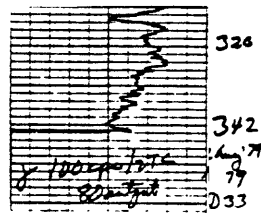
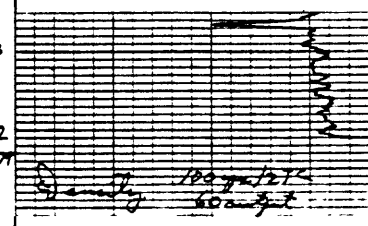
Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 342 ft

Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 342 ft



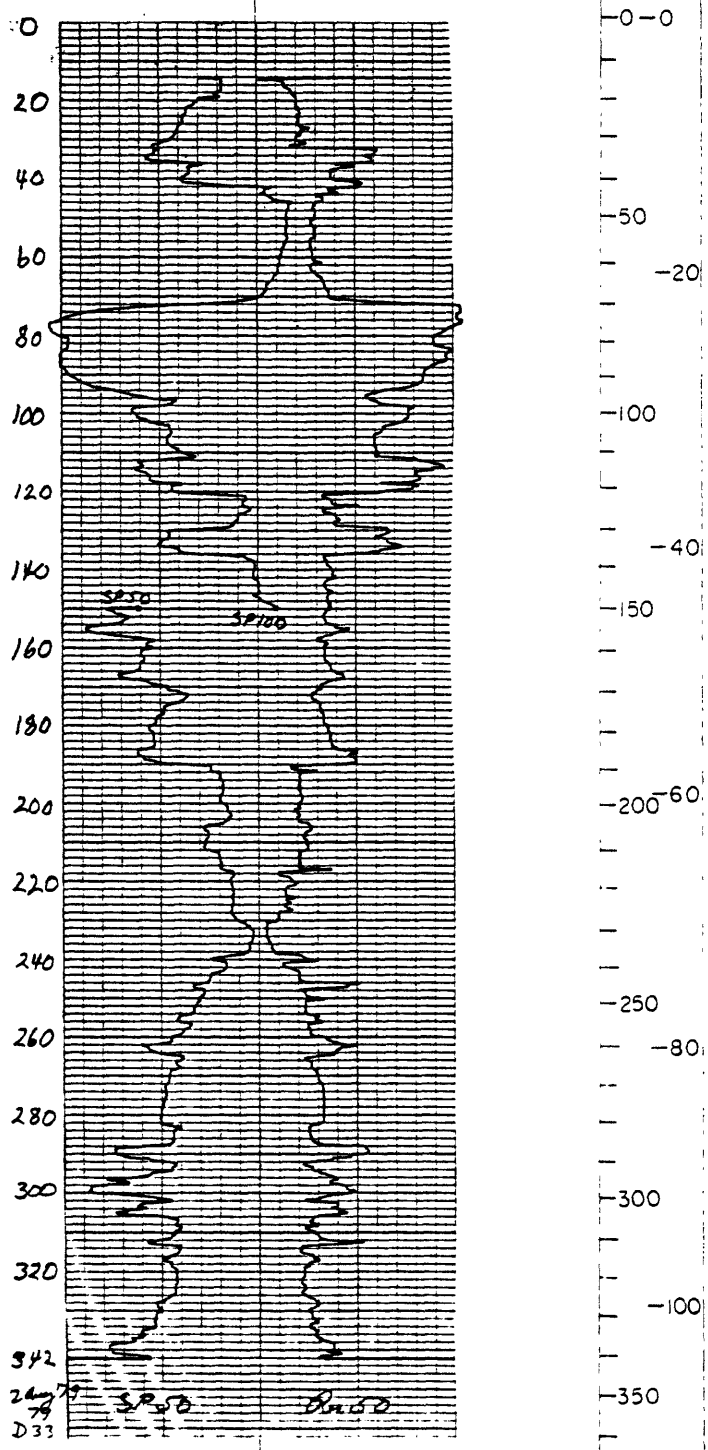
Hole number—continued

79D33

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Depth Feet / Meters
311-312 Lignite 312-335 Claystone 335-340 Sandstone			300 100 350 120 400 450 140 500 160 550 180 600

79D33 Hole number – Continued

SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 342 ft	Logged depth 342 ft	



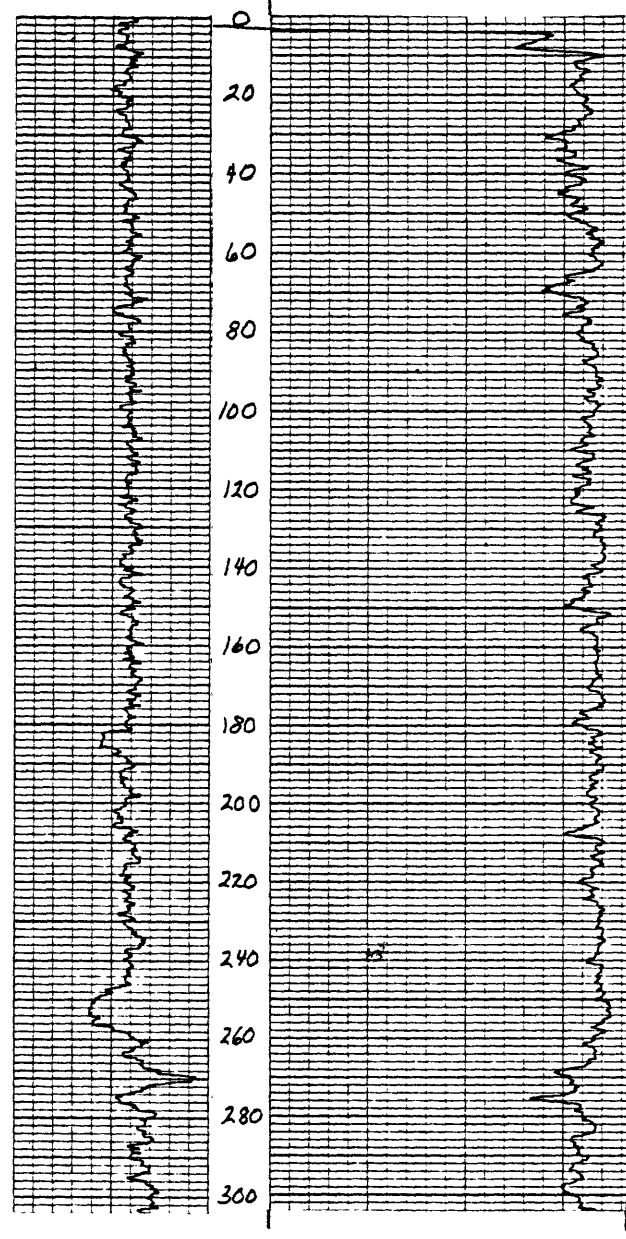
NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D34 Map: Noonen SE Date: 8-9-79 State: ND County: Divide
Elev.: 2350 Location: T. 162 N/S, R. 95 E/W, Sec. 31, Tract: cccc Drilled depth: 402 ft
Measured: 232 ft FSL, 20 ft FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds: 312-315

Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

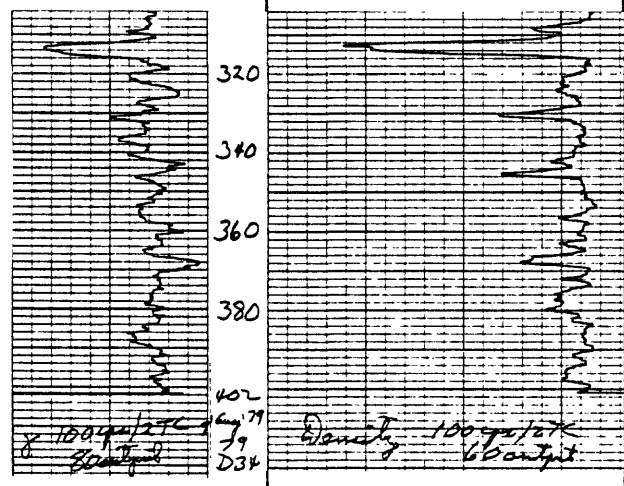
Lithology	Gamma: T.C. 2 Range 100cps, Recording speed 20 ft/min, Logged depth 402 ft	Density: T.C. 2 Range 100 cps, Recording speed 20 ft/min, Logged depth 402 ft	Depth Feet	Depth Meters
0- 3 Clay, brown				
3- 64 Till, brown, clayey, sandy, pebbly				
64- 66 Till, gray, silty, sandy				
66- 67 Gravel, brown, coarse-grained				
67-257 Till, gray, silty, sandy, pebbly				
257-266 Siltstone, brown				
266-275 Siltstone, gray				
275-313 Claystone, gray				



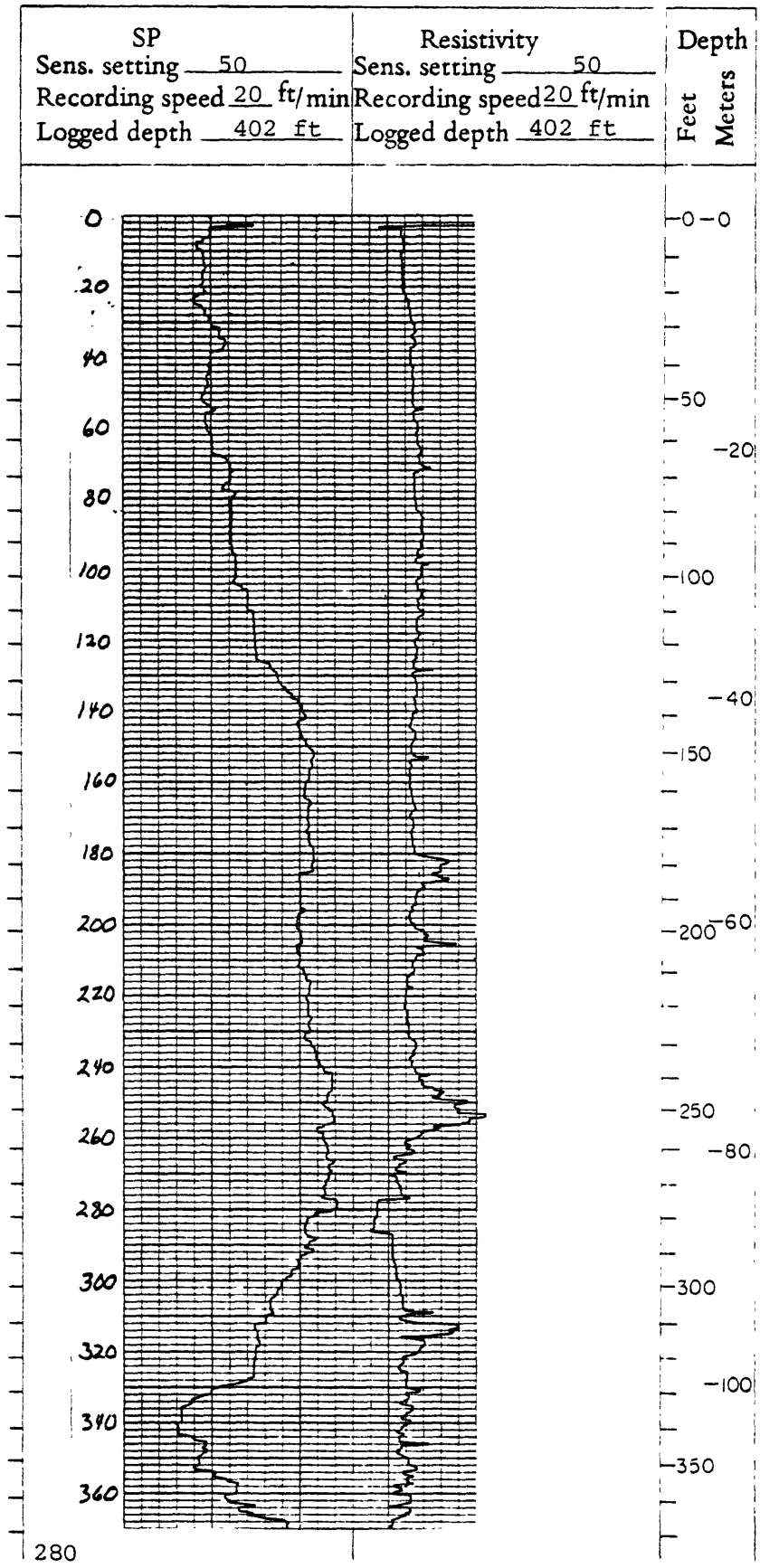
Hole number—continued

79D34

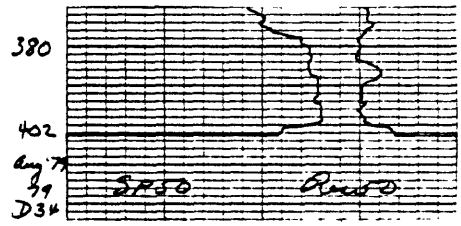
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Depth Feet / Meters
313-317	Lignite			300
317-320	Sandstone, gray, medium-grained			
320-328	Claystone, gray	320		−100
328-330	Lignite			
330-334	Claystone, greenish-brown	340		350
334-340	Siltstone, light-brown	360		
340-360	No samples	380		
360-382	Claystone, greenish-gray			−120
382-385	Siltstone, gray, clayey	402		400
385-400	Claystone, greenish-gray			
				450
				−140
				500
				−160
				550
				−180
				600



79D34 Hole number – continued



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 feet	Logged depth 402 feet	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750 Feet; 120, 140, 160, 180, 200, 220 Meters

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D35 Map: Noonen Date: 8-9-79 State: ND County: Divide

Elev.: 1972 Location: T. 162 N/S, R. 96 E/W, Sec. 1, Tract: dddd Drilled depth: 342 ft

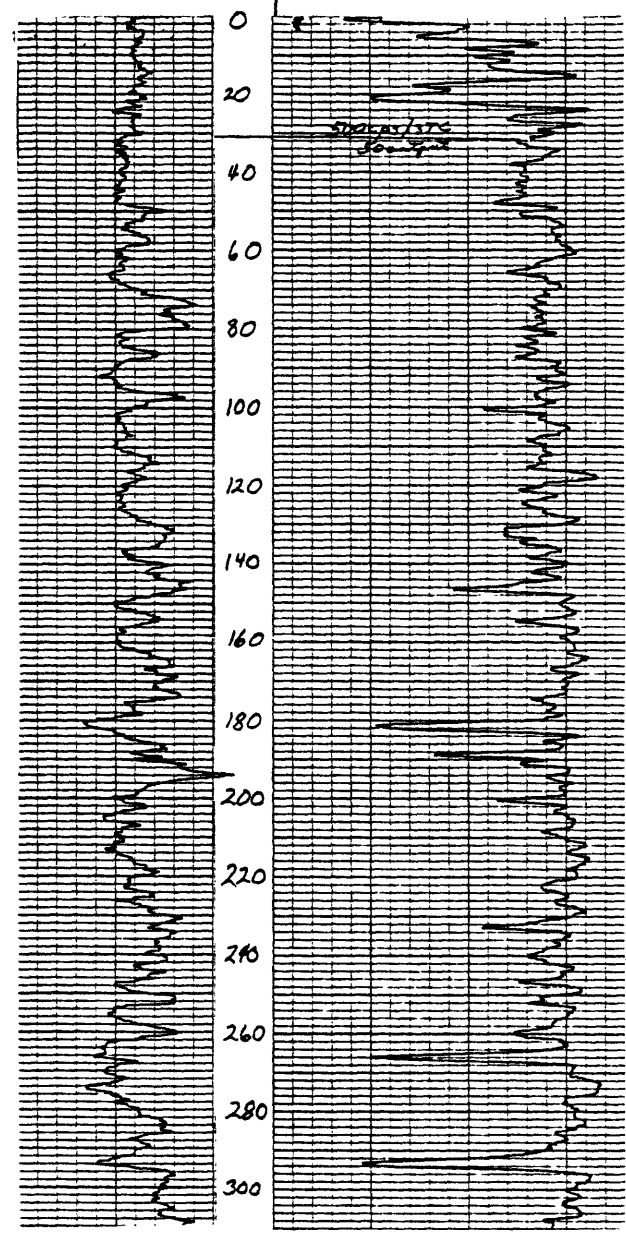
Measured: 162 ft FSL, 56 ft FEL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 180-183; 265-267; 292-294.5; 328-332

Remarks:

Lithology Recorded by: Thomas Delling Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 342 ft	Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 342 ft	Depth Feet	Depth Meters
0- 1	Silt, brown, sandy			0	0
1- 25	Till, brown, clayey, sandy			20	
25- 27	Gravel, brown, very coarse-grained			40	
27- 33	Till, gray-brown, silty, clayey, pebbly			50	
33- 49	Till, gray, silty, sandy, pebbly			60	20
49- 61	Siltstone, gray, clayey			80	
61- 69	Claystone, bluish-gray			100	100
69- 83	Sandstone, gray, medium-grained, silty			120	
83- 94	Siltstone, gray, clayey			140	40
94- 98	Claystone, bluish-gray			150	
98-100	Claystone, brown, lignitic			160	
100-109	Siltstone, gray, clayey			180	
109-120	Claystone, gray			200	200 60
120-130	Siltstone, gray			220	
130-131	Lignite			240	
131-148	Claystone, gray, silty			250	
148-152	Siltstone, gray, clayey			260	80
152-154	Siltstone, light-gray			280	
154-161	Siltstone, light-brown			300	300
161-167	Claystone, light-green				
167-178	Claystone, light-brown, silty				
178-181	Lignite				
181-185	Claystone, light-brown,				
185-187	Lignite				
187-188	Claystone, dark-brown				
188-192	Claystone, brown				
192-198	Claystone, olive-brown				
198-199	Lignite				
199-217	Claystone, grayish-brown				
217-221	Sandstone, greenish-gray, medium-grained, silty				
221-226	Siltstone, grayish-brown, sandy				



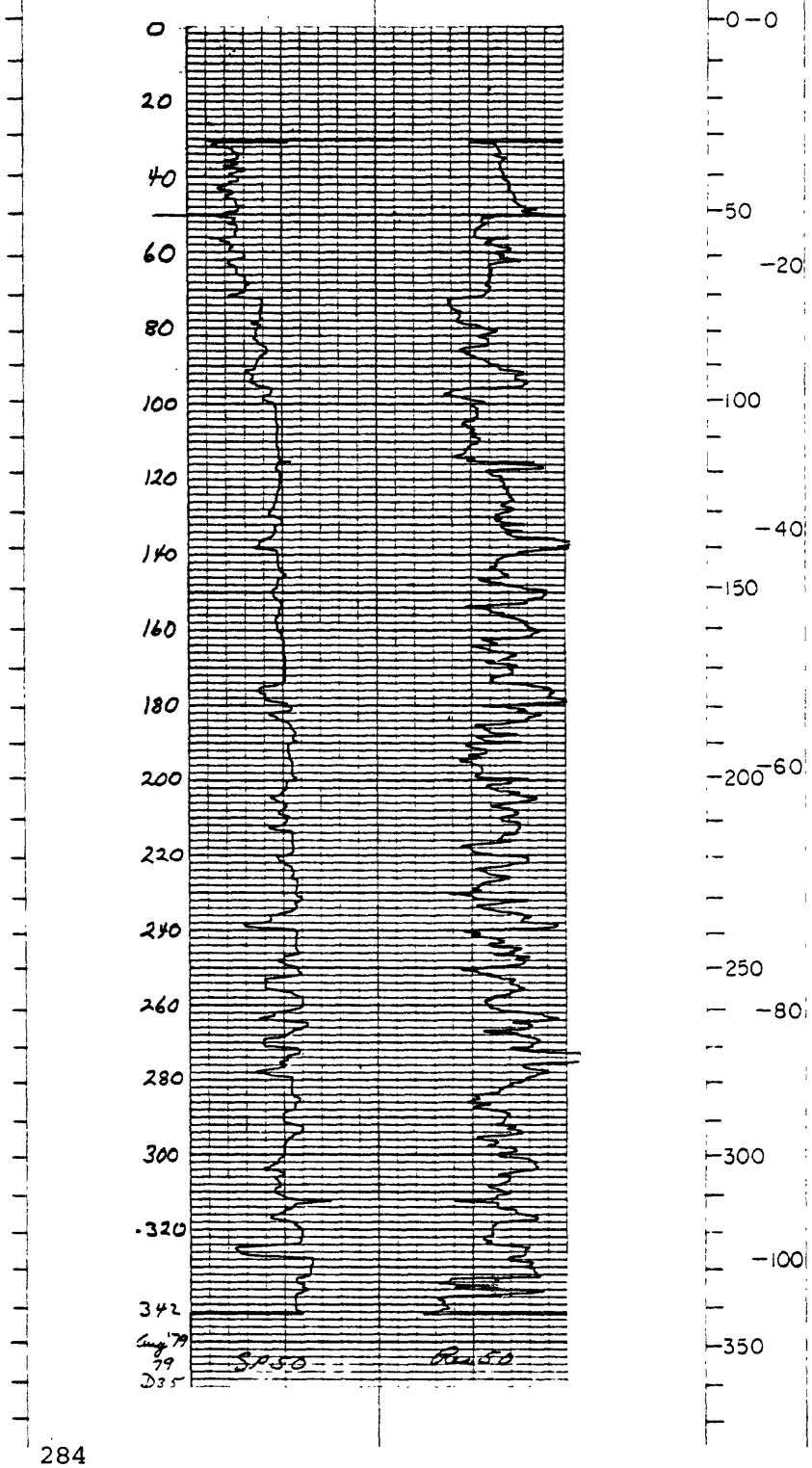
Hole number—continued

79D35

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Depth Feet / Meters
226-229	Claystone, grayish-brown			300
229-230	Lignite			
230-234	Siltstone, light-green, sandy	320		−100
234-237	Sandstone, bluish-green, medium-grained	342		350
237-238	Lignite			
238-249	Claystone, olive-gray, silty			
249-250	Lignite			−120
250-257	Claystone, light-brown			400
257-258	Lignite			
258-262	Siltstone, brown			
262-264	Lignite			
264-282	Claystone, light-brown			
282-284	Claystone, very dark-brown, carbonaceous			450
284-287	Siltstone, green			−140
287-291	Lignite			
291-292	Claystone, brown			
292-318	Claystone, pale-green, silty			
318-321	Claystone, brown, carbonaceous			500
321-327	Lignite			
327-330	Claystone, brown			−160
330-333	Lignite			
333-340	Claystone, greenish-brown			550
				−180
				600

79D35 Hole number – continued

SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 342 ft	Logged depth 342 ft	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D36 Map: Noonen SE Date: 8-8-79 State: ND County: Divide

Elev.: 2105 Location: T. 162 N S, R. 96 E W, Sec. 15, Tract: abbb Drilled depth: 342 ft

Measured: 60 ft FNL FSL, 2480 ft FEL FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds:

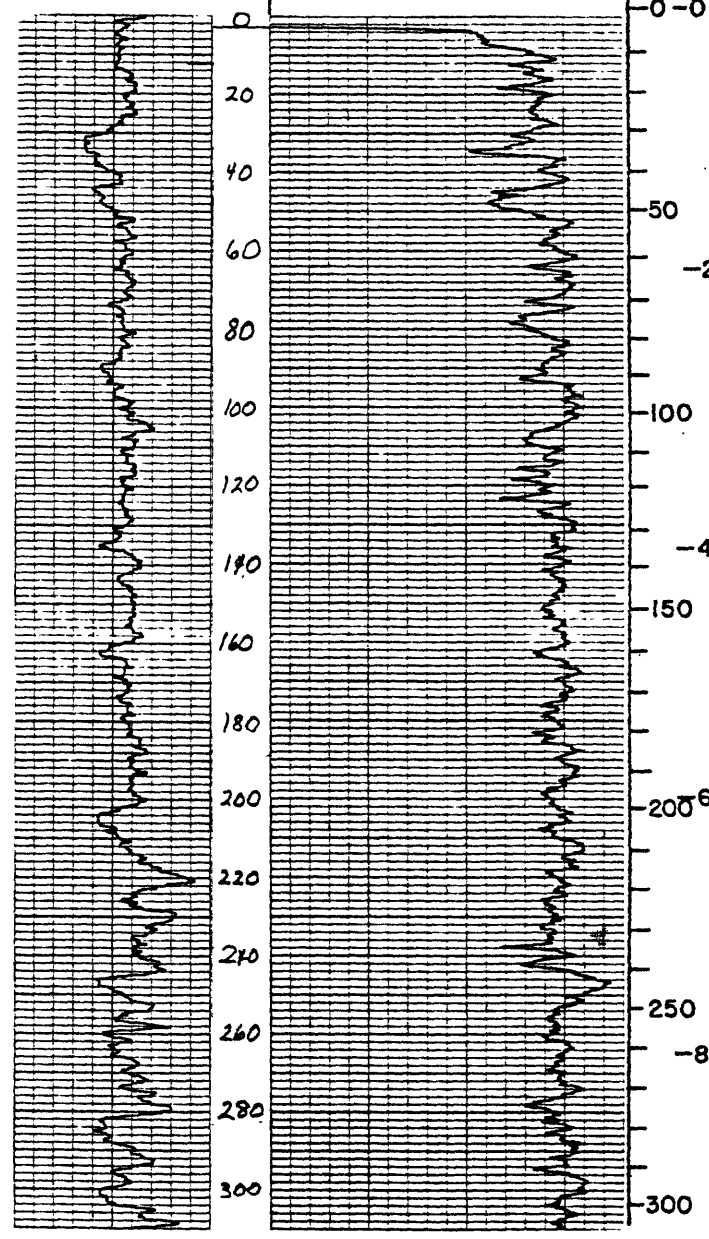
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 6	Silt, dusky-brown, sandy
6- 31	Till, dusky-brown, sandy, pebbly
31- 54	Gravel, coarse-grained, sandy
54-140	Till, dark-gray, clayey, pebbly
140-208	Till, dark-gray, clayey,
208-216	Gravel, coarse-grained, sandy
216-270	Siltstone, medium-gray, clayey
270-290	Claystone, medium-gray
290-295	Siltstone, medium-gray, clayey
295-300	Sandstone, medium-gray, medium-grained, clayey

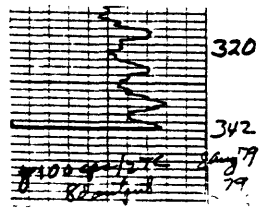
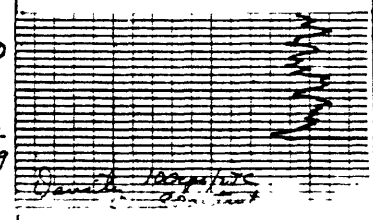
Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 342 ft

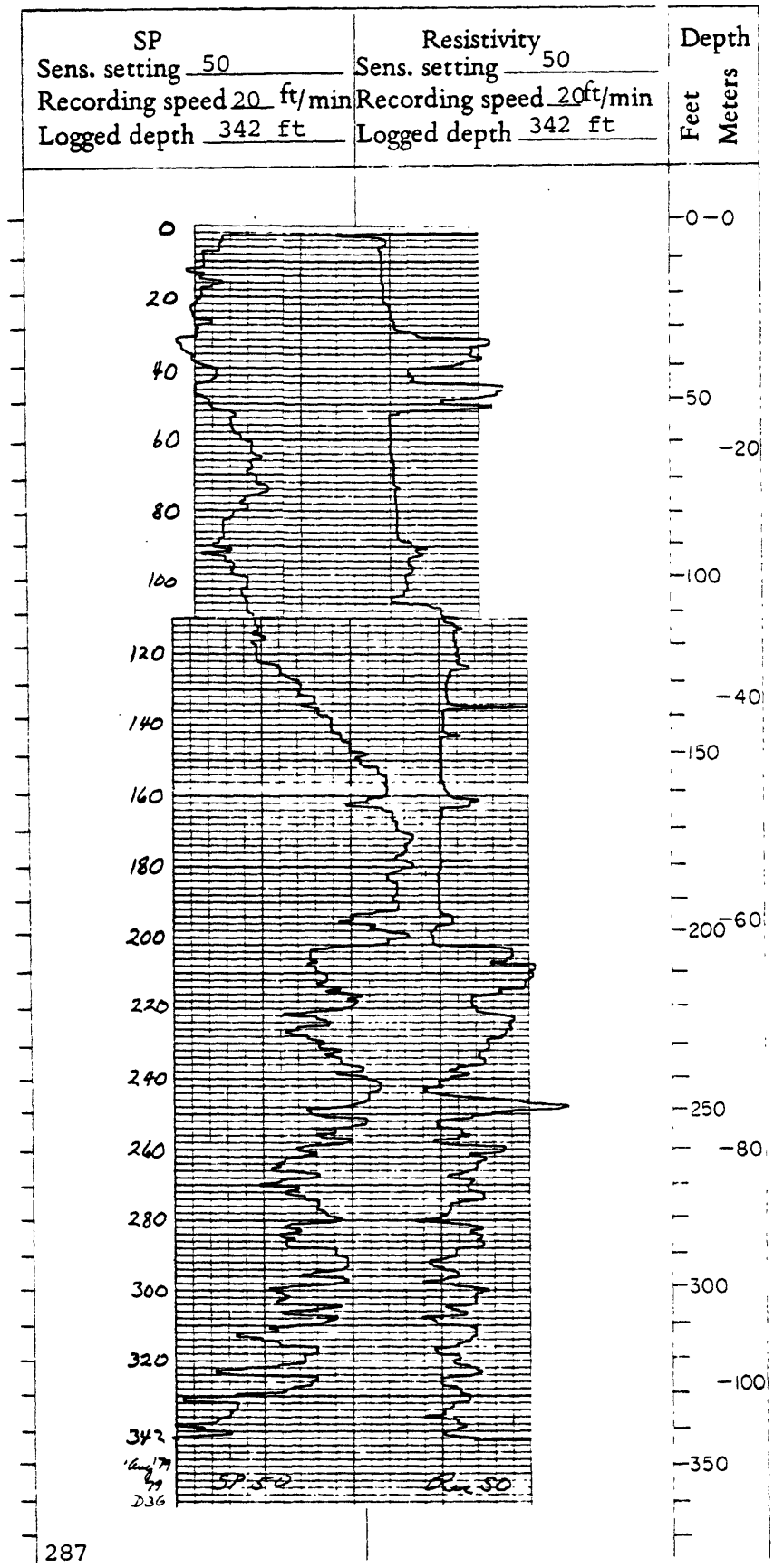
Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 342 ft



Hole number—continued

79D36

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Depth Feet / Meters
300-305 Siltstone, medium-gray 305-340 Claystone, medium-gray			300 100 350 120 400 450 140 500 160 550 180 600


SP
Sens. setting 50
Recording speed 20 ft/min
Logged depth 342 ft
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 342 ft
Depth
Feet
Meters
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
342
0
50
100
150
200
250
300
350
0
20
40
60
80
100
SP 50
Res 50
D36

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D37 Map: Noonan SW Date: 8-7-79 State: ND County: Divide

Elev.: 2025 Location: T. 162 N, R. 96 W, Sec. 18, Tract: dada Drilled depth: 402 ft

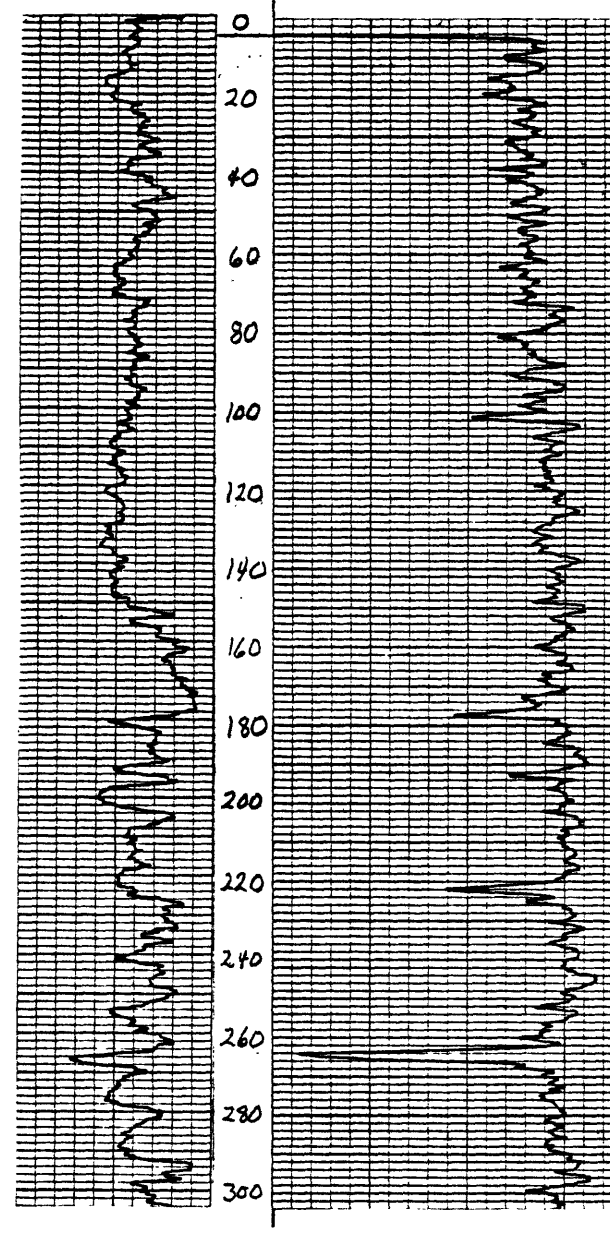
Measured: 1812 ft FSL, 30 ft FEL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 263-266; 332-335; 366-371

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

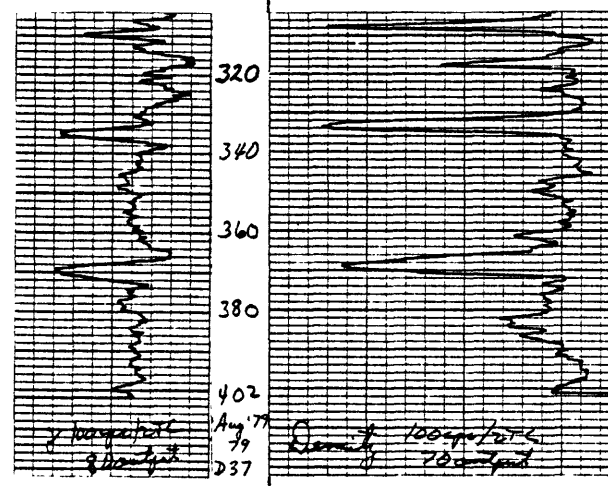
Lithology		Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 402 ft	Density: T.C. 2 Range 402; Recording speed 20 ft/min; Logged depth 402 ft	Depth Feet	Depth Meters
0- 4	Silt, medium-brown, clayey			0	0
4- 38	Till, medium-brown, sandy, pebbly				
38- 45	Till, dusky-brown, sandy, pebbly			20	
45- 66	Till, dark-gray, clayey, pebbly			40	
66- 68	Gravel			50	
68-104	Till, dark-gray, fine-grained, clayey, pebbly			60	20
104-157	Gravel, coarse-grained, sandy			80	
157-166	Claystone, medium-gray, silty			100	100
166-168	Claystone, olive-gray, silty			120	
168-189	Claystone, medium-gray, silty			140	40
189-195	Siltstone, medium-gray, clayey			150	
195-196	Lignite			160	
196-221	Claystone, medium-gray, silty			180	
221-224	Lignite			200	200 60
224-240	Claystone, medium-gray, silty			220	
240-250	Siltstone, medium-gray			240	
250-266	Claystone, medium-gray			250	80
266-268	Lignite			260	
268-280	Siltstone, dark-gray, clayey			280	
280-307	Claystone, dark-gray			300	300



