

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Geophysical and Lithologic Logs for 1977 Drilling in
McLean and Ward Counties, North Dakota

By

Michael L. Menge

Open-File Report 78-538

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
McLEAN AND WARD COUNTIES, NORTH DAKOTA

By Michael L. Menge

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 McLean and Ward Counties area (G77-1 to G77-61) of west-central North Dakota. Map locations shown at the top of each log correspond to Bureau of Land Management Surface-Minerals Management Quads of 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 western North Dakota and eastern Montana.

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.

Michael L. Menge supervised the project, assisted by Charles R. Frey, Susan M. Cook, and Gary L. Berg.

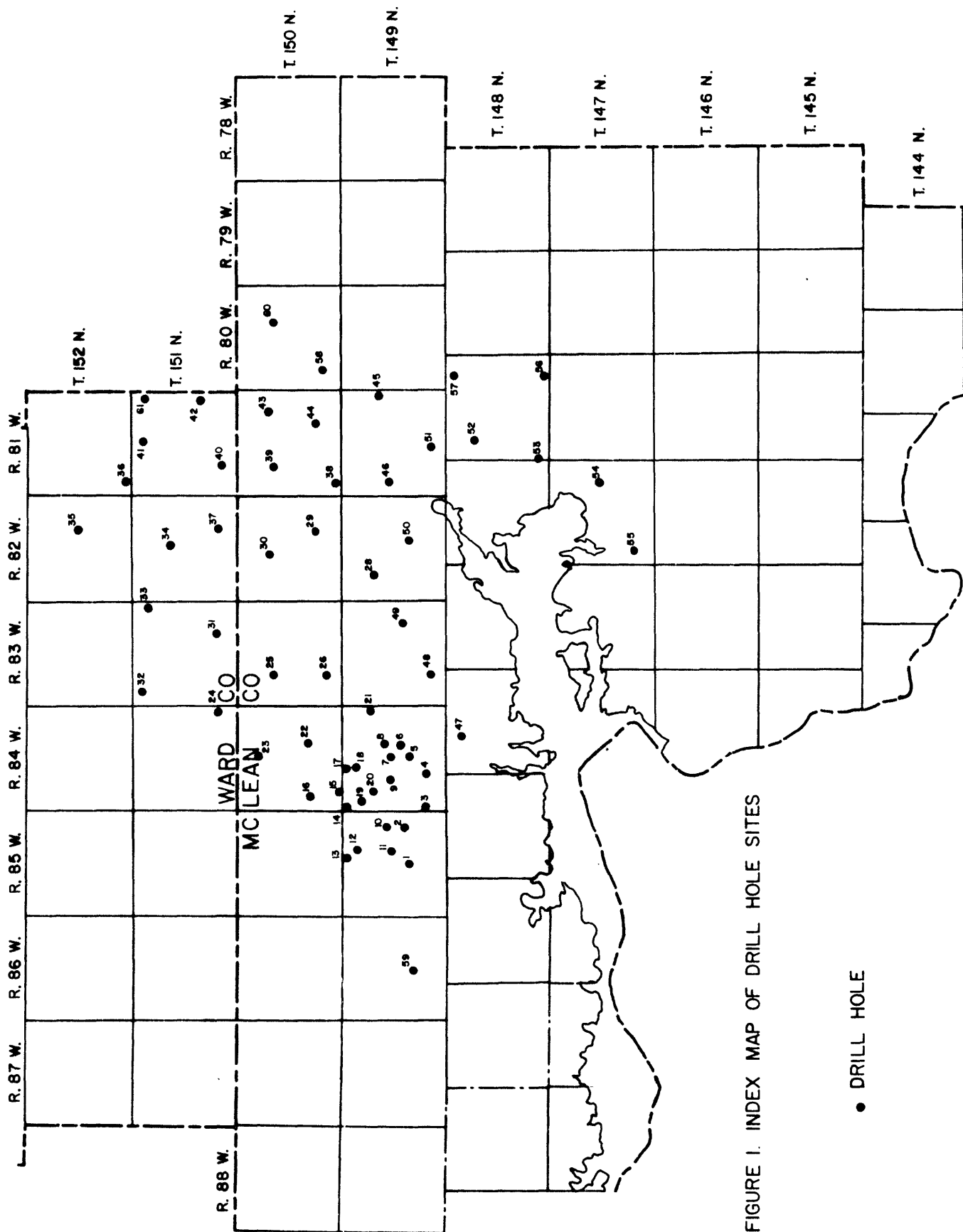
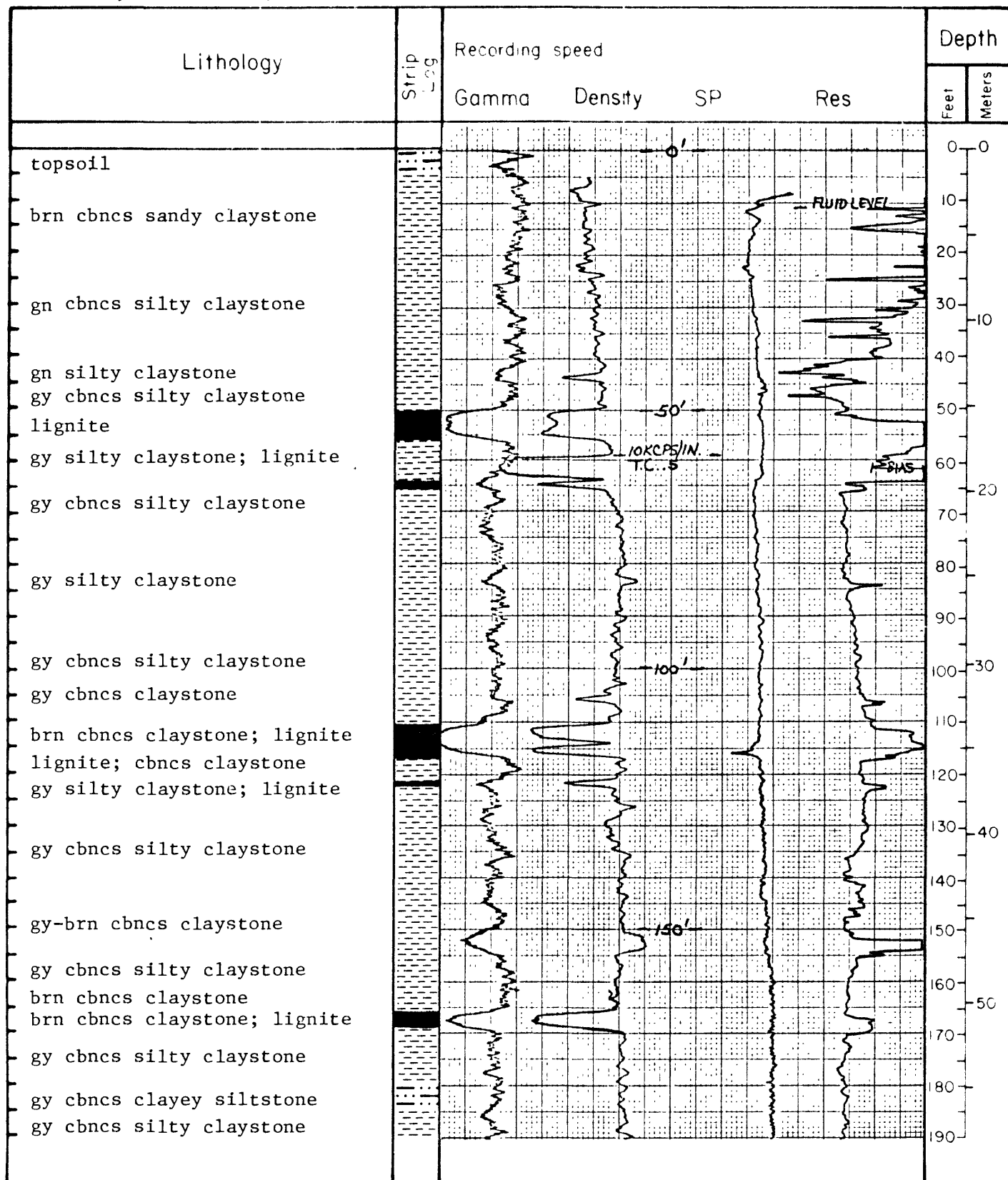


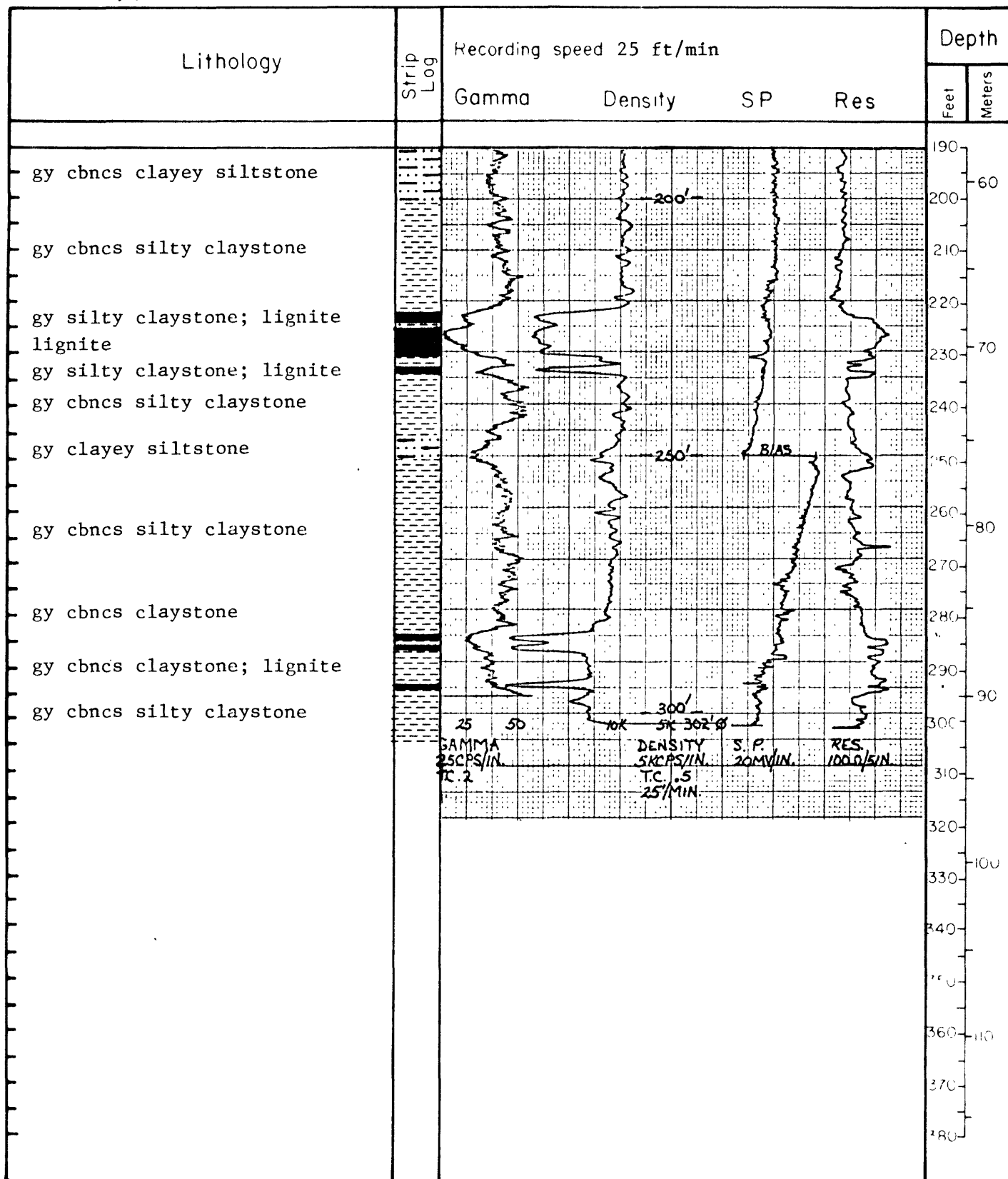
FIGURE 1. INDEX MAP OF DRILL HOLE SITES

• DRILL HOLE

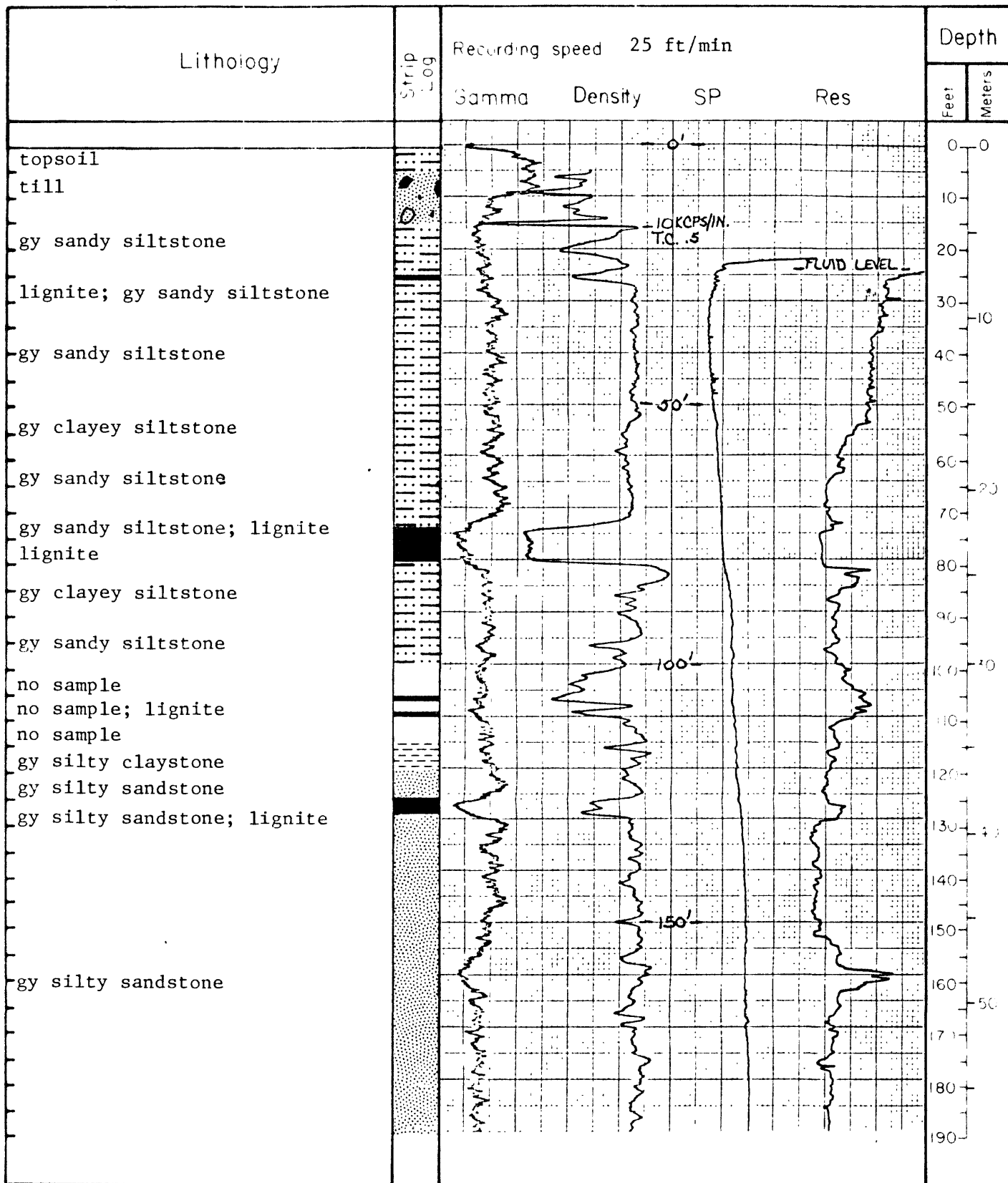
Hole no: G77-1 Map NW-22 Date 11-30-77 State N.D. County McLean
 Elev. 1986 ft Location T.149N., R.85W. Sec 21, Tract SE SE Drilled depth: 302 ft
 Measured: 60 ft FSL, 10 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



(continued)
Hole no: G77-1 Map _____ Date: _____ State _____ County _____
Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
Measured _____, _____ Hole size _____ Cored _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



Hole no: G77-2 Map NW-22 Date 11-30-77 State N.D. County: McLean
 Elev 1978 ft Location T.149N., R.85W. Sec 24, Tract SW NW Drilled depth: 281 ft
 Measured: 2160 ft FNL, 56 ft FWL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



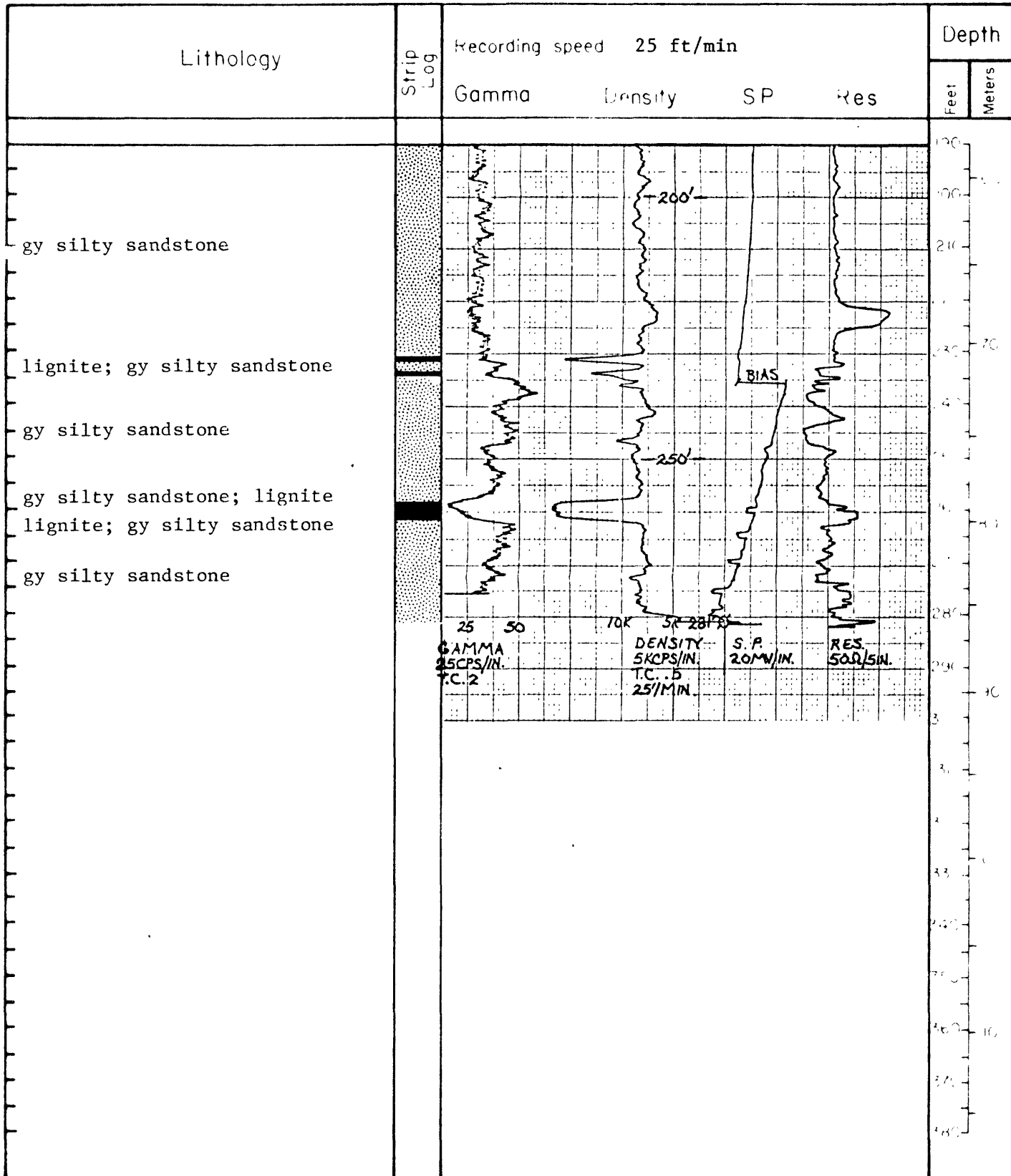
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Hole no. G77-2 Map _____ Date: _____ State _____ County _____

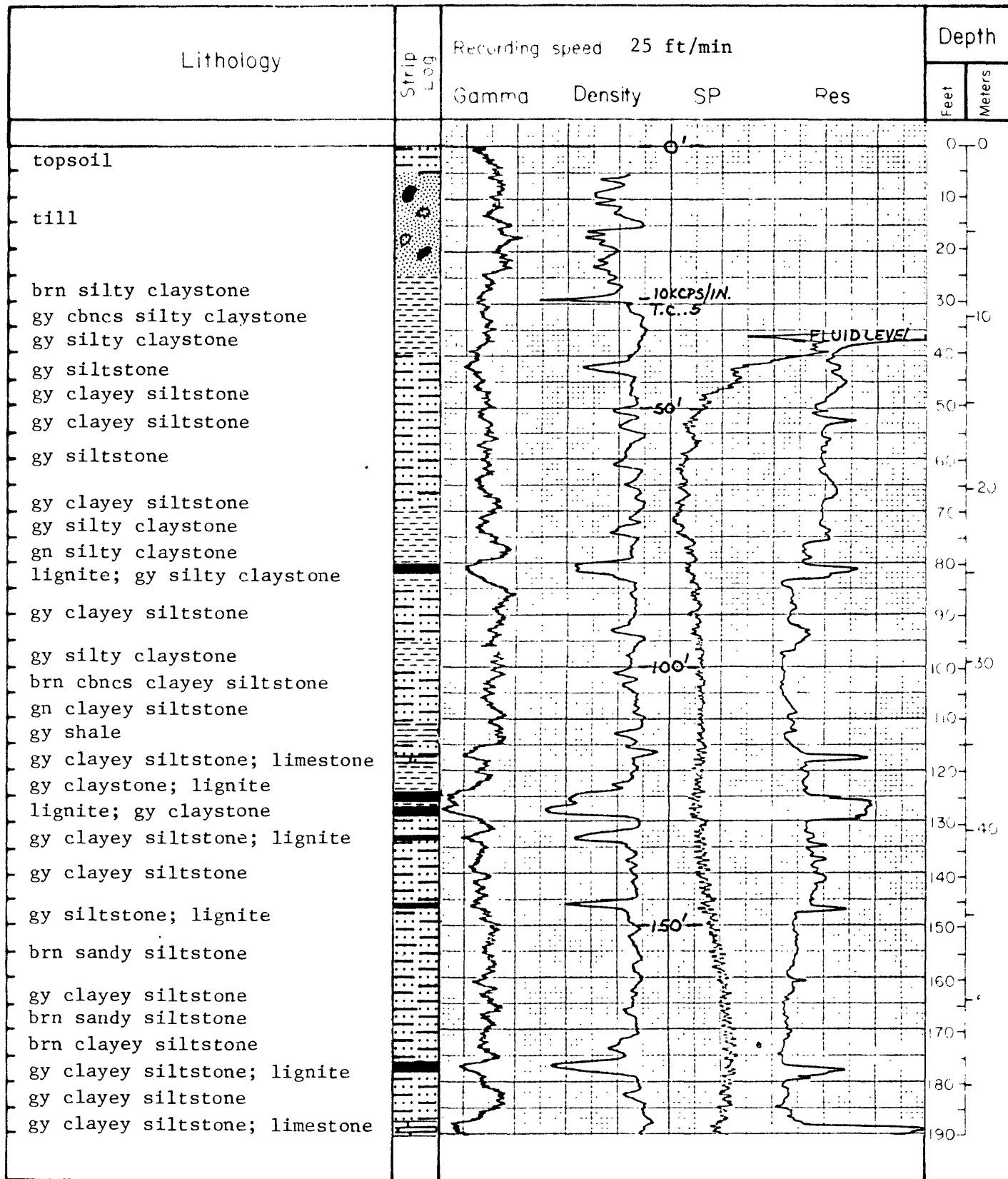
Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

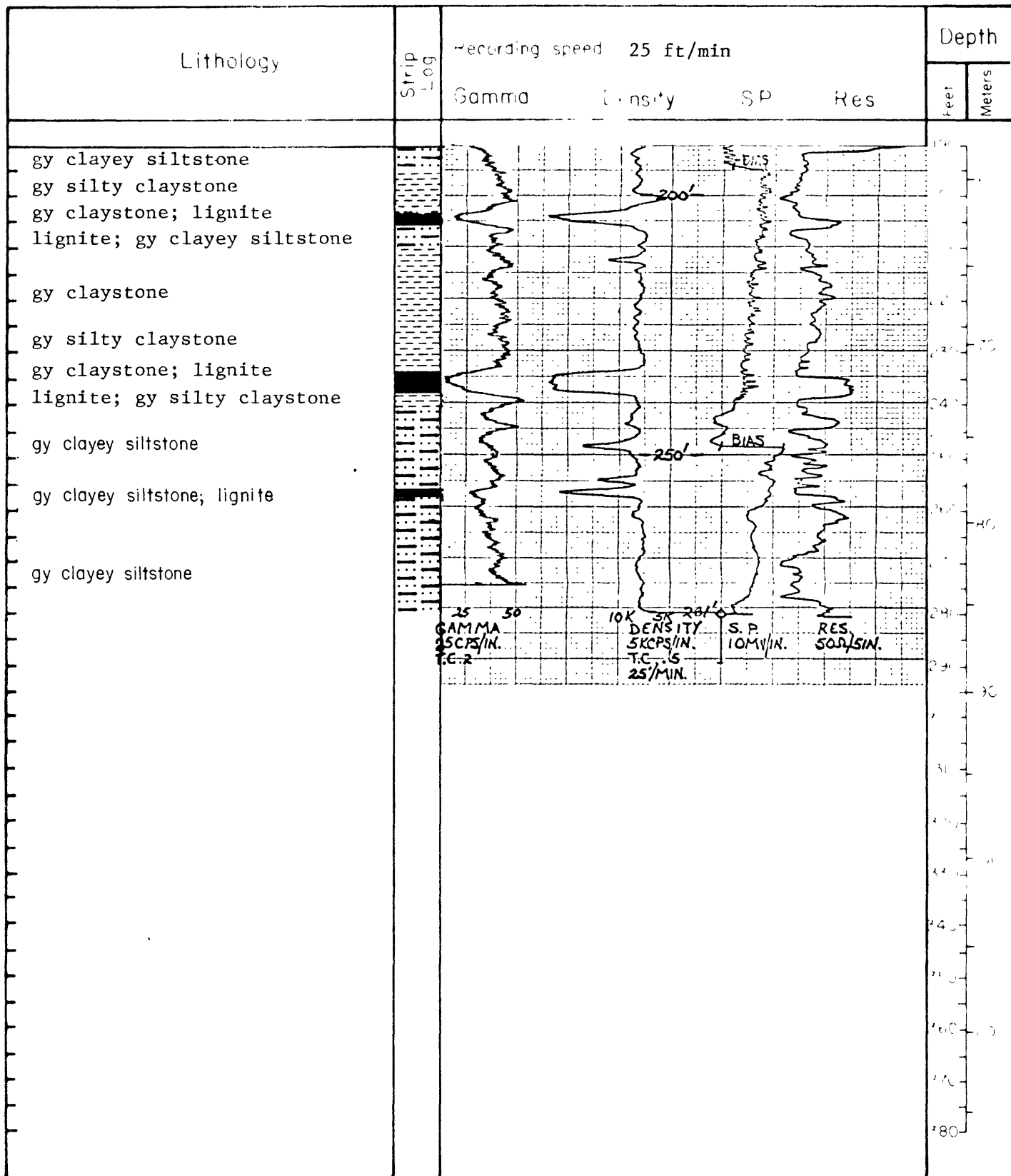
Remarks _____

Recorded by Mike Menge (Geologist)

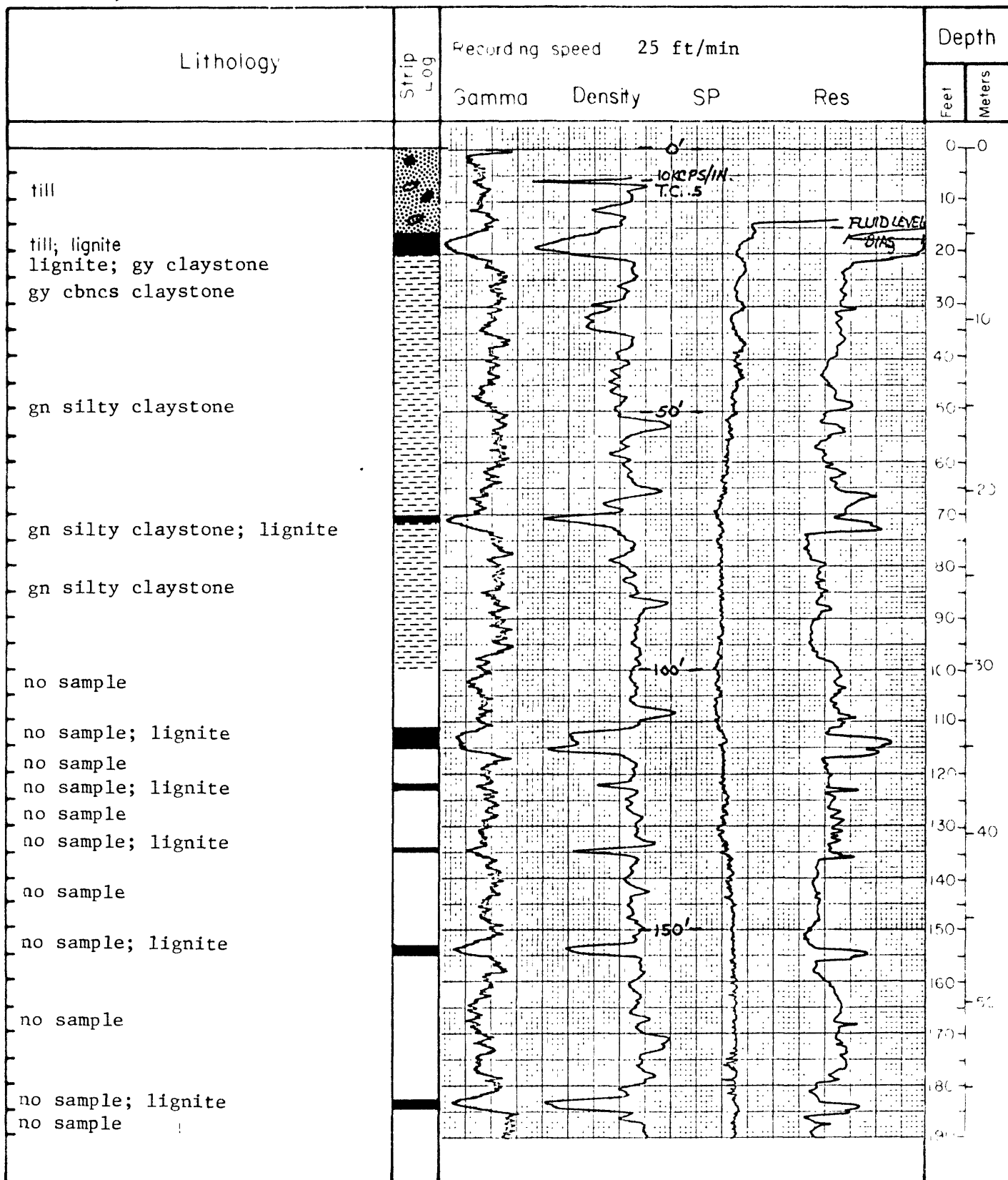
Hole no. G77-3 Map NW-22 Date 12-11-7 State N.D. County McLean
 Elev 1968 ft Location T.149N., R.84W. Sec 30, Tract lot 4 Drilled depth: 281 ft
 Measured 310 ft FSL, 10 ft FWL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geol. gist)



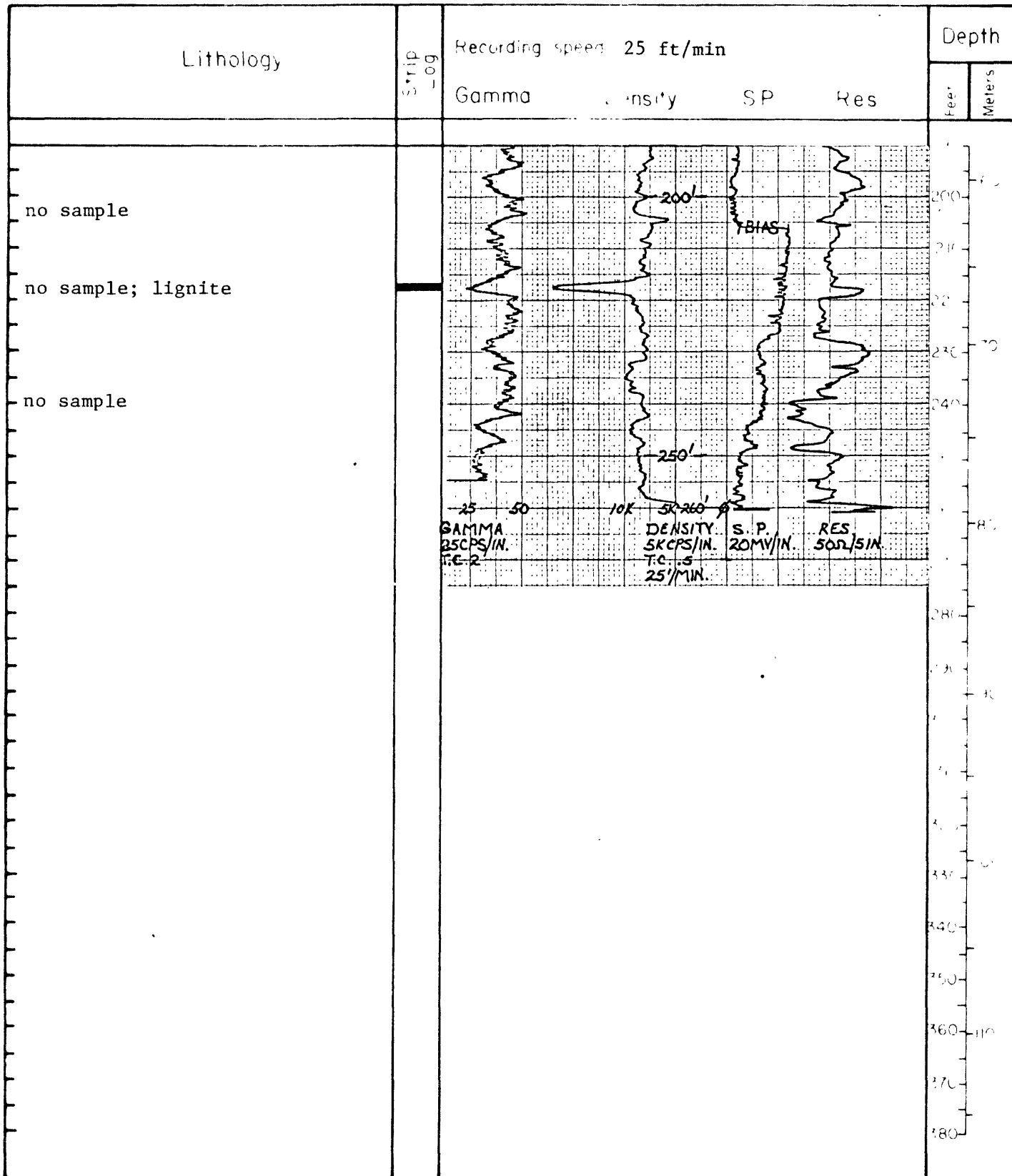
Hole no: G77-3 (continued) Map _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks _____
 Recorded by Mike Menge (Geologist)



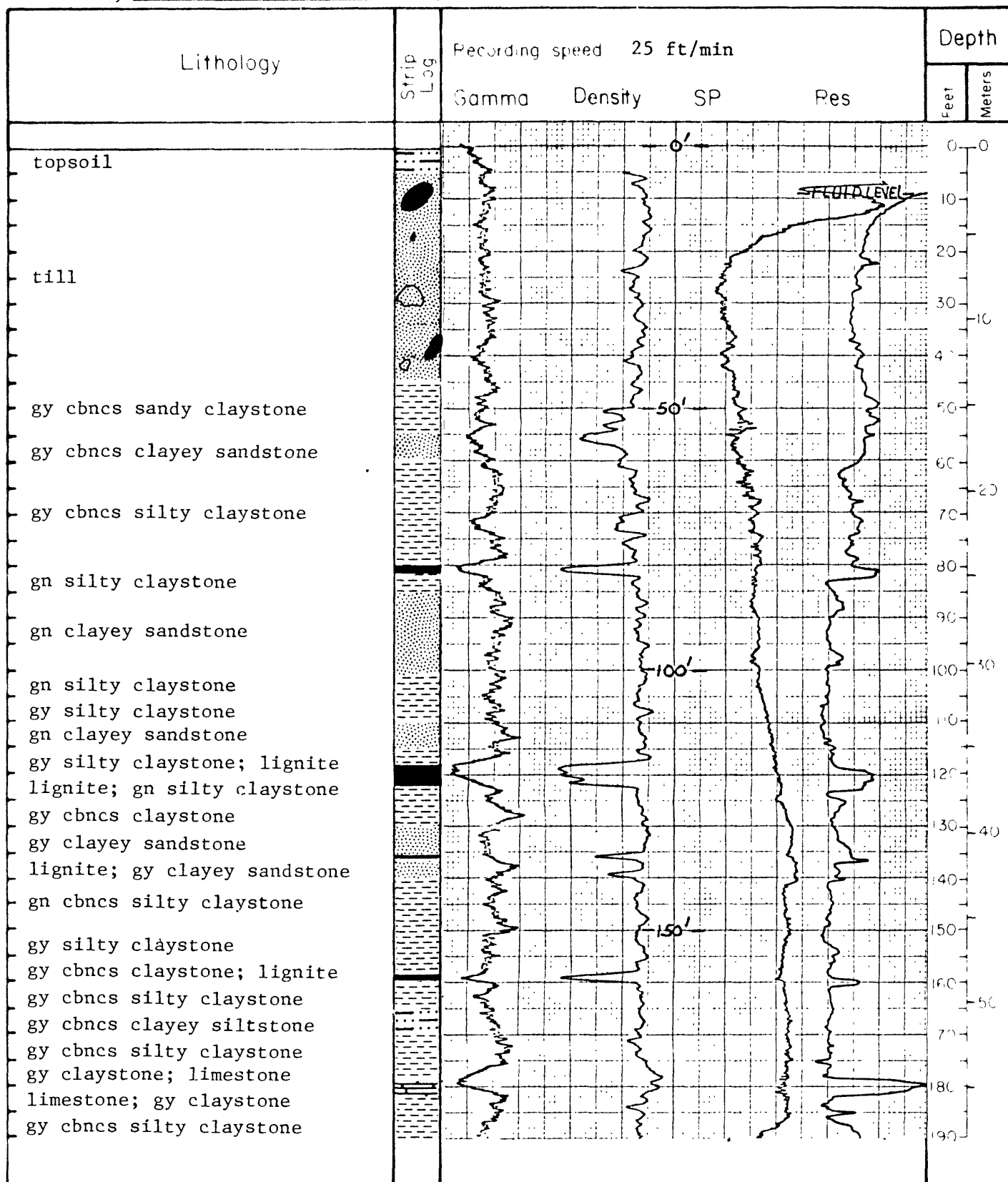
Hole no: G77-4 Map NW-22 Date 12-3-77 State N.D. County McLean
 Elev 1962 ft Location T.149N., R.84W. Sec 28, Tract SW SW Drilled depth 260 ft
 Measured 88 ft FSL, 212 ft FWL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



Hole no: G77-4 (continued) Map _____ Date _____ Site _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



Hole no: G77-5 Map NW-22 Date 12-2-77 State N.D. County McLean
 Elev 2008 ft Location T.149N., R.84W. Sec 22 Tract SW SW Drilled depth: 301 ft
 Measured 44 ft FSL, 538 ft FWL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



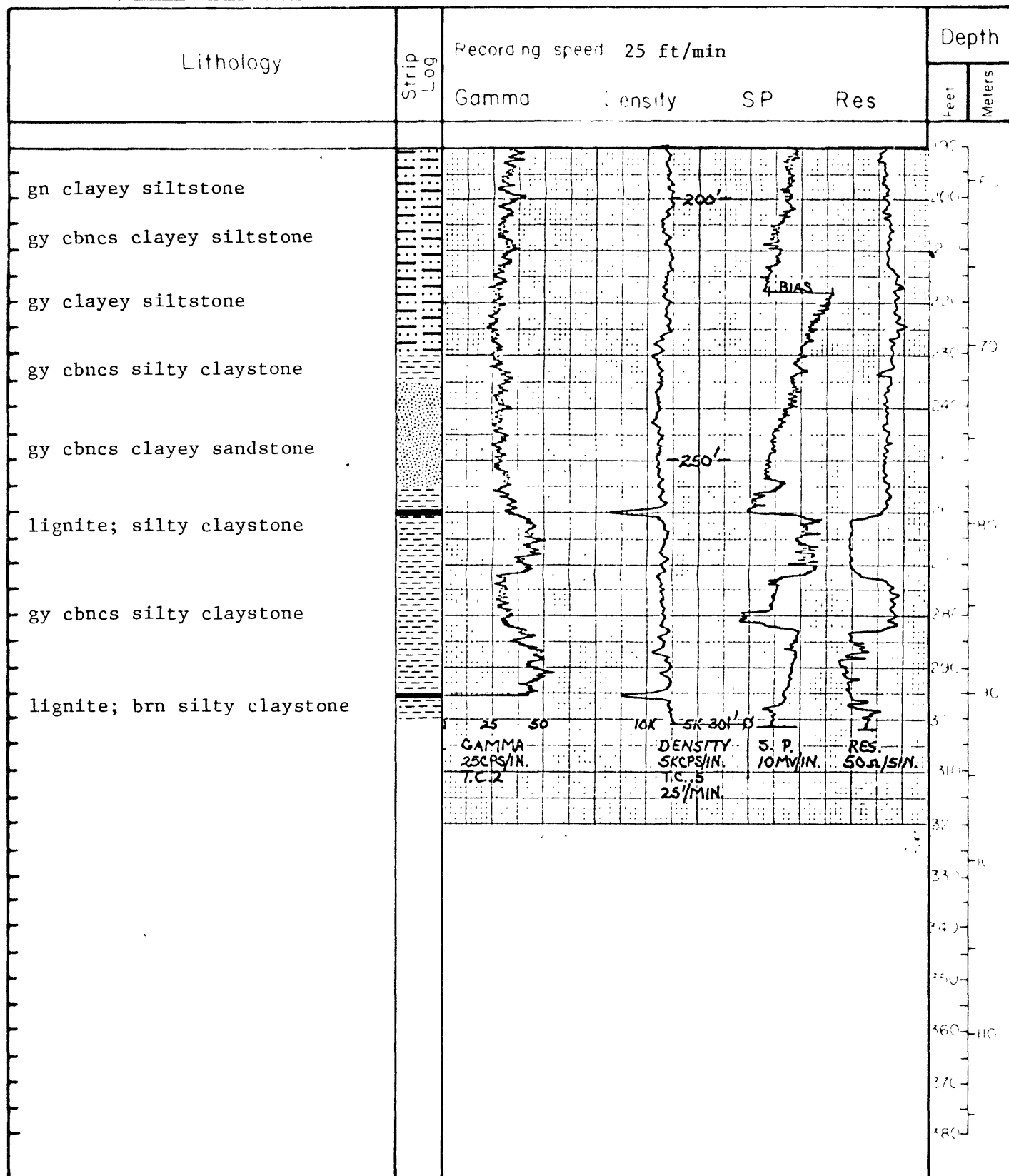
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Hole no. G77-5 Map _____ Date _____ State _____ County _____

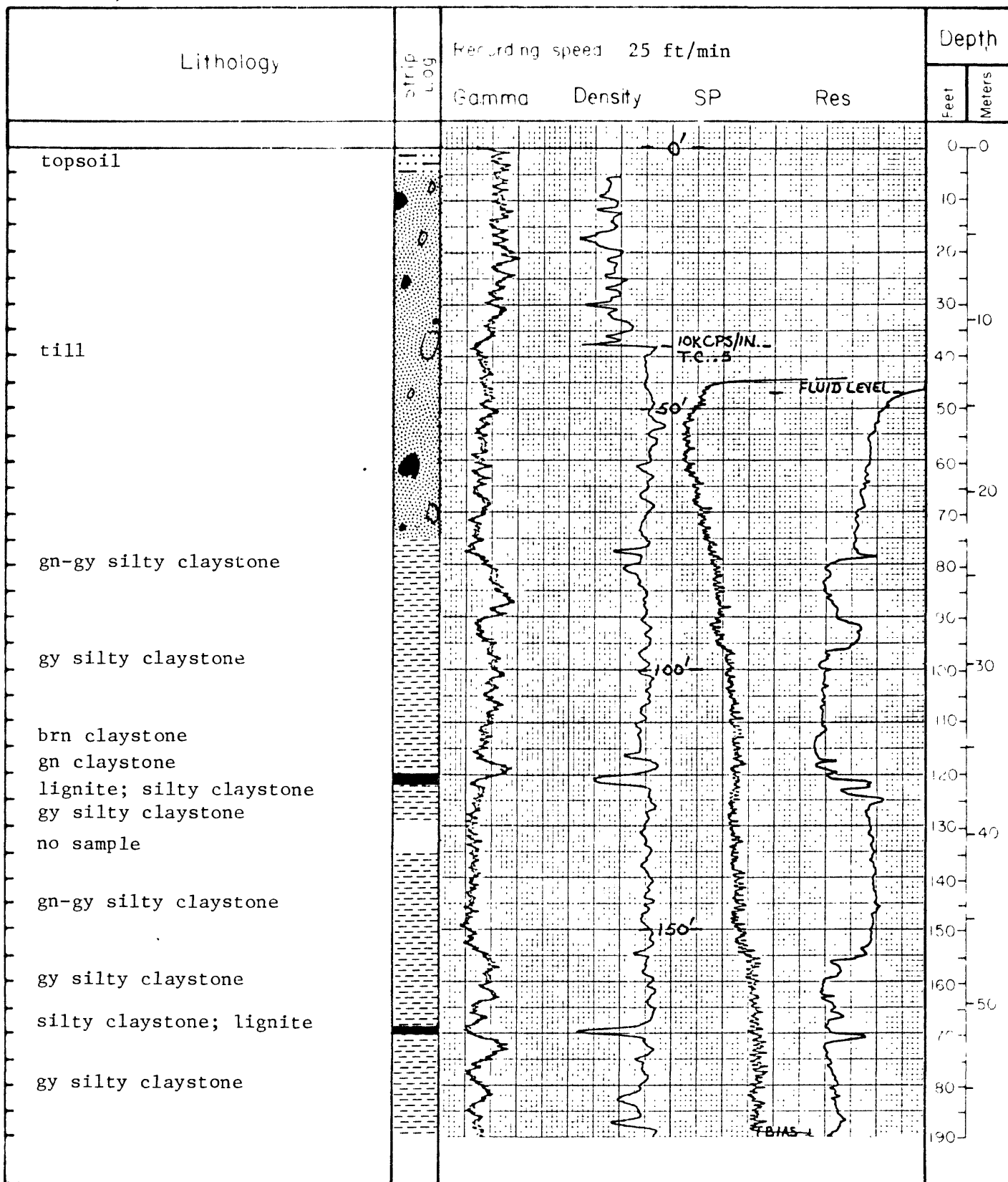
Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____

Measured _____, _____ Hole size _____ Cored _____

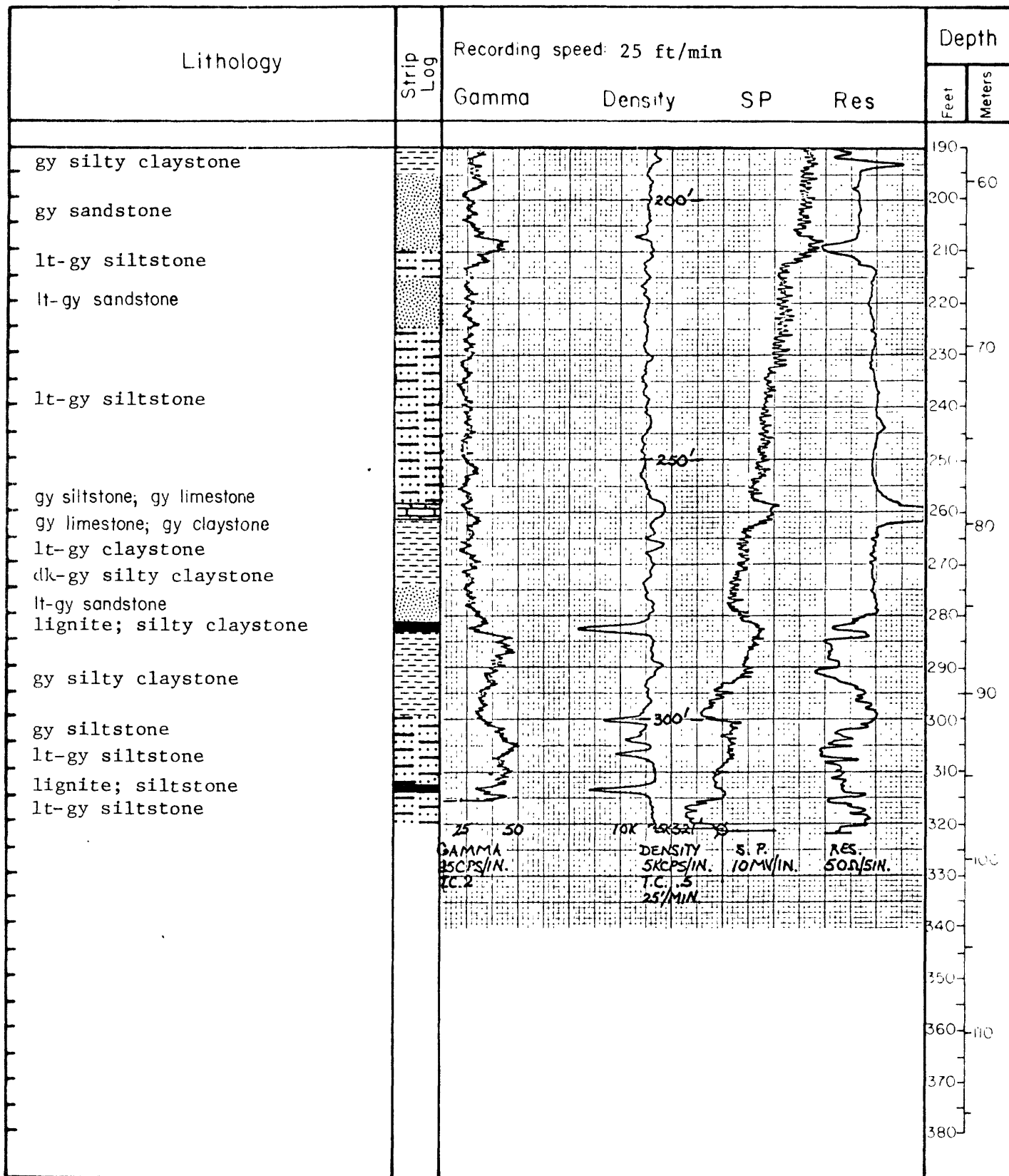
Remarks _____

Recorded by Mike Merga (Geologist)

Hole no. G77-6 Map NW-22 Date 12-12-77 State N.D. County McLean
 Elev 2026 ft Location T.149N., R.84W. Sec 22, Tract SE NE Drilled depth: 321 ft
 Measured 2455 ft FNL, 35 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by Mike Menge (Geologist)



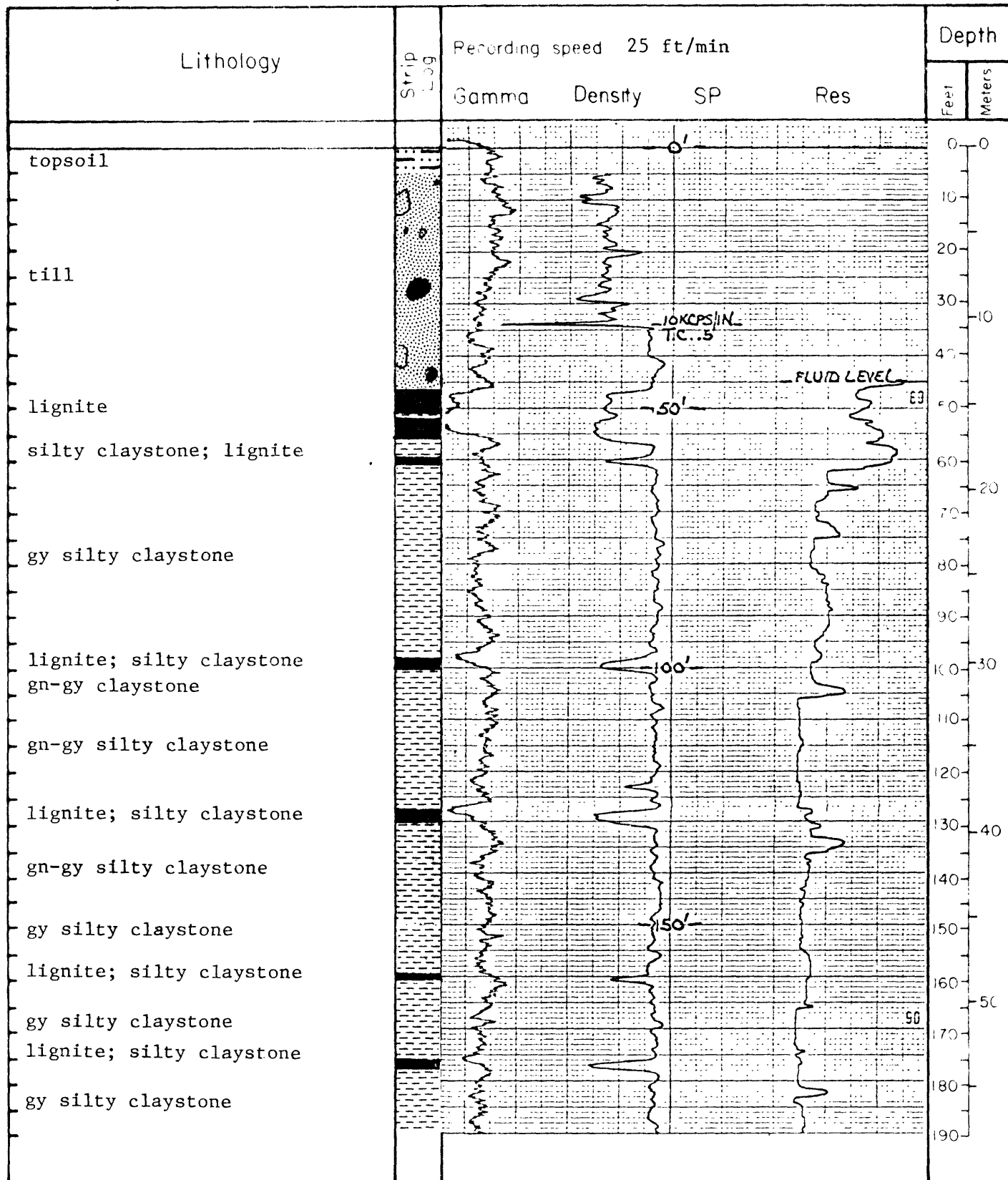
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Hole no: G77-6 Map _____ Date: _____ State: _____ County: _____
Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured _____, _____ Hole size _____ Cored _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



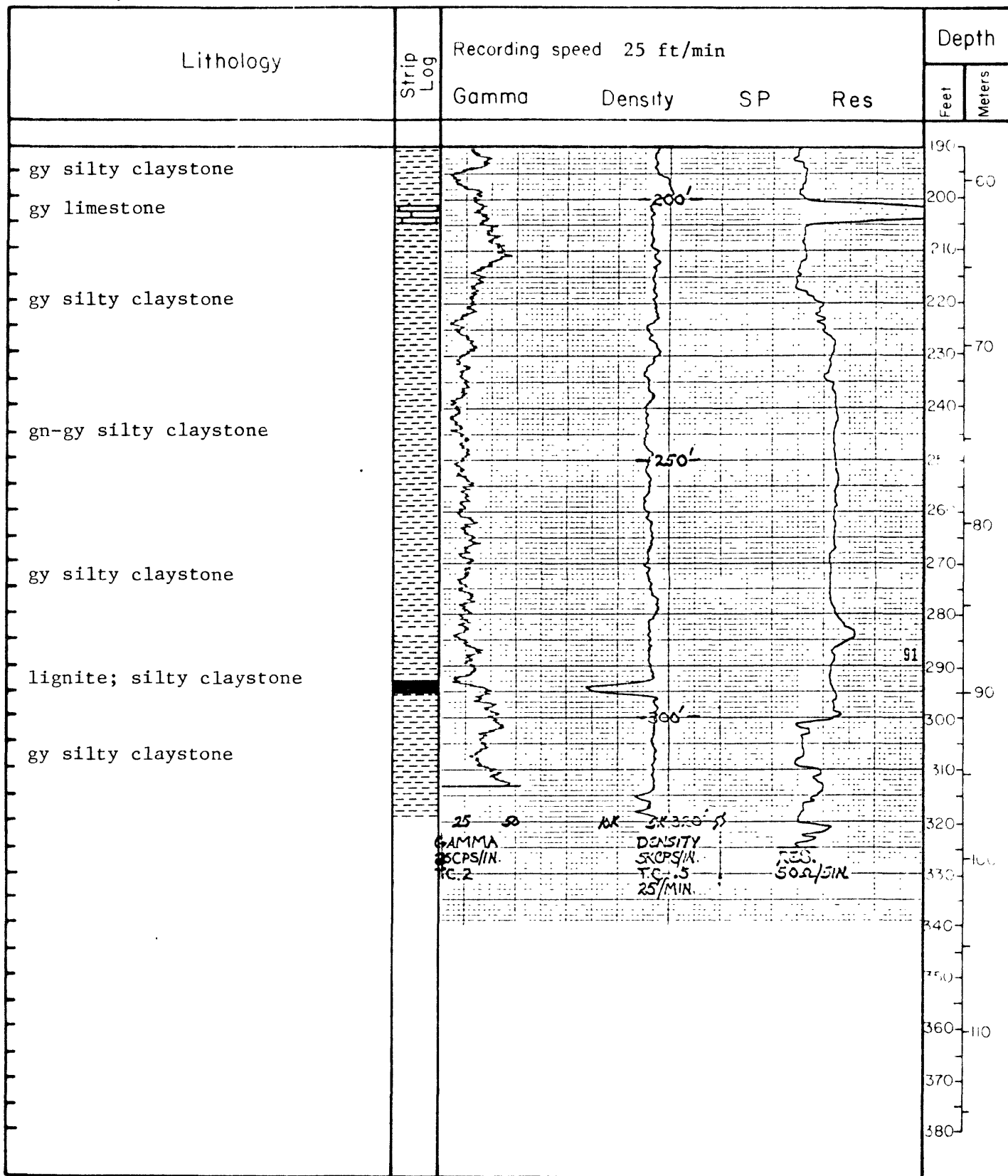
Hole no. G77-7 Map NW-16 Date 12-4-77 State N.D. County McLean
 Elev 2024 ft Location T.149N., R.84W. Sec 15, Tract SW SW Drilled depth: 320 ft
 Measured 8 ft FSL, 93 ft FWL Hole size 5 1/8 in. Cored no

Remarks _____

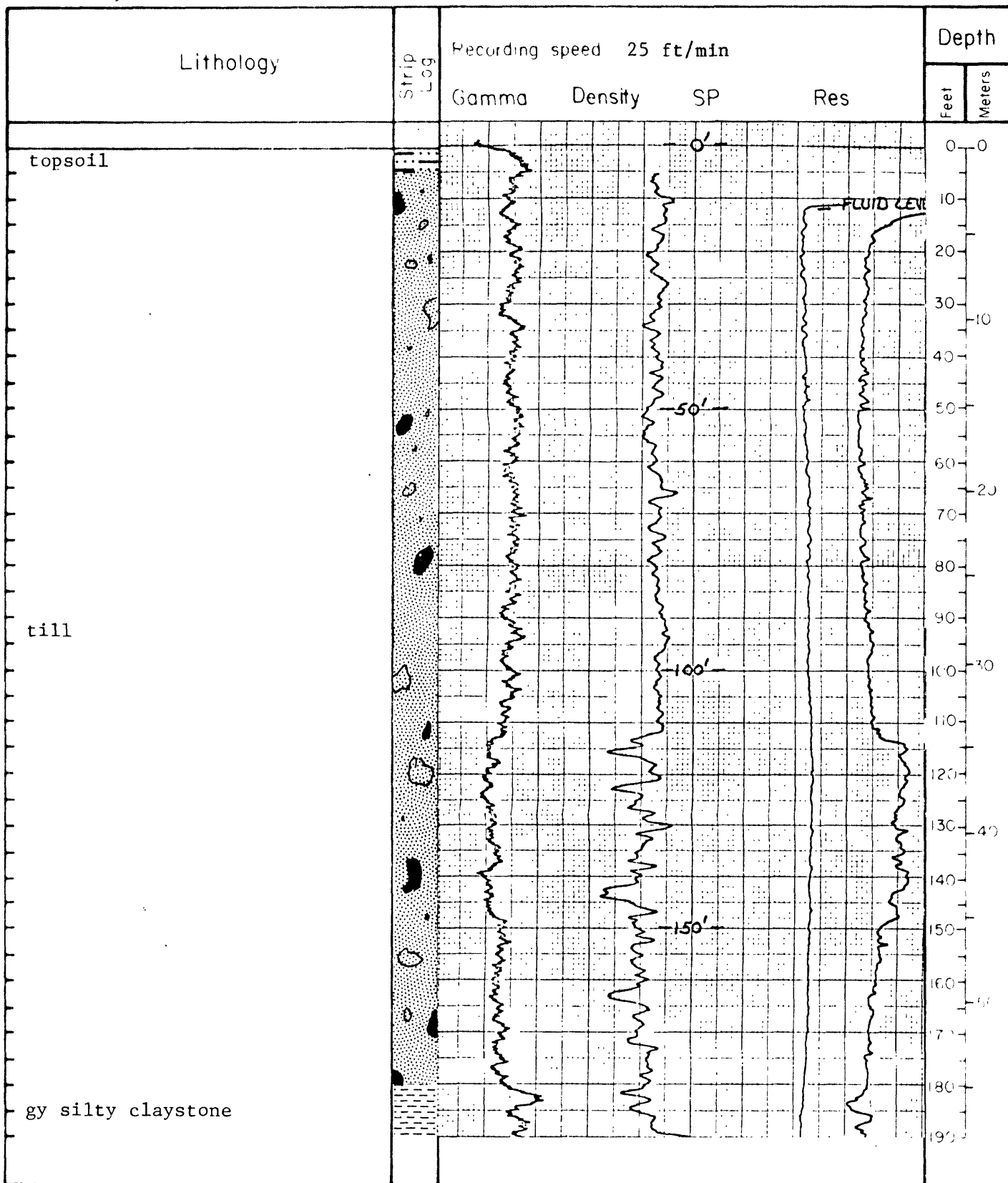
Recorded by Mike Menge (Geologist)



