

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

GEOPHYSICAL AND LITHOLOGIC LOGS FOR 1977 COAL DRILLING IN
WIBAUX COUNTY, MONTANA,
AND GOLDEN VALLEY COUNTY, NORTH DAKOTA

By

J. C. Harksen

Open-File Report 78-251

1978

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

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List of abbreviations:

bl - blue; bluish
brn - brown; brownish
calc - calcareous
cbncc - carbonaceous
conc - concretions
dk - dark
frags - fragments
gn - green; greenish
gy - gray; grayish
lt - light
med - medium
orng - orange
ox - oxidized
yel - yellow; yellowish

Geophysical and Lithologic Logs for 1977 Coal Drilling in
Wibaux County, Montana, and Golden Valley County, North Dakota

By J. C. Harksen

Introduction and acknowledgments

This report, one of several on the 1977 drilling program conducted by the U.S. Geological Survey (USGS), presents logs for holes in the Wibaux-Beach area (WB77-1 to WB77-111) of eastern Montana and western North Dakota.

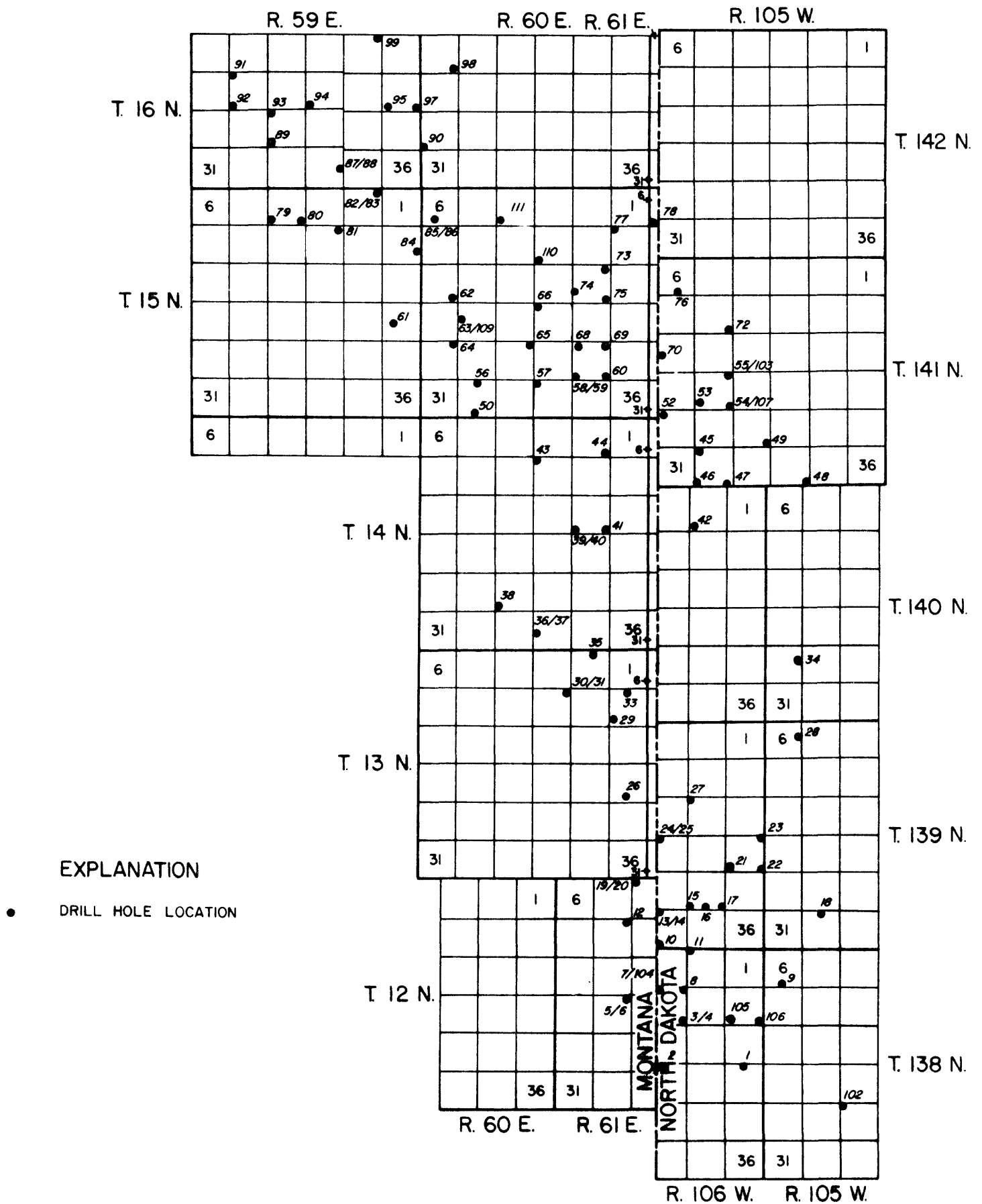
The drilling data presented here are part of a widespread and continuing USGS program to classify and evaluate mineral lands in the public domain. The program provides data on the thickness, quality, extent, and correlation of the coal beds and the thickness and lithology of the associated rock units in the Fort Union Formation (Paleocene) of eastern Montana and western North Dakota.

This report includes only geophysical and lithologic logs. Core samples and rotary cuttings of the coal beds from selected holes have been submitted to the U.S. Bureau of Mines for proximate analysis and for determination of Btu/lb values and form of sulfur present. Core samples and rotary cuttings of the rock units have been sent to the Bureau of Land Management for trace element analysis.

J. C. Harksen supervised the project, assisted by M. L. Menge, G. L. Berg, and S. M. Cook.

FIGURE 1. DRILL-HOLE LOCATION MAP

Wibaux County, Montana and Golden Valley County, North Dakota



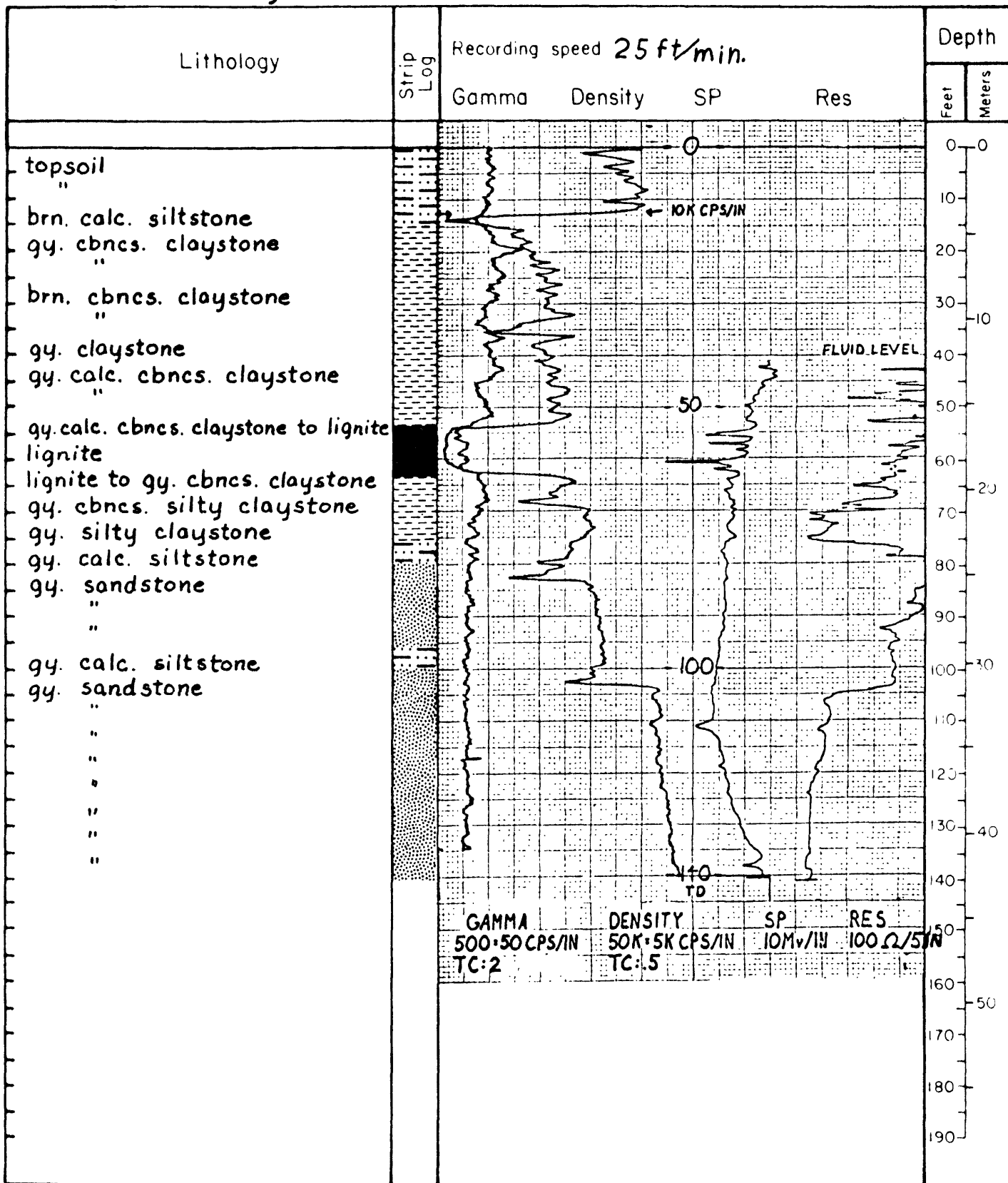
Hole no: WB77-1 Map SW-7 Date: 9/14/77 State: N.D. County: Golden Valley

Elev 2890ft Location: T 138 N, R 106 W Sec. 24, Tract NE NW Drilled depth: 140ft

Measured _____, _____ Hole size: 5 1/8 in. Cored No

Remarks _____

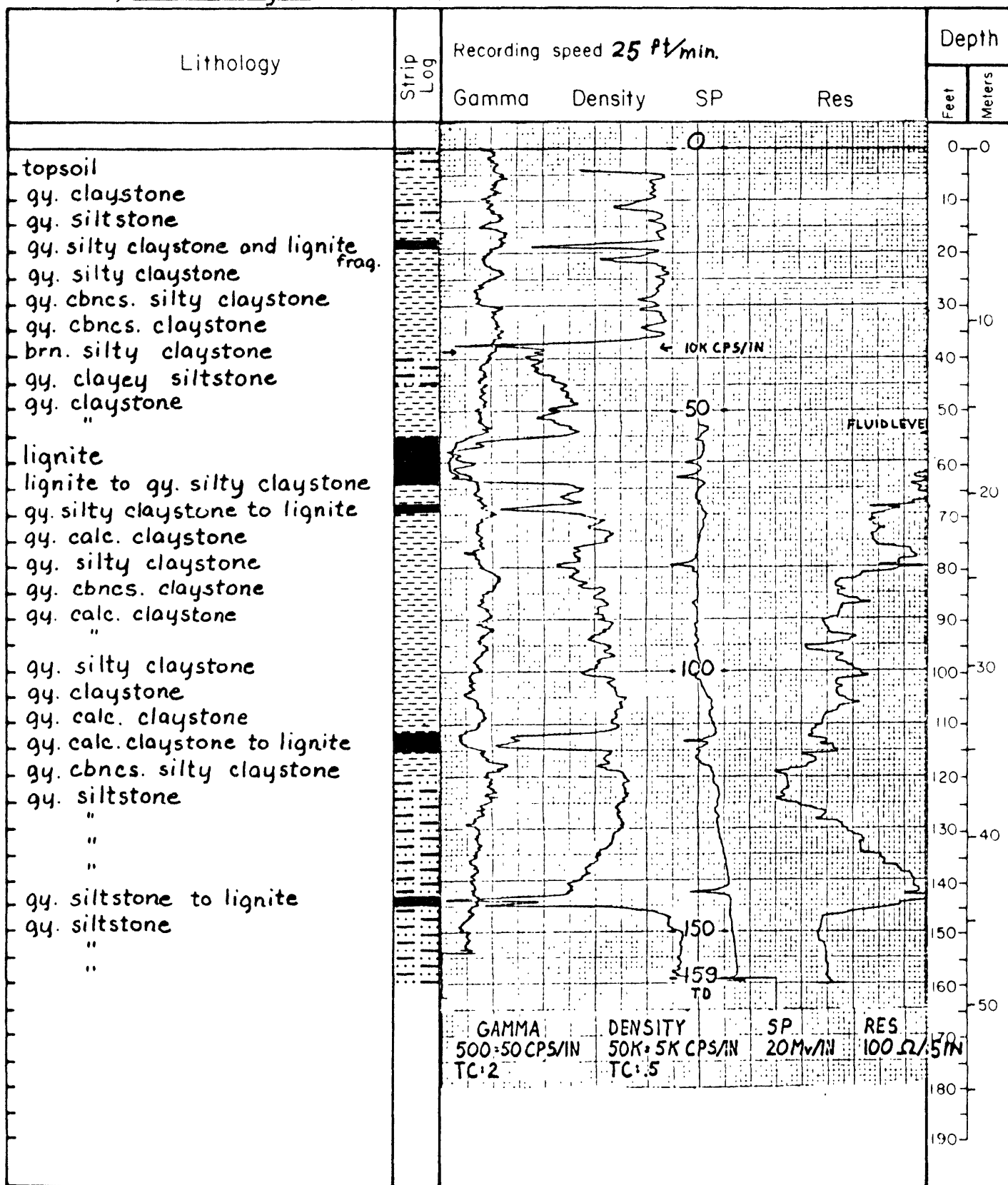
Recorded by: M.L. Menge



Hole no: WB77-2 Map SW-7 Date: 9/14/77 State: N.D. County: Golden Valley
 Elev. 3020 ft Location: T138N, R106W Sec. 22, Tract lot 1 Drilled depth: 159 ft
 Measured: _____, _____ Hole size 5 1/8 in. Cored No

Remarks _____

Recorded by: M.L. Menge

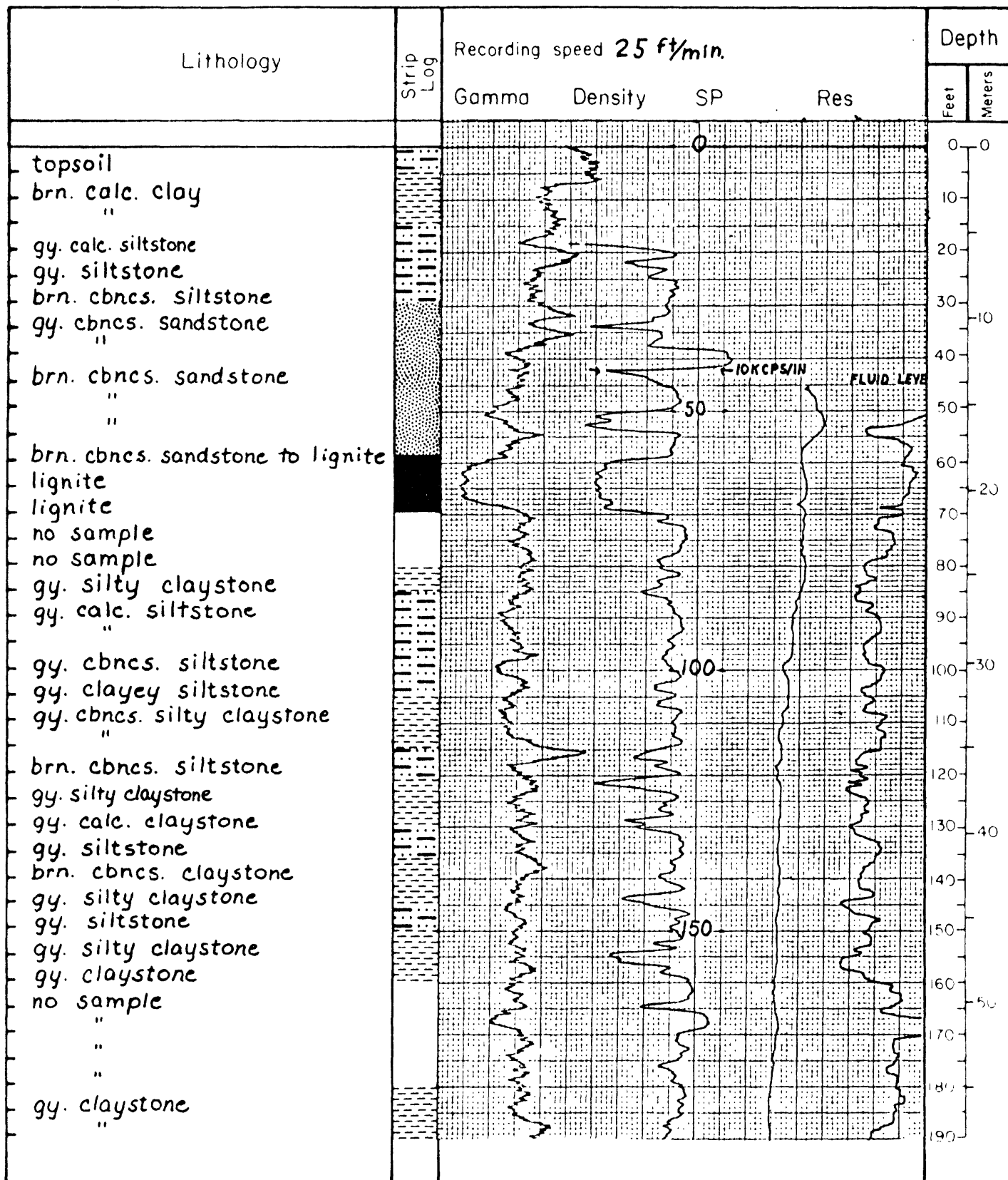


Hole no: WB77-3 Map _____ Date _____ State: _____ County _____
 Elev: _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size: _____ Cored: YES
 Remarks See WB77-4 for data
 Recorded by: _____

Lithology	Strip Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

Lithology	Strip Log	Recording speed: 25 ft/min.				Depth	
		Gamma	Density	SP	Res	Feet	Meters
topsoil						0	0
brn. calc. siltstone						10	
brn. calc. claystone						20	
brn. calc. siltstone						30	
gy. calc. silty claystone						40	
gy. cbncs. siltstone						50	10
gy. cbncs. silty claystone						60	
gy. silty claystone						70	
"						80	
"						90	
"						100	
gy. clayey siltstone						110	20
"						120	
lignite						130	
lignite						140	
gy. sandstone						150	
"						160	
brn. cbncs. siltstone and lignite frag						170	
brn. cbncs. siltstone						180	30
gy. siltstone						190	
"						200	
gy. siltstone and lignite frag.						210	
gy. siltstone						220	
"						230	
"						240	
"						250	
"						260	
"						270	
"						280	
"						290	
"						300	50
"						310	
"						320	
"						330	
"						340	
"						350	
"						360	
"						370	
"						380	
"						390	
"						400	
"						410	
"						420	
"						430	
"						440	
"						450	
"						460	
"						470	
"						480	
"						490	
"						500	

Hole no: W877-5 Map SE-8 Date 10/4/77 State Mont. County Wibaux
 Elev 2995 ft Location T12N, R61E Sec 20, Tract NE NE Drilled depth: 500 ft
 Measured _____, _____ Hole size 5 1/8 in. Cored: Yes
 Remarks Twin and core hole 5/6, core interval 12-66 ft
 Recorded by: J.C. Harksen



(CONTINUED)

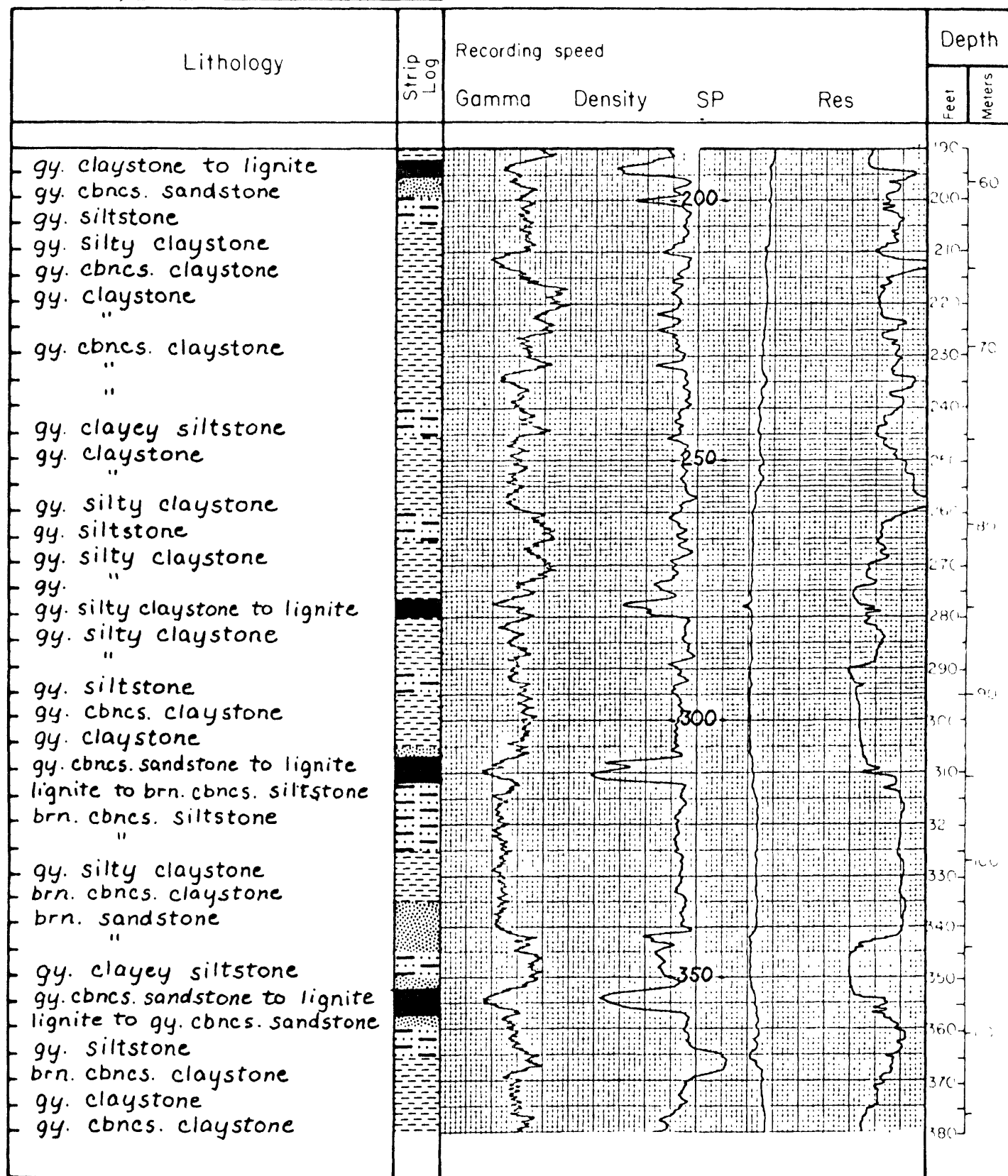
Hole no: WB77-5 Map _____ Date: _____ State: _____ County: _____

Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored: _____

Remarks _____

Recorded by _____



Hole no: WB77-5 Map _____ Date: _____ State: _____ County: _____
Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size _____ Cored: _____
Remarks _____
Recorded by: _____



Hole no: WB77-6 Map _____ Date _____ State: _____ County: _____

Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

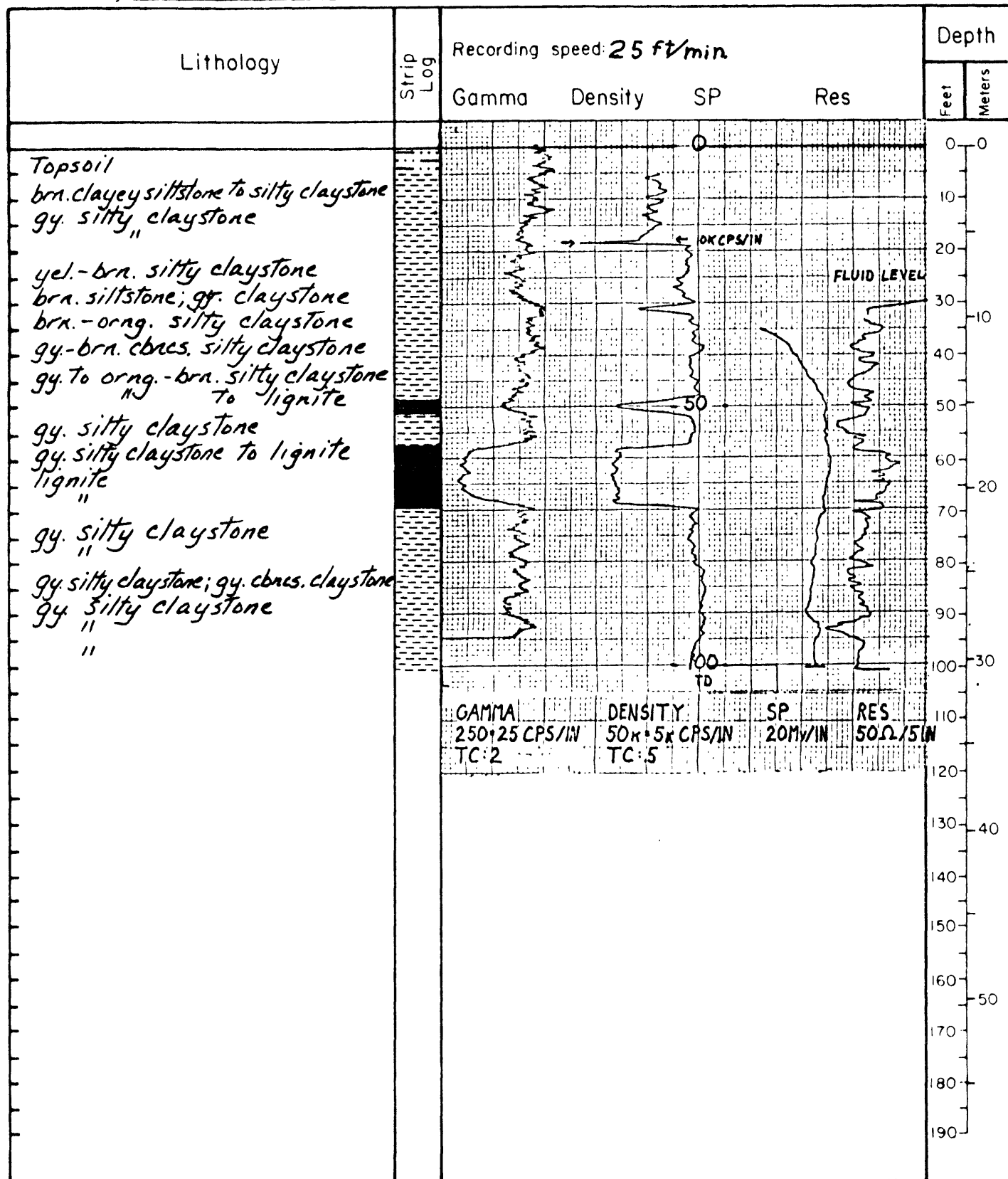
Measured: _____, _____ Hole size _____ Cored Yes

Remarks: See WB77-5 for data

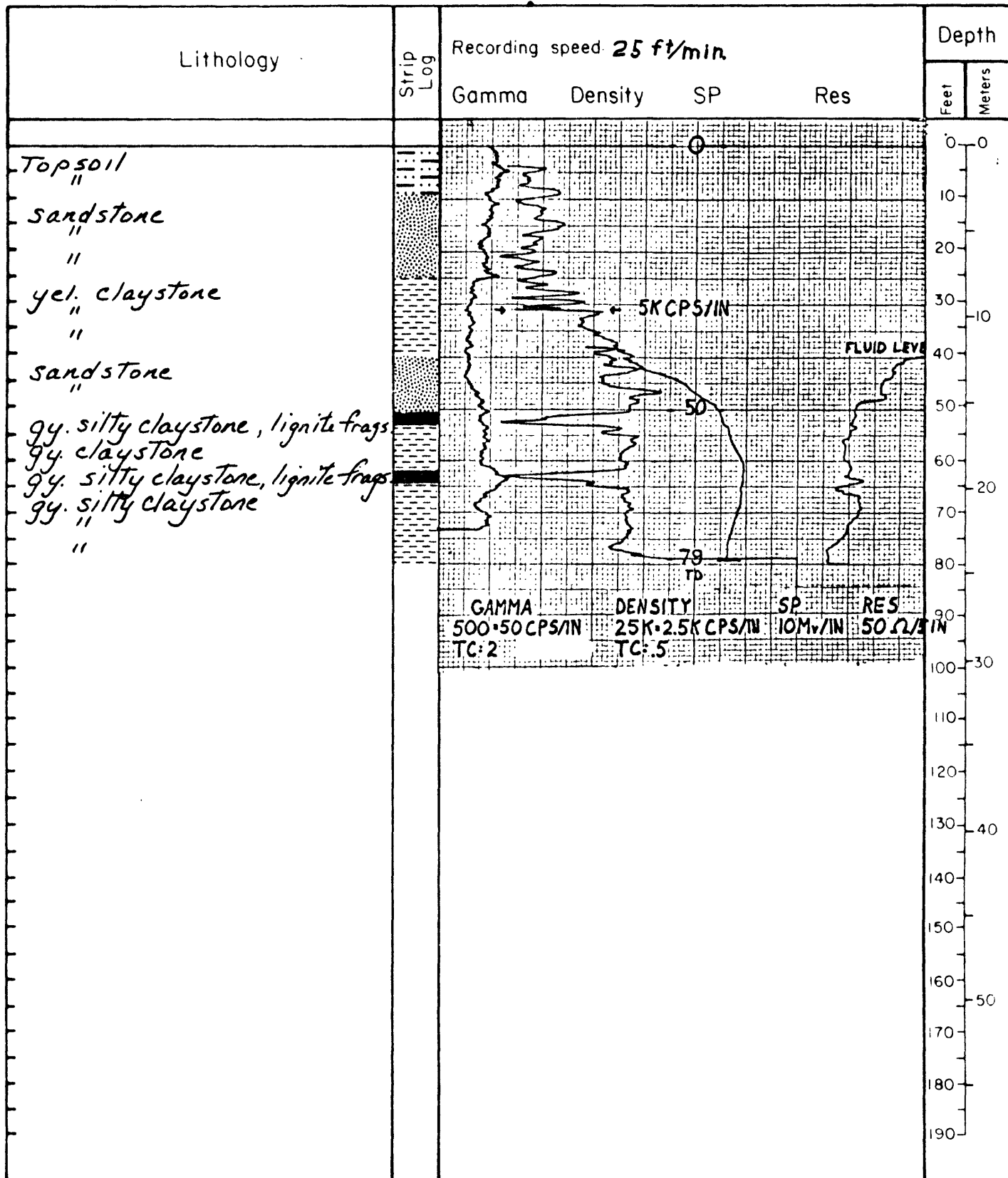
Recorded by: _____

Lithology	Strip Log	Recording speed.				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	
						40	10
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

Hole no: WB77-7 Map: SW-7 Date: 10/3/77 State: N. D. County: Golden Valley
 Elev 2960ft Location: T138N, R106W Sec. 10, Tract lot 1 Drilled depth: 100ft
 Measured: 15ft FWL, _____ Hole size: 5 7/8in Cored: Yes
 Remarks: Twin and core hole 7/104, core interval 40-70ft
 Recorded by: J. C. Harkser



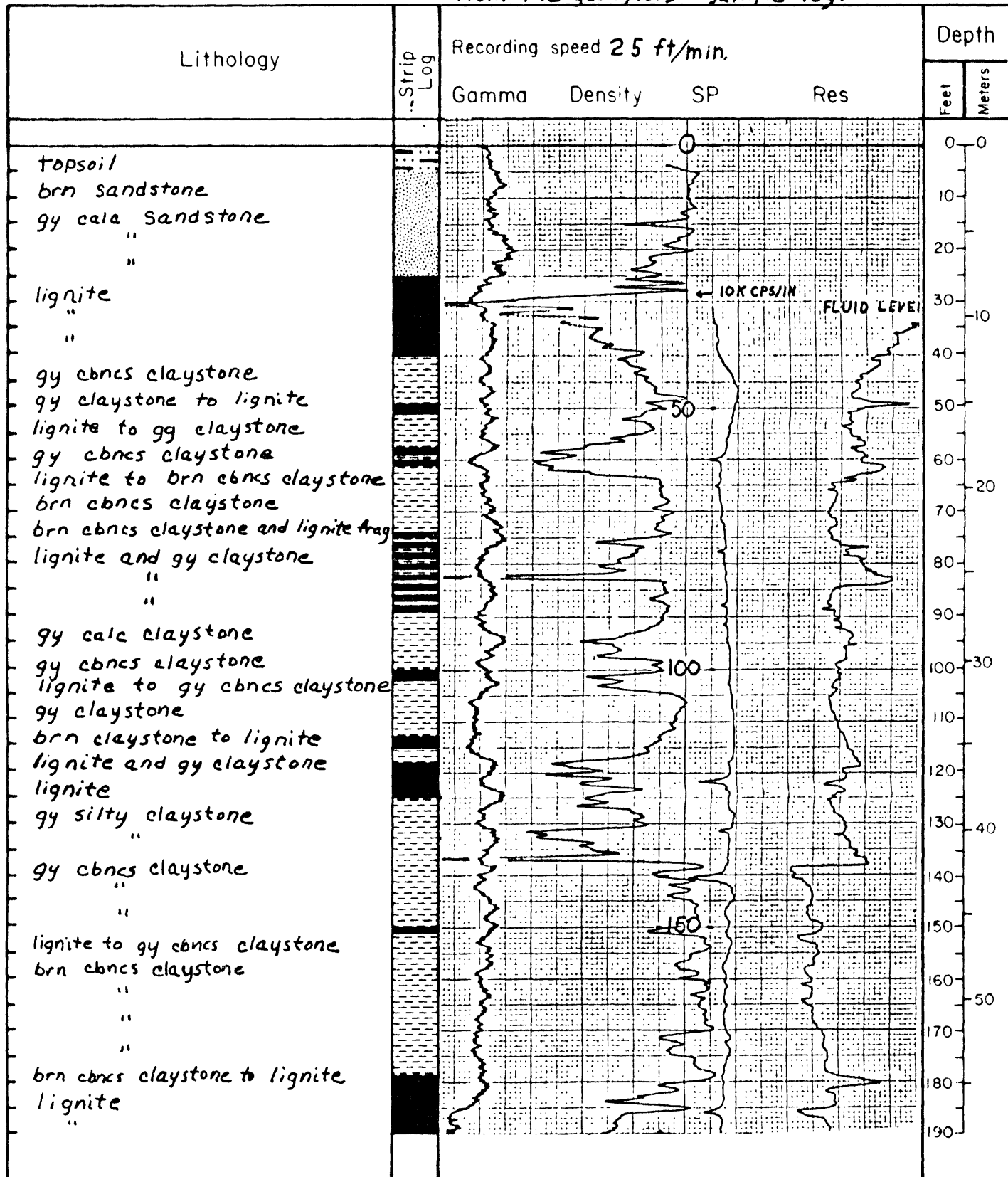
Hole no: WB77-2 Map SW-7 Date: 9/14/77 State: N.D. County: Golden Valley
 Elev 2915 ft Location: T138N, R106W Sec. 10, Tract NE NE Drilled depth: 79 ft
 Measured: _____, _____ Hole size: 5 1/8 in. Cored: No
 Remarks _____
 Recorded by: J. C. Harksen



Hole no: WB77-9 Map: SW-7 Date 9/15/77 State: N.D. County: Golden Valley
 Elev: 2920 ft Location: T.138N., R.105W Sec. 6, Tract SE SW Drilled depth: 236 ft
 Measured _____, _____ Hole size: 5 1/8 in. Cored: No

Remarks Due to the erratic nature of the electric log the lithology and strip logs are exclusive

Recorded by: J. C. Harksen from the geologist's sample log.



(Continued)

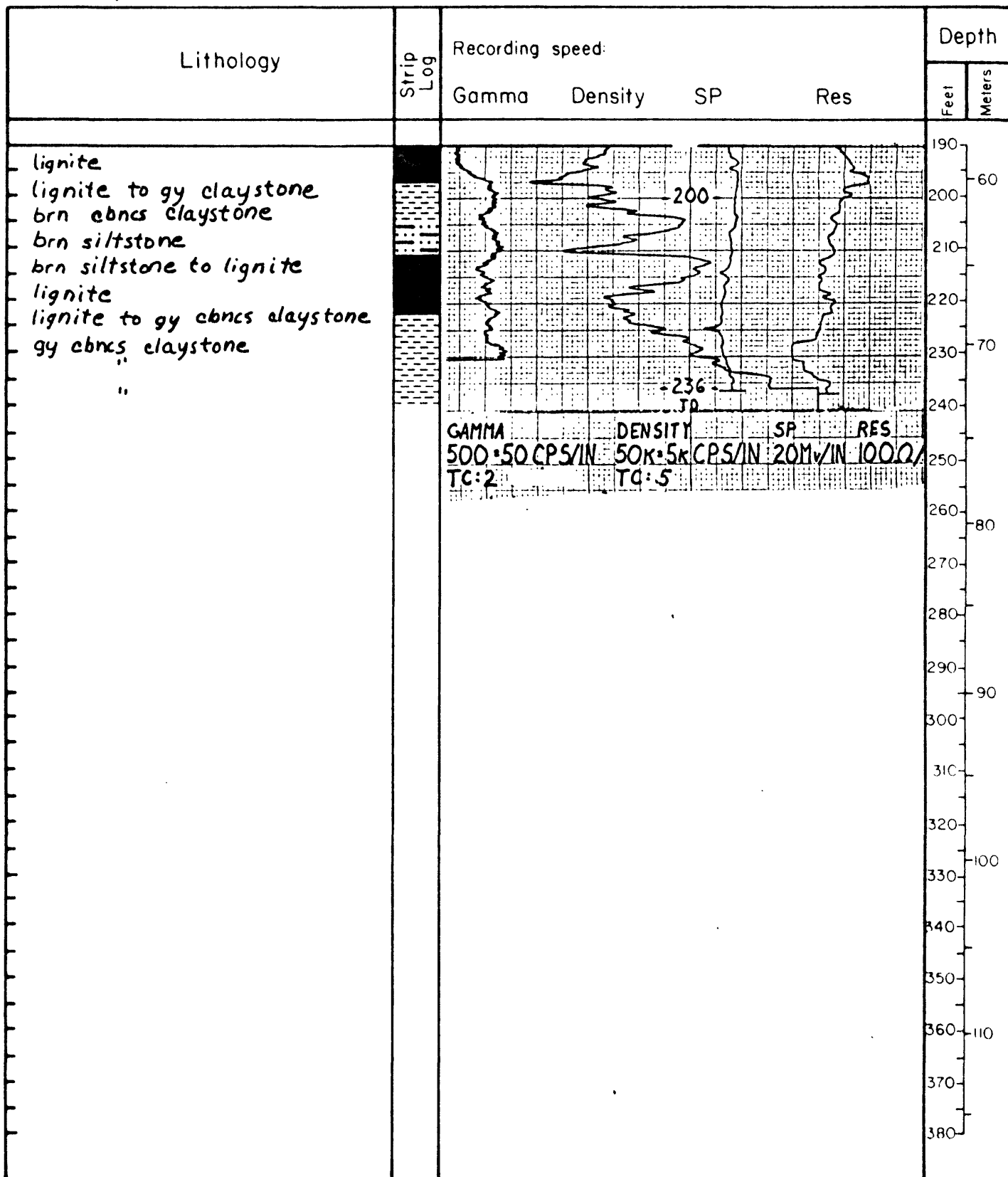
Hole no: WB77-9 Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size: _____ Cored: _____

Remarks: _____

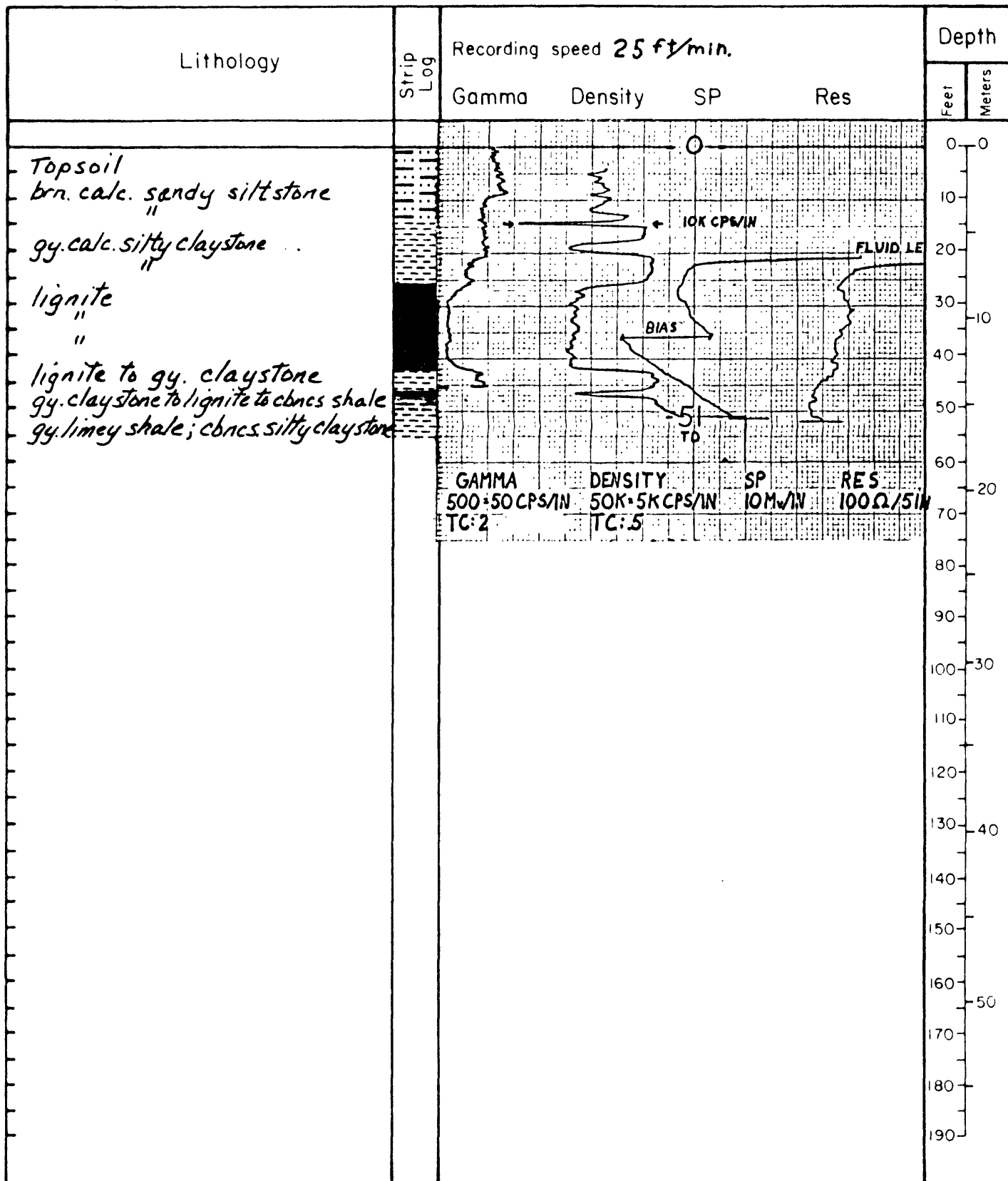
Recorded by: _____



Hole no: WB77-10 Map: SW-7 Date: 9/14/77 State: N. D. County: Golden Valley
 Elev 2910 ft Location: T139N, R106W Sec. 34, Tract SW SW Drilled depth: 51 ft
 Measured: 38 ft FWL, 30 ft FSL Hole size: 5 1/8 in Cored: No

Remarks:

Recorded by: J. C. Harksen



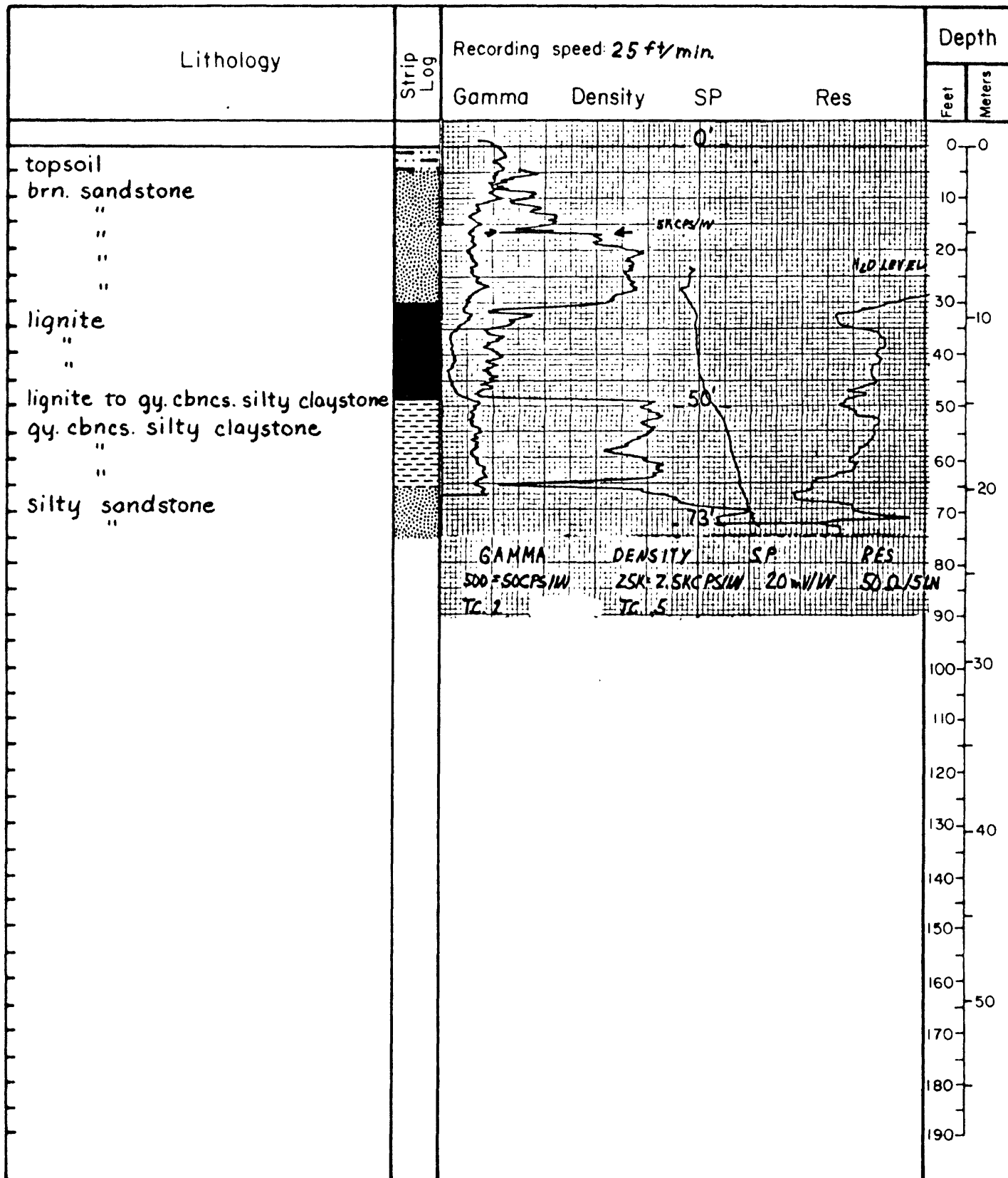
Hole no: WB77-11 Map: SW-7 Date: 9/14/77 State: N.D. County: Golden Valley

Elev.: 2875 ft Location: T 138 N, R 106 W Sec. 2, Tract lot 4 Drilled depth: 73 ft

Measured: 32 ft FWL 24 ft FNL Hole size: 5 1/8 in Cored: No

Remarks: _____

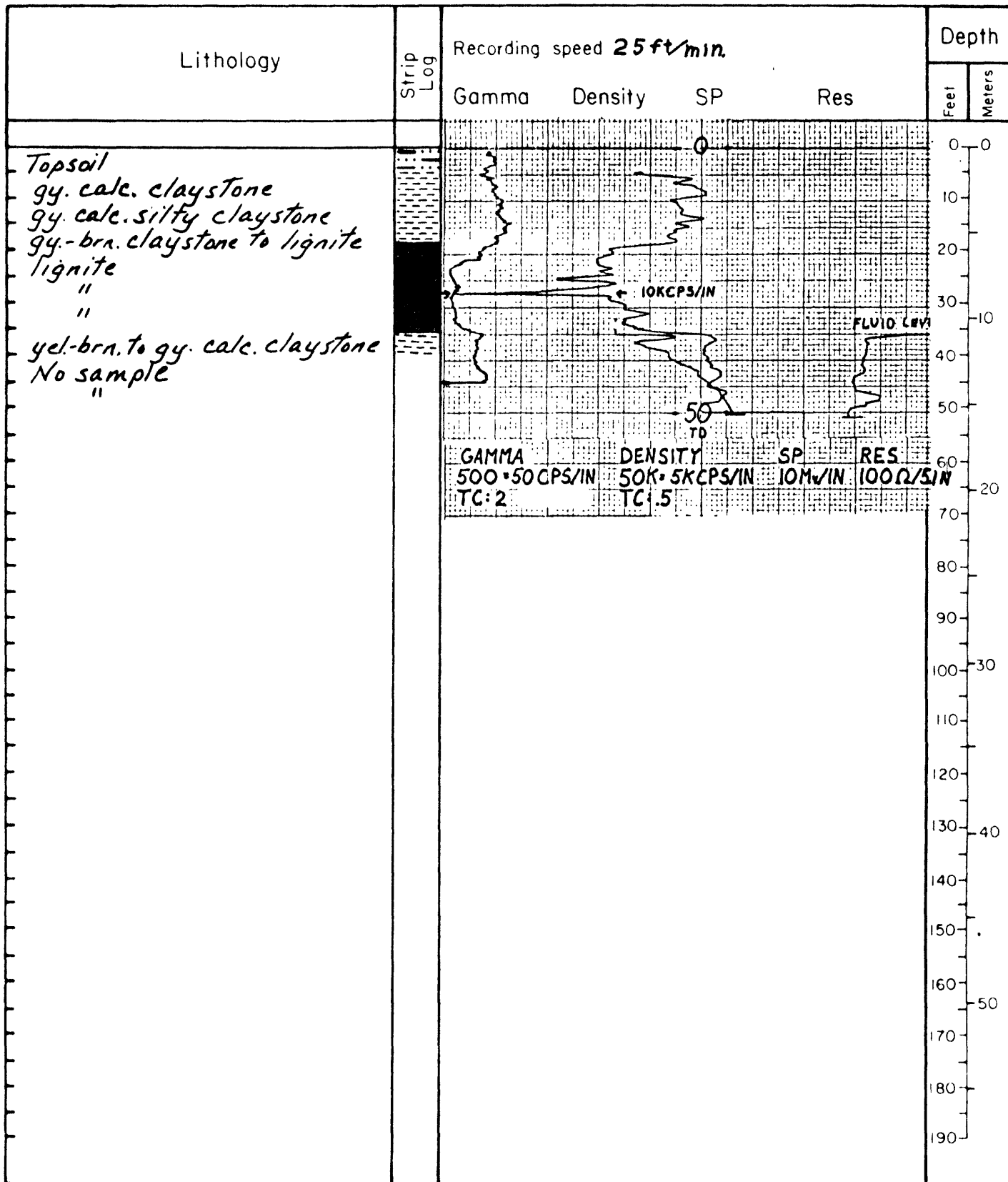
Recorded by: J. C. Harksen



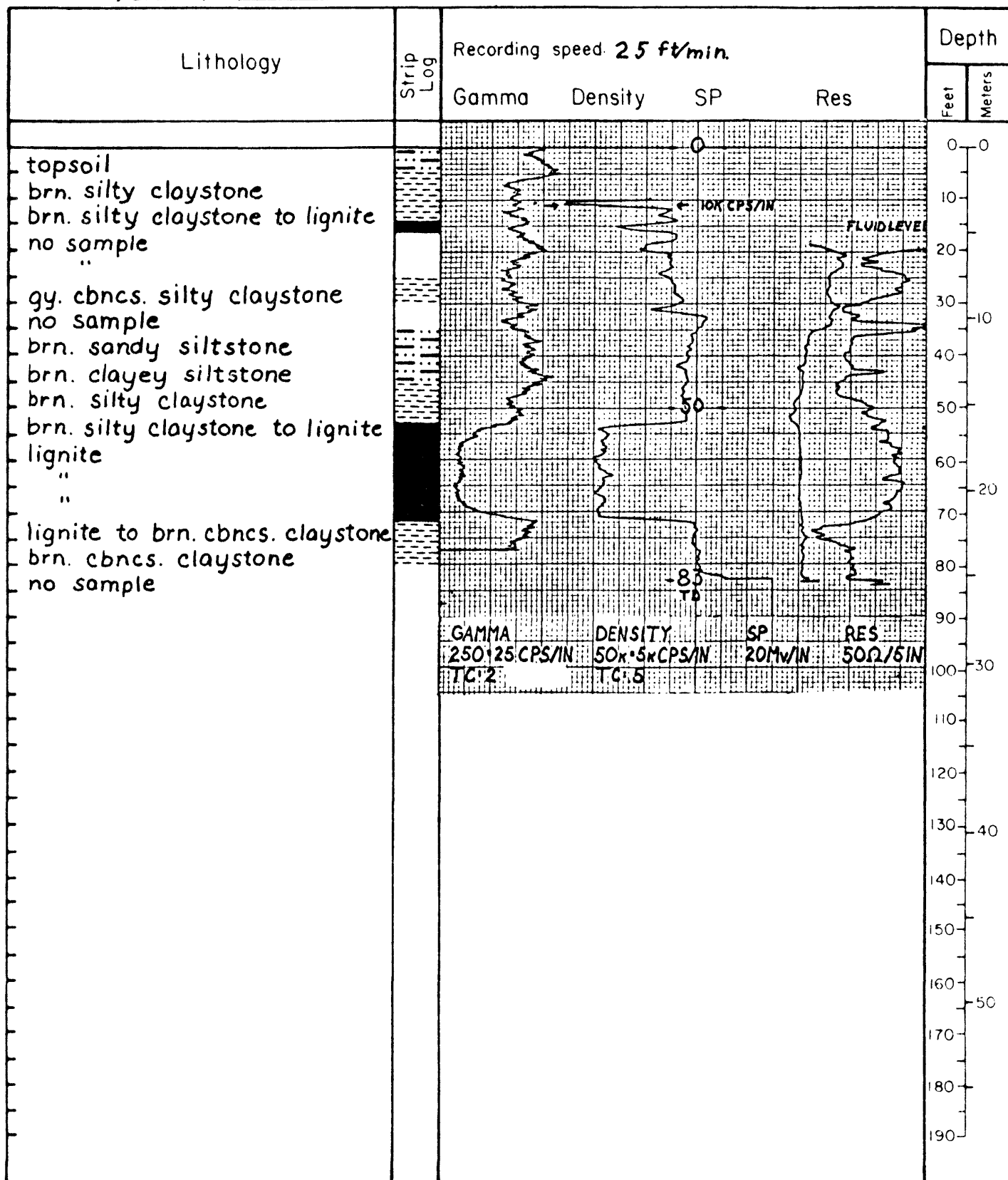
Hole no: WB77-12 Map: SE-8 Date: 9/14/77 State: Mont. County: Wibaux
 Elev. 2906ft Location: T12N, R61E Sec. 8, Tract NE NE Drilled depth: 50ft
 Measured: 94ft FEL, 8ft FNL Hole size: 5' 8 1/2" Cored No

Remarks: _____

Recorded by: J. C. Harksen



Hole no: WB77-13 Map: SW-7 Date: 10/11/77 State: N.D. County: Golden Valley
 Elev 2920 ft Location: T139N R106W Sec. 34, Tract lot 1 Drilled depth: 83 ft
 Measured: 24 ft FWL, 144 ft FNL Hole size: 5 1/8 in. Cored: Yea
 Remarks: Twin and core hole 13/14, core interval 50-75 ft
 Recorded by: J.C. Harksen



Hole no: WB77-14 Map _____ Date _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured: _____, _____ Hole size: _____ Cored: Yes

Remarks: See WB77-13 for data

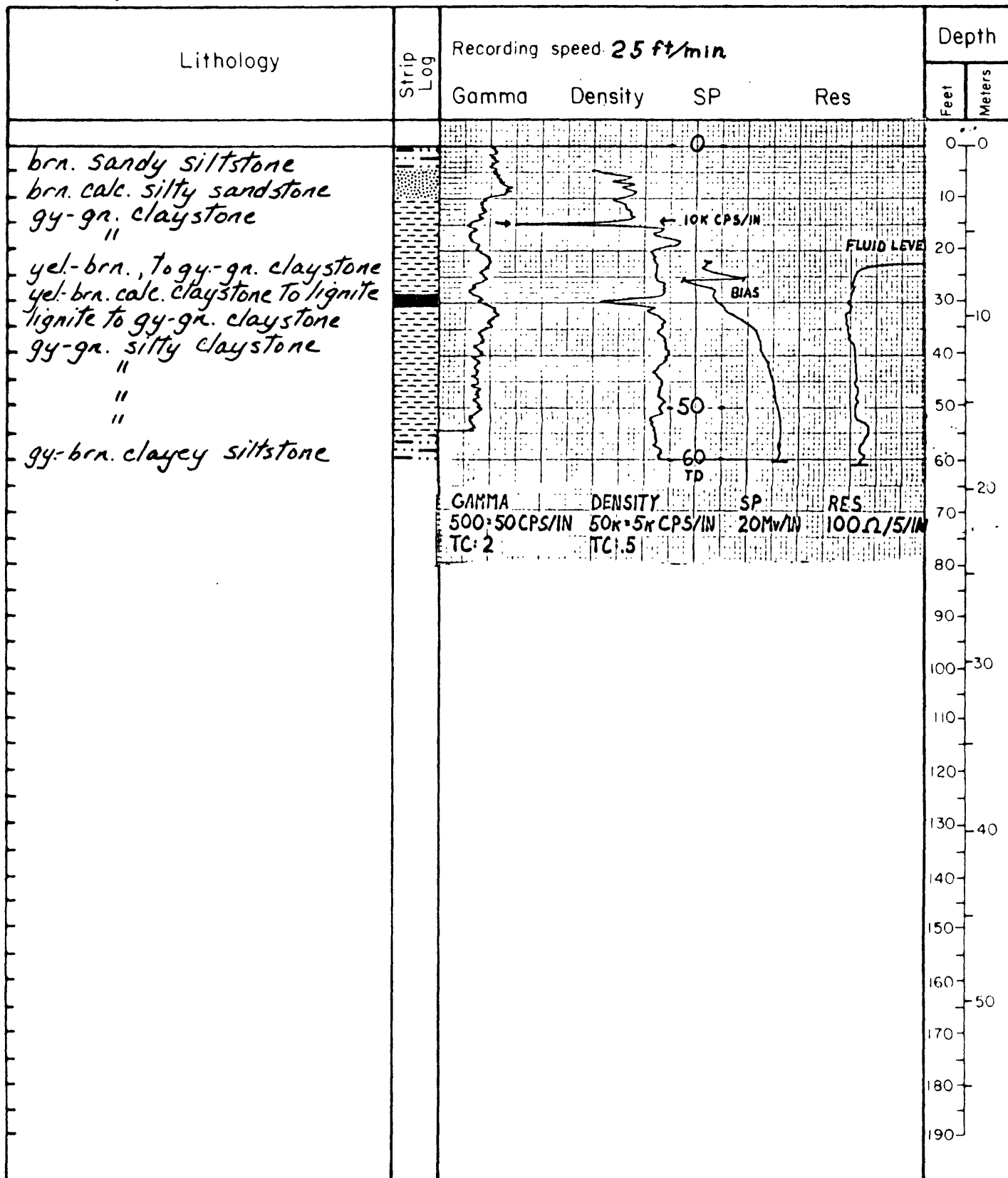
Recorded by: _____

Lithology	Strip Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	
						170	50
						180	
						190	

Hole no: WB77-15 Map: SW-7 Date: 9/1/72 State: N. D. County: Golden Valley
 Elev: 2845 ft Location: T139N, R106W Sec. 26, Tract SW SW Drilled depth: 60 ft
 Measured: 90 ft FWL, 70 ft FSL Hole size: 5 1/8 in. Cored: No

Remarks: _____

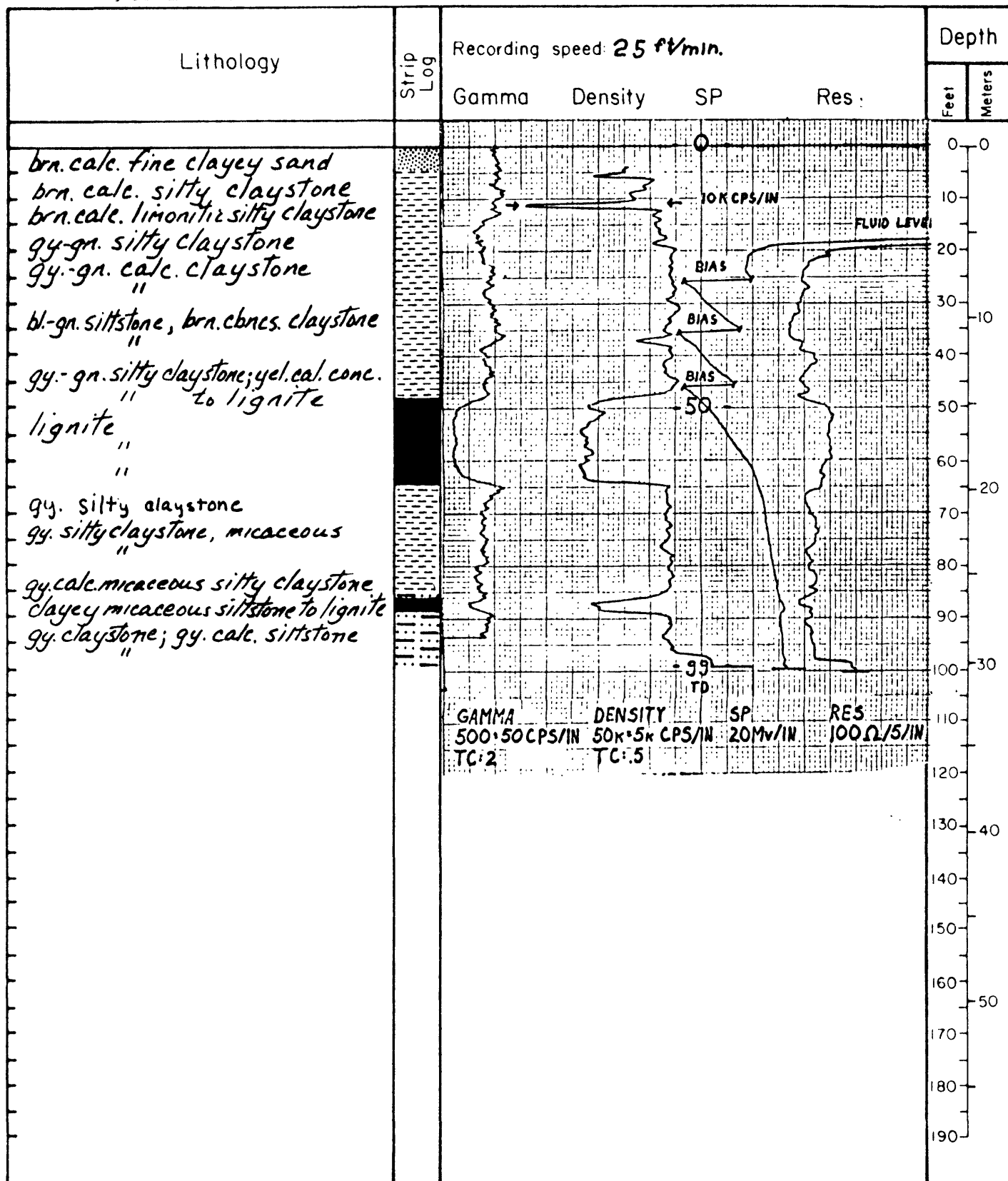
Recorded by: J. C. Harksen



Hole no: WB77-16 Map: SW-7 Date: 9/15/77 State: N. D. County: Golden Valley
 Elev 2880ft Location T139N, R106W Sec. 26, Tract SE SW Drilled depth: 99ft
 Measured 2560 ft FWH, 60 ft FSL Hole size: 5 1/8 in. Cored: No

Remarks _____

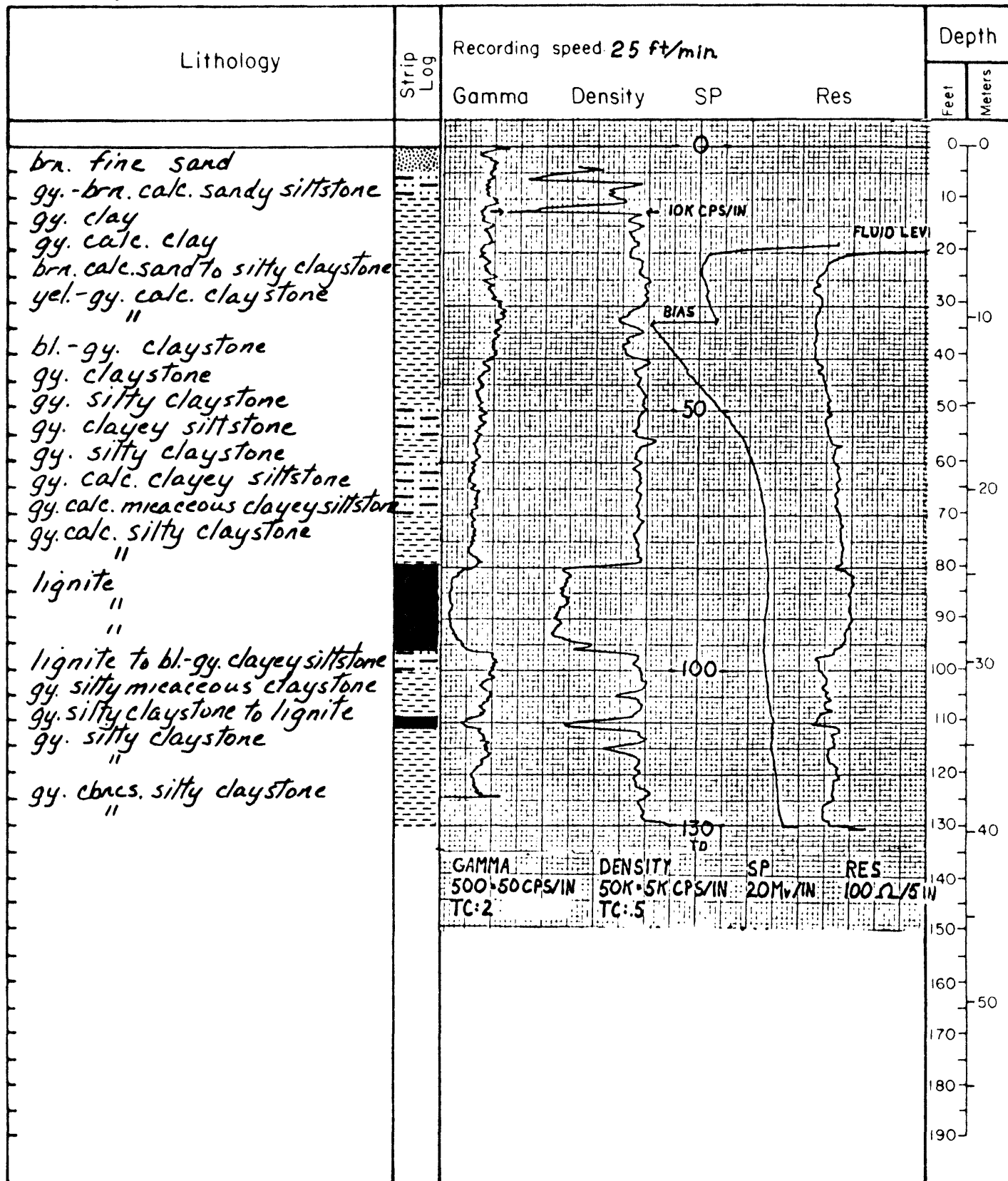
Recorded by: J. C. Harksen



Hole no: W877-17 Map SW-7 Date: 9/14/77 State: N. D. County: Golden Valley
 Elev 2870ft Location: T139N, R106W Sec. 26 Tract SE SE Drilled depth: 130ft
 Measured: 100ft FEL 53ft FSL Hole size: 5 7/8in Cored: No

Remarks: _____

Recorded by: J. C. Harksen



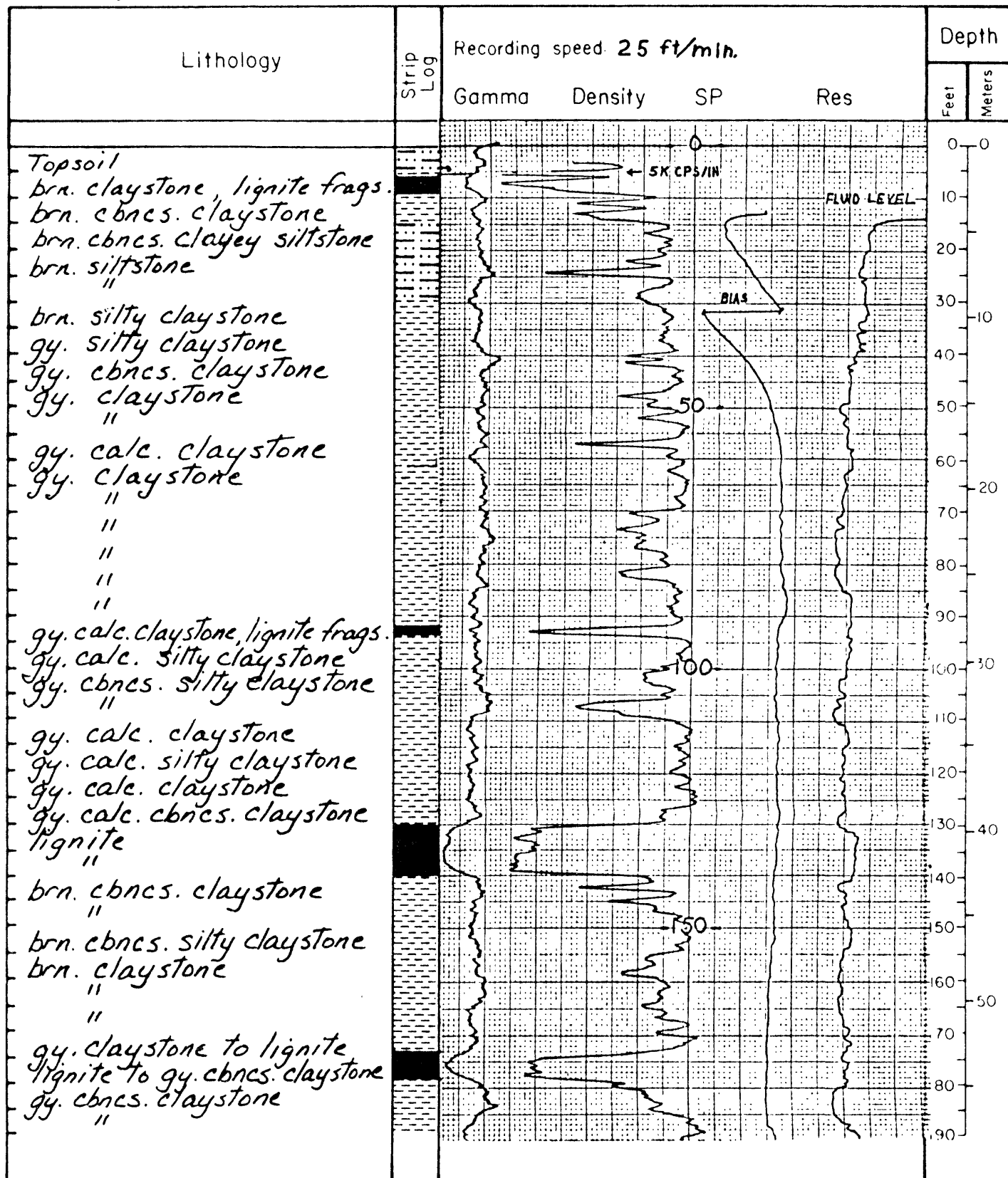
Hole no: W877-18 Map SW-7 Date: 9/16/77 State: N. D. County: Golden Valley

Elev: 2845 ft Location: T139N, R105W Sec. 32, Tract NW NE Drilled depth: 800 ft

Measured: _____, _____ Hole size: 5 1/8 in Cored No

Remarks: _____

Recorded by: J. C. Harksen



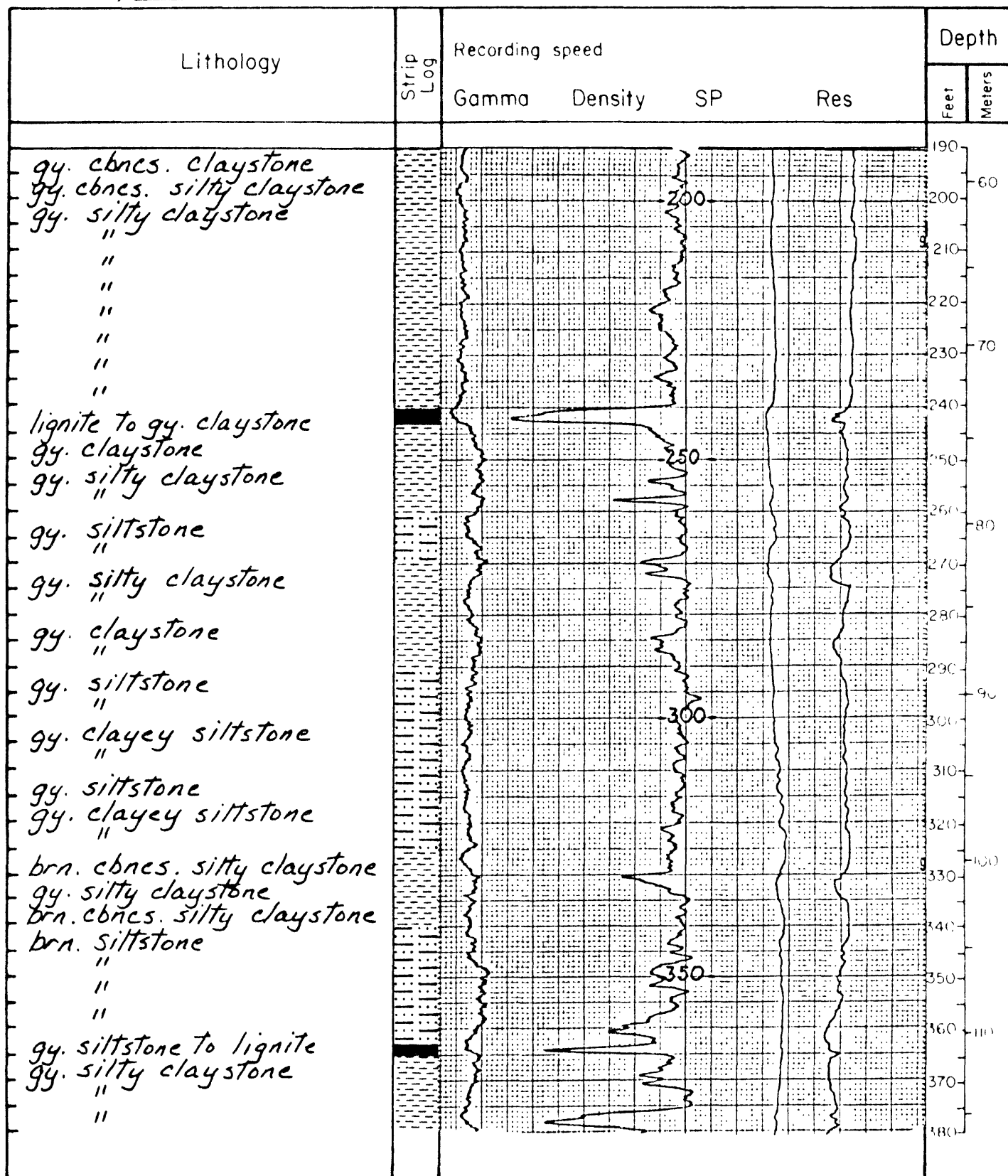
Hole no: W877-18 Map: _____ Date: _____ State: _____ County: _____

Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

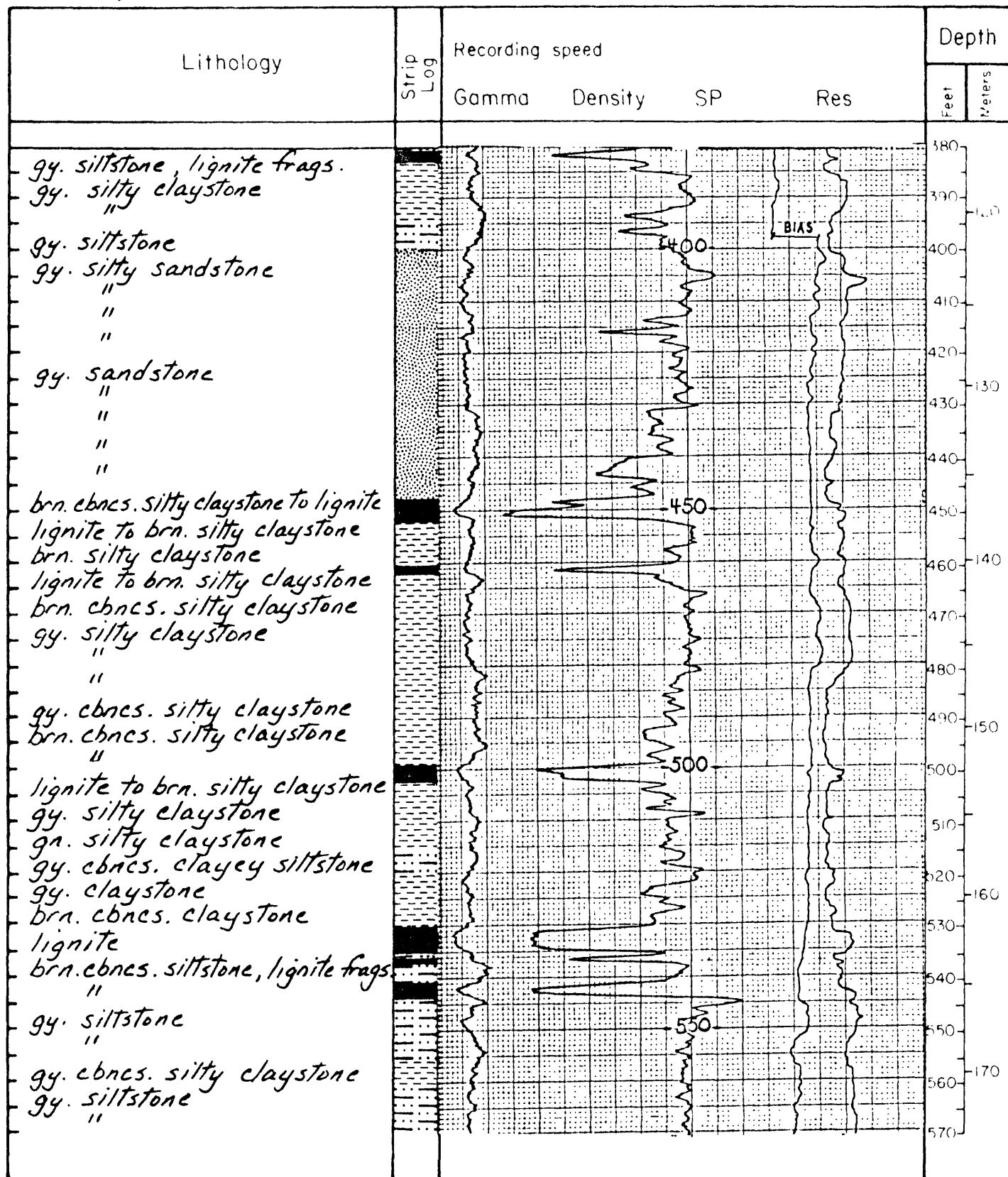
Measured _____, _____ Hole size: _____ Cored _____

Remarks _____

Recorded by: _____

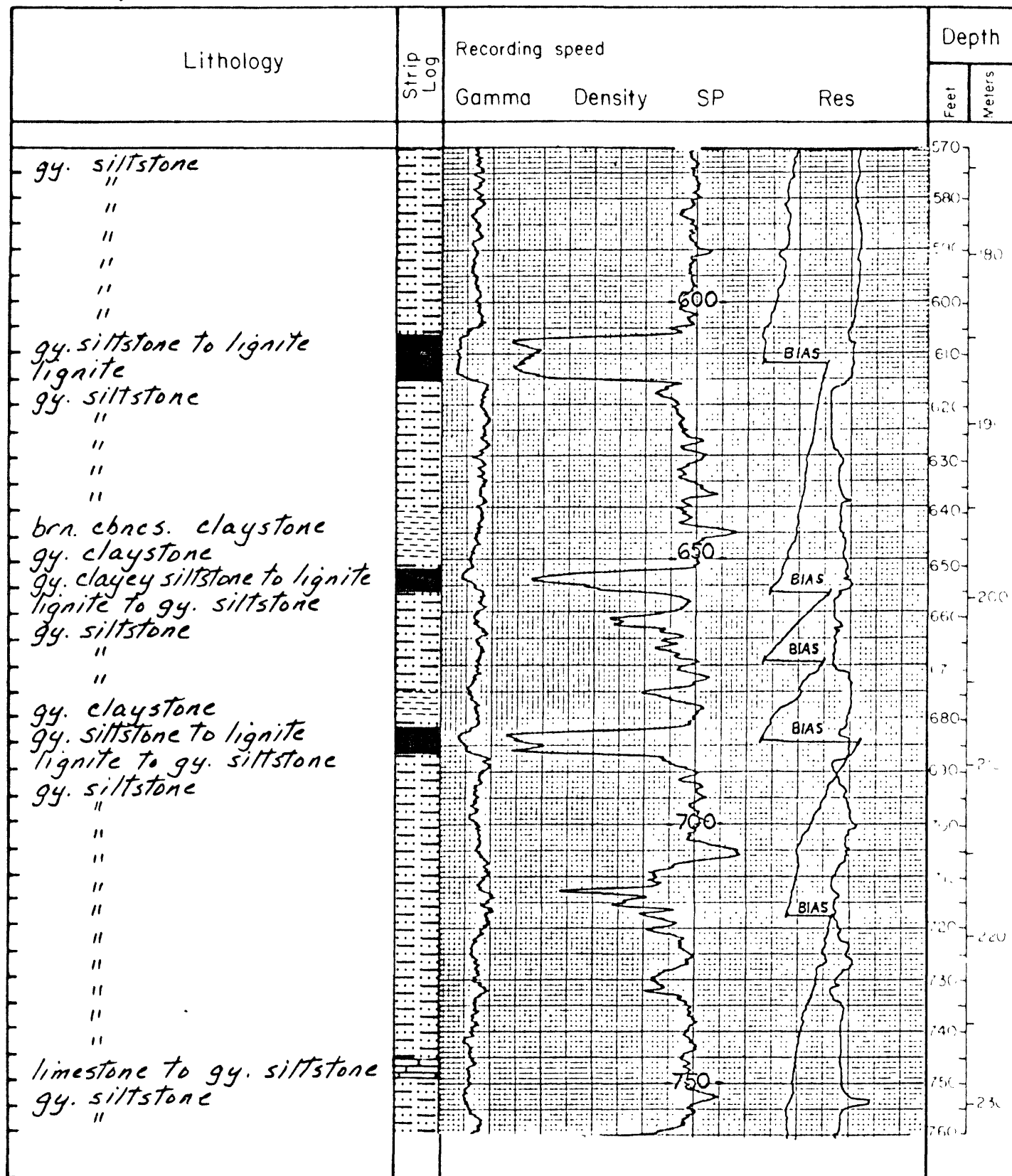


Hole no: W877-18 Map _____ Date: _____ State: _____ County: _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks _____
 Recorded by: _____



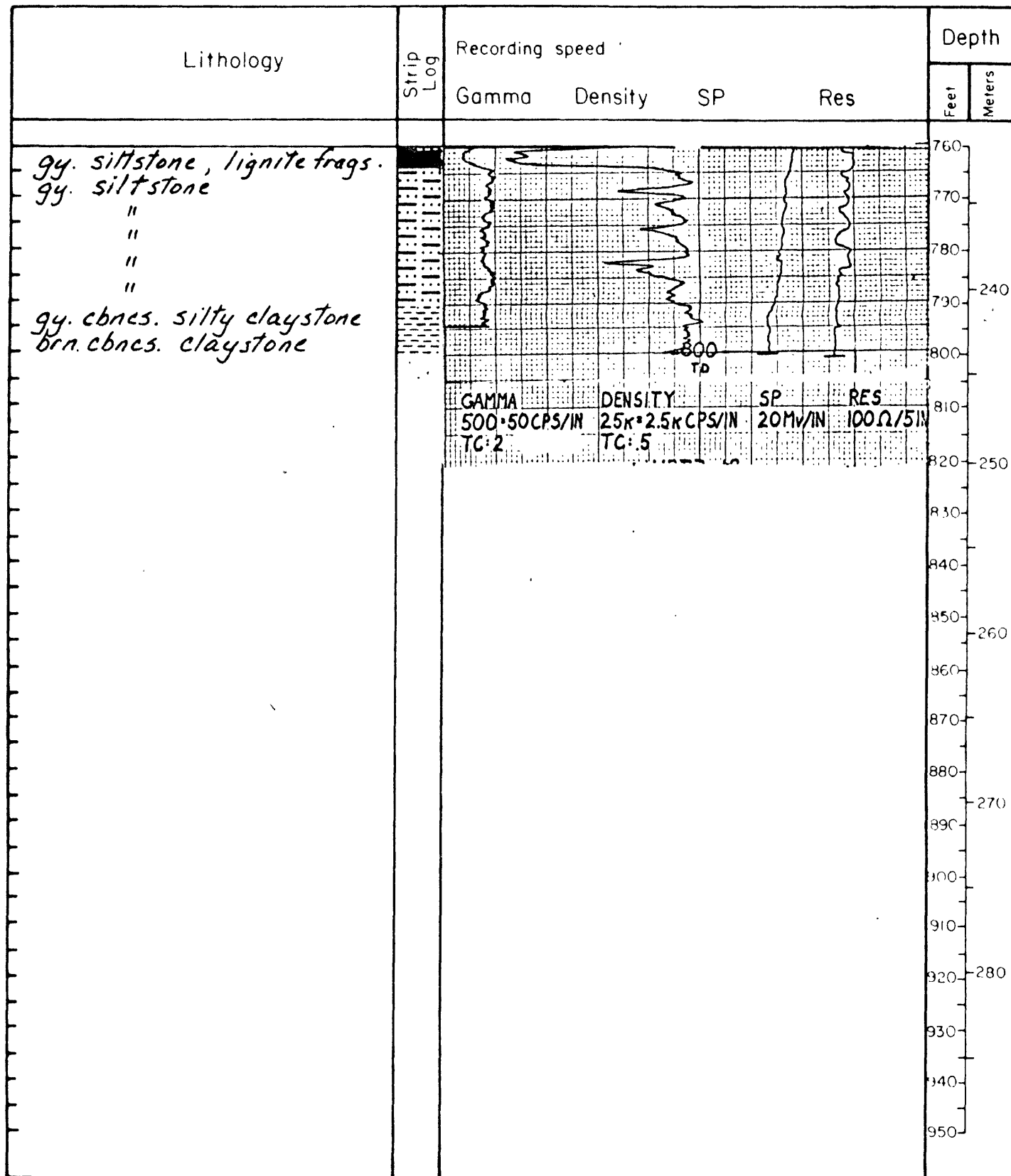
(Continued)

Hole no: W677-18 Map: _____ Date: _____ State: _____ County: _____
 Elev _____ Location _____ 'Sec. _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size: _____ Cored: _____
 Remarks: _____
 Recorded by: _____

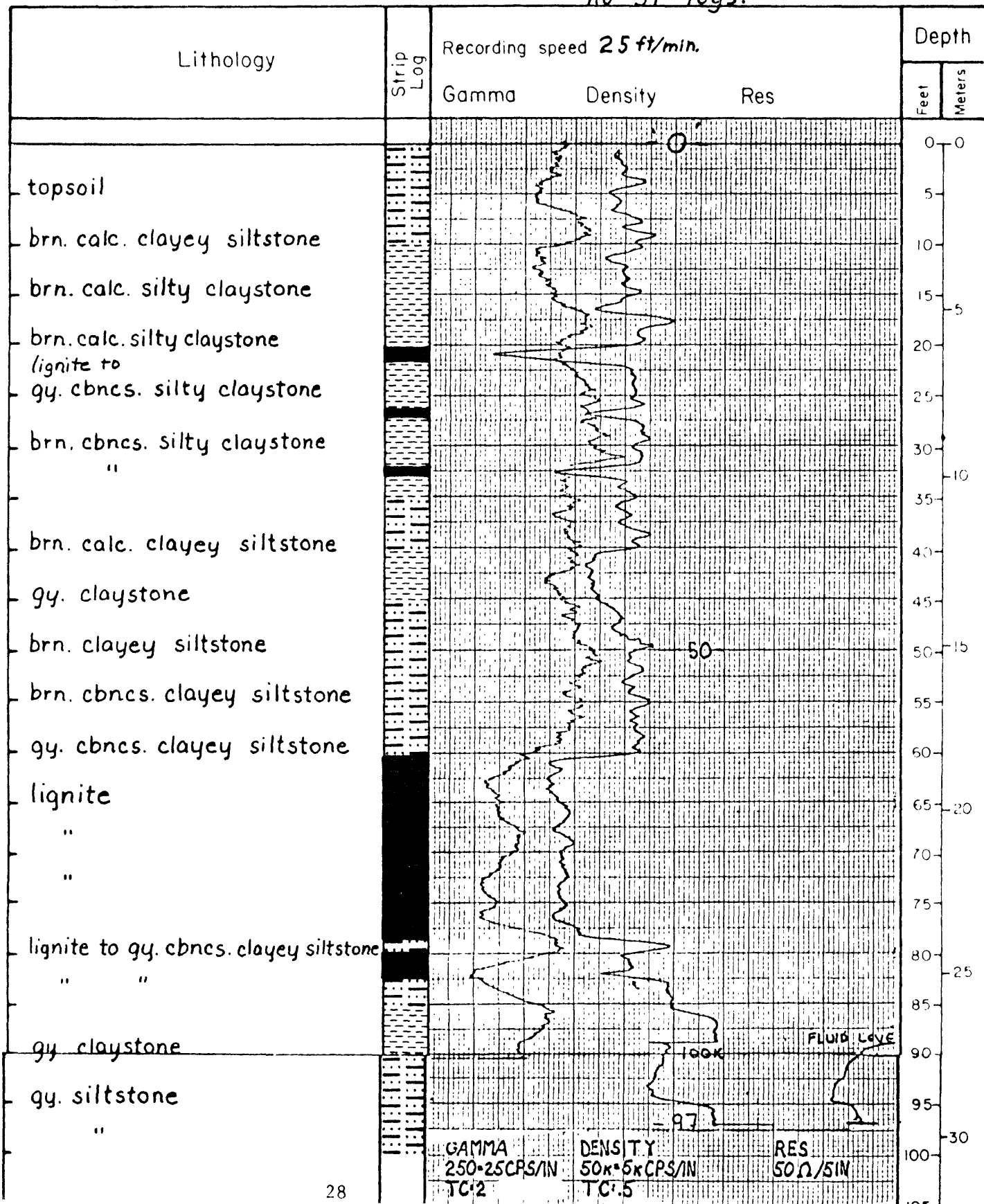


(continued)

Hole no: WB77-18 Map _____ Date: _____ State: _____ County: _____
Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size: _____ Cored: _____
Remarks: _____
Recorded by: _____



Hole no: WB77-19 Map: SE-8 Date: 10/16/77 State: Mont. County: Wibaux
 Elev: 2093 ft Location: T12N, R61E Sec. 4, Tract NW NW Drilled depth: 97 ft
 Measured _____, _____ Hole size 5 1/8 in. Cored: Yes
 Remarks: Twin and core hole 19/20, core interval 65-95 feet, vertical scale change.
 Recorded by: J.C. Harksen no SP logs.



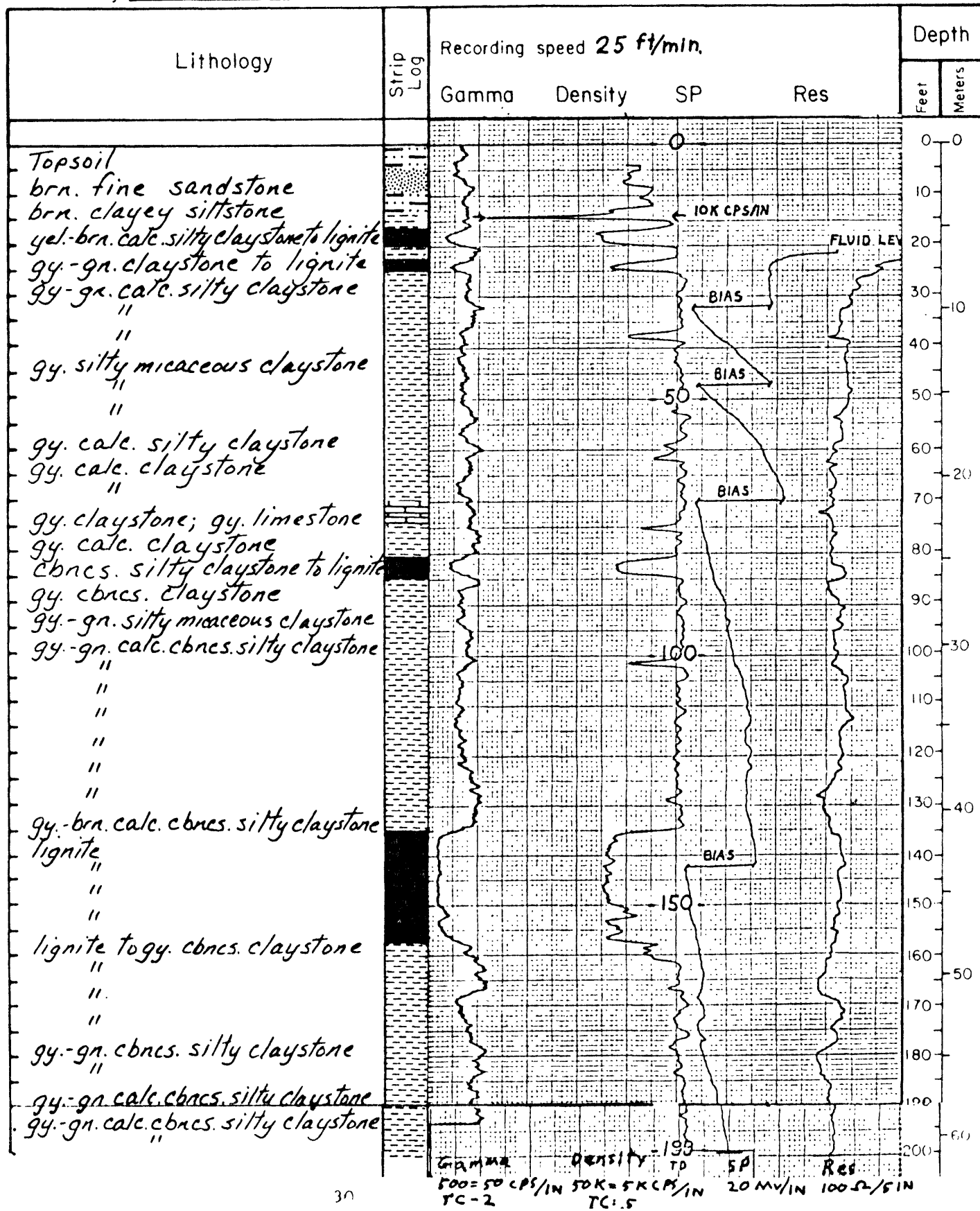
Hole no: WB77-20 Map: _____ Date _____ State: _____ County: _____
 Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size: _____ Cored Yes
 Remarks: See WB77-19 for data
 Recorded by: _____

Lithology	Strip log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

Hole no: W877-21 Map SW-7 Date: 9/15/77 State: N. D. County: Golden Valley
 Elev: 2875 ft Location: T139N, R106W Sec. 24, Tract SW SW Drilled depth: 199 ft
 Measured: 36 ft FWL, 84 ft FSL Hole size: 5 1/8 in Cored: No

Remarks: _____

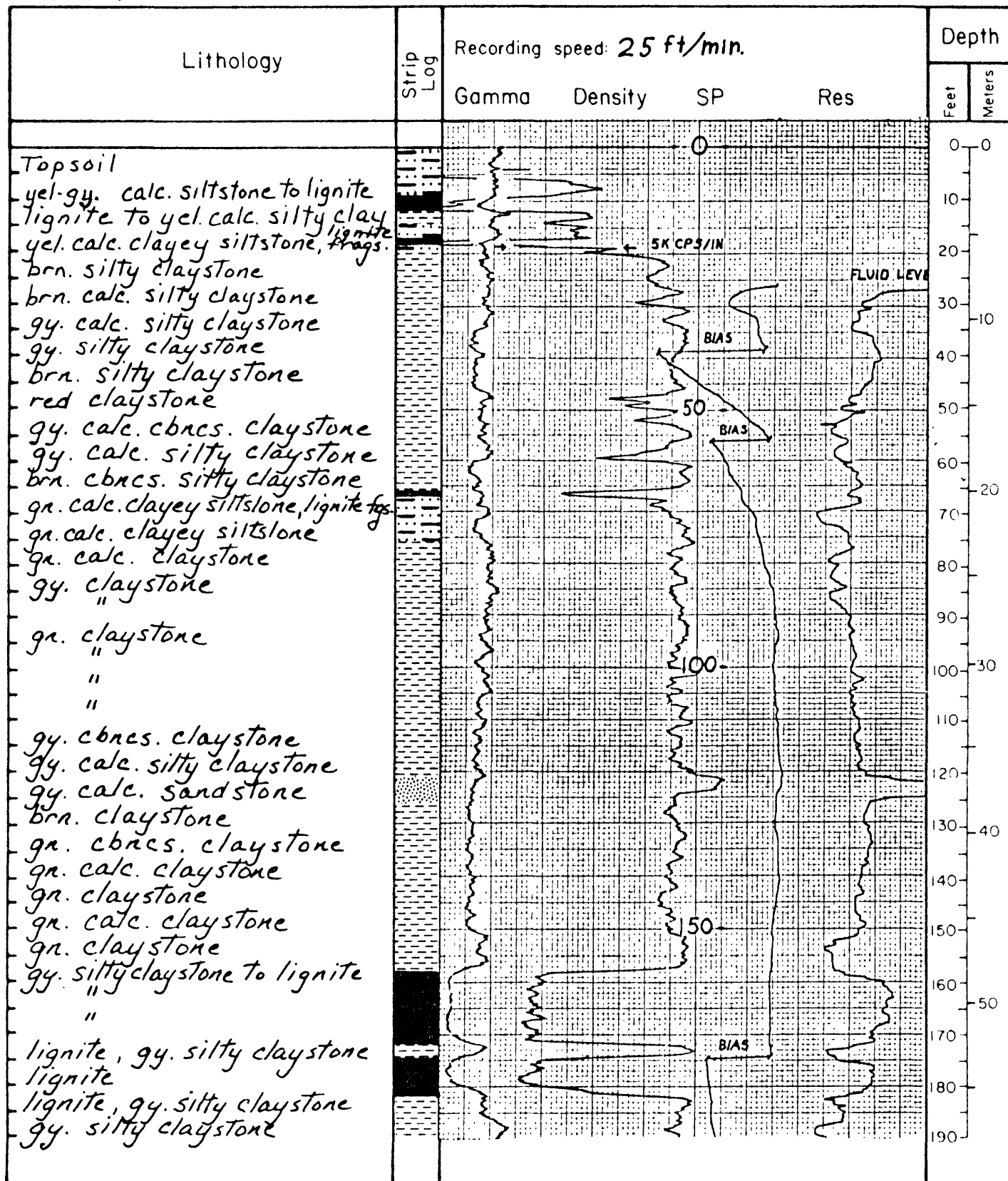
Recorded by: J. C. Harksen



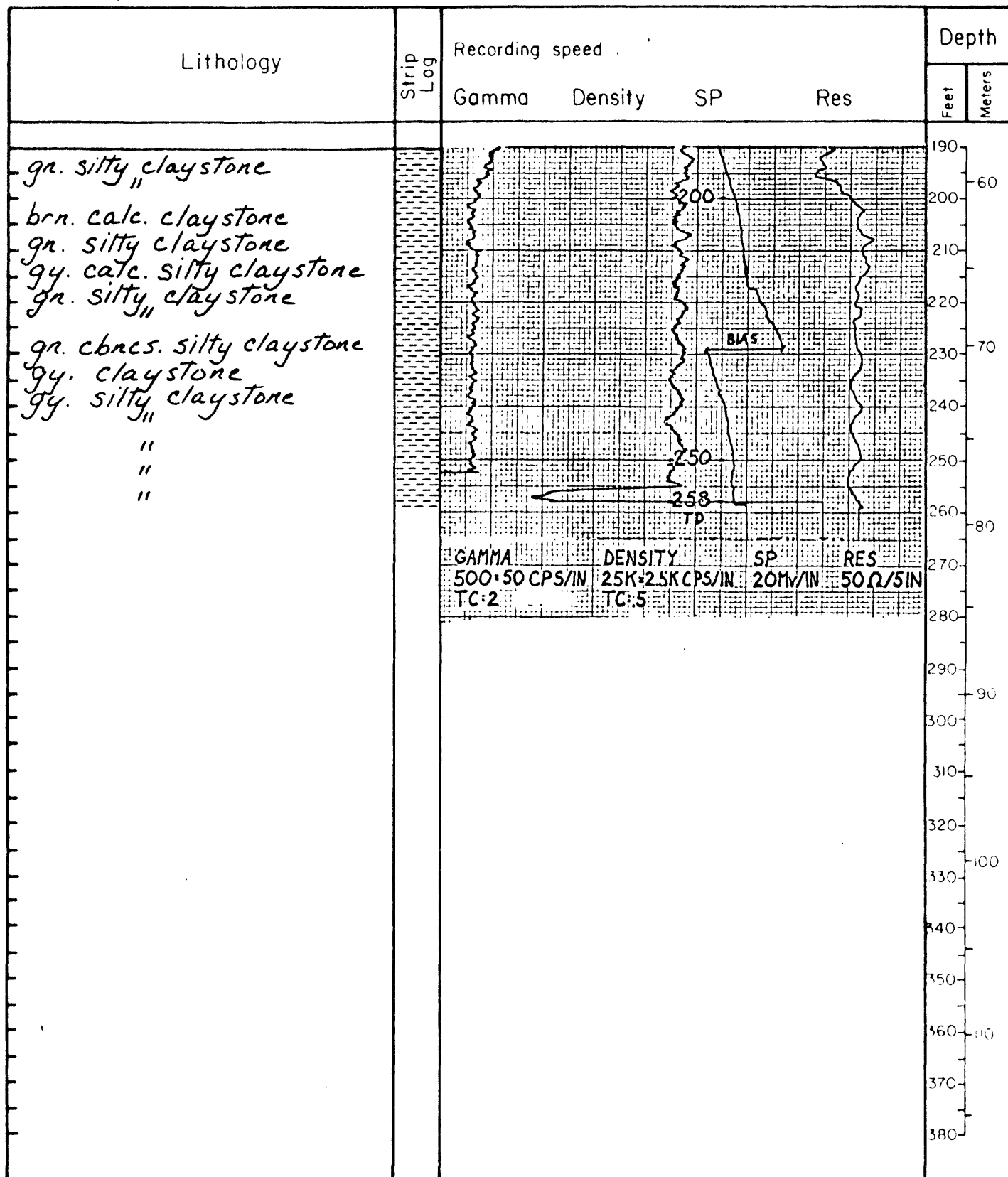
Hole no: W877-22 Map: SW-7 Date: 9-16-77 State: N. D. County: Golden Valley
 Elev: 2870 ft Location: T139N R106W Sec. 24, Tract SE SE Drilled depth: 258 ft
 Measured: 179 ft FEL, 87 ft FSL Hole size: 5 1/8 in. Cored: No

Remarks:

Recorded by: J. C. Harksen



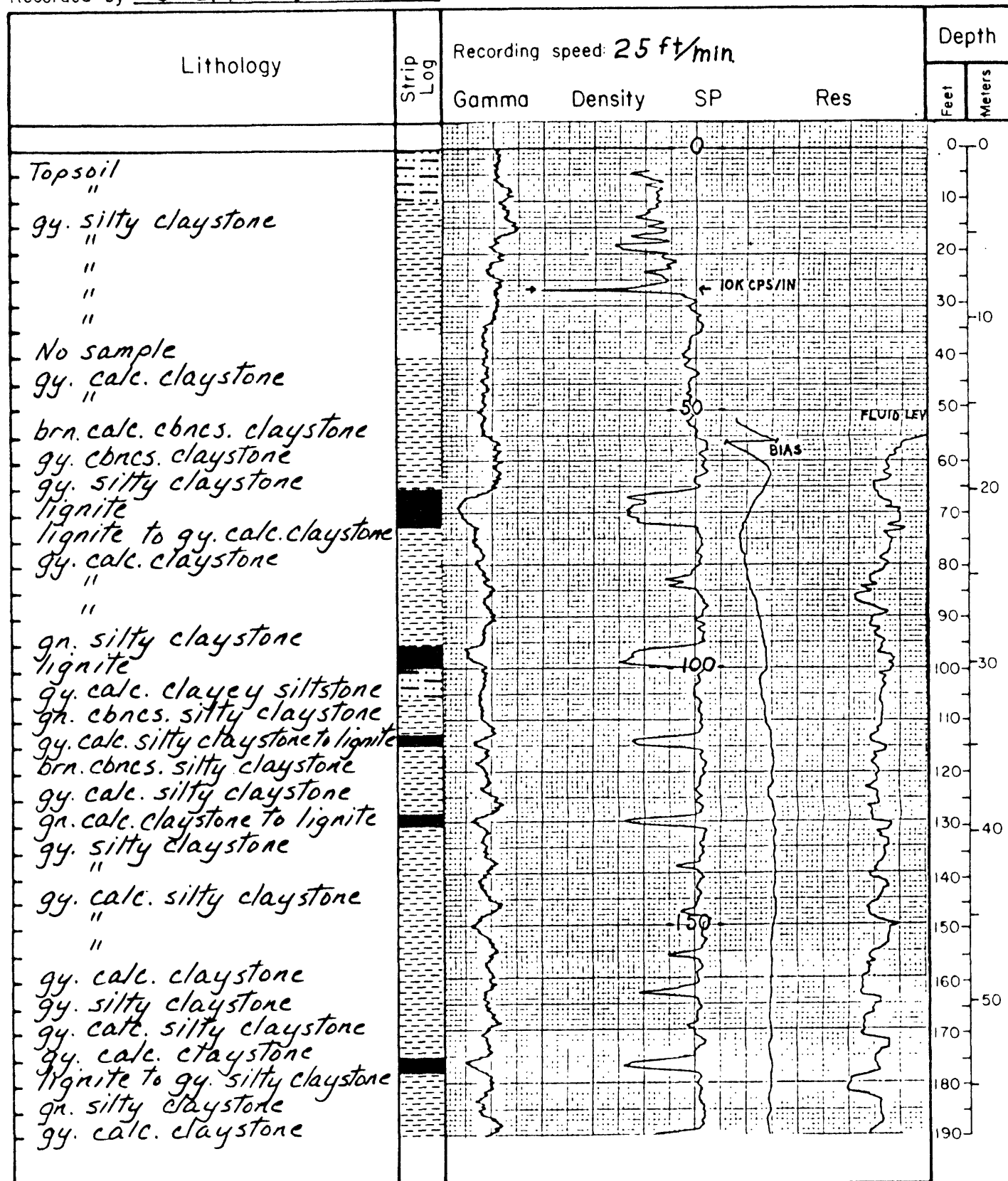
Hole no: WB77-22 Map _____ Date: _____ State: _____ County: _____
 Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size: _____ Cored: _____
 Remarks: _____
 Recorded by: _____



Hole no: WB77-23 Map: SW-7 Date: 9/16/77 State: N. D. County: Golden Valley
 Elev: 2890 ft Location: T139N, R106W Sec. 24, Tract NE NE Drilled depth: 279 ft
 Measured: 143 ft FEL, 160 ft FNL Hole size: 5 7/8 in. Cored: No

Remarks: _____

Recorded by: J. C. Harksen



(Continued)

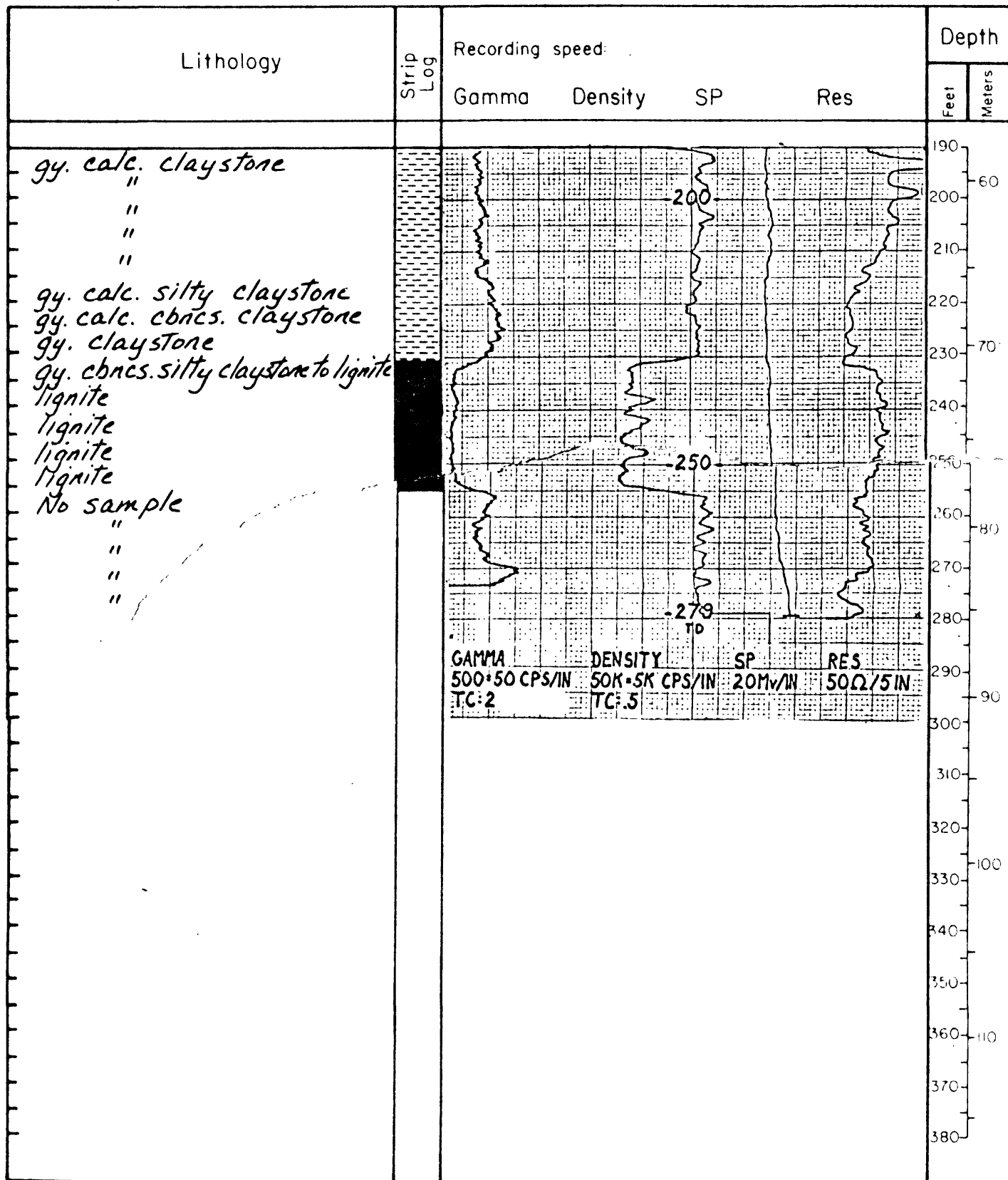
Hole no: WB77-23 Map: _____ Date: _____ State: _____ County: _____

Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured: _____ Hole size: _____ Cored: _____

Remarks: _____

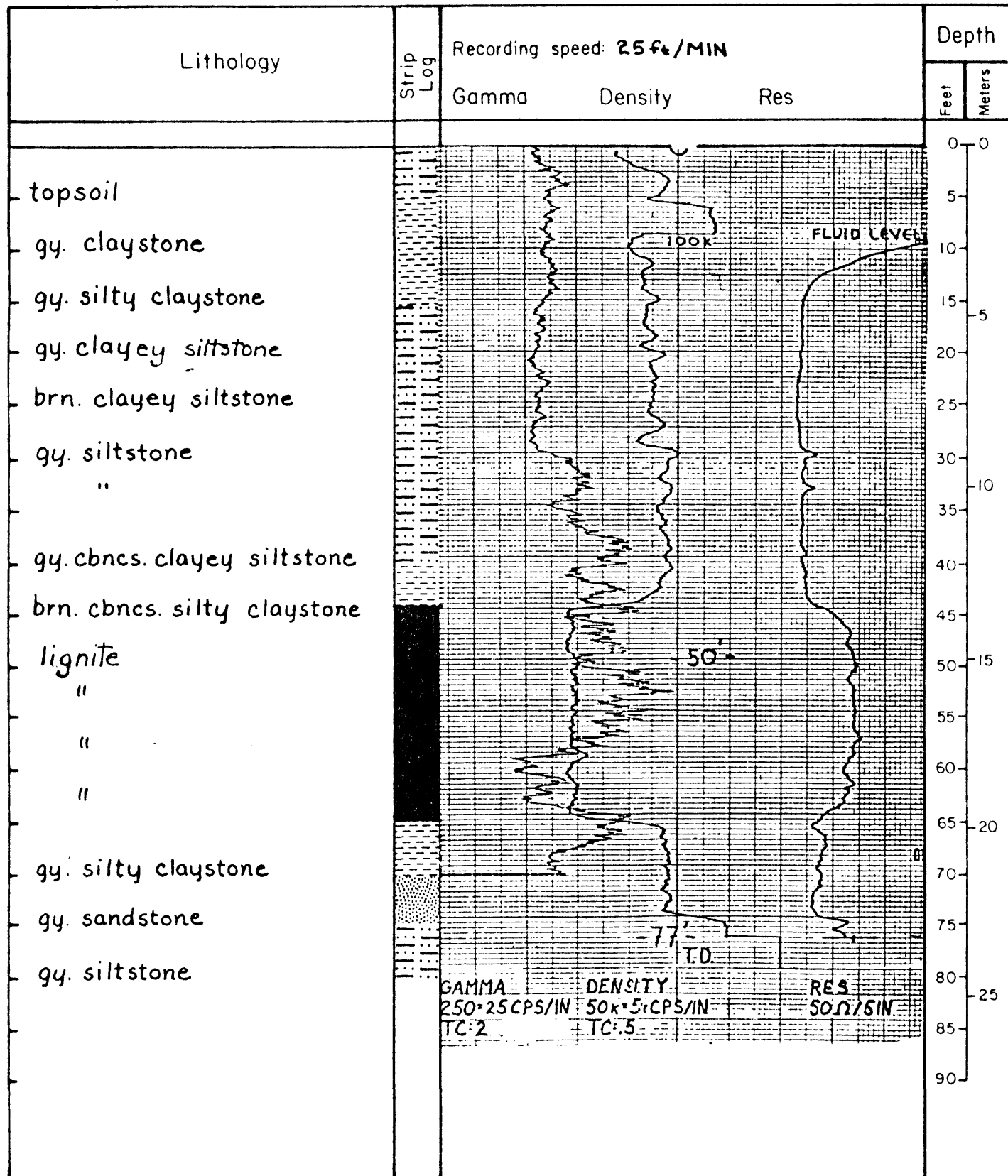
Recorded by: _____



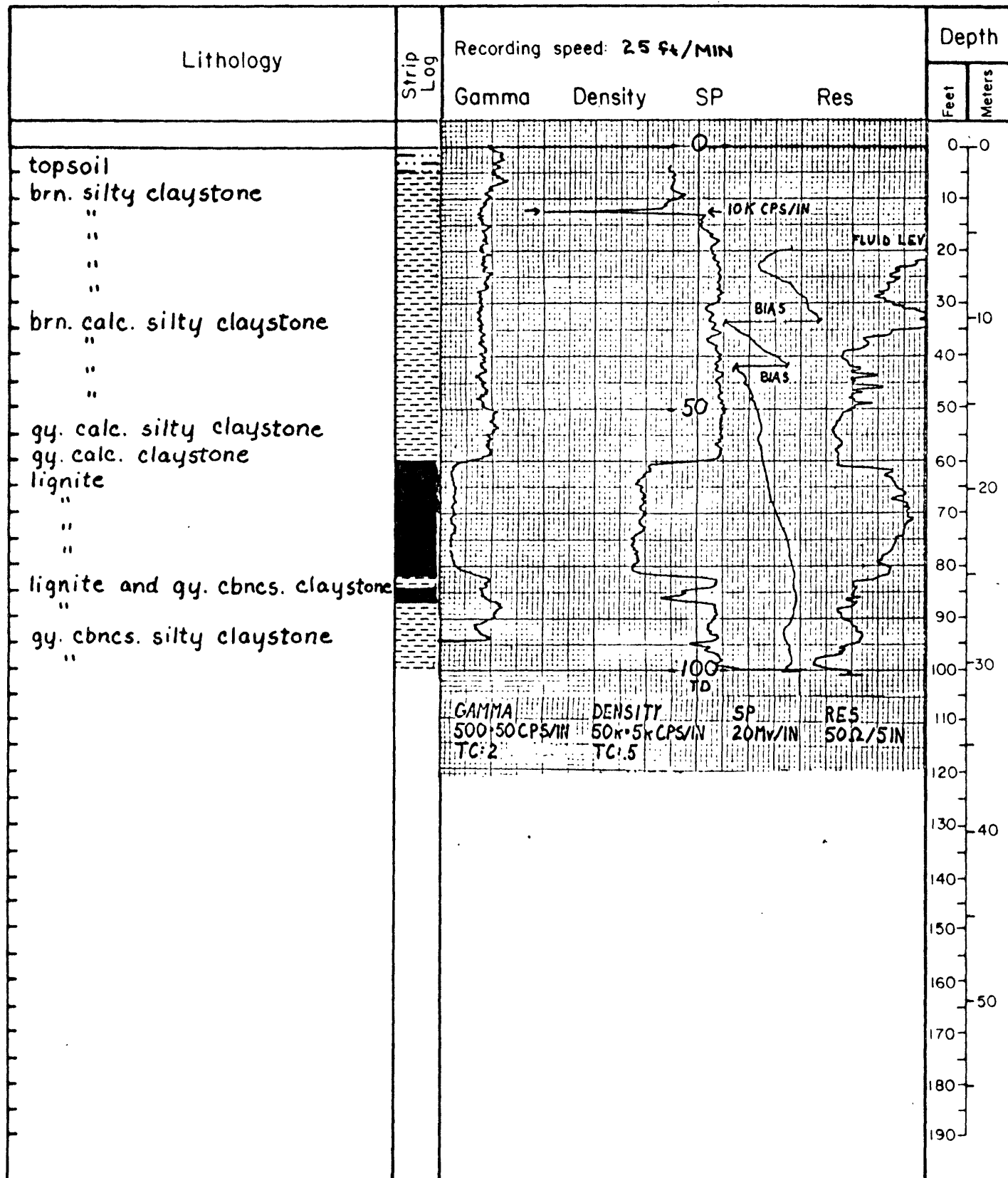
Hole no: WB77-24 Map: _____ Date: _____ State: _____ County: _____
 Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size: _____ Cored: Yes
 Remarks: See WB77-25 for data
 Recorded by: _____

Lithology	Strip Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

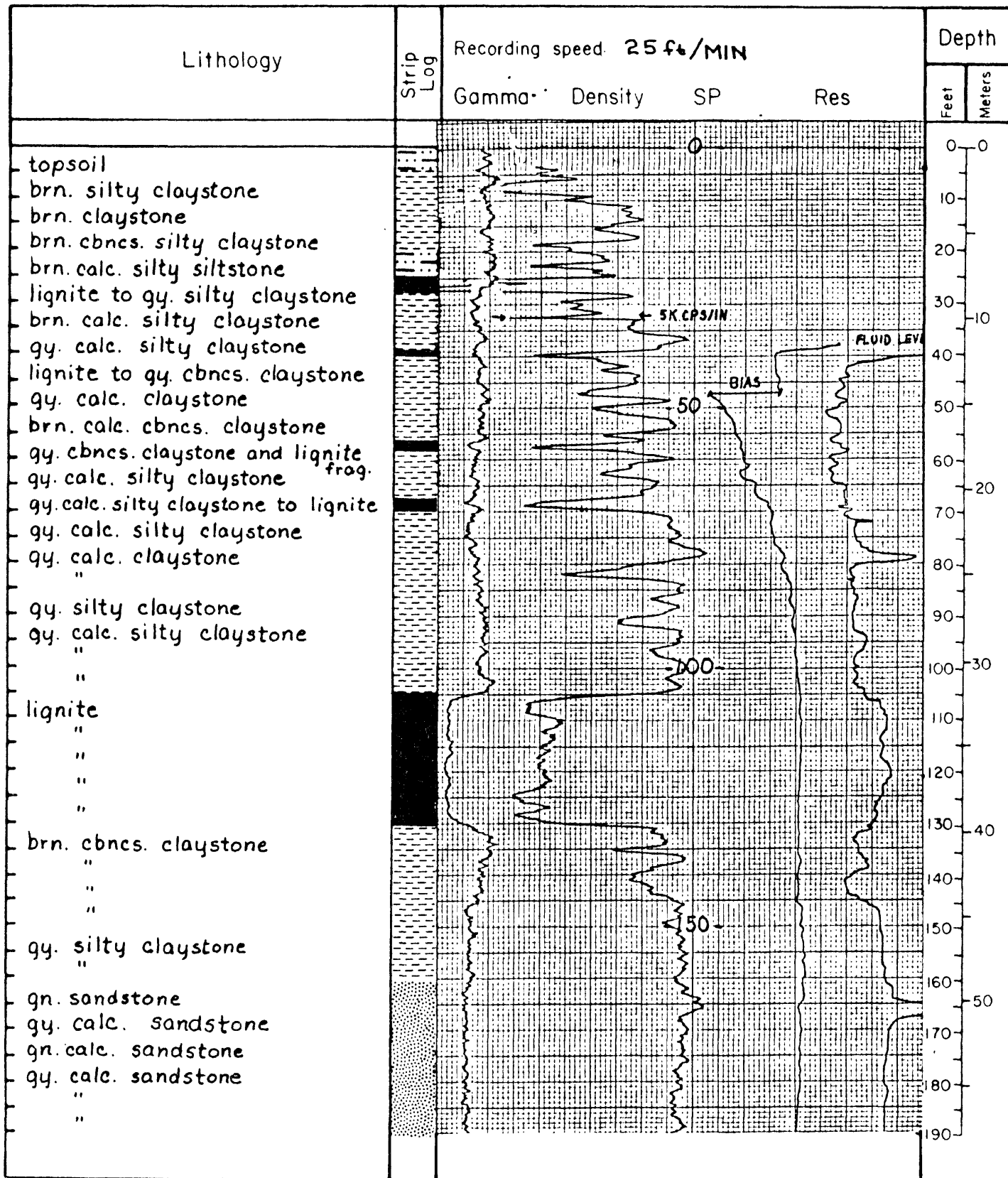
Hole no: WB77-25 Map: SW-1 Date: 10/16/77 State: N.D. County: Golden Valley
 Elev: 2850 ft Location: T139 N, R106 W Sec. 22, Tract lot 1 Drilled depth: 77 ft
 Measured: _____, _____ Hole size: 5 1/8 in. Cored: Yes
 Remarks: Twin and core hole 24/25, core interval 18-77 ft; vertical scale change.
 Recorded by: J. C. Harksen



Hole no: WB77-26 Map: NE-40 Date: 9/17/77 State: Mont. County: Wibaux
 Elev: 2850 ft Location: T13N, R60E Sec. 24, Tract SE SW Drilled depth: 100 ft
 Measured: _____, _____ Hole size: 5 1/8 in. Cored: No
 Remarks: _____
 Recorded by: J. C. Harksen



Hole no: WB77-27 Map: SW-1 Date: 9/17/77 State: N.D. County: Golden Valley
 Elev: 2860 ft Location: T 139 N, R 106 W Sec. 14, Tract NW NW Drilled depth: 650 ft
 Measured: 141 ft FWL, 140 ft FNL Hole size: 5 1/8 in. Cored: No
 Remarks: No drilling data for gamma, density, SP and Res. in cps/in., MV/in or Ω /in.
 Recorded by: J.C. Harksen



(Continued)

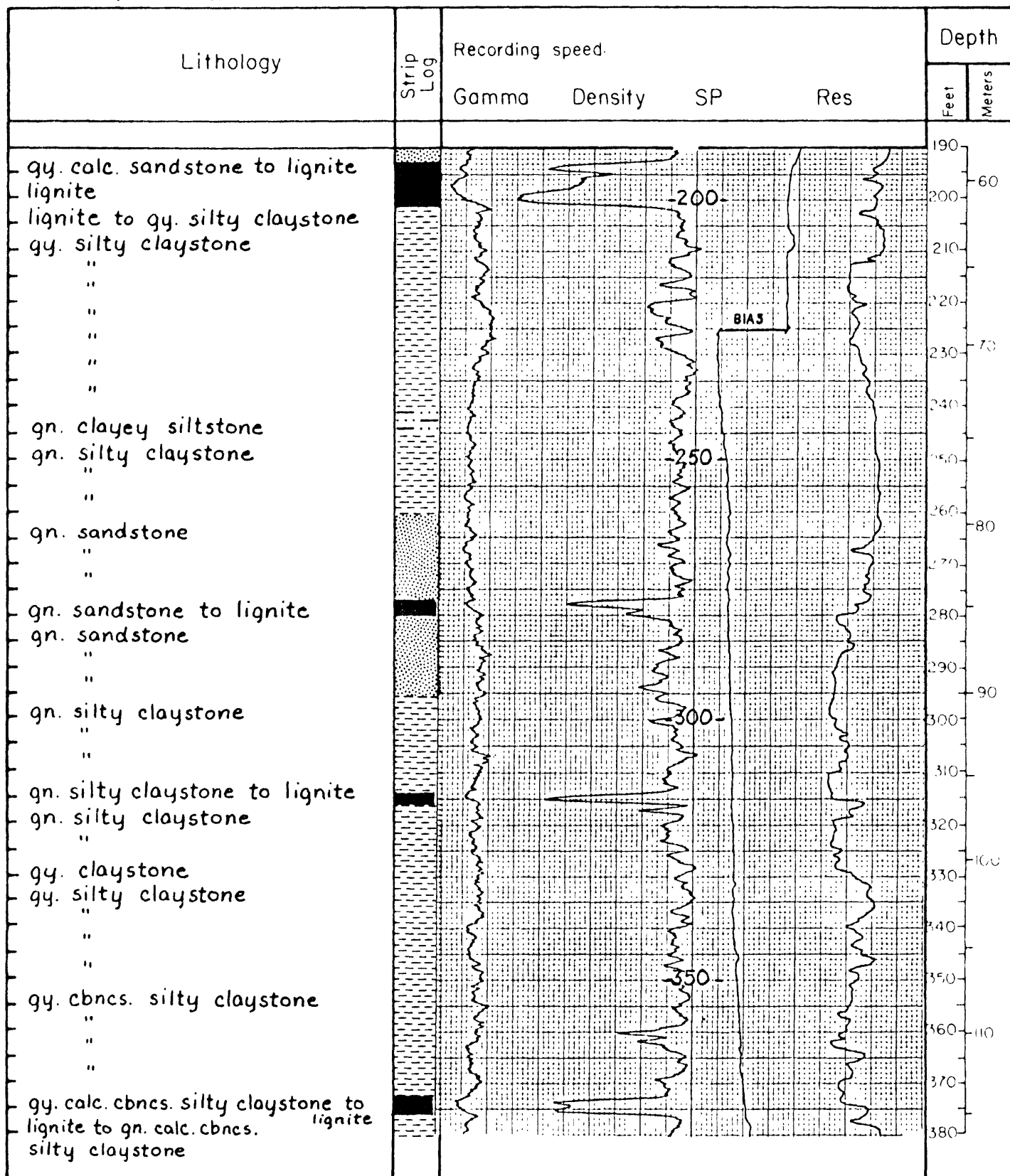
Hole no: WB77-27 Map _____ Date _____ State _____ County _____

Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

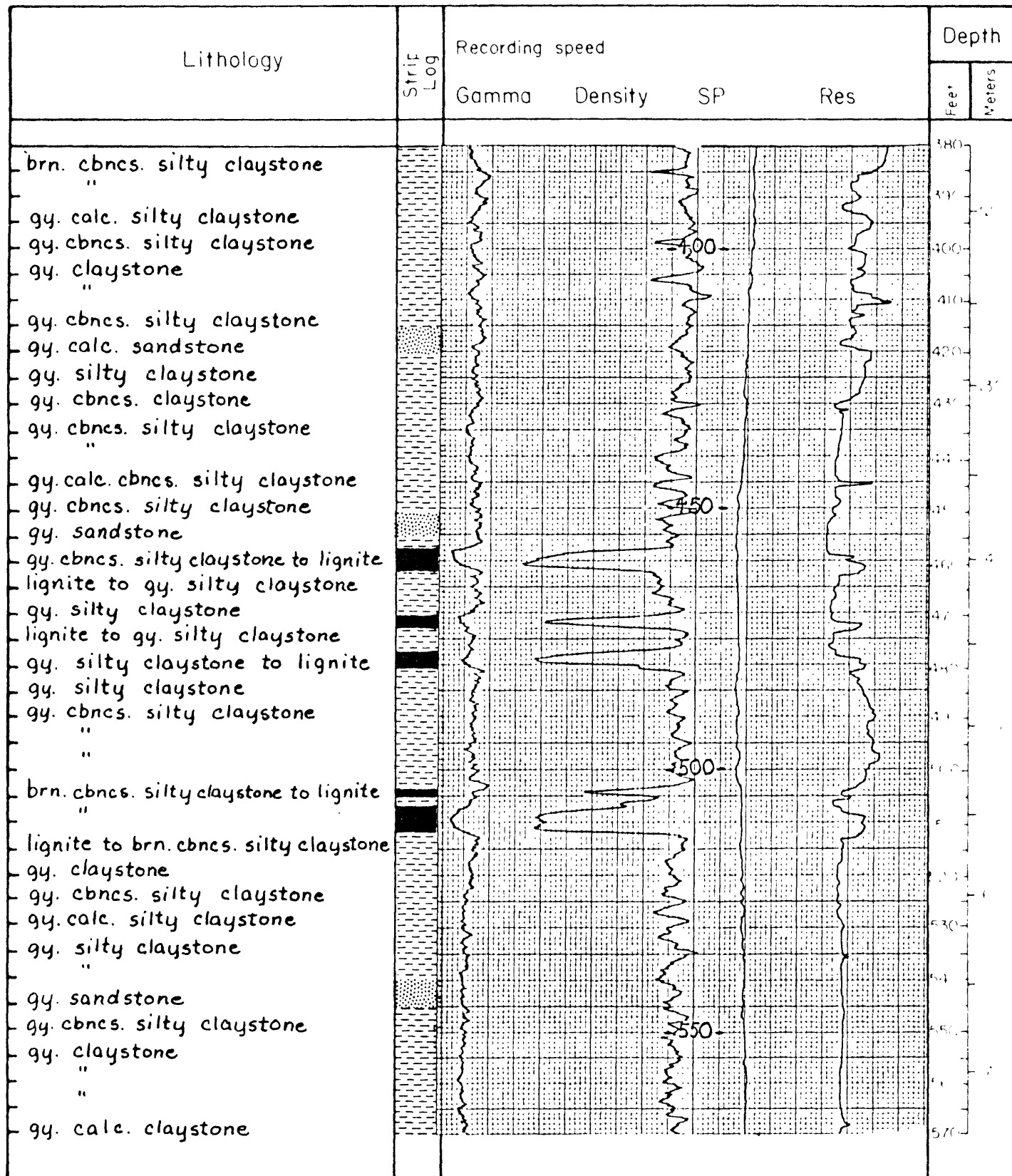
Remarks: _____

Recorded by _____



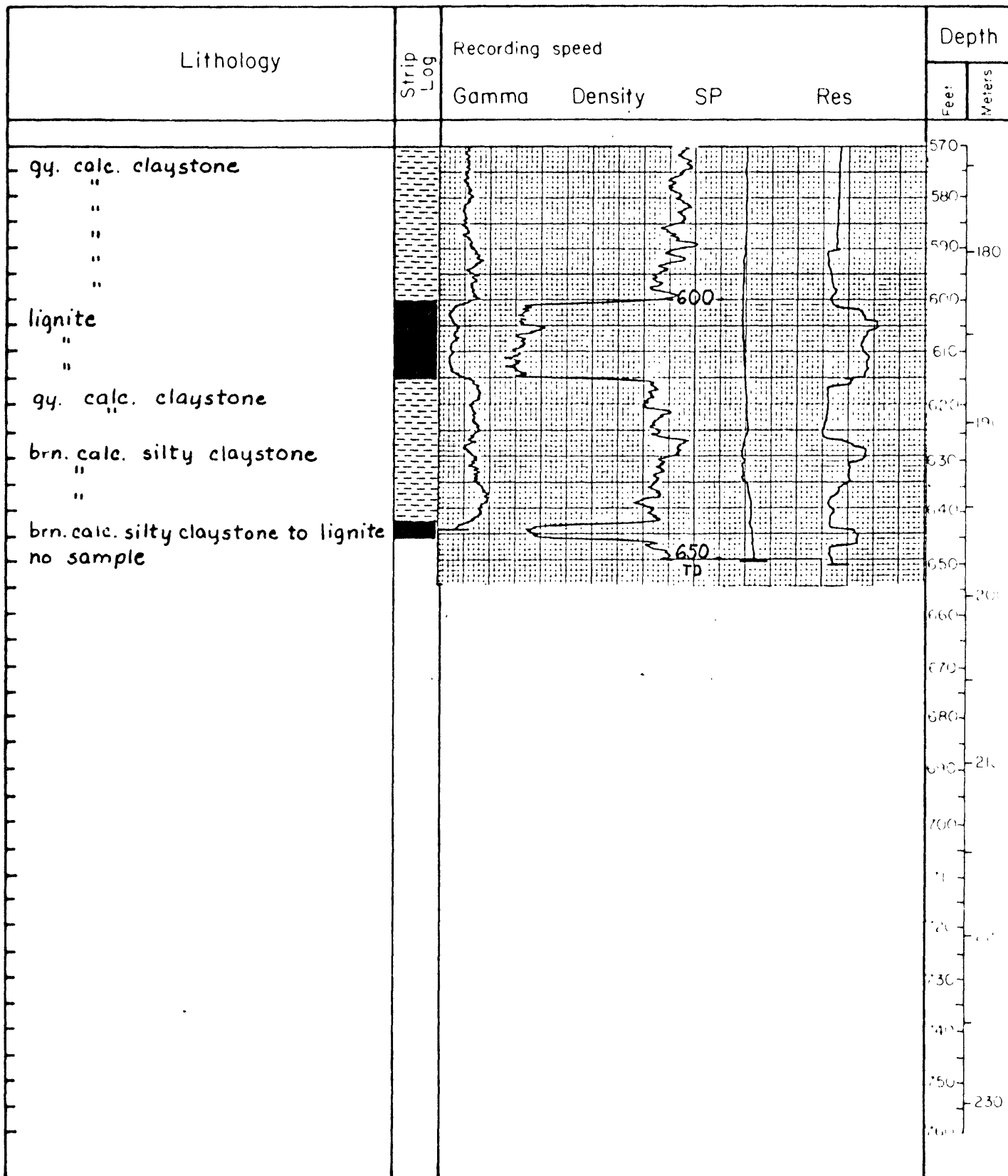
(Continued)

Hole no: WB77-27 Map _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks _____
 Recorded by: _____



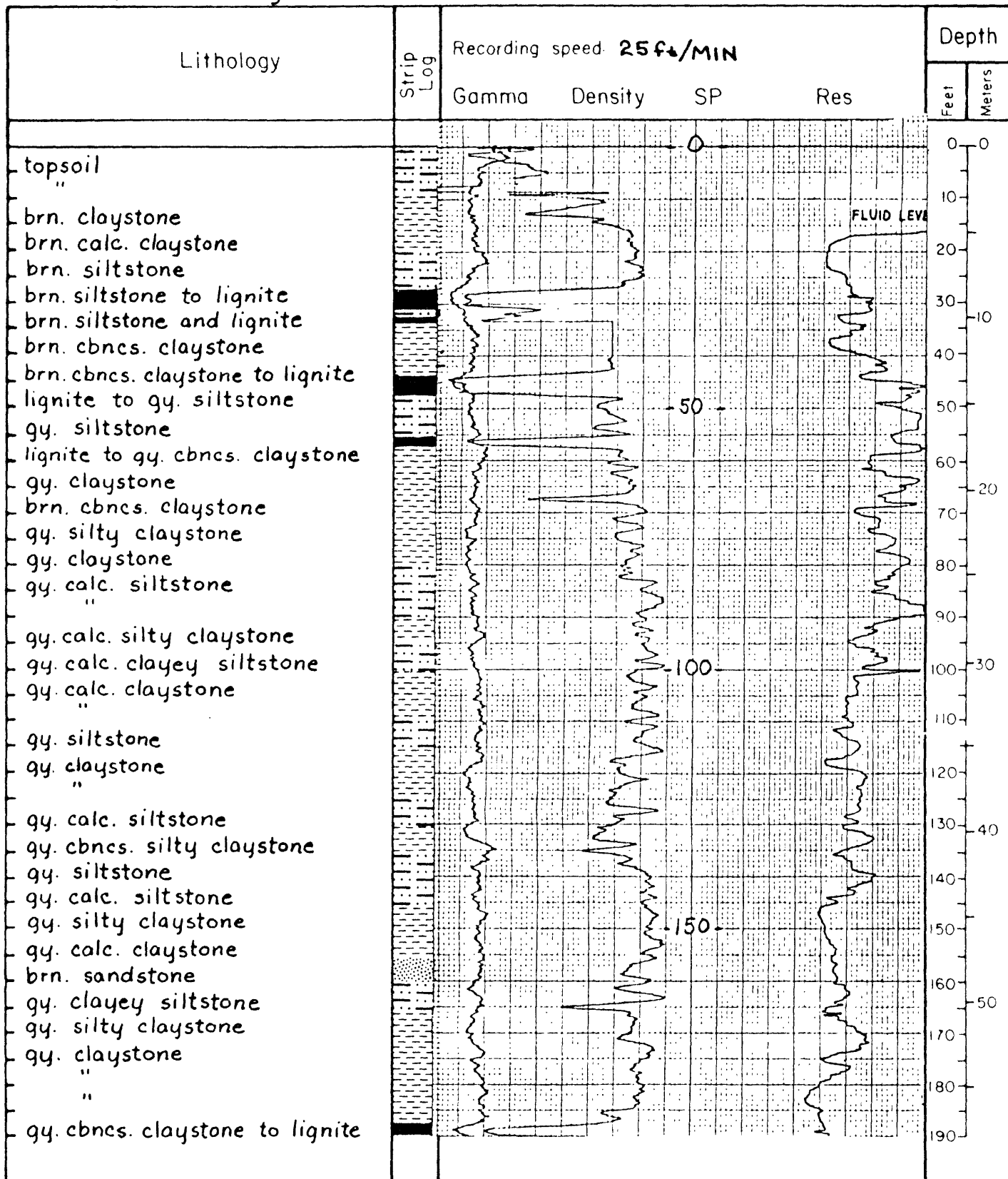
(continued)

Hole no: WB77-27 Map _____ Date _____ State _____ County _____
Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____
Measured _____, _____ Hole size _____ Cored _____
Remarks: _____
Recorded by: _____



Hole no: WB77-28 Map SW-1 Date: 9/17/77 State N.D. County: Golden Valley
 Elev 2780 ft Location: T 139 N, R 105 W Sec. 6, Tract SE NE Drilled depth: 300 ft
 Measured _____, _____ Hole size: 5 1/8 in. Cored No
 Remarks _____

Recorded by: M. L. Menge



(Continued)

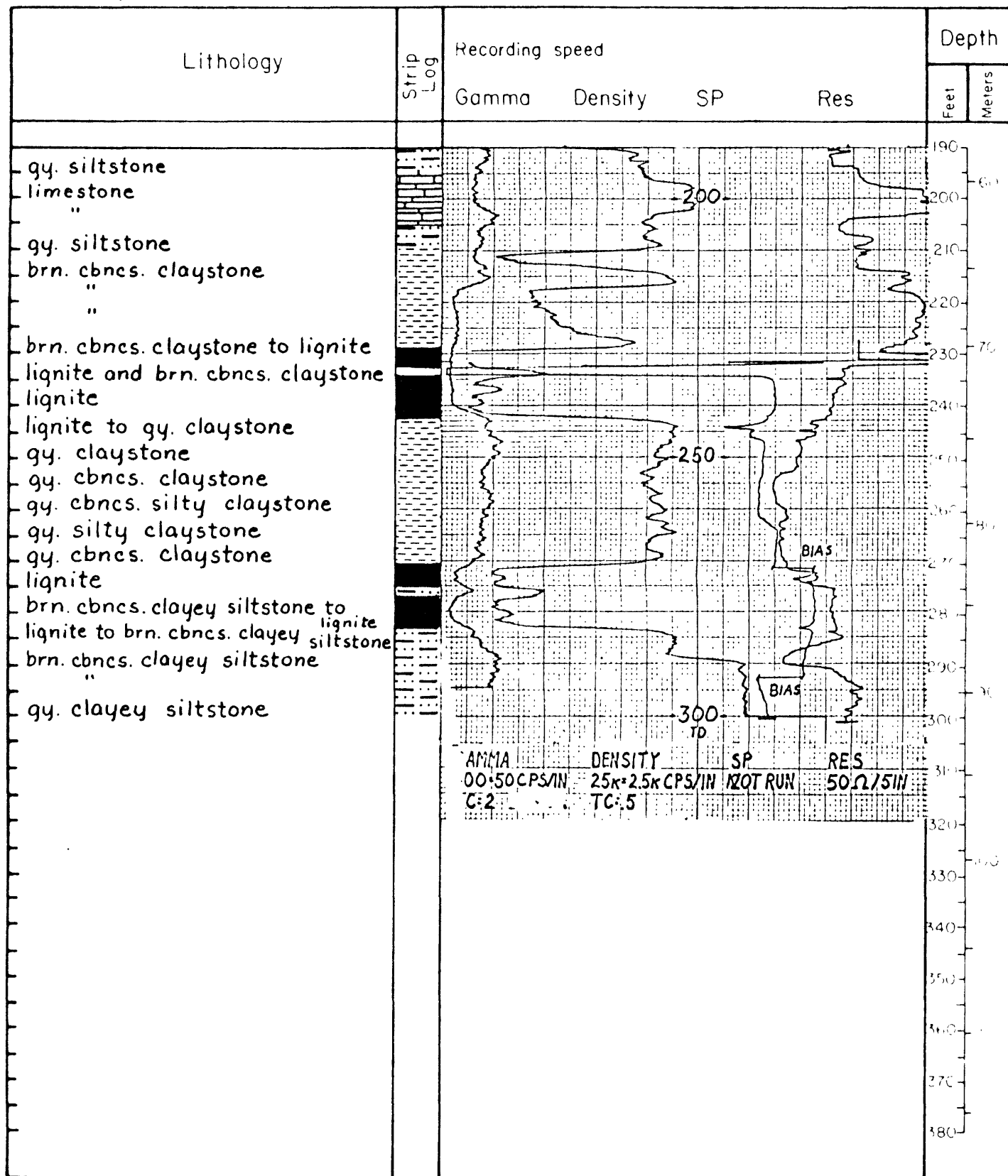
Hole no: WB77-28 Map _____ Date: _____ State _____ County: _____

Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

Remarks: _____

Recorded by: _____



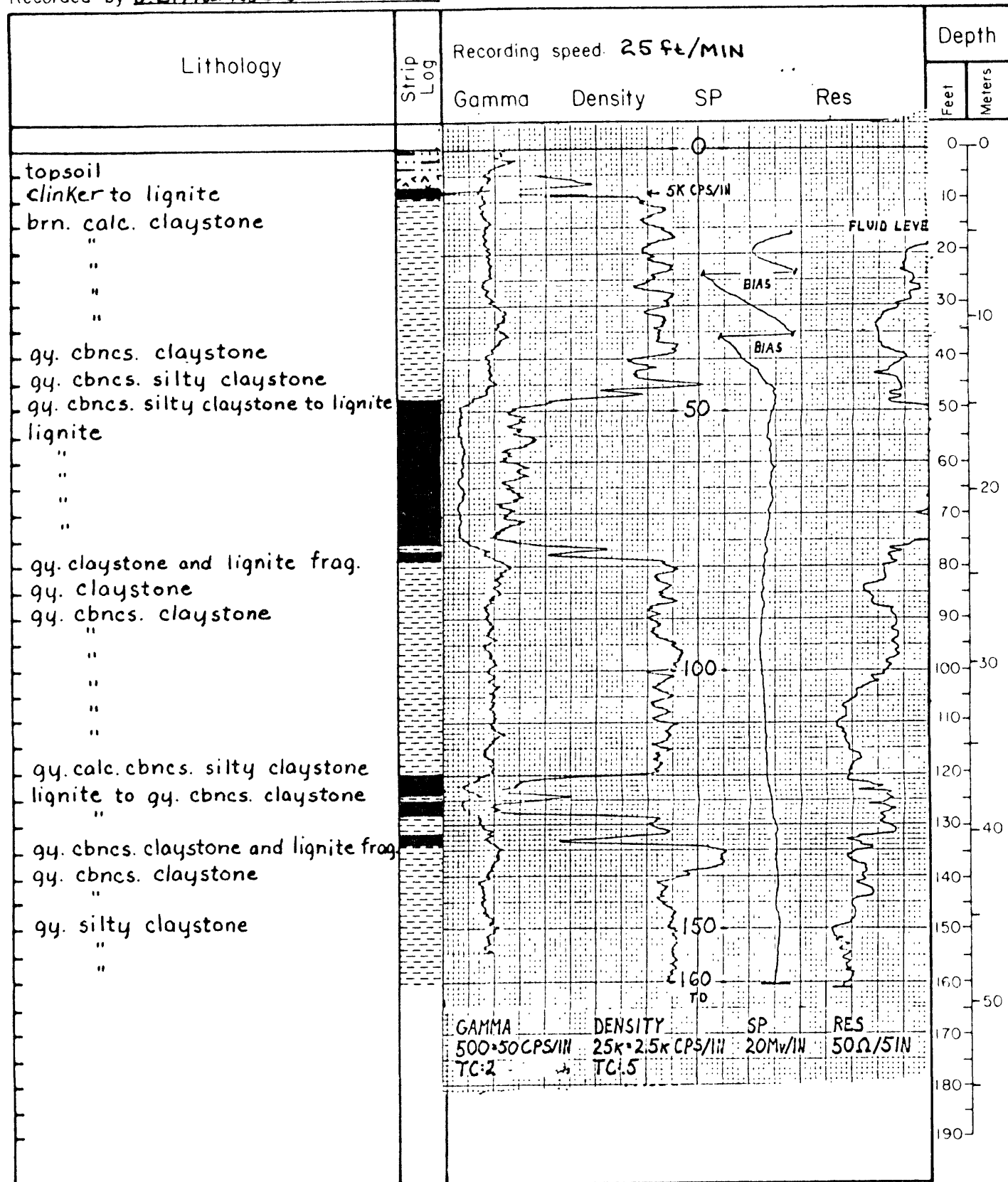
Hole no: WB77-29 Map: NE-40 Date: 9/17/77 State: Mont. County: Wibaux

Elev: 2820 ft Location: T 13 N, R 60 E Sec. 12, Tract SW SW Drilled depth: 160 ft

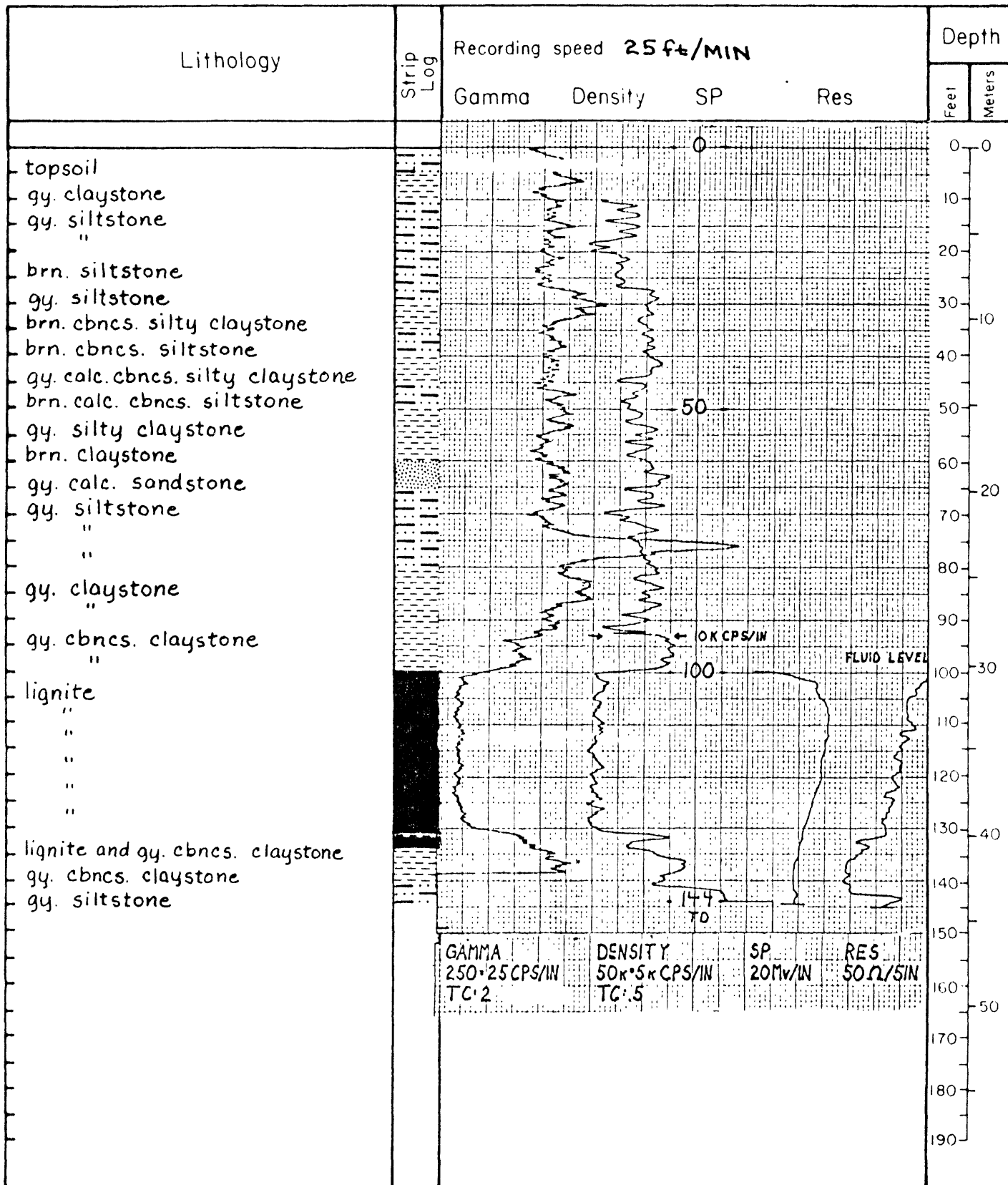
Measured: _____, _____ Hole size 5 1/8 in. Cored No

Remarks: _____

Recorded by: J.C. Harksen



Hole no: WB77-30 Map NE-40 Date 10/13/77 State Mont. County: Wibaux
 Elev 2870ft Location: T13N, R60E Sec. 10, Tract NE NE Drilled depth: 144ft
 Measured: _____, _____ Hole size: 5 1/8 in. Cored: Yes
 Remarks: Twin and core hole 30/31, core interval 98-135ft
 Recorded by: J. C. Harksen



Hole no: WB77-31 Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured: _____, _____ Hole size: _____ Cored: YES

Remarks See WB77-30 for data

Recorded by: _____

Lithology	Strip Log	Recording speed.				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

Hole no: W877-32 Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

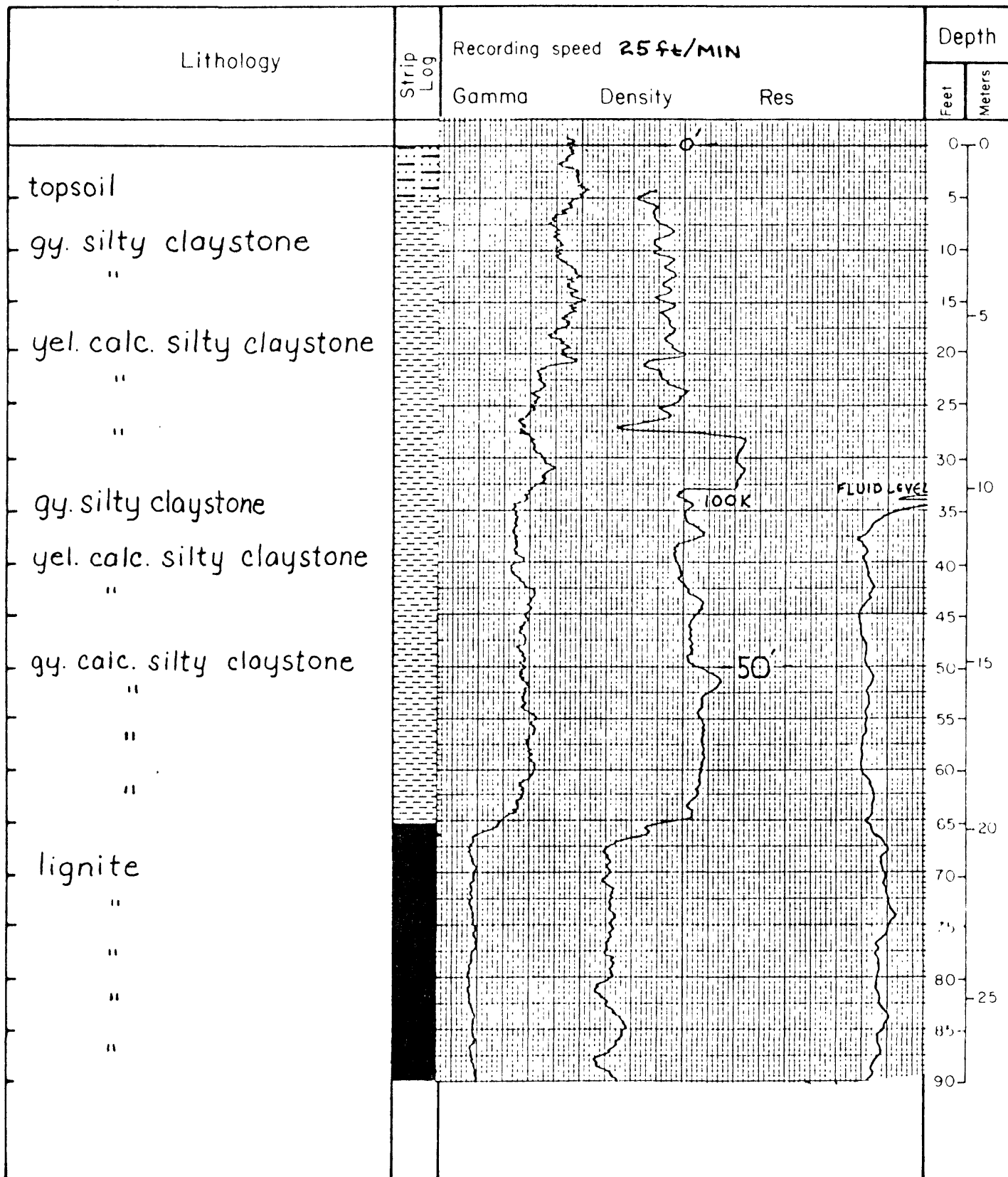
Measured: _____, _____ Hole size: _____ Cored: _____