Hole number—continued

79D37

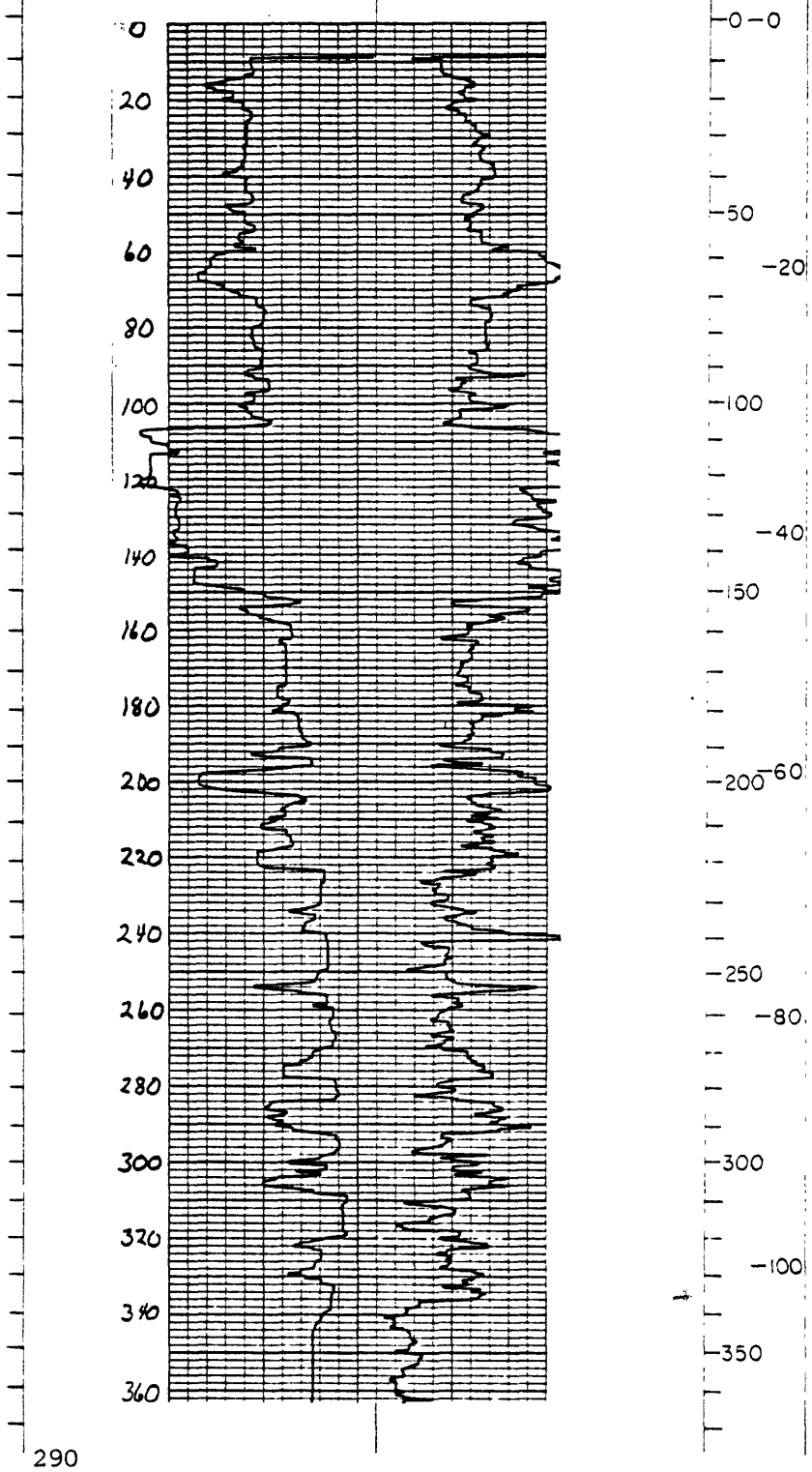
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Depth Feet / Meters
307-310	Lignite			
310-316	Claystone, medium-gray			
316-317	Lignite			
317-332	Claystone, medium-gray, silty			
332-334	Lignite			
334-336	Claystone, medium-gray			
336-338	Siltstone, medium-gray			
338-341	Claystone, medium-gray			
341-342	Lignite			
342-357	Siltstone, bluish-gray, clayey			
357-358	Lignite			
358-365	Claystone, dark-gray			
365-370	Sandstone, greenish-gray, medium-grained, clayey			
370-374	Sandstone, greenish-gray, medium-grained			
374-376	Lignite			
376-400	Sandstone, greenish-gray, clayey			



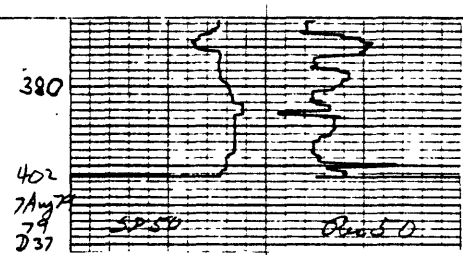
300
100
350
120
400
450
140
500
160
550
180
600

79D37 Hole number – continued

SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 ft	Logged depth 402 ft	



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 401 feet	Logged depth 401 feet	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750 (Feet); 120, 140, 160, 180, 200, 220 (Meters)

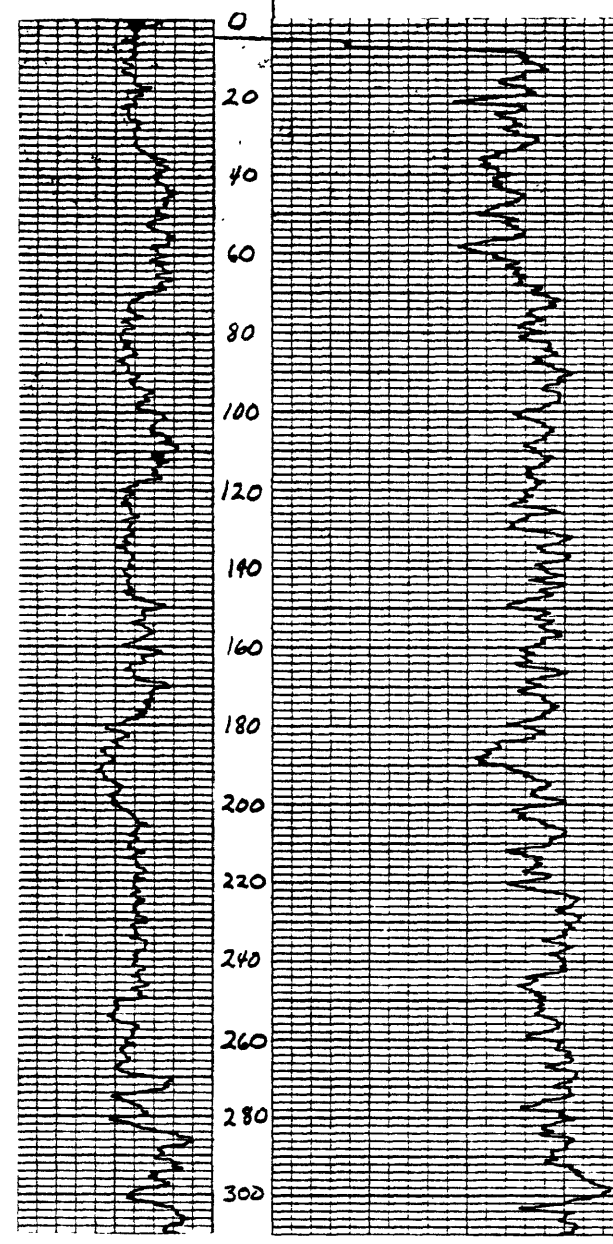
NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D38 Map: Noonan Sw Date: 8-8-79 State: ND County: Divide
Elev.: 2160 Location: T. 162 N/S, R. 96 E/W, Sec. 21, Tract: cccc Drilled depth: 401 ft
Measured: 84 ft FSL, 24 ft FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds: 342-344

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100cps, Recording speed 20 ft/min, Logged depth 401 ft	Density: T.C. 2 Range 100cps, Recording speed 20 ft/min, Logged depth 401 ft	Depth Feet	Depth Meters
0- 2	Silt, dusky-brown, silty			0	0
2- 67	Till, dusky-brown, silty, pebbly			20	
67-220	Till, dark-gray, clayey, pebbly			40	
220-250	Till, dark-gray, sandy, gravelly			50	
250-268	Gravel, coarse-grained, sandy			60	20
268-325	Claystone, medium-gray			80	
				100	100
				120	
				140	40
				150	
				160	
				180	
				200	200 60
				220	
				240	
				250	
				260	80
				280	
				300	300

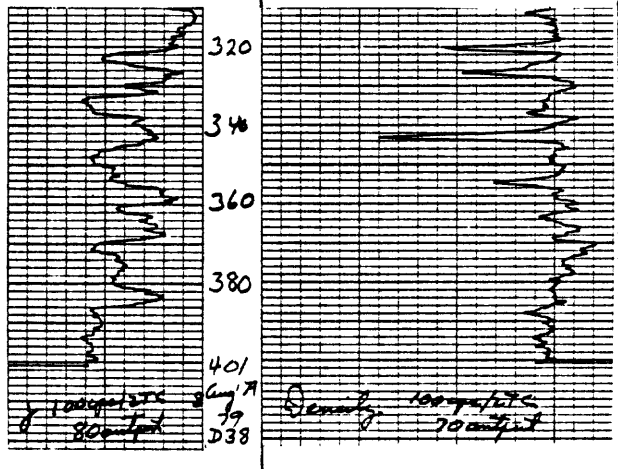


292

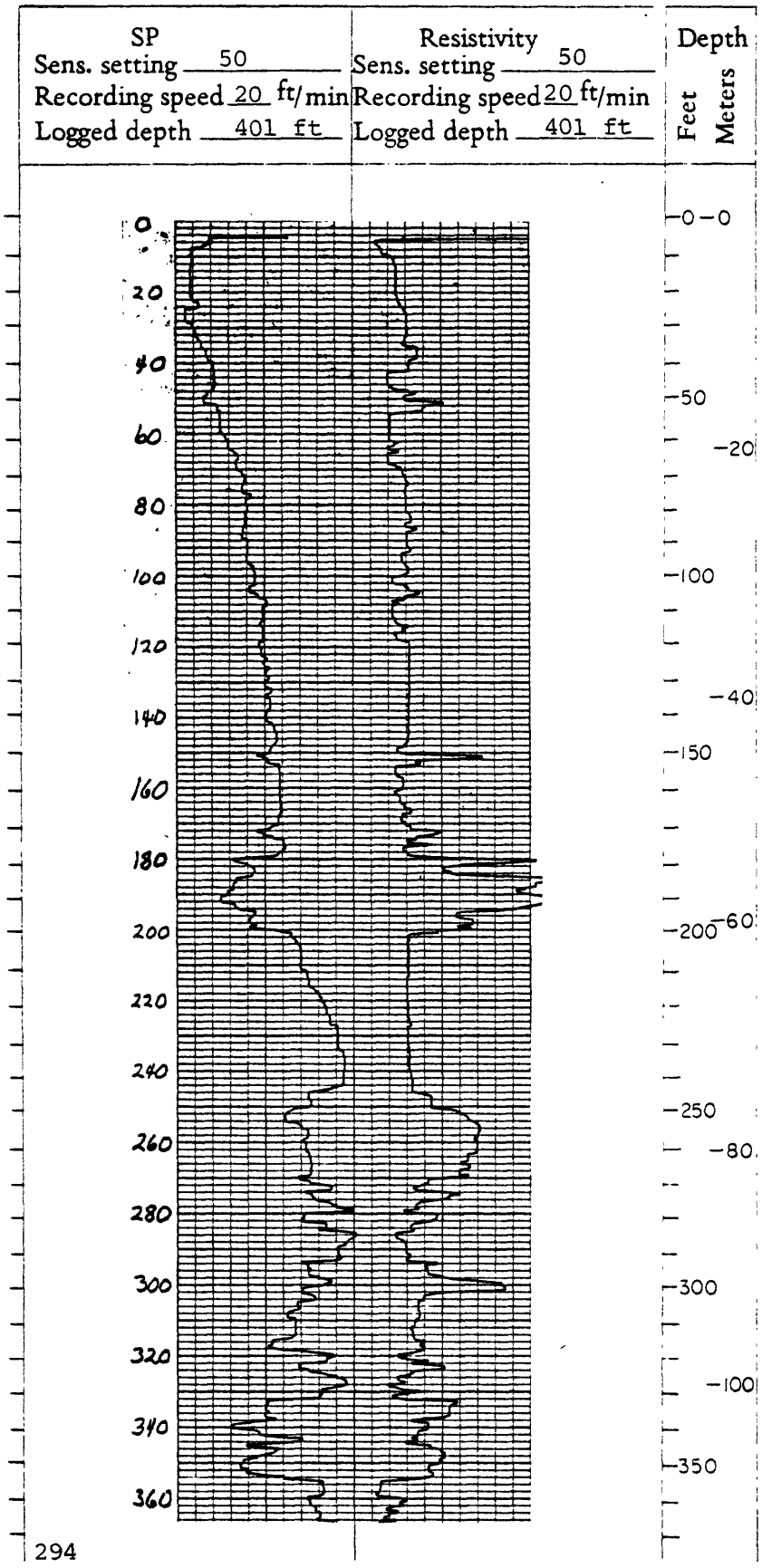
Hole number—continued

79D38

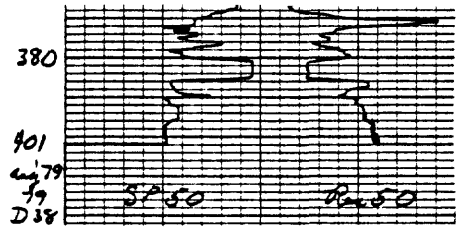
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 401 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 401 feet	Depth Feet / Meters
325-330	Siltstone, medium-gray			300
330-335	Sandstone, medium-gray, medium-grained, silty			
335-350	Claystone, medium-gray			100
350-355	Siltstone, medium-gray			
355-370	Claystone, medium-gray			350
370-400	Siltstone, medium-gray			
				120
				400
				450
				140
				500
				160
				550
				180
				600



79D38 Hole number – continued



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 401 feet	Logged depth 401 feet	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750; Meters: 120, 140, 160, 180, 200, 220

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D39 Map: Noonan SE Date: 8-8-79 State: ND County: Divide

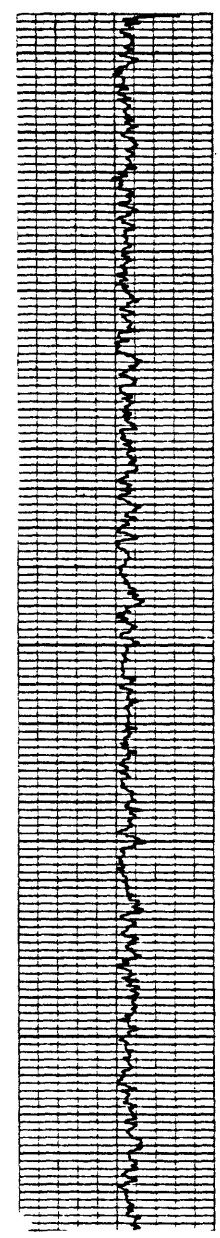
Elev.: 2200 Location: T. 162 N/S, R. 96 E/W, Sec. 23, Tract: cccc Drilled depth: 402 ft

Measured: 210 ft FNL/FSL, 30 ft FEL/FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

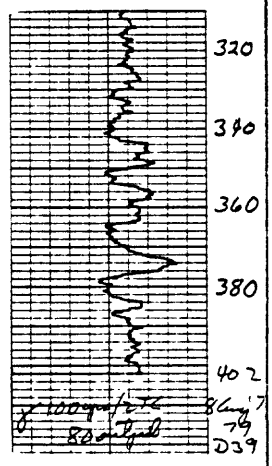
Lignite beds:

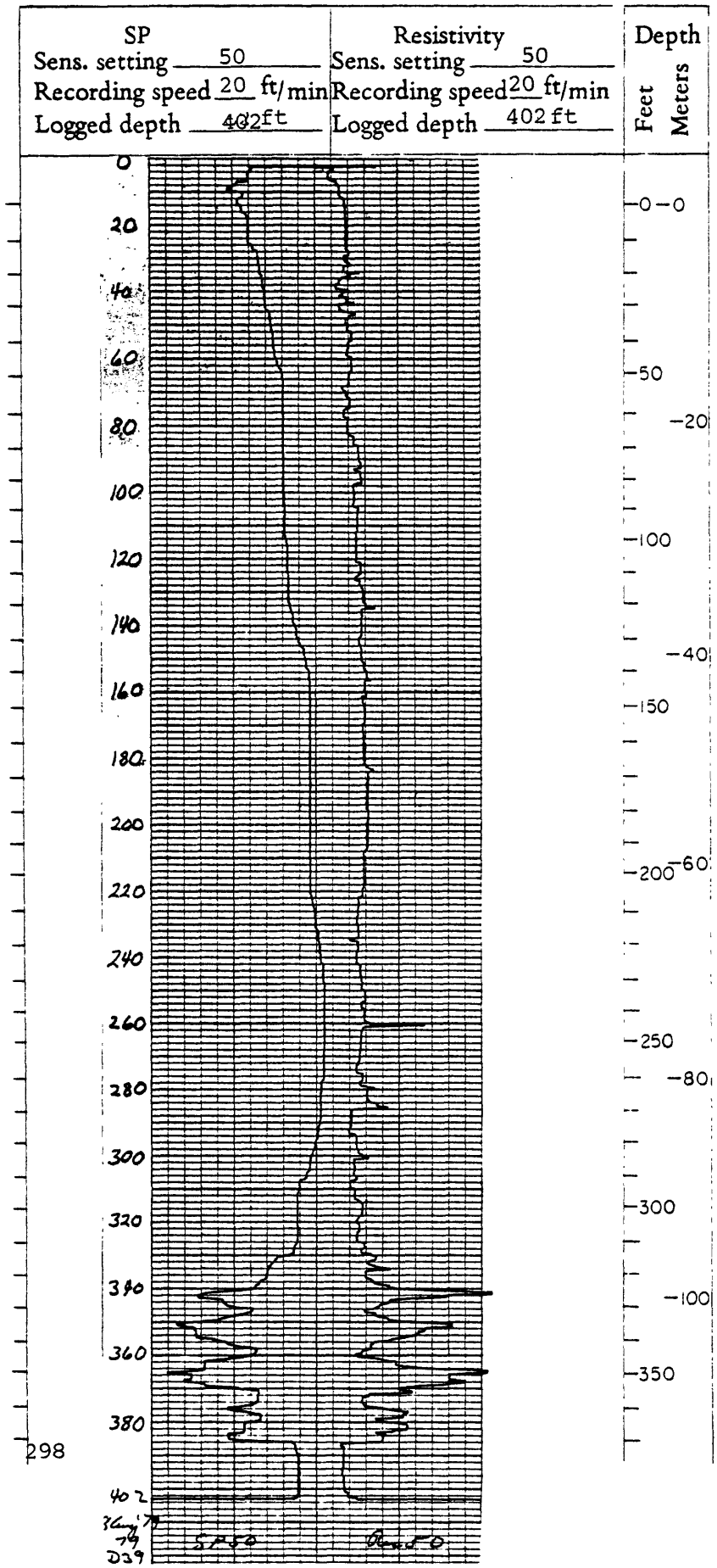
Remarks: No density log run

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 ft	Density: T.C. ___ Range ___; Recording speed ___ ft/min; Logged depth ___	Depth Feet / Meters
0- 3 Silty, dusky-brown, sandy 3- 18 Till, dusky-brown, sandy, pebbly 18-345 Till, dark-gray, clayey pebbly			

Hole number—continued
79D39

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth _____	Depth Feet / Meters
345-375 Till, light-brown, silty 375-383 Gravel, coarse-grained, sandy 383-400 Siltstone, medium-gray, sandy			300 100 350 120 400 450 140 500 160 550 180 600


SP
Sens. setting 50
Recording speed 20 ft/min
Logged depth 402 ft
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 402 ft
Depth
Feet
Meters
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
402
0
50
100
150
200
250
300
350
0
20
40
60
80
100

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D40 Map: Noonan SW Date: 8-7-79 State: ND County: Divide

Elev.: 2220 Location: T. 162 N/S, R. 96 E/W, Sec. 31, Tract: daaa Drilled depth: 402 ft

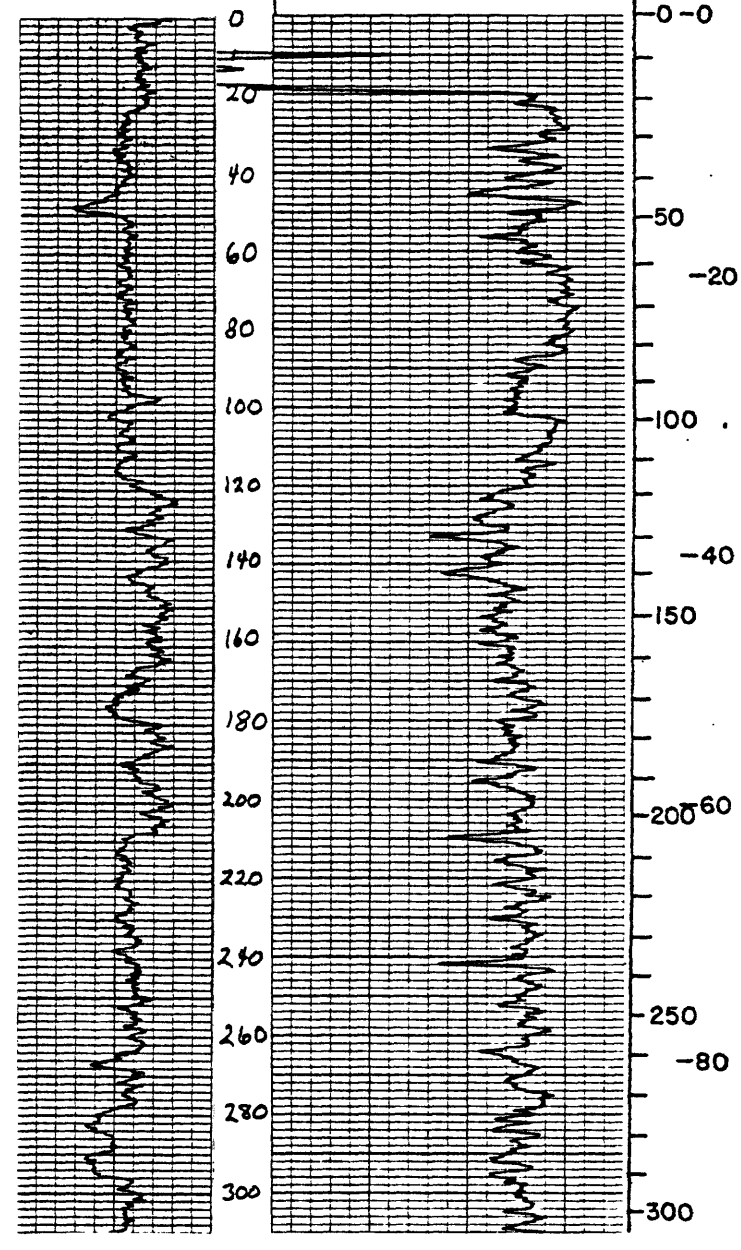
Measured: 2580 ft FSL, 27 ft FEL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds:

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

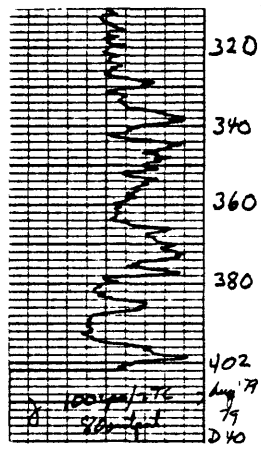
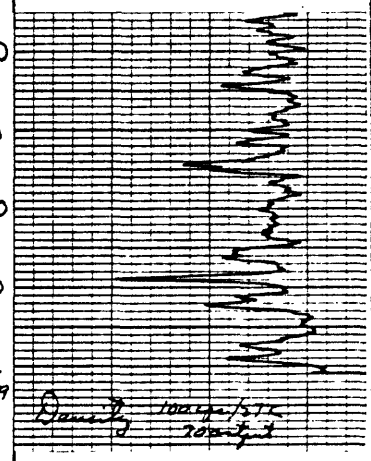
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 ft	Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 402 ft	Depth Feet	Depth Meters
0- 7	Silt, olive-gray, clayey				
7- 47	Till, dusky-brown, silty, pebbly				
47-270	Till, dark-gray, clayey pebbly				
270-275	Gravel, coarse-grained, sandy				
275-320	Silt, dark-gray, sandy				



300

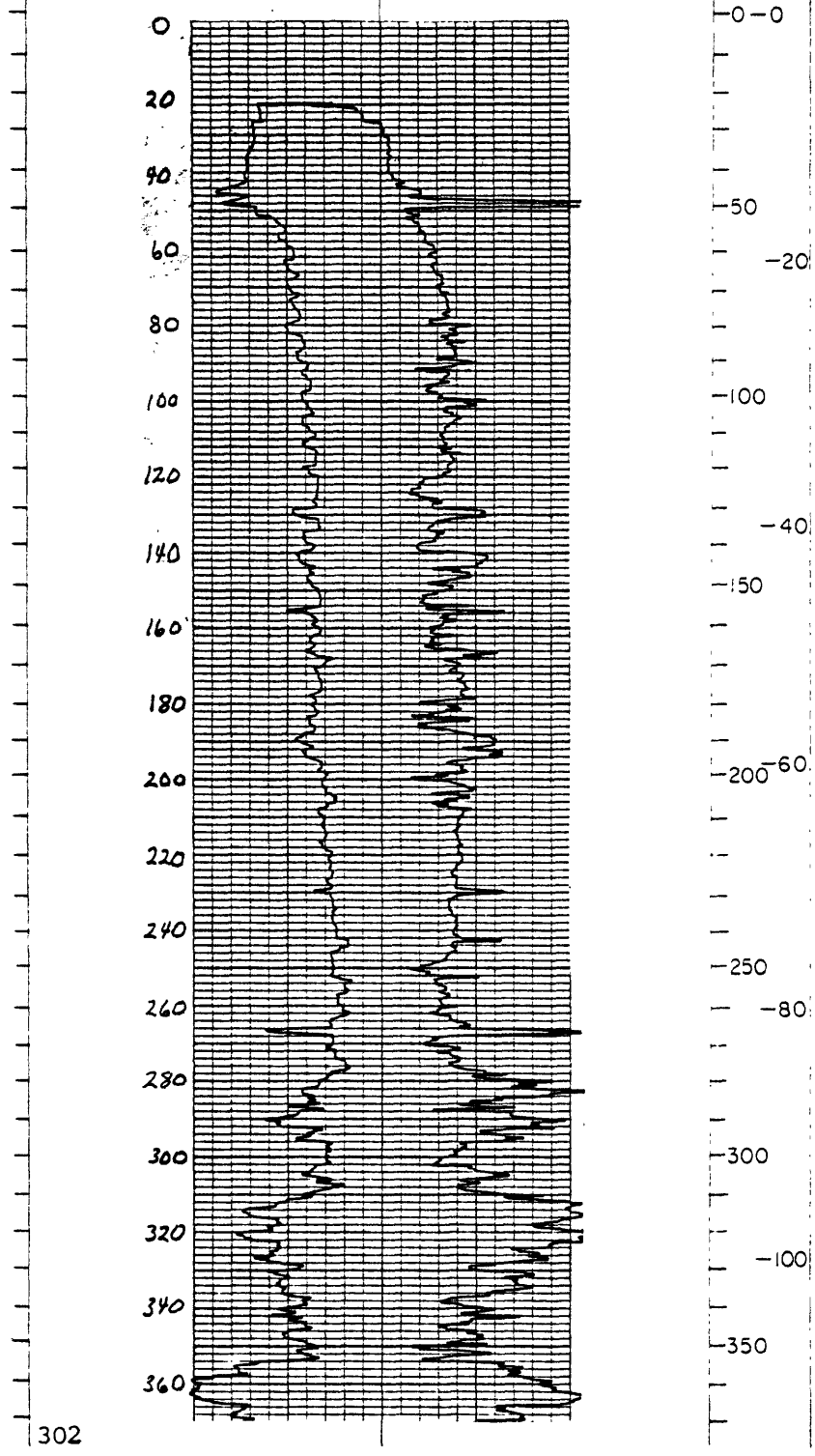
Hole number—continued

79D40

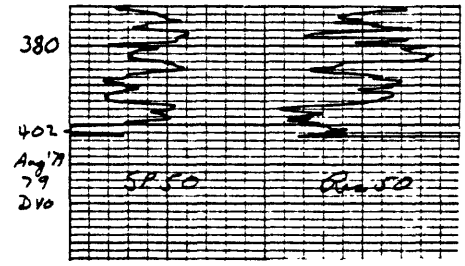
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Depth Feet / Meters
320-322	Siltstone, dark-gray, sandy			300
322-330	Siltstone, medium-gray, clayey			100
330-377	Claystone, medium-gray,			350
377-378	Lignite			120
378-400	Claystone, medium-gray			400
				450 / 140
				500
				160
				550
				180
				600

79D40 Hole number – continued

SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth ~~402 ft~~	Logged depth 402 ft	



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 feet	Logged depth 402 feet	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750 (Feet); 120, 140, 160, 180, 200, 220 (Meters)

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D41 Map: Ambrose Date: 8-16-79 State: ND County: Divide

Elev.: 2200 Location: T. 162 N/S, R. 98 E/W, Sec. 4, Tract: cbbc Drilled depth: 402 ft

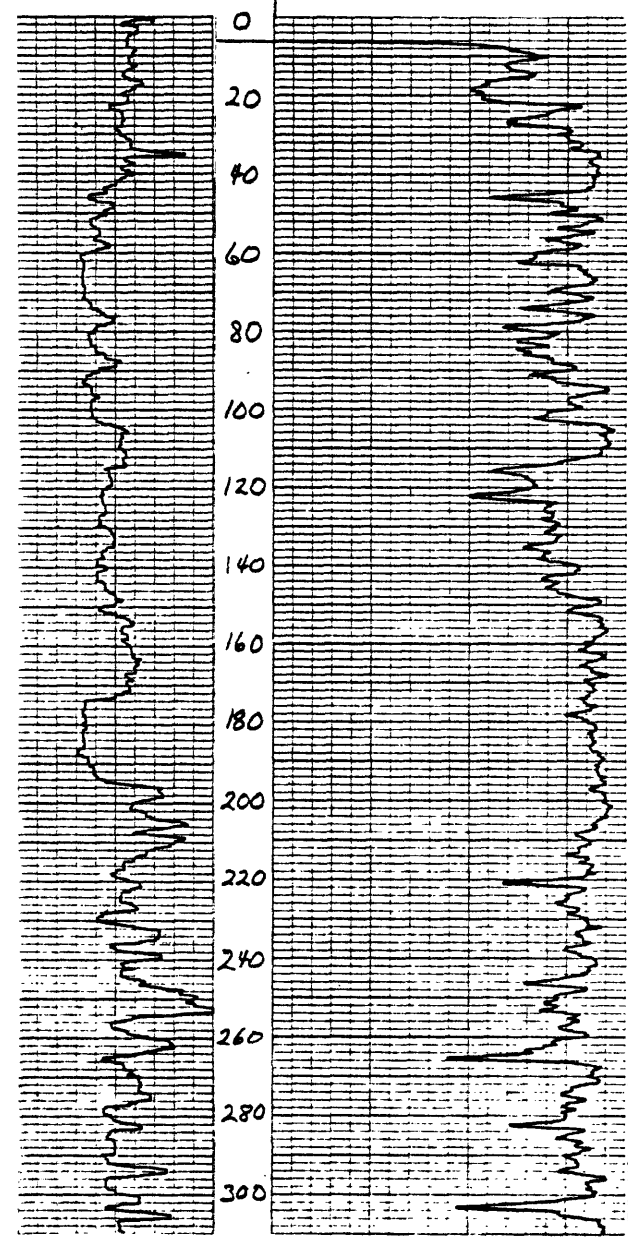
Measured: 2032 ft ~~FNL~~ FSL, 74 ft ~~FEL~~ FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 376-384

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

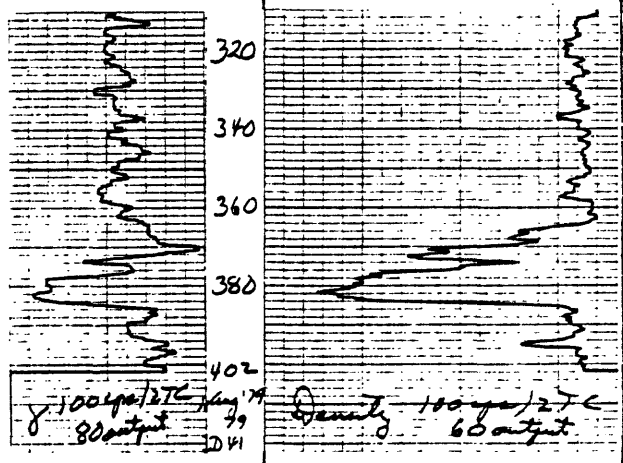
Lithology		Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 402 ft	Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 402 ft	Depth Feet	Depth Meters
0- 3	Silt, dusky-brown, clayey			0	0
3- 40	Till, dusky-brown, silty, pebbly			20	
40- 47	Gravel			40	
47- 52	Till, dusky-brown, silty, pebbly			50	
52- 73	Gravel			60	20
73- 78	Till, dusky-brown, silty, pebbly			80	
78-111	Gravel			100	
111-120	Till, dark-gray, clayey, pebbly			120	
120-156	Sand, dark-gray, medium-grained			140	40
156-192	Till, dark-gray, silty			150	
192-230	Claystone, medium-gray			160	
230-240	Siltstone, medium-gray, clayey			180	
240-261	Claystone, medium-gray,			200	60
261-263	Lignite			220	
263-297	Claystone, dark-gray			240	
297-298	Lignite			250	
298-302	Claystone, dark-gray			260	80
				280	
				300	