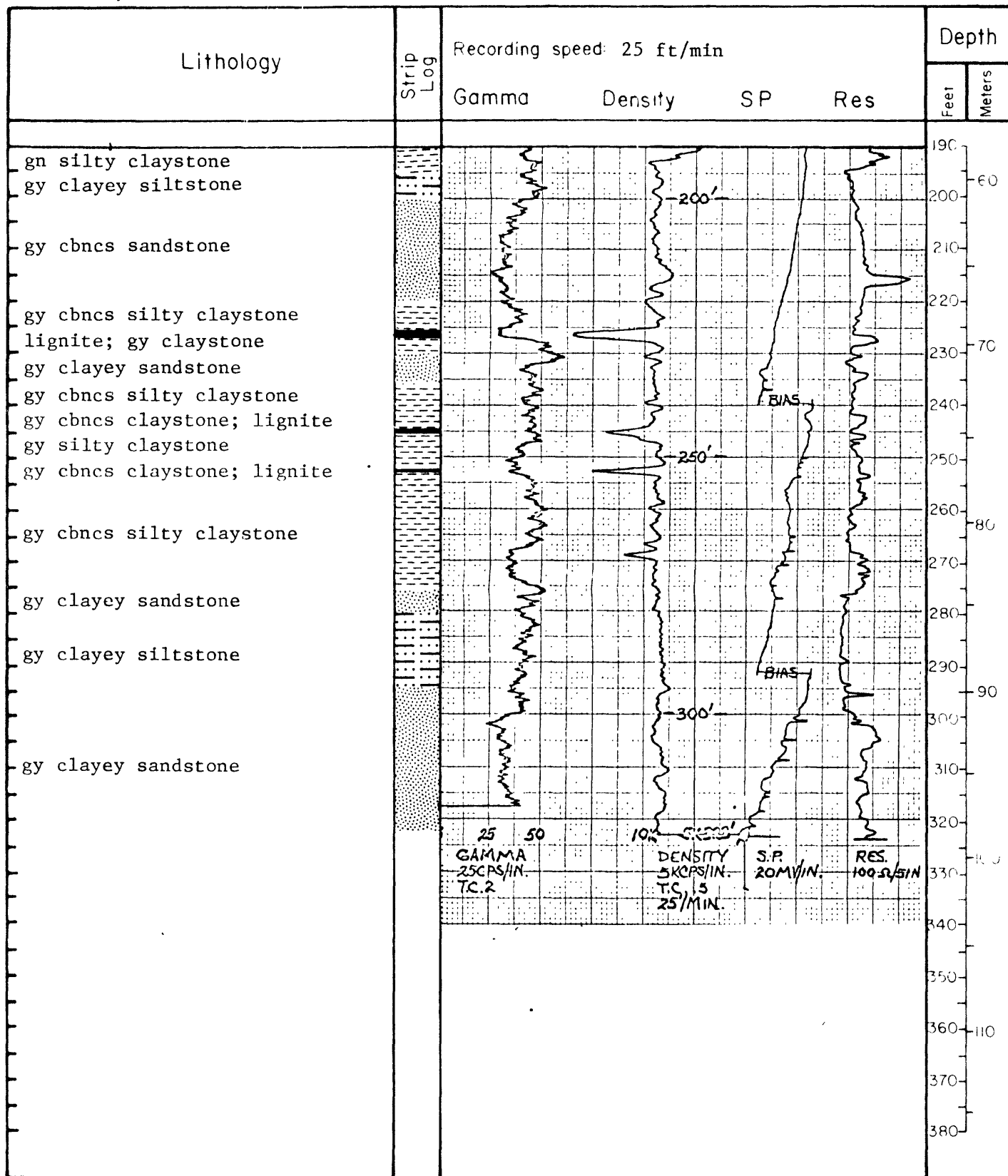
Hole no: G77-7 (continued) Map _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



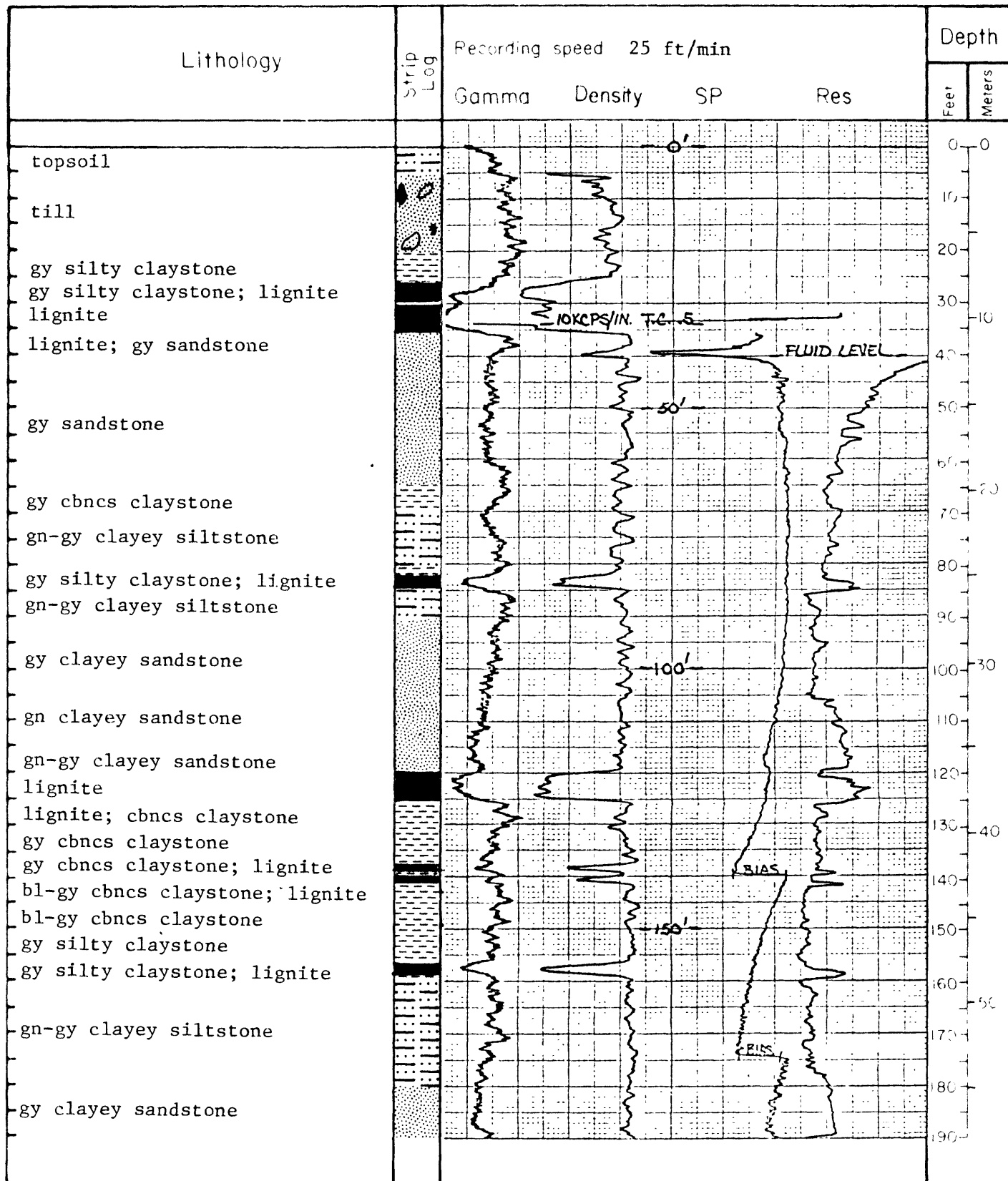
Hole no: G77-8 Map NW-16 Date 12-3-77 State N.D. County McLean
 Elev 1994 ft Location T.149N., R.84W. Sec. 15, Tract NE SE Drilled depth: 323 ft
 Measured 2605 ft FSL, 68 ft FEL Hole size 5 1/8 in. Cored no
 Remarks .
 Recorded by: Mike Menge (Geologist)



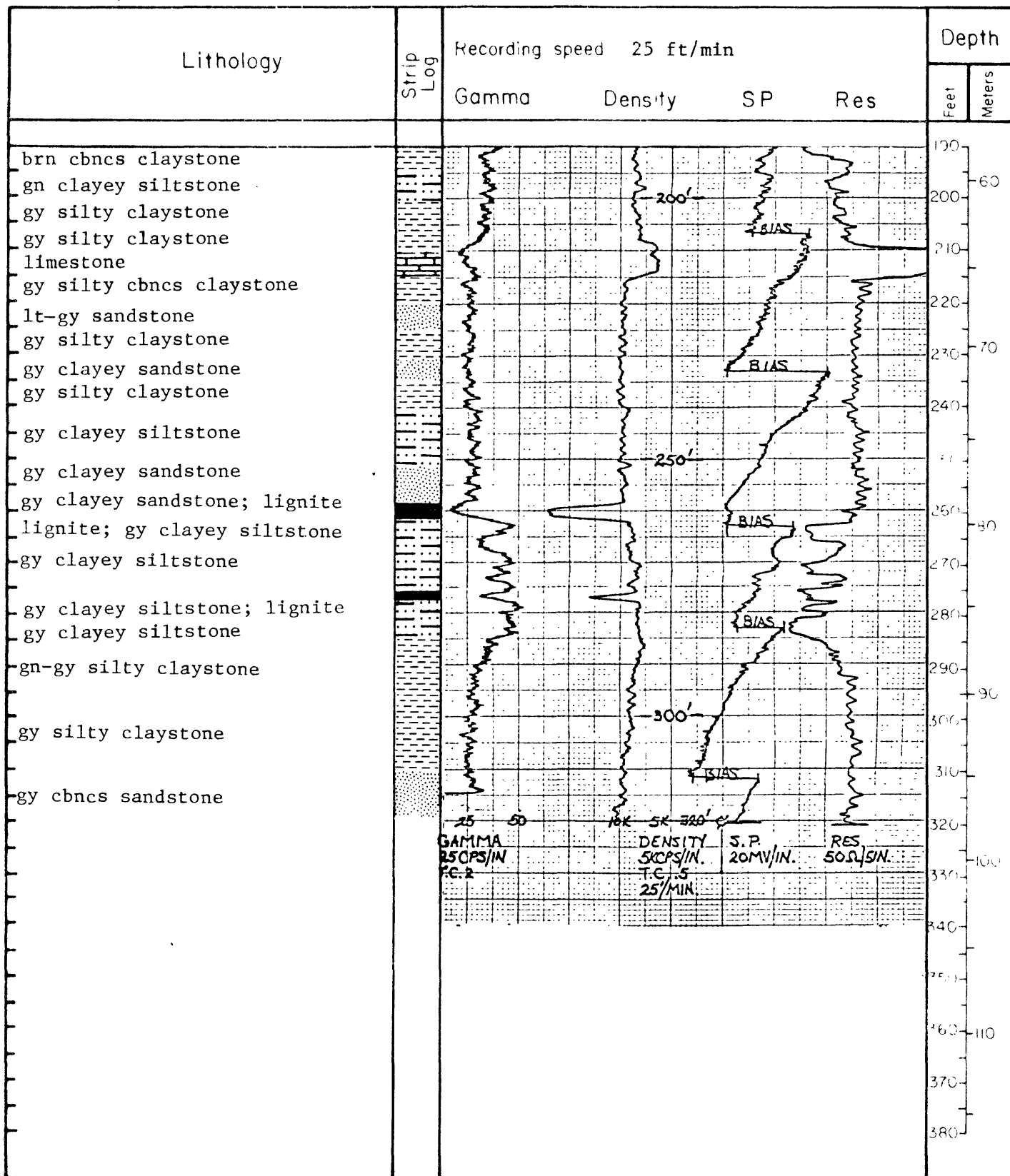
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Hole no: G77-8 Map _____ Date _____ State _____ County _____
Elev. _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size: _____ Cored: _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



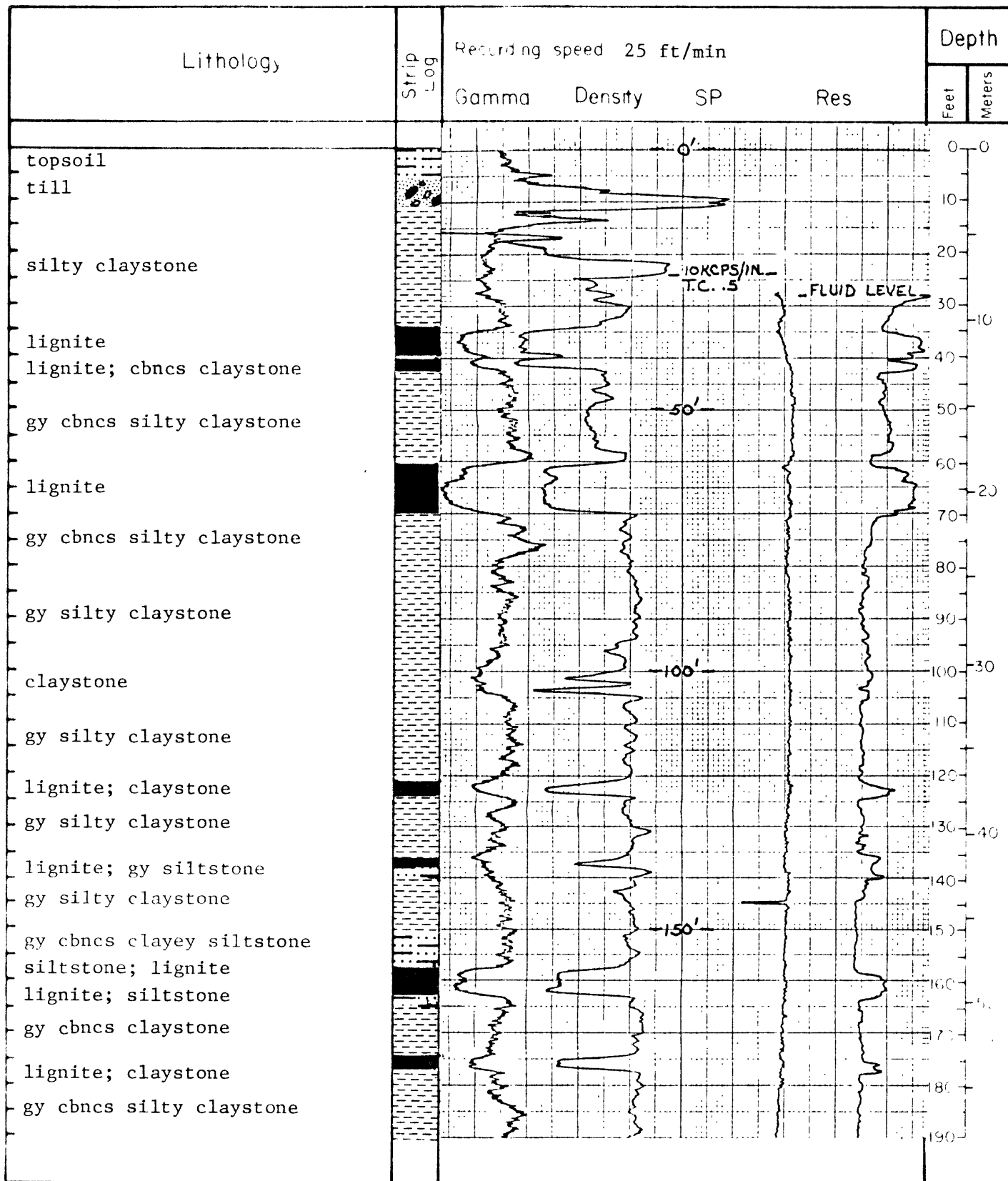
Hole no: G77-9 Map NW-16 Date 12-2-77 State N.D. County McLean
 Elev 2018 ft Location T.149N., R.84W. Sec 17, Tract SE SE Drilled depth: 320 ft
 Measured 26 ft FSL, 62 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



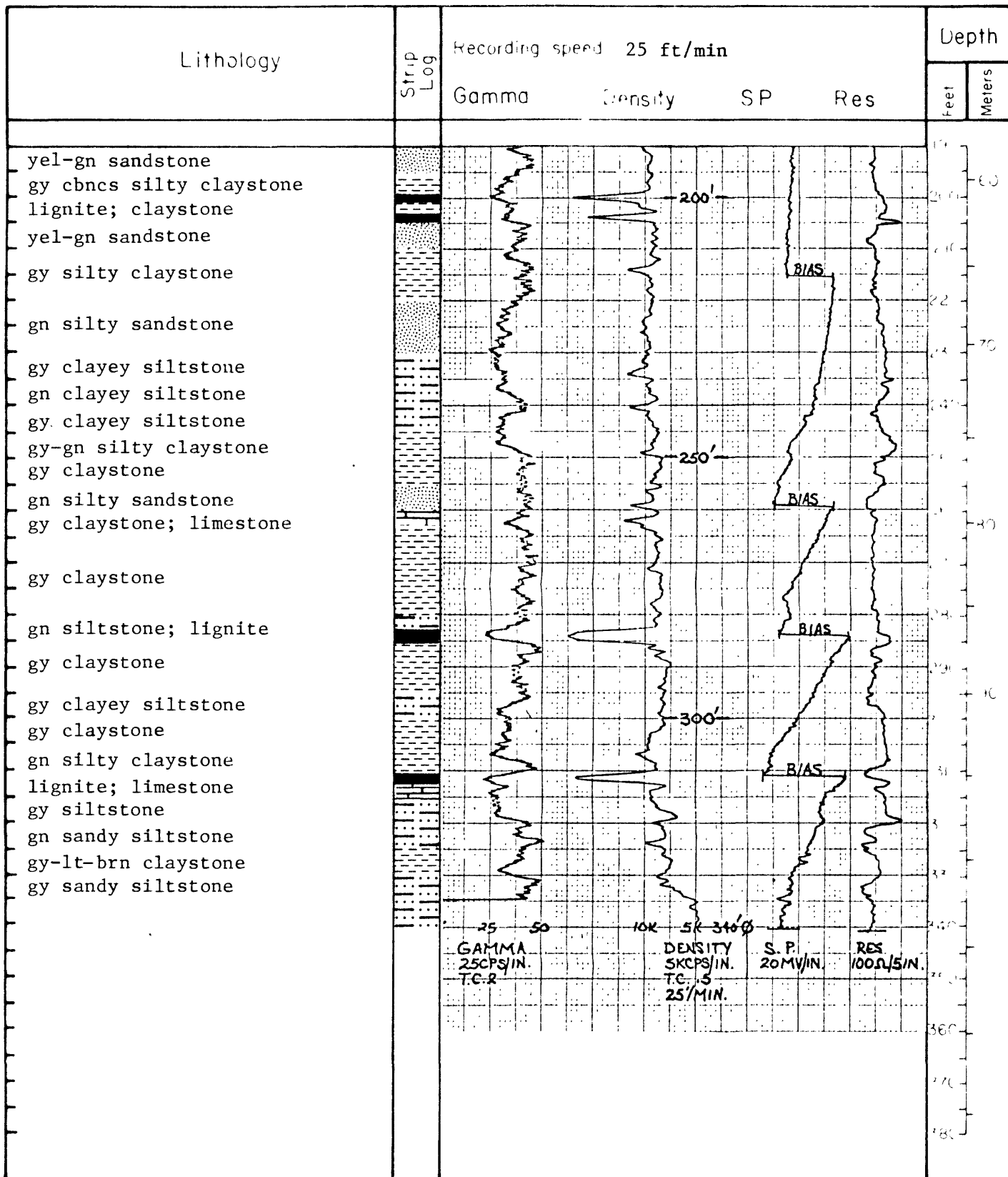
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Hole no: G77-9 Map _____ Date: _____ State: _____ County: _____
Elev _____ Location _____ Sec. _____, Tract _____ Drilled depth: _____
Measured _____, _____ Hole size _____ Cored _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



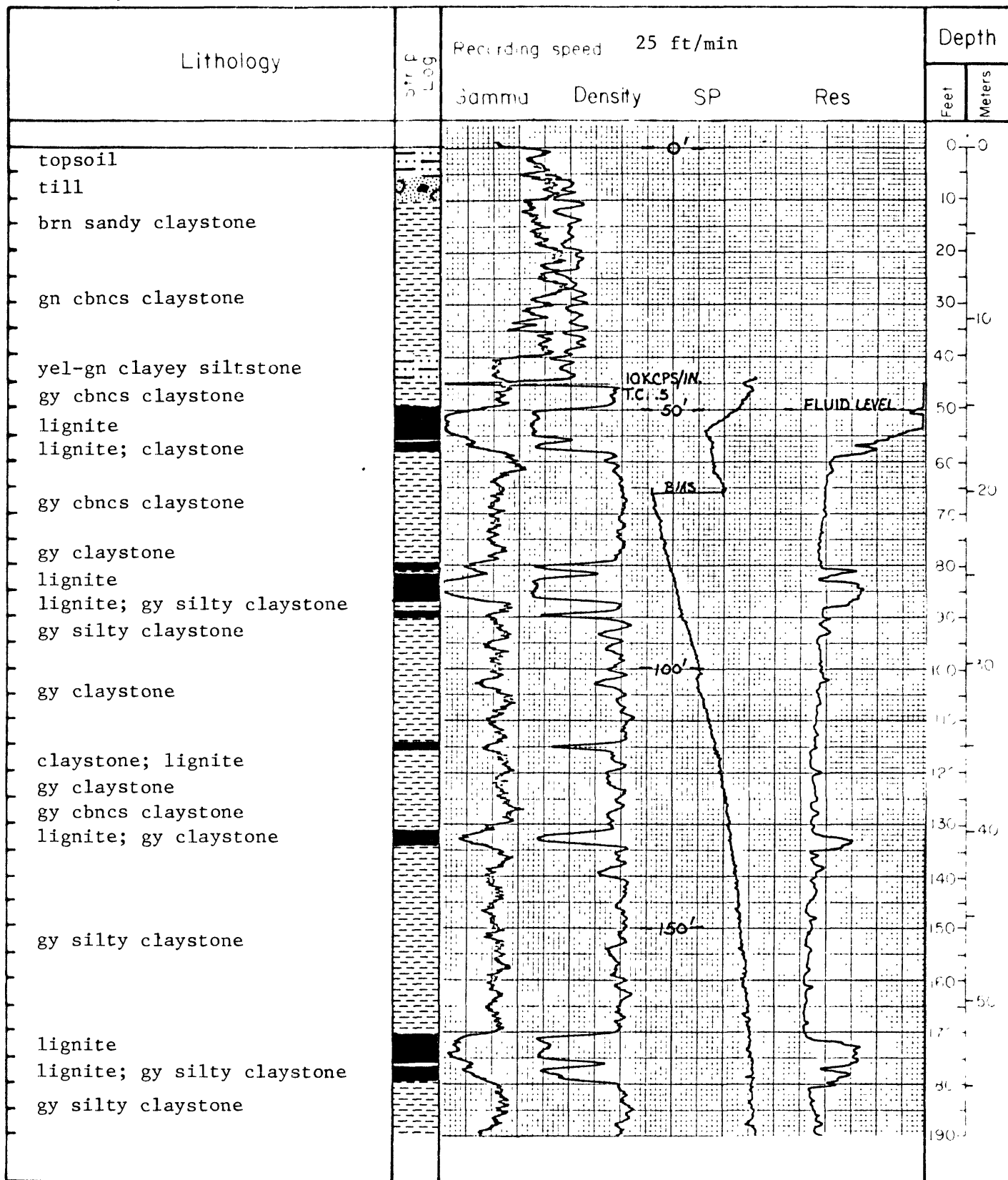
Hole no: G77-10 Map NW-16 Date 11-28-77 State N.D. County McLean
 Elev 1985 ft Location T.149N., R.85W. Sec 13, Tract NW SW Drilled depth: 340 ft
 Measured 2634 ft FSL, 4 ft FWL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by Mike Menge (Geologist)



Hole no. G77-10 (continued) Map _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks _____
 Recorded by: Mike Menge (Geologist)



Hole no: G77-11 Map NW-16 Date 11-27-77 State N.D. County McLean
 Elev 2002 ft Location T.149N., R.85W. Sec 15, Tract SE SE Drilled depth: 508 ft
 Measured: 32 ft FSL, 112 ft FEL Hole size: 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



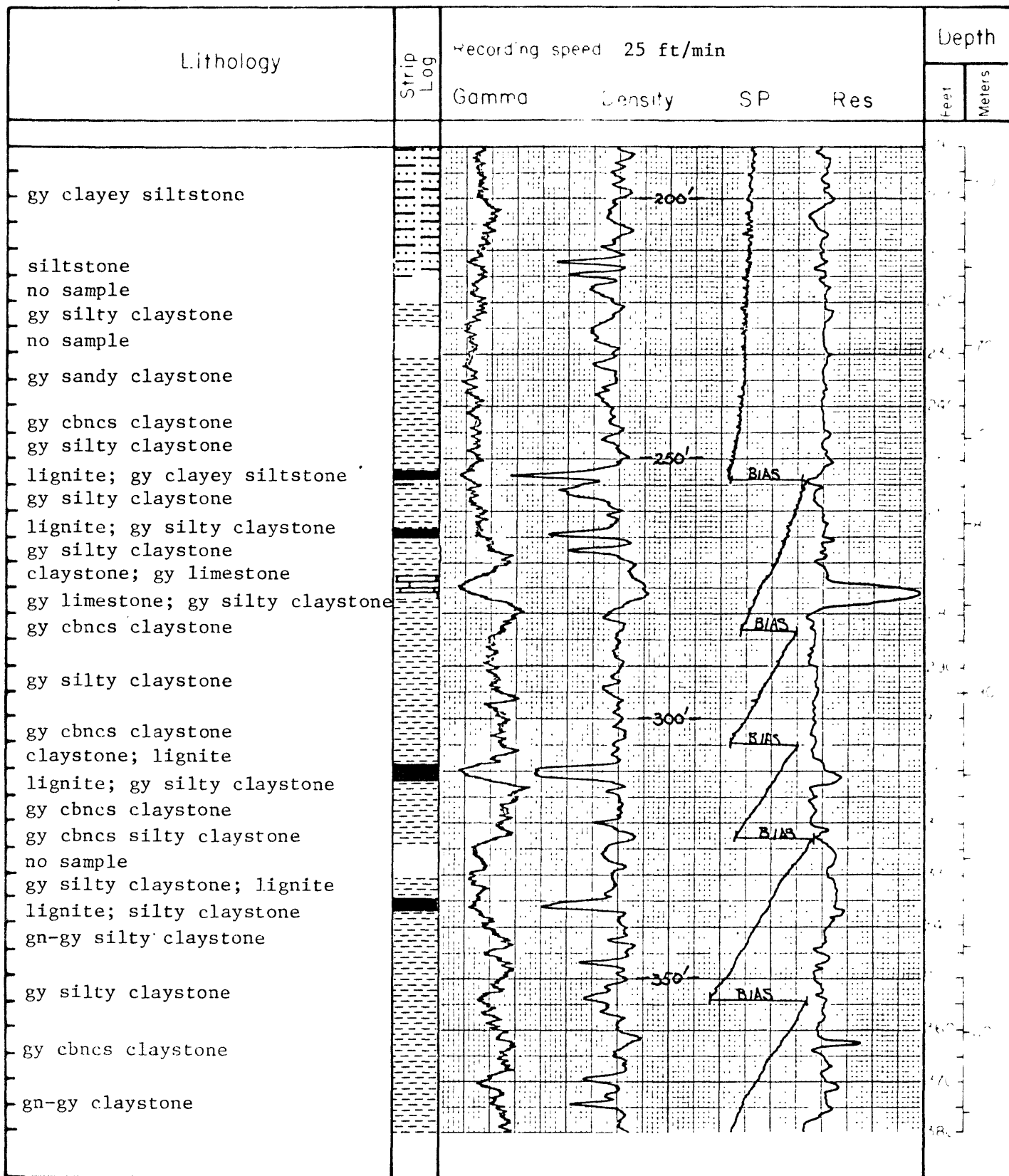
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Hole no: G77-11 Map _____ Date _____ State _____ County _____

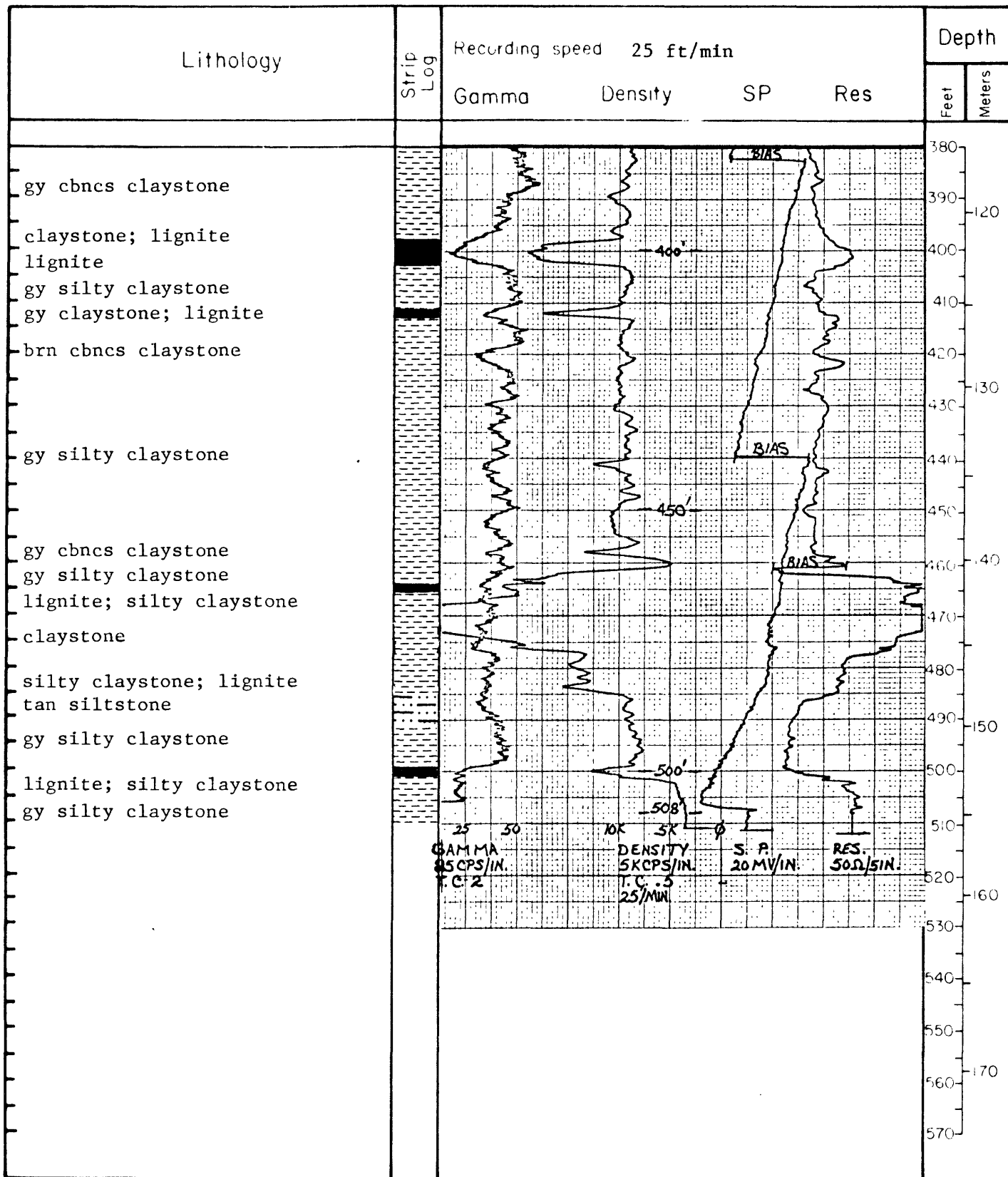
Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

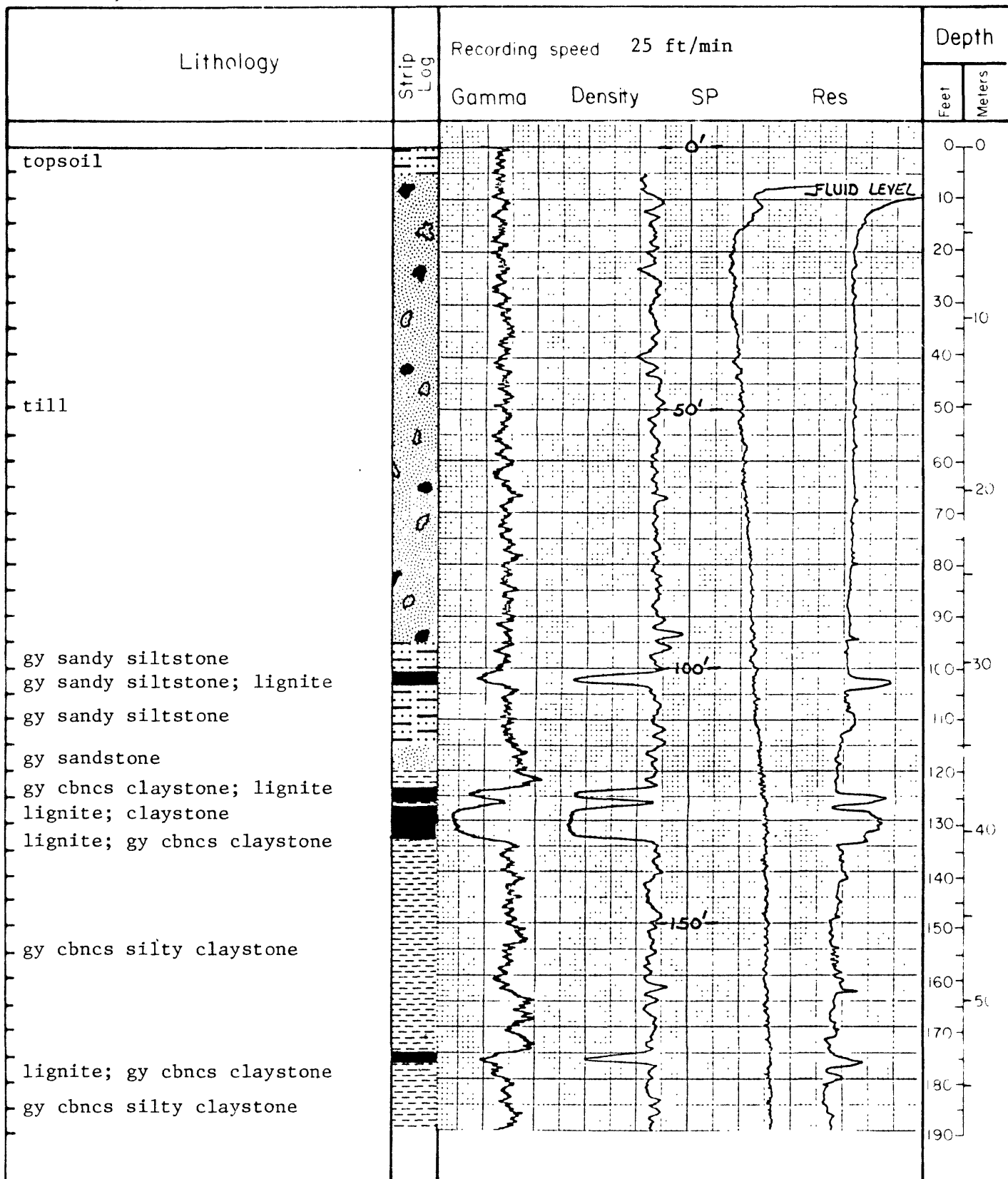
Remarks _____

Recorded by: Mike Menge (Geologist)

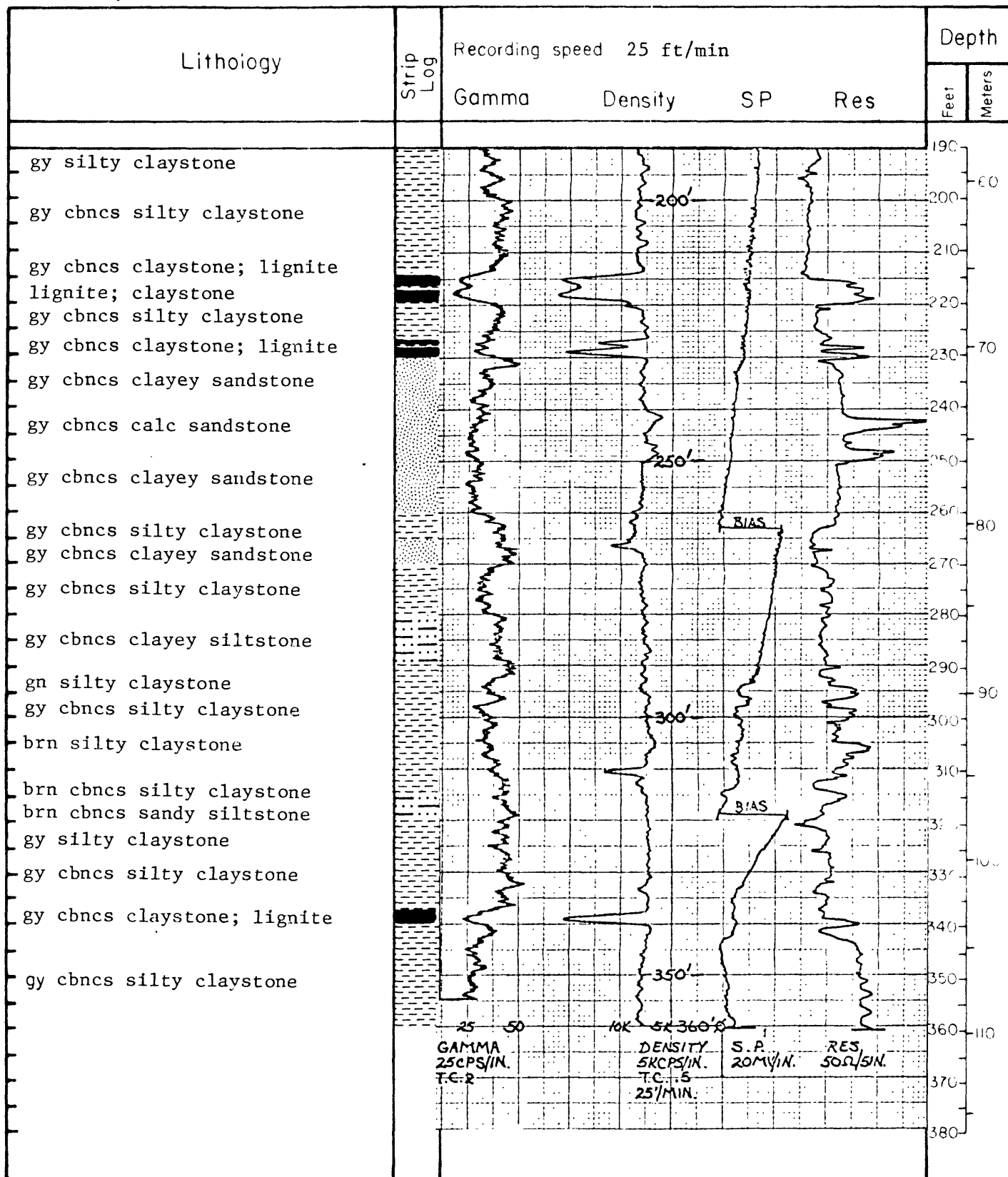
Hole no: G77-11 (continued) Date: _____ State: _____ County: _____
 Elev: _____ Location: _____ Sec: _____, Tract: _____ Drilled depth: _____
 Measured: _____, _____ Hole size: _____ Cored: _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



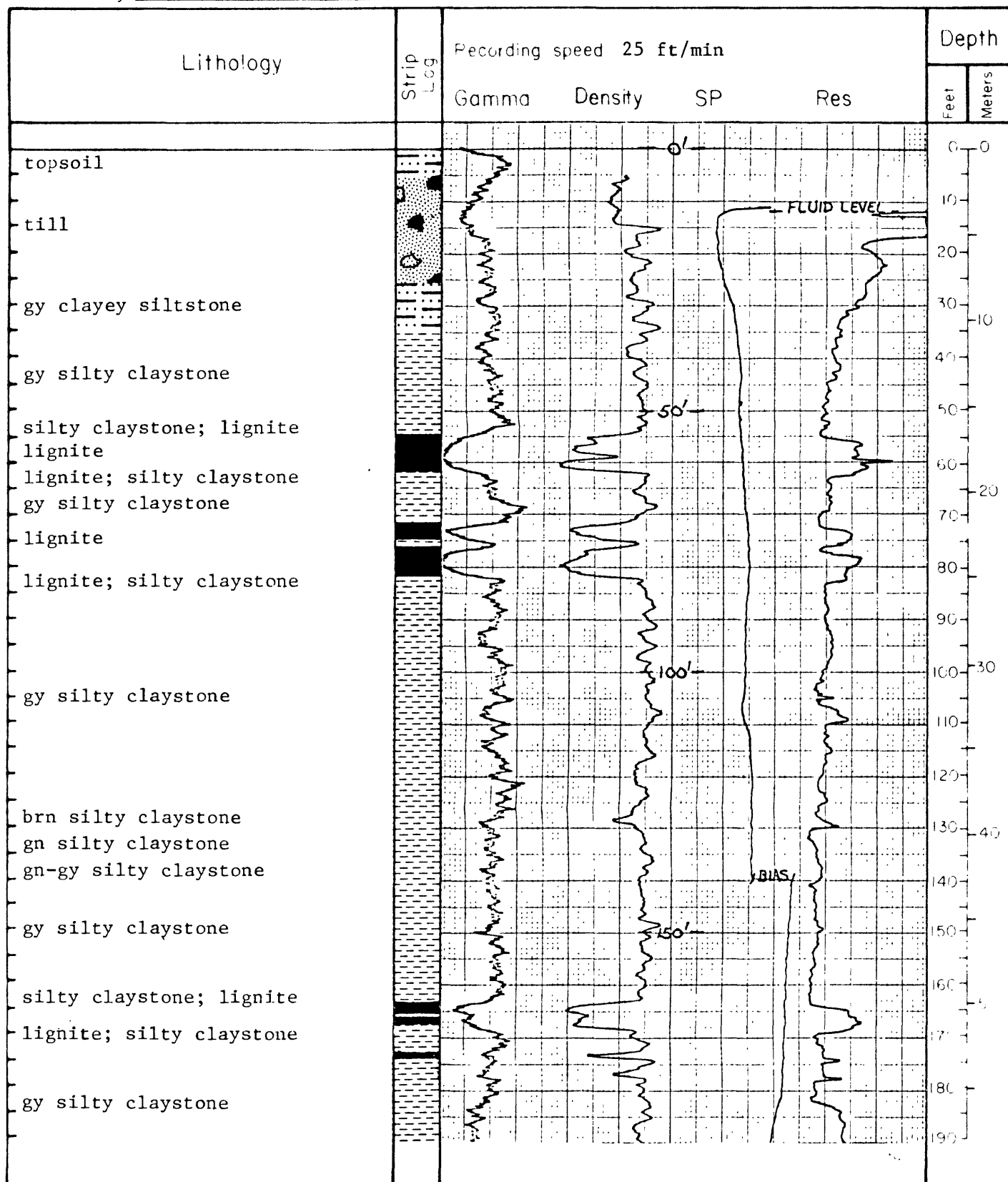
Hole no: G77-12 Map NW-16 Date 11-30-77 State N.D. County McLean
 Elev 2042 ft Location T.149N., R.85W. Sec.3, Tract SE SE Drilled depth: 360 ft
 Measured 77 ft FSL, 528 ft FEL Hole size: 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



Hole no: G77-12 (continued) Map _____ Date: _____ State: _____ County: _____
 Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size: _____ Cored: _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



Hole no: G77-13 Map NW-16 Date 11-30-77 State N.D. County McLean
 Elev. 1994 ft Location T.149N., R.85W. Sec 3, Tract lot 3 Drilled depth: 300 ft
 Measured 12 ft FNL, 1335 ft FWL Hole size: 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



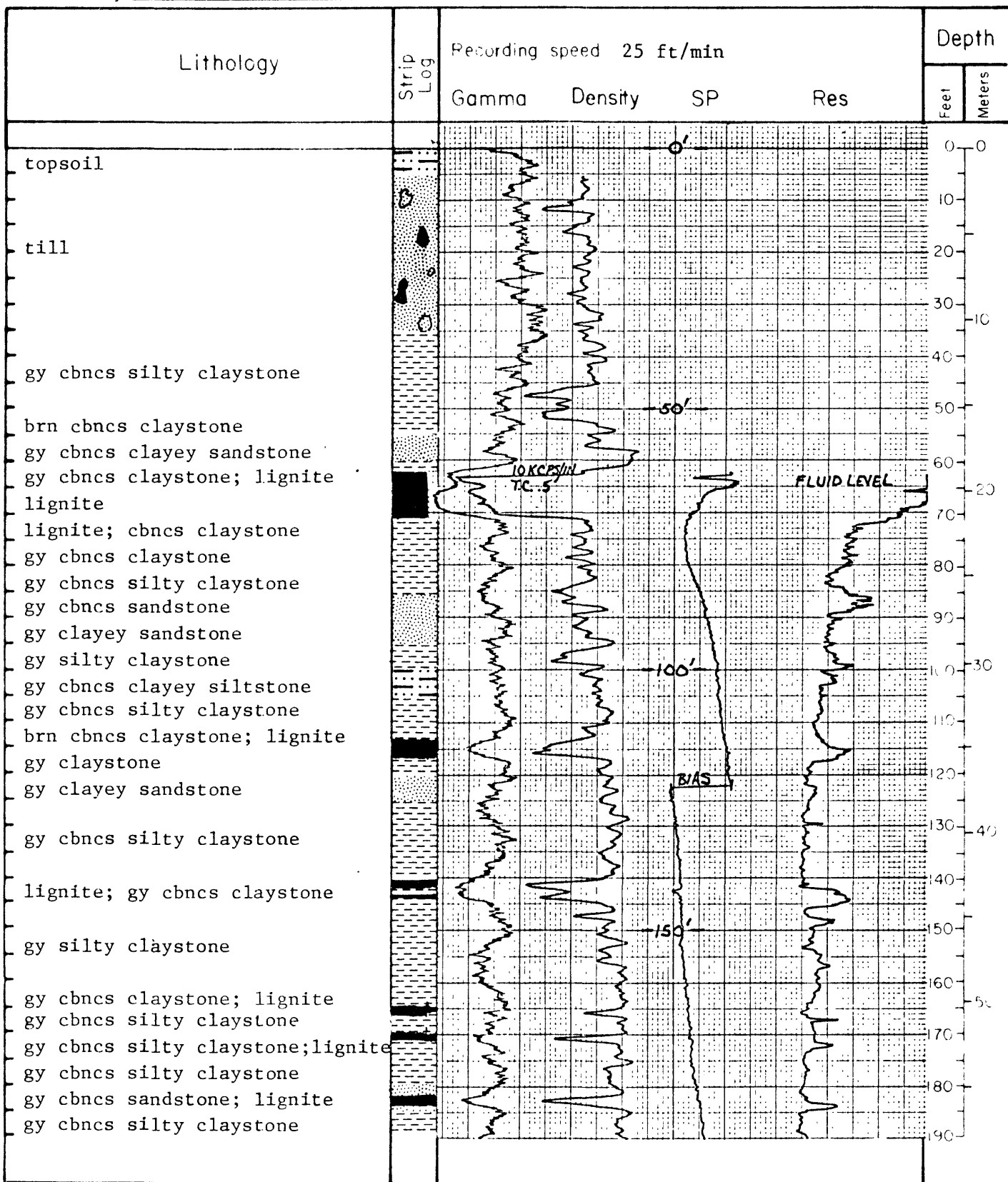
Recorded by: Mike Menge (Geologist)



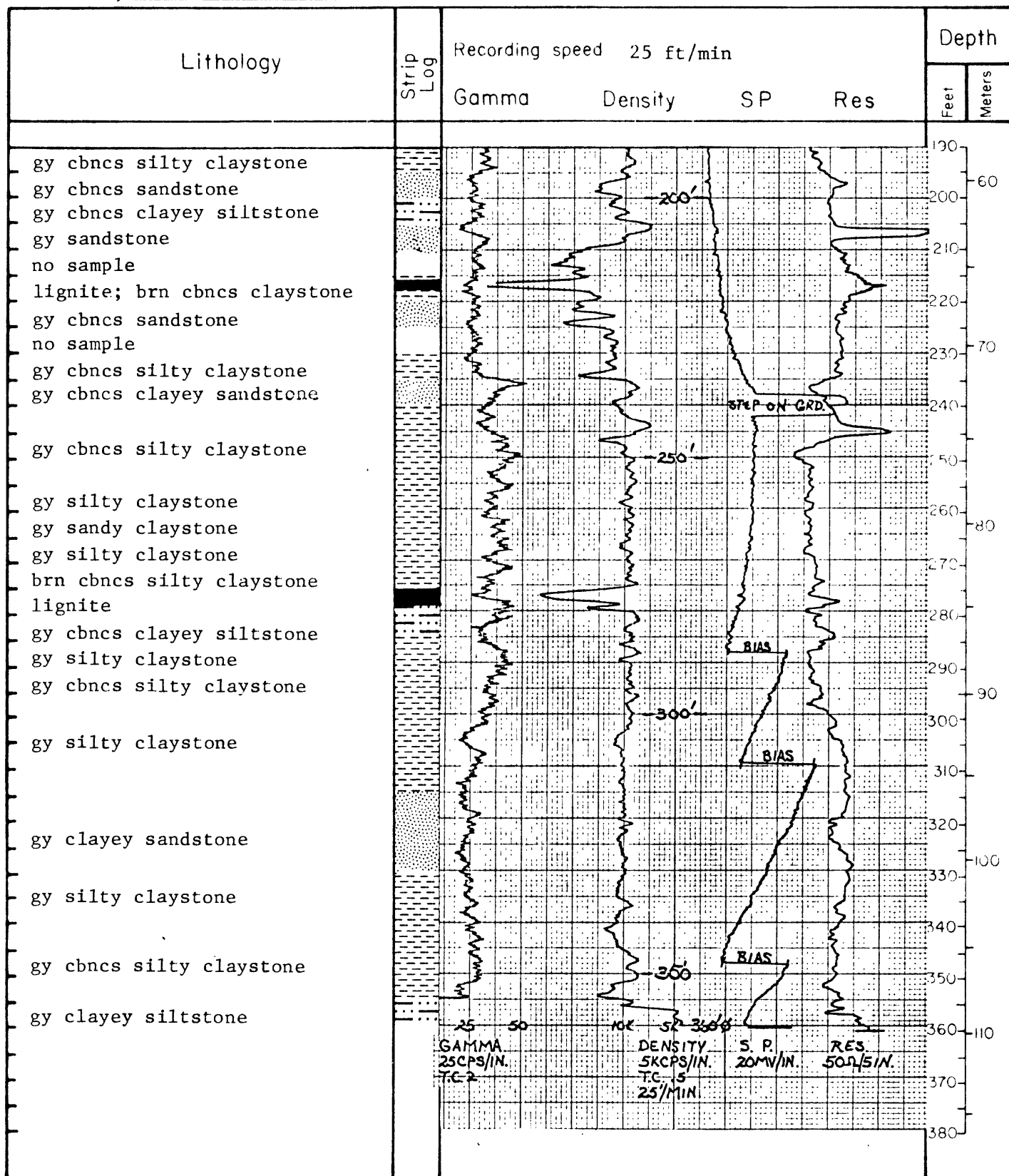
Hole no: G77-14 Map NW-16 Date 11-28-77 State N.D. County McLean
 Elev 2024 ft Location T.149N., R.84W. Sec. 6, Tract lot 4 Drilled depth: 360 ft
 Measured 12 ft FNL, 154 ft FWL Hole size 5 1/8 in. Cored no

Remarks _____

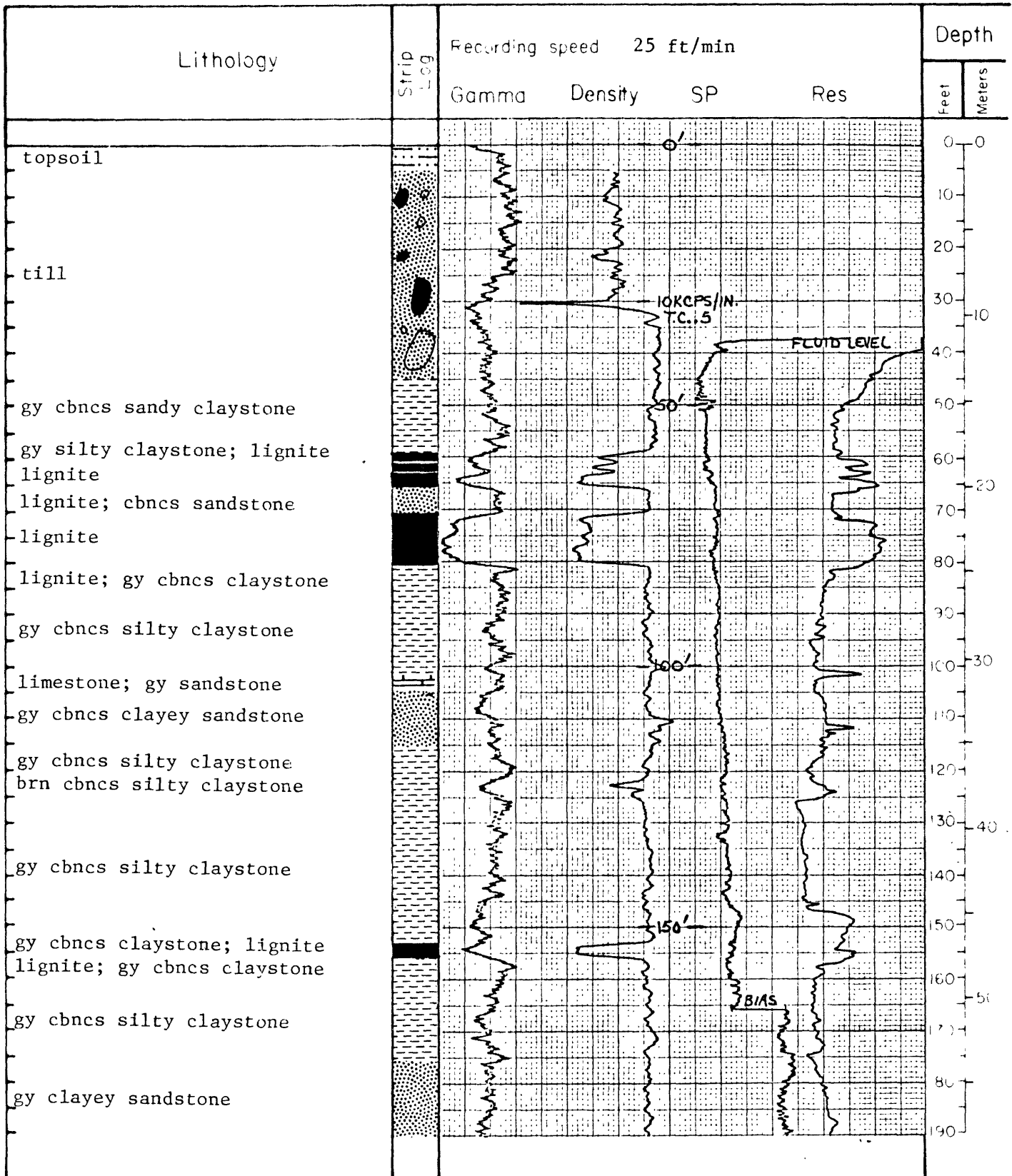
Recorded by: Mike Menge (Geologist)



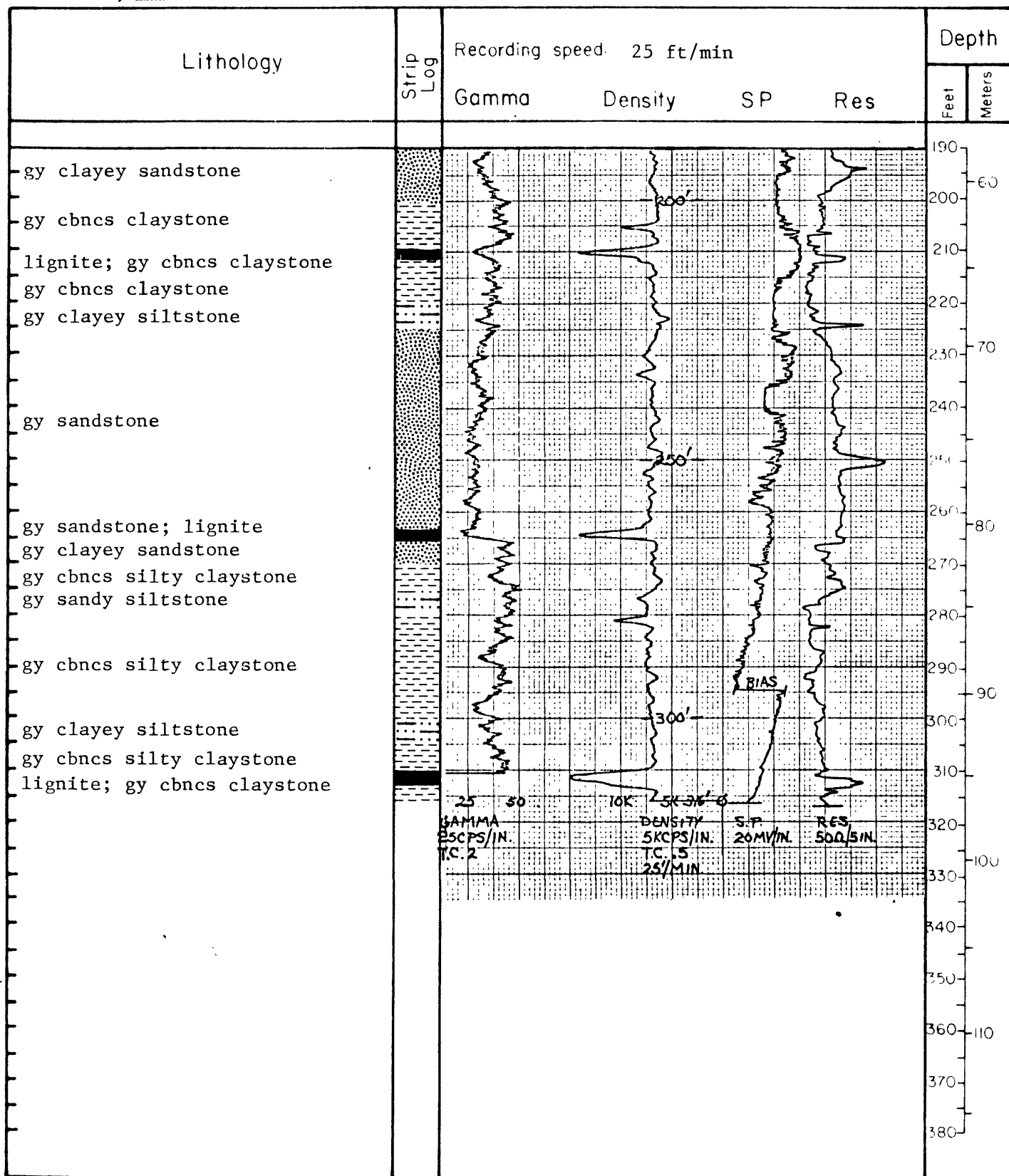
(continued)
 Hole no: G77-14 Map: _____ Date: _____ State: _____ County: _____
 Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored: _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