Remarks: Not drilled

Recorded by: _____

Lithology	Strip Log	Recording speed:				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

Hole no: WB77-33 Map NE-40 Date: 10/14/77 State: Mont. County: Wibaux
 Elev 2835 ft Location: T13N, R60E Sec. 12, Tract NE NW Drilled depth: 470 ft
 Measured 2510 ft FWL, 120 ft FNL Hole size 5 1/8 in. Cored No
 Remarks Vertical scale change, no SP log
 Recorded by: J.C. Harksen



(Continued)

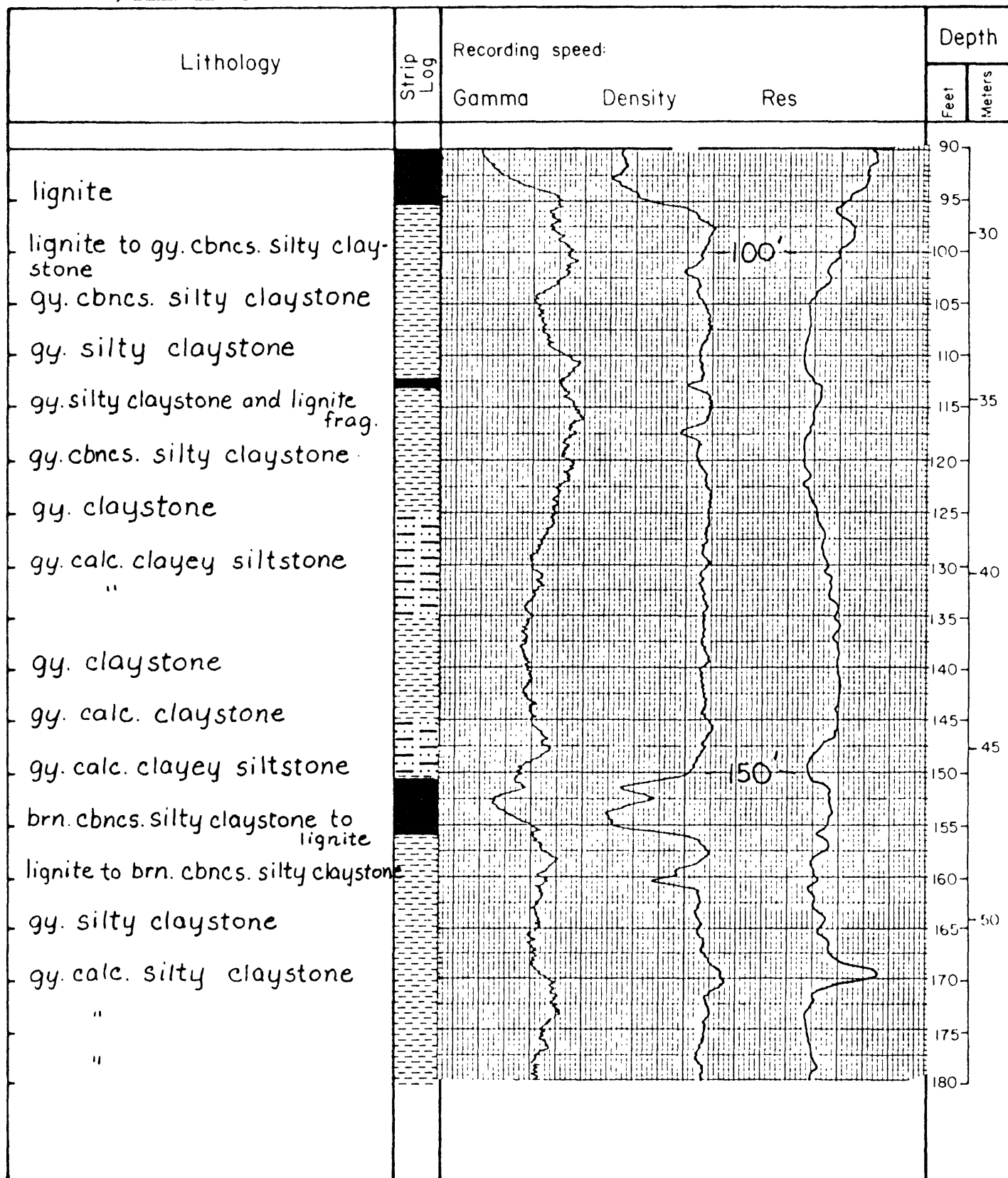
Hole no: WB77-33 Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured: _____, _____ Hole size: _____ Cored: _____

Remarks: _____

Recorded by: _____



(Continued)

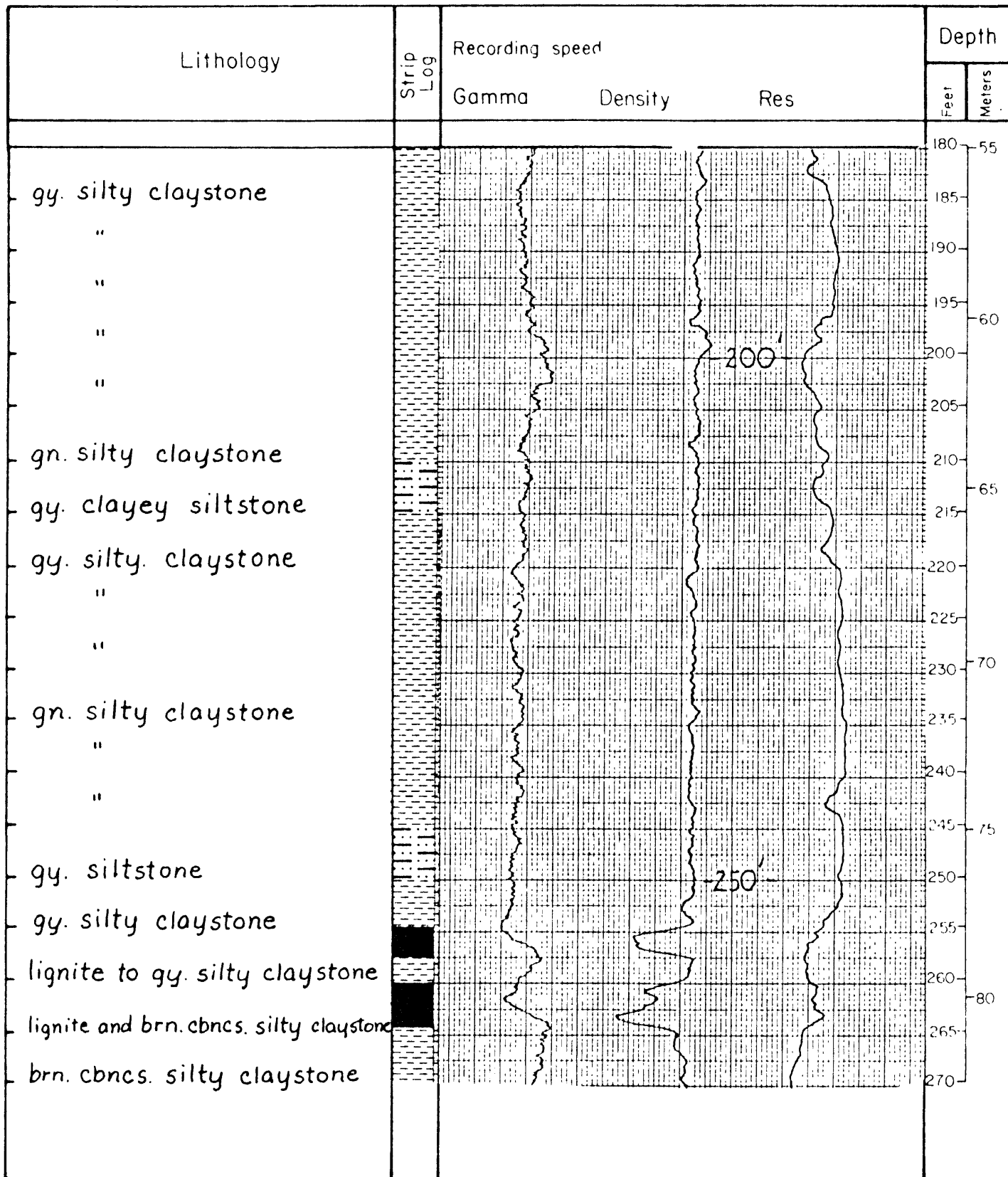
Hole no: WB77-33 Map: _____ Date: _____ State: _____ County: _____

Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

Remarks: _____

Recorded by: _____



(Continued)

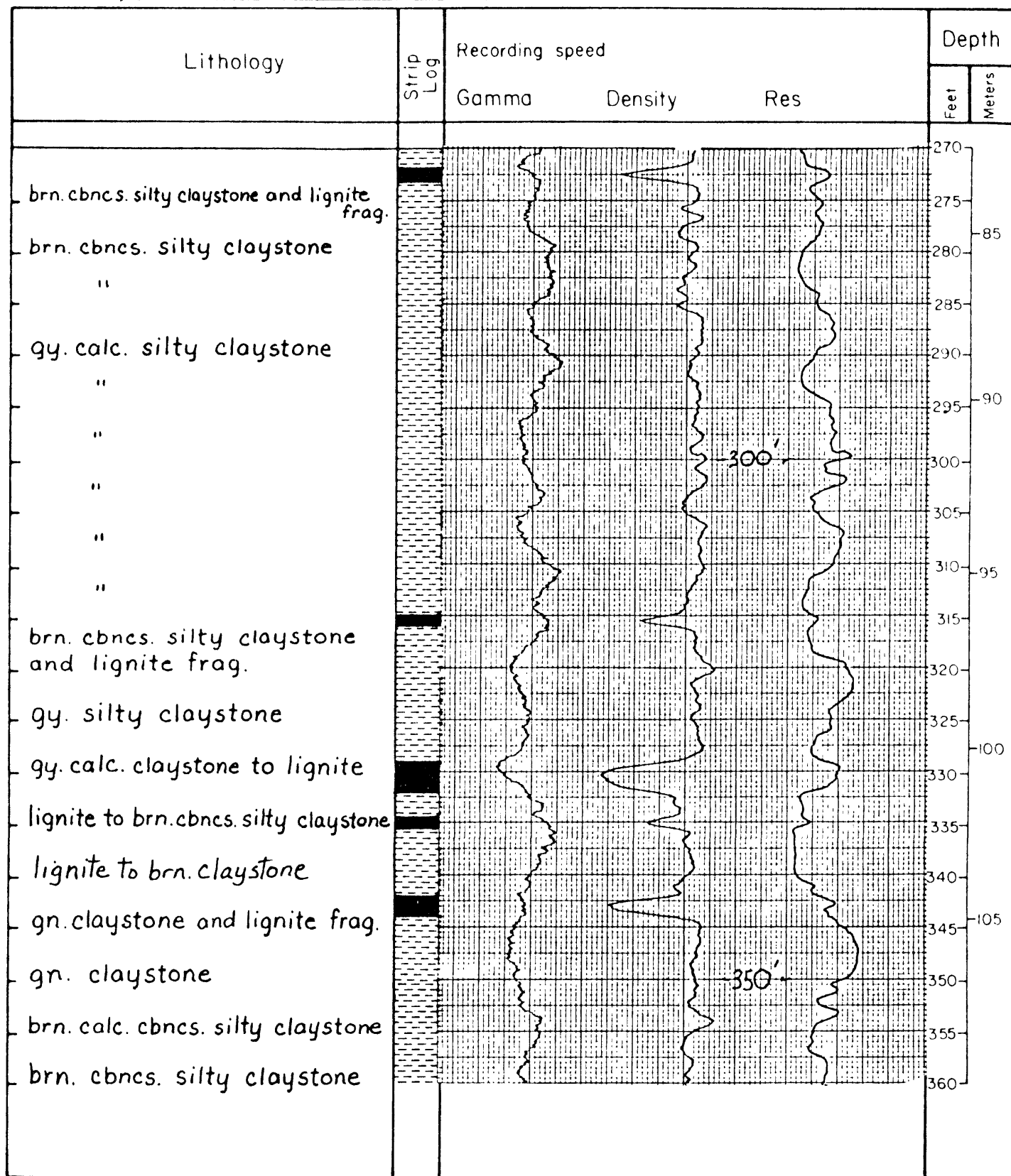
Hole no: WB77-33 Map: _____ Date: _____ State: _____ County: _____

Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size: _____ Cored: _____

Remarks: _____

Recorded by: _____



(Continued)

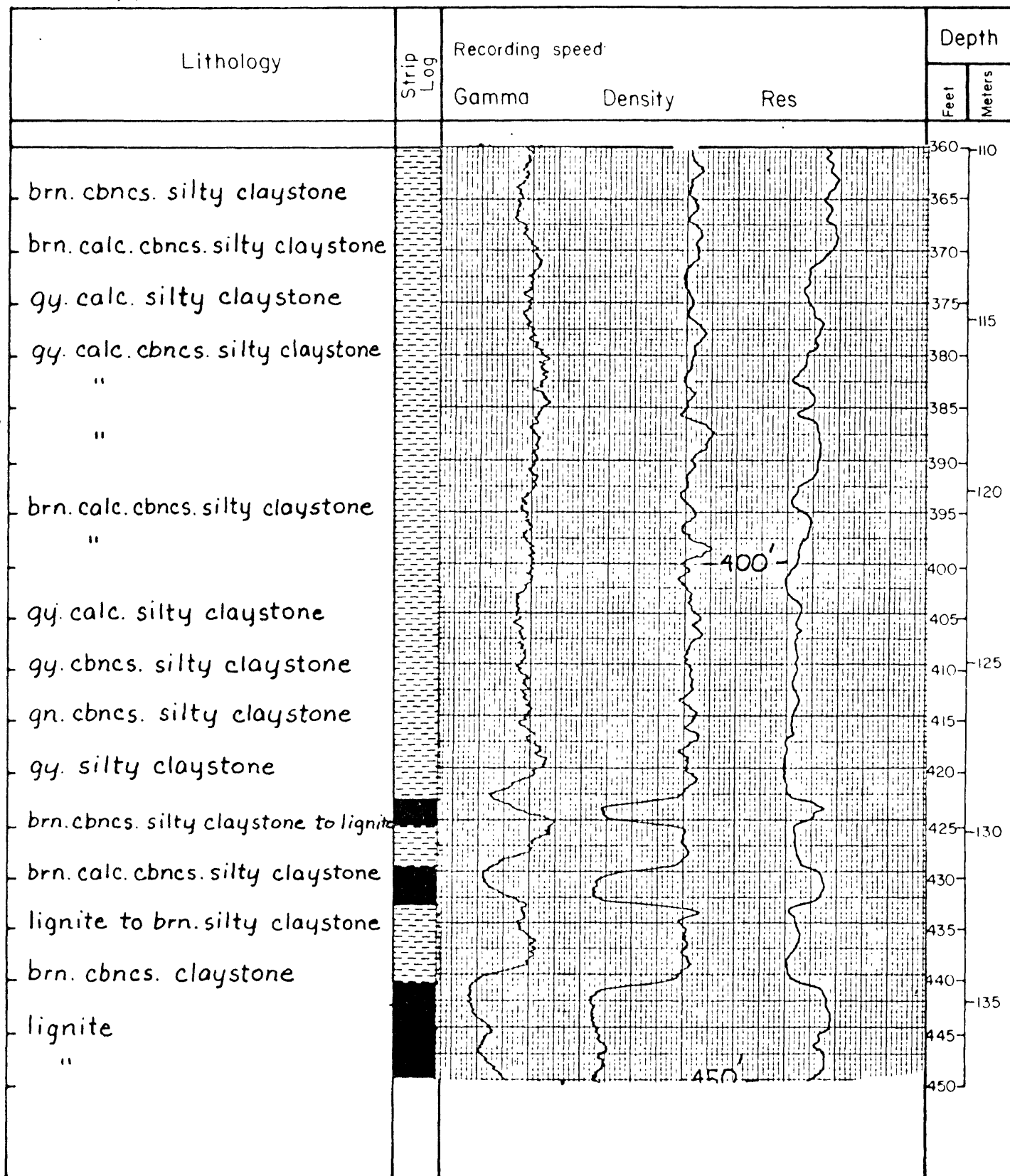
Hole no: WB77-33 Map _____ Date: _____ State _____ County: _____

Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured: _____, _____ Hole size: _____ Cored: _____

Remarks: _____

Recorded by: _____



(Continued)

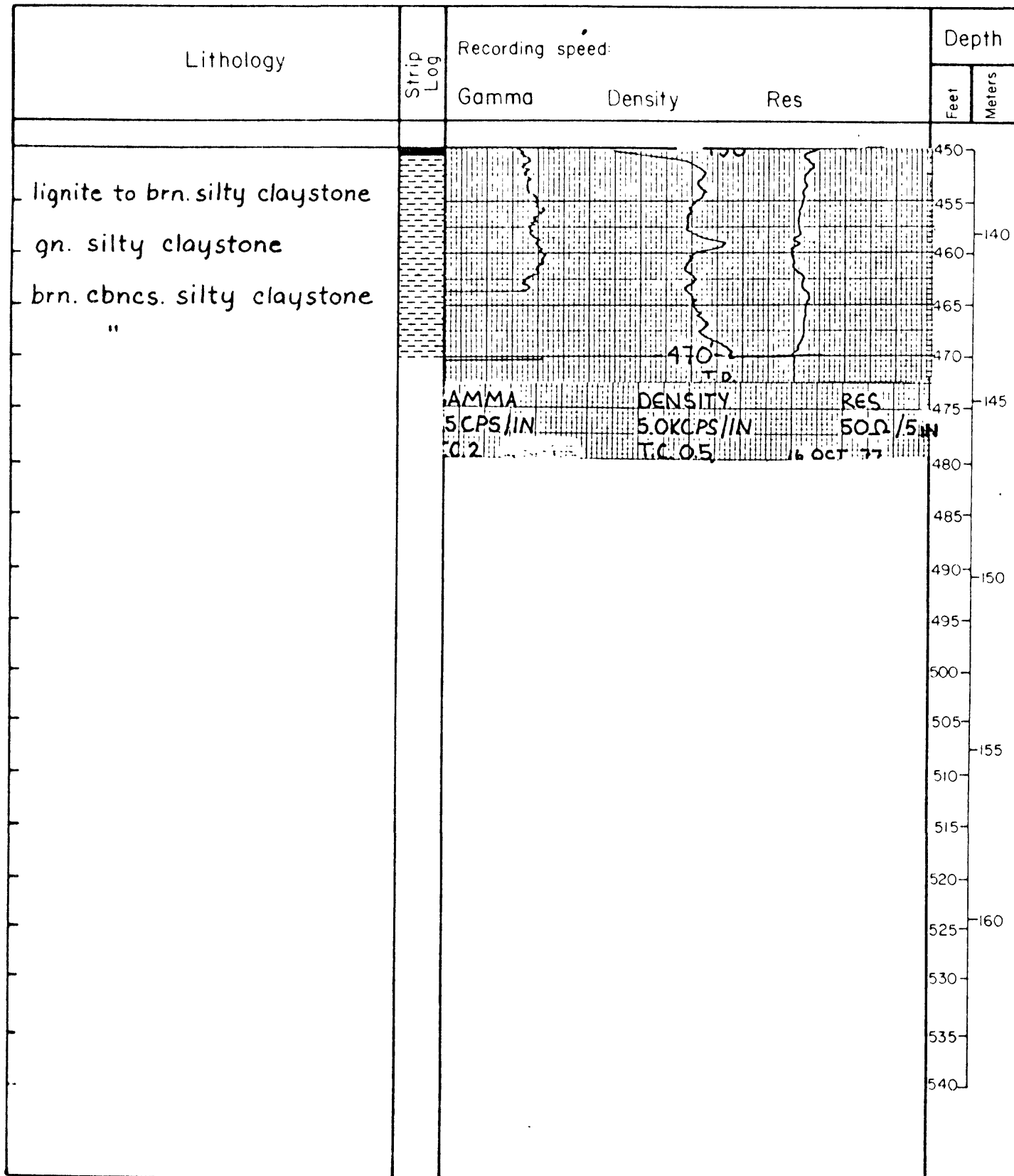
Hole no: WB77-33 Map: _____ Date: _____ State: _____ County: _____

Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

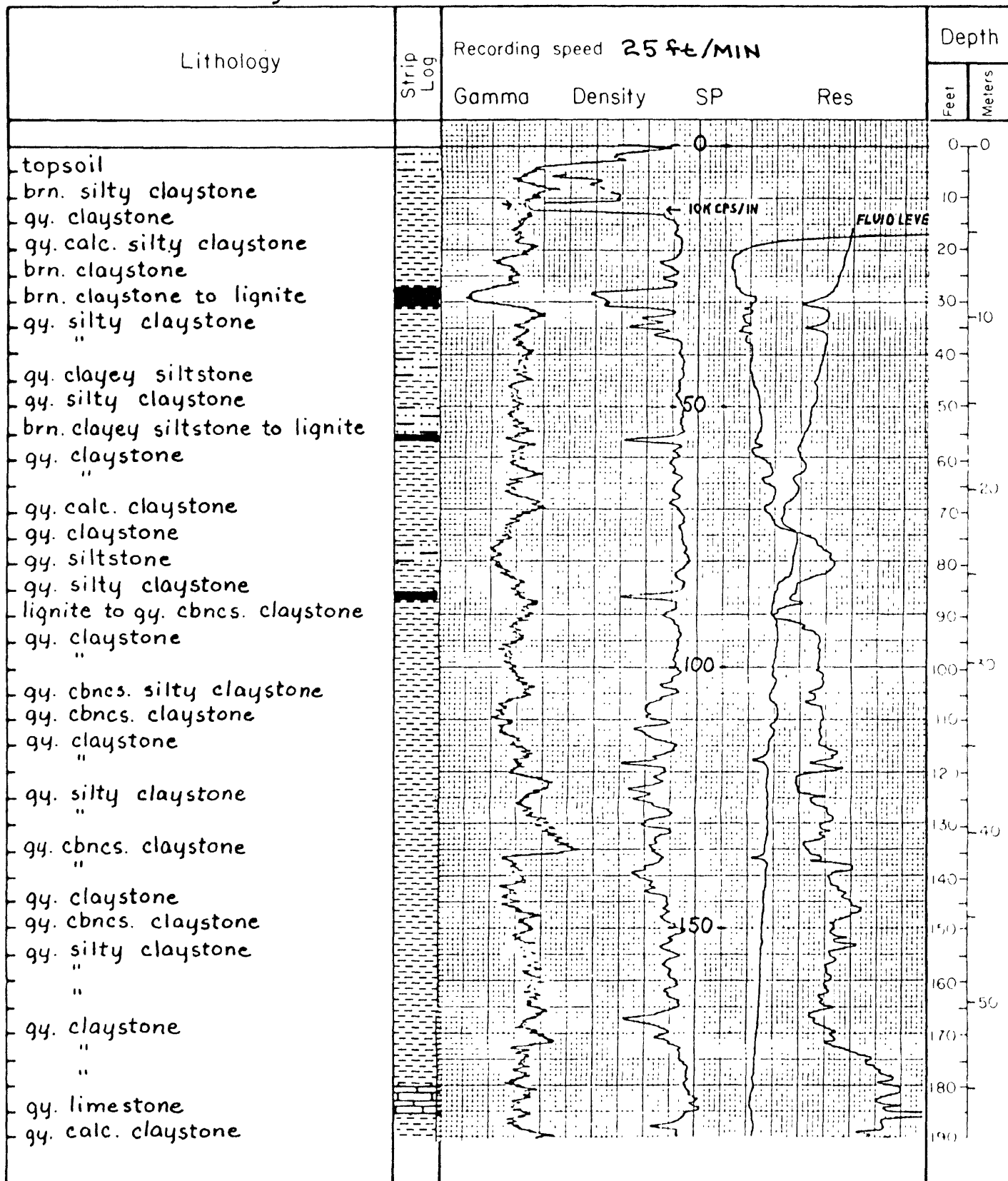
Measured _____, _____ Hole size _____ Cored: _____

Remarks _____

Recorded by: _____



Hole no: WB77-34 Map SW-1 Date 9/19/77 State N.D. County Golden Valley
 Elev 2750 ft Location T 140 N, R 105 W Sec. 30, Tract SE NE Drilled depth: 385 ft
 Measured _____, _____ Hole size 5 1/8 in. Cored: No
 Remarks _____
 Recorded by: M. L. Menge



(Continued)

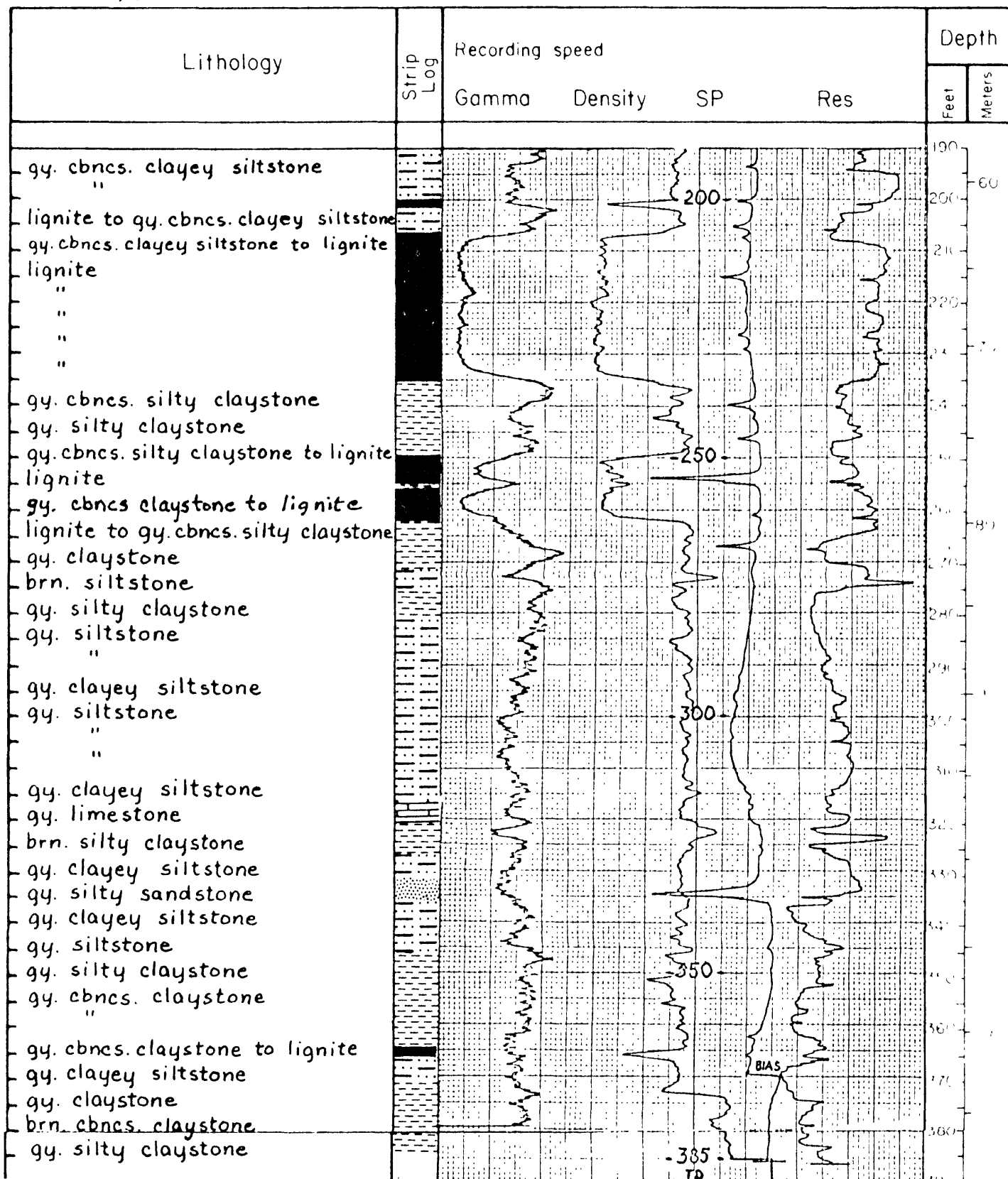
Hole no: WB77-34 Map _____ Date: _____ State: _____ County: _____

Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored: _____

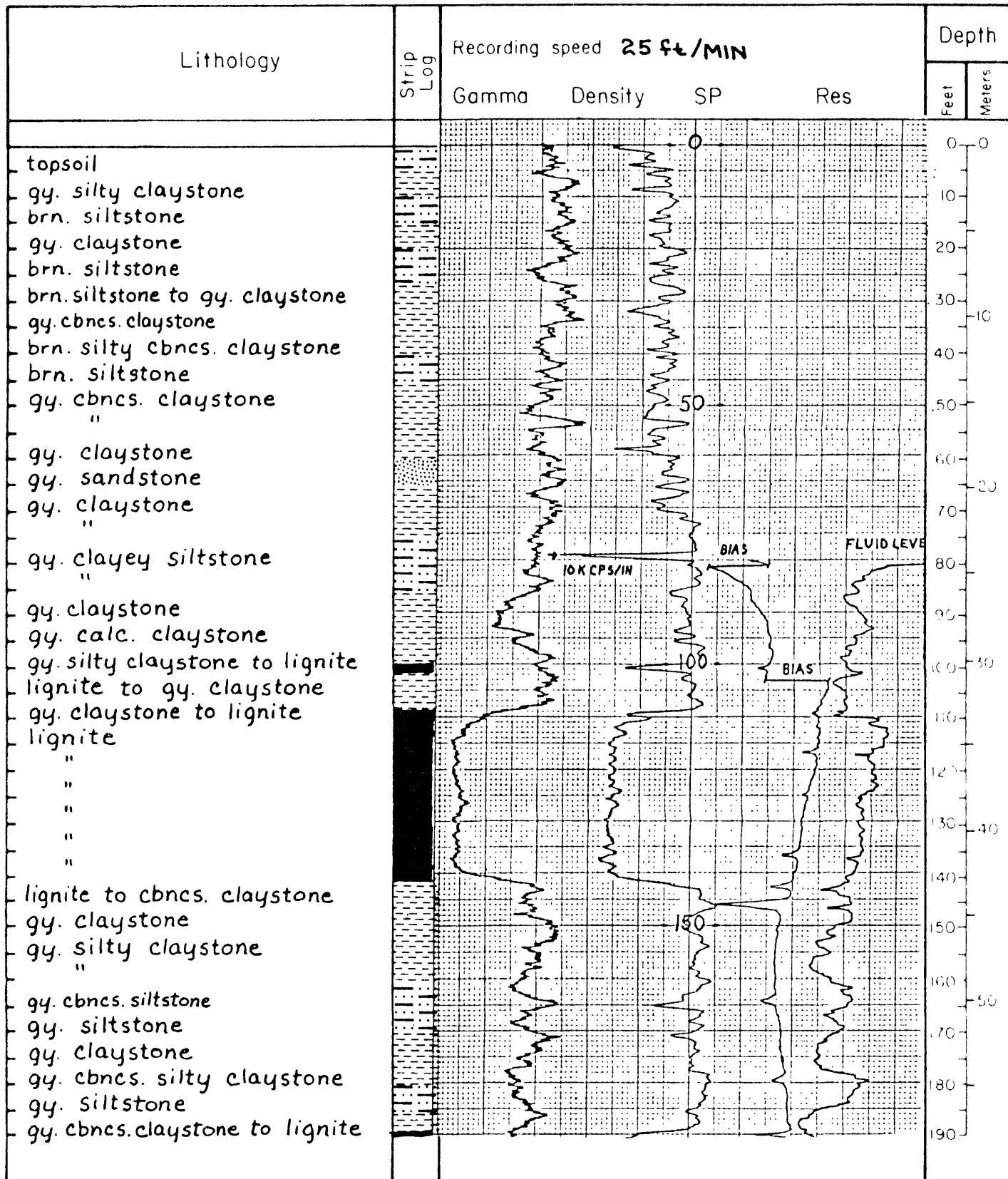
Remarks _____

Recorded by: _____



55 Gamma 250 = 25 CPS/IN TC=2 Density 50K = 5K CPS/IN TC=5 SP 20 MV/IN Res 50Ω/5IN

Hole no: WB77-35 Map NE-40 Date 9/29/77 State Mont. County: Wibaux
 Elev 2865 ft Location T 13 N, R 60 E Sec. 2, Tract NW NE Drilled depth: 207 ft
 Measured _____, _____ Hole size 5 1/8 in. Cored No
 Remarks _____
 Recorded by J. C. Harksen



(Continued)

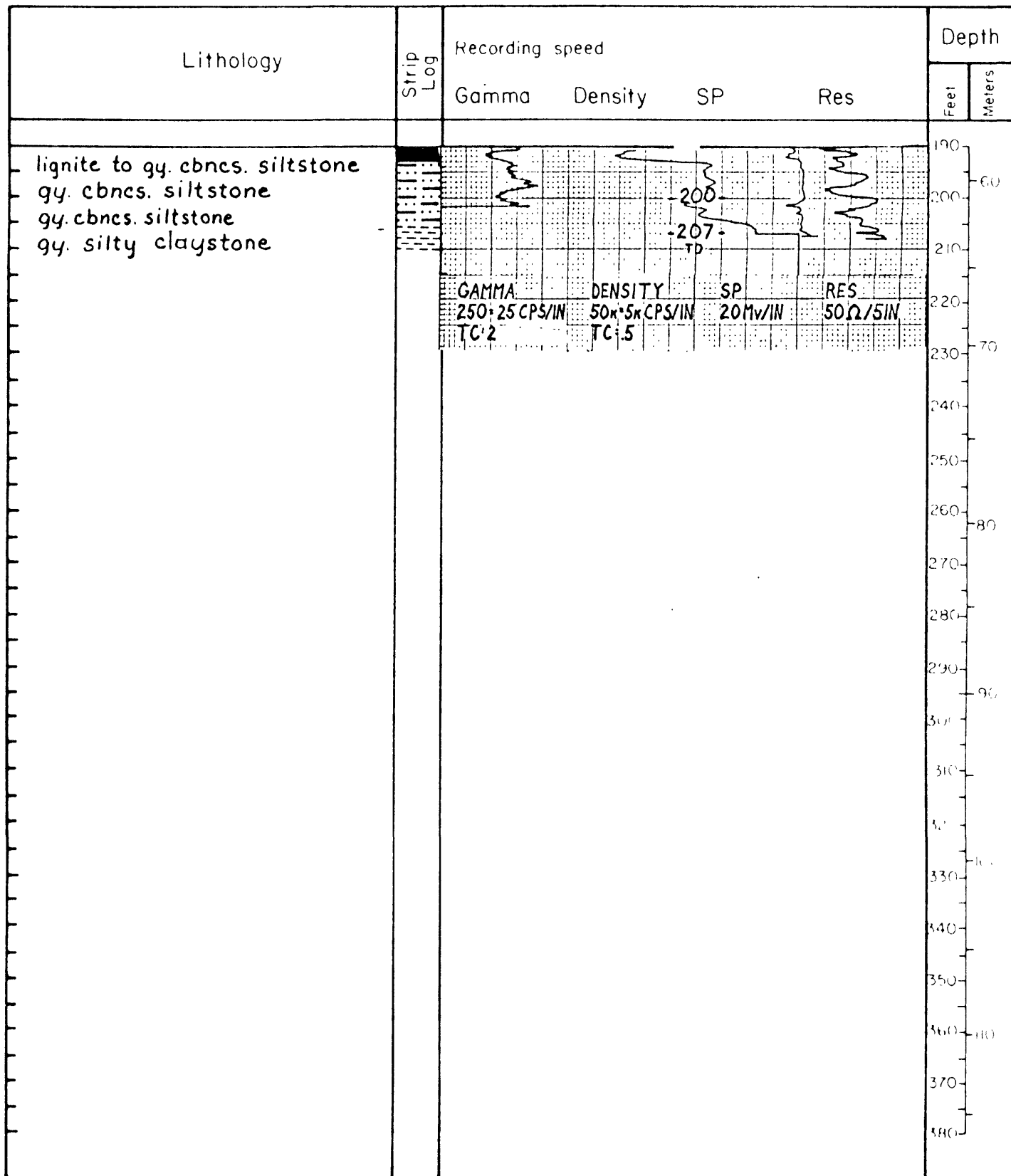
Hole no: **WB77-35** Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

Remarks _____

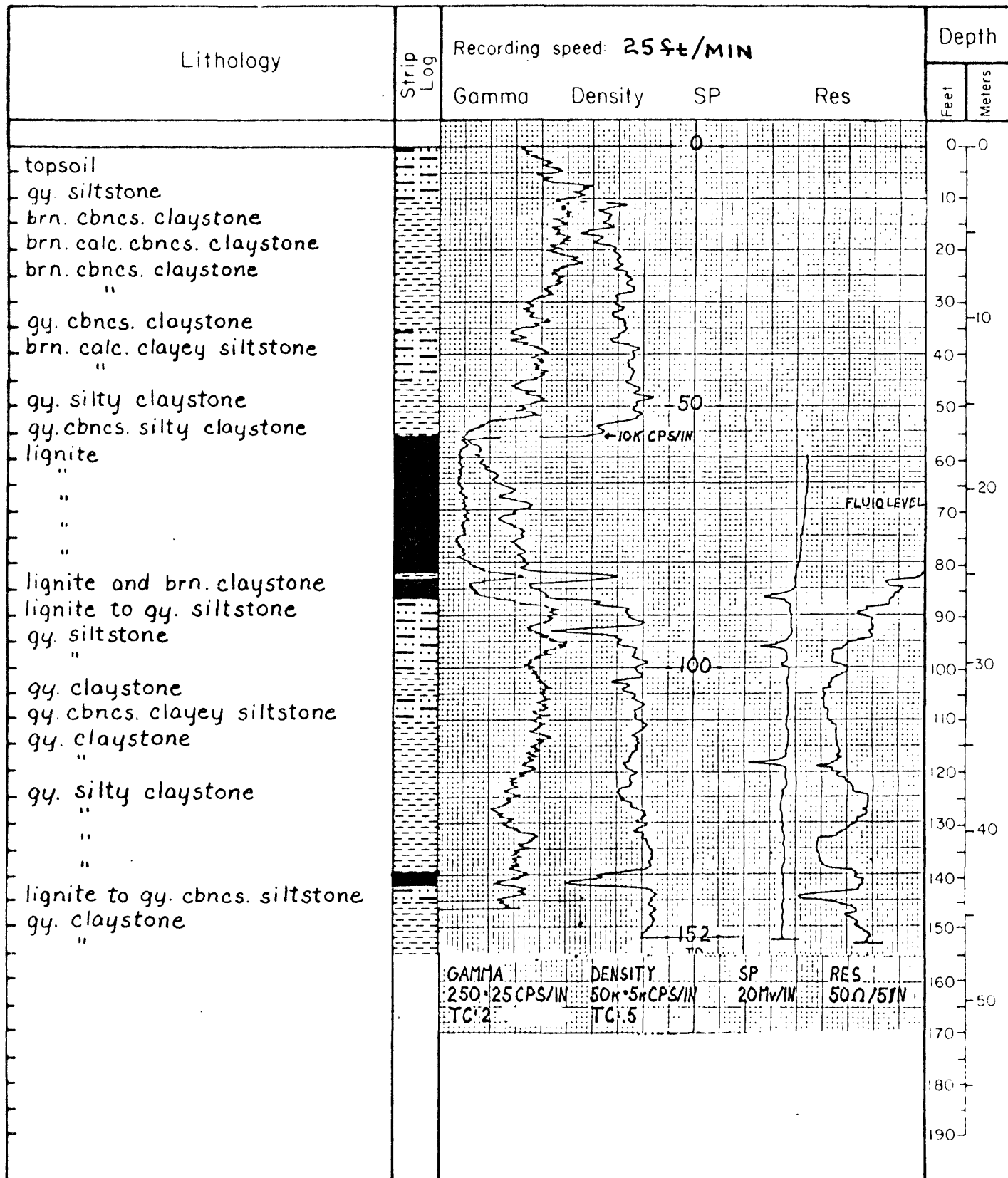
Recorded by: _____



Hole no: WB77-36 Map _____ Date _____ State: _____ County: _____
 Elev.: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size: _____ Cored YES
 Remarks: _____ See WB77-37 for data
 Recorded by: _____

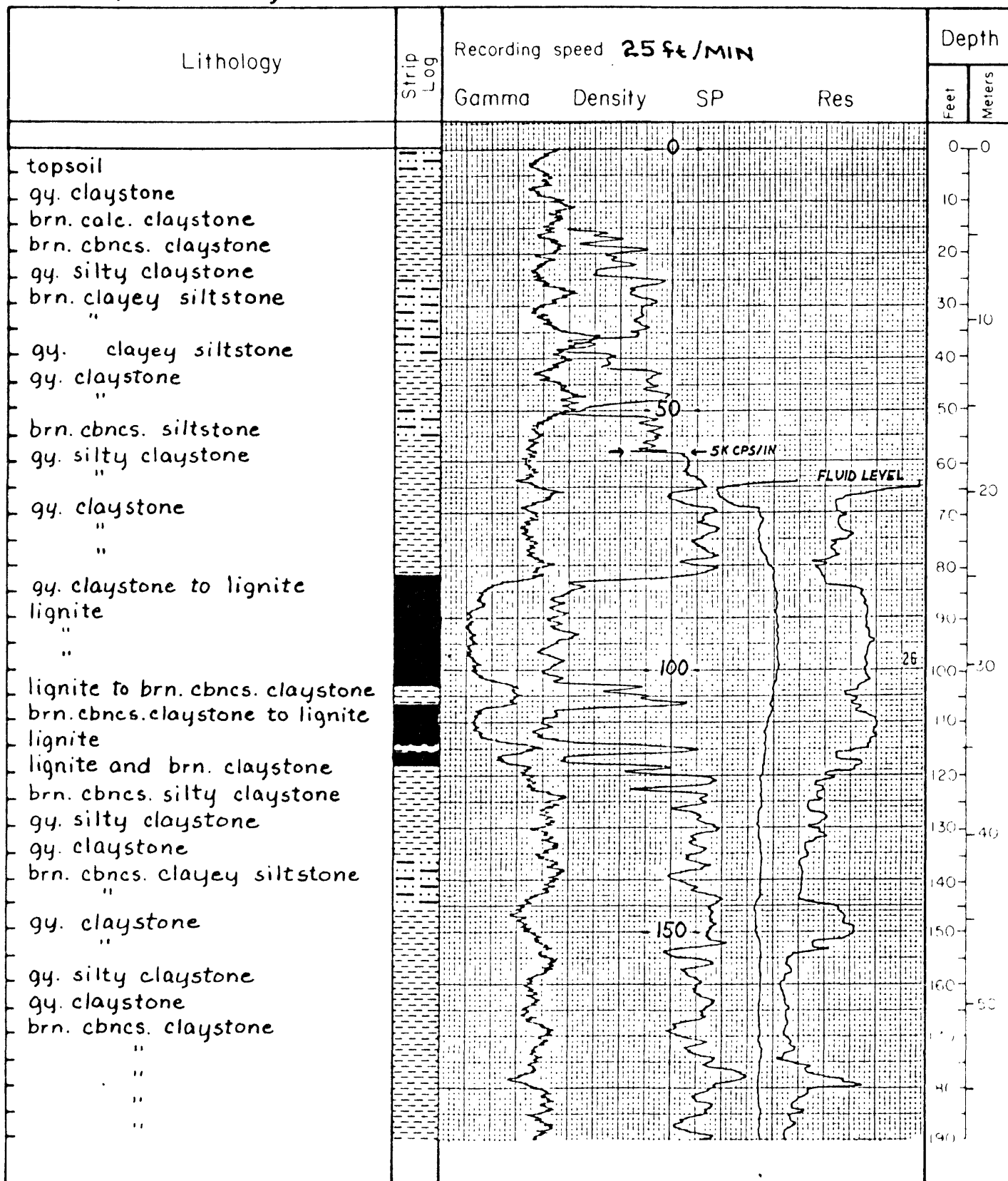
Lithology	Strip Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

Hole no: WB77-37 Map NE-40 Date: 10/14/77 State Mont. County: Wibaux
 Elev 2830 ft Location T14N, R60E Sec. 34, Tract NW SW Drilled depth: 152 ft
 Measured _____, _____ Hole size: 5 1/8 in. Cored Yes
 Remarks: Twin and core hole 36/37, core interval 24.9-83.9ft ; water observation well.
 Recorded by: J.C. Harksen



Hole no. WB77-38 Map NE-40 Date 9/21/77 State Mont. County Wibaux
 Elev 2830ft Location T 14 N, R 60 E Sec 28, Tract SW SW Drilled depth: 500ft
 Measured _____, _____ Hole size 5 1/8 in. Cored No
 Remarks: _____

Recorded by: M. L. Menge



(Continued)

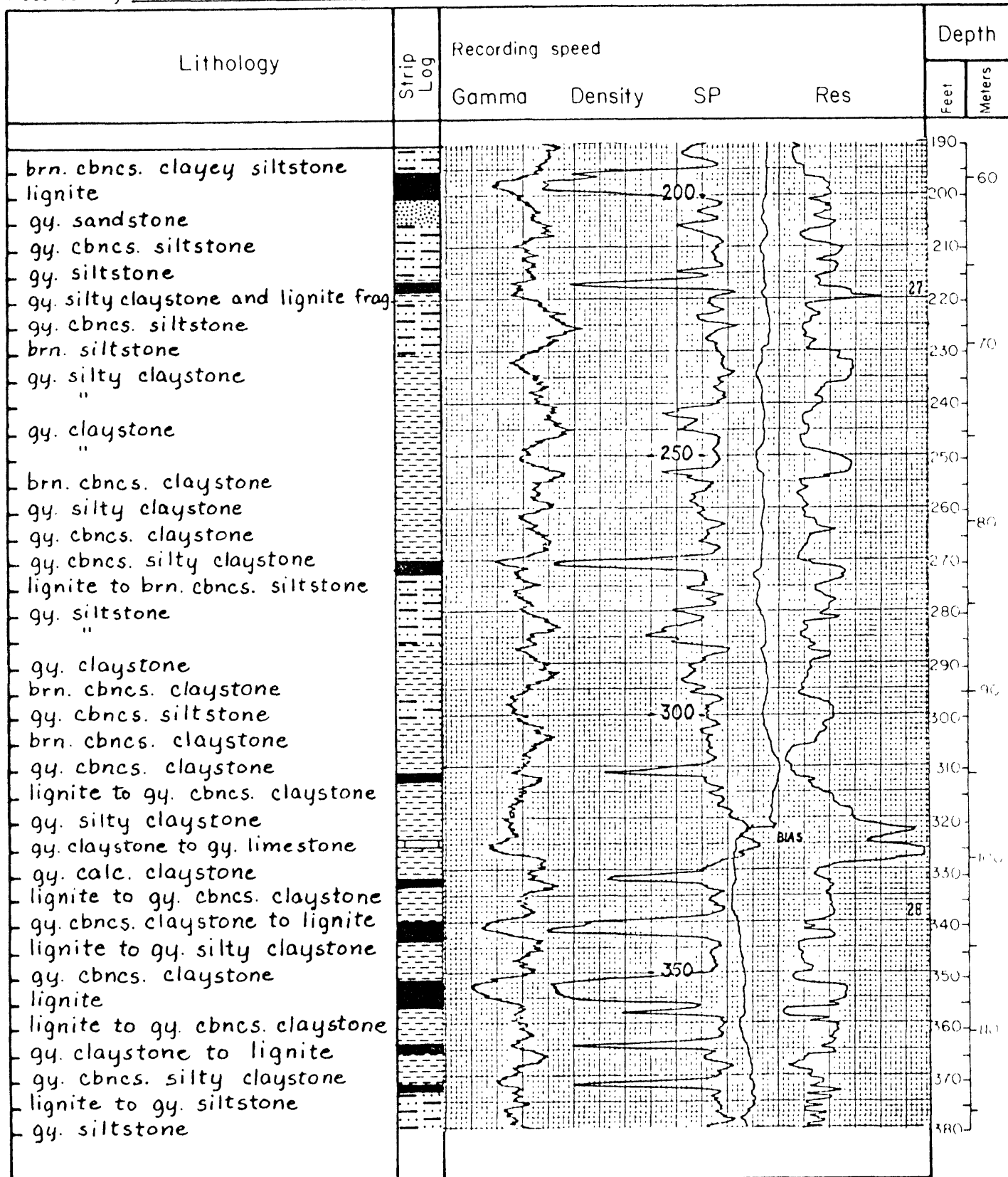
Hole no: WB77-38 Map _____ Date: _____ State _____ County: _____

Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size: _____ Cored: _____

Remarks: _____

Recorded by: _____



(Continued)

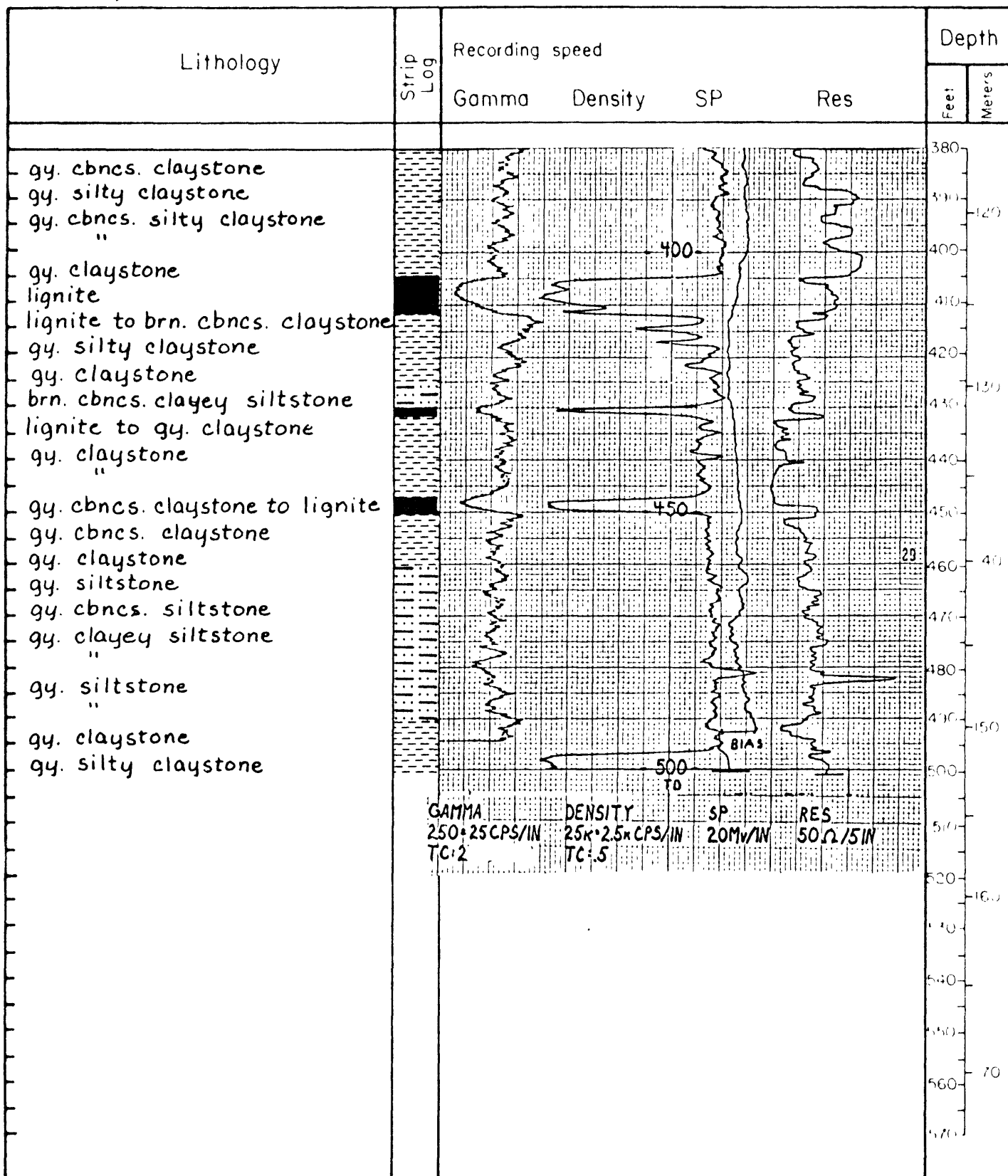
Hole no: WB77-38 Map _____ Date: _____ State _____ County _____

Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____

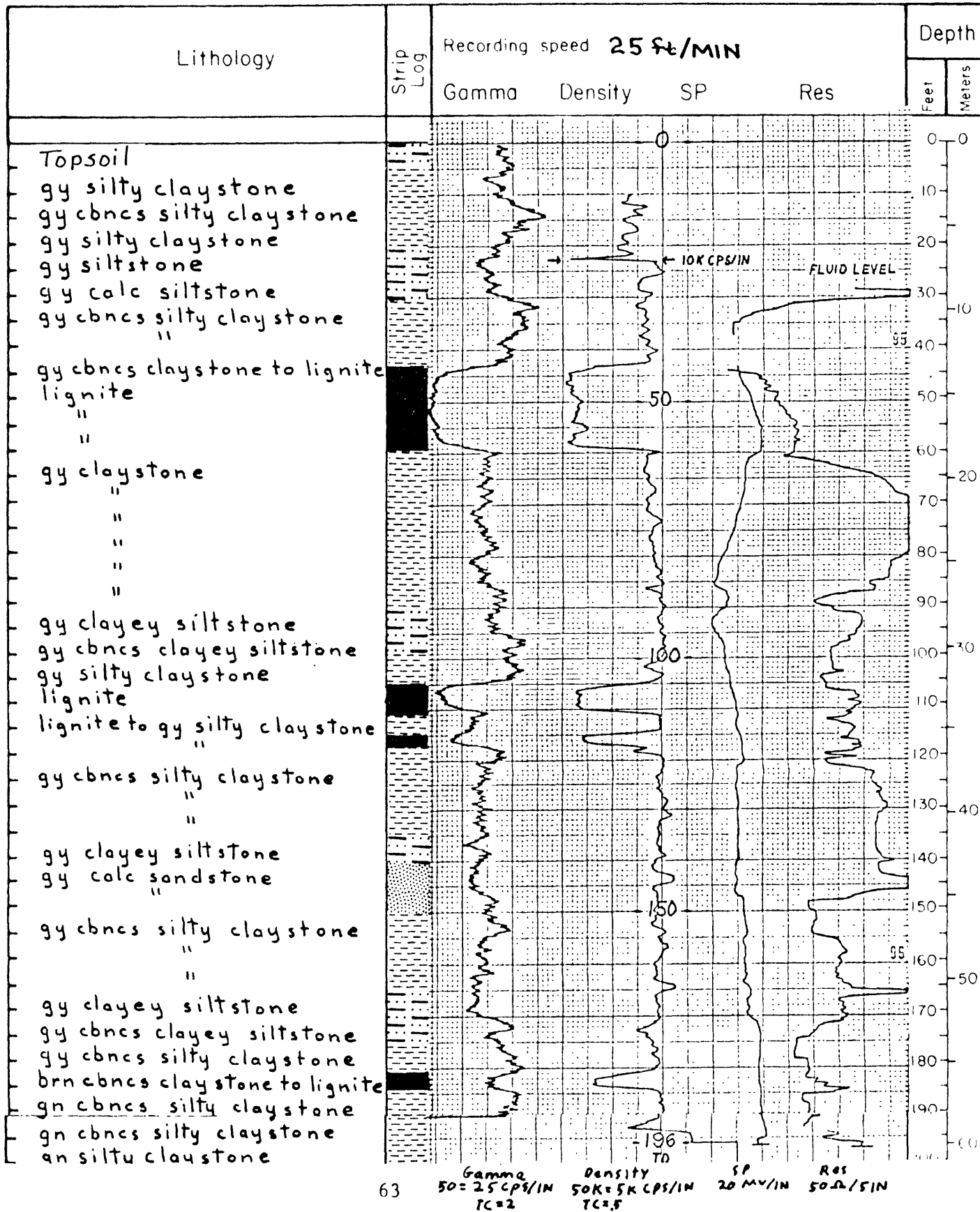
Measured: _____, _____ Hole size _____ Cored: _____

Remarks _____

Recorded by: _____



Hole no: WB 77-39 Map NE 40 Date 10/13/77 State Mont. County Wibaux
 Elev 2820 ft Location T14N, R 60E Sec 14, Tract SW SW Drilled depth: 196 ft.
 Measured 75 ft FWL, 33 ft FSL Hole size 5 1/8 in. Cored Yes
 Remarks: Twin and core hole 39/40, core interval 36-65 ft and 103-129 ft.
 Recorded by: J. C. Harksen water observation well.



Hole no: WB77-40 Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured: _____, _____ Hole size: _____ Cored: YES

Remarks: See WB77-39 for data

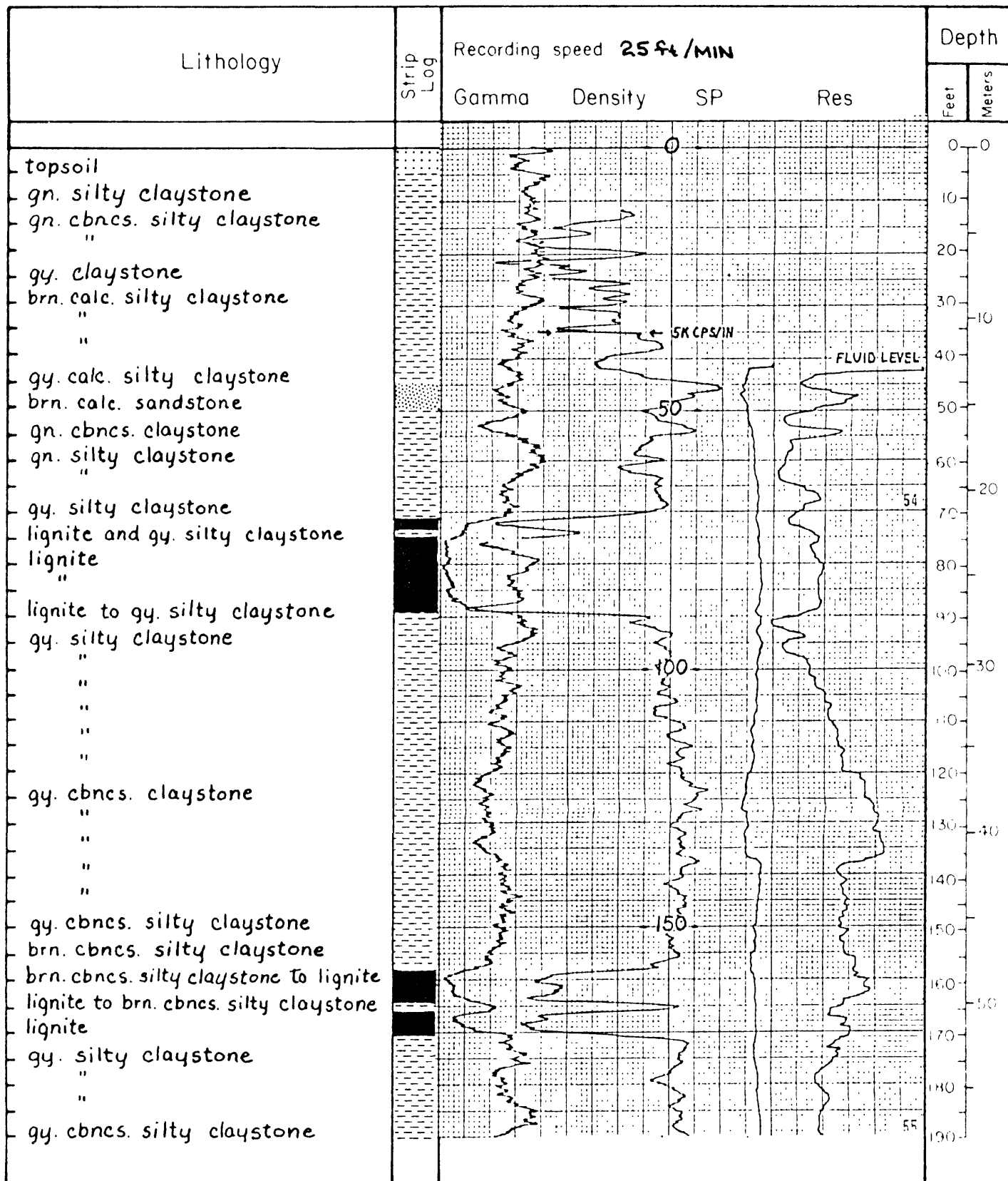
Recorded by: _____

Lithology	Strip Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

Hole no: WB77-41 Map NE-40 Date 9/19/77 State Mont. County Wibaux
 Elev. 2814 ft Location T 14 N, R 60 E Sec. 14, Tract SE SE Drilled depth: 640 ft
 Measured 75 ft. FEL 65 ft. FSL Hole size: 5 1/8 in. Cored No

Remarks _____

Recorded by J. C. Harksen



(Continued)

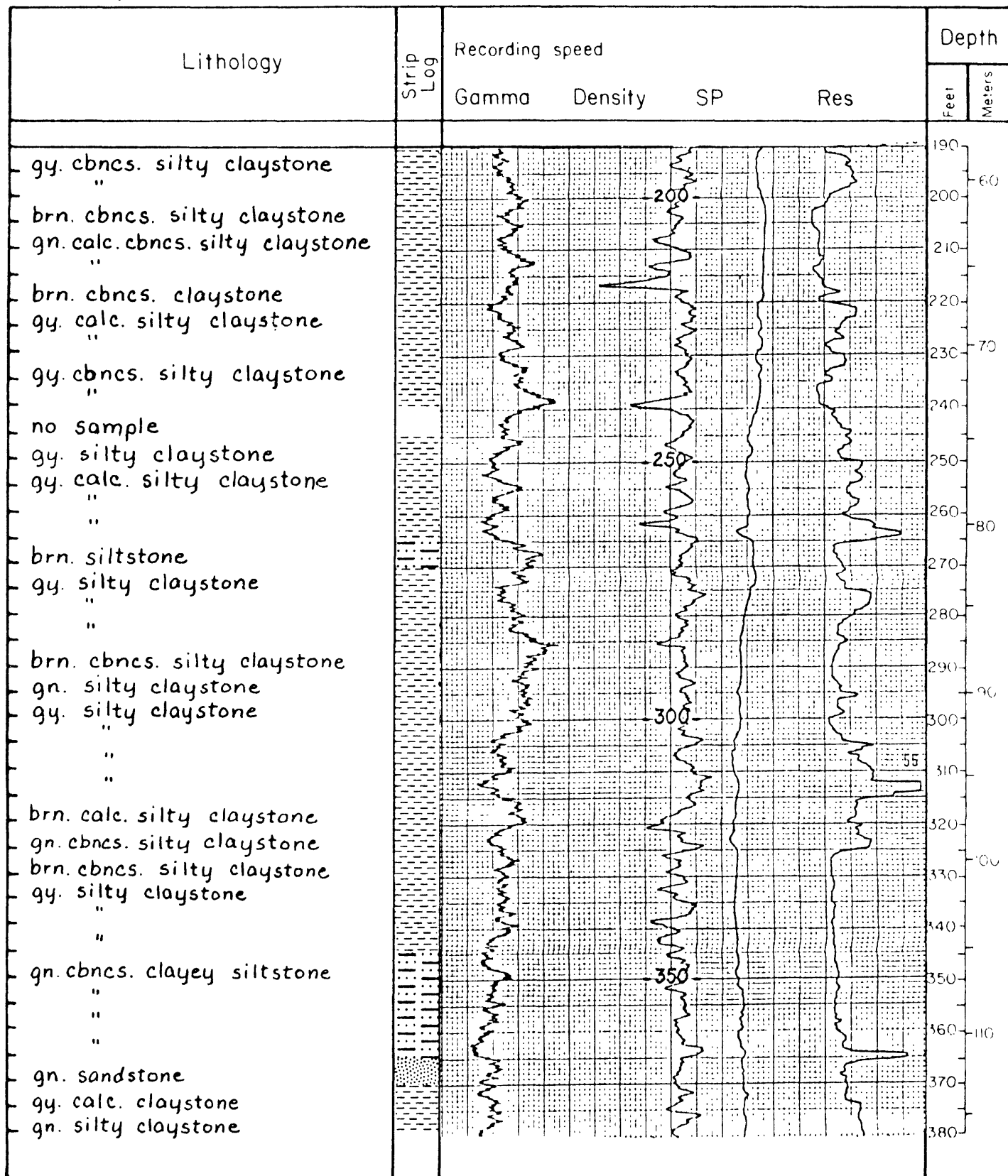
Hole no: WB77-41 Map _____ Date: _____ State _____ County: _____

Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored: _____

Remarks: _____

Recorded by: _____



(Continued)

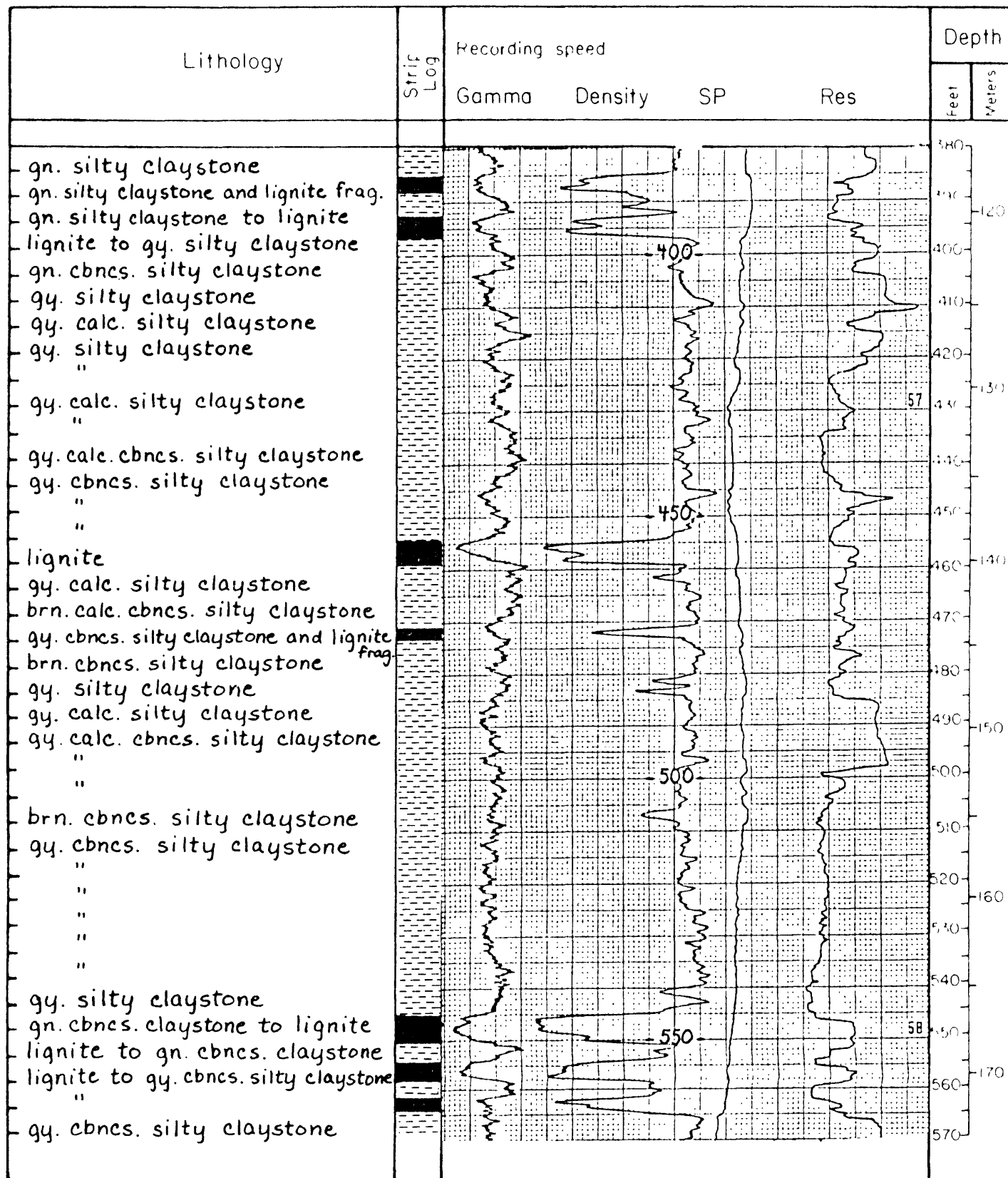
Hole no. WB77-41 Map _____ Date _____ State _____ County _____

Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____

Measured _____, _____ Hole size _____ Cored _____

Remarks _____

Recorded by _____



(Continued)

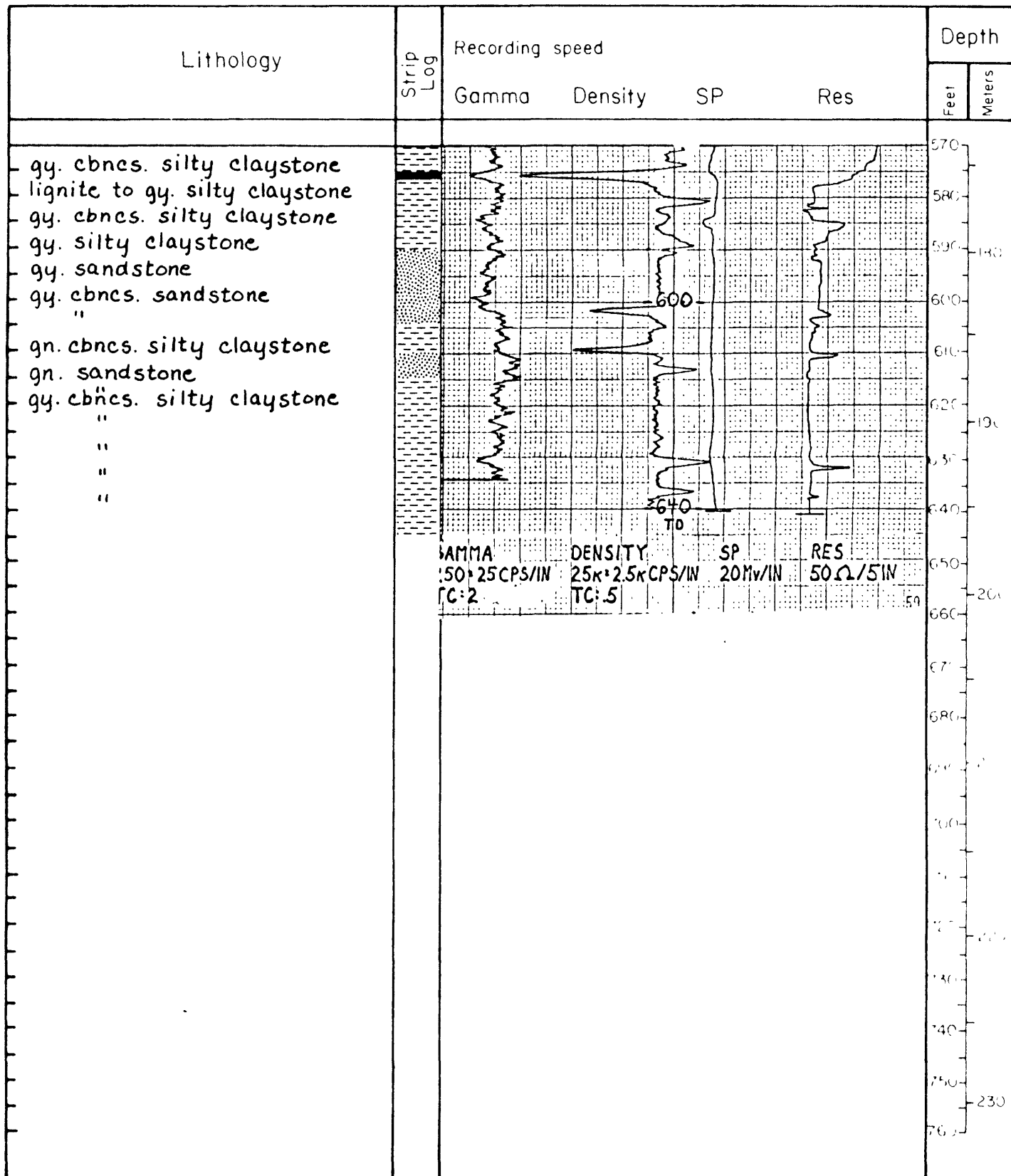
Hole no: **WB77-41** Map _____ Date: _____ State: _____ County: _____

Elev _____ Location _____ Sec. _____, Tract _____ Drilled depth: _____

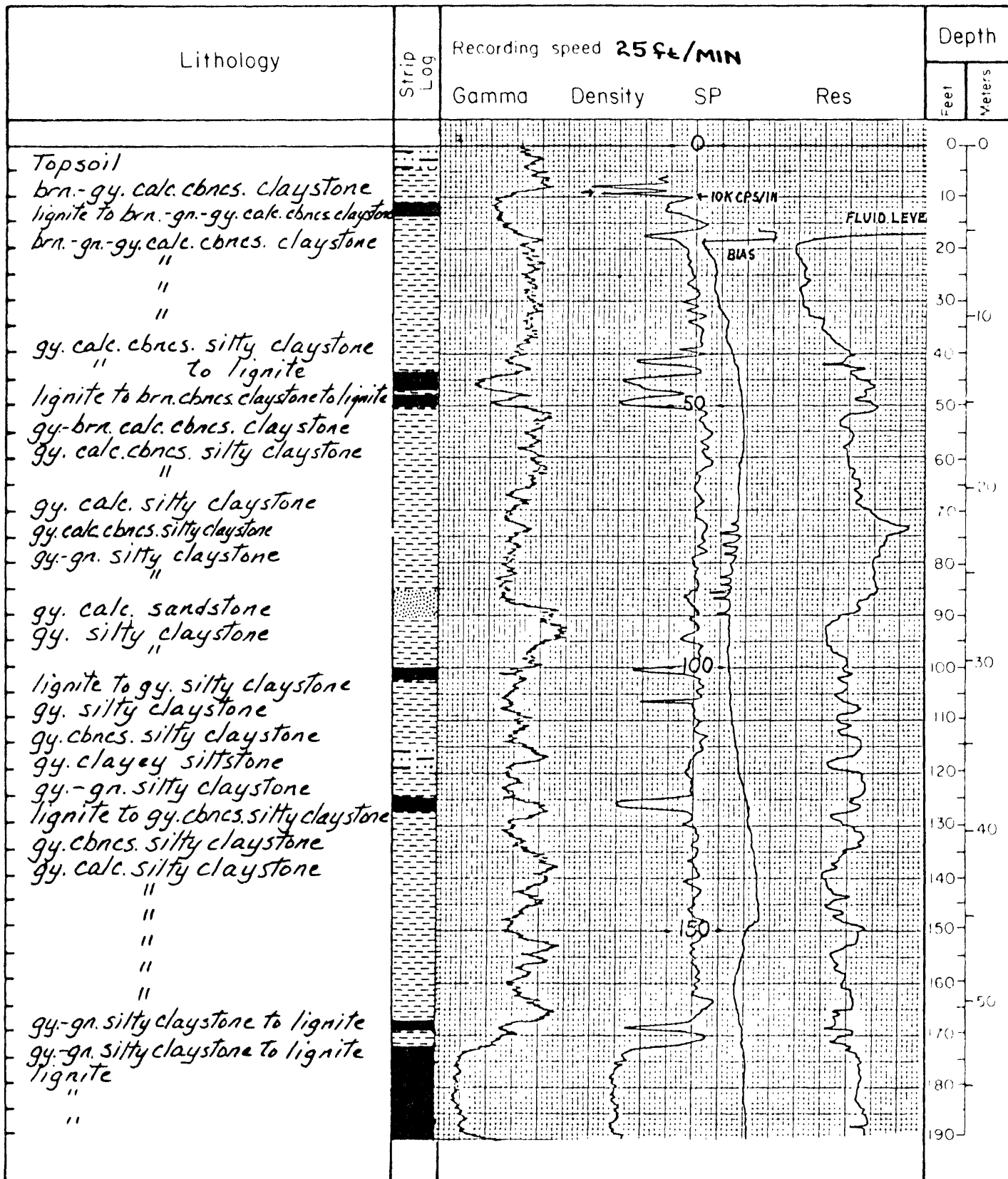
Measured: _____, _____ Hole size: _____ Cored: _____

Remarks _____

Recorded by: _____



Hole no WB77-42 Map SW-1 Date 9/28/72 State N. D. County Golden Valley
 Elev 2750 ft Location T140N, R106W Sec. 2, Tract SW SW Drilled depth: 300 ft
 Measured 75 ft FWL, 100 ft FSL Hole size: 5 7/8 in. Cored No
 Remarks _____
 Recorded by: J. C. Harksen



(Continued)