Hole number—continued

79D41

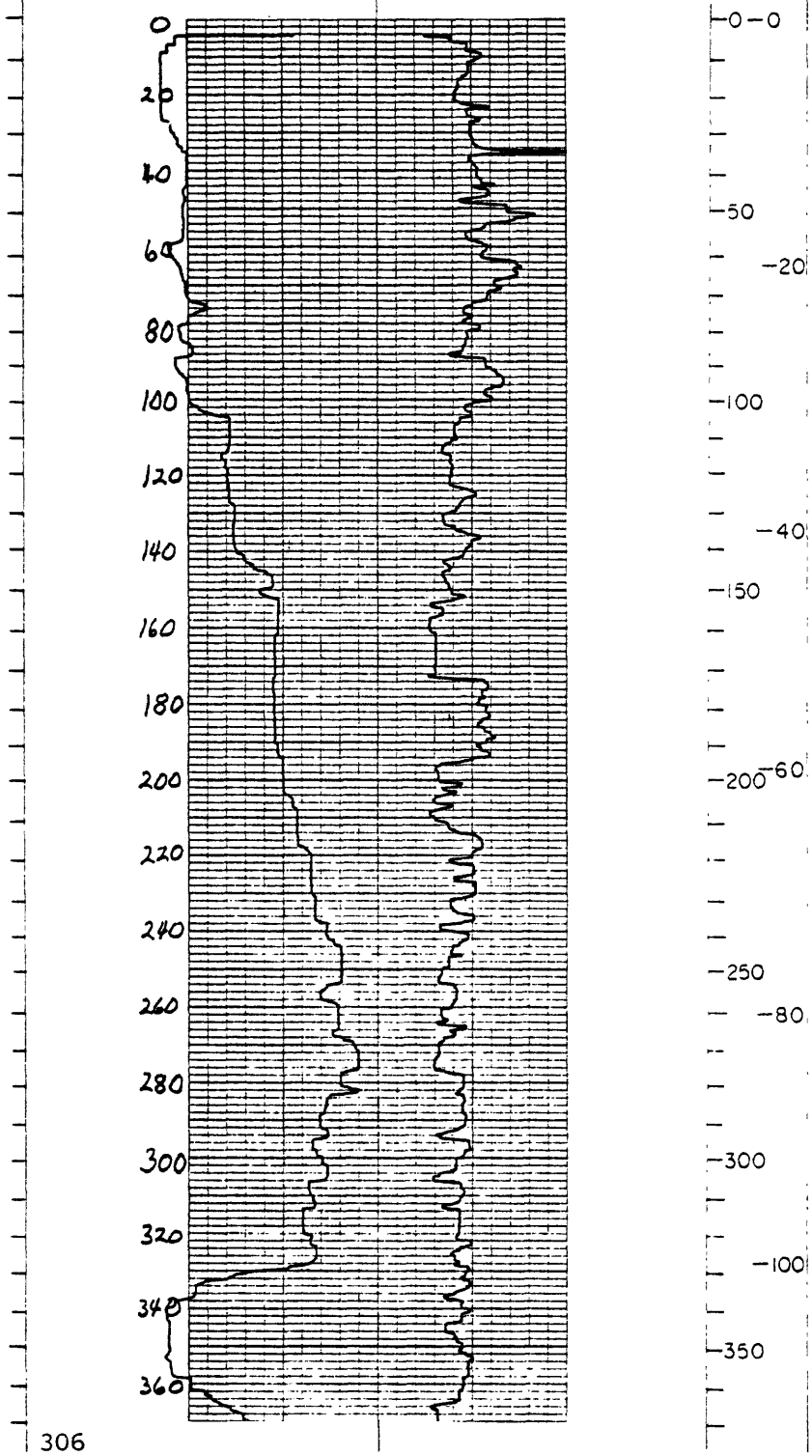
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Depth Feet / Meters
302-303	Lignite			
303-317	Claystone, dark-gray			
317-318	Lignite			
318-330	Siltstone, dark-gray, clayey			
330-370	Claystone, dark-gray, silty			
370-372	Lignite			
372-373	Claystone, dark-gray, carbonaceous			
373-374	Lignite			
374-376	Claystone, dark-gray, carbonaceous			
376-377	Lignite			
377-380	Claystone, dark-gray, carbonaceous			
380-402	Siltstone, dark-gray, clayey			



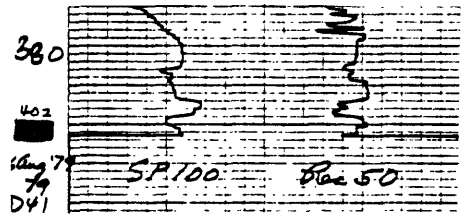
300
100
350
120
400
450
140
500
160
550
180
600

79D41 Hole number – continued

SP	Resistivity	Depth
Sens. setting 100	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402ft	Logged depth 402 ft	



SP	Resistivity	Depth
Sens. setting 100	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 402 feet	Logged depth 402 feet	



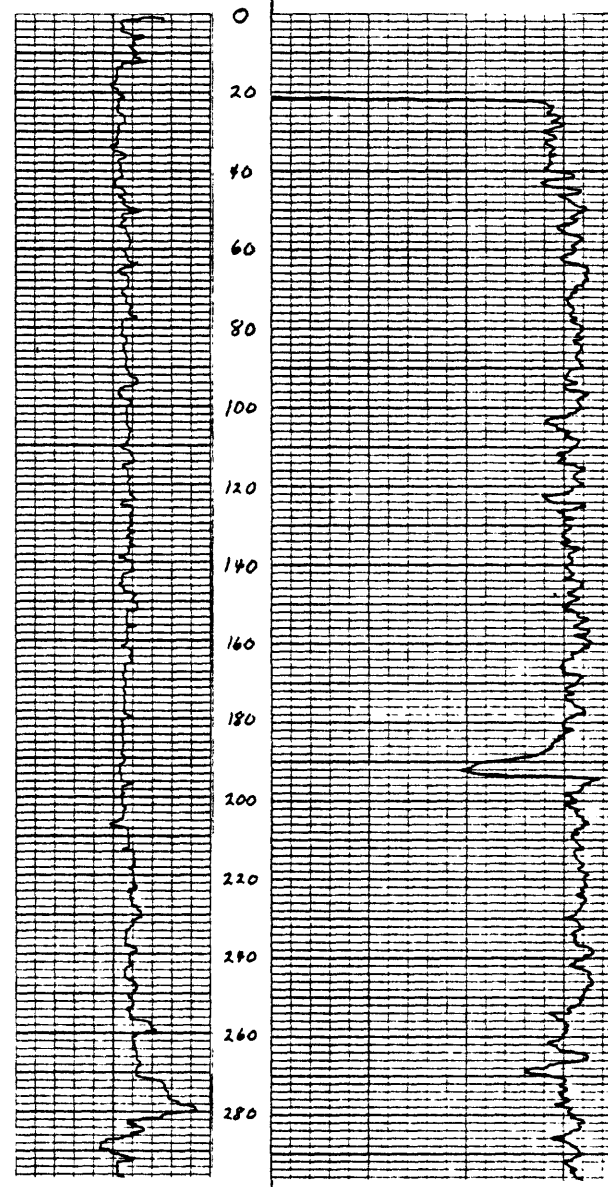
NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D42 Map: None Date: 8-21-79 State: ND County: Divide
Elev.: 2319 Location: T. 162 N, R. 99 E, Sec. 21, Tract: bbbb Drilled depth: 462 ft
Measured: 150 ft FNL, 20 ft FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds: 405-407; 440-451

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

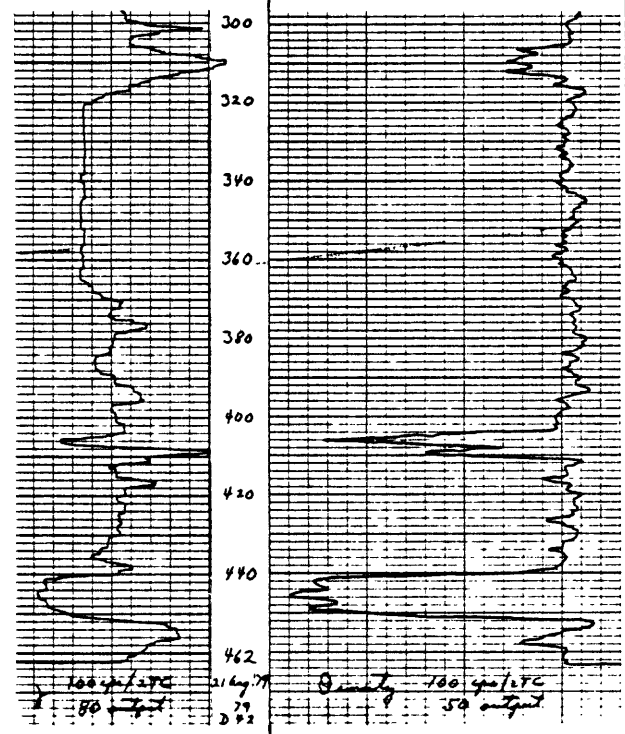
Lithology		Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 462 ft	Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 462 ft	Depth Feet	Depth Meters
0- 2	Silt, dusky-brown, clayey			0	0
2- 34	Till, dusky-brown, silty, pebbly				
34-215	Till, dark-gray, clayey, pebbly			50	20
215-255	Till, dusky-brown, silty, pebbly				
255-260	Claystone, dark-gray, silty			100	40
260-360	Siltstone, dark-gray, clayey, sandy			150	
				200	60
				250	80
				300	



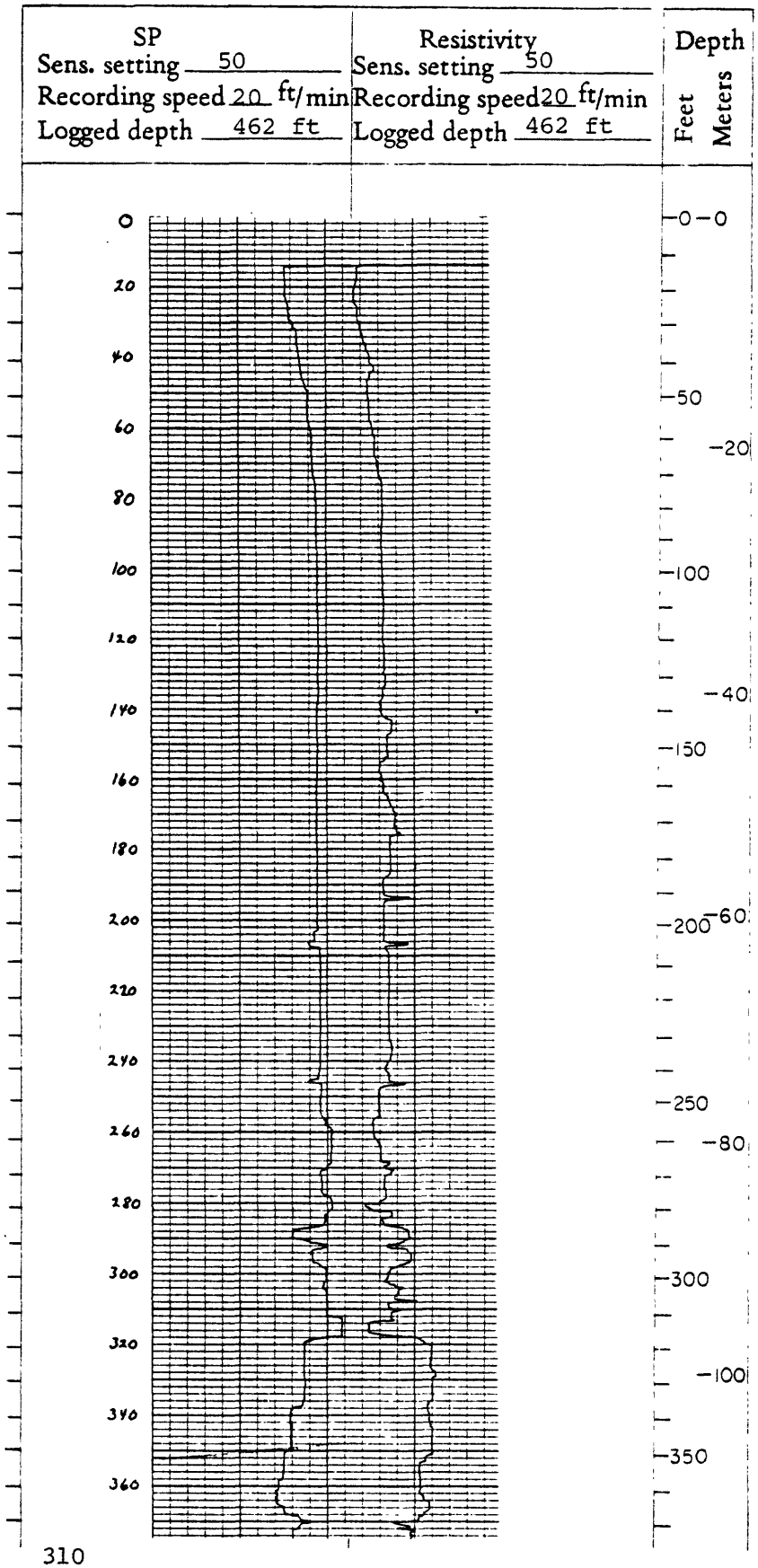
Hole number—continued

79D42

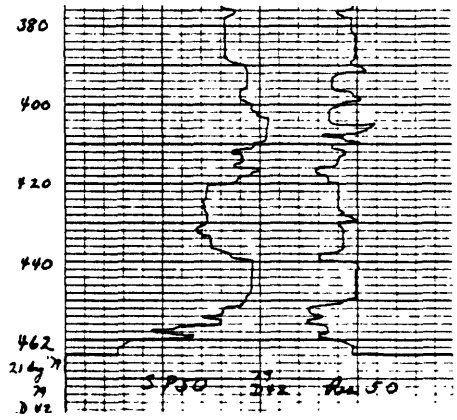
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 462 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 462 feet	Depth Feet / Meters
360-370	Sandstone, greenish-gray, medium-grained silty			
370-390	Claystone, dark-gray, silty			
390-404	Siltstone, dark-gray, clayey			
404-408	Lignite			
408-417	Claystone, dark-gray, silty			
417-421	Lignite			
421-423	Claystone, dark-gray			
423-433	Sandstone, dark-gray, medium-grained			
433-439	Claystone, dark-gray			
439-442	Lignite			
442-445	Claystone			
445-455	Lignite			
455-460	Siltstone, dark-gray, clayey, sandy			



79D42 Hole number – continued



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 462 feet	Logged depth 462 feet	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750 (Feet); 120, 140, 160, 180, 200, 220 (Meters)

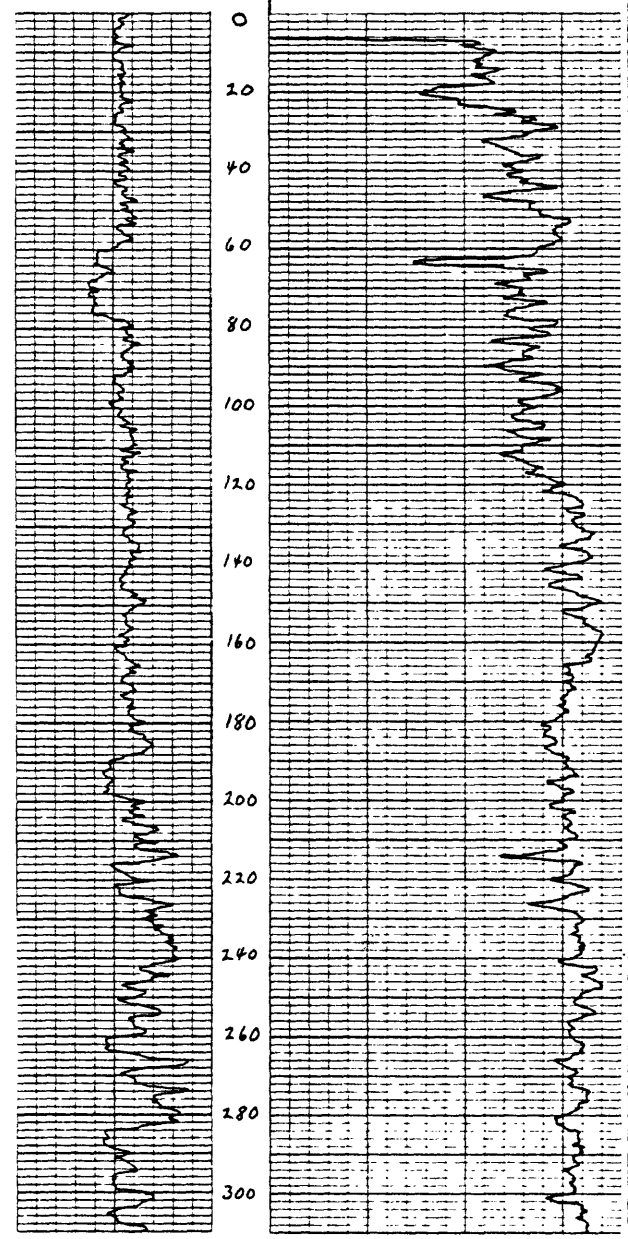
NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D43 Map: SW Crosby Date: 8-21-79 State: ND County: Divide
Elev.: 2225 Location: T.162 N, R.99 W, Sec.35, Tract: dddc Drilled depth: 702 ft
Measured: 60 ft FSL, 335 ft FEL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒
Lignite beds: 380-398

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

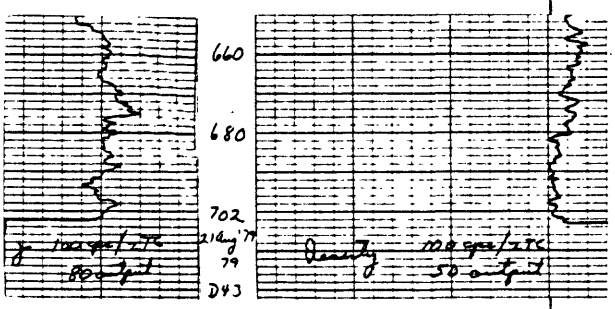
Lithology		Gamma T.C. 2 Range 100cps Recording speed 20 ft/min Logged depth 702 ft	Density T.C. 2 Range 100cps Recording speed 20 ft/min Logged depth 702 ft	Depth Feet	Depth Meters
0- 2	Silt, dusky-brown, clayey			0	0
2- 40	Till, dusky-brown, silty, pebbly			50	20
40- 60	Till, dark-gray, clayey, pebbly			100	40
60- 75	Sand, dark-gray, medium-grained, silty			150	60
75-180	Till, dark-gray, clayey, pebbly			200	80
180-235	Claystone, dusky-brown			250	100
235-240	Claystone, greenish-gray			300	120
240-315	Claystone, dark-gray				140
					160
					180
					200
					220
					240
					260
					280
					300

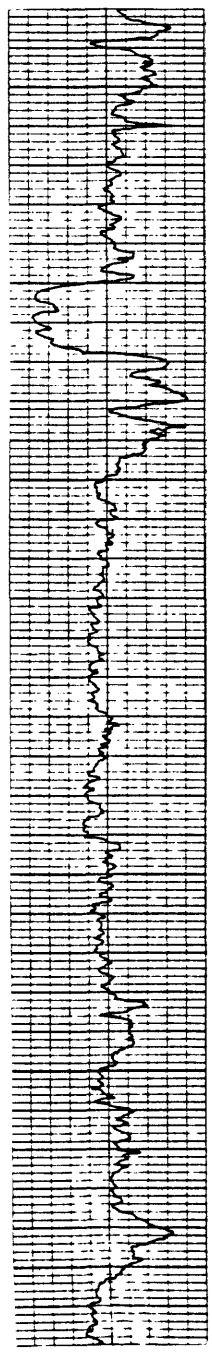


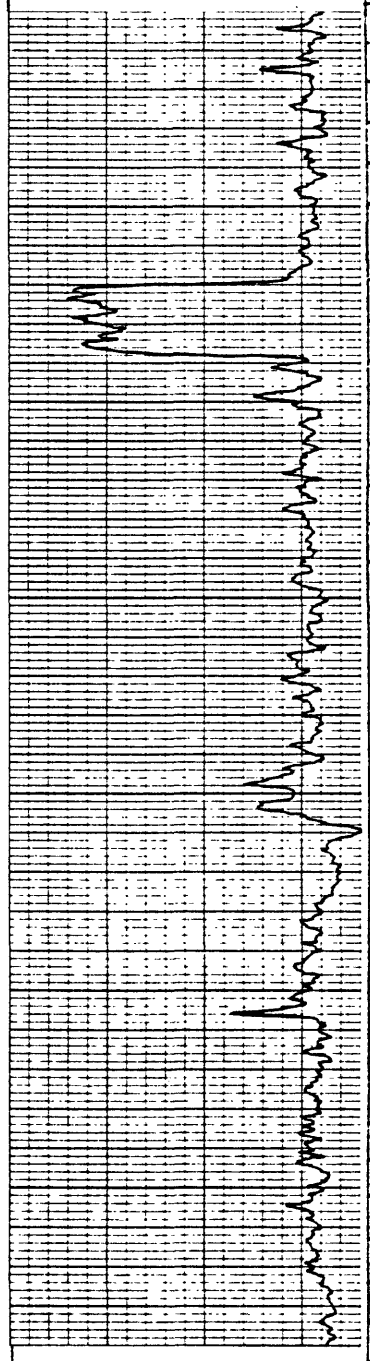
Hole number—continued

79D43

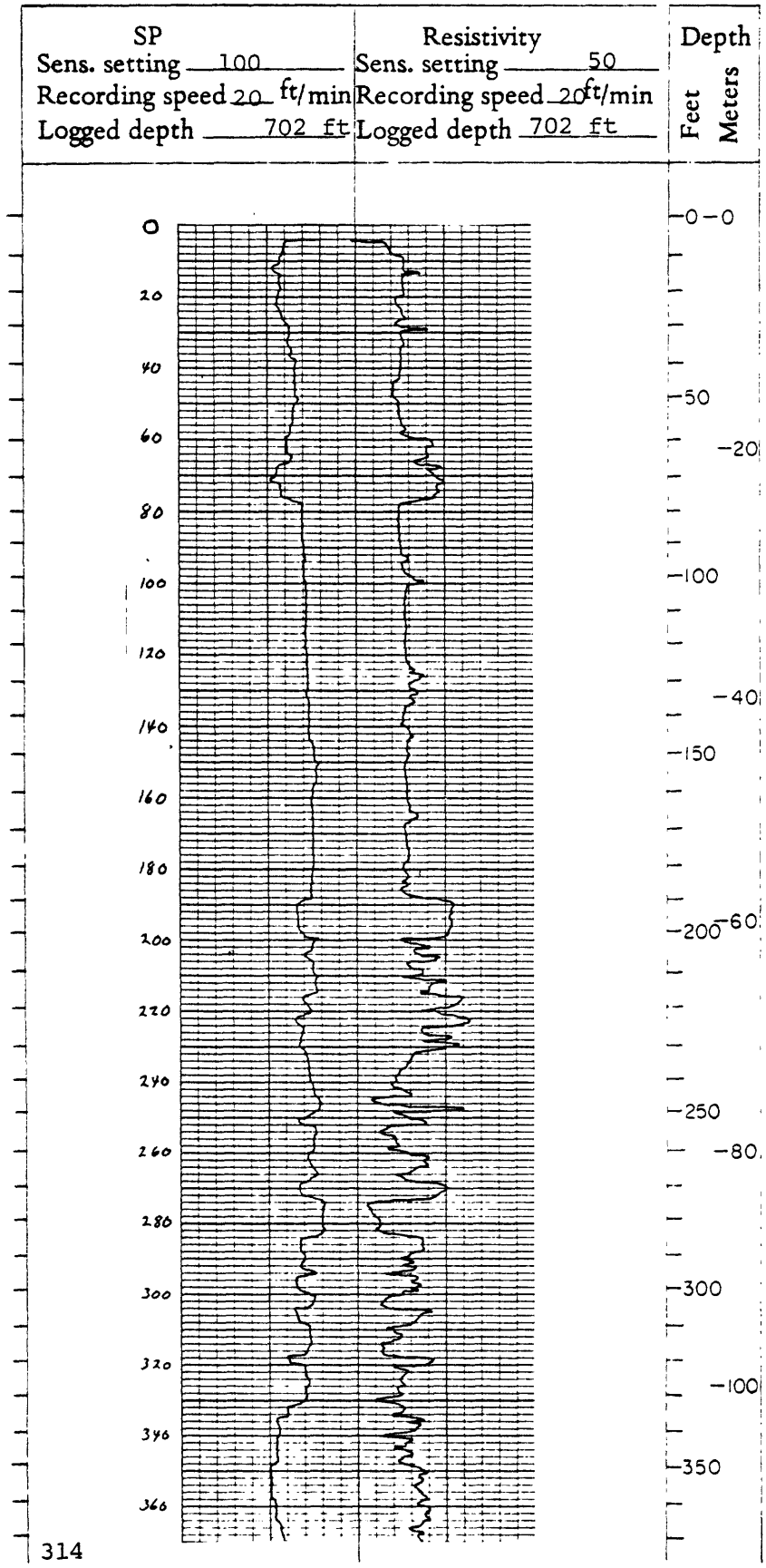
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 702 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 702 feet	Depth Feet / Meters
315-325	Siltstone, medium-gray, clayey			
325-381	Claystone, dark-gray, silty			
381-399	Lignite			
399-415	Claystone, dark-gray			
415-420	Siltstone, dark-gray, clayey			
420-500	Sandstone, greenish-gray			
500-700	No samples			

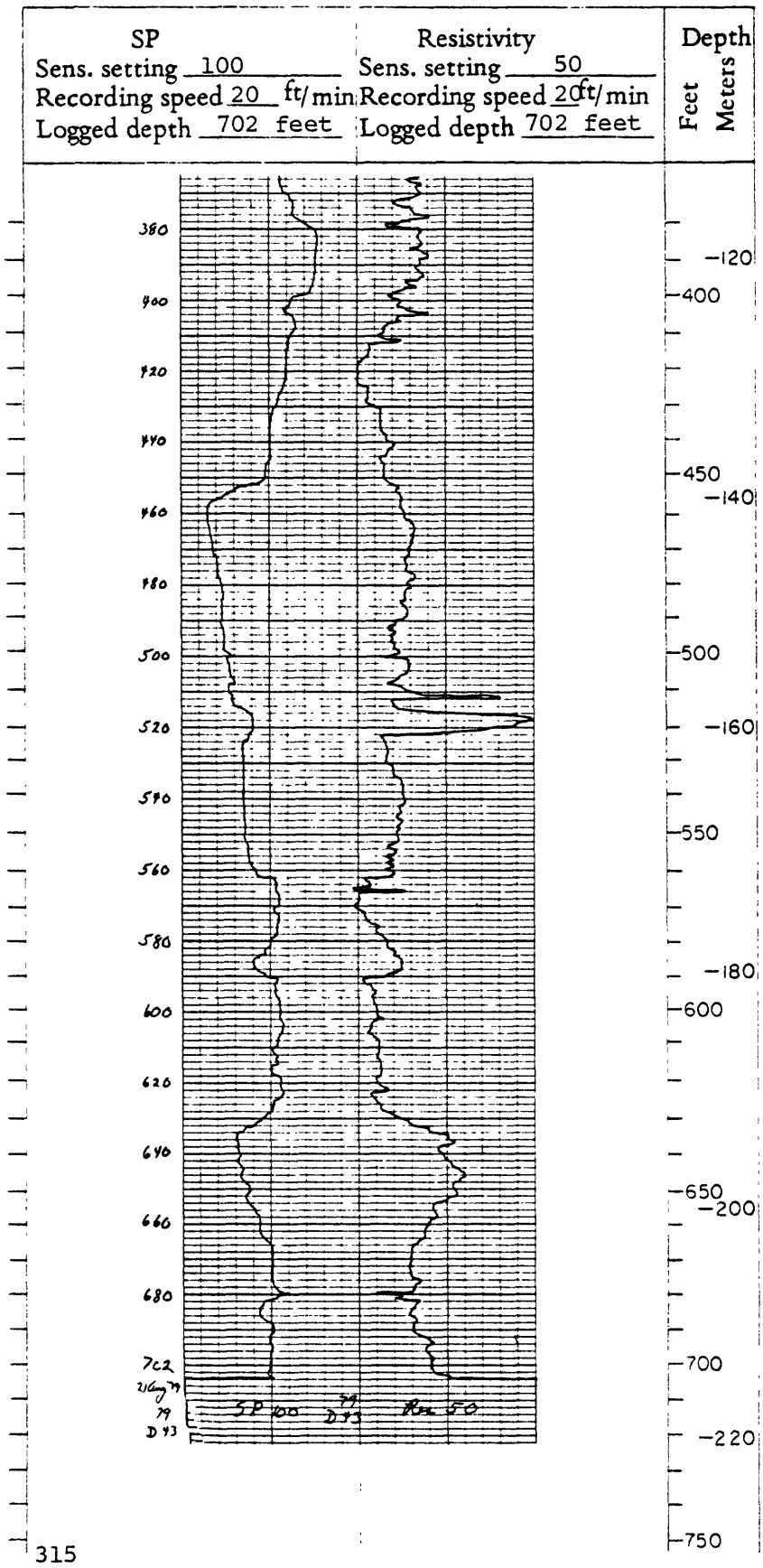






79D43 Hole number – Continued




SP
Sens. setting 100
Recording speed 20 ft/min
Logged depth 702 feet
Resistivity
Sens. setting 50
Recording speed 20 ft/min
Logged depth 702 feet
Depth
Feet
Meters
380
400
420
440
460
480
500
520
540
560
580
600
620
640
660
680
702
SP 100
Res 50
400
450
500
550
600
650
700
750
120
140
160
180
200
220

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D44 Map: None Date: 8-23-79 State: ND County: Divide

Elev.: 2219 Location: T. 162 N S, R. 100 E W, Sec. 27, Tract: abbb Drilled depth: 422 ft

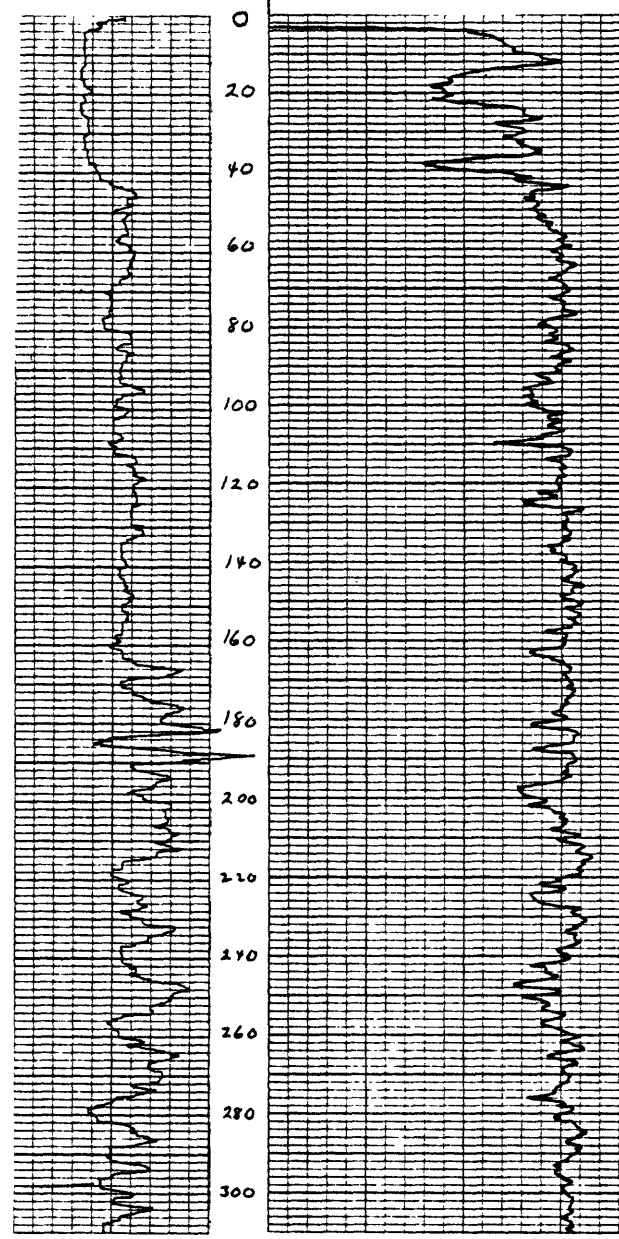
Measured: 39 ft ~~FSL~~ FNL, 2000 ft ~~FWL~~ FEL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 330-335; 355-357; 404-422

Remarks:

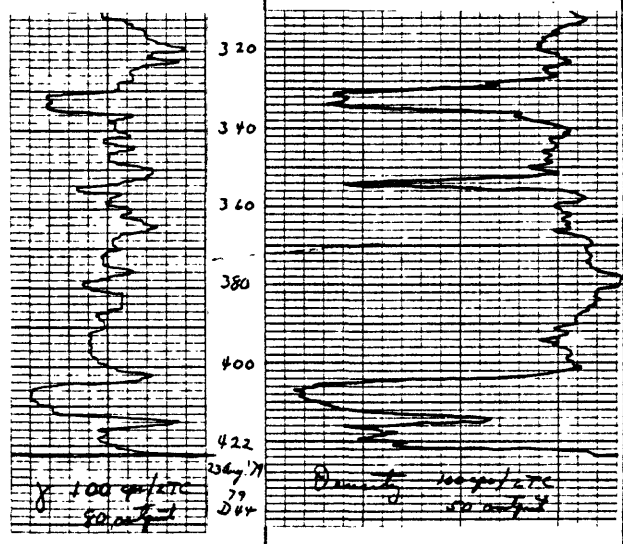
Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 422 ft	Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 422 ft	Depth Feet	Depth Meters
0- 1	Silt, dusky-grown, gravelly				
1- 41	Gravel, coarse-grained, sandy				
41-116	Till, dark-gray, clayey, pebbly				
116-182	Till, dusky-brown, clayey, pebbly				
182-275	Claystone, dark-gray				
275-276	Lignite				
276-327	Claystone, dark-gray				

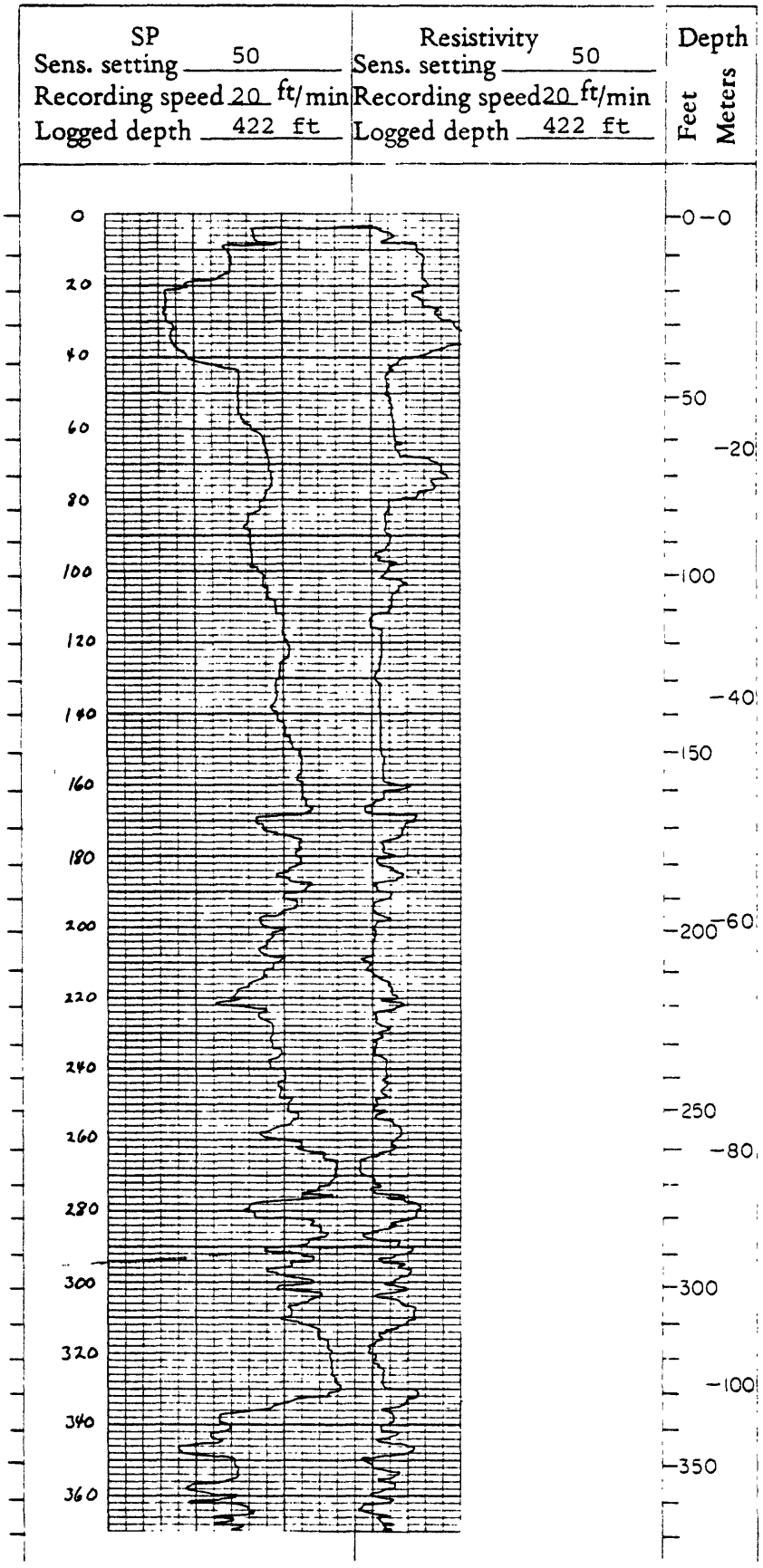


79D44

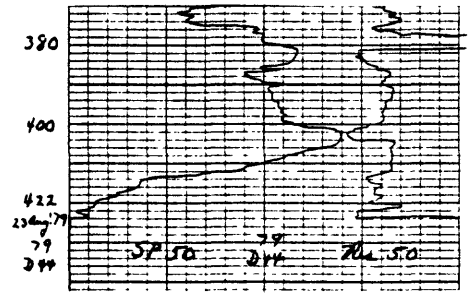
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 422 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 422 feet	Depth Feet / Meters
327-336	Lignite			
336-338	Claystone, dark-gray, carbonaceous			
338-341	Lignite			
341-347	Claystone, dark-gray, carbonaceous			
347-352	Lignite			
352-399	Claystone, dark-gray, carbonaceous			
399-402	Lignite			
402-404	Claystone, dark-gray, carbonaceous			
404-412	Lignite			
412-416	Claystone, dark-gray			
416-418	Lignite			
418-422	Claystone, dark-gray			