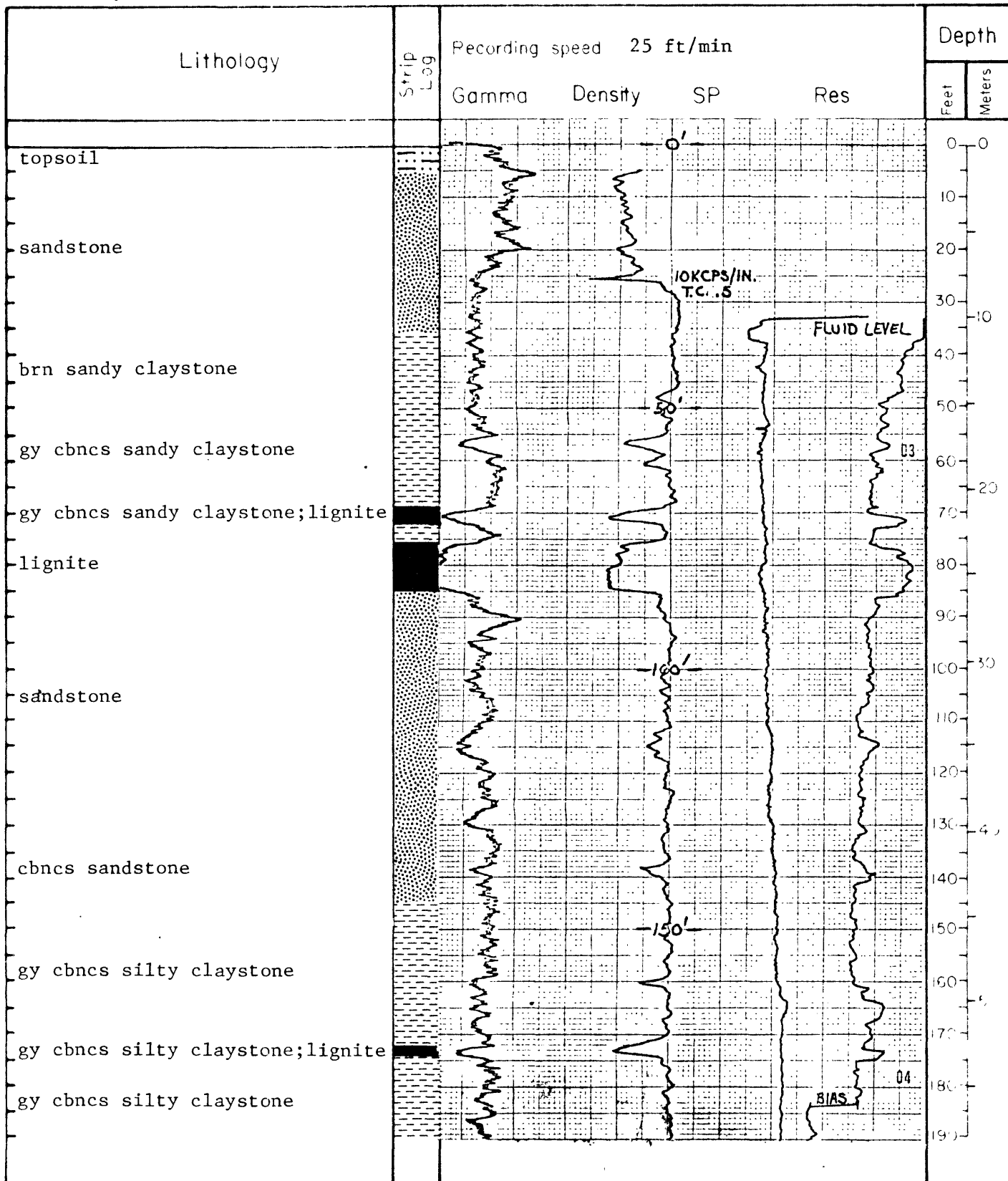
Hole no: G77-15 Map NW-16 Date 11-19-77 State N.D. County McLean
 Elev. 2038 ft Location T.150N., R.84W. Sec. 32, Tract SW SW Drilled depth: 316 ft
 Measured: 20 ft FSL, 183 ft FWL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



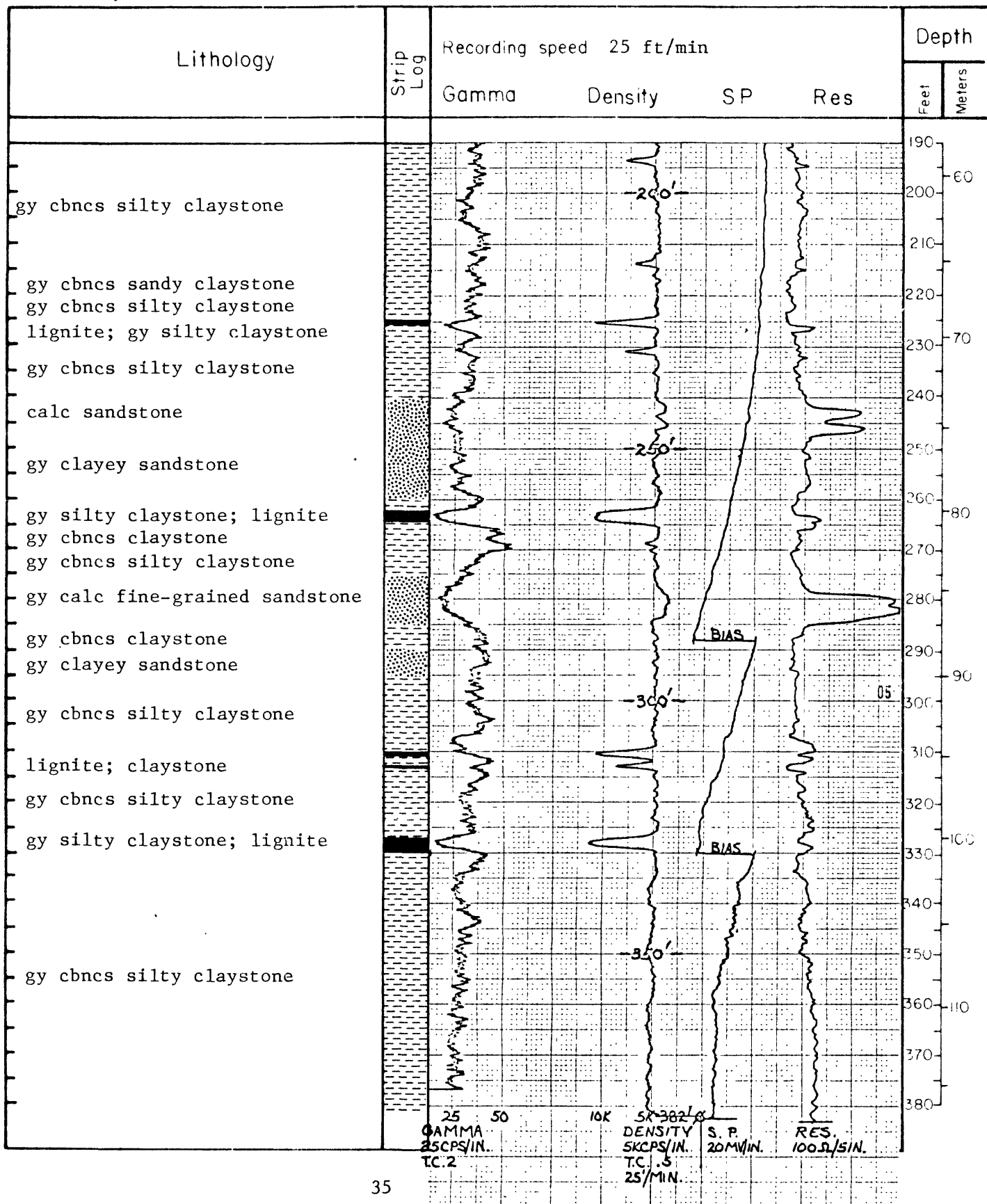
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Hole no: G77-15 Map: _____ Date: _____ State: _____ County: _____
Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size _____ Cored _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



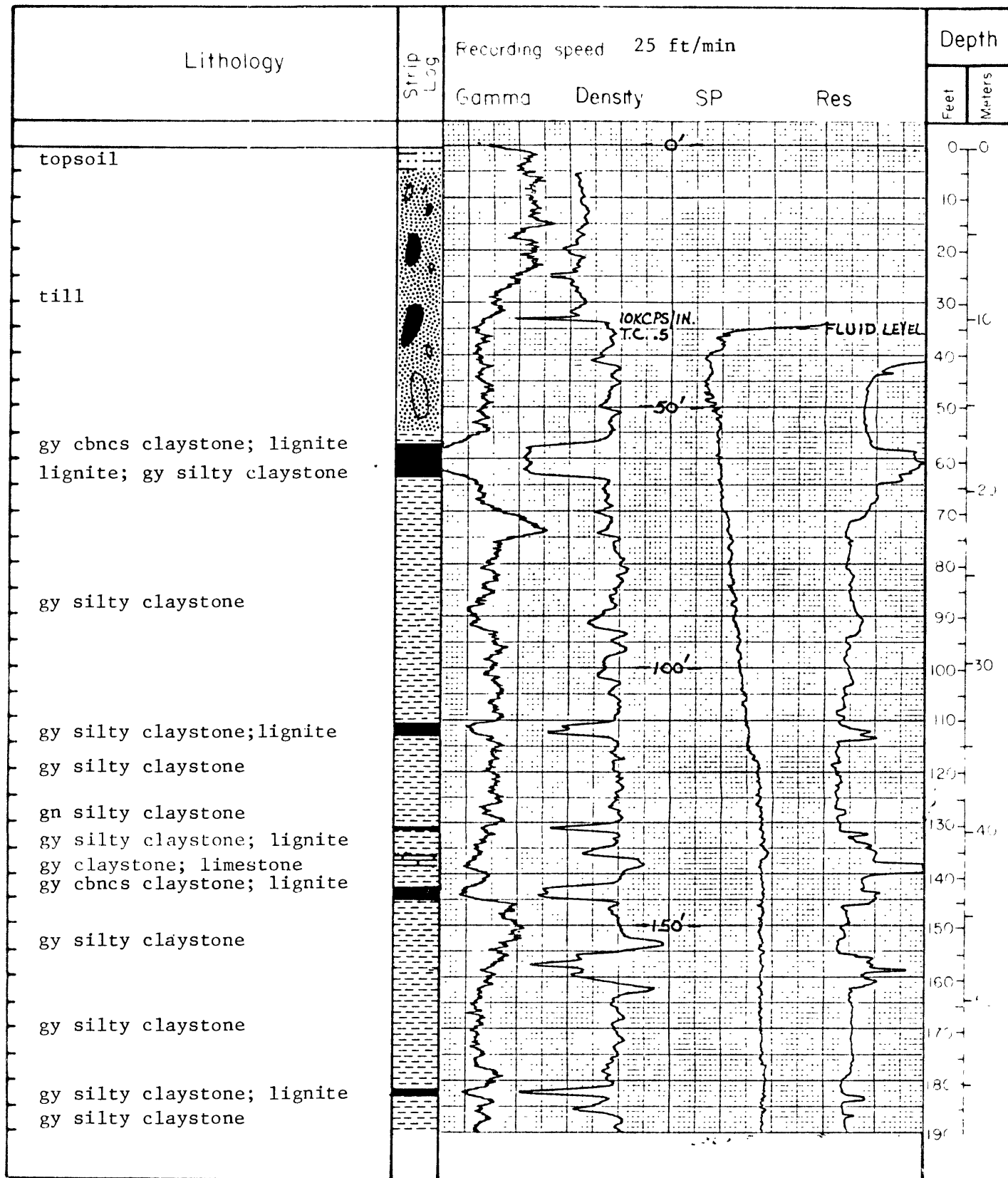
Hole no: G77-16 Map NW-16 Date 11-18-77 State N.D. County McLean
 Elev 2040 ft Location T.150N., R.84W. Sec. 30, Tract NE NE Drilled depth: 382 ft
 Measured: 135 ft FNL, 18 ft FEL Hole size: 5 1/8 in Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



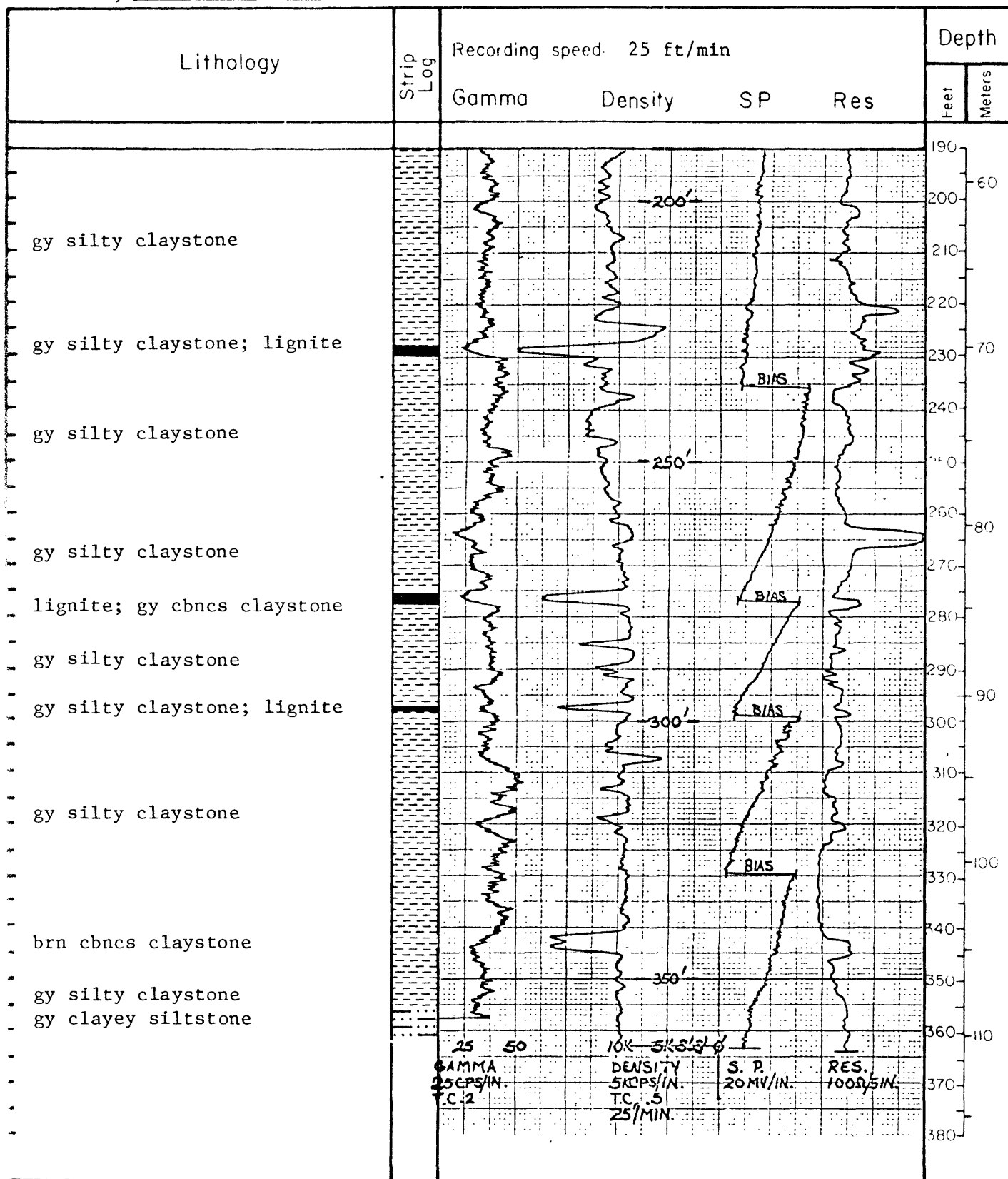
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Hole no: G77-16 Map: _____ Date: _____ State: _____ County: _____
Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size: _____ Cored: _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



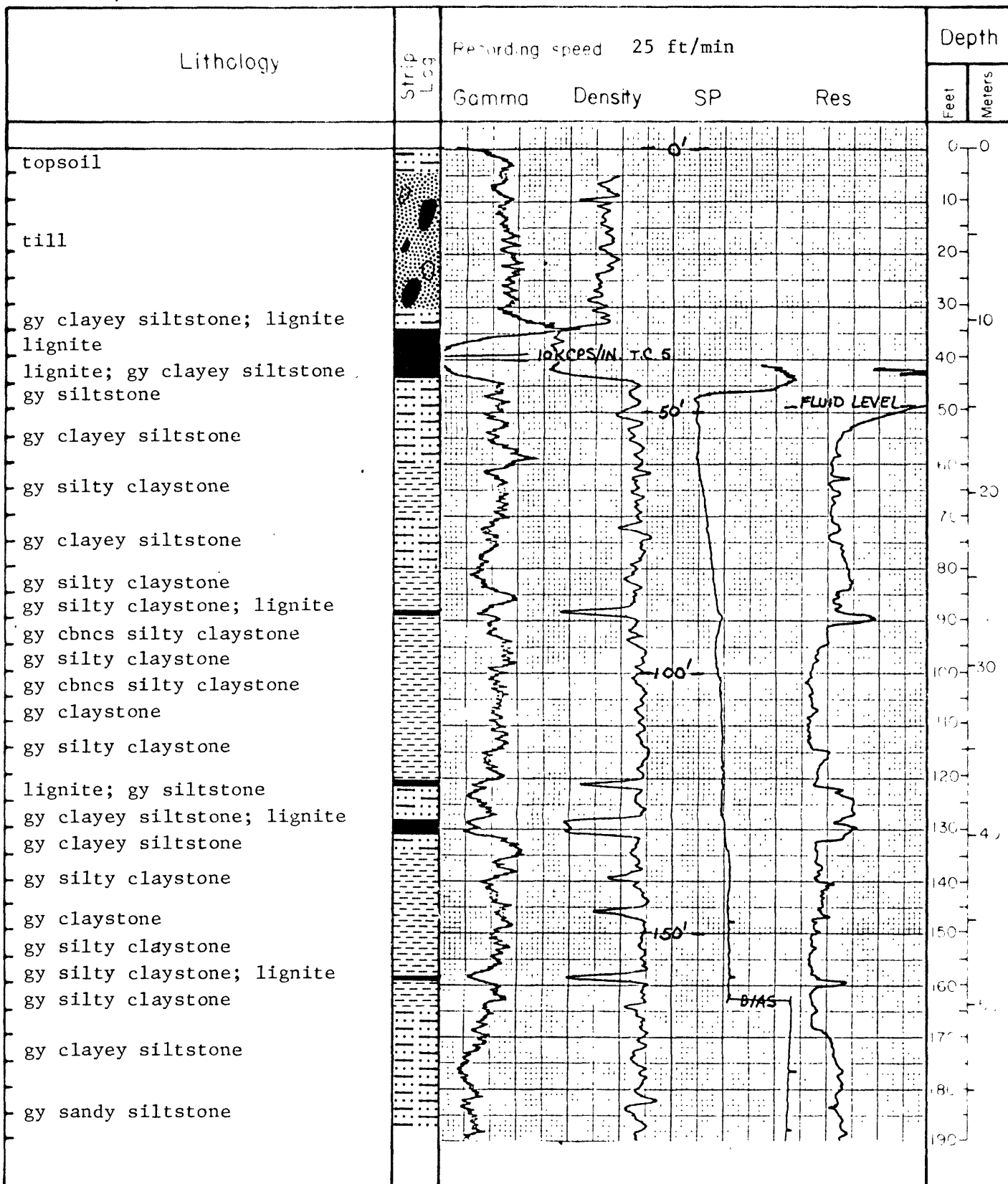
Hole no: G77-17 Map: NW-16 Date 11-23-77 State N.D. County: McLean
 Elev 2030 ft Location: T.149N., R.84W. Sec. 4, Tract lot 3 Drilled depth: 363 ft
 Measured 16 ft FNL, 2517 ft FWL Hole size: 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



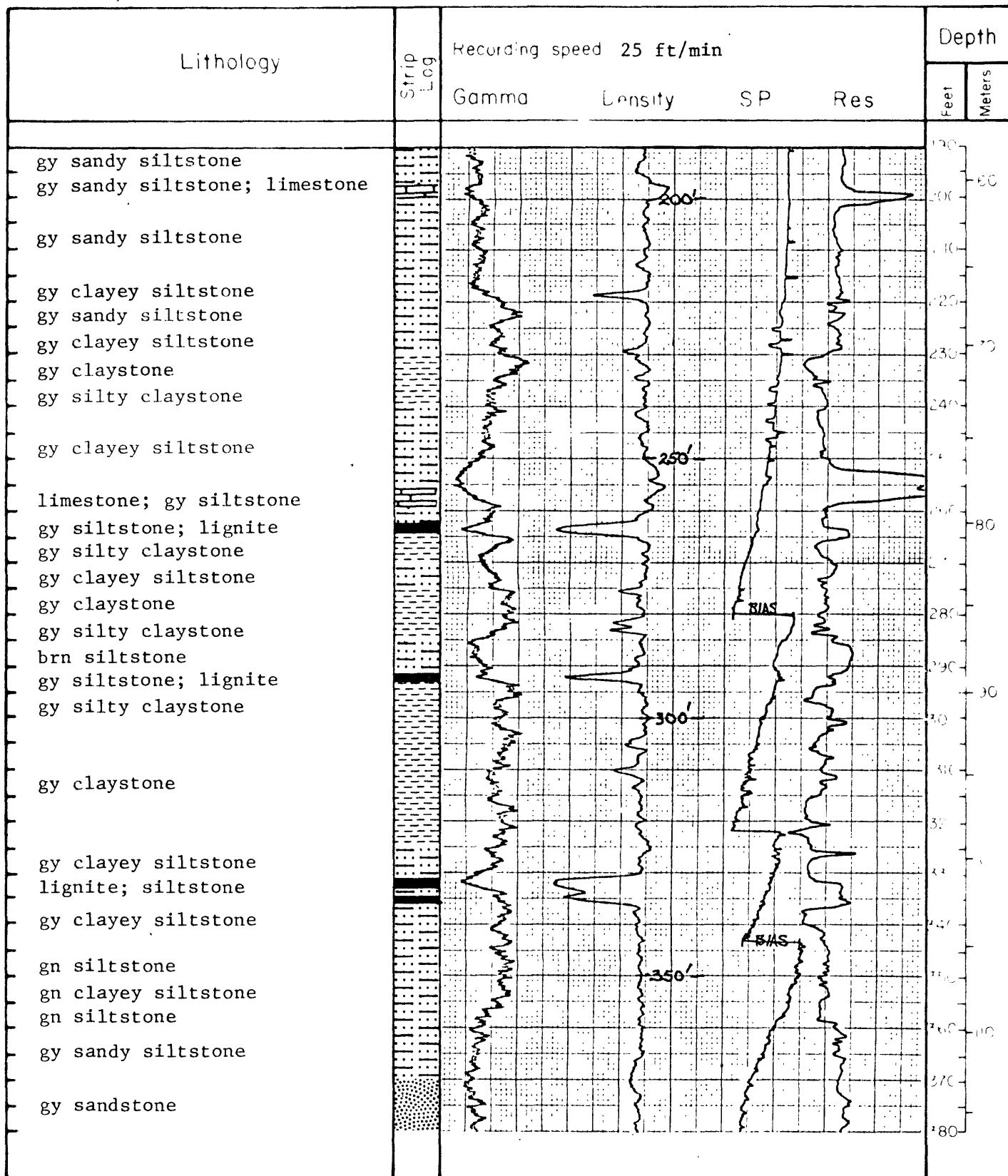
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Hole no: G77-17 Map _____ Date: _____ State: _____ County: _____
Elev. _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size _____ Cored _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



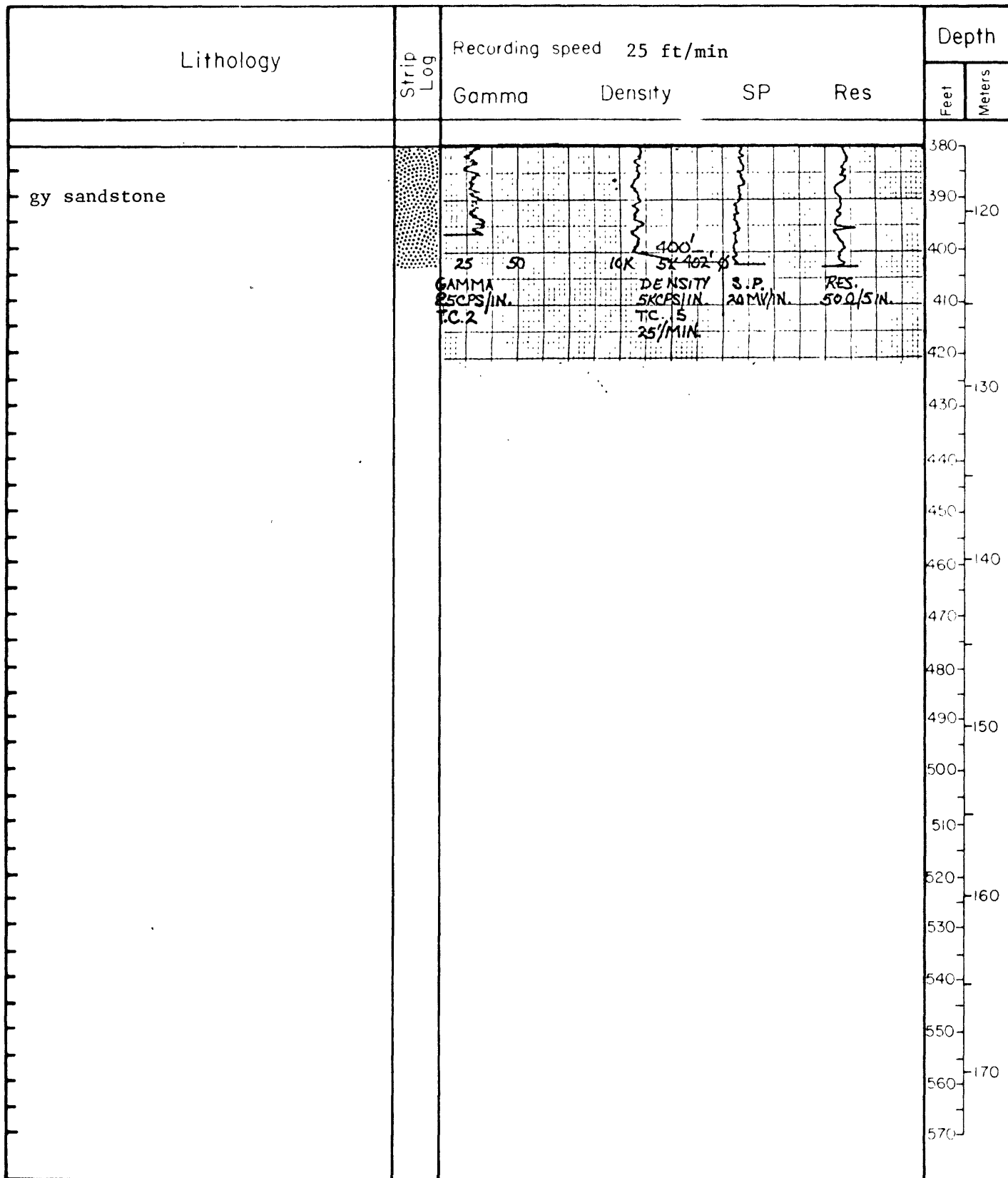
Hole no: G77-18 Map NW-16 Date 12-2-77 State N.D. County McLean
 Elev 2023 ft Location T.149N., R.84W. Sec 4, Tract SE SW Drilled depth 402 ft
 Measured 134 ft FSL, 2628 ft FWL Hole size 5 1/8 in/ (cored) no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



Hole no: G77-18 (continued) Map _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks _____
 Recorded by Mike Menge (Geologist)



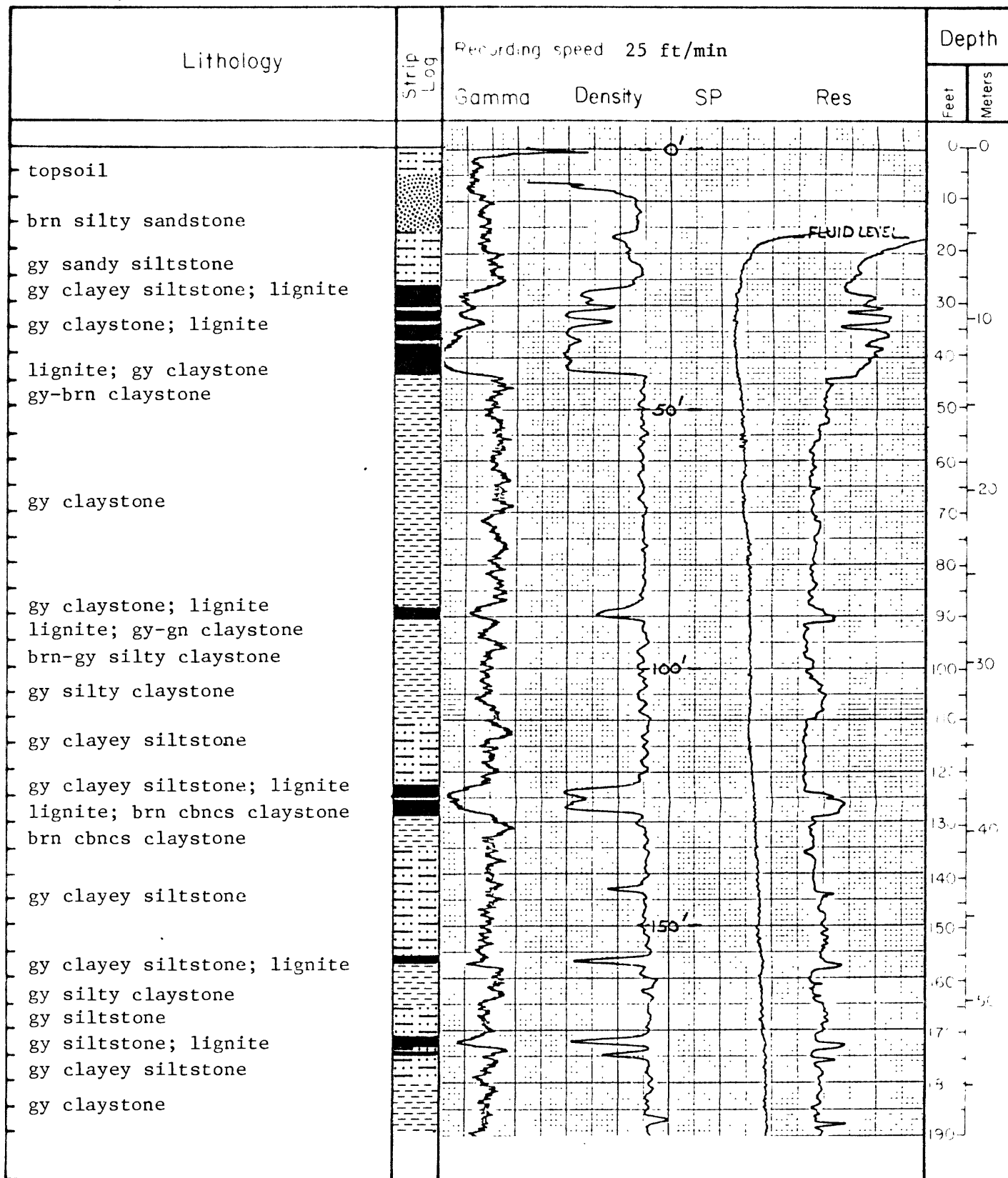
Hole no: G77-18 (continued) Map _____ Date: _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



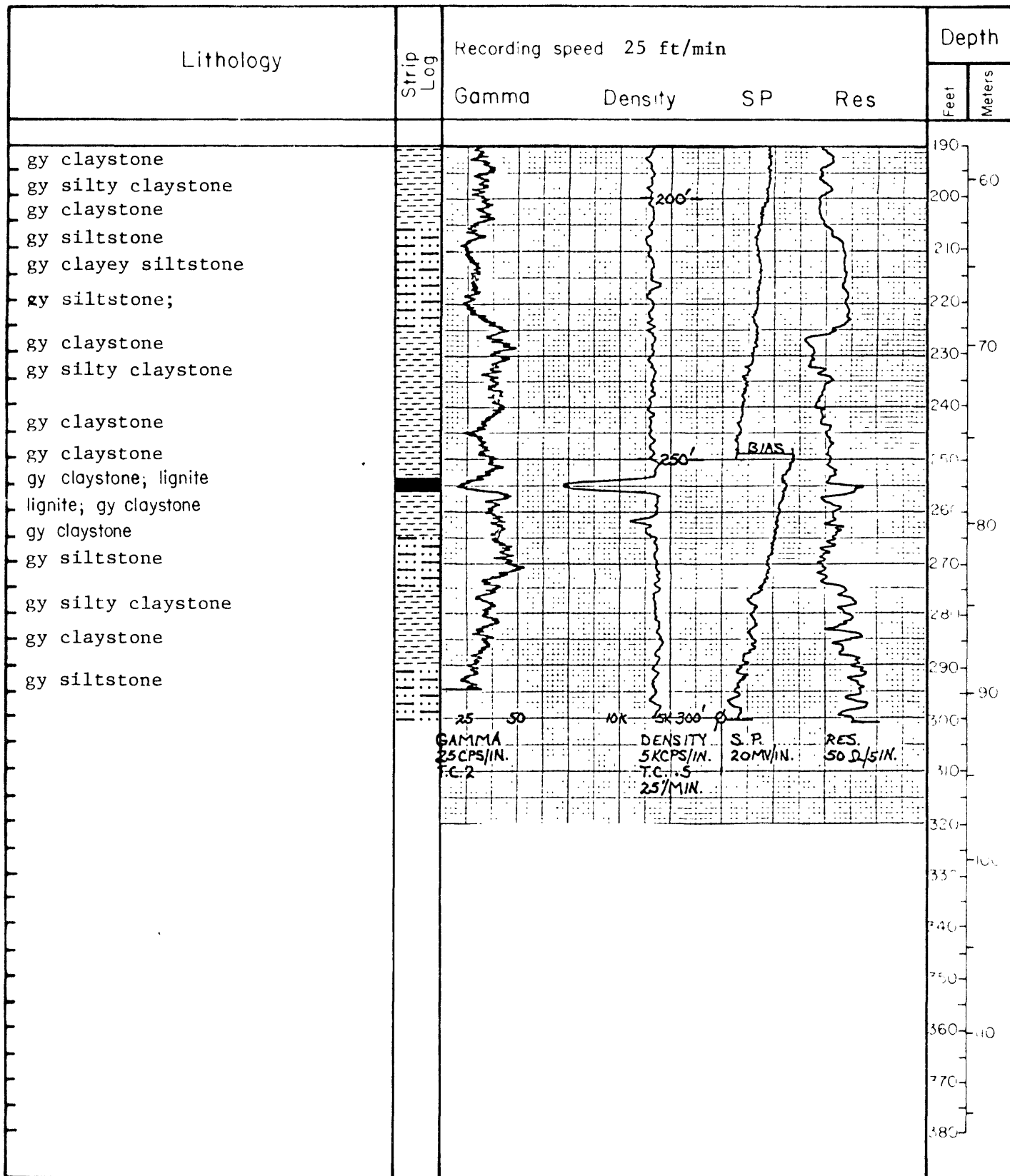
Hole no: G77-19 Map NW-16 Date 11-29-77 State N.D. County McLean
 Elev 1998 ft Location T.149N., R.84W. Sec 6, Tract SE SW Drilled depth: 300 ft
 Measured 34 ft FSL, 2585 ft FWL Hole size 5 1/8 in. Cored no

Remarks _____

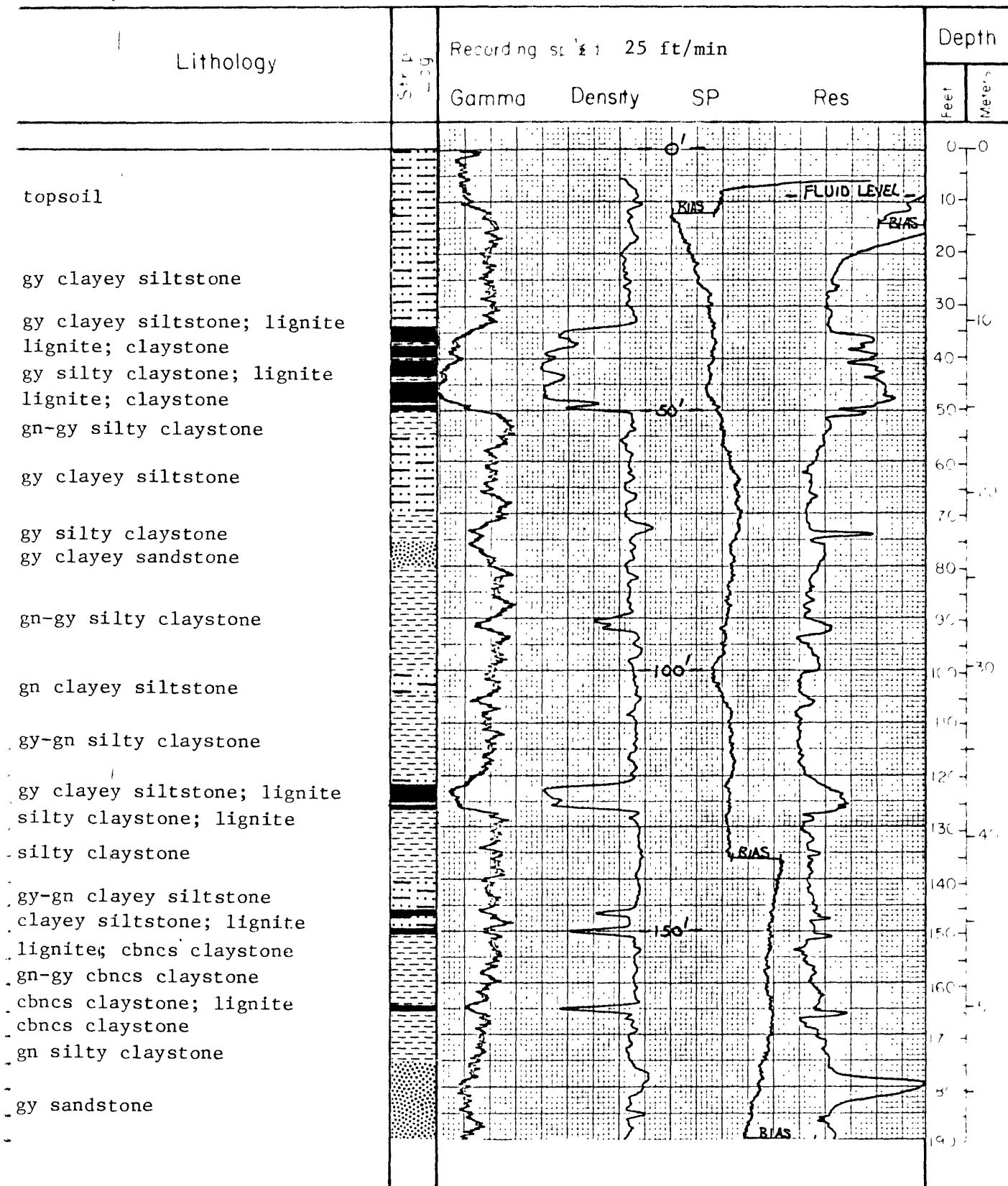
Recorded by Mike Menge (Geologist)



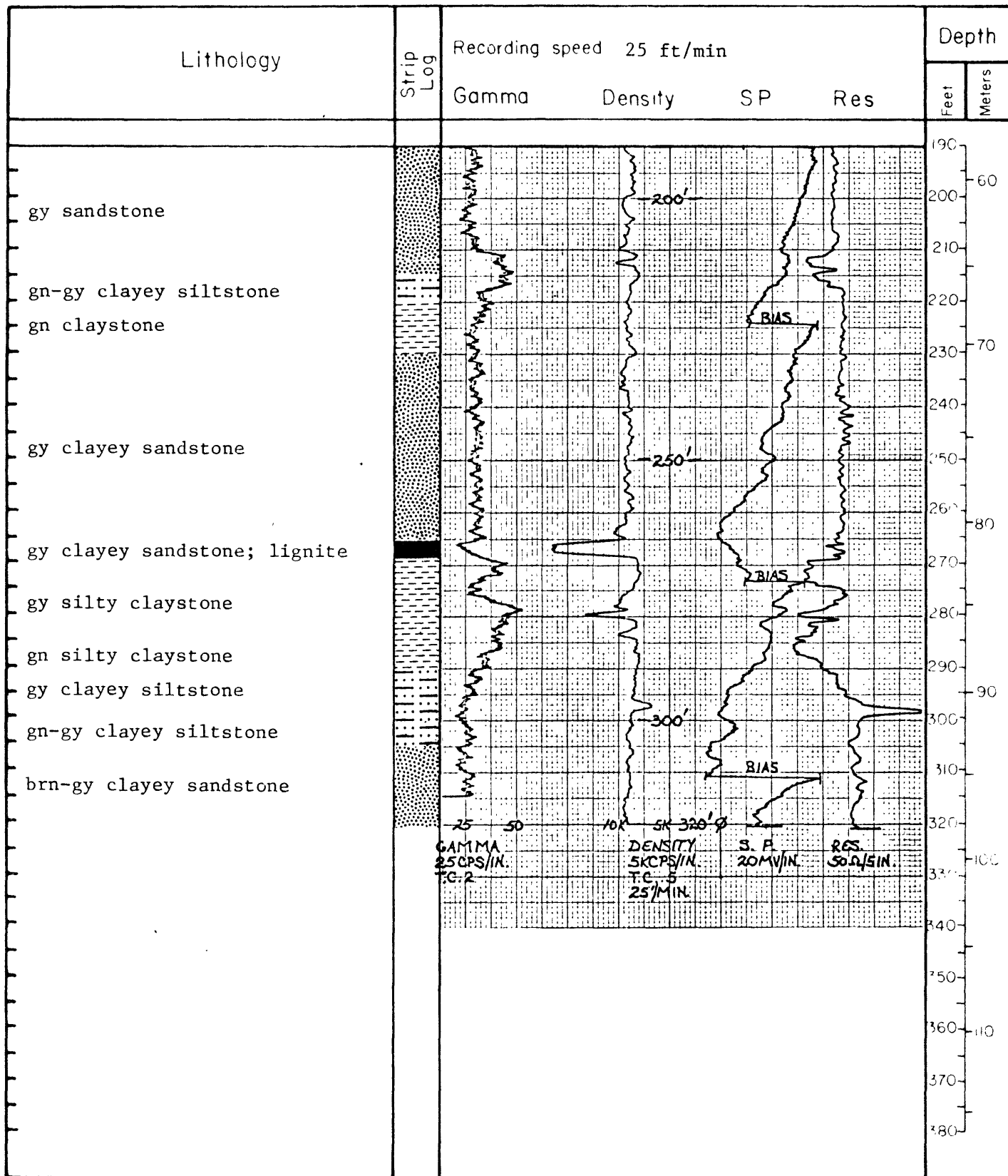
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Hole no: G77-19 Map _____ Date: _____ State: _____ County: _____
Elev: _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size: _____ Cored _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



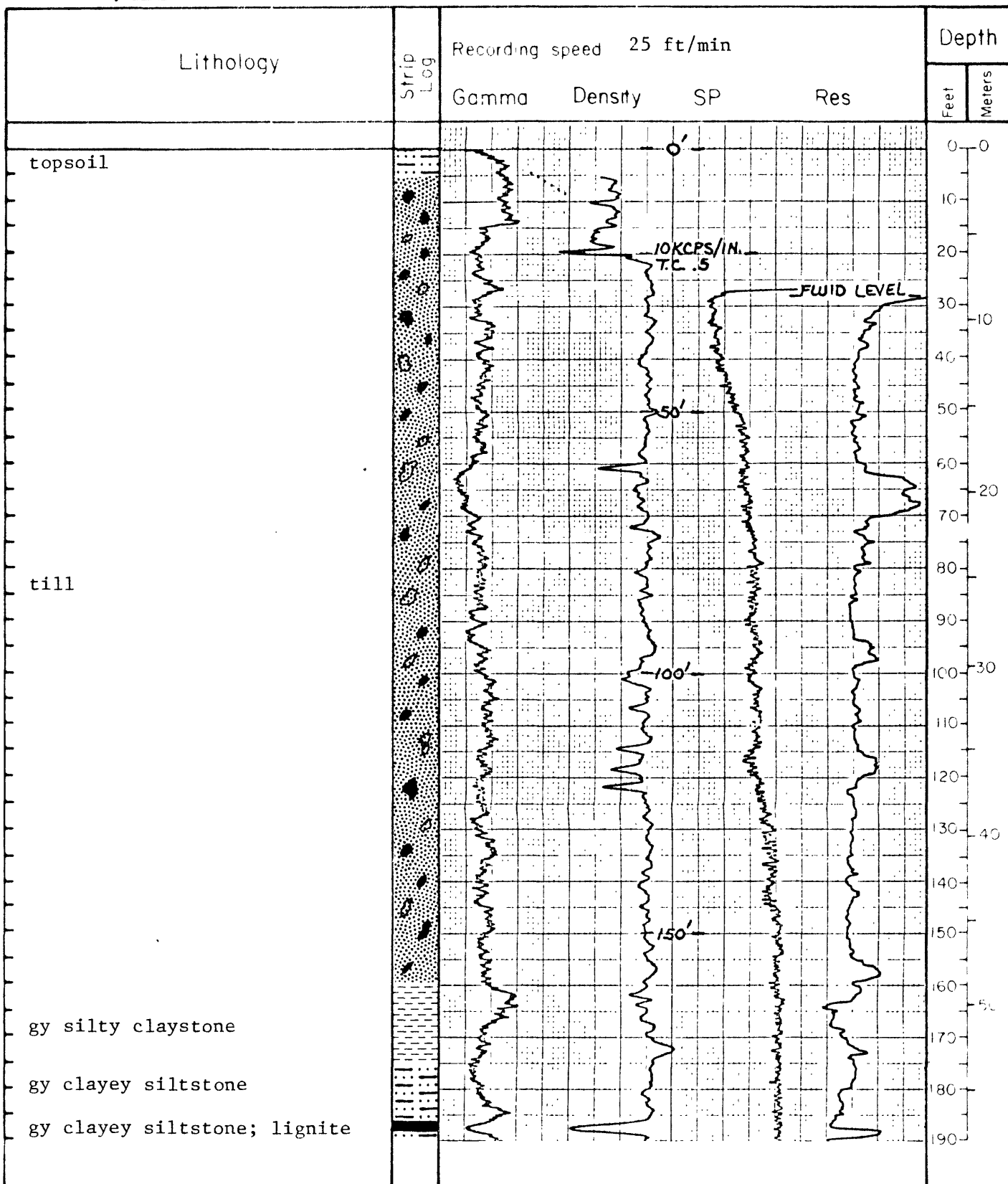
Well no. G77-20 Map NW-16 Date 11-29-77 State N.D. County McLean
 Elev 2008 ft Location T.149N., R.84W. Sec. 8, Tract SW SW Drilled depth 320 ft
 Measured 10 ft FSL, 118 ft FWL Hole size: 5 1/8 in. Cored no
 Remarks _____
 Recorded by Mike Menge (Geologist)



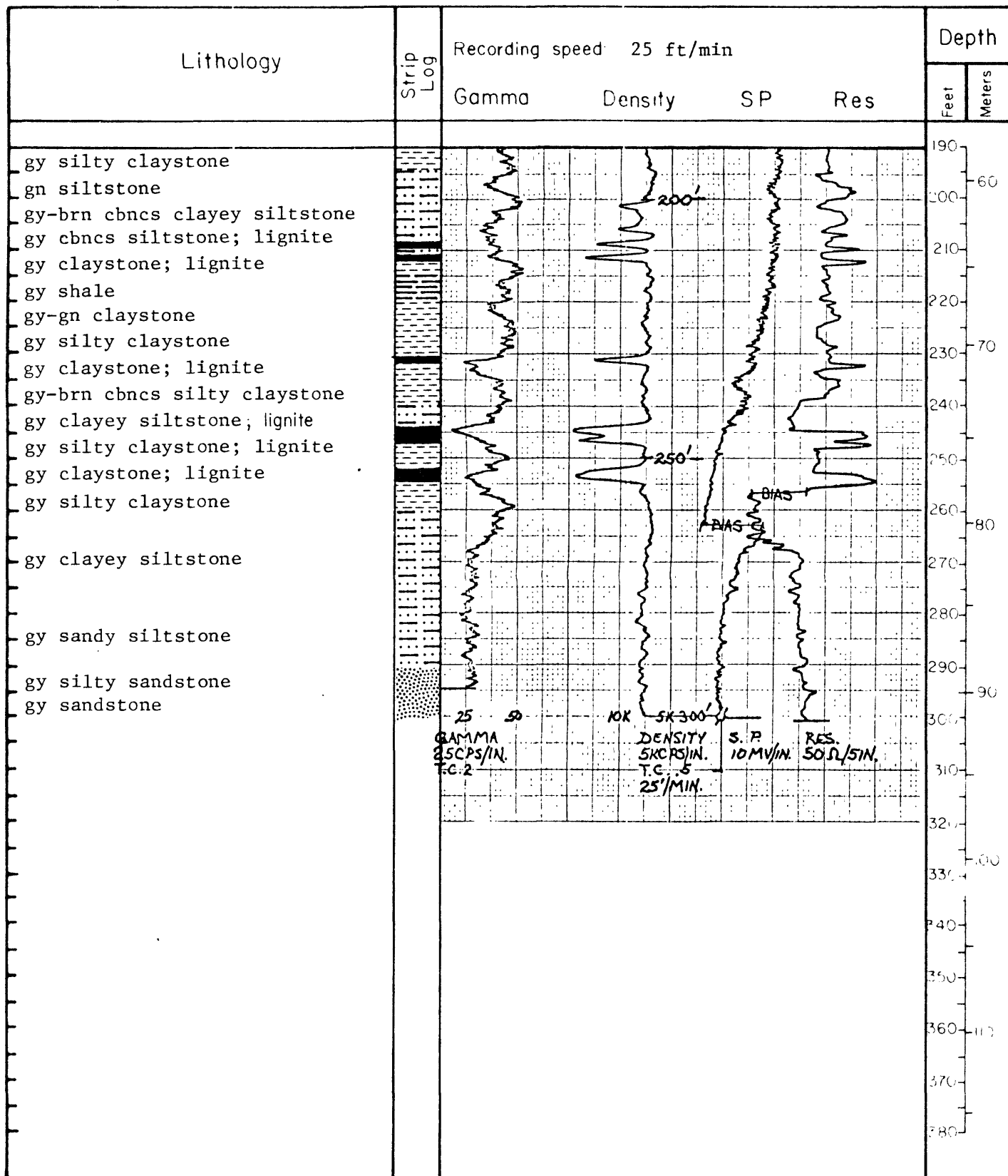
(continued)
Hole no: G77-20 Map _____ Date: _____ State: _____ County: _____
Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
Measured _____, _____ Hole size _____ Cored: _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



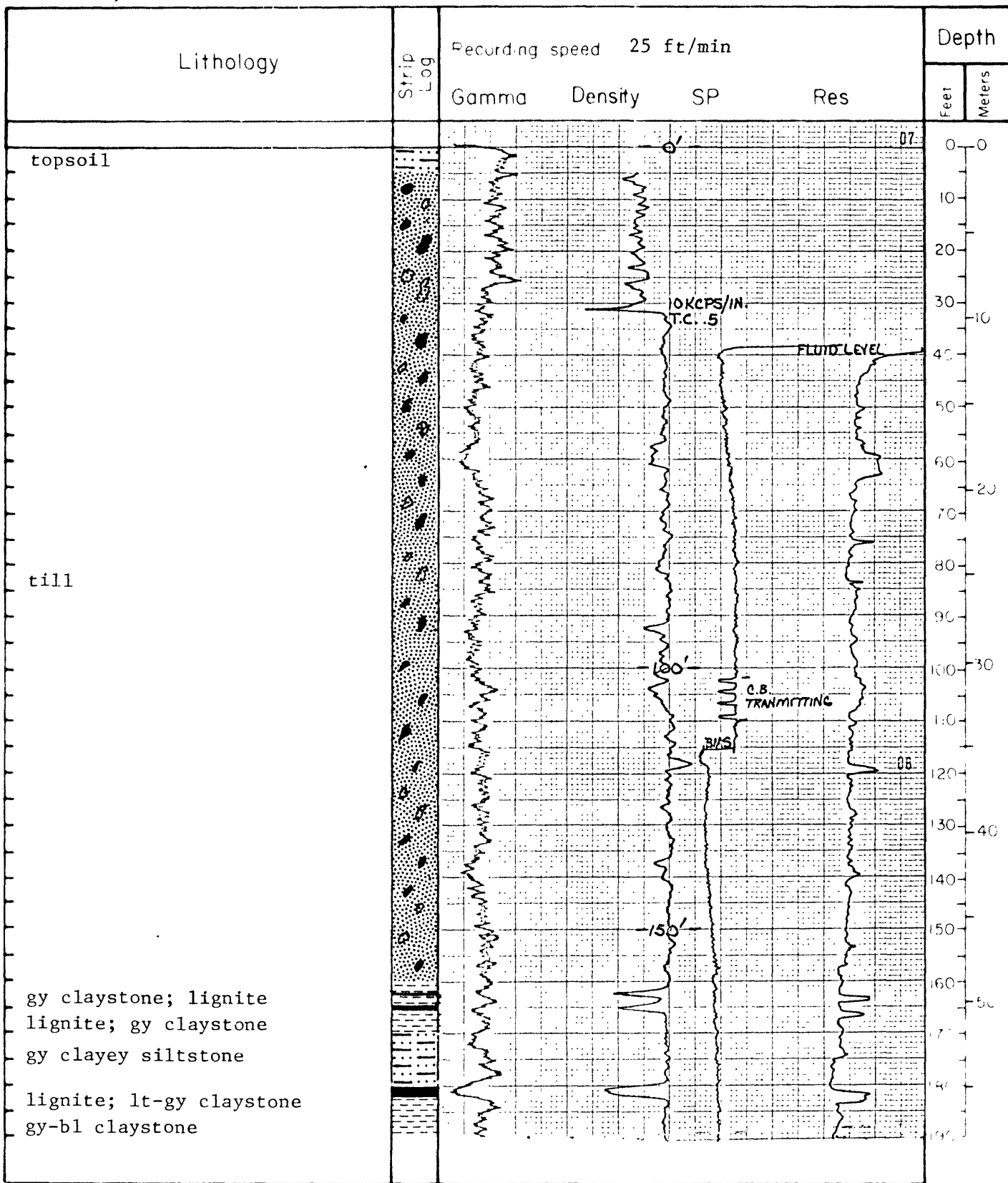
Hole no: G77-21 Map: NW-16 Date: 12-12-77 State: N.D. County: McLean
 Elev 1964 ft Location T.149N., R.84W. Sec 12, Tract NE SE Drilled depth: 300 ft
 Measured 1650 ft FSL, 32 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



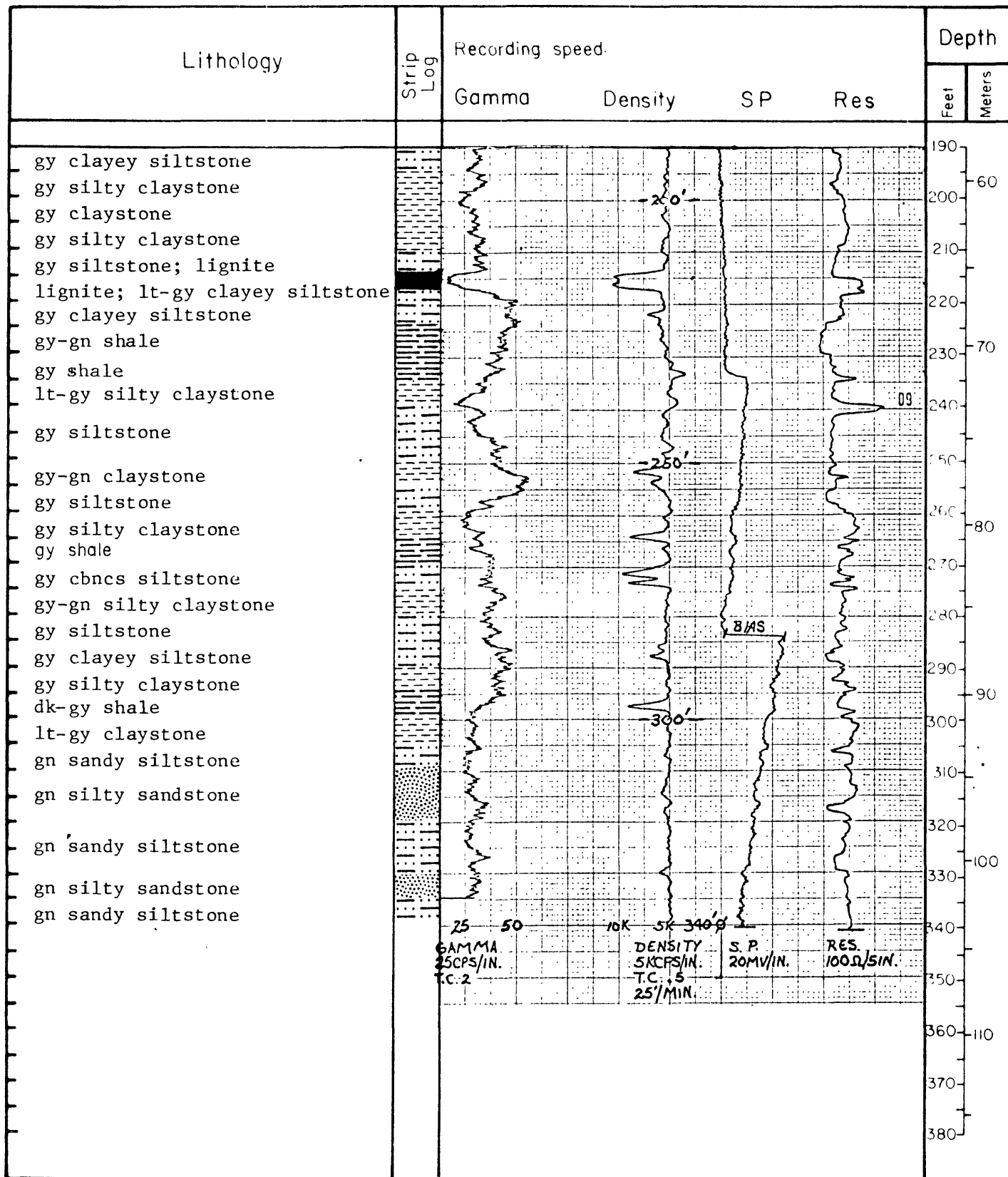
Hole no: G77-21 (continued) Map _____ Date _____ State _____ County _____
 Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored: _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



Hole no: G77-22 Map NW-16 Date 11-18-77 State N.D. County McLean
 Elev. 2014 ft Location T.150 N., R.84W. Sec. 27, Tract NE NE Drilled depth: 340 ft
 Measured 24 ft FNL, 308 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by Mike Menge (Geologist)



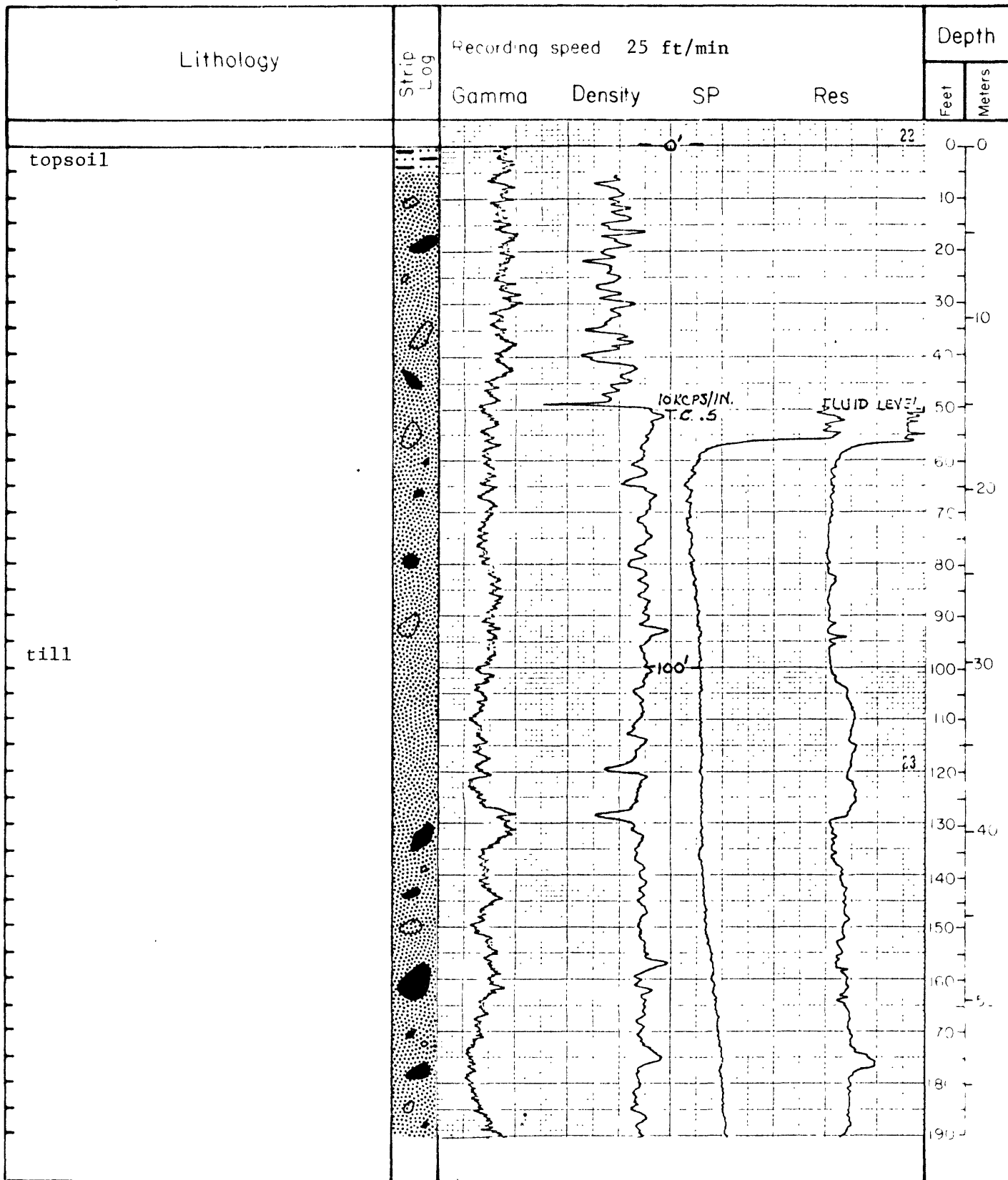
(continued)
Hole no: G77-22 Map _____ Date: _____ State: _____ County: _____
Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size: _____ Cored: _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