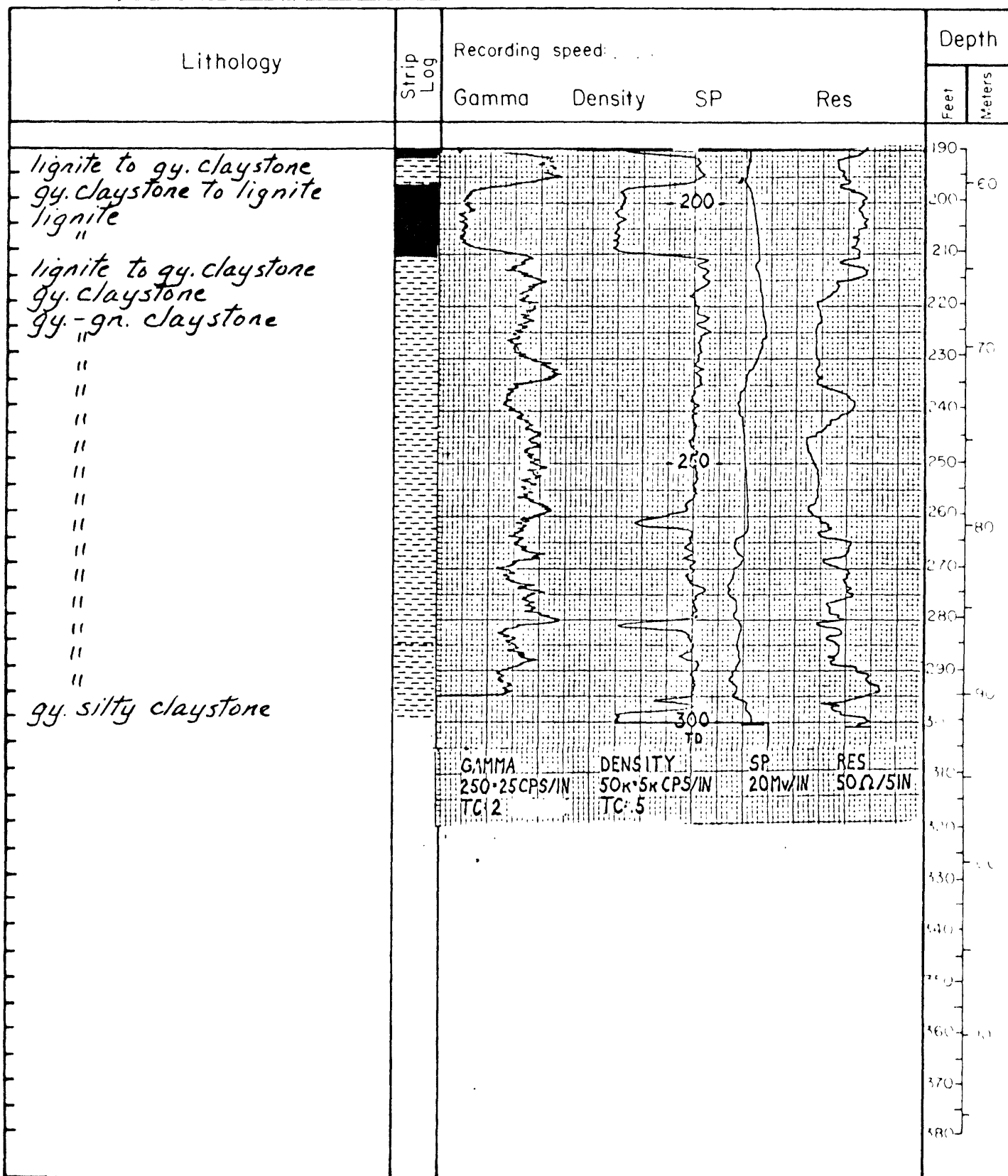
Hole no: WB77-42 Map _____ Date _____ State _____ County _____

Elev _____ Location _____ Sec. _____, Tract _____ Drilled depth: _____

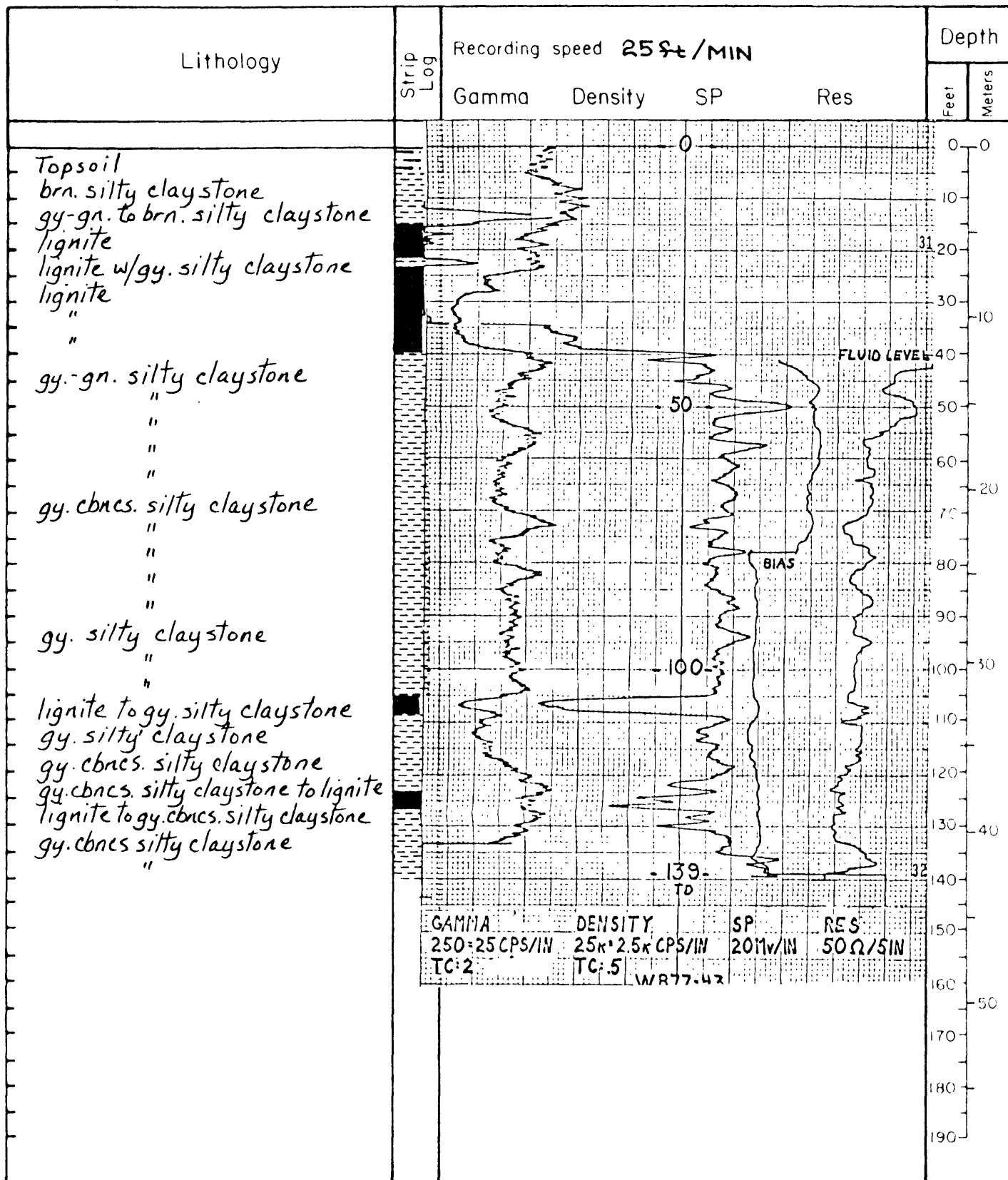
Measured _____ Hole size _____ Cored _____

Remarks: _____

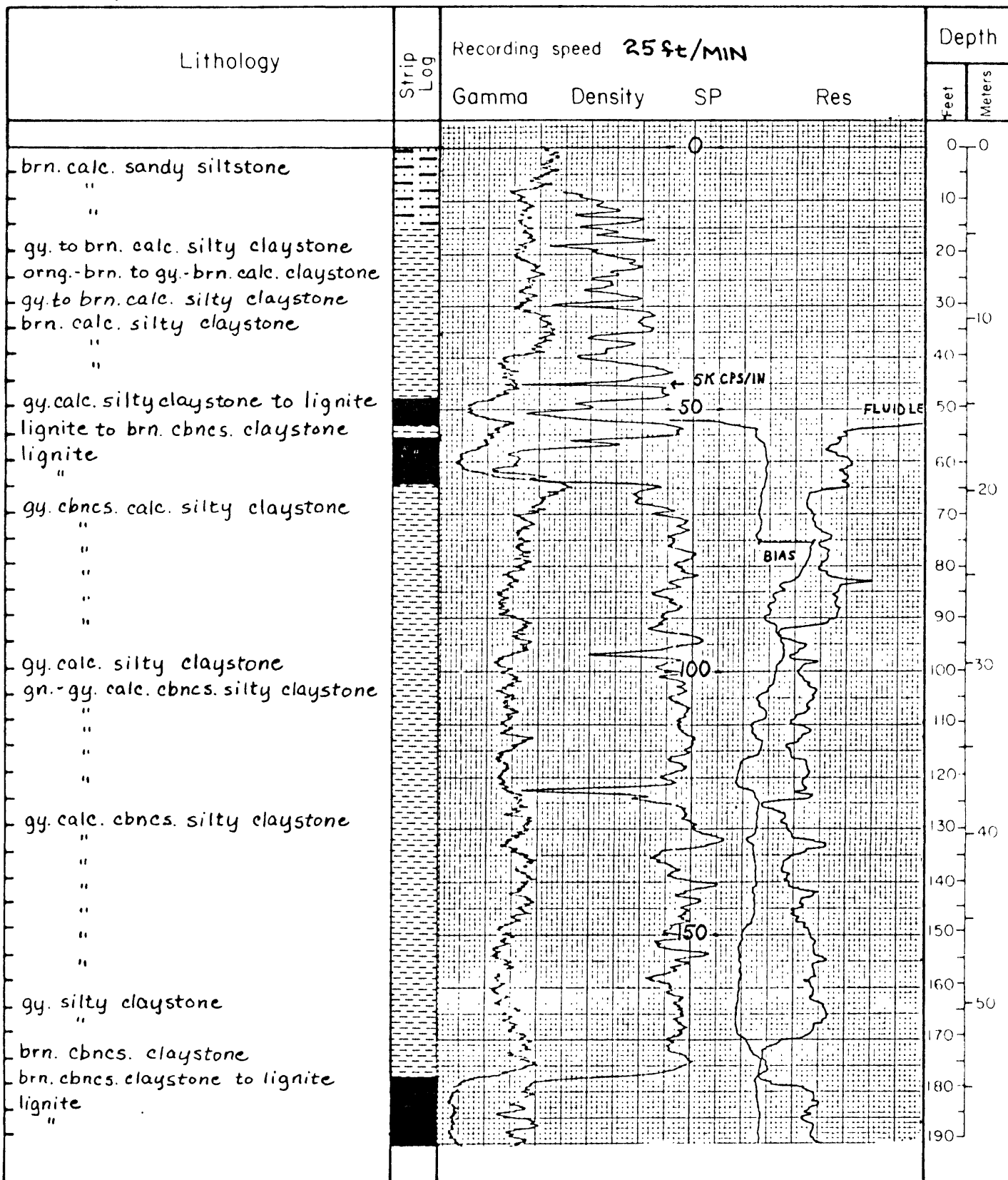
Recorded by: _____



Hole no: W877-43 Map NE-40 Date 9/21/77 State Mont. County Wibaux
 Elev. 2770 ft Location T14N, R6DE Sec. 10, Tract NW NW Drilled depth: 139 ft
 Measured 20 ft FWL, 100 ft FNL Hole size 4 3/4 in. Cored No
 Remarks Water observation well
 Recorded by: J. C. Harksen



Hole no: WB77-44 Map NE-40 Date 9/20/77 State Mont. County Wibaux
 Elev 2825 ft Location T 14 N, R 60 E Sec. 2, Tract SE SE Drilled depth: 239 ft
 Measured 129 ft FEL, 60 ft FSL Hole size 5 1/8 in. Cored No
 Remarks Water observation well
 Recorded by: J.C. Harksen



(Continued)

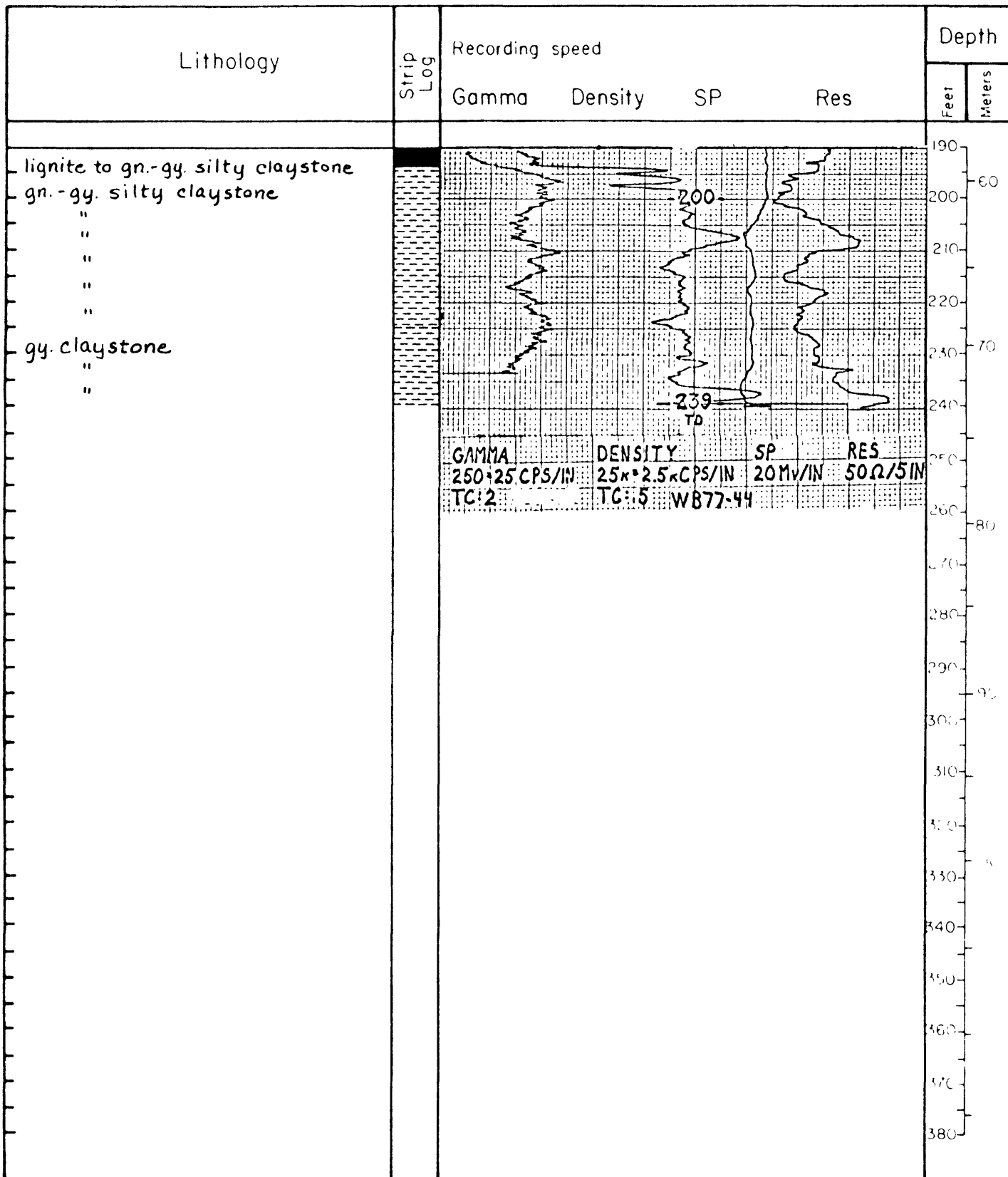
Hole no: WB77-44 Map _____ Date: _____ State: _____ County: _____

Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size: _____ Cored _____

Remarks: _____

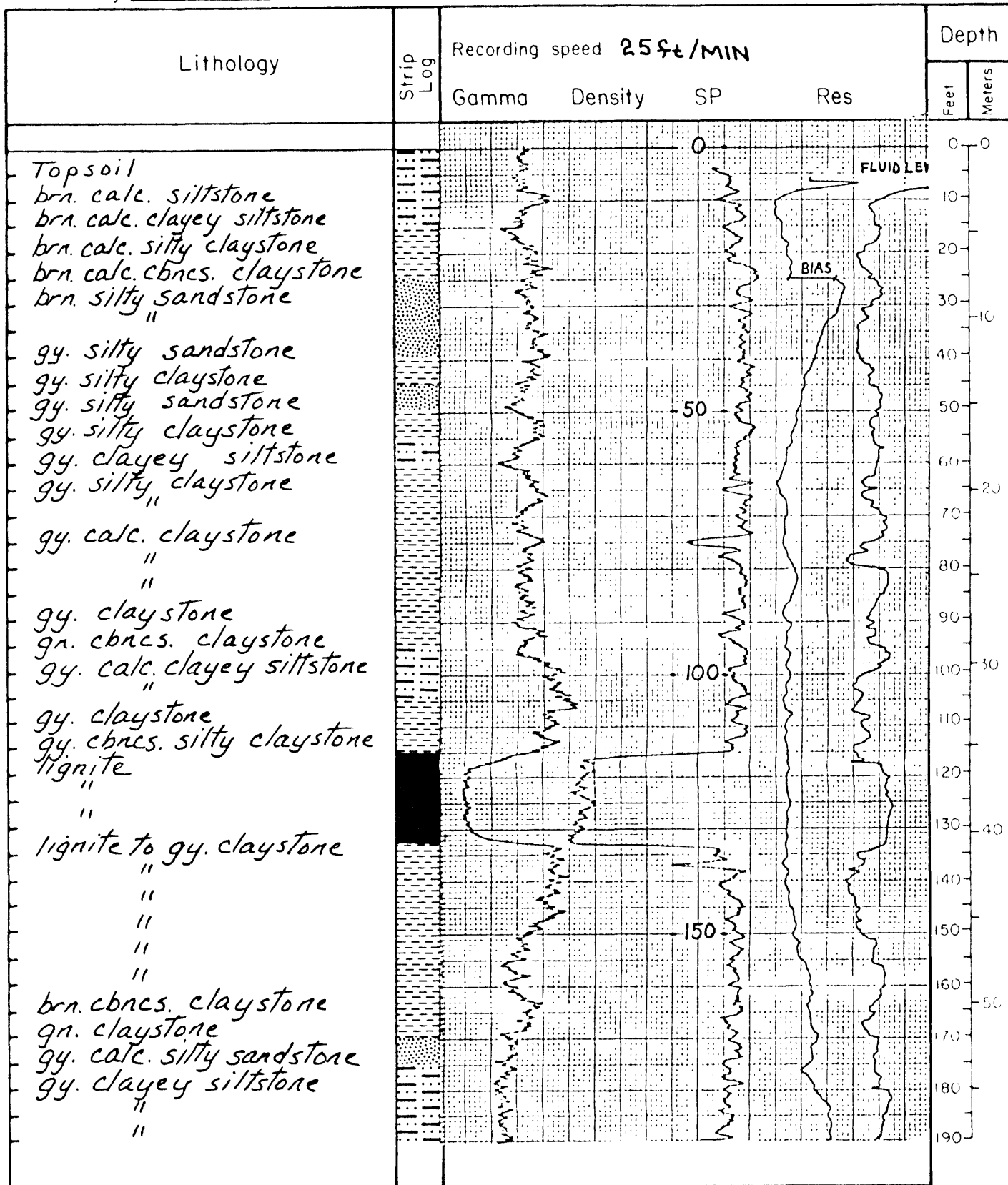
Recorded by: _____



Hole no: WB77-45 Map SW-1 Date 9/20/77 State N. D. County Golden Valley
 Elev 2740 ft Location T14N, R105W Sec. 32, Tract NW NW Drilled depth: 218 ft
 Measured 18 ft FWL 63 ft FNL Hole size 4 3/4 in. Cored No

Remarks _____

Recorded by: J. C. Harksen



(Continued)

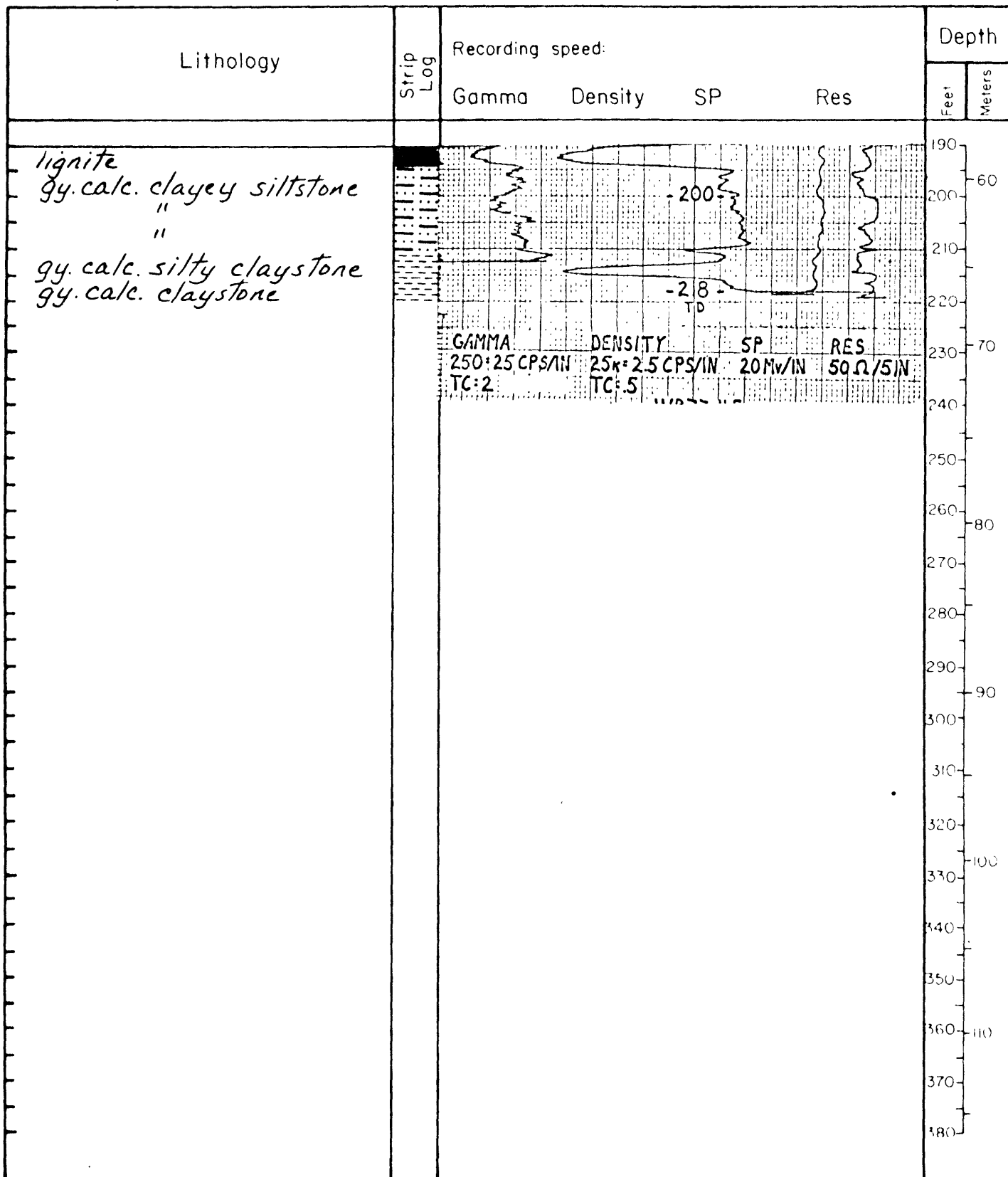
Hole no: WB77-45 Map _____ Date: _____ State _____ County: _____

Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size: _____ Cored: _____

Remarks: _____

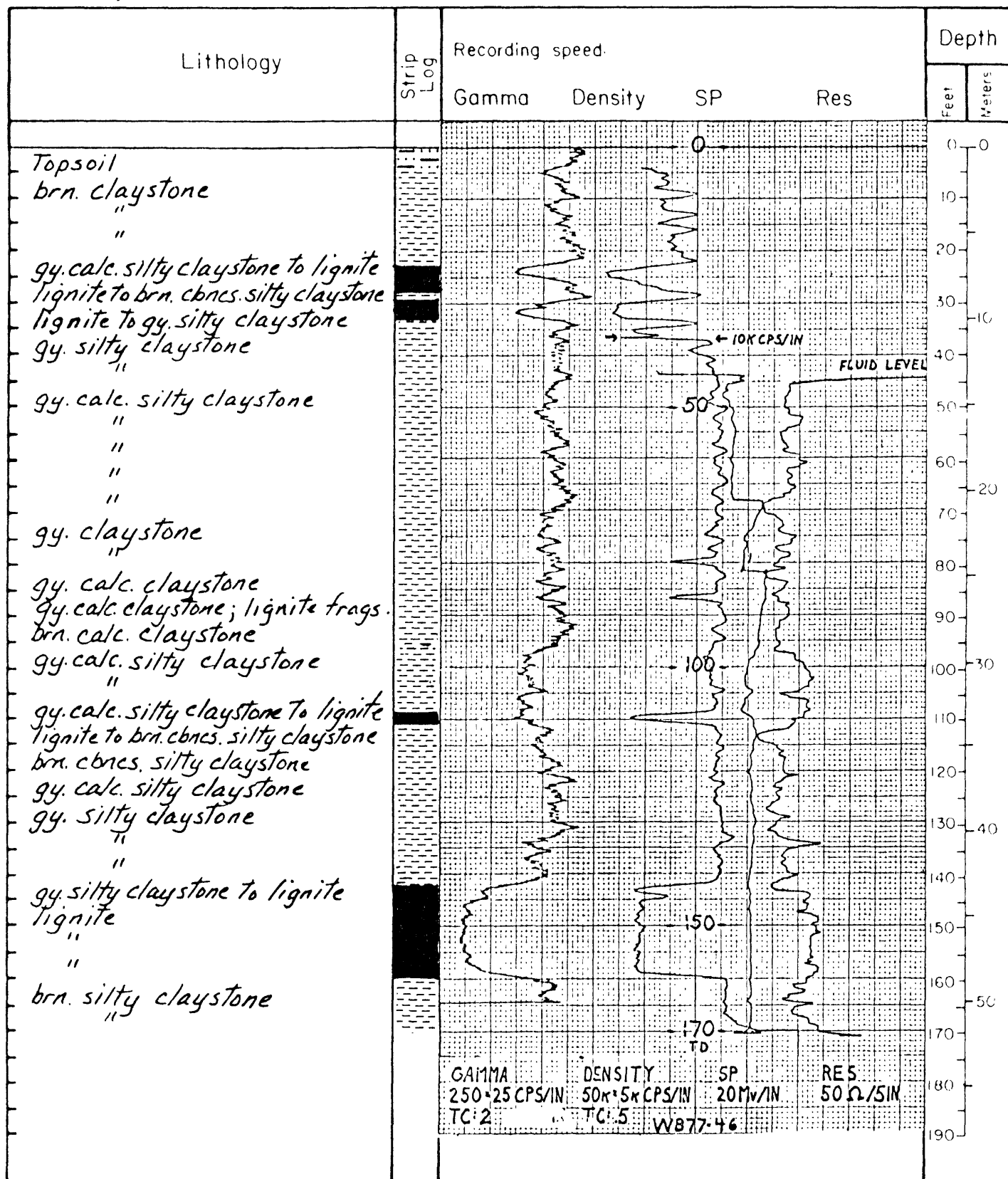
Recorded by: _____



Hole no: WB77-46 Map SW-1 Date 9/19/77 State N.D. County Golden Valley
 Elev 2760 ft Location T14N, R10SW Sec 32, Tract SW SW Drilled depth: 170 ft
 Measured 108 ft FWL, 150 ft FSL Hole size 5 7/8 in. Cored No

Remarks _____

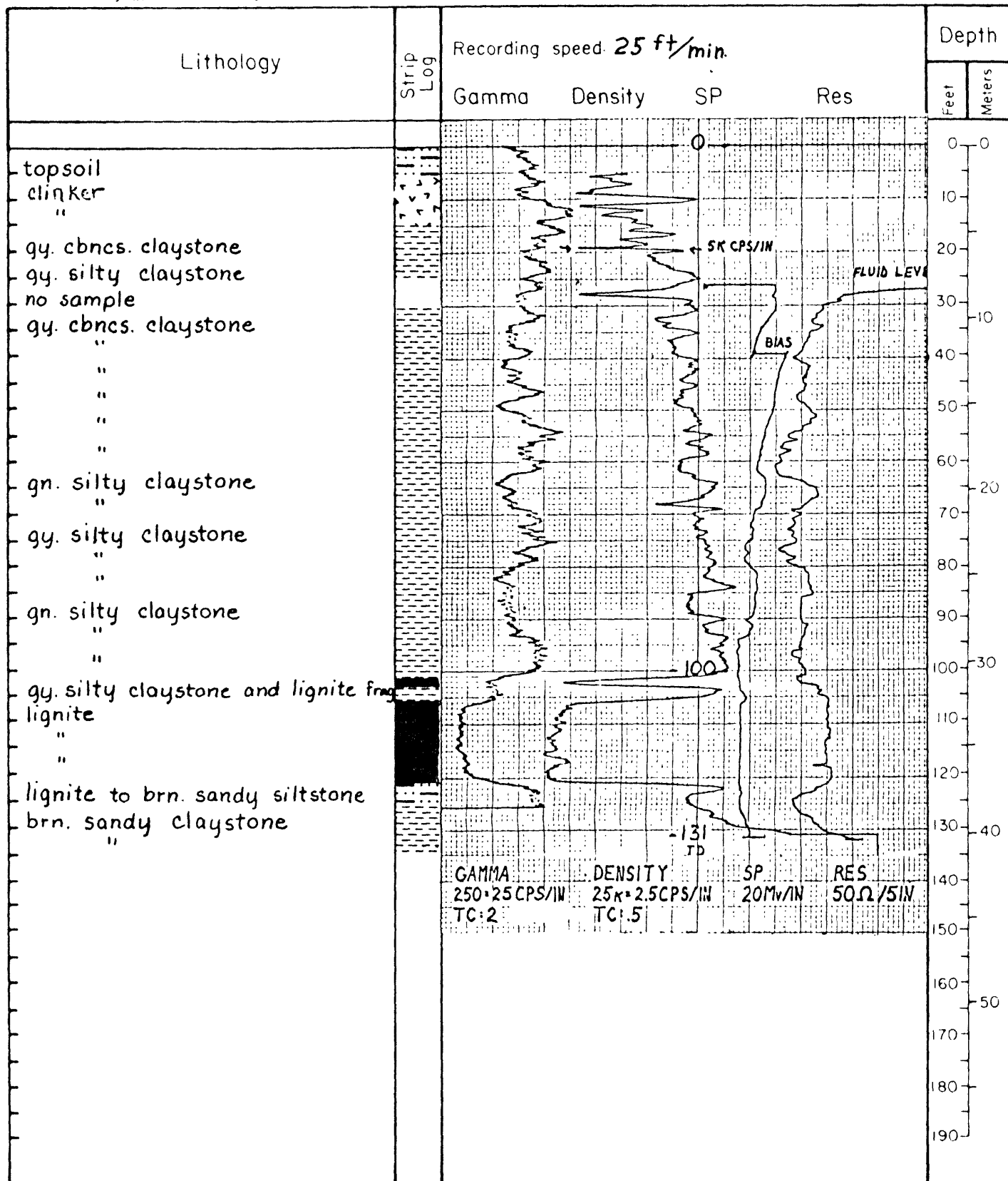
Recorded by: J. C. Harksen



Hole no: WB77-47 Map SW-1 Date: 9/19/77 State N.D. County Golden Valley
 Elev 2715 ft Location: T 141 N, R 105 W Sec. 32, Tract SE SE Drilled depth: 131 ft
 Measured: 785 ft FEL, 30 ft FSL Hole size: 4 3/4 in. Cored: No

Remarks _____

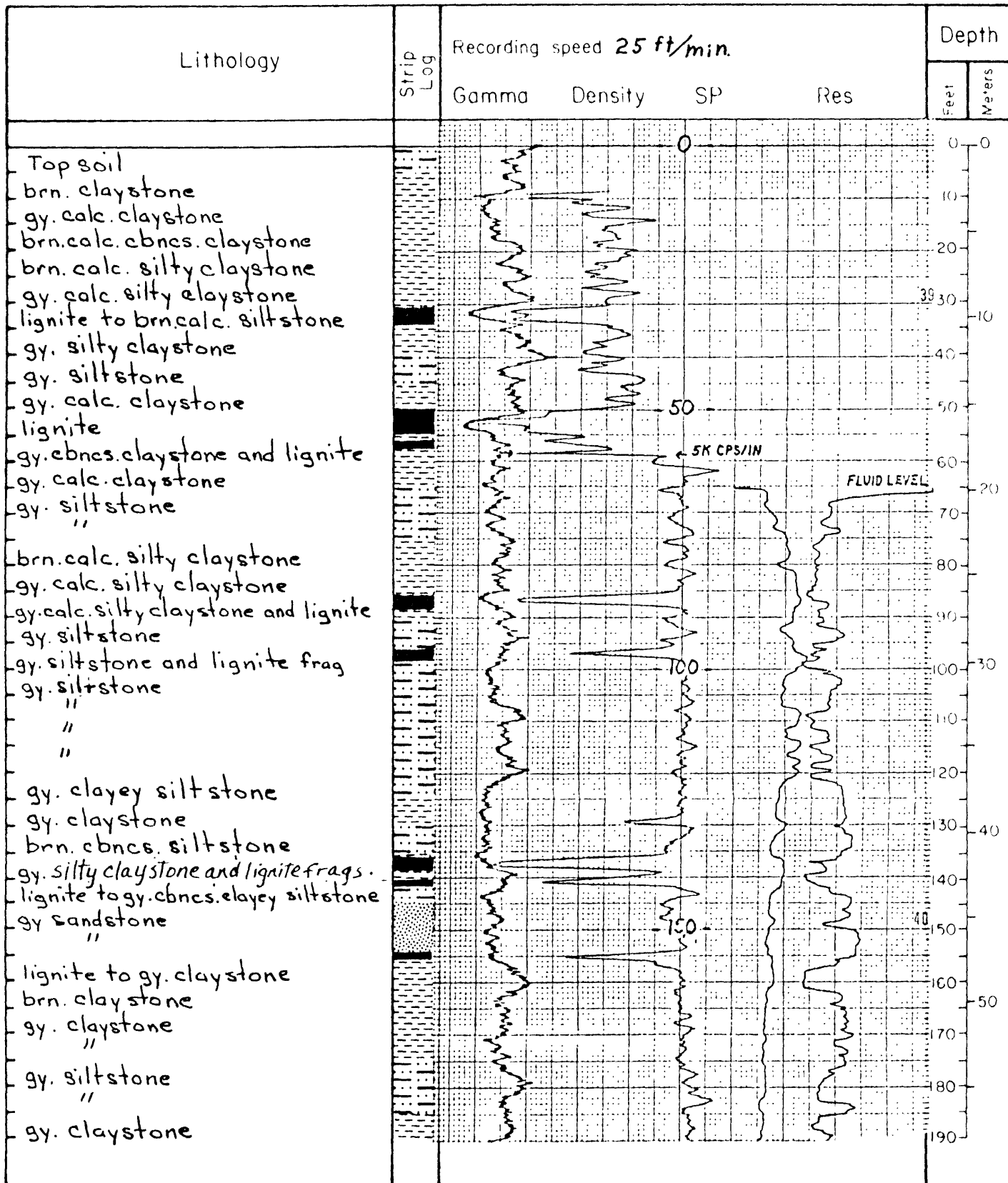
Recorded by: J. C. Harksen



Hole no: W077-48 Map SW-1 Date 9-28-77 State N.D. County Golden Valley
 Elev 2755 ft Location T14N, R105W Sec 34, Tract SE, SE Drilled depth: 700 ft
 Measured _____, _____ Hole size 5 1/8 in. Cored NO

Remarks _____

Recorded by: J.C. Harksen



(Continued)

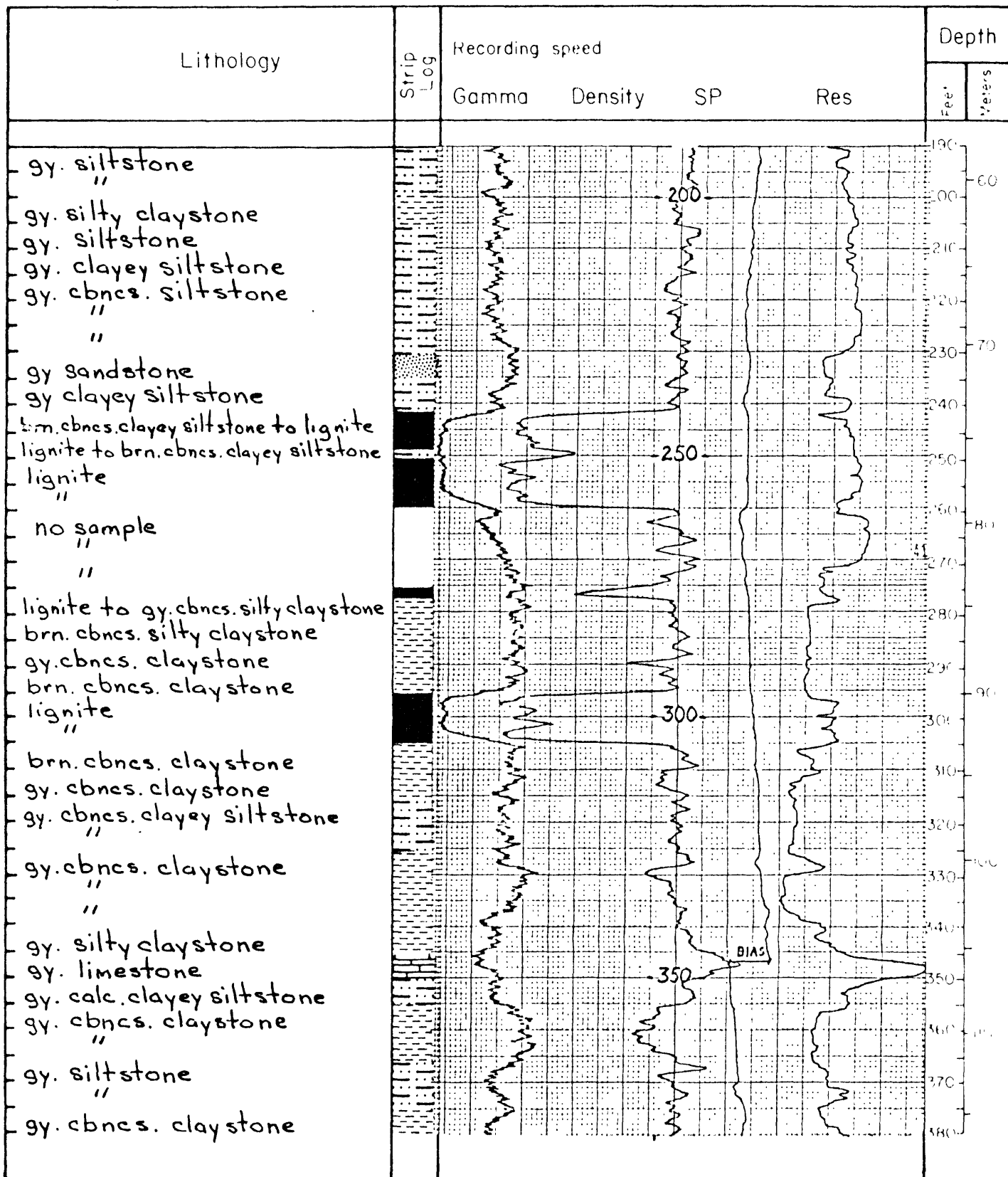
Hole no: WB77-48 Map _____ Date _____ State _____ County _____

Elev _____ Location _____ Sec. _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

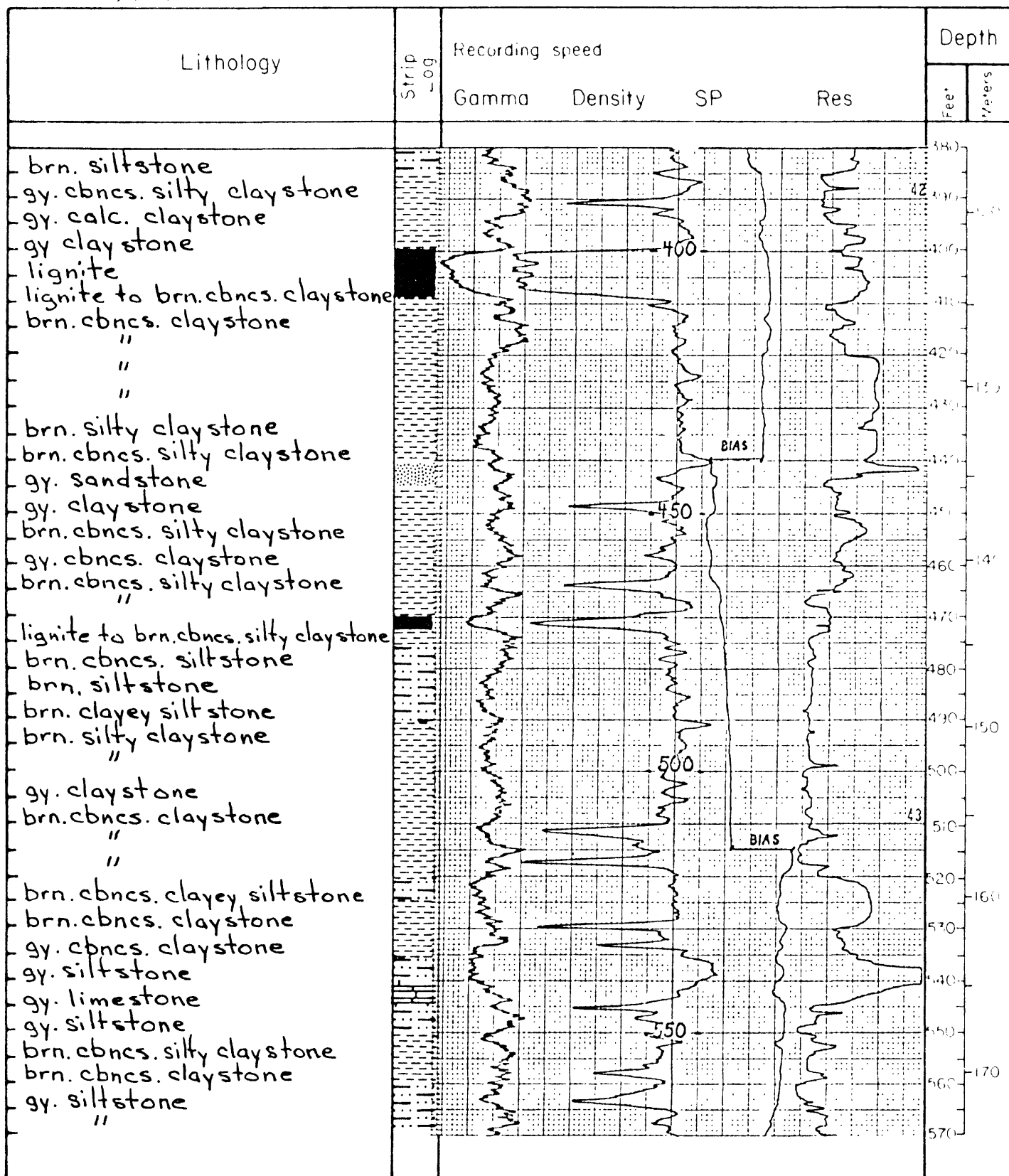
Remarks: _____

Recorded by: _____



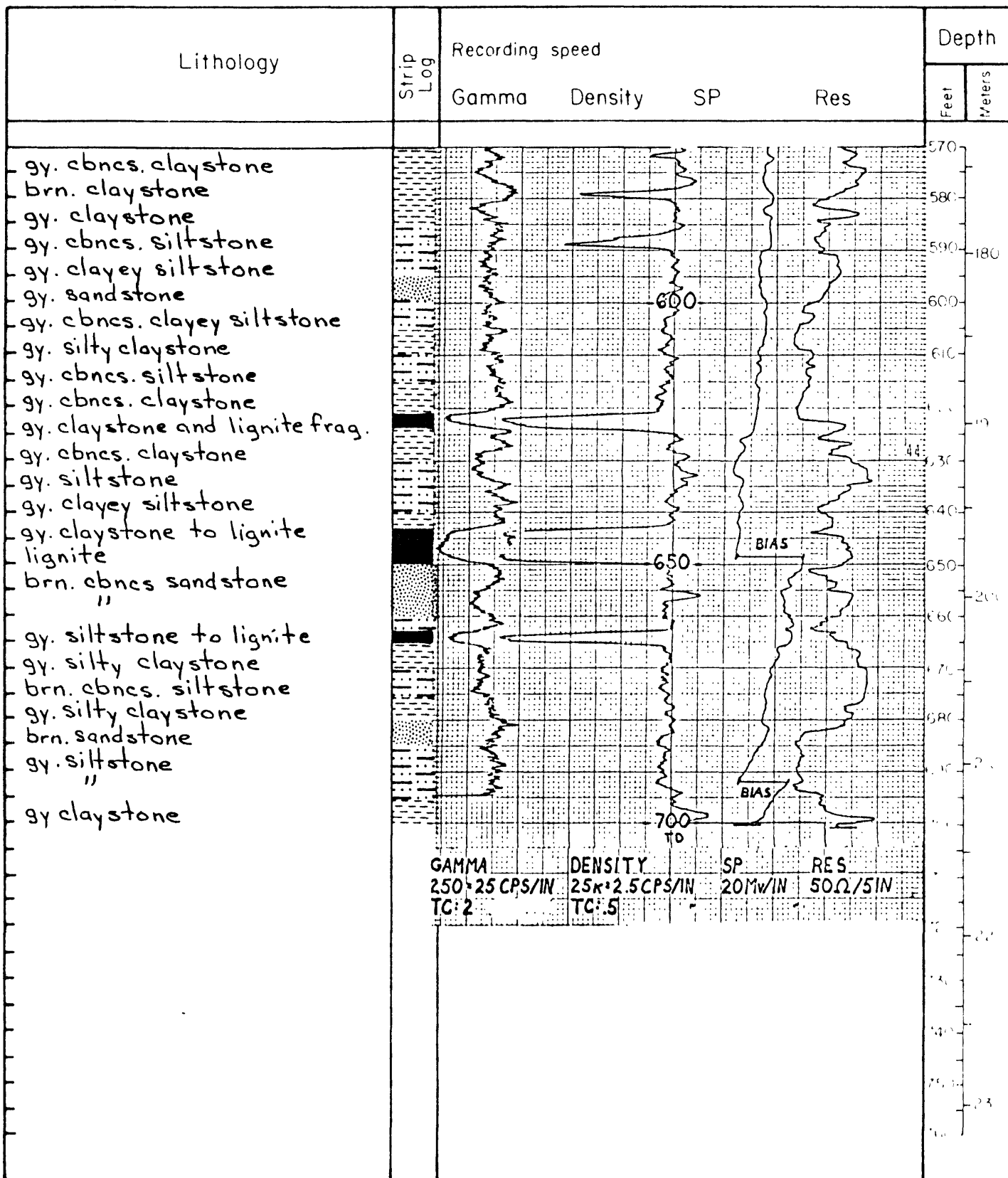
(Continued)

Hole no. WB77-40 Map _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks _____
 Recorded by: _____



(CONTINUED)

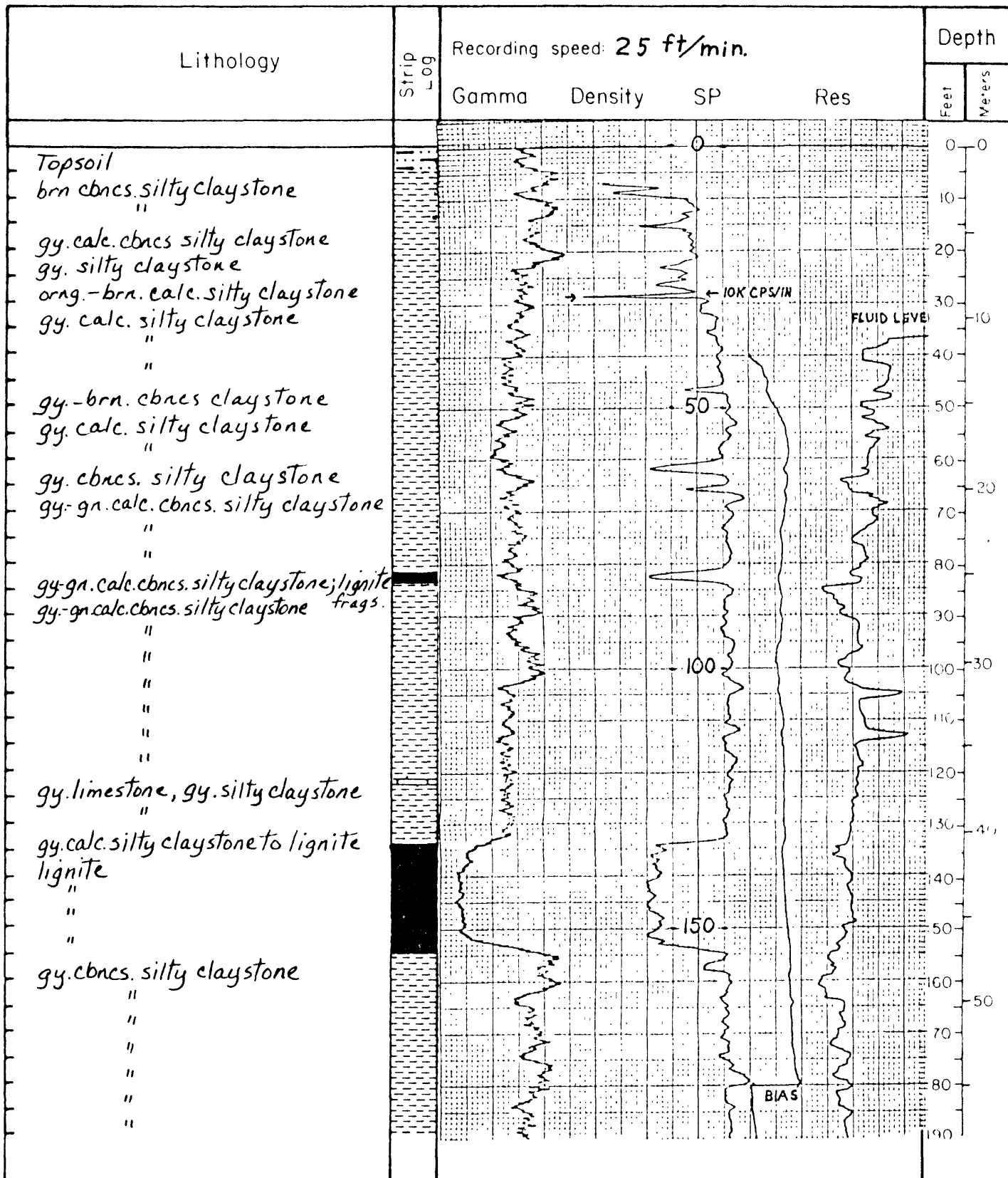
Hole no: WB77-48 Map: _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: _____



Hole no: WB77-49 Map SW-1 Date 9/28/77 State N. D. County Golden Valley
 Elev 2685 ft Location T14N, R105W Sec. 28, Tract SE SE Drilled depth: 250 ft
 Measured 15 ft FEL, 80 ft FSL Hole size 5/8 in. Cored No

Remarks: _____

Recorded by: J.C. Harksen



(Continued)

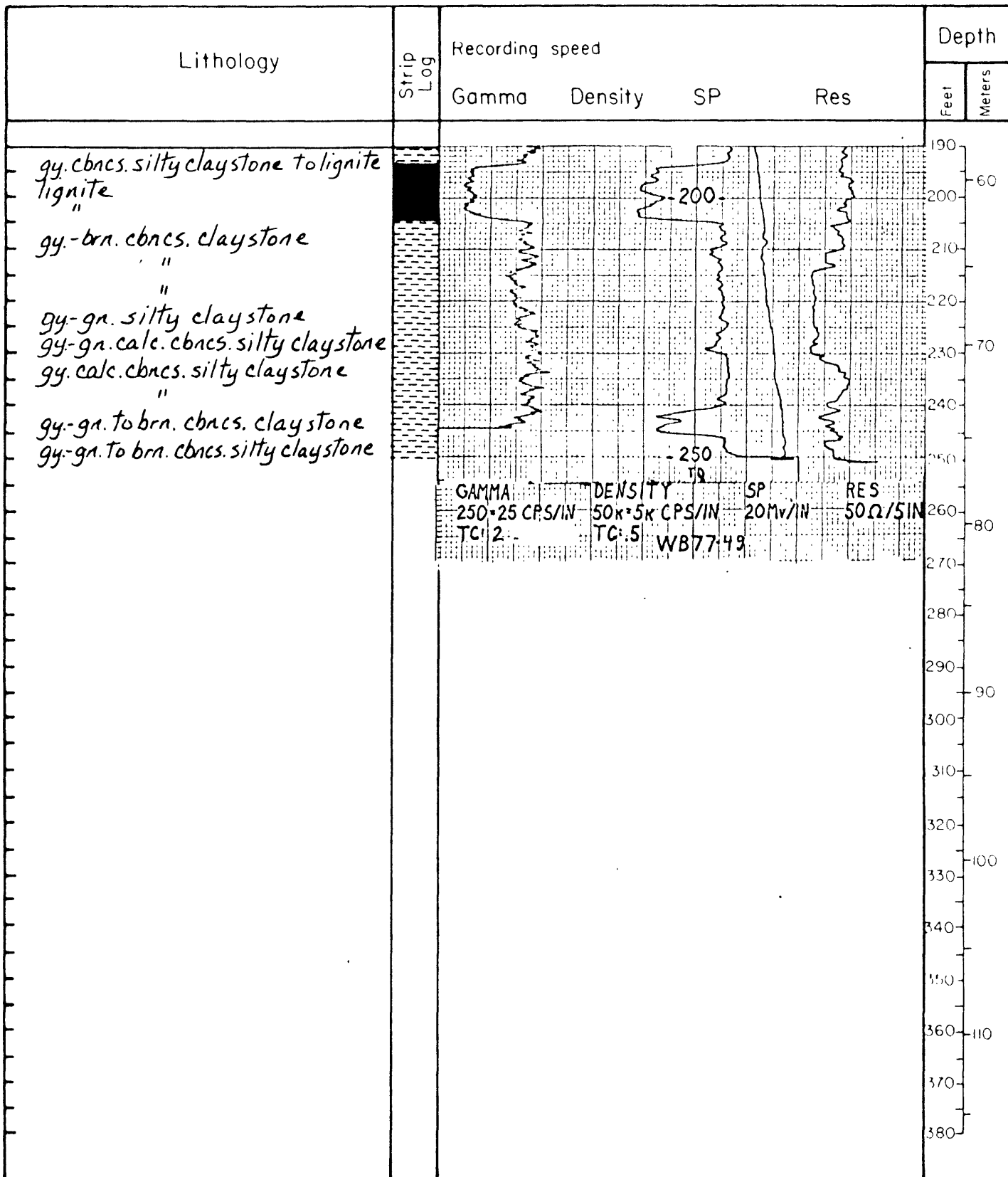
Hole no: WB77-49 Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

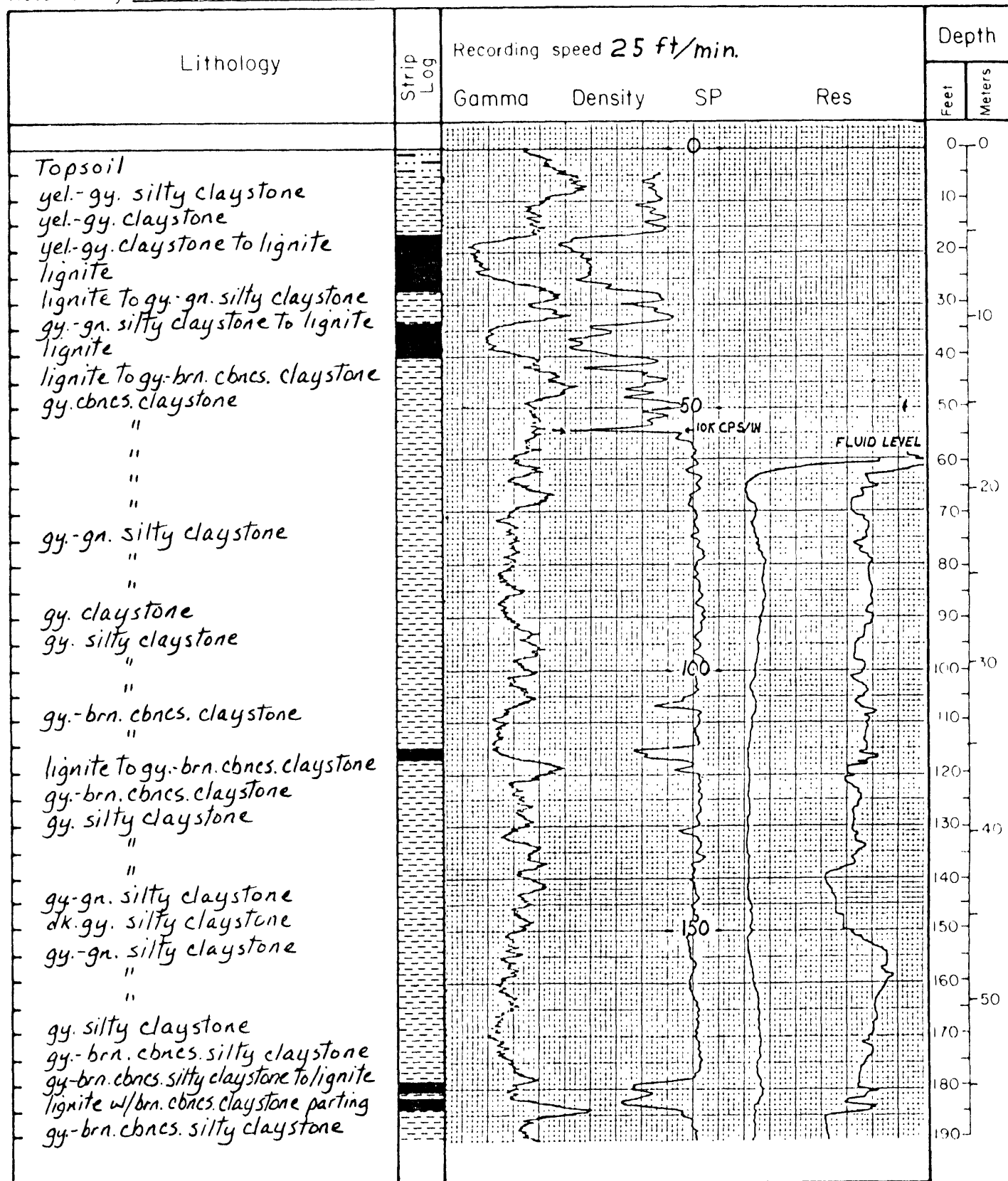
Measured _____, _____ Hole size: _____ Cored _____

Remarks: _____

Recorded by: _____

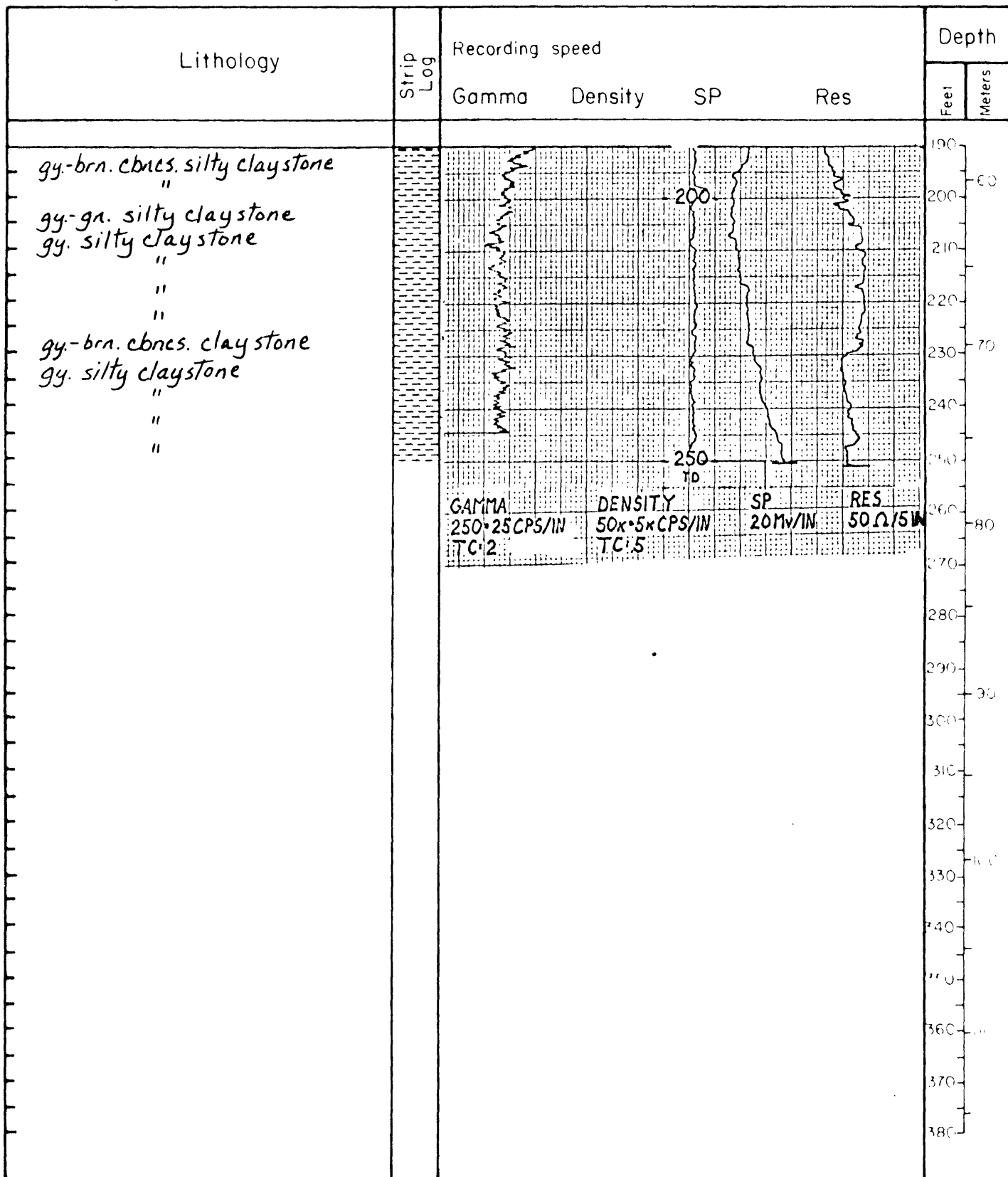


Hole no: WB77-5D Map NE-40 Date 10/2/77 State Mont. County Wibaux
 Elev 2780 ft Location T15N, R60E Sec 32, Tract SE SW Drilled depth 250 ft
 Measured _____, _____ Hole size 5 7/8 in. Cored No
 Remarks _____
 Recorded by: J.C. Hackser



(Continued)

Hole no: WB77-50 Map _____ Date: _____ State: _____ County: _____
Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size: _____ Cored: _____
Remarks _____
Recorded by: _____



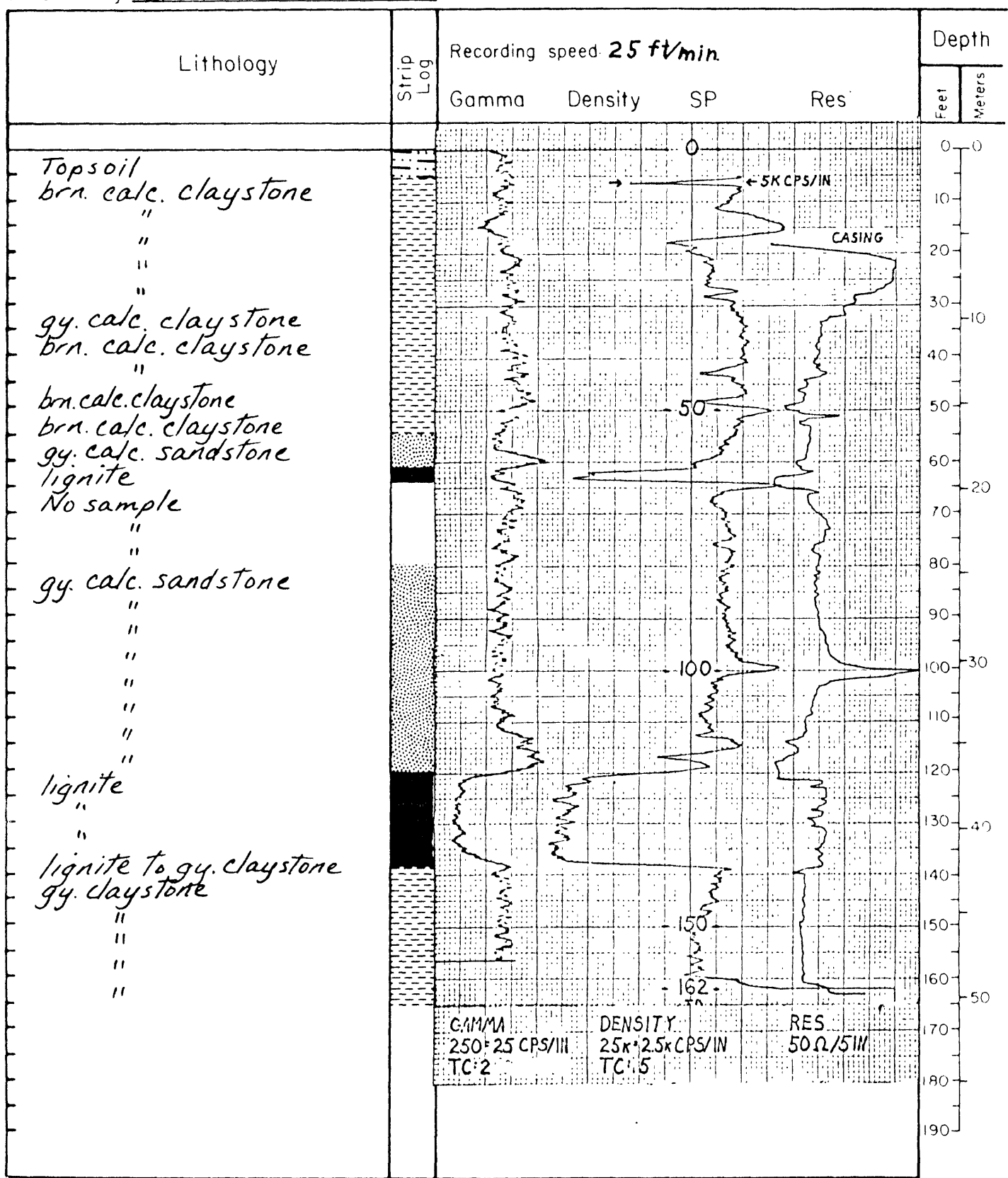
Hole no: WB77-51 Map: _____ Date: _____ State: _____ County: _____
 Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size _____ Cored _____
 Remarks: Not drilled
 Recorded by: _____

Lithology	Strip Log	Recording speed:				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

Hole no: WB77-52 Map SW-1 Date 9/24/77 State N. D. County Golden Valley
 Elev 2740 ft Location T14N, R105W Sec. 30, Tract lot 1 Drilled depth: 162 ft
 Measured: 21 ft FWL, 252 ft FNL Hole size 4 3/4 in. Cored No

Remarks: _____

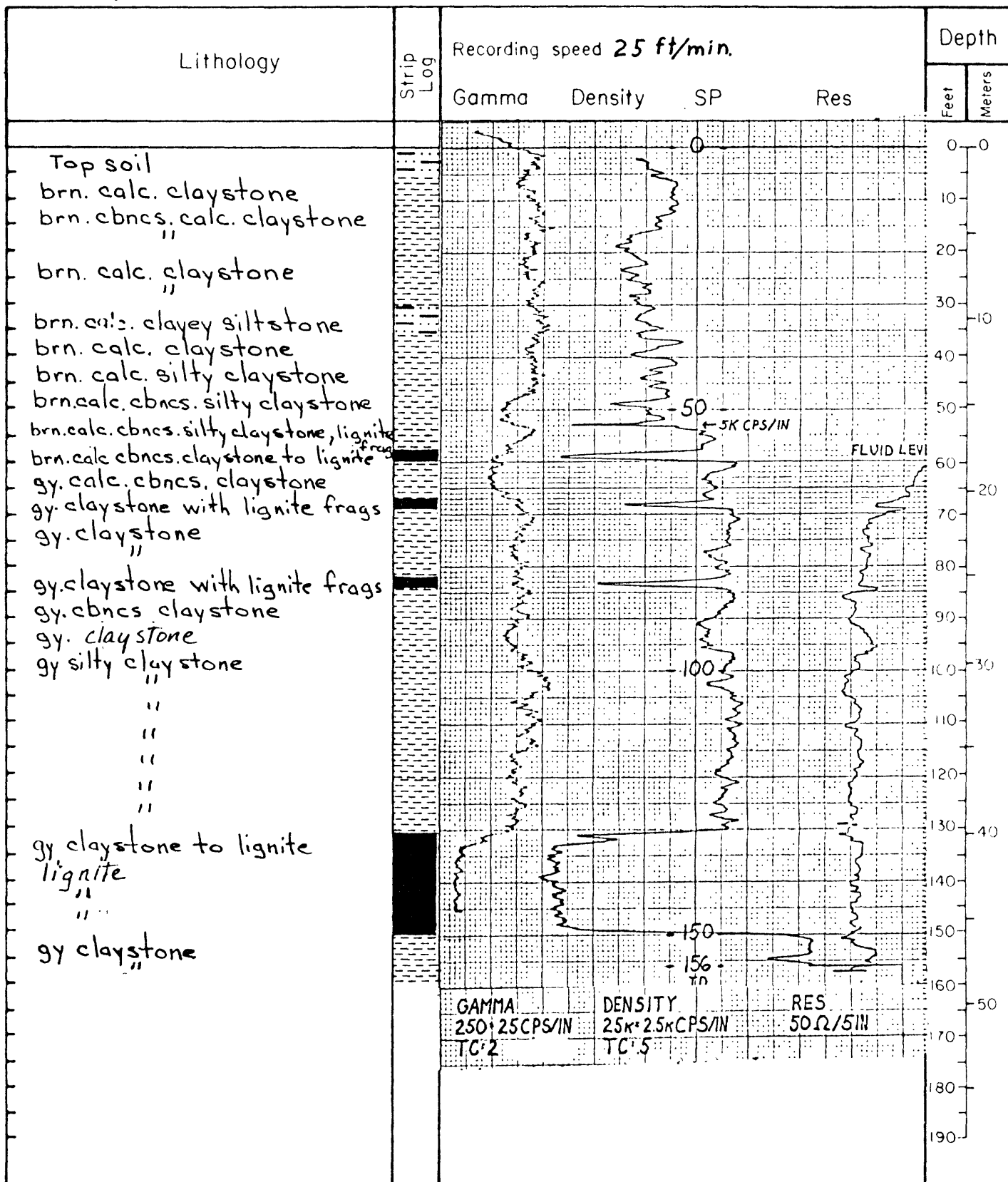
Recorded by: J. C. Harksen



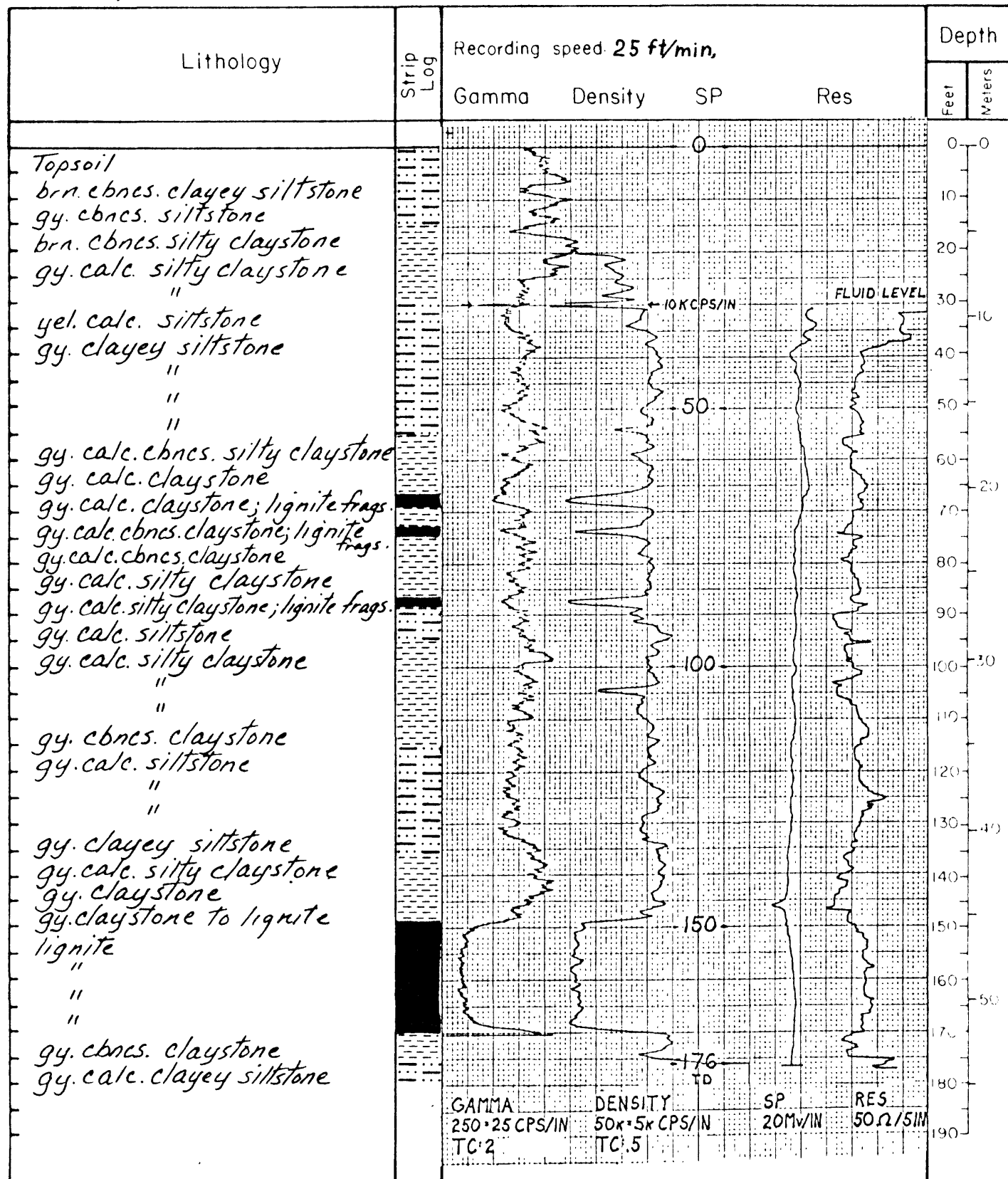
Hole no: WB77-53 Map: SW-1 Date: 9-26-77 State: N.D. County: Golden Valley
 Elev 2725 ft Location: T14N, R105W Sec. 20, Tract. SW, SW Drilled depth: 156 ft
 Measured 54 ft FWL, 21 ft FSL Hole size 4 3/4 in. Cored NO

Remarks: _____

Recorded by: JC Harksen



Hole no: WB77-54 Map SW-1 Date 10/13/77 State N. D. County Golden Valley
 Elev 2689ft Location T14N, R105W Sec 20, Tract SE SE Drilled depth: 176ft
 Measured _____, _____ Hole size 5 7/8 in. Cored Yes
 Remarks Twin and core hole 54/107, core interval 147 - 170.9 ft
 Recorded by J.C. Harksen



Hole no: WB77-55 Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

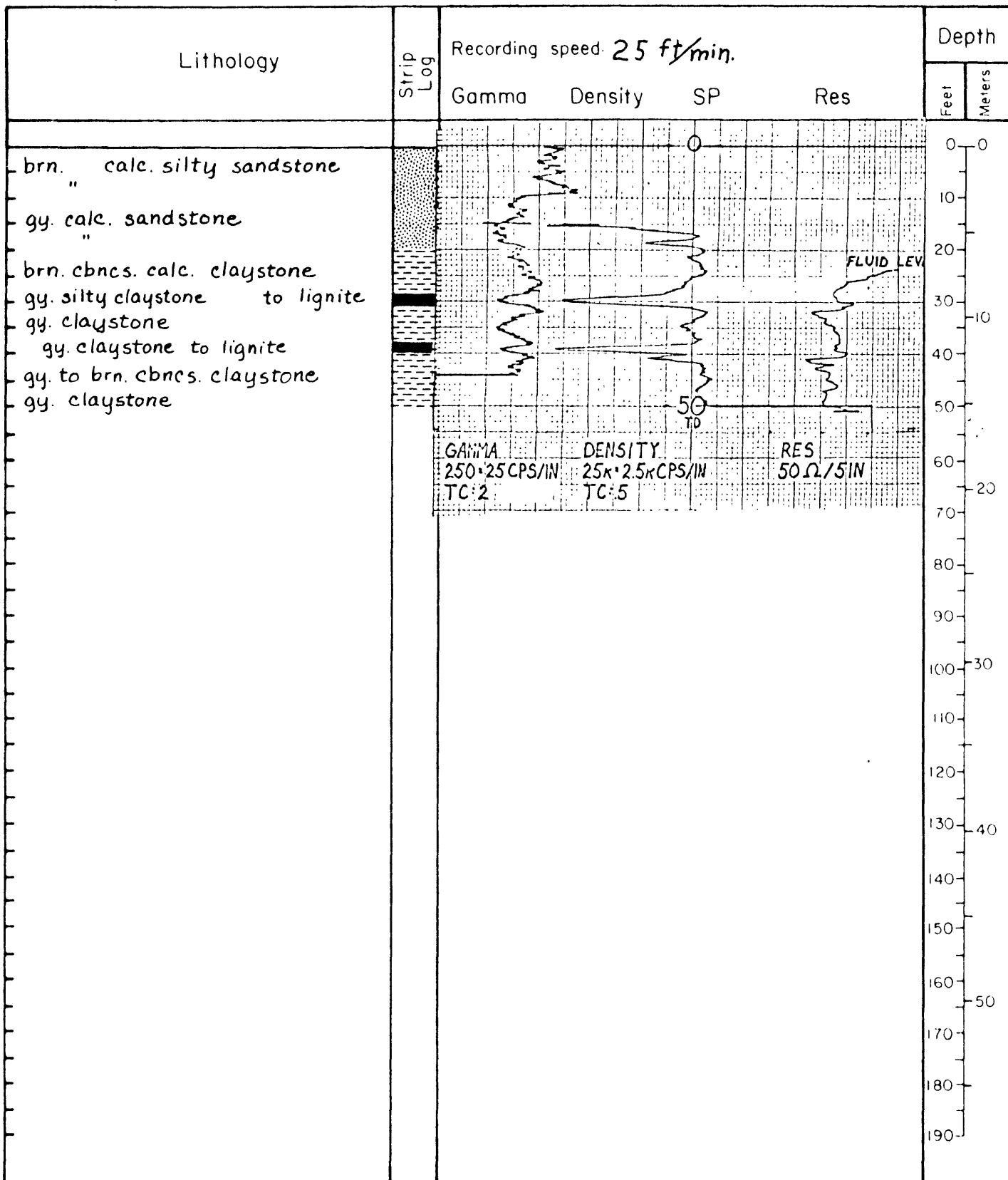
Measured: _____, _____ Hole size: _____ Cored Yes

Remarks See WB77-103 for Data.

