

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

GEOPHYSICAL AND LITHOLOGIC LOGS FROM COAL TEST HOLES DRILLED
DURING 1979 IN CONVERSE AND CAMPBELL COUNTIES, WYOMING

By

Thomas P. Lonnie, Harold E. Corley, and Rodney J. Noah

Open-File Report 80-1041

1980

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

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ABBREVIATIONS

carb-----	carbonaceous
conch-----	conchoidal
cps-----	counts per second
frac-----	fracture
irreg-----	irregular
L.T.D.-----	Logged Total Depth
MV-----	millivolts
Res-----	resistance
Sens-----	sensitivity
S.P.-----	spontaneous potential
subconch-----	subconchoidal
T.C.-----	time constant

CONVERSION TABLE		
To convert ENGLISH UNITS	Multiply by	To obtain METRIC UNITS
Inches	2.54	Centimeters
Feet	.3048	Meters

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INTRODUCTION

Fifty-six coal test holes were drilled in Converse and Campbell Counties, Wyo., from June 1 to November 1, 1979 (fig. 1). The drilling was done as part of the U.S. Geological Survey's (USGS) program to evaluate and classify mineral lands in the public domain. The purpose of the program is to gather data on the thickness, quality, extent, and recoverability of coal beds, and the lithologic characteristics of the associated rocks in the Tertiary Fort Union and Wasatch Formations of the Powder River Basin, Wyo. Similar information was presented in earlier reports (U.S. Geological Survey and Montana Bureau of Mines and Geology, 1973, 1973, 1976a, 1976b, 1977, and 1978; Kistner, 1977, 1980; and Kistner and others, 1979).

Figure 1 shows the location and test-hole number for each hole drilled during the 1979 field season. Test-hole locations appear on the log headings scaled, in feet, from section lines as they appear on topographic quadrangle sheets. Elevations are approximated from topographic contours for all test holes.

This report presents the lithologic logs (depth intervals corrected to match the geophysical logs) and the geophysical logs of the drill holes. A conventional rotary drill was used; circulating water was the usual drilling fluid. Continuous 10-foot samples were logged by a geologist in the field. Natural gamma-ray, resistance, and spontaneous-potential logs were recorded for each drill hole unless there were problems with the drill-hole stability. In those instances, the gamma-ray log was recorded through the drill pipe or, as in drill hole CD-79035, no geophysical log was run. The logs were photographically reduced to a scale of 1 in. equals 50 ft for convenience in reproducing this report, and the originals are on file at the USGS office, Casper, Wyo. Core samples were taken from eight offset core holes: CD-79006, CD-79007, CD-79008, CD-79016, CD-79018, CD-79020, CD-79022, and CD-79027. The analyses of these core samples are not yet available.

ACKNOWLEDGMENTS

Fieldwork was carried out by the following USGS personnel: Thomas P. Lonnie, Harold E. Corley, Alex J. Donatich, Beth M. Wrege, geologists; Gregg A. Hollomon, technician; and Harry R. Cureton, driller. Lithologic detail was added to the field descriptions by Harold E. Corley and Rodney J. Noah. Supervision and technical guidance were provided by Thomas P. Lonnie and Marvin L. Millgate.

REFERENCES

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U.S. Geological Survey and Montana Bureau of Mines and Geology, 1978, Geophysical logs for Campbell and Converse Counties, Wyoming, chapter E of Preliminary report of 1977 coal drilling in eastern Montana and northeastern Wyoming: U.S. Geological Survey Open-File Report 77-721-E, 202 p.

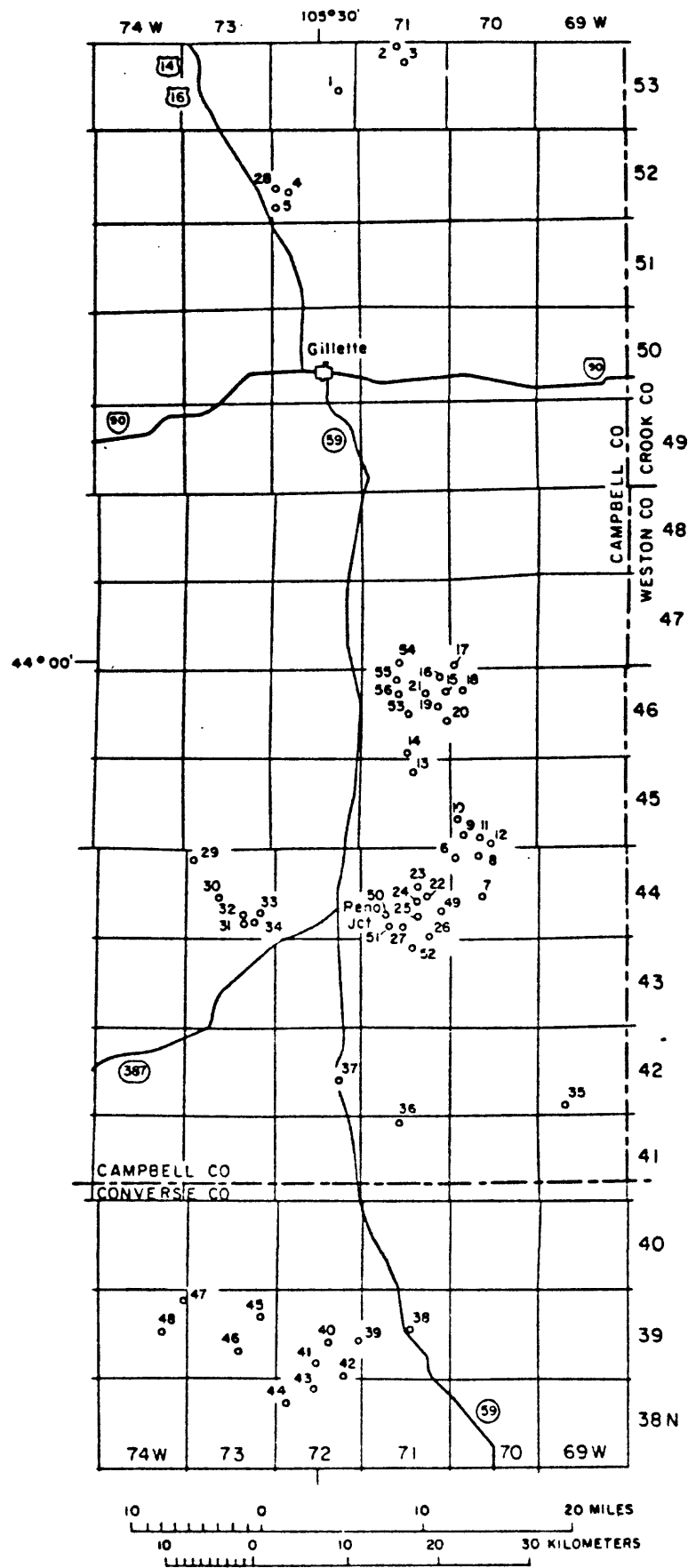
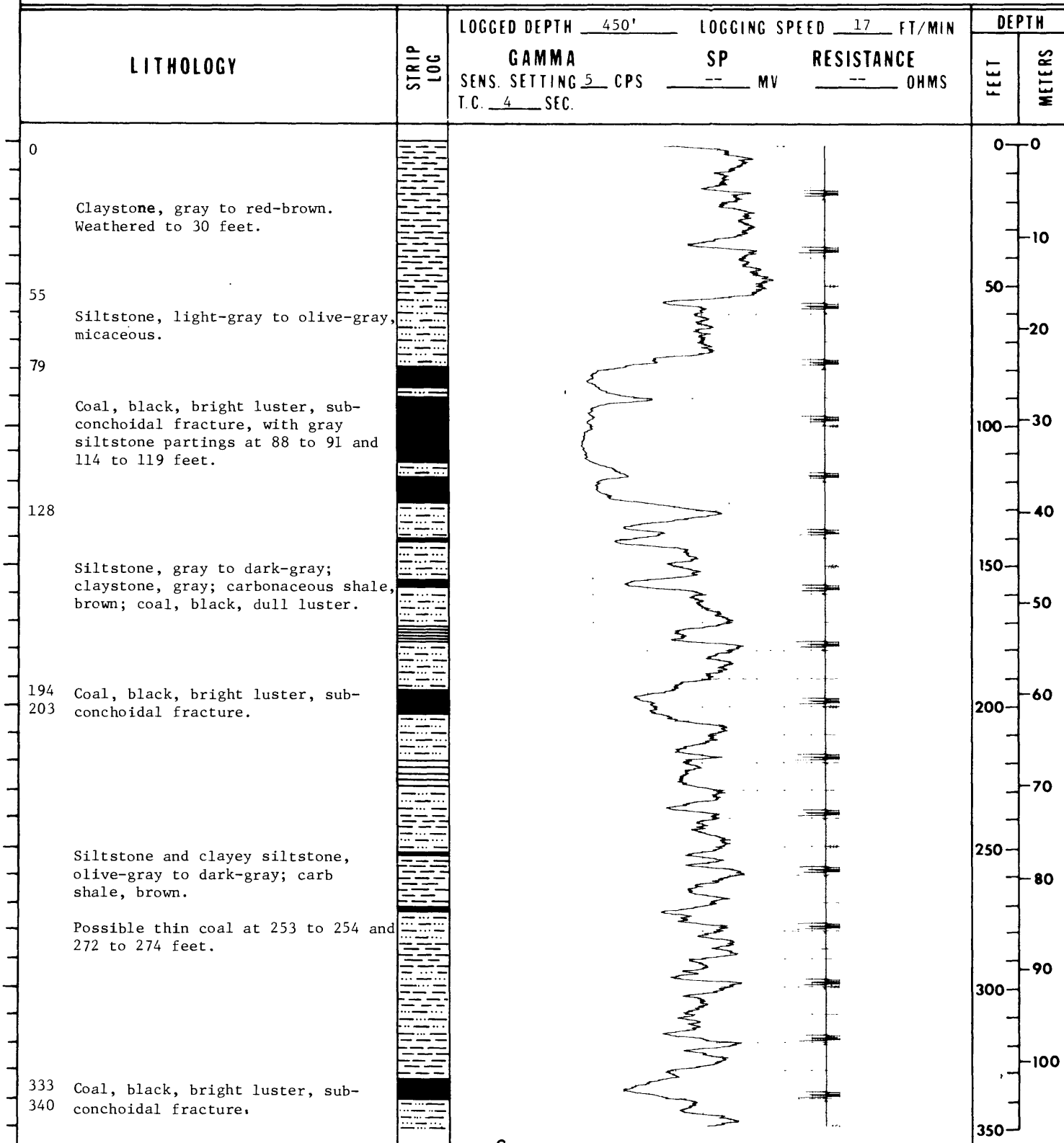


Figure 1.--Locations of coal test holes drilled during 1979 in Campbell and Converse Counties, Wyo. Individual drill-hole number (33), used on map above, is expanded on accompanying logs to identify driller (CD, Conservation Division, U.S. Geological Survey) and year (79): CD-79033.

UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79001
SHEET 1 OF 2

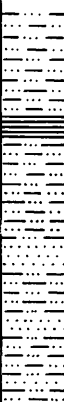
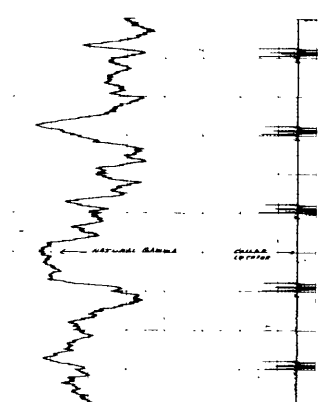
AREA Powder River Basin		QUAD NAME Weston SW	
DATE STARTED 6/1/79	DATE COMP. 6/2/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 23 T. 53 N., R. 72 W.,		FOOTAGE LOC. 2600' FNL 434 500' FEL 434	GROUND ELEV 4345'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 460' CORING 0	TOTAL DEPTH 460'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	DEPTH TO WATER NR
LITHOLOGY RECORDED BY A.J. Donatich		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS: Lost circulation at 120 feet. Logged through drill pipe. Drill collar locator 1000 MV			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79001
SHEET 2 OF 2

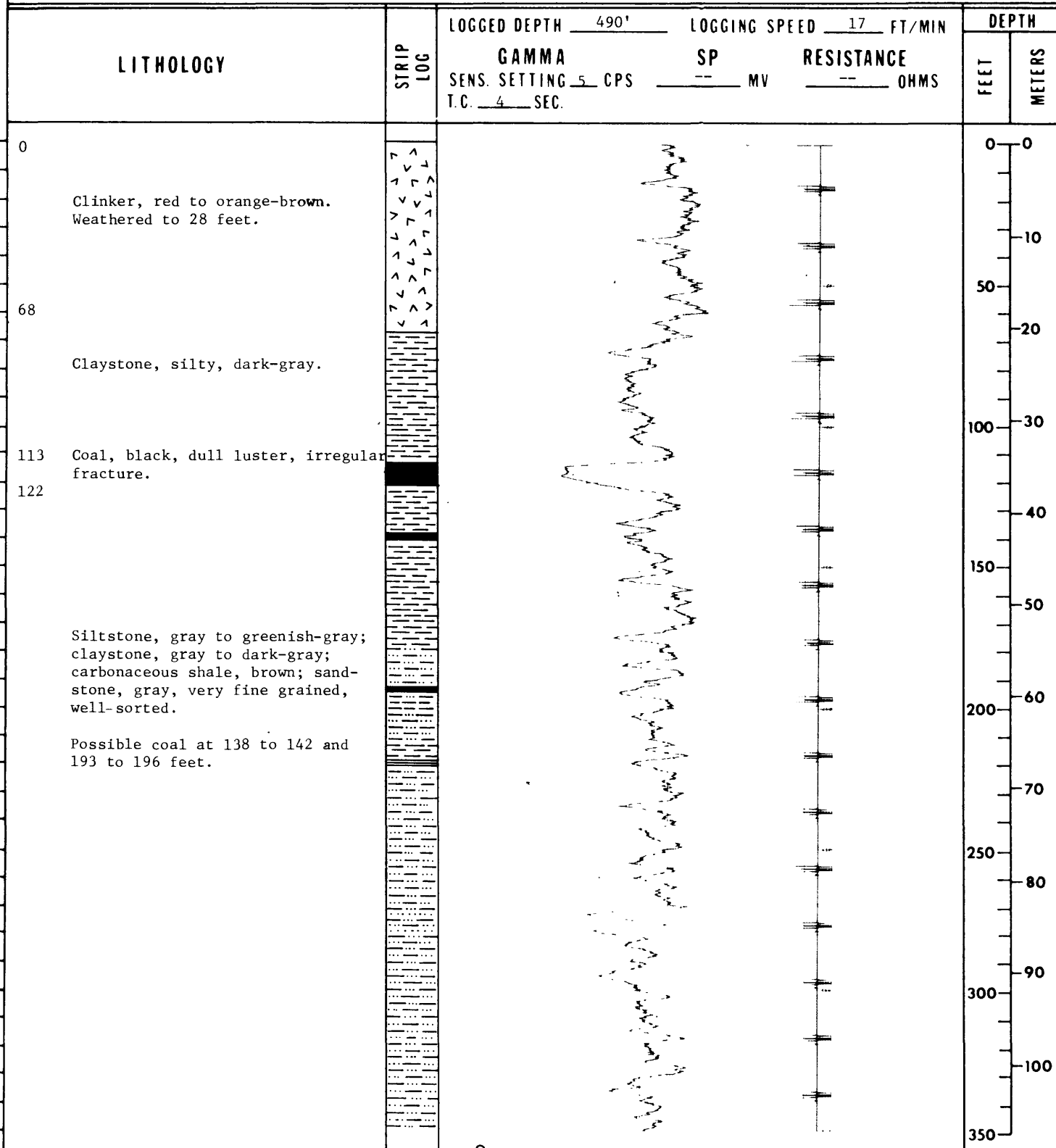
REMARKS:

LITHOLOGY	STRIP LOG	LOGGED DEPTH <u>450'</u> LOGGING SPEED <u>17</u> FT/MIN			DEPTH	
		GAMMA SENS. SETTING <u>5</u> CPS T.C. <u>4</u> SEC.	SP -- MV	RESISTANCE -- OHMS	FEET	METERS
Siltstone, dark-gray.					350	
376					110	
381 Carbonaceous shale, brown.					120	
Siltstone, slightly sandy, greenish-gray to dark-gray.					400	
450 L.T.D.					130	
					140	
					150	
					160	
					170	
					180	
					190	
					200	
					210	
					220	
					230	
					240	
					250	
					260	
					270	
					280	
					290	
					300	
					310	
					320	
					330	
					340	
					350	
					360	
					370	
					380	
					390	
					400	
					410	
					420	
					430	
					440	
					450	
					460	
					470	
					480	
					490	
					500	
					510	
					520	
					530	
					540	
					550	
					560	
					570	
					580	
					590	
					600	
					610	
					620	
					630	
					640	
					650	
					660	
					670	
					680	
					690	
					700	
					710	
					720	
					730	
					740	
					750	

UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79002
SHEET 1 OF 2

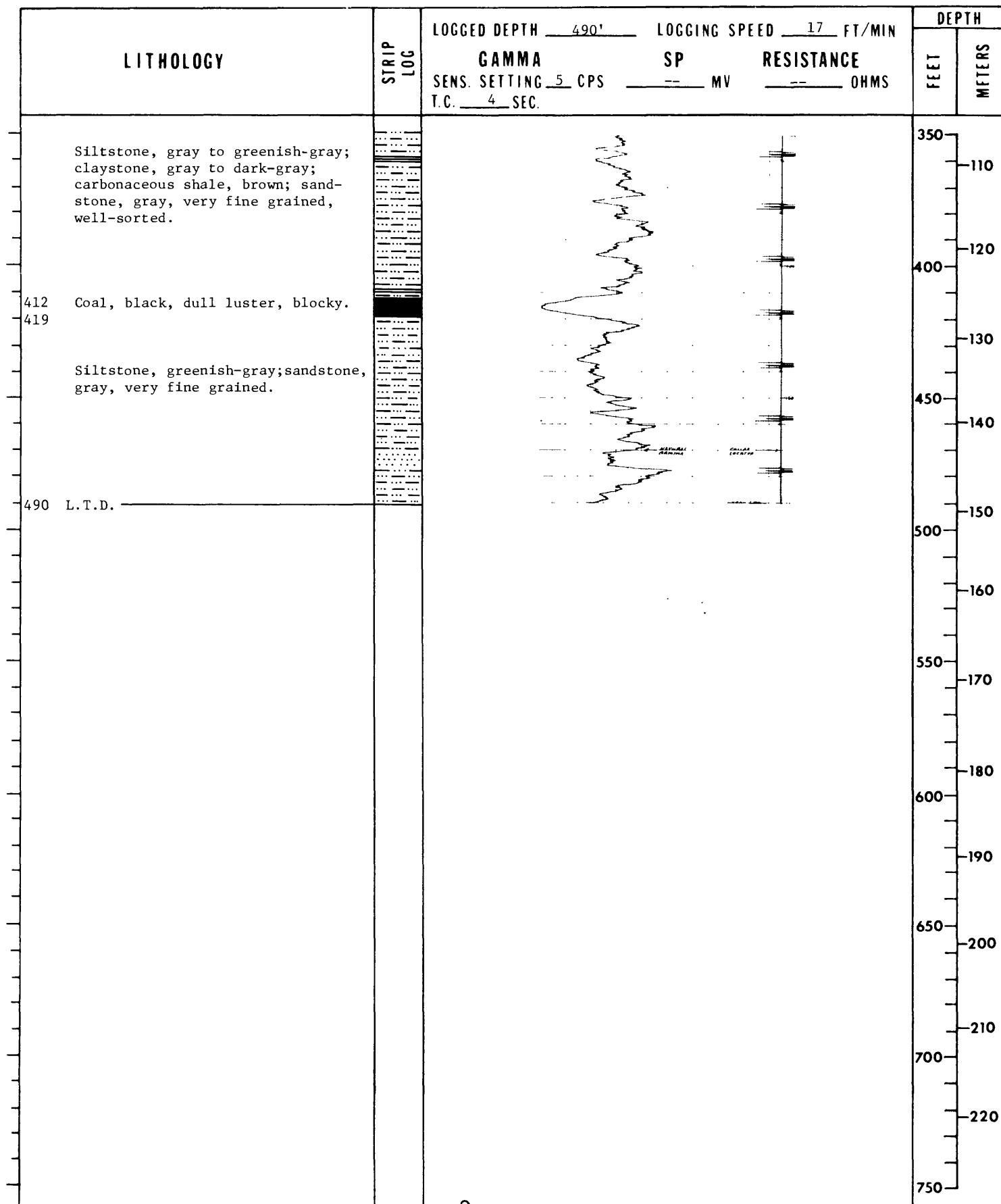
AREA Powder River Basin		QUAD NAME Weston SW	
DATE STARTED 6/3/79	DATE COMP. 6/4/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 4 T. 53 N., R. 71 W., FOOTAGE LOC. 2470'		FNL 1620'	FEL 4455'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 500 CDRING 0	TOTAL DEPTH 500'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	DEPTH TO FLUID 105'
LITHOLOGY RECORDED BY A. J. Donatich		GEOPHYSICAL LOGS RECORDED BY G. A. Hollomon	
REMARKS: Lost circulation at 110 feet. Logged through drill pipe. Drill collar locator 1000 MV			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79002
SHEET 2 OF 2

REMARKS:




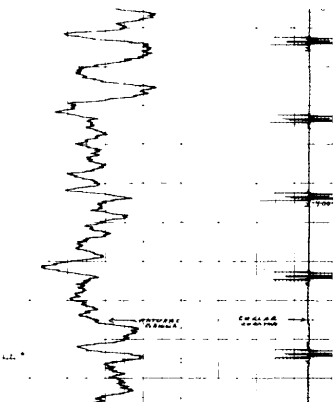
HOLE NO CD-79003
SHEET 1 OF 2

LITHOLOGY	STRIP LOG	LOGGED DEPTH	LOGGING SPEED	DEPTH		
		GAMMA SENS. SETTING	SP MV	RESISTANCE OHMS	FEET	METERS
0 Siltstone, grayish-brown; sandstone, gray, very fine grained, micaceous. Weathered to 19 feet.					0	0
29 Coal, black, dull luster, friable.					10	
36					50	
					20	
					30	
					40	
Siltstone, greenish-gray, with sandy and clayey brownish-gray beds; sandstone, olive-gray, very fine grained. Possible coal at 86 to 87, 169 to 171 and 214 to 216 feet.					100	30
					150	50
					200	60
					250	80
248 Sandstone, olive-gray, very fine grained.					300	90
256					100	
					350	
Siltstone, greenish-gray to dark-gray, with clayey dark-gray beds; sandstone, olive-gray, very fine grained.						
325 Coal, black, dull luster, irregular fracture.						
330						

UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79003
SHEET 2 OF 2

REMARKS:

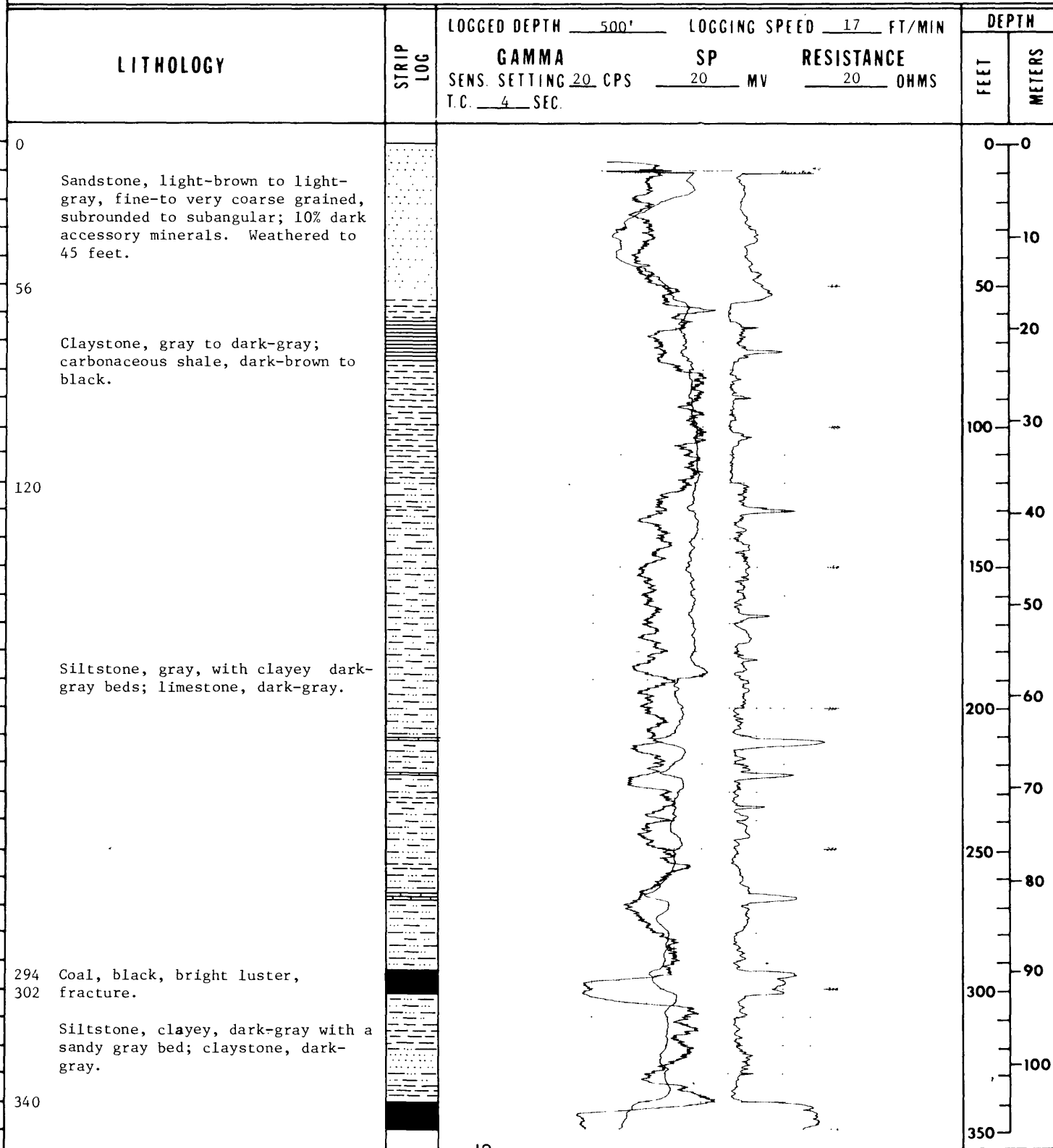
LITHOLOGY	STRIP LOG	LOGGED DEPTH <u>452'</u> LOGGING SPEED <u>17</u> FT/MIN			DEPTH	
		GAMMA SENS. SETTING <u>5</u> CPS T.C. <u>4</u> SEC.	SP -- MV	RESISTANCE -- OHMS	FEET	METERS
Siltstone, greenish-gray to dark-gray, with sandy dark-gray beds; carbonaceous shale, brown.					350	
					110	
					120	
					400	
					130	
					450	
					140	
					150	
					500	
					160	
					550	
					170	
					180	
					600	
					190	
					650	
					200	
					210	
					700	
					220	
					750	

452 L.T.D.

UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79004
SHEET 1 OF 2

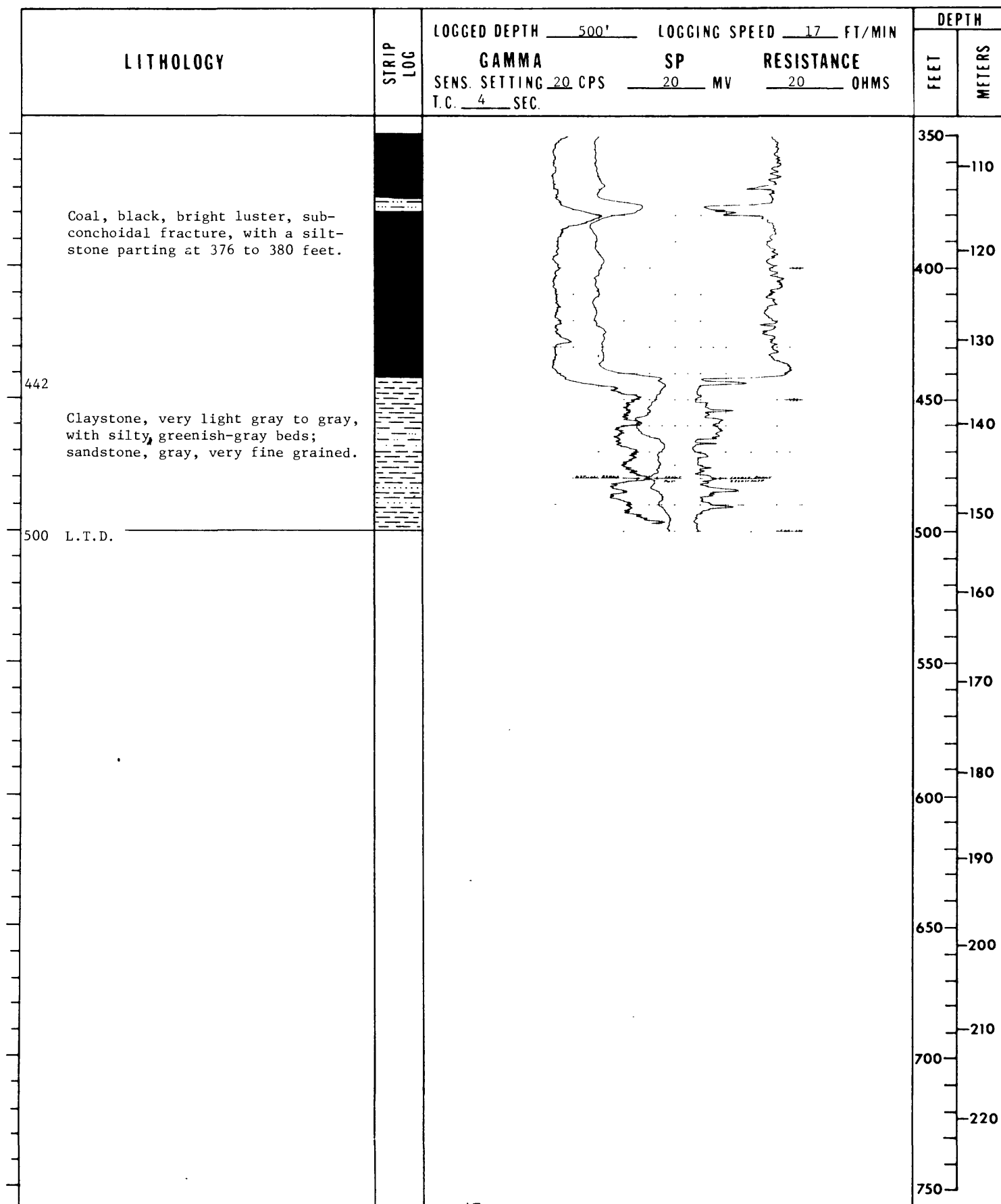
AREA Powder River Basin		QUAD NAME Rawhide School	
DATE STARTED 6/12/79	DATE COMP. 6/12/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 20 T. 52 N. R. 72 W. FOOTAGE LOC.		150' FSL	1500' FWL
SIZE AND BIT TYPE: 5" Drag		FOOTAGE	
		ROTARY 500'	CORING 0
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY A.J. Donatich		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79004
SHEET 2 OF 2

REMARKS:



HOLE NO CD-79005
SHEET 1 OF 2

LITHOLOGY	STRIP LOG	LOGGED DEPTH <u>440'</u>		LOGGING SPEED <u>16</u> FT/MIN		DEPTH	
		GAMMA SENS. SETTING <u>20</u> CPS		SP <u>20</u> MV		RESISTANCE <u>20</u> OHMS	
		T.C. <u>4</u> SEC.				FEET	METERS
0 Siltstone, gray to dark-gray; claystone, olive-gray; sandstone, light-gray, fine-to medium-grained, angular, 5% dark accessory minerals. Weathered to 30 feet.						0	0
40 Coal, black, bright luster, sub-conchoidal fracture, siltstone parting at 44 to 46 feet.						10	
52						50	
						100	30
						150	40
Siltstone, light-gray to dark-gray, with sandy light-gray beds; claystone, dark-gray; limestone, dark-gray; sandstone, gray, very fine grained, limy matrix.						200	60
						250	70
						300	80
301 Coal, black, dull luster, irregular fracture, with a claystone parting at 345 to 353 feet.						350	90
						100	
						350	

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HOLE NO CD-79005
SHEET 2 OF 2

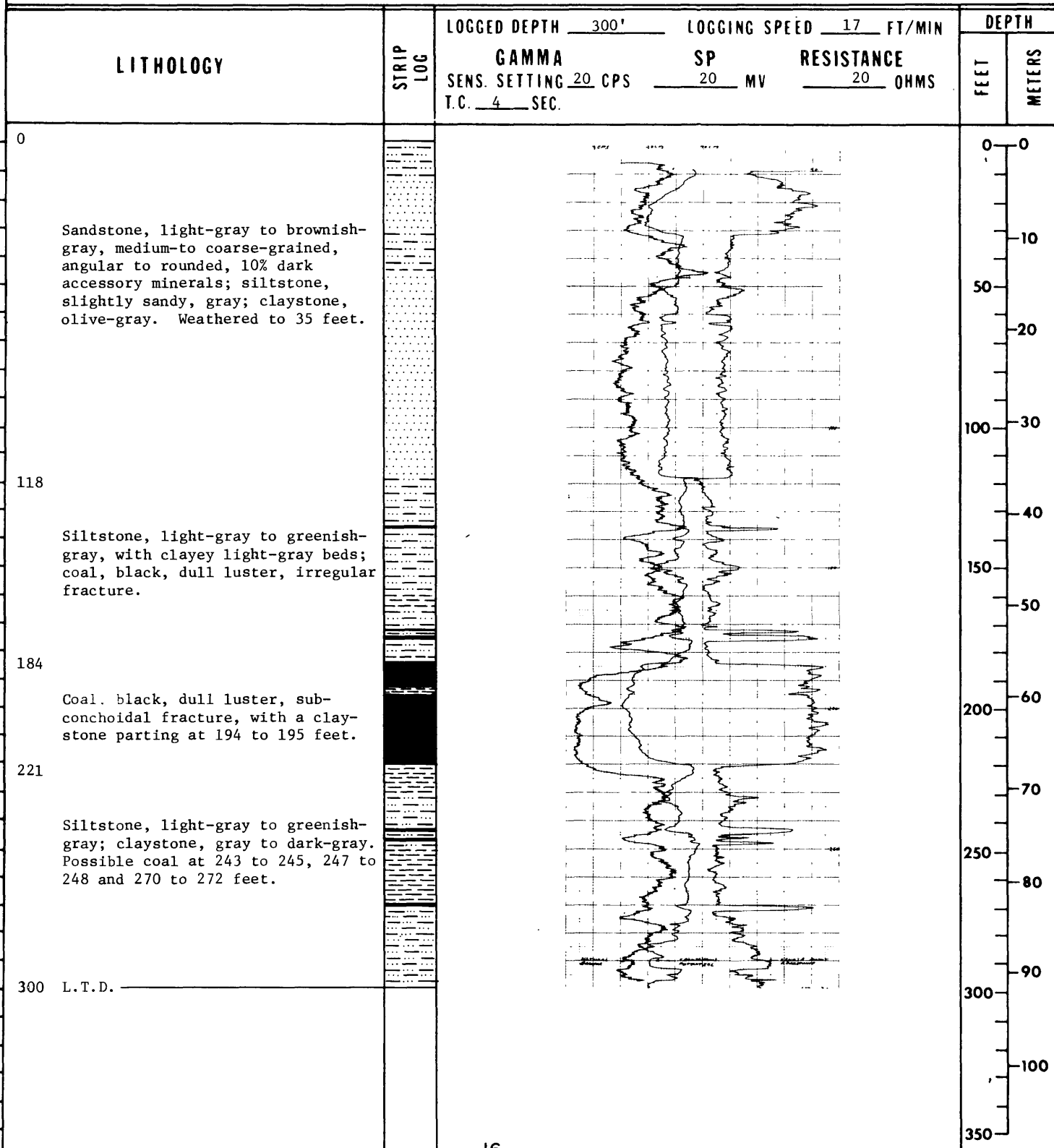
REMARKS:

LITHOLOGY	STRIP LOG	LOGGED DEPTH <u>440'</u> LOGGING SPEED <u>16</u> FT/MIN GAMMA SP RESISTANCE SENS. SETTING <u>20</u> CPS <u>20</u> MV <u>20</u> OHMS T.C. <u>4</u> SEC.	DEPTH	
			FEET	METERS
416 Claystone, light-gray; siltstone, sandy, gray. 440 L.T.D.		350 110 120 400 130 450 140 500 150 160 550 170 180 600 190 650 200 700 210 220 750		

UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79006
SHEET 1 OF 1

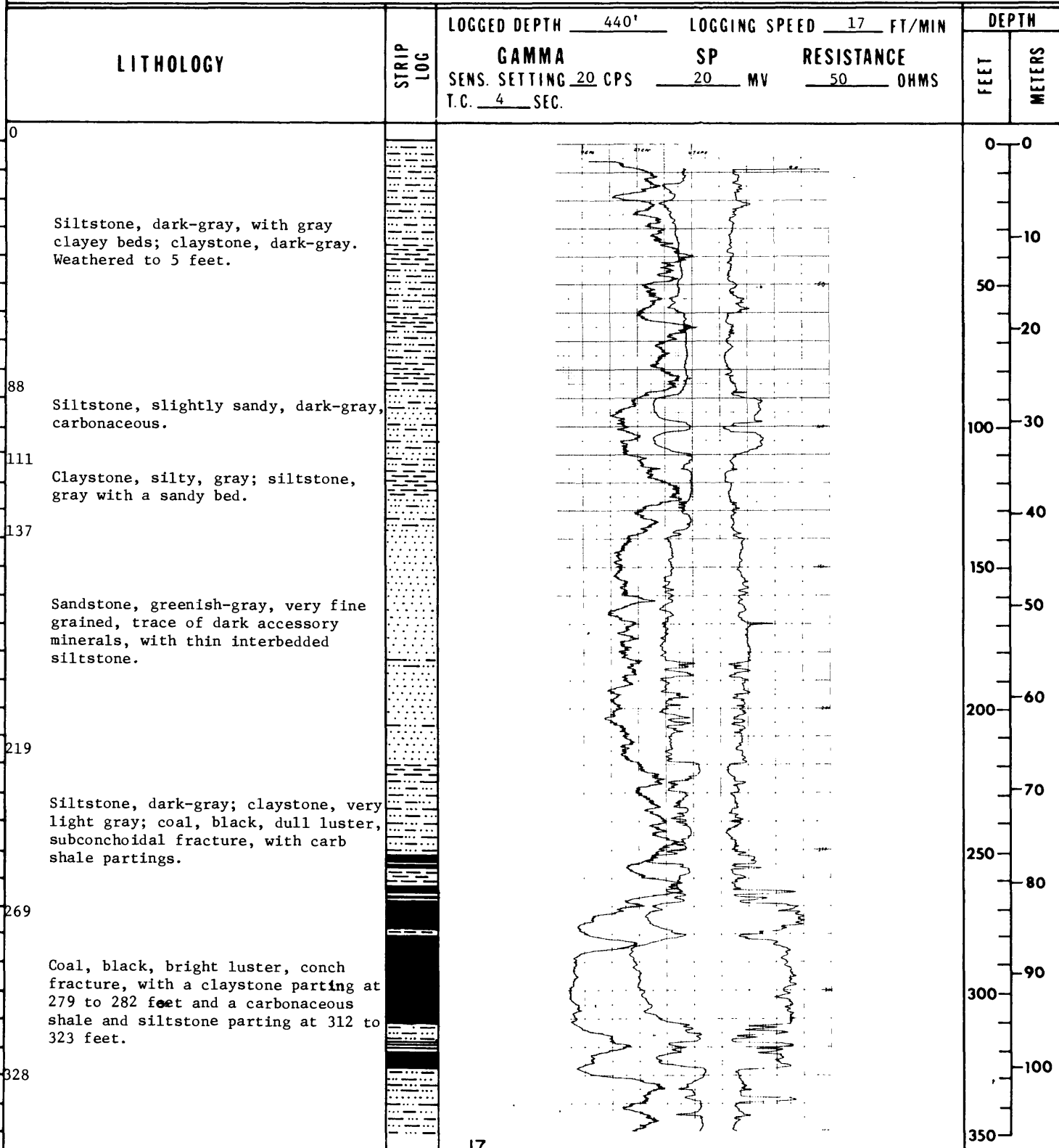
AREA Powder River Basin		QUAD NAME Hilight	
DATE STARTED 6/14/79	DATE COMP. 6/14/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 6 T. 44N., R. 70 W., FOOTAGE LOC.		1950 FWL 700 FWL	GROUND ELEV 4838'
SIZE AND BIT TYPE: 5" Drag		FOOTAGE	
		ROTARY 252'	CORING 48'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	TOTAL DEPTH 300'
LITHOLOGY RECORDED BY A.J. Donatich		DEPTH TO FLUID 9'	
GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon			
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79007
SHEET 1 OF 2

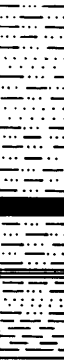
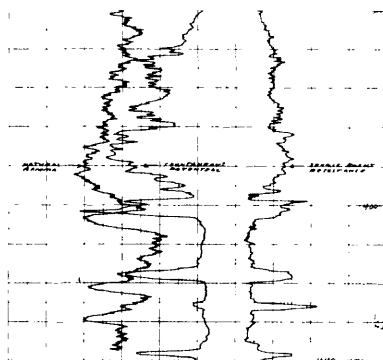
AREA Powder River Basin		QUAD NAME Hilight	
DATE STARTED 6/19/79	DATE COMP. 6/19/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 21 T. 44N. R. 70 W., FOOTAGE LOC.		FNL 109' FWL 292'	GROUND ELEV 4935'
SIZE AND BIT TYPE: 4 7/8" Drag		FOOTAGE	
		ROTARY 374' CDRNG 66'	TOTAL DEPTH 440'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	DEPTH TO FLUID 0'
LITHOLOGY RECORDED BY A.J. Donatich		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79007
SHEET 2 OF 2