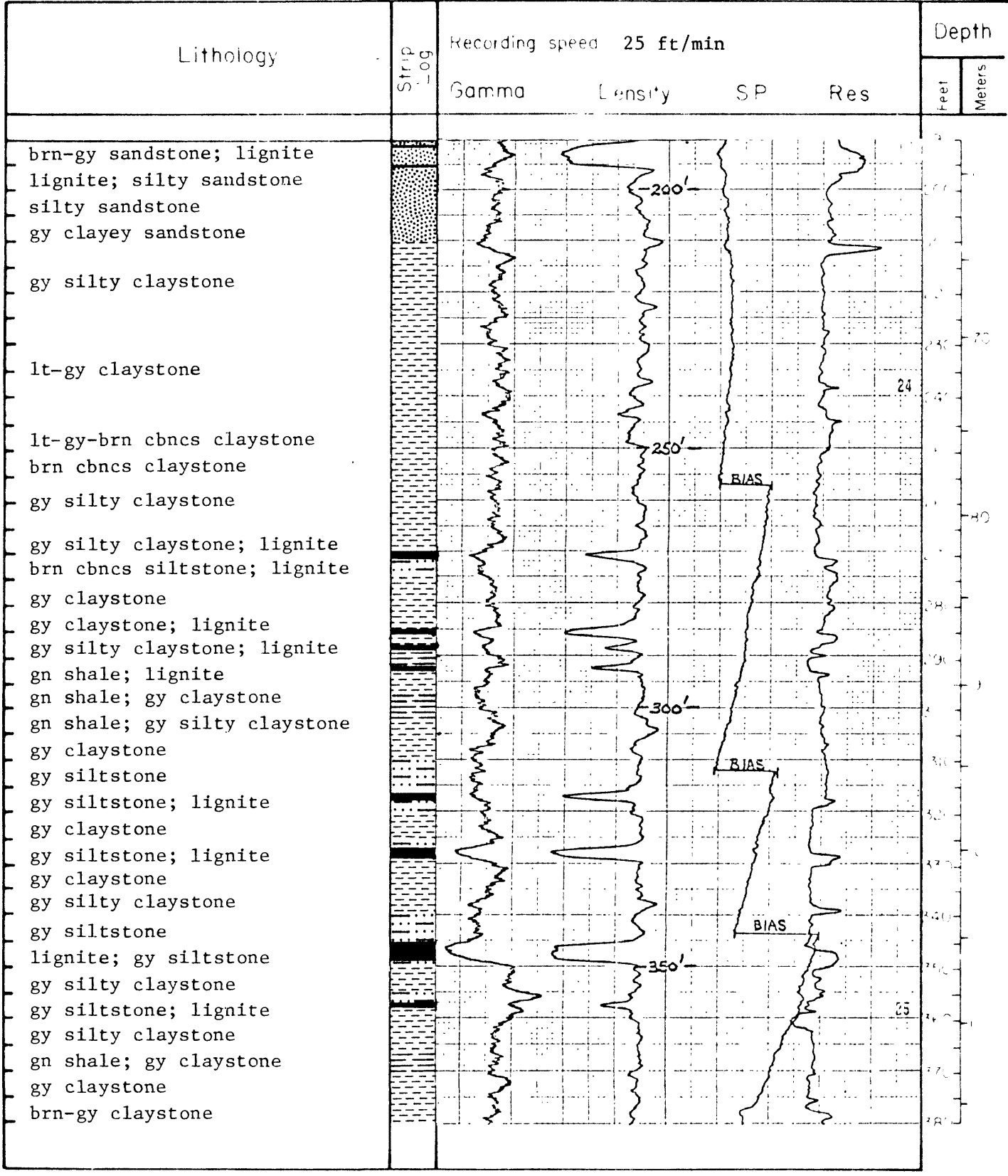
Hole no: G77-23 Map NW-16 Date 11-17-77 State: N.D. County: McLean
 Elev 2102 ft Location T.150 N., R.84W. Sec 10, Tract NW NW Drilled depth: 400 ft
 Measured 104 ft FNL, 32 ft FWL Hole size 5 1/8 in. Cored no

Remarks _____

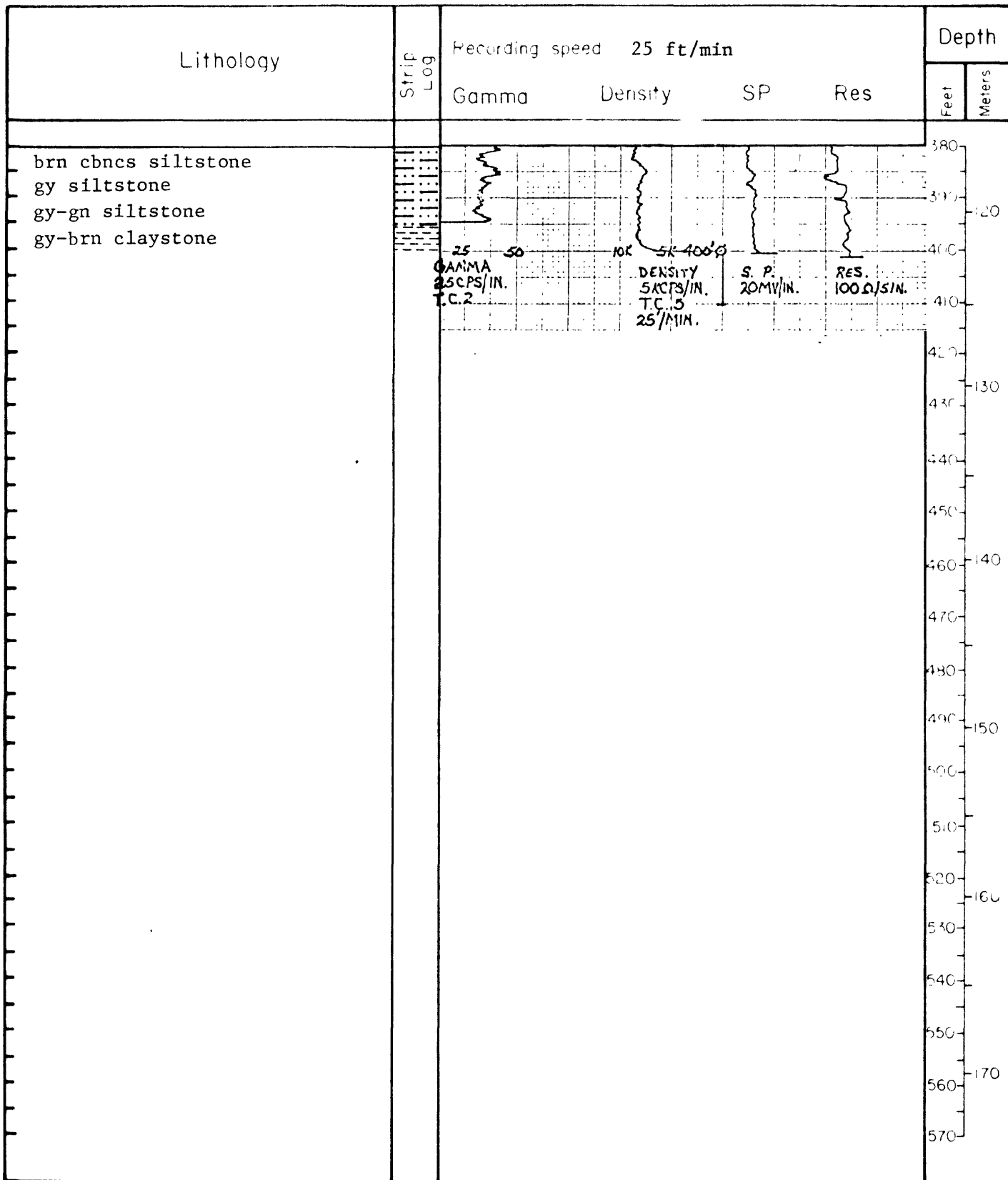
Recorded by: Mike Menge (Geologist)



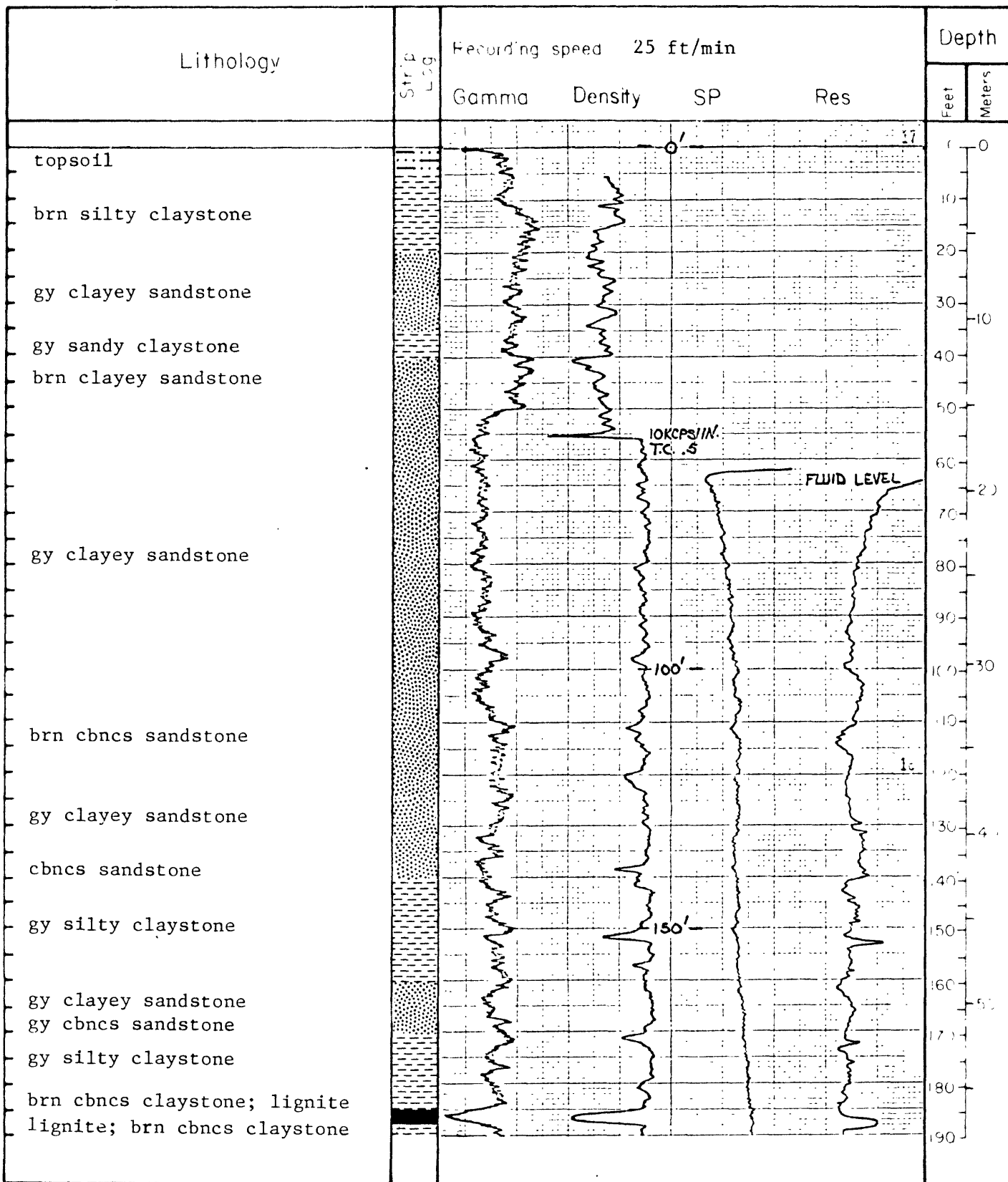
Hole no: G77-23 (continued) Map _____ Date _____ Title _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by Mike Menge (Geologist)



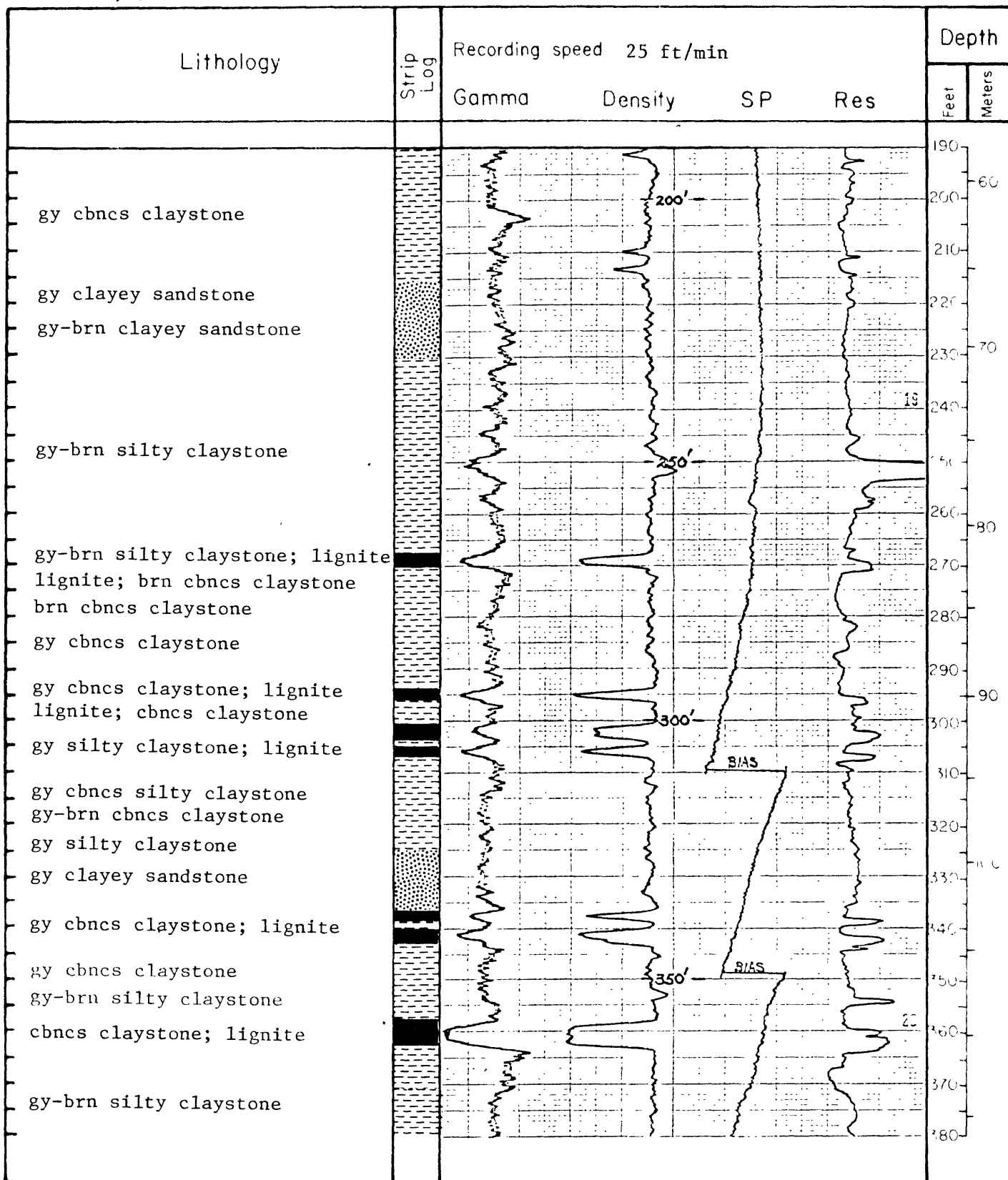
Hole no: G77-23 (continued) Map _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____
 Measured _____, _____ Hole size _____ Cased _____
 Remarks _____
 Recorded by: Mike Menge (Geologist)



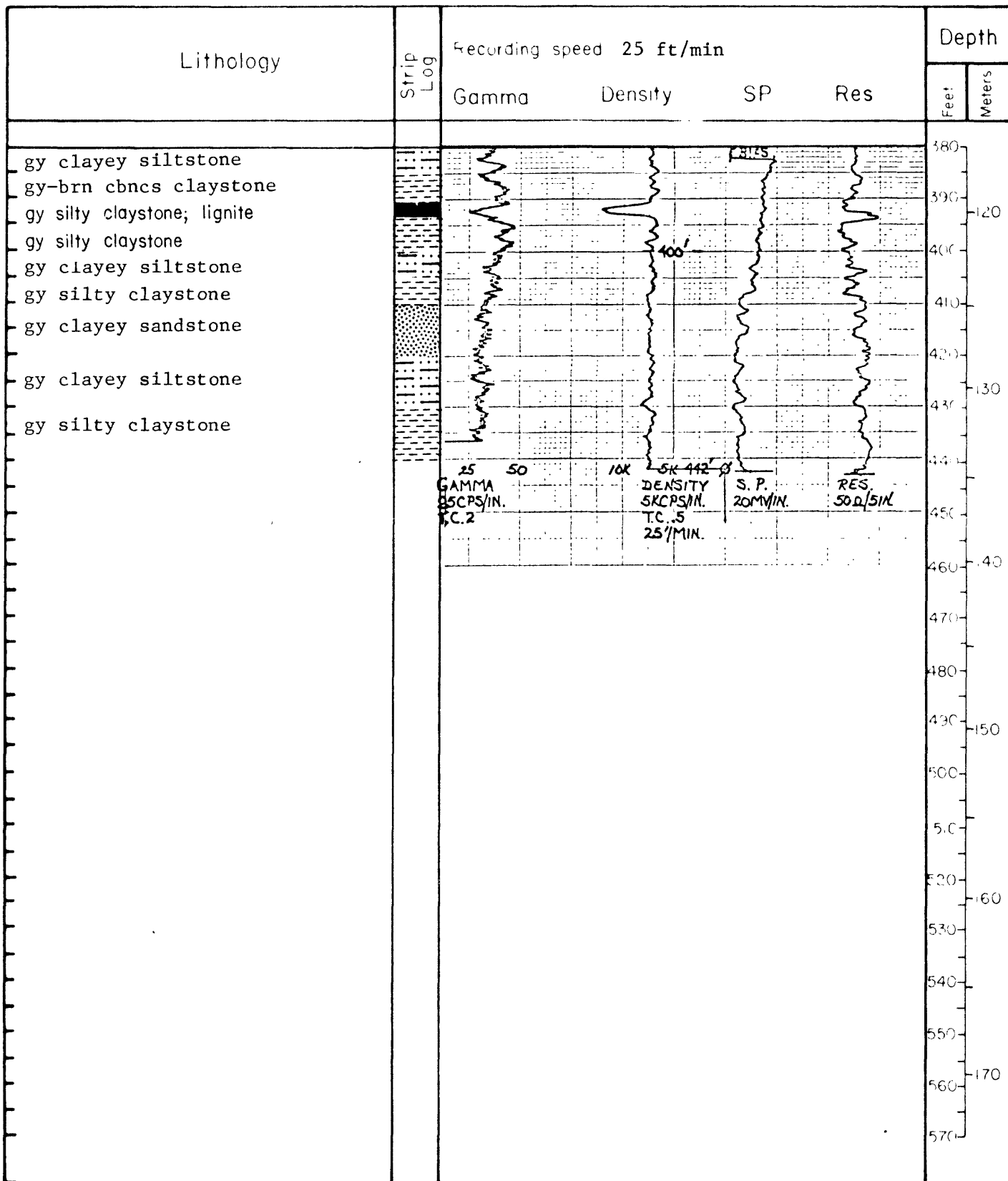
Hole no. G77-24 Map NW-16 Date 11-17-77 State N.D. County Ward
 Elev 2144 ft Location T.151N., R.84W. Sec 25, Tract SE SE Drilled depth 442 ft
 Measured 45 ft FSL, 180 ft FEL Hole size 5 1/8 in. Core no
 Remarks _____
 Recorded by Mike Menge (Geologist)



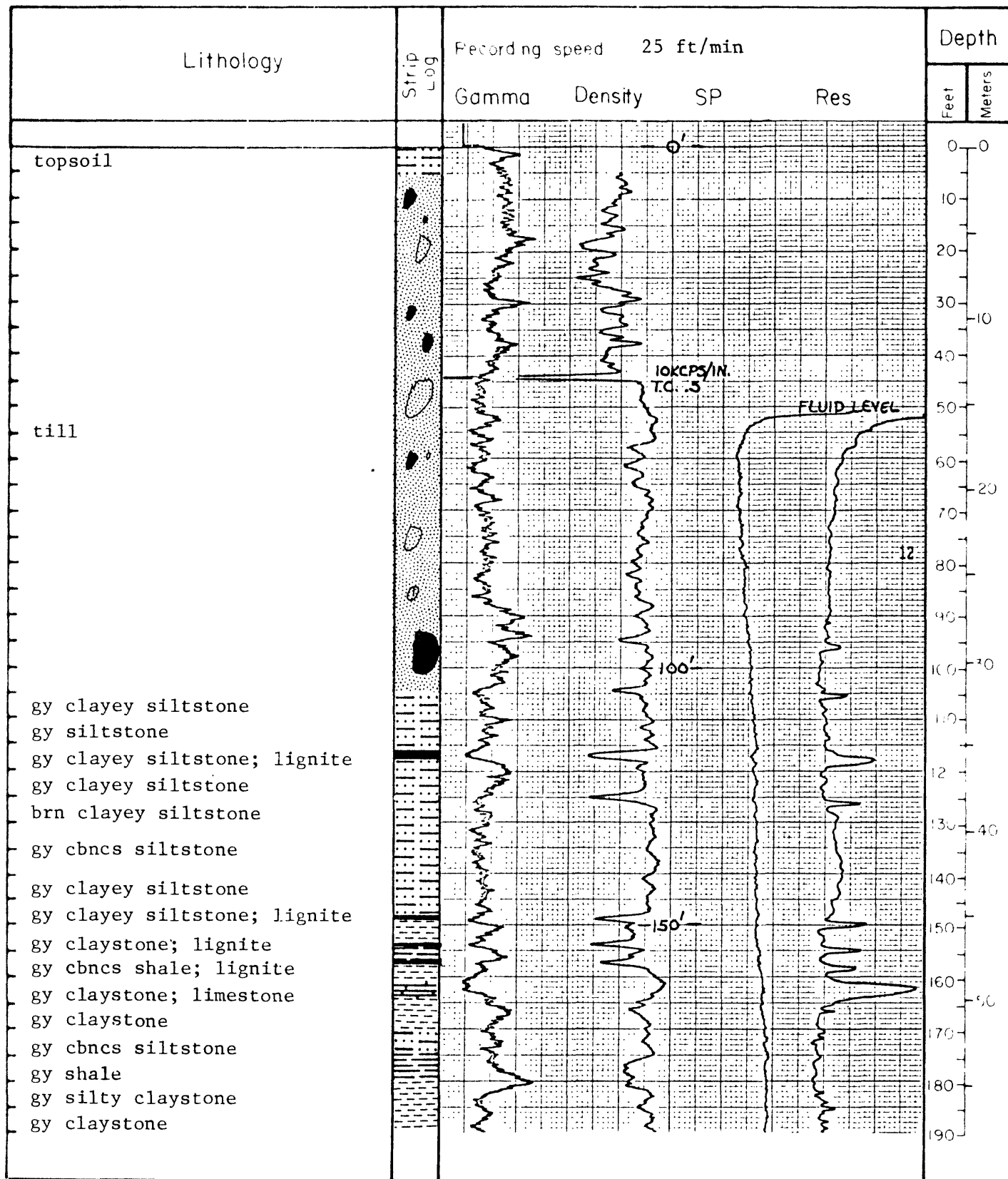
(continued)
 Hole no: G77-24 Map: _____ Date: _____ State: _____ County: _____
 Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



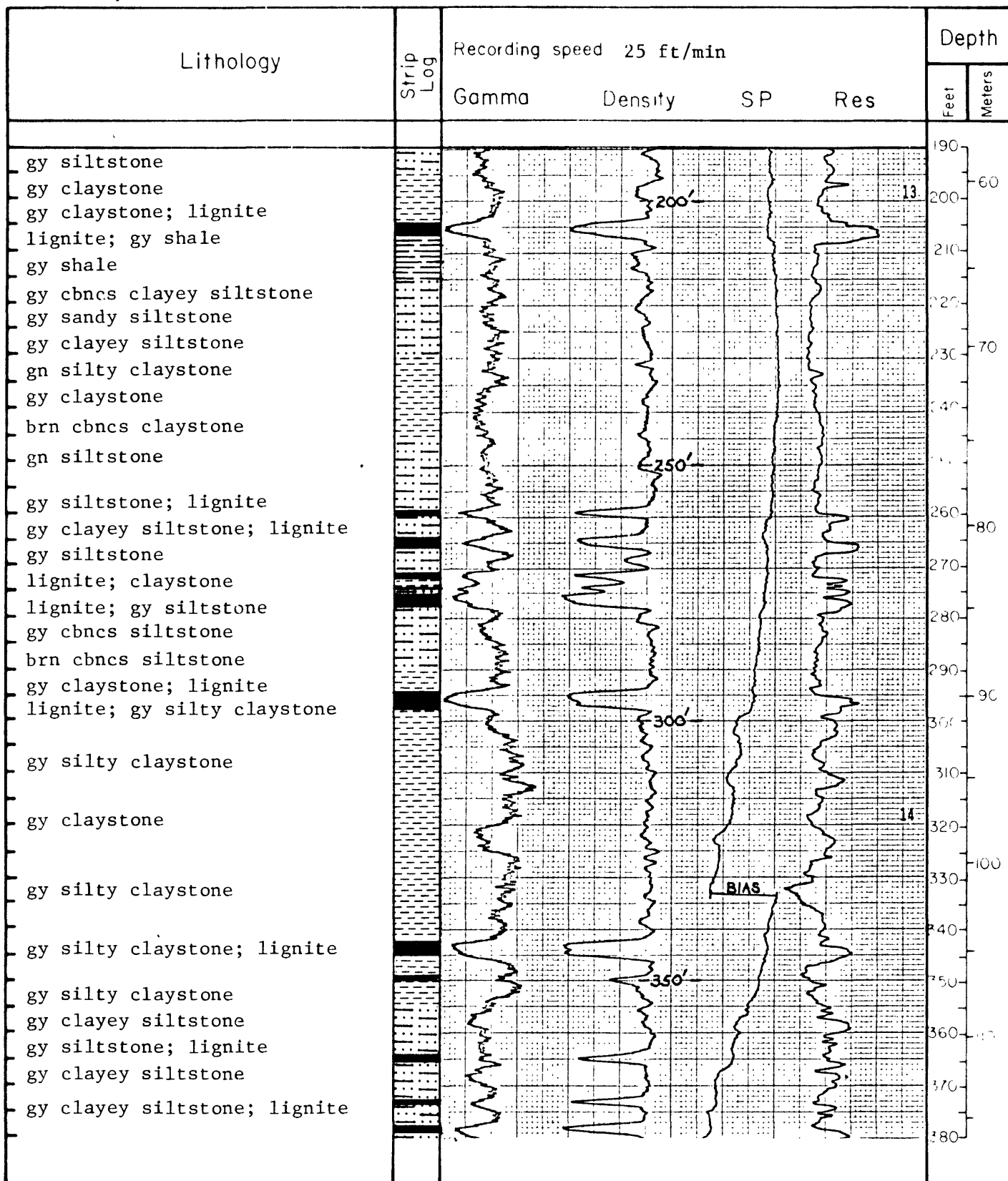
Hole no: G77-24 (continued) Map _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks _____
 Recorded by: Mike Menge (Geologist)



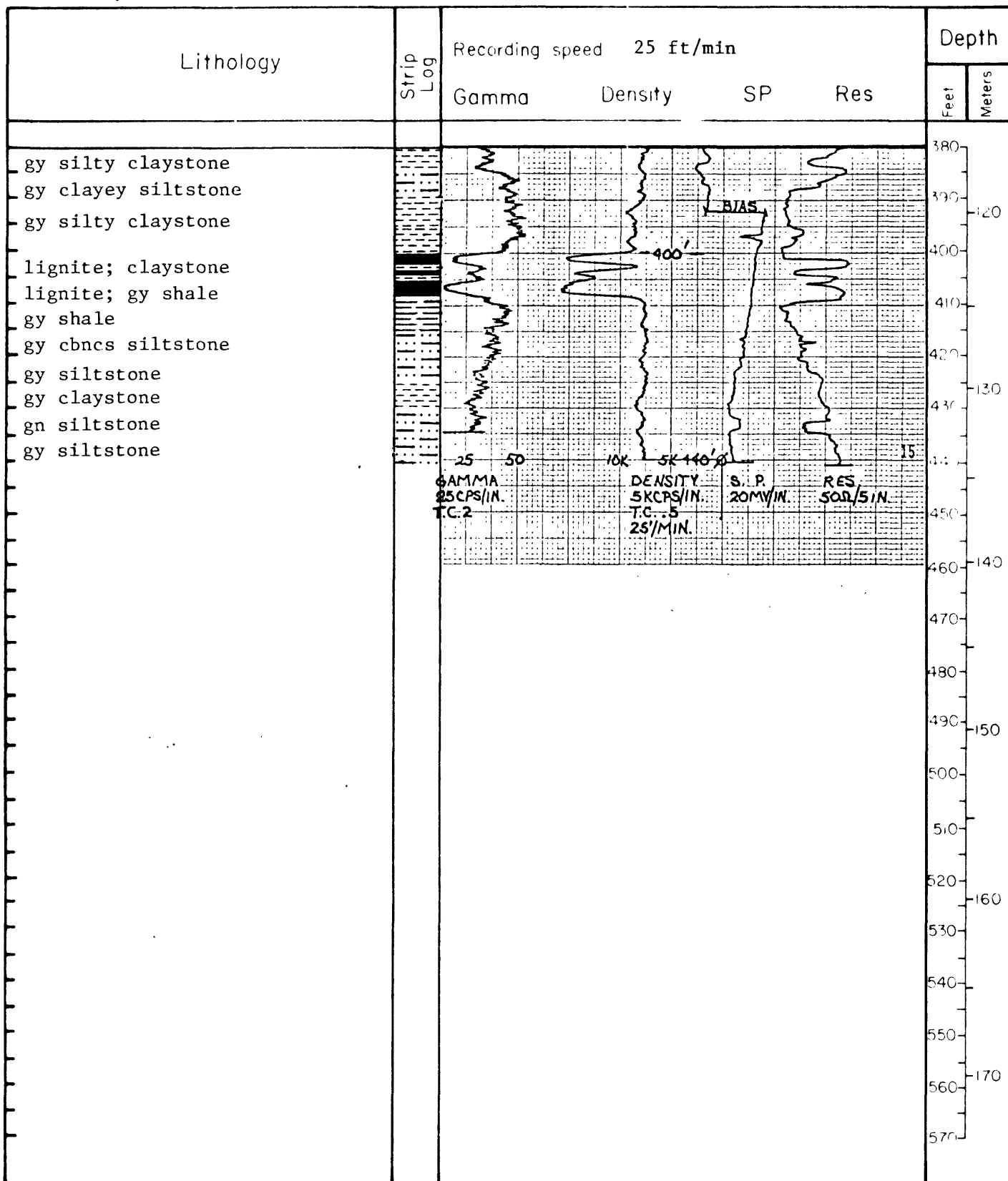
Hole no: G77-25 Map NW-16 Date 11-18-77 State N.D. County McLean
 Elev. 2069 ft Location T.150N., R.83W. Sec 17, Tract NE NE Drilled depth: 440 ft
 Measured 44 ft FNL, 620 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



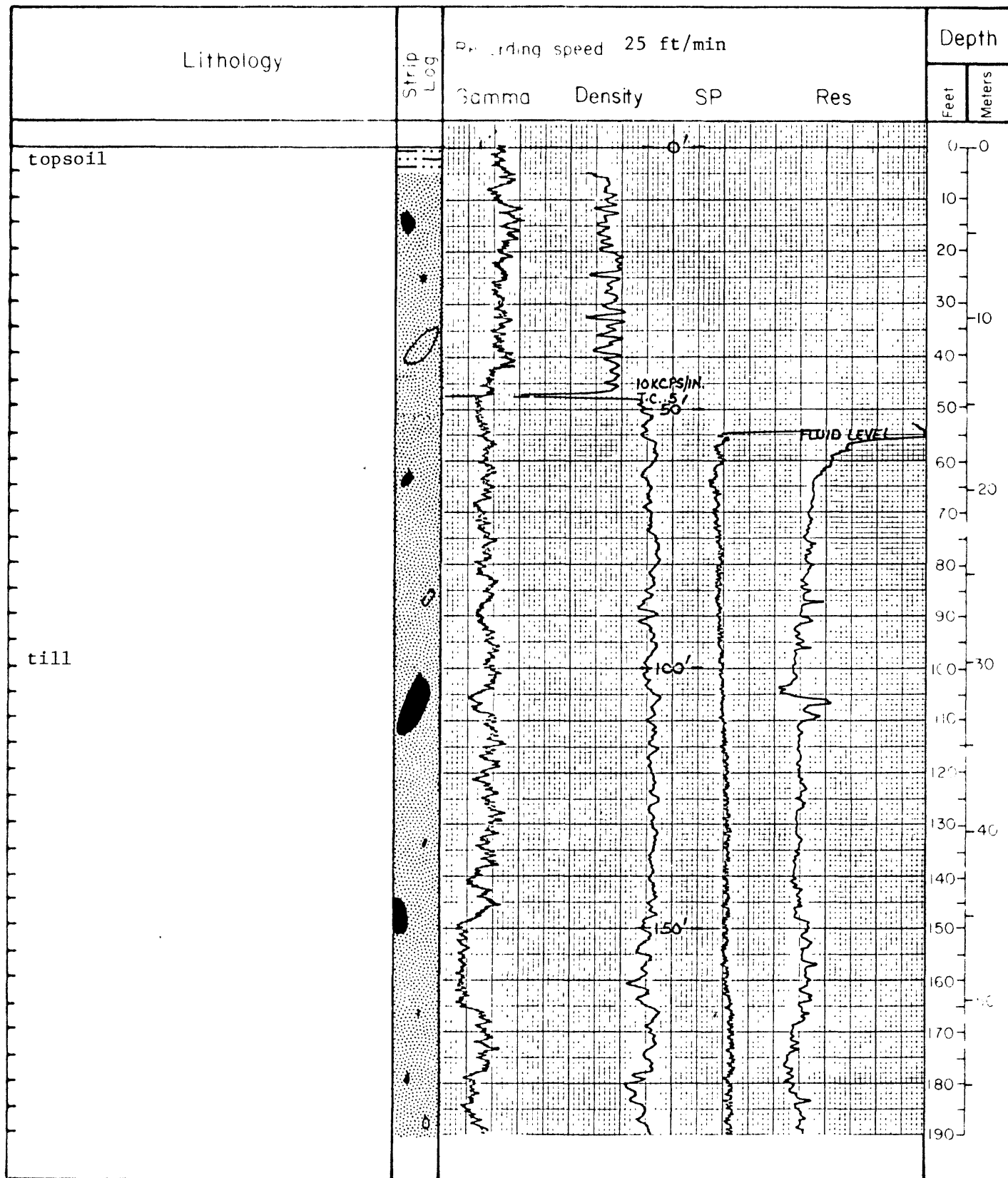
(continued)
Hole no: G77-25 Map: _____ Date: _____ State: _____ County: _____
Elev _____ Location _____ Sec. _____, Tract _____ Drilled depth: _____
Measured _____, _____ Hole size: _____ Cored _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



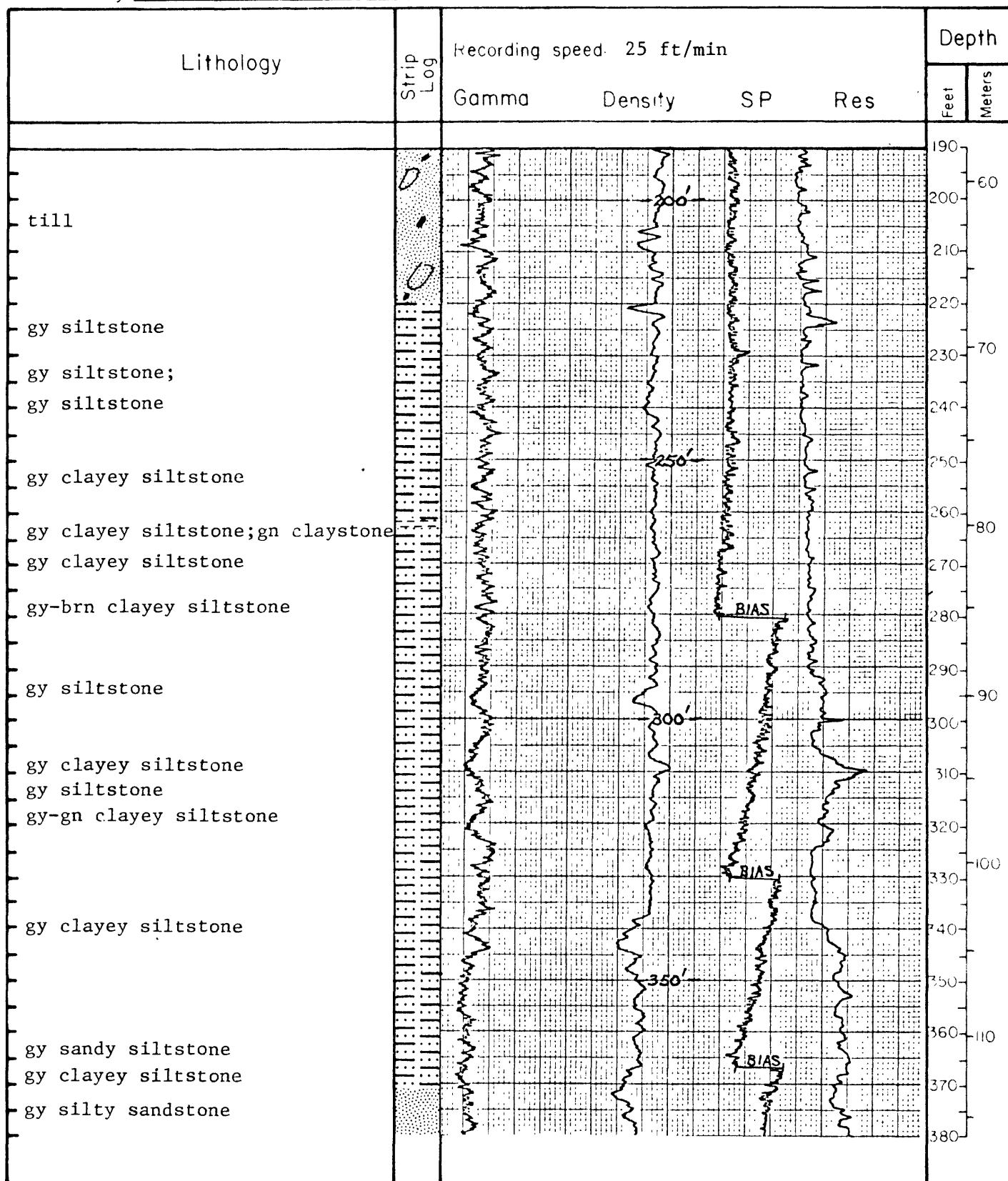
Hole no: G77-25 (continued) Map _____ Date: _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



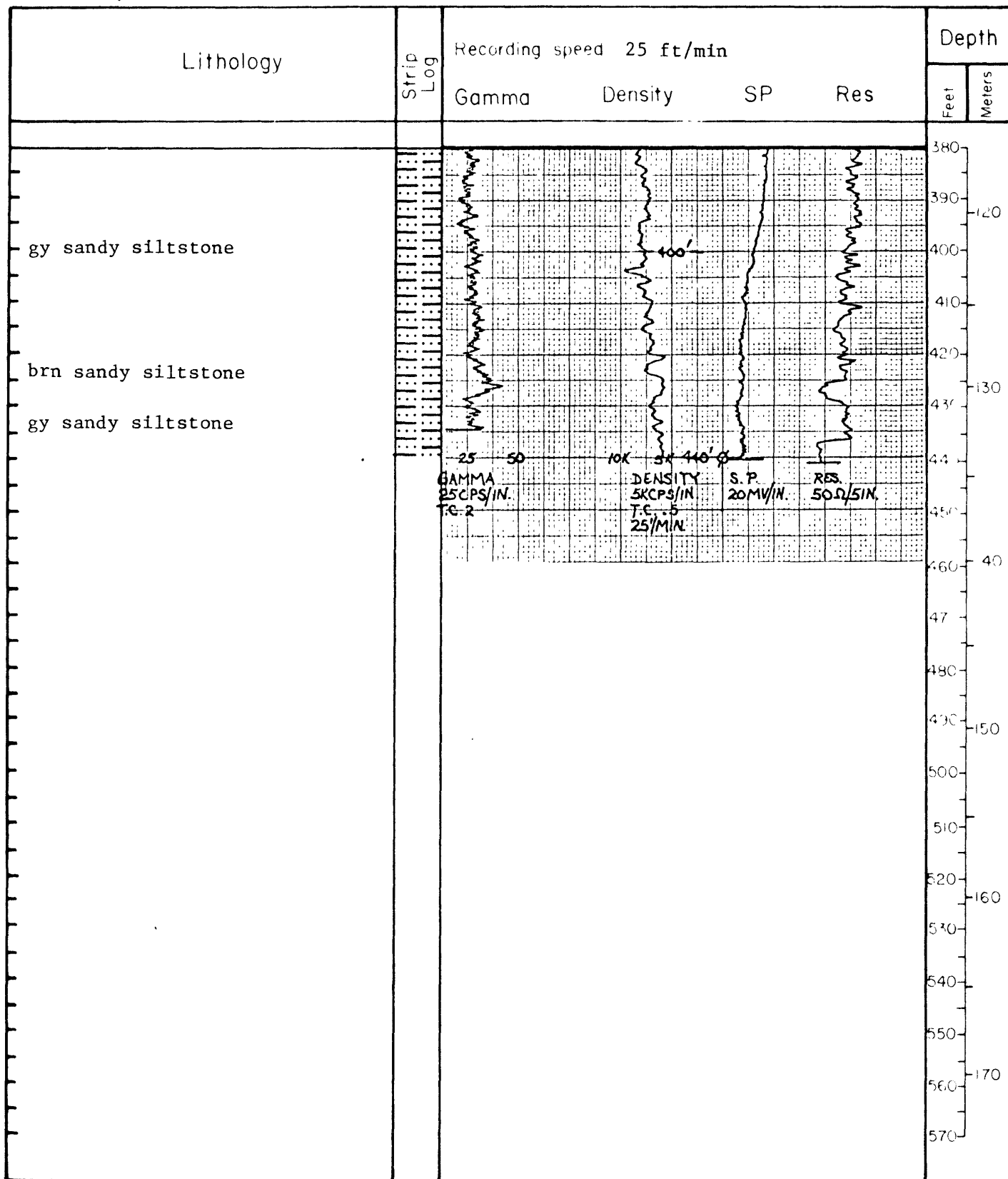
Hole no: G77-26 Map NW-16 Date 11-19-77 State N.D. County McLean
 Elev 2126 ft Location: T.150N., R.83W. Sec 32, Tract NE NE Drilled depth: 440 ft
 Measured 30 ft FNL, 92 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



(continued)
Hole no: G77-26 Map: _____ Date: _____ State: _____ County: _____
Elev. _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size: _____ Cored _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



Hole no: G77-26 (continued) Map _____ Date: _____ State _____ County _____
 Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks _____
 Recorded by: Mike Menge (Geologist)



Hole no: G77-27 Map: _____ Date: _____ State: _____ County: _____

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

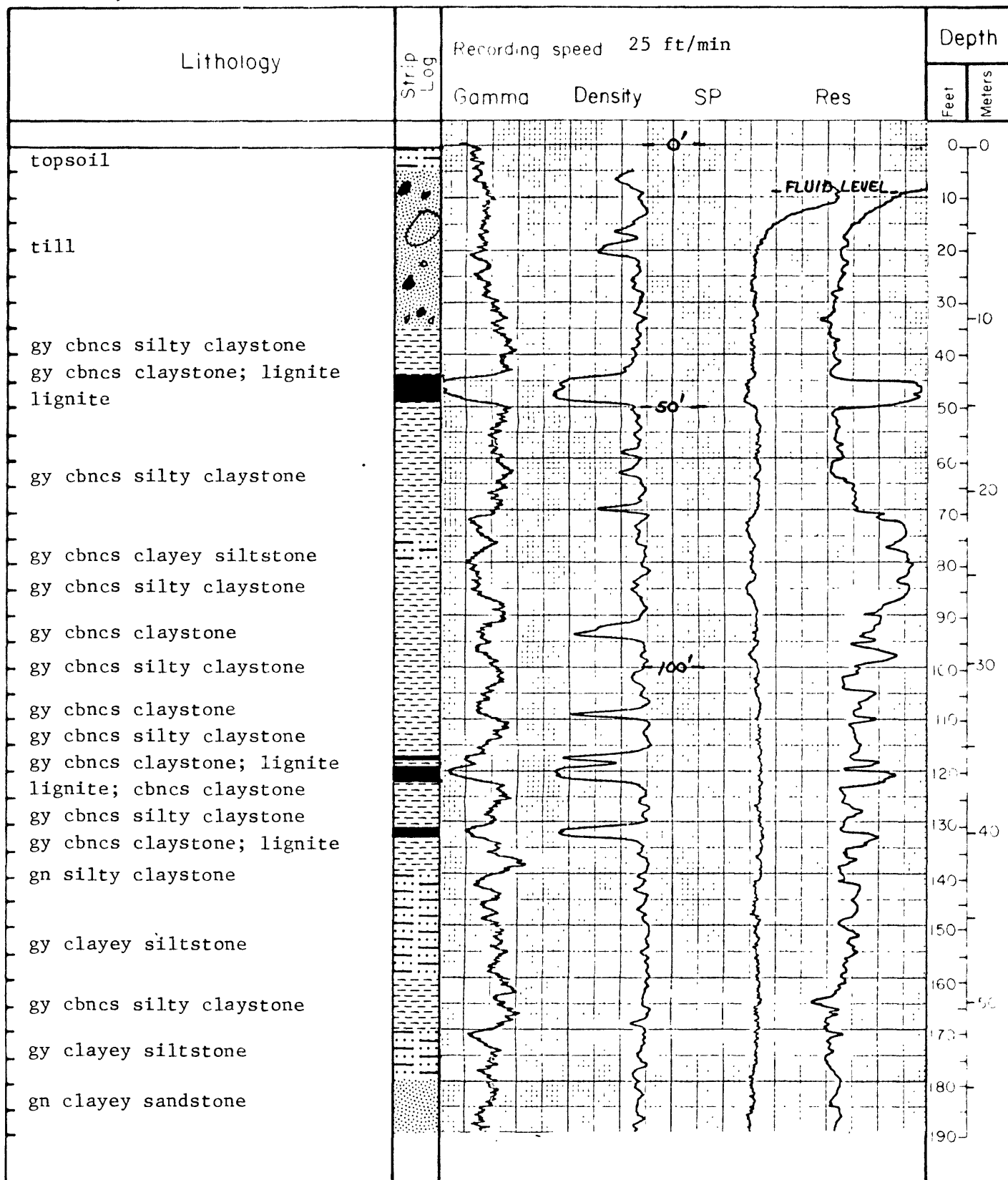
Measured: _____, _____ Hole size: _____ Cored: _____

Remarks: not drilled

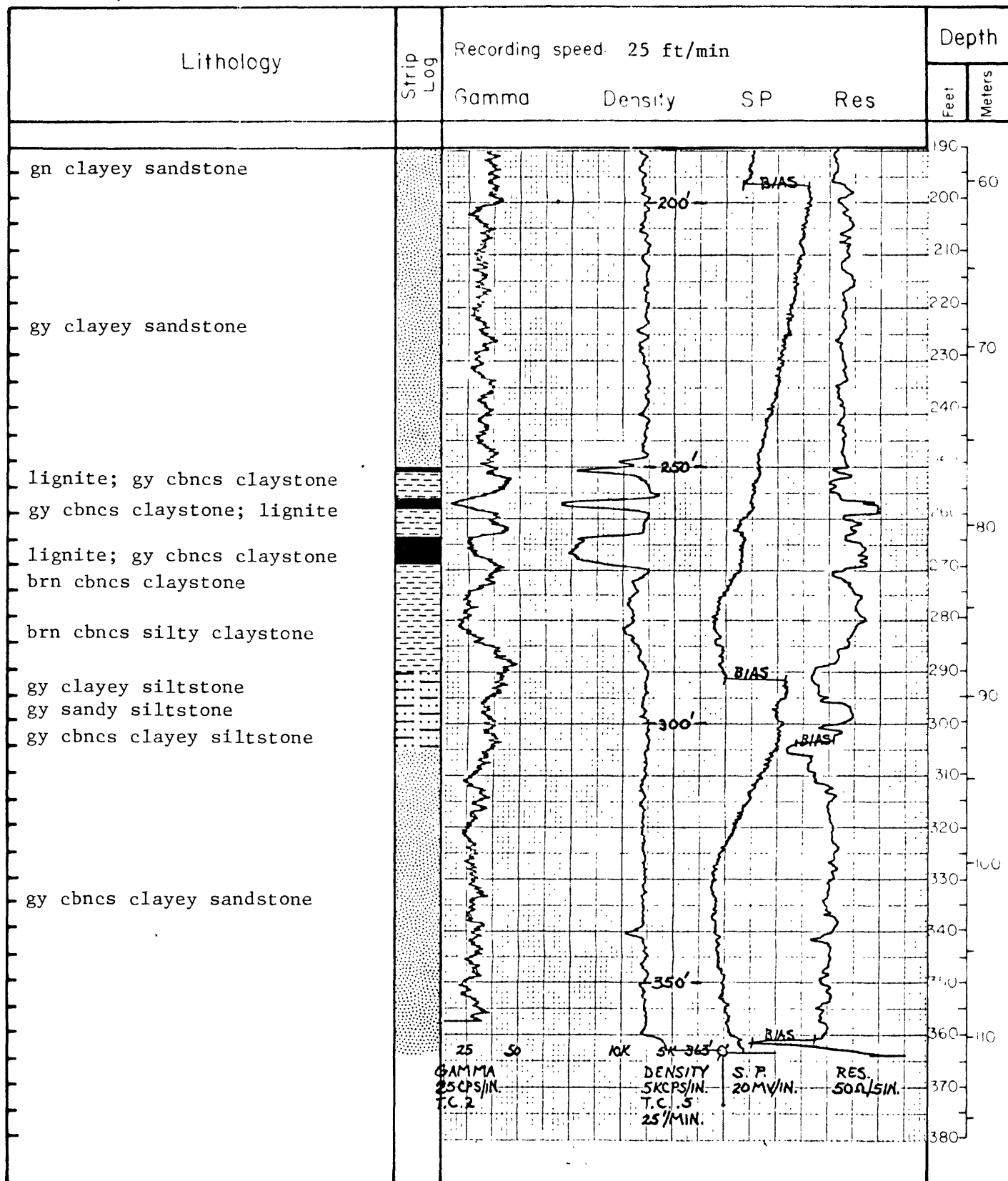
Recorded by: _____

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			

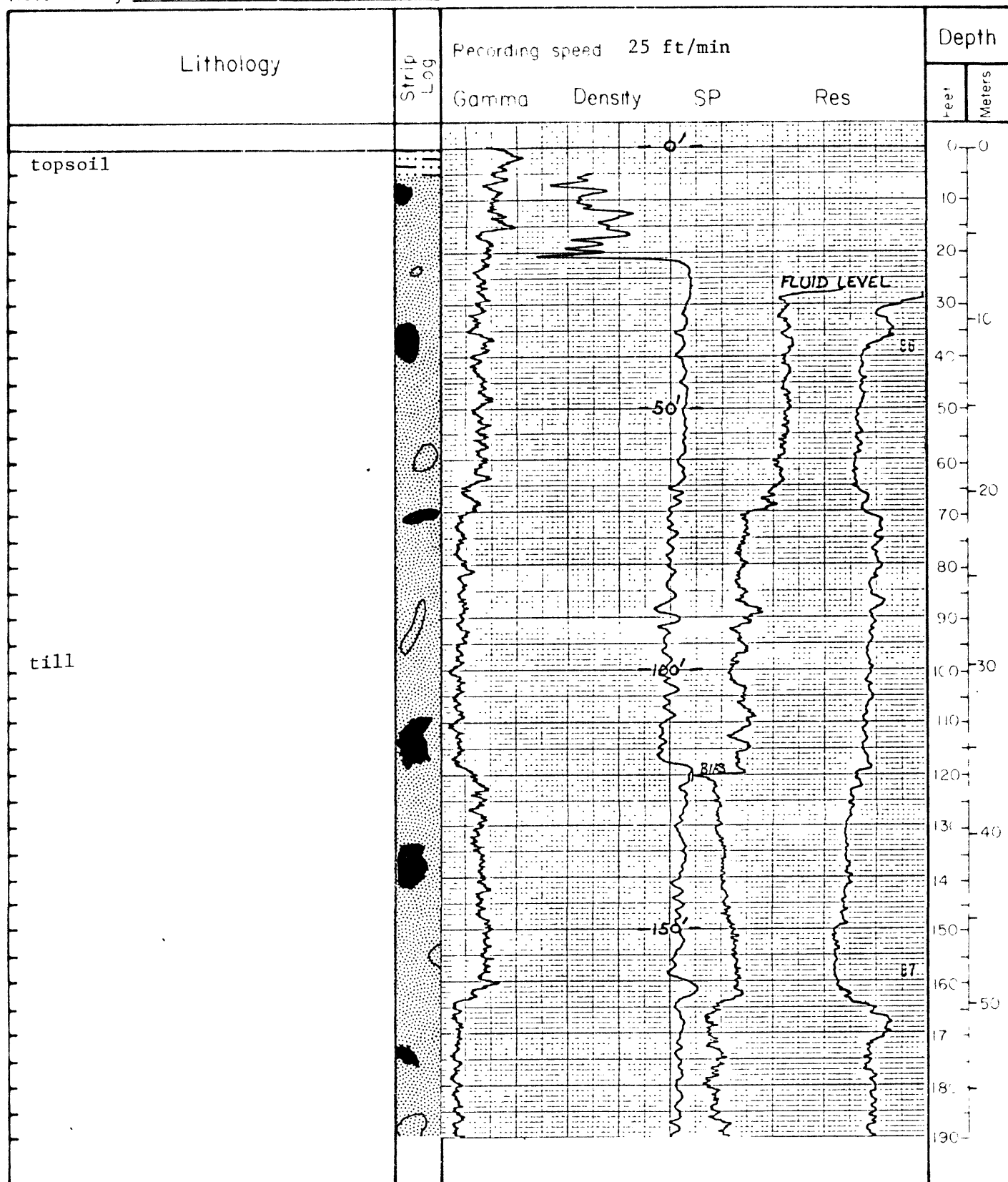
Hole no. G77-28 Map NW-16 Date 12-12-77 State N.D. County McLean
 Elev 2008 ft Location T.149N., R.82W. Sec. 8, Tract SW SE Drilled depth: 363 ft
 Measured 13 ft FSL, 2565 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



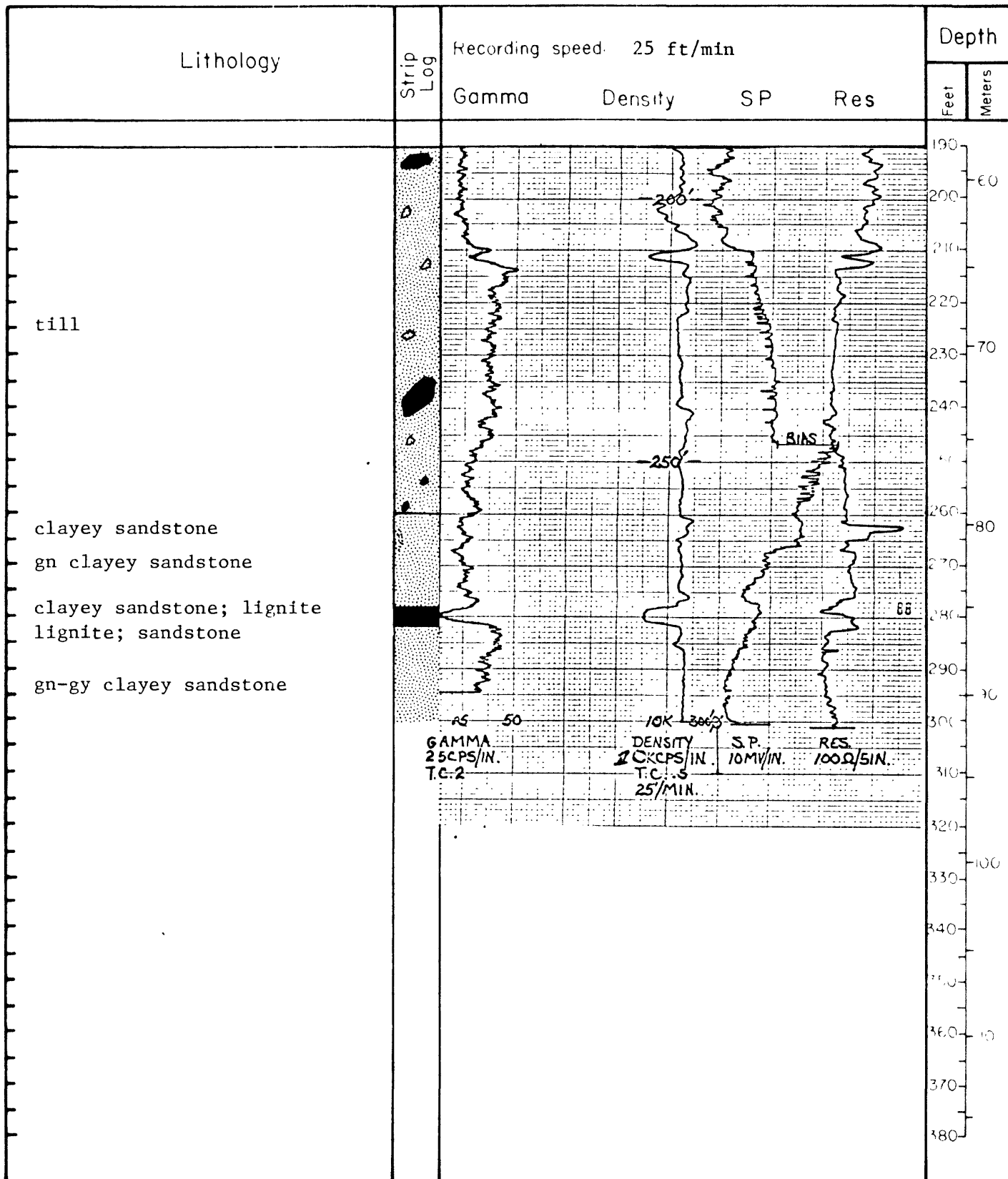
Hole no: G77-28 (continued) Map _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



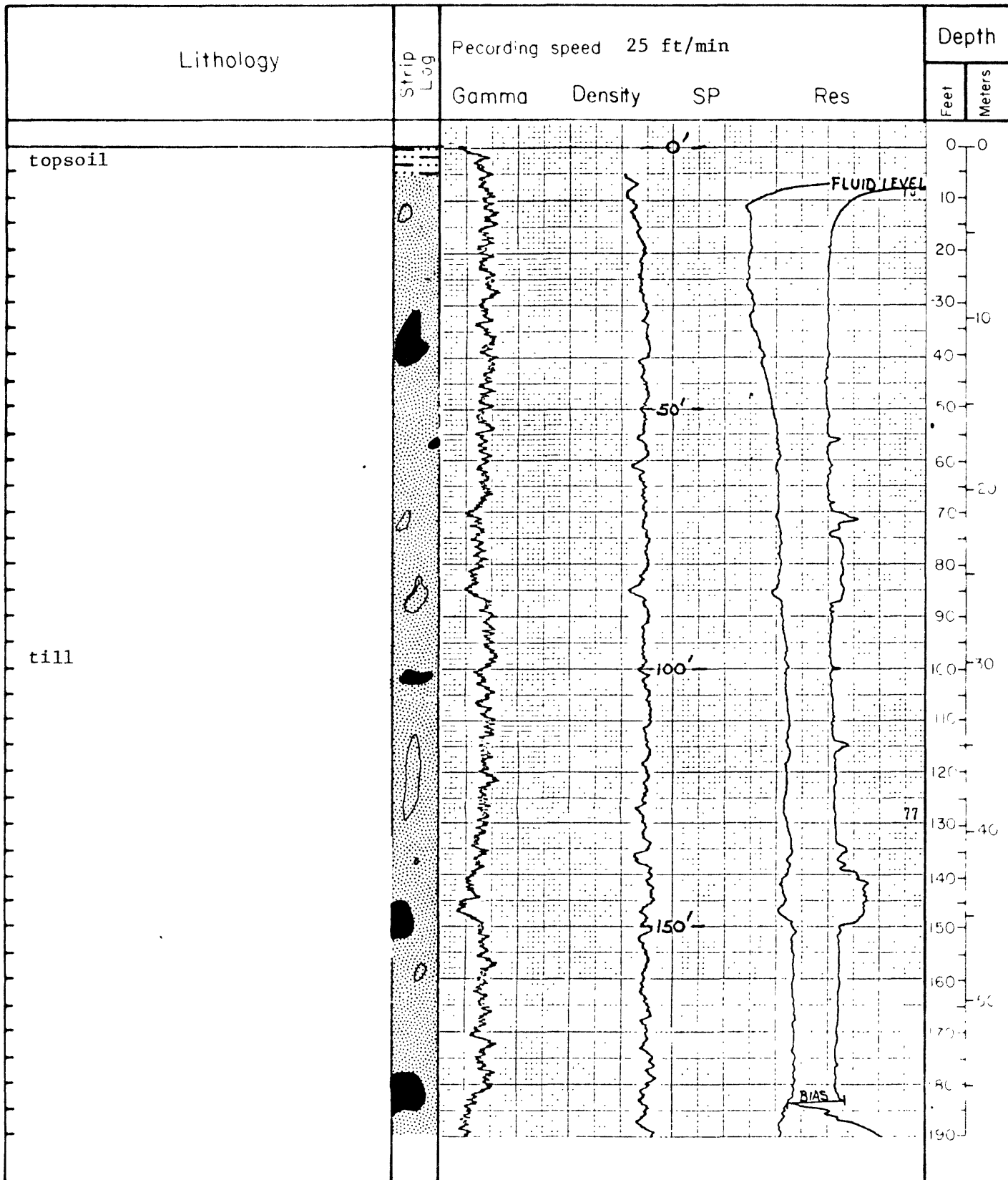
Hole no: G77-29 Map NW-16 Date 11-8-77 State N.D. County McLean
 Elev 1968 ft Location T.150N., R.82W. Sec 26, Tract SW NW Drilled depth 300 ft
 Measured 2224 ft FNL, 55 ft FWL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by Mike Menge (Geologist)