Recorded by: _____

Lithology	Strip Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

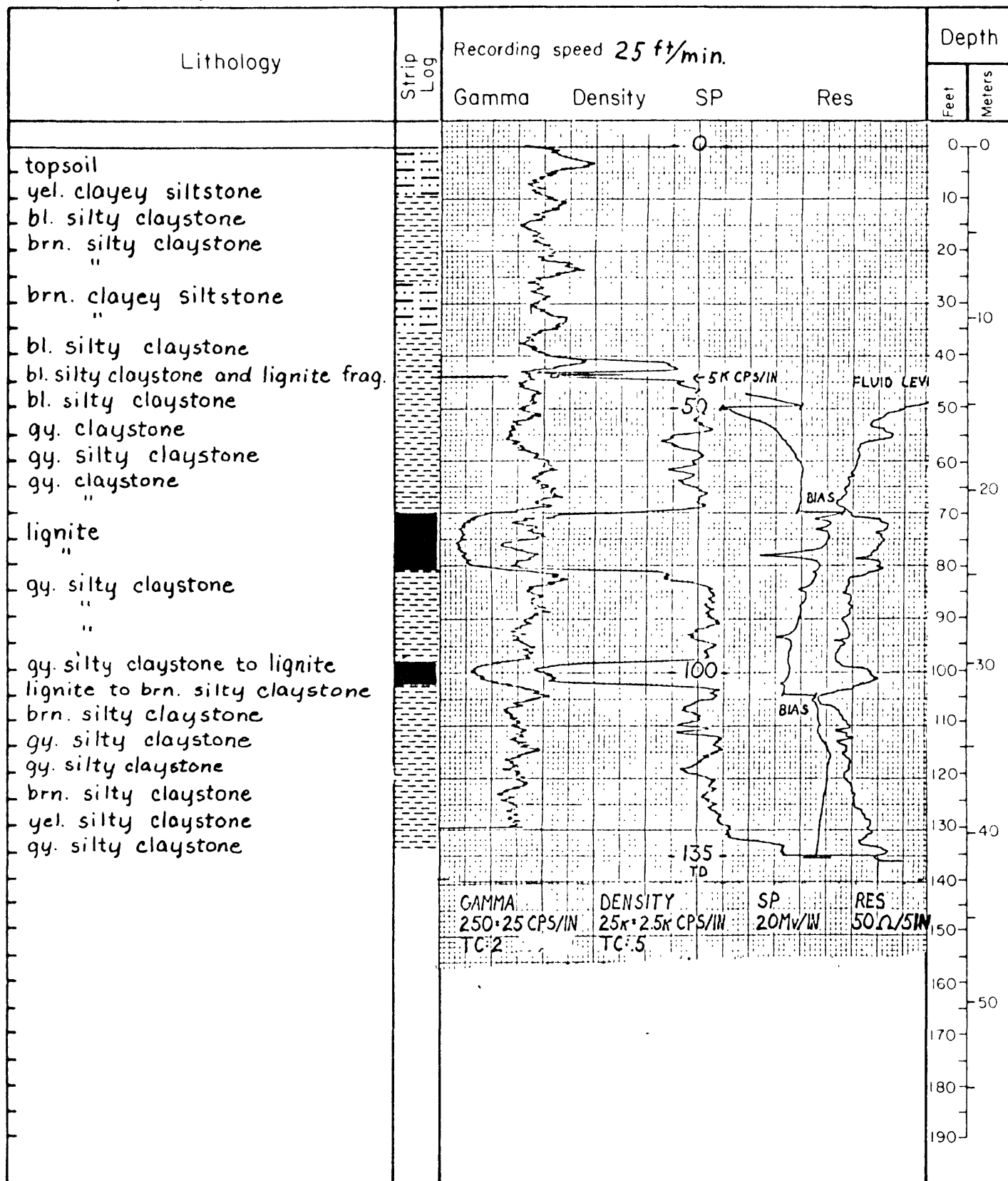
Hole no: WB77-56 Map NE-40 Date: 9/26/77 State Mont. County: Wibaux
 Elev 2740 ft Location: T 15 N, R 60 E Sec. 32, Tract NW NE Drilled depth: 50 ft
 Measured: 2605 ft FEL, 90 ft FNL Hole size: 4 3/4 in. Cored: No
 Remarks: Water observation well, SP missing
 Recorded by: J.C. Harksen



Hole no: WB77-57 Map NE-40 Date 9/27/77 State Mont. County Wibaux
 Elev. 2775 ft Location: T 15 N. R 60 E Sec. 34, Tract NW NW Drilled depth: 135 ft
 Measured 8 ft FWL, 120 ft FNL Hole size 4 3/4 in. Cored No

Remarks _____

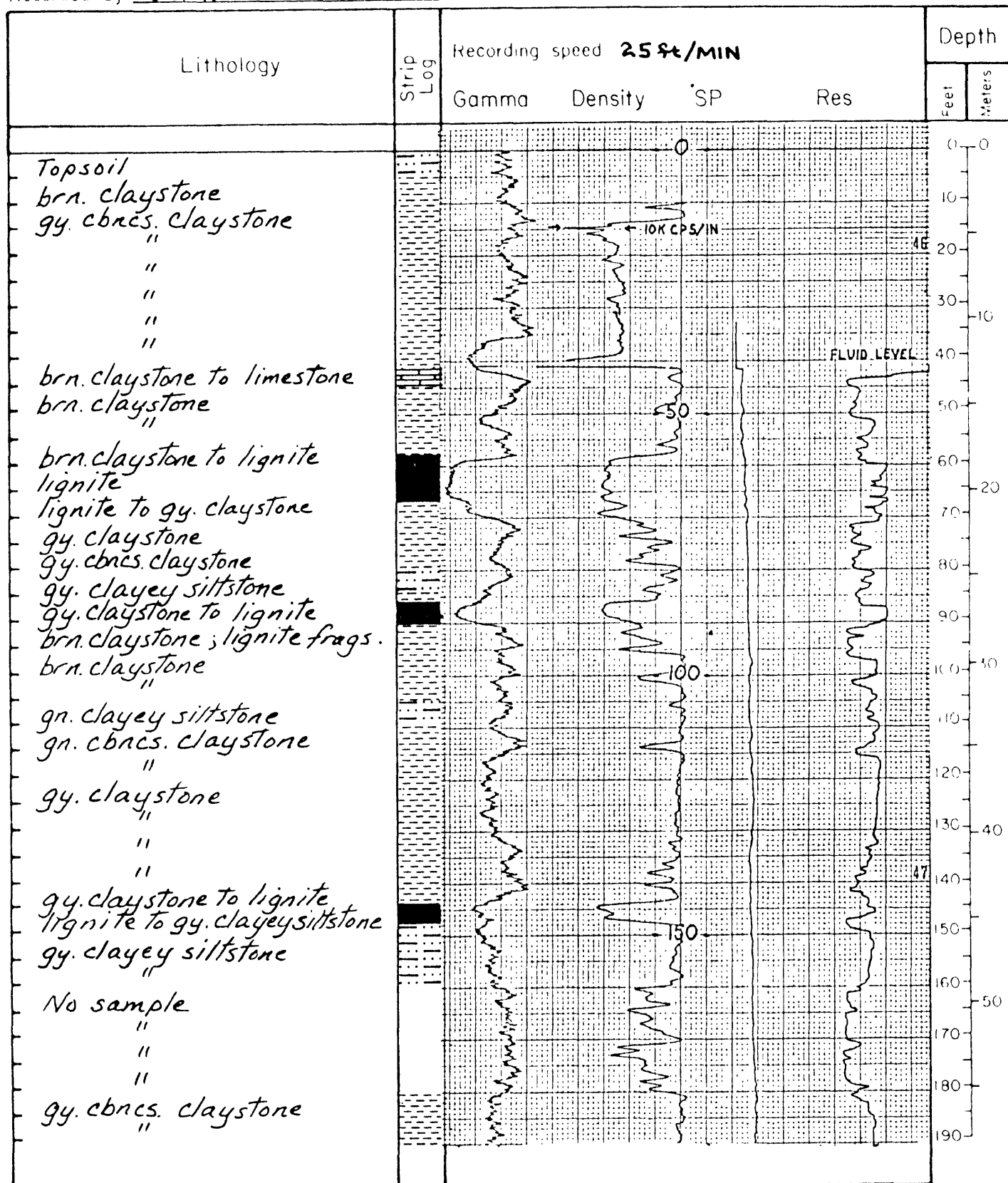
Recorded by: J.C. Harksen



Hole no: WB77-58 Map _____ Date _____ State _____ County _____
 Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored YES
 Remarks See WB77-59 for data
 Recorded by: _____

Lithology	Stratigraphic	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	
						40	10
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

Hole no: WB77-59 Map NE-40 Date 10/4/77 State MONT. County Wibaux
 Elev 2750 ft Location T15N, R60E Sec 26, Tract SW SW Drilled depth 584 ft
 Measured 135 ft FWL, 75 ft FSL Hole size 5 1/8 in. Cored Yes
 Remarks Twin and core hole 58/59, core interval 16-94.9 ft,
 Recorded by: J.C. Harksen



(Continued)

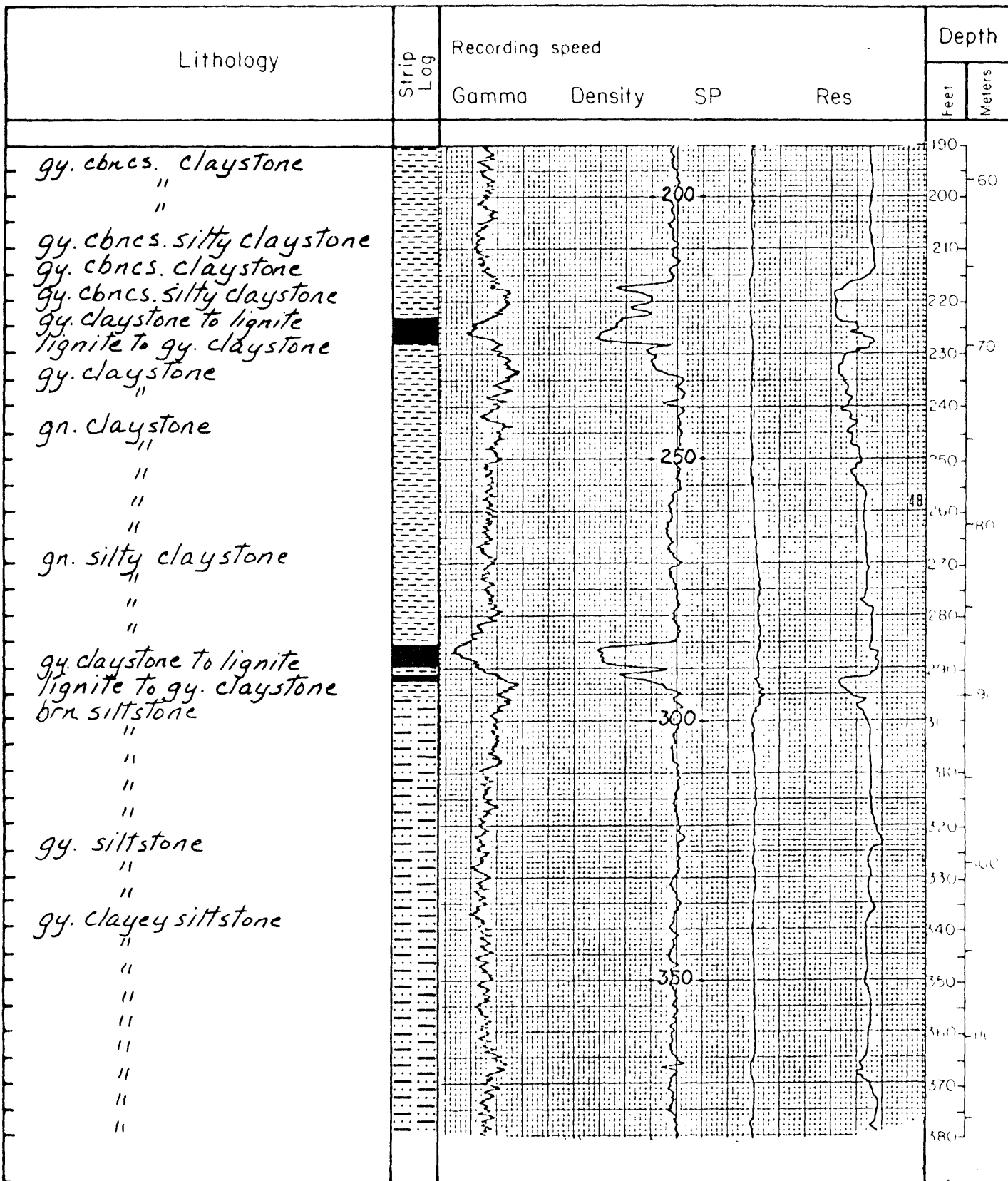
Hole no: W877-59 Map _____ Date: _____ State: _____ County: _____

Elev _____ Location _____ Sec. _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

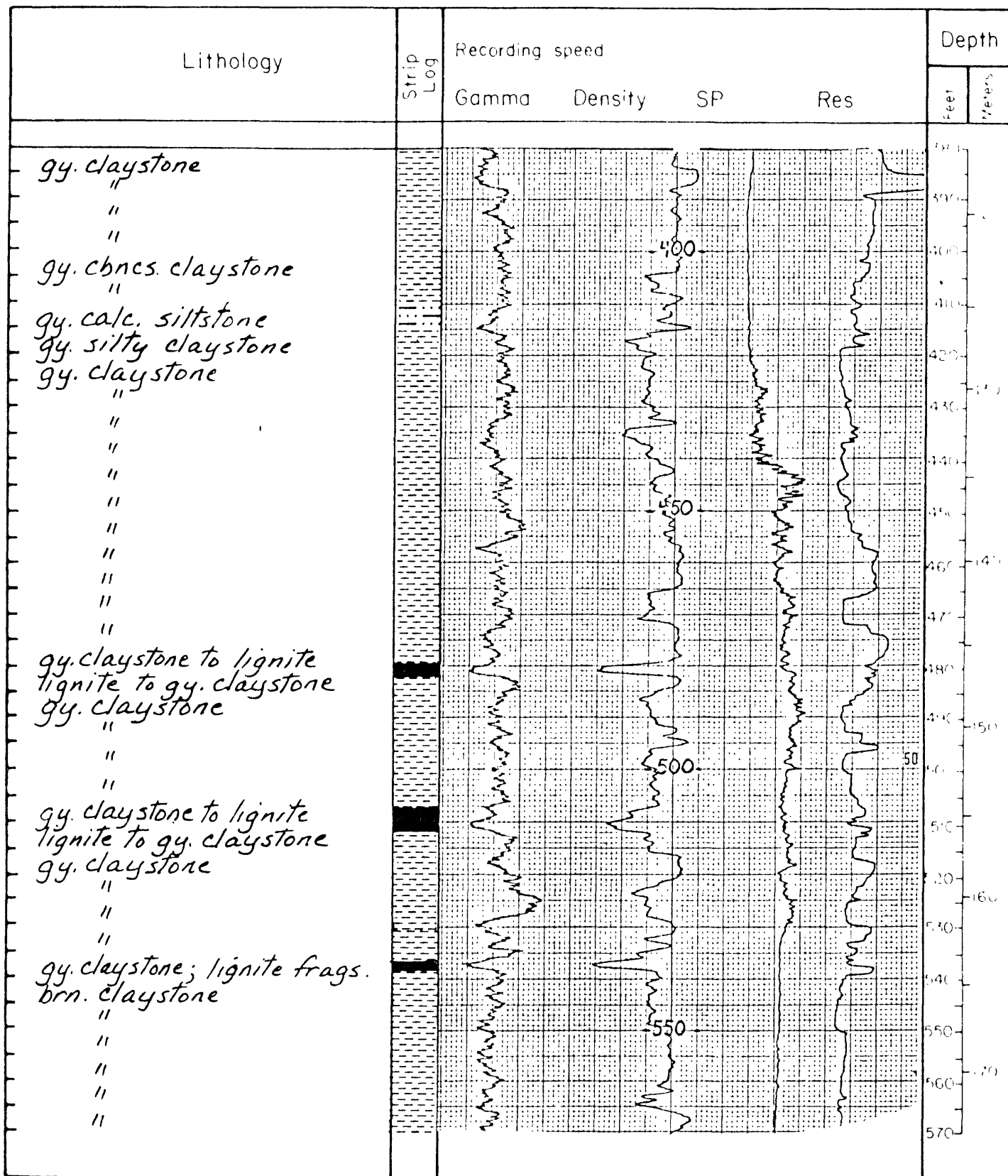
Remarks: _____

Recorded by: _____



(Continued)

Hole no: W377-59 Map _____ Date _____ State _____ County _____
Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____
Measured _____, _____ Hole size _____ Cored _____
Remarks _____
Recorded by _____



(Continued)

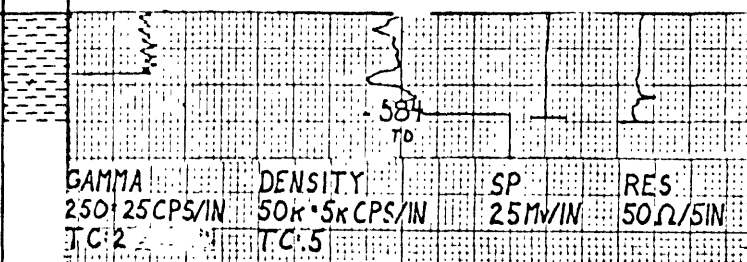
Hole no: W877-59 Map _____ Date: _____ State _____ County _____

Elev _____ Location _____ Sec. _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

Remarks: _____

Recorded by: _____

Lithology	Strip Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
brn. claystone "						570	
						580	
						590	18.0
						600	
						610	
						620	19.0
						630	
						640	
						650	
						660	20.0
						670	
						680	
						690	21.0
						700	
						710	
						720	22.0
						730	
						740	
						750	23.0
						760	

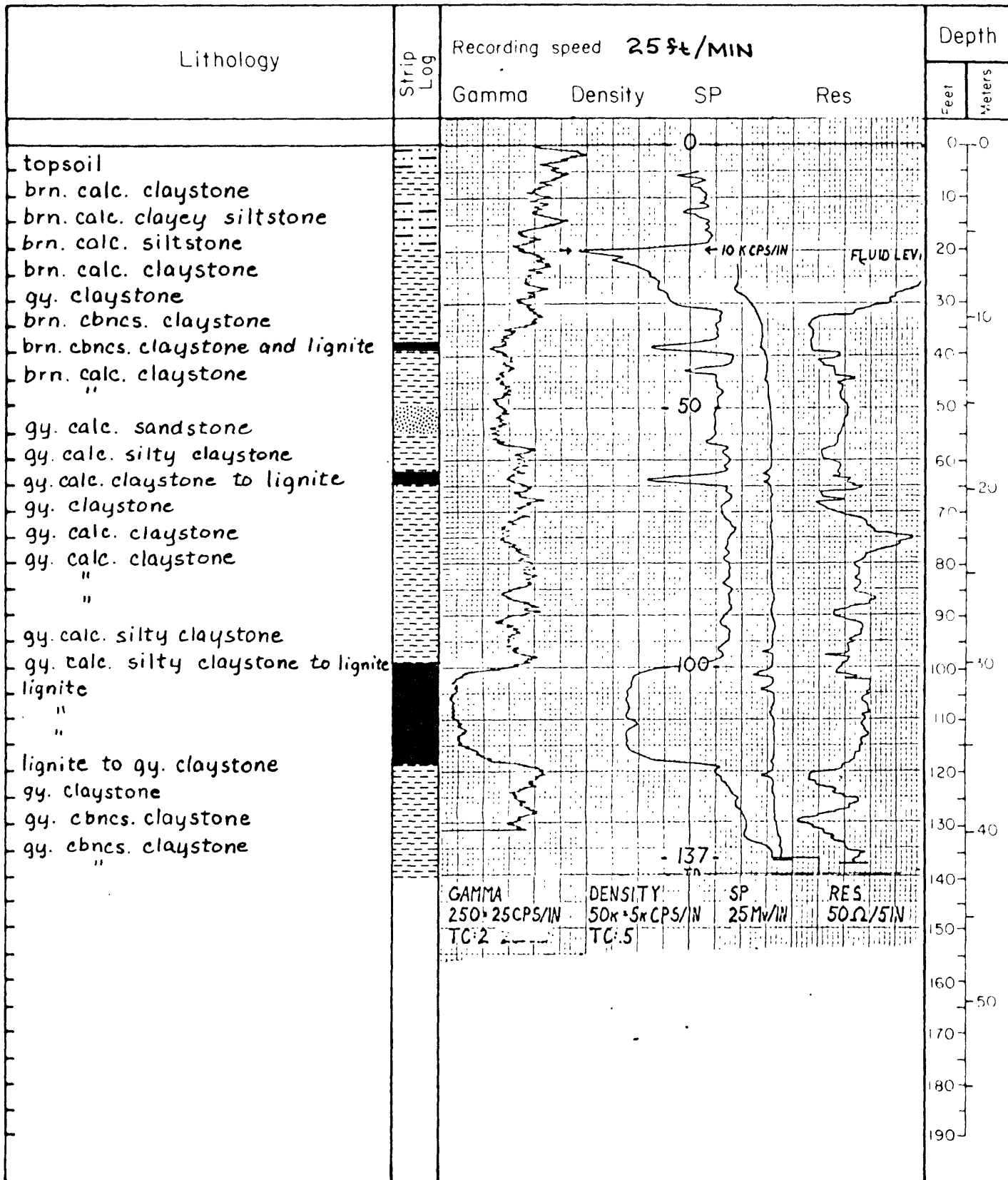
Hole no: WB77-60 Map NE-40 Date 9/27/77 State Mont. County Wibaux

Elev 2724 ft Location: T 15 N, R 60 E Sec. 26, Tract SE SE Drilled depth: 137 ft

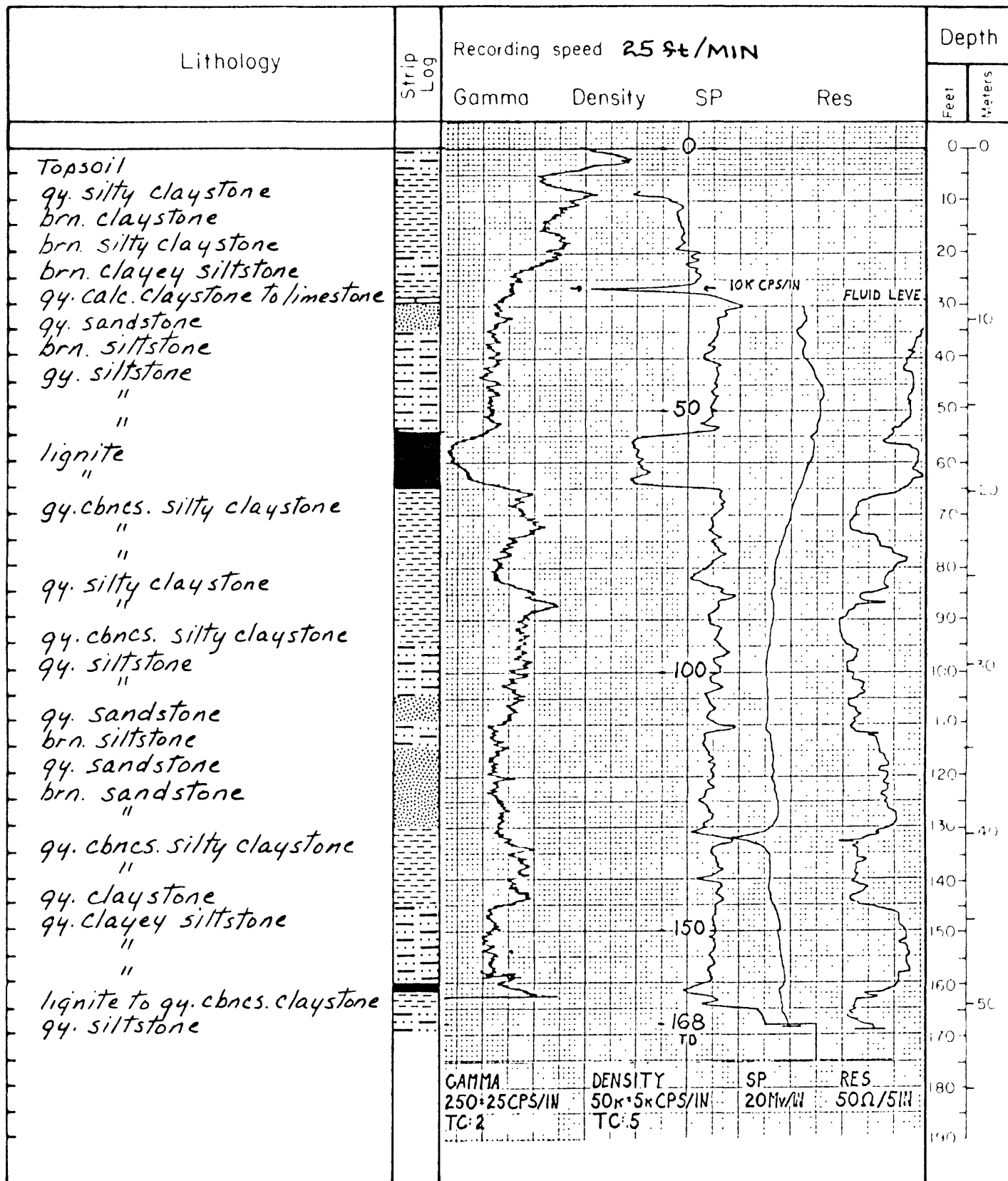
Measured 42 ft FEL, 12 ft FSL Hole size 4 3/4 in. Cored No

Remarks _____

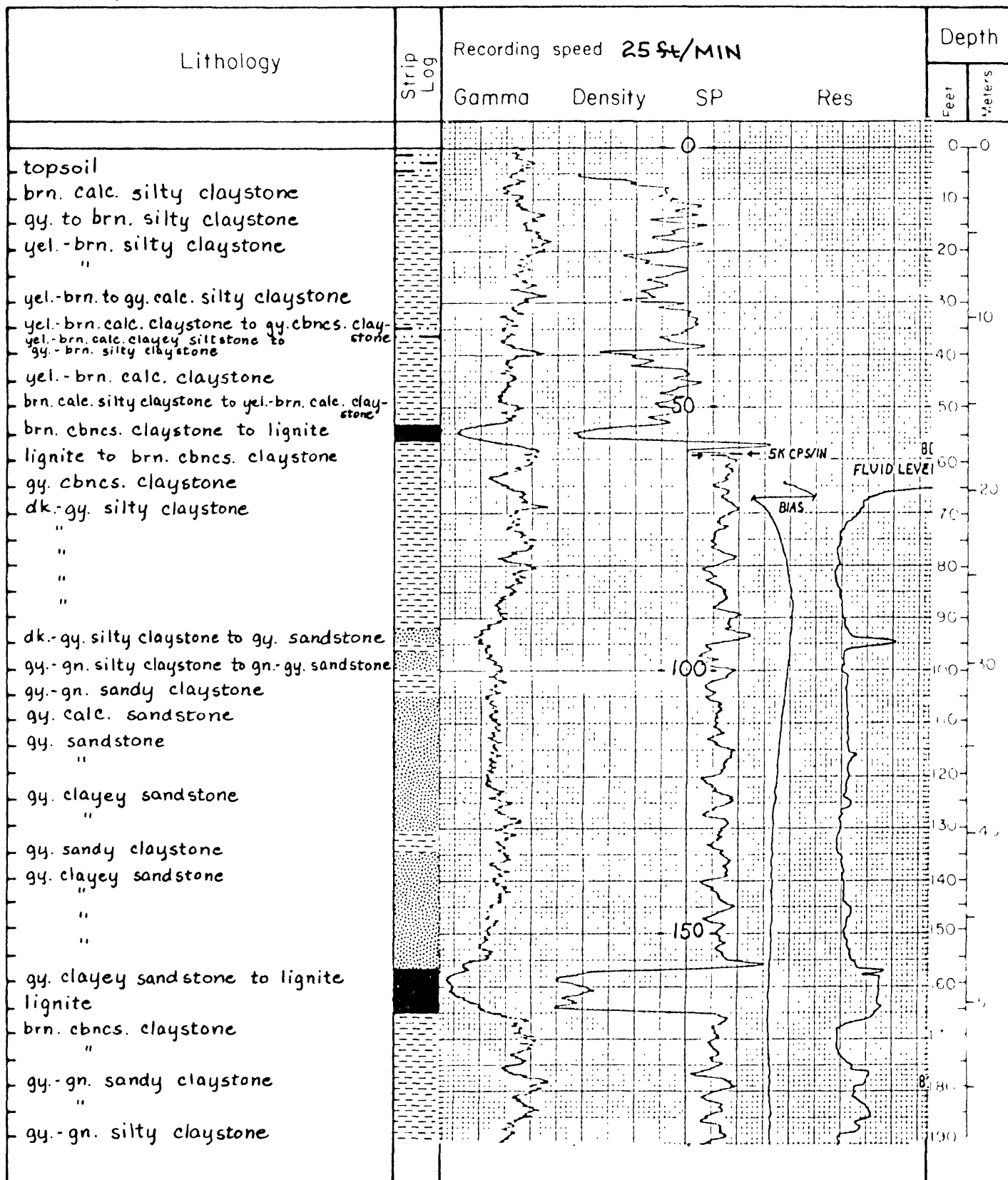
Recorded by: J. C. Harksen



Hole no: WB77-61 Map SE-8 Date: 10-2-77 State Mont. County Wibaux
 Elev 2700ft Location T15N R59E Sec 24, Tract SE-NW Drilled depth: 168ft
 Measured _____, Hole size 5 7/8 in. Cored NO
 Remarks _____
 Recorded by: J.C. Harksen



Hole no. WB77-62 Map NE-40 Date 9/27/77 State Mont. County Wibaux
 Elev 2650ft Location T 15 N. R 60 E Sec 18, Tract SE SE Drilled depth: 500ft
 Measured 50ft FEL, 30ft FSL Hole size: 4 3/4 in. Cored No
 Remarks Water observation well
 Recorded by J.C. Harksen



(Continued)

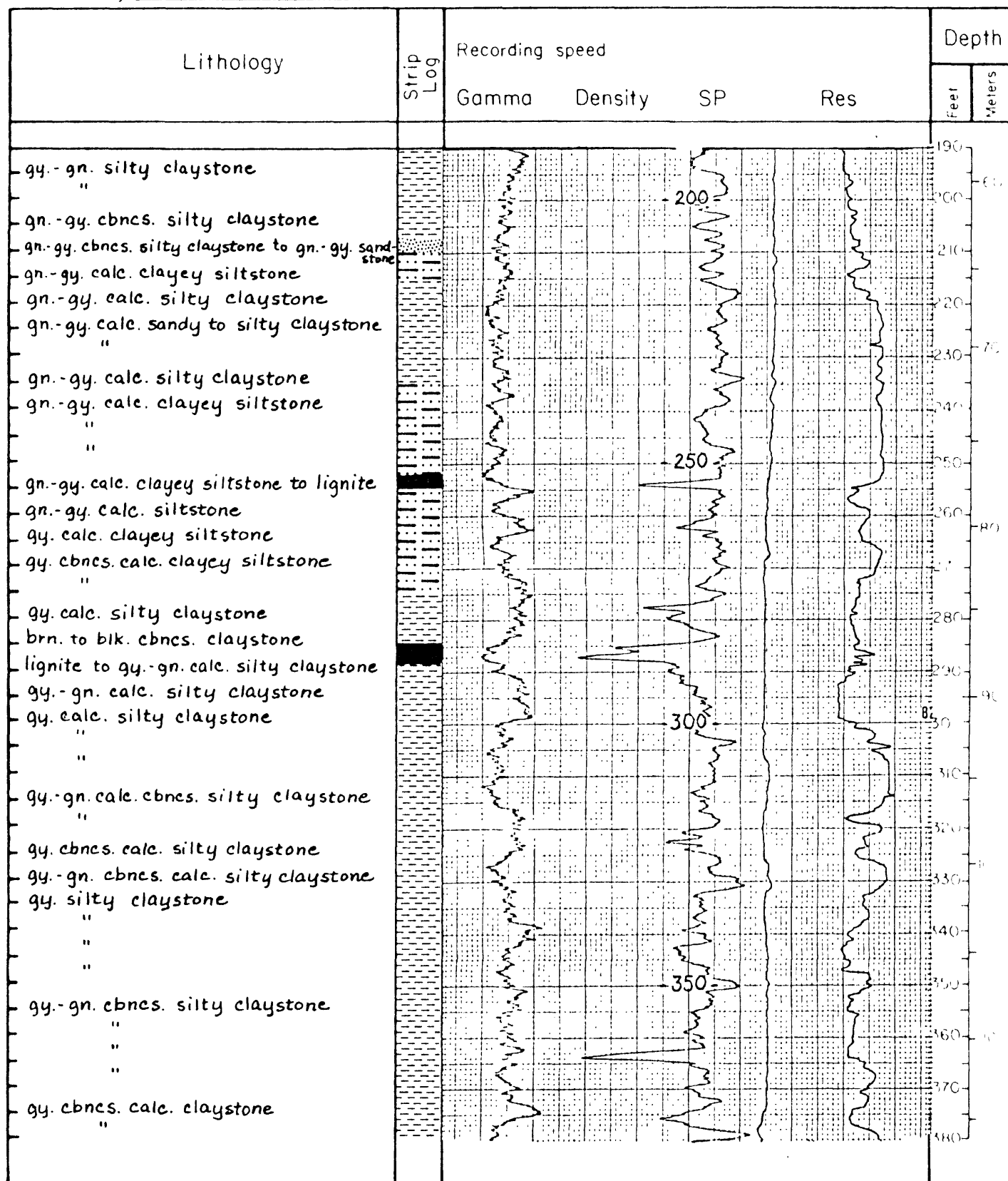
Hole no: WB77-62 Map _____ Date: _____ State _____ County: _____

Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored: _____

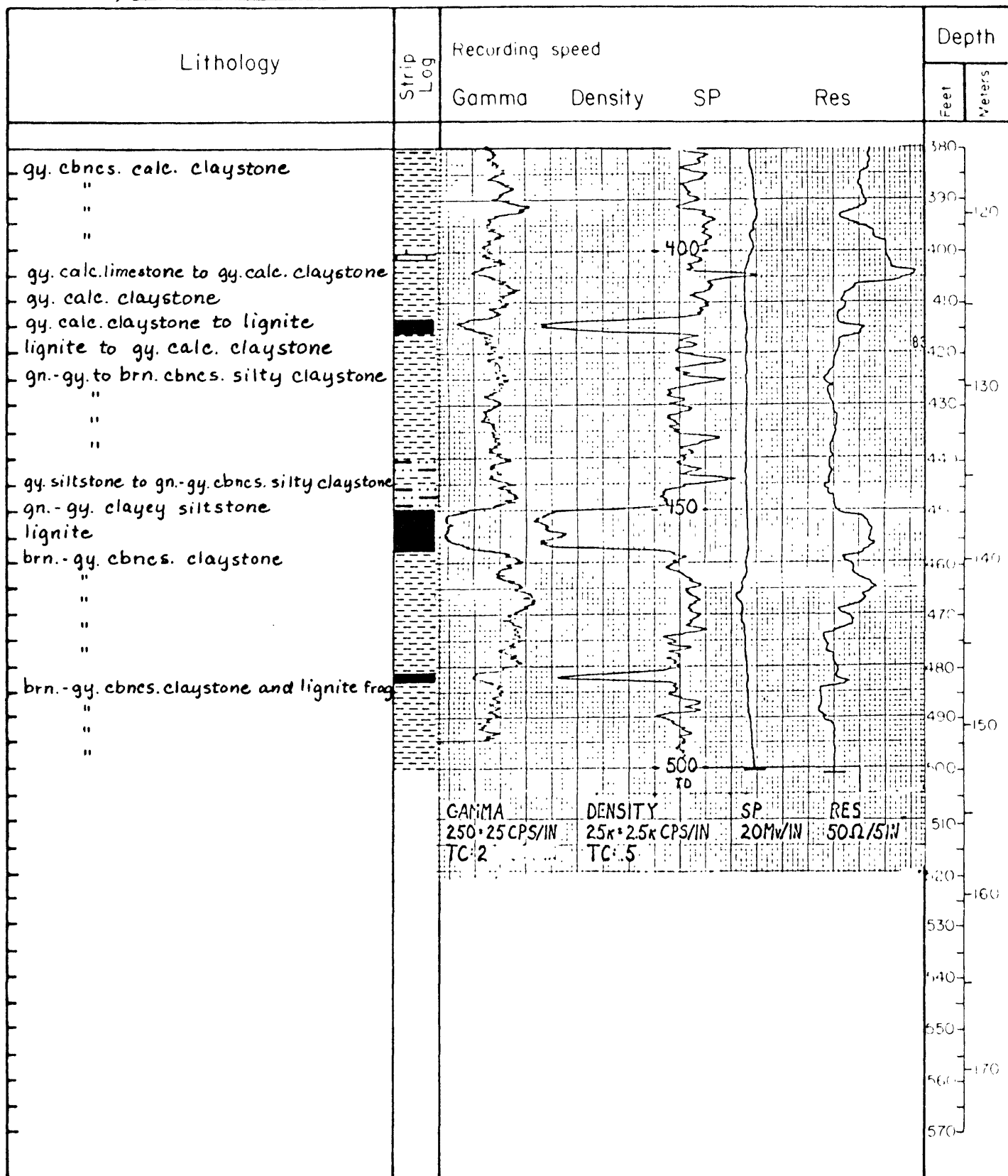
Remarks: _____

Recorded by: _____



(Continued)

Hole no. WB77-62 Map _____ Date _____ State _____ County _____
Elev _____ Location _____ Sec. _____, Tract _____ Drilled depth: _____
Measured _____, _____ Hole size _____ Cored _____
Remarks _____
Recorded by: _____



Hole no: WB77-63 Map _____ Date: _____ State: _____ County: _____

Elev: _____ Location _____ Sec. _____, Tract _____ Drilled depth: _____

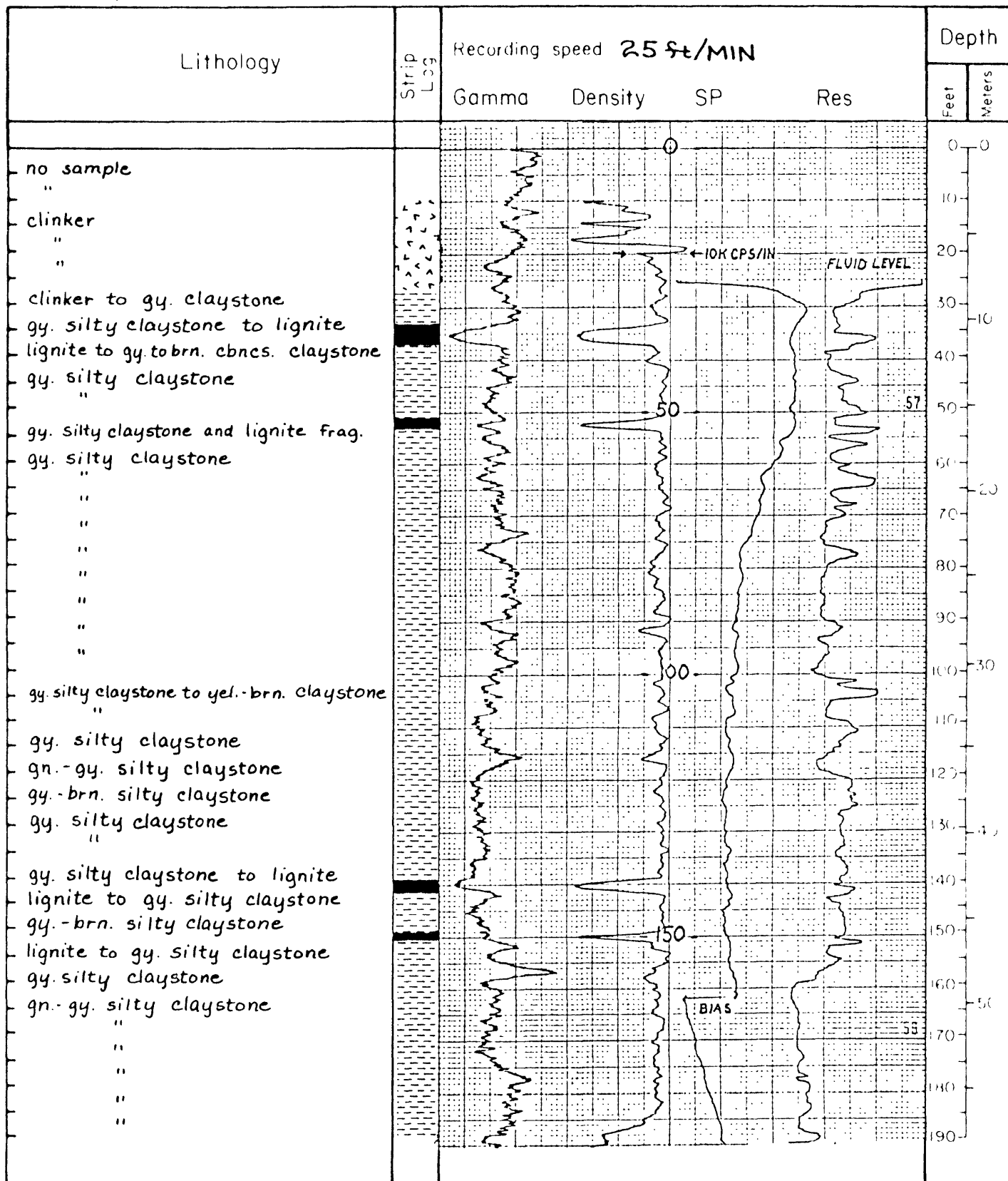
Measured: _____, _____ Hole size: _____ Cored: _____

Remarks: Not drilled

Recorded by: _____

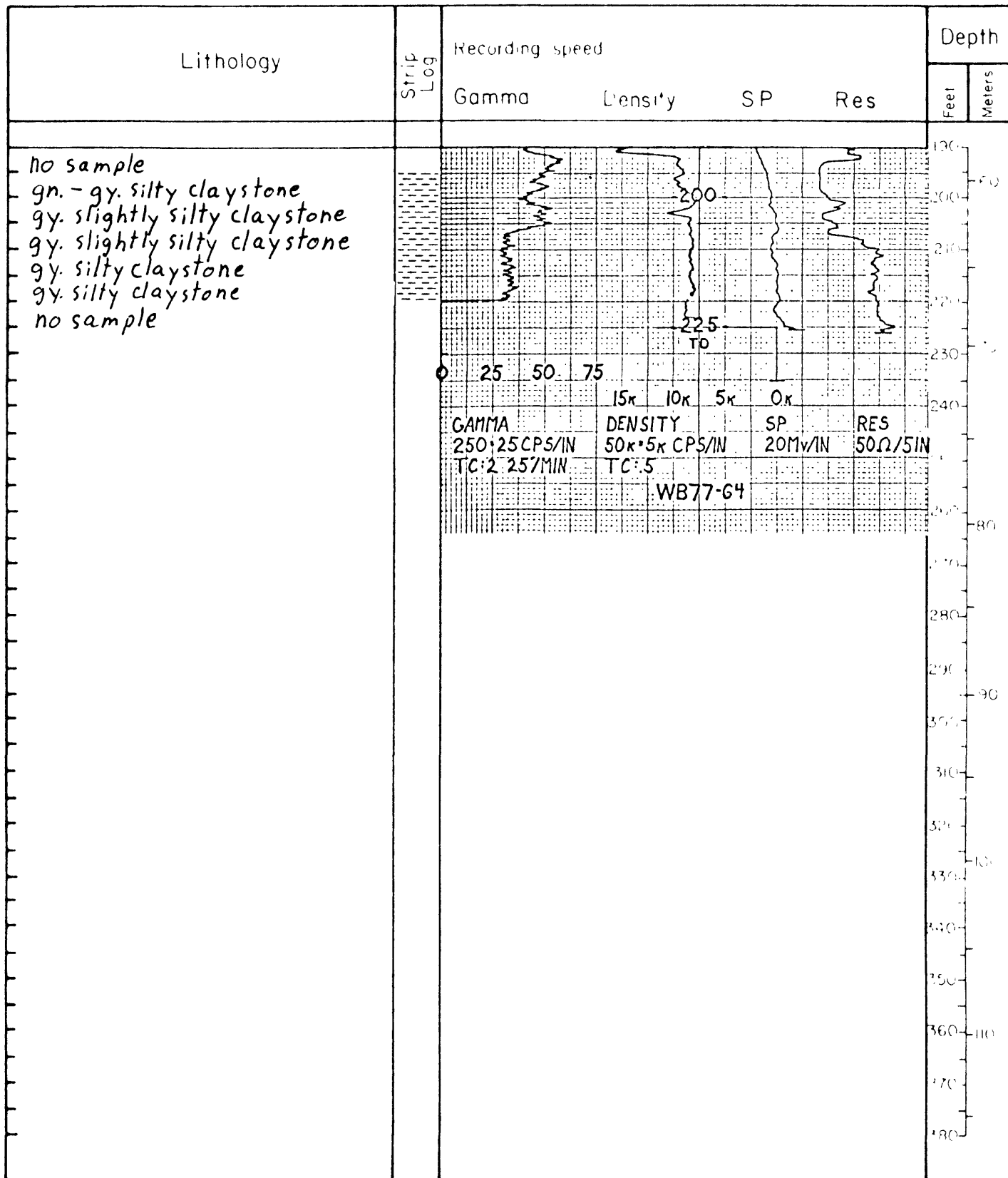
Lithology	Stratigraphic Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

Hole no: WB77-64 Map NE-40 Date 10/3/77 State Mont. County Wibaux
 Elev 2730 Location T 15 N, R 60 E Sec 30, Tract NE NE Drilled depth: 225 ft
 Measured 160 ft FEL, 110 ft FNL Hole size 5 1/8 in. Cored No
 Remarks Well log for 190-225 ft missing
 Recorded by: J. C. Harksen

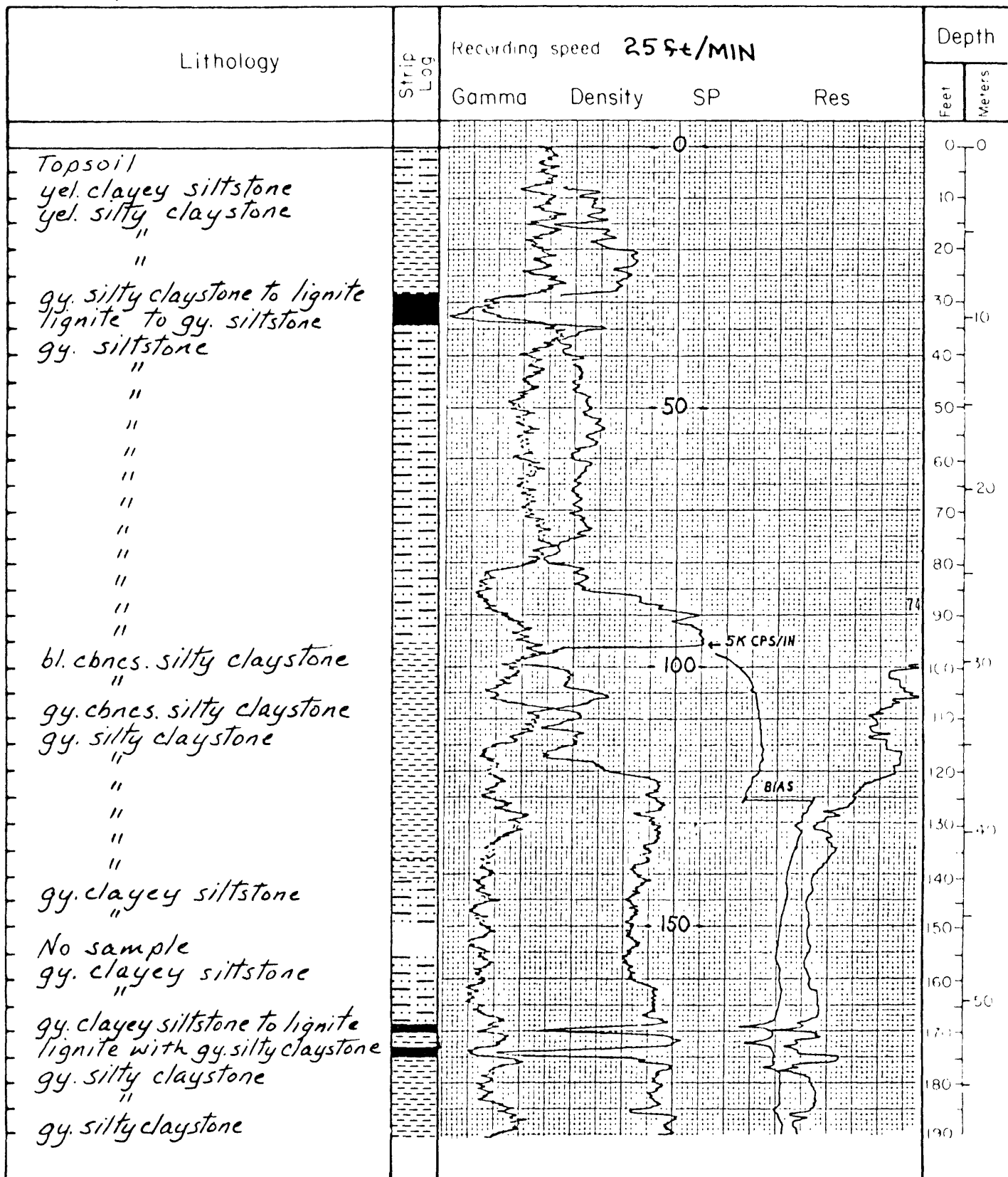


(continued)

Hole no: WB77-64 Map _____ Date: _____ State: _____ County: _____
Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured _____, _____ Hole size _____ Cored _____
Remarks _____
Recorded by: _____



Hole no: W877-65 Map NE-40 Date: 9/27/77 State Mont. County: Wibaux
 Elev 2740ft Location: T15N, R60E Sec. 28, Tract NE NE Drilled depth: 252ft
 Measured 45 ft FNL, 27 ft FEL Hole size 4 3/4 in. Cored No
 Remarks _____
 Recorded by: J. C. Harksen



(continued)

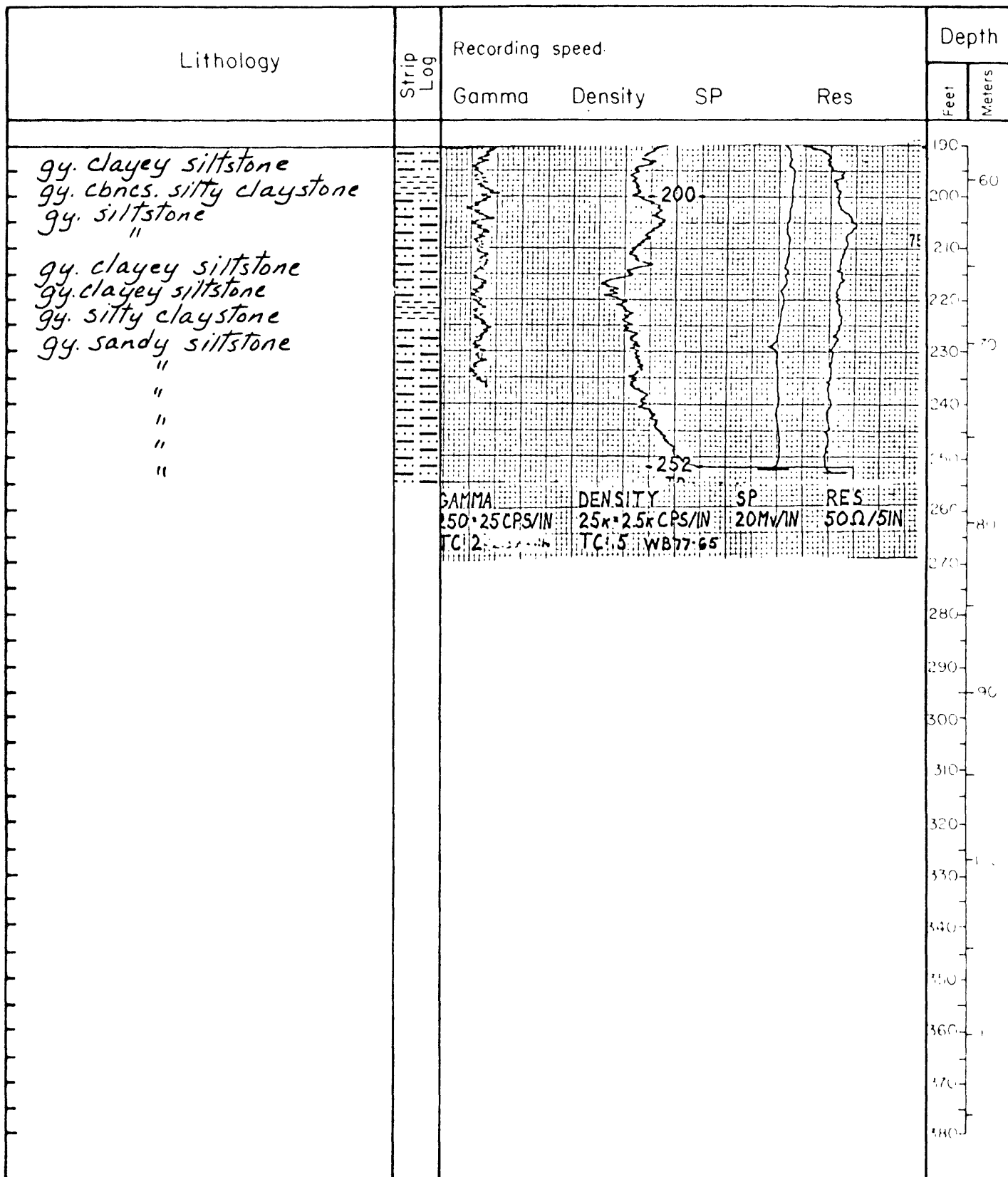
Hole no: WB77-65 Map _____ Date: _____ State: _____ County: _____

Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____

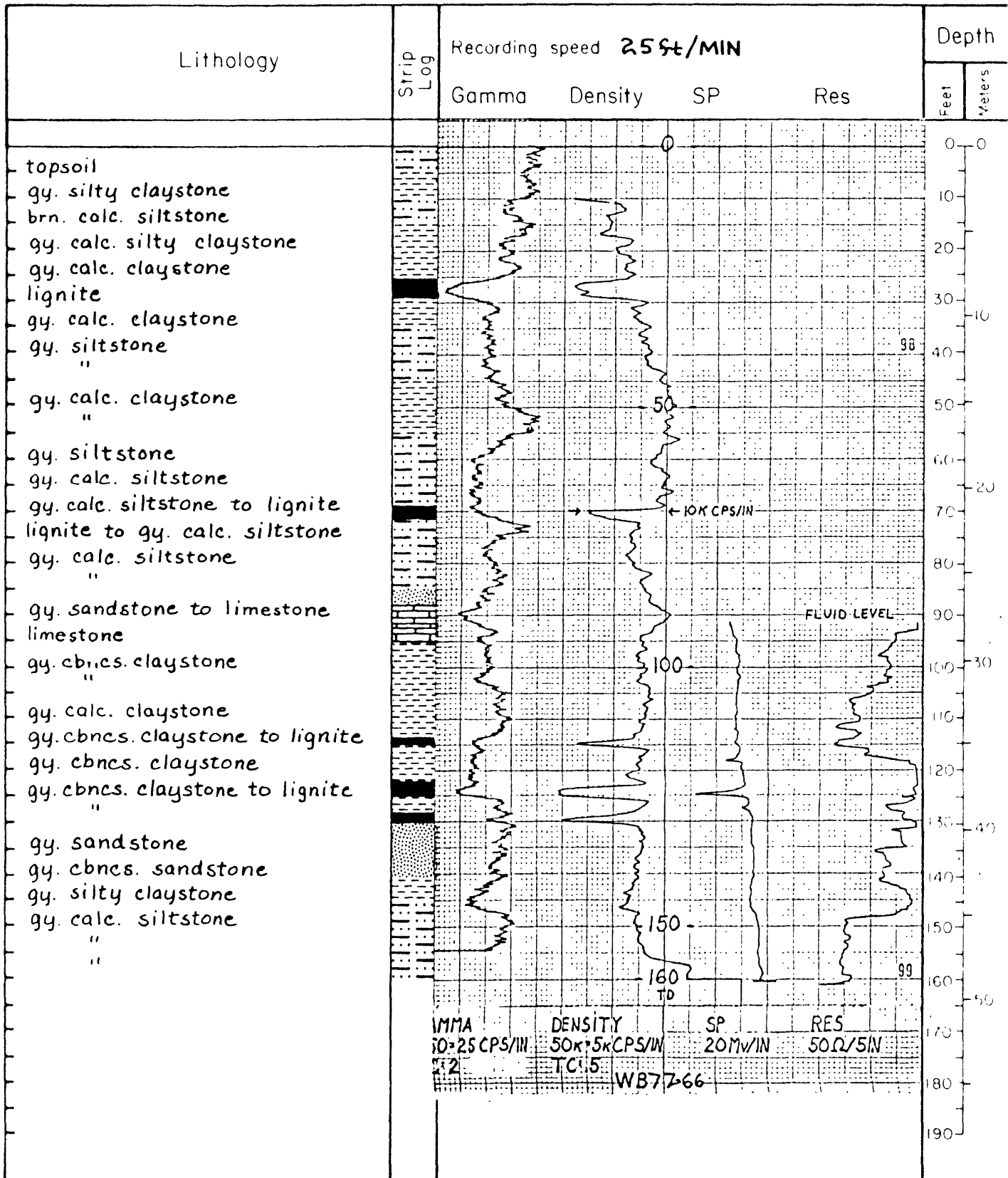
Measured _____, _____ Hole size _____ Cored _____

Remarks: _____

Recorded by: _____



Hole no: WB77-66 Map NE-40 Date 10/13/77 State Mont. County Wibaux
 Elev 2650 ft Location T15N, R60E Sec 22, Tract NW NW Drilled depth: 160 ft
 Measured _____, _____ Hole size 5 1/8 in. Cored No
 Remarks _____
 Recorded by: J.C. Harksen



Hole no: WB77-67 Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

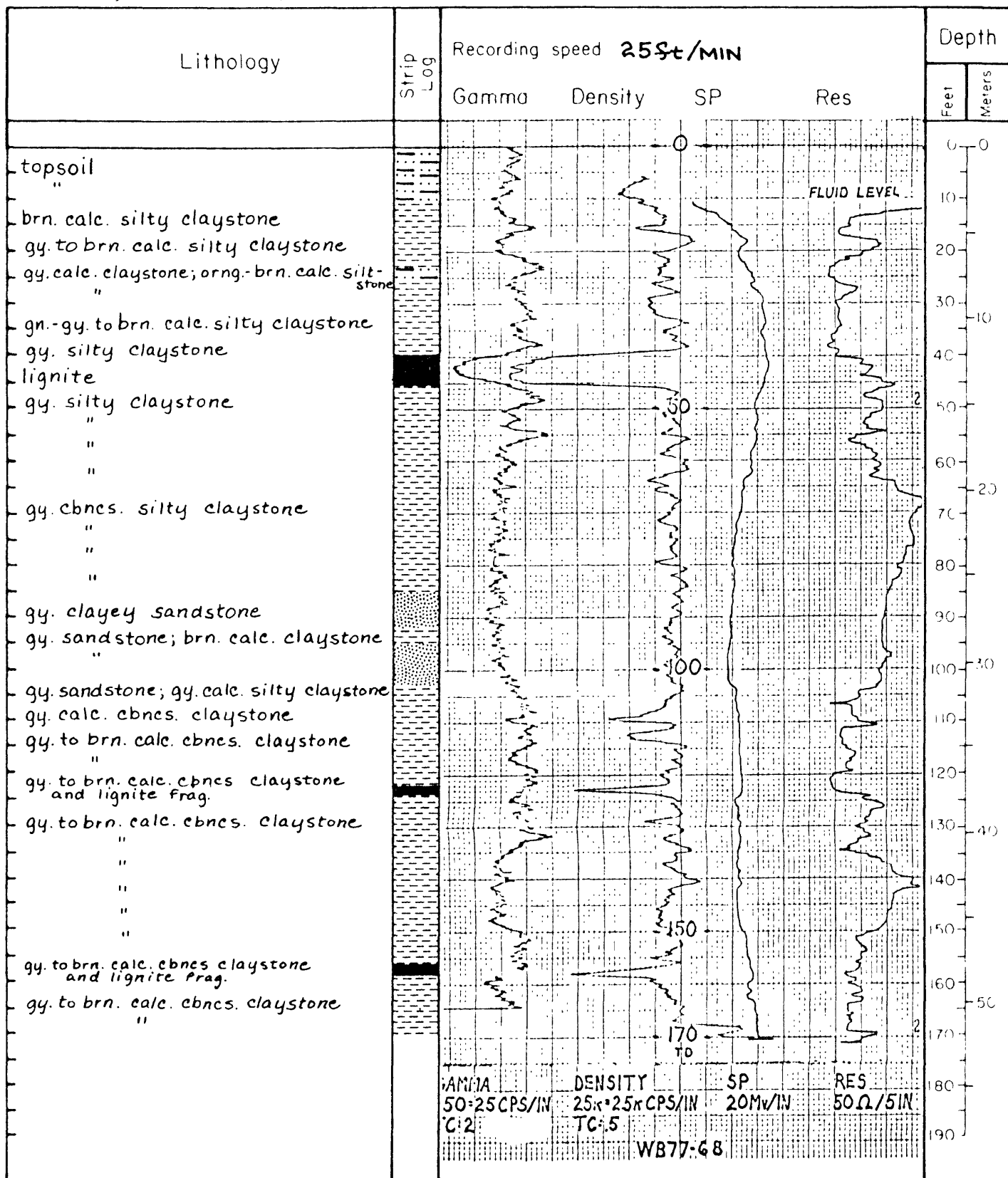
Measured: _____, _____ Hole size _____ Cored _____

Remarks: Not drilled

Recorded by: _____

Lithology	Strip Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

Hole no: WB77-68 Map NE-40 Date 9/21/77 State Mont County Wibaux
 Elev 2715 ft Location T 15 N. R 60 E Sec 26, Tract NW NW Drilled depth 170 ft
 Measured 135 ft FWL, 20 ft FNL Hole size 4 3/4 in Cored No
 Remarks Water observation well
 Recorded by J.C. Harksen



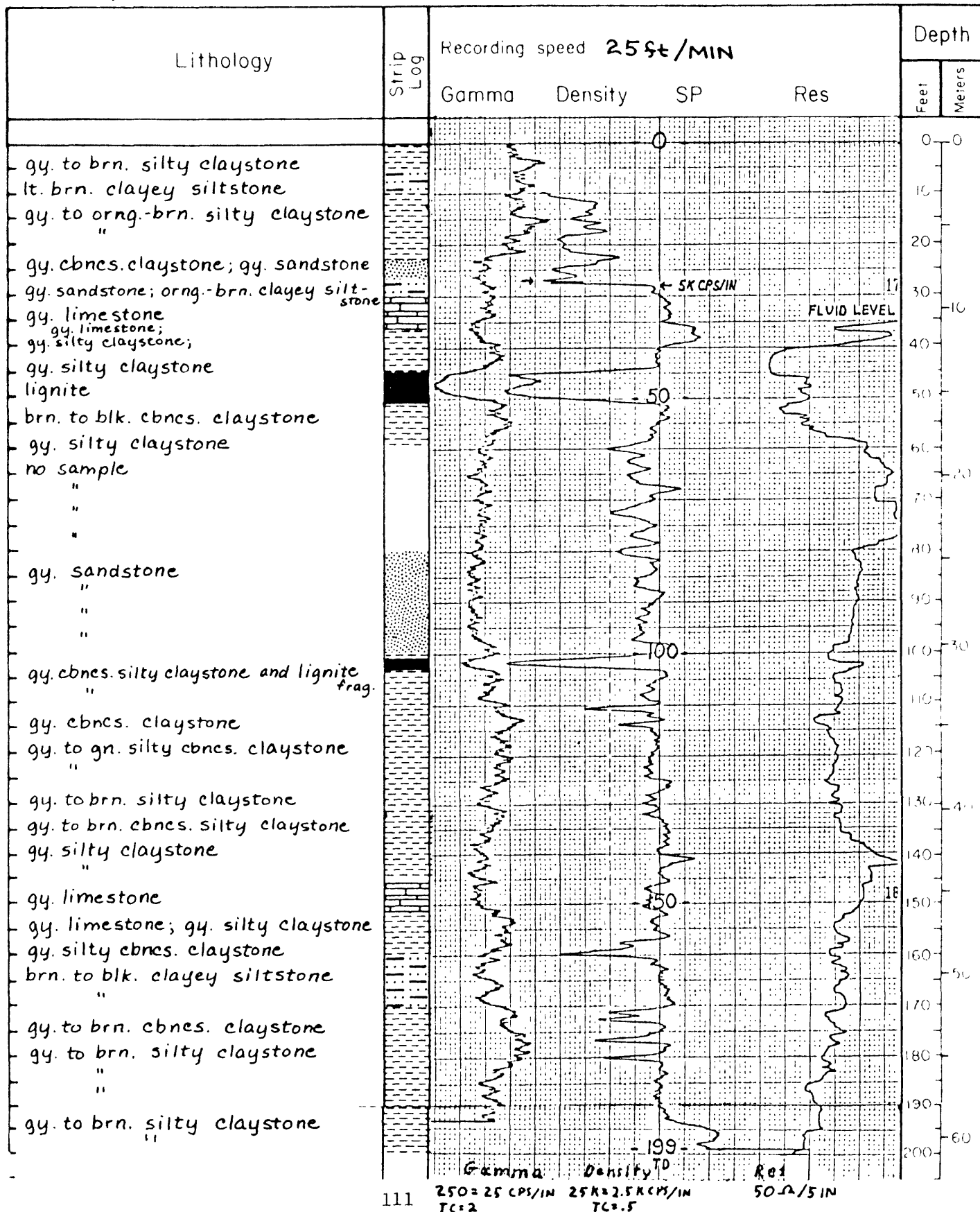
Hole no: WB77-69 Map NE-40 Date 9/26/77 State Mont. County Wibaux

Elev 2720ft Location T 15 N. R 60 E Sec 26, Tract NE NE Drilled depth: 199ft

Measured 220ft FEL, 20ft FNL Hole size 4 3/4 in. Cored No

Remarks Water observation well

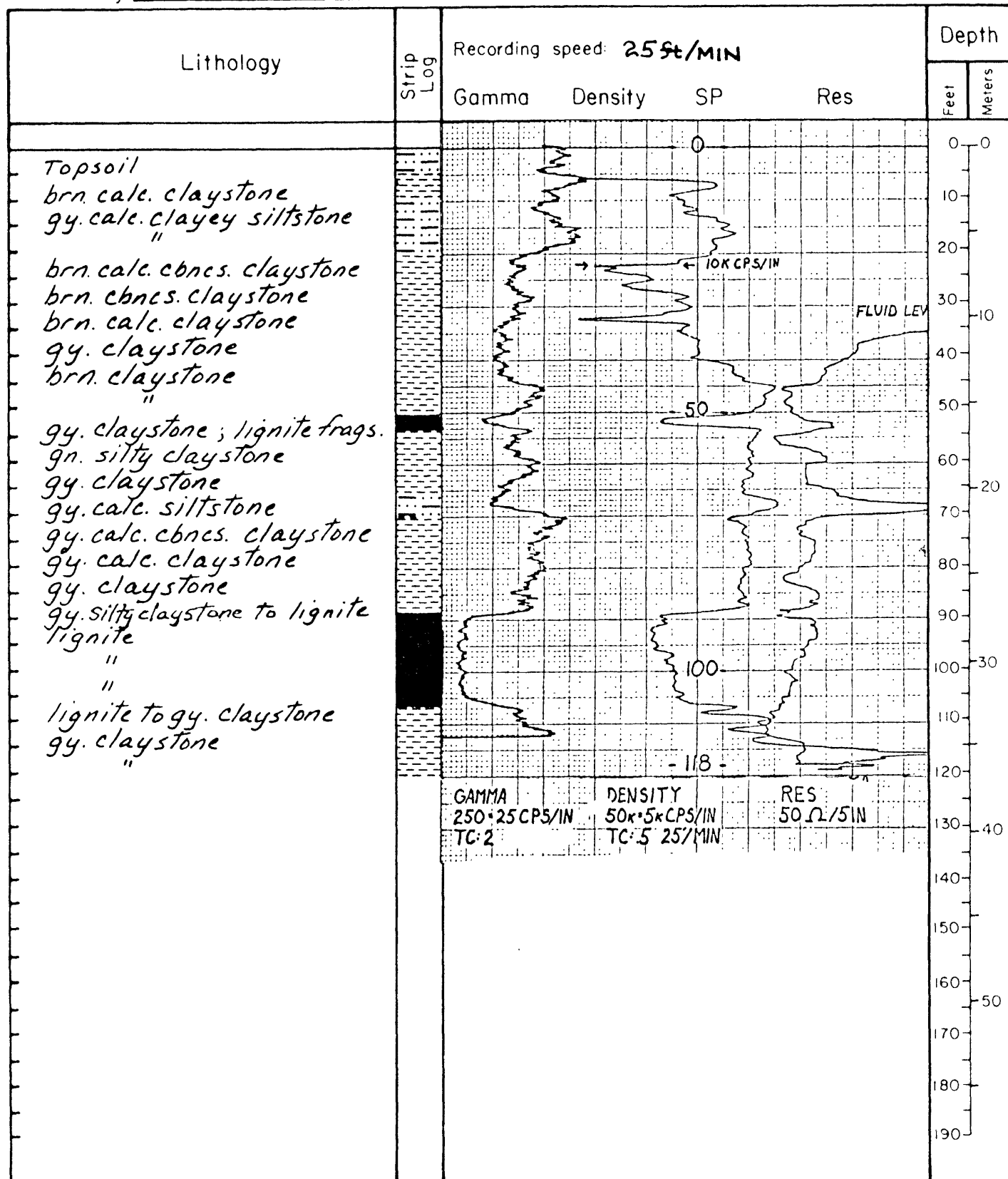
Recorded by: J.C. Harksen



Hole no: WB77-70 Map: SW-1 Date: 9/26/77 State: N.D. County: Golden Valley
 Elev: 2680ft Location: T14N, R105W Sec: 18, Tract: SW NW Drilled depth: 118ft
 Measured: 10ft FWL, 2328ft FNL Hole size: 4 3/4 in. Cored: No

Remarks: _____

Recorded by: J. C. Harksen



Hole no: WB77-71 Map _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____

Measured: _____, _____ Hole size: _____ Cored _____

Remarks: Not drilled

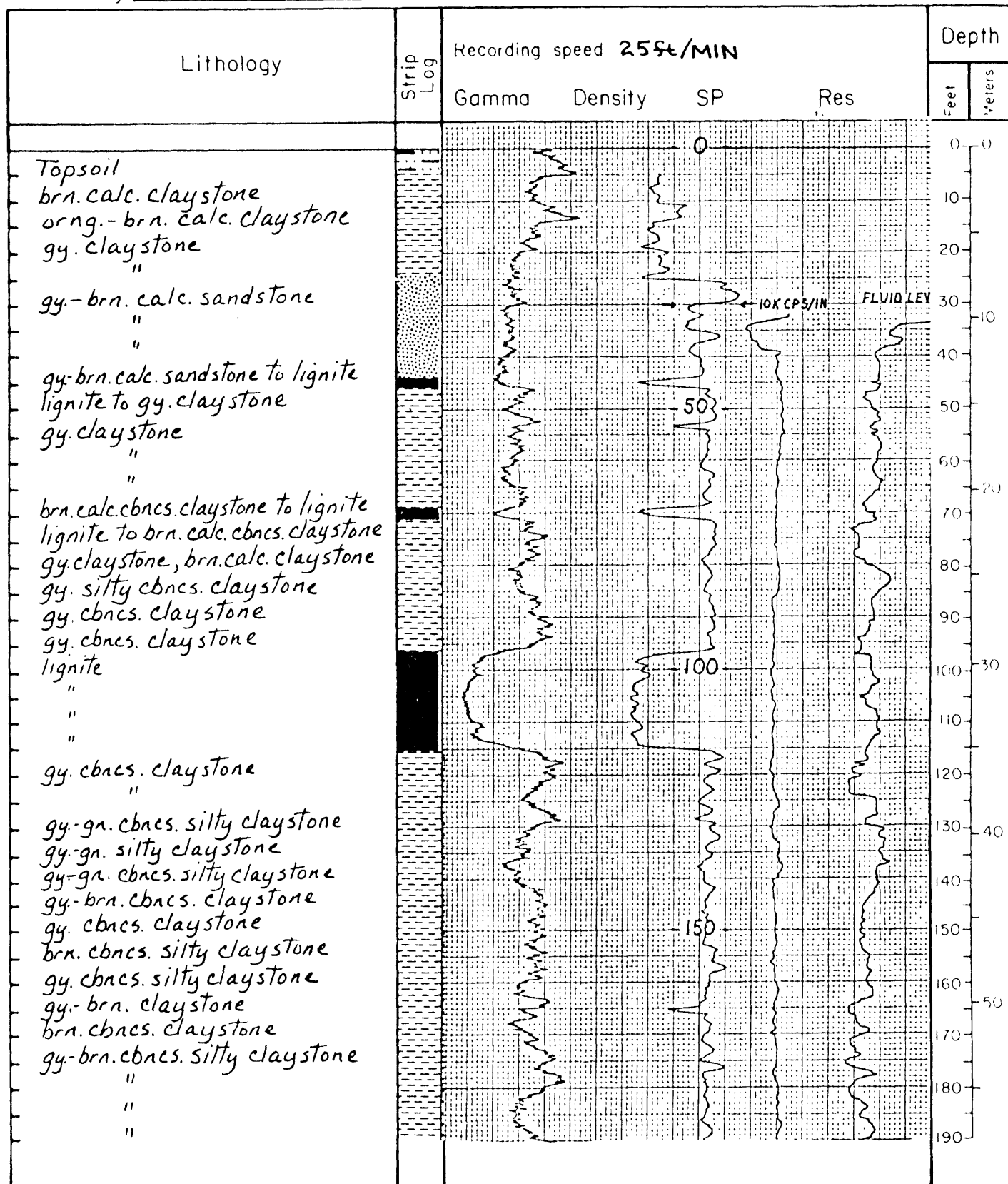
Recorded by: _____

Lithology	Strip Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	
						40	10
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

Hole no: W877-72 Map SW-1 Date: 9/29/77 State N. D. County Golden Valley
 Elev 2670ft Location T14N, R105W Sec 8, Tract SE SE Drilled depth 280ft
 Measured 200ft FEL, 50ft FSL Hole size 5 1/8 in. Cored No

Remarks _____

Recorded by: J. C. Harksen



(continued)

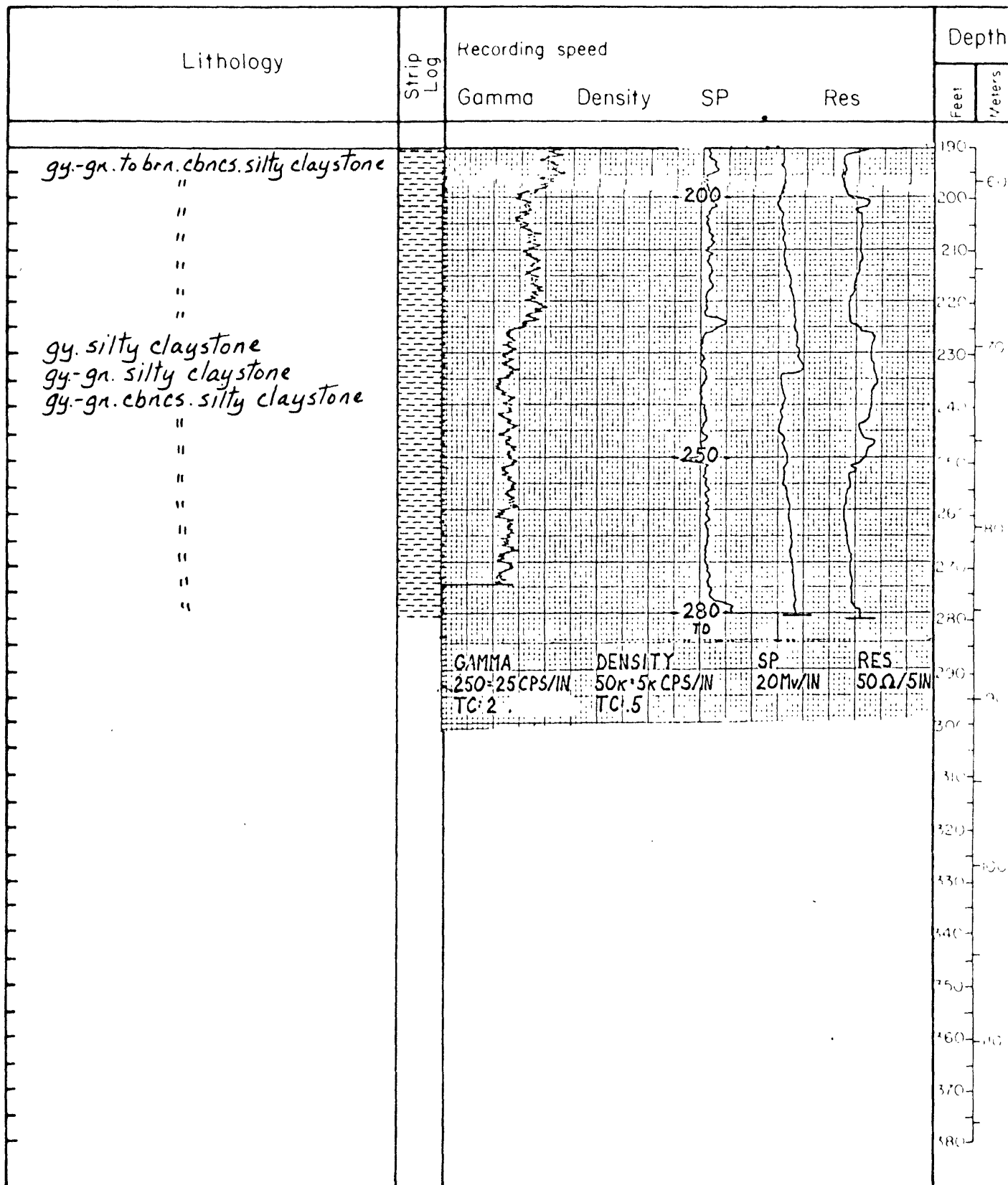
Hole no: WB77-72 Map _____ Date: _____ State _____ County: _____

Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____

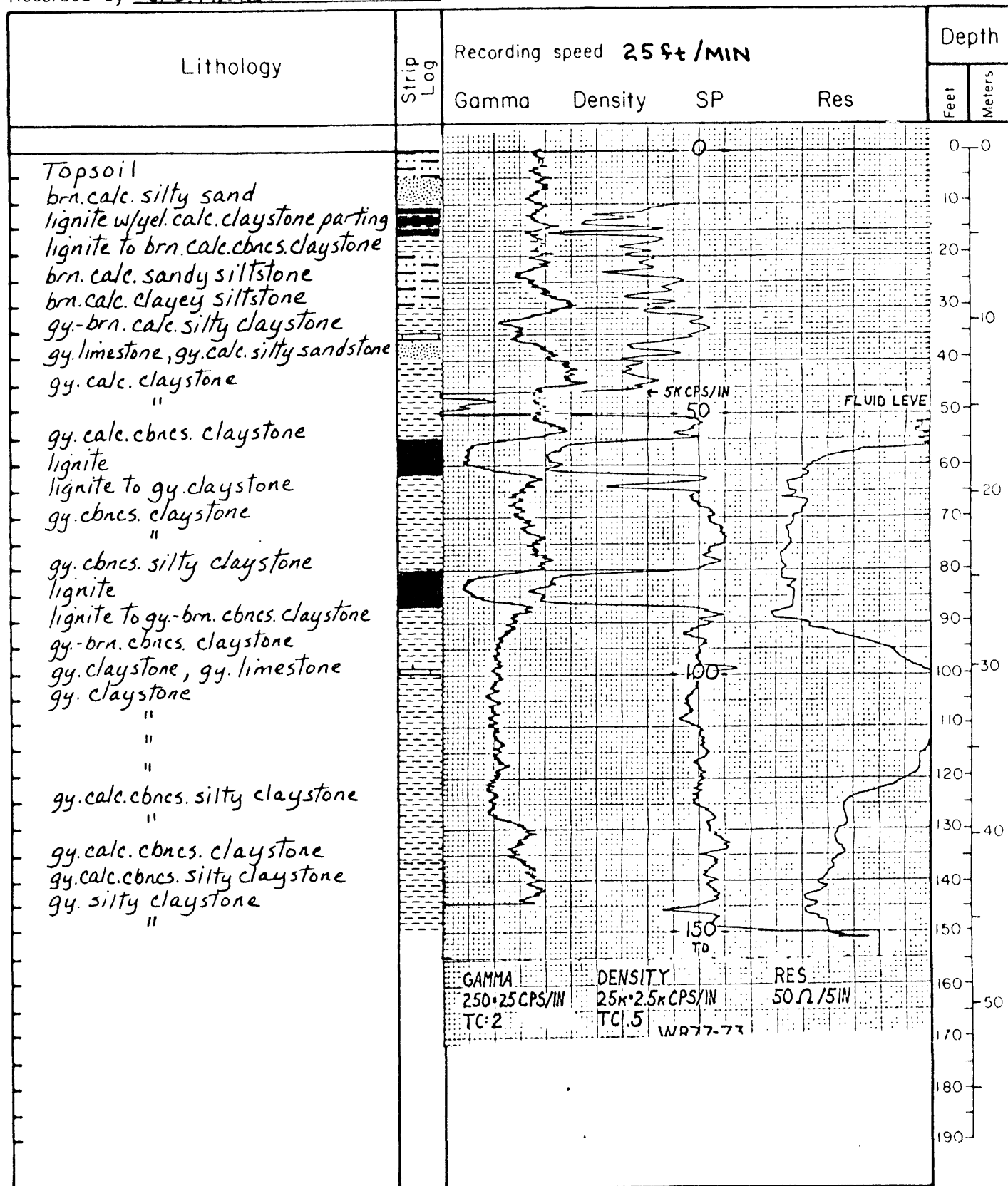
Measured _____, _____ Hole size _____ Cored _____

Remarks: _____

Recorded by: _____



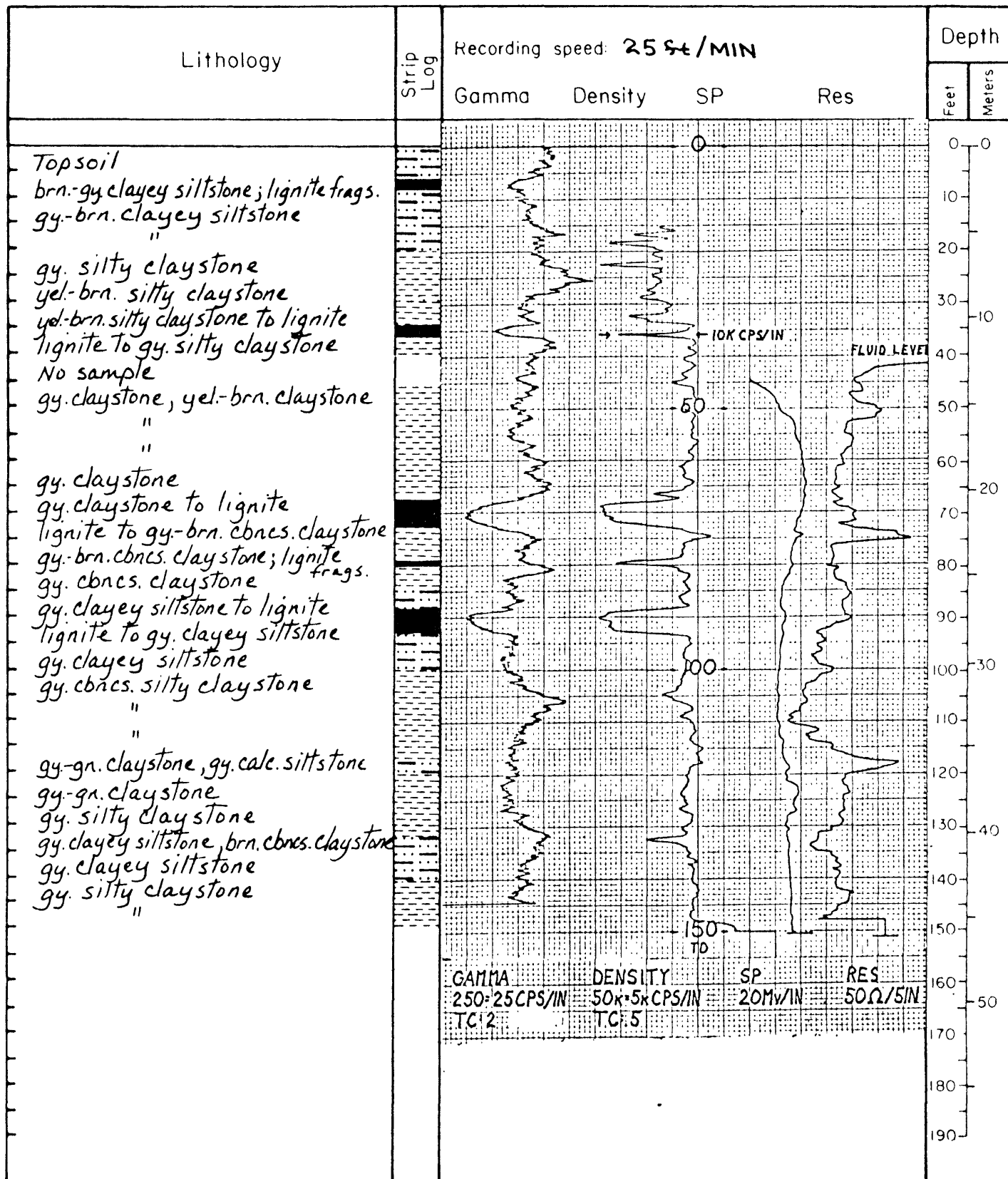
Hole no: WB77-73 Map NE-4D Date 9/26/77 State Mont. County Wibaux
 Elev 2680 ft Location T15N. R60E Sec. 14, Tract NE NE Drilled depth: 150 ft
 Measured: 410 ft FEL, 25 ft FNL Hole size: 4 3/4 in. Cored: No
 Remarks: Water observation well. No SP run.
 Recorded by: J. C. Harksen



Hole no: WB77-74 Map NE-40 Date: 10/2/77 State Mont County: Wibaux
 Elev: 2685ft Location T15N, R60E Sec. 14, Tract NW SW Drilled depth: 150ft
 Measured: 35ft FWL, 1600ft FSL Hole size 5 7/8 in. Cored No

Remarks:

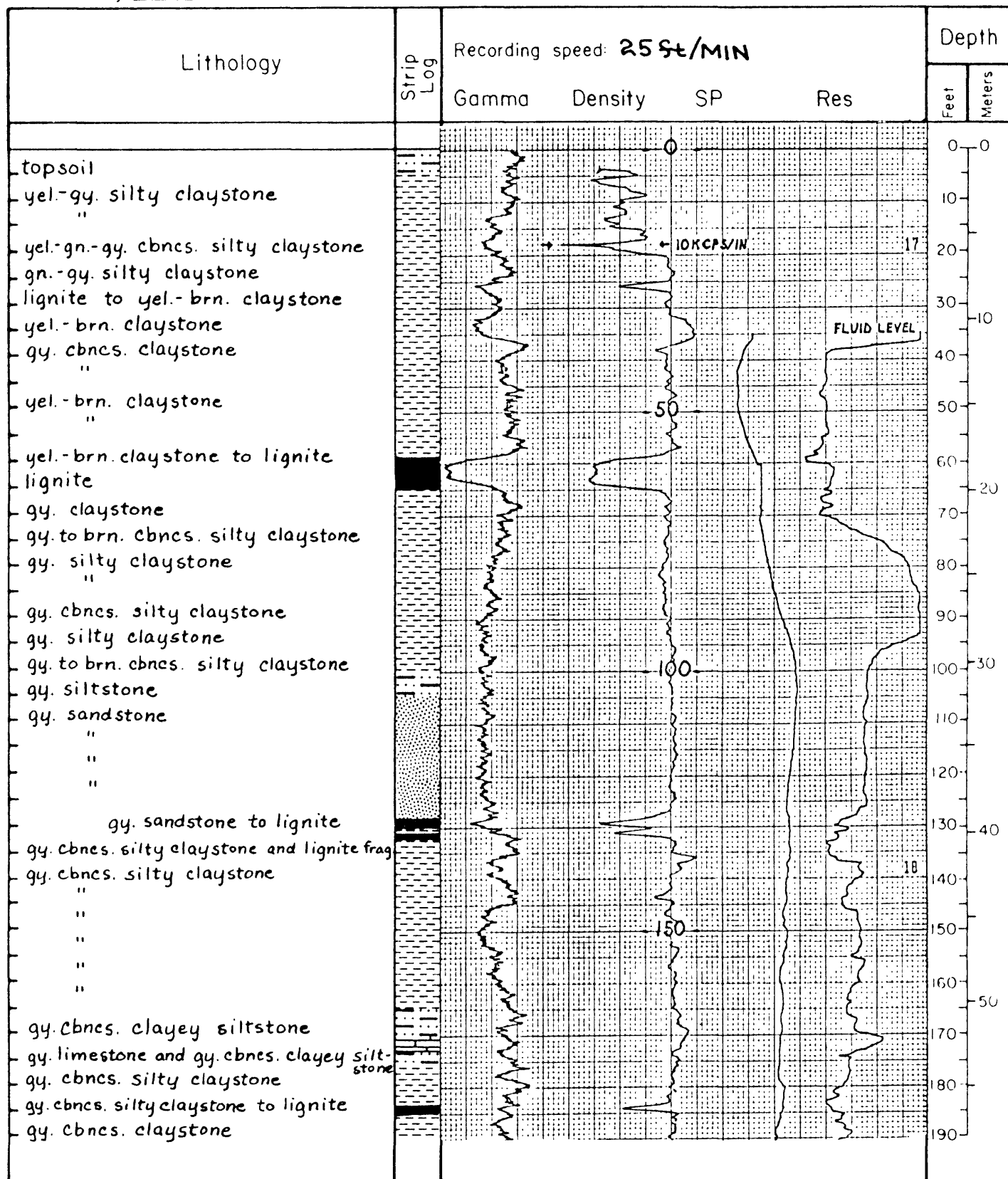
Recorded by: J.C. Harksen



Hole no: WB77-76 Map: SW-1 Date: 9/29/77 State: N. D. County: Golden Valley
 Elev 2680ft Location: T141 N. R 105 W Sec. 6, Tract SE SW Drilled depth: 250ft
 Measured 2265ft FWL, 75ft FSL Hole size 5 1/8 in. Cored No

Remarks: _____

Recorded by: J. C. Harksen



(continued)

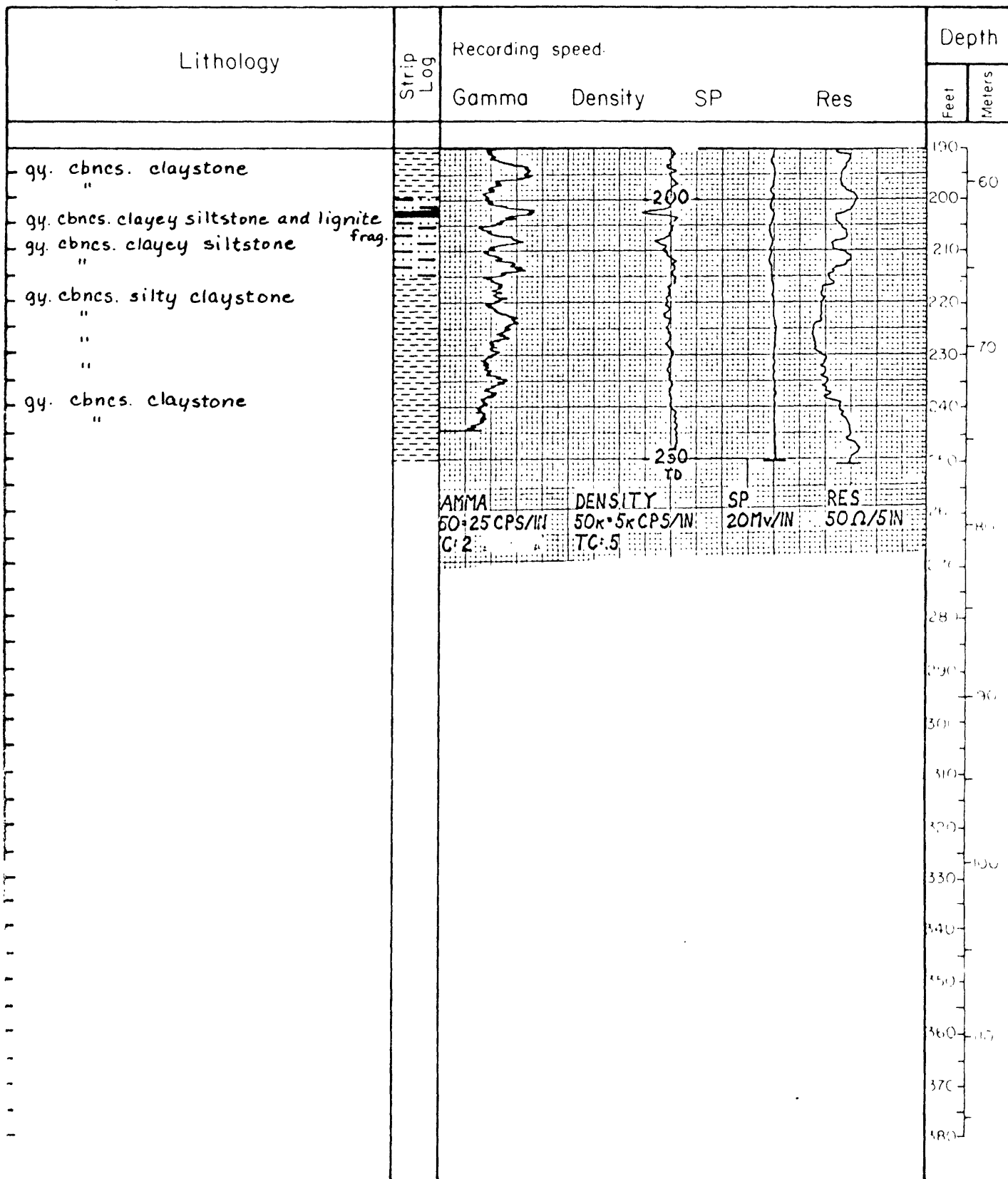
Hole no: WB77-76 Map _____ Date: _____ State _____ County: _____

Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

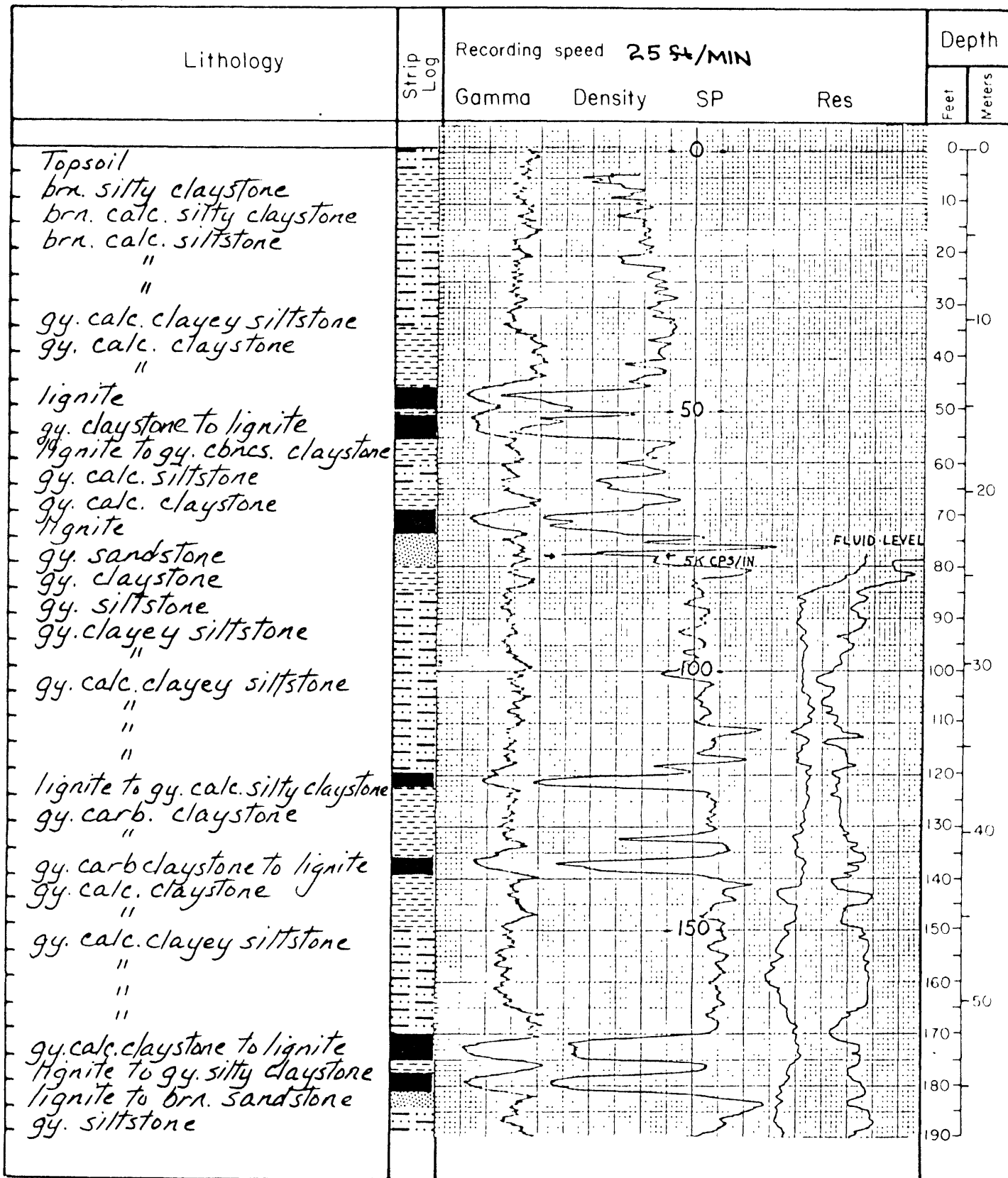
Measured _____, _____ Hole size _____ Cored _____

Remarks _____

Recorded by: _____



Hole no: WB77-77 Map NE-40 Date: 9/27/77 State: Mont County: Wibaux
 Elev 2723 ft Location T15N, R60E Sec. 12, Tract NW NW Drilled depth: 650 ft
 Measured _____, _____ Hole size: 5 1/8 in. Cored No
 Remarks _____
 Recorded by: J.C. Harksen



(continued)

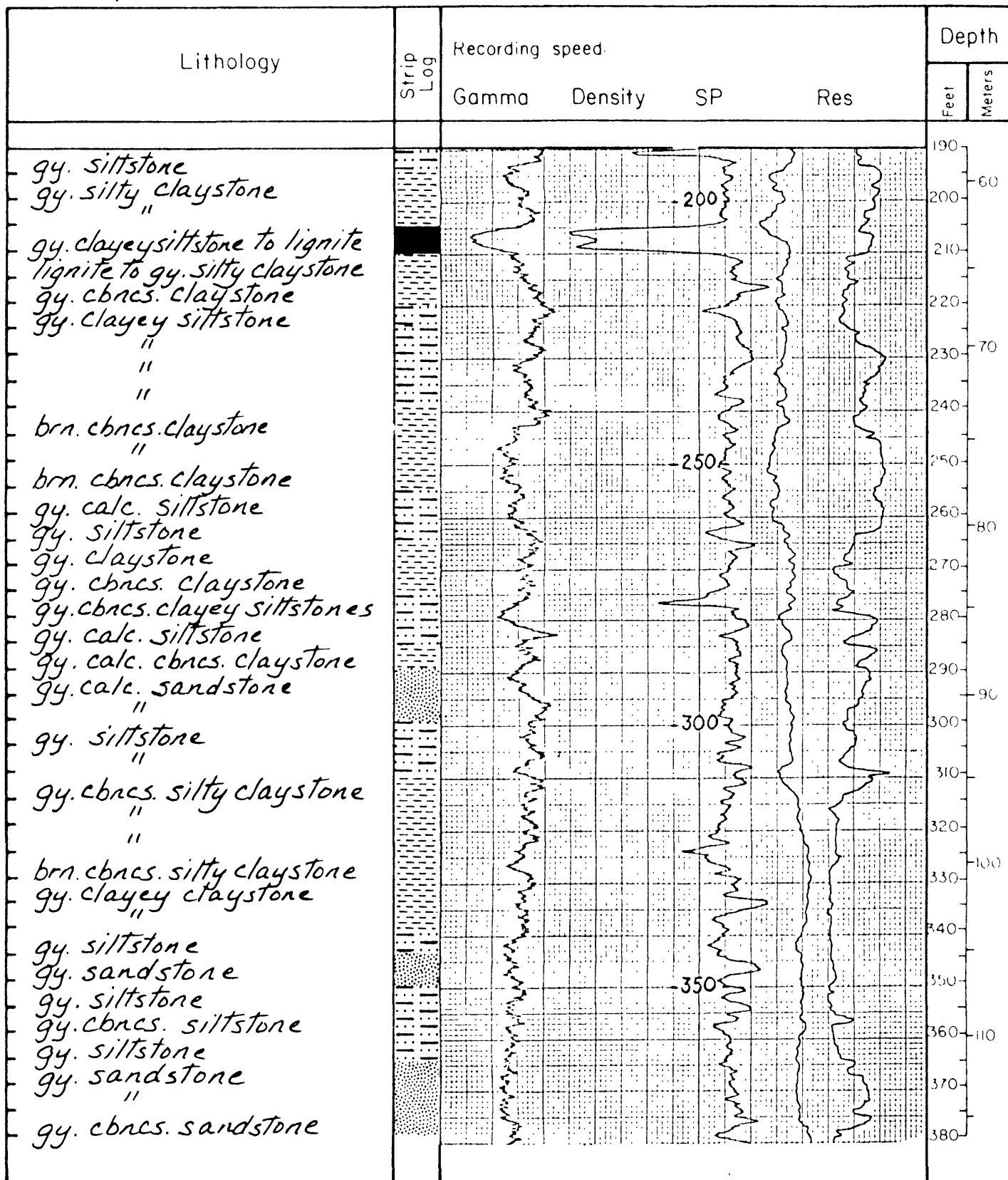
Hole no: WB77-77 Map _____ Date: _____ State: _____ County: _____

Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

Remarks: _____

Recorded by: _____



(continued)

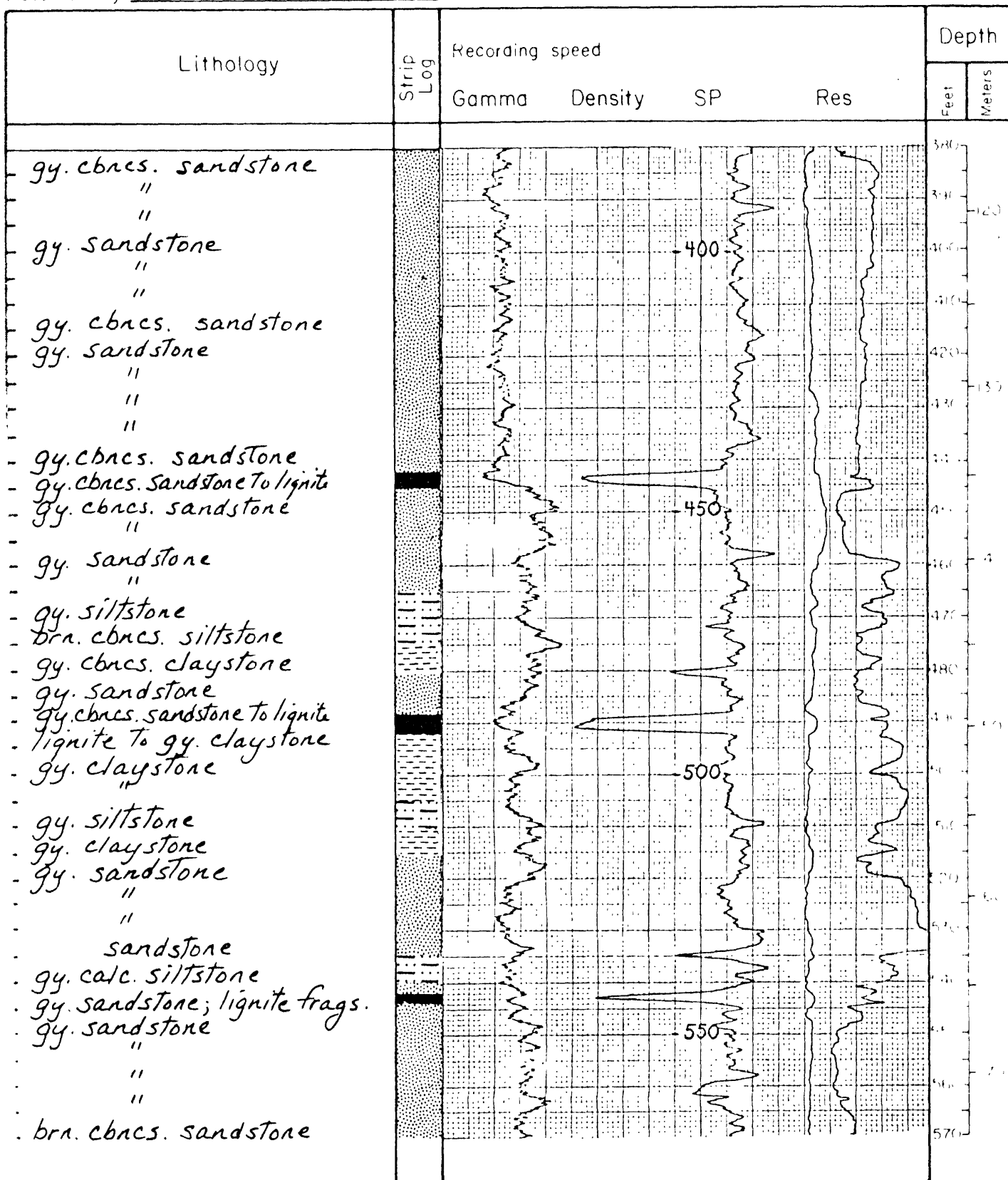
Hole no: WB77-77 Map _____ Date: _____ State: _____ County: _____

Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

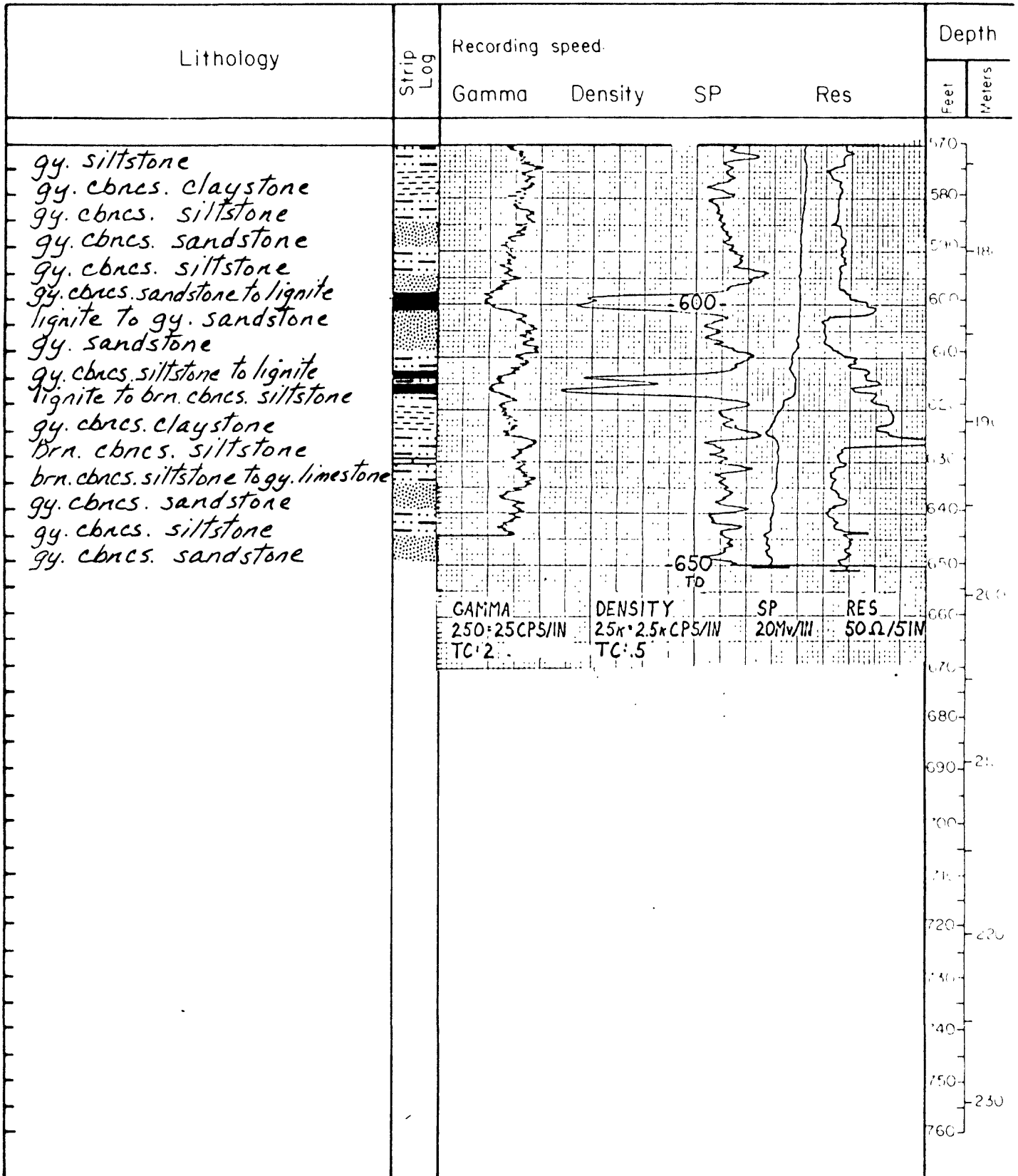
Remarks _____

Recorded by: _____



(continued)

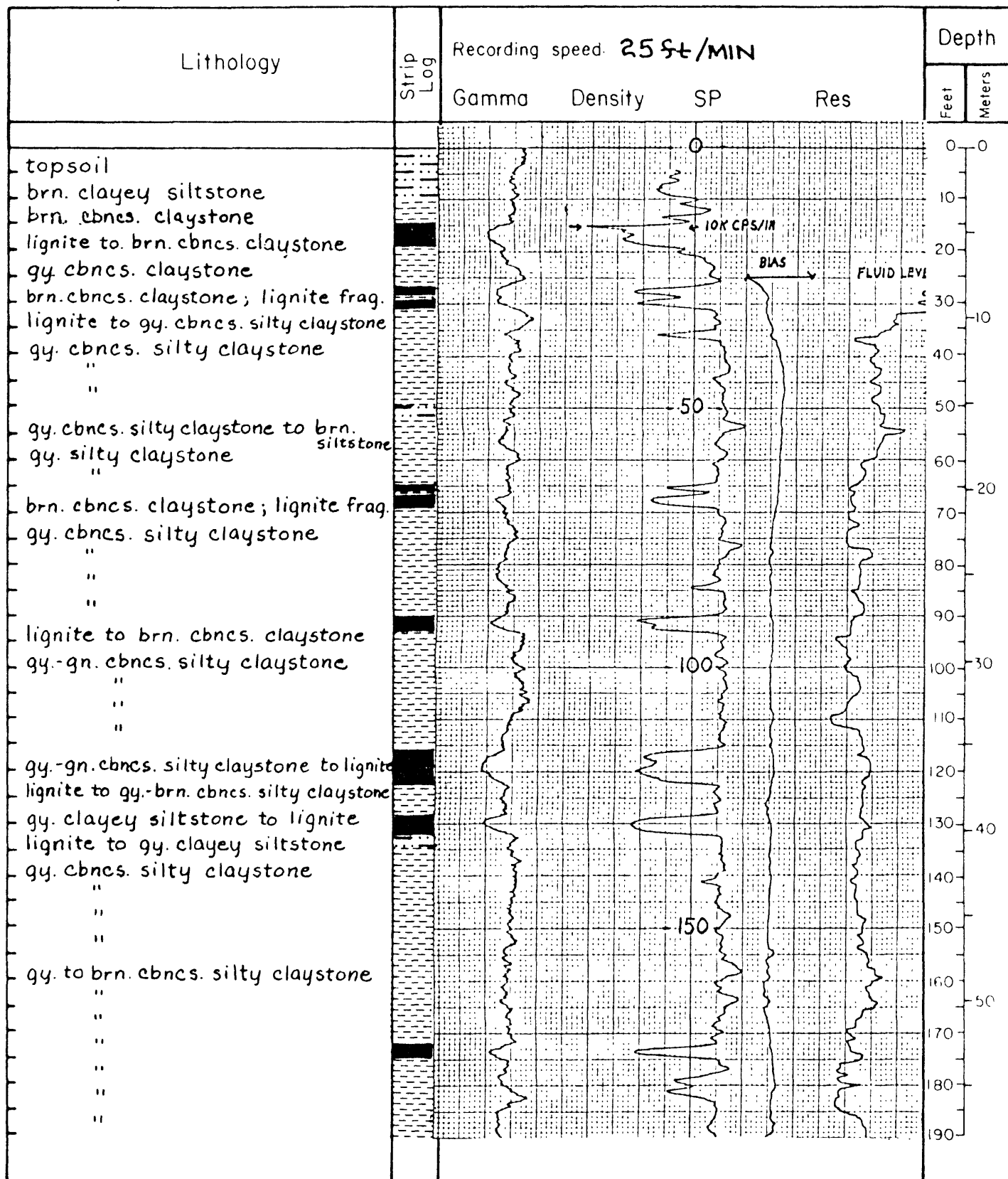
Hole no: WB77-77 Map _____ Date: _____ State: _____ County: _____
 Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: _____



Hole no: WB77-78 Map NE-40 Date: 9/30/77 State: Mont. County: Wibaux
 Elev 2670 ft Location: T.15N, R.61E Sec. 6, Tract lot 4 Drilled depth: 2525+
 Measured 400 ft FEL, 15 ft FSL Hole size: 5 1/8 in. Cored No

Remarks: _____

Recorded by: J.C. Harksen



(continued)

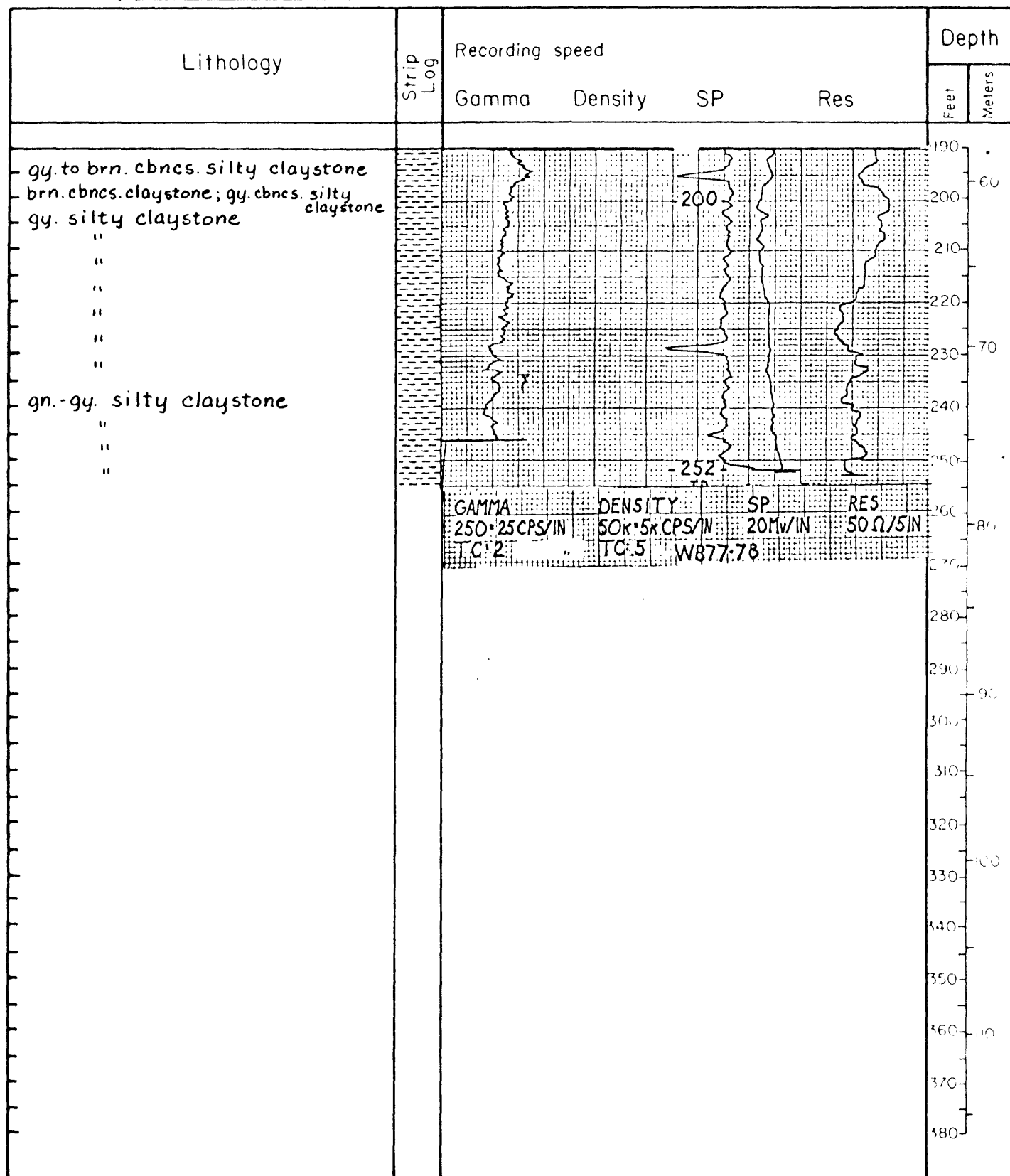
Hole no: WB77-78 Map _____ Date: _____ State: _____ County: _____

Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

Remarks: _____

Recorded by: _____



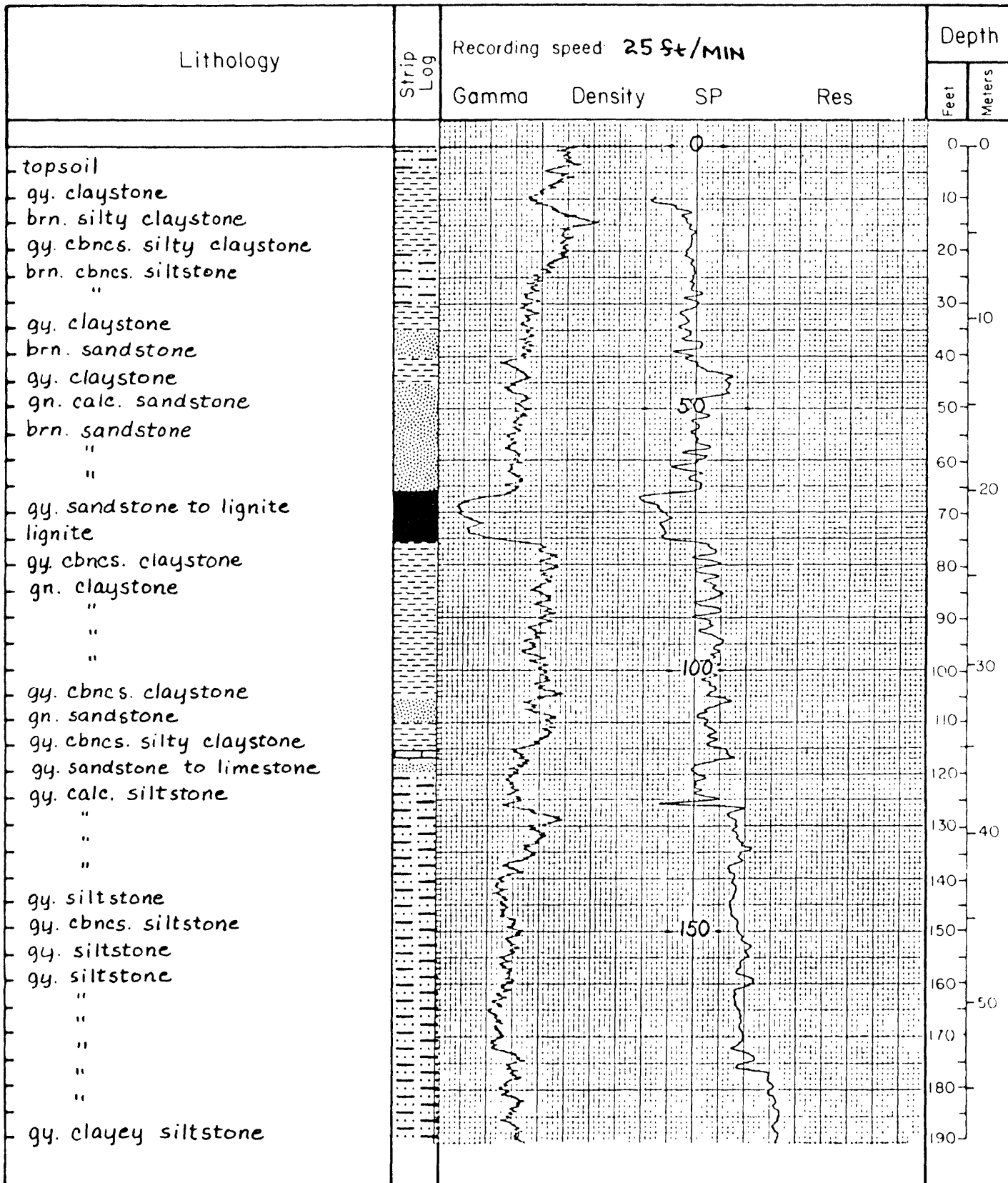
Hole no: WB77-79 Map: NE-40 Date: 10/2/77 State: Mont. County: Wibaux

Elev: 2640 ft Location: T 15 N, R 59 E Sec. 4, Tract: SW SW Drilled depth: 405 ft

Measured: _____, _____ Hole size: 5 1/8 in. Cored: No

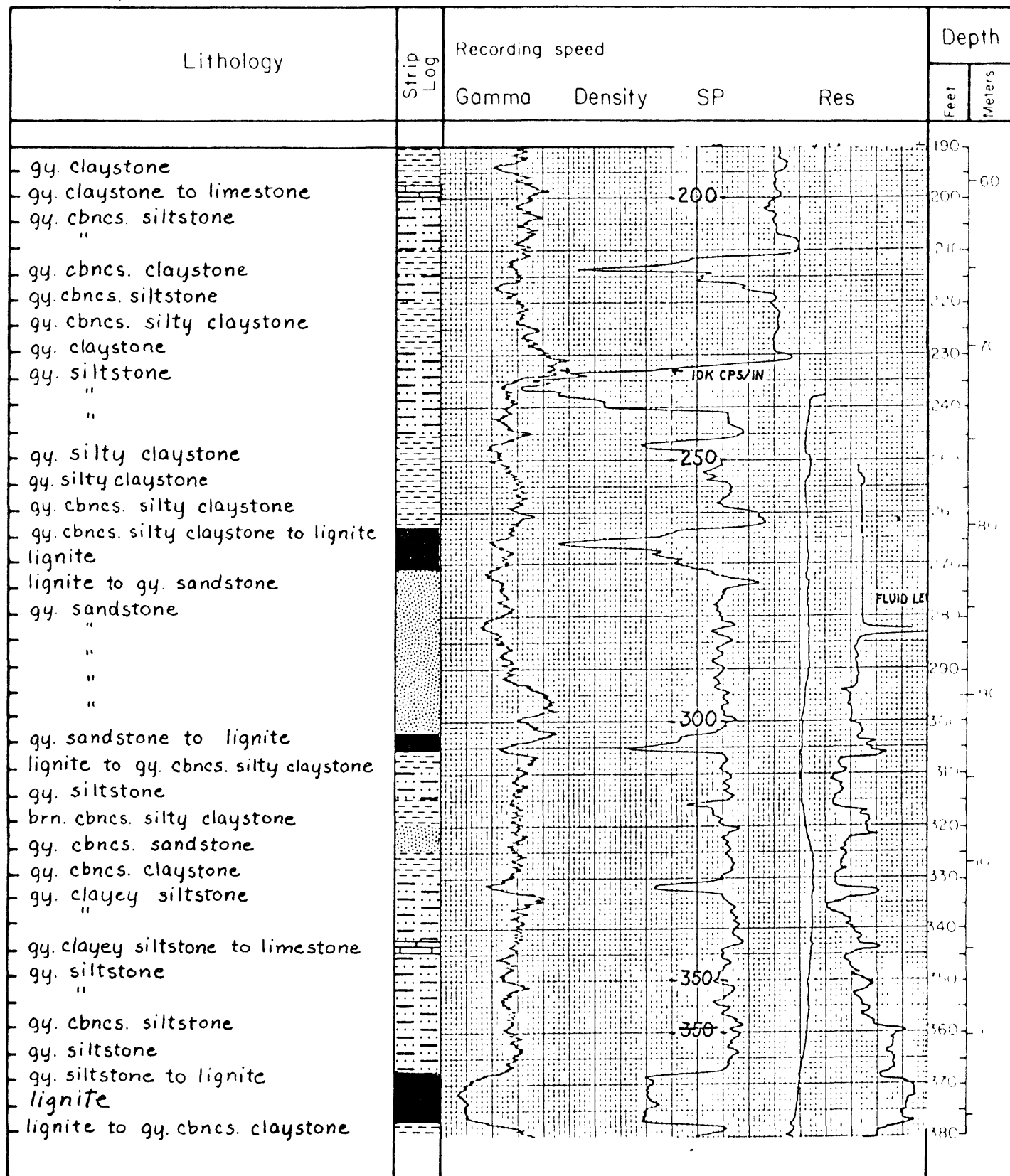
Remarks: _____

Recorded by: J. C. Harksen



(continued)

Hole no WB77-79 Map _____ Date _____ State _____ County _____
Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____
Measured _____, _____ Hole size _____ Cored _____
Remarks _____
Recorded by: _____



(continued)

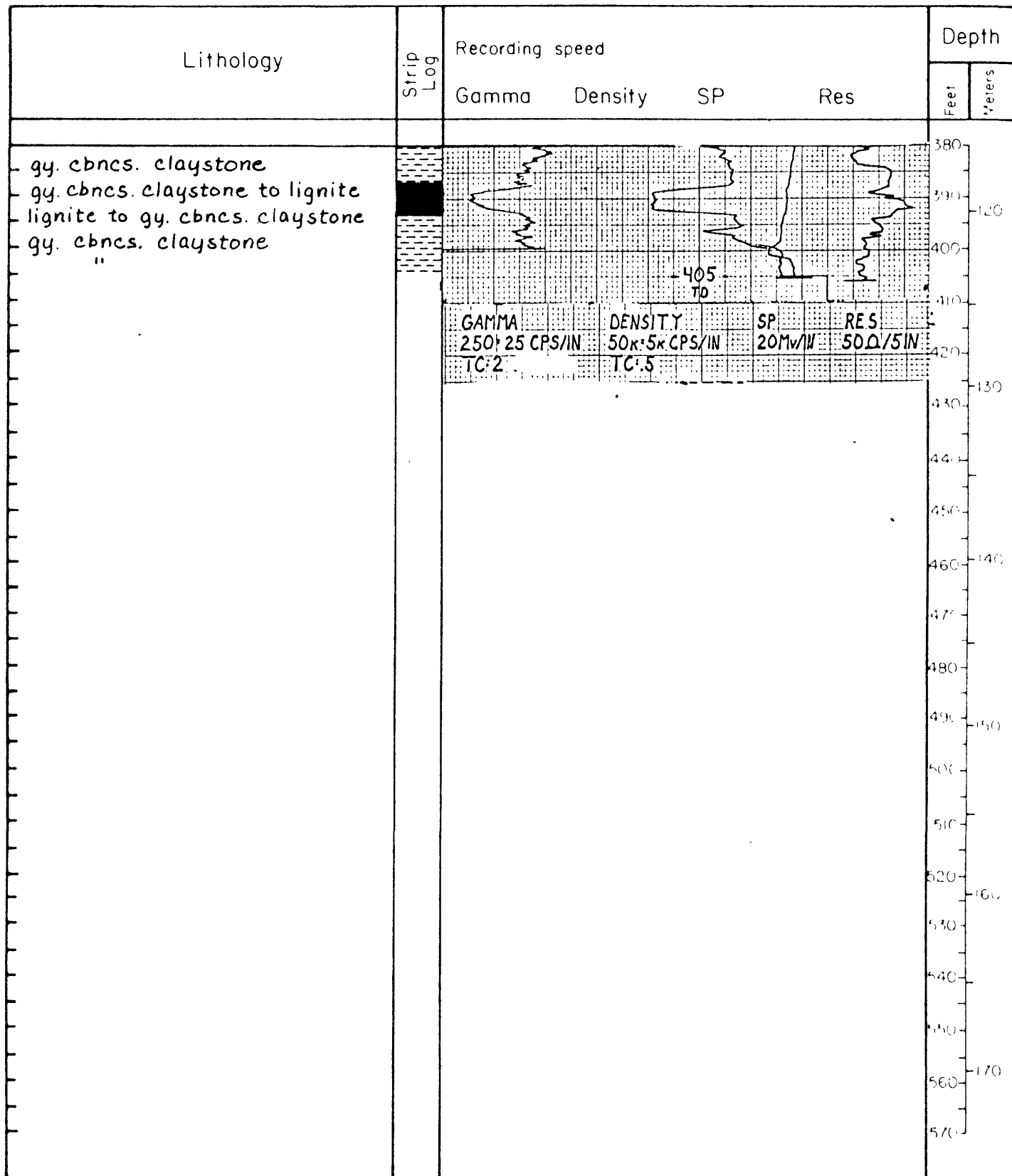
Hole no: WB77-79 Map _____ Date: _____ State _____ County _____

Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____

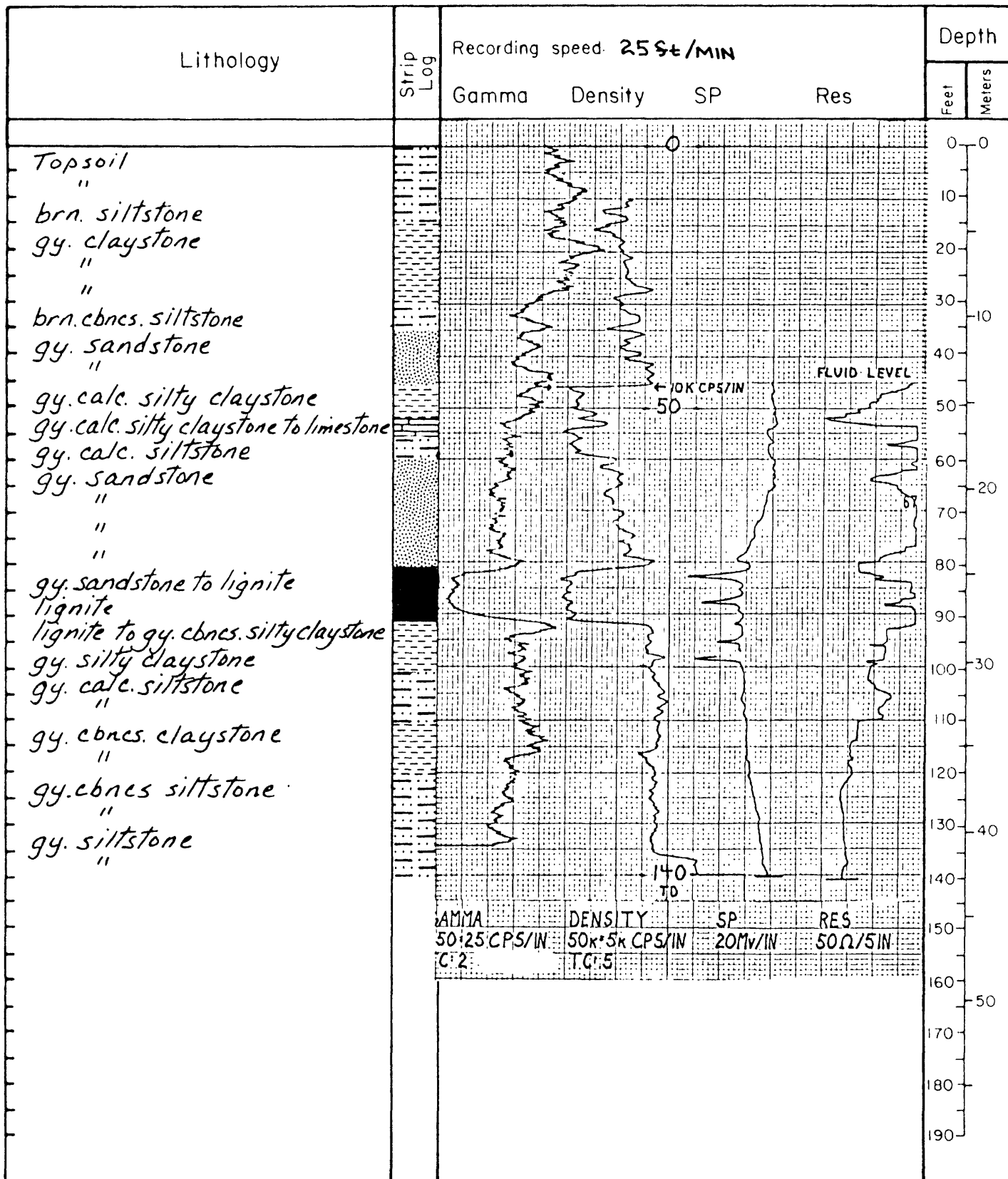
Measured _____, _____ Hole size _____ Cored _____

Remarks: _____

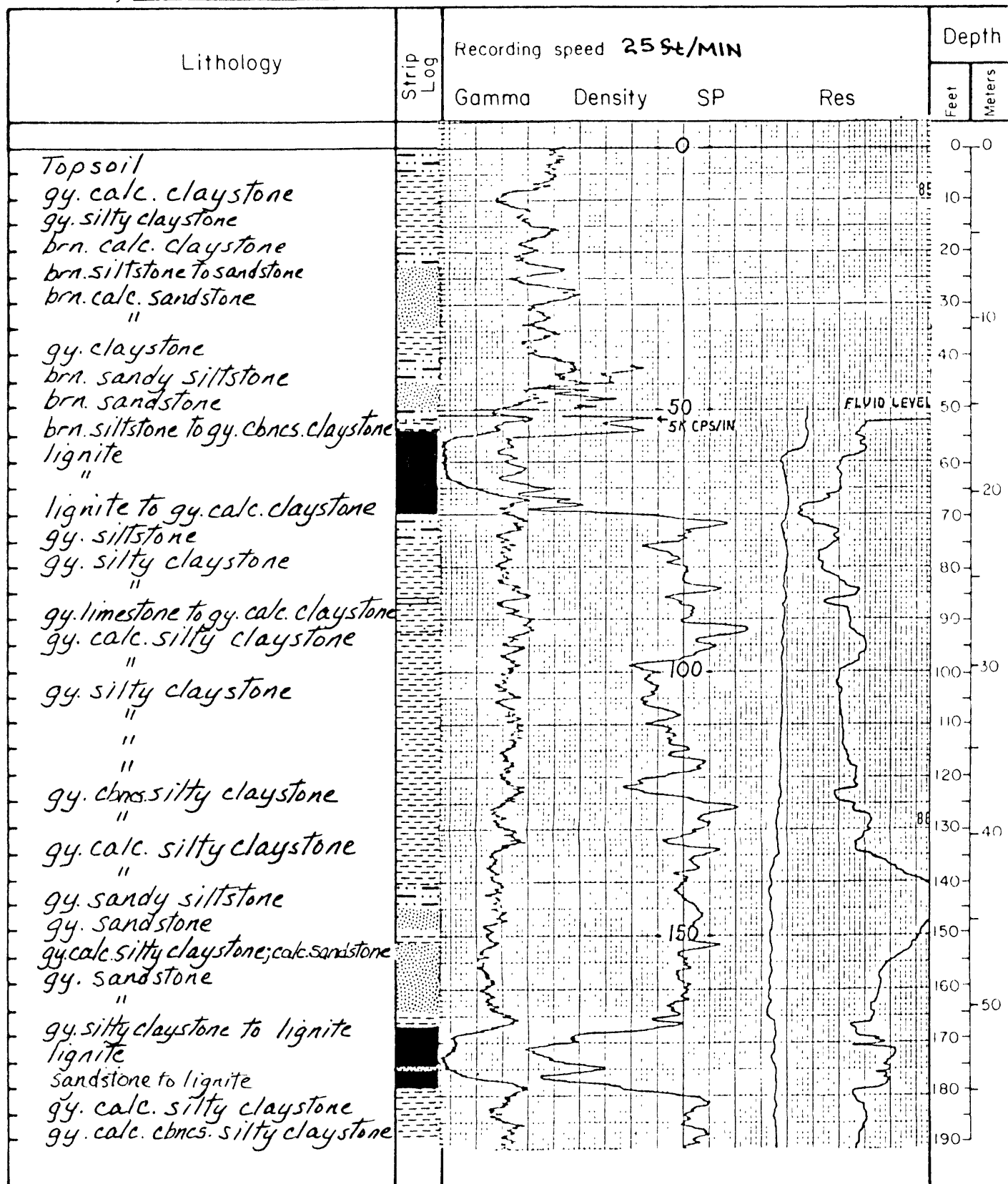
Recorded by: _____



Hole no: W877-80 Map NE-40 Date 10-3-77 State Mont County Wibaux
 Elev 2770 ft Location T15N, R59E Sec 4, Tract SE SE Drilled depth: 140 ft
 Measured: _____, _____ Hole size: 5 7/8 in. Cored No
 Remarks: _____
 Recorded by: J.C. Harksen



Hole no: WB77-81 Map NE-40 Date 9/27/77 State Mont County Wibaux
 Elev 2800ft Location T15N, R59E Sec 10, Tract NE NE Drilled depth: 660ft
 Measured _____, _____ Hole size 5 7/8 in. Cored NO
 Remarks: _____
 Recorded by: J.C. Harkser



(Continued)

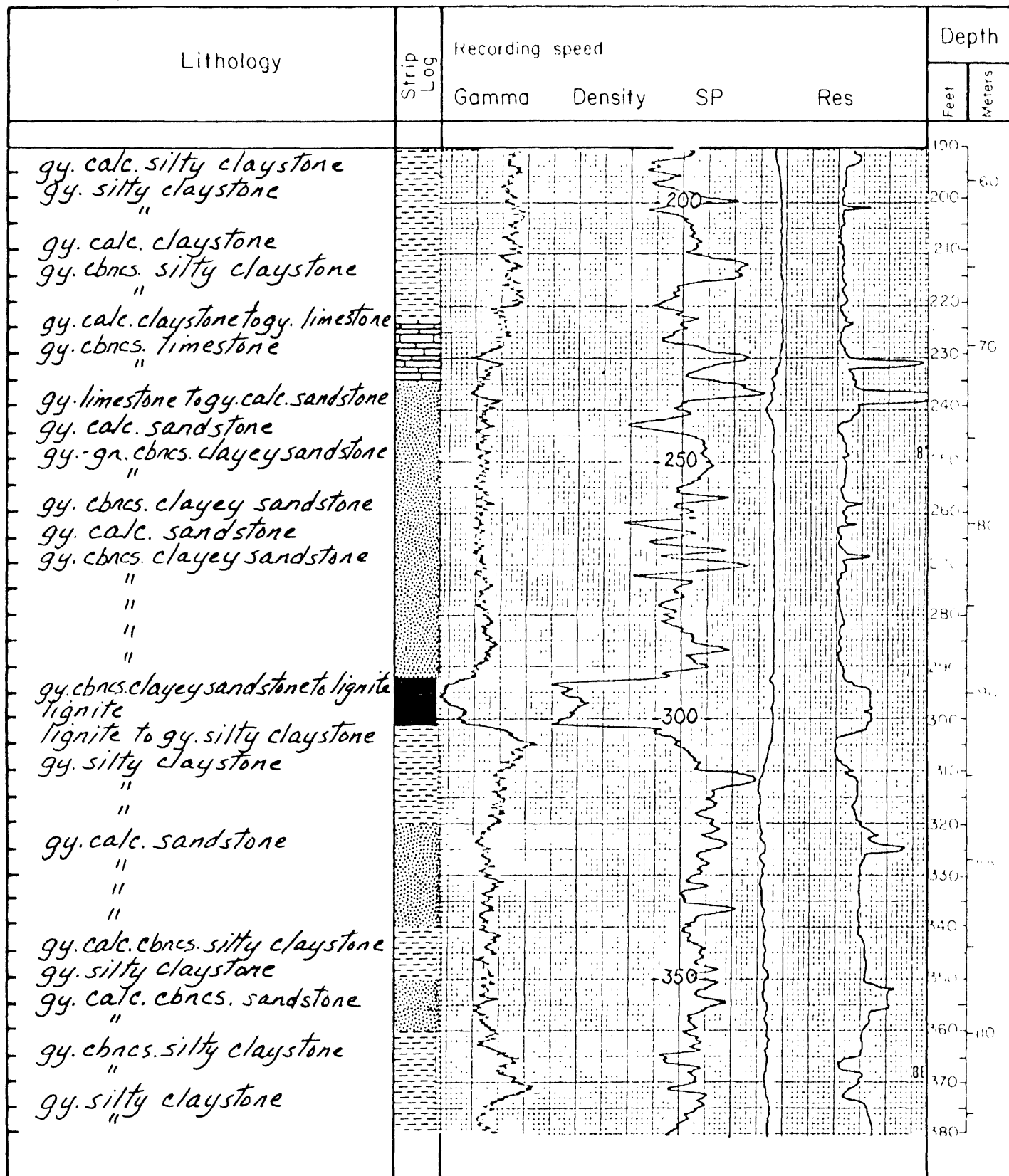
Hole no: W877-81 Map _____ Date: _____ State: _____ County: _____

Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

Remarks: _____

Recorded by: _____



(continued)

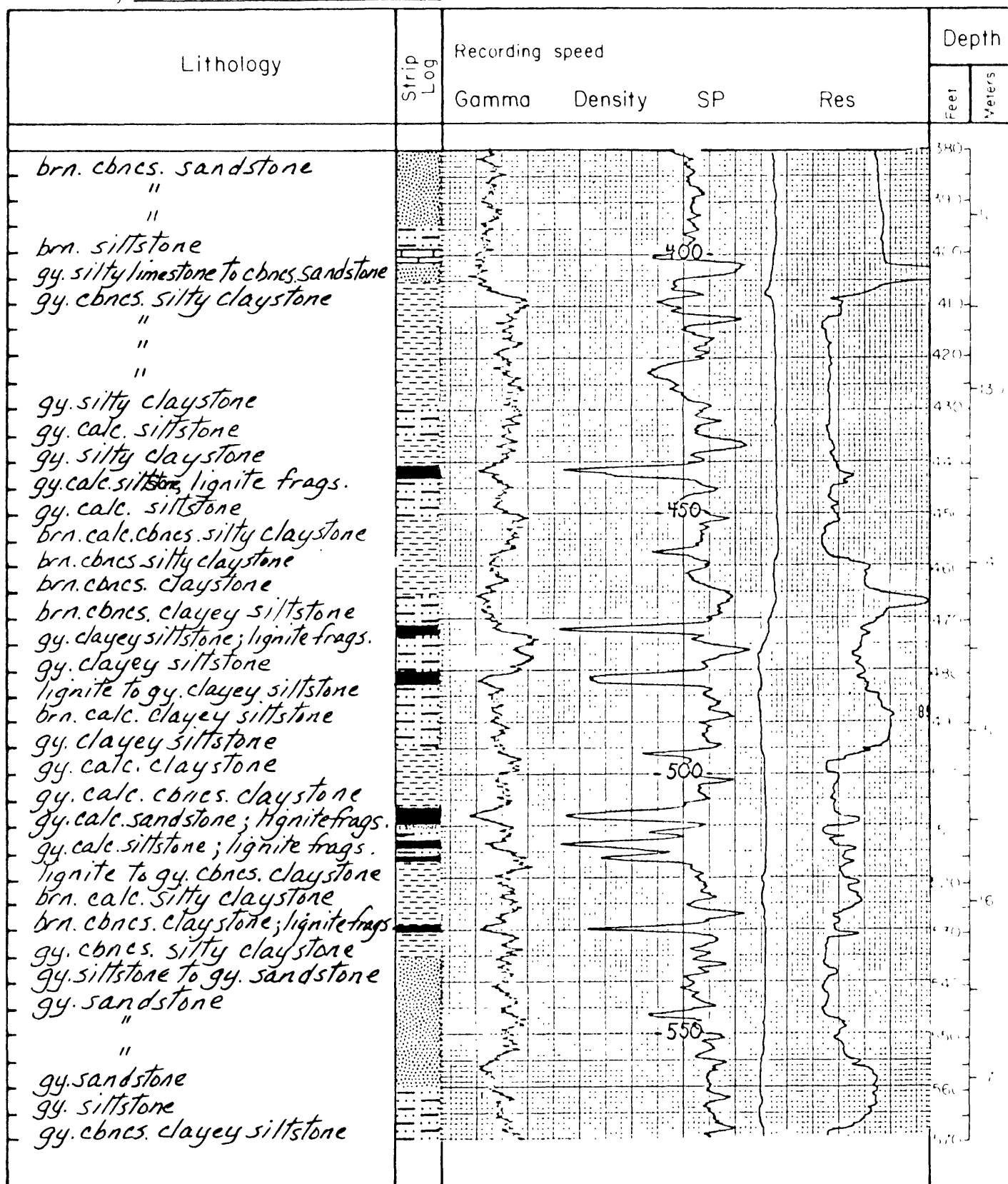
Hole no: WB77-81 Map _____ Date: _____ State _____ County: _____

Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

Remarks _____

Recorded by _____



(continued)

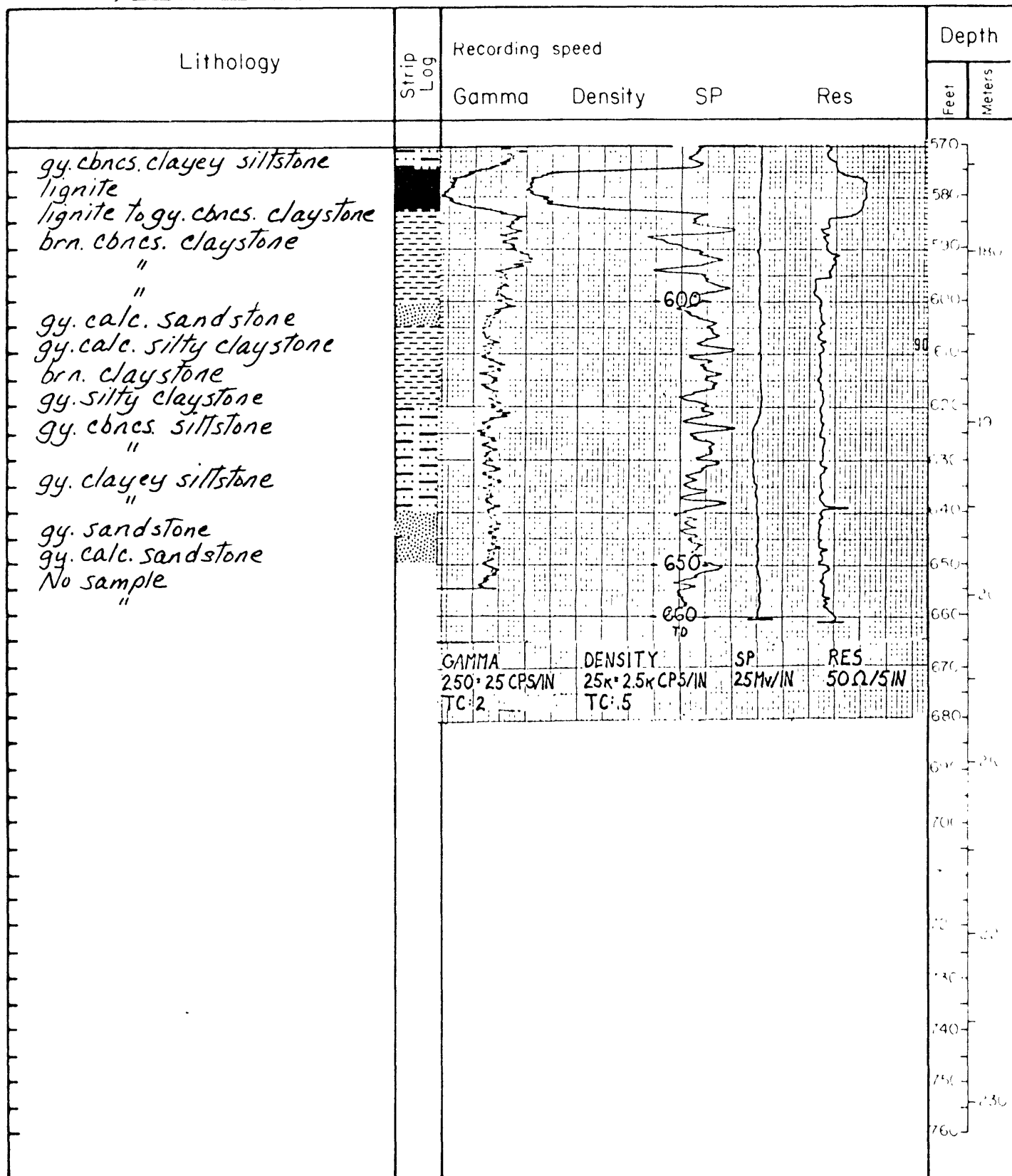
Hole no. WB77-81 Map _____ Date _____ State _____ County _____

Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____

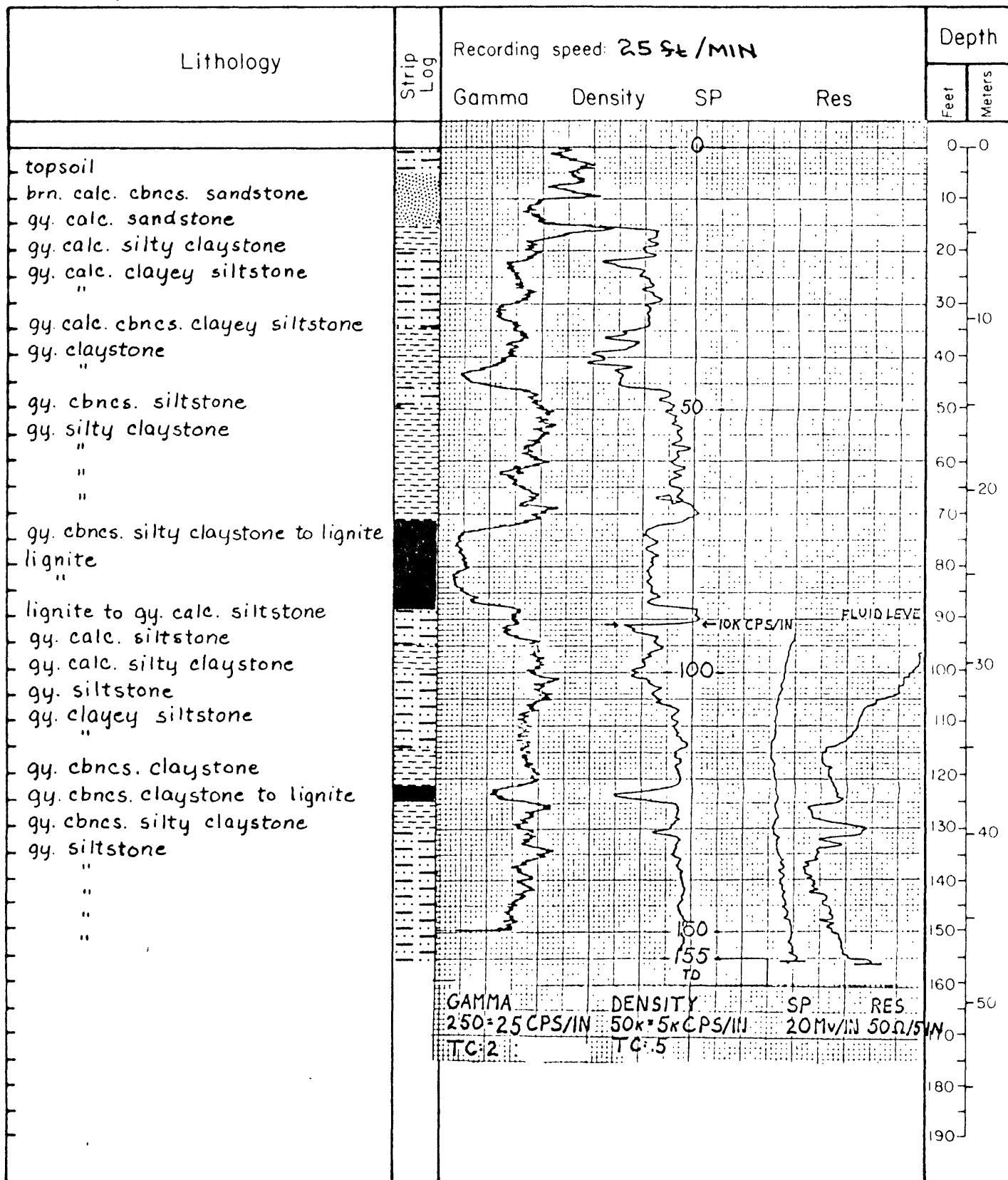
Measured _____, _____ Hole size _____ Cored: _____

Remarks _____

Recorded by: _____



Hole no: WB77-82 Map NE - 40 Date: 10/13/77 State: Mont. County: Wibaux
 Elev 2747ft Location: T 15 N, R 59 E Sec. 2, Tract NE NE Drilled depth: 155ft
 Measured: _____, _____ Hole size: 5 1/8 in. Cored: Yes
 Remarks Twin and core hole 82/83, core interval 16-92.9 ft. Water observation well
 Recorded by: J. C. Harksen