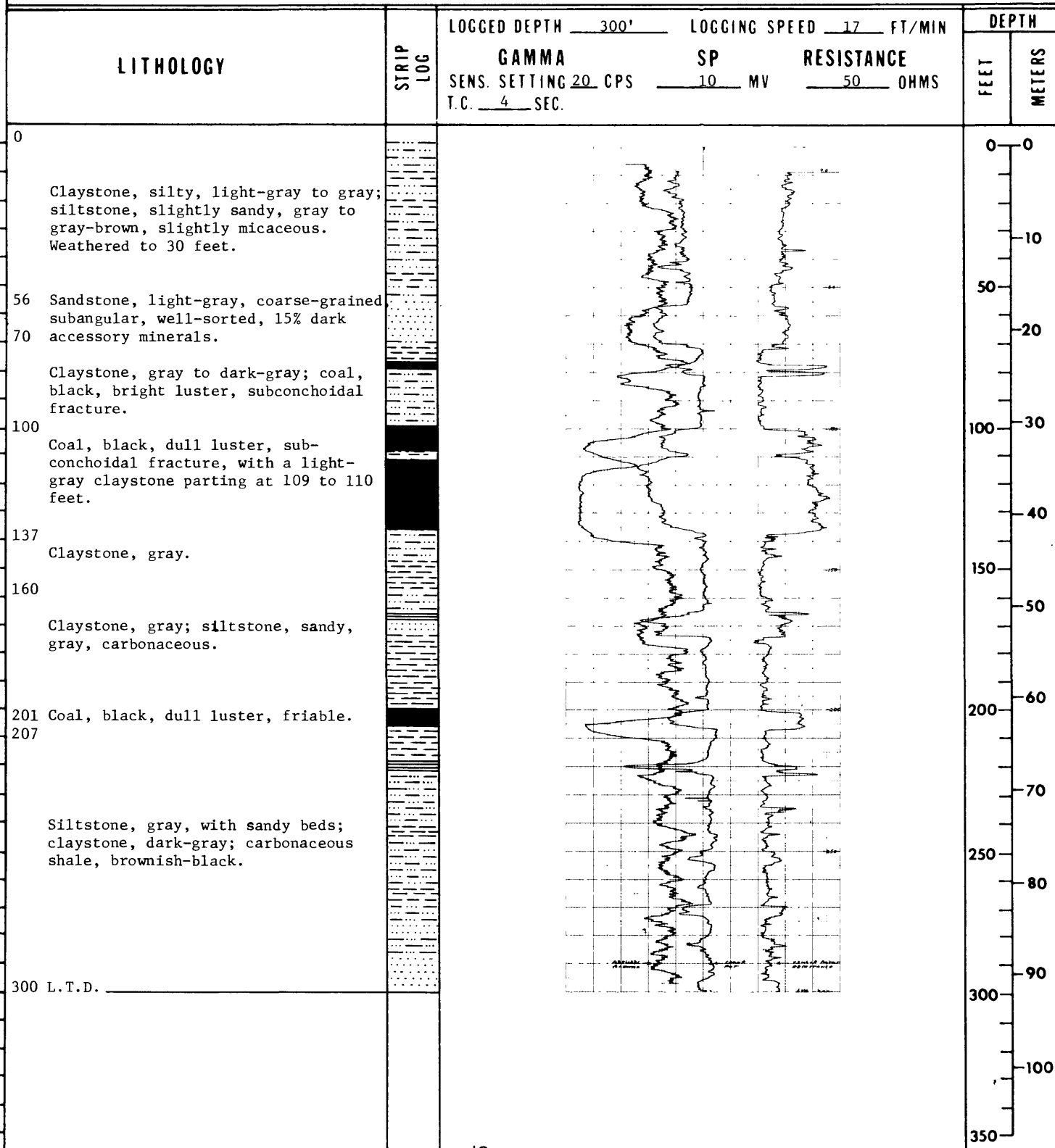
REMARKS:

LITHOLOGY	STRIP LOG	LOGGED DEPTH <u>440'</u> LOGGING SPEED <u>17</u> FT/MIN			DEPTH	
		GAMMA SENS. SETTING <u>20</u> CPS T.C. <u>4</u> SEC.	SP <u>20</u> MV	RESISTANCE <u>50</u> OHMS	FEET	METERS
<p>Siltstone, gray to dark-gray with clayey and sandy beds; sandstone, brownish-gray to olive-gray, very fine grained; carbonaceous shale, brown. Possible coal at 399 to 403 feet.</p> <p>440 L.T.D.</p>					350 110 120 400 130 450 140 500 150 550 160 600 170 650 180 700 190 750	

UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79008
SHEET 1 OF 1

AREA Powder River Basin		QUAD NAME Hilight	
DATE STARTED 6/26/79	DATE COMP. 6/26/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 5 T.44 N., R. 70 W., FOOTAGE LOC.		2200' FNL FSE	500' FEL FWE
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE	
		ROTARY 239'	CORING 61'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	GROUND ELEV 4815'
LITHOLOGY RECORDED BY A.J. Donatich		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS:			

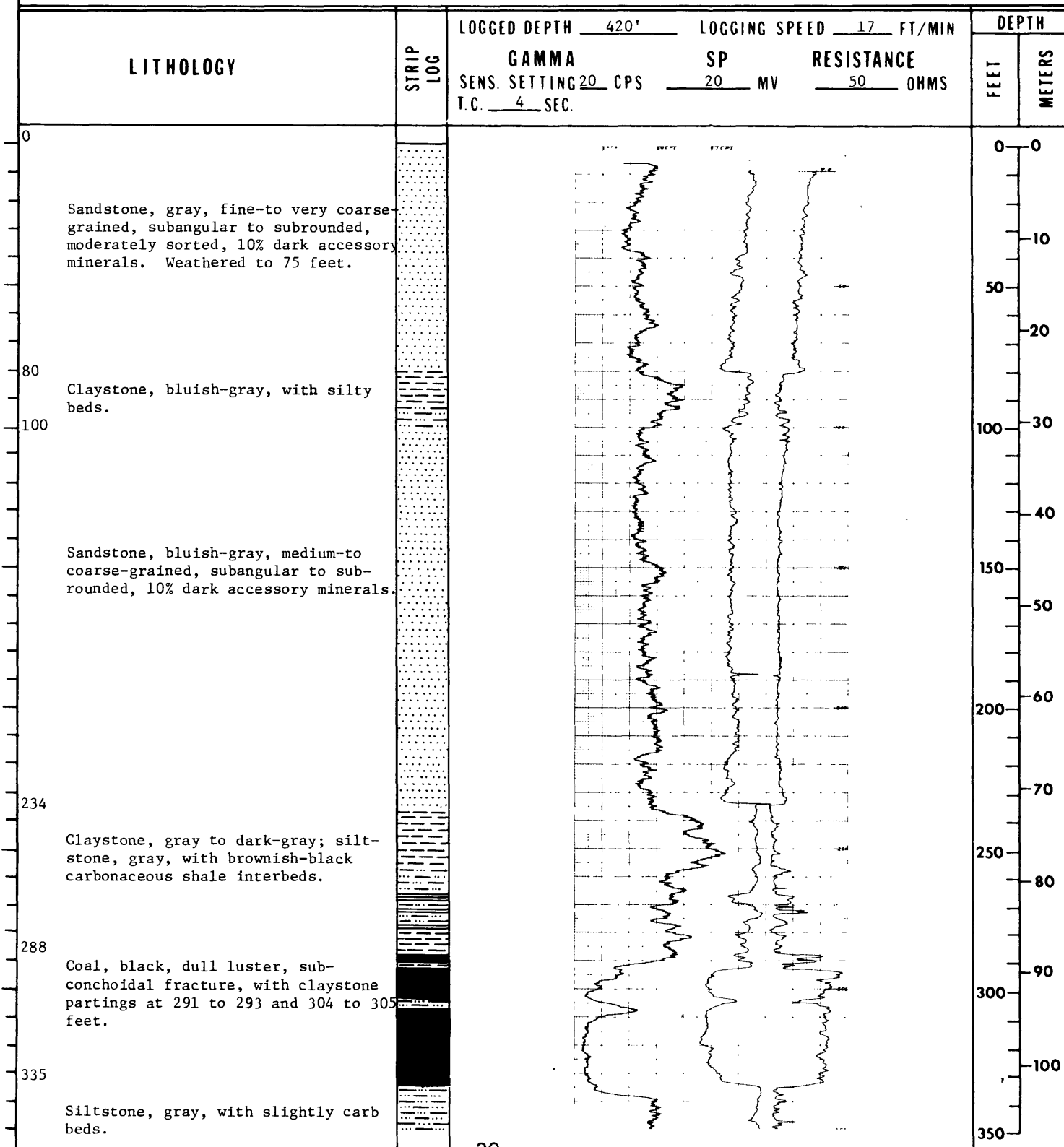


UNITED STATES GEOLOGICAL SURVEY

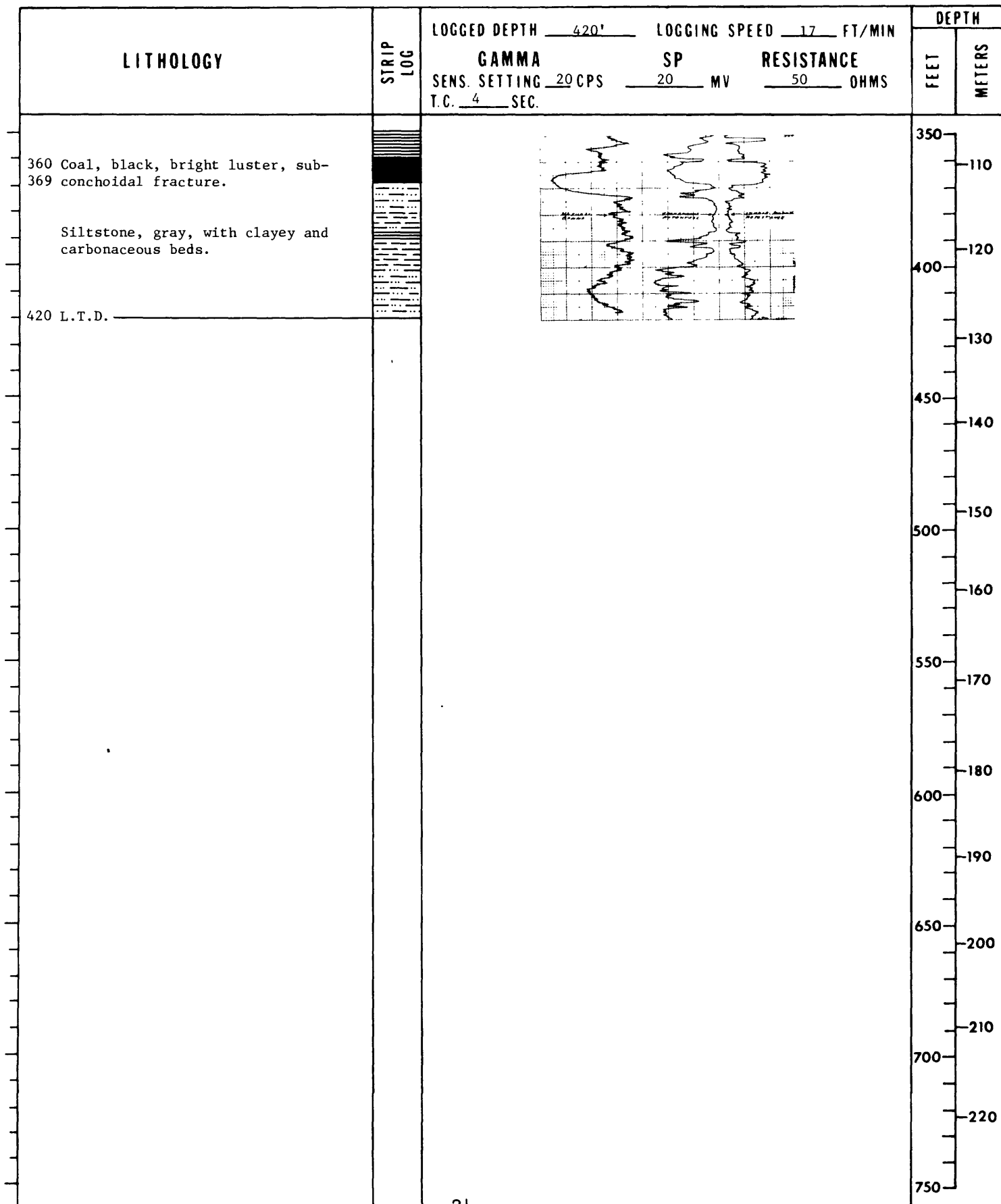
HOLE NO CD-79009
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Hilight	
DATE STARTED 6/28/79	DATE COMP. 6/28/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 32 T. 45 N., R. 70 W., FOOTAGE LOC.		FNL 105' #88	#88 840' FWL
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE	
		ROTARY 420'	CORING 0
DRILLING AGENCY: U.S. Geological Survey	DRILL TYPE: Portadrill 524		DEPTH TO FLUID 0'
LITHOLOGY RECORDED BY A.J. Donatich	GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon		

REMARKS:



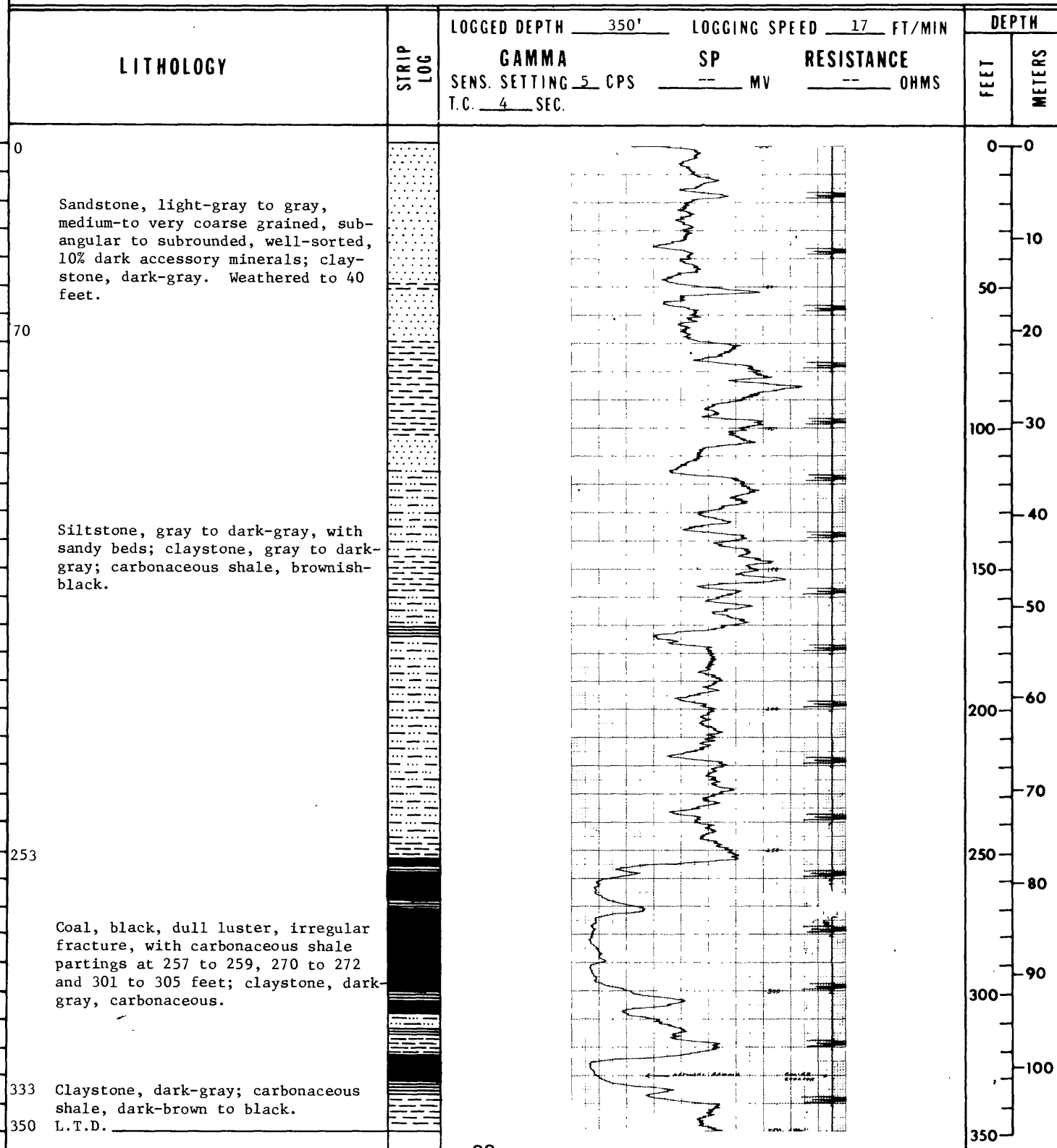
REMARKS:



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79010
SHEET 1 OF 1

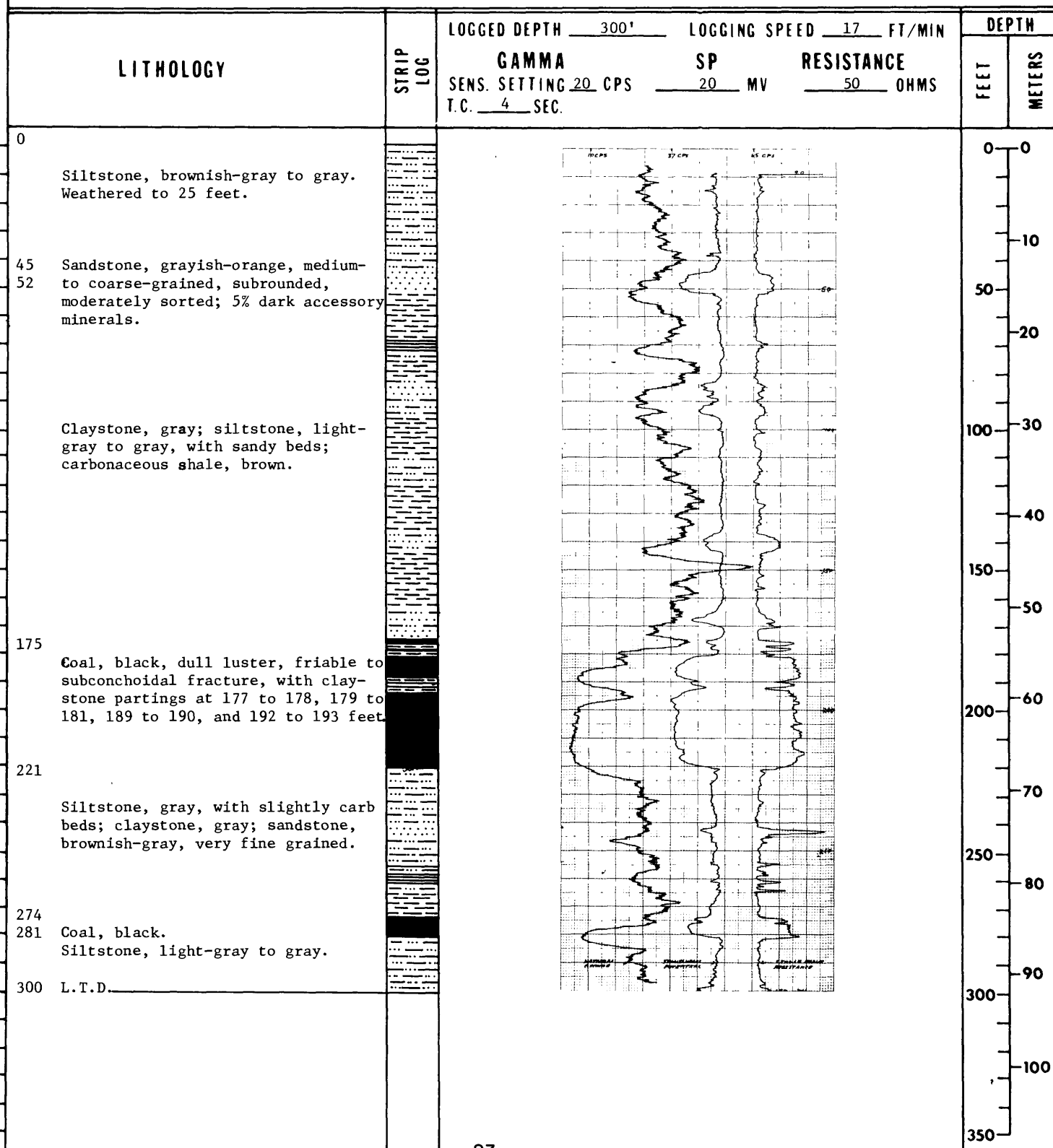
AREA Powder River Basin		QUAD NAME Hilight	
DATE STARTED 6/29/79	DATE COMP. 6/29/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 30 T.45 N. , R. 70 W. ,		FOOTAGE LOC. 720' FNL 1820' FEL	GROUND ELEV 4834'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 360' CORING 0	TOTAL DEPTH 360'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	DEPTH TO FLUID 97'
LITHOLOGY RECORDED BY A.J. Donatich		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS: Lost circulation at 360 feet. Logged through drill pipe. Drill collar locator 1000 MV.			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79011
SHEET 1 OF 1

AREA Powder River Basin		QUAD NAME H ₄ light	
DATE STARTED 6/30/79	DATE COMP. 6/30/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 33 T. 45 N., R. 70 W., FOOTAGE LOC.		FNL 1950' 1950' 630' FWL	GROUND ELEV 4880'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 300' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY A.J. Donatich		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79012
SHEET 1 OF 1

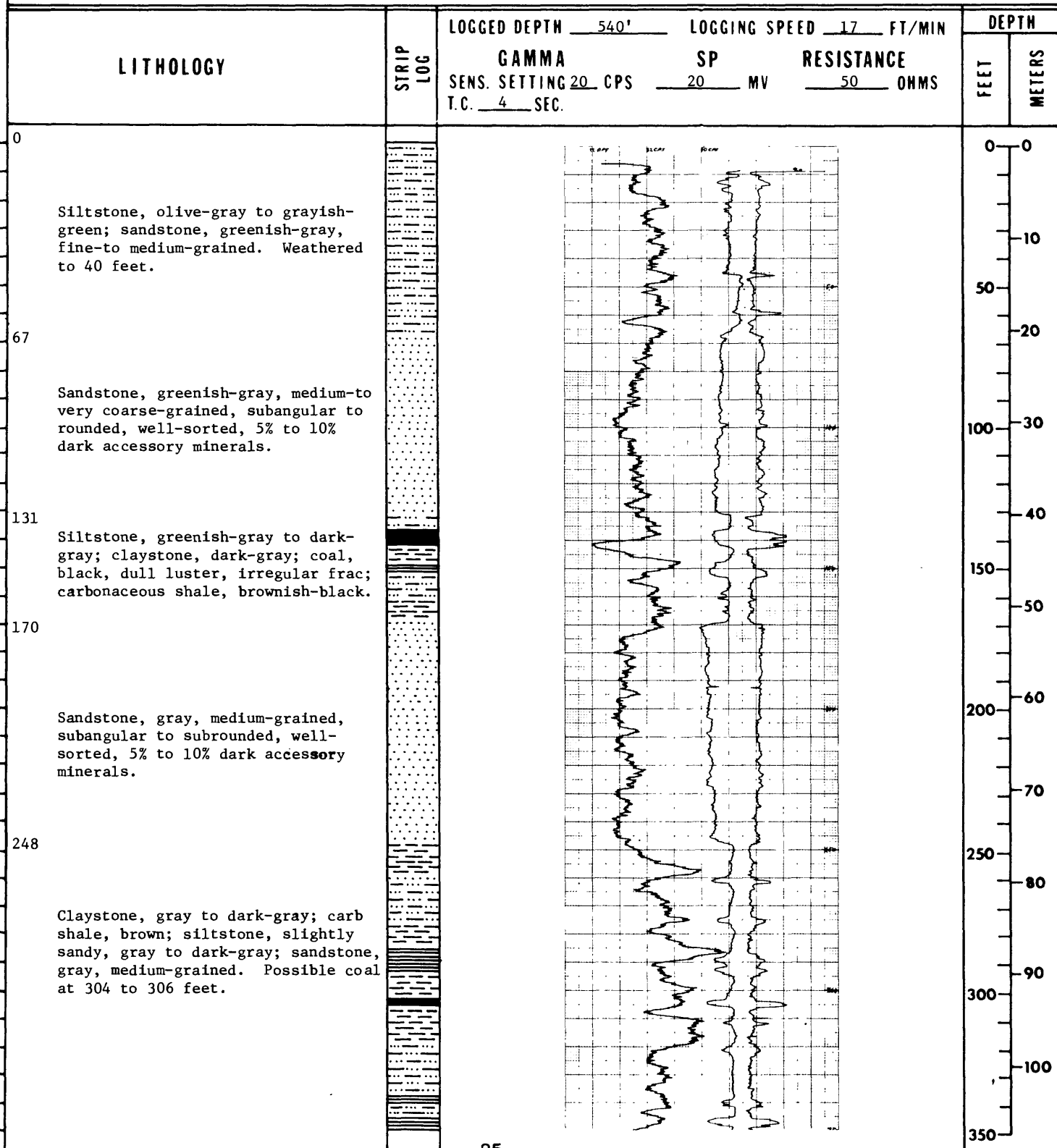
AREA Powder River Basin		QUAD NAME Hilgirt	
DATE STARTED 6/30/79	DATE COMP. 6/30/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 33 T.45 N., R. 70 W., FOOTAGE LOC.		440' FSL 690' FEL	GROUND ELEV 4790'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 240' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY A.J. Donatich		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS:			

LITHOLOGY	STRIP LOG	LOGGED DEPTH 240'	LOGGING SPEED 17 FT/MIN	DEPTH		
		GAMMA SENS. SETTING 20 CPS T.C. 4 SEC.	SP 20 MV	RESISTANCE 50 OHMS	FEET	METERS
0 Siltstone, grayish-brown. Weathered to 25 feet.					0	0
22 Sandstone, light-brown to light-gray.					10	
34 Siltstone, light-gray to gray, with sandy and clayey beds; claystone, dark-gray with interbedded carb shale.					20	
91 Coal, black, dull luster, irregular fracture, with a claystone parting at 102 to 105 feet.					30	
132 Siltstone, gray, with sandy beds; claystone, dark-gray, carbonaceous.					40	
194 Coal, black, dull luster, friable.					50	
201 Siltstone, light-gray, with sandy and clayey beds; claystone, dark-gray, carbonaceous.					60	
240 L.T.D.					70	
					80	
					90	
					100	
					350	

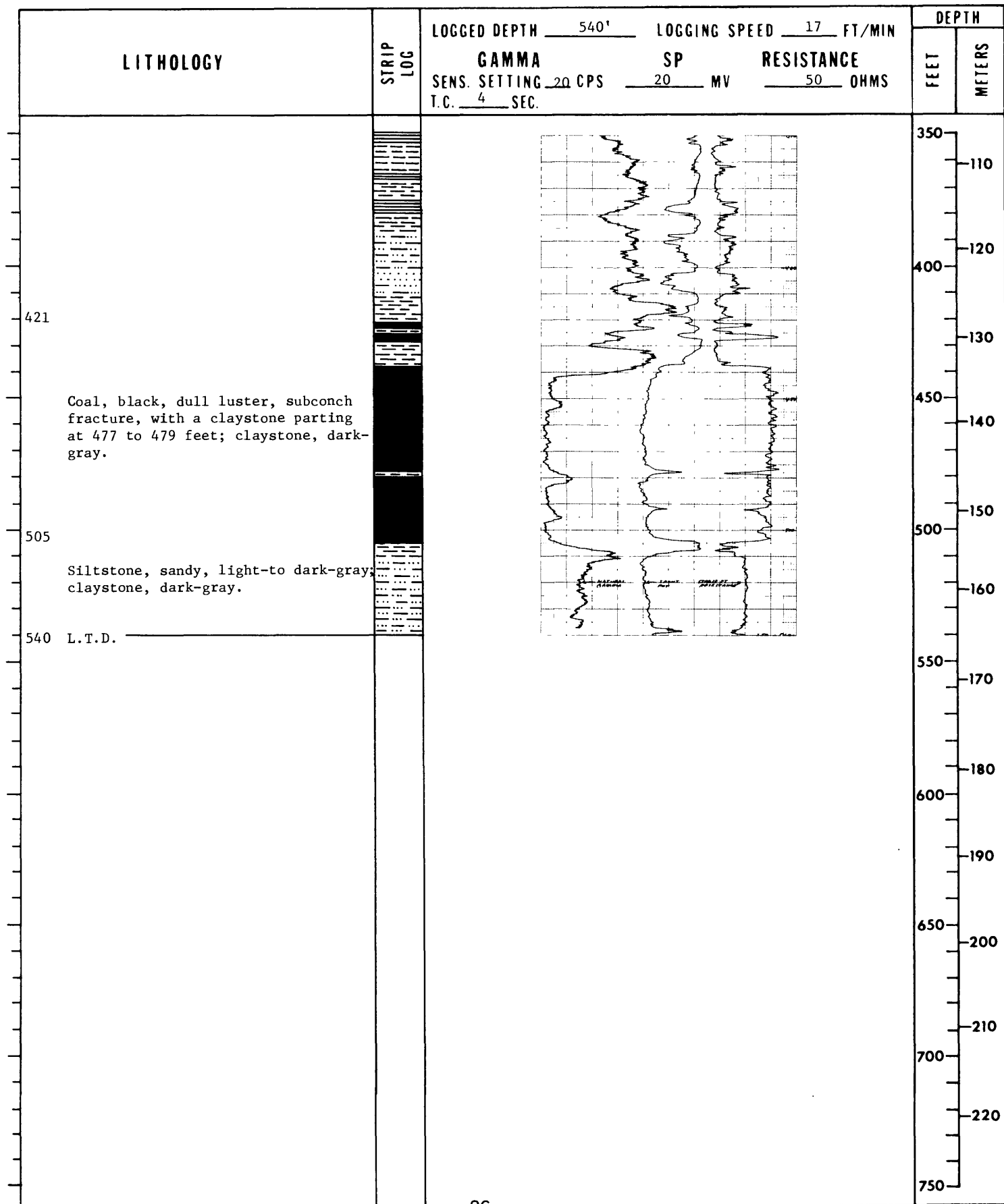
UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79013
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Eagle Rock	
DATE STARTED 7/1/79	DATE COMP. 7/1/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 3 T. 45 N., R. 71 W., FOOTAGE LOC.		600' FWL FSL	1810' FWL FSL
SIZE AND BIT TYPE: 5" Drag		FOOTAGE	
		ROTARY 540'	CORING 0
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY A.J. Donatich		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS:			



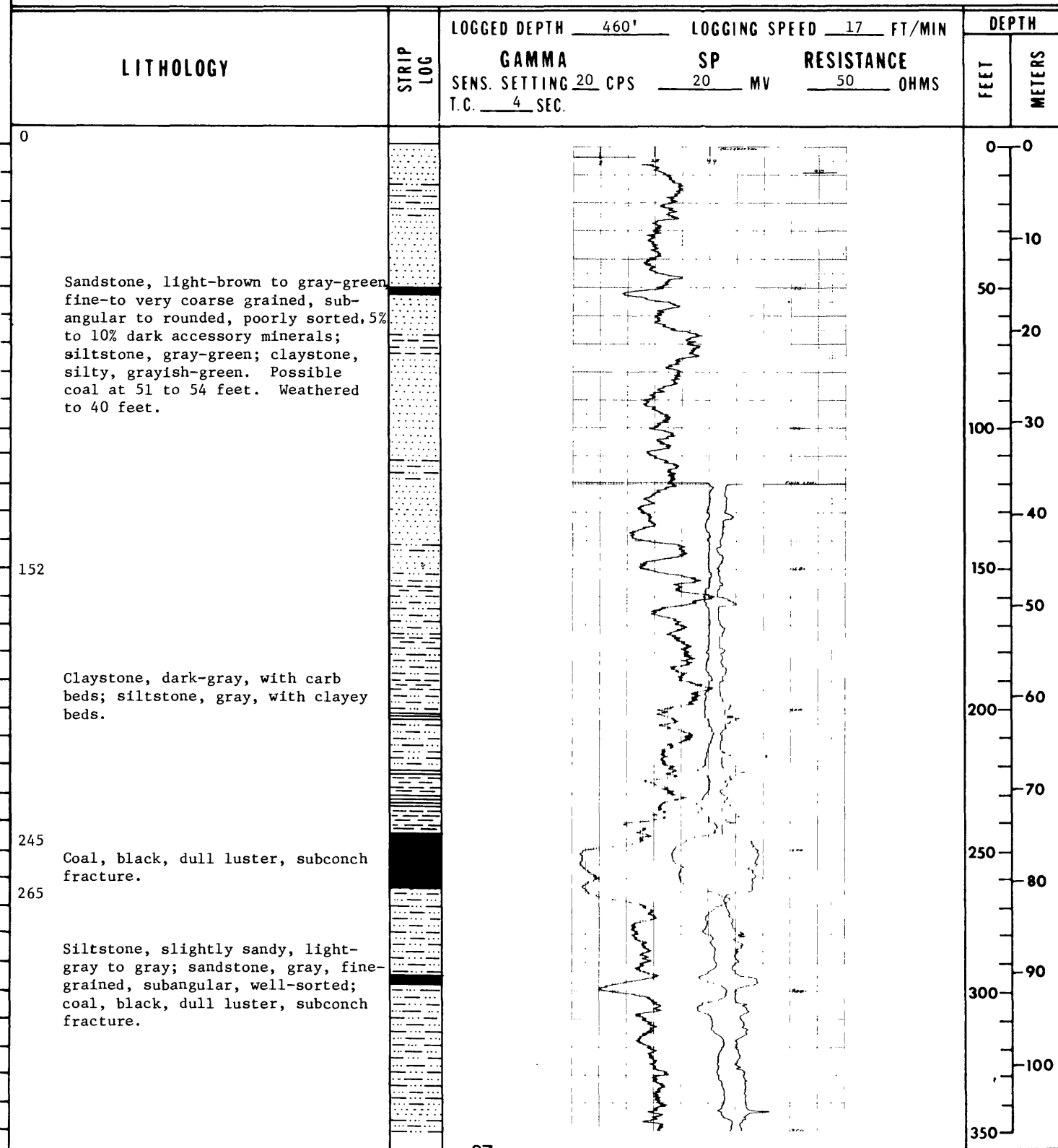
REMARKS:



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79014
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Eagle Rock	
DATE STARTED 7/2/79	DATE COMP. 7/2/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 34 T. 46 N., R. 71 W., FOOTAGE LOC.		#1 FSL 1940'	#2 FSL 150'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE	
		ROTARY 460'	CORING 0
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY A.J. Donatich		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS: Lost circulation at 460 feet.			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79014
SHEET 2 OF 2

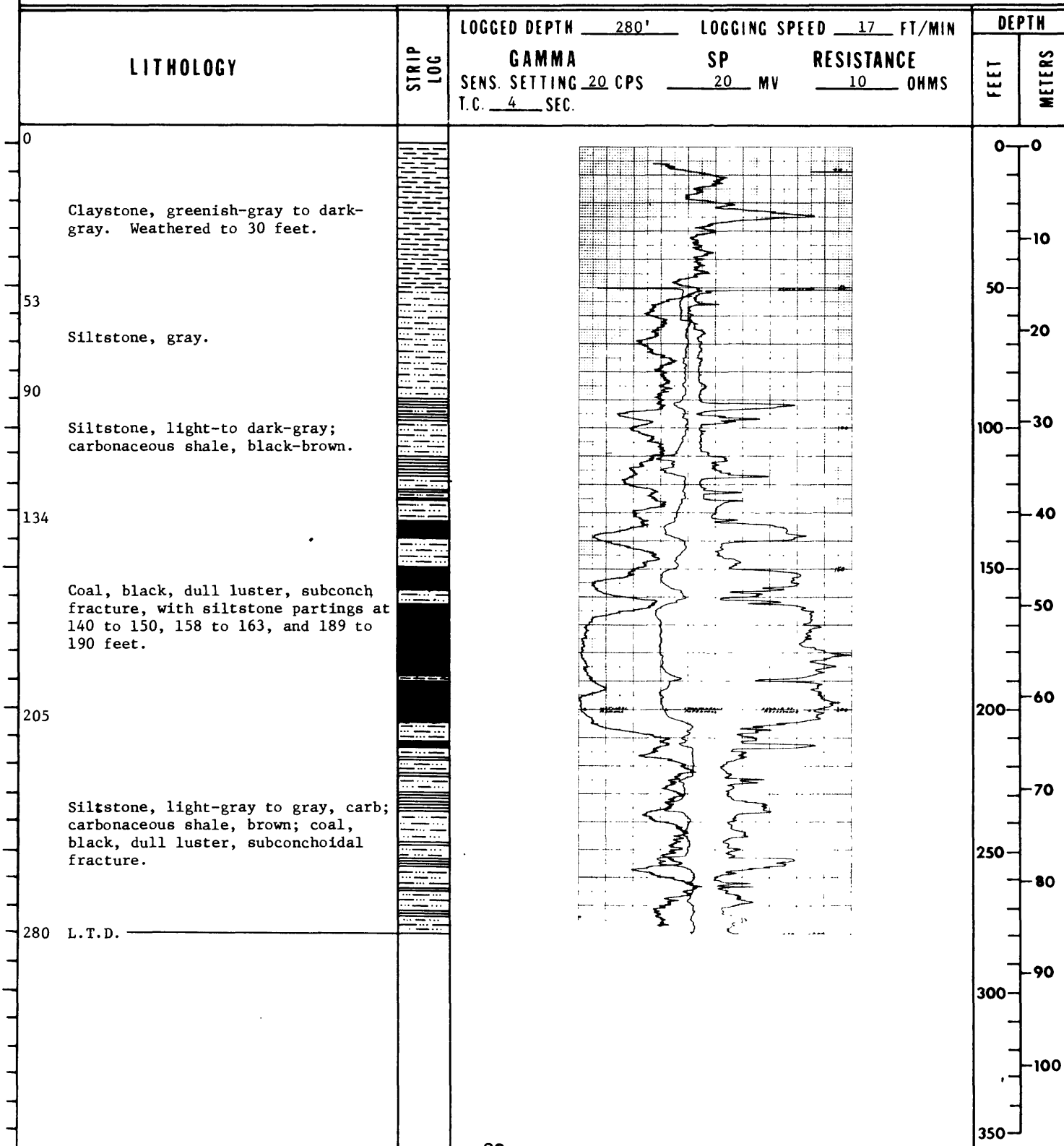
REMARKS:

LITHOLOGY	STRIP LOG	LOGGED DEPTH	LOGGING SPEED		DEPTH	
					FEET	METERS
		460'	GAMMA	SP	RESISTANCE	
		SENS. SETTING 20 CPS	20	MV	50	OHMS
		T.C. 4 SEC.				
399 Coal, black, dull luster, subconch fracture, with a claystone parting at 411 to 413 feet.						350
424 Siltstone, light-gray, with carb beds; claystone, silty, dark-gray, carbonaceous.						110
460 L.T.D.						120
						130
						140
						150
						160
						170
						180
						190
						200
						210
						220
						230
						240
						250
						260
						270
						280
						290
						300
						310
						320
						330
						340
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						370
						380
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						410
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						430
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						450
						460
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						570
						580
						590
						600
						610
						620
						630
						640
						650
						660
						670
						680
						690
						700
						710
						720
						730
						740
						750

UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79015
SHEET 1 OF 1

AREA Powder River Basin		QUAD NAME Neil Butte	
DATE STARTED 7/3/79	DATE COMP. 7/3/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 12 T. 46 N., R. 71 W., FOOTAGE LOC.		FNL 1470' FEL 1740'	GROUND ELEV 4632'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 280' CORING 0	TOTAL DEPTH 280'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	DEPTH TO FLUID 51'
LITHOLOGY RECORDED BY A.J. Donatich		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