79D44 Hole number - continued



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 422 feet	Logged depth 422 feet	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D45 Map: No Topo Date: 8-7-79 State: ND County: Divide

Elev.: 2250 Location: T. 162 N/S, R. 102 E/W, Sec. 1, Tract: cccc Drilled depth: 342 ft

Measured: 118 ft FSL, 42 ft FWL Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

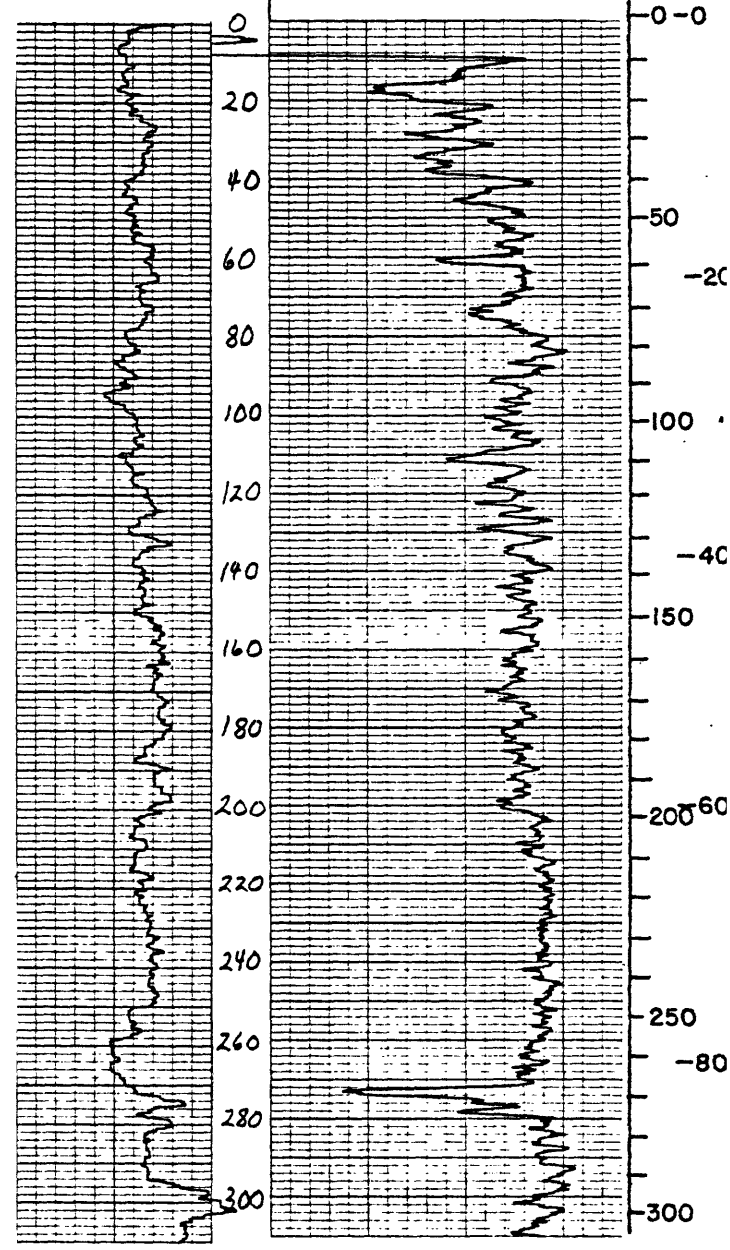
Lignite beds: 272-274

Remarks:

Lithology Recorded by: Clarence Carlson Geologist Yes Geophysical logs recorded by: Lechner

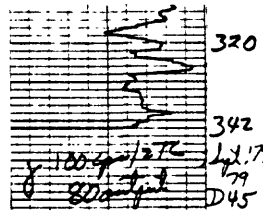
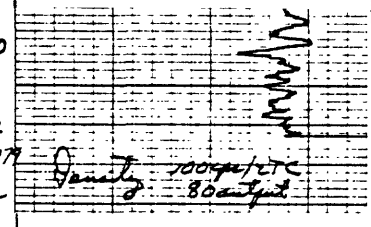
Lithology	Gamma	Density	Depth
	T.C. 2 Range 100cps Recording speed 20 ft/min Logged depth 342 ft	T.C. 2 Range 100cps Recording speed 20 ft/min Logged depth 342 ft	Feet / Meters

0- 12 Till, brownish-gray
12- 14 Gravel
14- 17 Clay, yellowish-brown
17- 35 Claystone, moderate-brown
35- 40 Claystone, medium-gray
40- 50 Siltstone, brownish-gray
50- 75 Claystone, medium-gray, silty
75- 87 Till, medium-gray
87- 92 Gravel, sand
92-257 Clay, medium-gray, silty
257-305 Bedrock, poor samples to 305

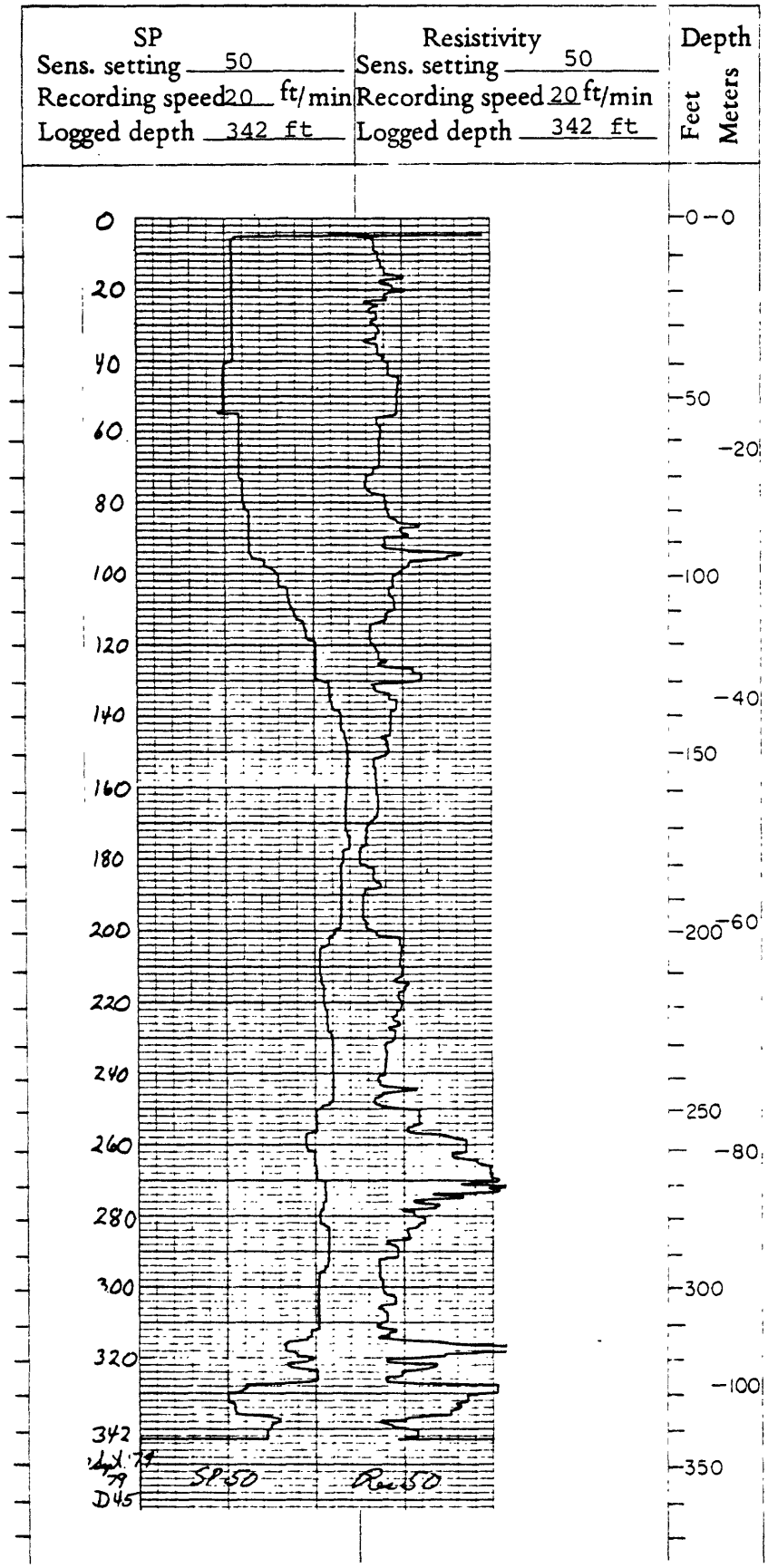


Hole number—continued

79D45

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Depth Feet / Meters
305-314 Siltstone, greenish-gray, clayey 314-342 Sandstone			300 100 350 120 400 450 140 500 160 550 180 600

79D45 Hole number – continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D46 Map: None Date: 8 29 79 State: ND County: Divide

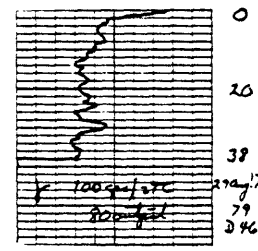
Elev.: 2125 Location: T. 162 N/S, R. 102 E/W, Sec. 17, Tract: cccc Drilled depth: 40 ft

Measured: 32 ft FSL, 76 ft FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds:

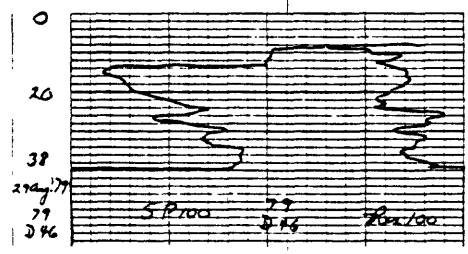
Remarks: No Density log run

Lithology Recorded by: Clarence Carlson Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma T.C. 2 Range 100cps Recording speed 20 ft/min Logged depth 38 ft	Density T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Depth Feet / Meters
0- 40 Gravel			0 -0 50 -20 100 -40 150 200 -60 250 -80 300

79D46 Hole number – continued

SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 38 ft	Logged depth 38 ft	



0 – 0
50
– 20
100
– 40
150
200 – 60
250
– 80
300
– 100
350

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D47 Map: None Date: 8 30 79 State: ND County: Divide

Elev.: 2137 Location: T. 162 N, R. 103 E, Sec. 11, Tract: addd Drilled depth: 362 ft

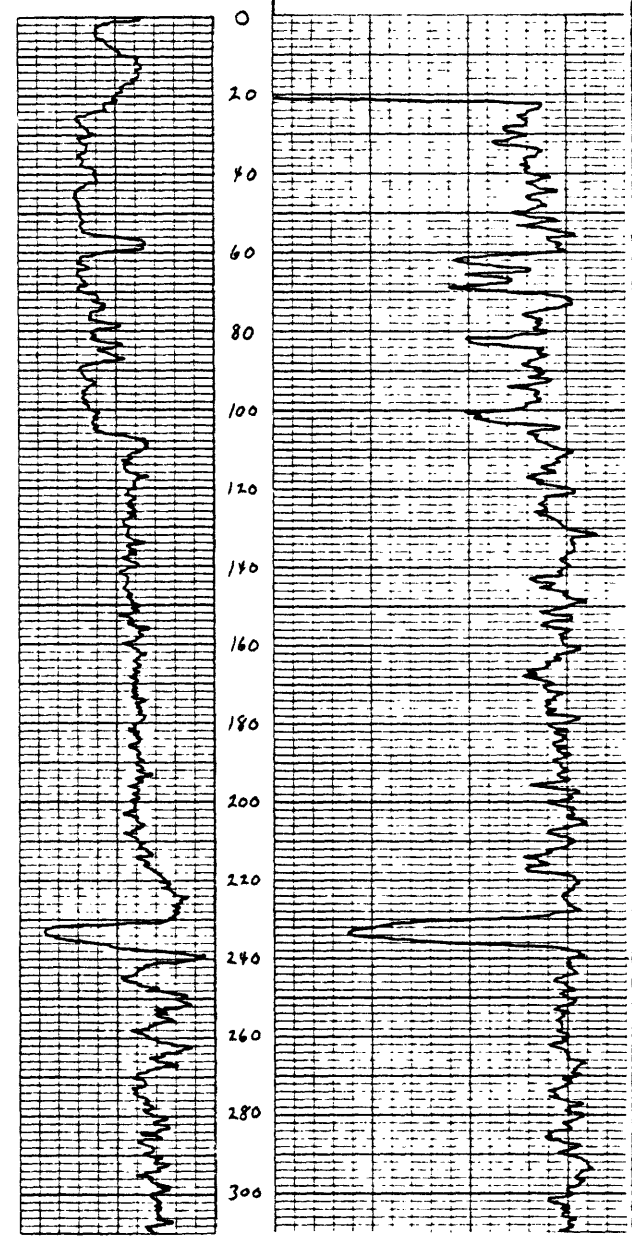
Measured: 2600 ft FNL, 286 ft FEL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 230-236

Remarks:

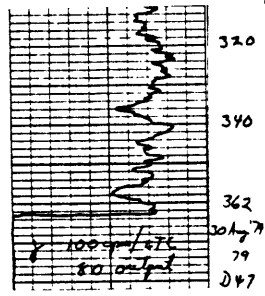
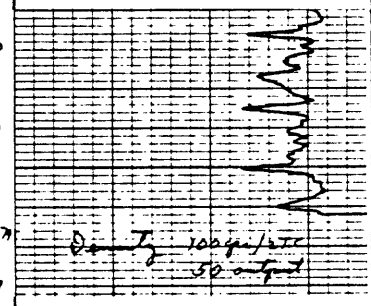
Lithology Recorded by: Clarence Carlson Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 362 ft	Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 362 ft	Depth Feet	Depth Meters
0- 7	Gravel			0	0
7- 8	Till, yellowish-brown				
8- 32	Gravel			20	
32- 38	Till, medium-gray				
38- 75	Gravel			40	
75- 80	Till, medium-gray				
80-105	Gravel			50	
105-137	Till, medium-gray, clayey			60	20
137-140	Gravel, much lignite				
140-177	Till, medium-gray, clayey			80	
177-180	Sand				
180-185	Siltstone, light-gray			100	100
185-200	Claystone, medium light-gray, silty				
200-205	Siltstone, light-gray			120	
205-213	Claystone, medium-light-gray			140	40
213-215	Claystone, light-brownish-gray				
215-217	Claystone, light-gray			160	150
217-221	Siltstone, light-gray				
221-223	Claystone, light-gray			180	
223-232	Lignite				
232-235	Claystone, brownish-gray			200	200 60
235-240	Claystone, medium-gray				
240-260	Claystone, very light-gray, silty			220	
260-320	Sandstone, light-gray, silty			240	250
				260	80
				280	
				300	300



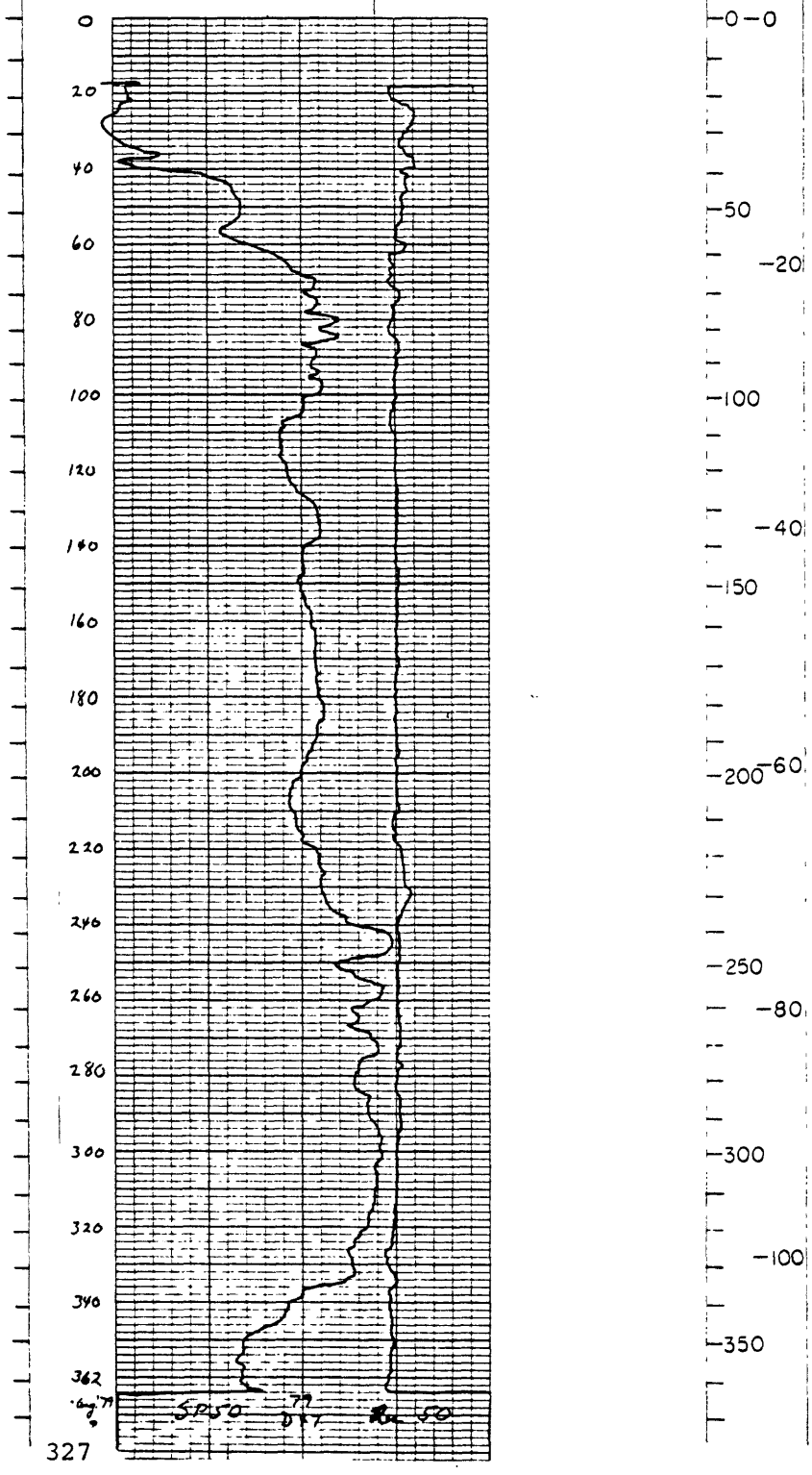
Hole number—continued

79D47

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 362 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 362 feet	Depth Feet / Meters
320-362 No samples			300 100 350 120 400 450 140 500 160 550 180 600

79D47 Hole number – continued

SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 362 ft	Logged depth 362 ft	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D48 Map: None Date: 8 29 79 State: ND County: Divide

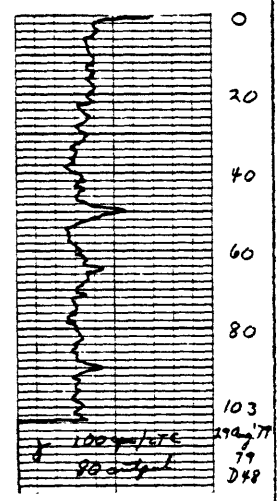
Elev.: 2147 Location: T. 162 N/S, R. 103 E/W, Sec. 27, Tract: adad Drilled depth: 120 ft

Measured: 1960 ft FNL/FSL, 42 ft FEL/FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds:

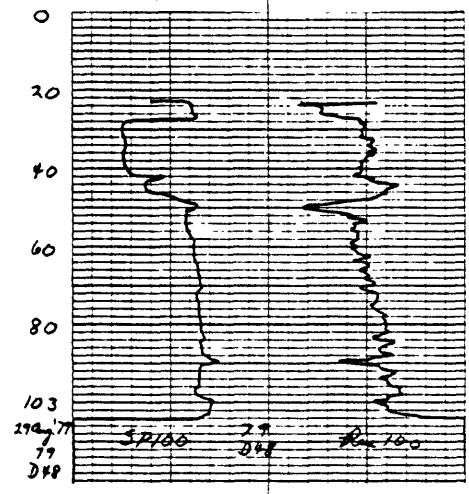
Remarks: No density log run

Lithology Recorded by: Clarence Carlson Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma T.C. 2 Range 100cps Recording speed 20 ft/min Logged depth 103 ft	Density T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Depth Feet / Meters
0-120 Gravel			0 / 0, 50, 100, 150, 200, 250, 300; 20, 40, 60, 80, 100, 120 / 40, 60, 80

79D 48 Hole number— continued

SP	Resistivity	Depth
Sens. setting _____	Sens. setting _____	Feet / Meters
Recording speed ___ ft/min	Recording speed ___ ft/min	
Logged depth _____	Logged depth _____	



0 — 0
50 — 20
100 — 40
150
200 — 60
250 — 80
300 — 100
350

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D49 Map: None Date: 8/29/79 State: ND County: Divide

Elev.: 2127 ft Location: T.162 N/S, R.103 E/W, Sec.34, Tract: caba Drilled depth: 342 ft

Measured: 2108 ft FNL/FSL, 718 ft FEL/FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

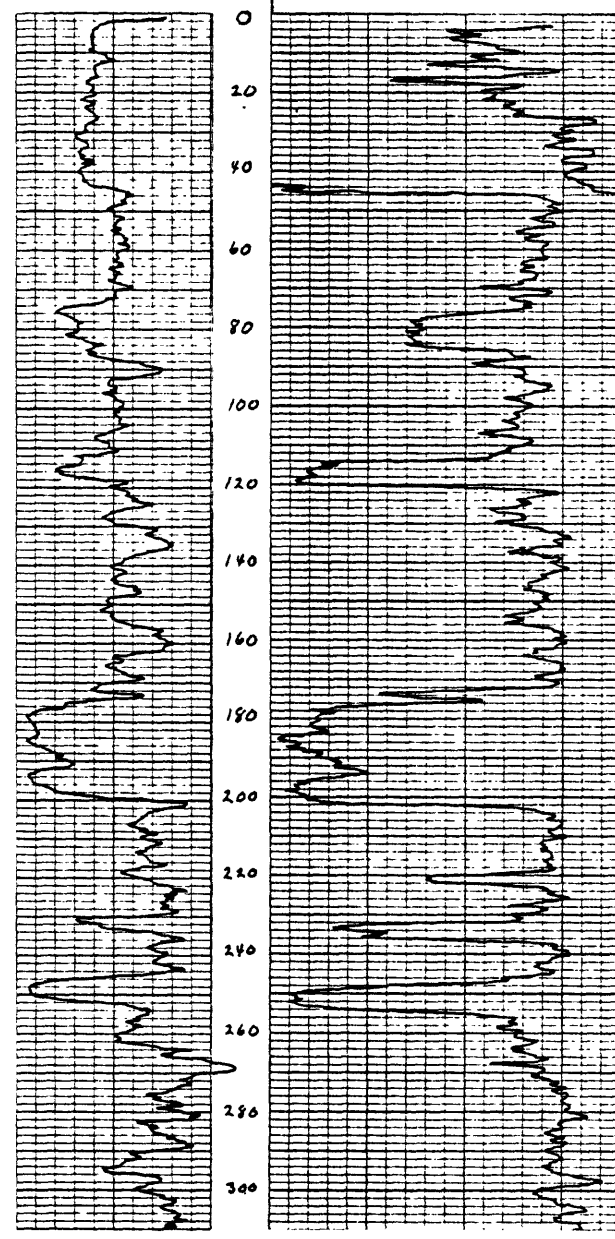
Lignite beds: 112-119; 174-200; 218-220; 230-234; 246-252.5

Remarks:

Lithology Recorded by: Clarence Carlson Geologist Yes

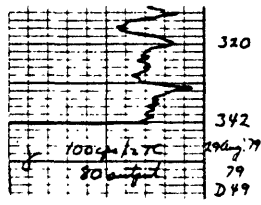
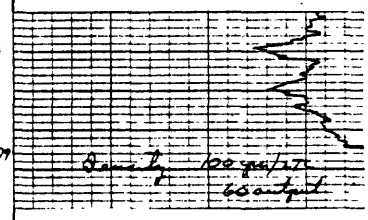
Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 342 ft	Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 342 ft	Depth Feet	Depth Meters
0- 40	Gravel, coarse, well rounded			0	0
40- 72	Till, medium-gray, clayey, silty			20	
72- 84	Sand			40	
84-107	Sandstone, light-gray, silty			50	
107-112	Lignite			60	20
112-115	Claystone, light-gray			80	
115-123	Siltstone, light-gray			100	
123-127	Sandstone			120	
127-135	Claystone, light-gray			140	40
135-142	Siltstone, light-gray, sandy			150	
142-158	Siltstone, light-gray, clayey			160	
158-164	Claystone, light-gray			180	
164-196	Lignite			200	60
196-205	Claystone, light-gray			220	
205-213	Claystone, light-gray, silty			240	
213-214	Lignite			250	
214-224	Siltstone, light-gray			260	80
224-227	Claystone, light-gray			280	
227-228	Lignite			300	
228-233	Claystone, light-greenish-gray				
233-238	Siltstone, light-greenish-gray				
238-243	Claystone, light-gray				
243-250	Lignite				
250-255	Siltstone, light-gray				
255-264	Claystone, light-gray, silty				
264-283	Claystone, light-greenish-gray				
283-286	Claystone, brownish-gray				
286-290	Siltstone, light-greenish-gray, sandy				
290-302	Claystone, light-greenish-gray				



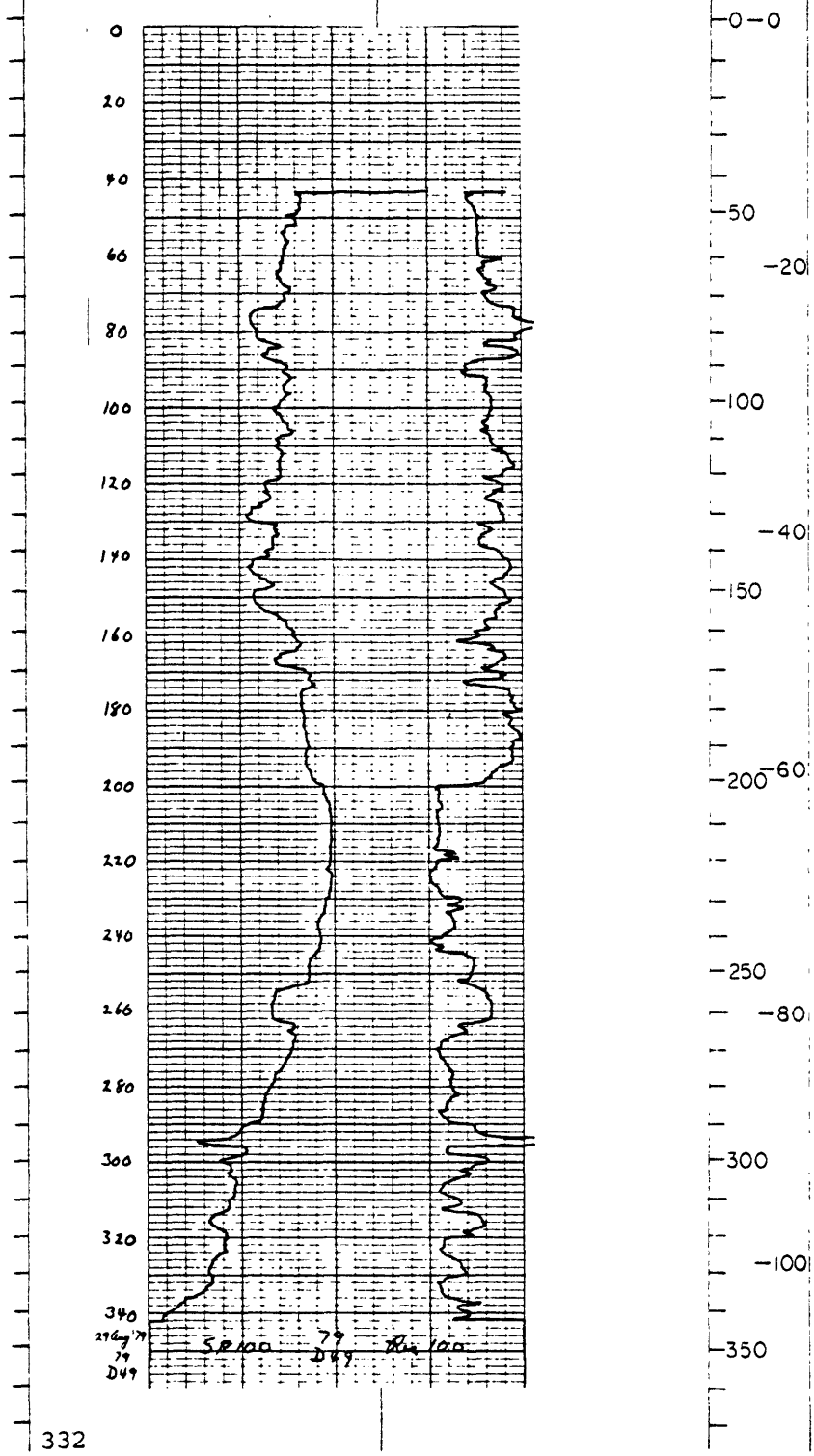
Hole number—continued

79D49

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 ft	Depth Feet / Meters
302-307	Claystone, brownish-gray			300
307-317	Claystone, very light-brownish-gray			−100
317-321	Claystone, brownish-gray			
321-340	Claystone, light-greenish-gray			350
				−120
				400
				450
				−140
				500
				−160
				550
				−180
				600

79D49 Hole number – continued

SP	Resistivity	Depth
Sens. setting 100	Sens. setting 100	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 340 ft	Logged depth 340 ft	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D50 Map: Atcoal Date: 8 13 79 State: ND County: Divide

Elev.: 1908 Location: T. 163 N/S, R. 95 E/W, Sec. 14, Tract: cccc Drilled depth: 300 ft

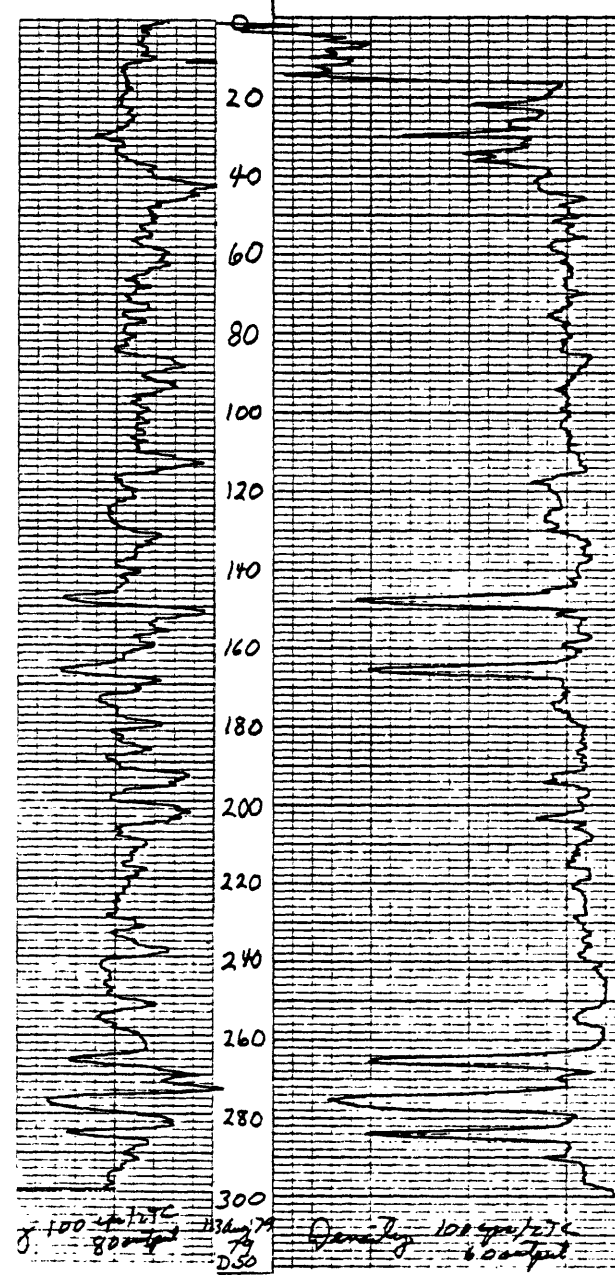
Measured: 30 ft FNL/FSL, 51 ft FEL/FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 146.5-149; 164-167; 264-267; 274-278; 283-285