Hole no: WB77-83 Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

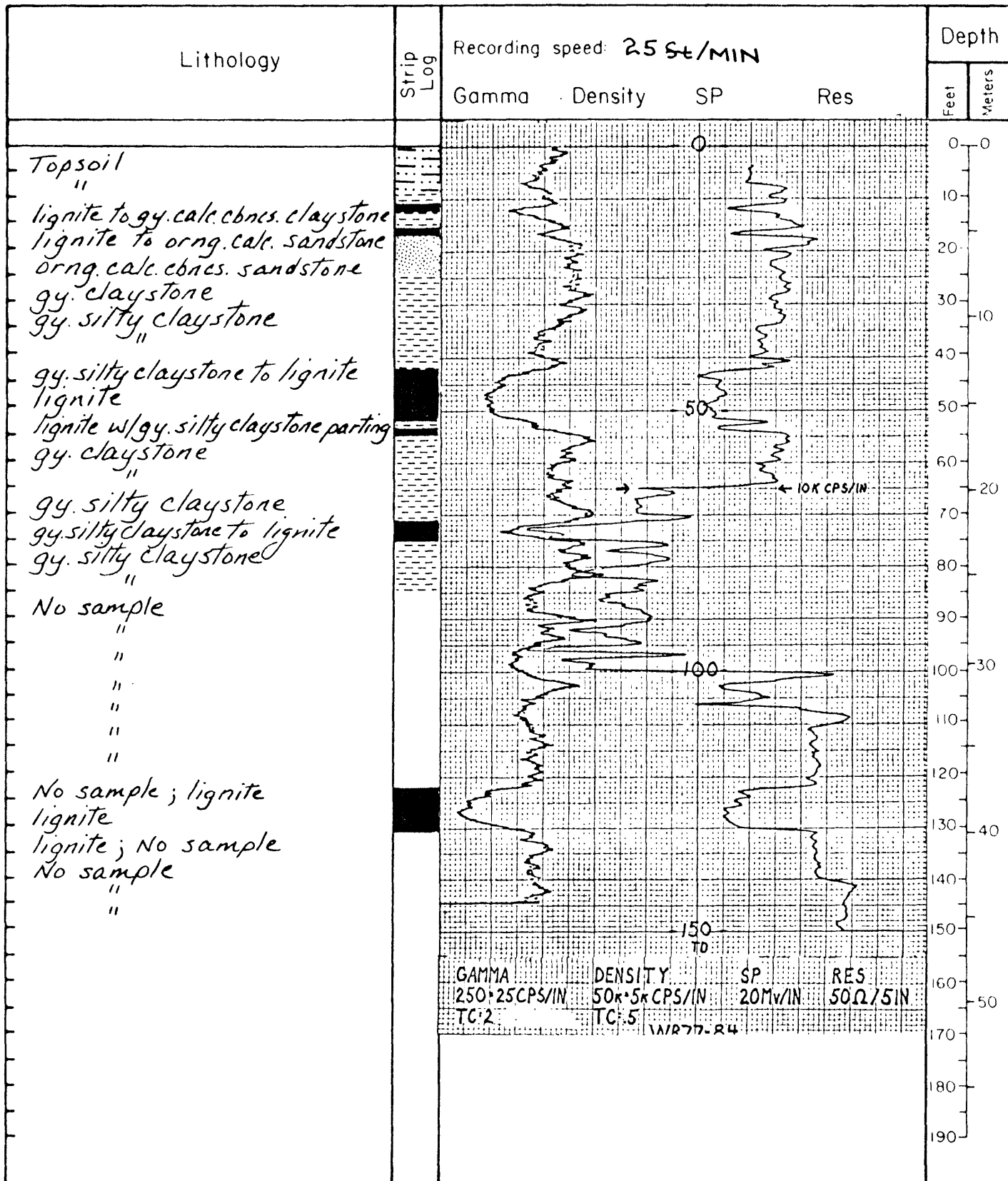
Measured: _____, _____ Hole size: _____ Cored: YES

Remarks: See WB77-82 for data

Recorded by: _____

Lithology	Strip Log	Recording speed:				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	
						170	50
						180	
						190	

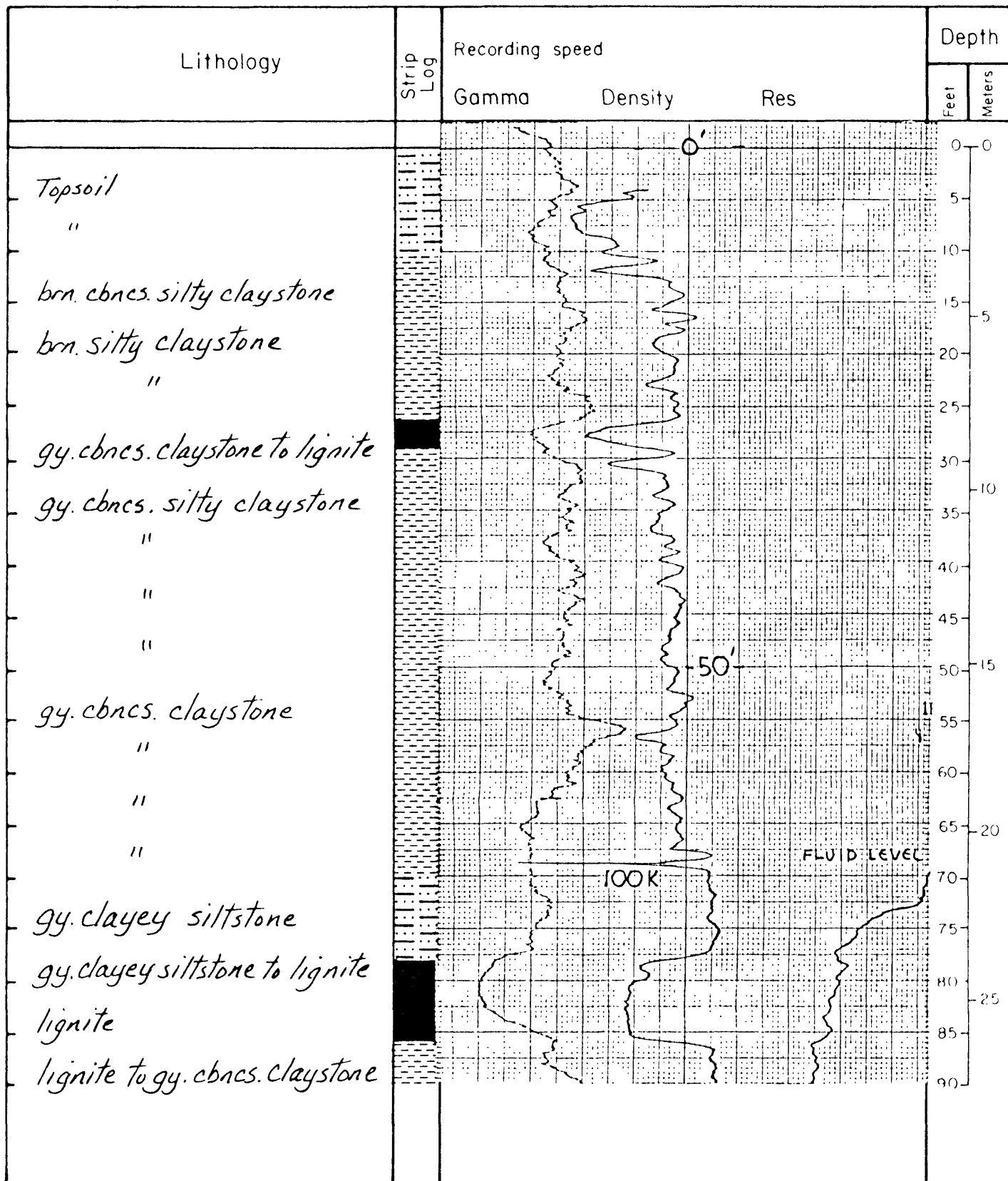
Hole no: W877-84 Map: NE-40 Date: 9/28/77 State: Mont County: Wibaux
 Elev 2700ft Location: T15N R59E Sec. 12, Tract NE SE Drilled depth: 150ft
 Measured: 120ft FEL, 2630ft FSL r. Hole size 4 3/4 in. Cored NO
 Remarks Water observation well; no samples from 85-150ft due to loss of circulation.
 Recorded by: J.C. Harksen



Hole no: WB77-85 Map _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored Yes
 Remarks See WB77-86 for data
 Recorded by: _____

Lithology	Strip log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

Hole no: W877-86 Map: NE-40 Date: 10/15/77 State: Mont. County: Wibaux
 Elev: 2730 ft Location: T15N, R60E Sec. 6, Tract SE SW Drilled depth: 300 ft
 Measured: _____, _____ Hole size: 5 1/8 in Cored yes
 Remarks: Twin and core hole; core interval 75-88 ft; vertical scale change.
 Recorded by: J.C. Harksen



(Continued)

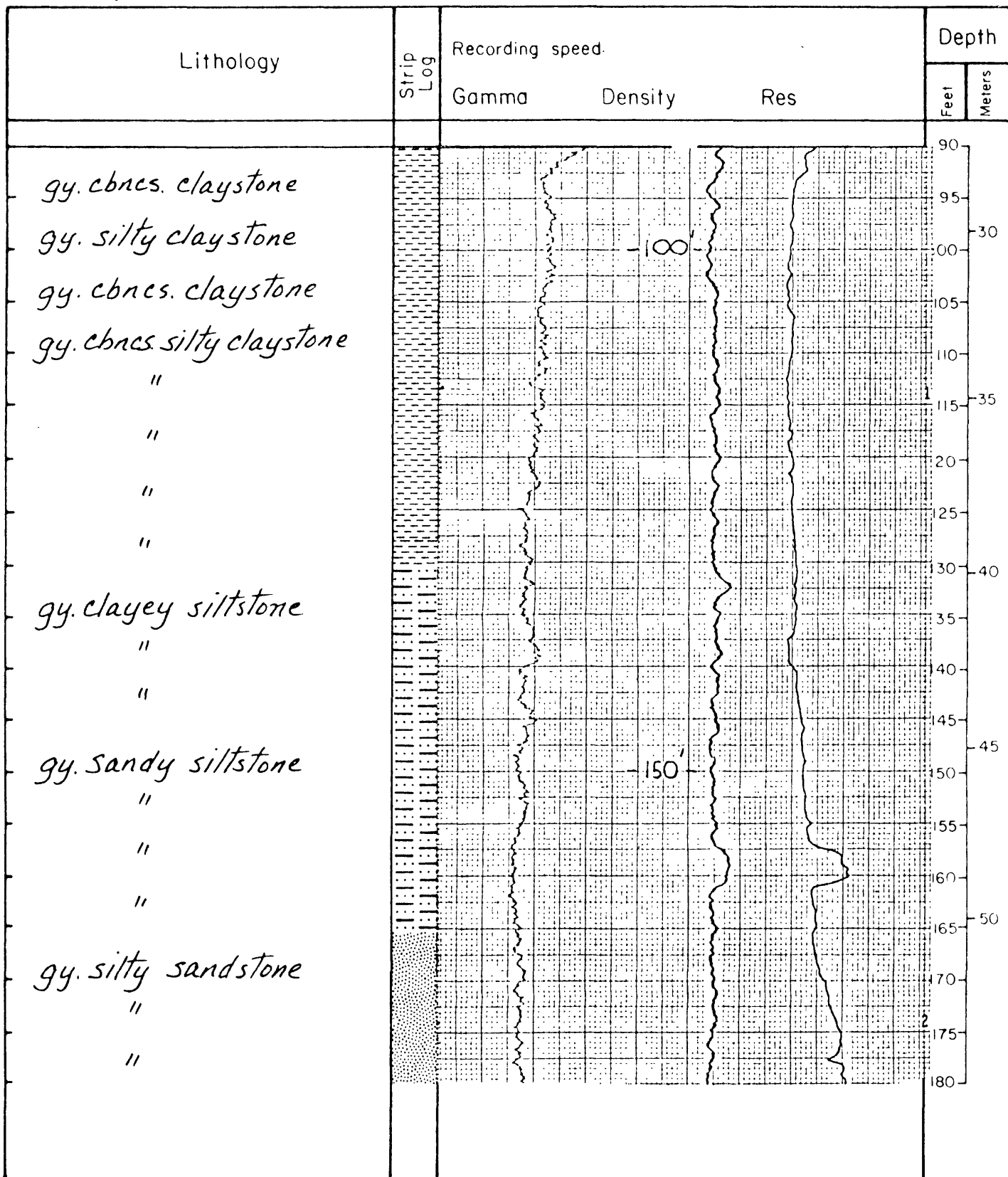
Hole no: W877-86 Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured: _____, _____ Hole size _____ Cored: _____

Remarks: _____

Recorded by: _____



(Continued)

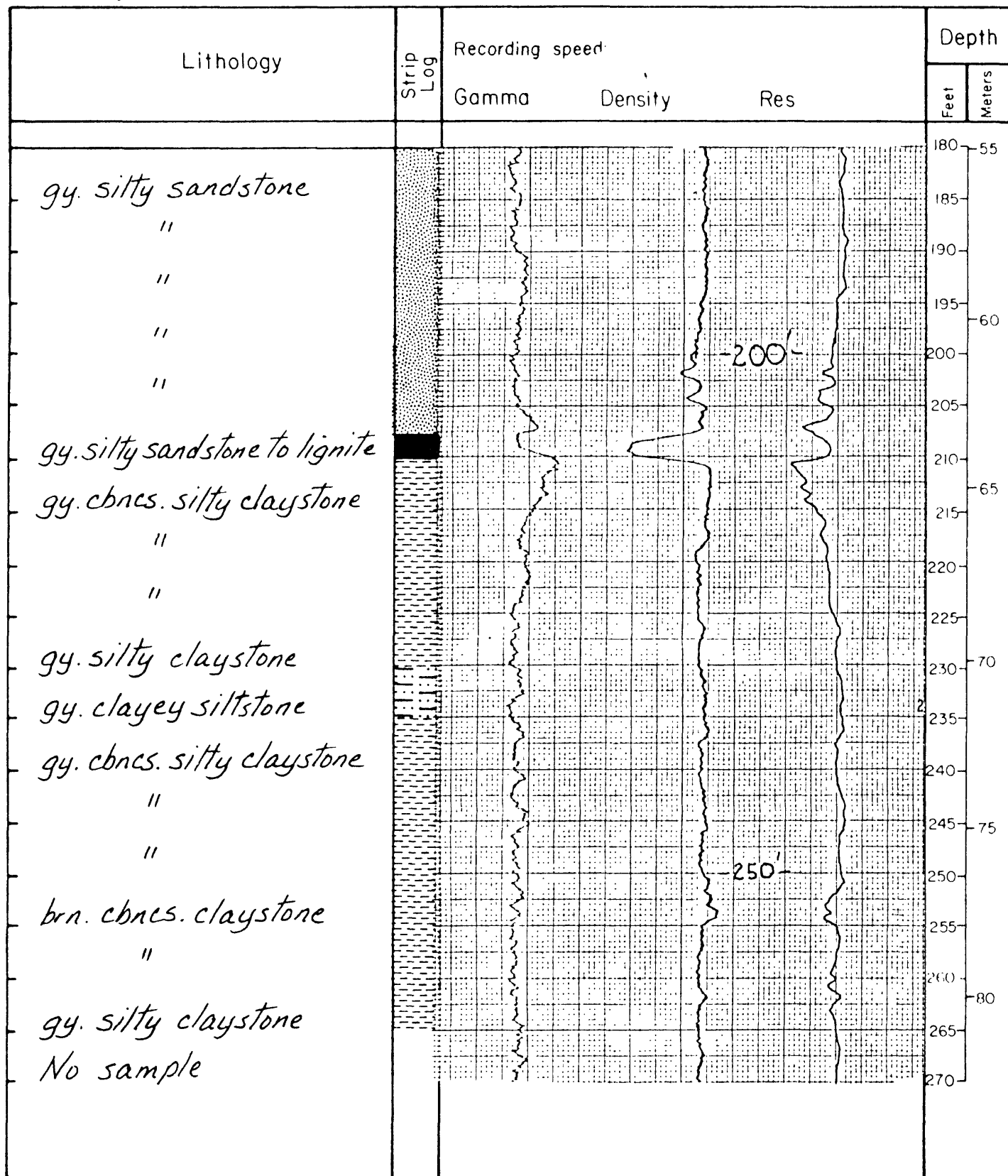
Hole no: W377-86 Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured: _____, _____ Hole size: _____ Cored: _____

Remarks: _____

Recorded by: _____



(continued)

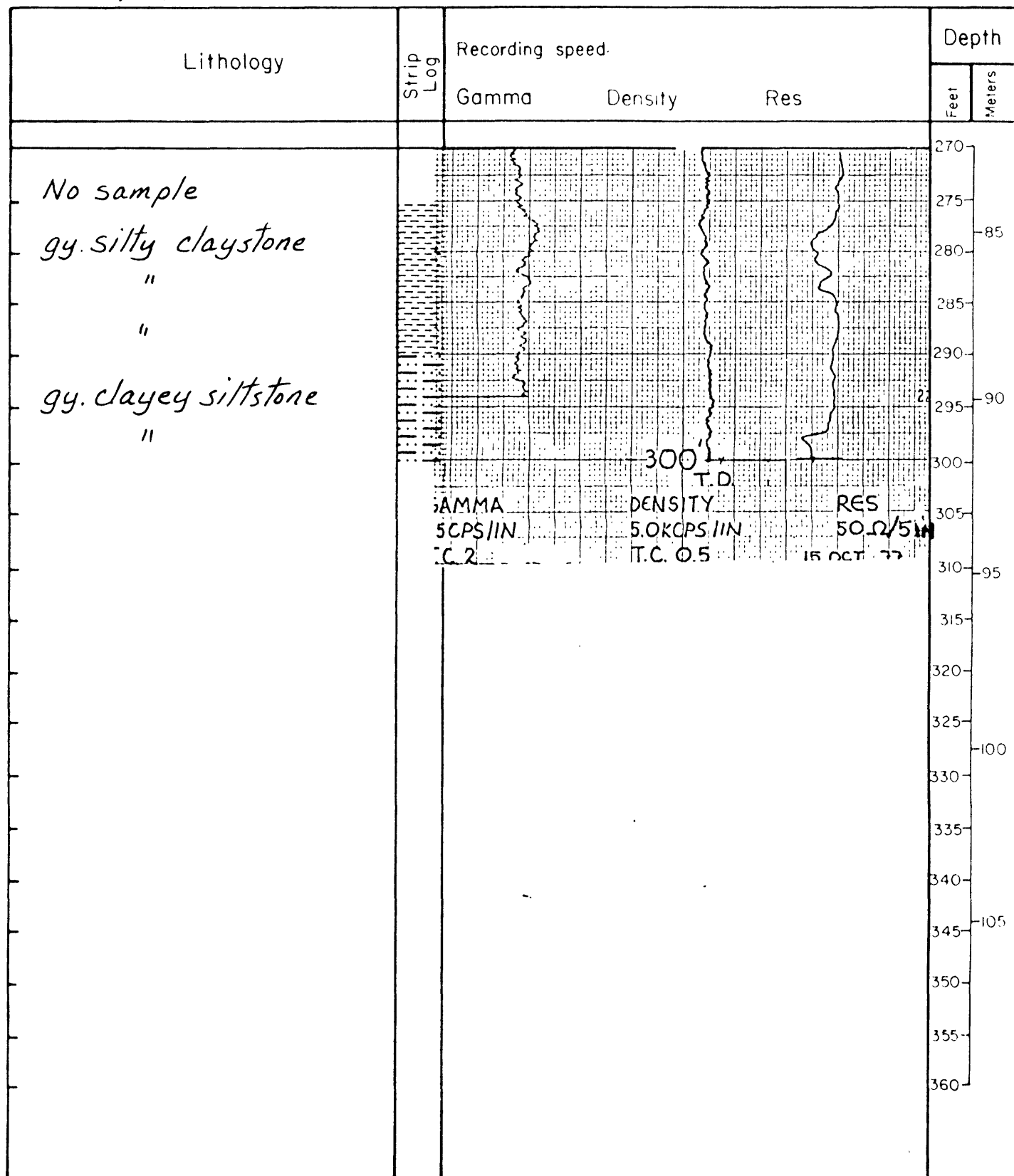
Hole no: WB77-86 Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured: _____, _____ Hole size: _____ Cored: _____

Remarks: _____

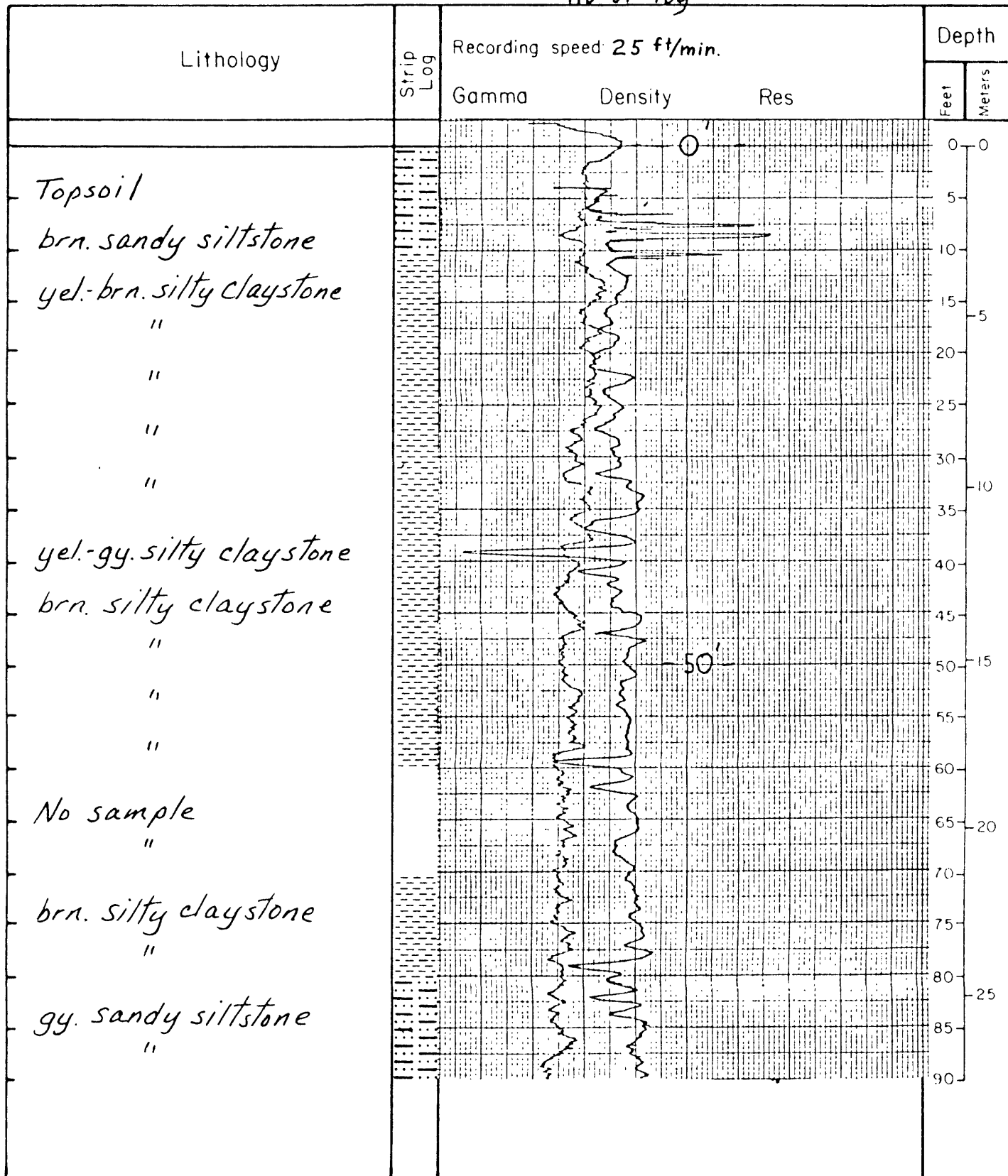
Recorded by: _____



Hole no: WB77-87 Map: _____ Date: _____ State: _____ County: _____
 Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size: _____ Cored: YES
 Remarks: See WB77-88 for data
 Recorded by: _____

Lithology	Strip Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

Hole no: WB77-88 Map NE-40 Date 10/16/77 State Mont County Wibaux
 Elev 2780ft Location: T16N R59E Sec. 34, Tract SE NE Drilled depth: 300ft
 Measured: 36ft FEL, 1710ft FNL; Hole size: 5 1/8 in. Cored: Yes
 Remarks: Vertical scale change; twin and core hole 87/88; core interval 240-254ft;
 Recorded by: J.C. Harksen no SP log



(continued)

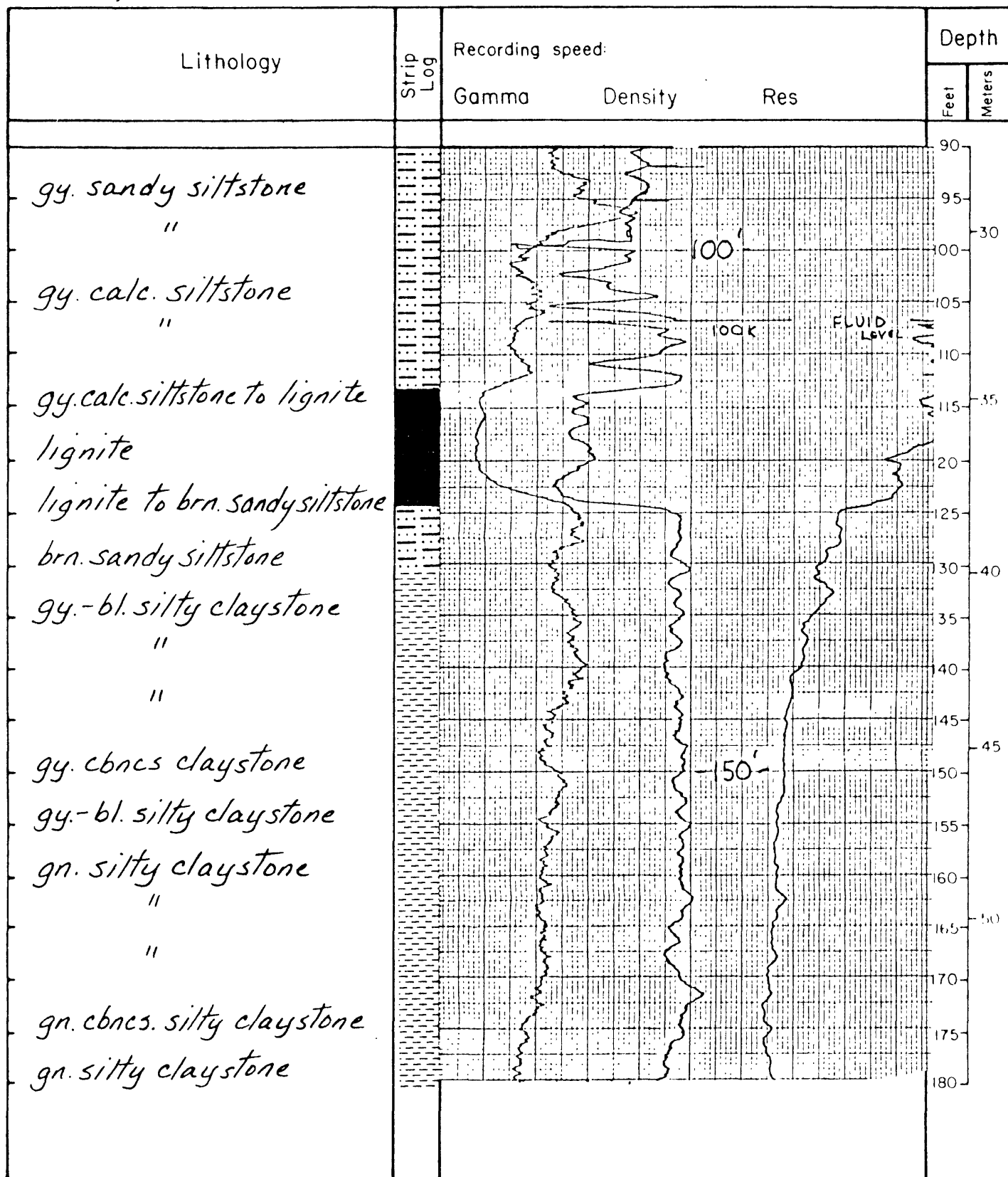
Hole no: WB77-88 Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored: _____

Remarks: _____

Recorded by: _____



(continued)

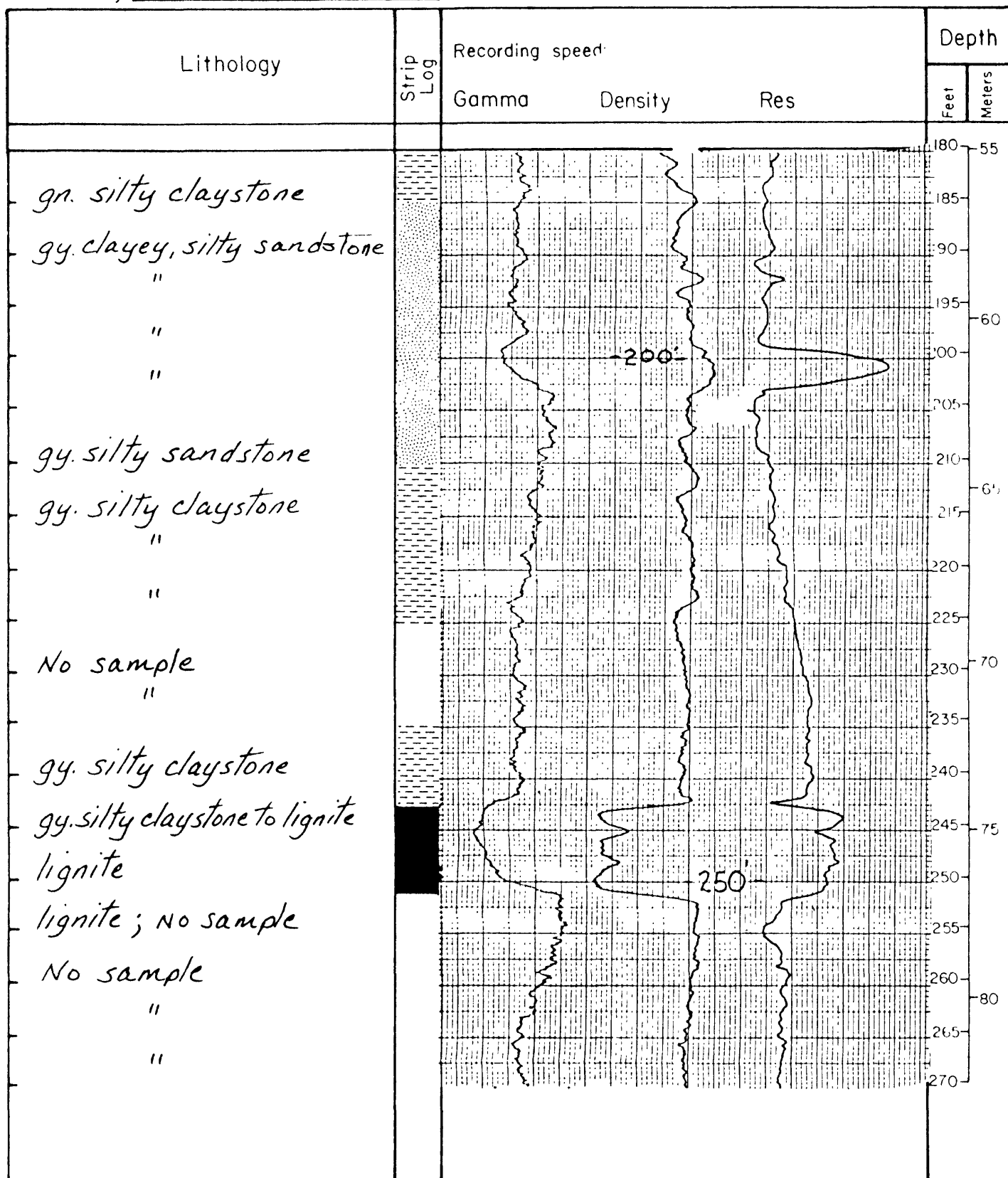
Hole no: WB77-88 Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured: _____, _____ Hole size: _____ Cored: _____

Remarks: _____

Recorded by: _____



(Continued)

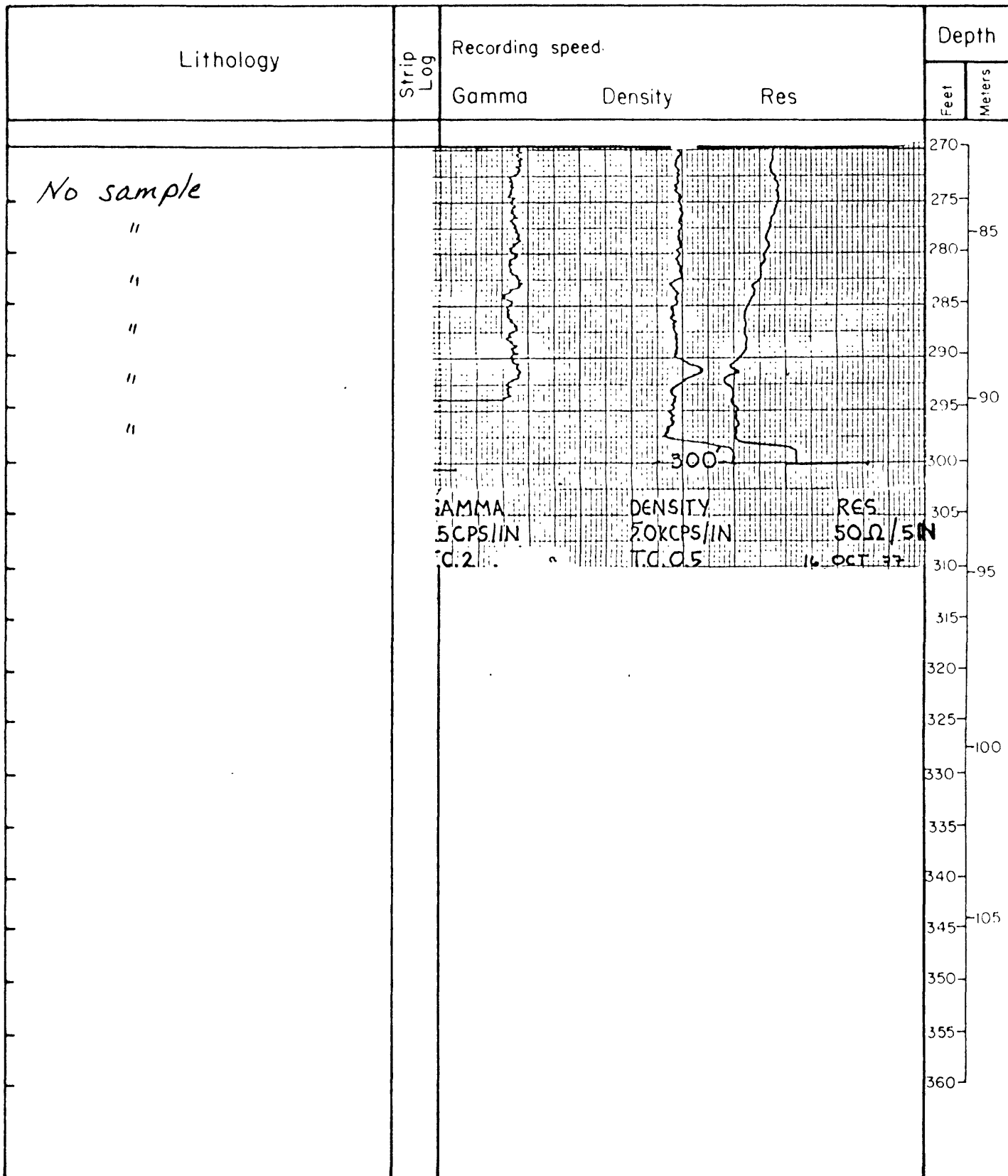
Hole no: WB77-88 Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size: _____ Cored: _____

Remarks: _____

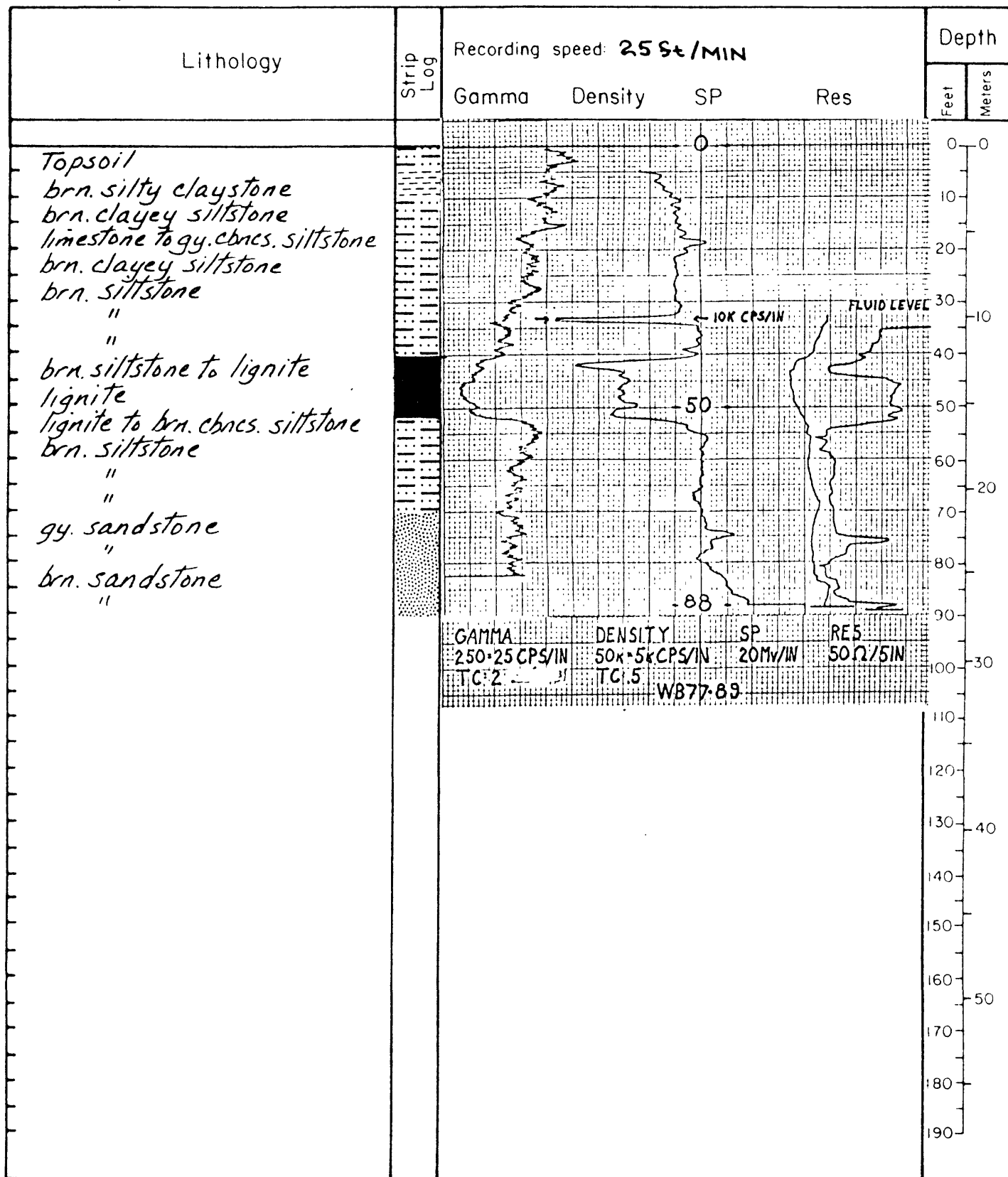
Recorded by: _____



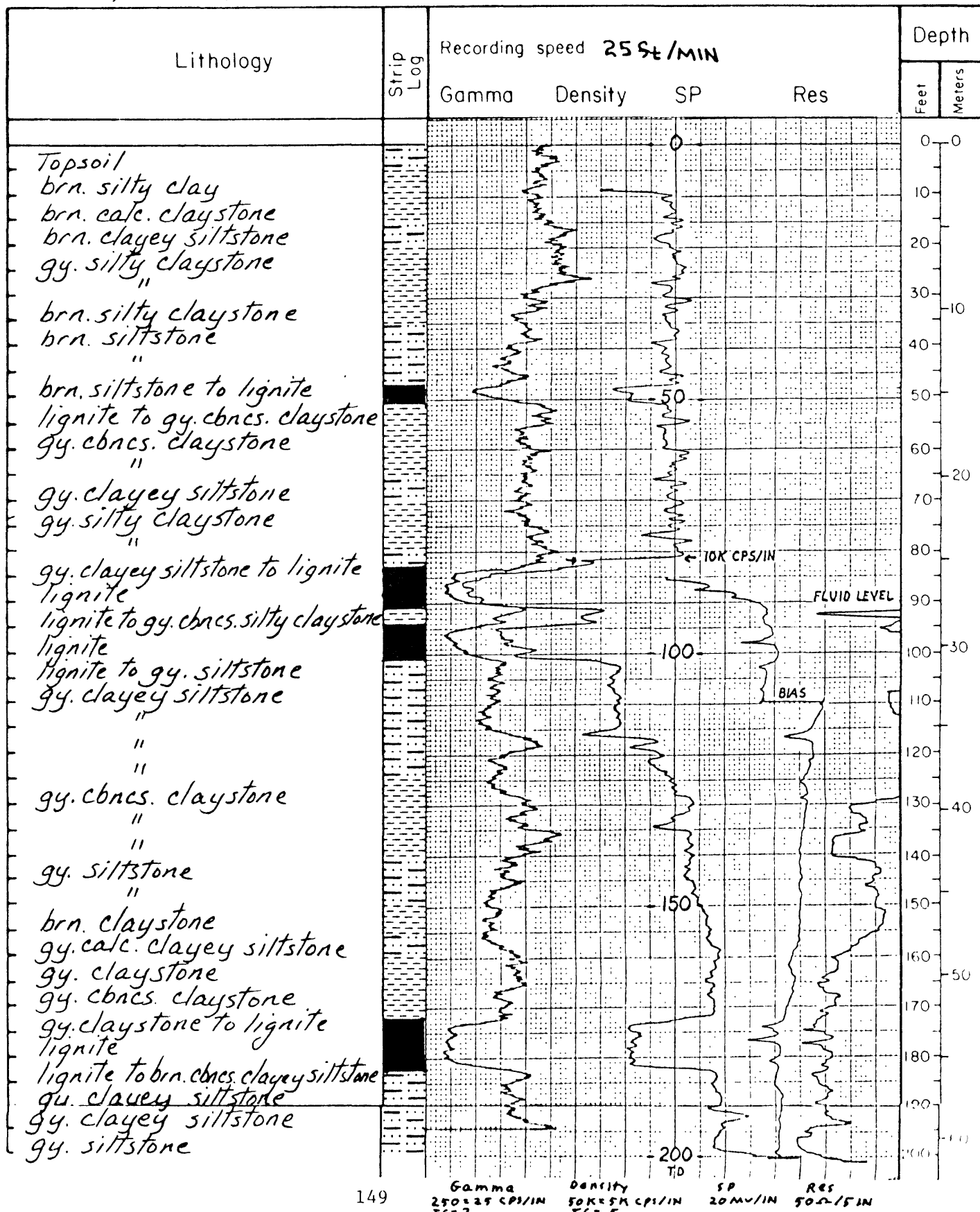
Hole no: WB77-89 Map: NE-40 Date: 10/2/77 State: Mont. County: Wibaux
 Elev 2600ft Location: T16N, R59E Sec. 28, Tract SW SW Drilled depth: 88ft
 Measured: _____, _____ Hole size: 5 1/8 in. Cored: No

Remarks: _____

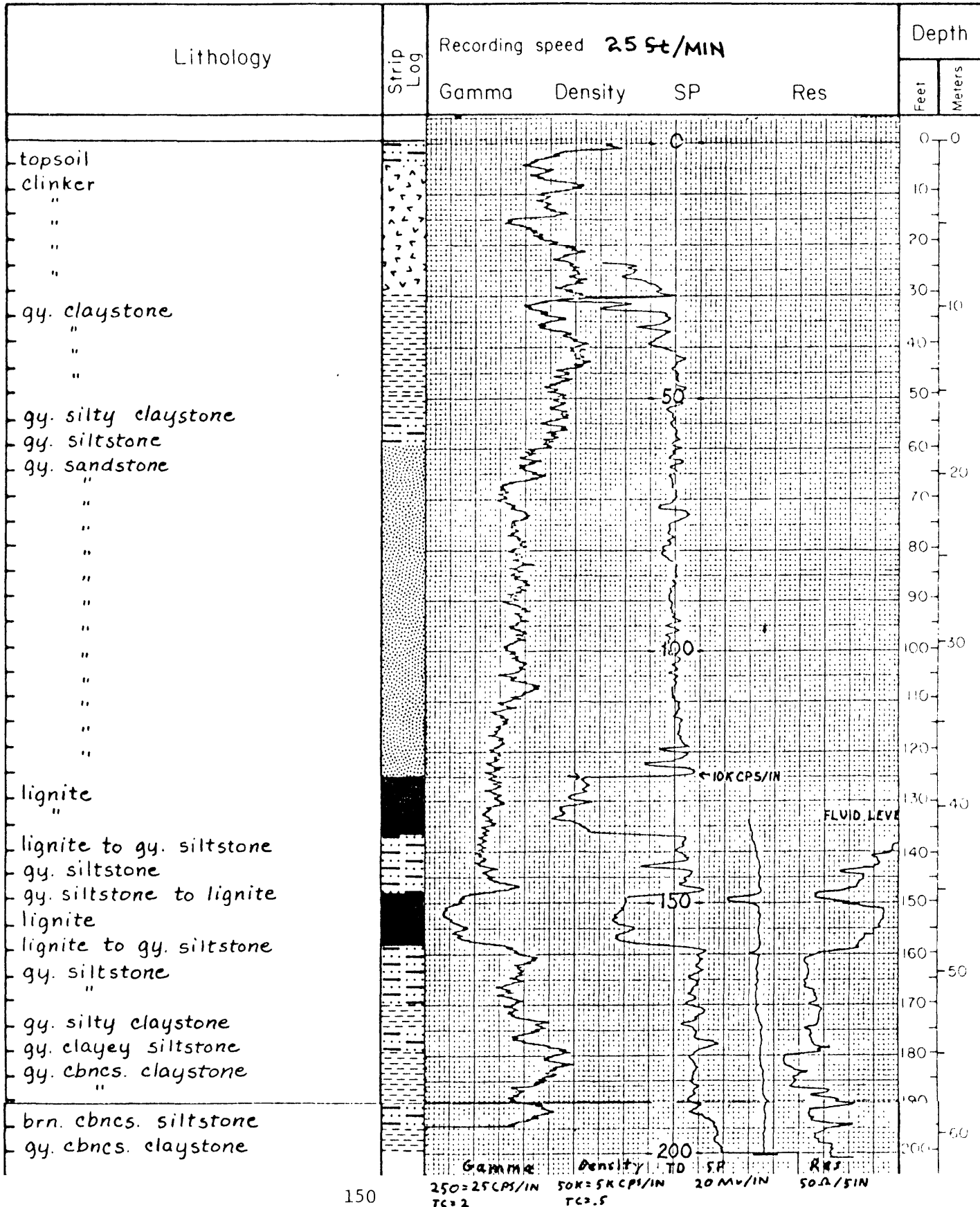
Recorded by: J. C. Harksen



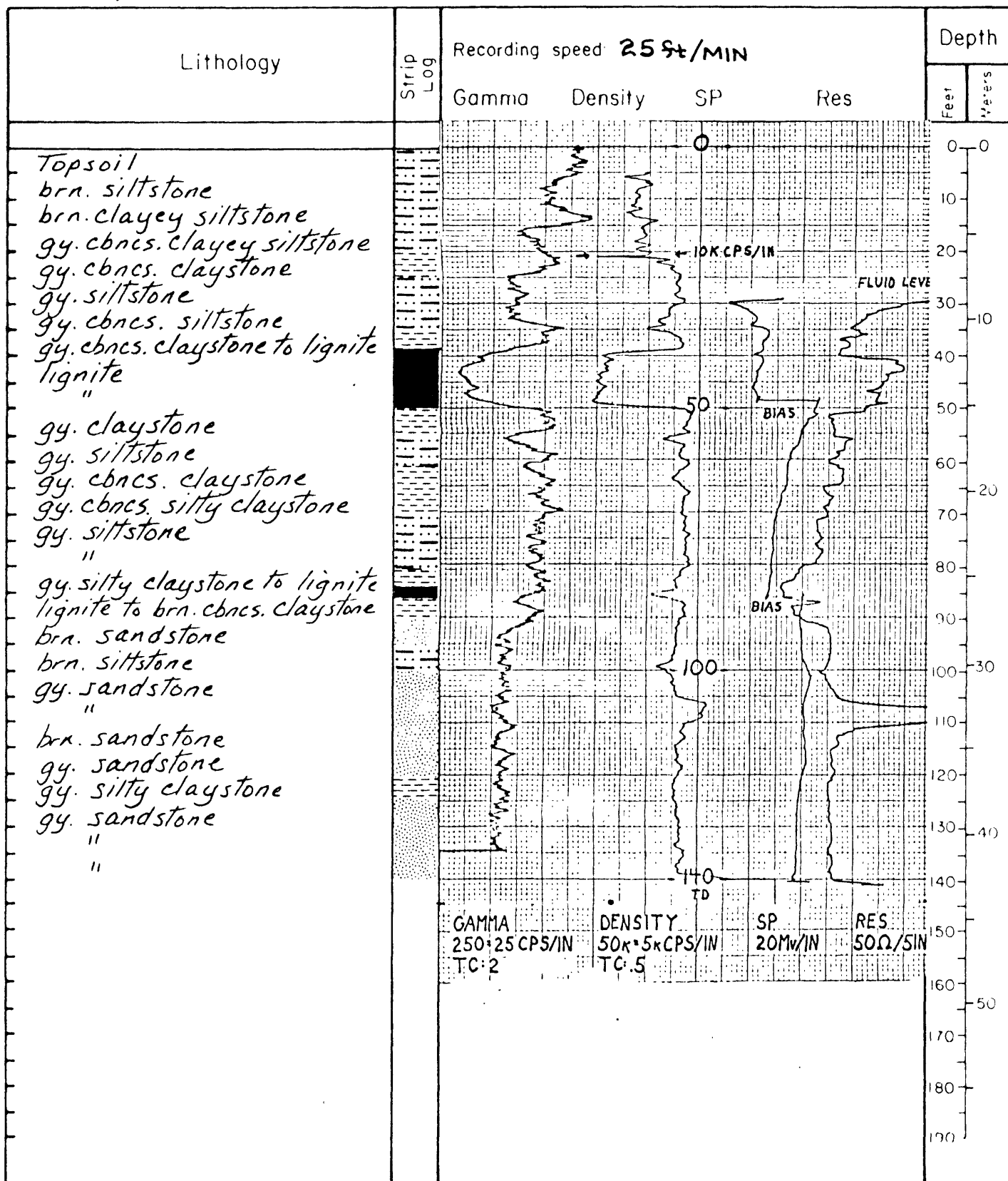
Hole no: W877-90 Map NE-40 Date 10/2/77 State Mont. County Wibaux
 Elev 2740 ft Location: T16N, R60E Sec. 30, Tract SW SW Drilled depth: 200 ft
 Measured: _____, _____ Hole size: 5 1/8 in. Cored No
 Remarks _____
 Recorded by: J.C. Harksen



Hole no WB77-91 Map NE-40 Date 9/29/77 State Mont. County Wibaux
 Elev 2610ft Location T 16 N. R 59 E Sec. 20, Tract NW NW Drilled depth: 2005ft
 Measured: _____, _____ Hole size: 5 1/8 in. Cored No
 Remarks _____
 Recorded by: J.C. Harksen



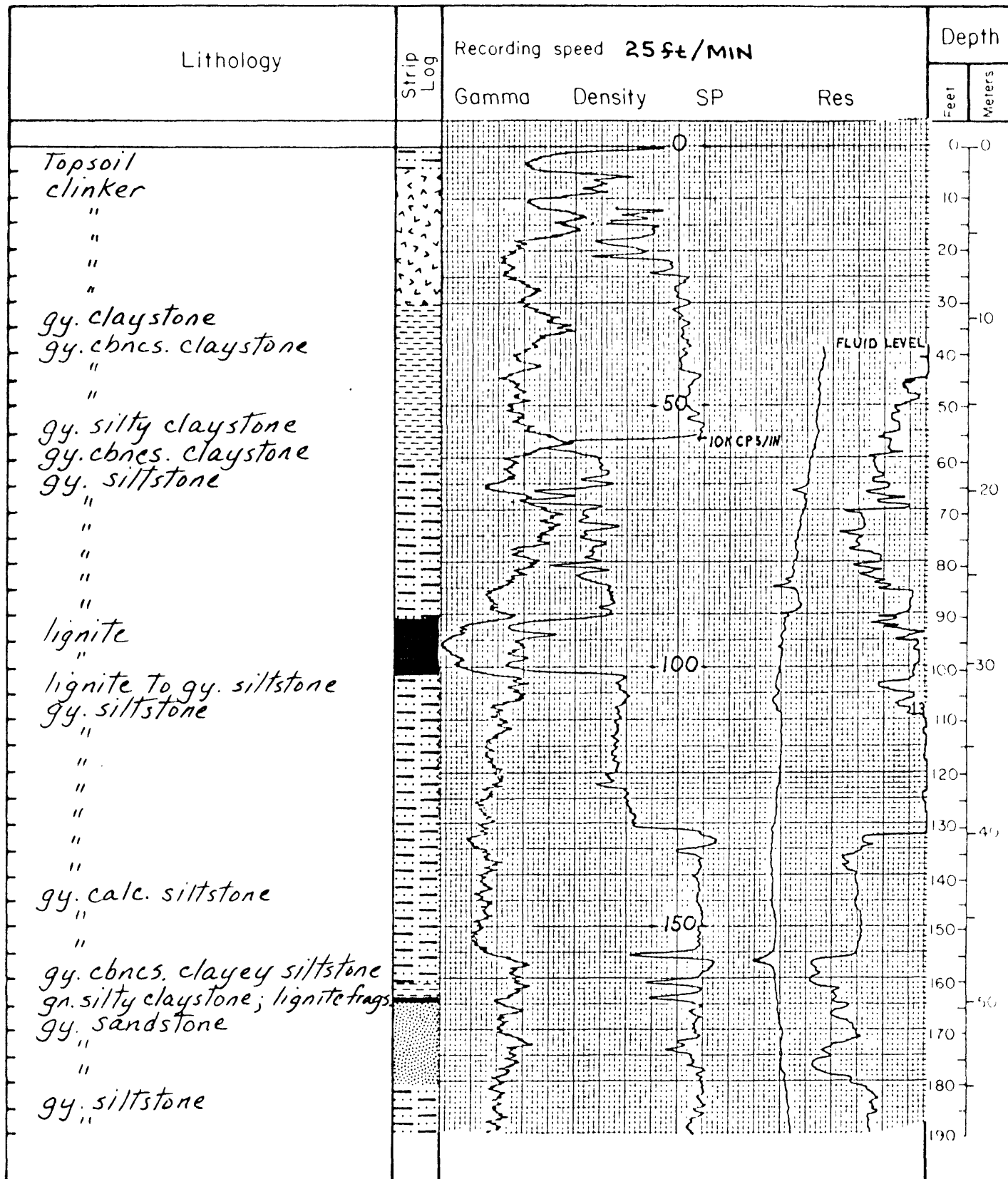
Hole no: WB77-92 Map NE-40 Date: 9/29/77 State Mont. County Wibaux
 Elev 2500ft Location T16N, R59E Sec. 20, Tract SW SW Drilled depth: 140ft
 Measured _____, _____ Hole size: 5 7/8 in. Cored: No
 Remarks _____
 Recorded by: J. C. Harksen



Hole no: WB77-93 Map NE - 40 Date 9/29/77 State Mont. County Wibaux
 Elev 2575 ft Location T16N, R59E Sec 28, Tract NW NW Drilled depth: 403 ft
 Measured _____, _____ Hole size 5 1/8 in. Cored No

Remarks _____

Recorded by: J.C. Harksen



(Continued)

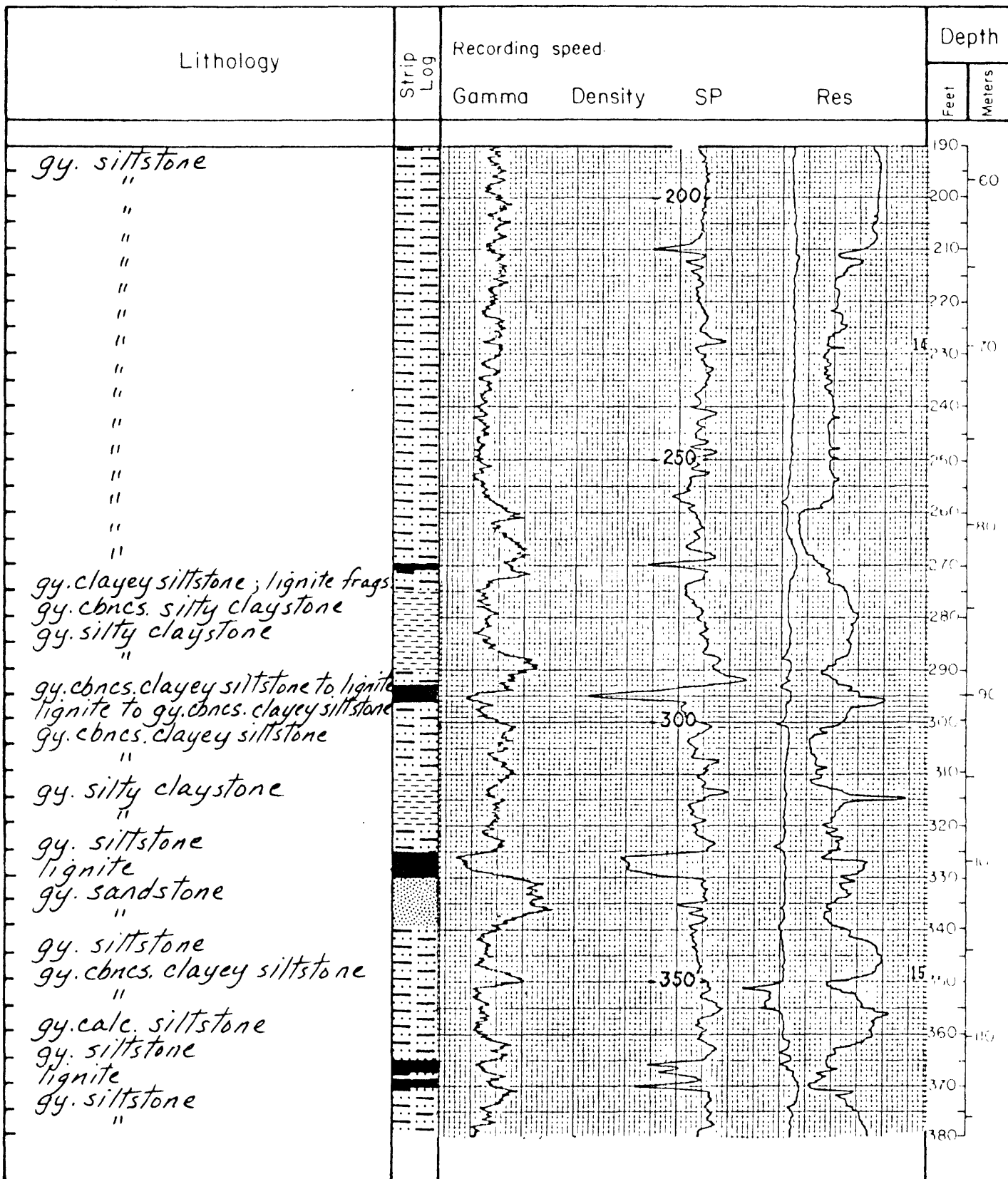
Hole no: WB77-93 Map _____ Date _____ State _____ County _____

Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

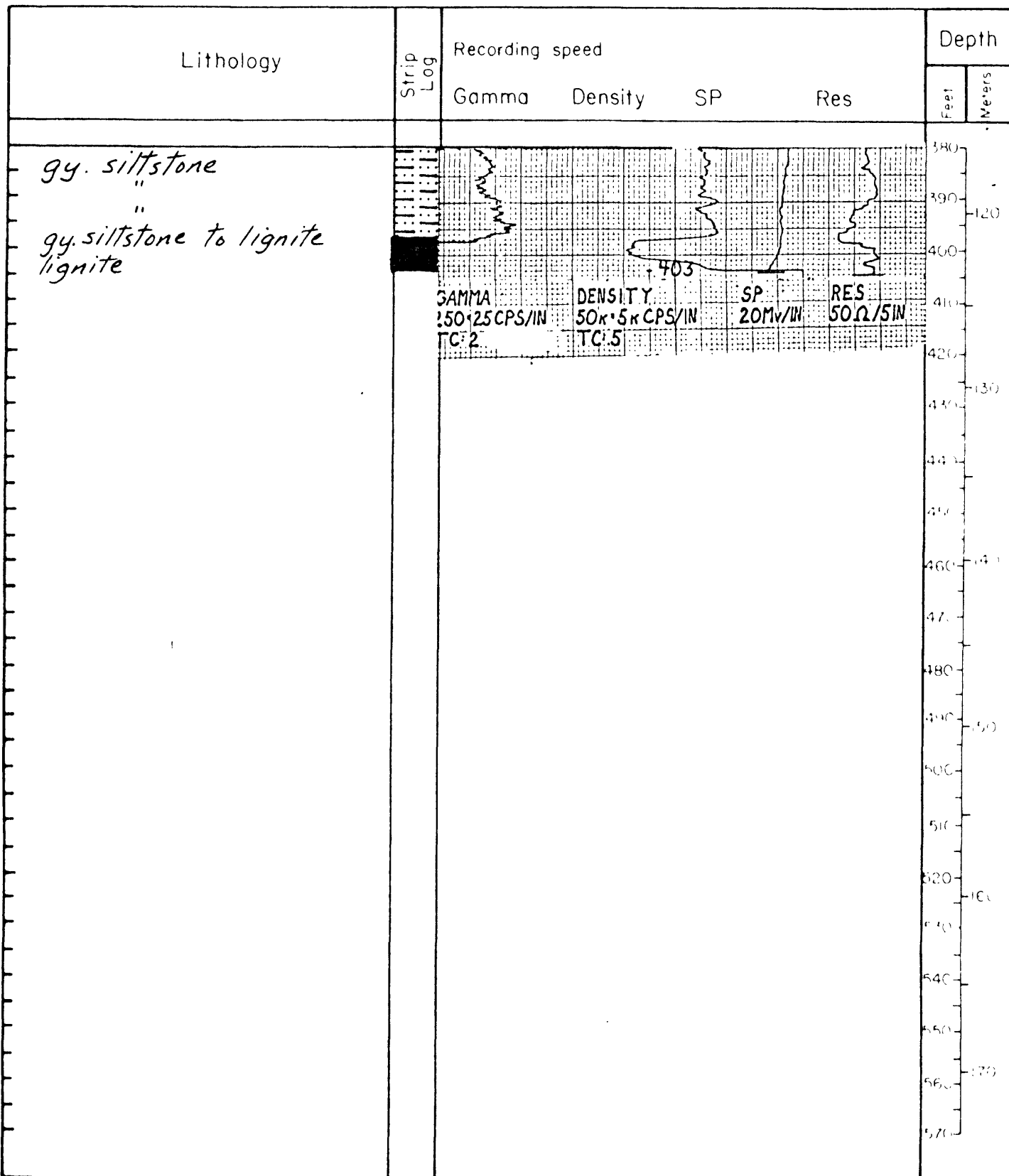
Remarks: _____

Recorded by: _____



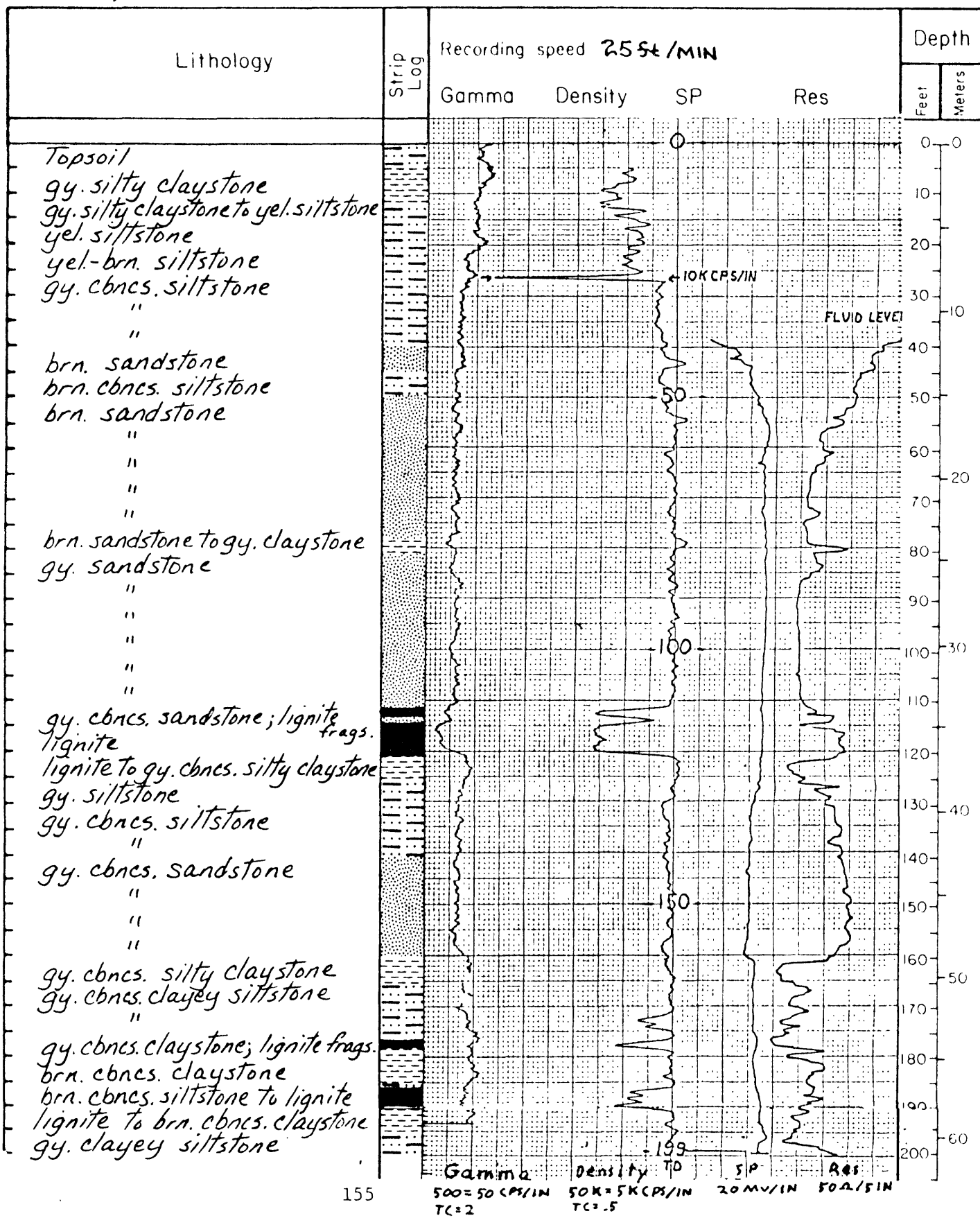
(continued)

Hole no: WB77-93 Map _____ Date: _____ State _____ County _____
Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____
Measured _____, _____ Hole size _____ Cored _____
Remarks _____
Recorded by _____



Hole no: WB77-94 Map NE-40 Date 9/30/77 State Mont. County Wibaux
 Elev. 2580 ft Location: T.16N., R. 59E. Sec. 22, Tract SW SW Drilled depth: 2005 ft
 Measured: _____, _____ Hole size 5 1/8 in. Cored No
 Remarks: _____

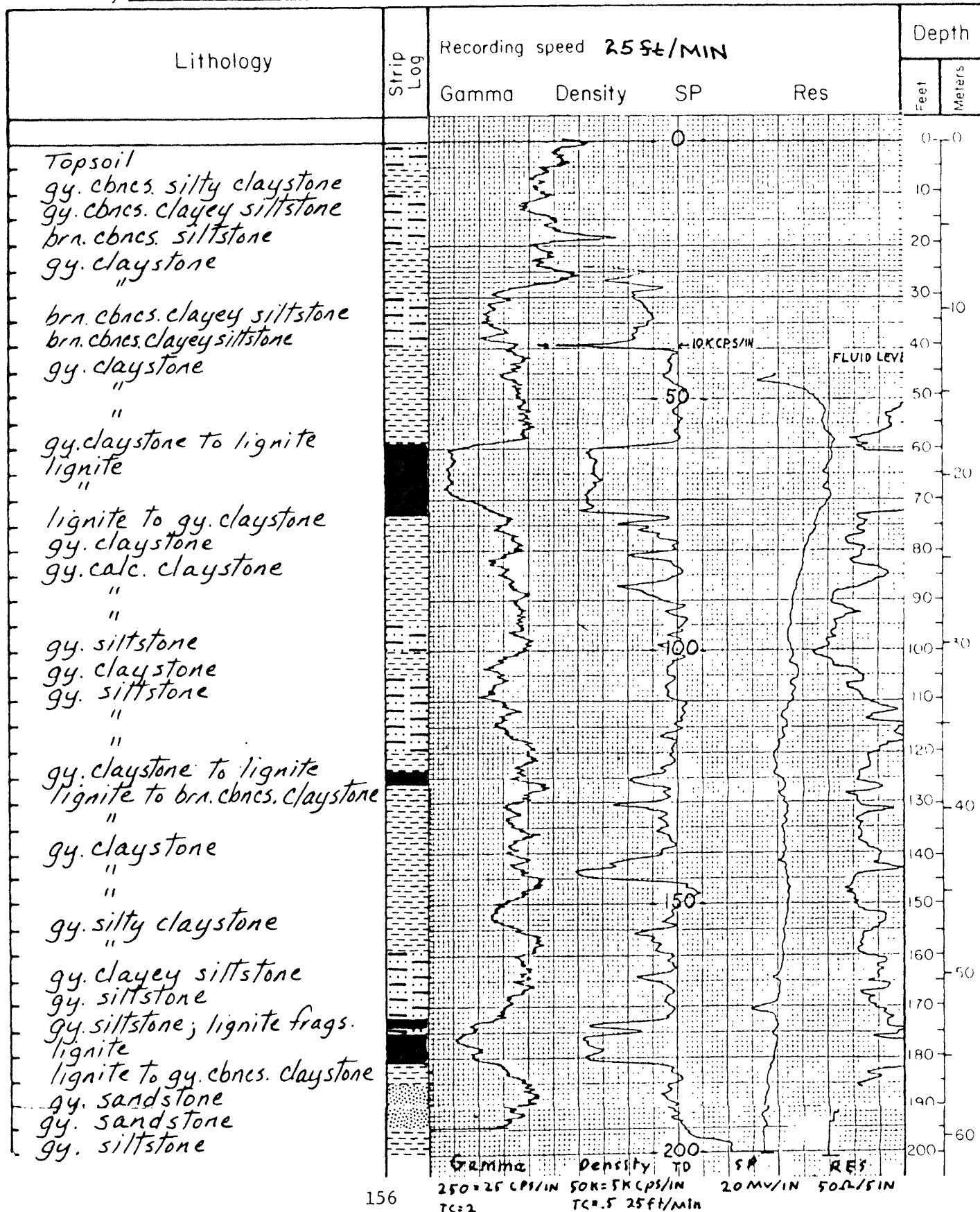
Recorded by: J. C. Harksen



Hole no: WB77-95 Map NE-40 Date 10/3/77 State Mont. County Wibaux
 Elev 2590 ft Location T16N, R59E Sec 24, Tract SW SW Drilled depth: 200 ft
 Measured: _____, _____ Hole size 5 7/8 in. Cored No

Remarks _____

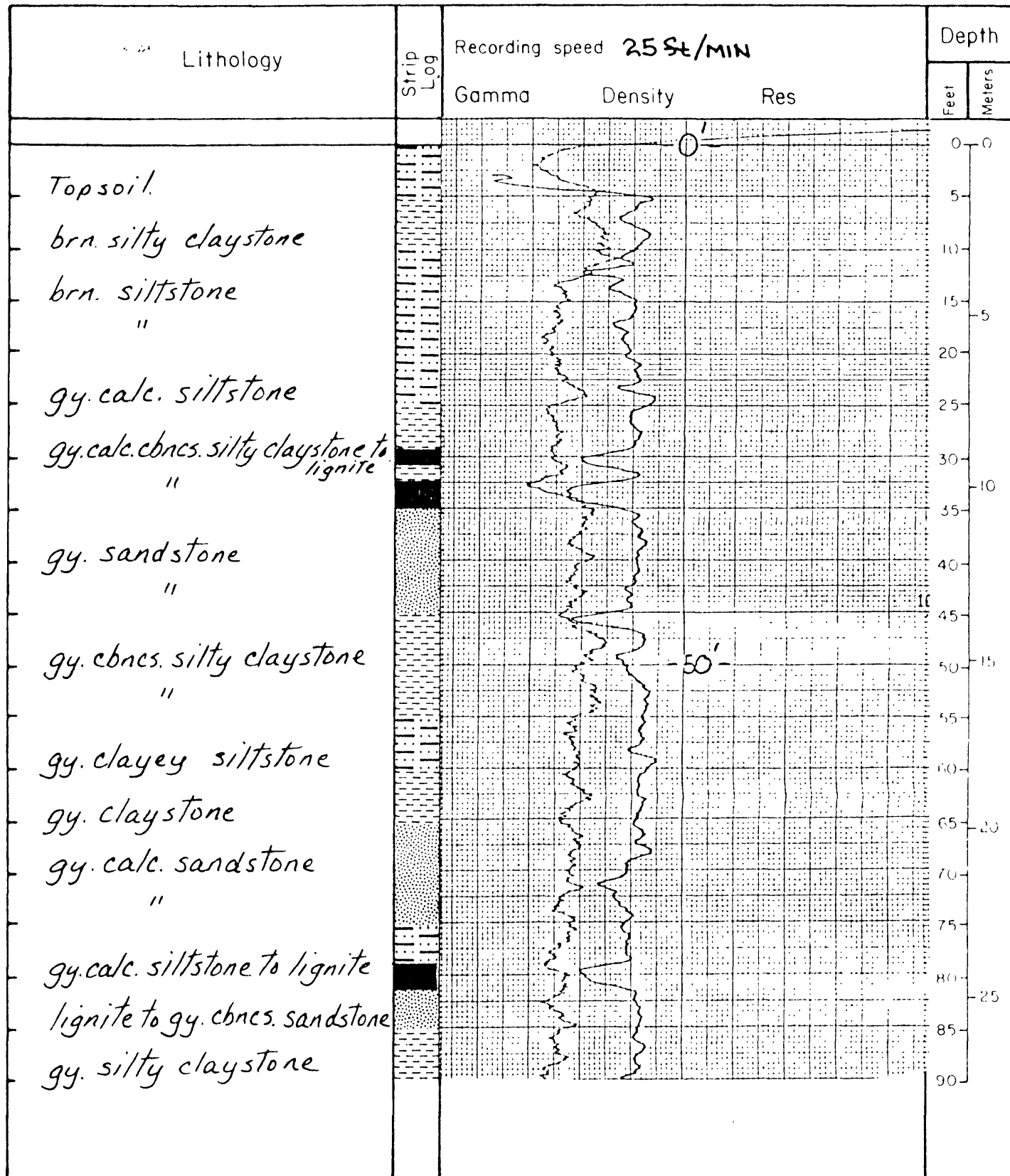
Recorded by: J. C. Harksen



Hole no: WB77-96 Map _____ Date: _____ State: _____ County: _____
 Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size: _____ Cored: _____
 Remarks: Not drilled
 Recorded by: _____

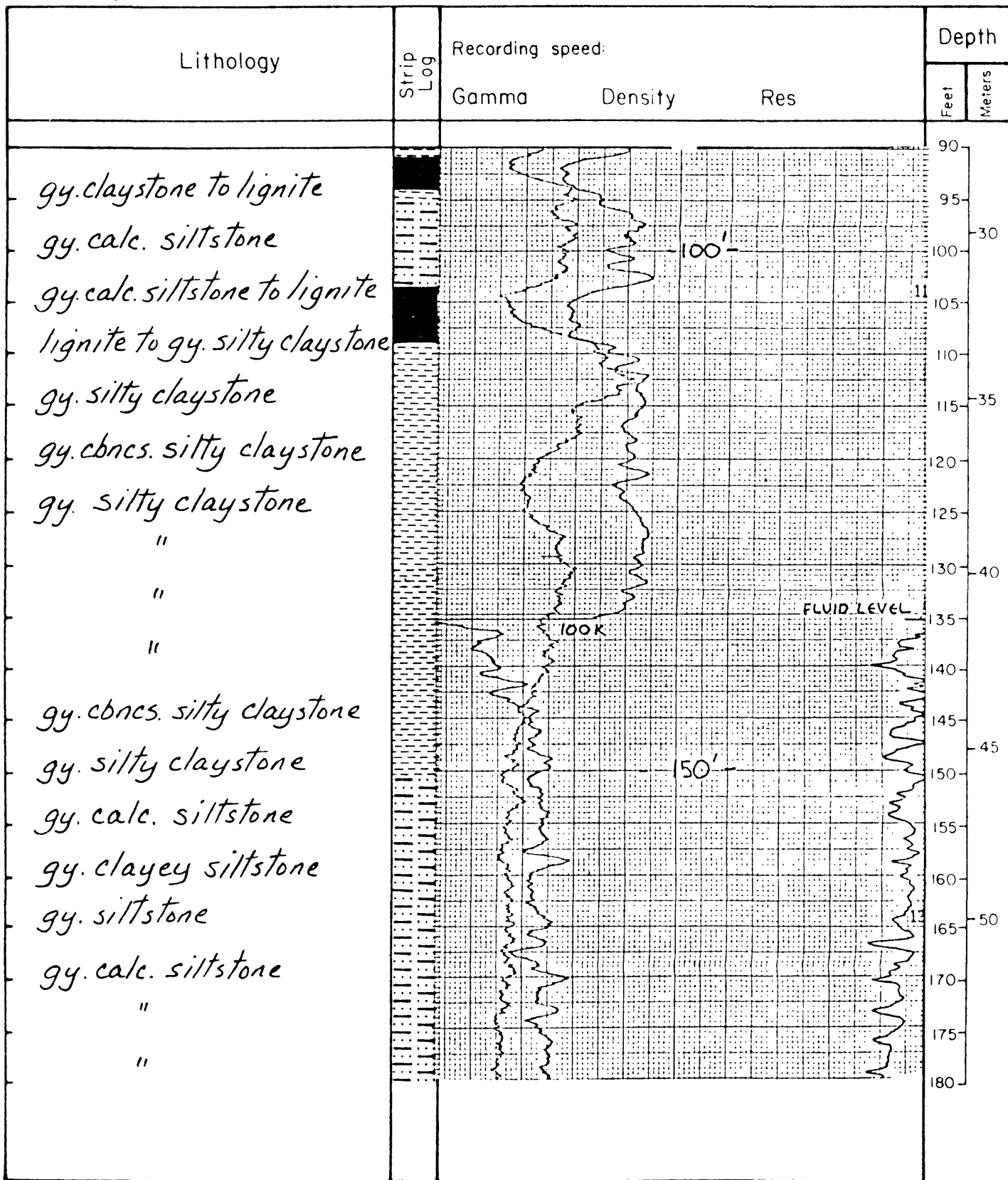
Lithology	Strip Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	
						170	50
						180	
						190	