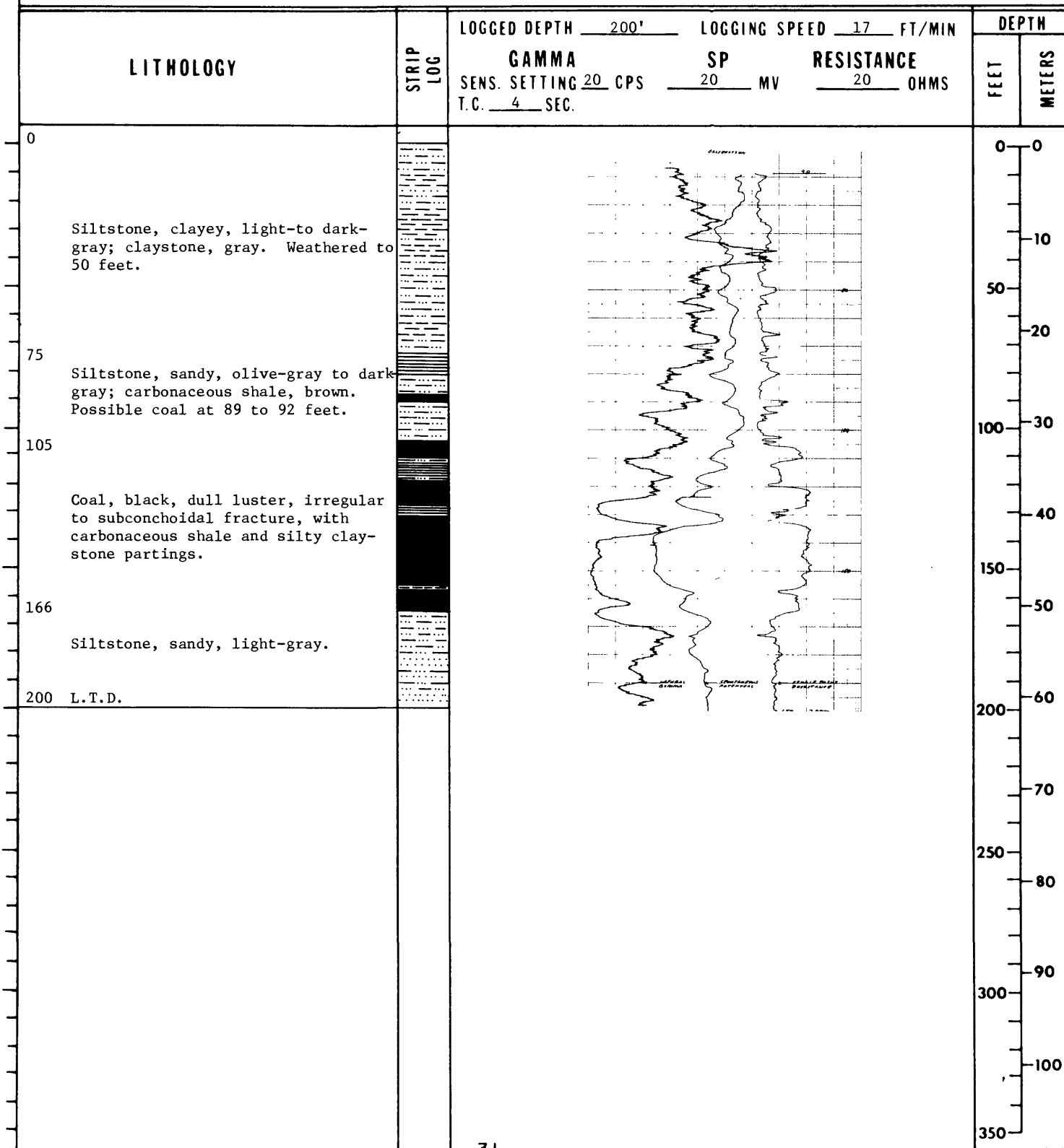
HOLE NO CD-79016
SHEET 1 OF 1

AREA Powder River Basin		QUAD NAME Neil Butte	
DATE STARTED 7/3/79	DATE COMP. 7/3/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 1 T. 46 N., R. 71 W., FOOTAGE LOC.		FNL 1520' 1520' 2350' FWL	GROUND ELEV 4550'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 132' CORING 68'	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	TOTAL DEPTH 200'
LITHOLOGY RECORDED BY A.J. Donatich		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS:			
LITHOLOGY	STRIP LOG	LOGGED DEPTH 200' LOGGING SPEED 17 FT/MIN	DEPTH
		GAMMA SENS. SETTING 20 CPS T.C. 4 SEC.	FEET METERS
0 Siltstone, slightly sandy, brown to dark-gray; coal, black, dull luster, irregular fracture. Weathered to 40 feet.			0 0
64 Coal, black, dull luster, subconch fracture, with a carbonaceous shale parting at 72 to 78 feet and siltstone partings at 100 to 102 and 112 to 113 feet.			10
118 Claystone, silty, dark-gray; coal, black, dull luster, subconchoidal fracture.			20
139 Siltstone, gray to dark-gray, carb; claystone, greenish-gray to dark-gray; carbonaceous shale, brown; sandstone, light-gray, fine-grained, well-cemented.			30
200 L.T.D.			40
			50
			60
			70
			80
			90
			100
			110
			120
			130
			140
			150
			160
			170
			180
			190
			200
			210
			220
			230
			240
			250
			260
			270
			280
			290
			300
			310
			320
			330
			340
			350

UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79017
SHEET 1 OF 1

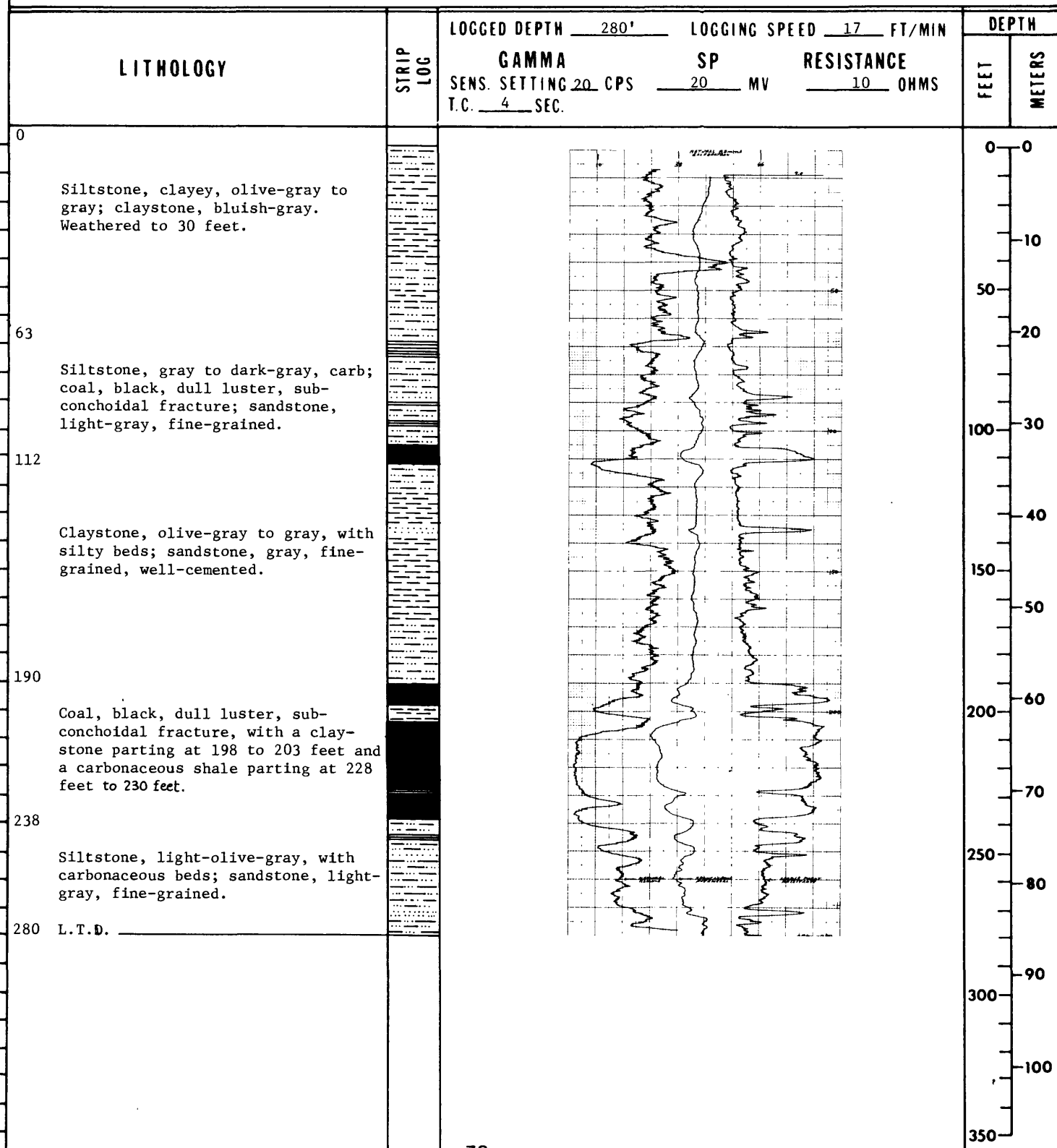
AREA Powder River Basin		QUAD NAME Saddle Horse Butte	
DATE STARTED 7/12/79	DATE COMP. 7/12/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 31 T. 47 N., R. 70 W., FOOTAGE LOC.		280' FSL	1030' FWL
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 200' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY A.J. Donatich		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79018
SHEET 1 OF 1

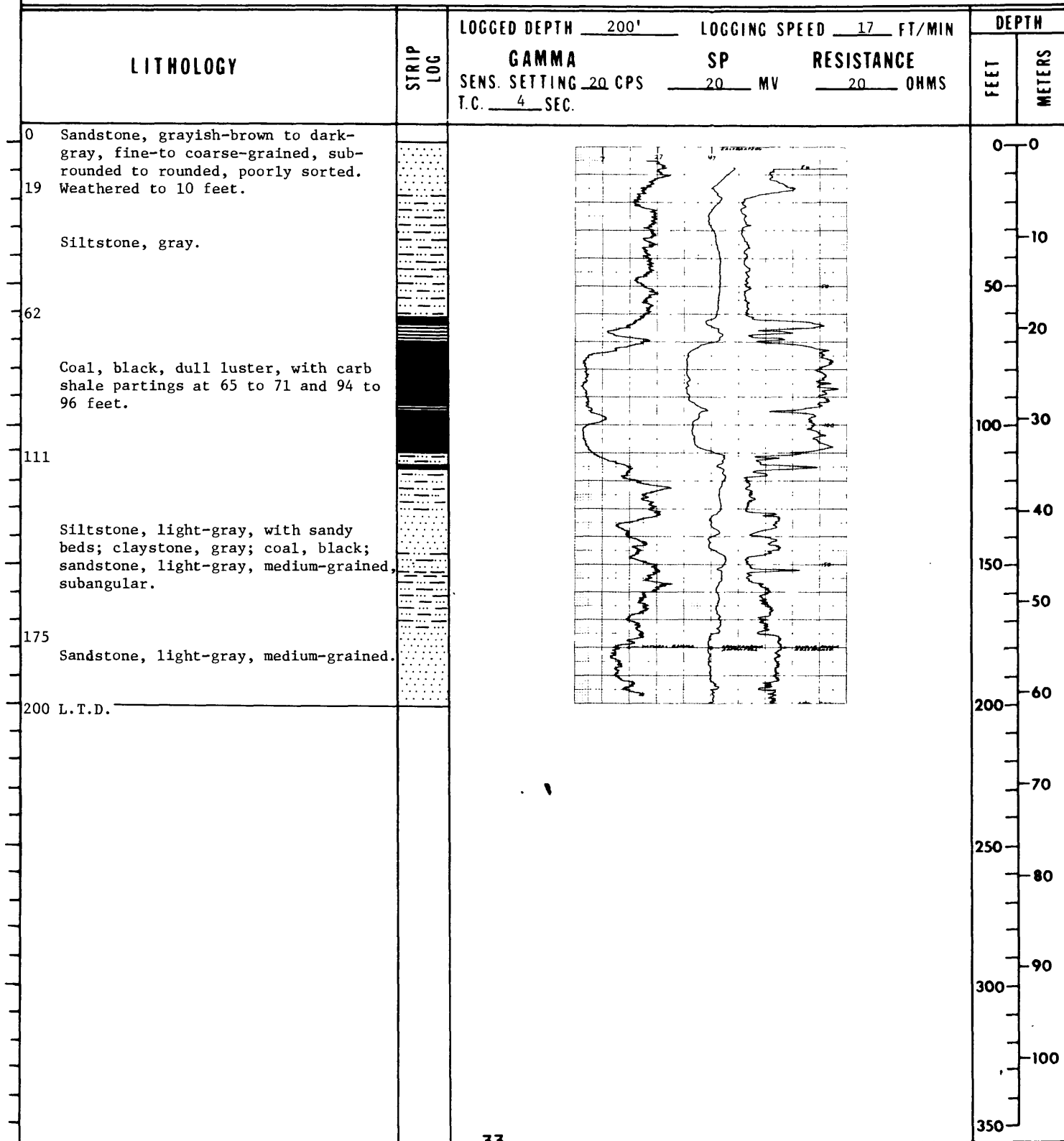
AREA Powder River Basin		QUAD NAME Neil Butte	
DATE STARTED 7/12/79	DATE COMP. 7/12/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 7 T.46 N., R.70 W., FOOTAGE LOC.		FNL 1980' 1980'	FEL 1240' 1240'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE	
		ROTARY 212'	CORING 68'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY A.J. Donatich		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79019
SHEET 1 OF 1

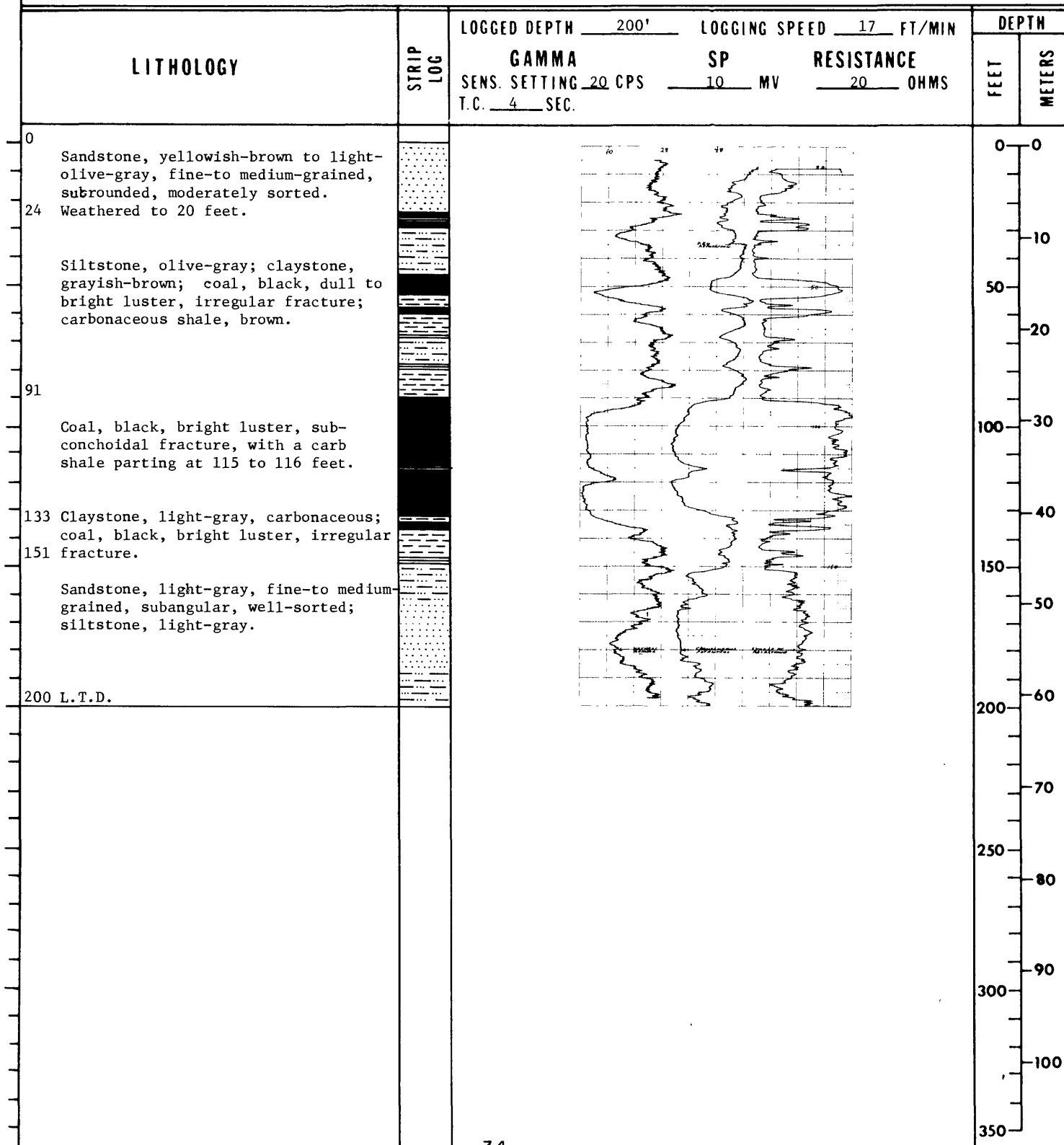
AREA Powder River Basin		QUAD NAME Neil Butte	
DATE STARTED 7/15/79	DATE COMP. 7/15/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 13 T. 46 N., R. 71 W., FOOTAGE LOC.		FNL 2270' 454'	#FWL 2340' FWL
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE	
		ROTARY 200'	CORING 0
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY B.M. Wrege		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79020
SHEET 1 OF 1

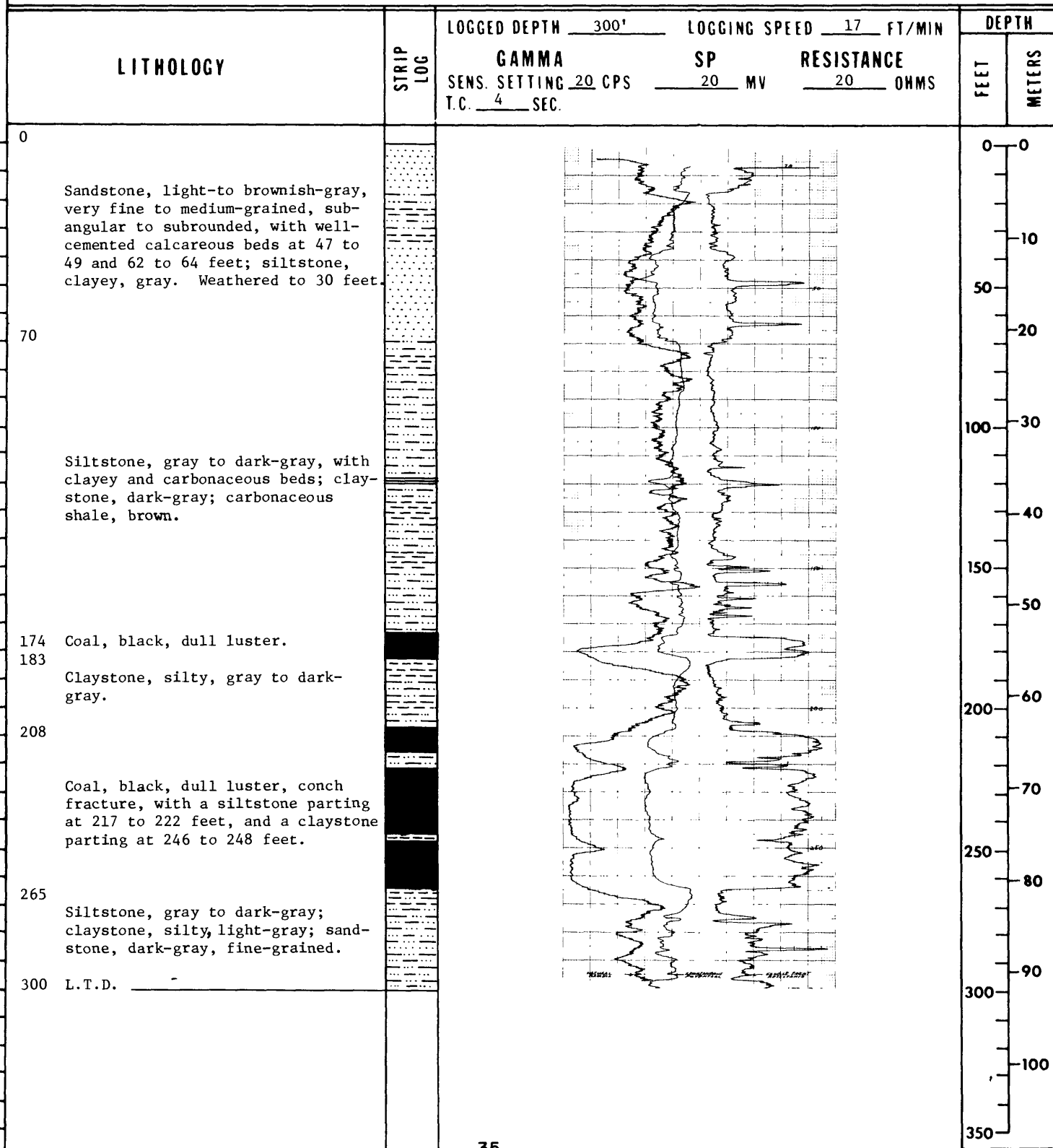
AREA Powder River Basin		QUAD NAME Neil Butte	
DATE STARTED 7/15/79	DATE COMP. 7/15/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 24 T. 46 N., R. 71 W., FOOTAGE LOC.		FNL 2075' 451'	FEL 575' 451'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE	
		ROTARY 136'	CORING 64'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY B.M. Wrege		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO. CD-79021
SHEET 1 OF 1

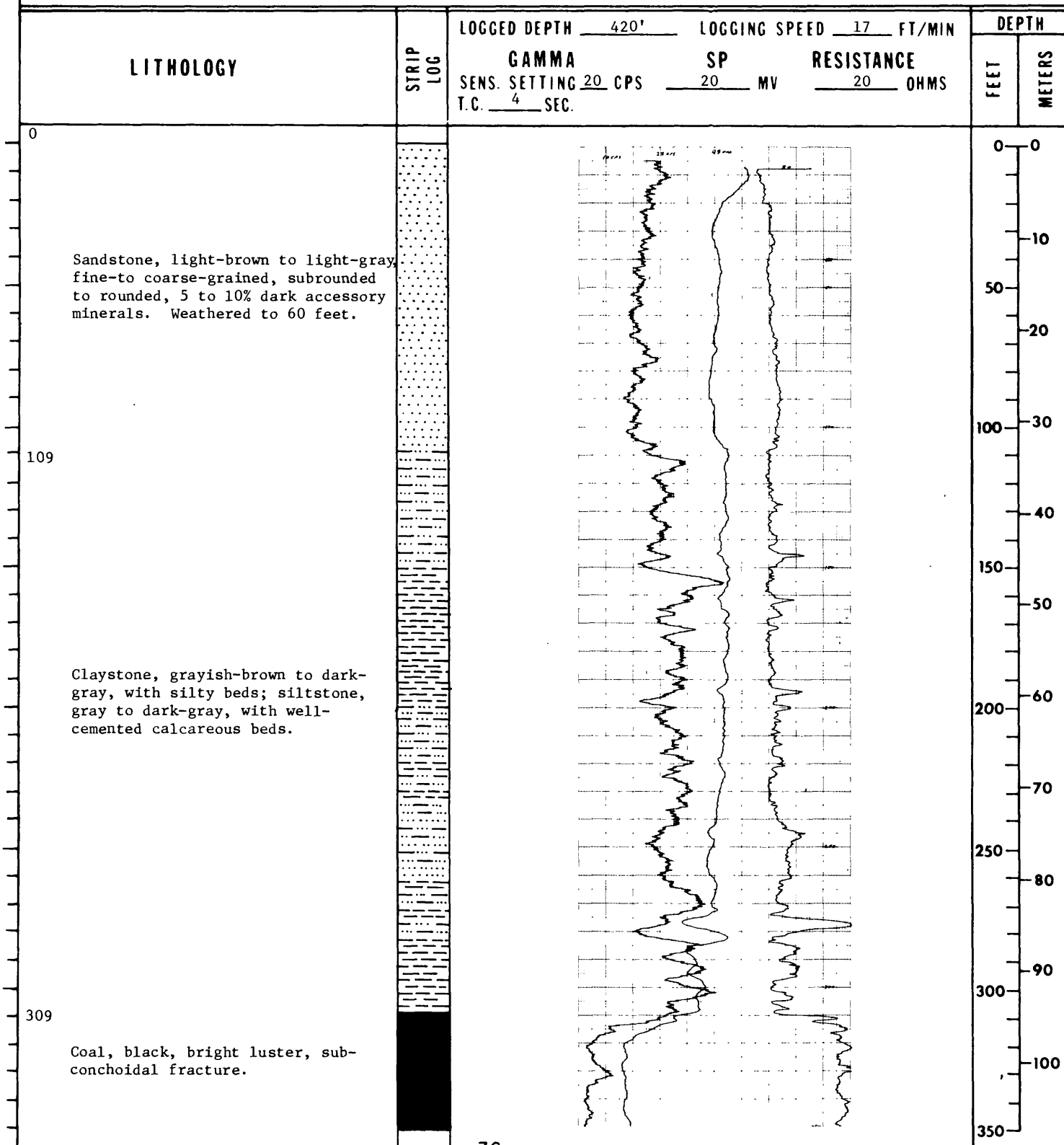
AREA Powder River Basin		QUAD NAME Neil Butte	
DATE STARTED 7/18/79	DATE COMP. 7/18/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 11 T. 46 N., R. 71 W., FOOTAGE LOC.		1840' FSL	2530' FWL
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE	
		ROTARY 300'	CORING 0
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY B.M. Wrege		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79022
SHEET 1 OF 2

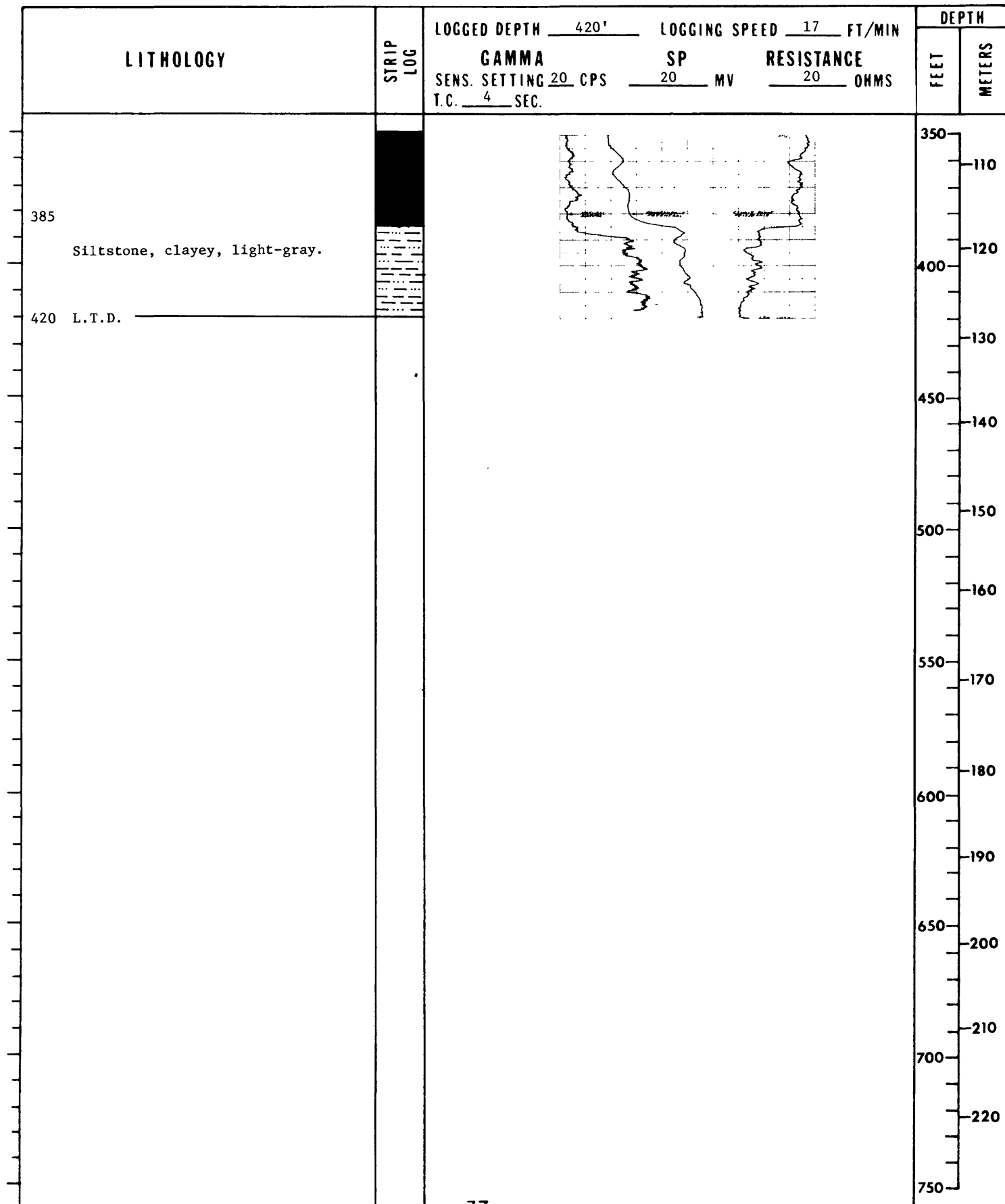
AREA Powder River Basin		QUAD NAME Hilgert	
DATE STARTED 7/24/79	DATE COMP. 7/24/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 23 T. 44 N. R. 71 W. , FOOTAGE LOC.		80' FNL 80' 2505' FWL 2505'	GROUND ELEV 4812'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE	
		ROTARY 343'	CORING 77'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY A.J. Donatich		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79022
SHEET 2 OF 2

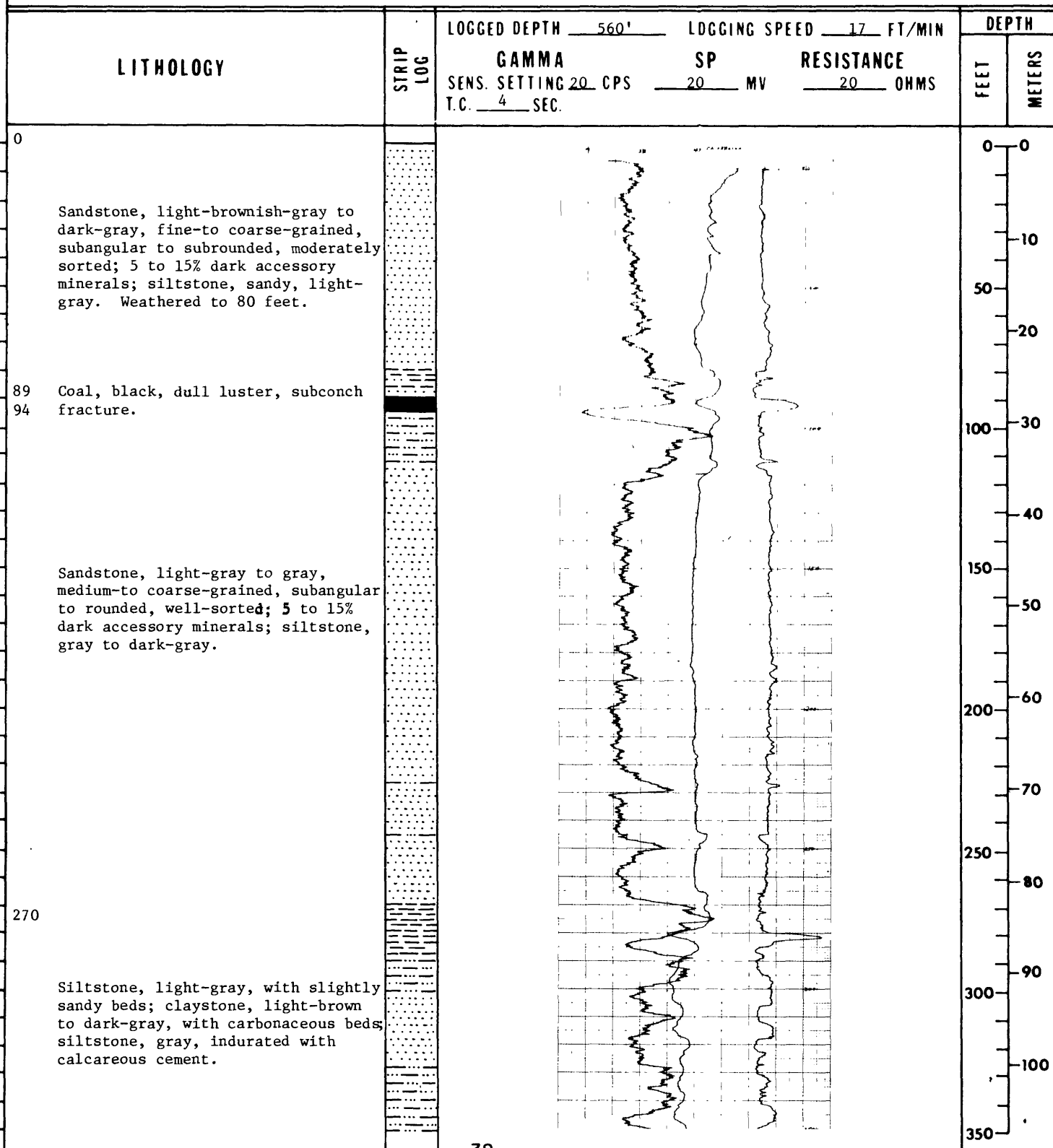
REMARKS:



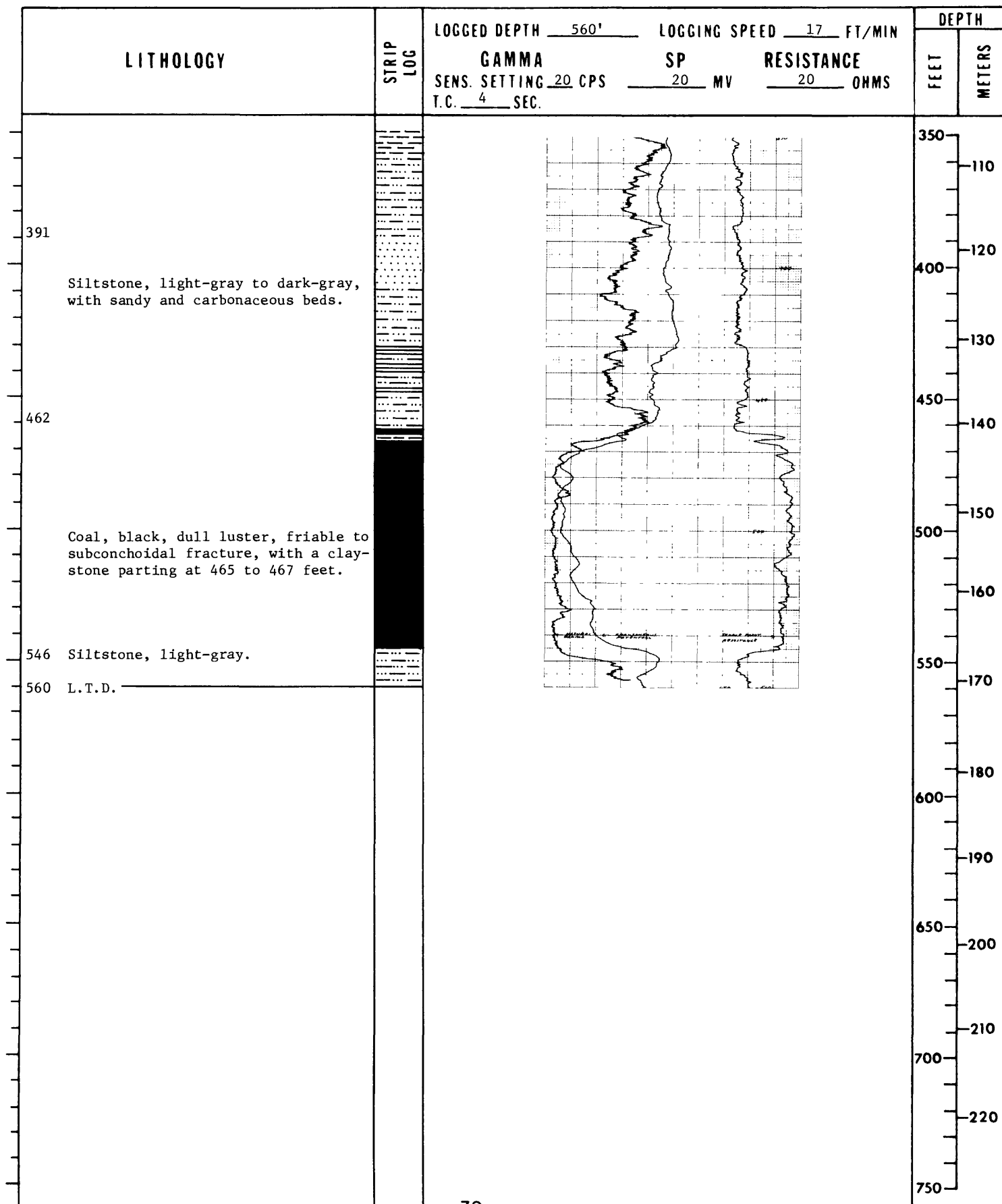
UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79023
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Hilight	
DATE STARTED 7/28/79	DATE COMP. 7/28/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 15 T. 44 N., R. 71 W., FOOTAGE LOC.		2280' FNL FE	975' FEL FE
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 580' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon and H.E. Corley	
REMARKS:			



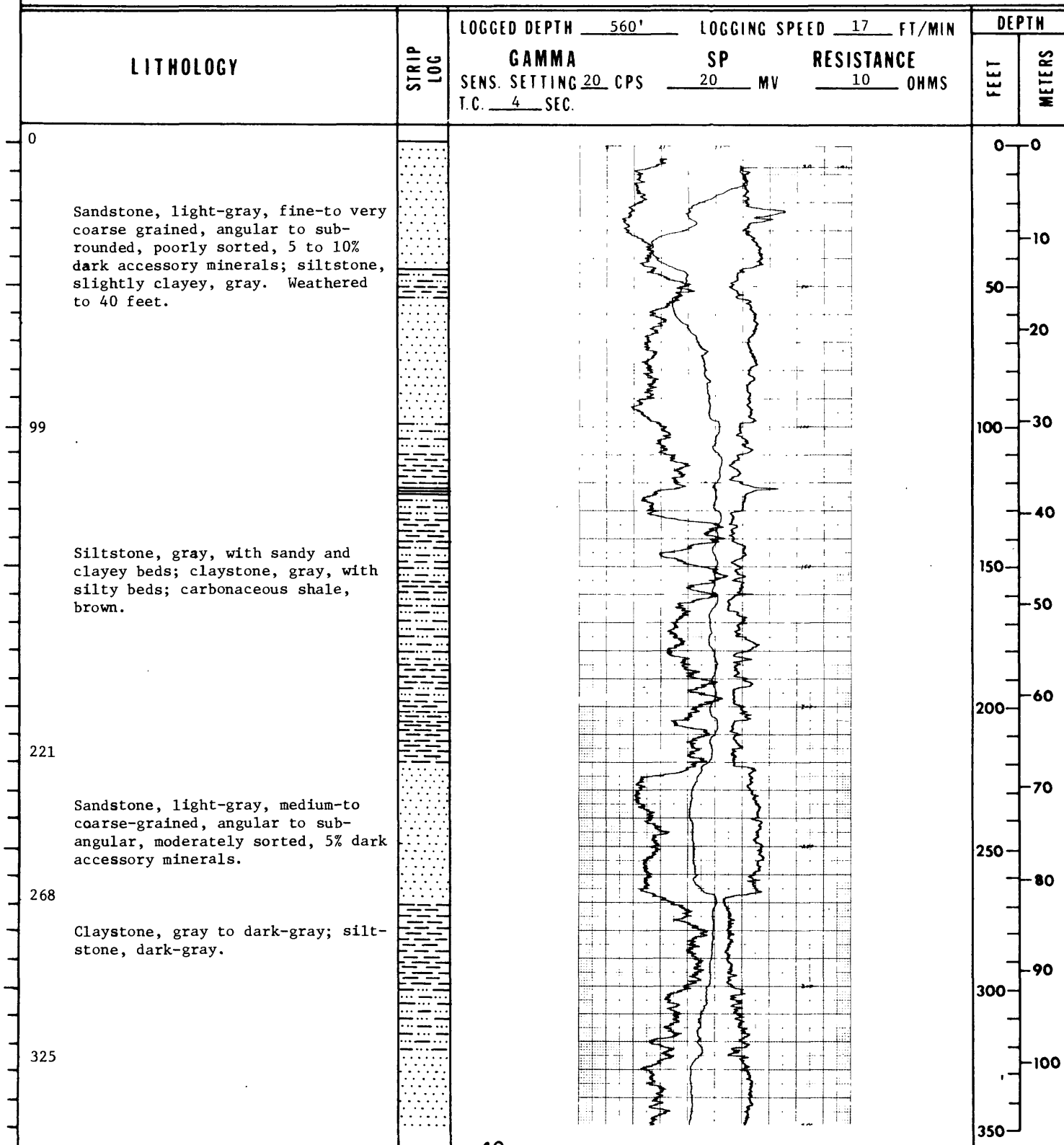
REMARKS:



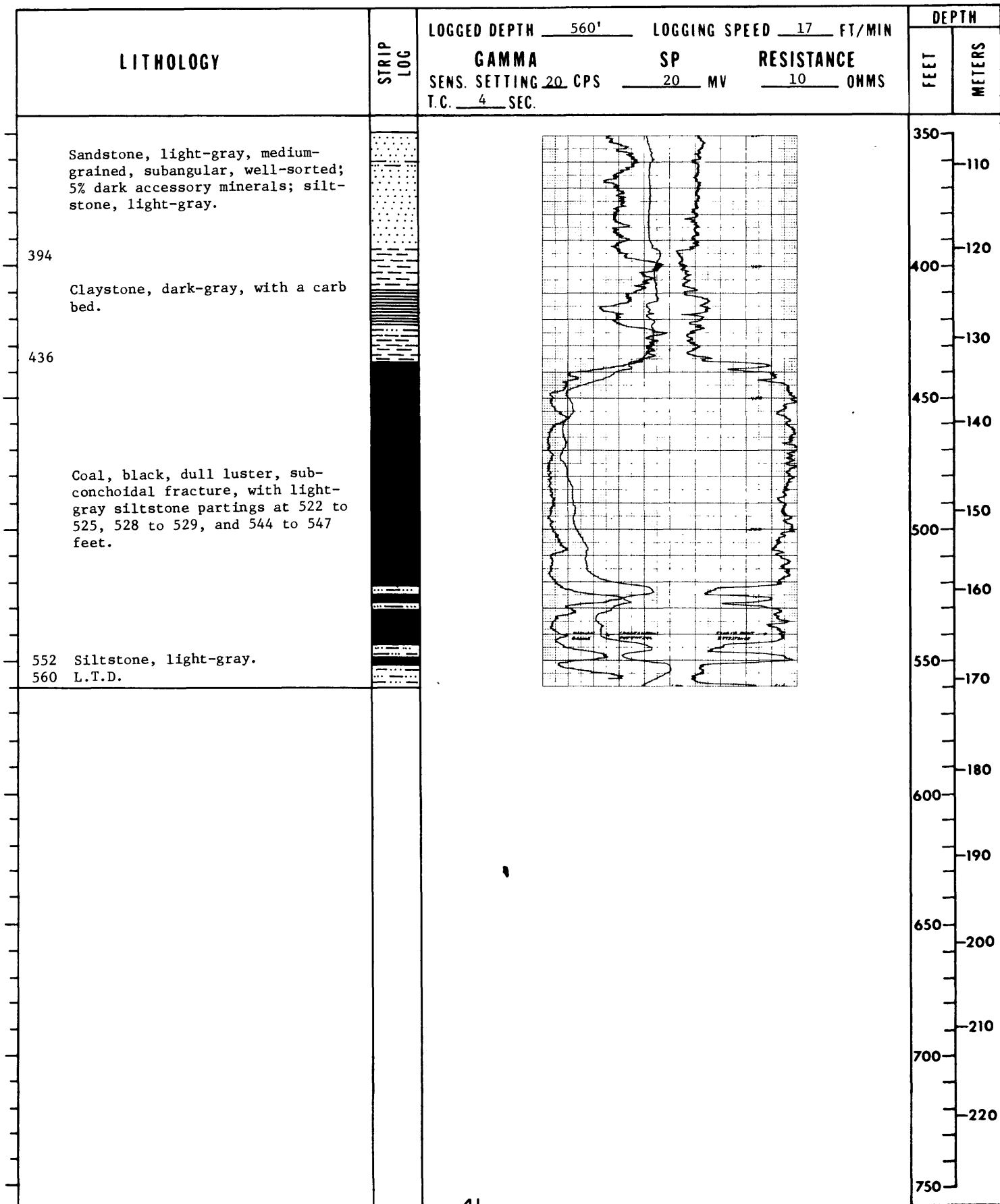
UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79024
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Hilight	
DATE STARTED 7/29/79	DATE COMP. 7/29/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 22 T.44 N., R. 71 W.,		FOOTAGE LOC. 2840' FSL 1275' FEL	
SIZE AND BIT TYPE: 4 3/4" Kenclaw		FOOTAGE ROTARY 560' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	
REMARKS:			