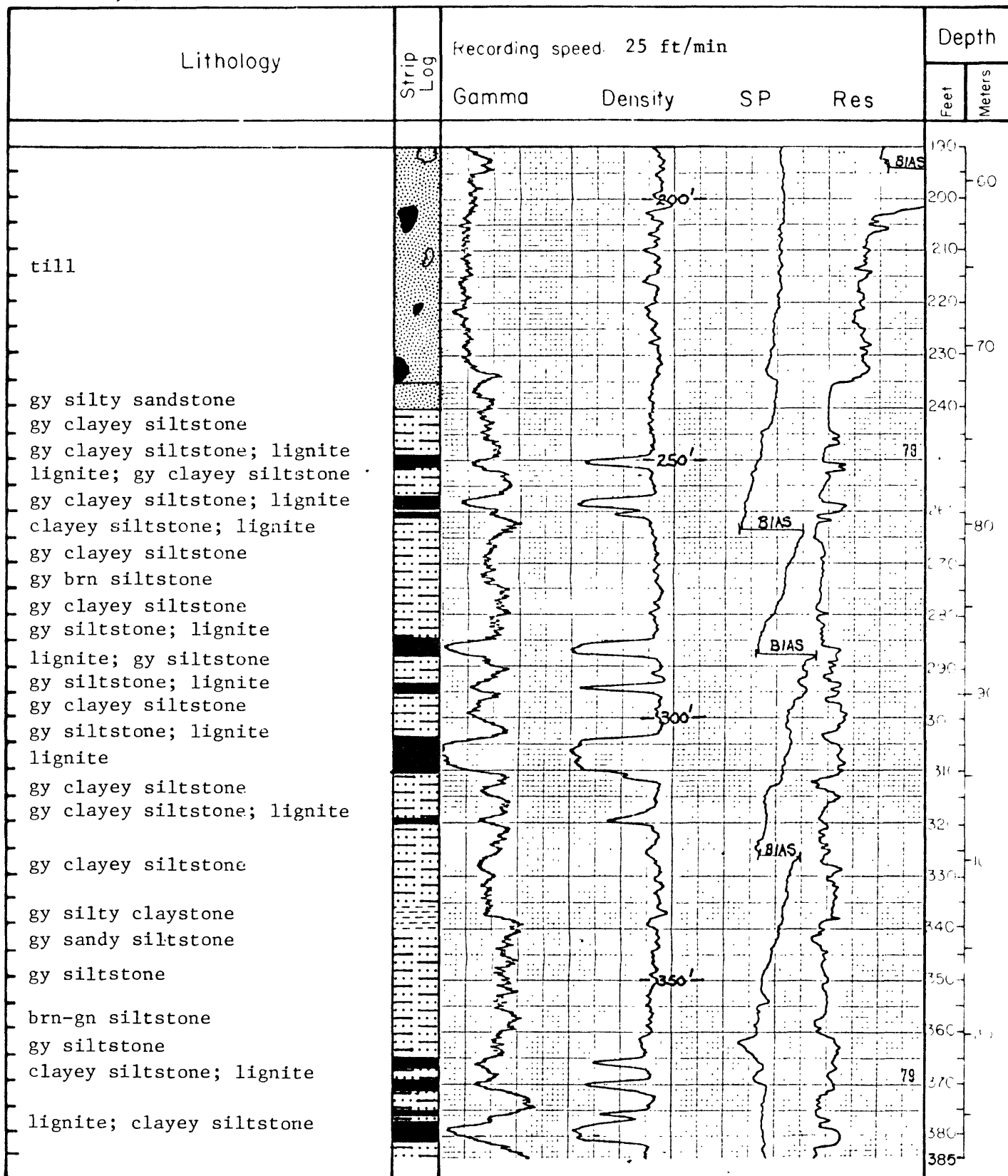
Hole no: G77-29 (continued) Map _____ Date: _____ State: _____ County: _____
 Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size _____ Cored: _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



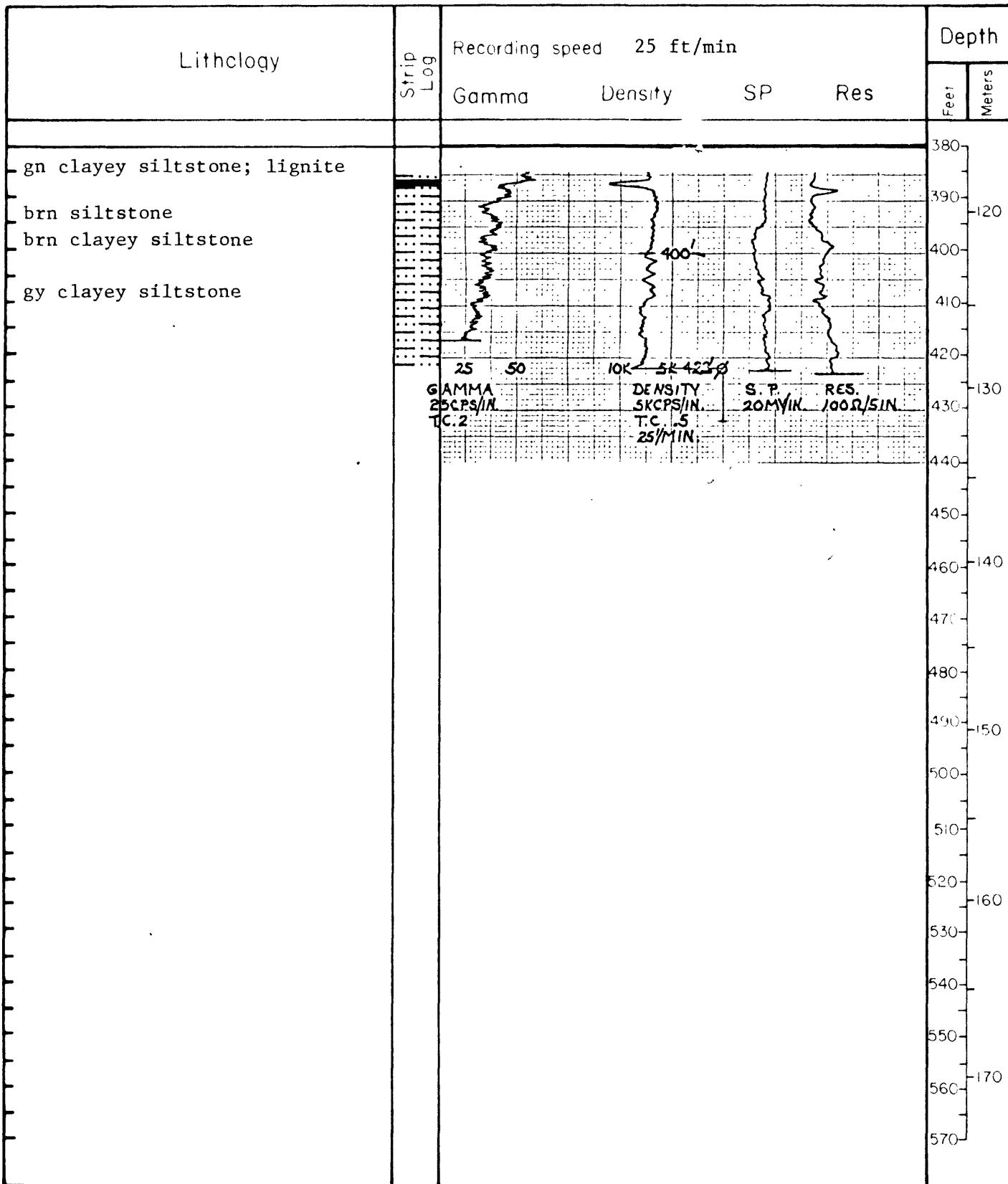
Hole no: G77-30 Map NW-16 Date: 11-9-77 State: N.D. County McLean
 Elev 2112 ft Location T.150N., R.82W. Sec. 9, Tract SW SE Drilled depth: 422 ft
 Measured 48 ft FSL, 2394 ft FEL Hole size: 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



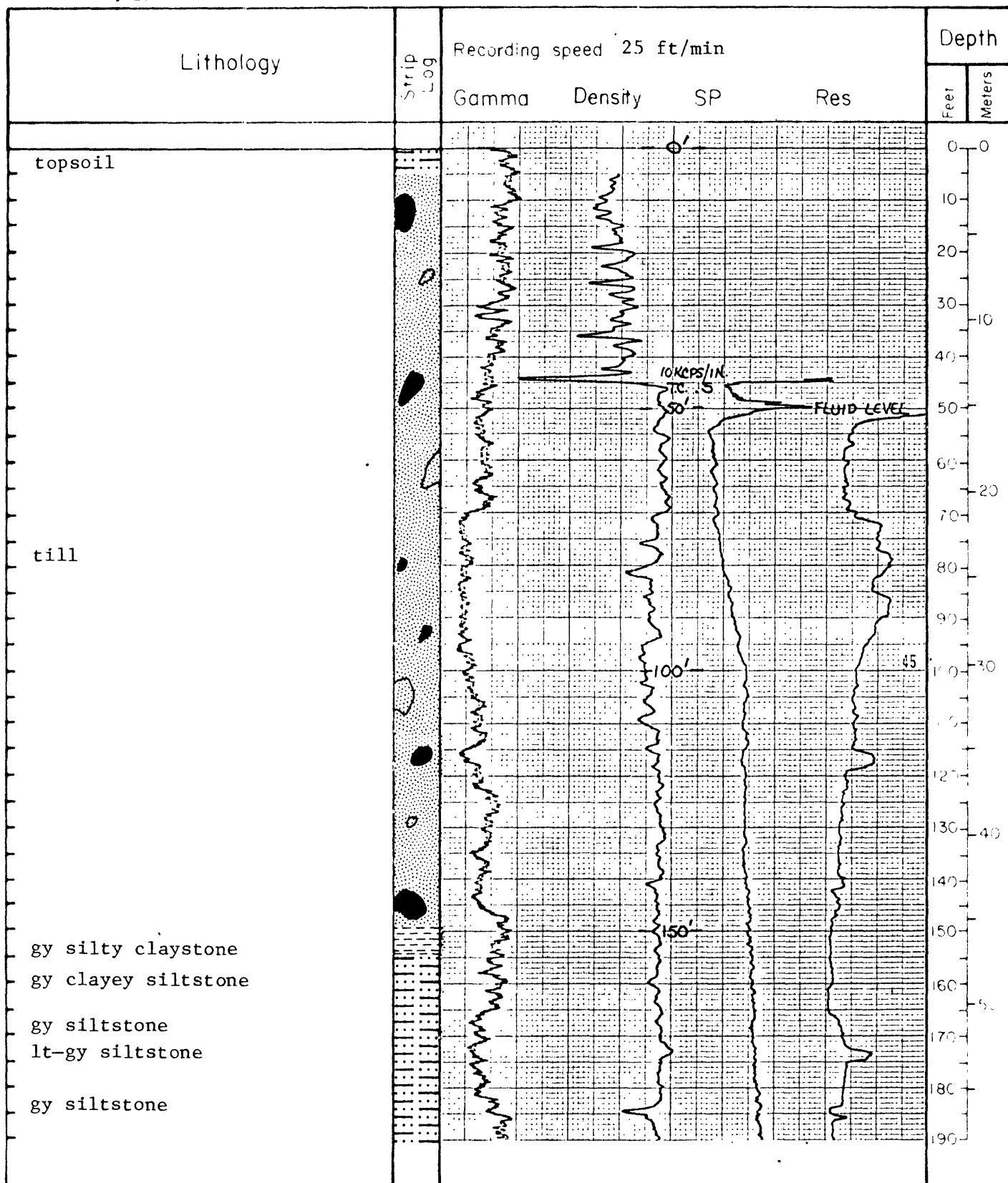
(continued)
Hole no: G77-30 Map _____ Date: _____ State: _____ County: _____
Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured _____, _____ Hole size _____ Cored _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



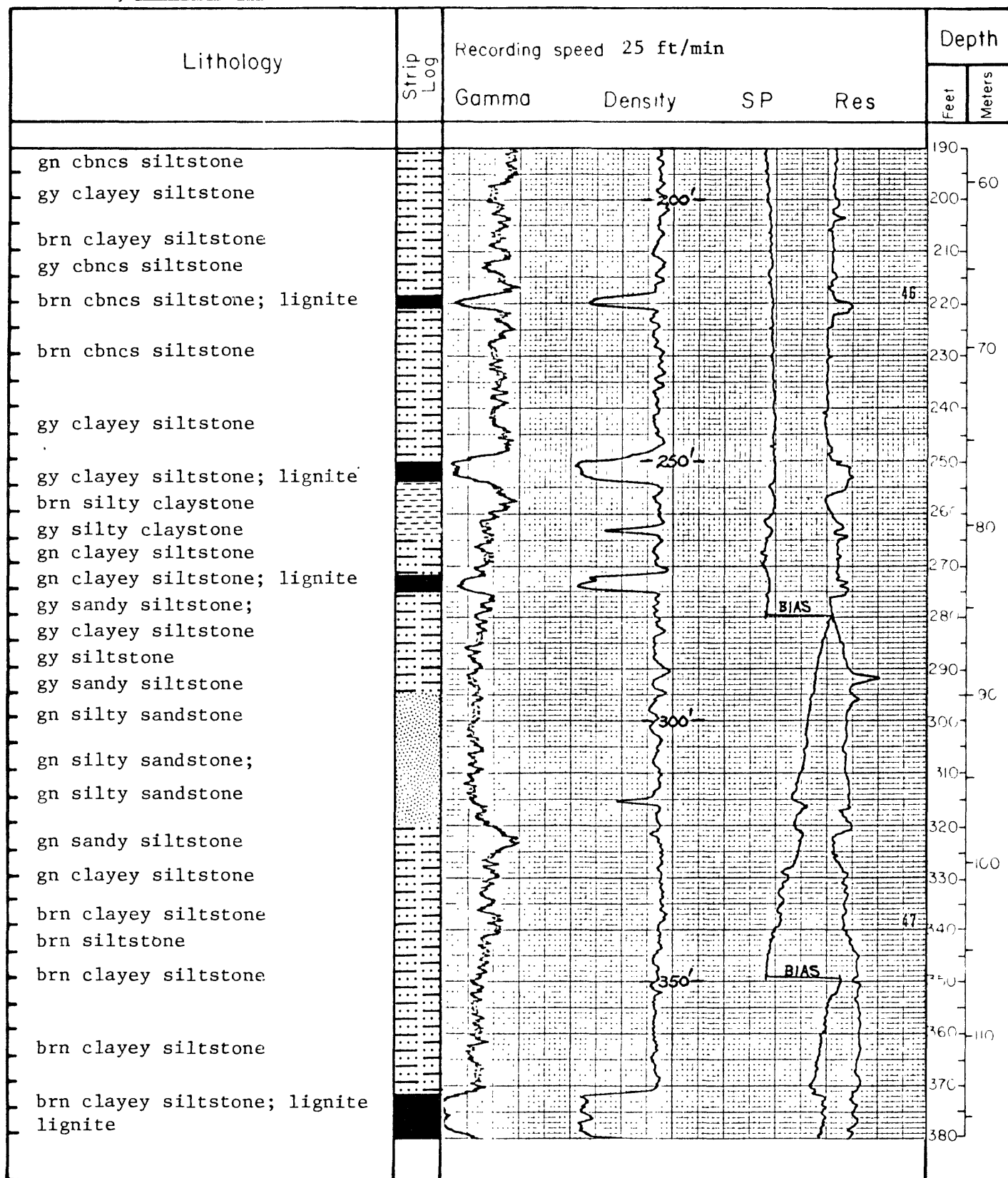
Hole no: G77-30 (continued) Map _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size _____ Cored _____
 Remarks _____
 Recorded by: Mike Menge (Geologist)



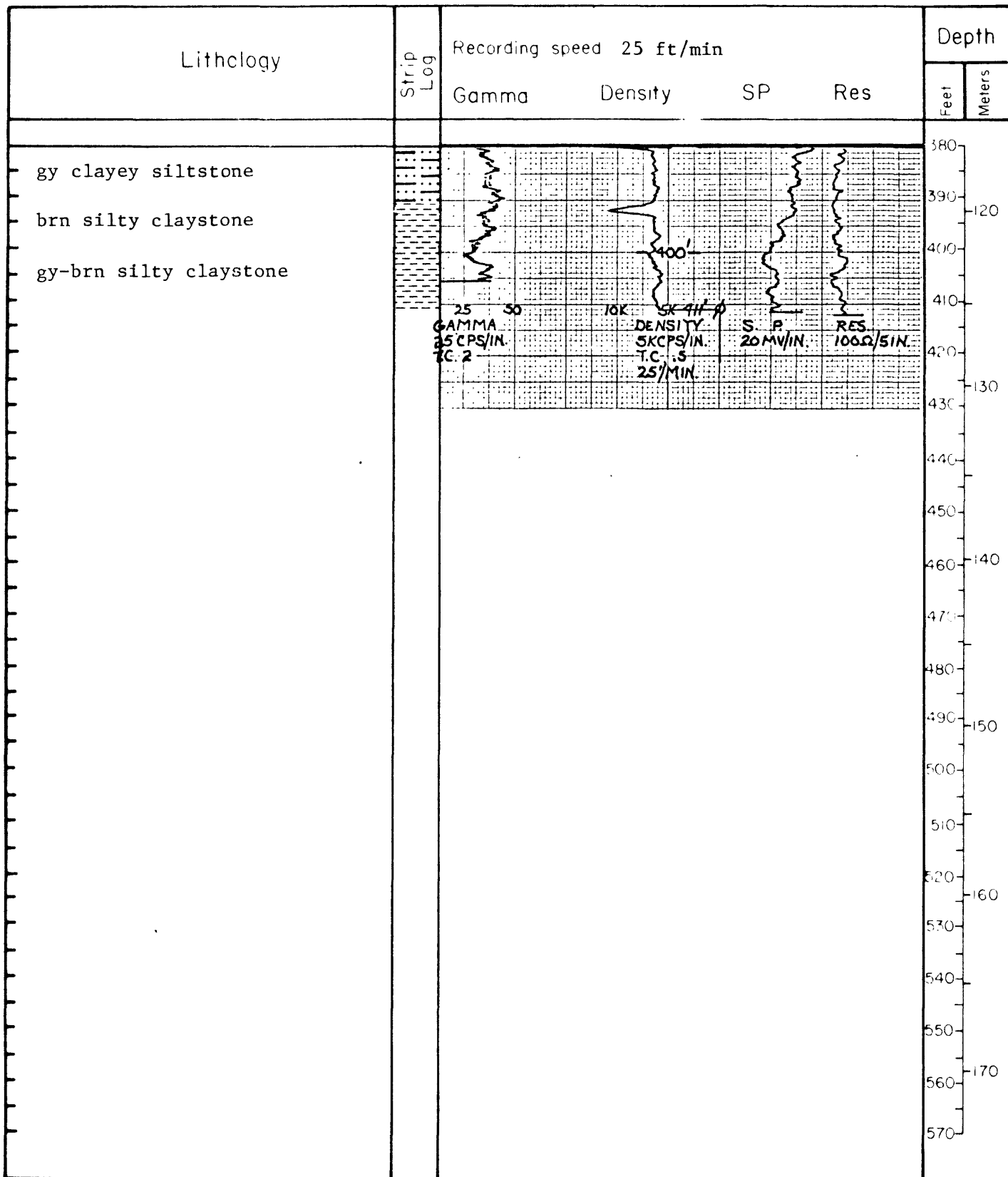
Hole no: G77-31 Map NW-16 Date 11-13-77 State: N.D. County: Ward
 Elev 2131 ft Location: T.151N., R.83W. Sec. 26, Tract NW SW Drilled depth: 411 ft
 Measured 1425 ft FSL, 14 ft FWL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by Mike Menge (Geologist)



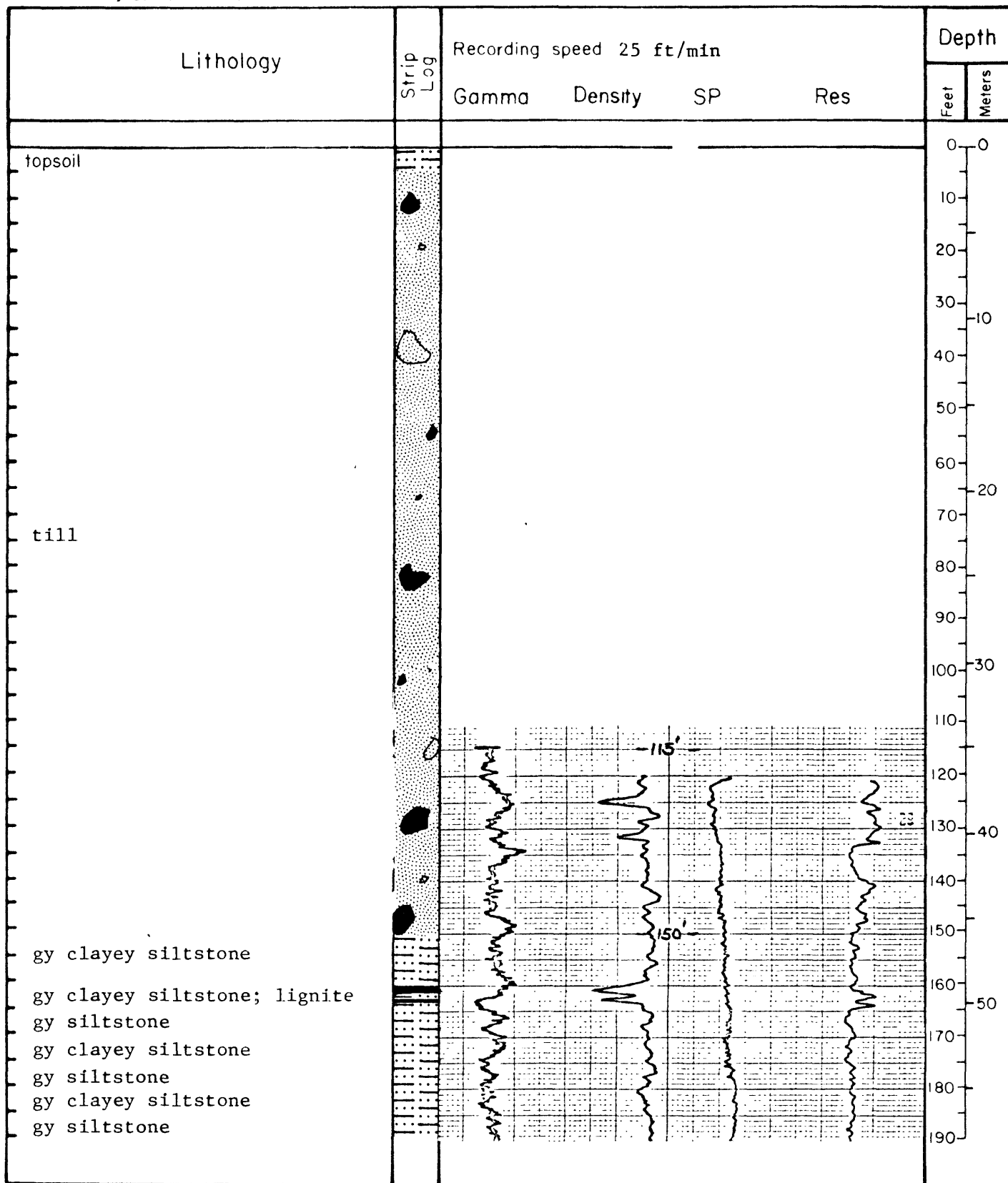
(continued)
Hole no: G77-31 Map: _____ Date: _____ State: _____ County: _____
Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size: _____ Cored: _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



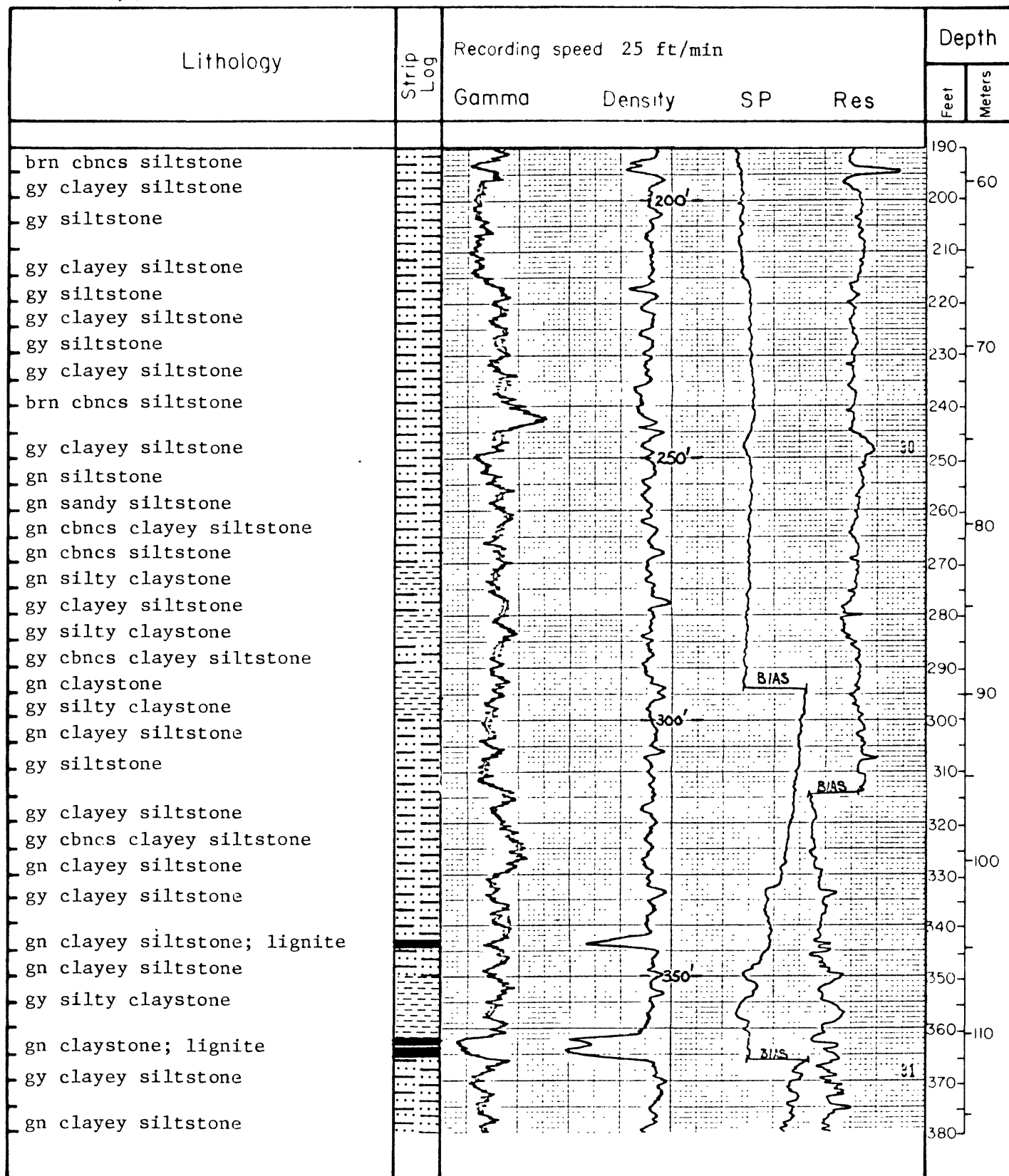
Hole no: G77-31 (continued) Map _____ Date: _____ State: _____ County: _____
 Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks _____
 Recorded by: Mike Menge (Geologist)



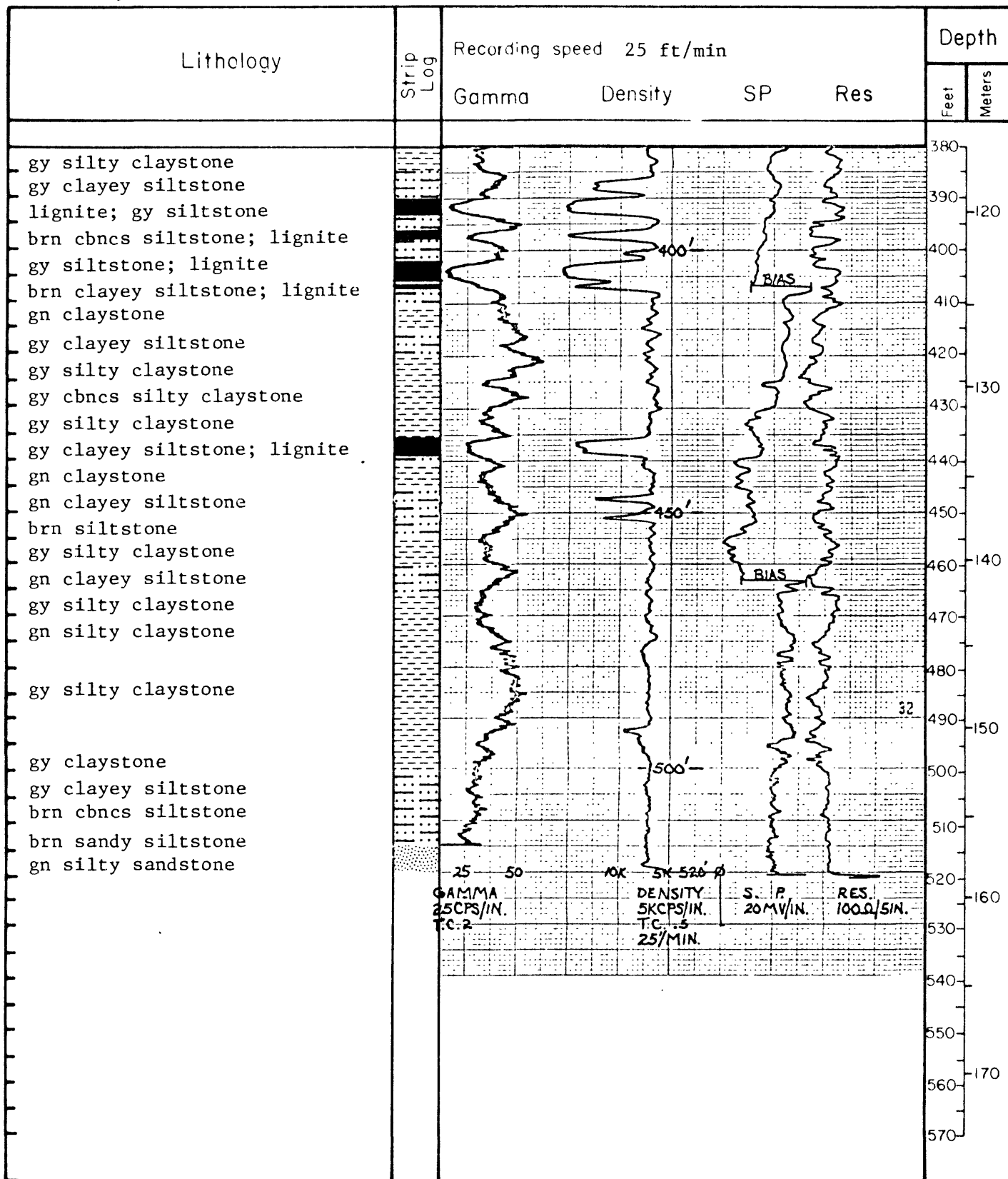
Hole no: G77-32 Map: NW-16 Date: 11-16-77 State: N.D. County: Ward
 Elev: 2167 ft Location: T.151N., R.83W. Sec. 6, Tract NE SE Drilled depth: 520 ft
 Measured 1484 ft FSL, 15 ft FEL Hole size 5 1/8 in. Cored no
 Remarks: Logging probe stuck in till and unable to complete first 110 feet.
 Recorded by: Mike Menge



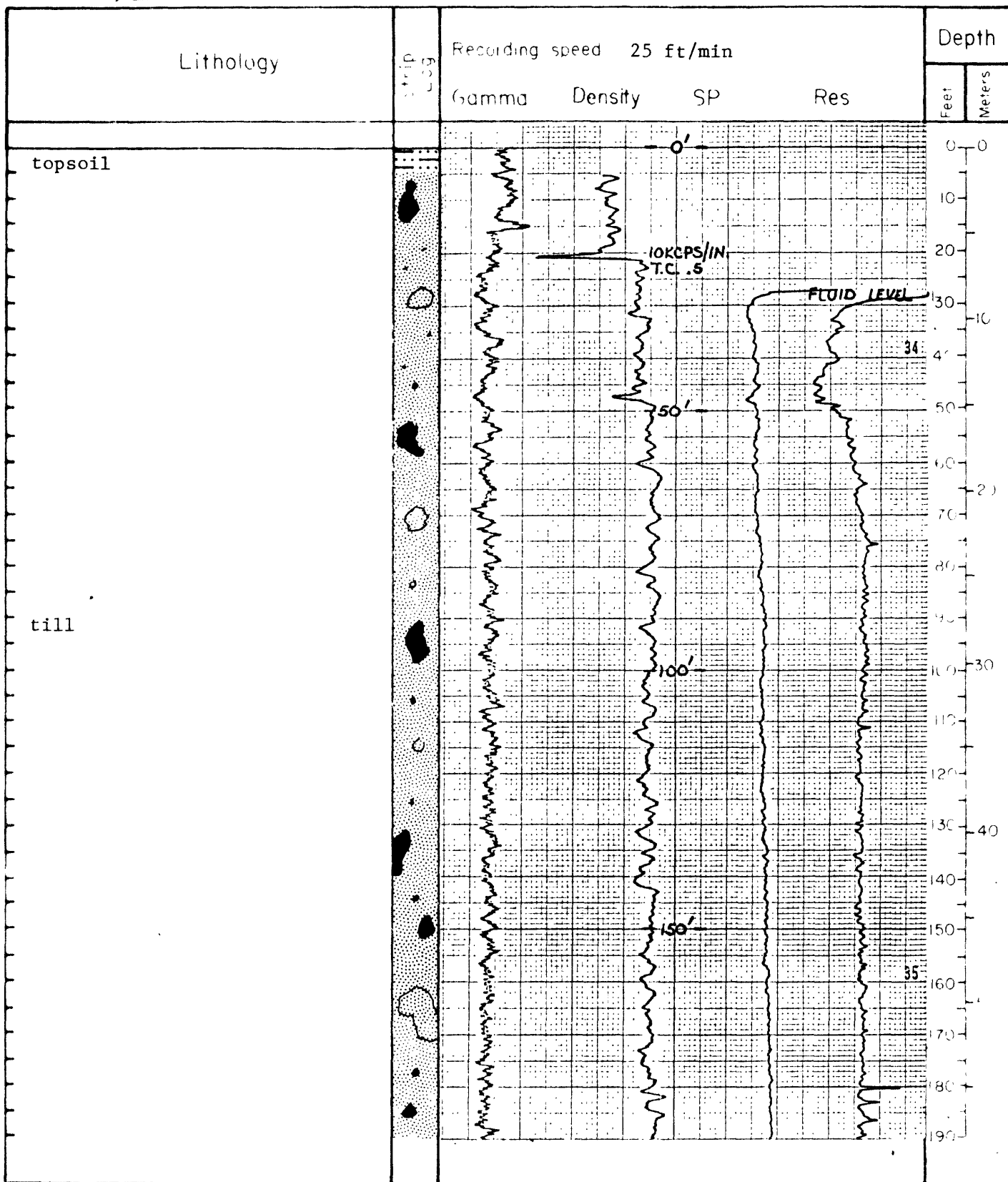
(continued)
Hole no: G77-32 Map _____ Date: _____ State: _____ County: _____
Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size: _____ Cored: _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



Hole no: G77-32 (continued) Map _____ Date: _____ State: _____ County: _____
 Elev: _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)

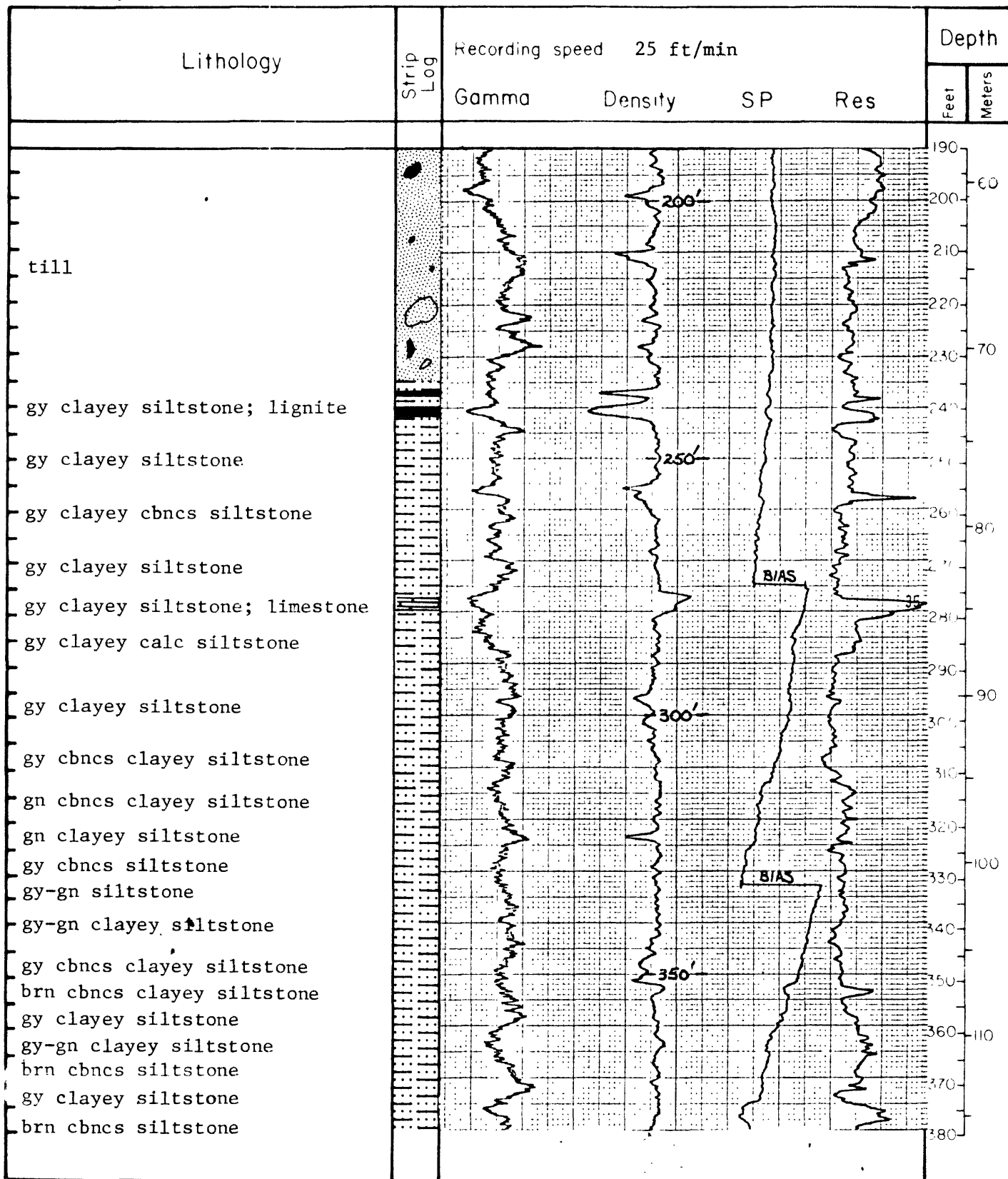


Hole no. G77-33 Map NW-16 Date 11-15-77 State N.D. County Ward
 Elev 2224 ft Location T.151N., R.83W. Sec 1 Tract SE SE Drilled depth: 540 ft
 Measured 65 ft FSL, 1004 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by Mike Menge (Geologist)



(continued)

Hole no: G77-33 Map _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



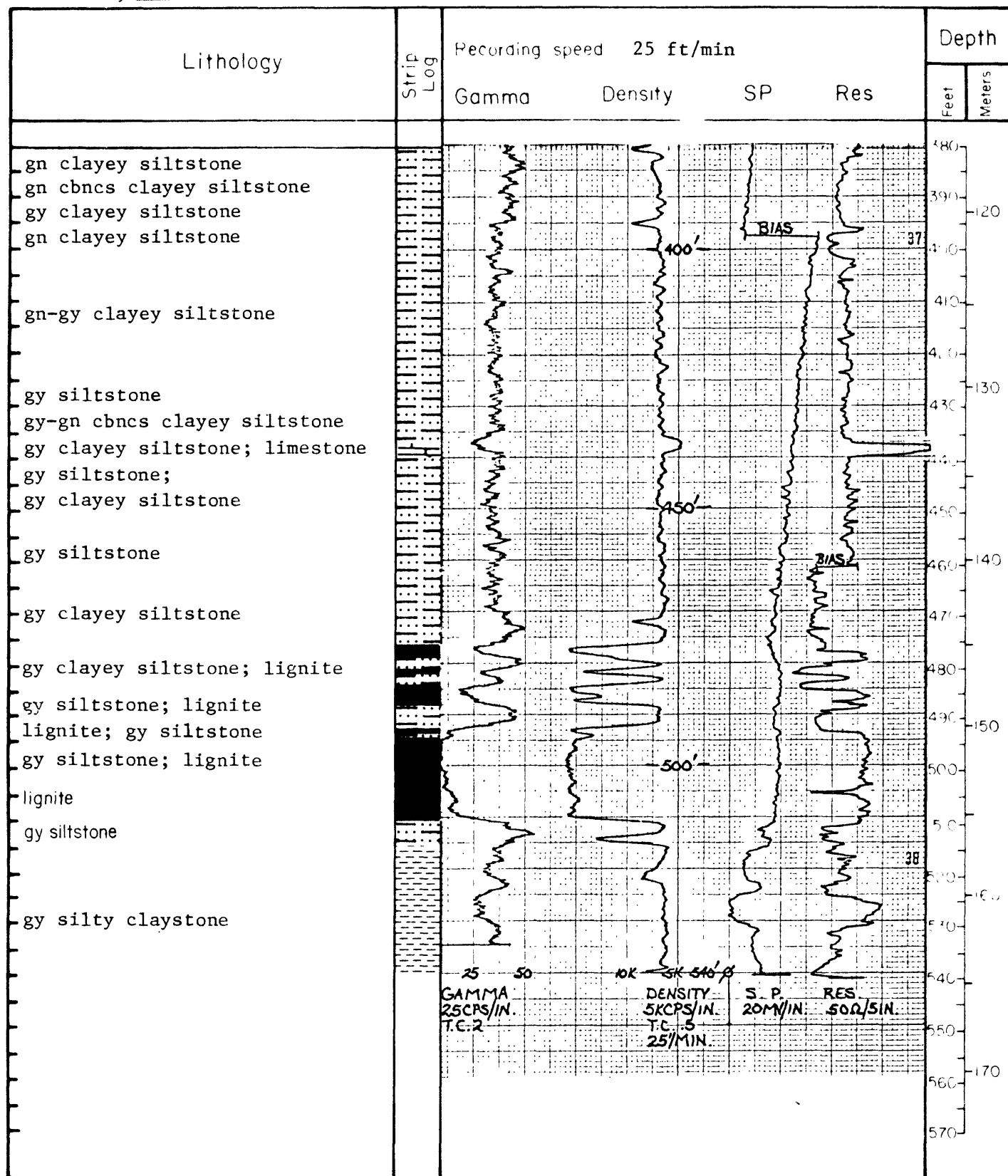
(continued)

Hole no: G77-33 Map _____ Date _____ State _____ County _____

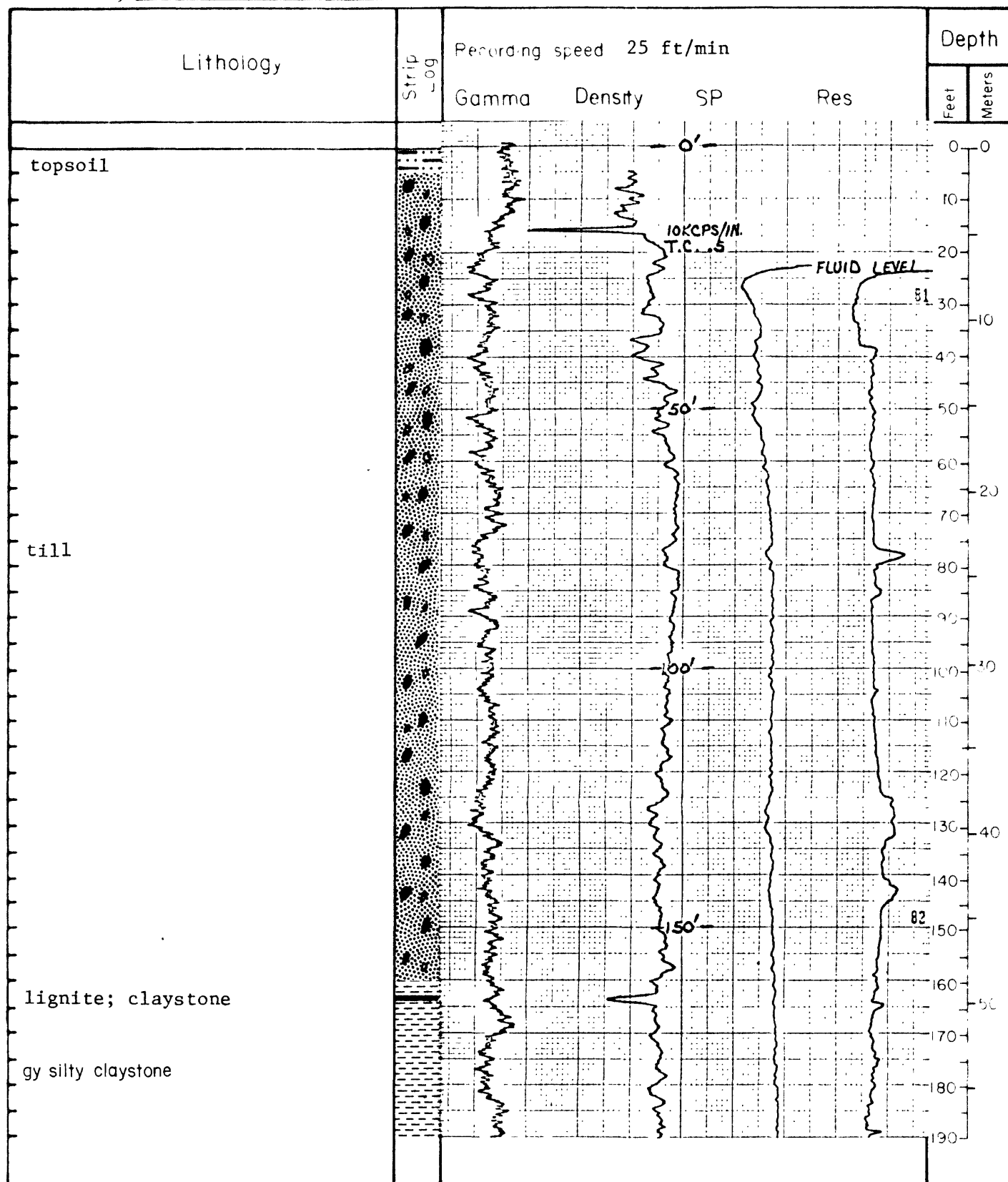
Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____

Measured _____, _____ Hole size _____ Cored _____

Remarks _____

Recorded by: Mike Menge (Geologist)

Hole no: G77-34 Map NW-16 Date 11-8-77 State: N.D. County: Ward
 Elev 2111 ft Location: T.151N., R.82W., Sec. 15, Tract NW NW Drilled depth 420 ft
 Measured: 75 ft FNL, 55 ft FWL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



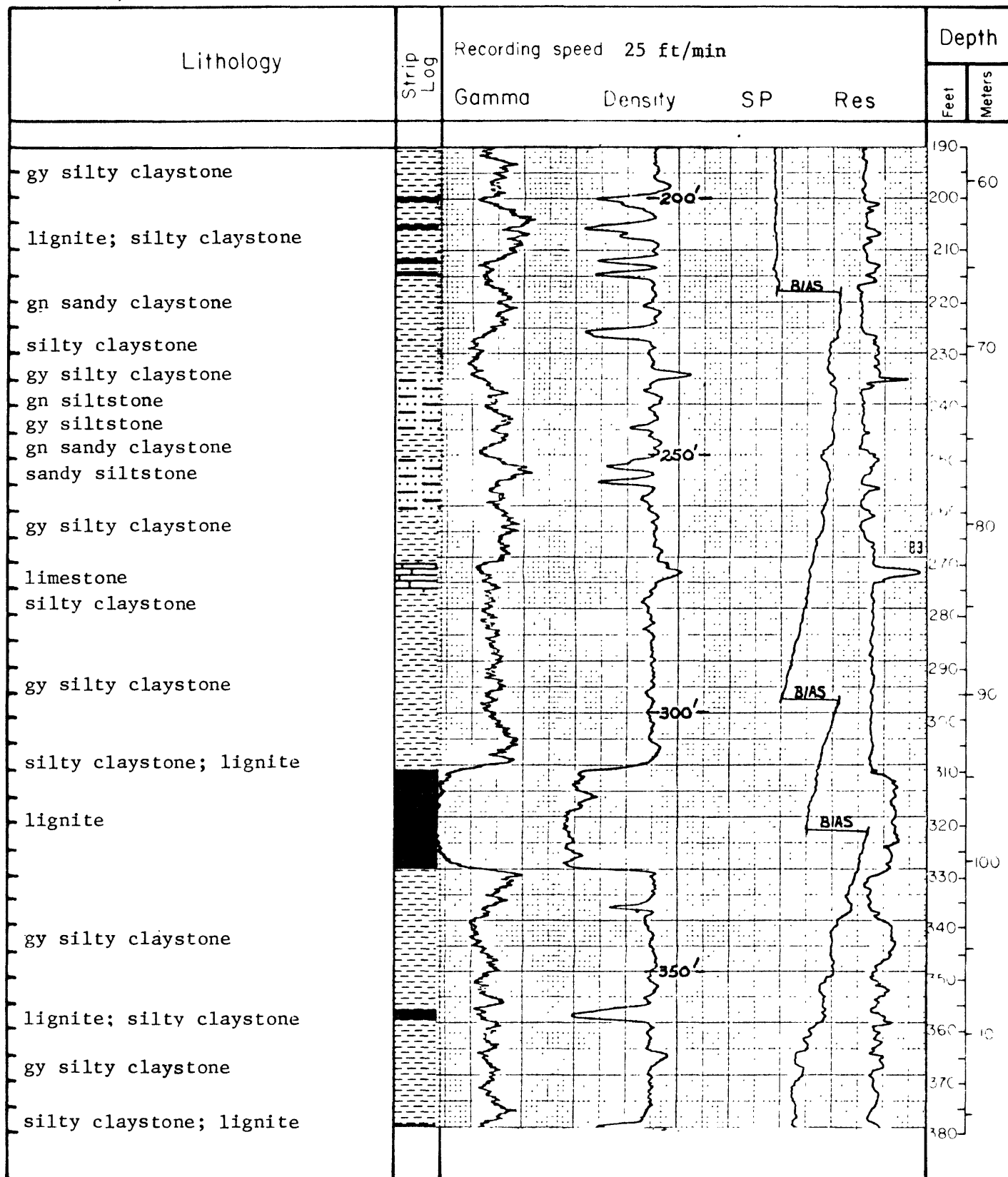
(continued)

Hole no: G 77-34 Map _____ Date _____ State _____ County _____

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

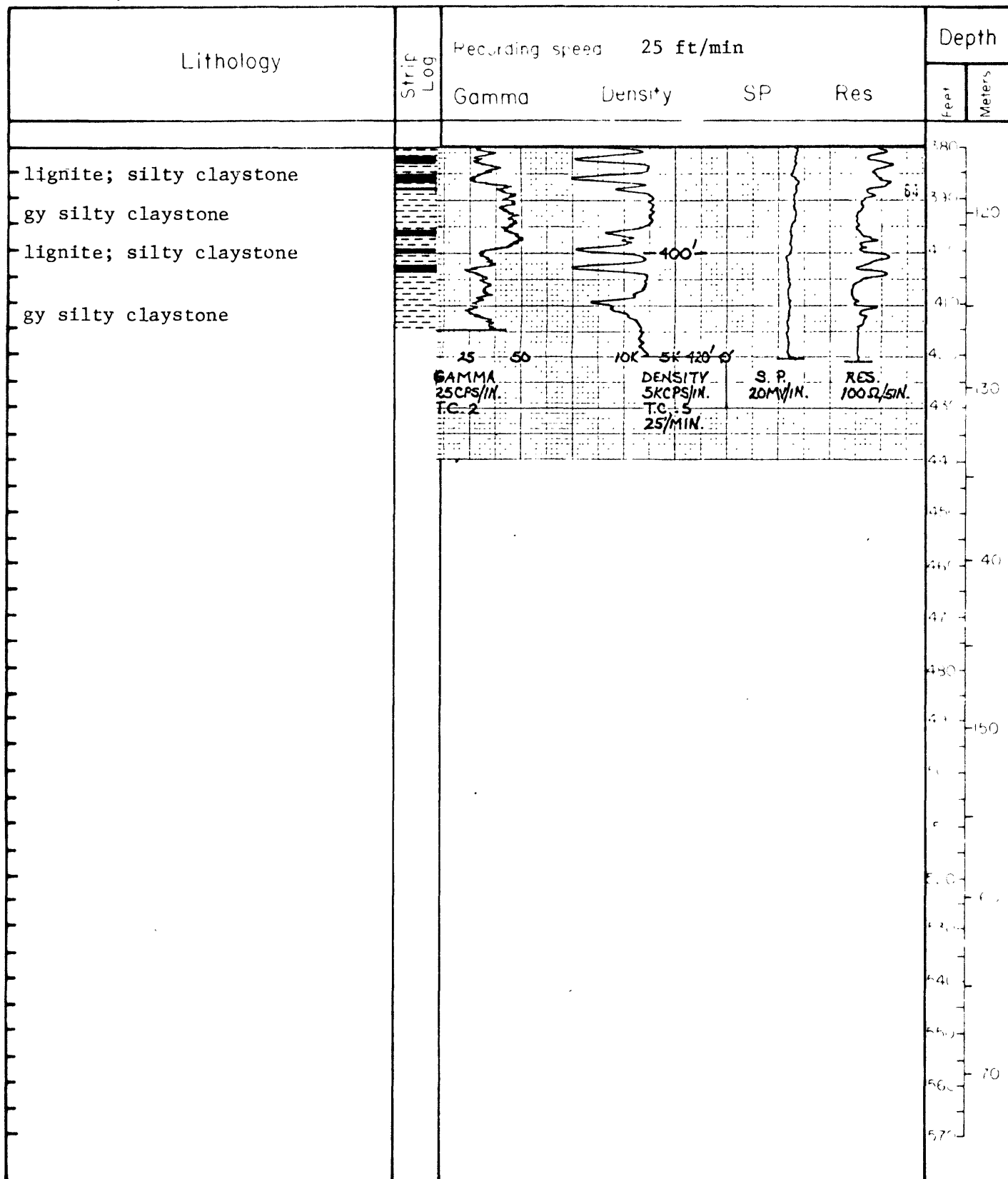
Measured _____, _____ Hole size _____ Cored _____

Remarks _____

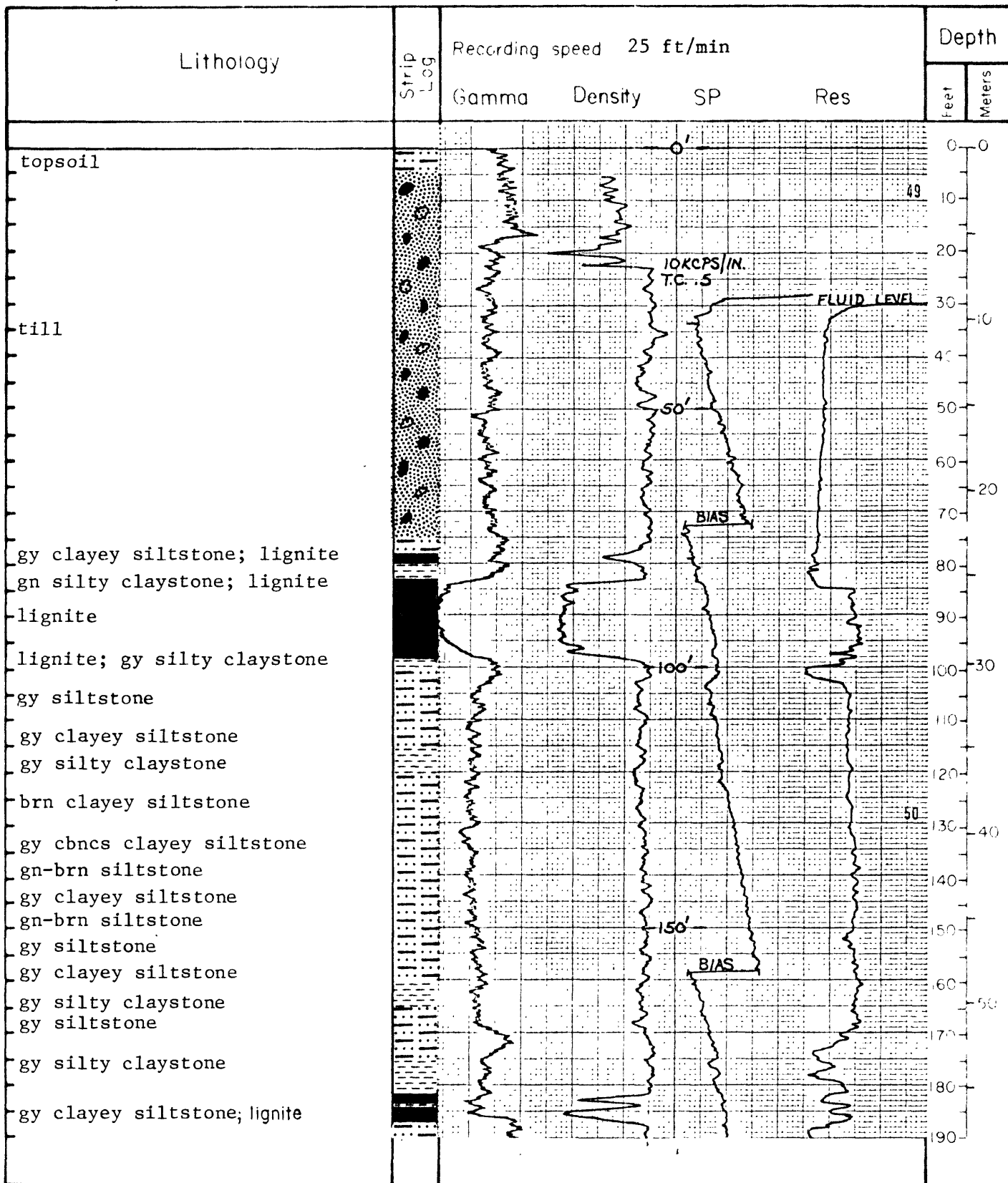
Recorded by: Mike Menge (Geologist)

(continued)

Hole no: G77-34 Map _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____
 Measured _____, _____ Hole size _____ IPF _____
 Remarks _____
 Recorded by: Mike Menge (Geologist)



Hole no: G77-35 Map NW-16 Date 11-13-77 State N.D. County: Ward
 Elev 1934 ft Location T.152N., R.82W. Sec 14, Tract SW SW Drilled depth 240 ft
 Measured 93 ft ESL, 21 ft FWL Hole size 5 1/8 in. Core no _____
 Remarks _____
 Recorded by: Mike Menge (Geologist)