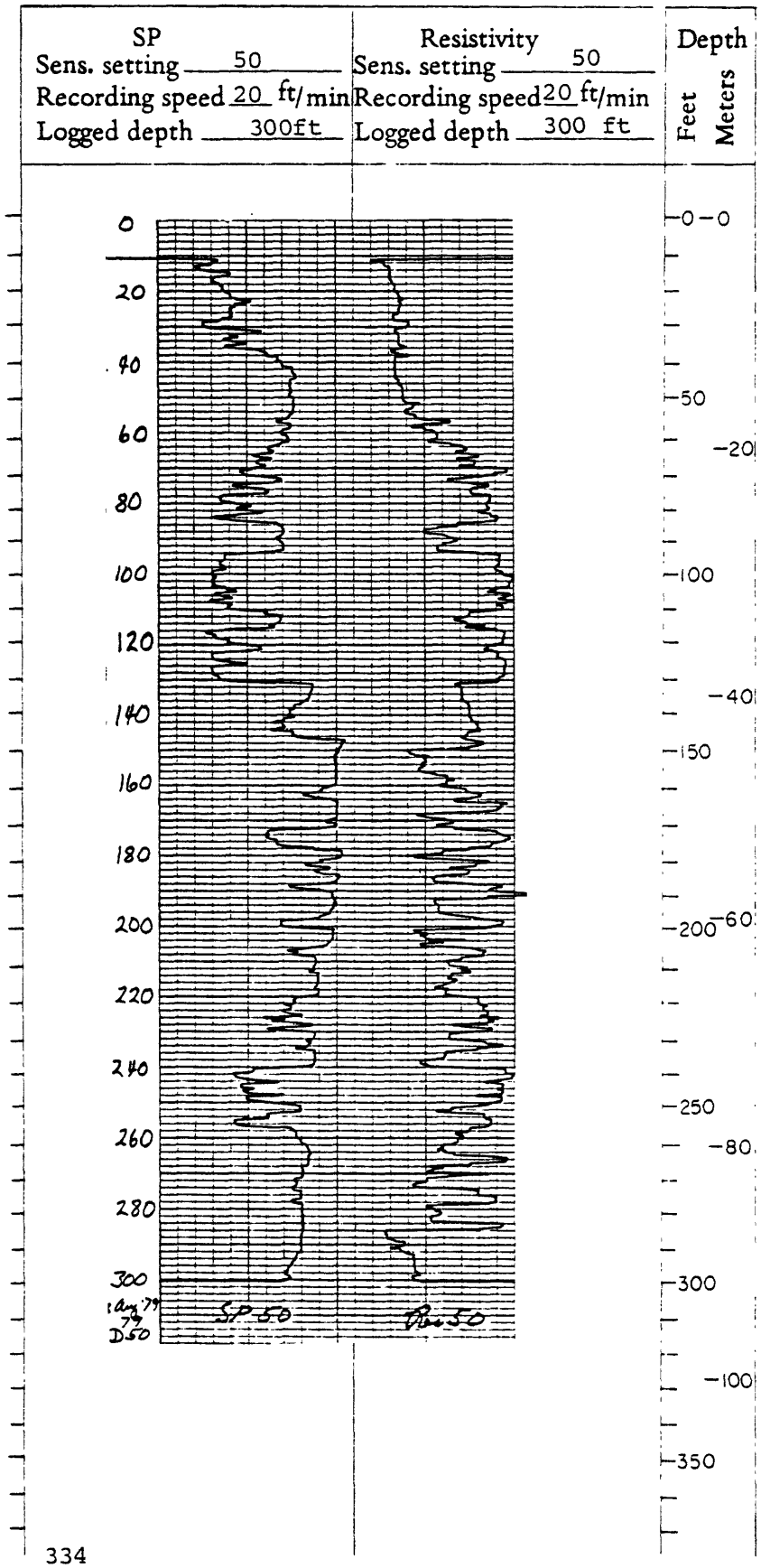
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 300 ft	Density: T.C. 2 Range 100cps; Recording speed 20ft/min; Logged depth 300 ft	Depth Feet	Depth Meters
0- 1	Silt, black, clayey			0	0
1- 27	Till, brownish-gray, silty, pebbly				
27- 33	Sand, brownish-gray, medium-grained, gravelly			20	
33- 37	Till, brownish-gray, silty, pebbly			40	
37- 43	Claystone, brownish-gray, silty			50	
43- 84	Claystone, medium-gray			60	20
84-115	Claystone, greenish-gray, silty			80	
115-142	Siltstone, medium-gray, clayey			100	
142-143	Lignite			120	
143-157	Claystone, medium-gray			140	40
157-166	Siltstone, medium-gray, clayey			150	
166-168	Lignite			160	
168-175	Siltstone, greenish-gray, clayey			180	
175-180	Siltstone, greenish-gray, sandy			200	60
180-250	Siltstone, greenish-gray, clayey			220	
250-264	Claystone, medium-gray, silty			240	
264-266	Lignite			250	
266-272	Siltstone, dark-gray, clayey			260	80
272-274	Lignite			280	
274-283	Siltstone, dark-gray, clayey			300	300
283-285	Lignite				
285-300	Sandstone, medium-gray, medium-grained, clayey				



79D50 Hole number – continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D51 Map: At coal Date: 8-13-79 State: ND County: Divide

Elev.: 1912 feet Location: T. 163 N, R. 95 W, Sec. 24, Tract: dcdc Drilled depth: 302 feet

Measured: 36 ft FSL, 1488 ft FEL Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

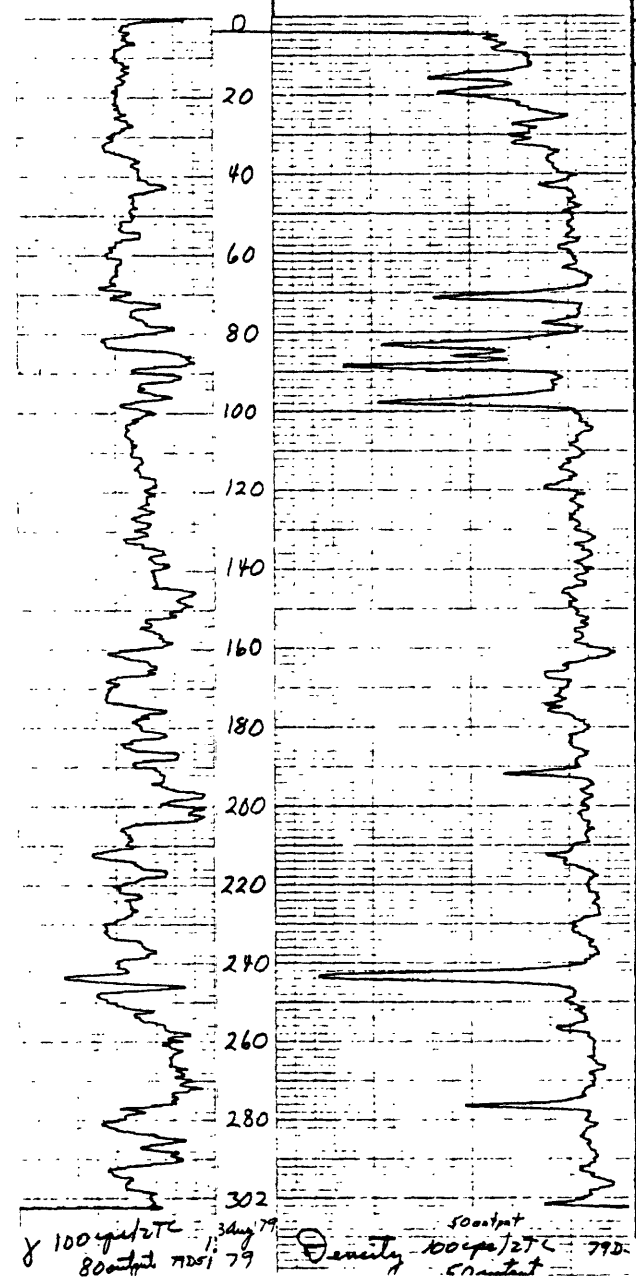
Lignite beds: 70-72; 82-84; 88-90; 96-98; 242-244.5

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma	Density	Depth
		T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 302 feet	T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 302 feet	Feet / Meters

0- 2	Silt, brownish-black, clayey
2- 15	Till, reddish-brown, silty, sandy
15- 25	Till, dusky-brown, silty
25- 35	Sandstone, reddish-brown, medium-grained, silty
35- 38	Claystone, reddish-brown, medium-gray
38- 45	Claystone, medium-gray
45- 55	Siltstone, medium-gray, clayey
55- 65	Sandstone, medium-gray, medium-grained, silty
65- 70	Claystone, medium-gray
70- 72	Lignite
72- 82	Siltstone, medium-gray, clayey
82- 84	Lignite
84- 87	Claystone, dark-gray, carbonaceous
87- 88	Lignite
88- 90	Claystone, greenish-gray
90- 91	Claystone, medium-gray
91- 96	Siltstone, medium-gray
96- 98	Lignite
98-118	Siltstone, medium-gray, clayey
118-123	Claystone, medium-gray
123-132	Siltstone
132-187	Claystone, medium-gray
187-188	Lignite
188-200	Claystone, medium-gray
200-238	Siltstone, medium-gray, clayey
238-239	Lignite
239-241	Siltstone, medium-gray, clayey
241-242	Lignite
242-246	Claystone, medium-gray
246-250	Siltstone, medium-gray, clayey

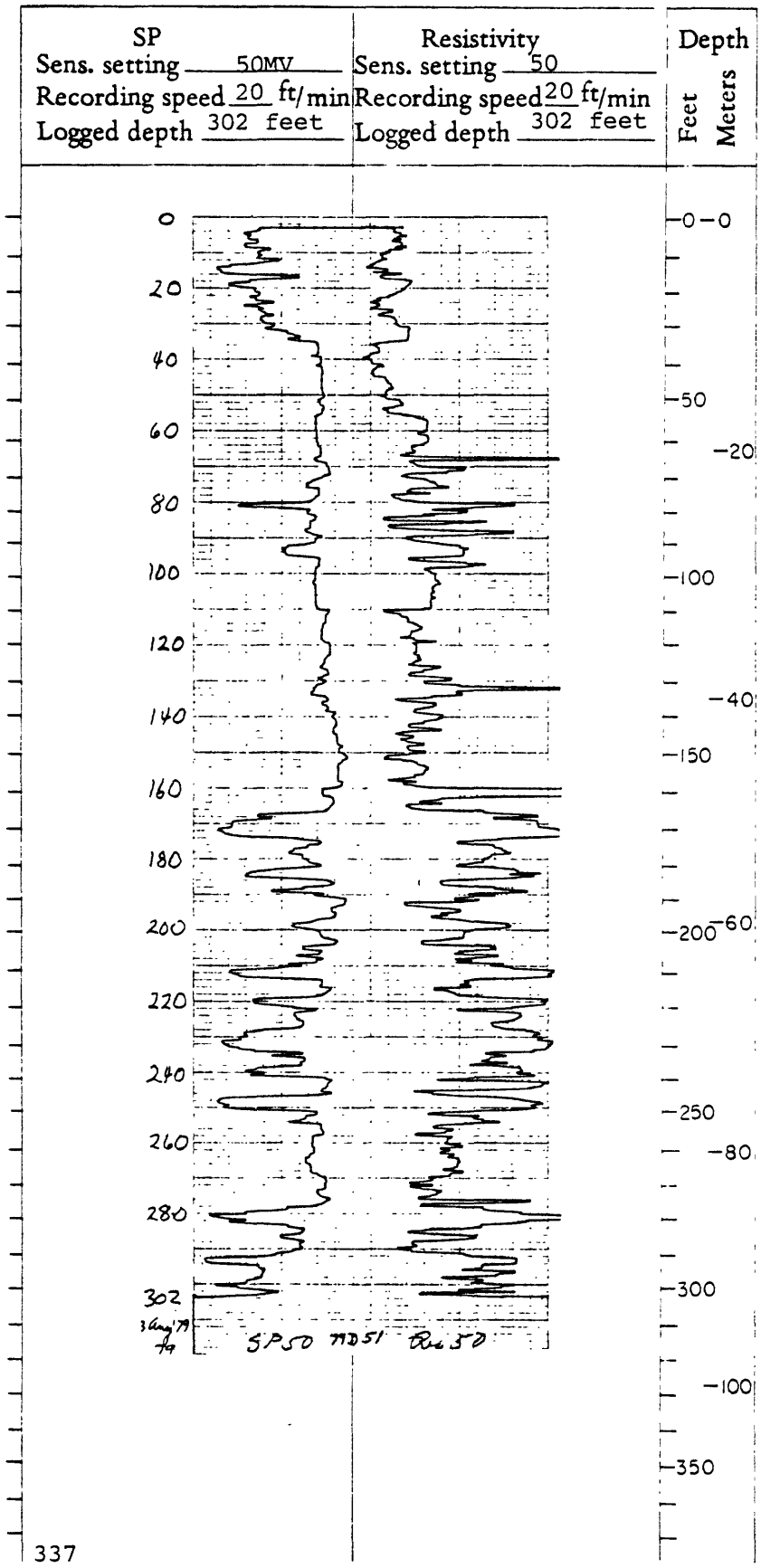


Hole number—continued

79D51

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 302 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 302 feet	Depth Feet / Meters
250-261 Claystone, medium-gray 261-262 Lignite 262-300 Claystone, medium-gray			300 100 350 120 400 450 140 500 160 550 180 600

79D51 Hole number – continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D52 Map: Paulson Date: 8-14-79 State: ND County: Divide

Elev.: 1913 feet Location: T. 163 N, R. 96 W, Sec. 18, Tract: CCCC Drilled depth: 120 feet

Measured: 110 ft FSL, 200 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

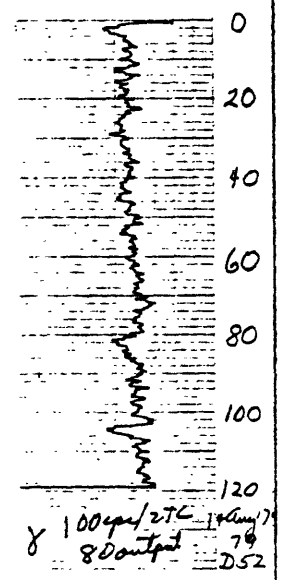
Lignite beds:

Remarks: No density log run

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma	Density	Depth
	T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 120 feet	T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 120 feet	Feet / Meters

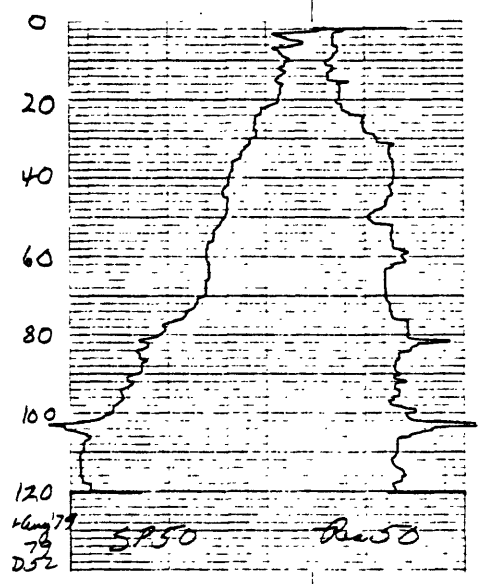
0- 2 Silt, brownish-gray, clayey
2- 44 Till, dusky-brown, silty, pebbly
44- 46 Gravel, coarse-grained, sandy
46-120 Till, dusky-brown, silty, sandy, pebbly



Depth: 0, 50, 100, 150, 200, 250, 300 Feet; 0, 20, 40, 60, 80 Meters

79D52 Hole number – continued

SP	Resistivity	Depth
Sens. setting 50 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 120 feet	Logged depth 120 feet	



0 – 0
50 – 20
100 – 40
150
200 – 60
250 – 80
300 – 100
350

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D53 Map: Crosby Date: 8-14-79 State: ND County: Divide

Elev.: 1932 feet Location: T. 163 N, R. 98 W, Sec. 1, Tract: aaab Drilled depth: 342 feet

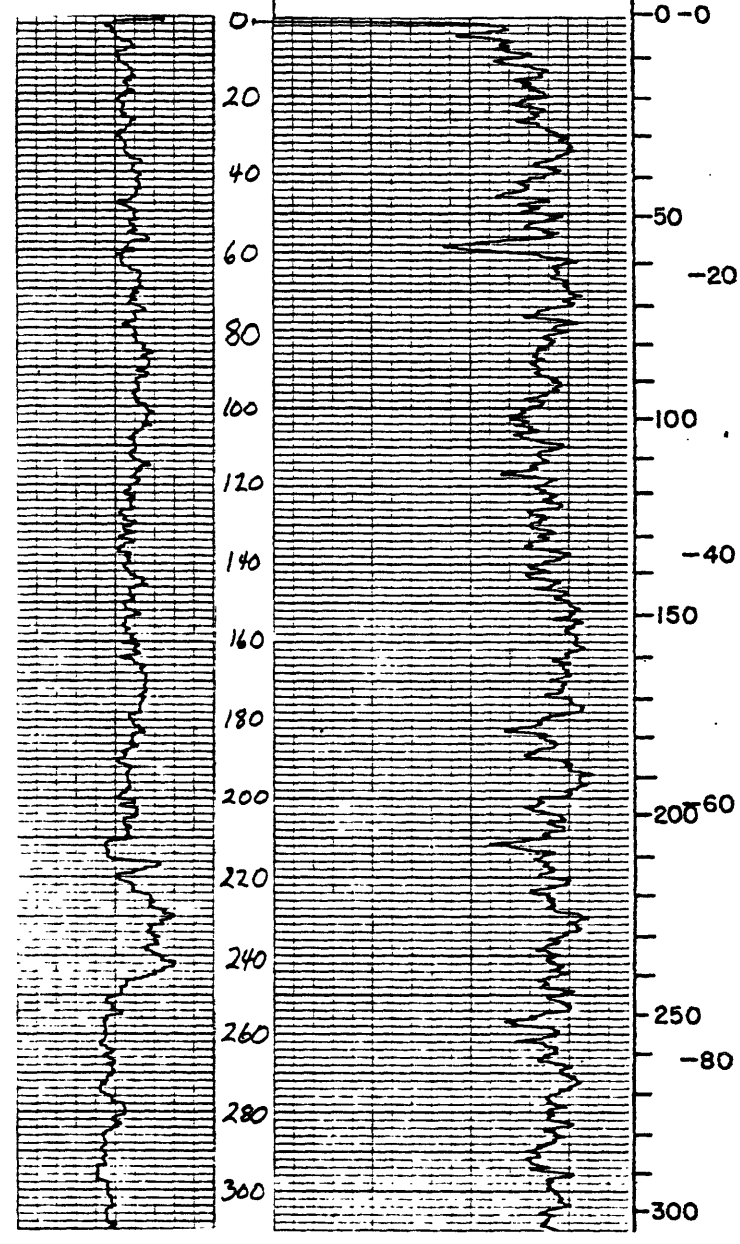
Measured: 10 ft FNL, 528 ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds:

Remarks:

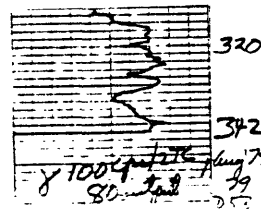
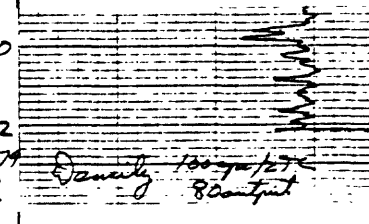
Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 342 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 342 feet	Depth Feet	Depth Meters
0- 12	Silt, dusky-brown, sandy, pebbly				
12- 63	Till, dusky-brown, silty, pebbly				
63-163	Till, dark-gray, clayey, pebbly				
163-166	Gravel, coarse-grained, sandy				
166-184	Till, dusky-brown, silty, sandy, pebbly				
184-205	Till, dark-gray, silty, sandy, pebbly				
205-222	Siltstone, medium-gray, clayey, sandy				
222-228	Claystone, dark-gray				
228-242	Claystone, greenish-gray, silty				
242-313	Sandstone, greenish-gray, medium-grained, clayey silty				



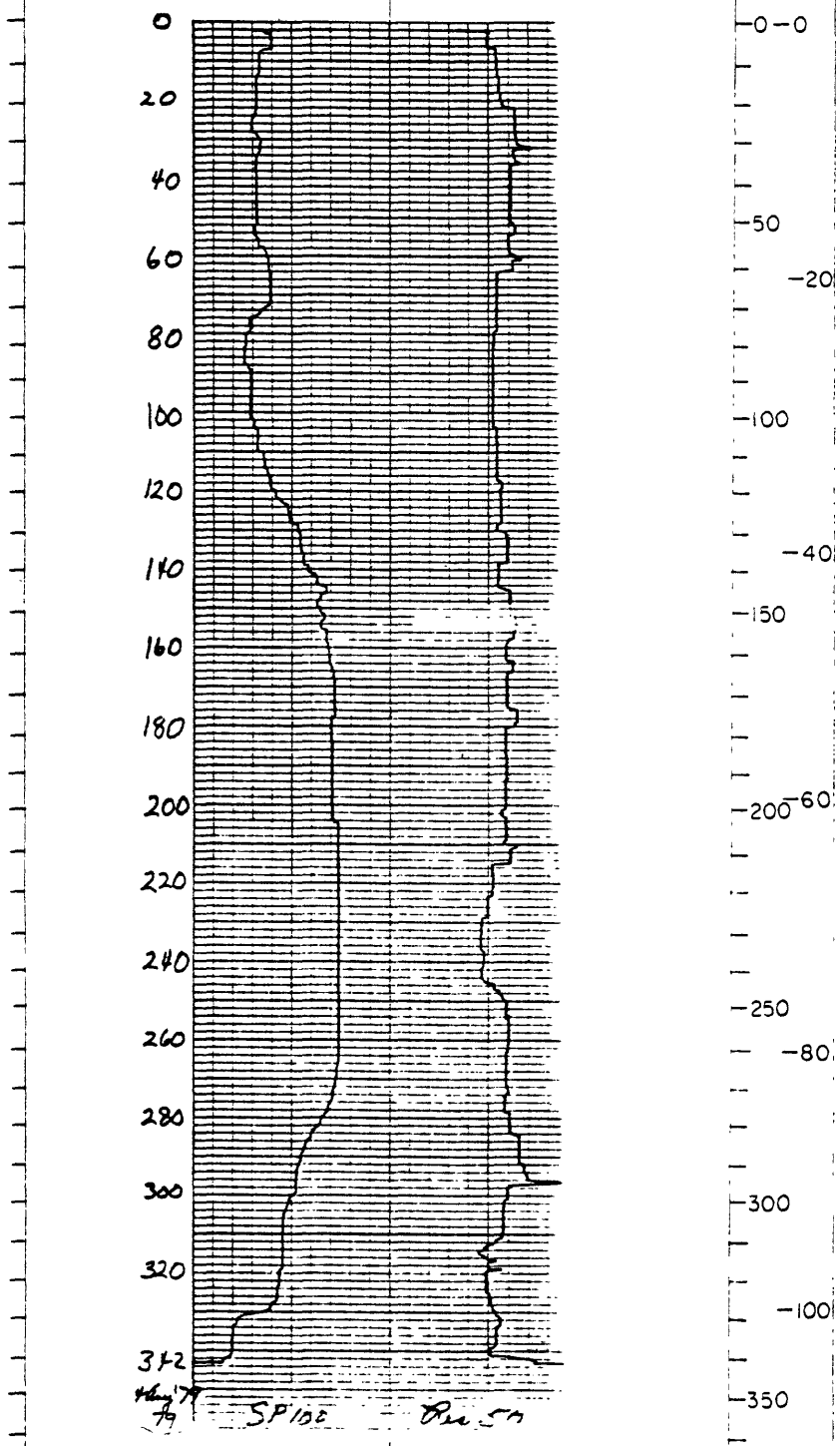
Hole number—continued

79D53

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Depth Feet / Meters
313-315	Claystone, greenish-gray, silty			300
315-316	Lignite			
316-325	Claystone, greenish-gray, silty			100
325-340	Siltstone, greenish-gray, clayey			350
				120
				400
				450
				140
				500
				160
				550
				180
				600

79D53 Hole number - continued

SP	Resistivity	Depth
Sens. setting 50 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 342 feet	Logged depth 342 feet	



342

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D54 Map: Ambrose Date: 8-14-79 State: ND County: Divide

Elev.: 1947 feet Location: T. 163 N, R. 98 W, Sec. 11, Tract: bbbc Drilled depth: 342 feet

Measured: 570 ft FNL, 60 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds:

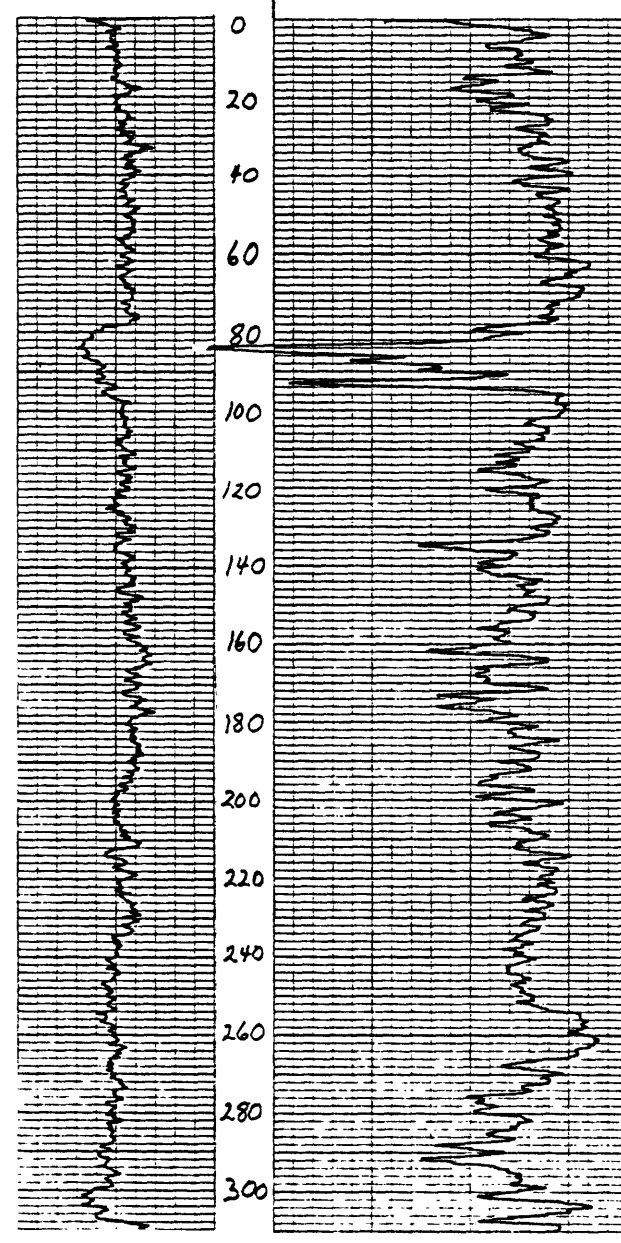
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 1	Silt, black, clayey
1- 17	Till, dusky-brown, silty, pebbly
17- 82	Till, dark-gray, clayey, pebbly
82- 99	Sand, medium-grained
99-163	Till, dark-gray, clayey, pebbly
163-180	No samples
180-310	Sandstone, greenish-gray, medium-grained, clayey

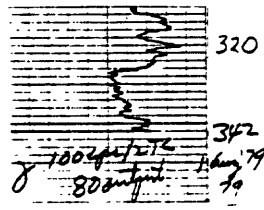
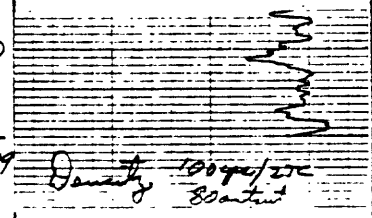
Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 342 feet

Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 342 feet

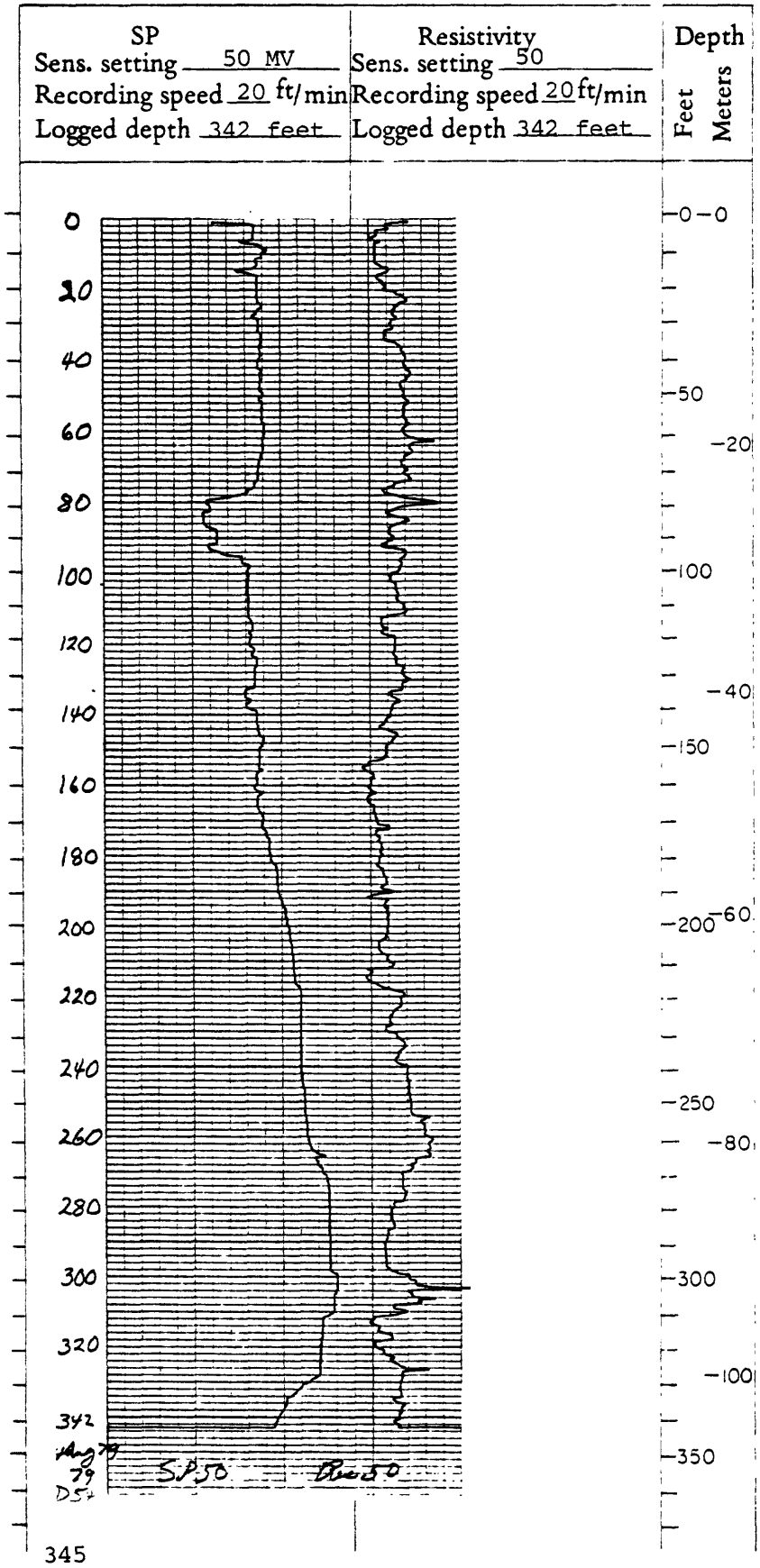


Hole number—continued

79D54

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Depth Feet / Meters
310-311 Lignite 311-340 Siltstone, greenish-gray, clayey			300 100 350 120 400 450 140 500 160 550 180 600
	344		

79D54 Hole number – continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D55 Map: Ambrose Date: 8-15-79 State: ND County: Divide

Elev.: 2125 feet Location: T. 163 N, R. 98 W, Sec. 17, Tract: cbbb Drilled depth: 342 feet

Measured: 2565 ft FSL, 25 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 263-265; 290-292; 294-302; 339-342

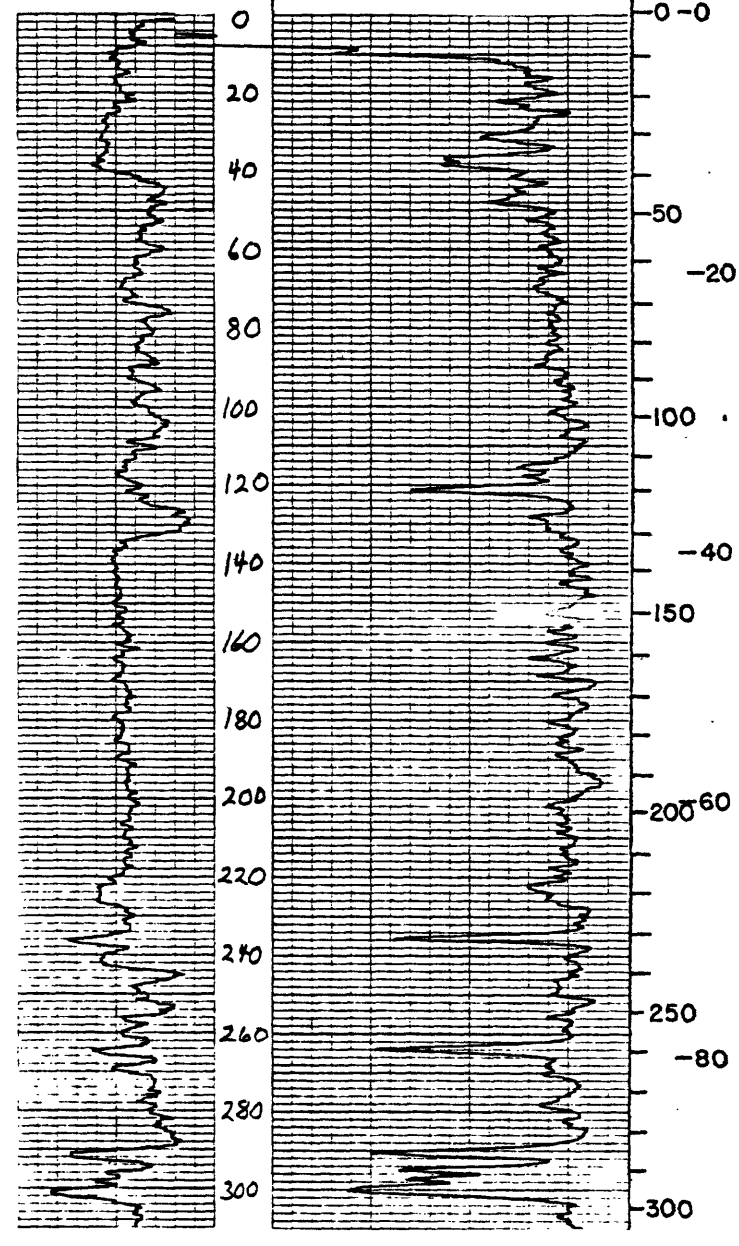
Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology	
0- 3	Silt, dusky-brown, clayey
3- 9	Till, dusky-brown, silty, pebbly
9- 10	Gravel
10- 30	Till, dusky-brown, silty, pebbly
30- 36	Sandstone, medium-gray, fine-grained
36- 38	Claystone, dusky-brown, silty
38- 40	Siltstone, dark-gray, clayey
40- 45	Siltstone, dusky-brown, carbonaceous
45- 46	Lignite
46- 95	Siltstone, dark-gray, clayey
95-103	Claystone, dark-gray, silty
103-108	Claystone, greenish-gray, silty
108-117	Siltstone, greenish-gray, clayey, sandy
117-119	Claystone, dark-gray
119-121	Lignite
121-132	Claystone, dark-gray
132-224	Till, dark-gray, fine grained, clayey, pebbly
224-236	Sandstone
236-238	Till
238-240	Lignite
240-245	Siltstone, dusky-brown, clayey
245-262	Claystone, medium-gray
262-265	Lignite
265-291	Claystone, medium-gray
291-293	Lignite
293-297	Claystone, medium-gray
297-300	Lignite

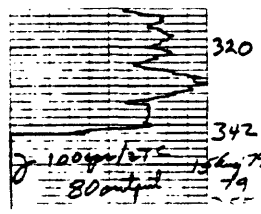
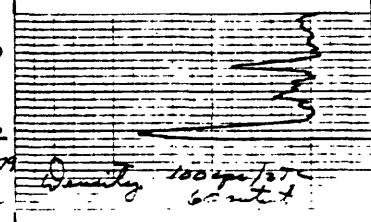
Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 342 feet

Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 342 feet



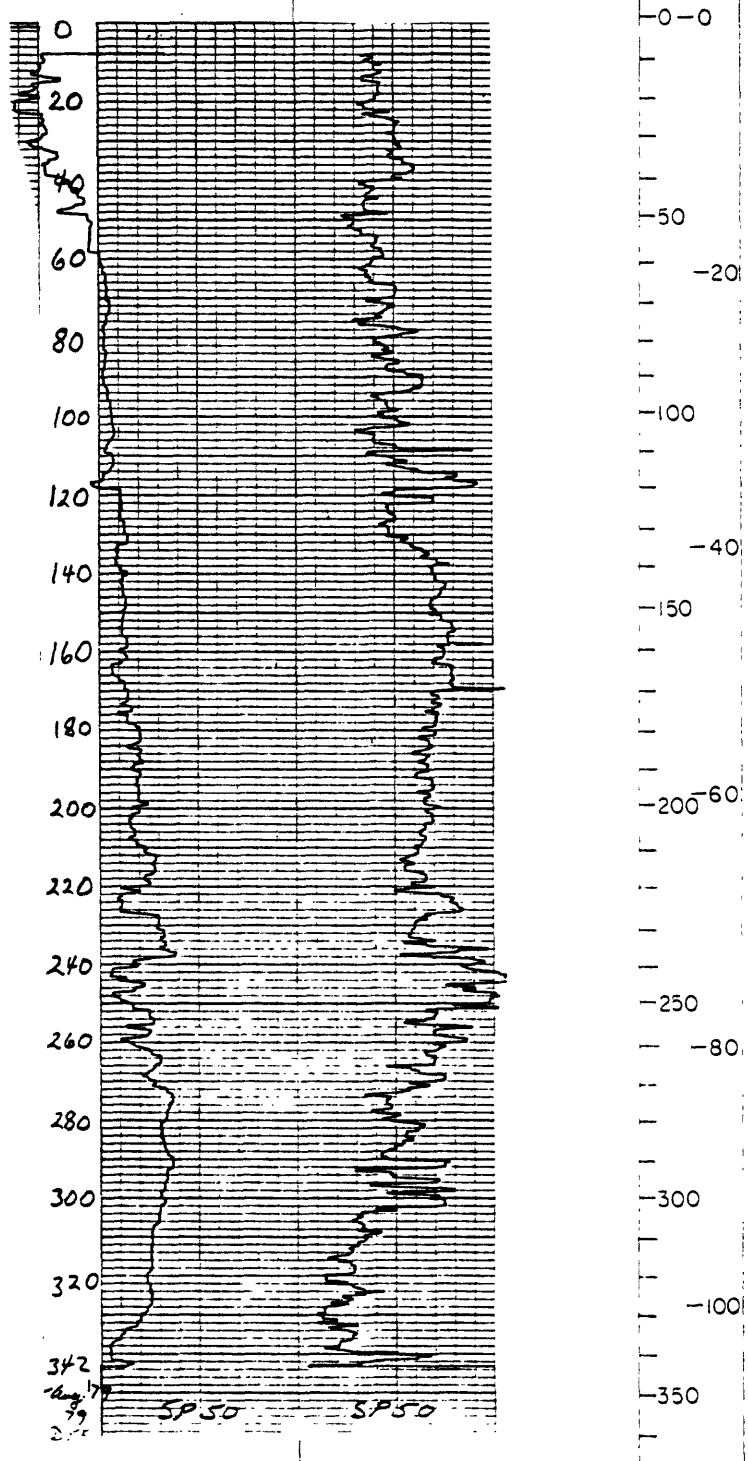
Hole number—continued

79D55

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Density T.C. 2 Range 100cps Recording speed 20 ft/min Logged depth 342 feet	Depth Feet / Meters
300-302 Claystone, greenish-gray 302-306 Sandstone, greenish-gray 306-336 Claystone, greenish-gray 336-338 Lignite 338-340 Claystone, greenish-gray			300 100 350 120 400 450 140 500 160 550 180 600

79D55 Hole number – continued

SP	Resistivity	Depth
Sens. setting 50 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 342 feet	Logged depth 342 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D56 Map: No Topo or Map Name Date: 8-22-79 State: ND County: Divide

Elev.: 2250 feet Location: T. 163 N, R. 99 W, Sec. 33, Tract: bcbb Drilled depth: 416 feet

Measured: 2605 ft FSL, 45 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

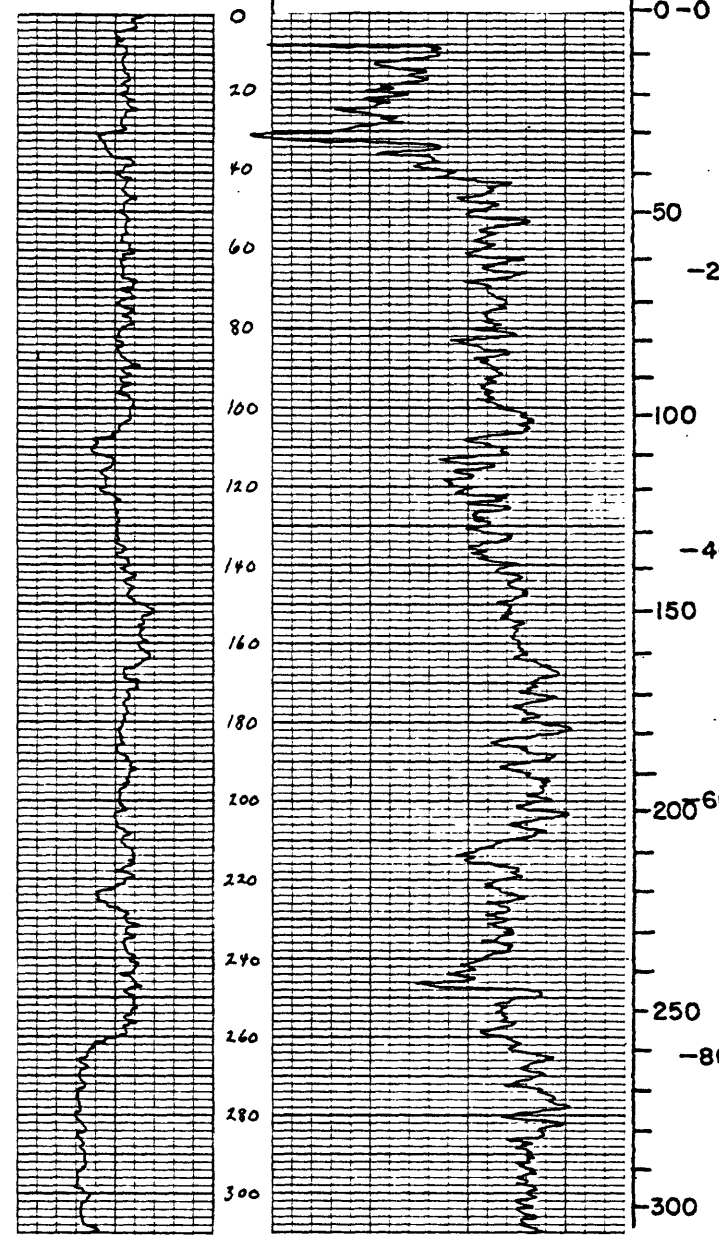
Lignite beds:

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

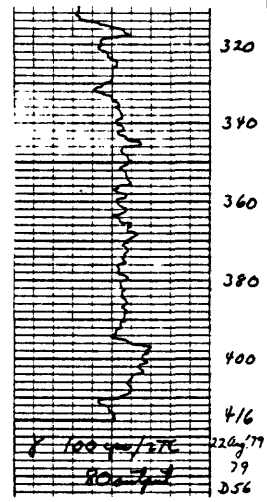
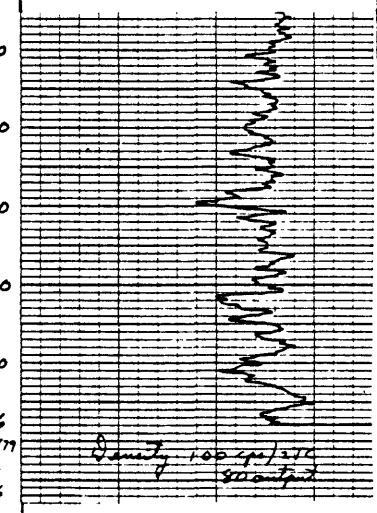
Lithology		Gamma	Density	Depth
		T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 416 feet	T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 416 feet	Feet / Meters

0- 4	Silt, dusky-brown, clayey
4- 34	Till, dusky-brown, silty, pebbly
34- 35	Gravel, coarse-grained
35- 37	Till, dusky-brown, silty, pebbly
37-110	Till, dark-gray, silty, pebbly
110-119	Gravel, coarse-grained
119-160	Silt, dark-gray, sandy
160-260	Till, dark-gray, clayey, pebbly
260-312	Sand

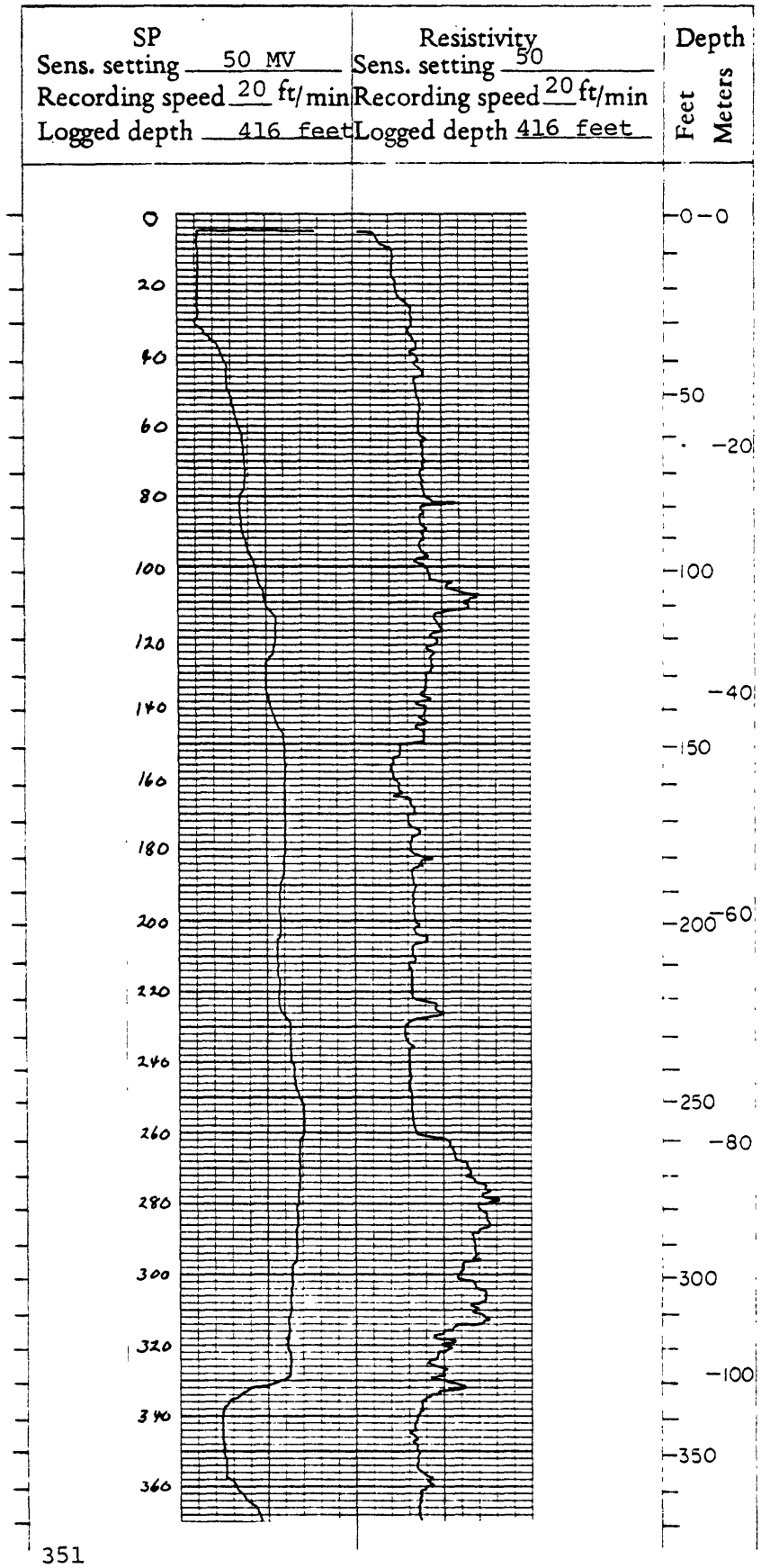


Hole number—continued

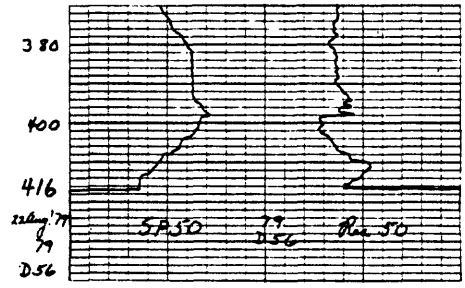
79D56

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 416 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 416 feet	Depth Feet / Meters
312-316 Gravel 316-415 Till, dark-gray, clayey, pebbly			300 100 350 120 400 450 140 500 160 550 180 600

79D56 Hole number - continued



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 416 feet	Logged depth 416 feet	



Depth scale: 400, 450, 500, 550, 600, 650, 700, 750 Feet; 120, 140, 160, 180, 200, 220 Meters

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D57 Map: No Topo Date: 9- -79 State: ND County: Divide

Elev.: _____ Location: T. 163N, R. 101W, Sec. 7, Tract: cccc Drilled depth: 40 feet

Measured: 40 ft FSL, 10 ft FWL, Hole size: 4 3/4" Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: _____

Remarks: No log runs

Lithology Recorded by: Clarence Carlson Geologist Yes Geophysical logs recorded by: David Lechner

Lithology	Gamma T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Density T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Depth Feet / Meters
0-40 Gravel			0 / 0
			50 / 20
			100 / 40
			150
			200 / 60
			250 / 80
			300

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D58 Map: No Topo or Map Name Date: 9-25-79 State: ND County: Divide

Elev.: 2360 feet Location: T. 163 N, R. 101 W, Sec. 11, Tract: cbcb Drilled depth: 342 feet

Measured: 1965 ft FNL FSL, 30 ft FEL FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

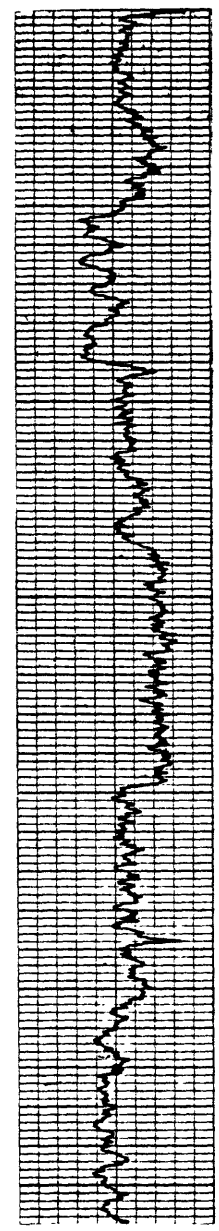
Lignite beds:

Remarks: No density log run

Lithology Recorded by: Clarence Carlson Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma	Density	Depth
	T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Feet / Meters

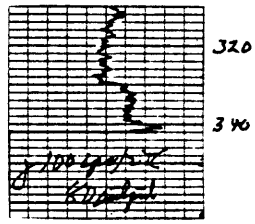
30- 50	Till, medium-gray, clayey
50- 85	Gravel
85-100	Till, medium-dark-gray
100-125	Gravel, sand
125-160	Till, medium-gray, sandy
160-175	Till, medium-dark-gray, clayey, very few pebbles
175-235	Till, medium-dark-gray
235-280	Gravel
280-340	No samples



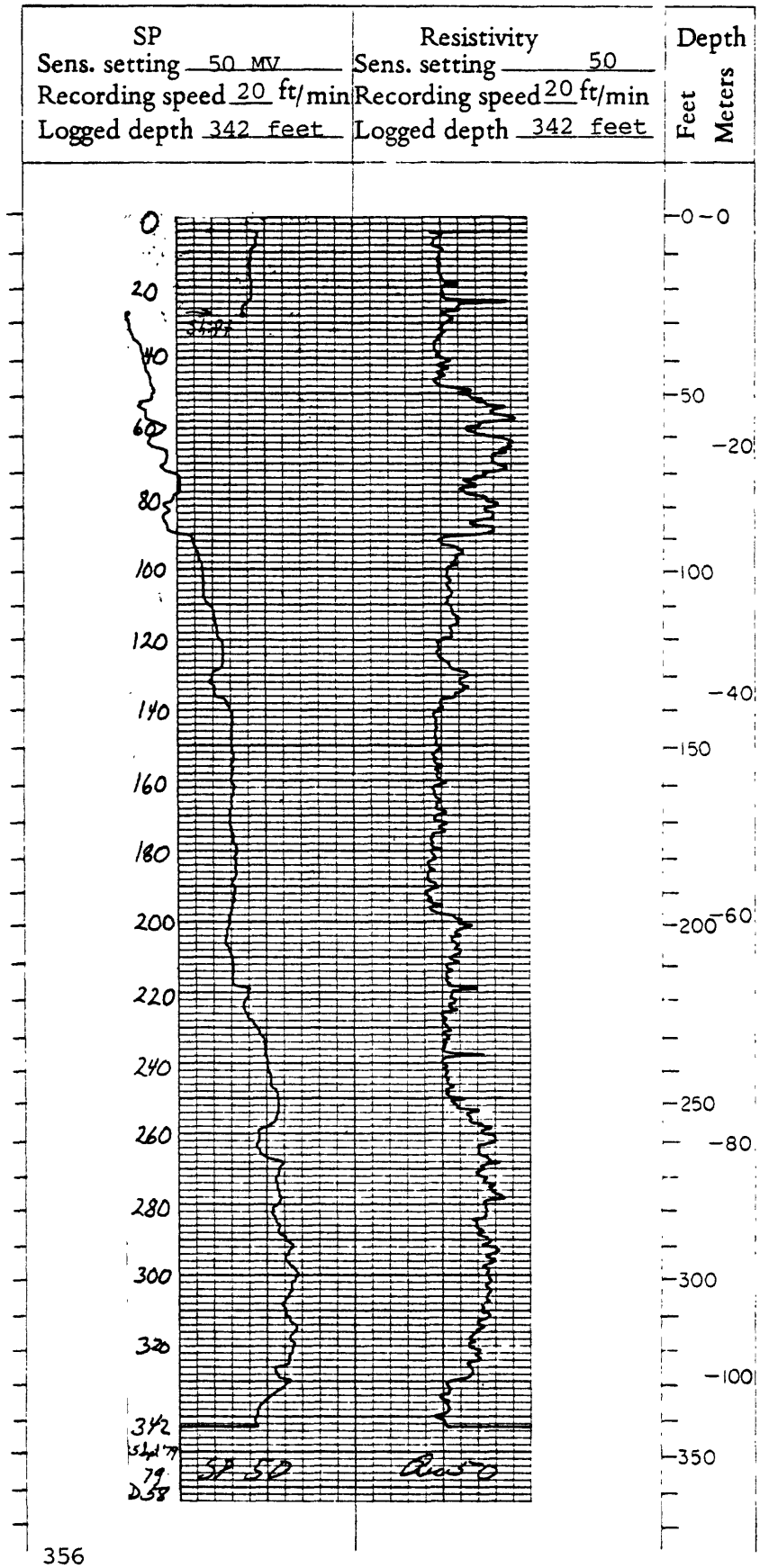
Depth: 0 -0, 50, -20, 100, -40, 150, 200 -60, 250, -80, 300

Hole number—continued

79D58

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Depth Feet / Meters
			300 100 350 120 400 450 140 500 160 550 180 600

79D58 Hole number - continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D59 Map: No Topo or Map Name Date: 9-07-79 State: ND County: Divide

Elev.: 2248 feet Location: T. 163 N, R. 102 W, Sec. 9, Tract: bbbb Drilled depth: 342 feet

Measured: 30 ft FNL, 76 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

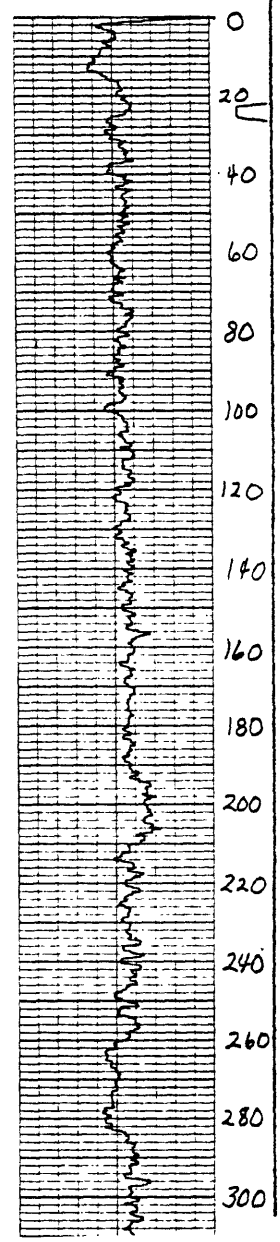
Lignite beds:

Remarks: No density log run

Lithology Recorded by: Clarence Carlson Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma	Density	Depth
	T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___ feet	Feet / Meters

0- 2	Silt, yellowish-brown, clayey
2- 7	Till, yellowish-brown, clayey
7- 13	Sand
13- 24	Till, brownish-gray, clayey
24-255	Till, medium-gray, clayey
255-283	Gravel and sand
283-340	Till, brownish-gray, clayey

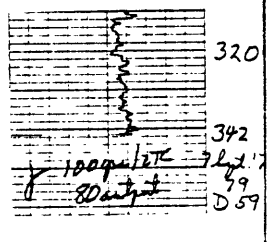


Depth: 0 – 0; 50; 100; 150; 200; 250; 300

Meters: 20; 40; 60; 80

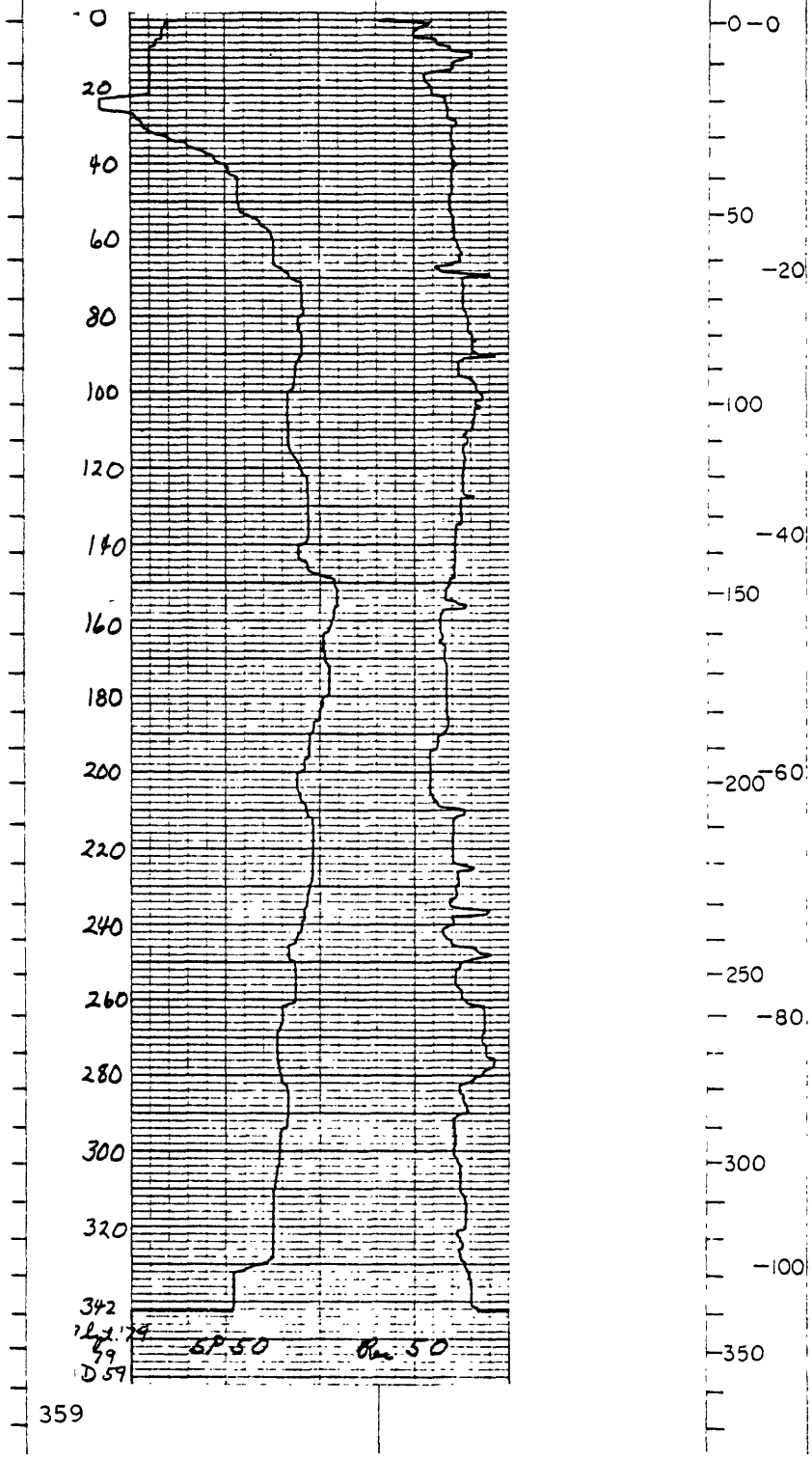
Hole number—continued

79D59

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth _____	Depth Feet / Meters
			300 100 350 120 400 450 140 500 160 550 180 600

79D59 Hole number -continued

SP	Resistivity	Depth
Sens. setting 50 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 342 feet	Logged depth 342 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D60 Map No Topo or Map Name Date: 9-07-79 State: ND County: Divide

Elev.: 2186 feet Location: T. 163 N, R. 102 W, Sec. 20, Tract: cccc Drilled depth: 382 feet

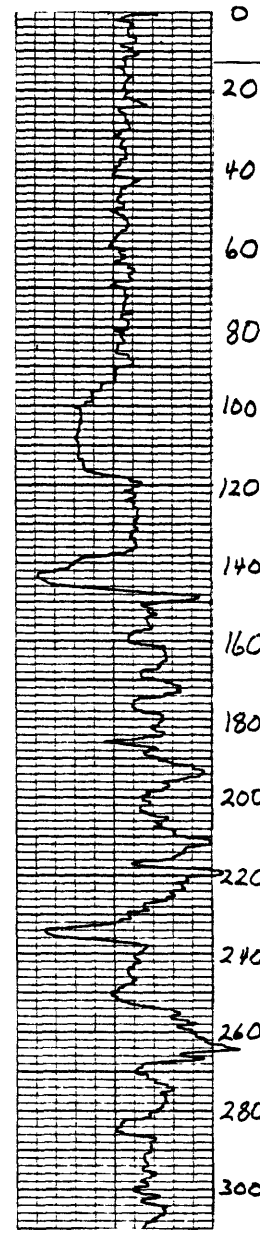
Measured: 12 ft FSL, 128 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

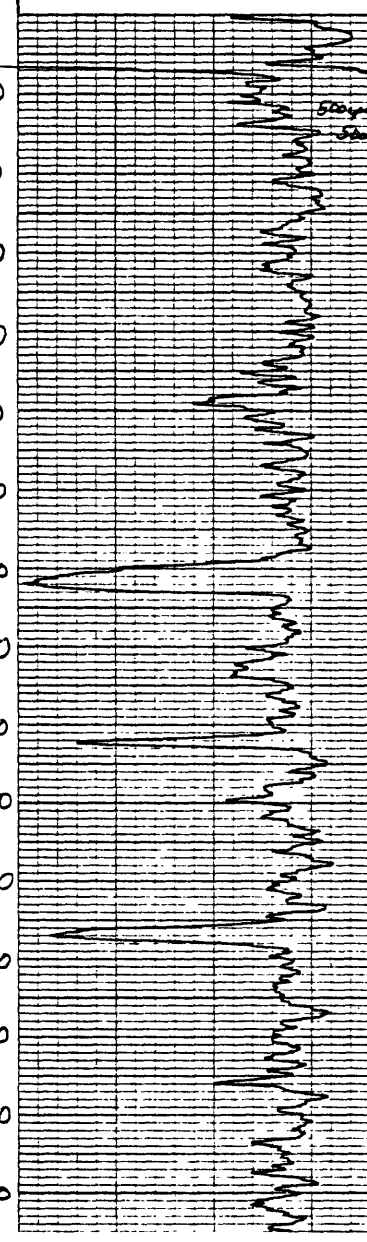
Lignite beds: 139-146; 183-185; 232-235

Remarks:

Lithology Recorded by: Clarence Carlson Geologist Yes Geophysical logs recorded by: Lechner

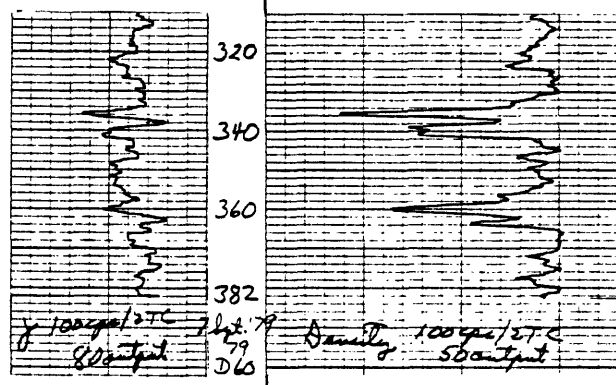
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 382 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 382 feet	Depth Feet	Depth Meters
0- 15	Till, yellowish-brown, clayey			0	0
15- 22	Till, brownish-gray				
22- 92	Till, medium-dark-gray, clayey			50	
92-115	Gravel				20
115-138	Till, medium-gray				
138-142	Lignite				
142-162	Claystone, greenish-gray				
162-163	Lignite				
163-181	Claystone, greenish-gray				
181-184	Lignite				
184-188	Claystone, light-greenish-gray			100	
188-204	Siltstone, light-greenish-gray				
204-212	Claystone, light-greenish-gray, silty				40
212-214	Limestone, light-gray			150	
214-216	Claystone, brownish-gray				
216-220	Claystone, moderate brown				
220-227	Siltstone, light-greenish-gray				
227-229	Lignite				
229-231	Claystone, light-greenish-gray			200	60
231-233	Claystone, brownish-gray carbonaceous				
233-237	Siltstone, light-brownish-gray				
237-245	Sandstone				
245-258	Siltstone, very light-gray			250	
258-265	Siltstone, greenish-gray				80
265-267	Claystone, brownish-gray, carbonaceous				
267-270	Claystone, brownish-gray, silty				
270-271	Lignite			300	
271-277	Claystone, greenish-gray	360			





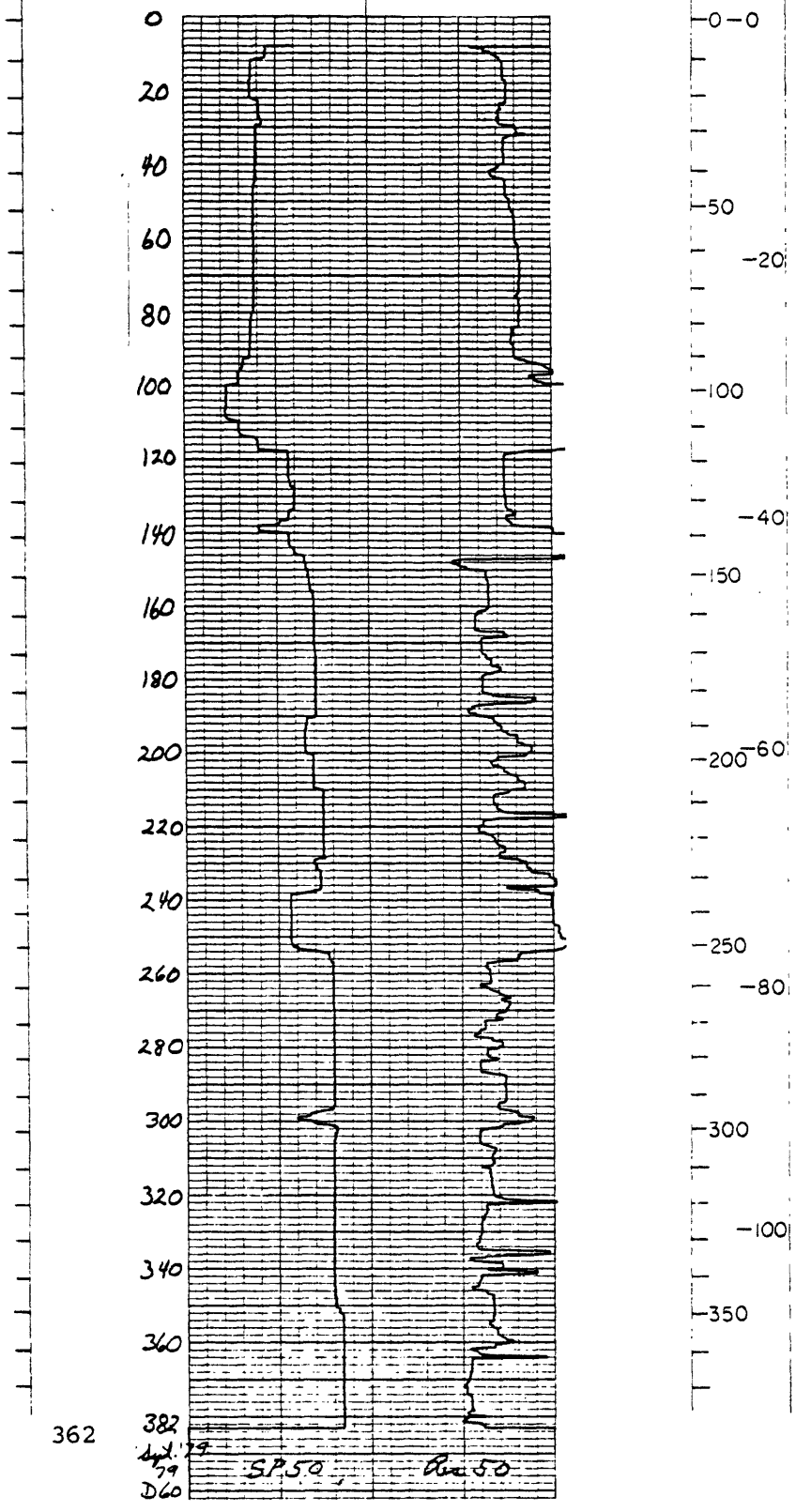
79D60

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 382 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 382 feet	Depth Feet / Meters
277-280	Siltstone, greenish-gray			300
280-285	Claystone, brownish-gray			
285-295	Siltstone, greenish-gray			
295-297	Claystone, brownish-gray			100
297-325	Siltstone, greenish-gray, clayey			
325-333	Claystone, brownish-gray			350
333-336	Lignite			
336-342	Claystone, greenish-gray			
342-352	Siltstone, greenish-gray			
352-354	Lignite			
354-356	Claystone, brownish-gray			120
356-358	Lignite			400
358-370	Claystone, greenish-gray			
370-372	Claystone, brownish-gray			
372-380	Claystone, greenish-gray			
				450
				140
				500
				160
				550
				180
				600



79D60 Hole number - continued

SP	Resistivity	Depth
Sens. setting 50MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 382 feet	Logged depth 382 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D61 Map: No Topo or Map Name Date: 9-08-79 State: ND County: Divide