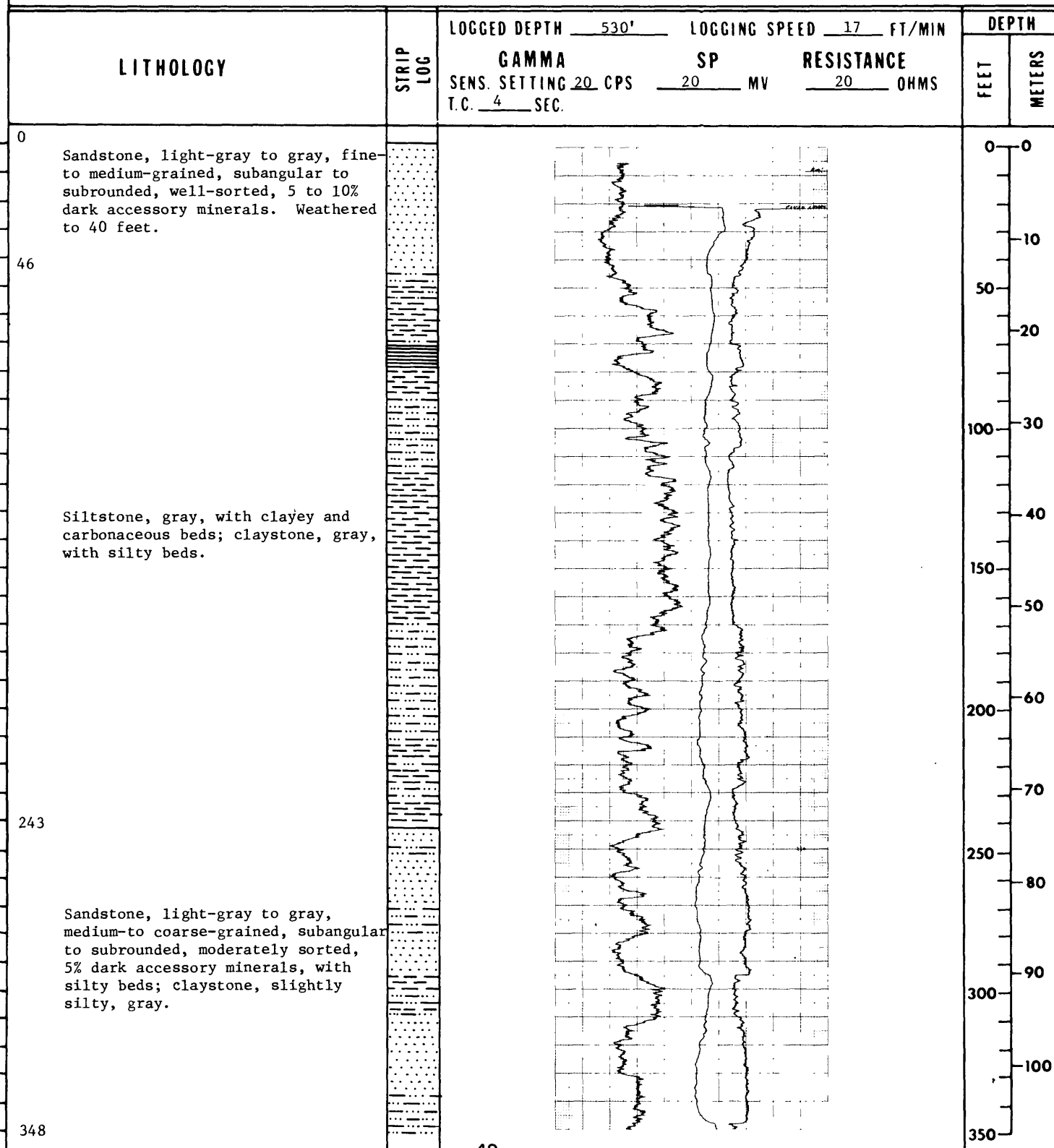
REMARKS:



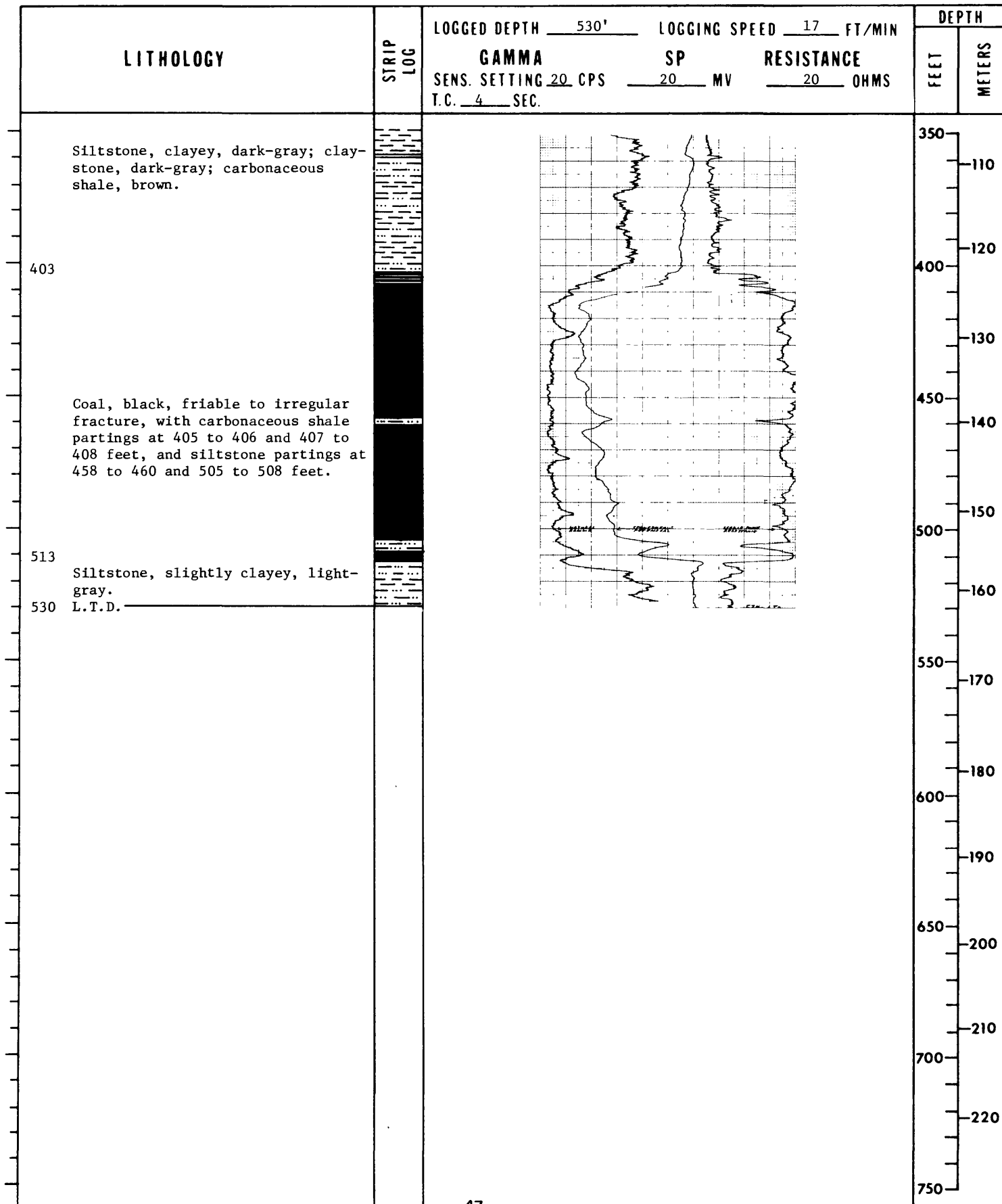
UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79025
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Hilight	
DATE STARTED 7/30/79	DATE COMP. 7/31/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 27 T. 44 N., R. 71 W., FOOTAGE LOC.		FNL 1625' FE	FEL 1950' FE
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 540' CORING 0	
DRILLING AGENCY: U.S. Geological Survey	DRILL TYPE: Portadrill 524		GROUND ELEV 4785'
LITHOLOGY RECORDED BY H.E. Corley	GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon		TOTAL DEPTH 540'
REMARKS:			



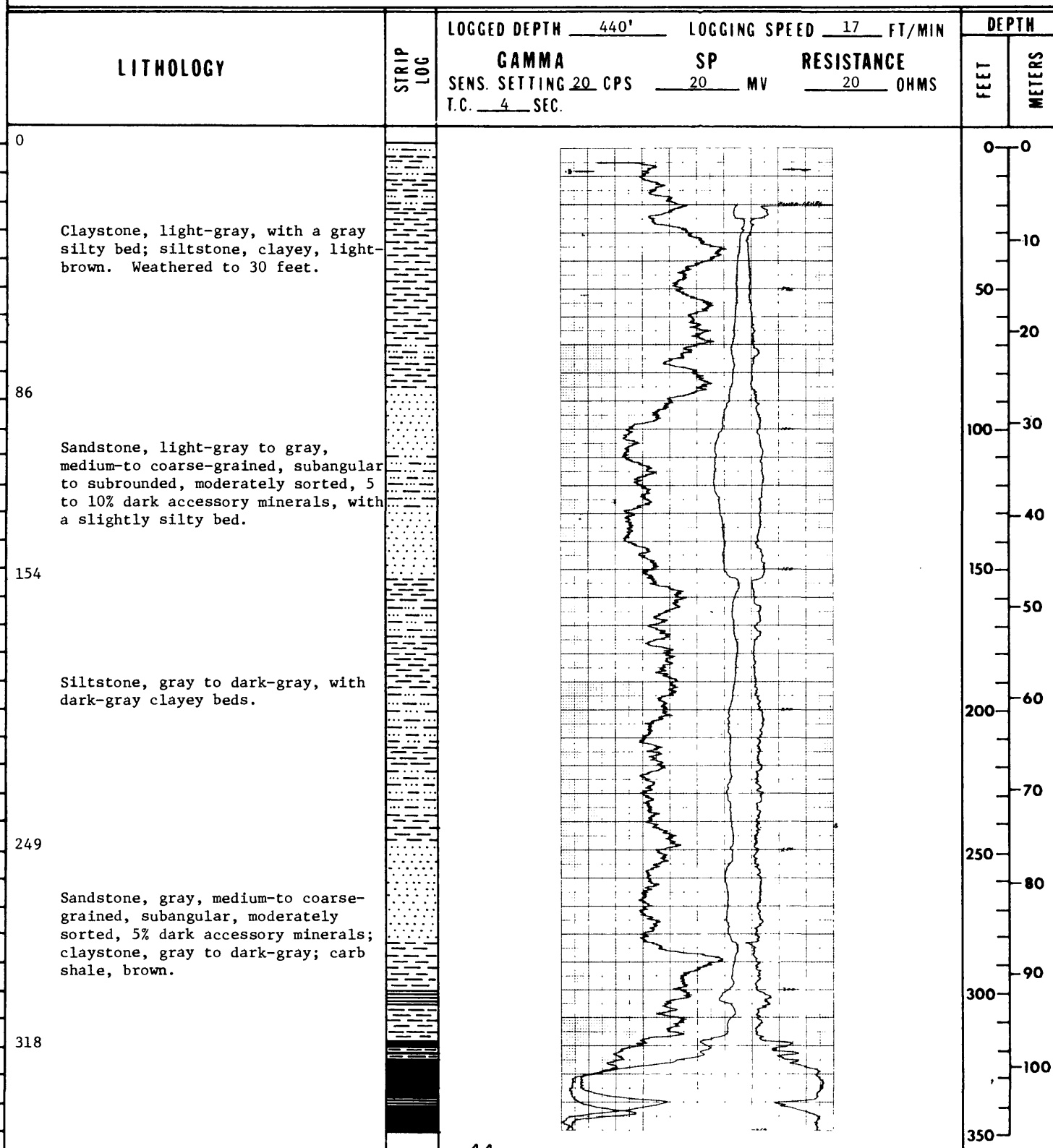
REMARKS:



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79026
SHEET 1 OF 2

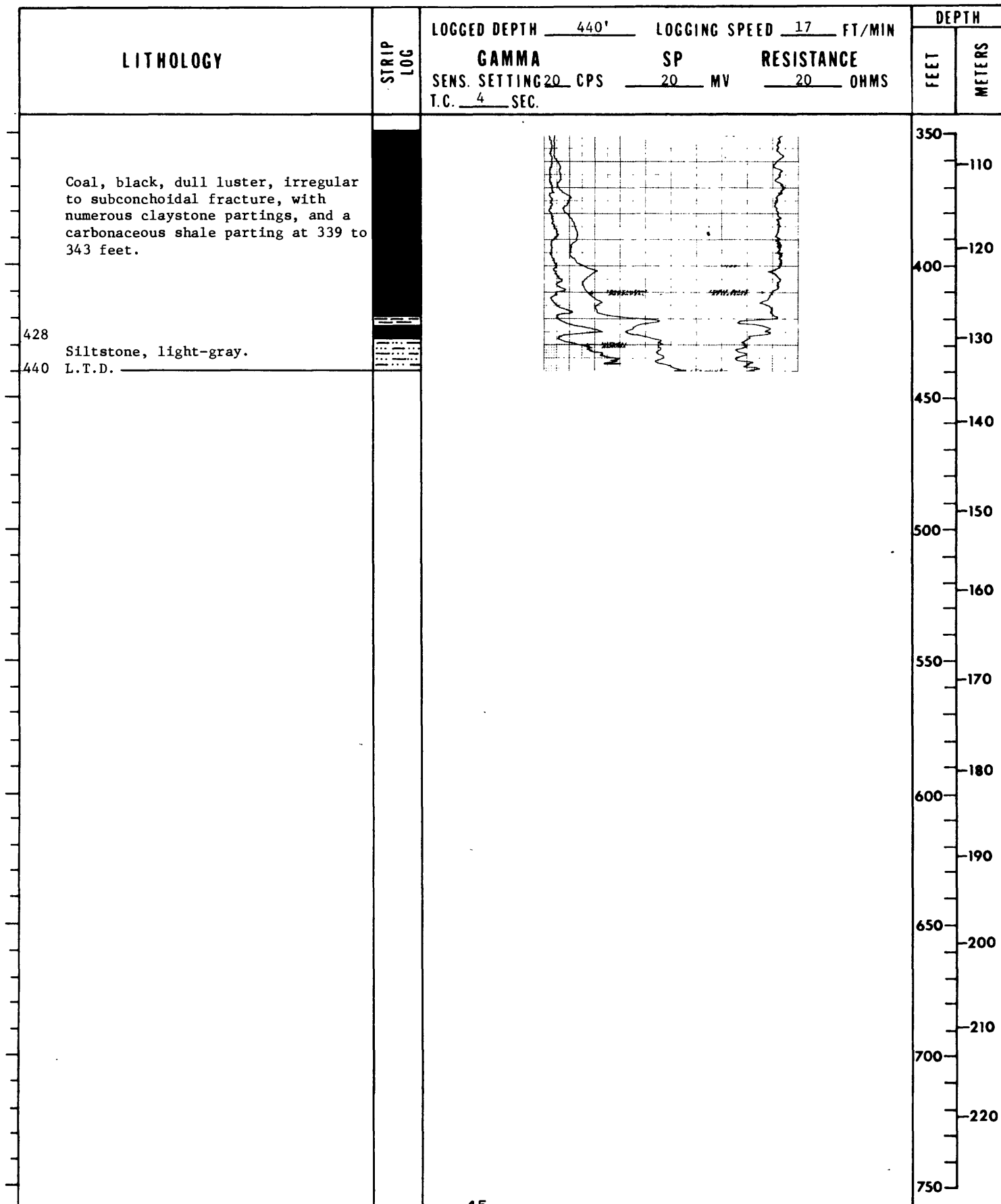
AREA Powder River Basin		QUAD NAME Reno Reservoir	
DATE STARTED 7/31/79	DATE COMP. 7/31/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 35 T. 44 N., R. 71 W., FOOTAGE LOC.		60' FWL 2700' FWL	GROUND ELEV 4750'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 440' CORING 0	TOTAL DEPTH 440'
DRILLING AGENCY: U.S. Geological Survey	DRILL TYPE: Portadrill 524		DEPTH TO FLUID 20'
LITHOLOGY RECORDED BY H.E. Corley	GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon		
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79026
SHEET 2 OF 2

REMARKS:

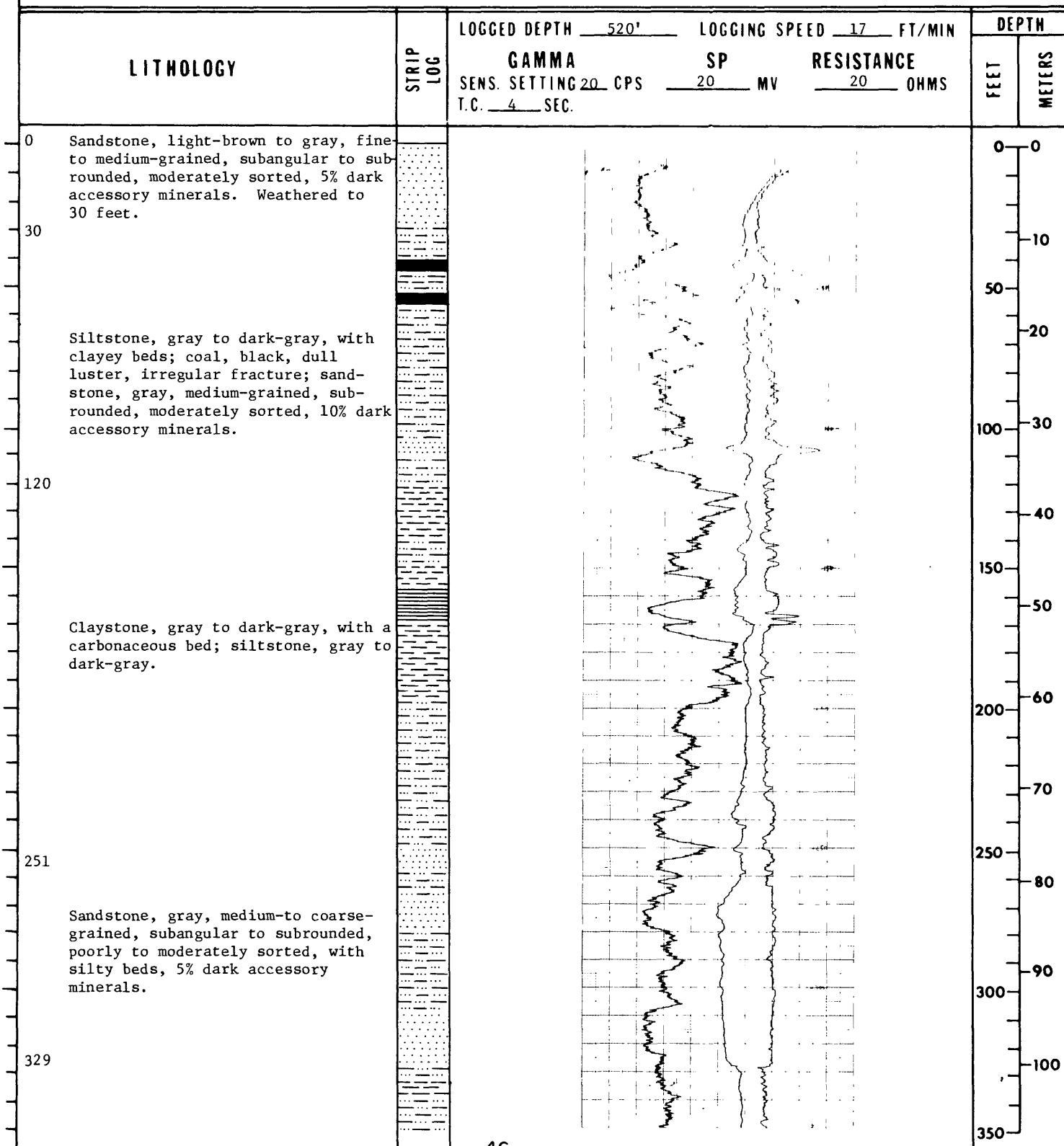


UNITED STATES GEOLOGICAL SURVEY

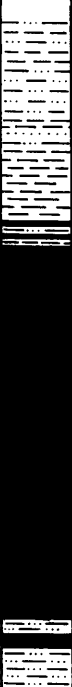
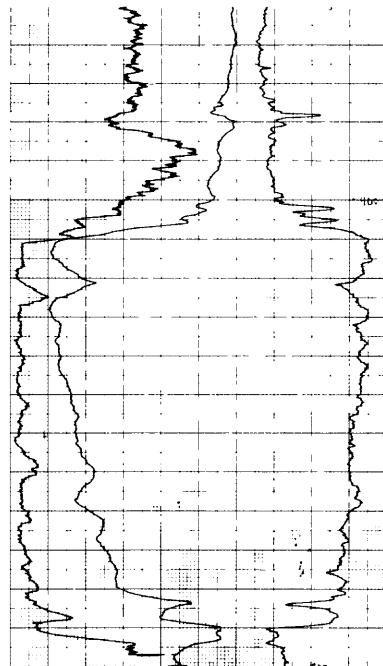
HOLE NO CD-79027
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Reno Junction	
DATE STARTED 8/1/79	DATE COMP. 8/1/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 33 T. 44 N. R. 71 W. FOOTAGE LOC.		500' FNL FS	520' FEL FW
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE	
		ROTARY 409'	CORING 111'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY G.A. Hollomon	

REMARKS:



REMARKS:

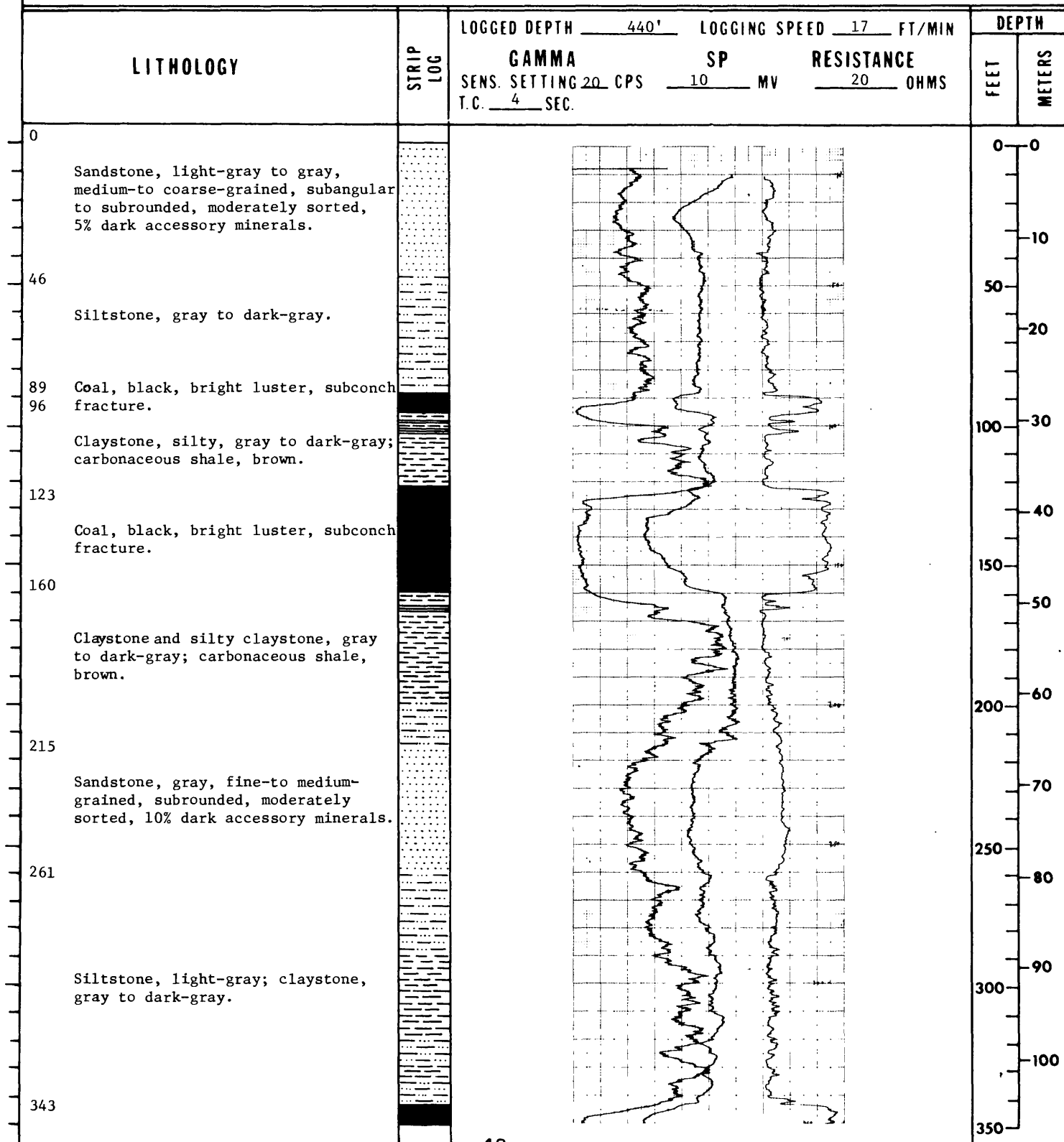
LITHOLOGY	STRIP LOG	LOGGED DEPTH <u>520'</u> LOGGING SPEED <u>17</u> FT/MIN			DEPTH	
		GAMMA SENS. SETTING <u>20</u> CPS T.C. <u>4</u> SEC.	SP <u>20</u> MV	RESISTANCE <u>20</u> OHMS	FEET	METERS
<p>Siltstone, clayey, gray; claystone, light-brown; sandstone, gray, fine-grained, subrounded, well-sorted.</p> <p>401</p> <p>Coal, black, dull luster, irregular to subconchoidal fracture, with light-brown claystone partings at 403 to 404 and 406 to 407 feet, and a gray siltstone parting at 503 to 505 feet.</p> <p>510 Siltstone, light-gray. 520 L.T.D.</p>					<p>350</p> <p>110</p> <p>120</p> <p>400</p> <p>130</p> <p>450</p> <p>140</p> <p>500</p> <p>150</p> <p>160</p> <p>550</p> <p>170</p> <p>180</p> <p>600</p> <p>190</p> <p>650</p> <p>200</p> <p>210</p> <p>700</p> <p>220</p> <p>750</p>	

UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79028
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Rawhide School	
DATE STARTED 8/11/79	DATE COMP. 8/11/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 19 T. 52 N., R. 72 W., FOOTAGE LOC.		60' FSL 1210' FSL	GROUND ELEV 4241'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 440' CORING 0	TOTAL DEPTH 440'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	DEPTH TO FLUID NR
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	

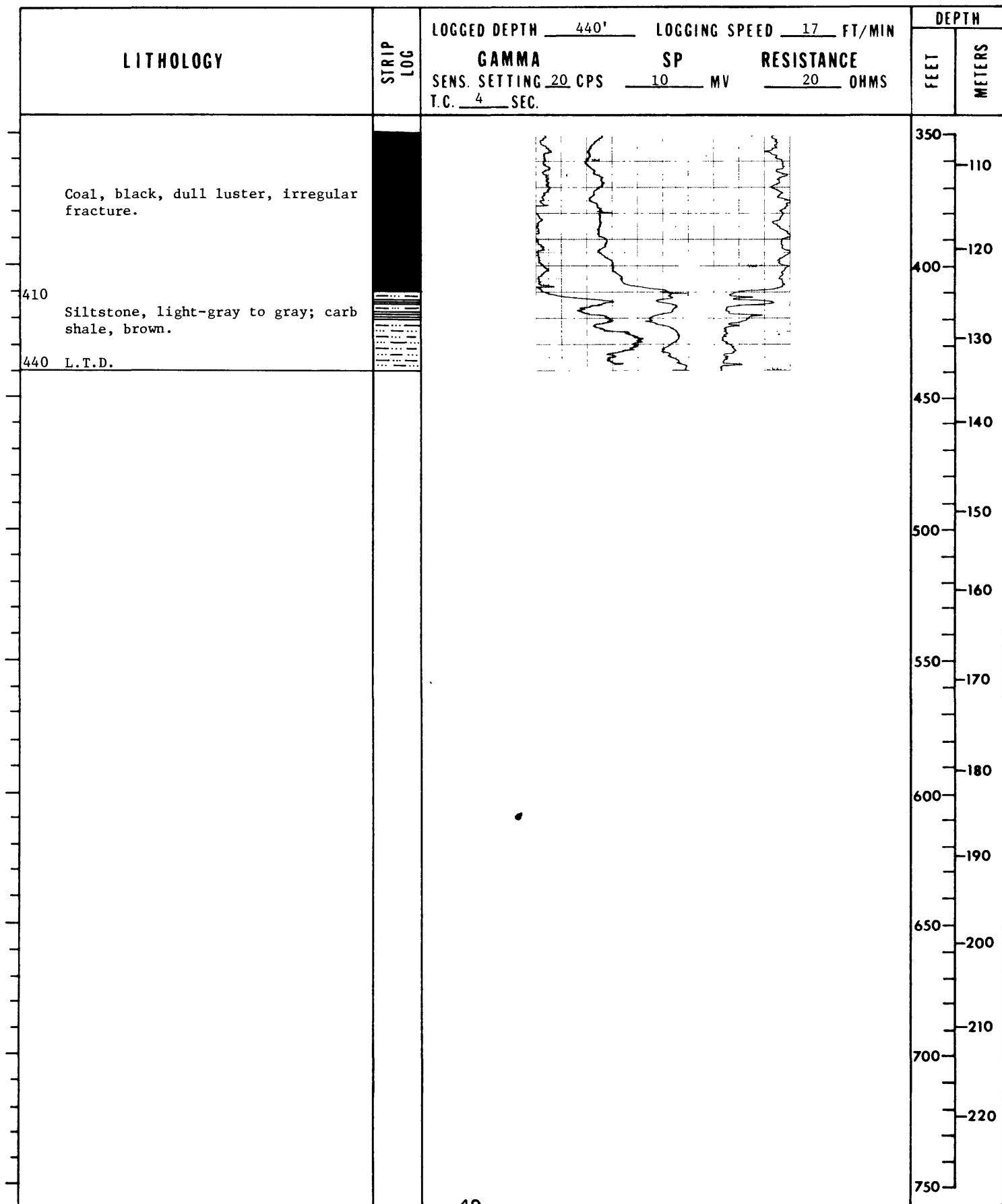
REMARKS:



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79028
SHEET 2 OF 2

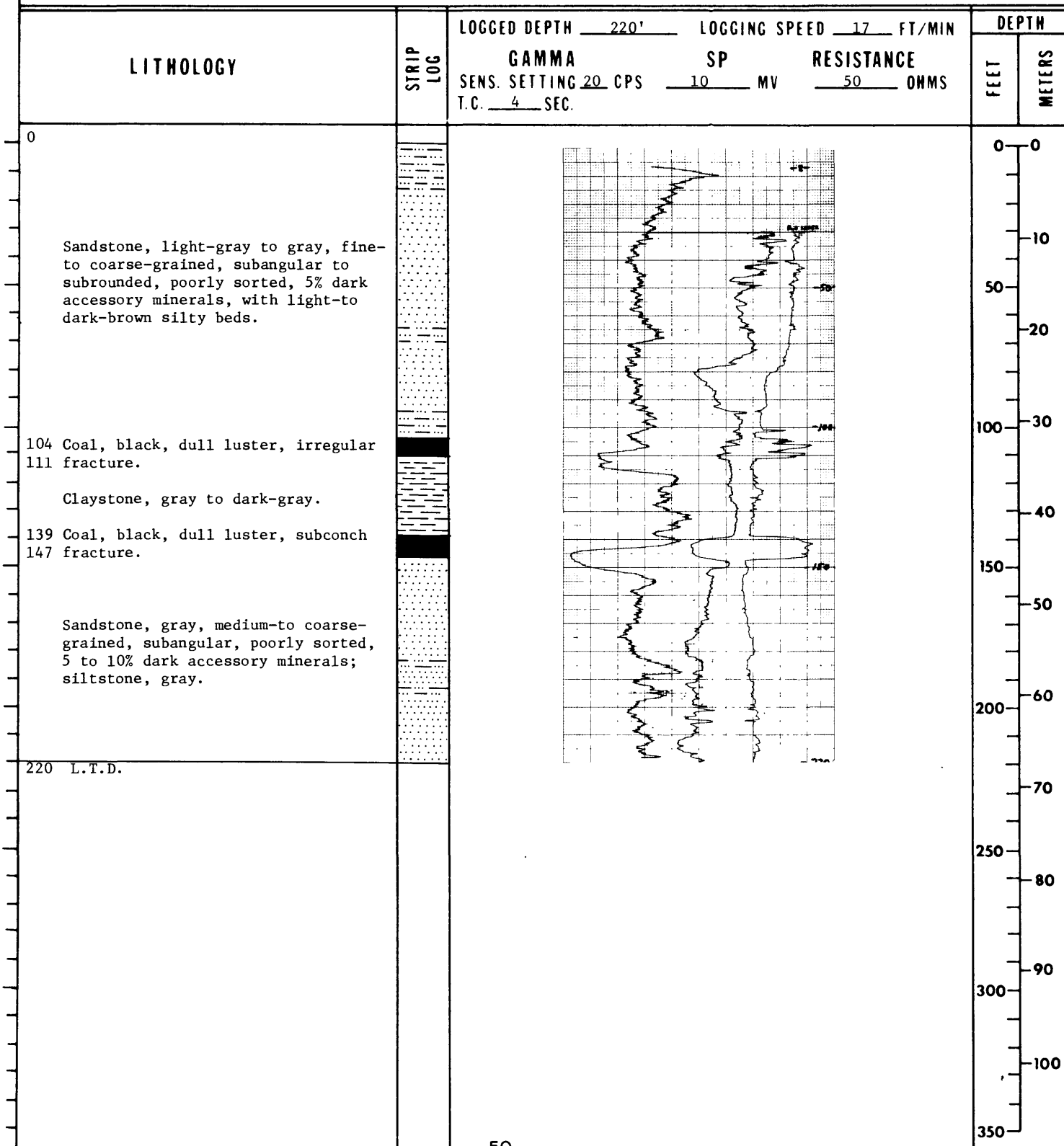
REMARKS:



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79029
SHEET 1 OF 1

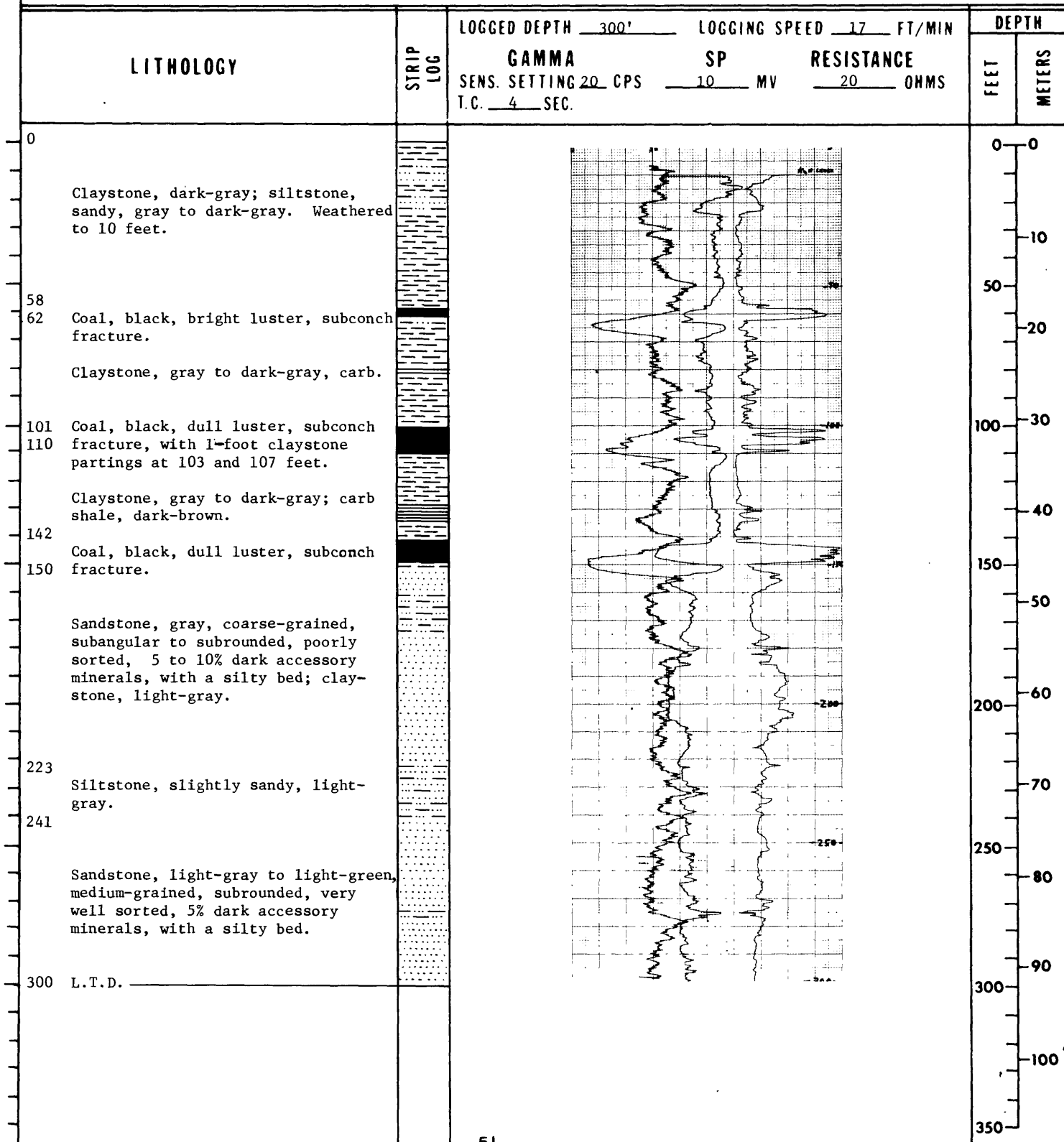
AREA Powder River Basin		QUAD NAME North Star School	
DATE STARTED 8/23/79	DATE COMP. 8/23/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 6 T. 44 N., R. 73 W.,		FOOTAGE LOC. 2175' FSL 85' FWL	
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 220' CORING 0'	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79030
SHEET 1 OF 1

AREA Powder River Basin		QUAD NAME North Star School	
DATE STARTED 8/24/79	DATE COMP. 8/24/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 21 T. 44 N. R. 73 W. FOOTAGE LOC.		FWL 2680' FSL 445'	GROUND ELEV 5085'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 300' CORING 0	TOTAL DEPTH 300'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	DEPTH TO FLUID 10'
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79031
SHEET 1 OF 2


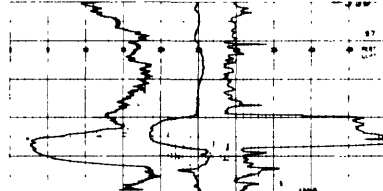


AREA Powder River Basin		QUAD NAME North Star School	
DATE STARTED 8/24/79	DATE COMP. 8/25/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 27 T. 44 N., R. 73 W., FOOTAGE LOC. 310' FSL 965' FEL		GROUND ELEV. 5213'	
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 400' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS:			

LITHOLOGY	STRIP LOG	LOGGED DEPTH 400'	LOGGING SPEED 17 FT/MIN	DEPTH		
		GAMMA SENS. SETTING 20 CPS T.C. 4 SEC.	SP 20 MV	RESISTANCE 20 OHMS	FEET	METERS
0 Siltstone, clayey, light-brown, weathered; claystone, light-brown.					0	0
15 Sandstone, silty, light-brown, fine grained; siltstone, clayey, dark-gray.					10	
32 Claystone and slightly silty claystone, gray to dark-gray; siltstone, clayey, light-brown.					50	
58 Claystone and slightly silty claystone, gray to dark-gray; sandstone, gray, indurated with calcareous cement. Possible thin coal at 157 feet.					100	30
203 Coal, black, dull luster, irregular fracture.					200	60
206 Claystone and silty claystone, light brown to dark-gray, carbonaceous; sandstone, gray, indurated with calcareous cement.					250	80
329 Coal, black, dull luster, irregular fracture, numerous claystone and carbonaceous shale partings.					300	90
346					350	100

UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79031
SHEET 2 OF 2

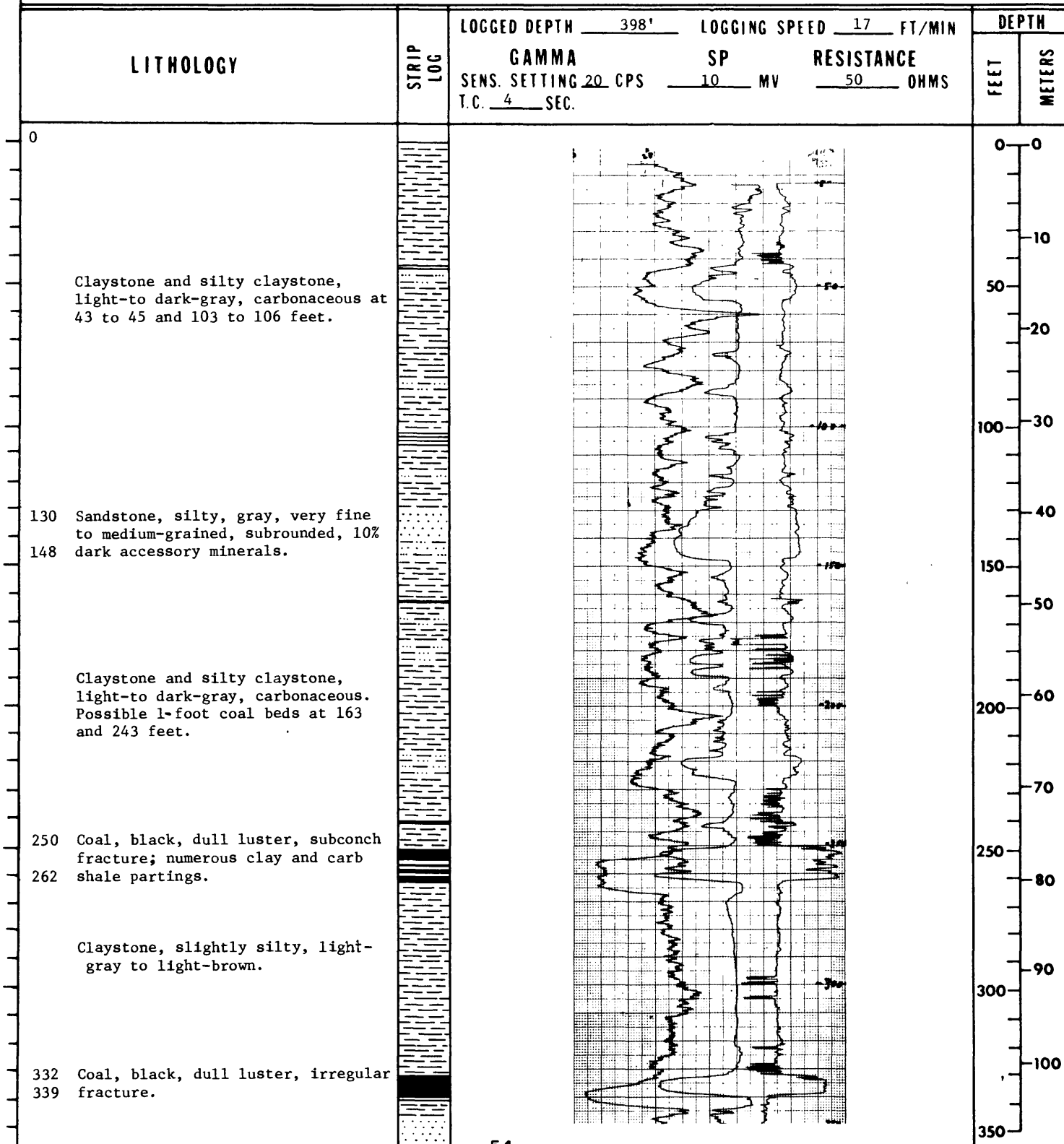
REMARKS:

LITHOLOGY	STRIP LOG	LOGGED DEPTH <u>400'</u> LOGGING SPEED <u>17</u> FT/MIN			DEPTH	
		GAMMA SENS. SETTING <u>20</u> CPS T.C. <u>4</u> SEC.	SP <u>20</u> MV	RESISTANCE <u>20</u> OHMS	FEET	METERS
Claystone, gray to dark-gray, with thin interbedded carbonaceous shale.					350	
379 Coal, black, dull luster, irregular fracture.					110	
388 Claystone, gray, with thin interbedded carbonaceous shale.					120	
400 L.T.D.					400	
					130	
					140	
					150	
					160	
					170	
					180	
					190	
					200	
					210	
					220	
					230	
					240	
					250	
					260	
					270	
					280	
					290	
					300	
					310	
					320	
					330	
					340	
					350	
					360	
					370	
					380	
					390	
					400	
					410	
					420	
					430	
					440	
					450	
					460	
					470	
					480	
					490	
					500	
					510	
					520	
					530	
					540	
					550	
					560	
					570	
					580	
					590	
					600	
					610	
					620	
					630	
					640	
					650	
					660	
					670	
					680	
					690	
					700	
					710	
					720	
					730	
					740	
					750	

UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79032
SHEET 1 OF 2

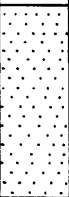
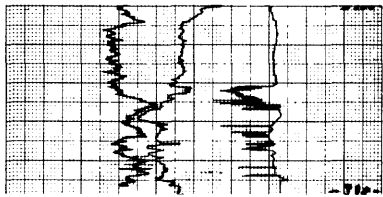
AREA Powder River Basin		QUAD NAME North Star School	
DATE STARTED 8/26/79	DATE COMP. 8/26/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 27 T.44 N., R. 73 W., FOOTAGE LOC. 1383' ### FSL 545' ### FEL		GROUND ELEV 5220'	
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 400' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS: Resistance spiking.			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79032
SHEET 2 OF 2

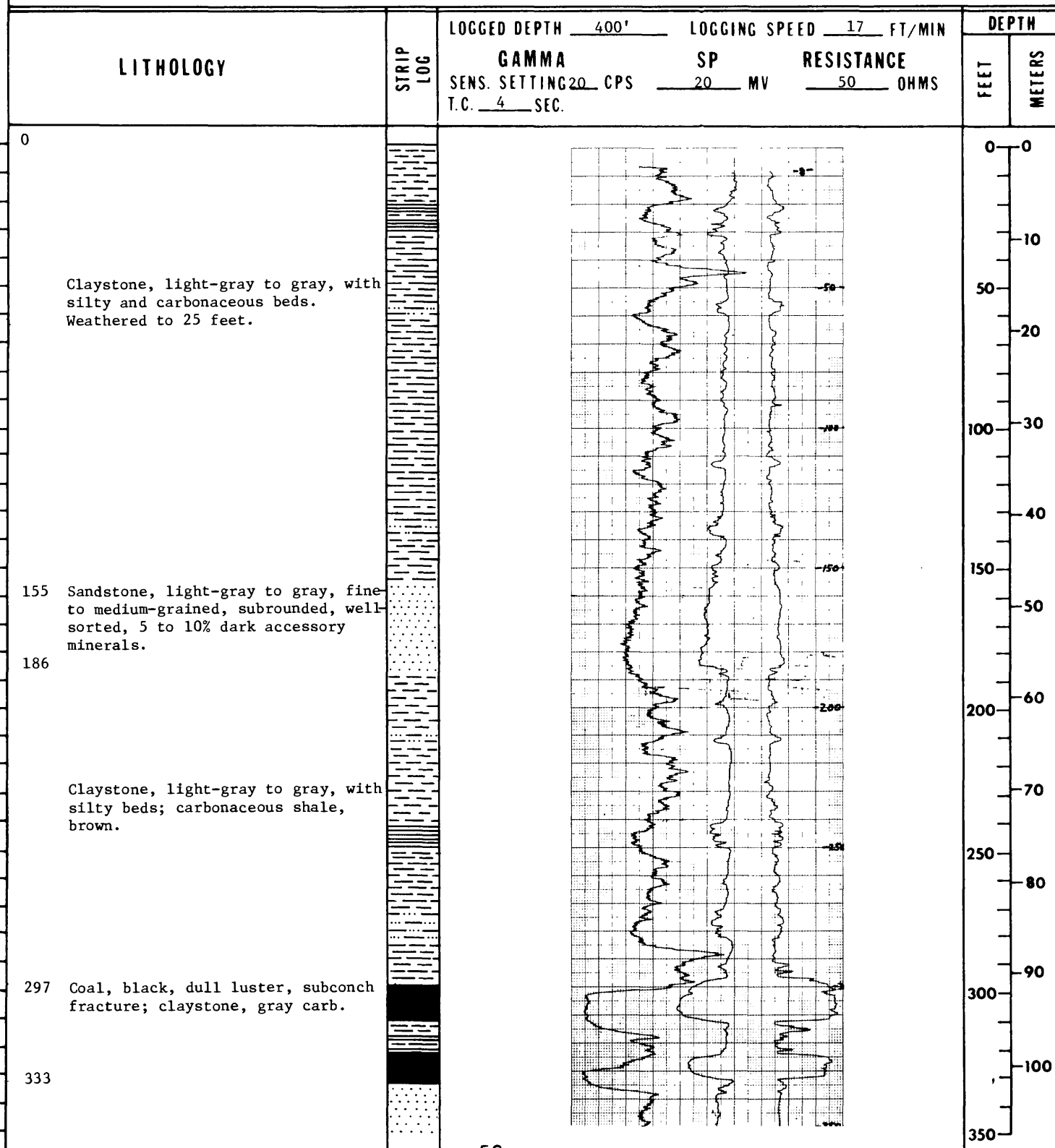
REMARKS:

LITHOLOGY	STRIP LOG	LOGGED DEPTH <u>398'</u> LOGGING SPEED <u>17</u> FT/MIN			DEPTH	
		GAMMA SENS. SETTING <u>20</u> CPS T.C. <u>4</u> SEC.	SP <u>10</u> MV	RESISTANCE <u>50</u> OHMS	FEET	METERS
Sandstone, gray, coarse-to very coarse grained, subangular, poorly sorted, 5% dark accessory minerals; claystone, dark-gray. 398 L.T.D.					350 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400 410 420 430 440 450 460 470 480 490 500 510 520 530 540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690 700 710 720 730 740 750	

UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79033
SHEET 1 OF 2

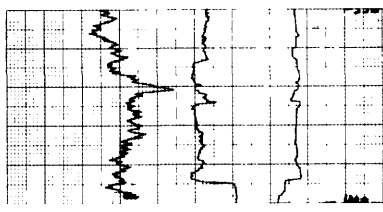
AREA Powder River Basin		QUAD NAME North Star School	
DATE STARTED 8/26/79	DATE COMP. 8/27/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 26 T. 44 N., R. 73 W., FOOTAGE LOC.		2500' FNL	1490' FEL
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE	
		ROTARY 400'	CORING 0
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	GROUND ELEV 5183'
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79033
SHEET 2 OF 2

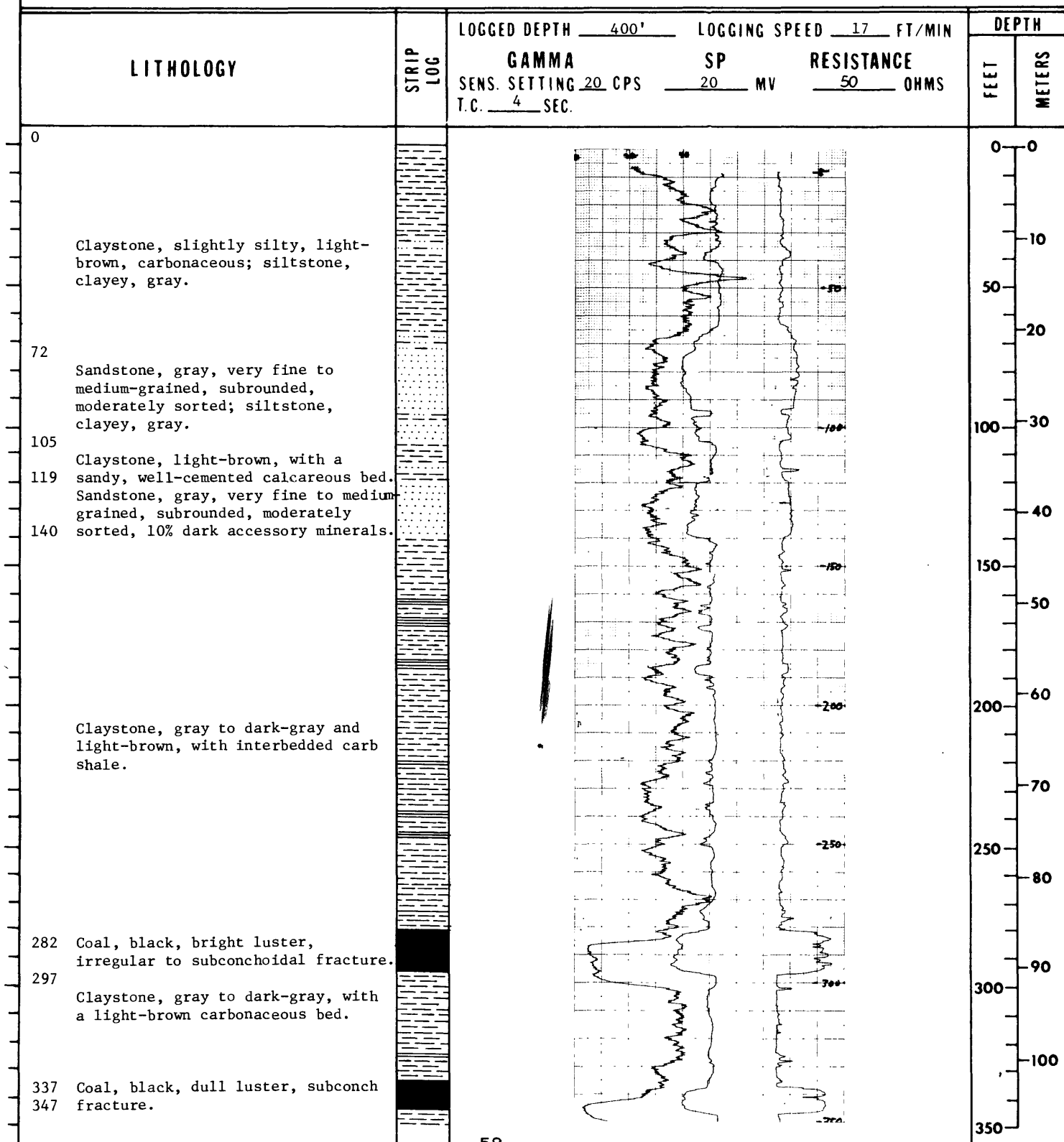
REMARKS:

LITHOLOGY	STRIP LOG	LOGGED DEPTH <u>400'</u> LOGGING SPEED <u>17</u> FT/MIN			DEPTH	
		GAMMA SENS. SETTING <u>20</u> CPS T.C. <u>4</u> SEC.	SP <u>20</u> MV	RESISTANCE <u>50</u> OHMS	FEET	METERS
<p>Sandstone, light-gray to gray, fine to coarse-grained, subangular to subrounded, poorly sorted, 5% dark accessory minerals, with silty beds; claystone, silty, light-gray.</p> <p>400 L.T.D.</p>		<p>350</p> <p>110</p> <p>120</p> <p>130</p> <p>140</p> <p>150</p> <p>160</p> <p>170</p> <p>180</p> <p>190</p> <p>200</p> <p>210</p> <p>220</p> <p>230</p> <p>240</p> <p>250</p> <p>260</p> <p>270</p> <p>280</p> <p>290</p> <p>300</p> <p>310</p> <p>320</p> <p>330</p> <p>340</p> <p>350</p> <p>360</p> <p>370</p> <p>380</p> <p>390</p> <p>400</p> <p>410</p> <p>420</p> <p>430</p> <p>440</p> <p>450</p> <p>460</p> <p>470</p> <p>480</p> <p>490</p> <p>500</p> <p>510</p> <p>520</p> <p>530</p> <p>540</p> <p>550</p> <p>560</p> <p>570</p> <p>580</p> <p>590</p> <p>600</p> <p>610</p> <p>620</p> <p>630</p> <p>640</p> <p>650</p> <p>660</p> <p>670</p> <p>680</p> <p>690</p> <p>700</p> <p>710</p> <p>720</p> <p>730</p> <p>740</p> <p>750</p>				

UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79034
SHEET 1 OF 2

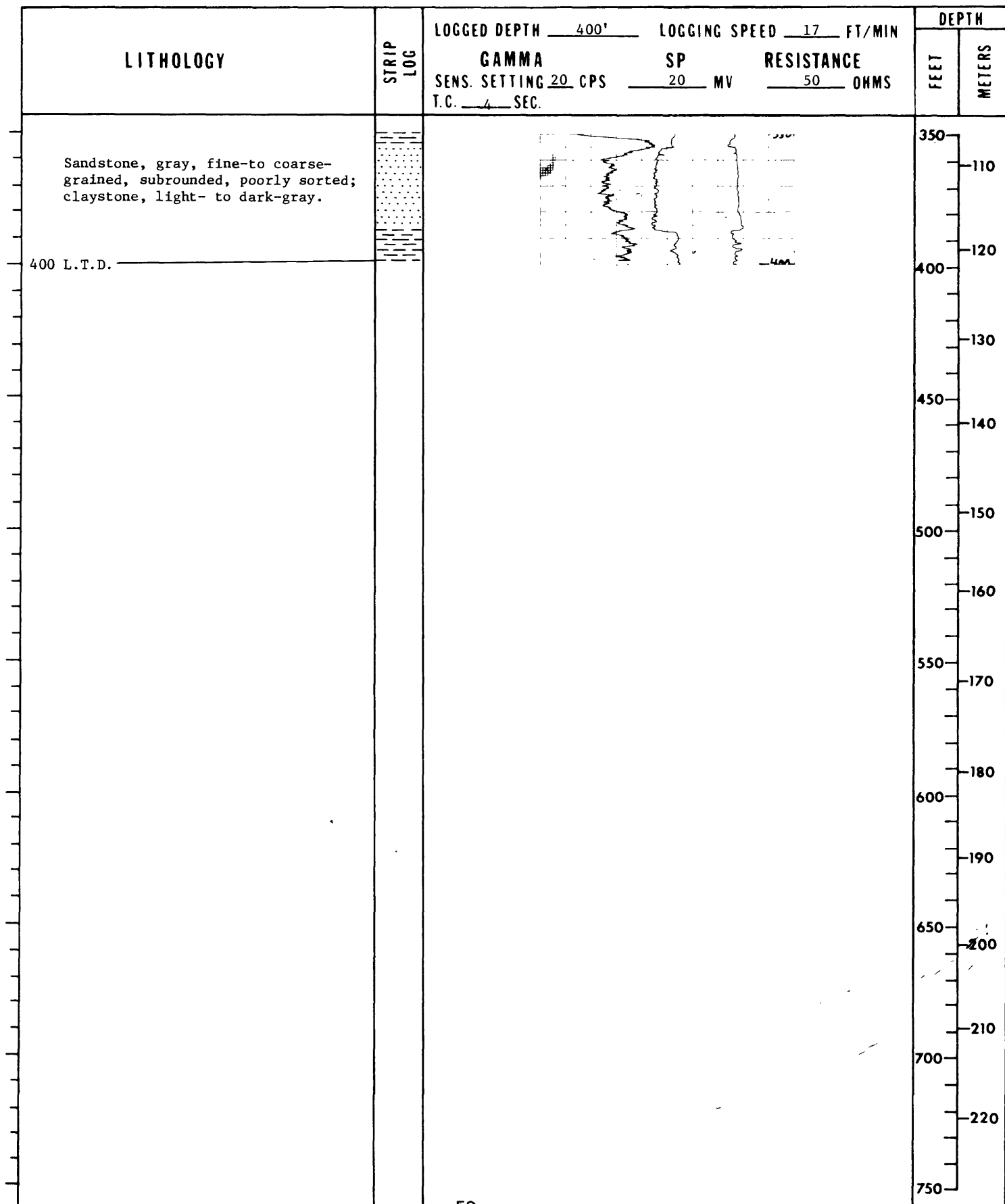
AREA Powder River Basin		QUAD NAME North Star School	
DATE STARTED 8/27/79	DATE COMP. 8/27/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 26 T. 44 N., R. 73 W., FOOTAGE LOC.		1010' ### FSL	1682' ### FWL
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 400' CORING 0	
DRILLING AGENCY: U.S. Geological Survey	DRILL TYPE: Portadrill 524		GROUND ELEV 5182'
LITHOLOGY RECORDED BY H.E. Corley		DEPTH TO FLUID 0'	
REMARKS:		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79034
SHEET 2 OF 2

REMARKS:



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79035
SHEET 1 OF 1

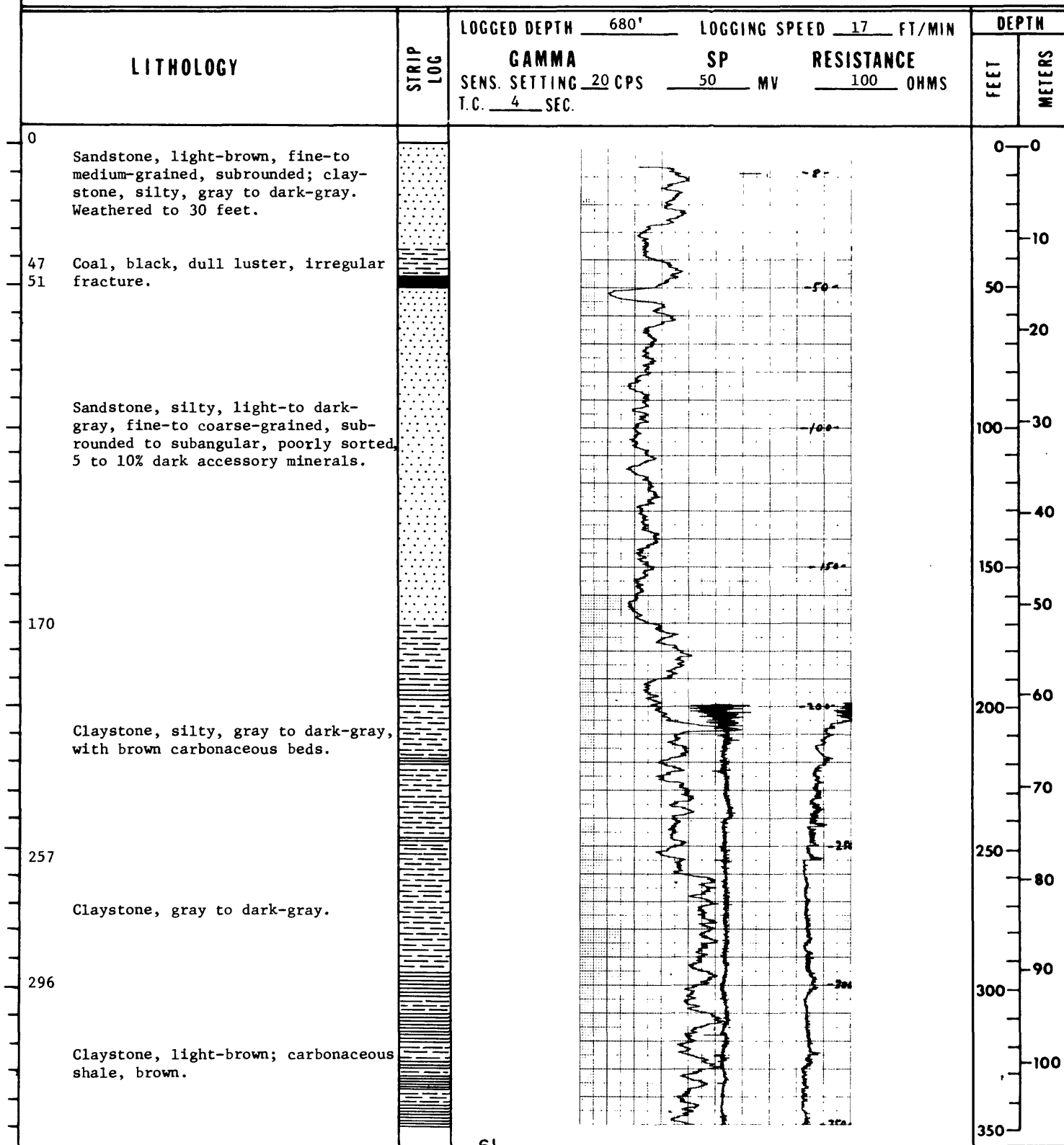
AREA Powder River Basin		QUAD NAME Piney Canyon SW	
DATE STARTED 8/28/79	DATE COMP. abandoned	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 32 T. 42 N., R. 69 W., FOOTAGE LOC. 2252'		FNL ### 2100' FWL ###	GROUND ELEV 4911'
SIZE AND BIT TYPE: 4 3/4" Rock		FOOTAGE ROTARY 80' CORING 0	TOTAL DEPTH 80'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	DEPTH TO FLUID NR
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY	
REMARKS: Hole abandoned due to loss of circulation. No Geophysical log recorded.			

LITHOLOGY	STRIP LOG	LOGGED DEPTH _____	LOGGING SPEED _____ FT/MIN	DEPTH	
		GAMMA SENS. SETTING _____ CPS T.C. _____ SEC.	SP _____ MV	RESISTANCE _____ DHMS	FEET
0 Claystone, silty, light-brown.				0	0
8 Clinker, red.				10	
80 L.T.D. _____				50	
				20	
				100	30
				40	
				150	
				50	
				200	60
				70	
				250	
				80	
				90	
				300	90
				100	
				350	100

UNITED STATES GEOLOGICAL SURVEY

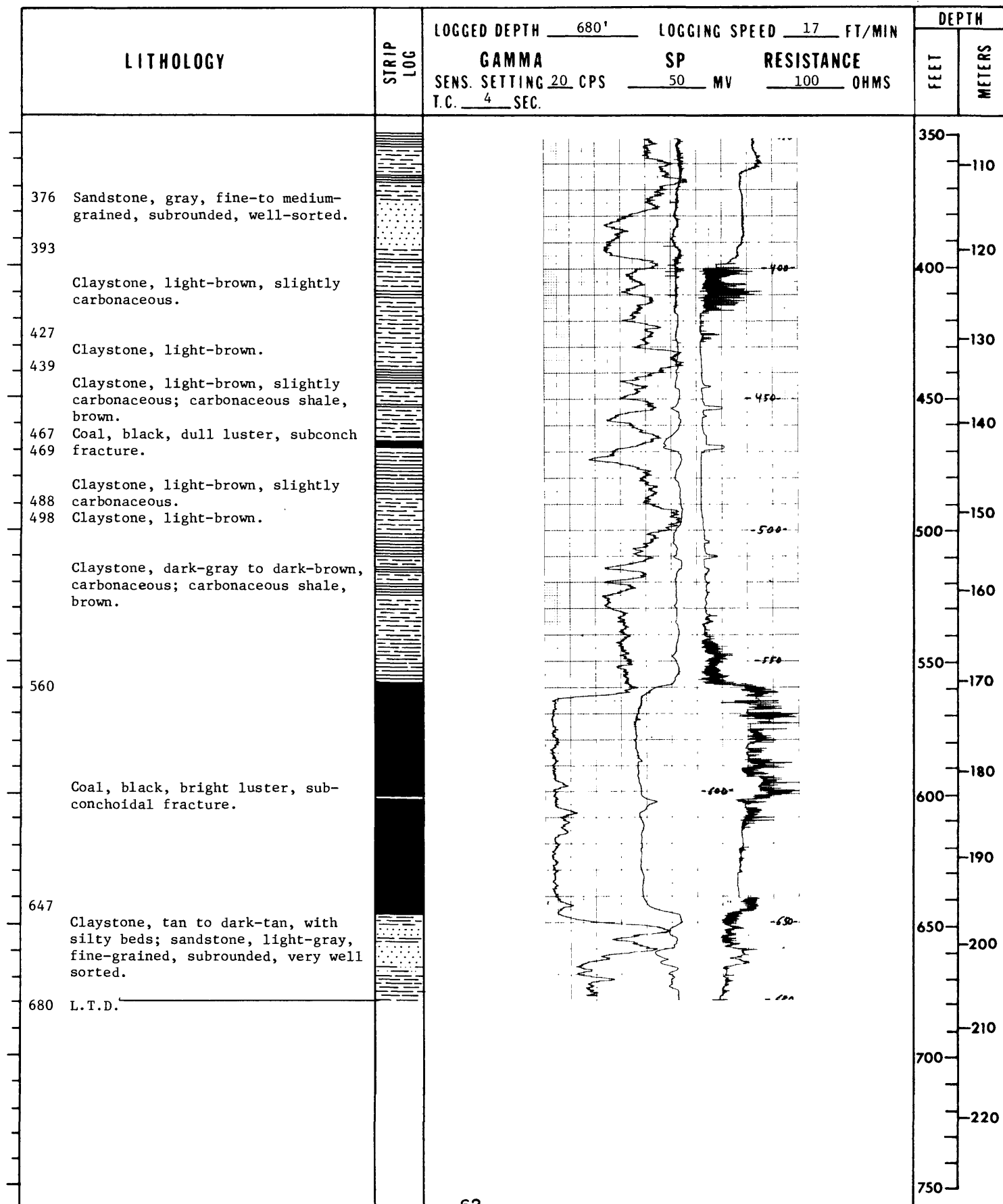
HOLE NO CD-79036
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Teckla SW	
DATE STARTED 9/5/79	DATE COMP. 9/6/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 4 T. 41 N., R. 71 W., FOOTAGE LOC.		765' ### FSL	2180' ### FWL
SIZE AND BIT TYPE: 5" Drag		FOOTAGE	
		ROTARY 680'	CORING 0
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	GROUND ELEV 4956'
LITHOLOGY RECORDED BY H.E. Corley		DEPTH TO FLUID NR	
GEOPHYSICAL LOGS RECORDED BY H.E. Corley			
REMARKS: Resistance and SP spiking			



REMARKS:

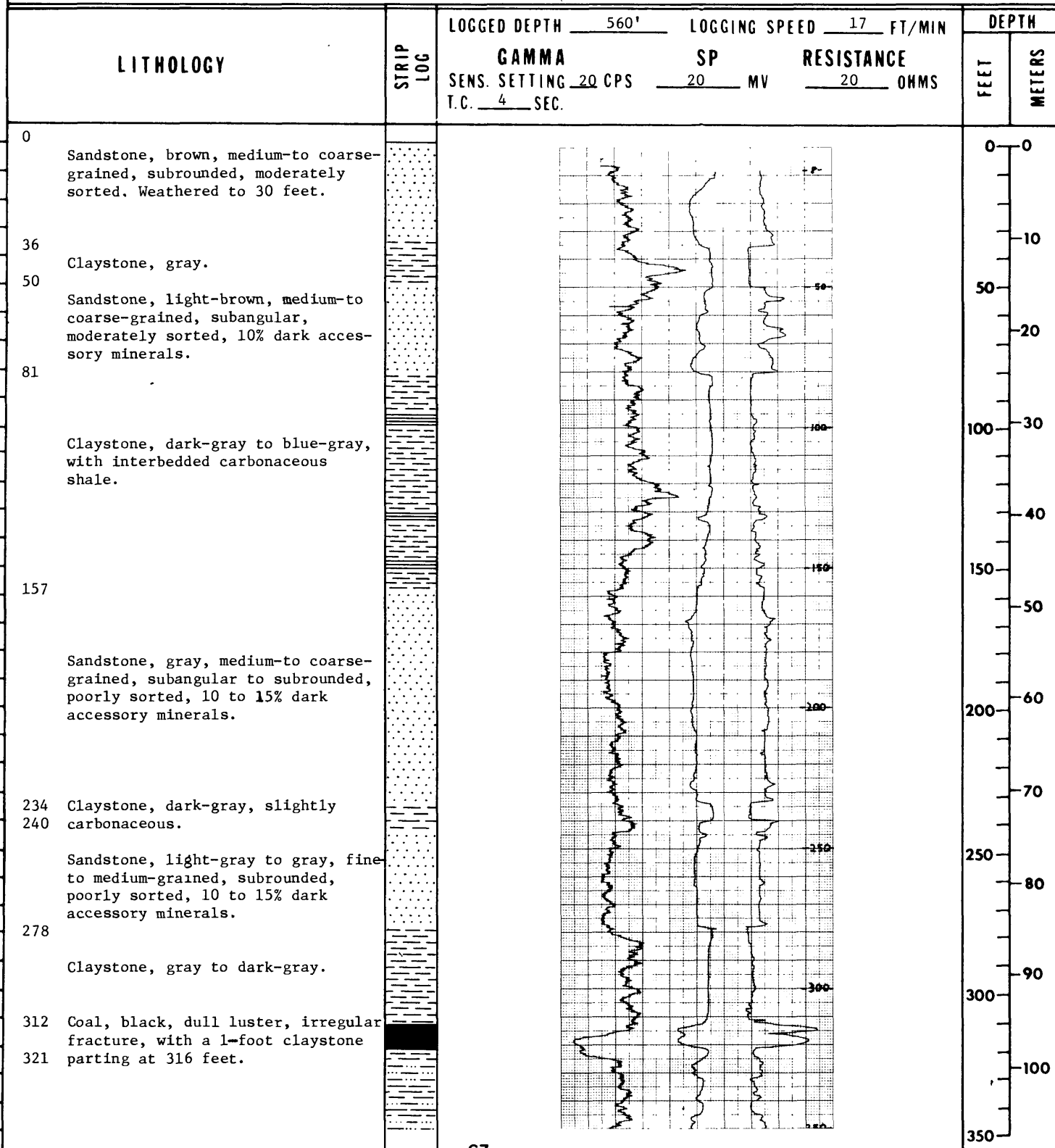
Resistance and SP spiking



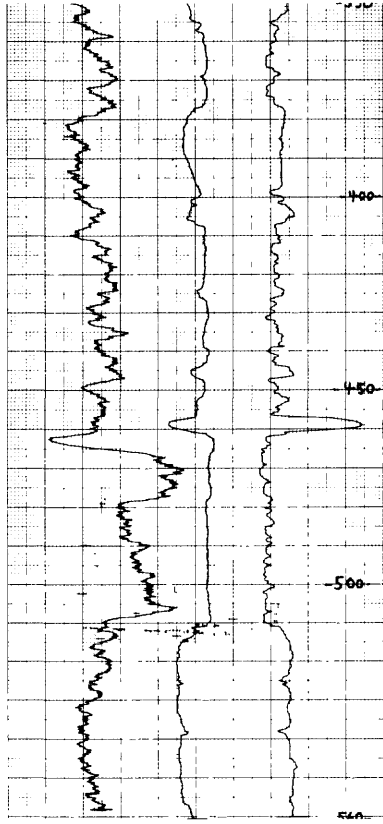
UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79037
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Teckla SW	
DATE STARTED 9/7/79	DATE COMP. 9/8/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 23 T. 42 N., R. 72 W., FOOTAGE LOC. 2296'		FWL 2156'	GROUND ELEV 5102'
SIZE AND BIT TYPE: 5" Kenclaw		FOOTAGE	
		ROTARY 560'	CORING 0
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	DEPTH TO FLUID NR
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS:			



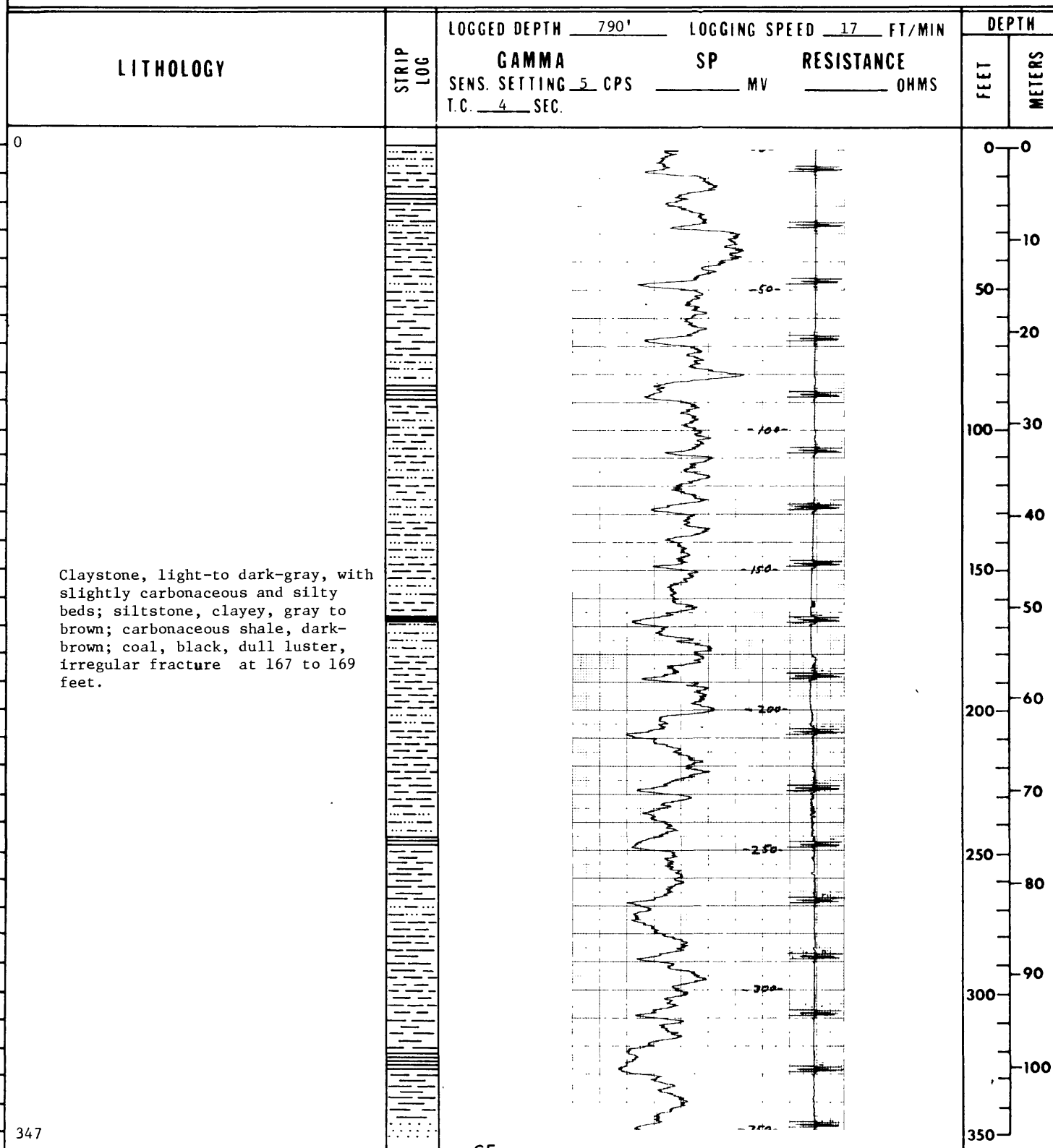
REMARKS:

LITHOLOGY	STRIP LOG	LOGGED DEPTH <u>560'</u> LOGGING SPEED <u>17</u> FT/MIN			DEPTH	
		GAMMA SENS. SETTING <u>20</u> CPS T.C. <u>4</u> SEC.	SP <u>20</u> MV	RESISTANCE <u>20</u> OHMS	FEET	METERS
Claystone, silty, gray to dark-gray; siltstone, clayey, gray.					350	
					110	
					120	
					130	
457 Coal, black, dull luster, irregular 461 fracture. 475 Claystone, dark-gray.					140	
Claystone, silty, gray to dark-gray, slightly carbonaceous.					150	
511					160	
Sandstone, gray, coarse-to very coarse grained, subangular, poorly sorted, 10% dark accessory minerals.					170	
560 L.T.D.					180	
					190	
					200	
					210	
					220	
					230	
					240	
					250	
					260	
					270	
					280	
					290	
					300	
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					330	
					340	
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					360	
					370	
					380	
					390	
					400	
					410	
					420	
					430	
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					700	
					710	
					720	
					730	
					740	
					750	

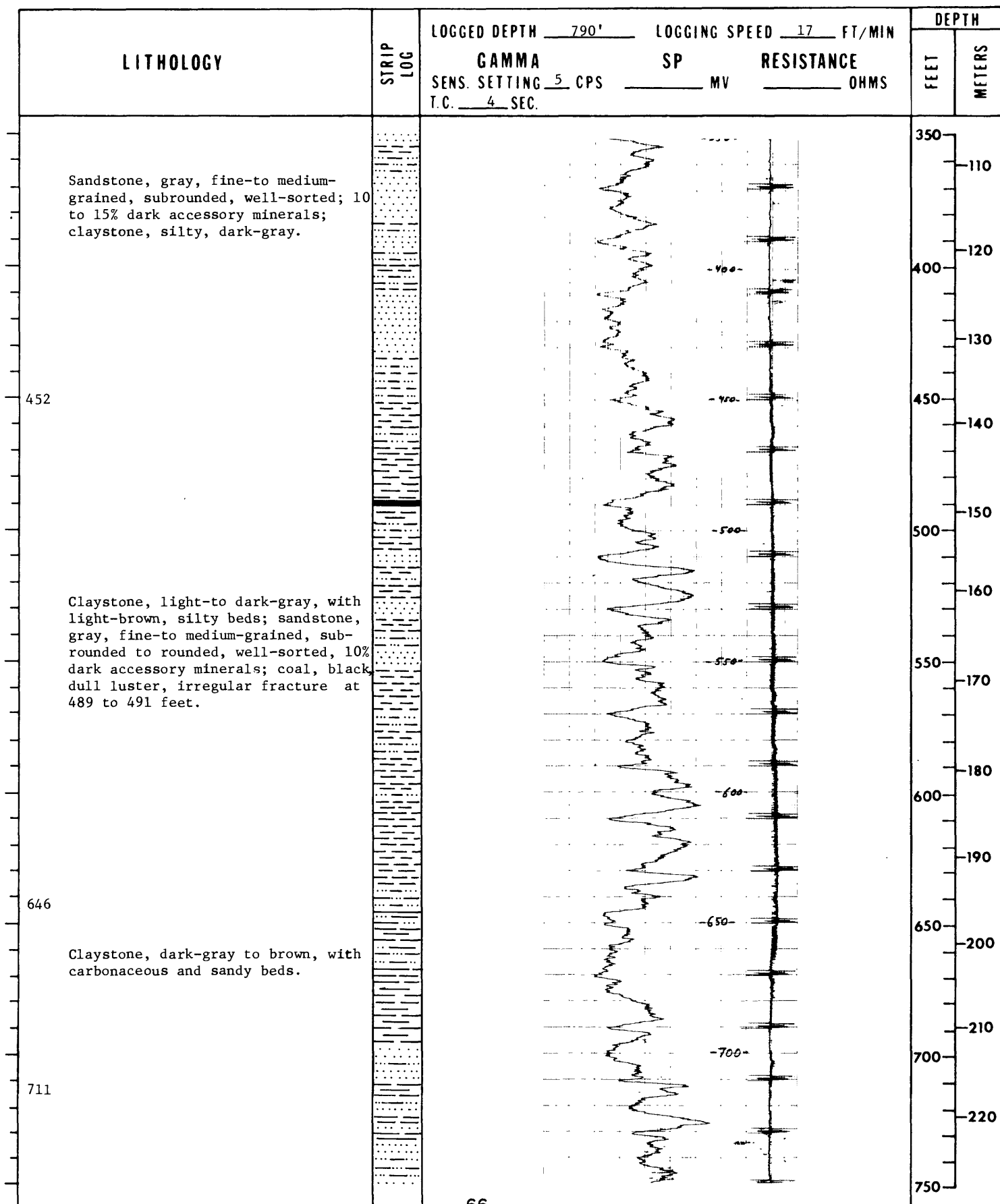
UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79038
SHEET 1 OF 3