Hole no: WB77-97 Map NE-40 Date: 10/15/77 State: Mont County: Wibaux
 Elev 2700 ft Location: T16N, R59E Sec. 24, Tract SE SE Drilled depth: 40 ft
 Measured _____, _____ Hole size 5 7/8 in Cored No
 Remarks Vertical scale change
 Recorded by J.C. Harksen



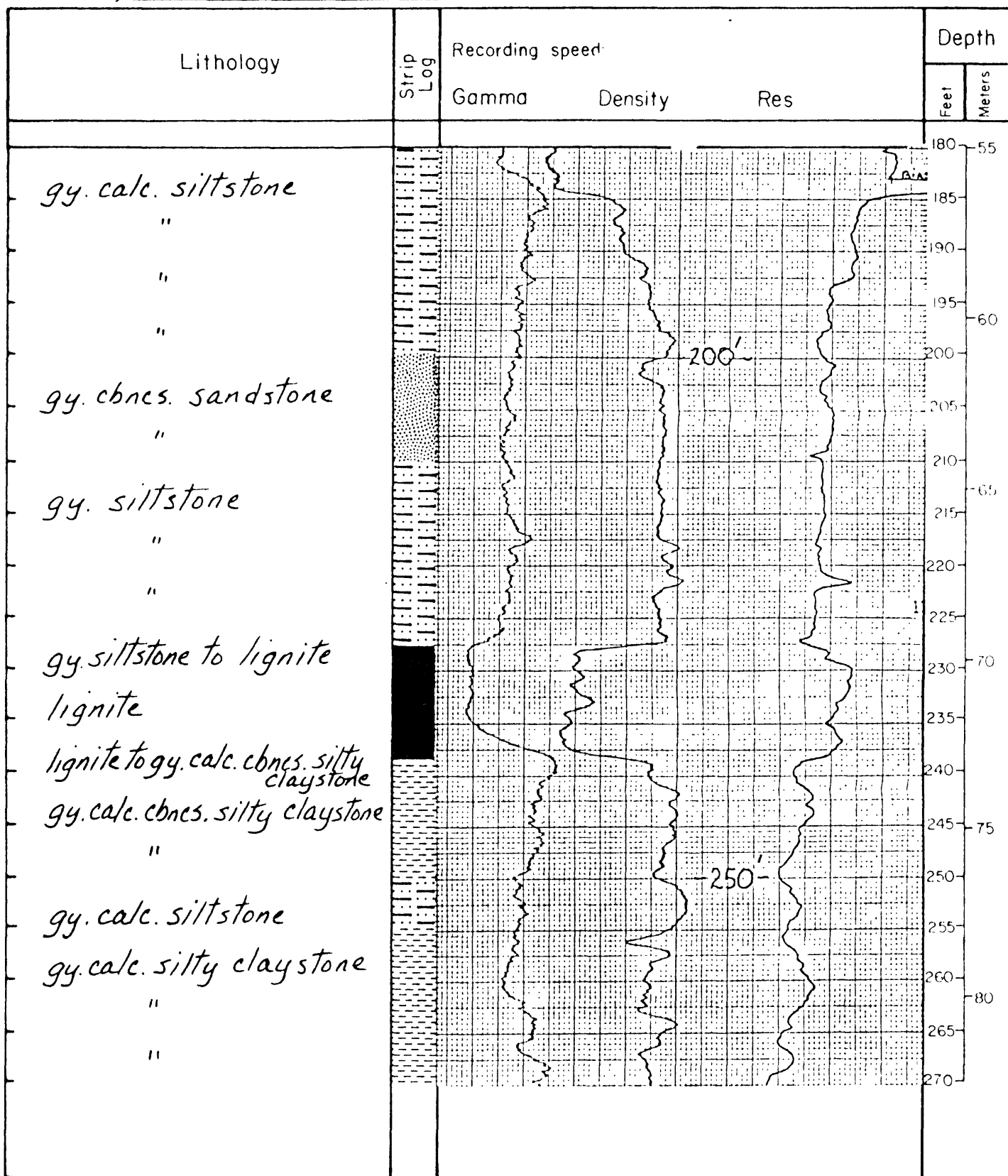
(continued)

Hole no: WB77-97 Map: _____ Date: _____ State: _____ County: _____
Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size: _____ Cored: _____
Remarks: _____
Recorded by: _____



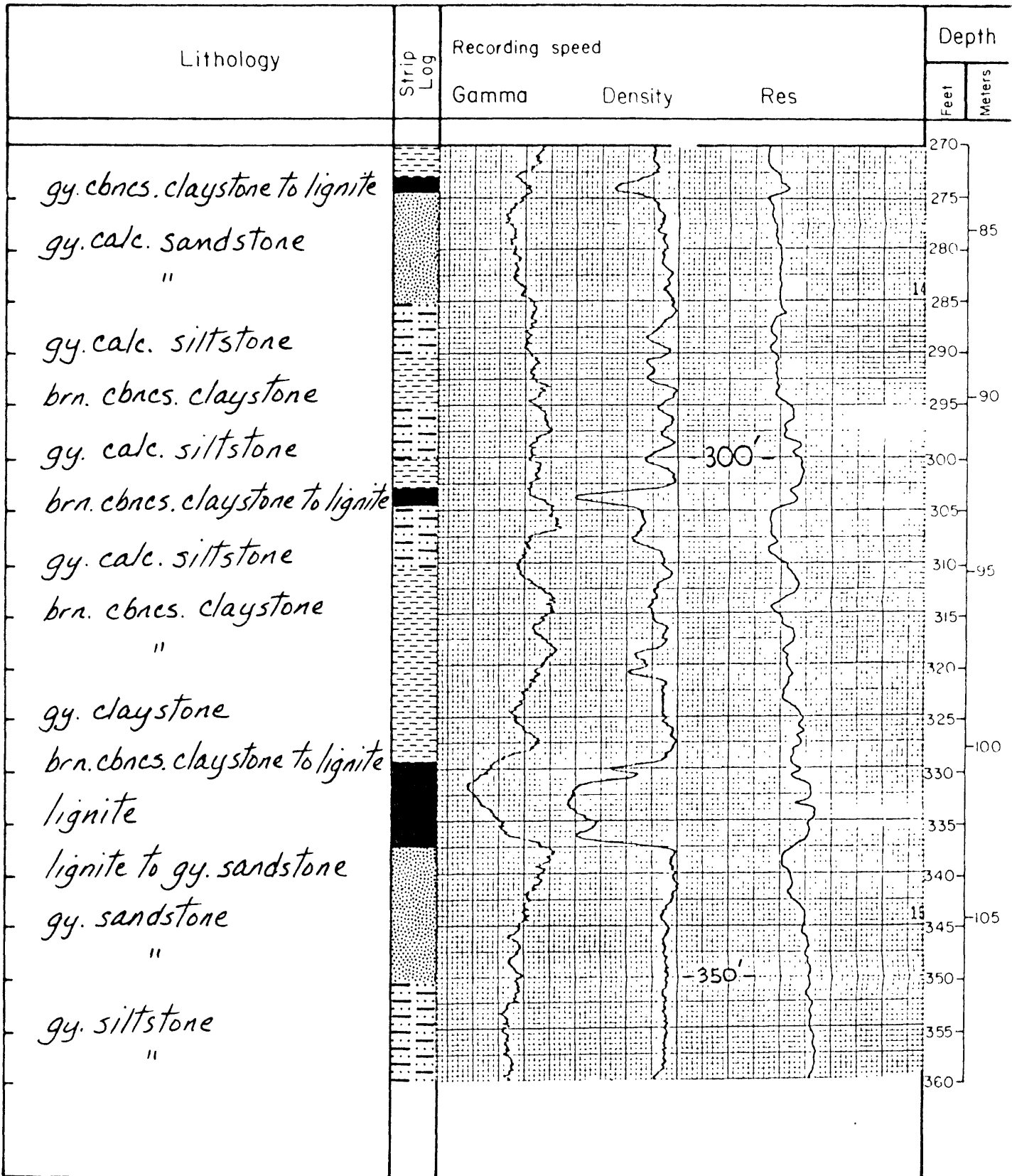
(Continued)

Hole no: WB77-97 Map: _____ Date: _____ State: _____ County: _____
Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size: _____ Cored: _____
Remarks: _____
Recorded by: _____



(continued)

Hole no: WB77-97 Map: _____ Date: _____ State: _____ County: _____
Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size: _____ Cored: _____
Remarks: _____
Recorded by: _____



(Continued)

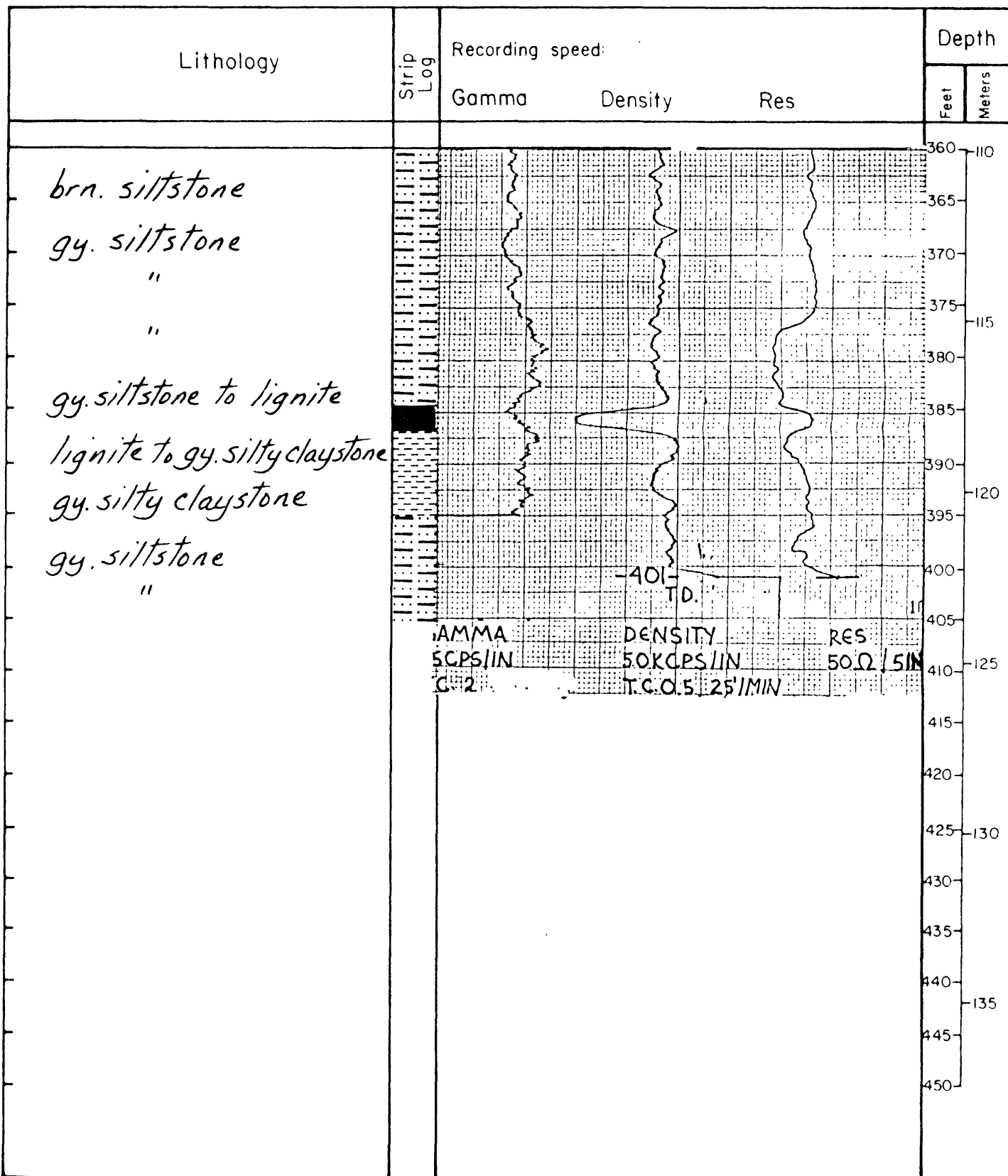
Hole no: WB77-97 Map: _____ Date: _____ State: _____ County: _____

Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

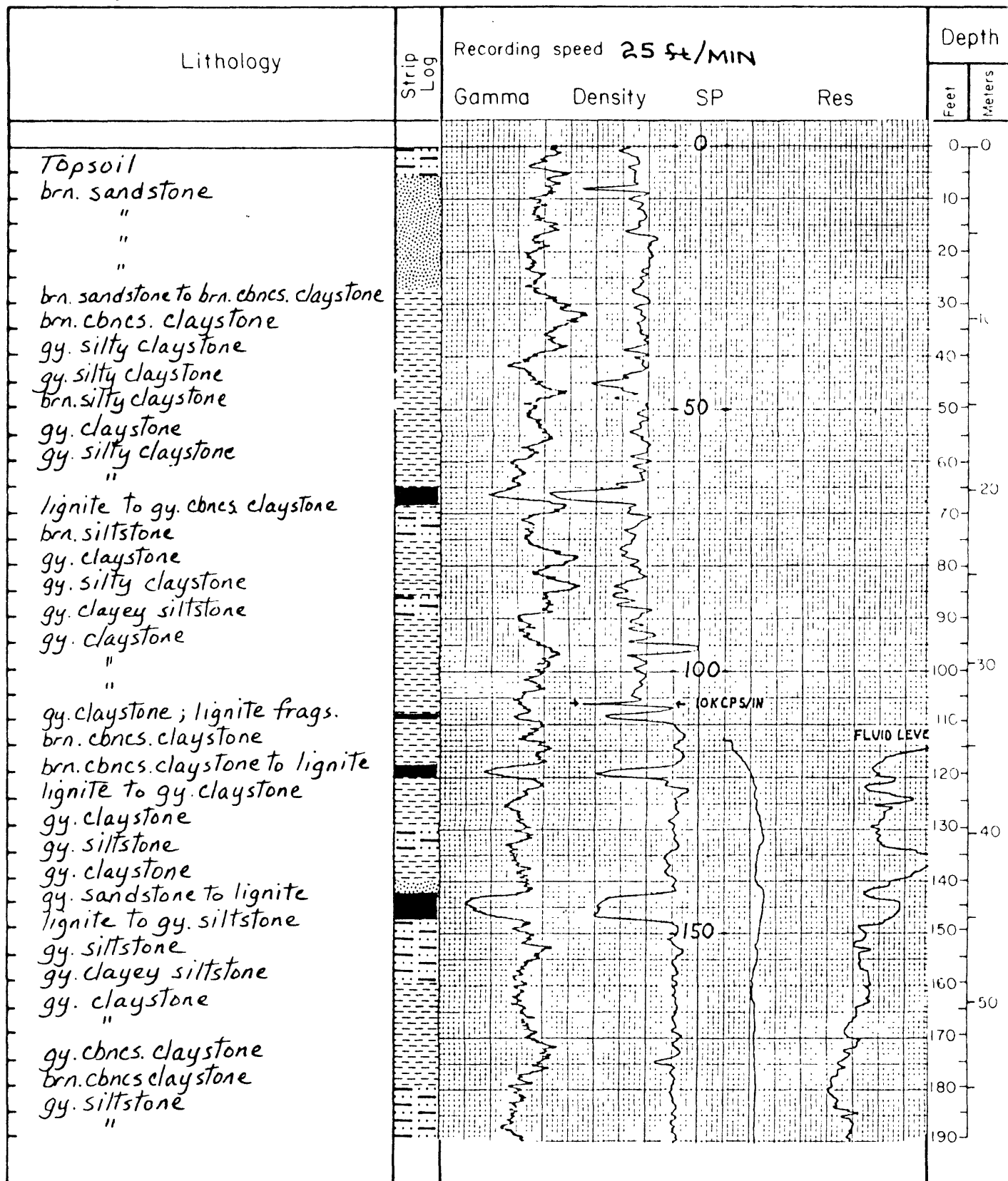
Measured _____, _____ Hole size: _____ Cored: _____

Remarks: _____

Recorded by: _____



Hole no: WB77-98 Map NE-40 Date 9/28/77 State Mont. County Wibaux
 Elev 2640 ft Location: T. 16 N., R. 60 E. Sec 18, Tract SE SE Drilled depth: 600 ft
 Measured _____, _____ Hole size 5 1/8 in. Cored No
 Remarks _____
 Recorded by: J. C. Harksen



(Continued)

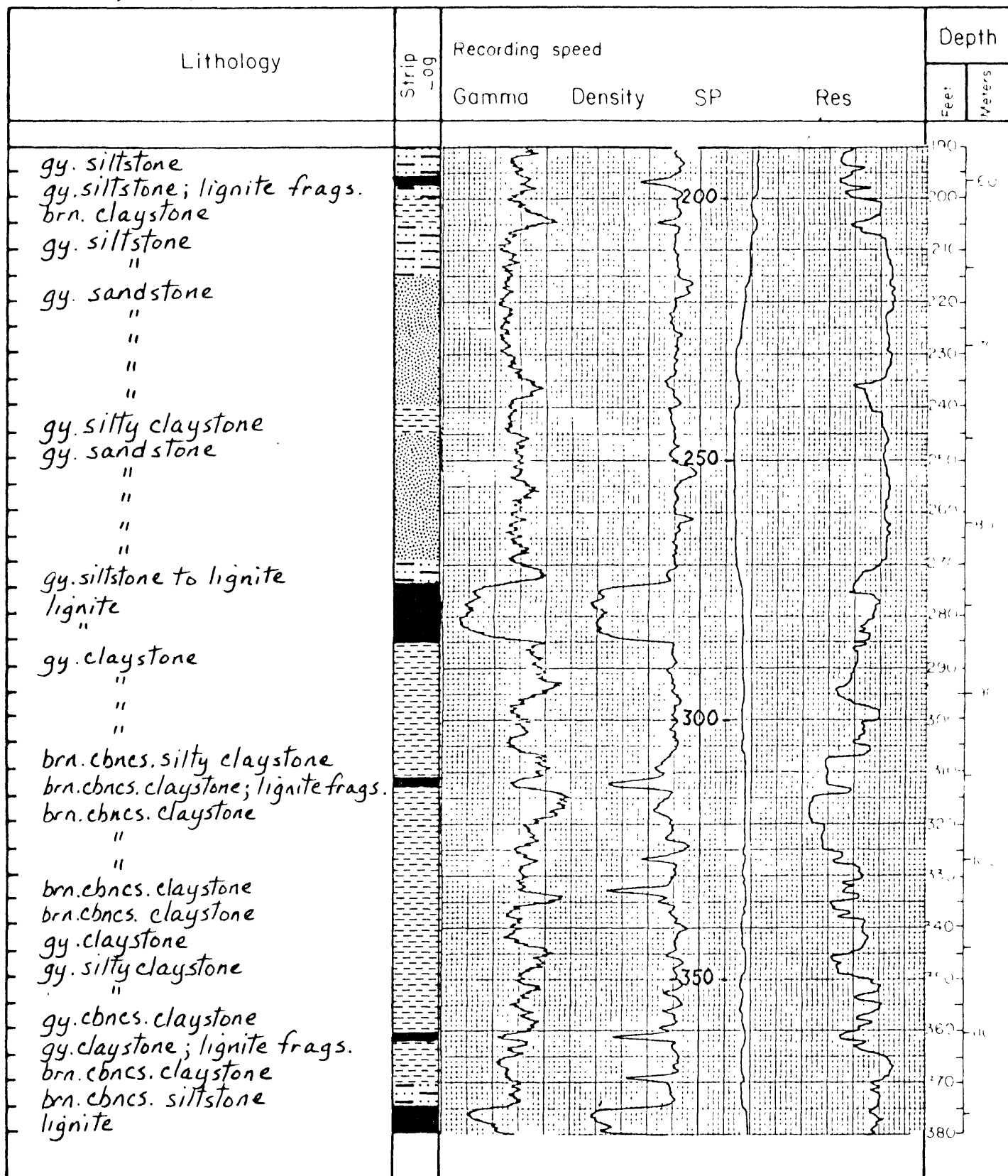
Hole no: WB77-98 Map _____ Date _____ State _____ County _____

Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____

Measured _____, _____ Hole size _____ Cored _____

Remarks: _____

Recorded by: _____



(Continued)

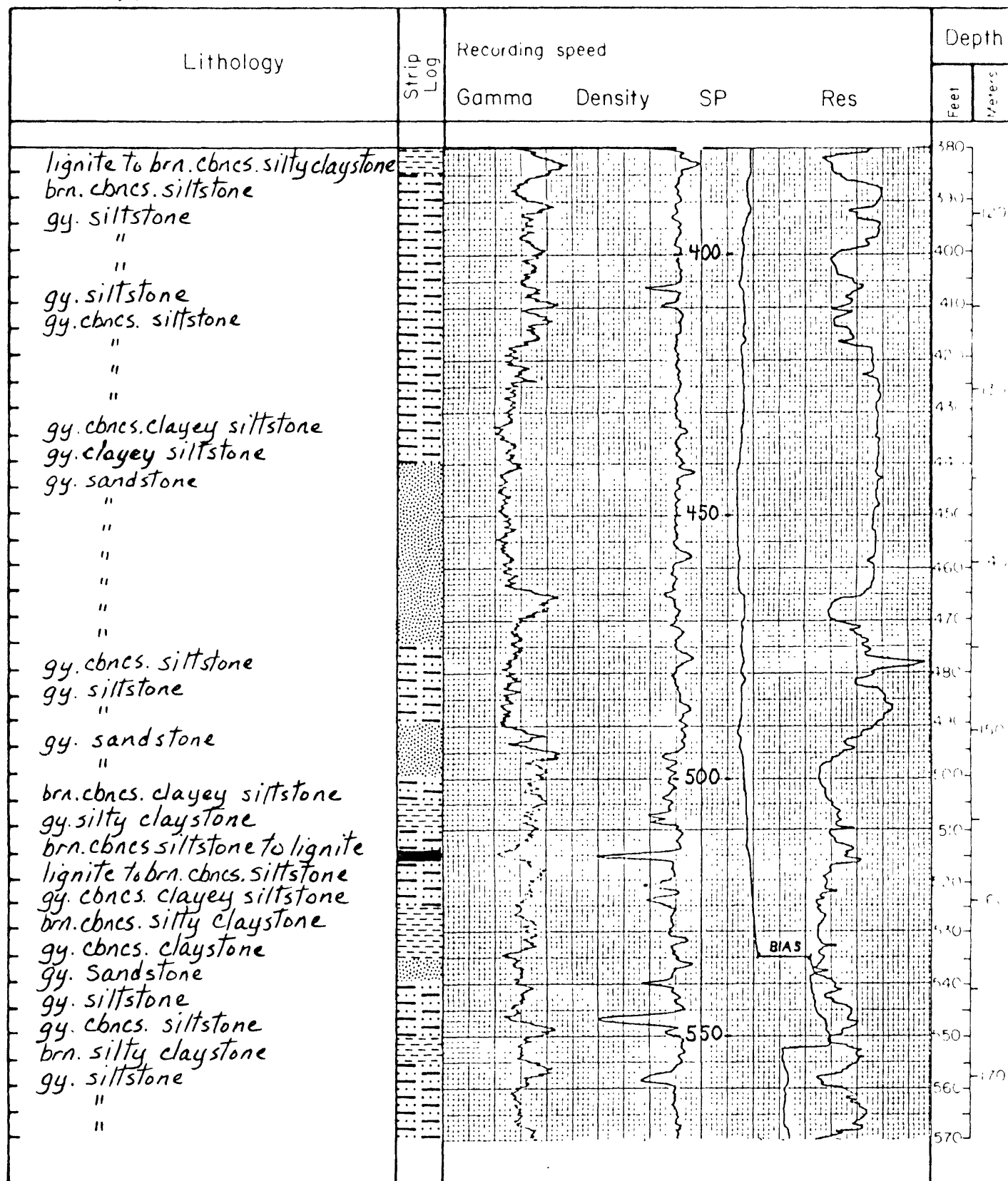
Hole no: WB77-98 Map _____ Date _____ State _____ County _____

Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____

Measured _____, _____ Hole size _____ Cored _____

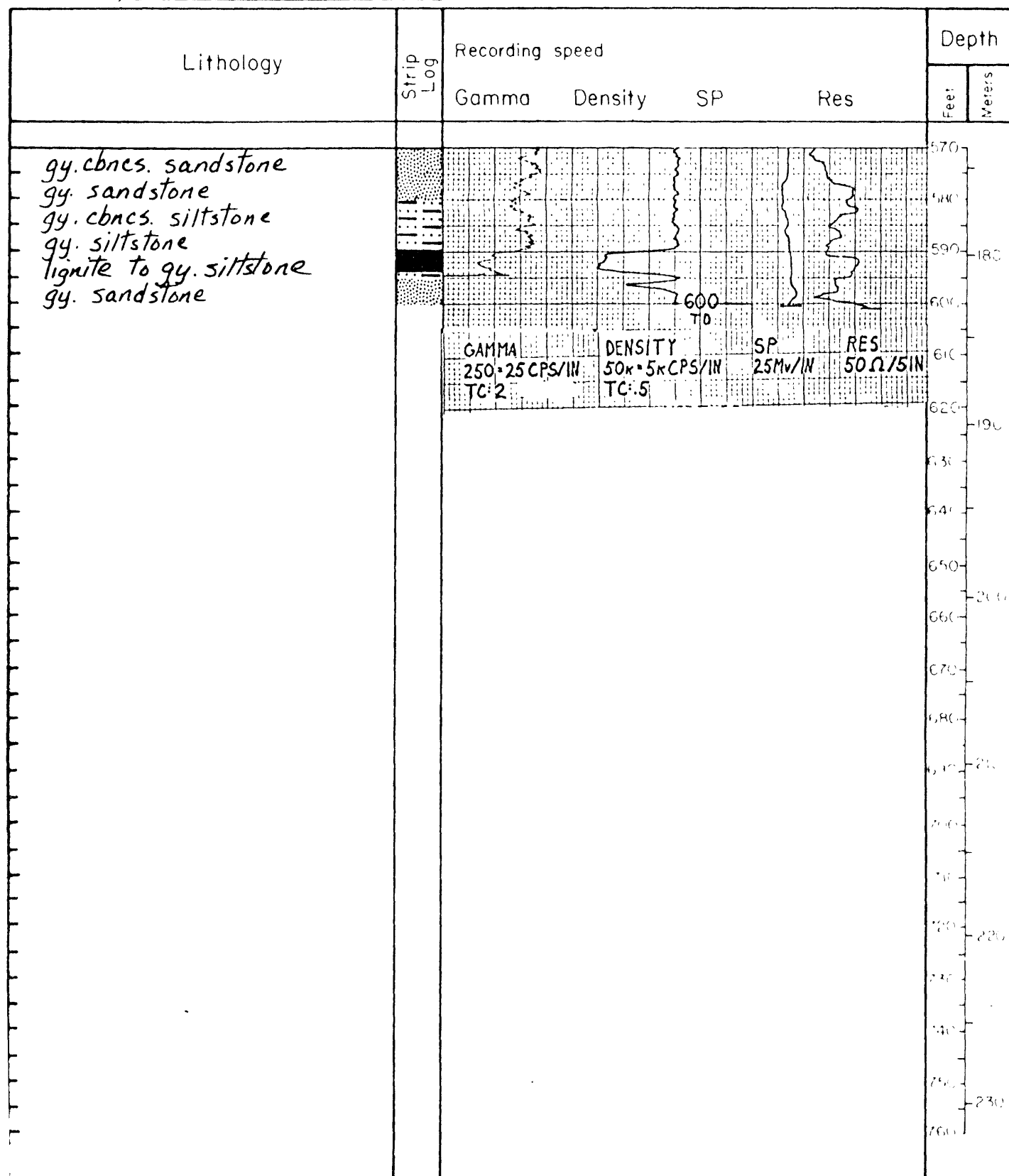
Remarks _____

Recorded by _____



(CONTINUED)

Hole no: WB77-98 Map _____ Date: _____ State: _____ County: _____
Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured _____, _____ Hole size _____ Cored _____
Remarks: _____
Recorded by: _____



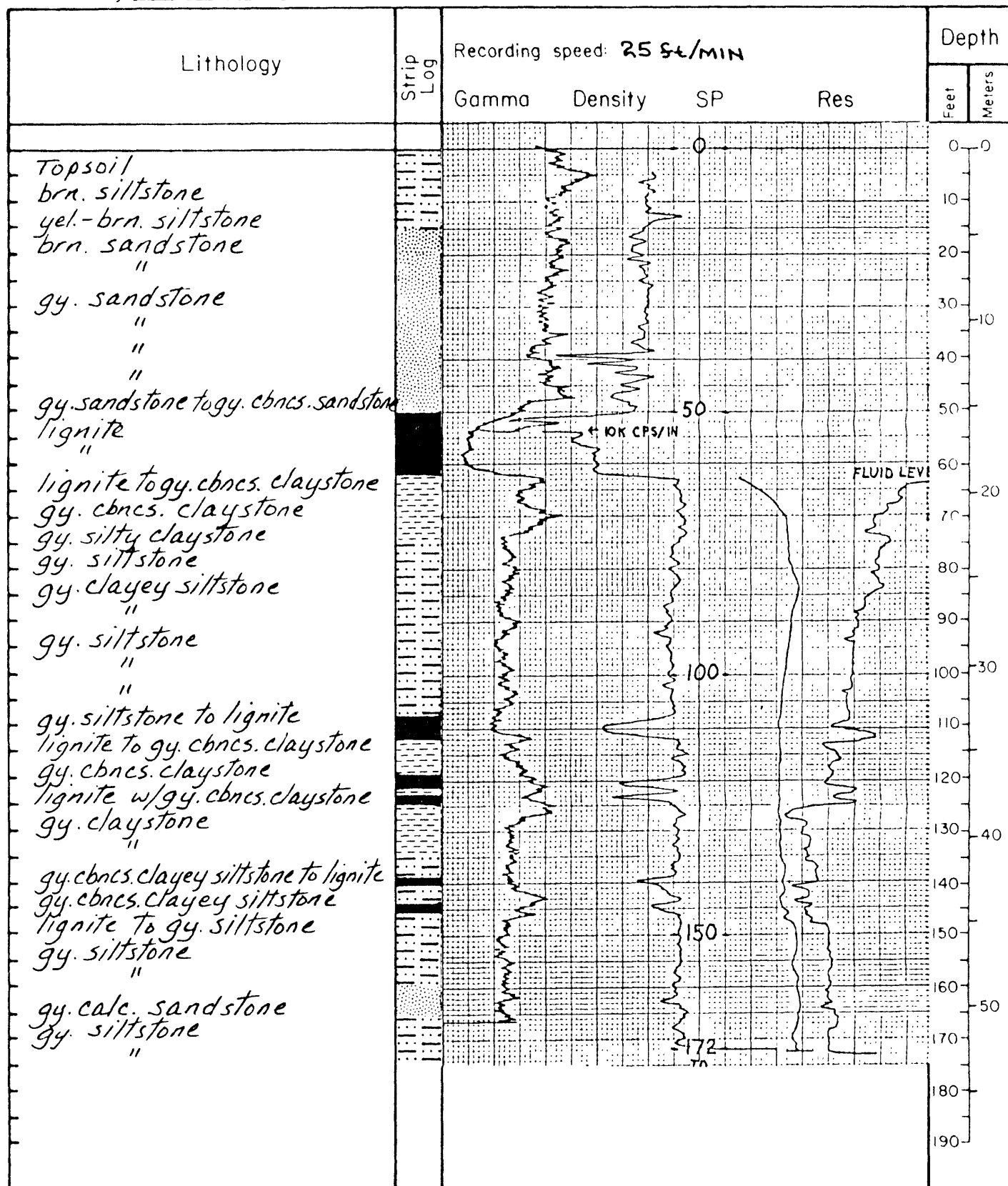
Hole no: W/B77-99 Map NE-40 Date: 9/29/77 State: Mont. County: Wibaux

Elev 2500ft Location T16N, R59E Sec. 14, Tract NE NE Drilled depth: 172 ft

Measured _____, _____ Hole size 5 1/8 in Cored No

Remarks: _____

Recorded by: J. C. Harksen



Hole no: WB77-100 Map: _____ Date: _____ State: _____ County: _____
 Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size _____ Cored: _____
 Remarks: Not drilled
 Recorded by: _____

Lithology	Strip Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

Hole no: WB77-101 Map: _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec: _____, Tract: _____ Drilled depth: _____

Measured: _____, _____ Hole size: _____ Cored: _____

Remarks Not drilled

Recorded by: _____

Lithology	Strip Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	
						40	10
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

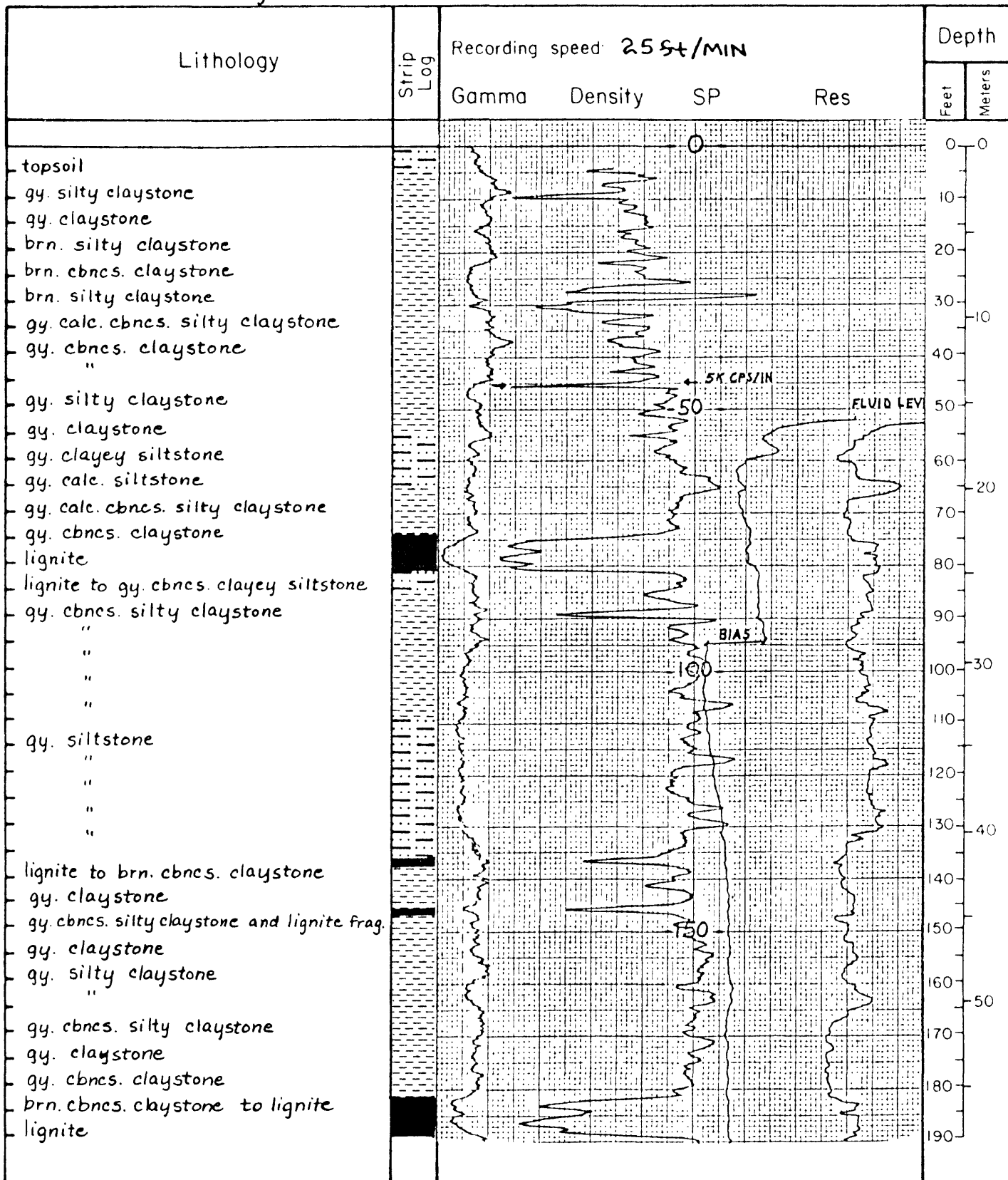
Hole no: WB77-102 Map: SW-7 Date: 9/15/77 State: N. D. County: Golden Valley

Elev 2822 ft Location: T 138 N, R 105 W Sec. 28, Tract NW NW Drilled depth: 603 ft

Measured: _____, _____ Hole size: 5 1/8 in. Cored No

Remarks: _____

Recorded by: M. L. Menge



(continued)

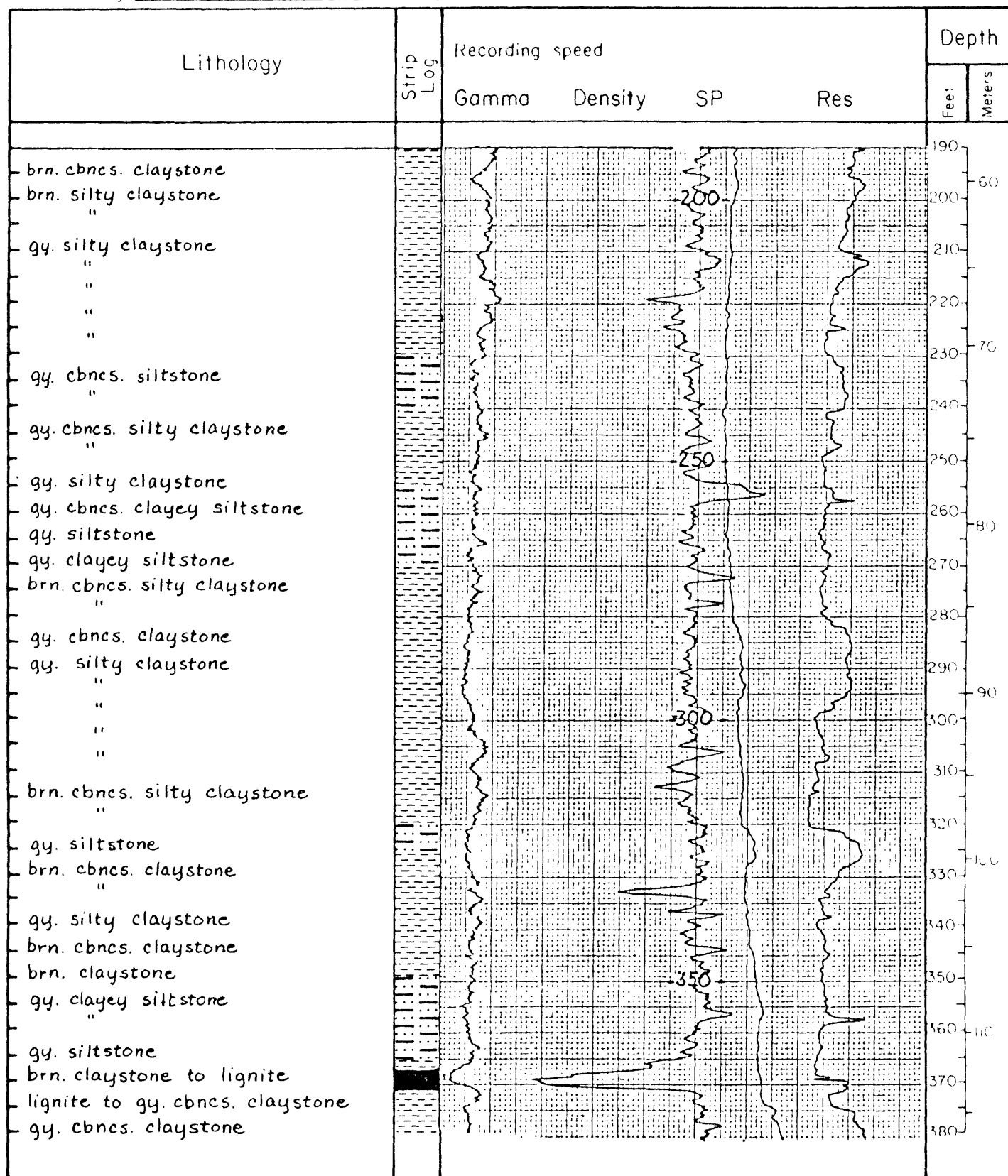
Hole no: WB77-102 Map _____ Date: _____ State _____ County: _____

Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

Remarks: _____

Recorded by: _____



(continued)

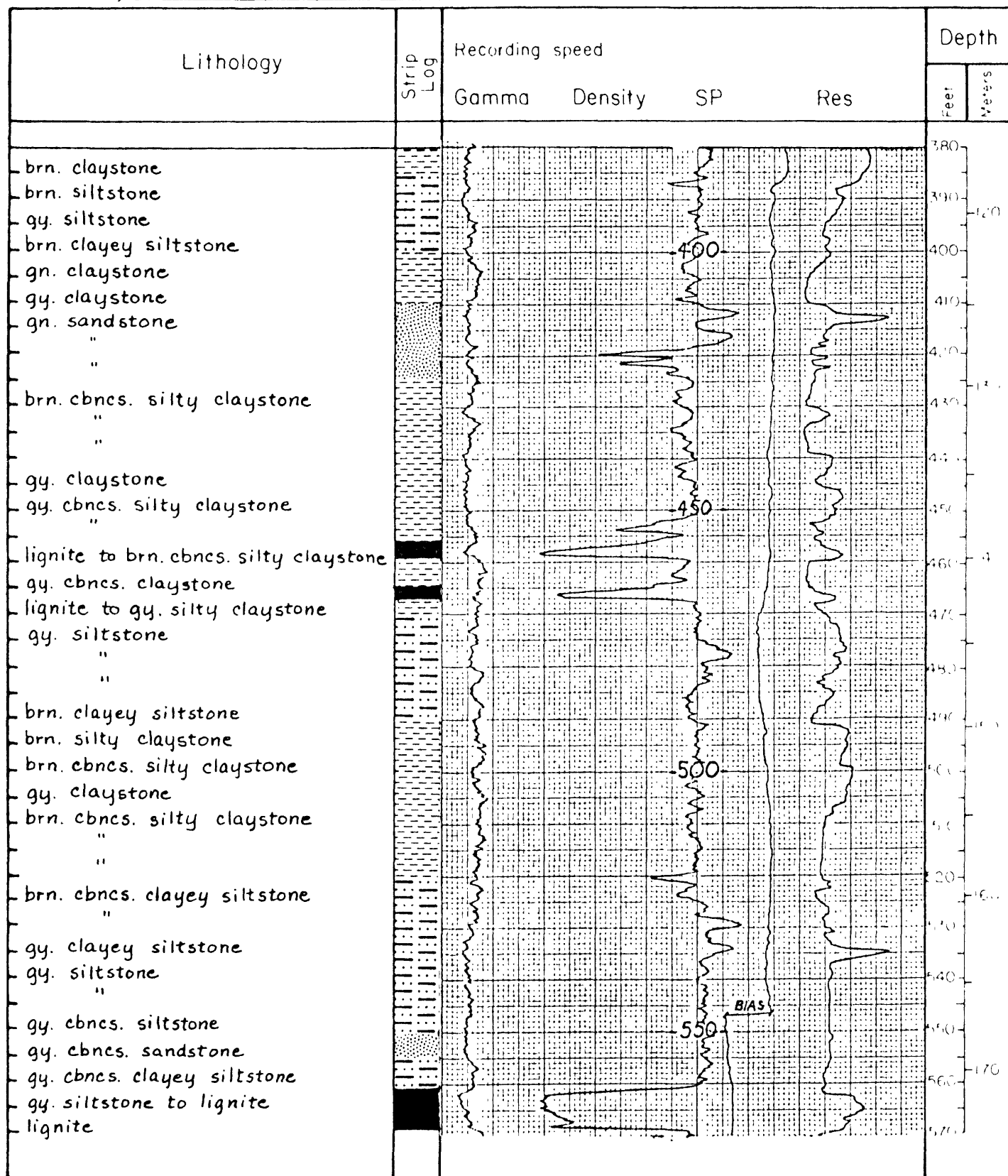
Hole no: WB77-102 Map _____ Date: _____ State: _____ County: _____

Elev _____ Location _____ Sec. _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

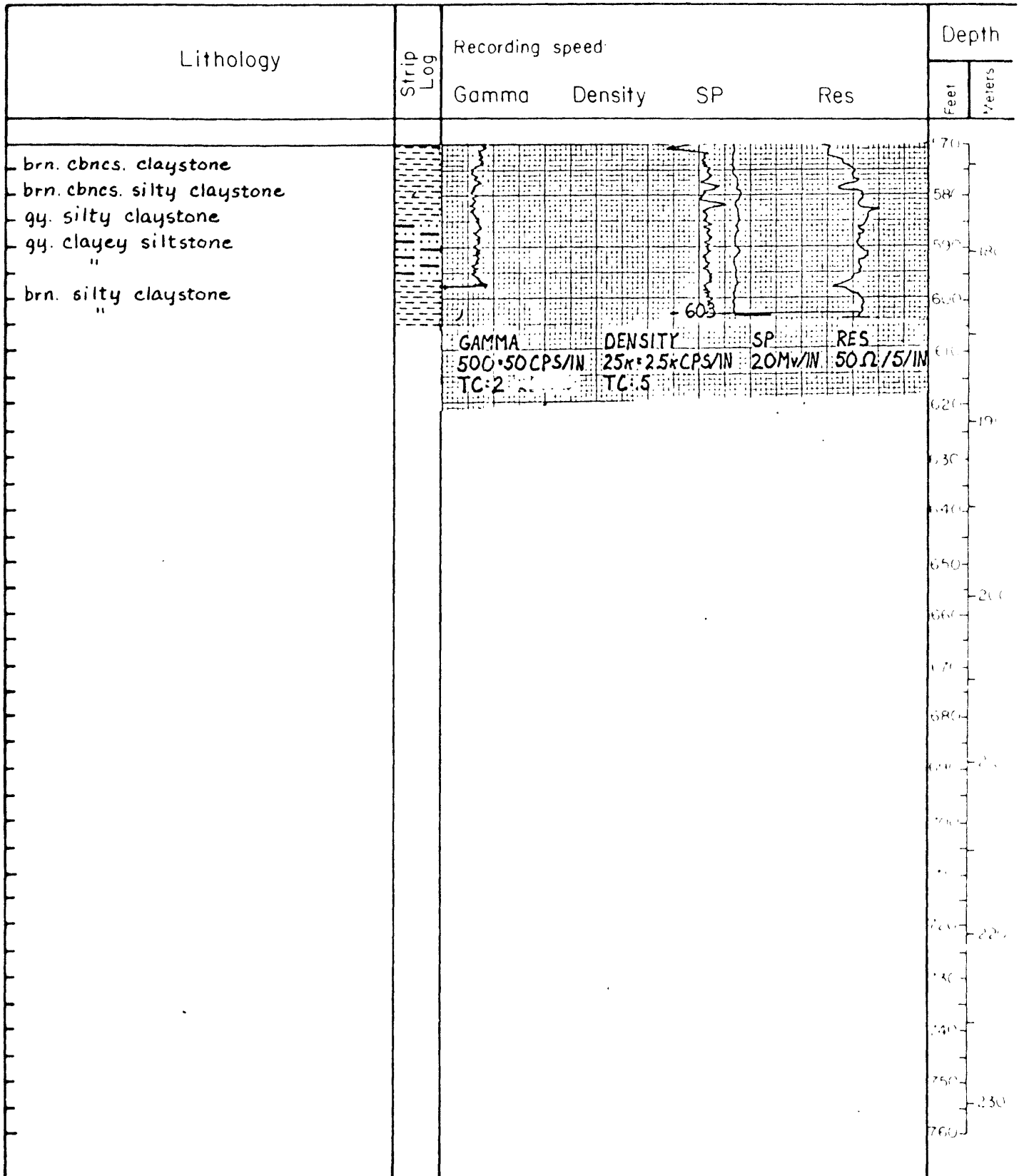
Remarks _____

Recorded by: _____

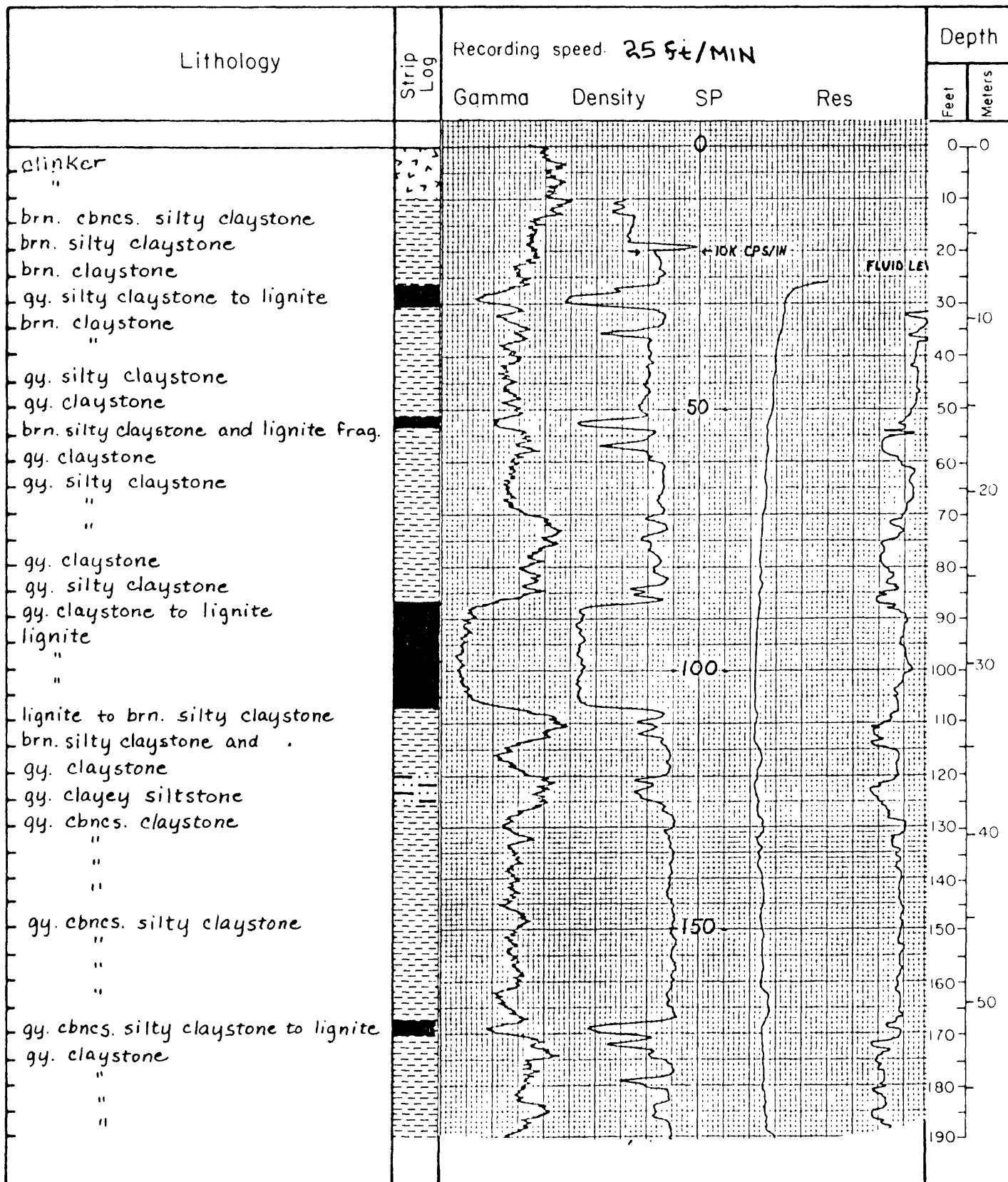


(Continued)

Hole no: WB77-102 Map _____ Date: _____ State: _____ County: _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: _____



Hole no: WB77-103 Map: SW-1 Date: 10/5/77 State: N. D. County: Golden Valley
 Elev 2670 ft Location: T 141 N, R 105 W Sec. 20, Tract NE NE Drilled depth: 600 ft
 Measured: _____, _____ Hole size: 5 7/8 in. Cored: Yes
 Remarks: Twin and core hole; 55/103, core interval 25-130 ft.
 Recorded by: J. C. Harksen



(continued)

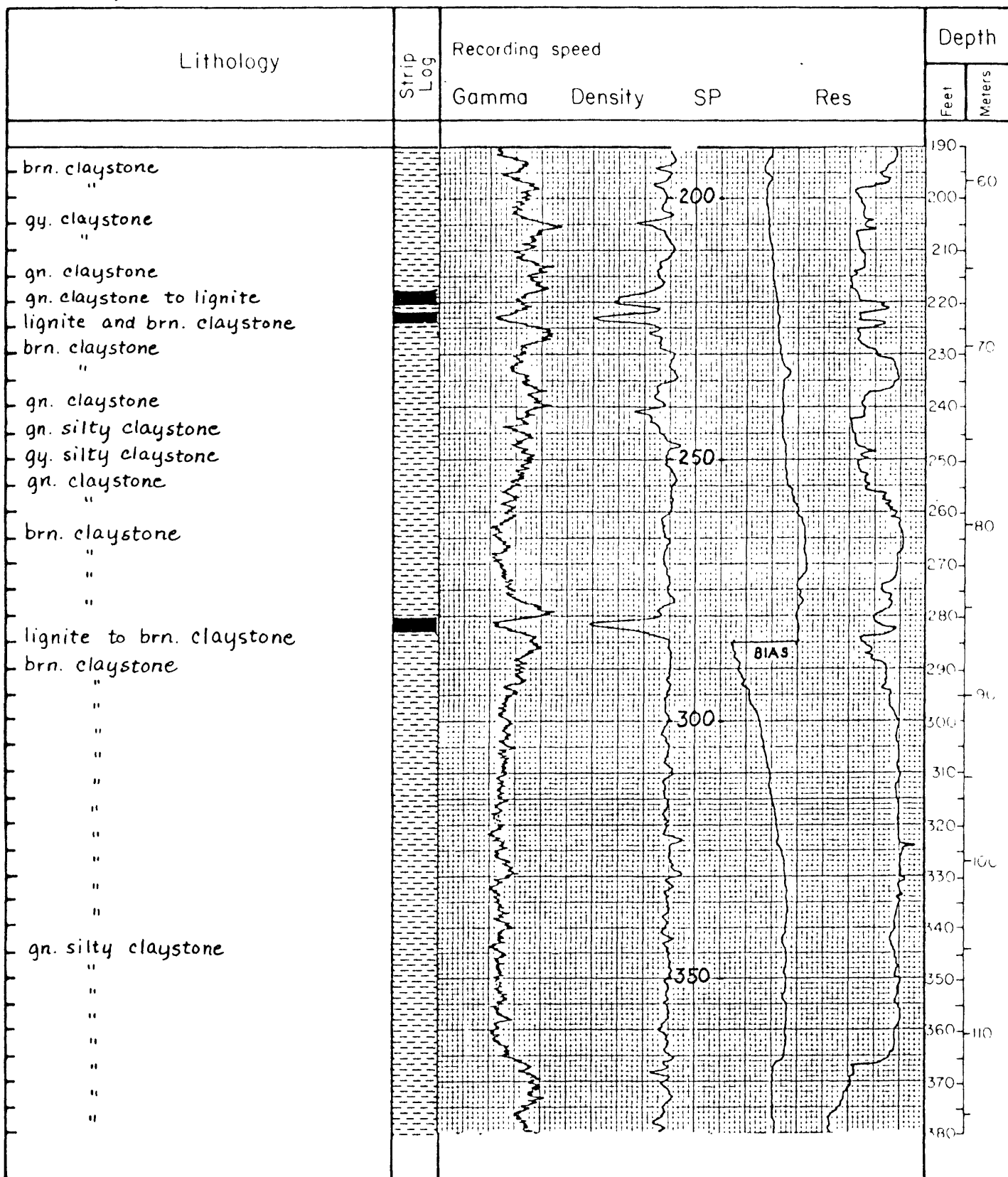
Hole no: WB77-103 Map Date State County

Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size: _____ Cored: _____

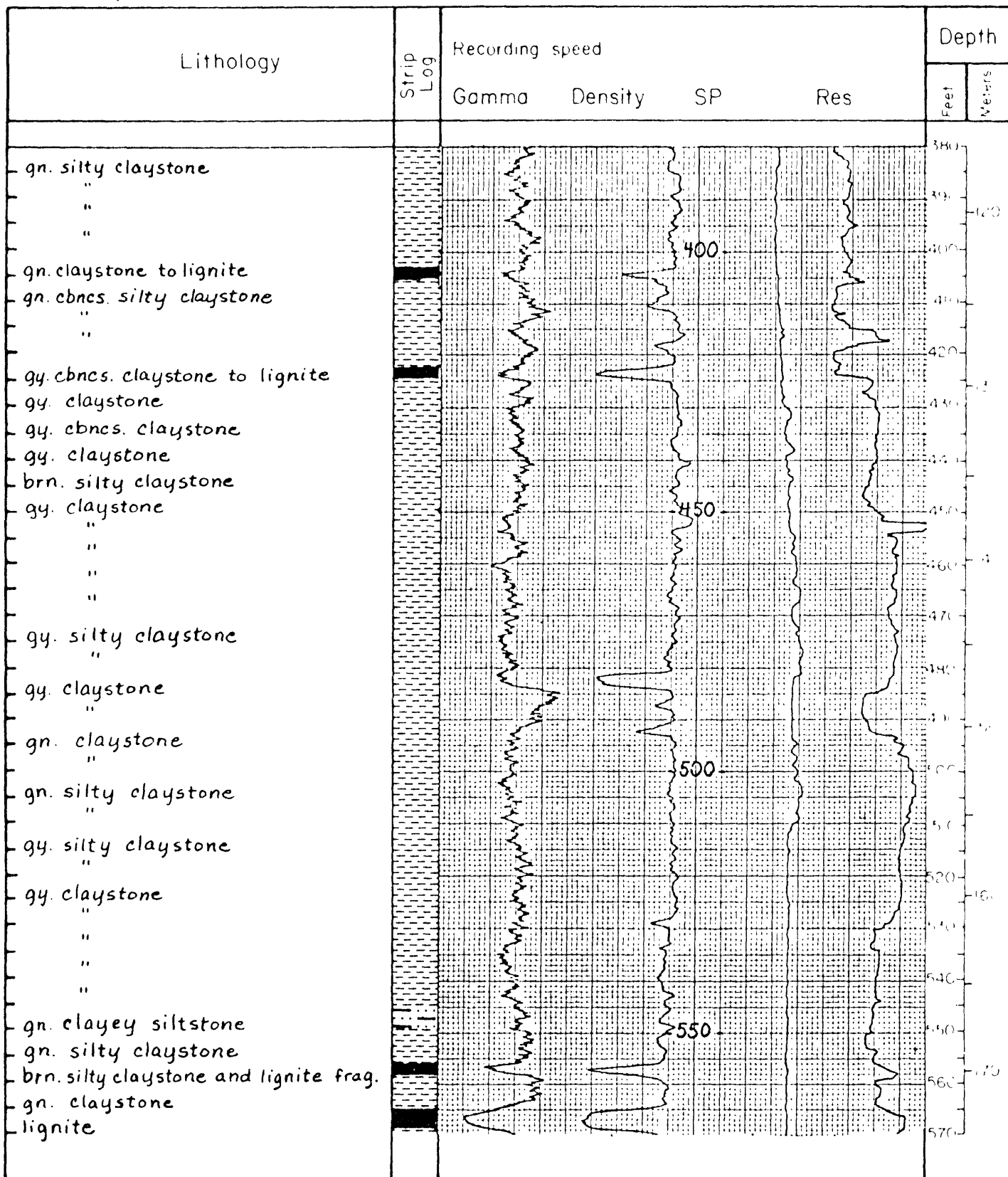
Remarks _____

Recorded by: _____



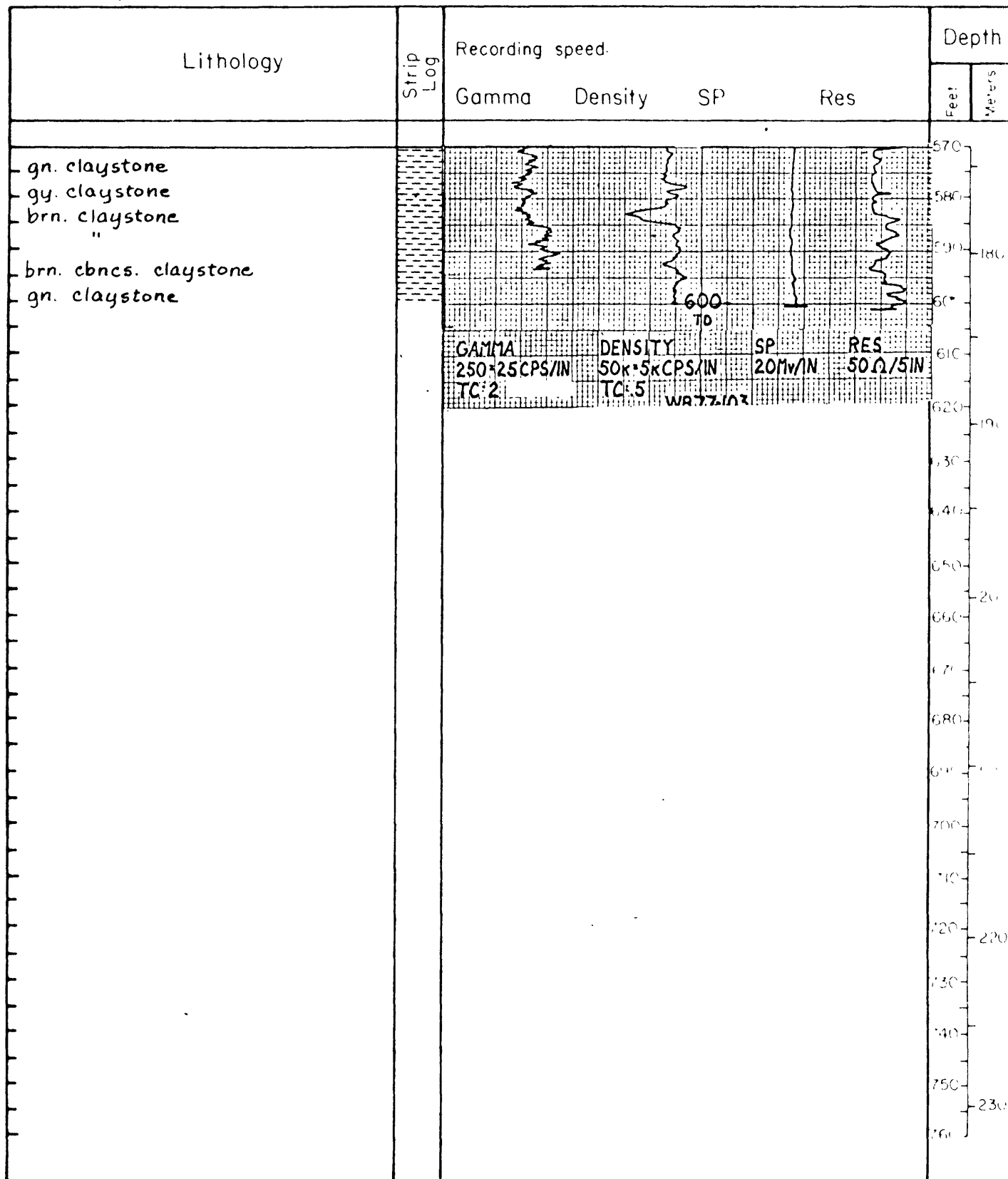
(Continued)

Hole no: WB77-103 Map _____ Date: _____ State: _____ County: _____
Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____
Measured _____, _____ Hole size _____ Cored _____
Remarks _____
Recorded by: _____



(continued)

Hole no: WB77-103 Map _____ Date _____ State _____ County _____
Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured _____, _____ Hole size _____ Cored _____
Remarks: _____
Recorded by: _____



Hole no: WB77-104 Map _____ Date: _____ State: _____ County: _____

Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

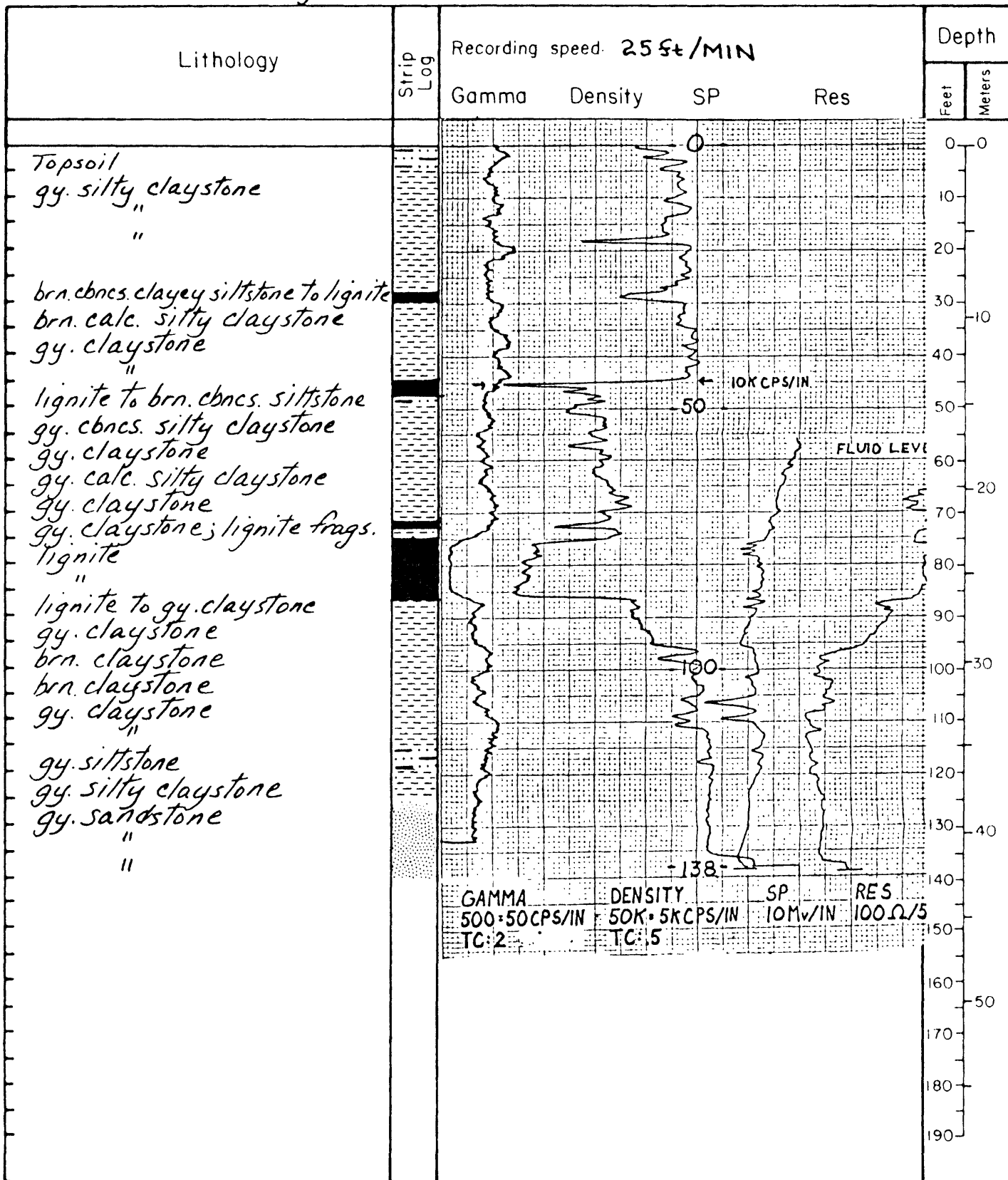
Measured: _____, _____ Hole size: _____ Cored: YES

Remarks: SEE WB77-103 for data

Recorded by: _____

Lithology	Strip Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	
						170	50
						180	
						190	

Hole no: WB77-105 Map: SW-7 Date: 9/14/77 State: N. D. County: Golden Valley
 Elev: 2930 ft Location: T138 R106 Sec. 12, Tract SW SW Drilled depth: 138 ft
 Measured: _____, _____ Hole size: 5 7/8 in. Cored: No
 Remarks: _____
 Recorded by: Mike L. Menge



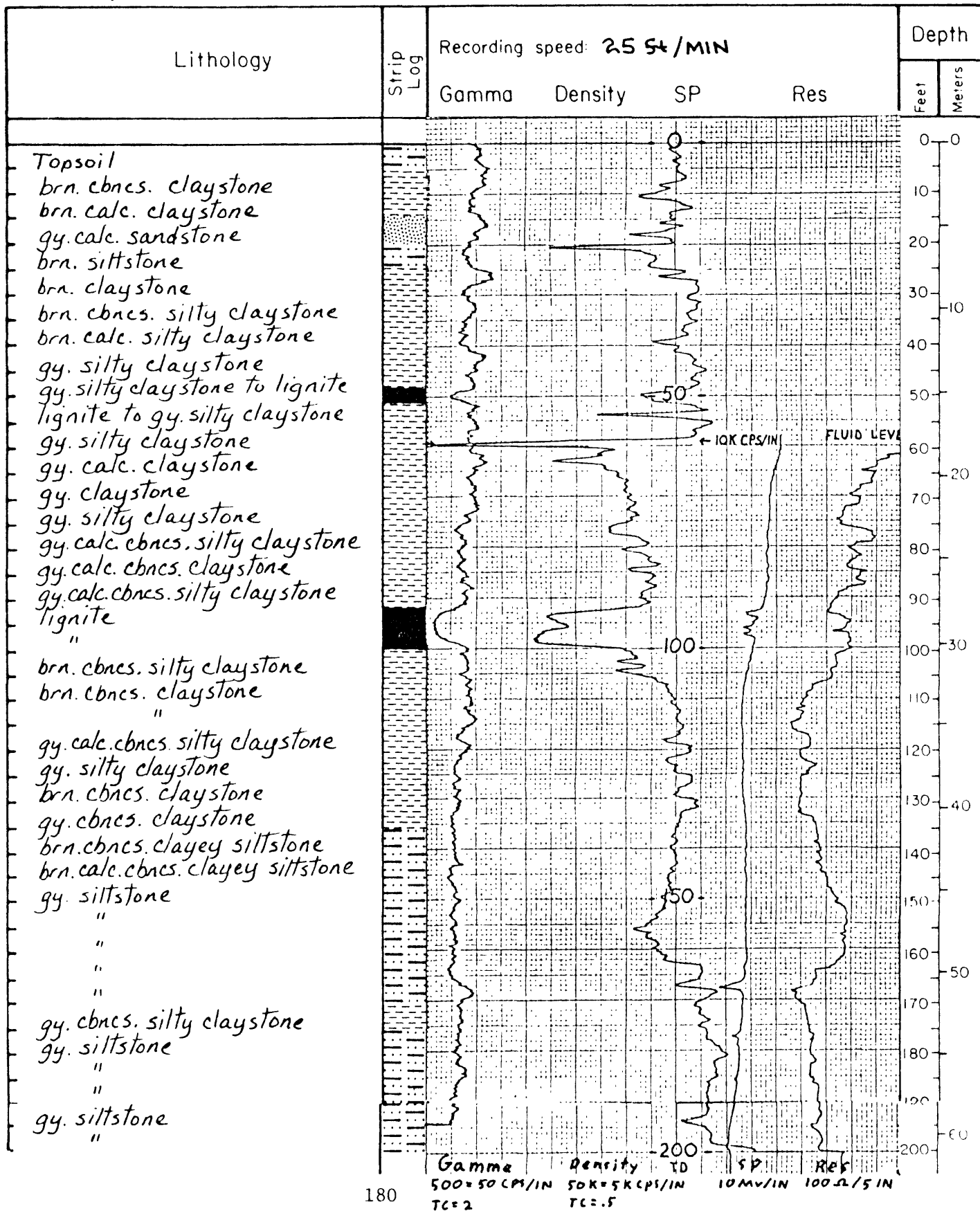
Hole no: WB77-106 Map: SW-7 Date: 9/14/77 State: N. D. County: Golden Valley

Elev: 2920 ft Location: T138N R106W Sec: 12, Tract SE SE Drilled depth: 200 ft

Measured: _____, _____ Hole size: 5 7/8 in. Cored No

Remarks: _____

Recorded by: J. C. Harksen



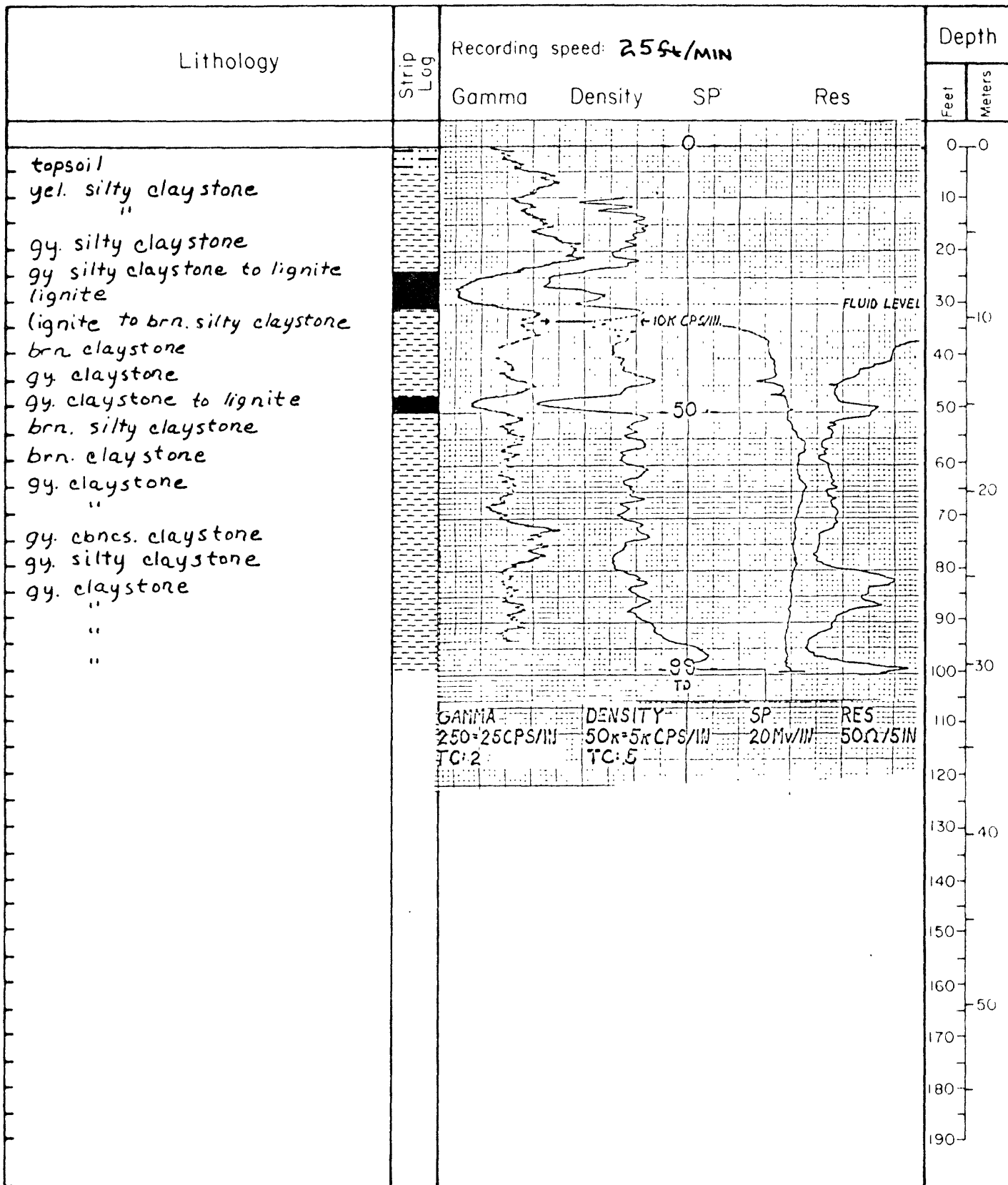
Hole no: WB77-107 Map _____ Date _____ State _____ County _____
 Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored YES
 Remarks see WB77-54 for data
 Recorded by: _____

Lithology	Strip log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	
						170	50
						180	
						190	

Hole no: WB77-108 Map: _____ Date: _____ State: _____ County: _____
 Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size: _____ Cored _____
 Remarks: Not drilled
 Recorded by: _____

Lithology	Strip Log	Recording speed:				Depth	
		Gamma	Density	SP	Res	Feet	Meters
						0	0
						10	
						20	
						30	10
						40	
						50	
						60	
						70	20
						80	
						90	
						100	30
						110	
						120	
						130	40
						140	
						150	
						160	50
						170	
						180	
						190	

Hole no: WB77-109 Map NE-40 Date 10/4/71 m. nt. Wibaux County
 Elev 2730 ft Location T.15N., R.60E. Sec 20, Tract SW Drilled depth: 99ft
 Measured 550ft FWL, 2625ft FNL Hole size 5 1/8 in. Cored Yes
 Remarks Twin and core hole; 63/109, core intervals 18ft-32ft, 45ft-51ft.
 Recorded by: J. C. Marksen



Hole no: WB77-111 Map NE-40 Date 10/2/66 Mont. County: Wibaux
 Elev 2675 ft Location: T 15 N, R 60 E Sec. 4, Tract SW 5 Drilled depth: 149 ft
 Measured: 550 ft FWL, 520 ft FSL Hole size: 5 1/8 in. Cored: No

Remarks: _____

Recorded by: J. C. Harksen