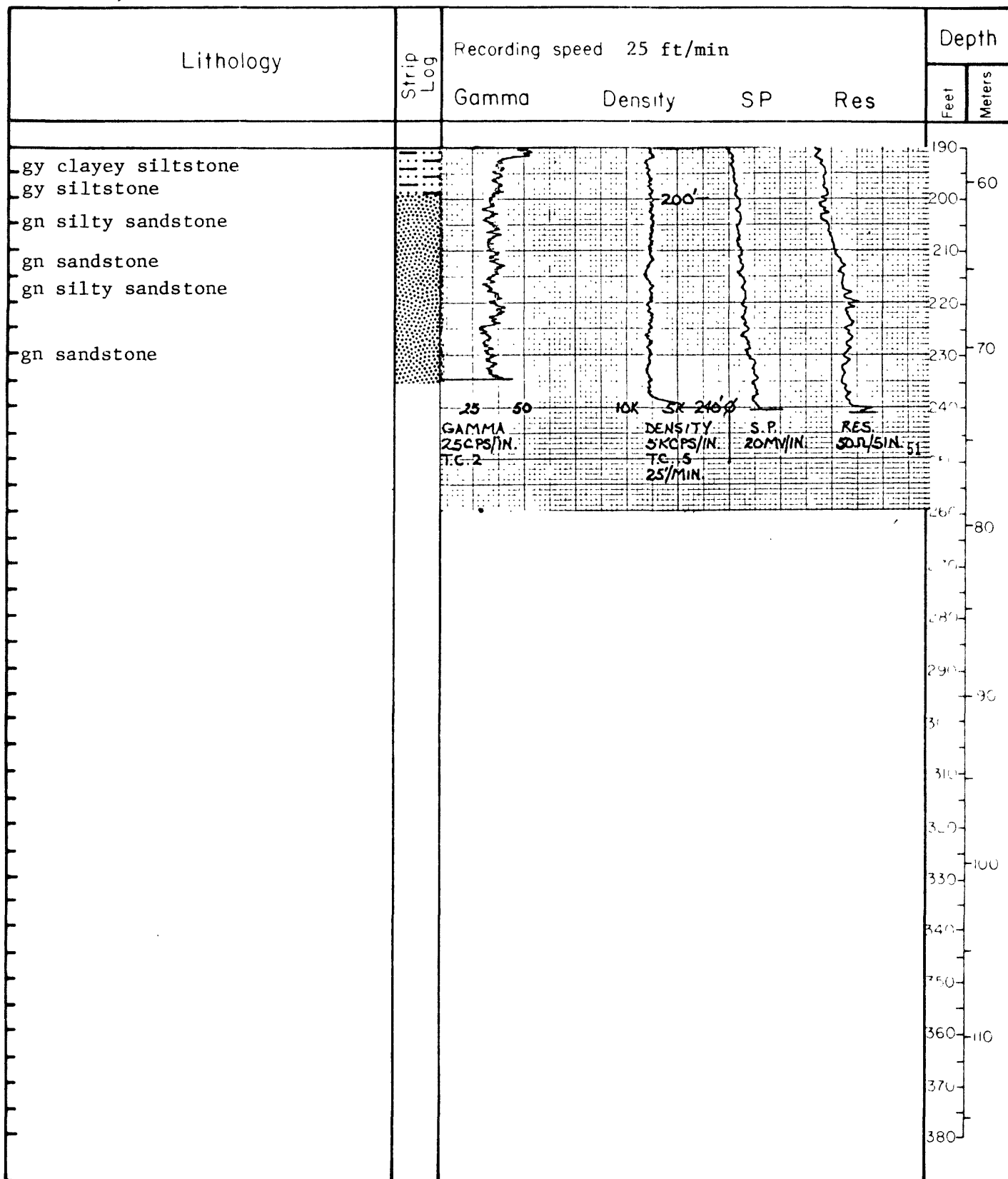
(continued)

Hole no: G77-35 Map _____ Date: _____ State _____ County: _____

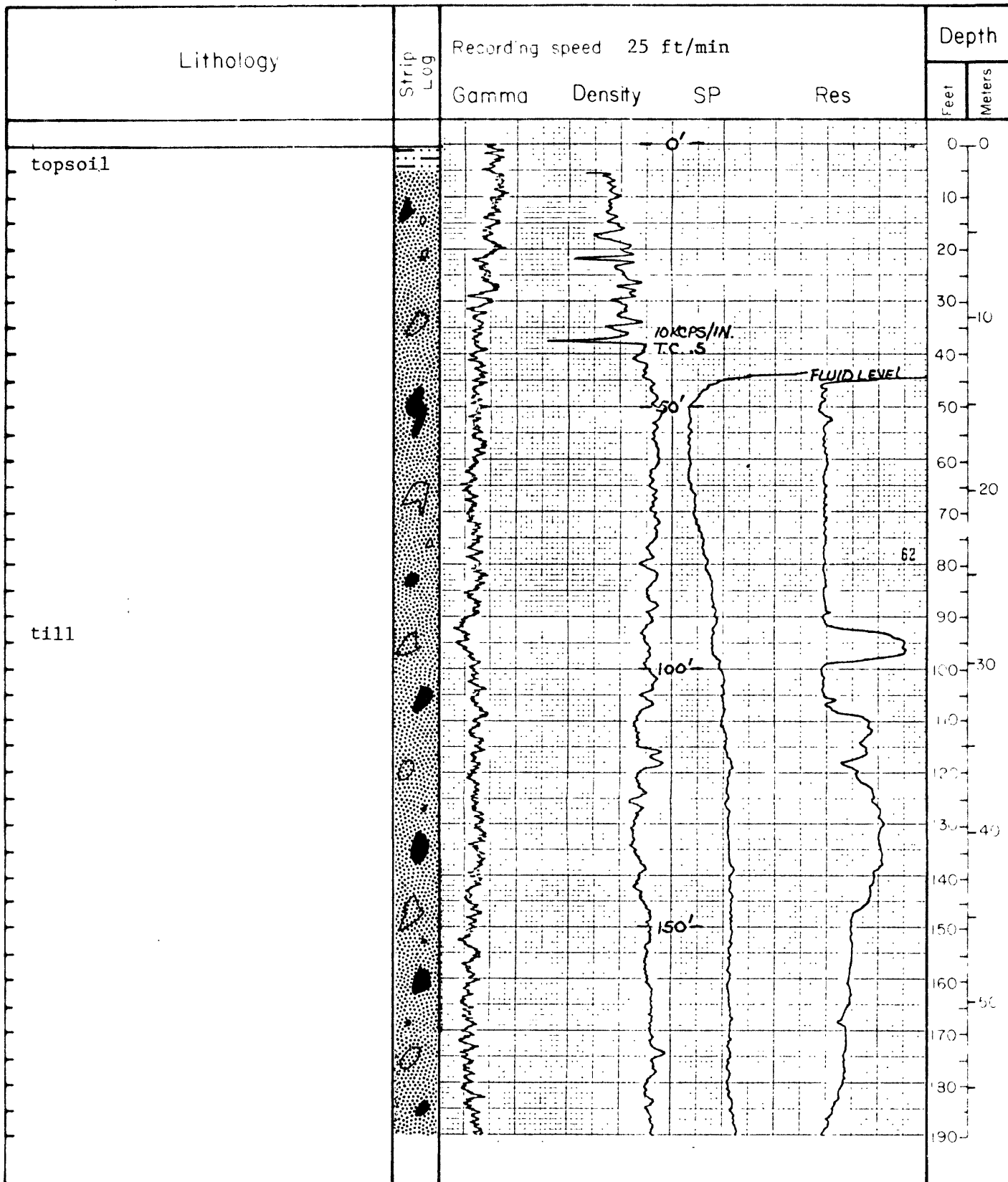
Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

Remarks _____

Recorded by: Mike Menge (Geologist)

Hole no: G77-36 Map: NW-16 Date 11-10-77 State: N.D. County: Ward
 Elev 2118 ft Location T.152N., R.81W. Sec 31, Tract SE SE Drilled depth: 408 ft
 Measured 295 ft FSL, 52 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by Mike Menge (Geologist)



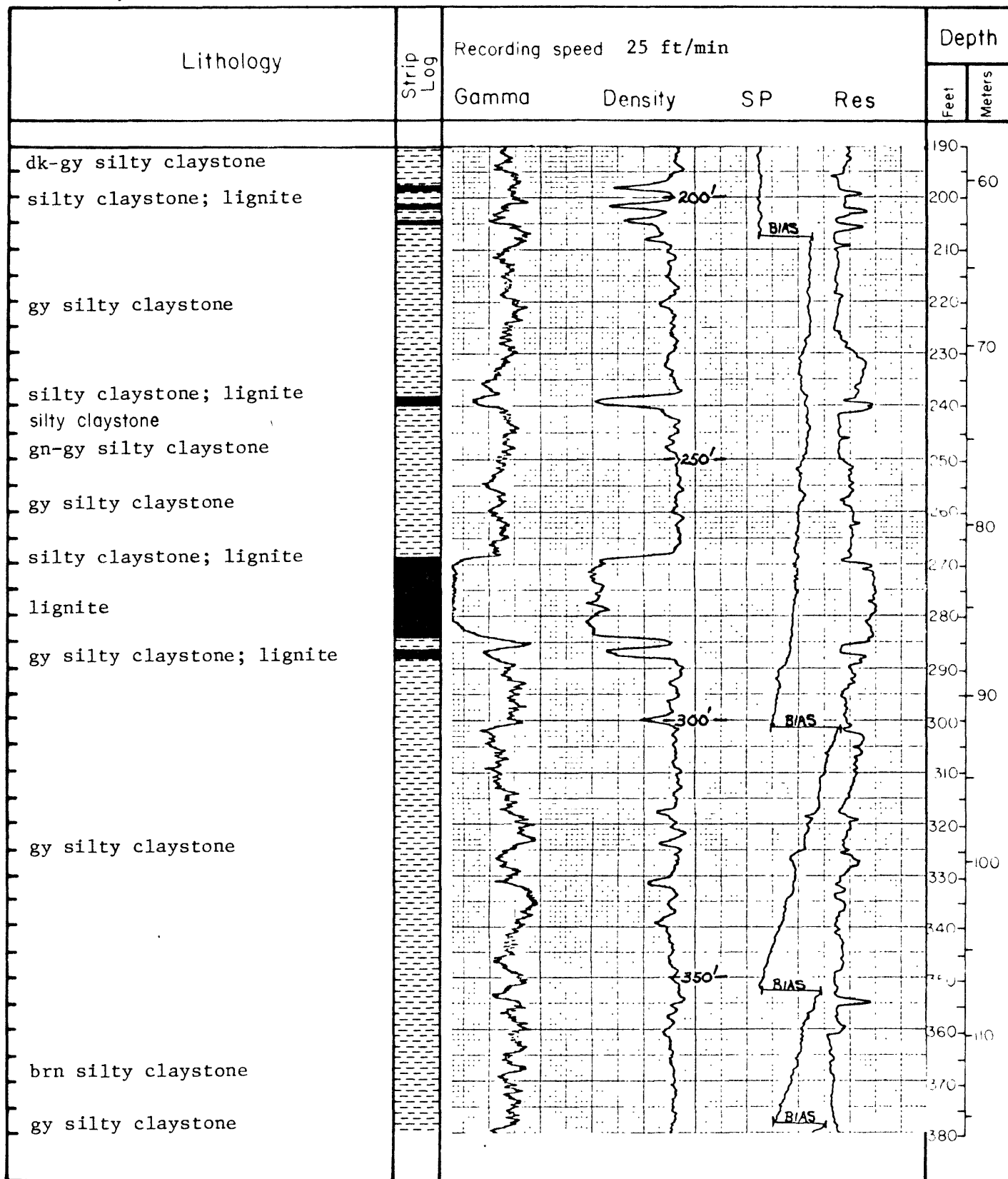
(continued)

Hole no: G77-36 Map _____ Date: _____ State: _____ County: _____

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

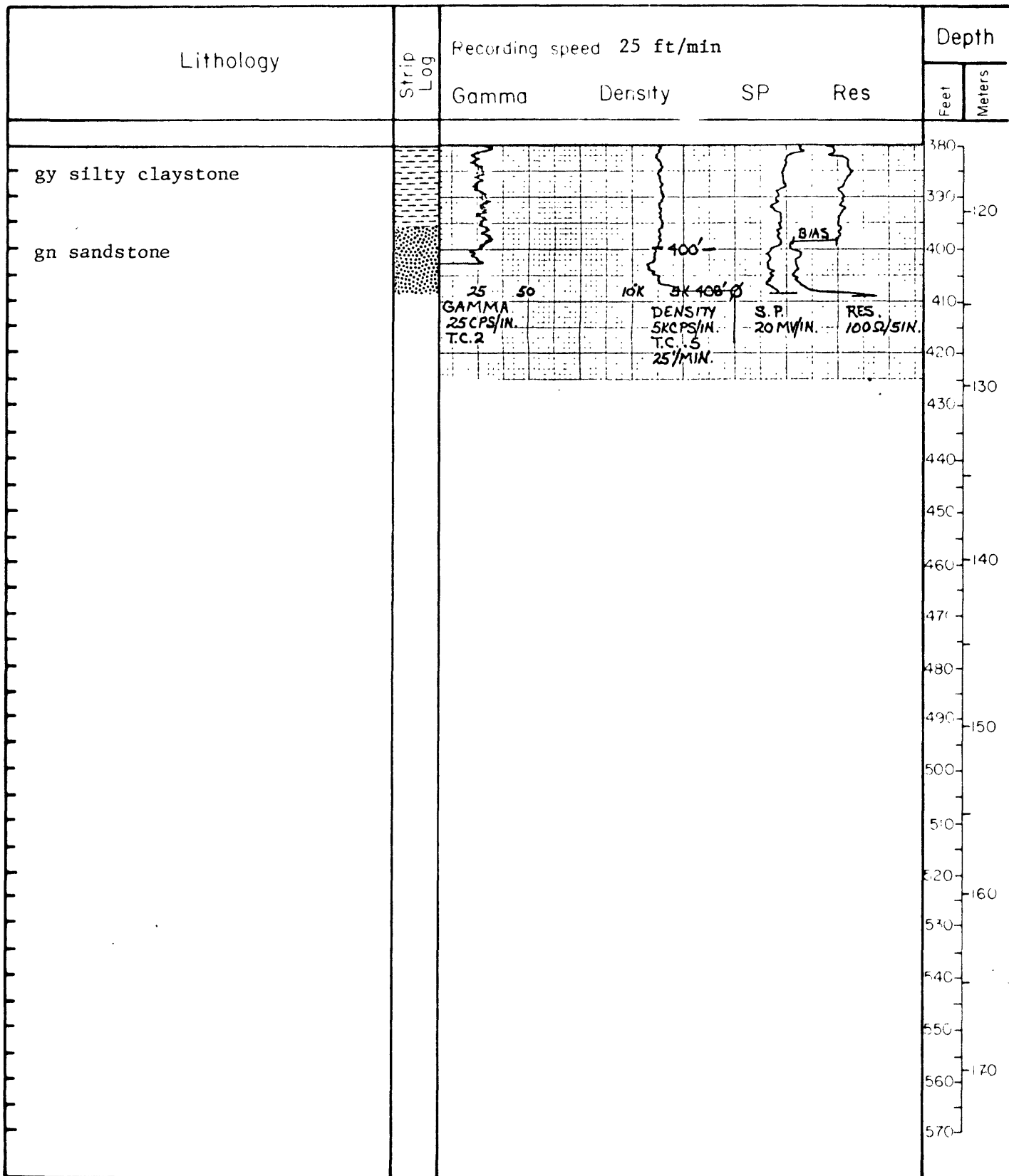
Measured _____, _____ Hole size: _____ Cored _____

Remarks: _____

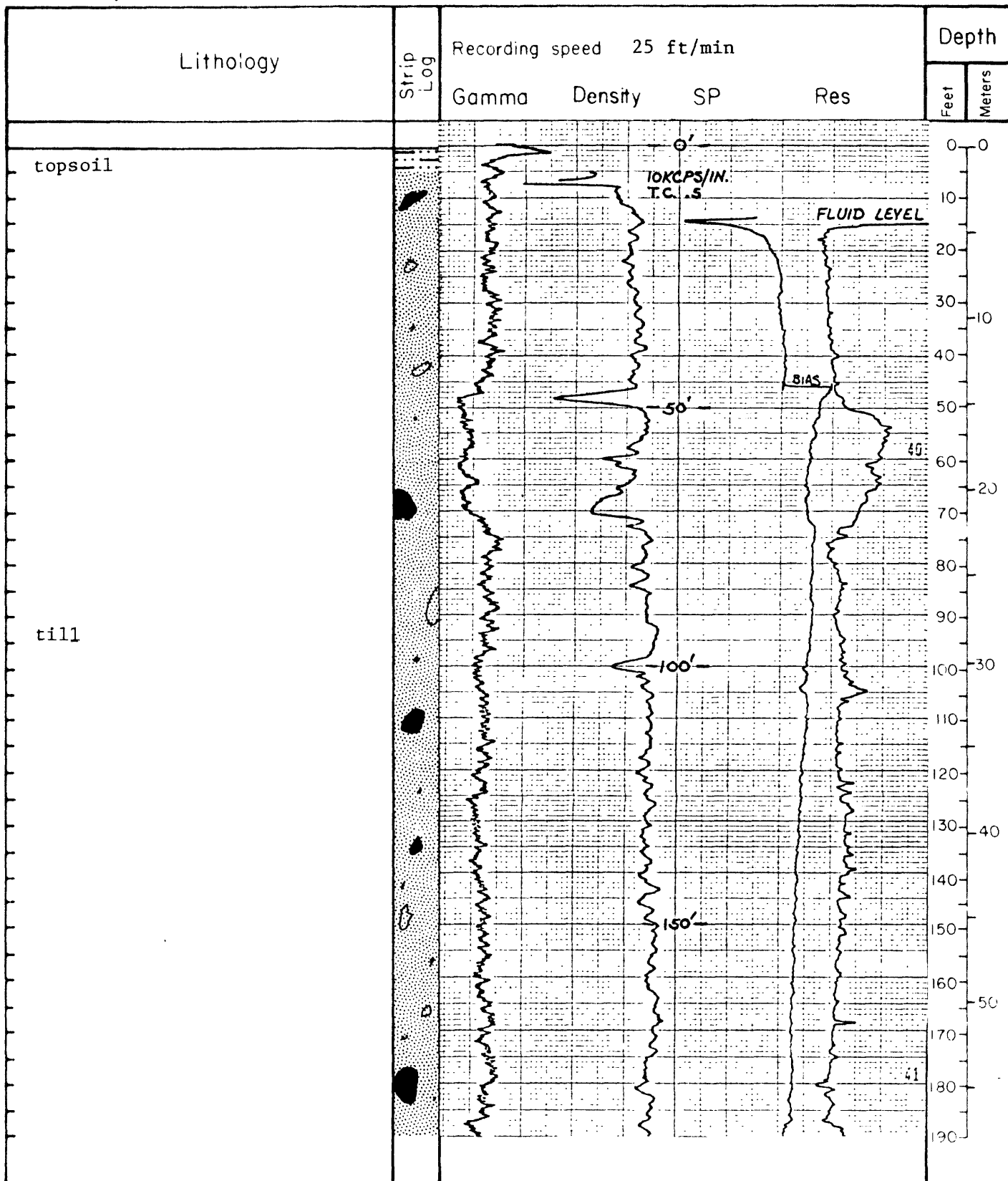
Recorded by: Mike Menge (Geologist)

(continued)

Hole no: G77-36 Map _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec. _____, Tract _____ Drilled depth _____
 Measured: _____, _____ Hole size _____ (Cored _____)
 Remarks _____
 Recorded by: Mike Menge (Geologist)



Hole no: G77-37 Map: NW-16 Date 11-14-77 State N.D. County: Ward
 Elev 2132 ft Location: T.151N., R.82W. Sec 26, Tract SW SW Drilled depth: 400 ft
 Measured: 12 ft FSL, 375 ft FWL Hole size 5 1/8 in. Cored: no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



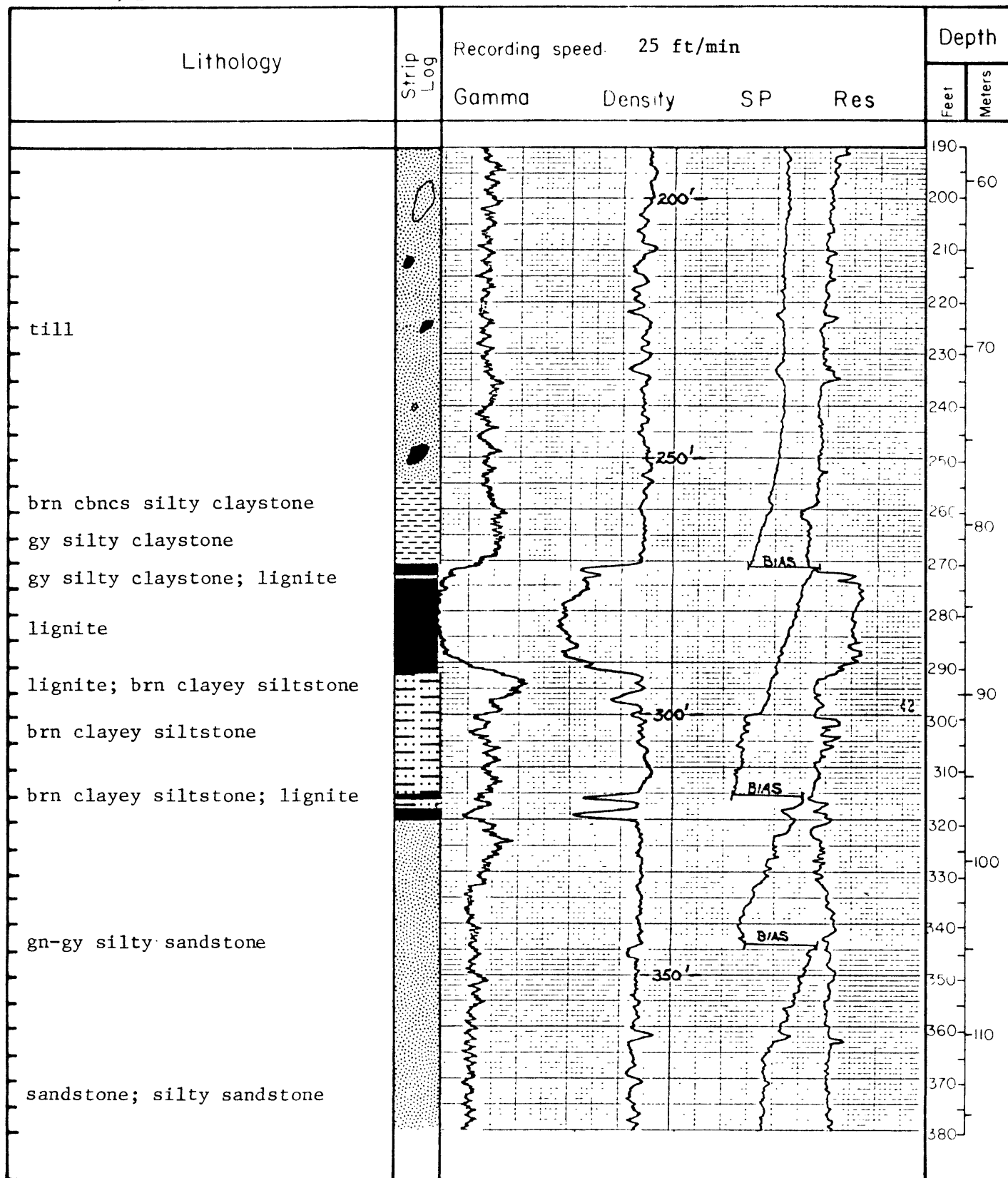
(continued)

Hole no: G77-37 Map: _____ Date: _____ State: _____ County: _____

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

Measured _____ Hole size _____ Cored _____

Remarks: _____

Recorded by: Mike Menge (Geologist)

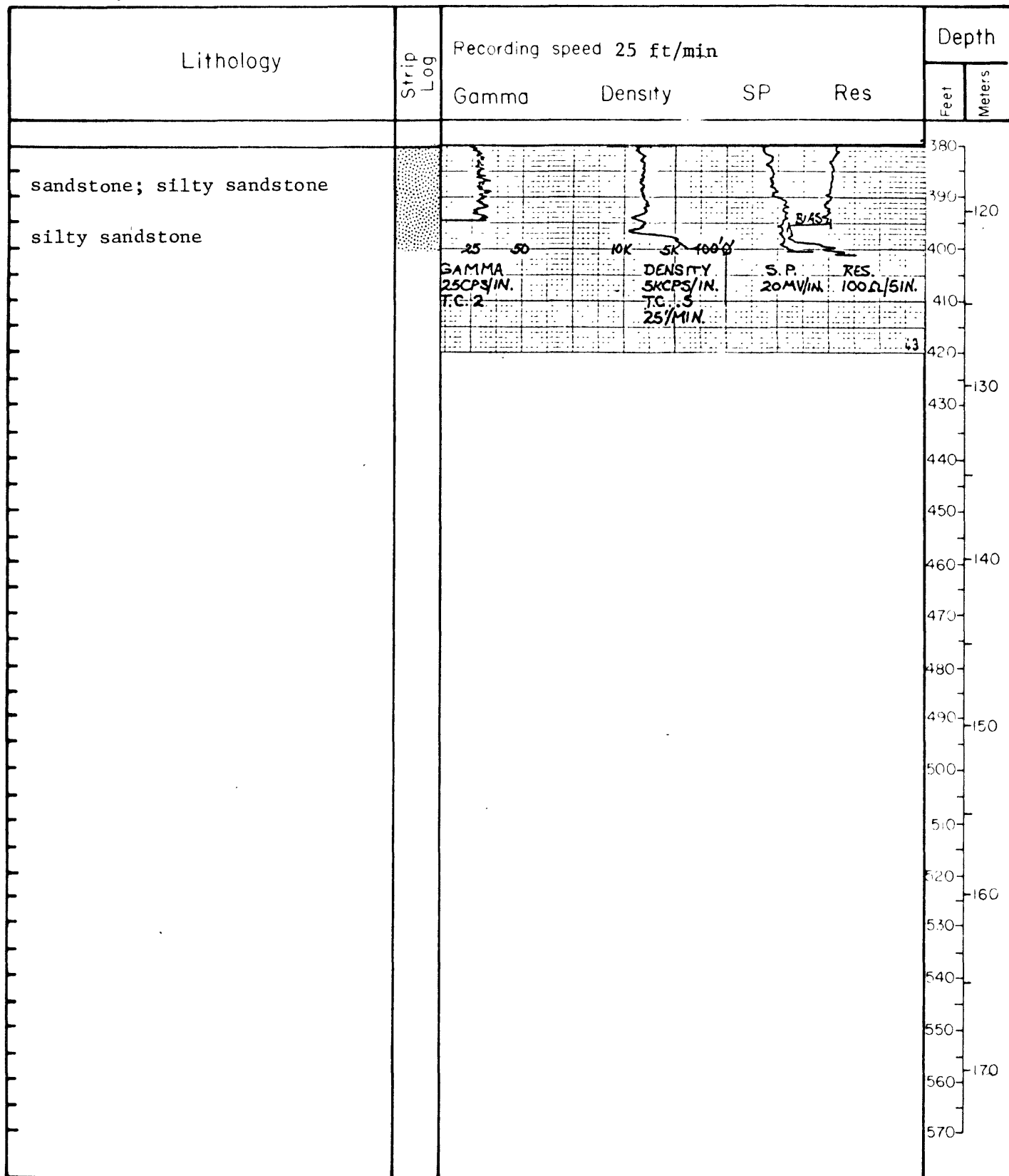
(continued)

Hole no: G77-37 Map _____ Date _____ State _____ County _____

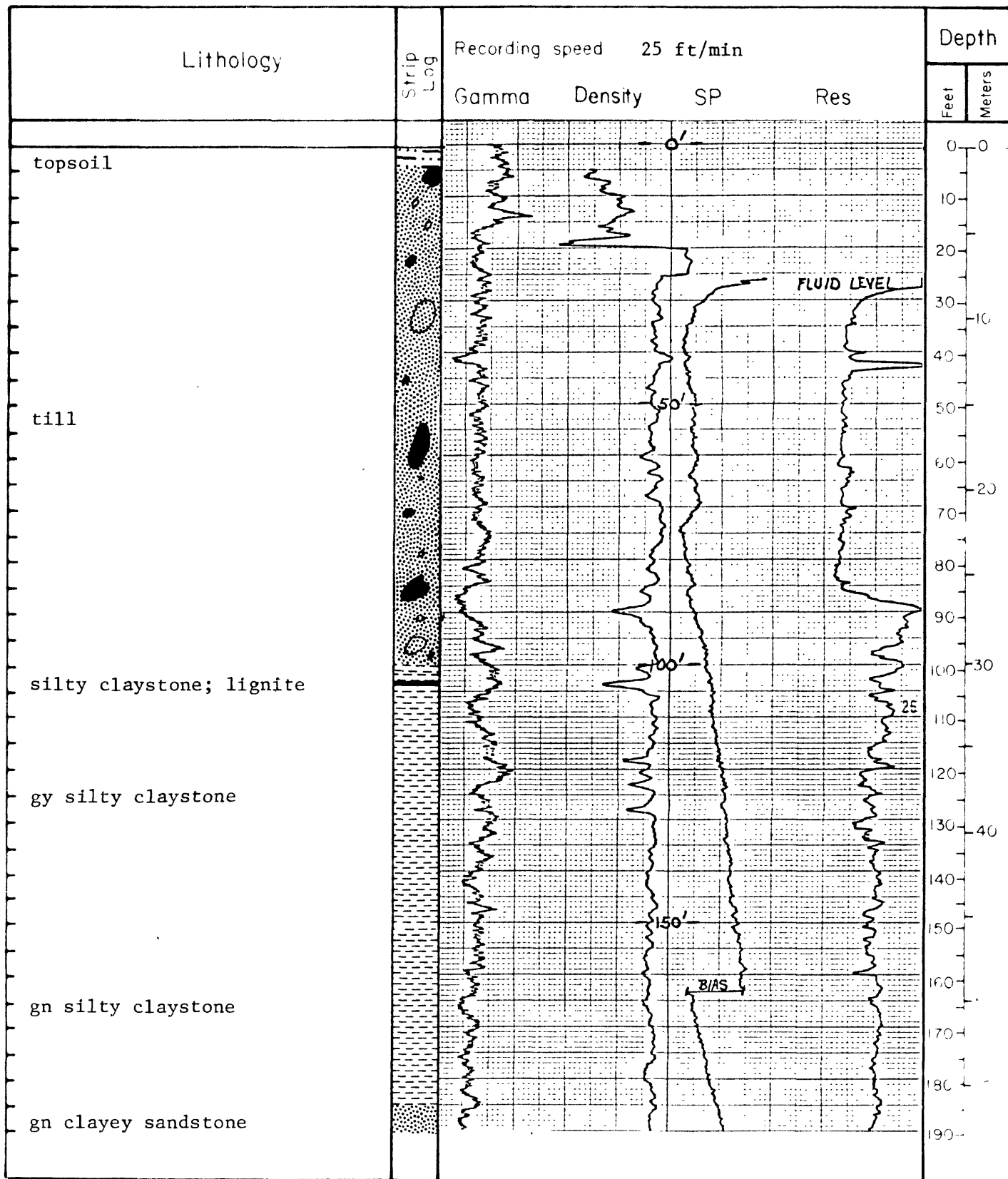
Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____

Measured: _____, _____ Hole size _____ Cored _____

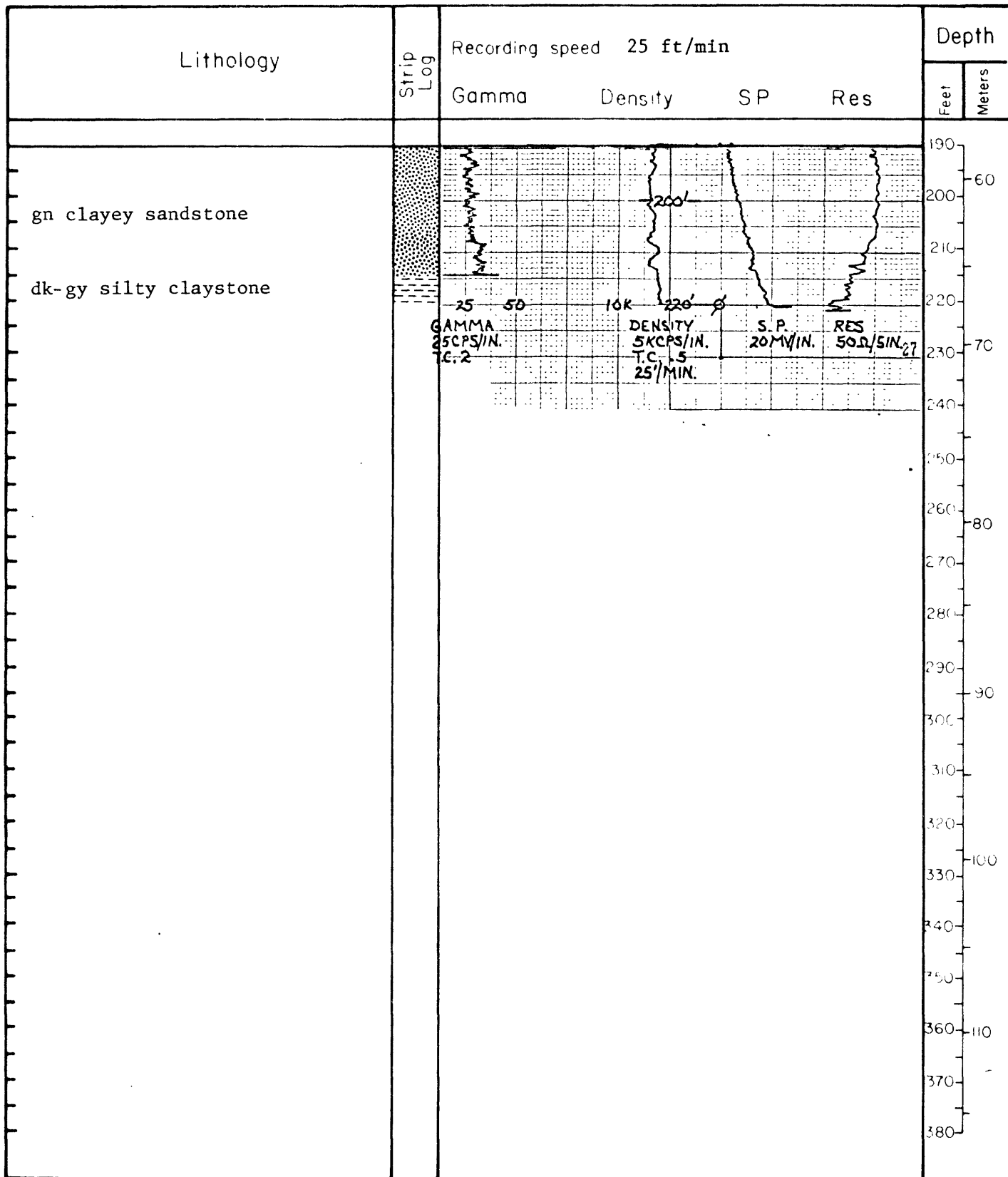
Remarks _____

Recorded by: Mike Menge (Geologist)

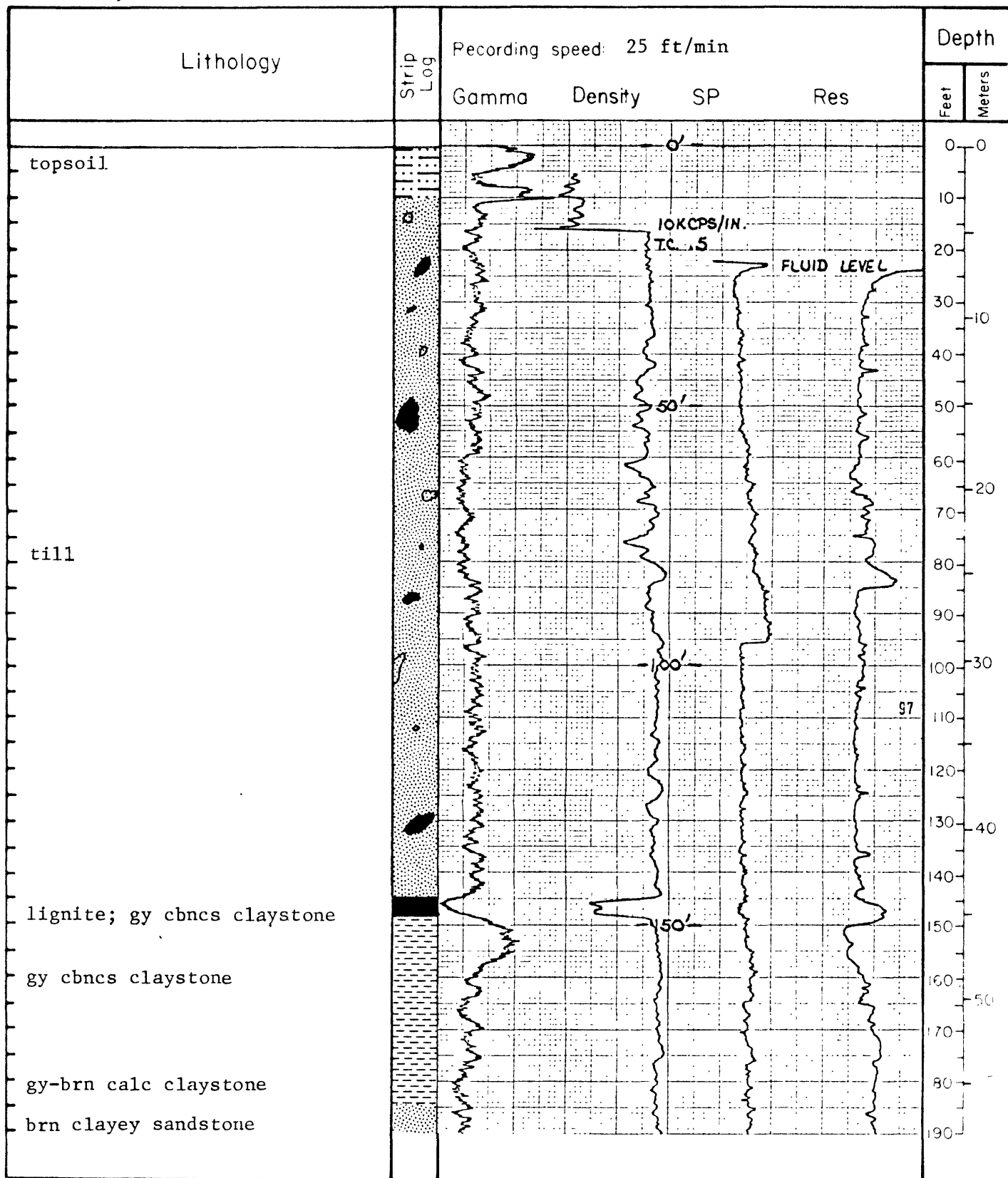
Hole no: G77-38 Map: NW-16 Date: 10-28-77 State: N.D. County: McLean
 Elev 1778 ft Location T.150N., R.81W. Sec 31, Tract SE SE Drilled depth: 220 ft
 Measured: 700 ft FSL, 50 ft FEL Hole size: 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



Hole no: G77-38 Map _____ Date: _____ State: _____ County: _____
 Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



Hole no: G77-39 Map: NW -16 Date: 11-2-77 State: N.D. County: McLean
 Elev. 2058 ft Location: T.150N., R.81W. Sec 17, Tract NE NW Drilled depth: 361 ft
 Measured 62 ft FNL, 1689 ft FWL Hole size 5 1/8 in. Cored no
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



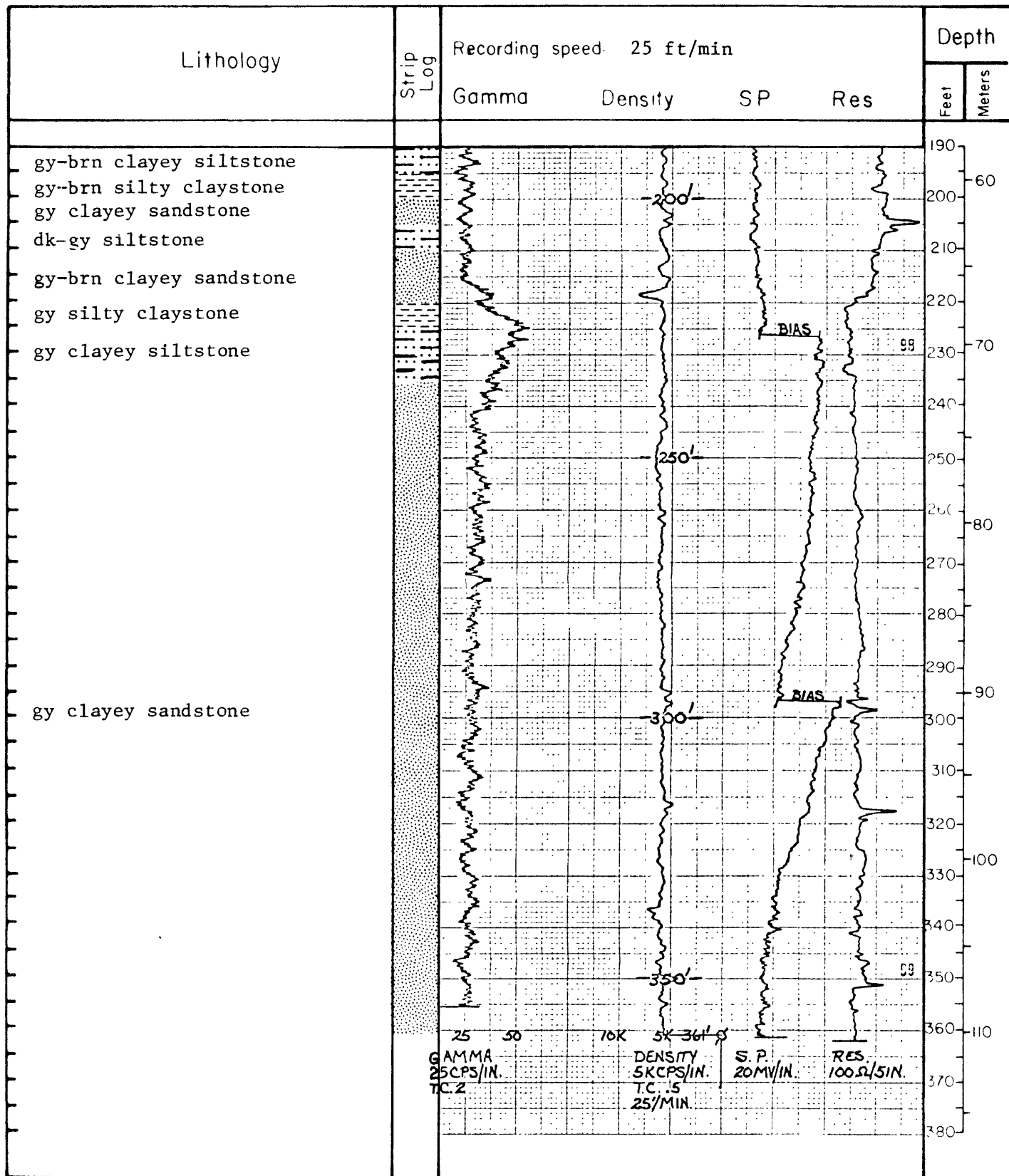
(continued)

Hole no: G77-39 Map _____ Date: _____ State: _____ County: _____

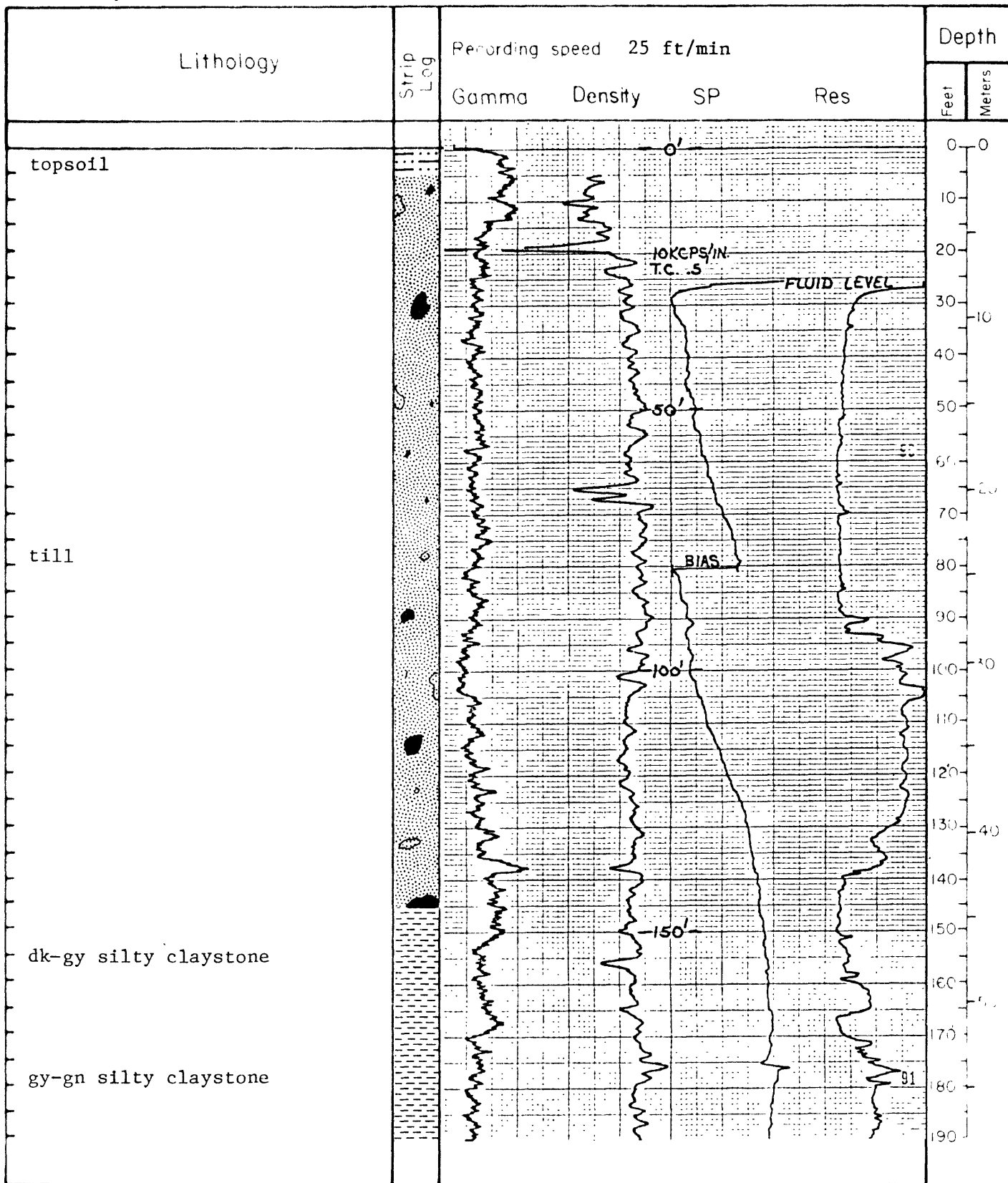
Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____

Measured _____, _____ Hole size _____ Cored _____

Remarks: _____

Recorded by: Mike Menge (Geologist)

Hole no: G77-40 Map NW-16 Date: 11-3-77 State N.D. County Ward
 Elev 2182 ft Location T.151N., R.81W. Sec 32, Tract NE NE Drilled depth 481 ft
 Measured 247 ft FNL, 28 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



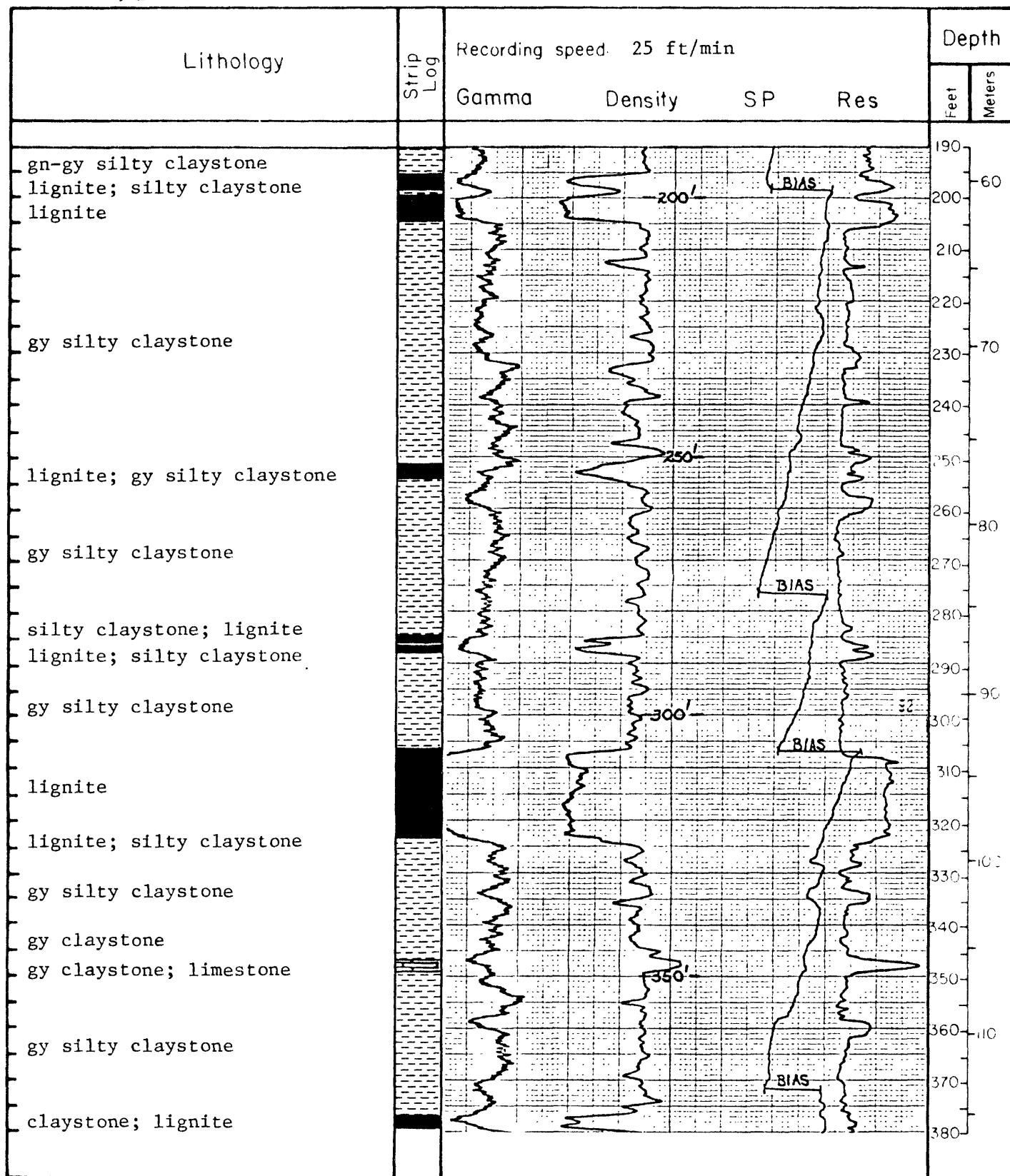
(continued)

Hole no: G77-40 Map _____ Date _____ State _____ County _____

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

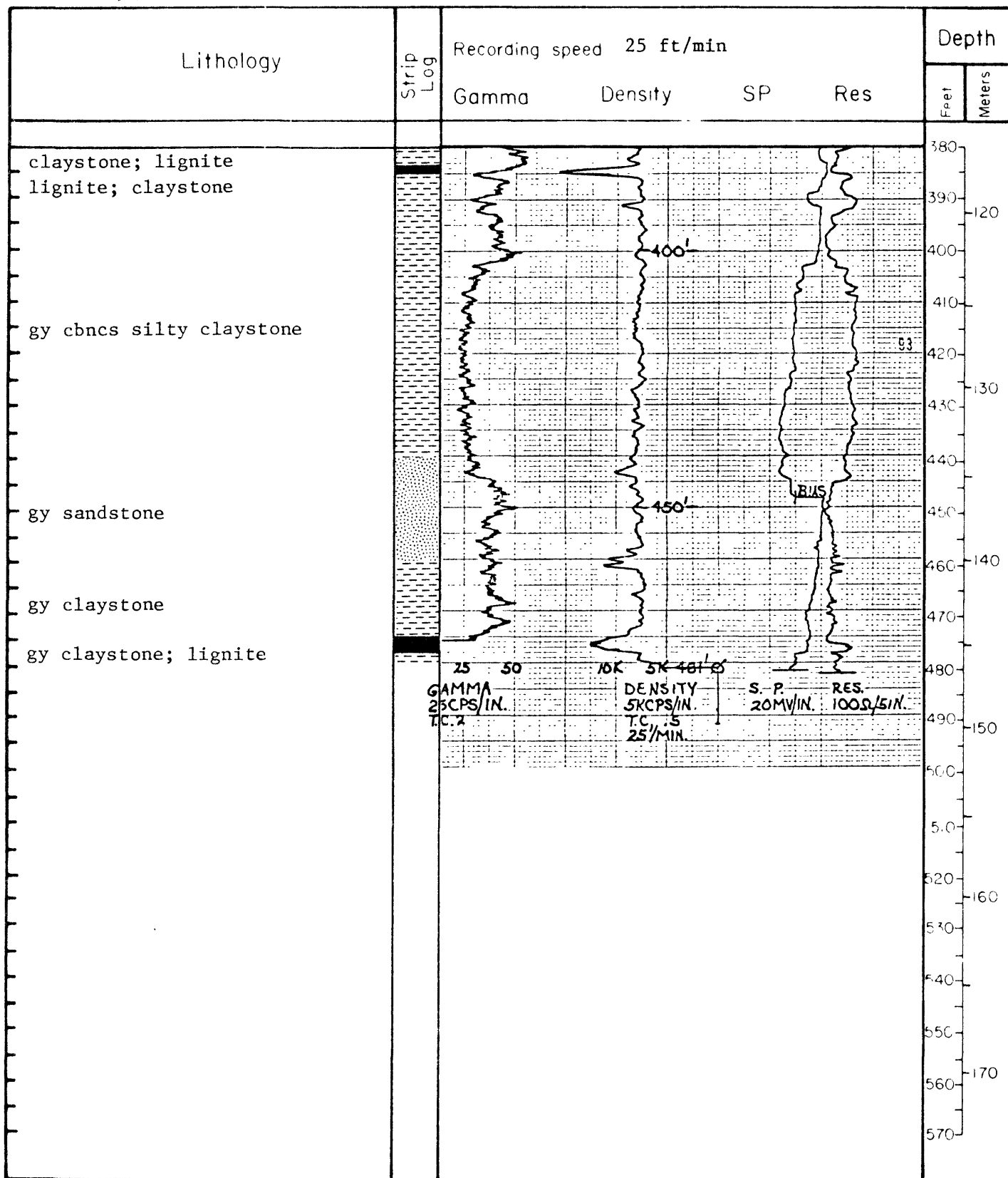
Measured _____, _____ Hole size _____ Cored _____

Remarks: _____

Recorded by: Mike Menge (Geologist)

(continued)

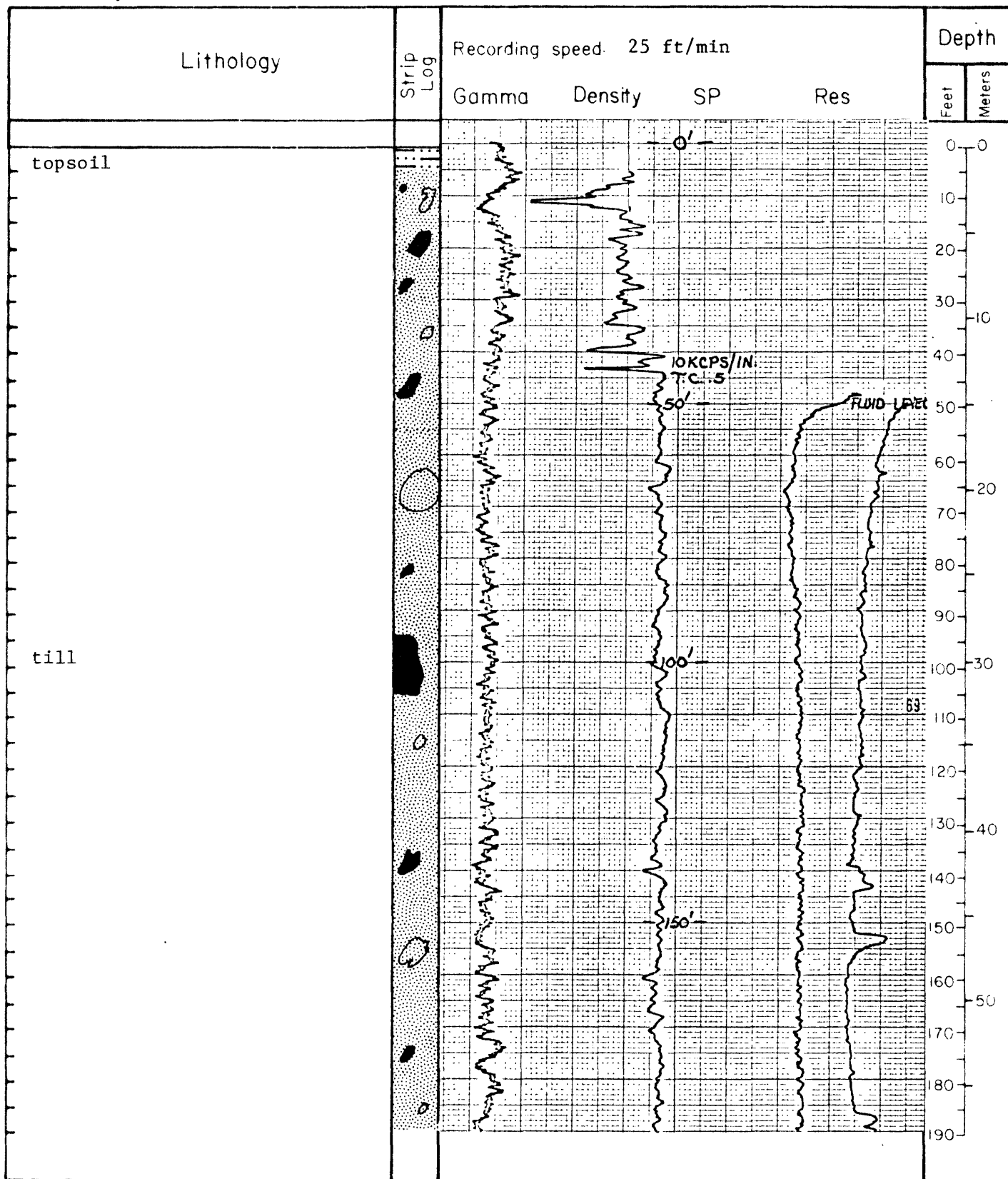
Hole no: G77-40 Map _____ Date: _____ State _____ County _____
 Elev _____ Location _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



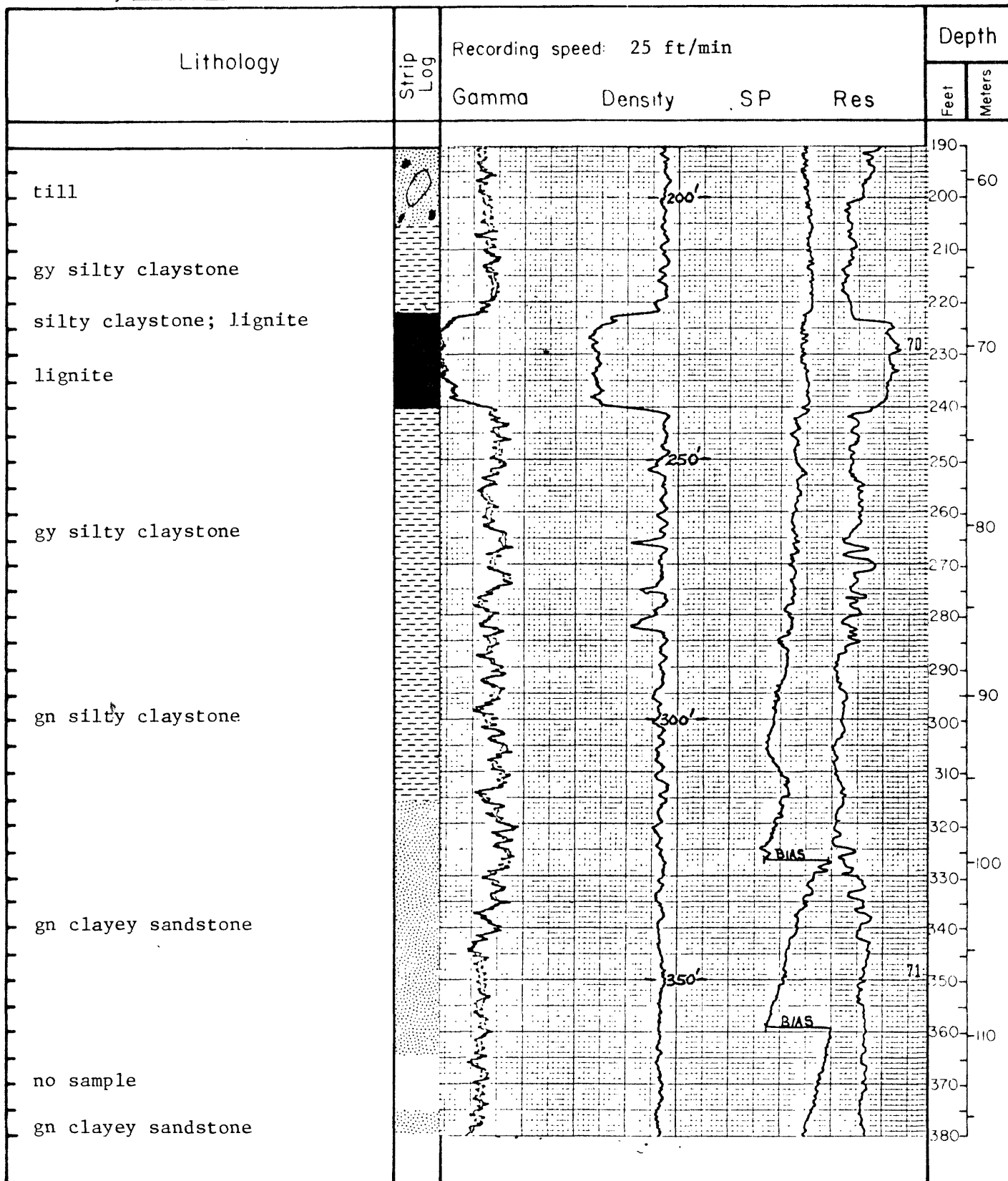
Hole no: G77-41 Map: NW-16 Date: 11-9-77 State: N.D. County: Ward
 Elev 2134 ft Location: T.151N., R.81W. Sec. 3, Tract NW SW Drilled depth: 420 ft
 Measured: 2112 ft FSL, 85 ft FWL Hole size: 5 1/8 in. Cored: no