AREA Powder River Basin		QUAD NAME Betty Reservoir	
DATE STARTED 9/8/79	DATE COMP. 9/10/79	COUNTY Converse	STATE Wyoming
LOCATION: SEC. 15 T. 39 N., R. 71 W., FOOTAGE LOC.		1590' FT FSL	540' FT FWL
SIZE AND BIT TYPE: 5" Drag		FOOTAGE ROTARY 800' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS: Logged through drill pipe. Collar locator 1000 MV			




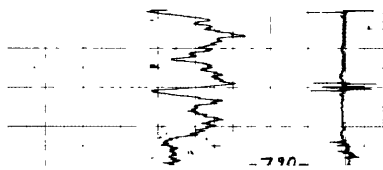
REMARKS:



UNITED STATES GEOLOGICAL SURVEY

HOLE NO. CD-79038
SHEET 3 OF 3

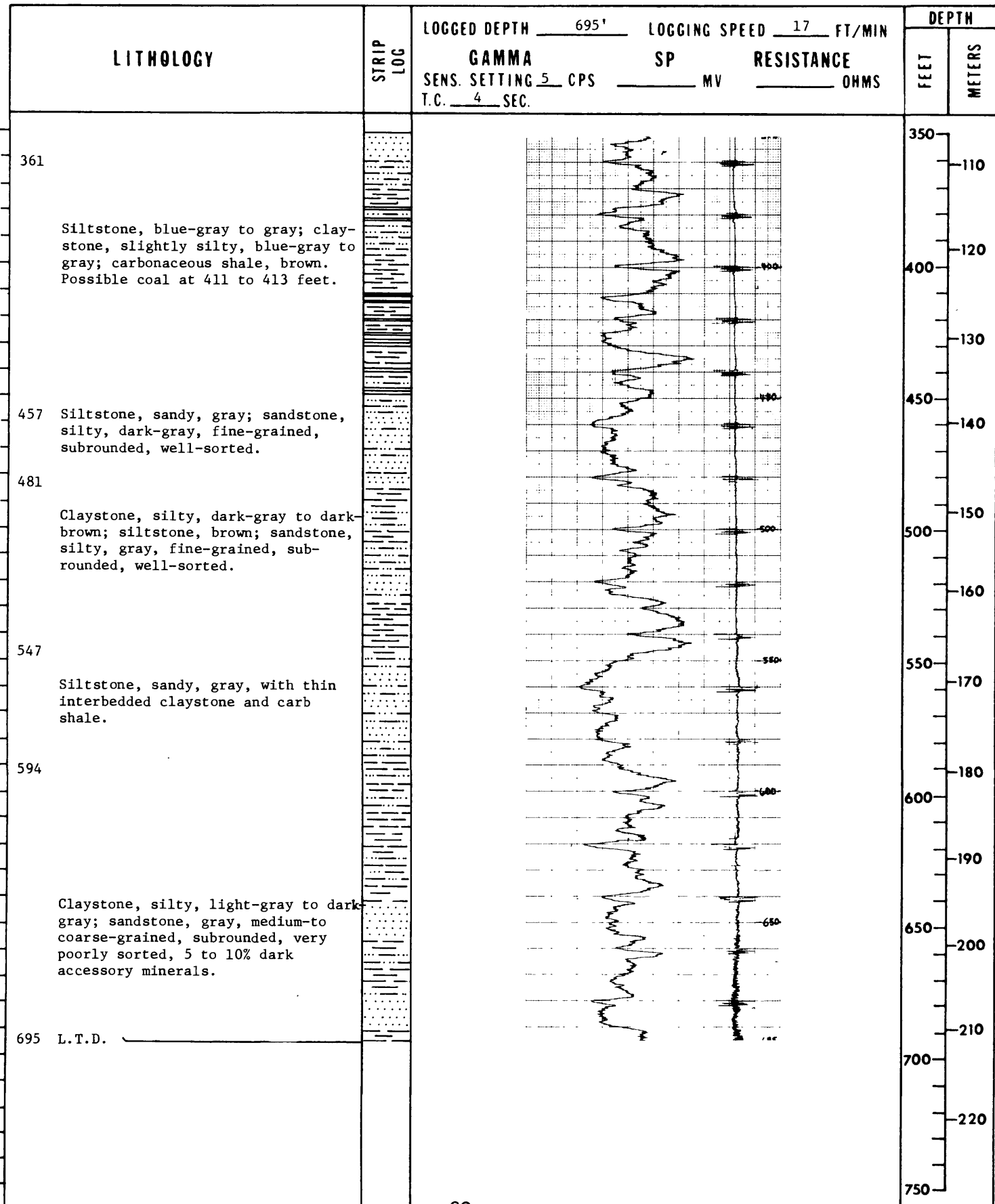
REMARKS:

LITHOLOGY	STRIP LOG	LOGGED DEPTH <u>790'</u>	LOGGING SPEED <u>17</u> FT/MIN	DEPTH	
		GAMMA SENS. SETTING <u>5</u> CPS T.C. <u>4</u> SEC.	SP MV	RESISTANCE OHMS	FEET
Claystone, dark-gray, with slightly sandy beds; sandstone, silty, dark-gray, fine-to medium-grained, sub-rounded to rounded, well-sorted, 10 to 15% dark accessory minerals.				750	230
790 L.T.D.				800	240
				850	250
				900	260
				950	270
				1000	280
				1050	290
				1100	300
				1150	310
					320
					330
					340
					350

HOLE NO CD-79039
SHEET 1 **OF** 2

LITHOLOGY	STRIP LOG	LOGGED DEPTH <u>695'</u>	LOGGING SPEED <u>17</u> FT/MIN	DEPTH	
				FEET	METERS
<p>0</p> <p>Claystone, blue-gray to gray, with gray to dark-gray silty beds; carb shale, brown. Weathered to 50 feet.</p> <p>249</p> <p>Claystone, blue-gray to gray-brown, with thin carbonaceous and silty beds; sandstone, gray, fine-grained, subrounded, well-sorted.</p>		<p>GAMMA SENS. SETTING <u>5</u> CPS T.C. <u>4</u> SEC.</p>	<p>SP MV</p>	<p>RESISTANCE OHMS</p>	<p>0 0</p> <p>10</p> <p>50 20</p> <p>100 30</p> <p>150 40</p> <p>200 50</p> <p>250 60</p> <p>300 70</p> <p>350 80</p> <p>90</p> <p>100</p> <p>300</p> <p>100</p> <p>350</p>

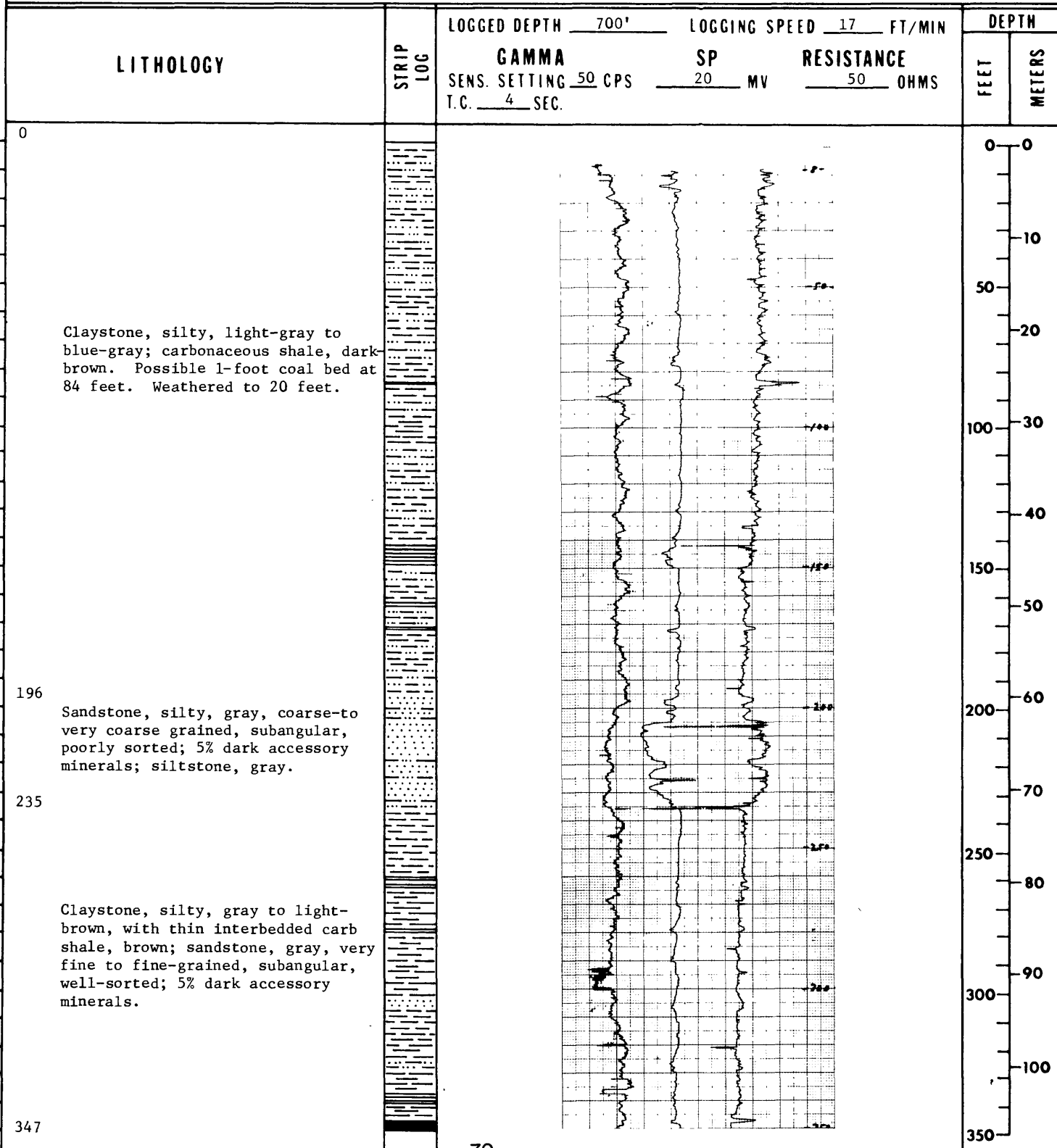
REMARKS:



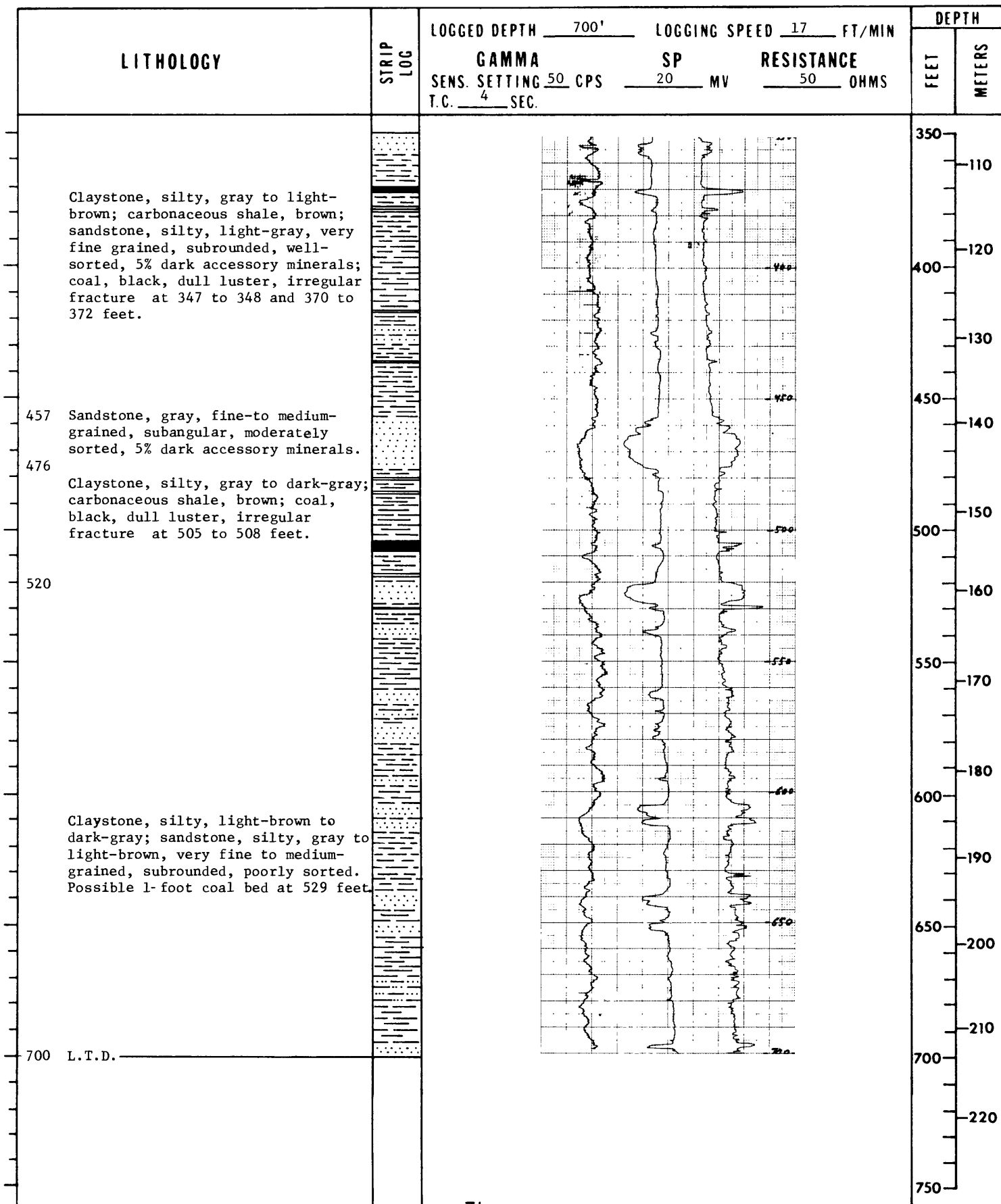
UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79040
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Betty Reservoir	
DATE STARTED 9/18/79	DATE COMP. 9/18/79	COUNTY Converse	STATE Wyoming
LOCATION: SEC. 22 T. 39 N., R. 72 W., FOOTAGE LOC.		1775' ### FSL 2000' ### FEL	GROUND ELEV 4997'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 700' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	DEPTH TO FLUID NR
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS: Resistance spiking.			



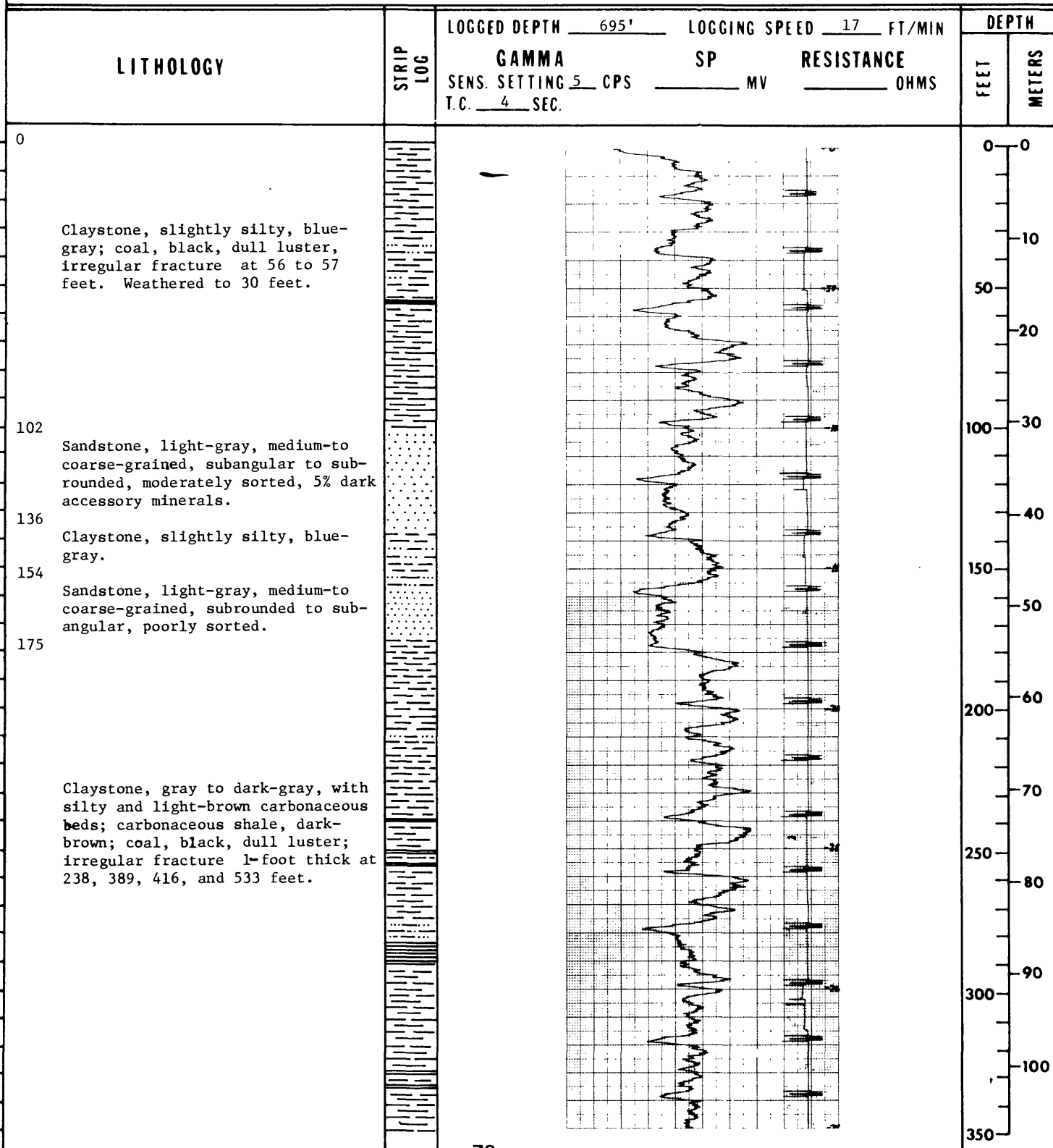
REMARKS:



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79041
SHEET 1 OF 2

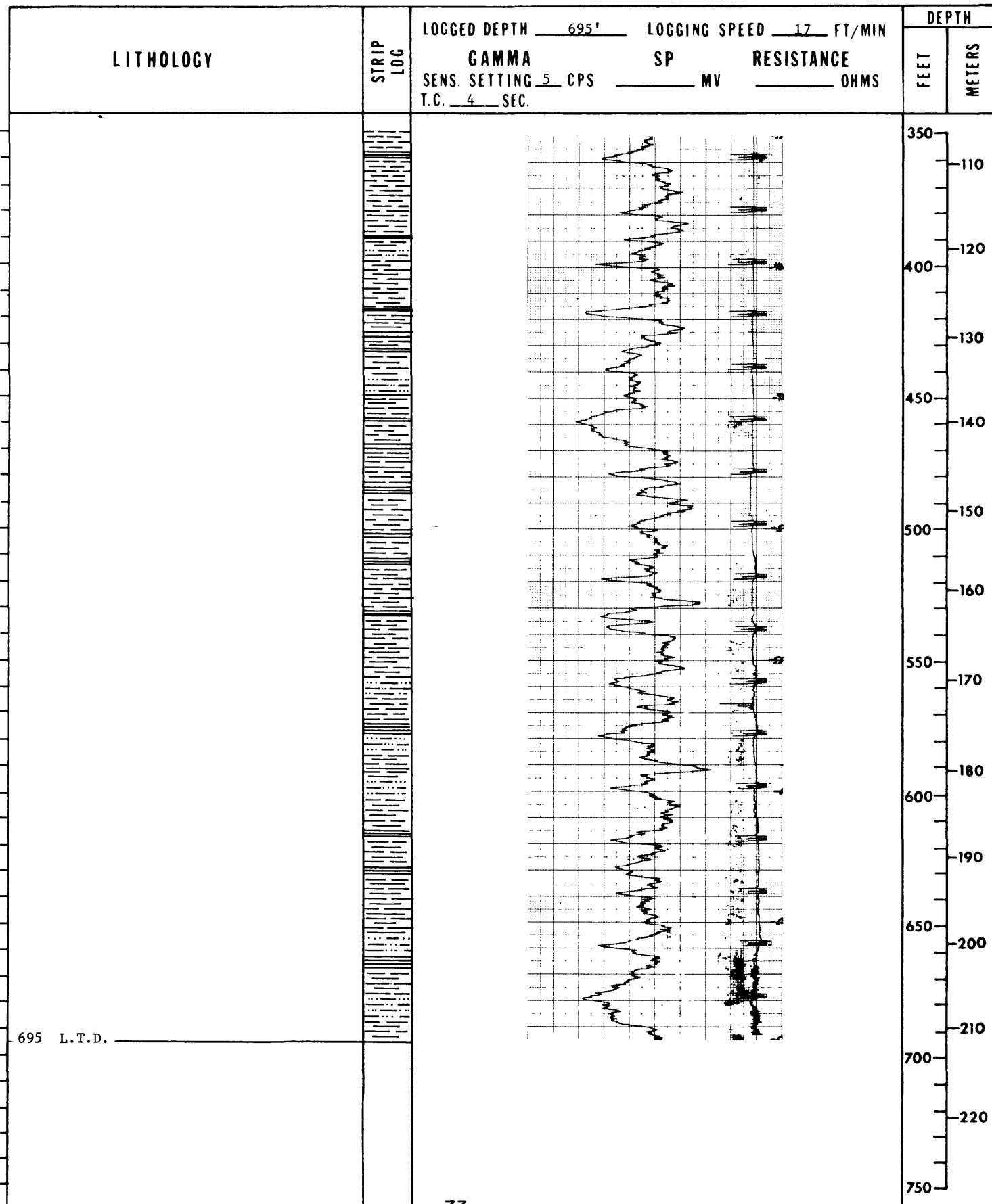
AREA Powder River Basin		QUAD NAME Coal Draw	
DATE STARTED 9/19/79	DATE COMP. 9/20/79	COUNTY Converse	STATE Wyoming
LOCATION: SEC. 28 T. 39 N., R. 72 W., FOOTAGE LOC.		610' ### FSL	590' ### FEL
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 700' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS: Logged through drill pipe. Collar locator 1000 MV			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79041
SHEET 2 OF 2

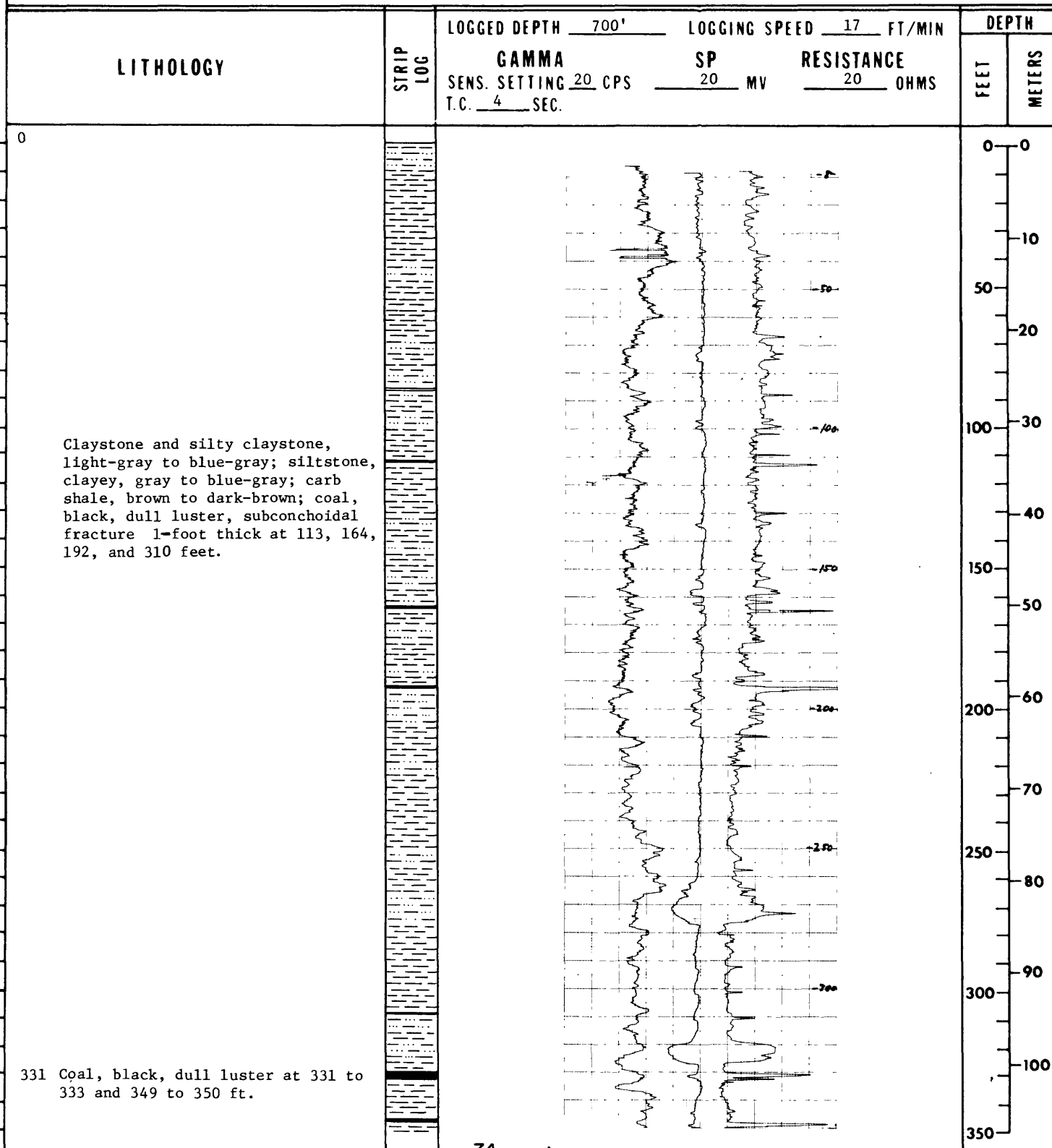
REMARKS:



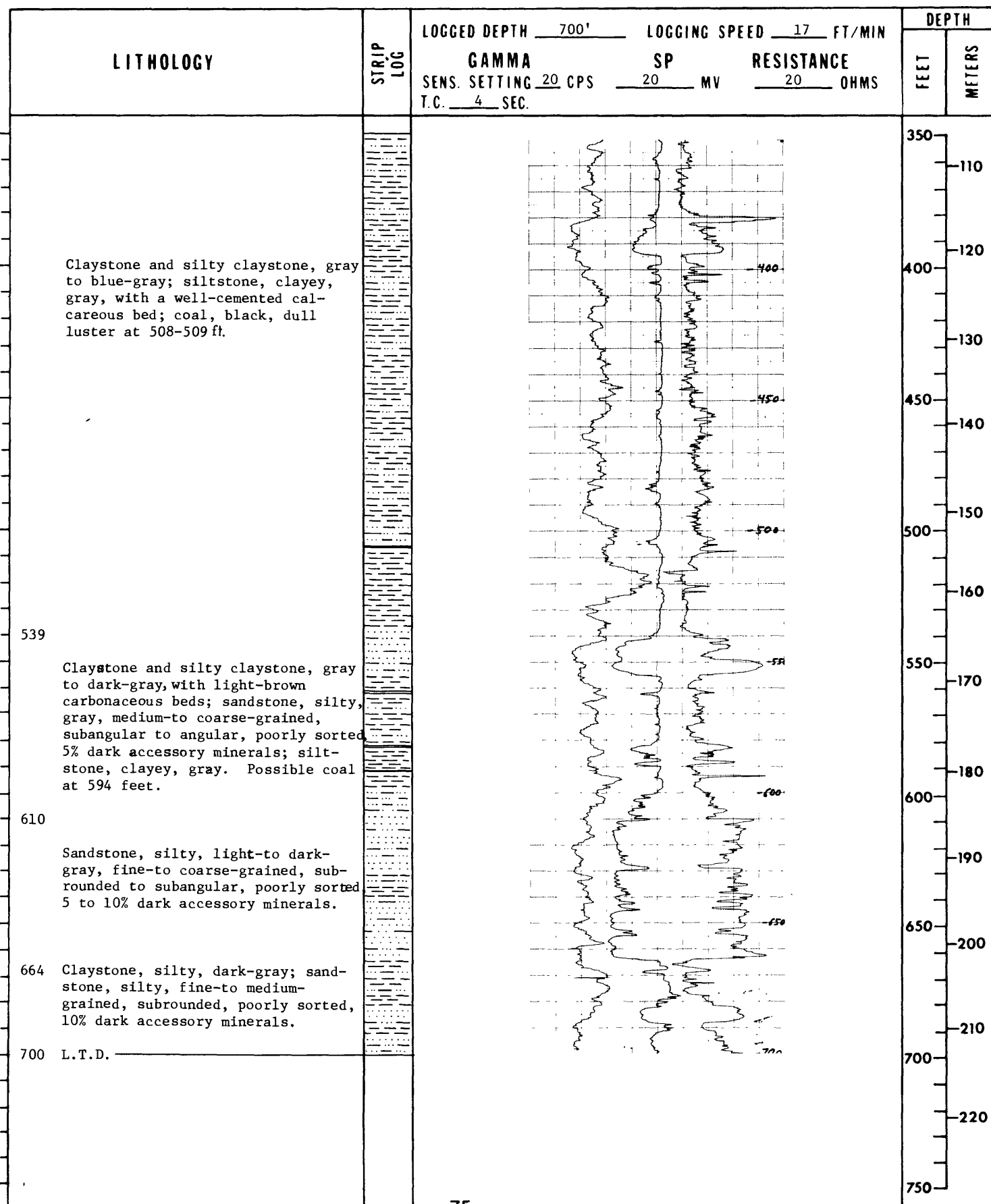
UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79042
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Betty Reservoir	
DATE STARTED 9/21/79	DATE COMP. 9/22/79	COUNTY Converse	STATE Wyoming
LOCATION: SEC. 35 T. 39 N., R. 72 W., FOOTAGE LOC.		1265' FNL FE	1110' FEL FE
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE	
		ROTARY 700'	CORING 0
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS:			



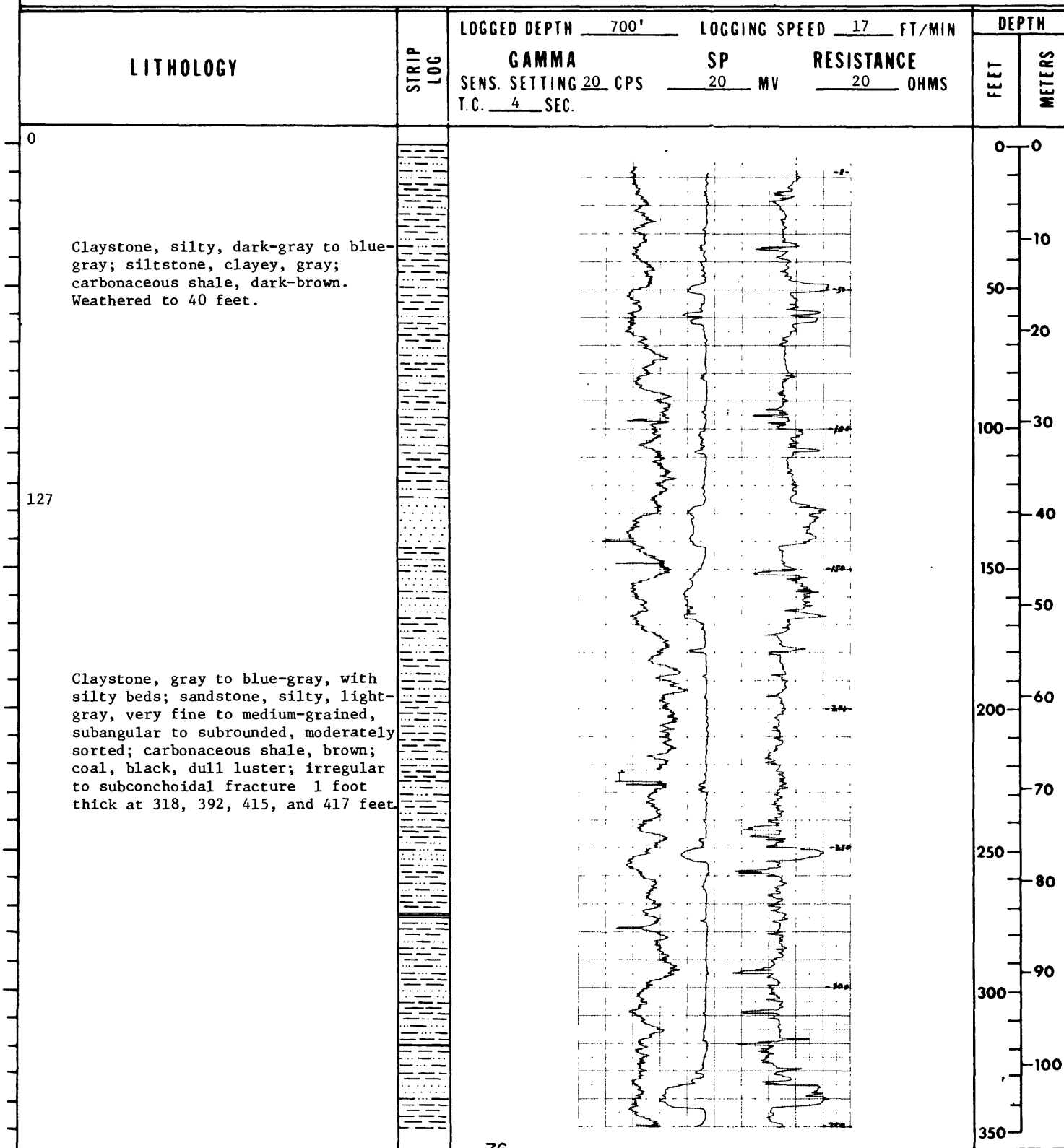
REMARKS:



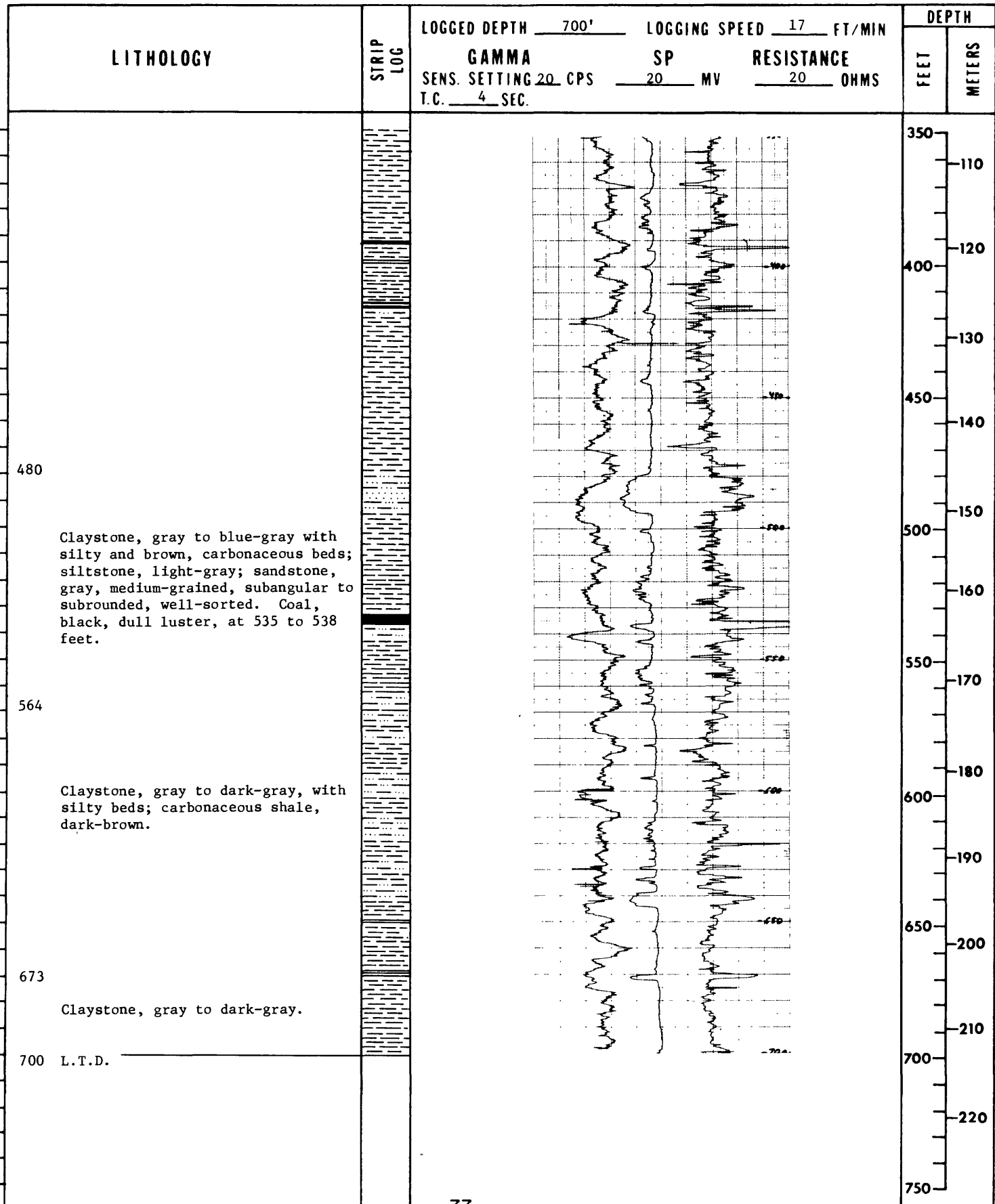
UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79043
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Coal Draw	
DATE STARTED 9/23/79	DATE COMP. 9/24/79	COUNTY Converse	STATE Wyoming
LOCATION: SEC. 4 T. 38 N., R. 72 W.,		FOOTAGE LOC. 2320' ### FSL 120' FEL ###	GROUND ELEV 5200'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 700' CORING 0	TOTAL DEPTH 700'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	DEPTH TO FLUID NR
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS: Gamma spiking			



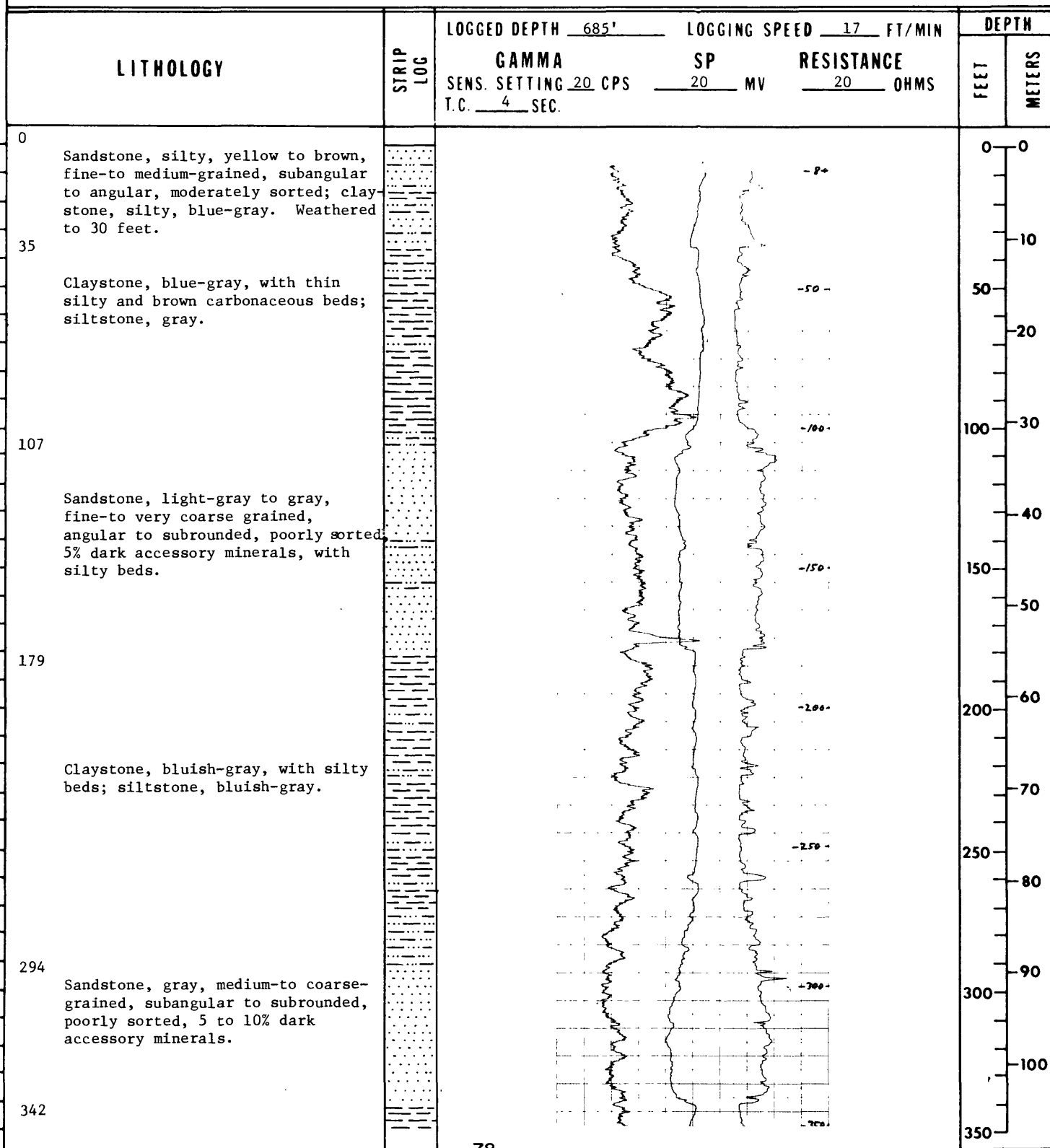
REMARKS:



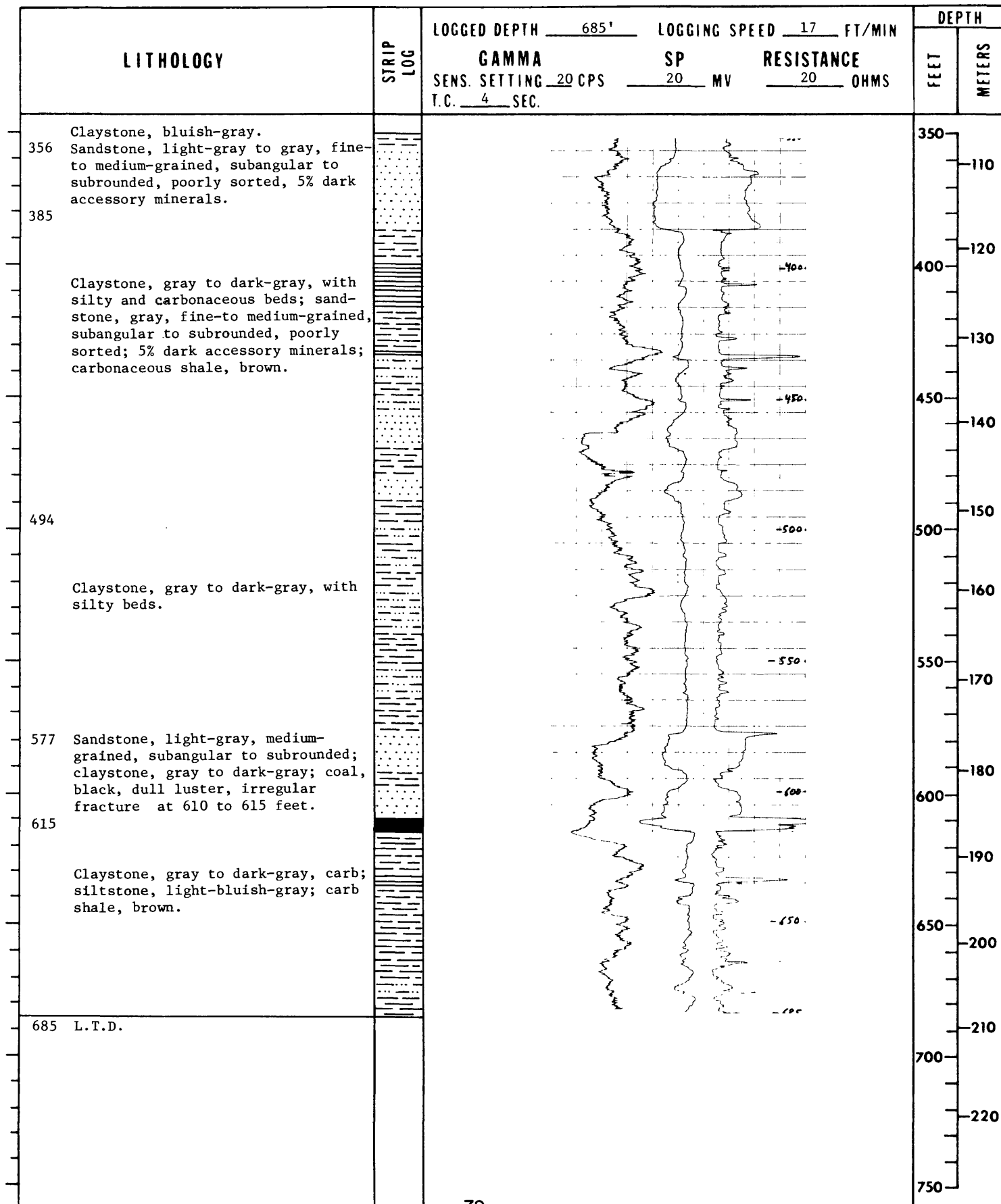
UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79044
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Coal Draw	
DATE STARTED 9/25/79	DATE COMP. 9/26/79	COUNTY Converse	STATE Wyoming
LOCATION: SEC. 7 T. 38 N., R. 72 W., FOOTAGE LOC.		FNL 1220' ###	FWL 1050' ###
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE	
		ROTARY 685'	CORING 0
DRILLING AGENCY: U.S. Geological Survey	DRILL TYPE: Portadrill 524	GROUND ELEV 5210'	
LITHOLOGY RECORDED BY H.E. Corley	GEOPHYSICAL LOGS RECORDED BY H.E. Corley	TOTAL DEPTH 685'	
REMARKS:			



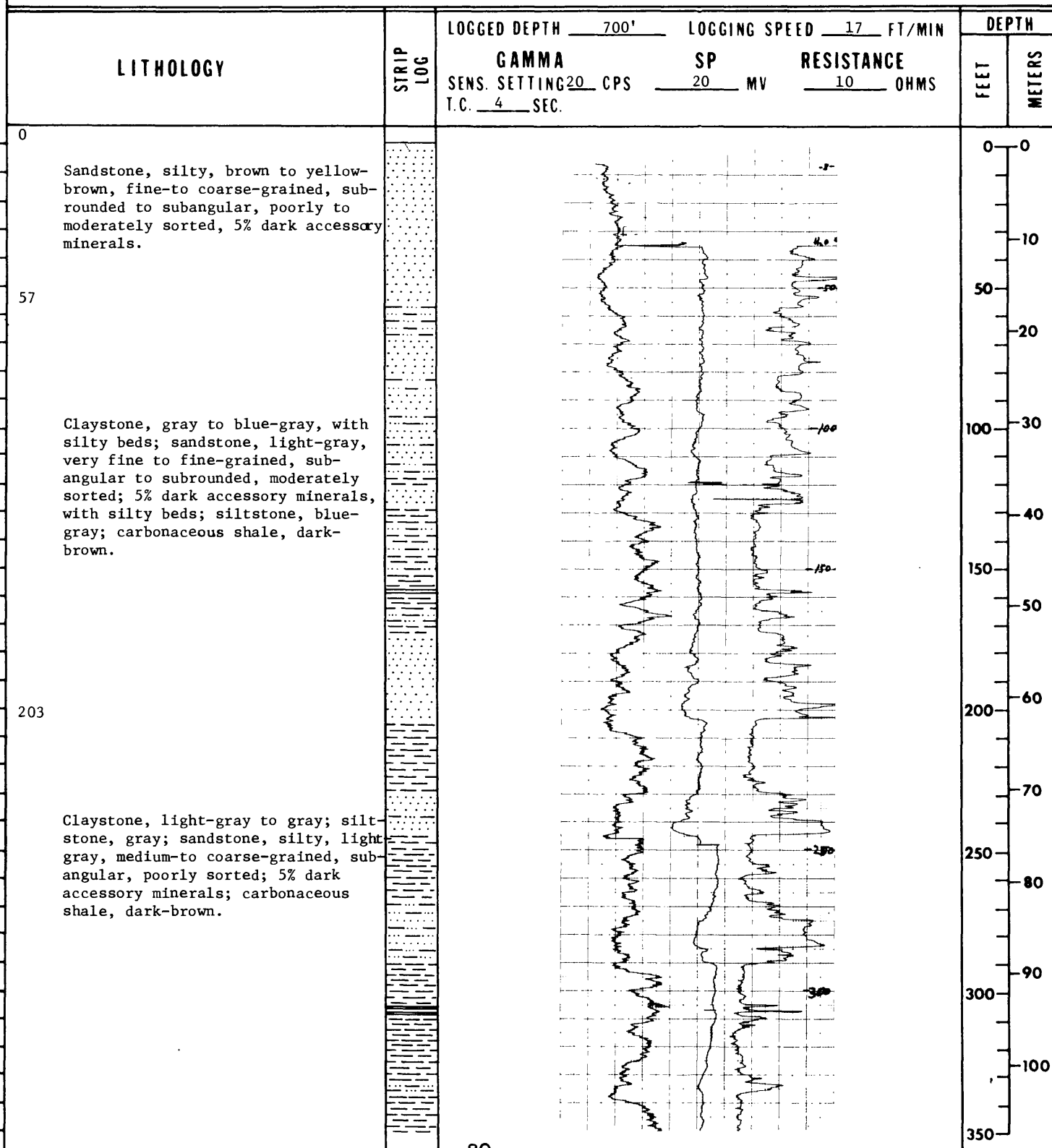
REMARKS:



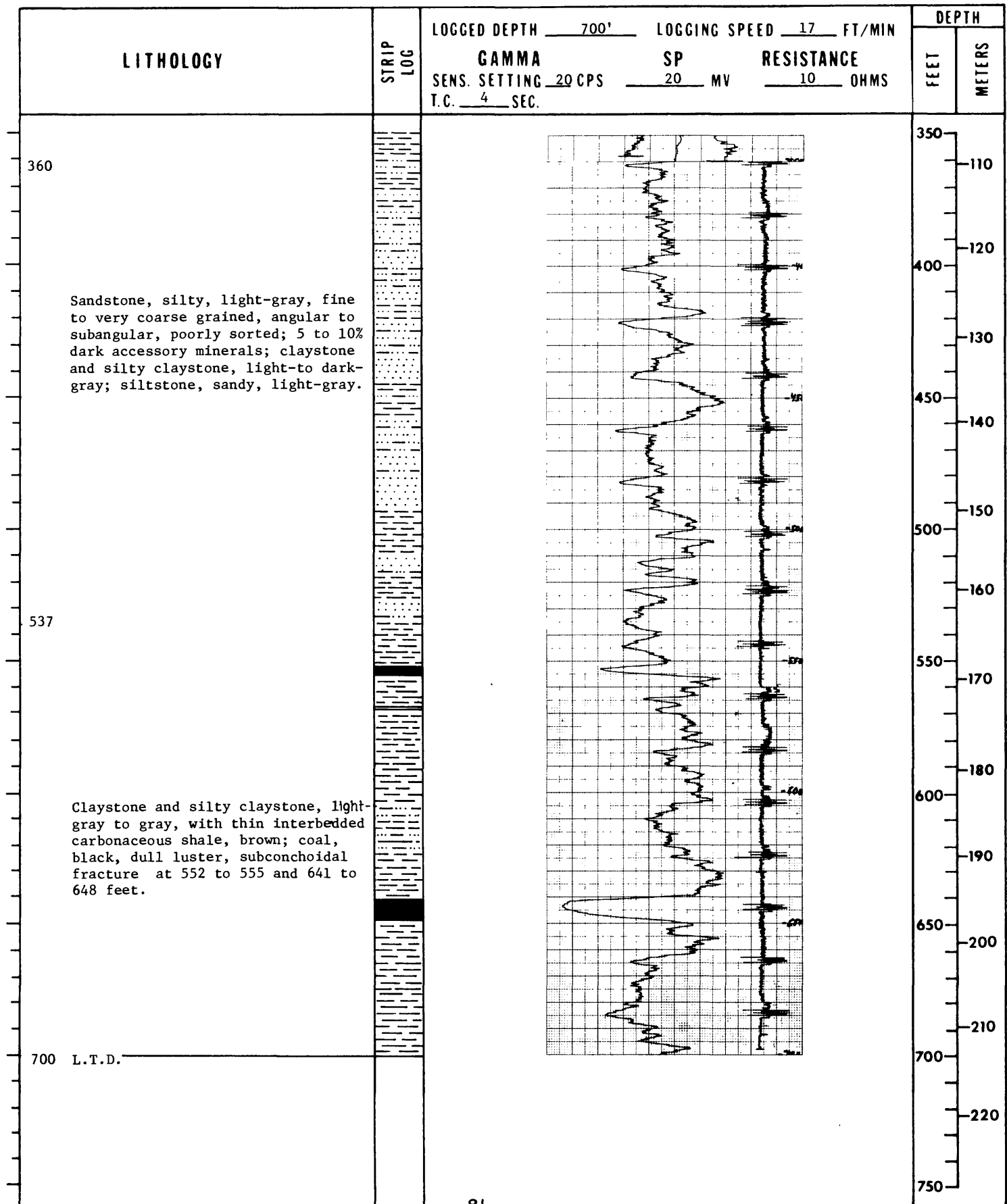
UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79045
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Coal Draw	
DATE STARTED 10/2/79	DATE COMP. 10/3/79	COUNTY Converse	STATE Wyoming
LOCATION: SEC. 11 T. 39 N., R. 73 W., FOOTAGE LOC. 810' ### FEL 390' ###		GROUND ELEV 5154'	
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 700 CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	DEPTH TO FLUID 35'
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS: Logged through drill pipe 360 to 700 feet. Below 360 feet gamma sensitivity setting is 5 CPS. Collar locator 1000 MV			



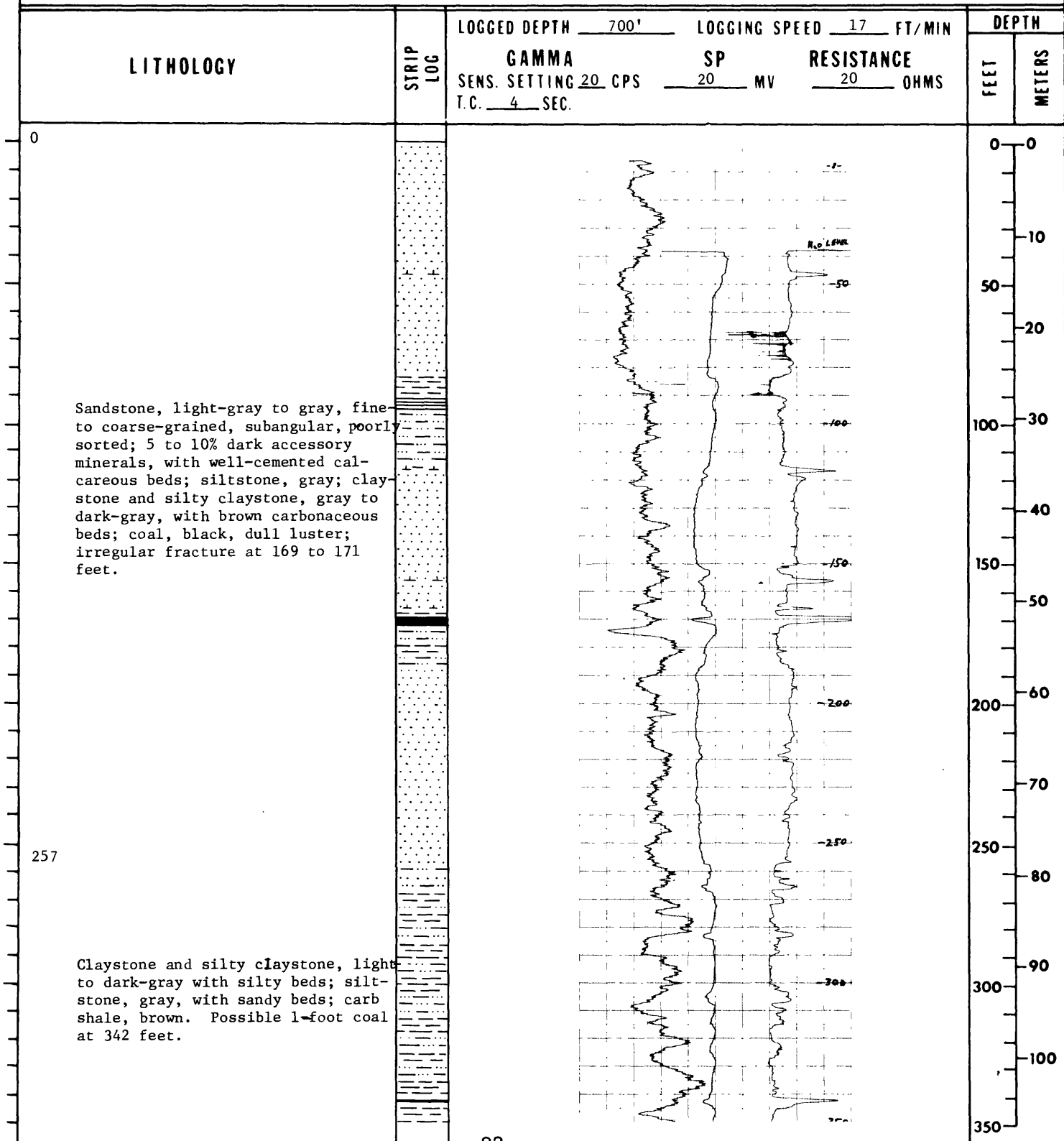
REMARKS:



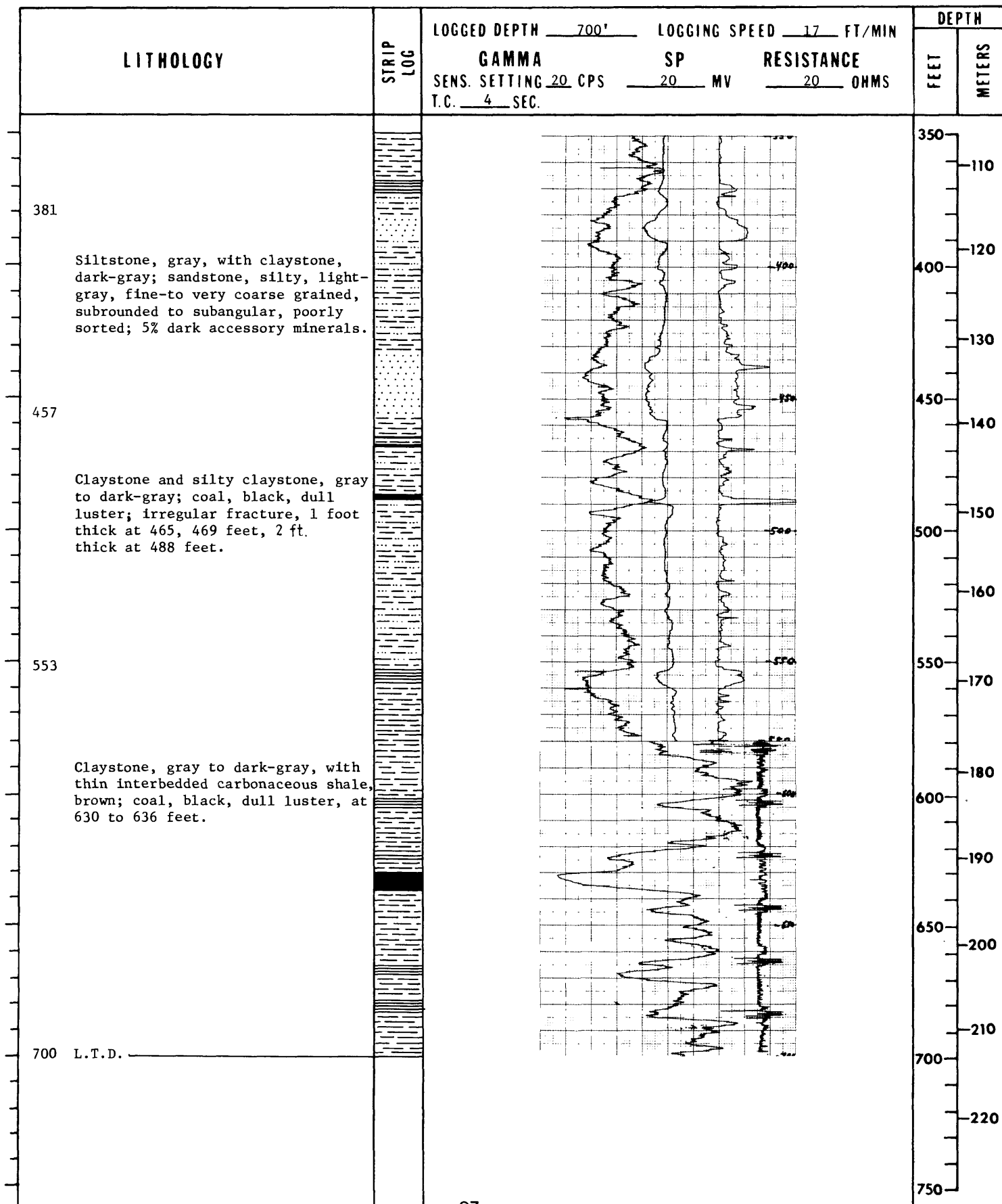
UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79046
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Coal Draw	
DATE STARTED 10/4/79	DATE COMP. 10/5/79	COUNTY Converse	STATE Wyoming
LOCATION: SEC. 27 T. 39 N., R. 73 W.,		FOOTAGE LOC. 630' FWL 2100' FWL	GROUND ELEV 5200'
SIZE AND BIT TYPE: 5" Kenclaw		FOOTAGE ROTARY 705' CORING 0	TOTAL DEPTH 705'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	DEPTH TO FLUID 38'
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS: Logged through drill pipe from 580 to 700 feet. Below 580 feet gamma sensitivity setting is 5 CPS Collar locator 1000 MV			



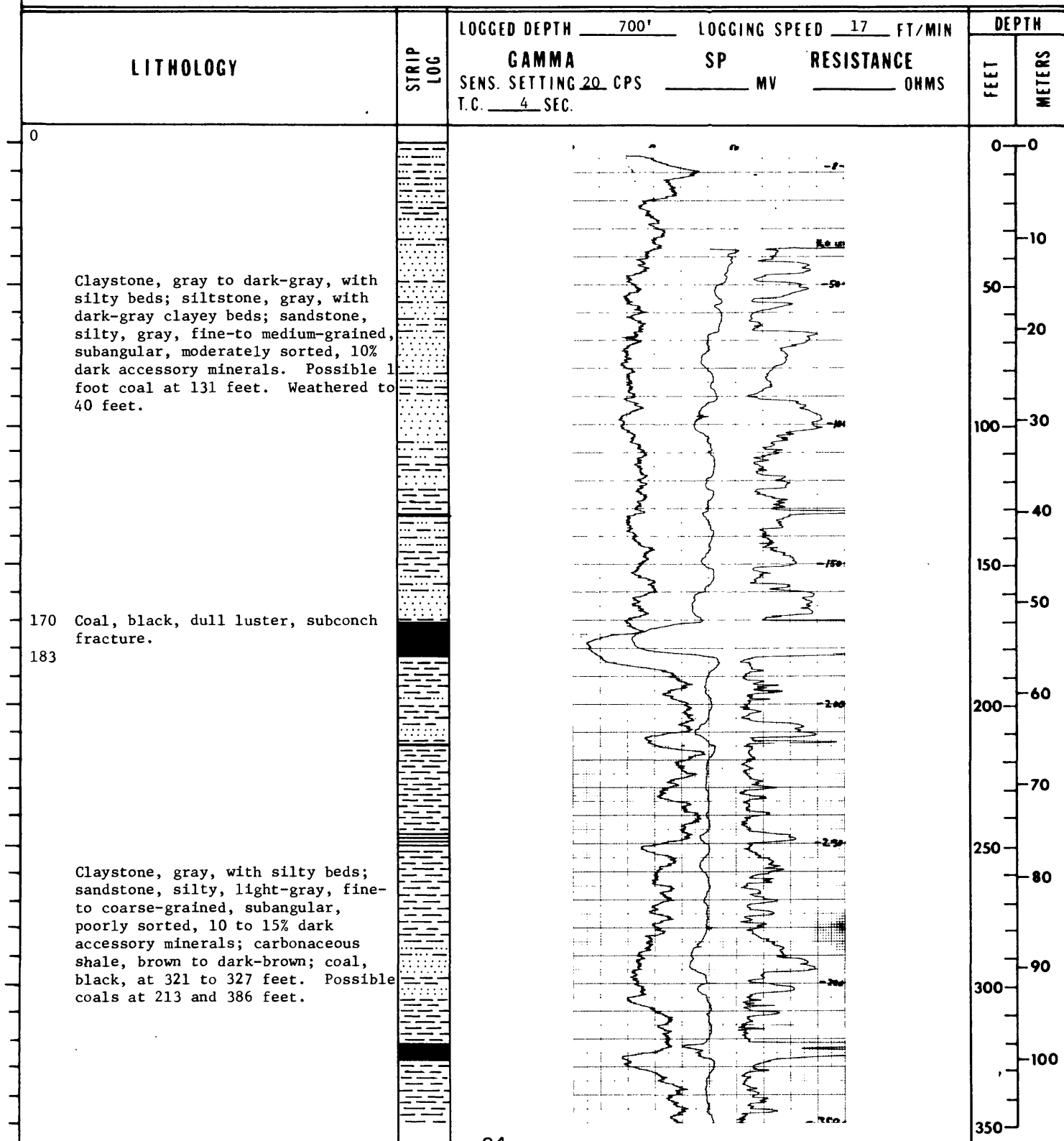
REMARKS:



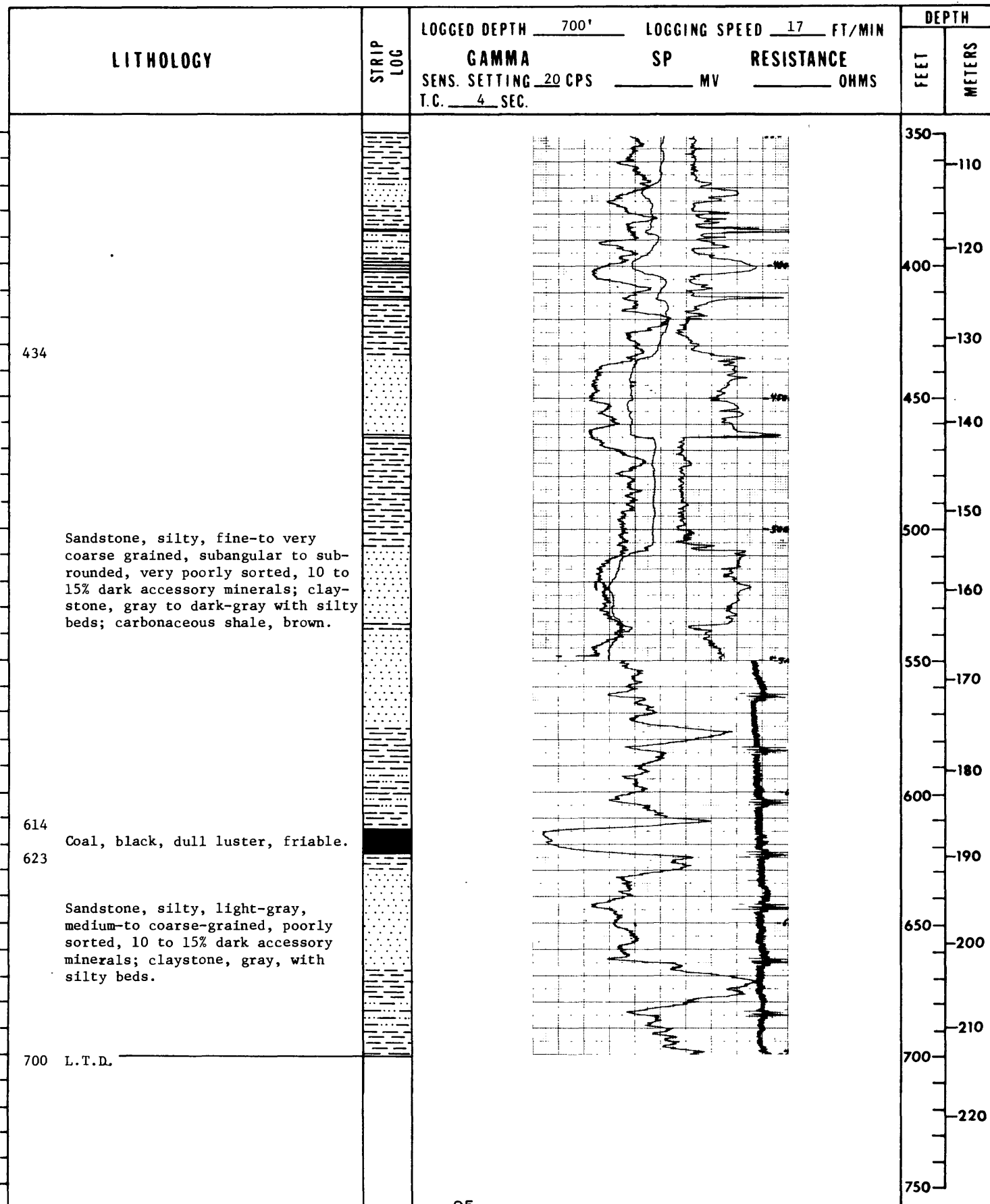
UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79047
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Coal Draw	
DATE STARTED 10/6/79	DATE COMP. 10/7/79	COUNTY Converse	STATE Wyoming
LOCATION: SEC. 1 T. 39 N., R. 74 W., FOOTAGE LOC. 2100' FSL 400' FEL		GROUND ELEV 5115'	
SIZE AND BIT TYPE: 5" Drag		FOOTAGE ROTARY 705' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS: Logged through drill pipe 550 to 700 feet. Collar locator 1000 MV			



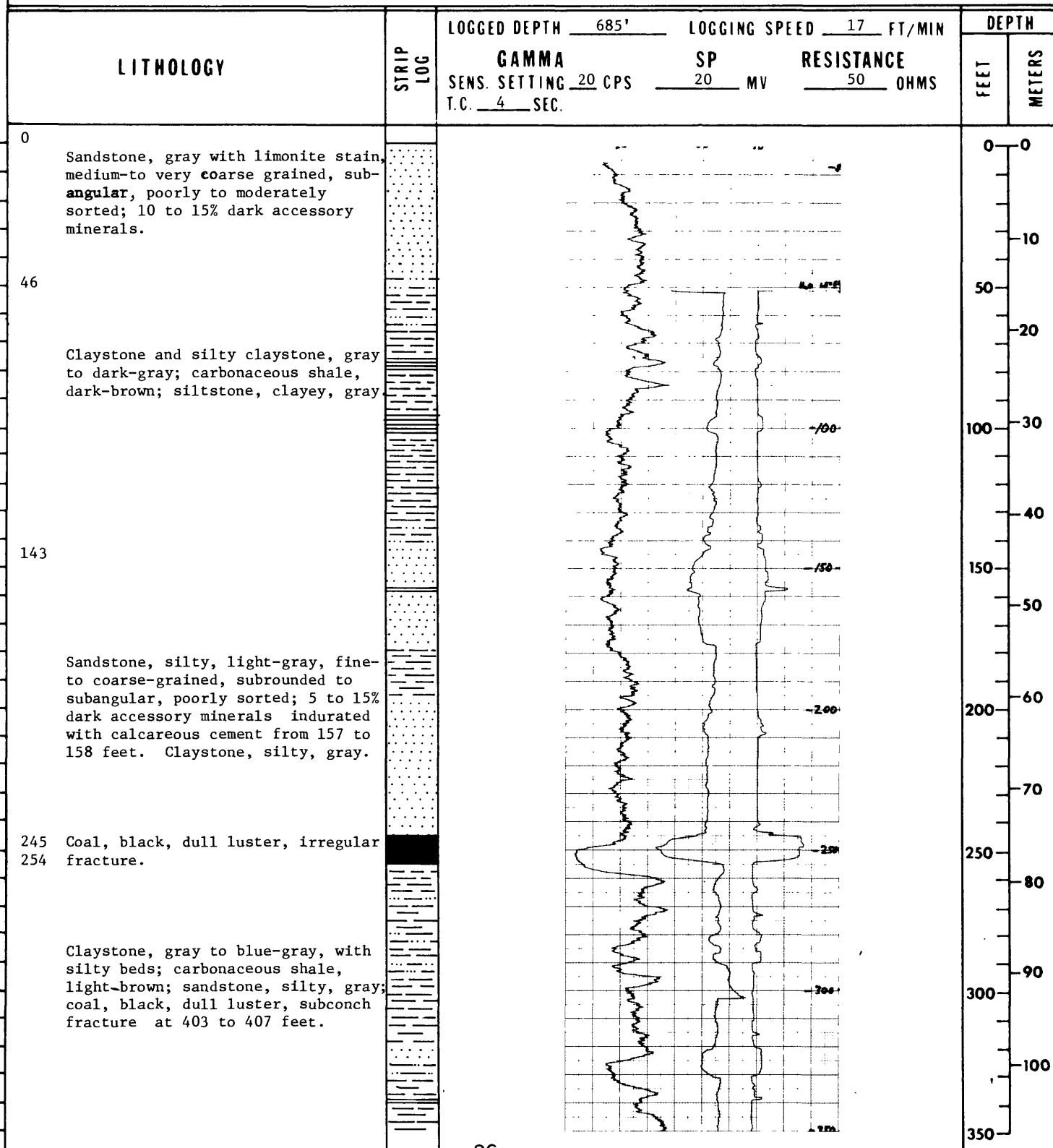
REMARKS:



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79048
SHEET 1 OF 2

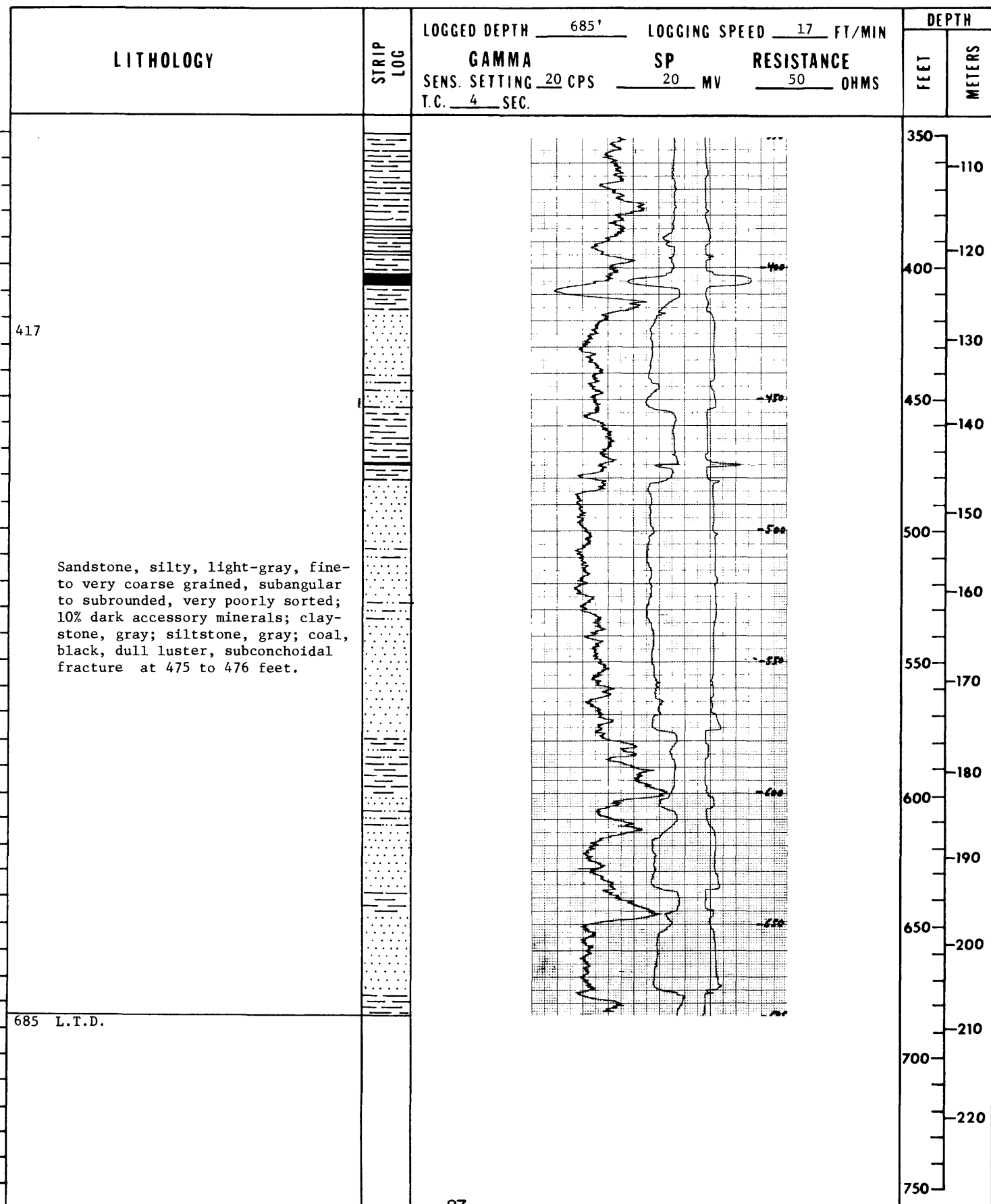
AREA Powder River Basin		QUAD NAME Coal Draw	
DATE STARTED 10/8/79	DATE COMP. 10/9/79	COUNTY Con erse	STATE Wyoming
LOCATION: SEC. 14 T. 39 N., R. 74 W., FOOTAGE LOC.		560' FSL	800' FWL
SIZE AND BIT TYPE: 5" Drag		FOOTAGE ROTARY 685' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79048
SHEET 2 OF 2

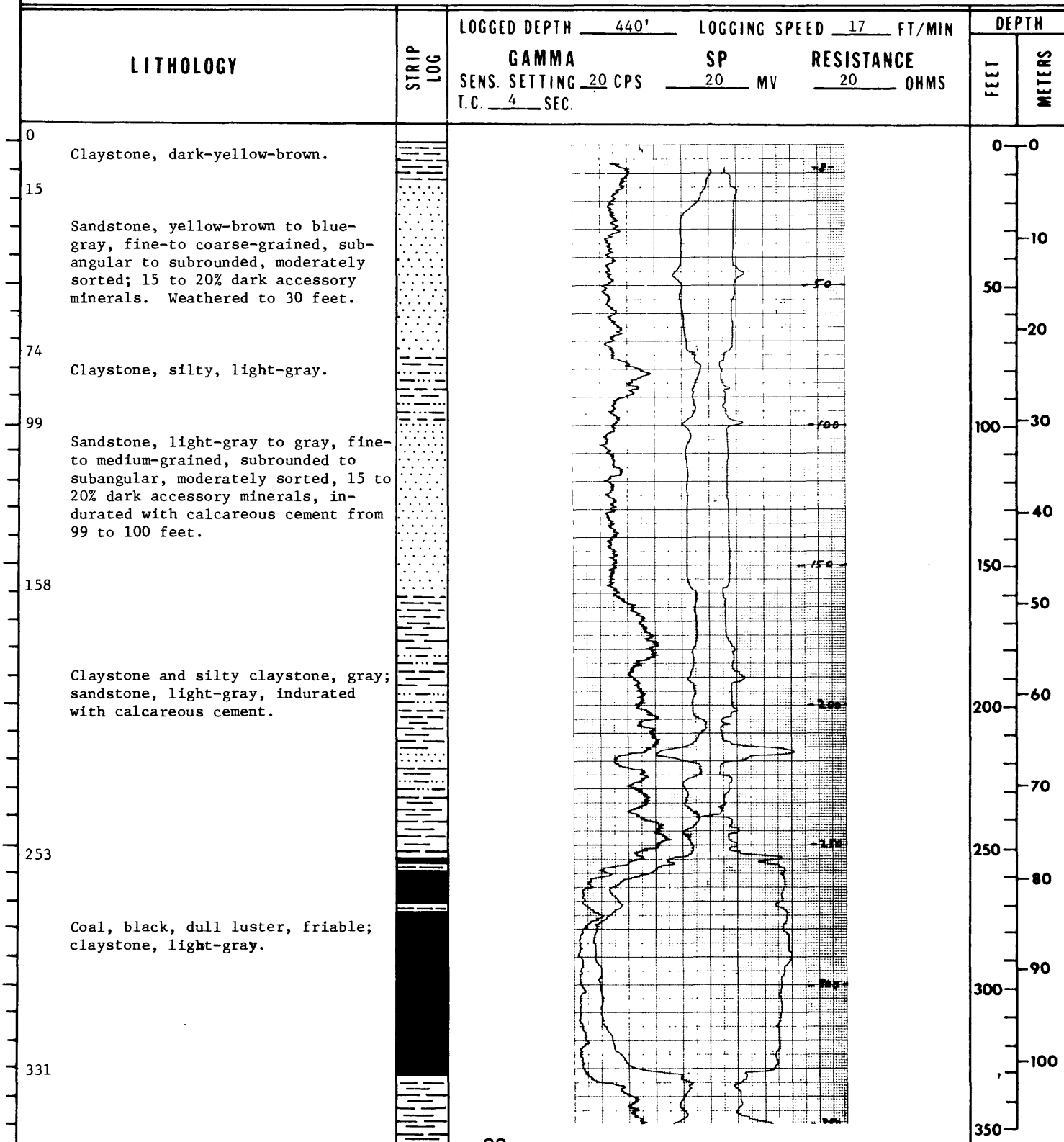
REMARKS:



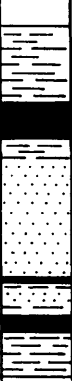
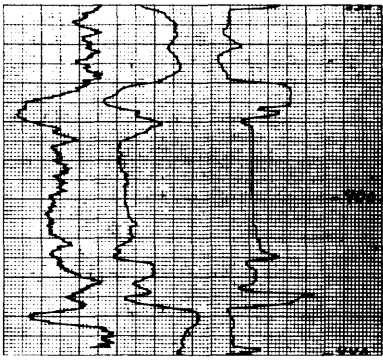
UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79049
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Hilight	
DATE STARTED 10/17/79	DATE COMP. 10/17/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 25 T. 44 N., R. 71 W., FOOTAGE LOC.		675' FWL 330' FWL	GROUND ELEV 4775'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE	
		ROTARY 440' CORING 0	TOTAL DEPTH 440'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	DEPTH TO FLUID 0
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS:			