Elev.: 2140 feet Location: T. 163 N, R. 102 W, Sec. 24, Tract: dcdd Drilled depth: 334 feet

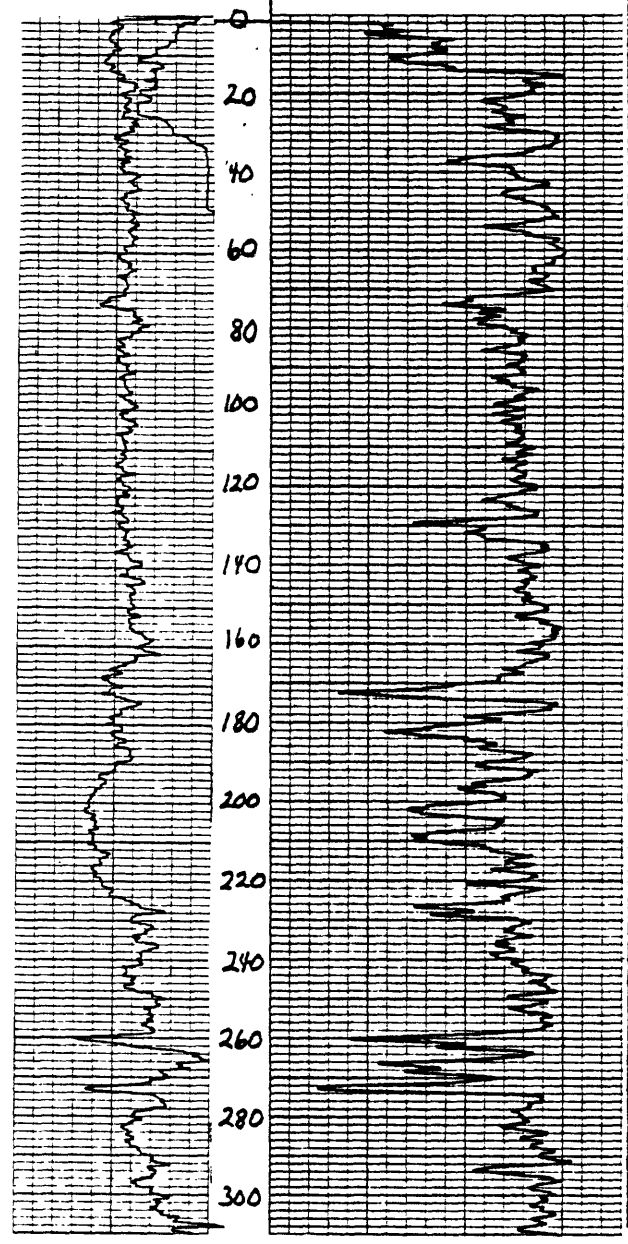
Measured: 32 ft FSL, 1440 ft FEL Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 272-274

Remarks:

Lithology Recorded by: Clarence Carlson Geologist Yes Geophysical logs recorded by: Lechner

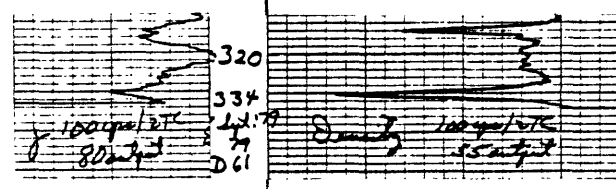
Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 334 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 334 feet	Depth Feet	Depth Meters
0- 2	Silt, dark-brown			0	0
2- 20	Till, brownish-gray, silty, clayey			20	
20- 74	Till, medium-gray, clayey			40	
74- 76	Gravel			50	
76-125	Till, medium-gray, clayey			60	20
125-130	Gravel			80	
130-162	Till, brownish-gray			100	100
162-222	Gravel and sand, well-rounded			120	
222-235	Siltstone, greenish-gray			140	40
235-240	Claystone, brownish-gray			150	
240-242	Claystone, very light-brownish-gray			160	
242-256	Claystone, medium-light-gray			180	
256-260	Lignite			200	200 60
260-262	Claystone, light-gray			220	
262-276	Lignite, and claystone, brownish-gray			240	
276-280	Claystone, greenish-gray			250	
280-286	Siltstone, light-greenish-gray			260	80
286-288	Lignite			280	
288-294	Siltstone, light-greenish-gray			300	300
294-302	Claystone, light-greenish-gray, silty				



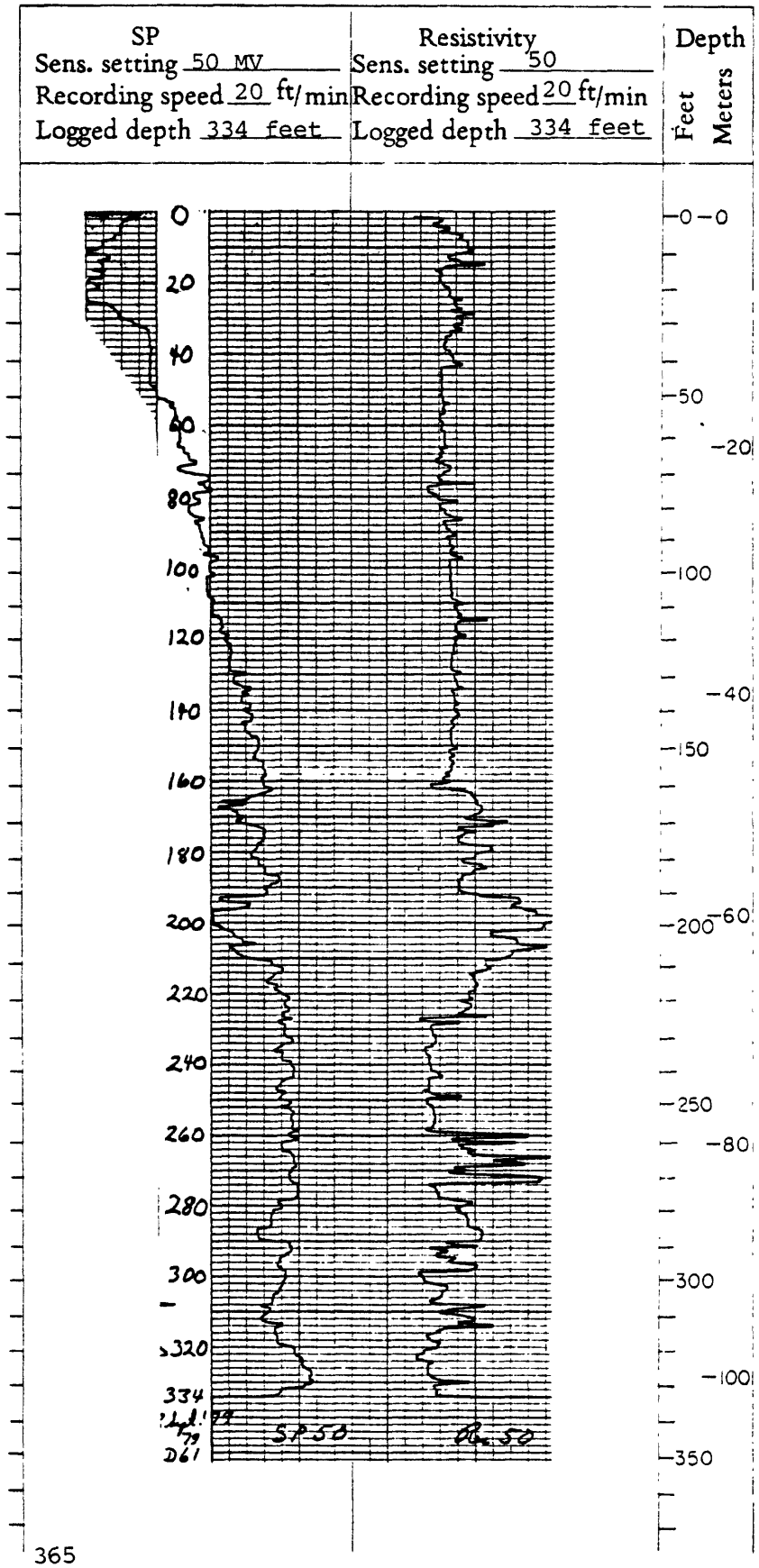
Hole number—continued

79D61

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 334 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 334 feet	Depth Feet / Meters
302-305	Lignite			300
305-312	Claystone, light-greenish-gray			
312-315	Claystone, light-greenish-gray			100
315-325	Claystone, light-greenish-gray			350
325-327	Lignite			
327-332	Claystone, light-greenish-gray			
				120
				400
				450
				140
				500
				160
				550
				180
				600



79D61 Hole number -continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D63 Map: No Topo or Map name Date: 9-06-79 State: ND County: Divide

Elev.: 2188 feet Location: T. 163 N, R. 103 W, Sec. 11, Tract: aaad Drilled depth: 342 feet

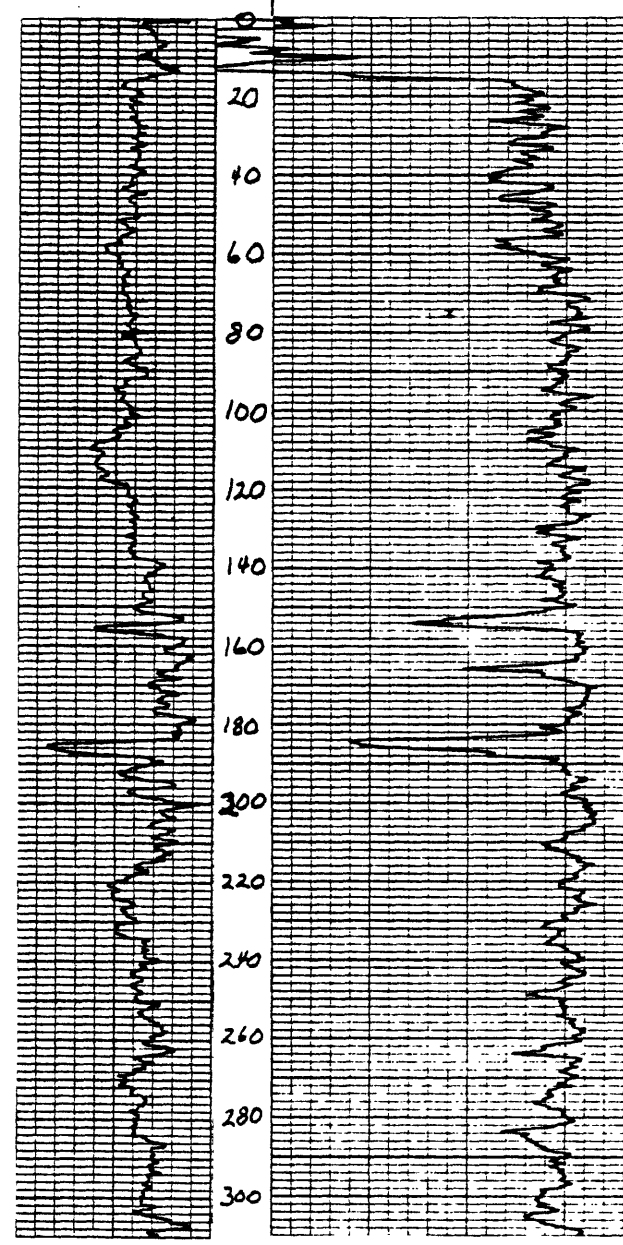
Measured: 514 ft FNL, 70 ft FEL Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 184-186

Remarks:

Lithology Recorded by: Clarence Carlson Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Depth Feet	Depth Meters
0- 12	Clay, yellowish-brown, silty			0	0
12- 22	Clay, brownish-gray, silty				
22- 30	Clay, grayish-brown				
30- 92	Clay, medium-gray				
92-103	Till, medium-dark-gray, clayey			50	
103-112	Gravel and sand				20
112-135	Till, dark-brownish-gray				
135-145	Siltstone, light-gray				
145-148	Claystone, light-gray				
148-150	Claystone, brownish-gray, carbonaceous			100	
150-152	Lignite				
152-154	Claystone, very light-brownish-gray				
154-162	Claystone, greenish-gray, silty				40
162-163	Lignite			150	
163-165	Claystone, very light-brownish-gray				
165-178	Siltstone, light-greenish-gray				
178-182	Claystone, brownish-gray				
182-185	Lignite			200	60
185-193	Claystone, light-brownish-gray, silty				
193-203	Siltstone, light-brownish-gray				
203-210	Claystone, light-greenish-gray				
210-215	Siltstone, light-greenish-gray			250	80
215-220	Claystone, brownish-gray				
220-222	Siltstone, light-greenish-gray				
222-232	Sandstone, greenish-gray, very fine-grained, silty			300	
232-242	Siltstone, light-greenish-gray				



366

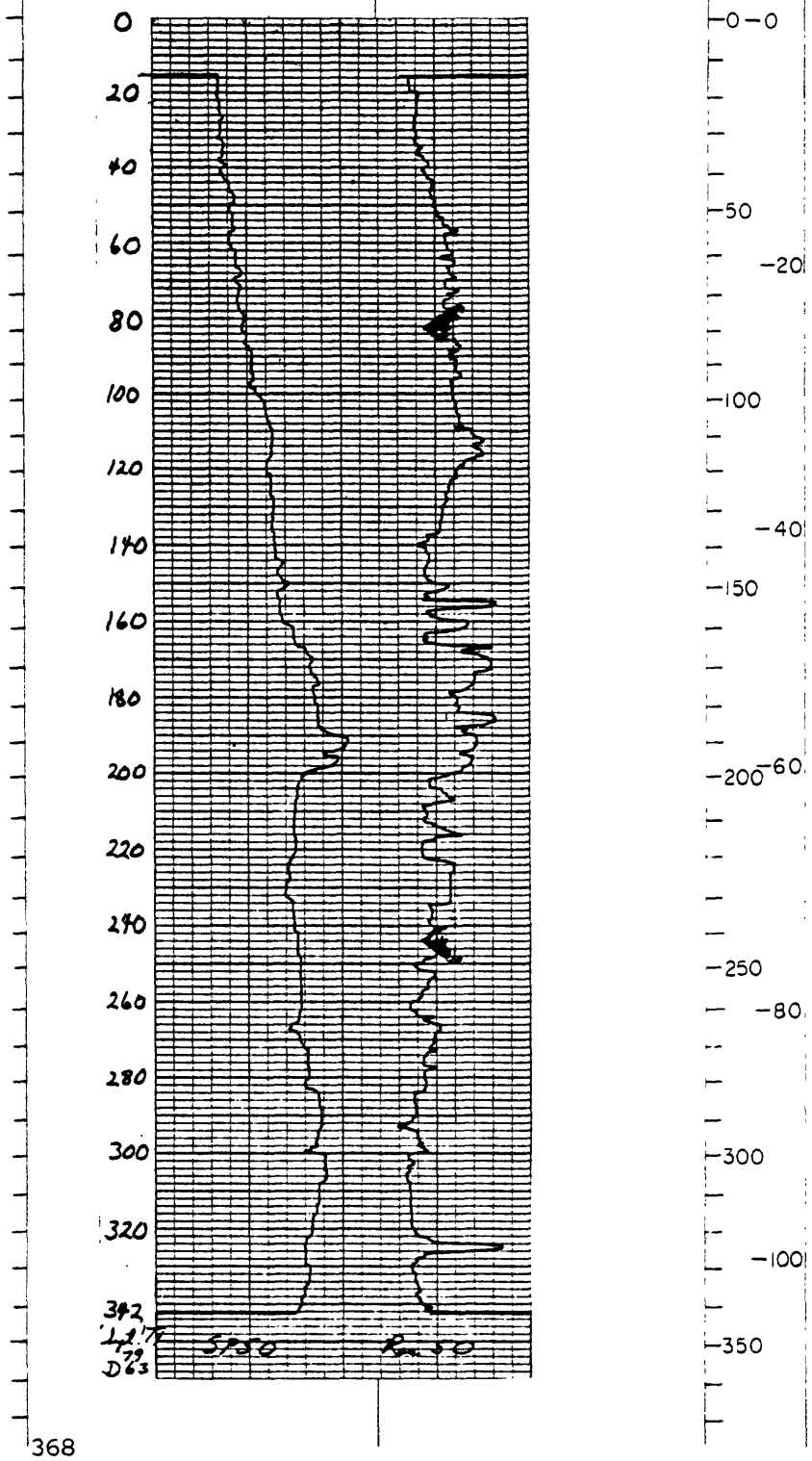
Hole number—continued

79D63

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 342 feet	Depth Feet / Meters
242-245	Claystone, light-greenish-gray			300
245-248	Claystone, light-brownish-gray	320		−100
248-256	Claystone, brownish-gray, silty	342		
256-260	Siltstone, greenish-gray			350
260-261	Lignite			
261-272	Siltstone, greenish-gray			
272-274	Claystone, brownish-gray			−120
274-282	Siltstone, light-brownish-gray			400
282-295	Claystone, greenish-gray			
295-298	Siltstone, light-brownish-gray			
298-310	Claystone, greenish-gray			
310-315	Siltstone, greenish-gray			
315-322	Claystone, greenish-gray			450
322-340	Claystone, brownish-gray			−140
				500
				−160
				550
				−180
				600

79D63 Hole number - continued

SP	Resistivity	Depth
Sens. setting 50 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 342 feet	Logged depth 342 feet	



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D64 Map: No Topo or Map Name Date: 9-06-79 State: ND County: Divide

Elev.: ~~2188 feet~~ Location: T. 163 N, R. 103 W, Sec. 27, Tract: addd Drilled depth: 270 feet

Measured: 2625 ft FNL, 130 ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

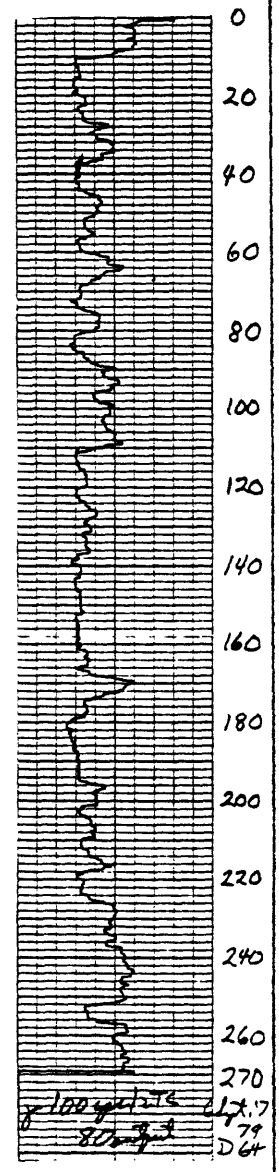
Lignite beds:

Remarks: No density log run

Lithology Recorded by: Clarence Carlson Geologist Yes Geophysical logs recorded by: Lechner

Lithology	Gamma	Density	Depth
	T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 270 feet	T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Feet / Meters

0- 2 Silt, yellowish-brown
2- 7 Till, yellowish-brown
7- 20 Gravel and sand
20- 35 Sand
35- 40 Gravel
40- 90 Sand and gravel
90- 95 Till, dark-brownish-gray, sandy
95-160 Sand and gravel
160-270 No samples

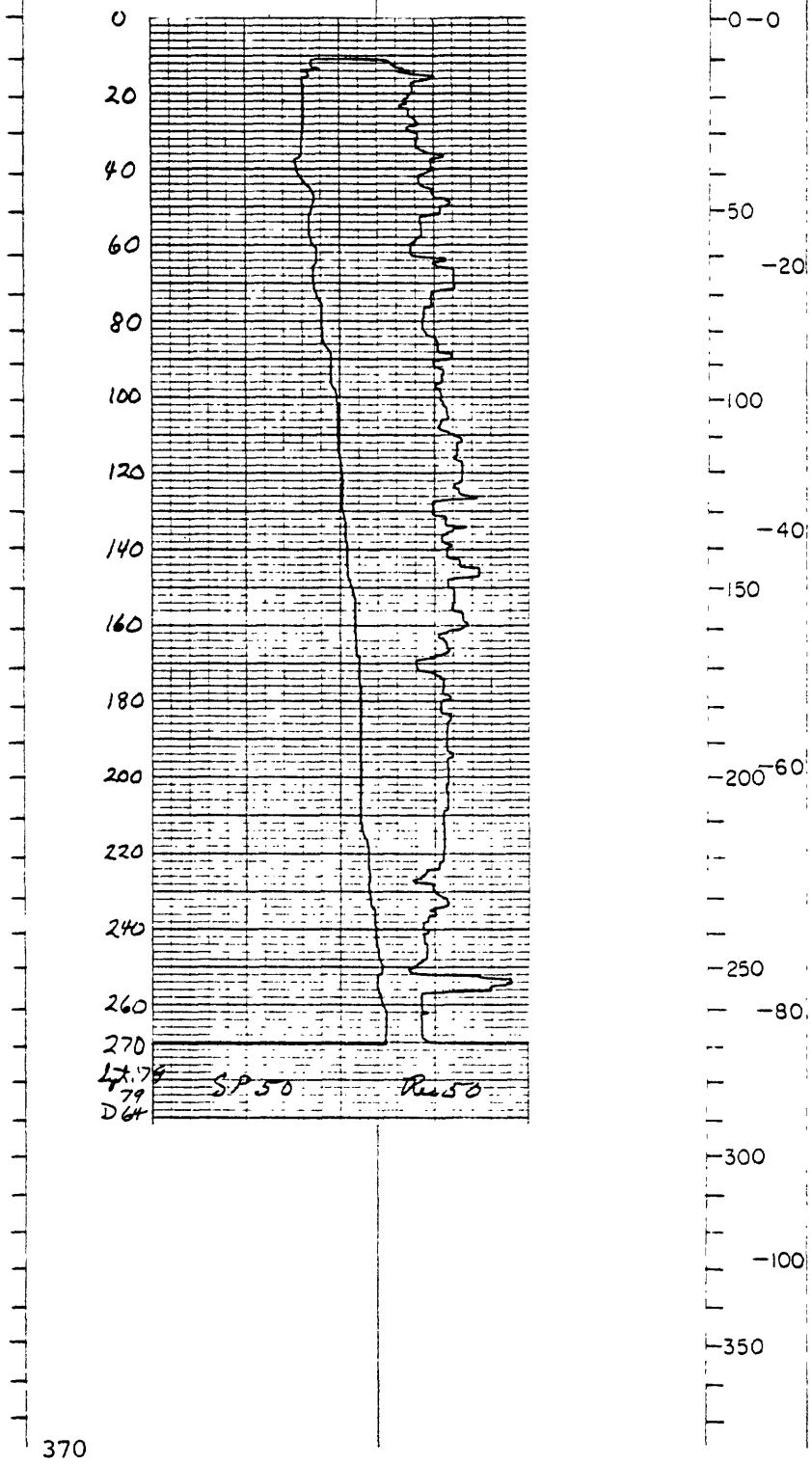


Depth: 0, 50, 100, 150, 200, 250, 300 feet; 0, 20, 40, 60, 80 meters

79D64

Hole number – Continued

SP	Resistivity	Depth
Sens. setting 50 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 270 feet	Logged depth 270 feet	



370

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D64A Map: No Topo or Map Name Date: 9-05-79 State: ND County: Divide

Elev.: 2188 feet Location: T163 N, R.103 W, Sec. 26, Tract: cabb Drilled depth: 170 feet

Measured: 2586 ft FSL, 1580 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

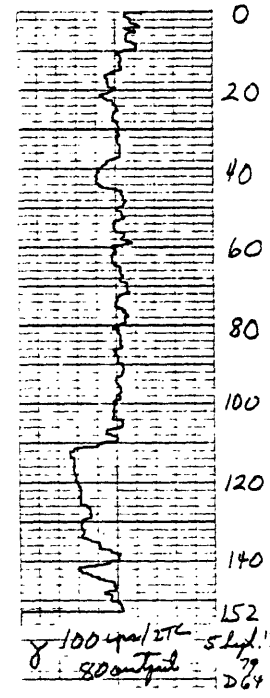
Lignite beds: 141-143

Remarks: No density log run

Lithology Recorded by: Clarence Carlson Geologist Yes Geophysical logs recorded by: Lechner

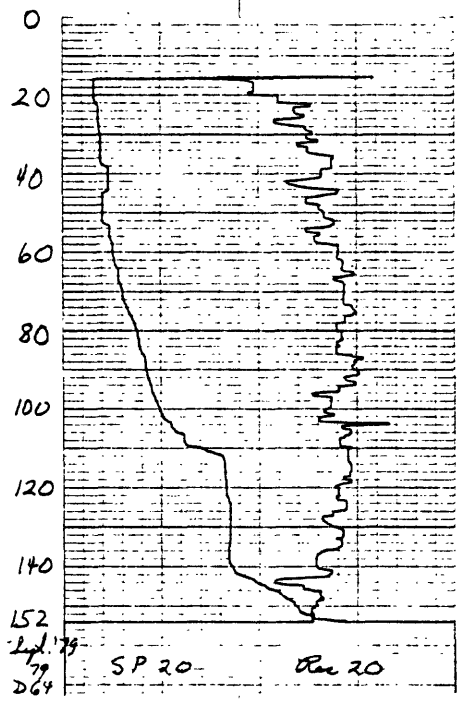
Lithology	Gamma	Density	Depth
	T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 152 feet	T.C. ___ Range ___ Recording speed ___ ft/min Logged depth ___	Feet / Meters

0- 2	Topsoil, silty clay, yellowish-brown
2- 15	Till, yellowish-brown, clayey
15- 27	Till, yellowish-brown, sandy
27- 36	Till, medium-gray, clayey
36- 40	Sandy gravel
40- 55	Sand, fine-grained
55- 60	Till, medium-gray
60- 62	Gravel
62-105	Till, medium-gray, clayey
105-135	Sand and gravel
135-138	Claystone, medium-gray
138-140	Lignite
140-160	Sand and gravel
160-162	Sandstone



79D64A Hole number - continued

SP	Resistivity	Depth
Sens. setting 50 MV	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 152 feet	Logged depth 152 feet	



0 – 0
50
– 20
100
– 40
150
200 – 60
250
– 80
300
– 100
350

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D65 Map: No Topo or Map Name Date: 9-05-79 State: ND County: Divide

Elev.: 2184 feet Location: T. 163 N, R. 102 W, Sec. 31, Tract: bbab Drilled depth: 402 feet

Measured: 690 ft FNL, 12 ft FWL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

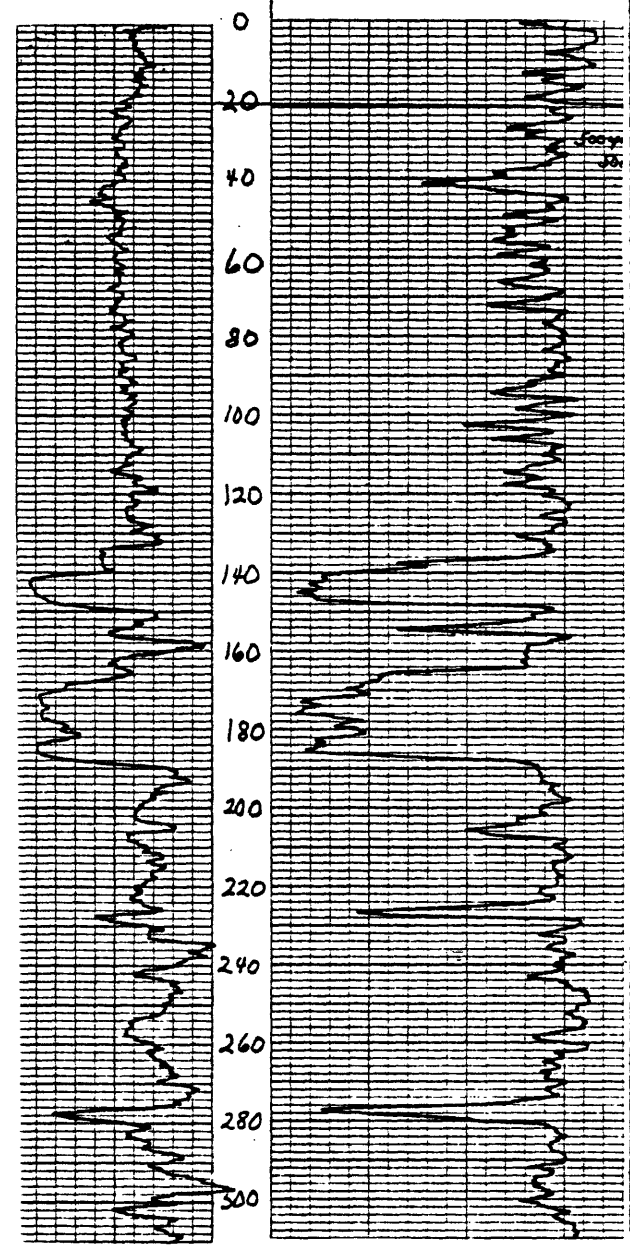
Lignite beds: 137-148; 165-187; 225-228; 266-268.5

Remarks:

Lithology Recorded by: Clarence Carlson Geologist Yes

Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 feet	Density: T.C. 2 Range 100 cps; Recording speed 20 ft/min; Logged depth 402 feet	Depth Feet	Depth Meters
0- 2	Clay, brownish-gray, silty				
2- 27	Till, yellowish-gray, clayey				
27- 37	Till, medium-gray, clayey				
37- 55	Sand				
55- 75	Clay, medium-gray, silty				
75-112	Till, medium-gray, clayey				
112-120	Siltstone, yellowish-brown, clayey				
120-123	Claystone, yellowish-brown				
123-137	Claystone, medium-light-gray				
137-153	Lignite				
153-162	Claystone, medium-light-gray				
162-183	Lignite				
183-195	Claystone, medium-gray				
195-198	Claystone, medium-gray				
198-235	No samples				
235-240	Sandstone				
240-250	Claystone, medium-light-gray				
250-255	Siltstone, light-gray				
255-273	Claystone, light-gray				
273-276	Lignite				
276-285	Claystone, medium-light-gray				
285-295	Siltstone, light-gray				
295-297	Claystone, light-brownish-gray, carbonaceous				
297-300	Claystone, light-gray, silty				

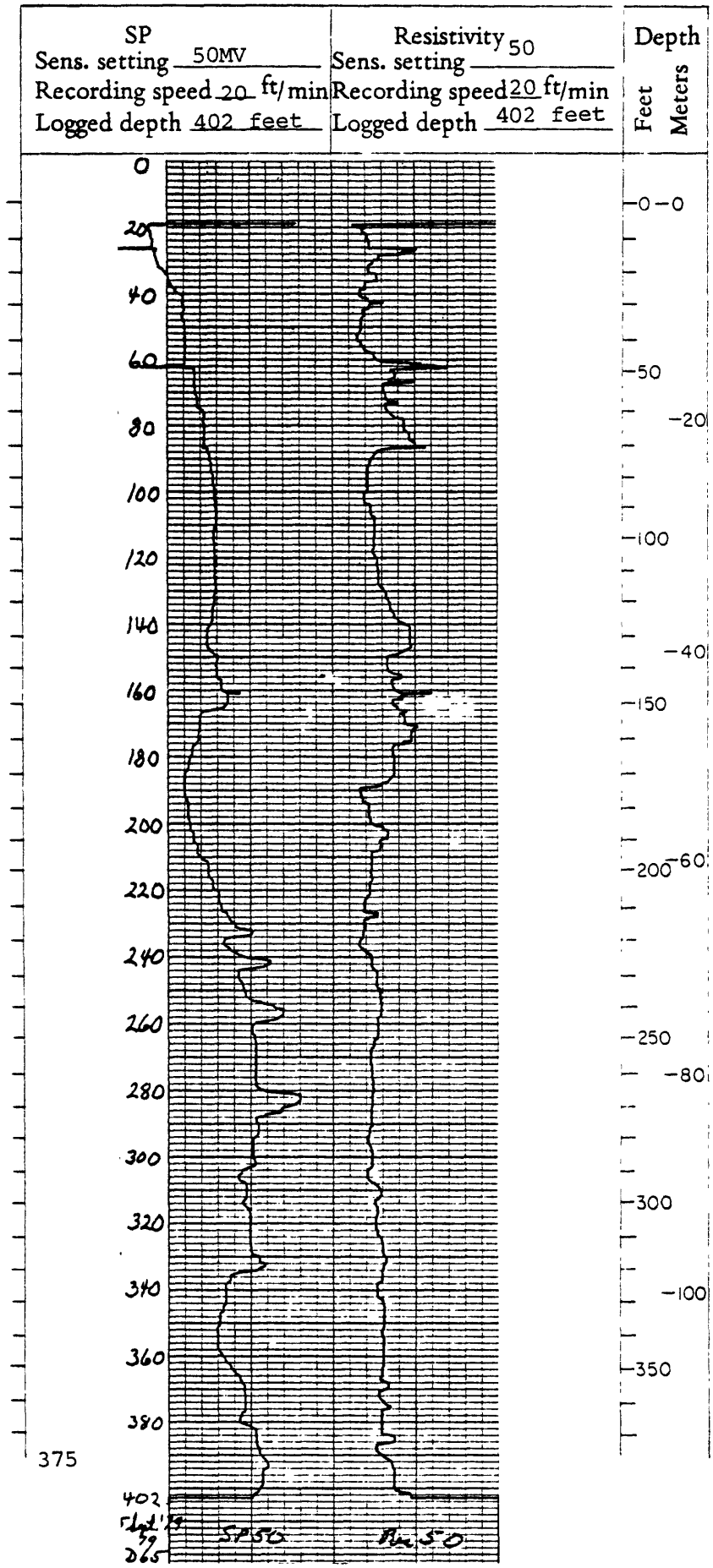


Hole number—continued

79D65

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 402 feet	Depth Feet / Meters
300-305	Claystone, medium-gray			300
305-320	Claystone, light-gray			
320-327	Claystone, very light-gray	320		−100
327-330	Claystone, medium-light-gray	340		
330-335	Siltstone, medium-light-gray	360		350
335-345	Claystone, very light-gray	380		
345-355	Claystone, medium-light-gray, silty			−120
355-360	Siltstone, medium-light-gray	402		400
360-365	Claystone, light-greenish-gray			
365-368	Lignite			
368-373	Claystone, brownish-gray			
373-380	Claystone, light-greenish-gray			450 −140
380-382	Claystone, medium-gray			
382-383	Lignite			
383-390	Claystone, light-greenish-gray			
390-395	Siltstone, light-greenish-gray			500
				−160
				550
				−180
				600

79D65 Hole number – continued



375

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D66 Map: Noonon Date: 8-13-79 State: ND County: Divide

Elev.: 1893 Location: T. 164 N, R. 95 W, Sec. 33, Tract: aaad Drilled depth: 322 feet