Remarks _____

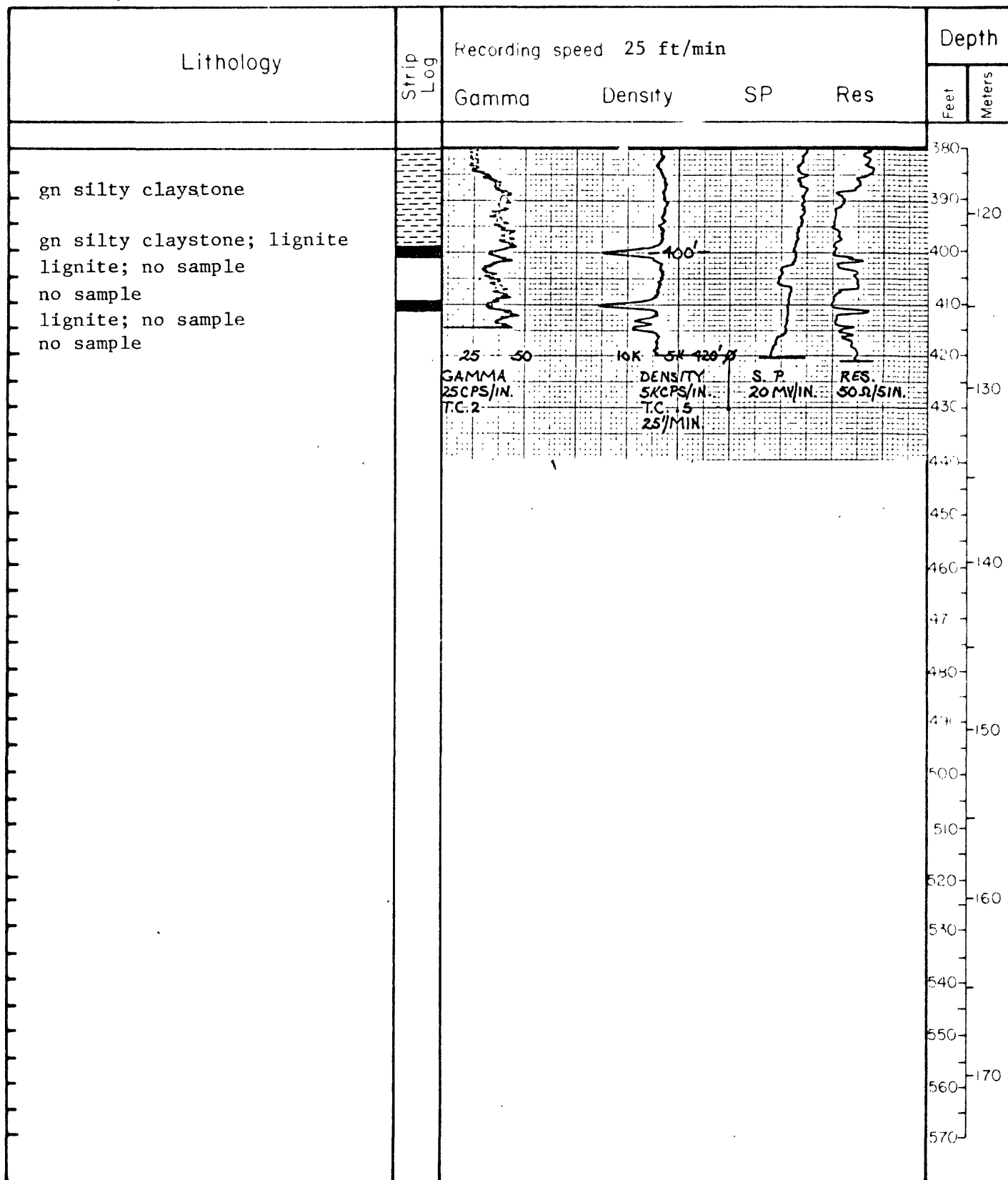
Recorded by: Mike Menge (Geologist)



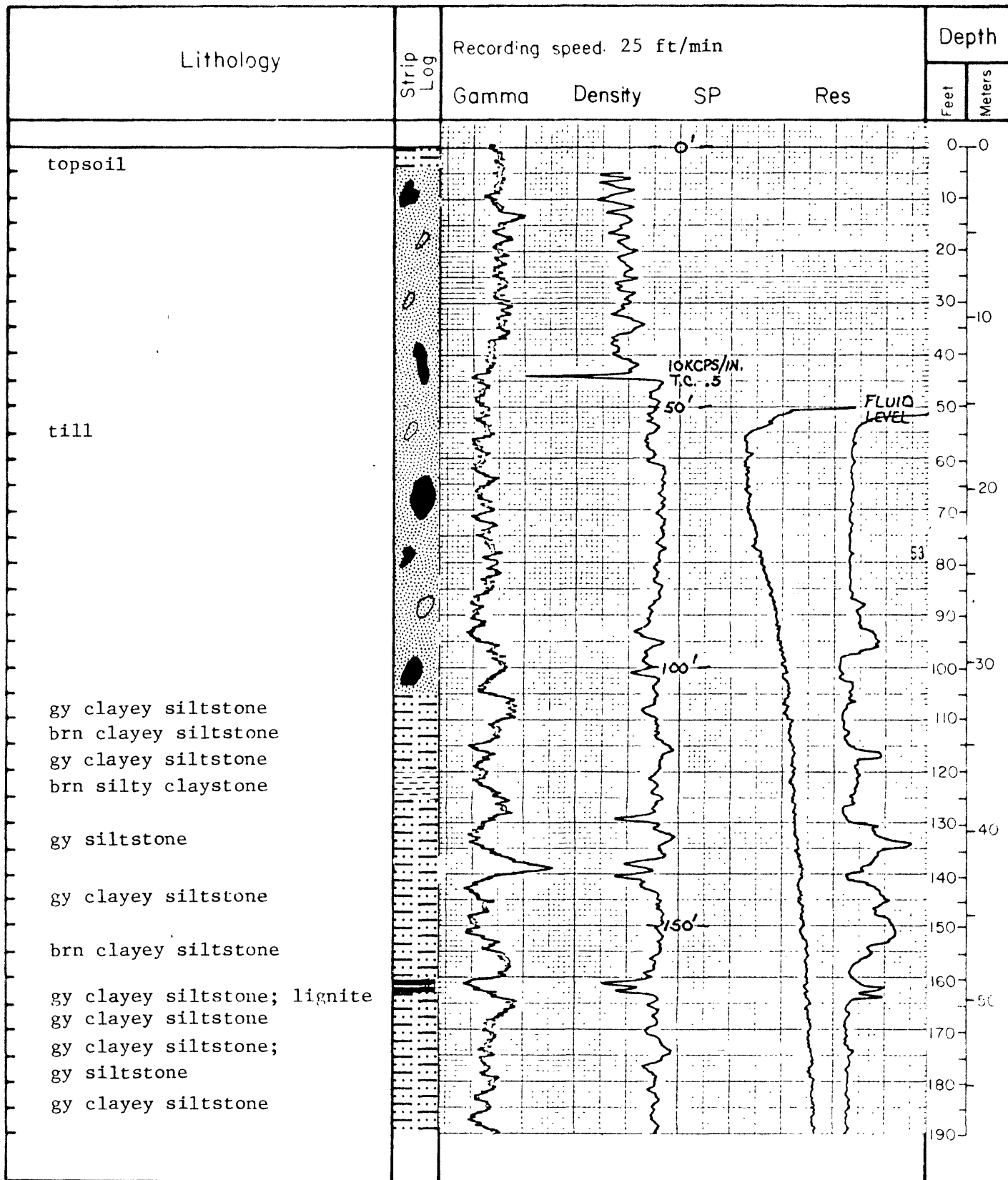
(continued)
Hole no: G77-41 Map: _____ Date: _____ State: _____ County: _____
Elev. _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size _____ Cored: _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



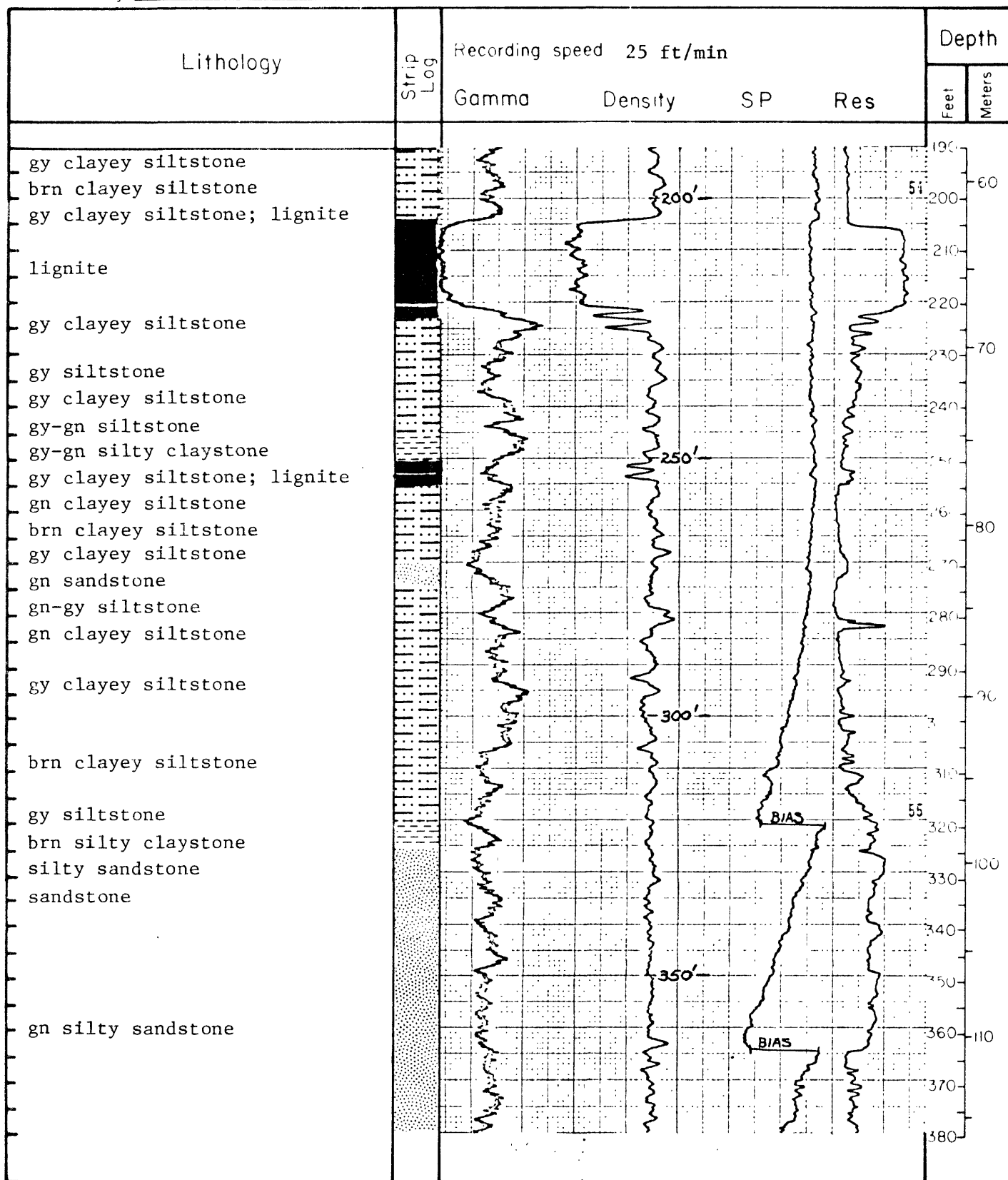
Hole no: G77-41 (continued) Map _____ Date: _____ State: _____ County: _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks _____
 Recorded by: Mike Menge (Geologist)



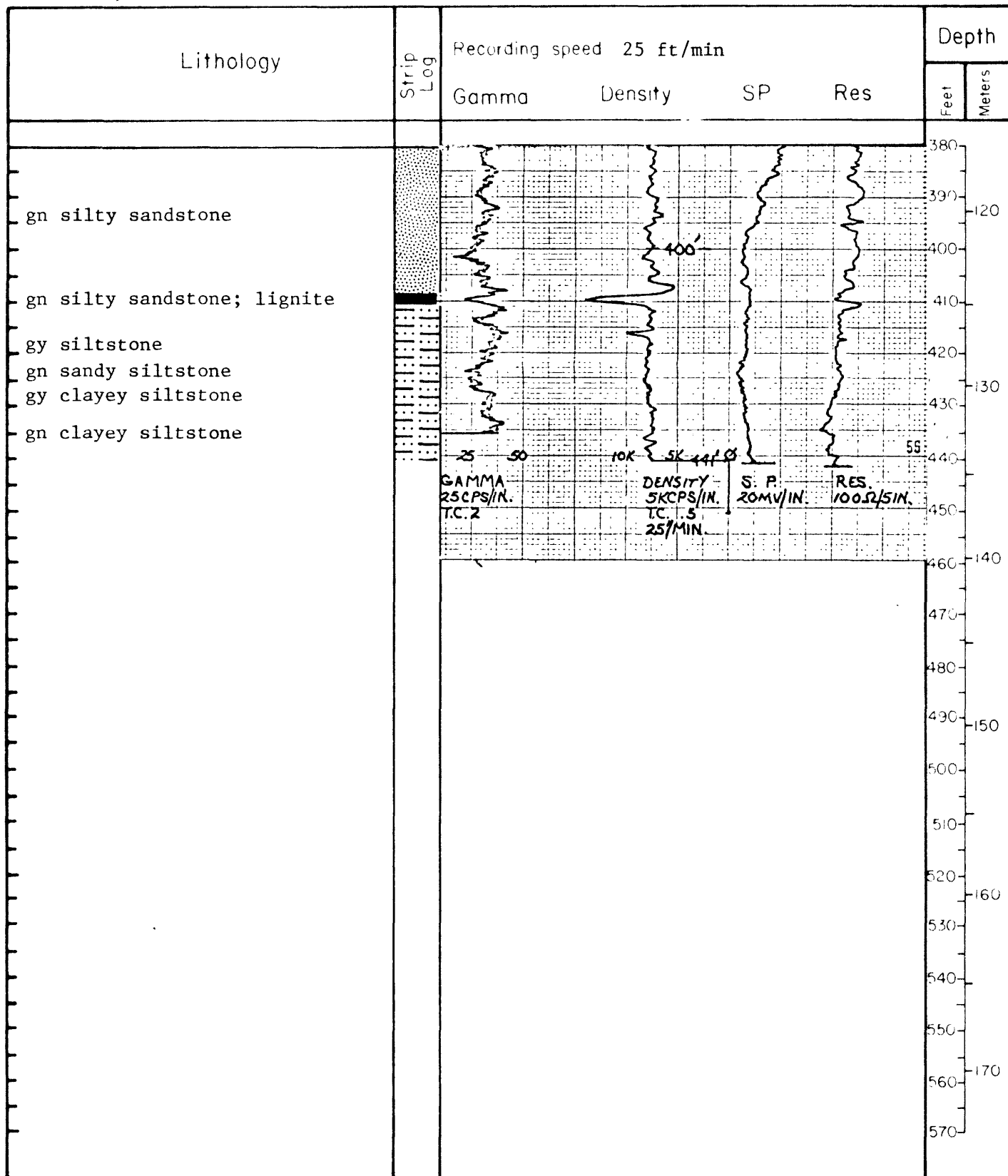
Hole no: G77-42 Map NW-16 Date 11-12-77 State N.D. County Ward
 Elev 2108 ft Location T.151N., R.81W. Sec. 24, Tract SW SE Drilled depth: 441 ft
 Measured 32 ft FSL, 1584 ft FEL Hole size 5 1/8 in. Cored no
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



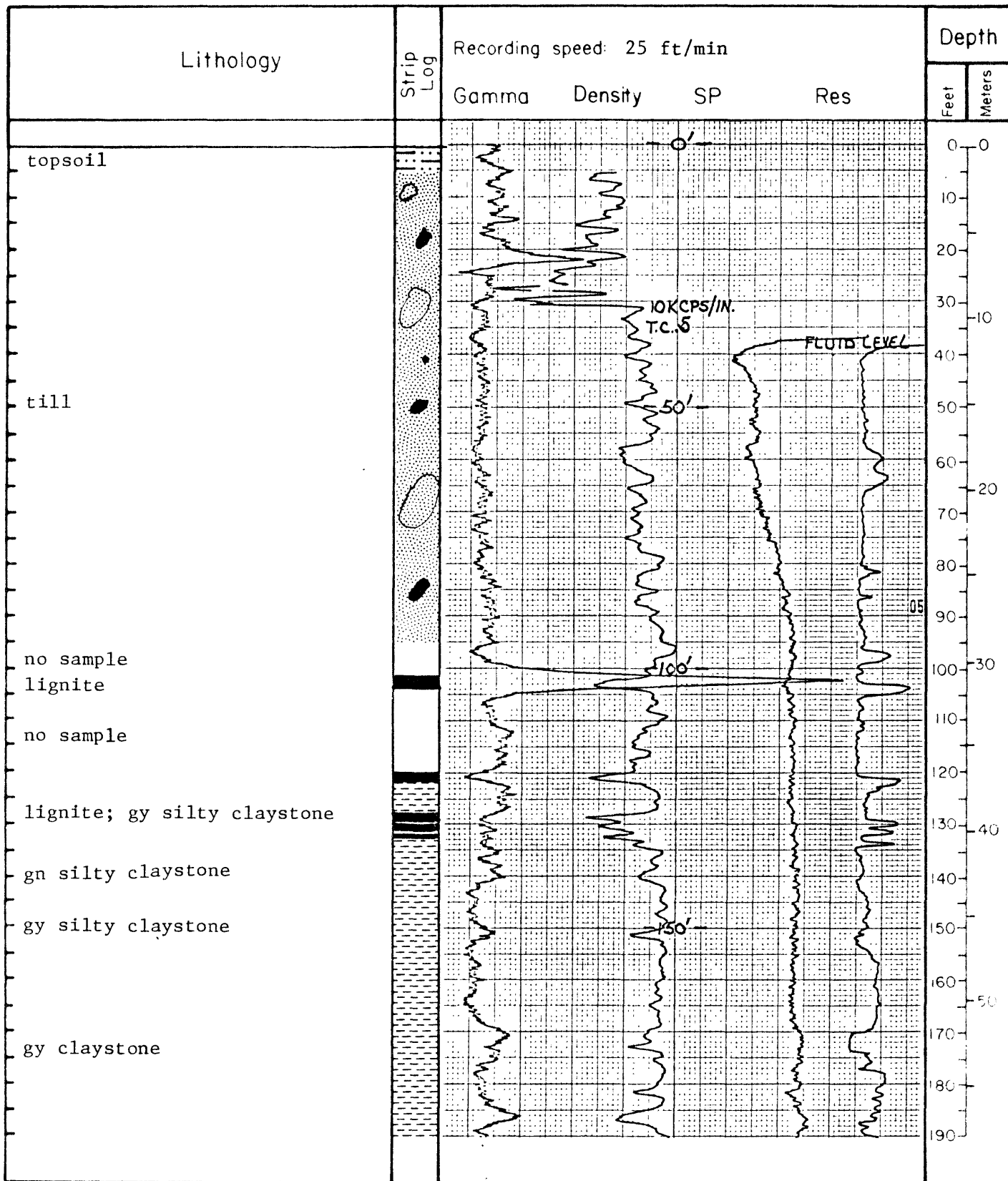
Hole no: G77-42 (continued) Map _____ Date: _____ State: _____ County: _____
 Elev: _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



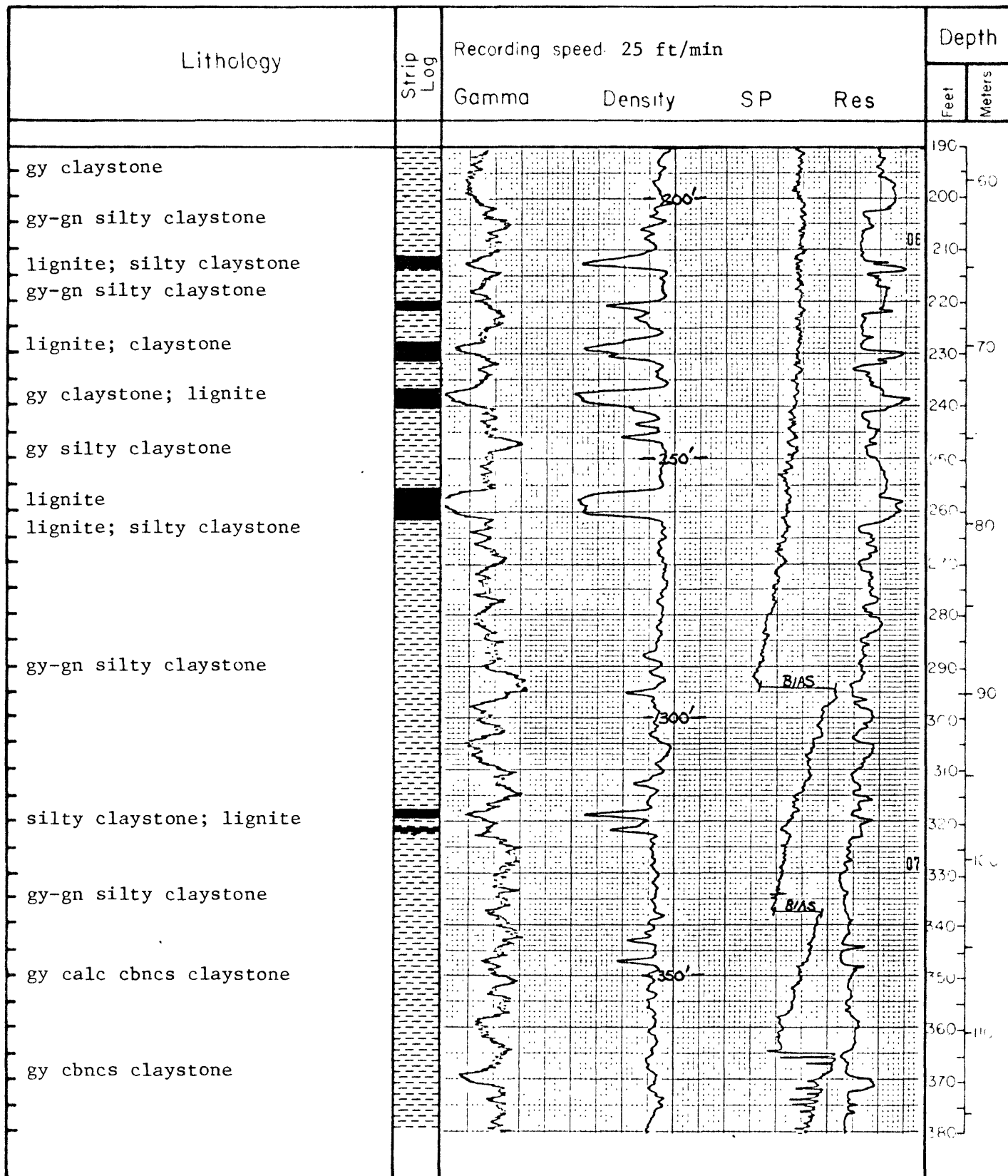
Hole no: G77-42 (continued) Map _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____
 Measured: _____, _____ Hole size _____ Cored: _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



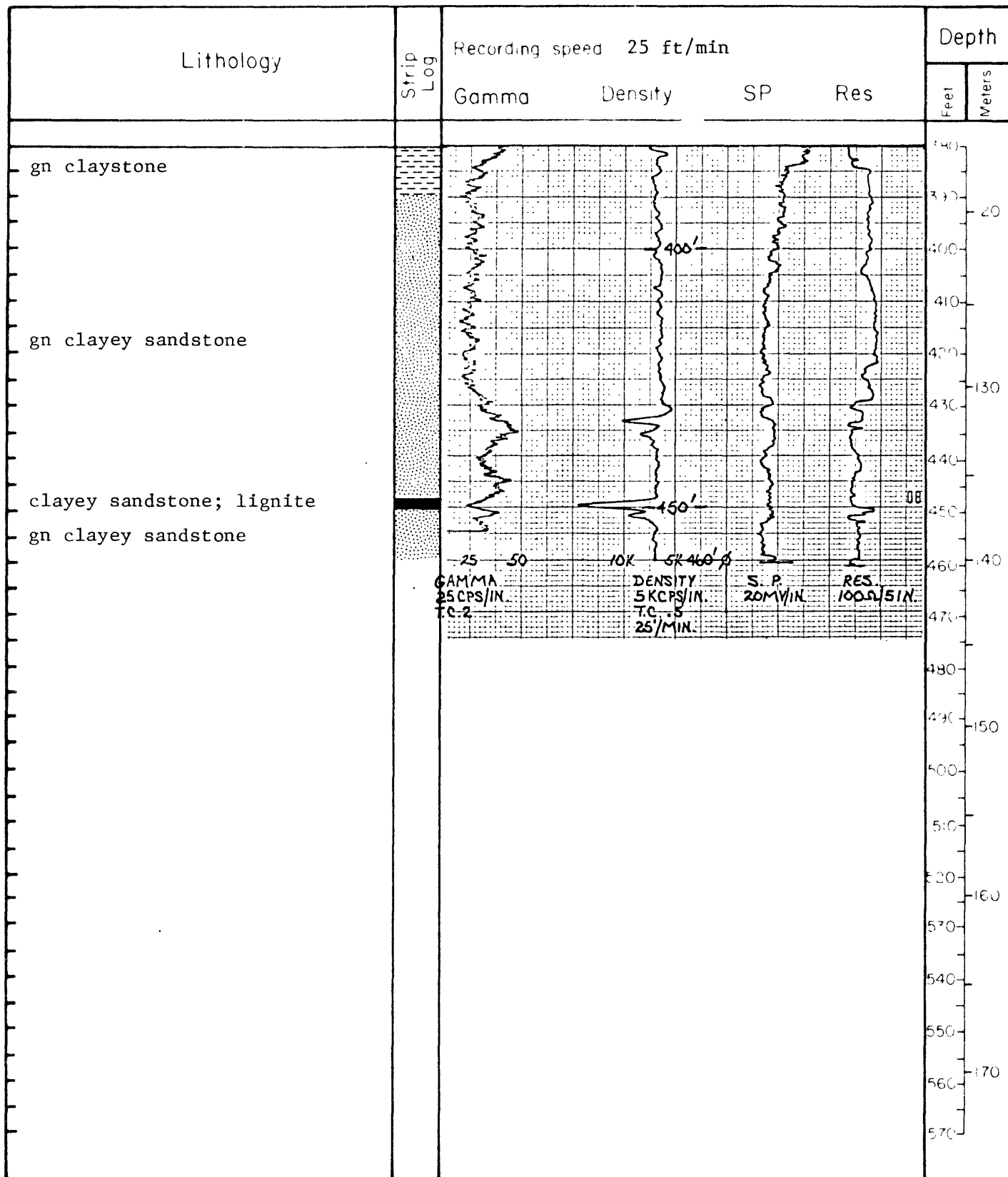
Hole no: G77-43 Map NW-16 Date: 11-2-77 State: N.D. County: McLean
 Elev: 2154 ft Location: T.150N., R.81W. Sec. 11, Tract SE SE Drilled depth: 460 ft
 Measured 148 ft FSL, 46 ft FEL Hole size 5 1/8 in. Cored: no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



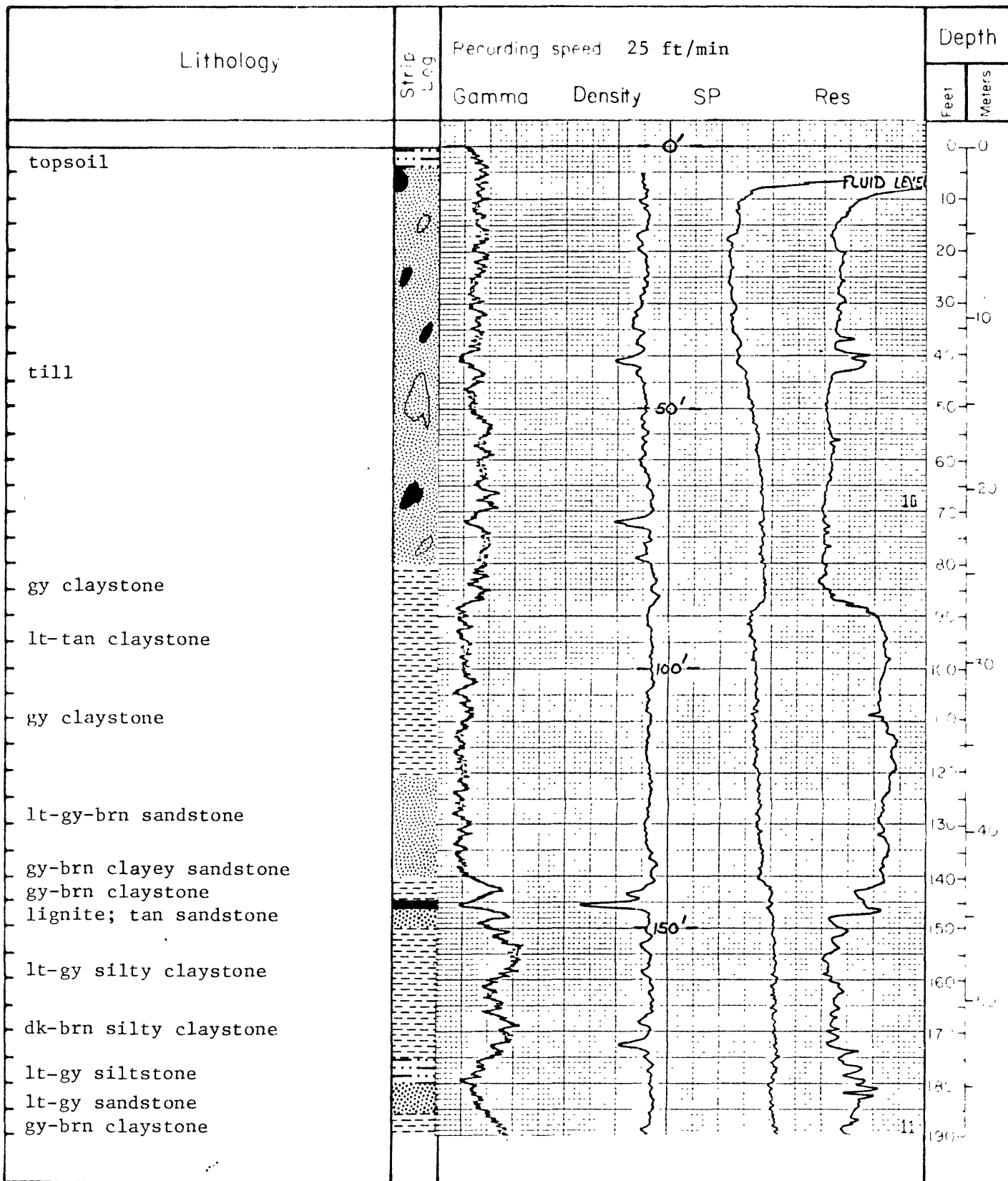
(continued)
Hole no: G77-43 Map: _____ Date: _____ State: _____ County: _____
Elev _____ Location _____ Sec. _____, Tract _____ Drilled depth: _____
Measured _____, _____ Hole size: _____ Cored _____
Remarks _____
Recorded by: Mike Menge (Geologist)



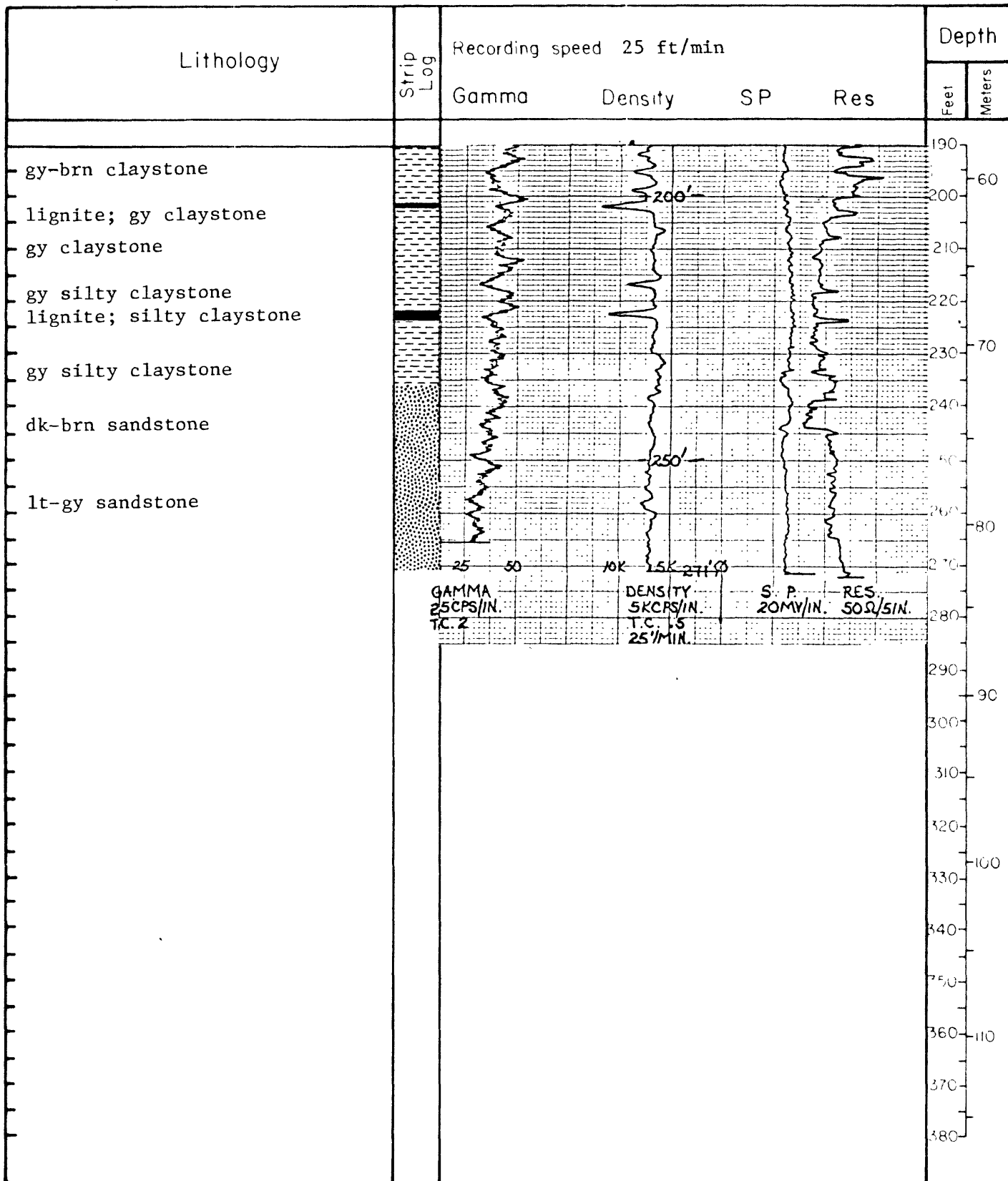
Hole no: G77-43 (continued) Map _____ Date: _____ State _____ County _____
 Elev _____ Location _____ Sec _____, Tract _____ Drilled depth _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks _____
 Recorded by: Mike Menge (Geologist)



Hole no: G77-44 Map NW-16 Date 10-31-77 State N.D. County McLean
 Elev 2048 ft Location T.150N., R.81W. Sec 26, Tract NW SW Drilled depth 271 ft
 Measured 1690 ft FSL, 24 ft FWL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by Mike Menge (Geologist)



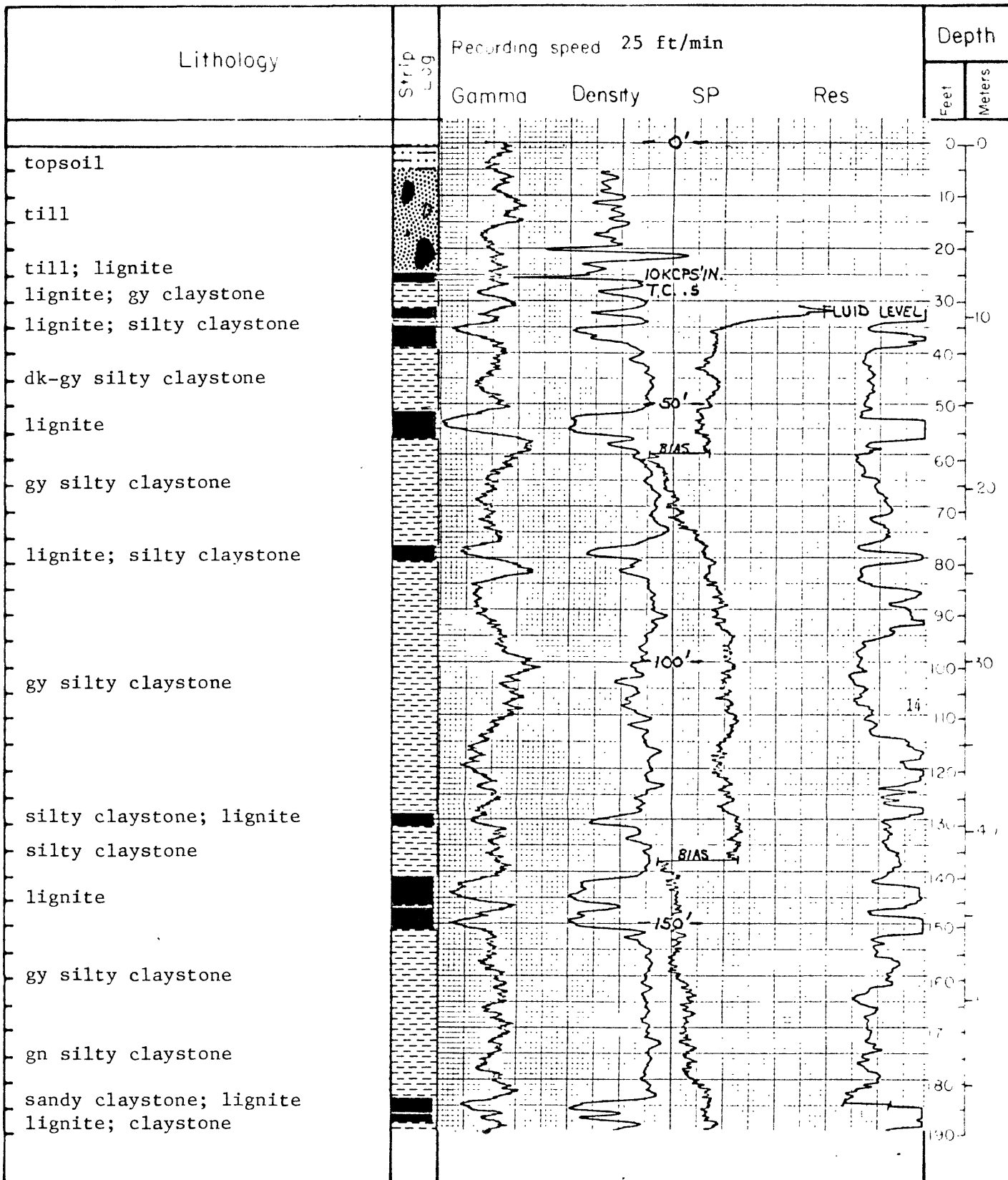
Hole no: G77-44 (continued) Map _____ Date _____ State _____ County _____
 Elev _____ Location _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



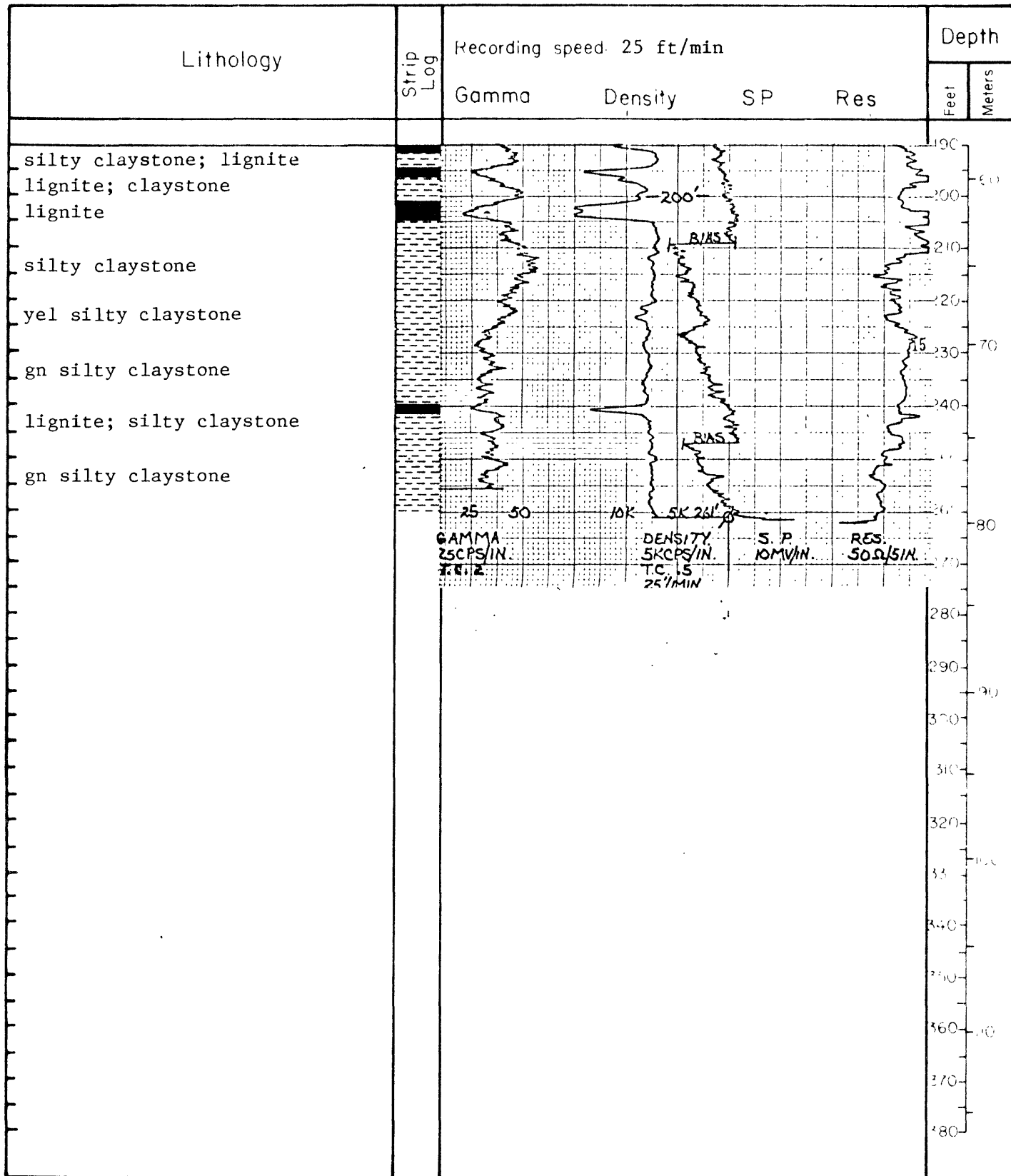
Hole no: G77-45 Map Turtle Lake Date 10-31-77 State N.D. County McLean
 Elev 2005 ft Location T.149N., R.81W. Sec 13, Tract NE NE Drilled depth: 261 ft
 Measured 182 ft FNL, 33 ft FEL Hole size 5 1/8 in. Cored no

Remarks _____

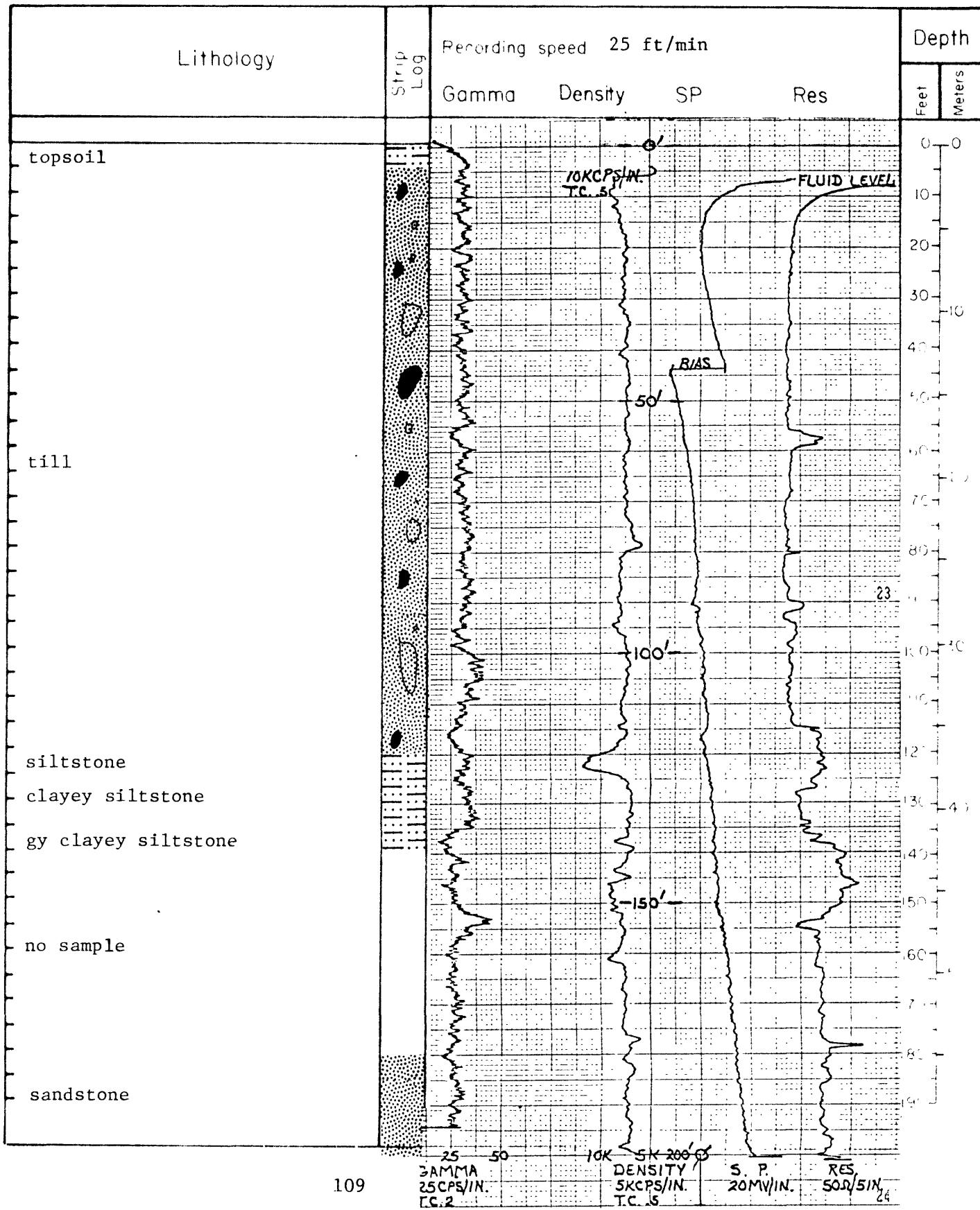
Recorded by Mike Menge (Geologist)



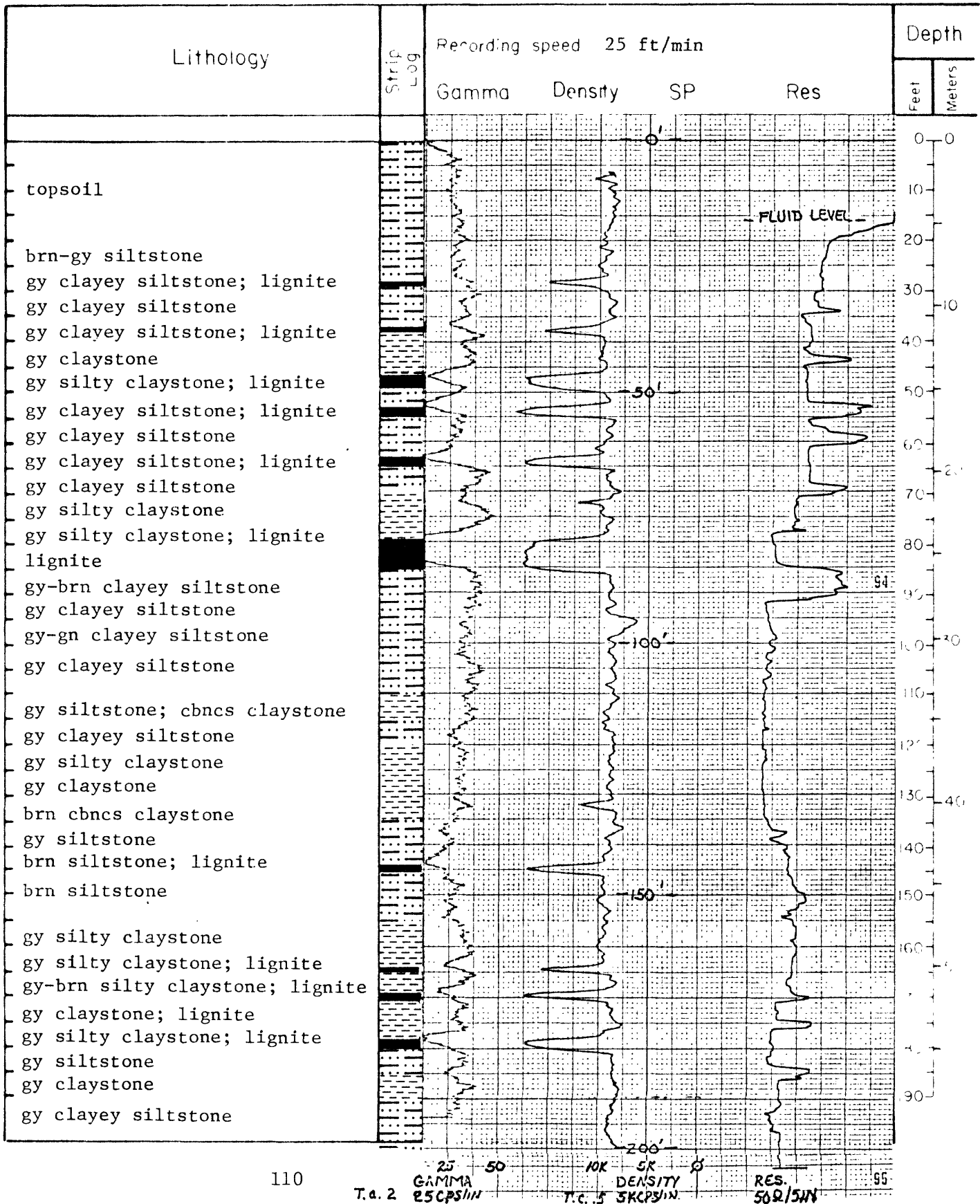
Hole no: G77-45 (continued) Map _____ Date: _____ State: _____ County: _____
 Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



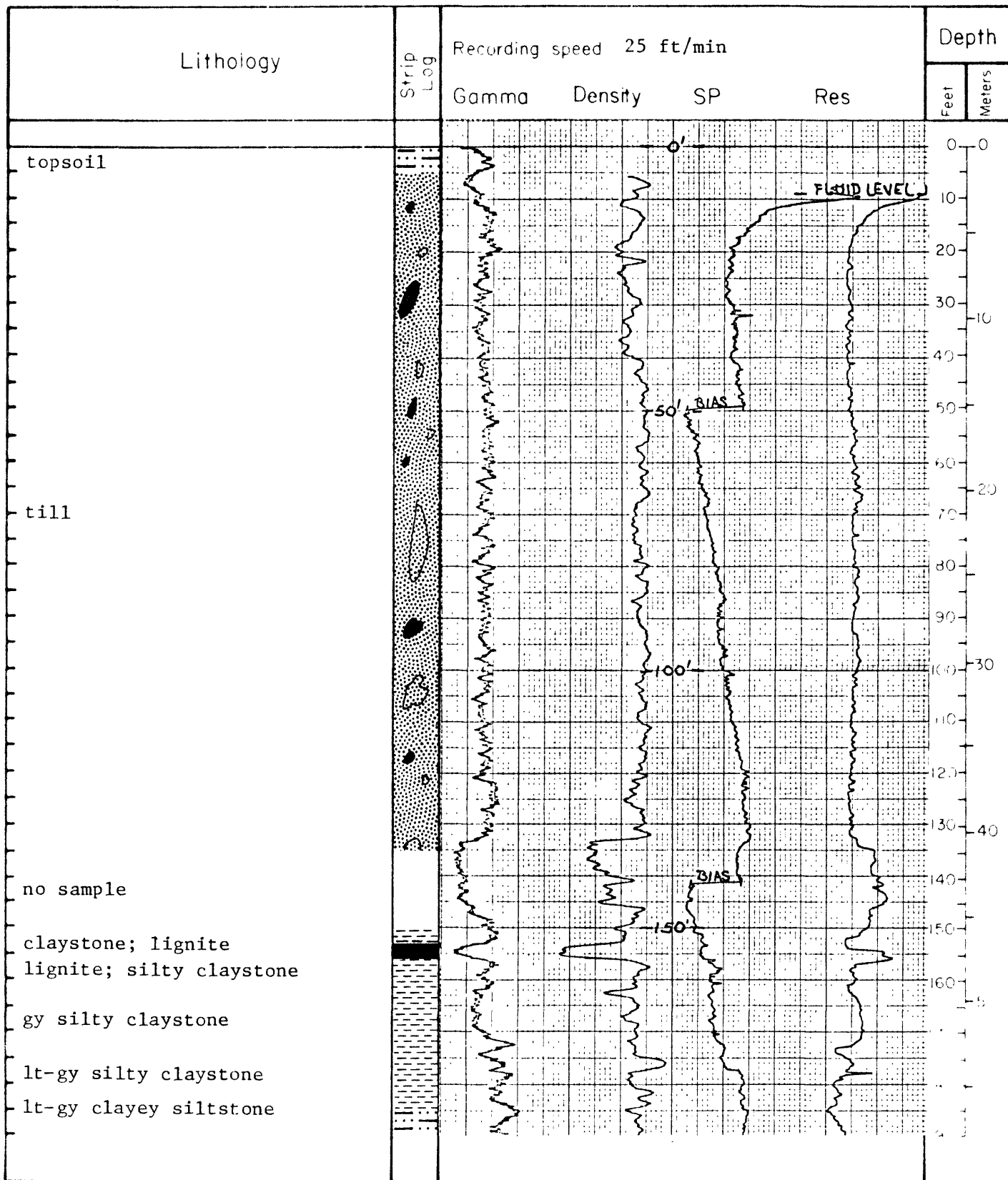
Hole no: G77-46 Map NW-16 Date 10-28-77 State N.D. County McLean
 Elev 1948 ft Location T.149N., R.81W. Sec 18, Tract SE SE Drilled depth: 200 ft
 Measured 57 ft FSL, 50 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



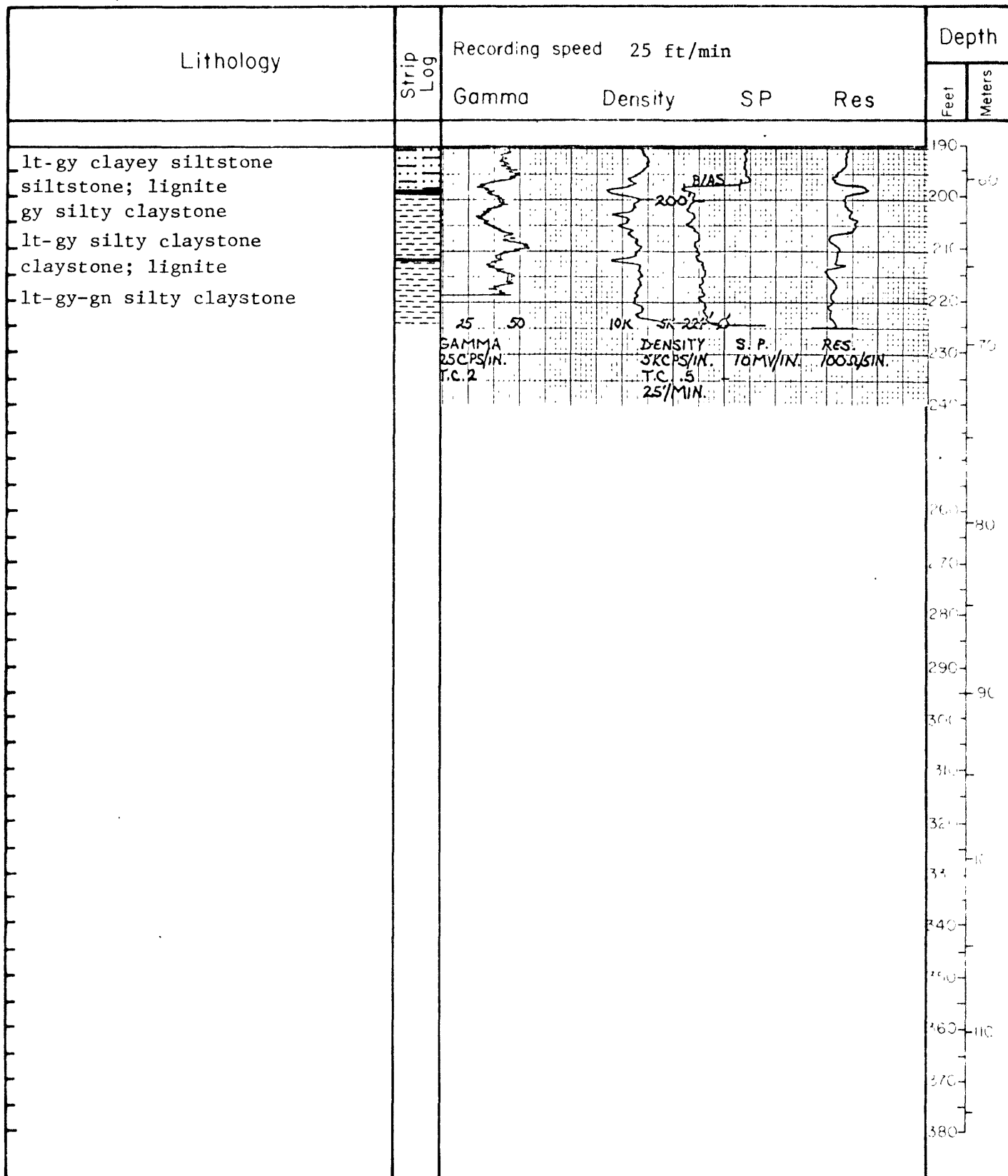
Hole no: G77-47 Map NW-22 Date 12-4-77 State N.D. County McLean
 Elev 1941 ft Location T.148N., R.84W. Sec 4, Tract SW SW Drilled depth: 200 ft
 Measured 398 ft FSL, 54 ft FWL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by Mike Menge (Geologist)



Hole no: G77-48 Map NW-22 Date 12-11-77 State N.D. County McLean
 Elev 1938 ft Location T.149 N., R.83W Sec 32, Tract NE NE Drilled depth: 224 ft
 Measured 75 ft FNL, 125 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