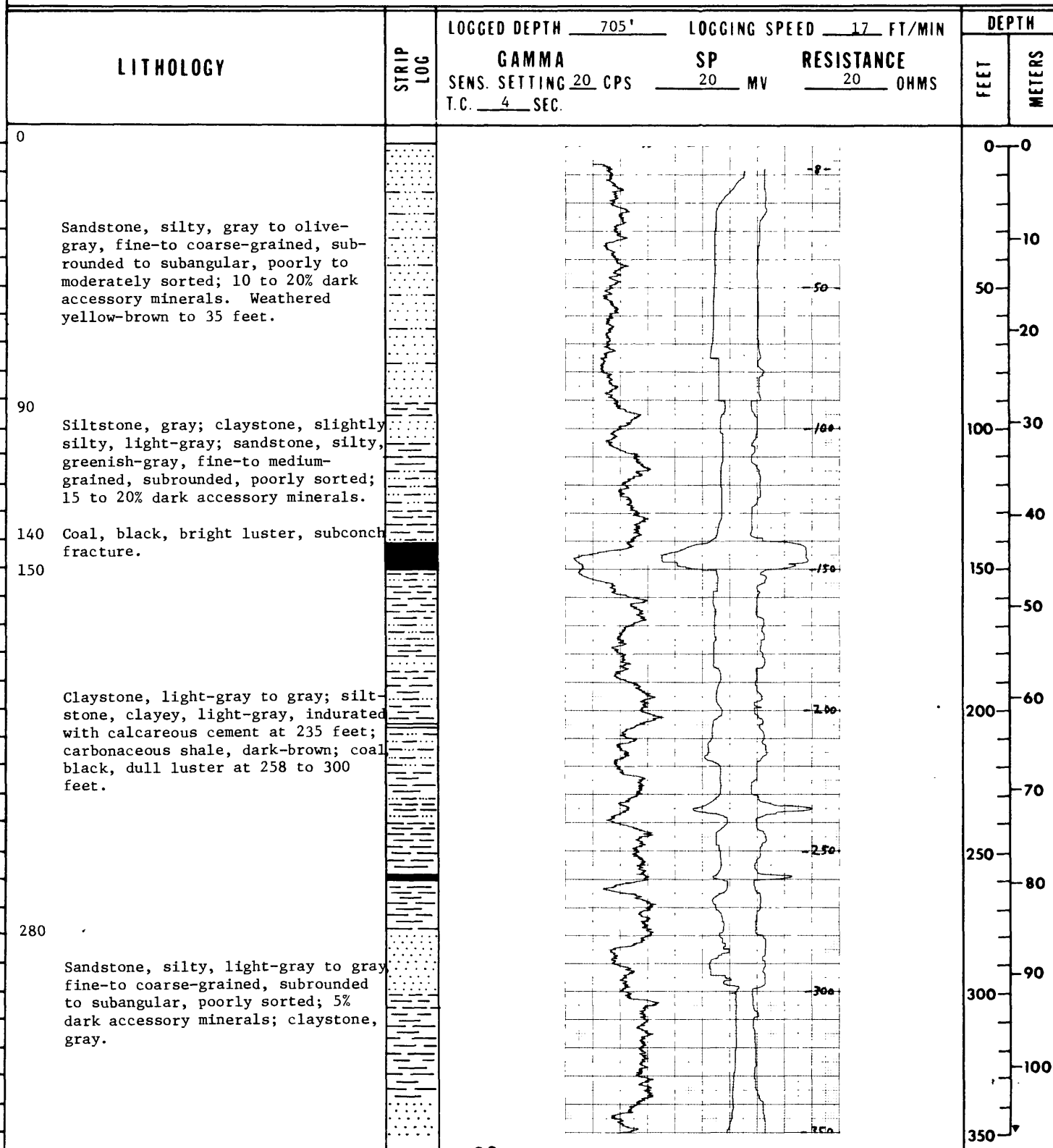
REMARKS:

LITHOLOGY	STRIP LOG	LOGGED DEPTH <u>440'</u> LOGGING SPEED <u>17</u> FT/MIN			DEPTH	
		GAMMA SENS. SETTING <u>20</u> CPS T.C. <u>4</u> SEC.	SP <u>20</u> MV	RESISTANCE <u>20</u> OHMS	FEET	METERS
<p>370</p> <p>Claystone, silty, light-gray; chert, gray.</p> <p>Sandstone, silty, gray, slightly carbonaceous; coal, black, dull luster, friable; claystone, silty, gray.</p> <p>440 L.T.D.</p>					<p>350</p> <p>110</p> <p>400</p> <p>120</p> <p>130</p> <p>450</p> <p>140</p> <p>500</p> <p>150</p> <p>160</p> <p>550</p> <p>170</p> <p>600</p> <p>180</p> <p>190</p> <p>650</p> <p>200</p> <p>210</p> <p>700</p> <p>220</p> <p>750</p>	

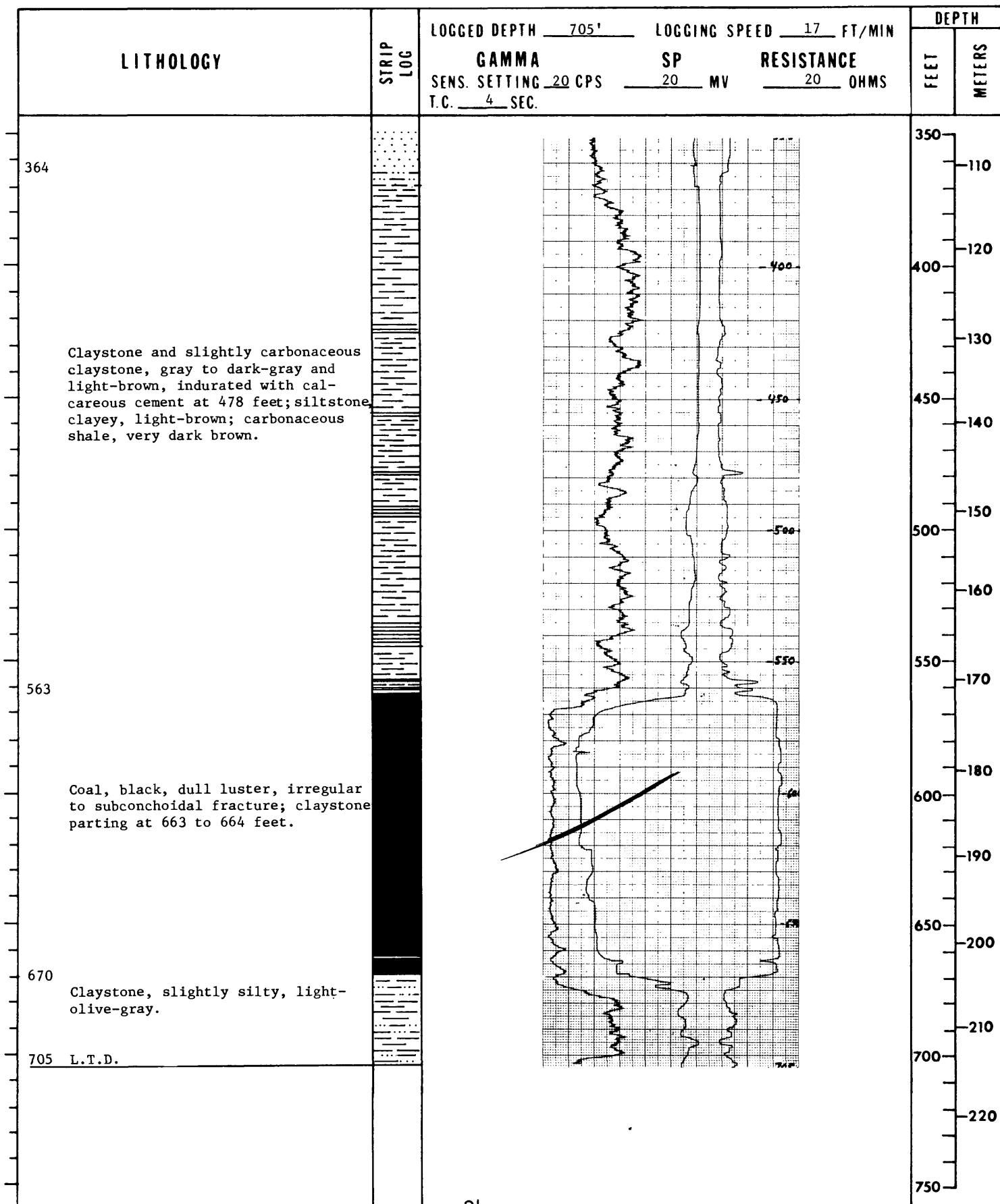
UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79050
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Reno Junction	
DATE STARTED 10/18/79	DATE COMP. 10/19/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 29 T.44 N., R.71 W., FOOTAGE LOC. 2460' FNL 2365' FEL		GROUND ELEV 4824'	
SIZE AND BIT TYPE: 4 3/4" Kenclaw		FOOTAGE ROTARY 705' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS:			



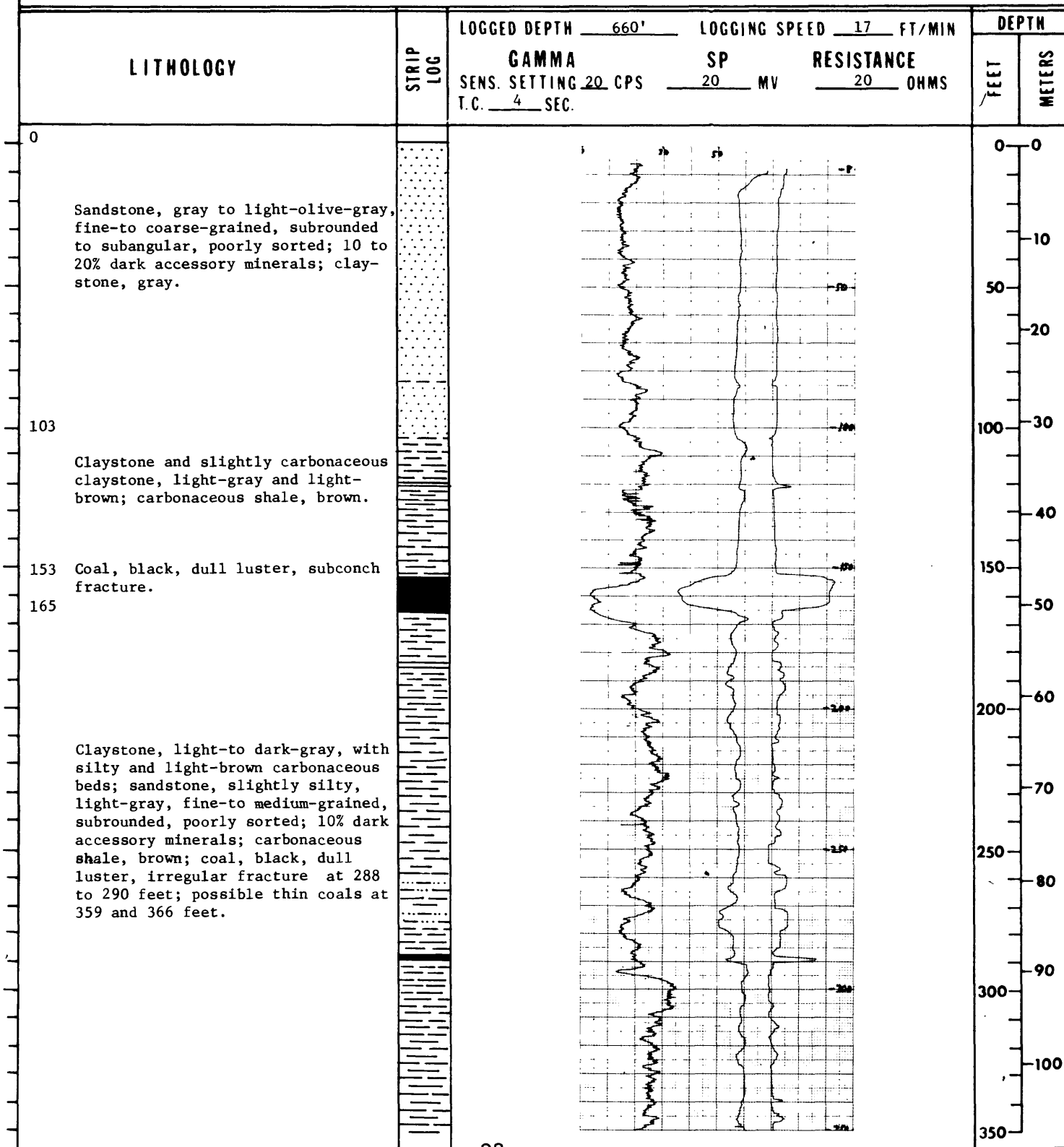
REMARKS:



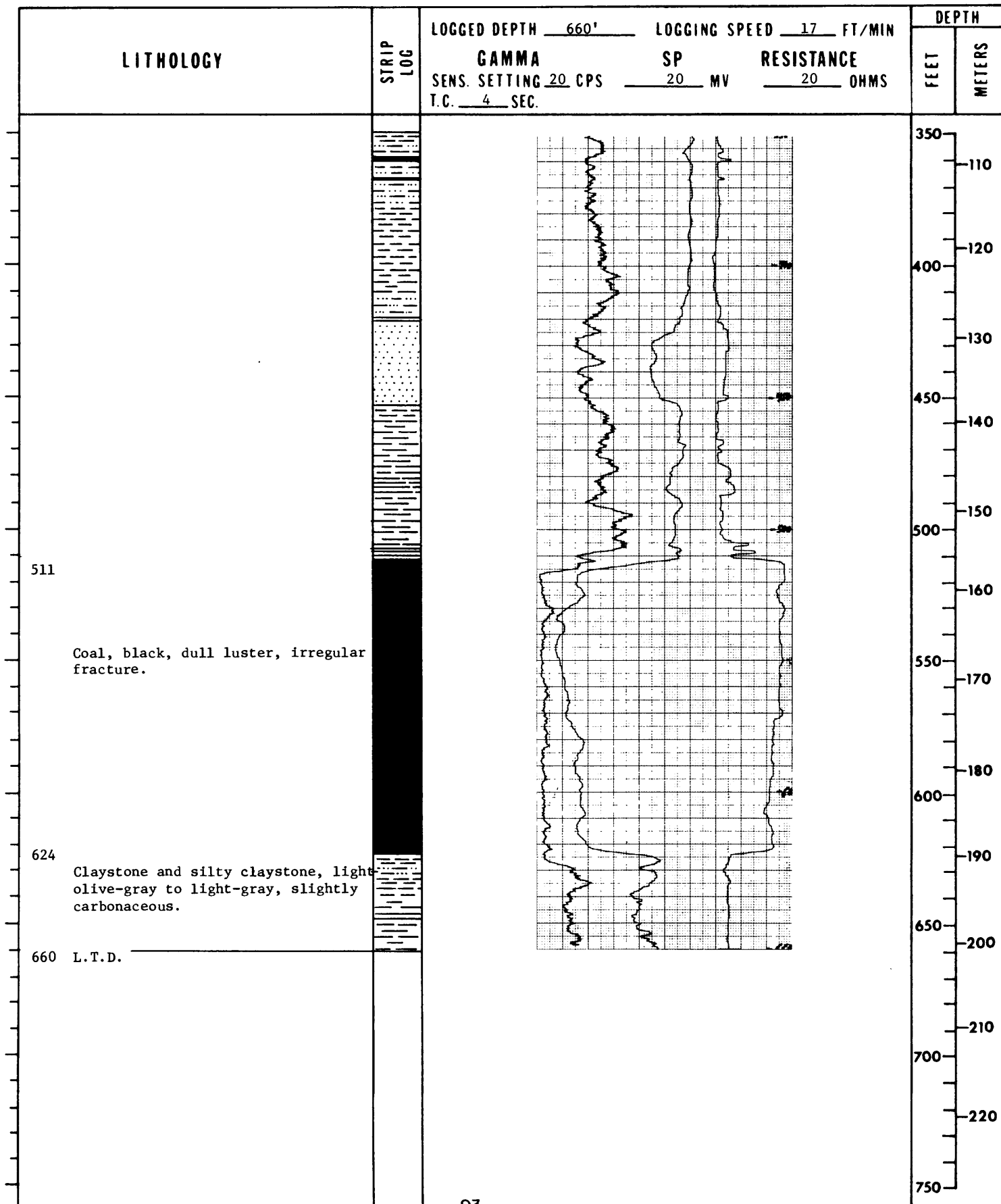
UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79051
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Little Thunder Reservoir	
DATE STARTED 10/19/79	DATE COMP. 10/20/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 32 T. 44 N., R. 71 W., FOOTAGE LOC.		4150' FSL	1500' FEL
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE	GROUND ELEV 4811'
		ROTARY 665' CORING 0	TOTAL DEPTH 665'
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	DEPTH TO FLUID NR
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS:			



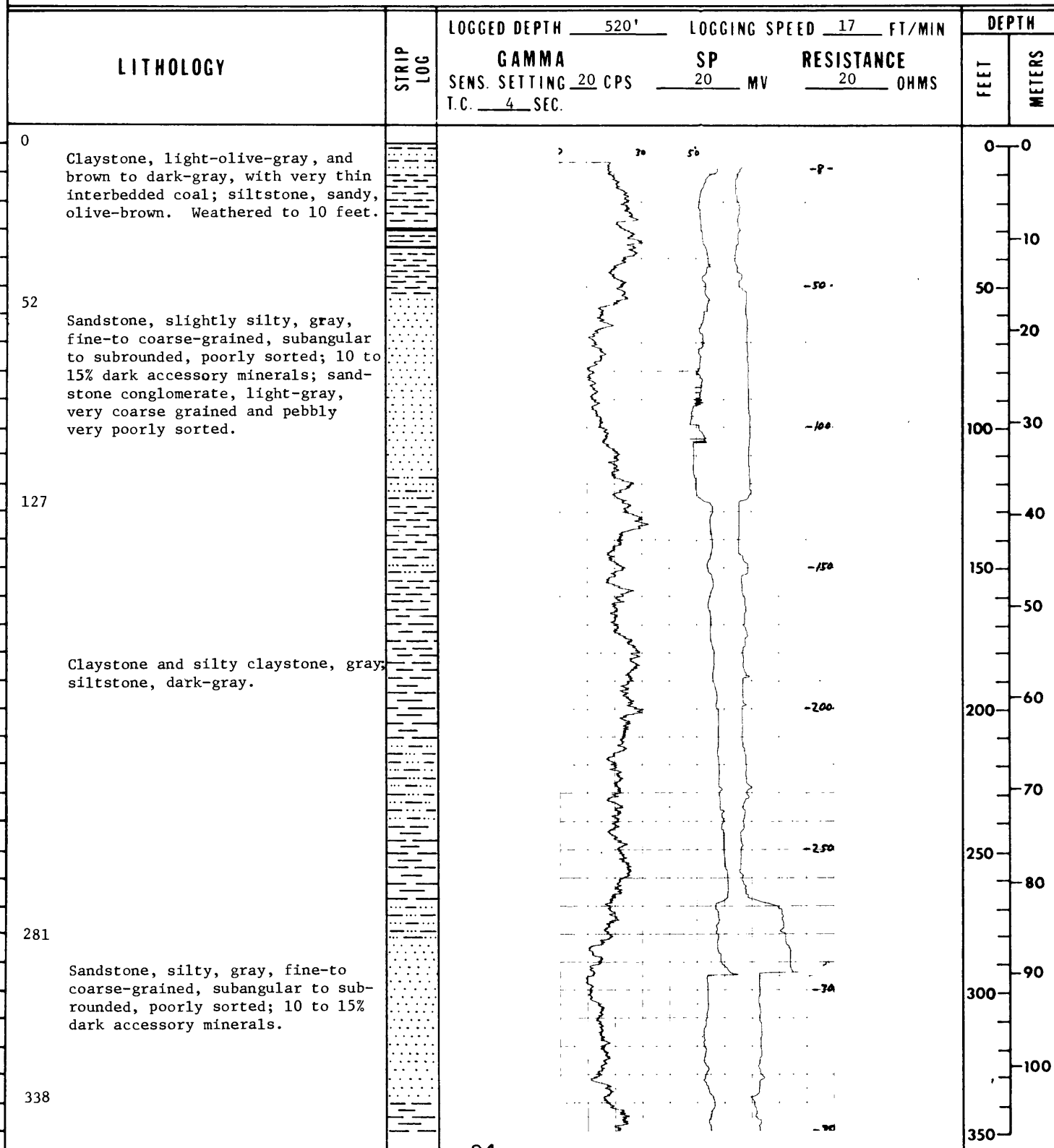
REMARKS:



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79052
SHEET 1 OF 2

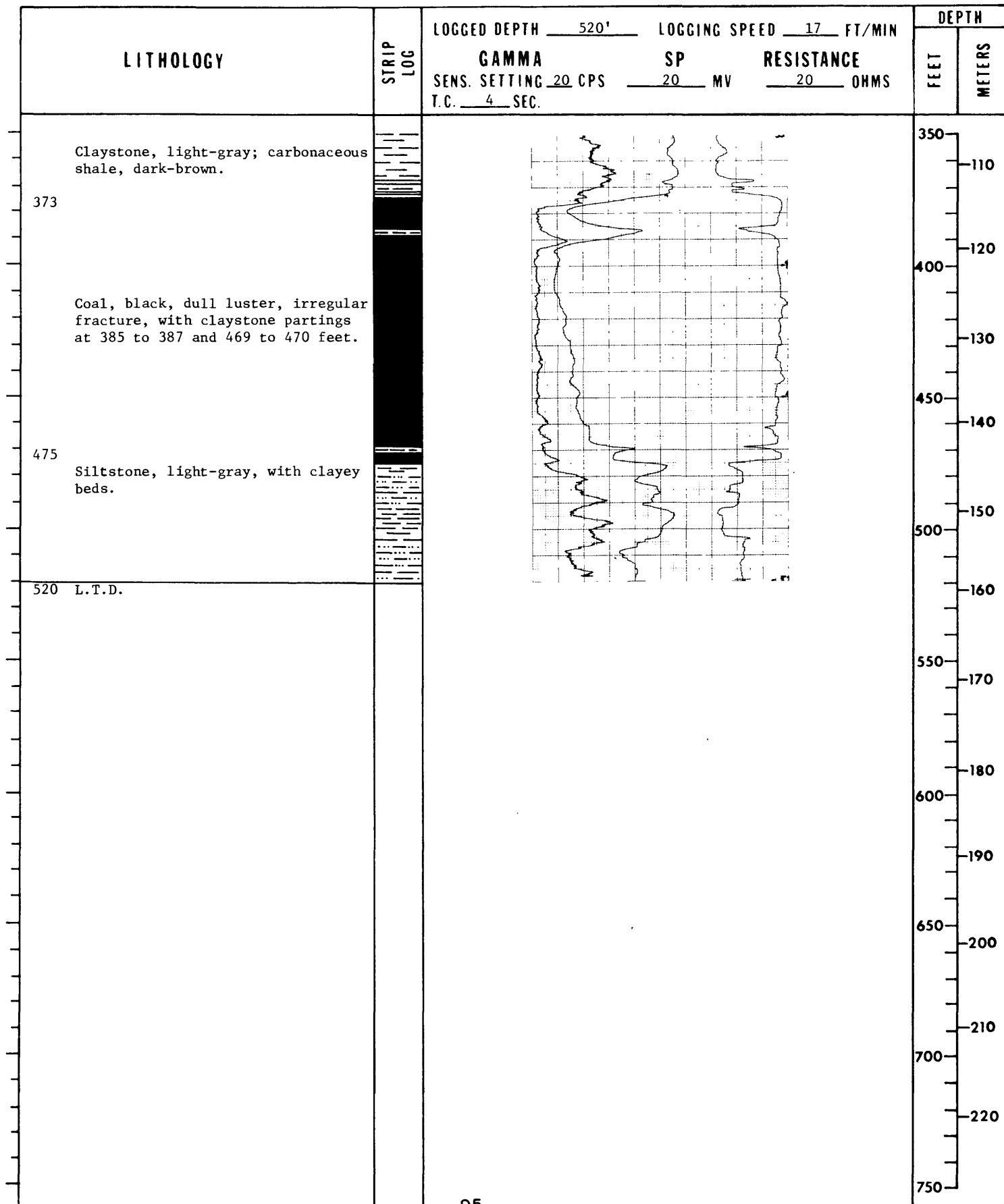
AREA Powder River Basin		QUAD NAME Reno Reservoir	
DATE STARTED 10/22/79	DATE COMP. 10/22/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 3 T. 43 N., R. 71 W., FOOTAGE LOC.		1570' FNL #88	3150' FEL #WE
SIZE AND BIT TYPE: 4 3/4" Kenclaw		FOOTAGE	
		ROTARY 520'	CORING 0
DRILLING AGENCY: U.S. Geological Survey	DRILL TYPE: Portadrill 524		GROUND ELEV 4768'
LITHOLOGY RECORDED BY H.E. Corley	GEOPHYSICAL LOGS RECORDED BY H.E. Corley		DEPTH TO FLUID NR
REMARKS: Spiking at 294 feet.			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79052
SHEET 2 OF 2

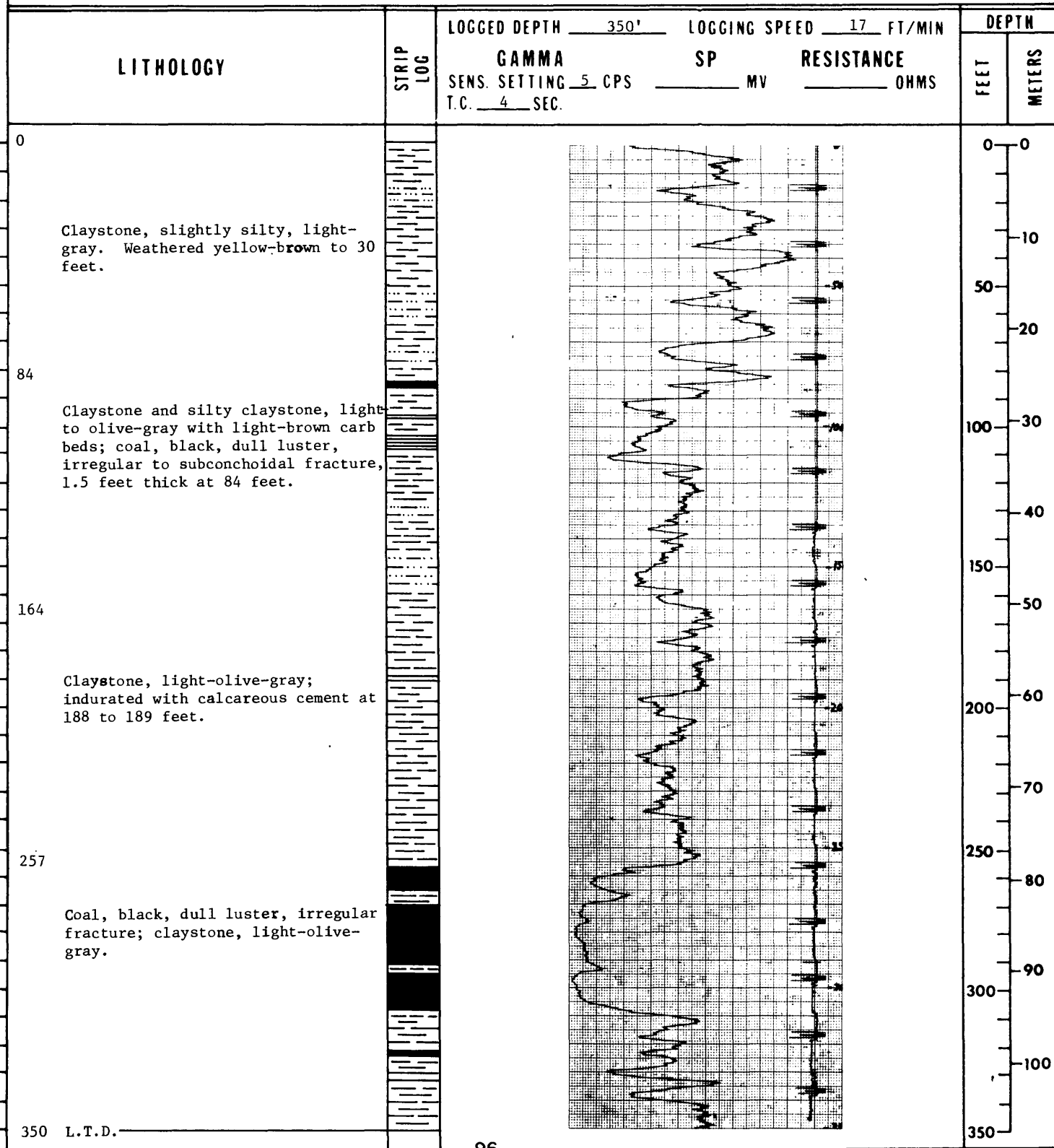
REMARKS:



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79053
SHEET 1 OF 1

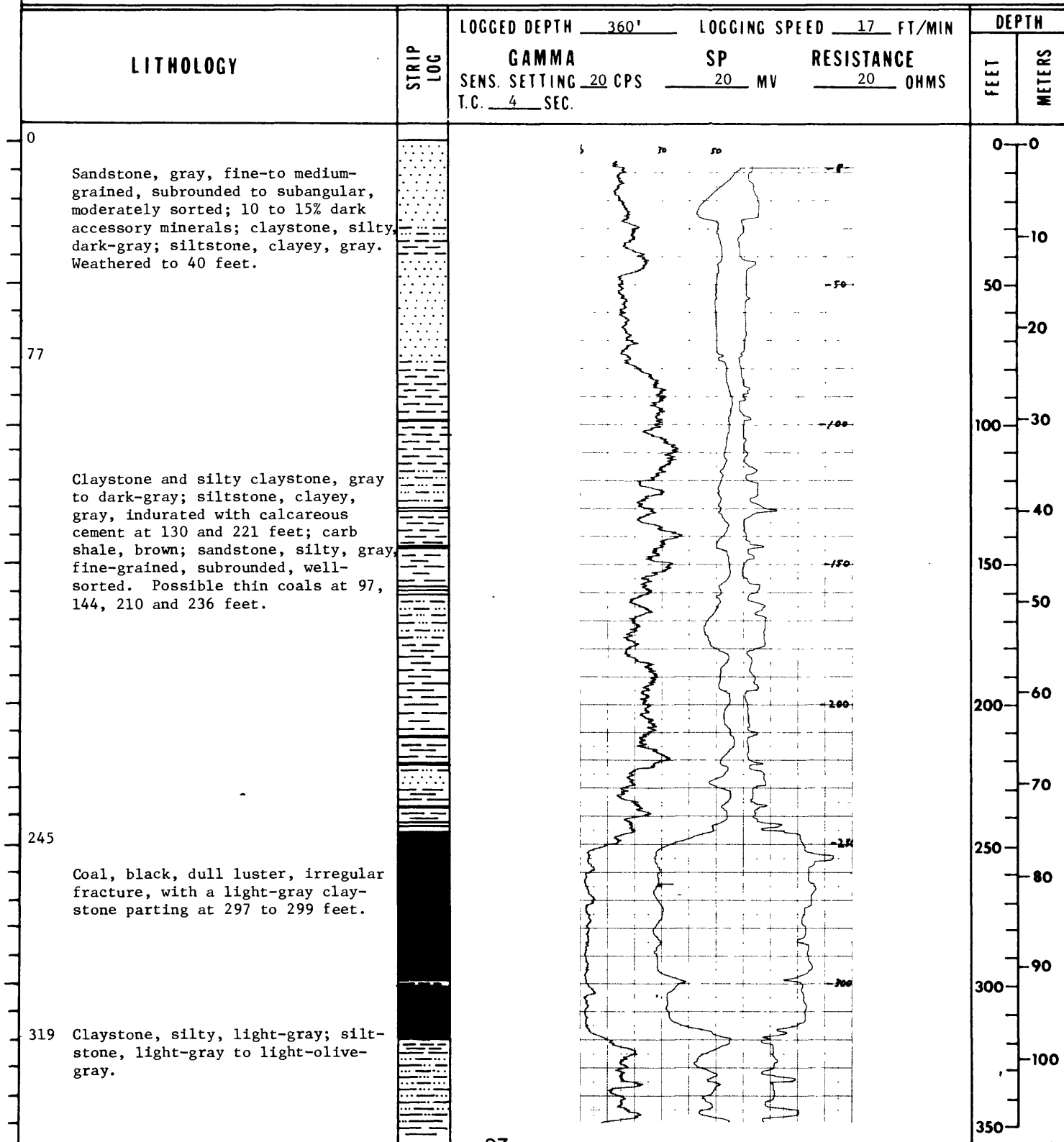
AREA Powder River Basin		QUAD NAME Eagle Rock	
DATE STARTED 10/23/79	DATE COMP. 10/23/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 15 T. 46 N., R. 71 W.,		FOOTAGE LOC. 120' FSL 660' FWL	
SIZE AND BIT TYPE: 5" Drag		FOOTAGE ROTARY 360' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS: Logged through drill pipe. Collar locator 1000 MV			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79054
SHEET 1 OF 2

AREA Powder River Basin		QUAD NAME Gap SW	
DATE STARTED 10/24/79	DATE COMP. 10/24/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 33 T. 47 N., R. 71 W., FOOTAGE LOC. 2260' FSL 2700' FSL		GROUND ELEV 4645'	
SIZE AND BIT TYPE: 5" Drag		FOOTAGE ROTARY 360' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY T.P. Lonnie	
REMARKS:			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79054
SHEET 2 OF 2

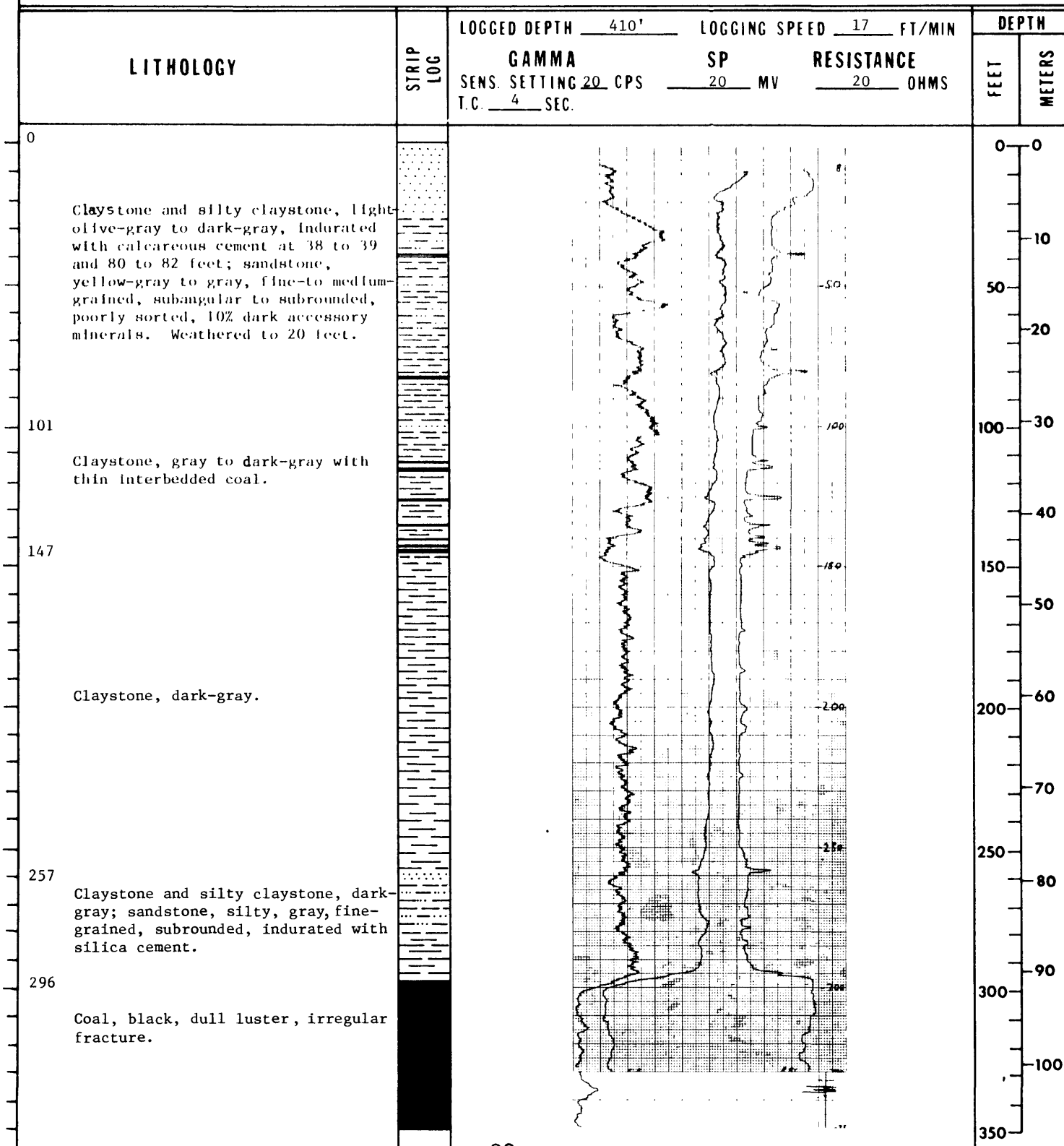
REMARKS:

LITHOLOGY	STRIP LOG	LOGGED DEPTH <u>360'</u>	LOGGING SPEED <u>17</u> FT/MIN	DEPTH	
		GAMMA SENS. SETTING <u>20</u> CPS T.C. <u>4</u> SEC.	SP <u>20</u> MV	RESISTANCE <u>20</u> OHMS	FEET
360 L.T.D.				350	
				110	
				120	
				400	
				130	
				450	
				140	
				500	
				150	
				160	
				550	
				170	
				180	
				600	
				190	
				650	
				200	
				210	
				700	
				220	
				750	

UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79055
SHEET 1 OF 2

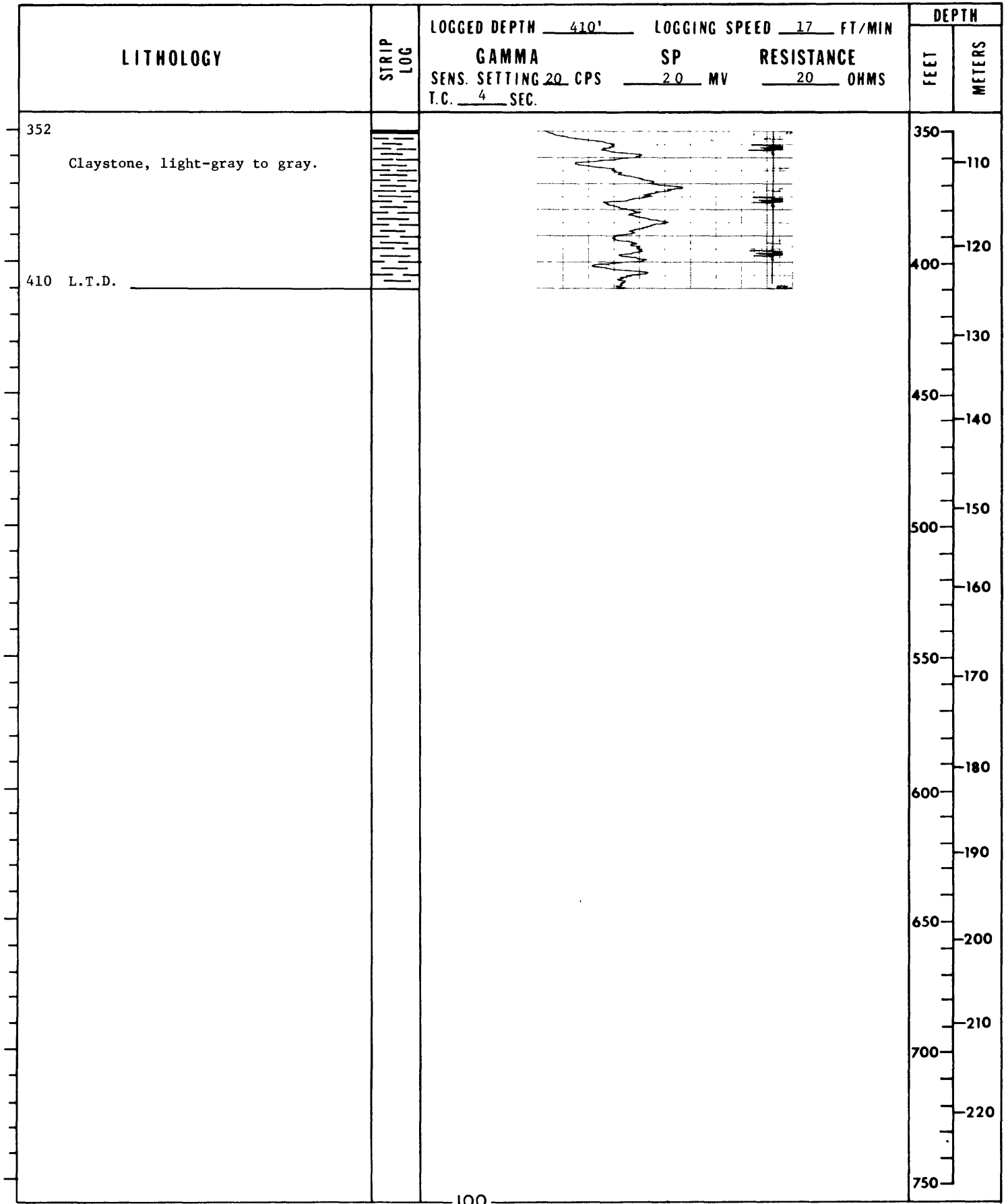
AREA Powder River Basin		QUAD NAME Eagle Rock	
DATE STARTED 10/24/79	DATE COMP. 10/25/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 4 T. 46 N., R. 71 W., FOOTAGE LOC.		2110' FSL 2650' FEL	GROUND ELEV 4607'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 420' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	DEPTH TO FLUID 0
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY T.P. Lonnie	
REMARKS: Logged through drill pipe from 329 to 410 feet. Collar locator 1000 MV			



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79055
SHEET 2 OF 2

REMARKS:



UNITED STATES GEOLOGICAL SURVEY

HOLE NO CD-79056
SHEET 1 OF 1

AREA Powder River Basin		QUAD NAME Eagle Rock	
DATE STARTED 10/31/79	DATE COMP. 10/31/79	COUNTY Campbell	STATE Wyoming
LOCATION: SEC. 9 T. 46 N., R. 71 W., FOOTAGE LOC.		1650' FSL 1920' FEL	GROUND ELEV 4586'
SIZE AND BIT TYPE: 4 3/4" Drag		FOOTAGE ROTARY 300' CORING 0	
DRILLING AGENCY: U.S. Geological Survey		DRILL TYPE: Portadrill 524	
LITHOLOGY RECORDED BY H.E. Corley		GEOPHYSICAL LOGS RECORDED BY H.E. Corley	
REMARKS:			

LITHOLOGY	STRIP LOG	LOGGED DEPTH 300'	LOGGING SPEED 17 FT/MIN	DEPTH		
		GAMMA SENS. SETTING 20 CPS T.C. 4 SEC.	SP 10 MV	RESISTANCE 20 OHMS	FEET	METERS
0 Claystone, light-bluish-gray to dark gray, with silty beds; indurated with calcareous cement from 117 to 119 feet.					0	0
133 Claystone, dark-yellowish-brown, carbonaceous; carbonaceous shale, brown to dark-brown; coal, black, dull luster; irregular fracture at 190 to 196 feet.					50	15
215 Coal, black, dull luster, irregular fracture.					100	30
272 Claystone, light-olive-gray; coal, black, dull luster, irregular fracture at 280 to 282 and 286 to 289 feet.					150	45
300 L.T.D.					200	60
					250	75
					300	90
					350	105