Measured: 655 ft FNL, 132 ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

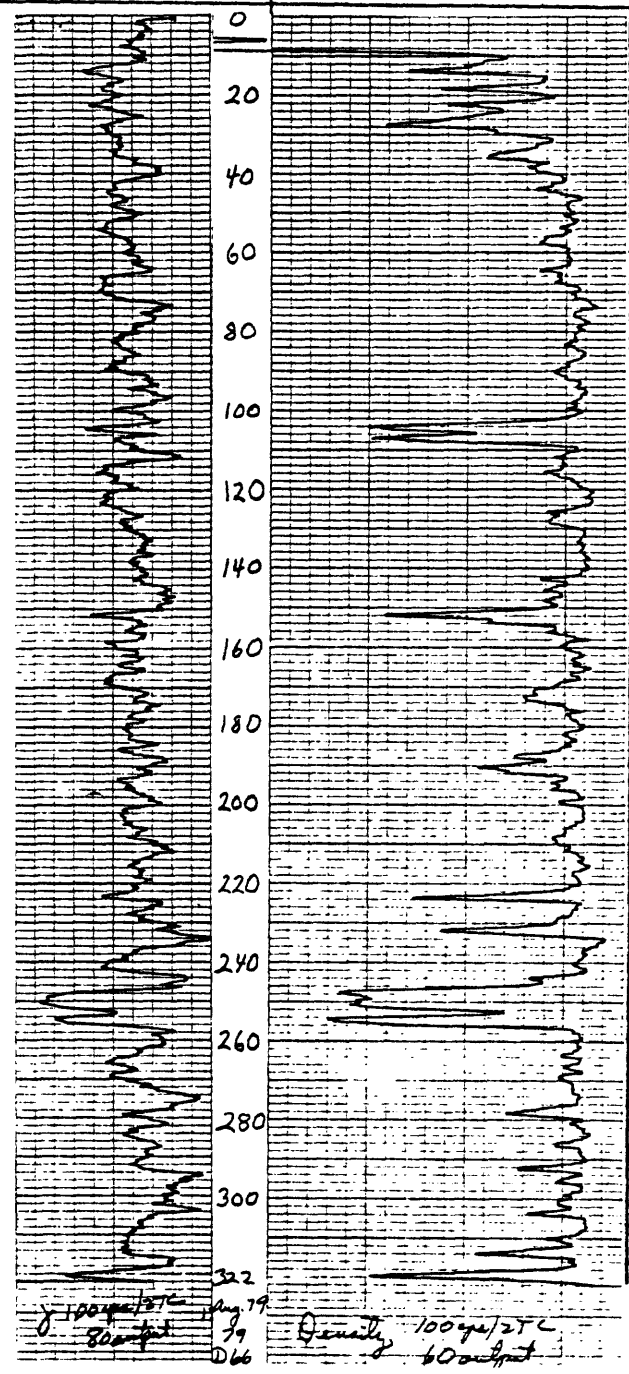
Lignite beds: 103-108; 246-252; 253.5-256

Remarks:

Lithology Recorded by: Gary Stefanovsky Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma	Density	Depth
		T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 322 feet	T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 322 feet	Feet / Meters

0- 1	Silt, brownish-gray, clayey
1- 13	Till, brownish-gray, silty, pebbly
13- 15	Sand, brownish-gray, fine-grained, gravelly
15- 24	Till, dusky-brown, silty, pebbly
24- 30	Gravel
30- 35	Siltstone, olive-gray, clayey
35- 82	Siltstone, medium-gray, clayey
82-104	Claystone, greenish-gray, silty
104-107	Lignite
107-150	Siltstone, greenish-gray, clayey
150-151	Lignite
151-158	Siltstone, medium-gray, clayey
158-187	Claystone, medium-gray, silty
187-188	Lignite
188-199	Claystone, medium-gray, silty
199-200	Lignite
200-204	Claystone, medium-gray, silty
204-205	Lignite
205-210	Claystone, medium-gray, carbonaceous
210-211	Lignite
211-243	Claystone, dark-gray, carbonaceous, silty
243-251	Lignite
251-252	Claystone, dark-gray, carbonaceous, silty
252-254	Lignite
254-256	Claystone, dark-gray, silty

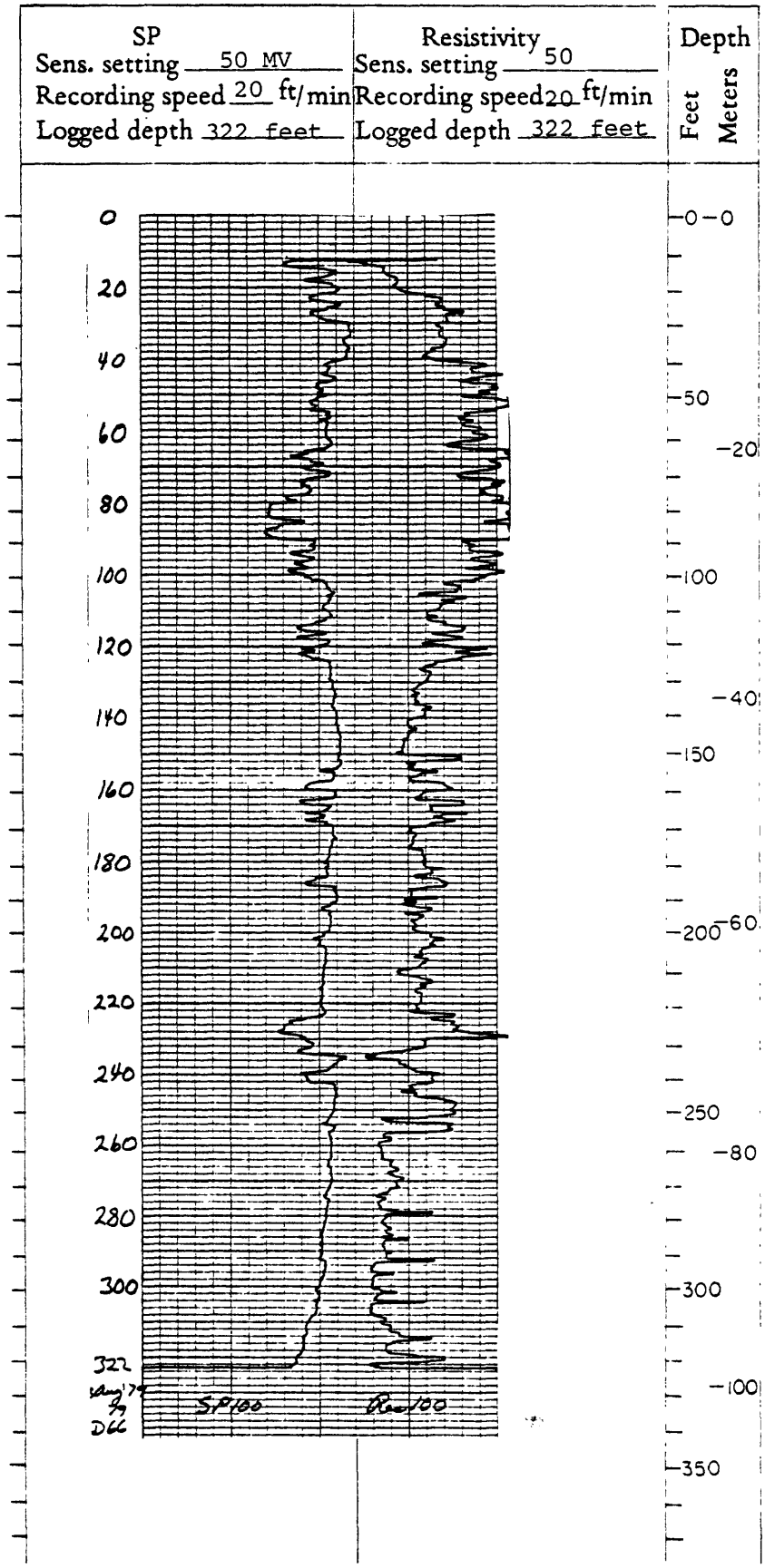


Hole number—continued

79D66

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 322 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 322 feet	Depth Feet / Meters
256-263	Siltstone, dark-gray, clayey			300
263-275	Sandstone, medium-gray, medium-grained, silty			100
275-280	Siltstone, medium-gray, clayey, sandy			350
280-300	Claystone, greenish-gray, silty			
300-301	Lignite			
301-303	Claystone, greenish-gray			
303-304	Lignite			120
304-316	Claystone, greenish-gray			400
316-317	Lignite			
317-322	Claystone, medium-gray, silty			
				450 140
				500
				160
				550
				180
				600

79D66 Hole number – continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D67 Map: No Topo or Map Name Date: 9-25-79 State: ND County: Divide

Elev.: 2300 feet Location: T. 164 N, R. 101 W, Sec. 35, Tract: aaad Drilled depth: 340 feet

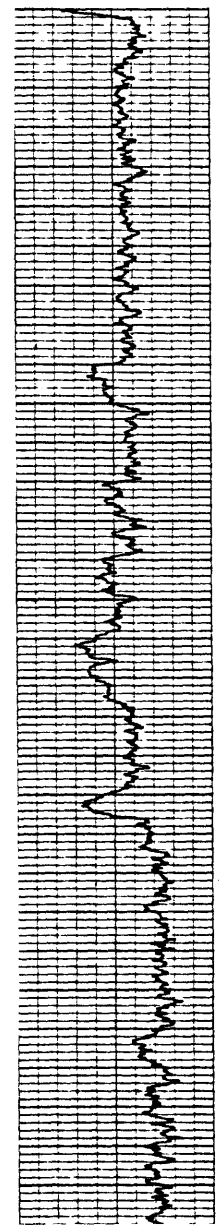
Measured: 512 ft FNL, 130 ft FEL, Hole size: 4 3/4 in Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds:

Remarks: No density log run

Lithology Recorded by: Clarence Carlson Geologist Yes Geophysical logs recorded by: Lechner

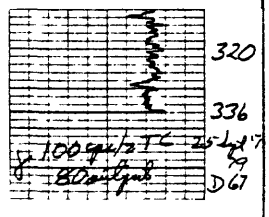
Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 336 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 336 feet	Depth Feet / Meters
0- 5 Clay, medium-gray			
5- 12 Clayey, yellowish-gray			
12- 22 Till, yellowish-brown			
22- 87 Till, medium dark-gray			
87-135 Gravel			
136-145 Till, medium-gray			
145-160 Sand			
160-340 No samples			



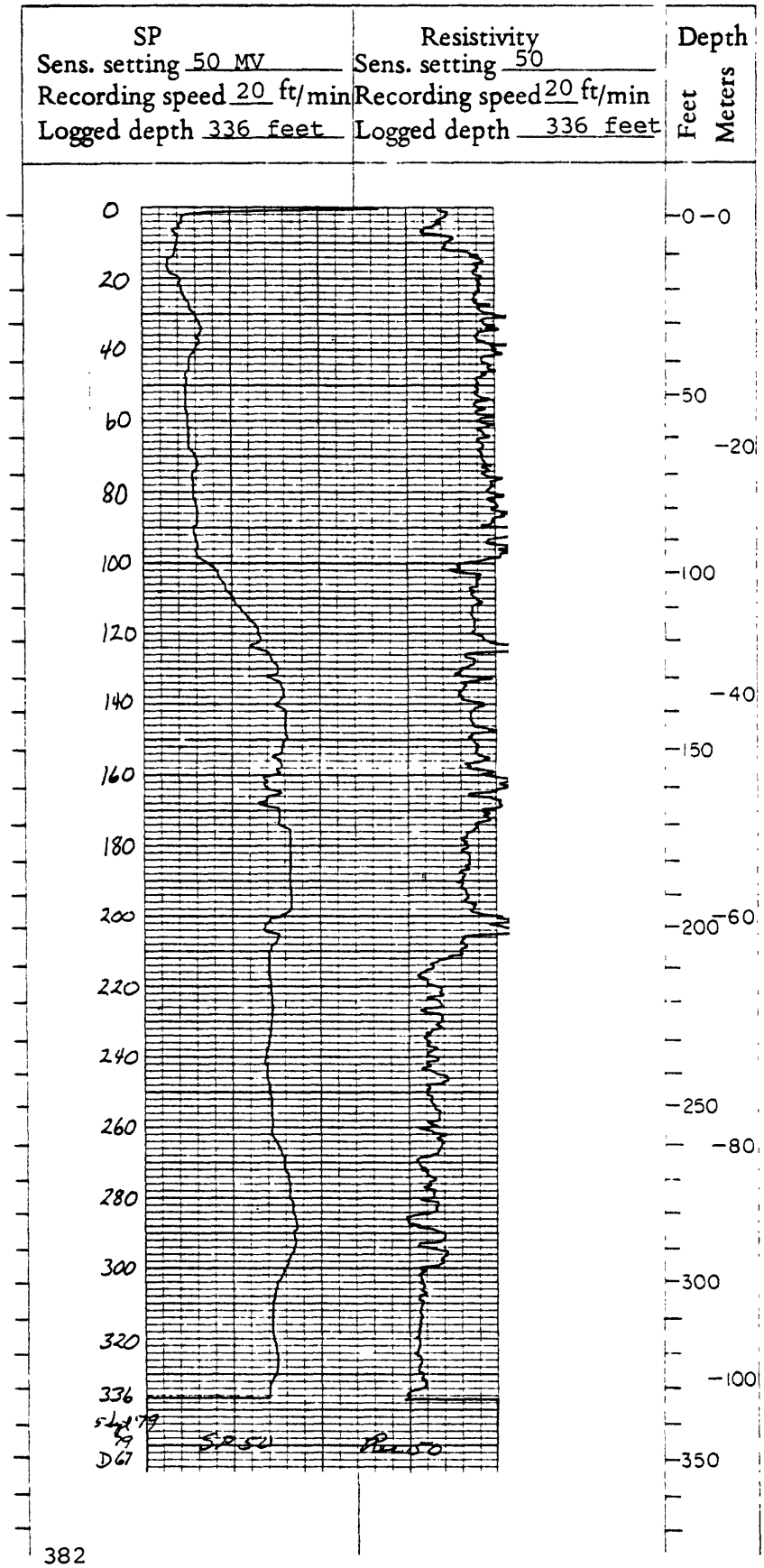
380

Hole number—continued

79D67

Lithology	Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 336 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 336 feet	Depth Feet / Meters
			300
			—100
			350
			—120
			400
			450
			—140
			500
			—160
			550
			—180
			600

79D67 Hole number – continued



NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D68 Map: Stady Date: 9 26 79 State: ND County: Divide

Elev.: 2212 Location: T. 161 N/S, R. 101 E/W, Sec. 26, Tract: aada Drilled depth: 482 ft

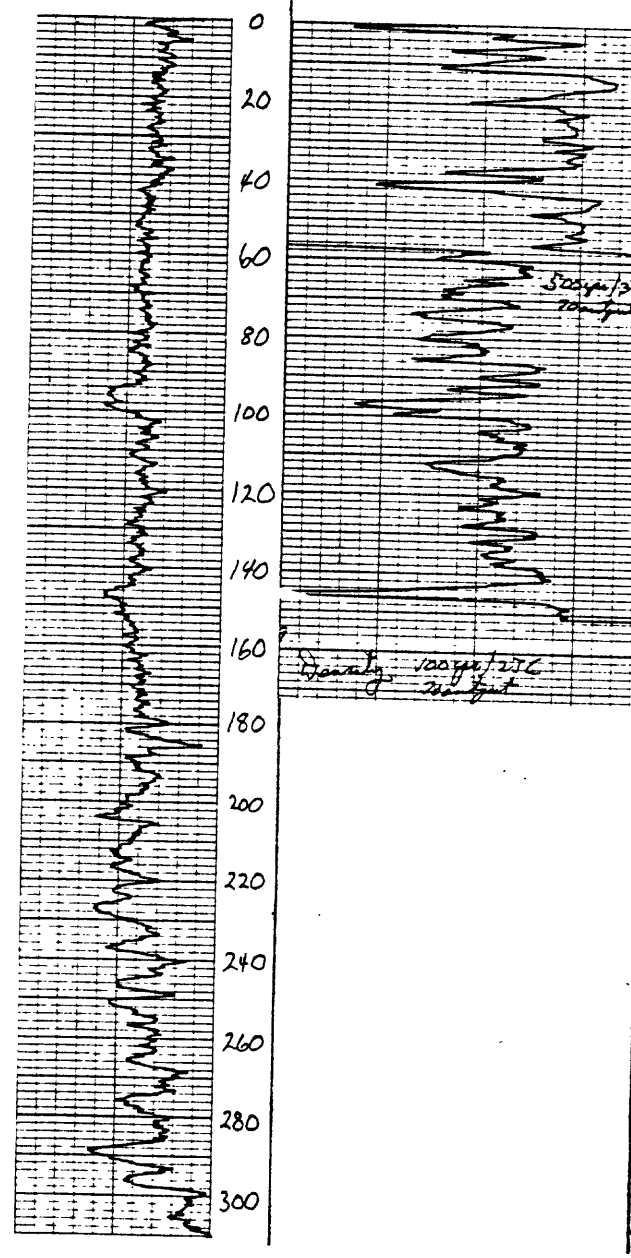
Measured: 760 ft FNL/FSL, 22 ft FEL/FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 432-443

Remarks:

Lithology Recorded by: Clarence Carlson Geologist Yes Geophysical logs recorded by: Lechner

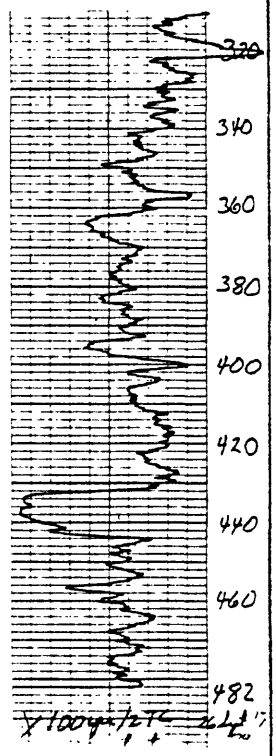
Lithology		Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 482 ft	Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 151 ft	Depth Feet	Depth Meters
0- 2	Silt, yellowish-brown, sandy				
2- 32	Till, yellowish-brown				
32- 42	Silt, medium-gray				
42- 62	Till, yellowish-brown				
62- 75	Till, olive-gray				
75- 92	Till, medium dark-gray to medium-gray				
92- 96	Gravel				
96-142	Till, medium-gray				
142-155	Sand, light-gray, very fine- to fine-grained				
155-172	Till, olive-gray, clayey				
172-177	Claystone, medium-light-gray, silty				
177-180	Siltstone, light-gray				
180-181	Lignite				
181-187	Siltstone, medium-light-gray				
187-195	Claystone, medium-light-gray				
195-199	Siltstone, medium-light-gray				
199-201	Limestone, medium-gray				
201-208	Claystone, medium-gray				
208-214	Sandstone, medium-light-gray, very fine-grained, silty				
214-217	Clay, medium-light-gray				
217-218	Lignite and shale, brownish-gray, carbonaceous				
218-220	Siltstone, brownish-gray				
220-222	Sand, light-gray				
222-227	Lignite				
227-260	No samples				
260-263	Siltstone, light-gray				
263-267	Claystone, light-gray				
267-273	Siltstone, light-gray				
273-279	Claystone, medium-gray				
279-286	Siltstone, light-gray				
286-288	Lignite				



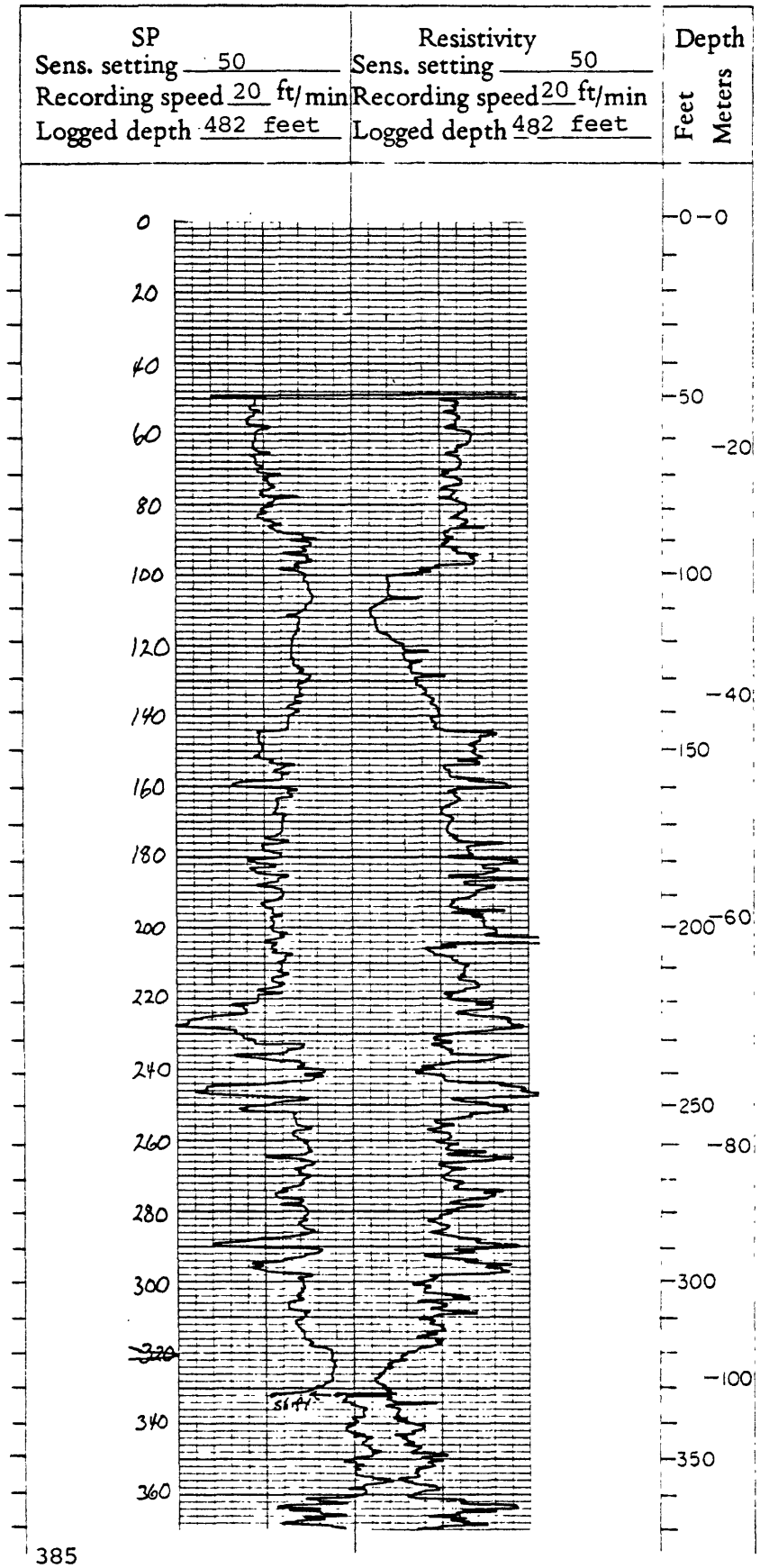
Hole number—continued

79D68

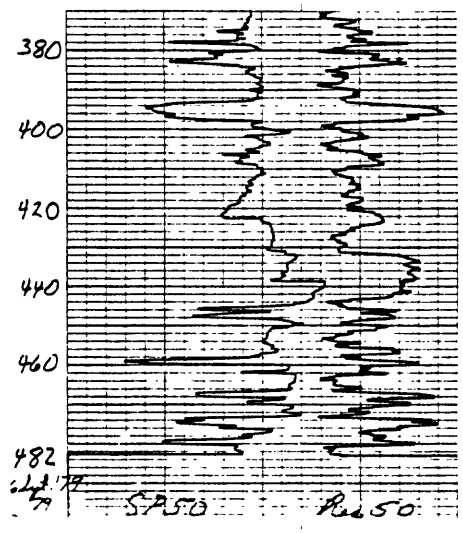
Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 482 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 151 feet	Depth Feet / Meters
288-290	Claystone, brownish-gray			300
290-305	Claystone, light-greenish-gray			
305-307	Lignite			−100
307-317	Claystone, light-greenish-gray			
317-345	Claystone, greenish-gray			350
345-346	Claystone, brownish-gray			
346-347	Lignite			
347-355	Claystone, greenish-gray			
355-357	Siltstone, light-greenish-gray			−120
357-360	Claystone, light-greenish-gray			400
360-362	Limestone, light-gray			
362-377	Claystone, light-greenish-gray			
377-380	Claystone, brownish-gray			
400-403	Claystone, greenish-gray			450
403-406	Claystone, brownish-gray			−140
406-418	Claystone, very-light-brownish-gray			
418-429	Claystone, light-brownish-gray			
429-440	Lignite			500
440-446	Siltstone, brownish-gray, clayey			
446-456	Claystone, greenish-gray			−160
456-458	Lignite			
458-460	Claystone, light-brownish-gray			
460-463	Claystone, light-greenish-gray			550
463-476	Claystone, brownish-gray			
476-480	Siltstone, light-greenish-gray			−180
				600



79D68 Hole number - continued



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 482 feet	Logged depth 482 feet	



Depth: 120, 400, 450, 140, 500, 160, 550, 180, 600, 650, 200, 700, 220, 750

NORTH DAKOTA GEOLOGICAL SURVEY

Hole No: 79D69 Map: Stady Date: 9 26 79 State: ND County: Divide

Elev.: 2240 Location: T. 161 N S, R. 100 E W, Sec. 28, Tract: addd Drilled depth: 442 ft

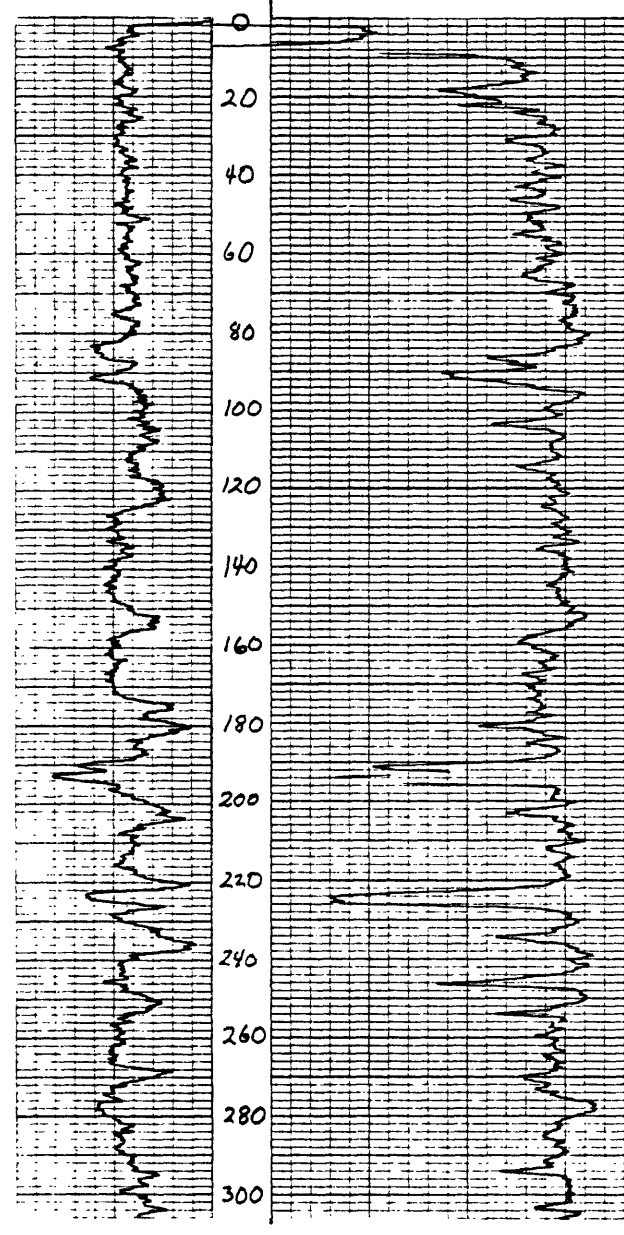
Measured: 2505 ft FNL FSL, 30 ft FEL FWL, Hole size: 4 3/4 Air ☐ Water ☒ Cored: Yes ☐ No ☒

Lignite beds: 190-196; 222.5-224.5; 416-418

Remarks:

Lithology Recorded by: Clarence Carlson Geologist Yes Geophysical logs recorded by: Lechner

Lithology		Gamma: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 442 ft	Density: T.C. 2 Range 100cps; Recording speed 20 ft/min; Logged depth 442 ft	Depth Feet	Depth Meters
0- 2	Sand, yellowish-brown, silty				
2- 27	Till, yellowish-brown,				
27- 28	Gravel, sandy				
28- 33	Till, yellowish-brown				
33- 41	Till, olive gray				
41- 80	Till, medium-dark-gray				
80- 83	Gravel				
83- 87	Till, medium-dark-gray				
87- 88	Gravel				
88-100	Claystone, light-gray				
100-107	Siltstone, light-gray				
107-111	Claystone, light-gray				
111-112	Shale, brownish-gray, lignitic				
112-127	Siltstone, light-gray				
127-155	Sandstone, light-gray				
155-160	Claystone, yellowish-brown				
160-178	Sandstone, light-gray				
178-180	Lignite				
180-184	Claystone, medium-light-gray				
184-186	Lignite				
186-187	Claystone, brownish-gray				
187-190	Lignite				
190-193	Claystone, light-greenish-gray				
193-198	Siltstone, light-greenish-gray				
198-200	Shale, brownish-gray, lignitic				
200-213	Siltstone, light-greenish-gray				
213-214	Lignite				
214-218	Siltstone, light-greenish-gray				
218-221	Claystone, light-greenish-gray				
221-224	Lignite				
224-226	Claystone, brownish-gray				



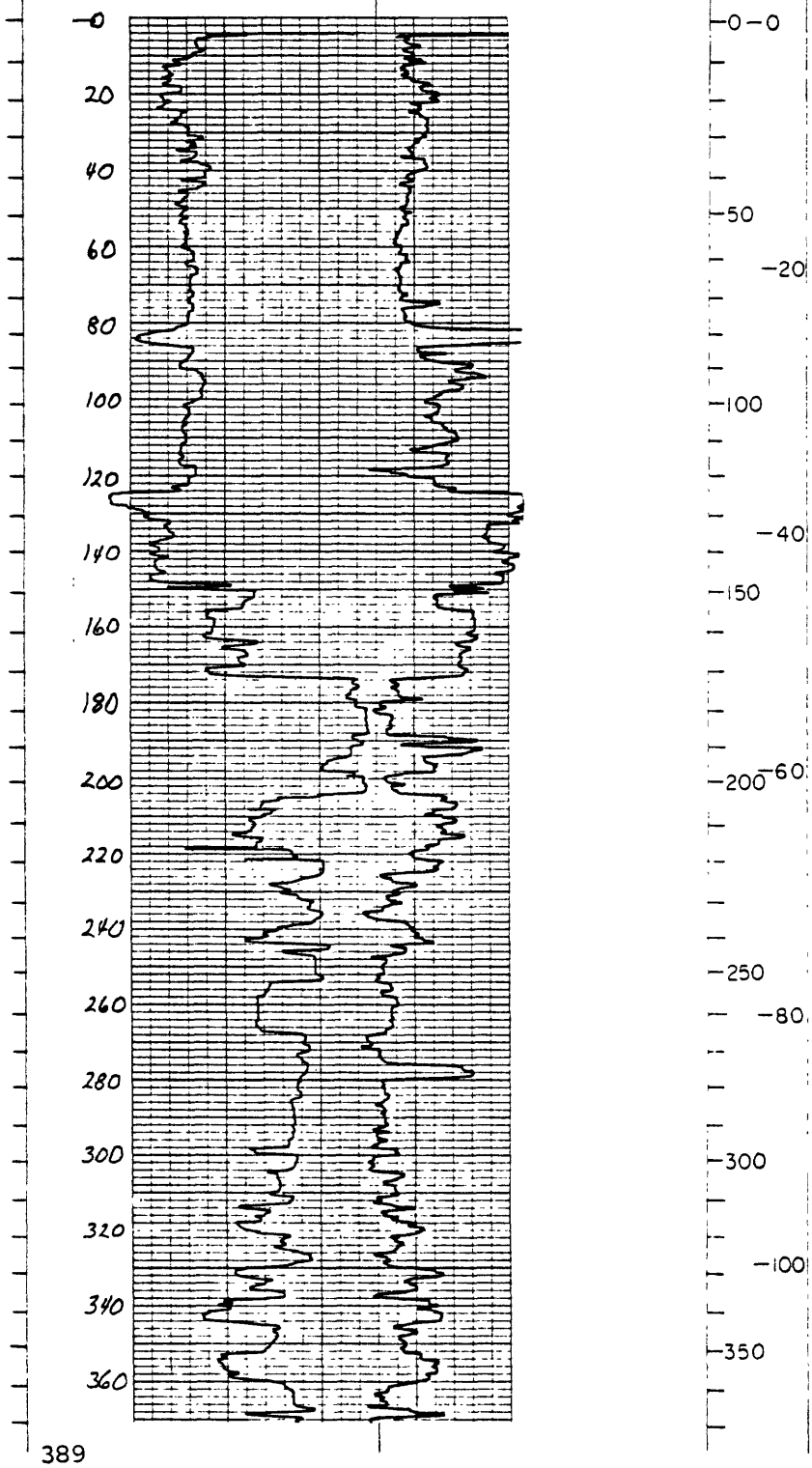
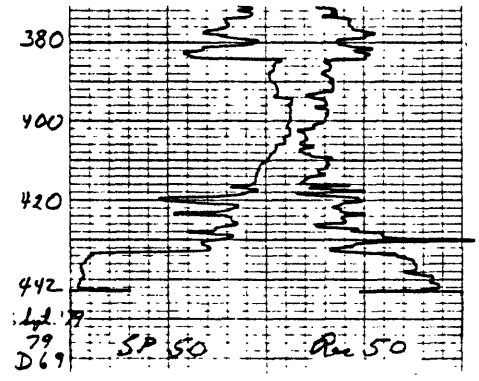
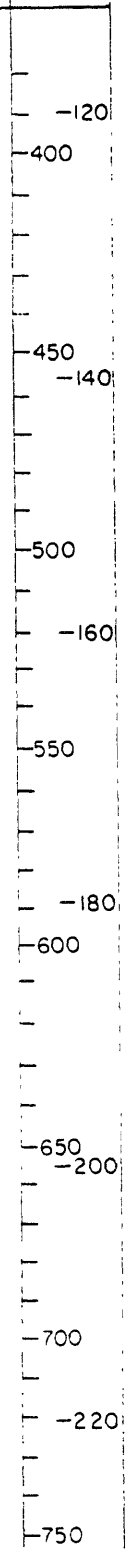
Hole number—continued

79D69

Lithology		Gamma T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 442 feet	Density T.C. 2 Range 100 cps Recording speed 20 ft/min Logged depth 442 feet	Depth Feet / Meters
226-227	Lignite			300
227-234	Siltstone, light-brownish-gray			
234-236	Claystone, brownish-gray	320		−100
236-237	Lignite			
237-243	Siltstone, light-greenish-gray	340		350
243-244	Lignite			
244-246	Claystone, light-greenish-gray	360		
246-254	Siltstone, light-greenish-gray, sandy	380		−120
254-260	Siltstone, light-greenish-gray	400		400
260-272	Sandstone, light-gray			
272-302	Siltstone, light-greenish-gray, sandy	420		
302-306	Claystone, brownish-gray	442		
306-307	Lignite			450
307-312	Claystone, light-brownish-gray			−140
312-320	Siltstone, light-brownish-gray			
320-322	Claystone, brownish-gray, lignitic			500
322-328	Siltstone, light-greenish-gray			
328-334	Claystone, light-greenish-gray			−160
334-338	Siltstone, light-brownish-gray			
338-355	Claystone, light-brownish-gray			550
355-358	Siltstone, light-brownish-gray			
358-362	Claystone, brownish-gray			−180
362-363	Lignite			
363-368	Claystone, brownish-gray, carbonaceous			600
368-377	Claystone, light-brownish-gray			
377-380	Siltstone, light-greenish-gray			
380-402	Claystone, greenish-gray			
402-410	Lignite			
410-440	No samples			

79D69 Hole number — continued

SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 422 feet	Logged depth 422 feet	



SP	Resistivity	Depth
Sens. setting 50	Sens. setting 50	Feet / Meters
Recording speed 20 ft/min	Recording speed 20 ft/min	
Logged depth 442 feet	Logged depth 442 feet