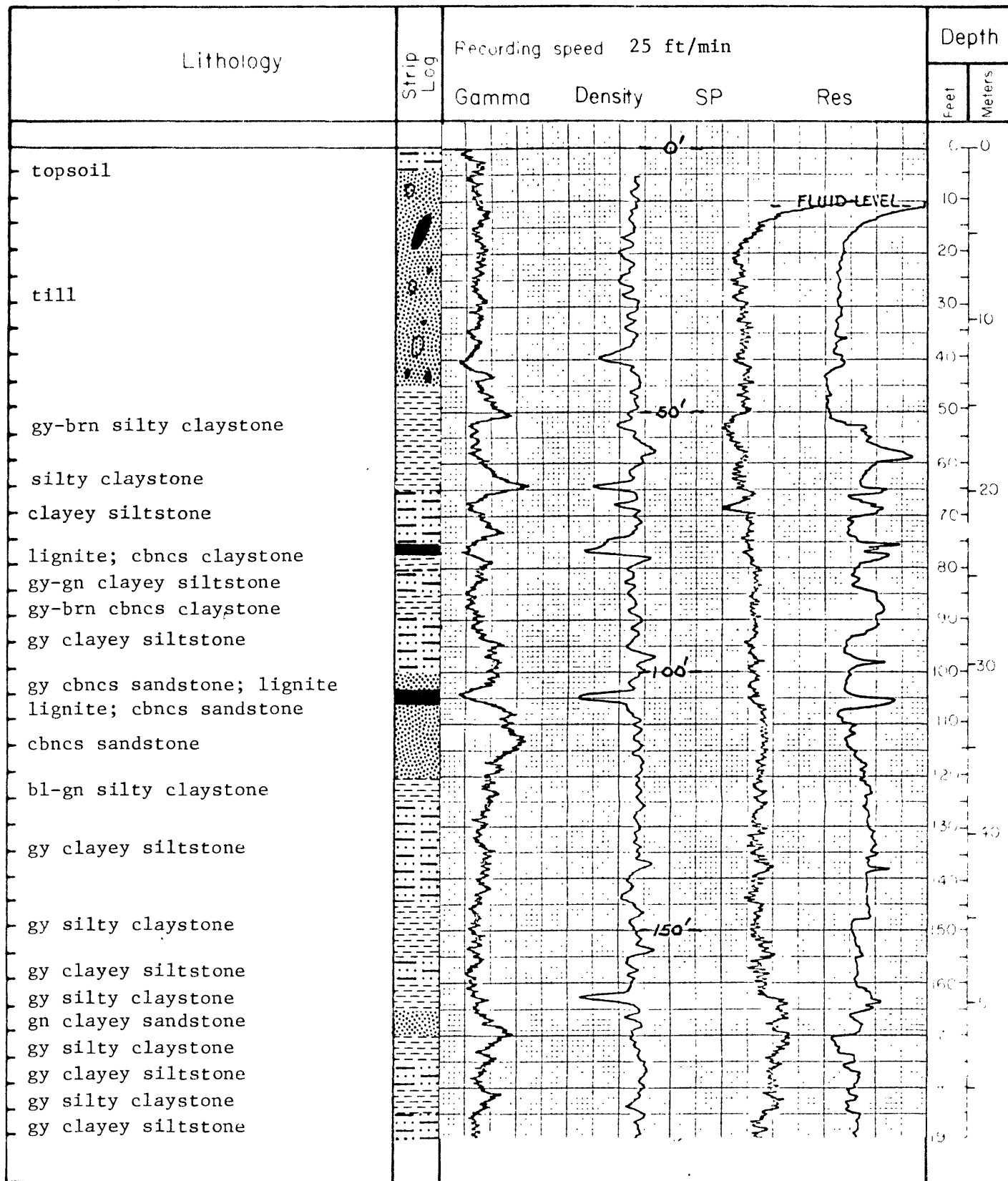
(continued)
 Hole no: G77-48 Map: _____ Date: _____ State: _____ County: _____
 Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)



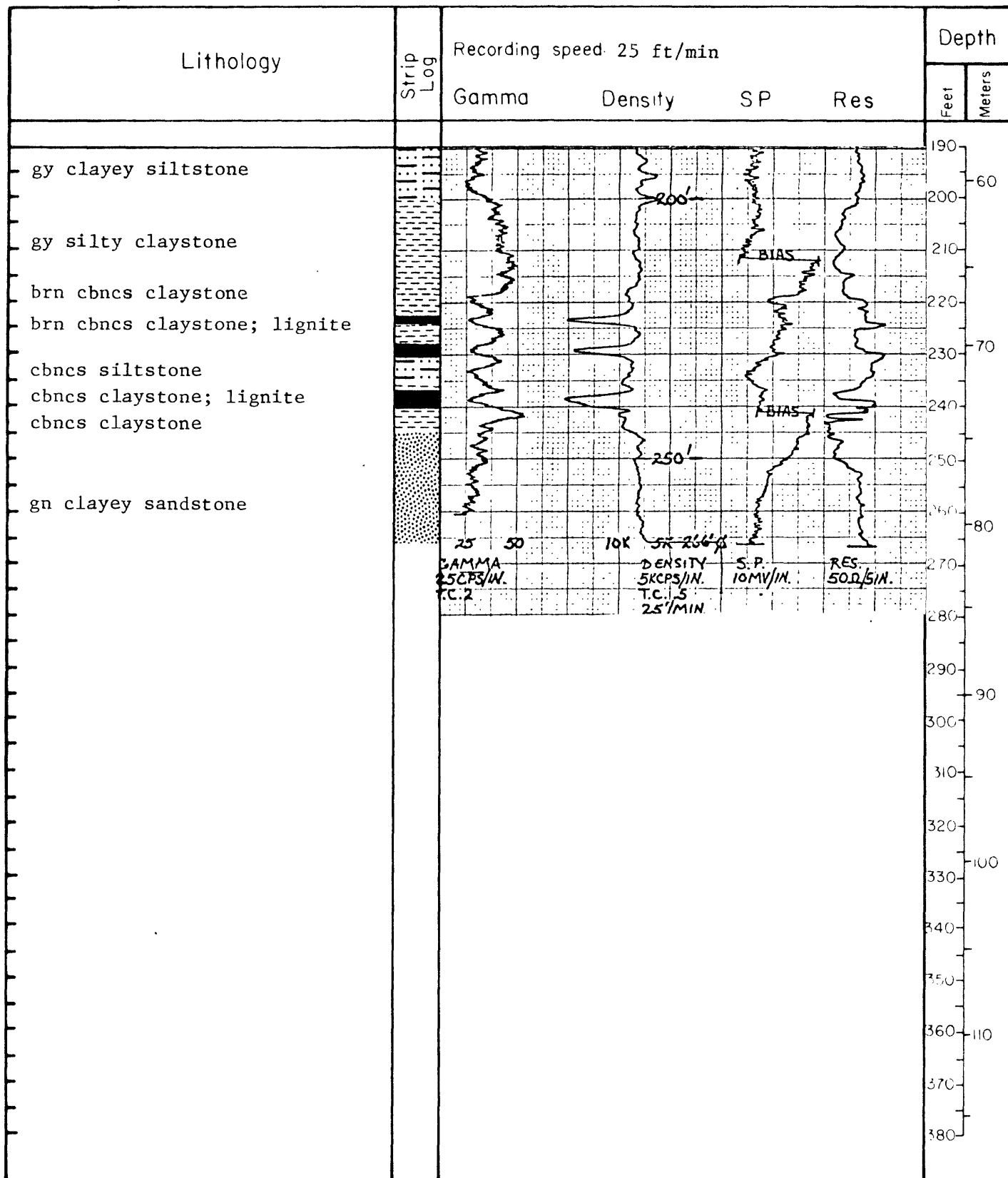
Hole no: G77-49 Map NW-22 Date 12-12-77 State N.D. County McLean
 Elev 1987 ft Location T.149N., R.83W. Sec. 23, Tract NE SE Drilled depth: 266 ft
 Measured 2492 ft FSL, 25 ft FEL Hole size 5 1/8 in. Cored no

Remarks _____

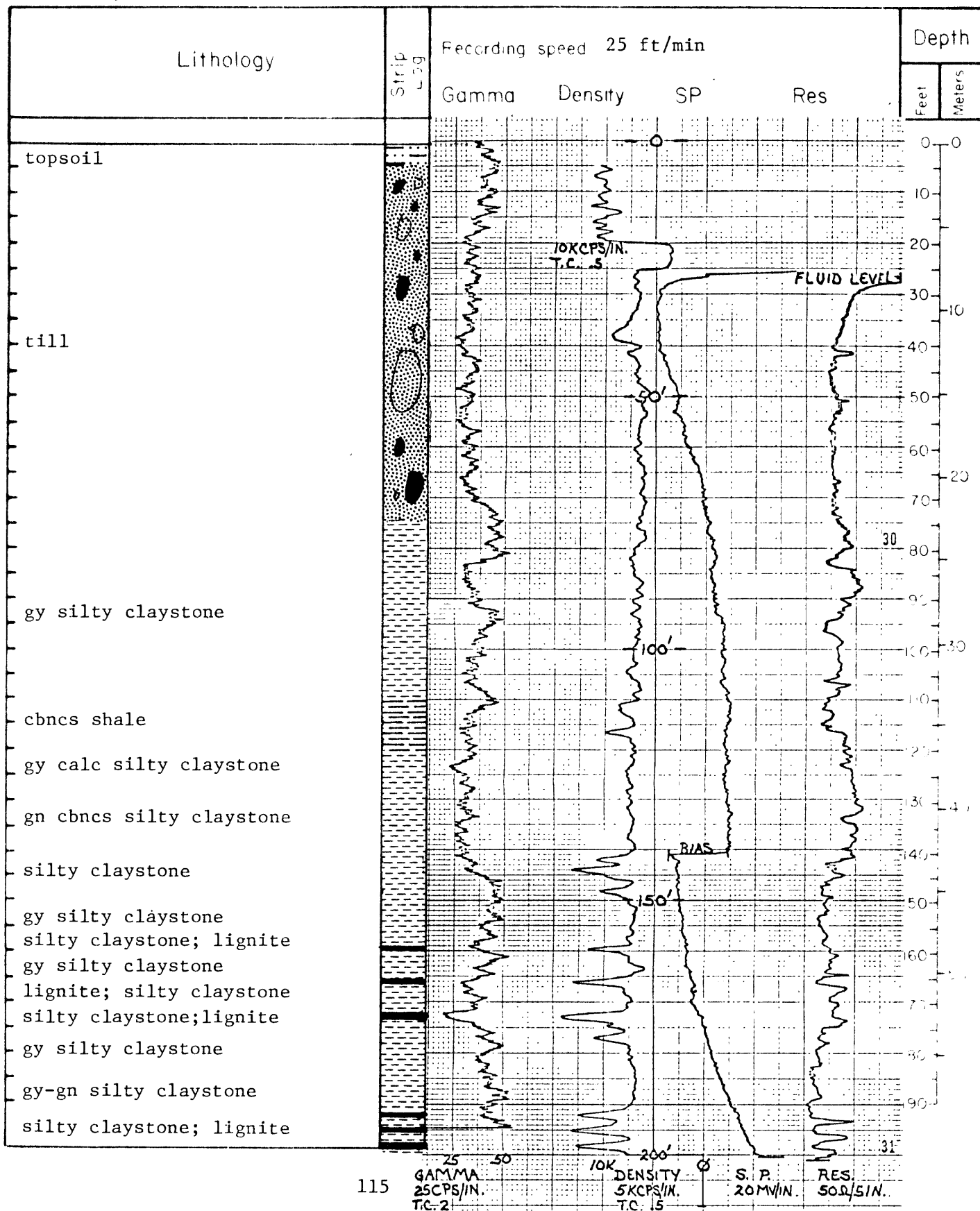
Recorded by: Mike Menge (Geologist)



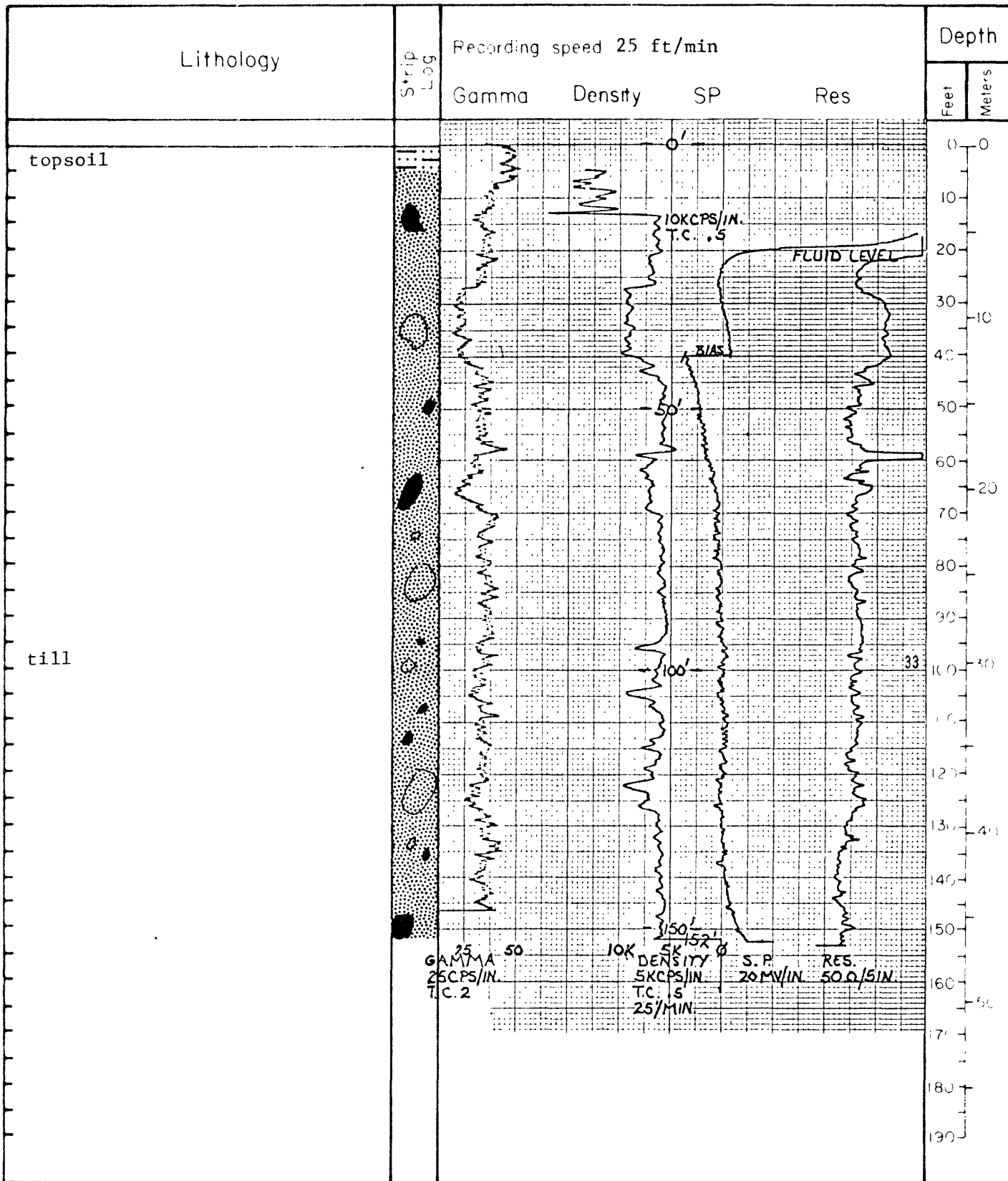
(continued)
Hole no: G77-49 Map _____ Date: _____ State: _____ County: _____
Elev. _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
Measured: _____, _____ Hole size: _____ Cored _____
Remarks: _____
Recorded by: Mike Menge (Geologist)



Hole no: G77-50 Map NW-22 Date 10-27-77 State N.D. County McLean
 Elev 1952 ft Location T.149N., R.82W. Sec 22, Tract SW SE Drilled depth: 200 ft
 Measured 75 ft FSL, 2620 ft FEL Hole size: 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



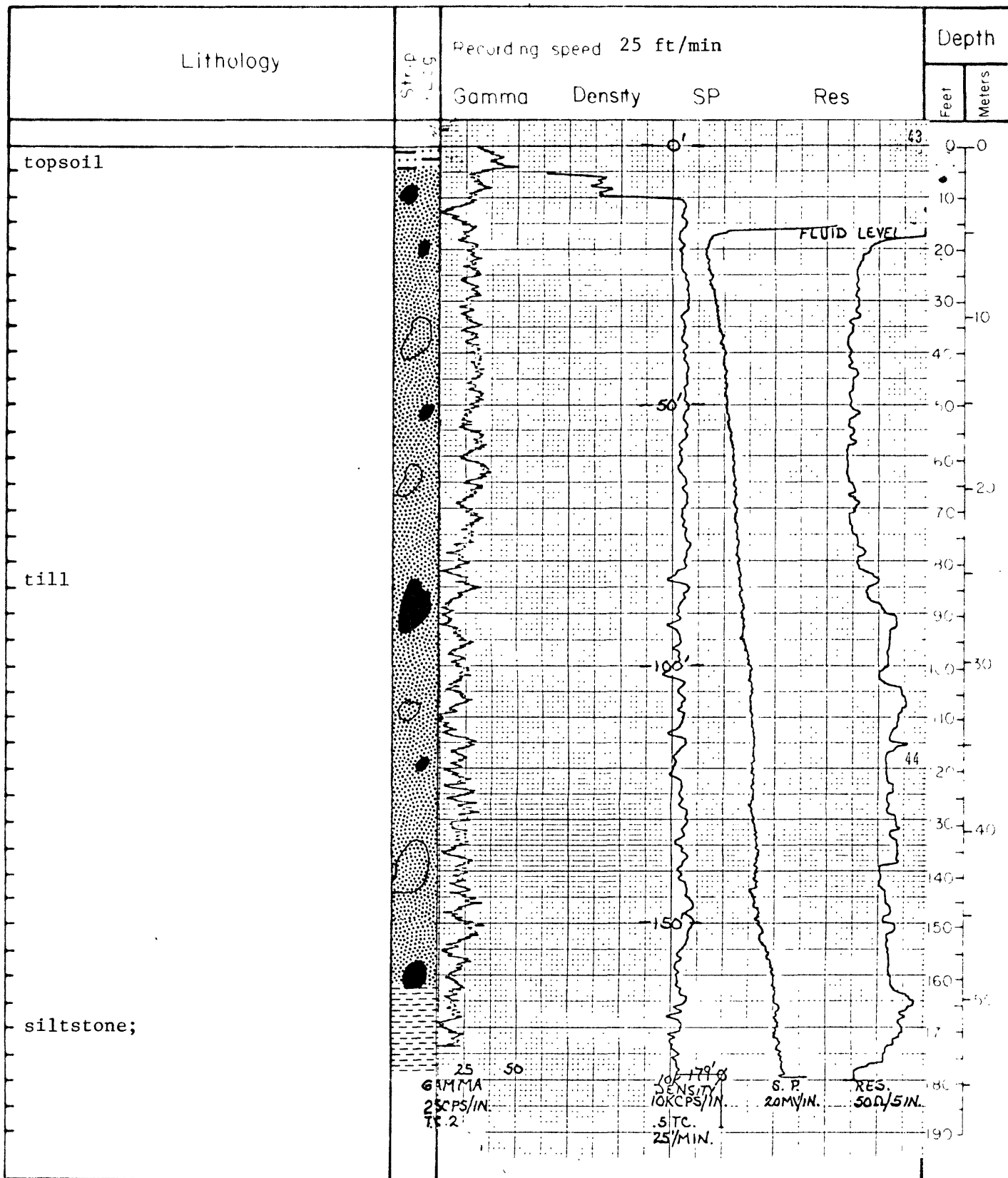
Hole no: G77-51 Map NW-22 Date 10-27-77 State N.D. County McLean
 Elev 1895 ft Location T.149N., R.81W. Sec 33, Tract NE NE Drilled depth: 152 ft
 Measured 92 ft FNL, 5 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by Mike Menge (Geologist)



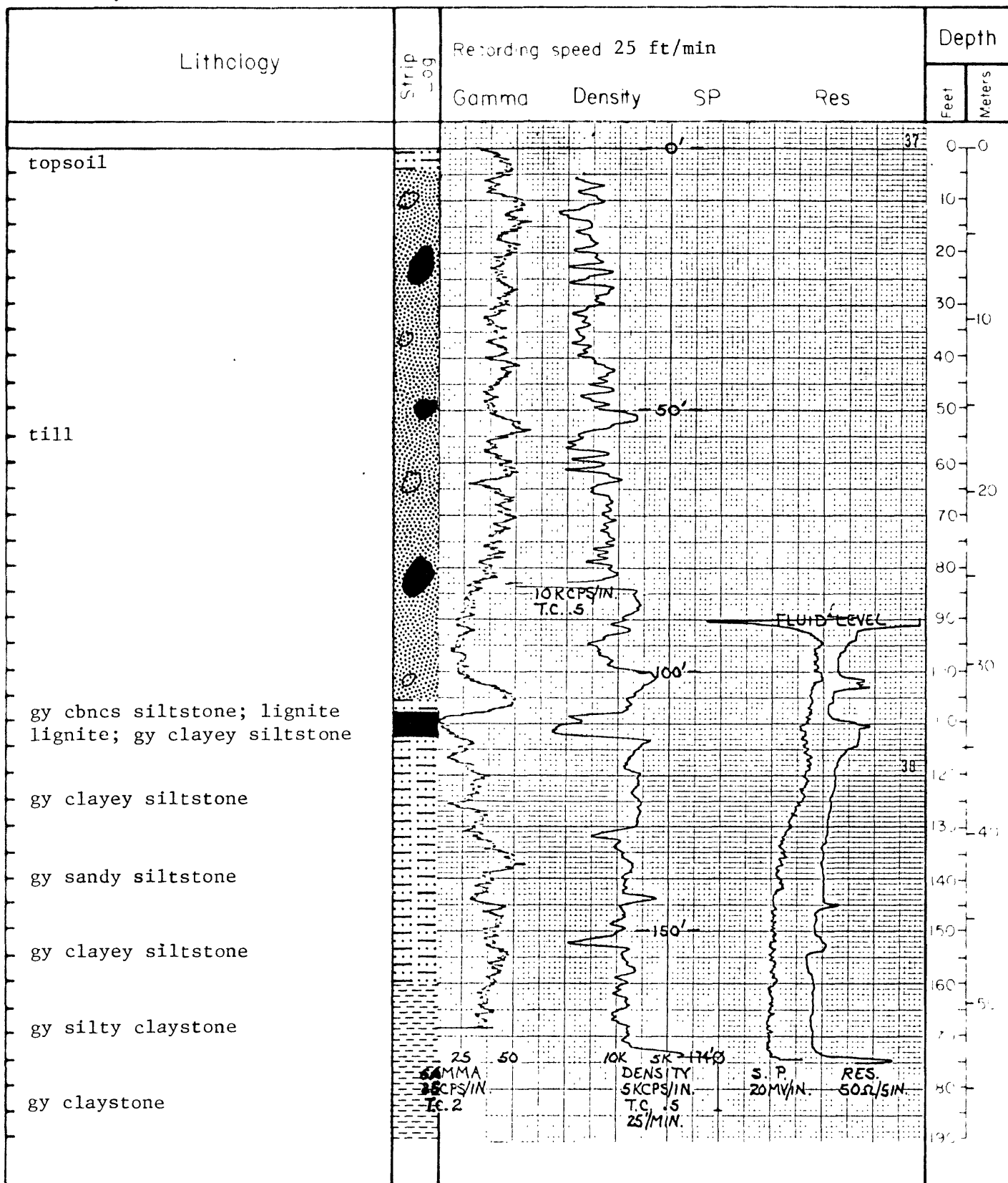
Hole no: G77-52 Map NW-22 Date 10-26-77 State N.D. County McLean
 Elev 1875 ft Location T.148N., R.81W. Sec 8 Tract NW SW Drilled depth: 179 ft
 Measured 1320 ft FSL, 12 ft FWL Hole size 5 1/8 in. (or) no

Remarks _____

Recorded by: Mike Menge (Geologist)



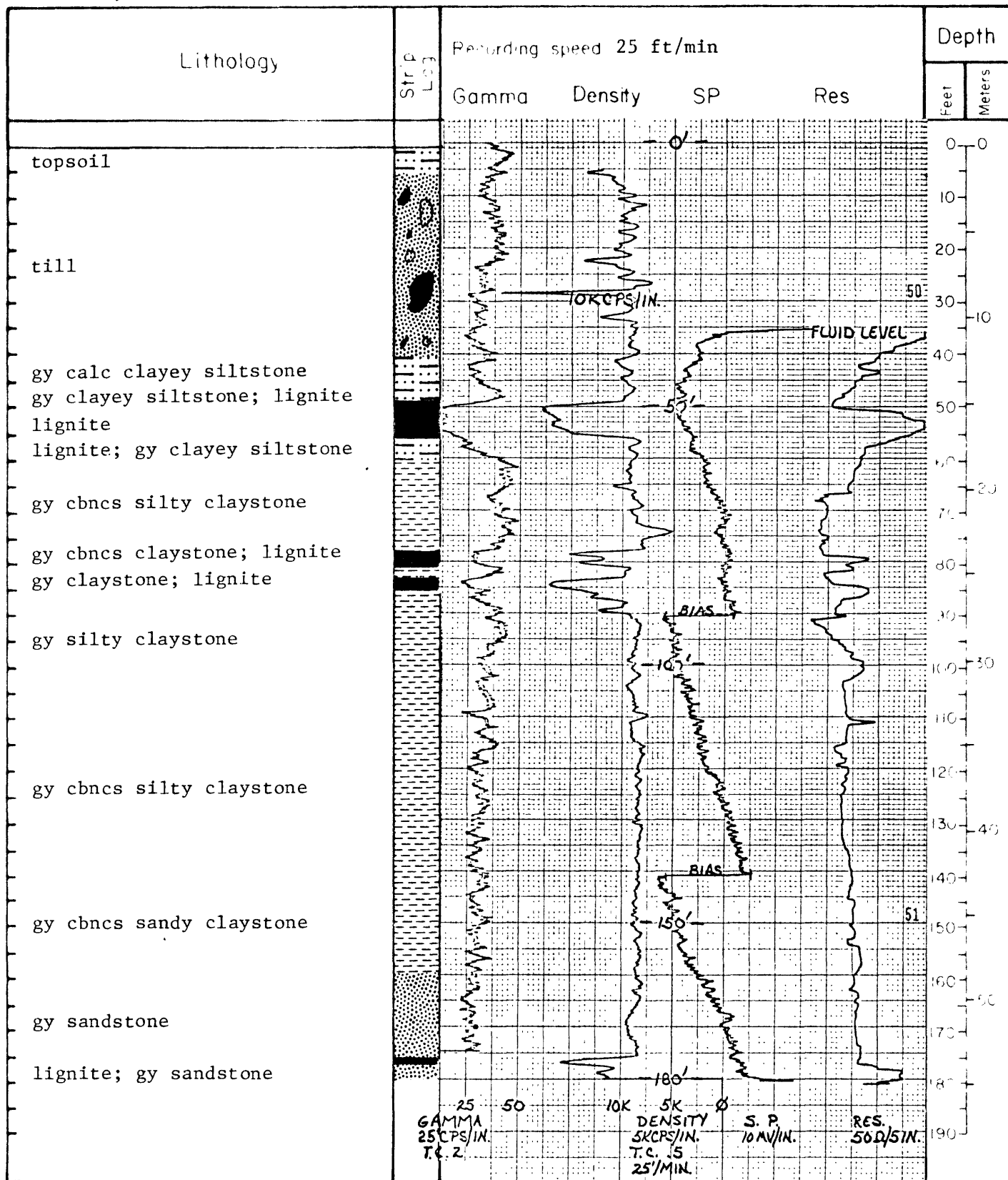
Hole no G77-53 Map NW-22 Date 10-26-77 State N.D. County McLean
 Elev 1918 ft Location T.148N., R.81W. Sec 31, Tract NW SW Drilled depth: 230 ft
 Measured 1755 ft FSL, 14 ft FWL Hole size 5 1/8 in. Cored no
 Remarks geophysical logs to 174 feet
 Recorded by Mike Menge (Geologist)



Hole no: G77-53 (continued) Map _____ Date: _____ State: _____ County: _____
 Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)

Lithology	Strip Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
gy claystone						190	
gy claystone; lignite						200	60
gy claystone						210	
						220	
gy silty claystone						230	70
						240	
						250	
						260	80
						270	
						280	
						290	
						300	90
						310	
						320	
						330	100
						340	
						350	
						360	110
						370	
						380	

Hole no. G77-54 Map NW-22 Date 10-25-77 State N.D. County: McLean
 Elev 1877 ft Location T.147N., R.82W. Sec 14, Tract SE SE Drilled depth: 180 ft
 Measured 21 ft FEL, 63 ft FSL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



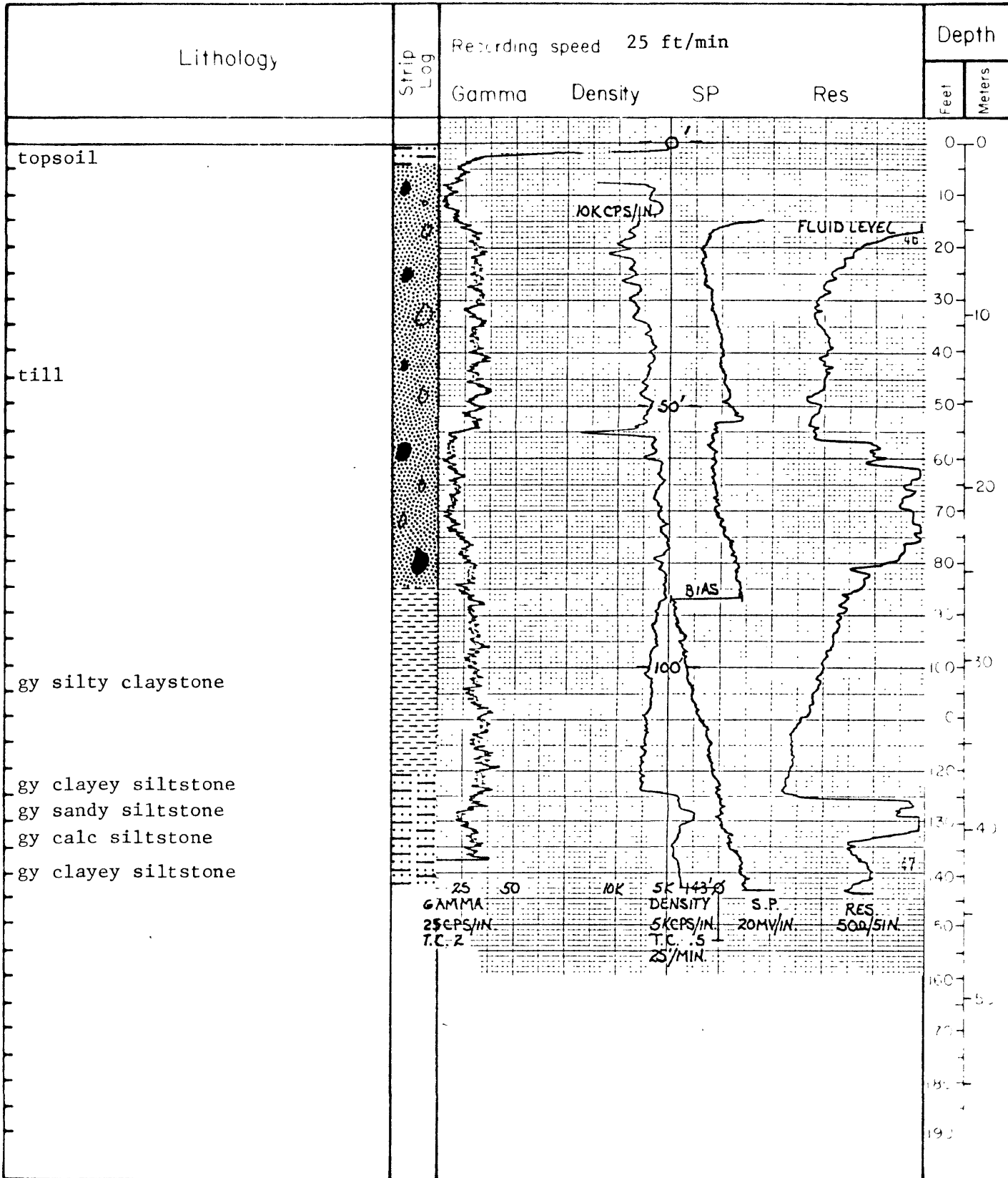
Hole no: G77-55 Map: NW-22 Date: 10-25-77 State: N. D. County: McLean
 Elev: 2012 Location T.147N., R.82W. Sec. 30, Tract SW SE Drilled depth: 316 ft
 Measured 18 ft FSL, 1424 ft FEL Hole size 5 1/8 in. Cored no
 Remarks: no geophysical logs
 Recorded by: _____

Lithology	Strip Log	Recording speed				Depth	
		Gamma	Density	SP	Res	Feet	Meters
topsoil						0	0
till						10	
gy calc silty claystone						20	
gy silty claystone						30	10
gy clayey siltstone						40	
brn sandstone						50	
gy clayey siltstone						60	20
gy sandstone						70	
gy silty claystone						80	
brn clayey siltstone						90	
gy silty claystone						100	30
gy calc clayey siltstone						110	
gy cbncs silty claystone						120	
brn cbncs siltstone						130	40
gy claystone						140	
gy cbncs silty claystone						150	
gy clayey siltstone						160	
gy cbncs claystone						170	50
brn sandstone						180	
brn claystone						190	
brn sandstone							

Hole no: G77-55 (continued) Map _____ Date: _____ State: _____ County: _____
 Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured: _____, _____ Hole size: _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)

Lithology	Strip Log	Recording speed: 25 ft/min				Depth	
		Gamma	Density	SP	Res	Feet	Meters
brn sandstone						190	
						200	60
brn cbncl sandstone						210	
						220	
gy clayey sandstone						230	70
						240	
gy clayey siltstone						250	
						260	
gy sandstone						270	80
brn sandstone						280	
						290	
gy clayey sandstone						300	90
						310	
gy sandstone						320	
gy clayey sandstone						330	100
brn clayey sandstone						340	
						350	
						360	110
						370	
						380	

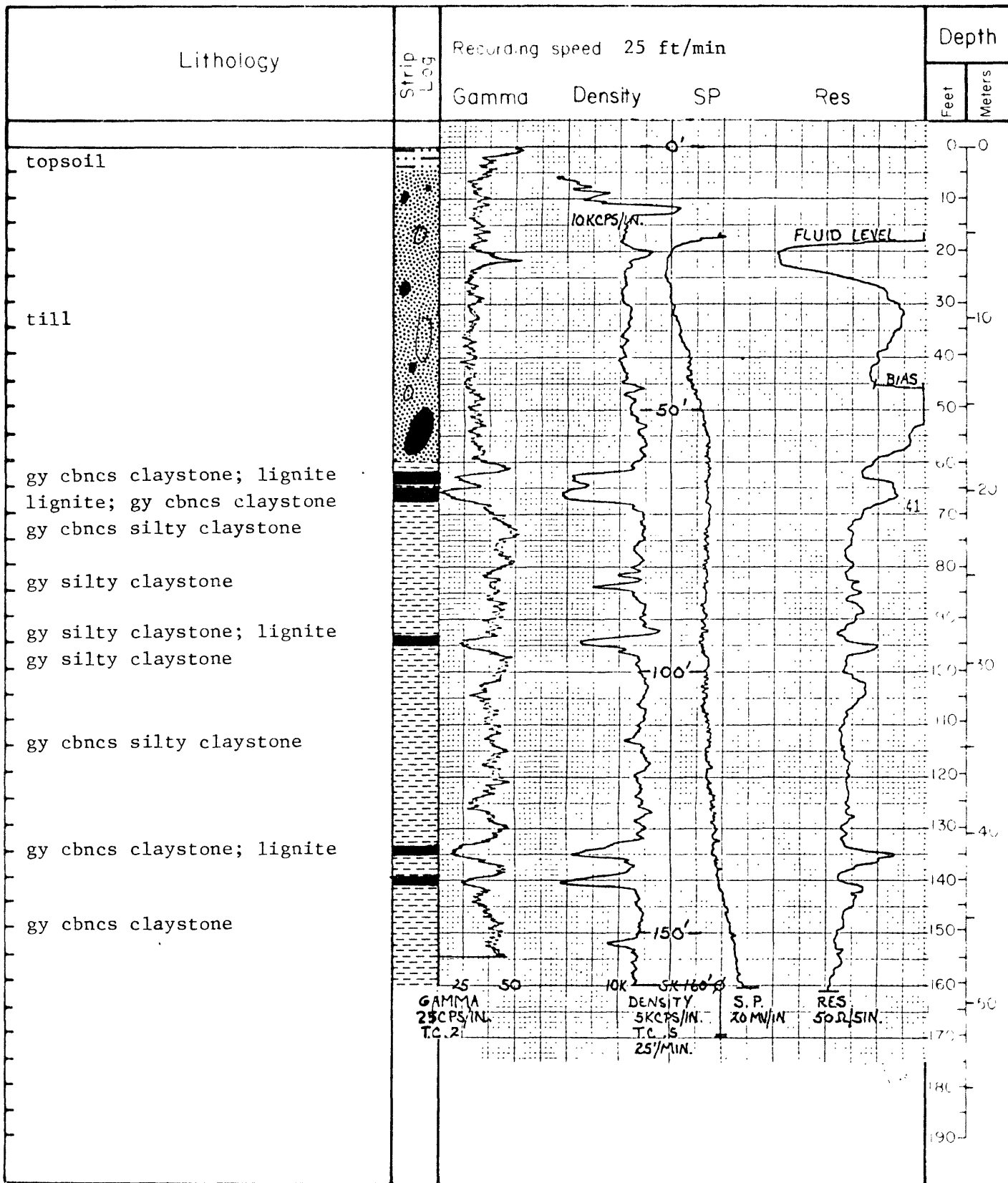
Hole no: G77-56 Map NW-23 Date 10-26-77 State N.D. County McLean
 Elev 1850 ft Location T.148N, R.81W. Sec. 35, Tract SE SE Drilled depth: 143 ft
 Measured 22 ft FSL, 520 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



Hole no: G77-57 Map NW-23 Date 10-26-77 State N.D. County McLean
 Elev. 1951 ft Location T.148N., R.81W. Sec. 2, Tract SE NE Drilled depth: 160 ft
 Measured 1600 ft FNL, 20 ft FEL Hole size 5 1/8 in. Cored no

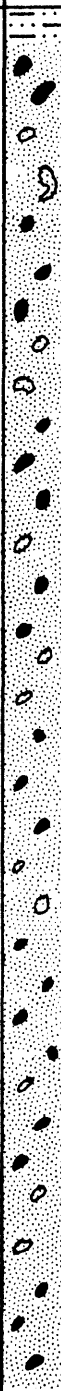
Remarks _____

Recorded by: Mike Menge (Geologist)

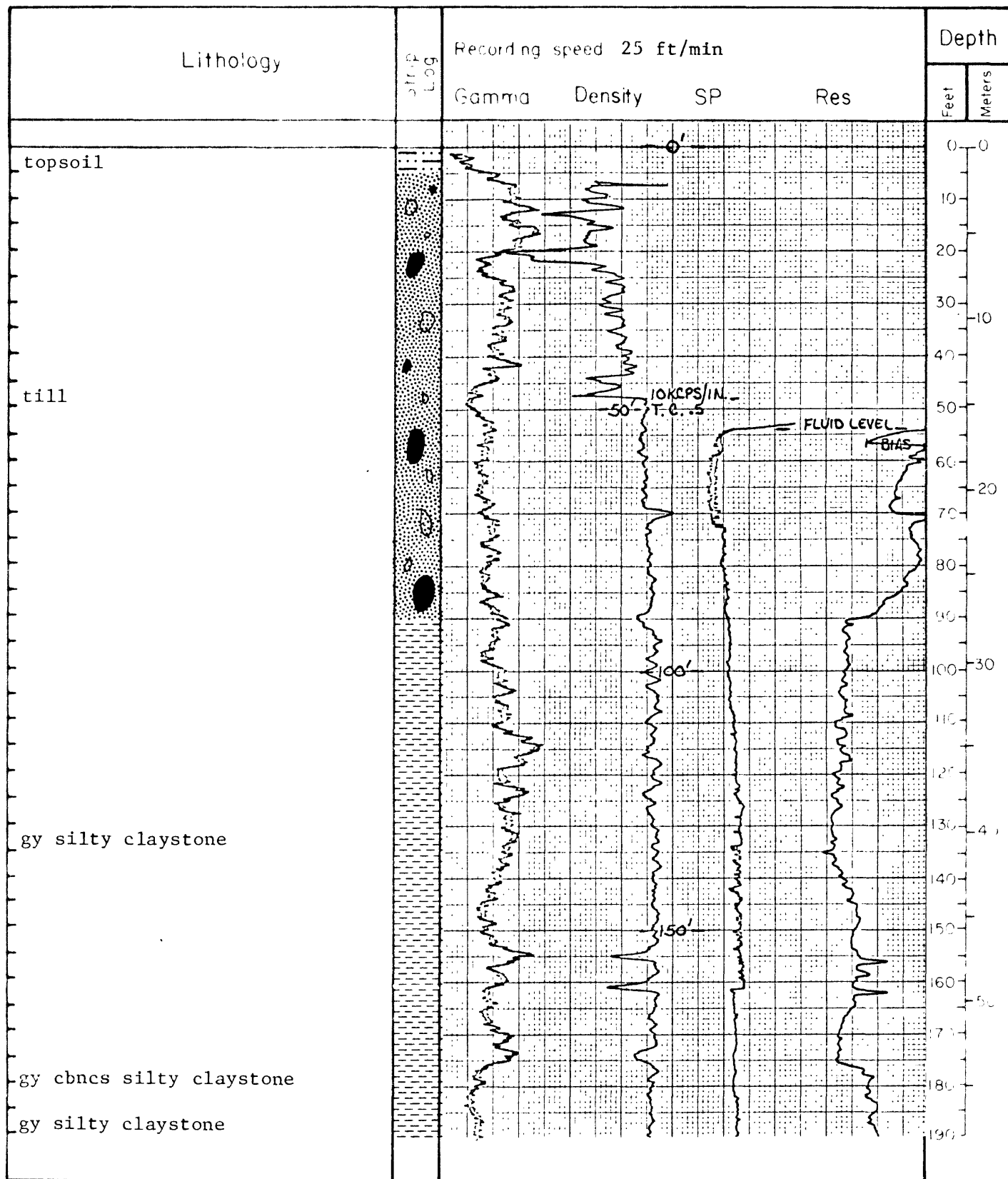


Hole no: G77-58 Map: NW-17 Date: 10-31-77 State: N.D. County: McLean
 Elev: 2042 Location: T.150W., R.80W. Sec. 29, Tract SW SW Drilled depth: 190 ft
 Measured: 668 ft FSL, 38 ft FWL Hole size: 5 1/8 in. Cored: 190 ft
 Remarks: no geophysical logs

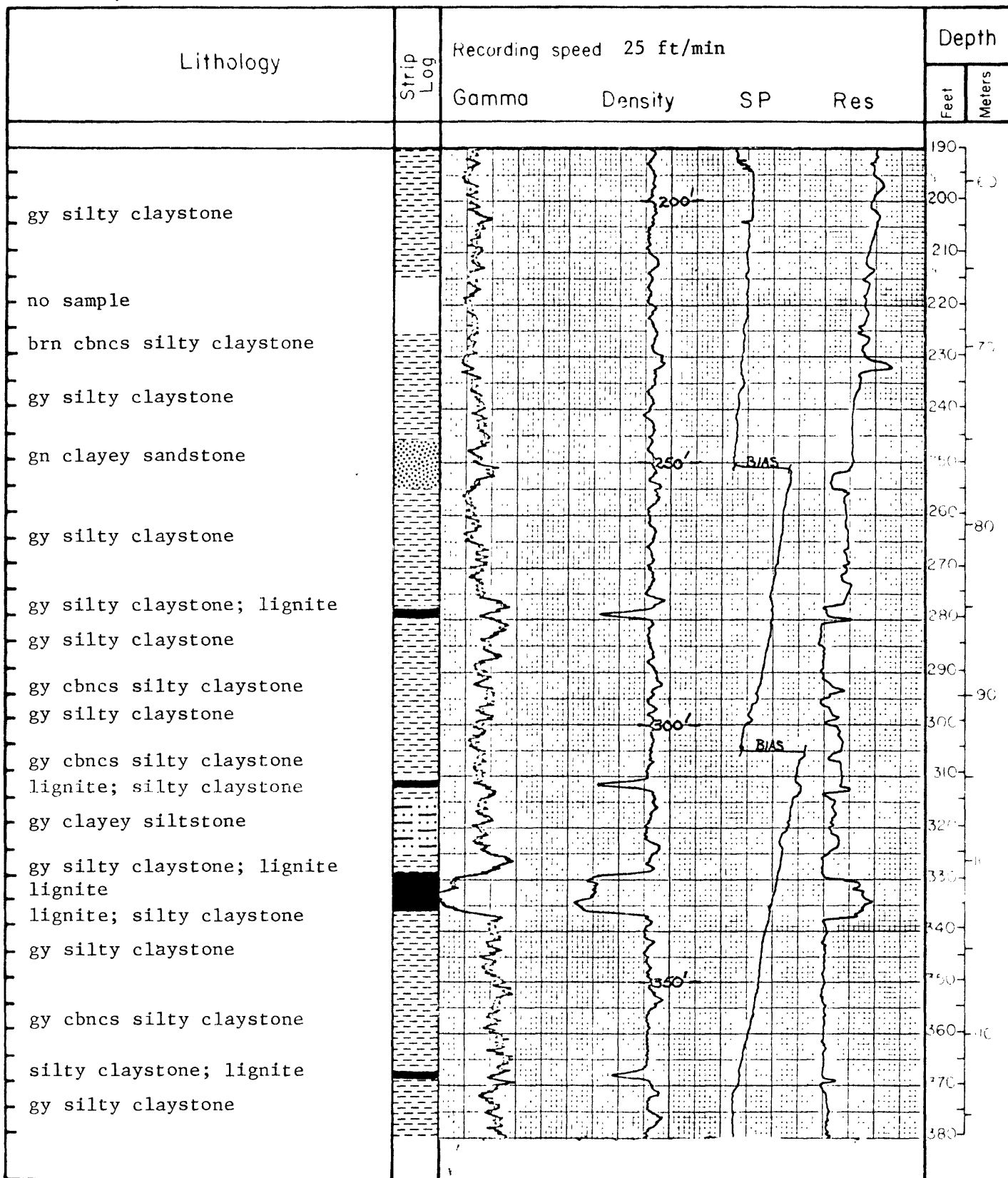
Recorded by: _____

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

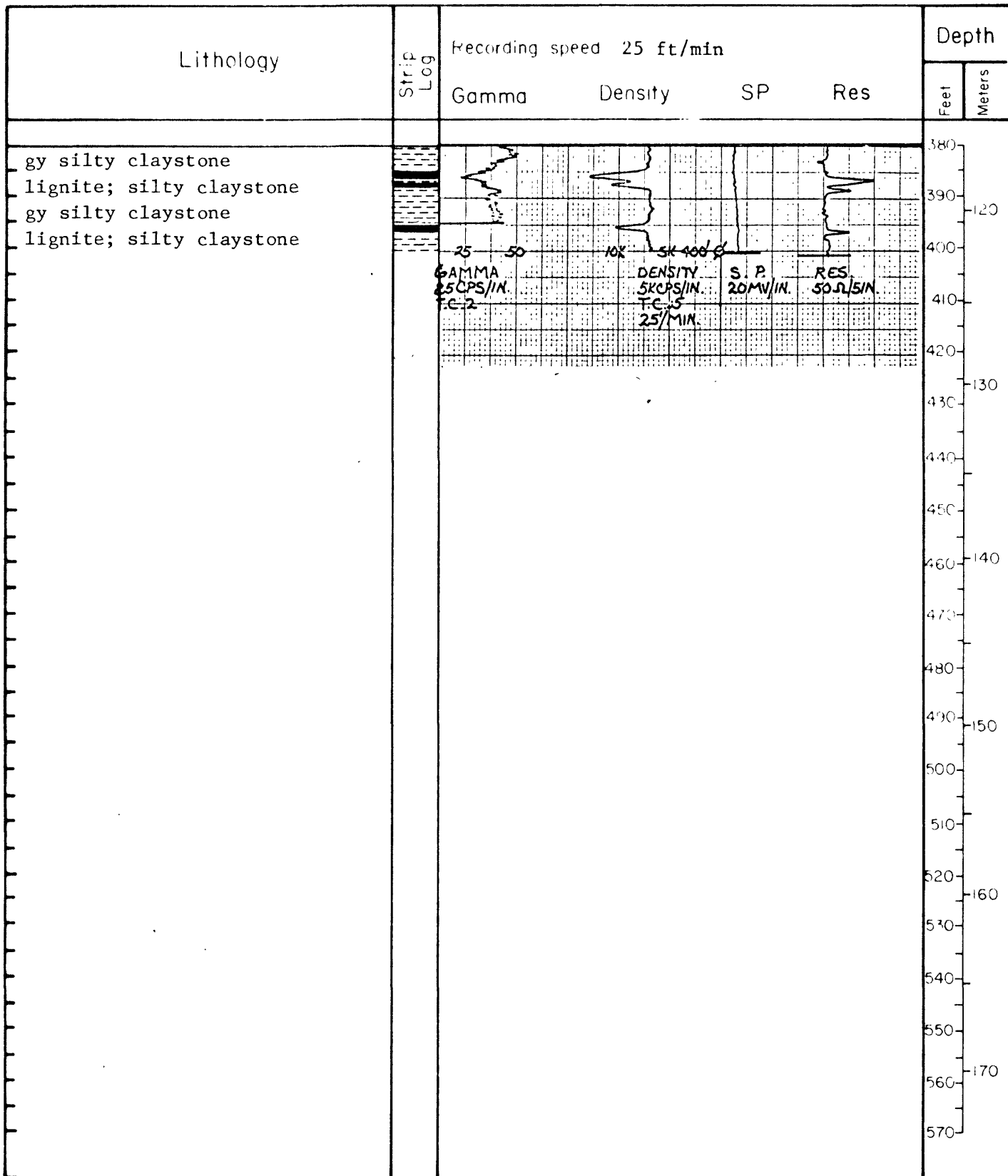
Hole no: G77-59 Map NW-22 Date 12-2-77 State N.D. County McLean
 Elev 2153 ft Location T.149N., R.86W. Sec 28, Tract NE NE Drilled depth: 400 ft
 Measured 35 ft FNL, 68 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by: Mike Menge (Geologist)



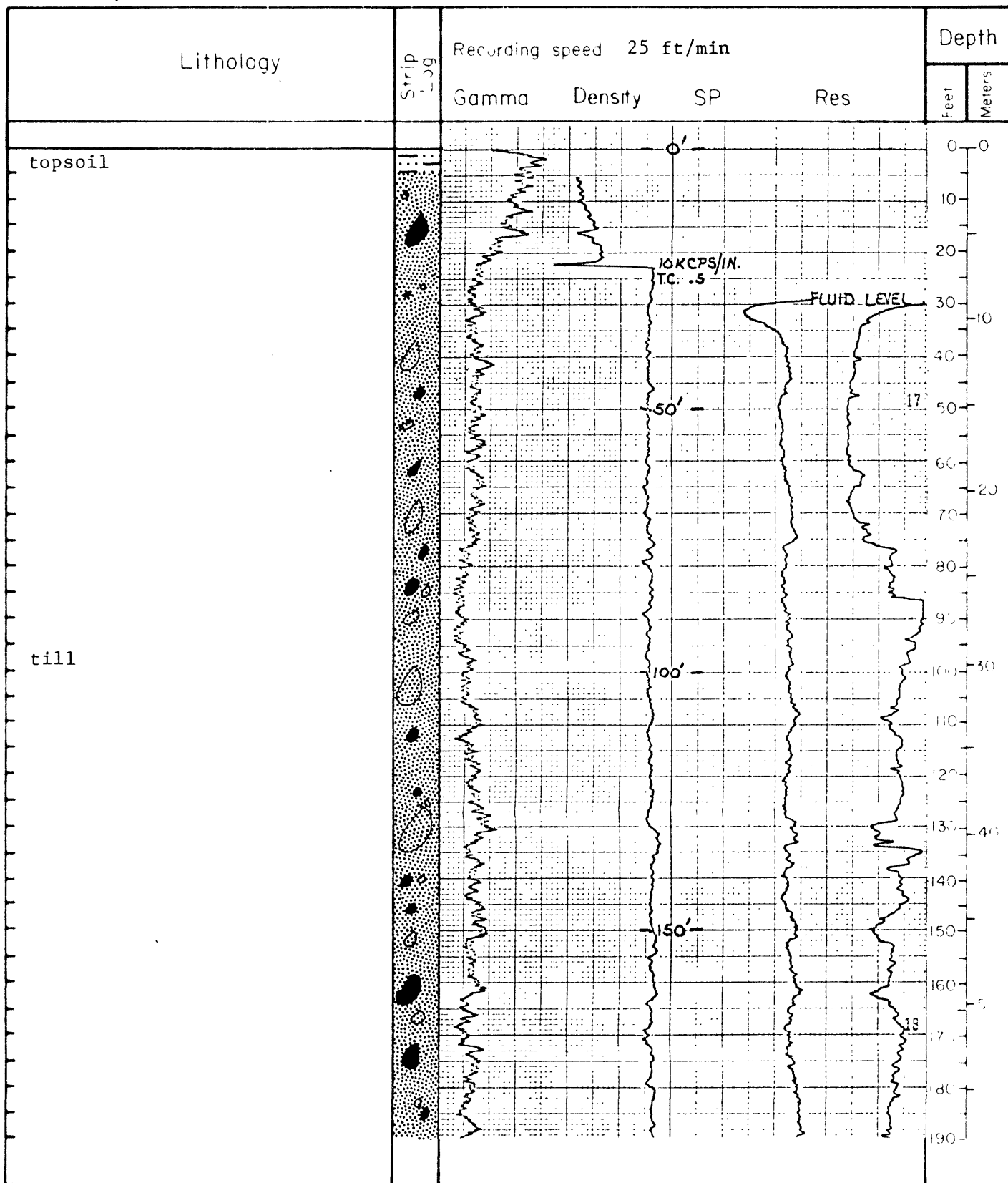
(continued)
 Hole no: G77-59 Map _____ Date: _____ State: _____ County: _____
 Elev _____ Location: _____ Sec. _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks _____
 Recorded by: Mike Menge (Geologist)



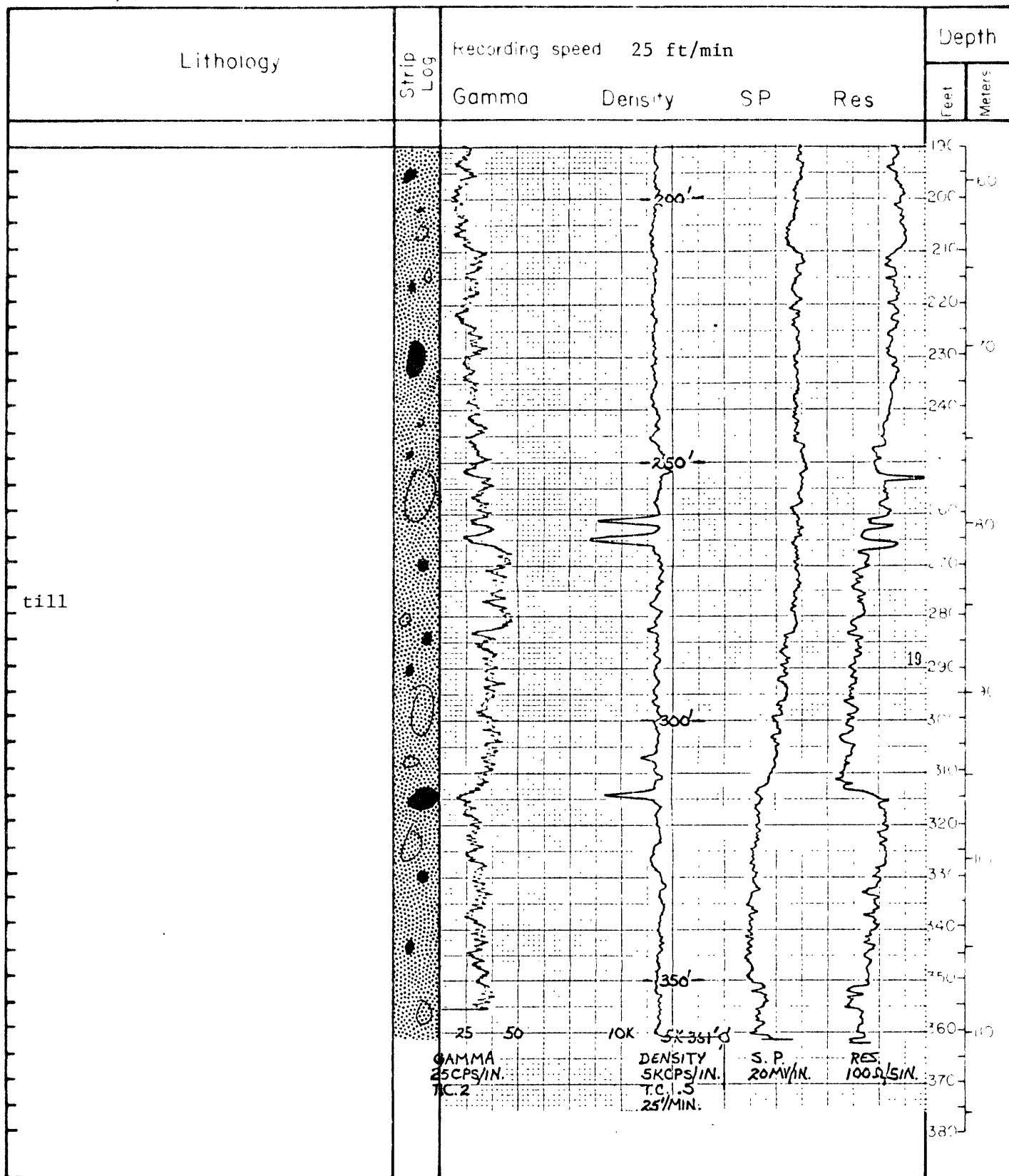
Hole no: G77-59 (continued) Map _____ Date _____ State _____ County _____
 Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks _____
 Recorded by: Mike Menge (Geologist)



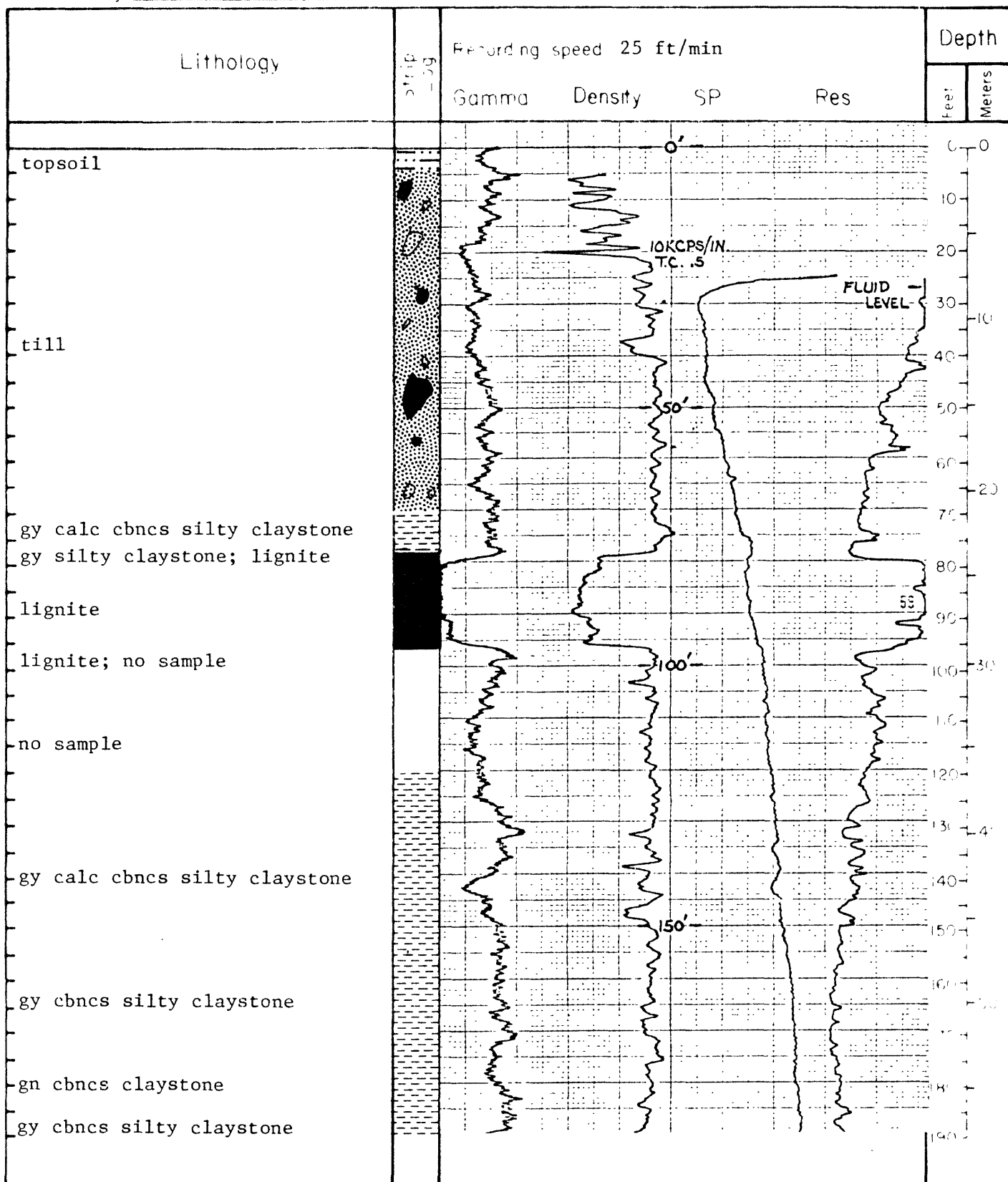
Hole no: G77-60 Map NW-17 Date 10-30-77 State N.D. County McLean
 Elev 2064 ft Location T.150N., R.80W. Sec. 15, Tract NE NE Drilled depth: 361 ft
 Measured 134 ft FNL, 68 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by Mike Menge (Geologist)



Hole no: G77-60 (continued) Map _____ Date _____ State _____ County _____
 Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks _____
 Recorded by: Mike Menge (Geologist)



Hole no: G77-61 Map NW-16 Date 11-11-77 State N.D. County Ward
 Elev 2022 ft Location T.151N., R.81W. Sec. 1, Tract SE SE Drilled depth: 330 ft
 Measured 135 ft FSL, 900 ft FEL Hole size 5 1/8 in. Cored no
 Remarks _____
 Recorded by Mike Menge (Geologist)



Hole no: G77-61 (continued) Map _____ Date _____ State _____ County _____
 Elev _____ Location: _____ Sec _____, Tract _____ Drilled depth: _____
 Measured _____, _____ Hole size _____ Cored _____
 Remarks: _____
 Recorded by: Mike Menge (Geologist)

