

Jones, William V., EMNRD

From: Jones, William V., EMNRD
Sent: Wednesday, September 30, 2009 11:36 AM
To: 'Brian Collins'
Cc: Warnell, Terry G, EMNRD
Subject: RE: Sausage SWD 1 (Order SWD-1184) Injection Tubing Size

Brian:
Thanks for the detailed and rapid reply.
With these concerns addressed, I intend to print out this email and amend the permit.
The amended permit will either be mailed to you or will appear on the web site – the procedure for doing this seems to be evolving.

Will

William V. Jones PE
New Mexico Oil Conservation Division
1220 South St. Francis
Santa Fe, NM 87505
505-476-3448

— *Corrected API also*
— *Special Requirements were satisfied also,*

From: Brian Collins [mailto:bcollins@marbob.com]
Sent: Wednesday, September 30, 2009 10:48 AM
To: Jones, William V., EMNRD
Subject: Re: Sausage SWD 1 (Order SWD-1184) Injection Tubing Size

Will:

We can pressure test annulus just fine. The 3-1/2" can be fished inside 5-1/2" with a spear on the ID and/or an overshot over the tube OD. The coupling would have to be dressed off with a mill prior to using an overshot to catch the coupling or the tube below the coupling. Running 3-1/2" tubing with special clearance couplings inside 5-1/2" is a common practice. I've done it here at Marbob and when I was with Yates.

I'm very comfortable doing this and believe it can be fished out for proper well plugging. I don't anticipate needing to fish since we closely watch the tubing x casing annulus for mechanical integrity and we use packer fluid containing corrosion inhibitor, bactericide and oxygen scavenger in the tubing x casing annulus. Thanks.

Brian Collins
Marbob Energy

----- Original Message -----

From: Jones, William V., EMNRD
To: Brian Collins
Sent: Wednesday, September 30, 2009 9:27 AM
Subject: RE: Sausage SWD 1 (Order SWD-1184) Injection Tubing Size

Brian:
Probably OK, but questions:

Will you still have an annulus sufficient in size to pressure test from surface to the packer?
Can you fish this? We worry about a situation if you lose the tubing above a (5-1/2 inch) cement top and cannot fish, then the well would be hard to properly plug.

What do you say?

Will

From: Brian Collins [mailto:bcollins@marbob.com]
Sent: Wednesday, September 30, 2009 8:13 AM
To: Jones, William V., EMNRD
Subject: Sausage SWD 1 (Order SWD-1184) Injection Tubing Size

Will:

I submitted, and you approved, 2-7/8" injection tubing for the Sausage SWD 1. We're thinking about using 3-1/2"/9.3ppf/J55/EUE Special Clearance Duoline 20 injection tubing instead of 2-7/8" to increase capacity with lower friction pressure. It is very common to use 3-1/2" injection tubing with special clearance couplings inside of 5-1/2" casing.

The approved order says 2-7/8" or smaller tubing. I'm asking for your approval to run the 3-1/2" instead of the 2-7/8" injection tubing. Do I need to send a letter or will this email suffice? Thanks!

Brian Collins
Marbob Energy
bcollins@marbob.com
575-748-3303

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Submit 3 Copies To Appropriate District
Office
District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Ave., Artesia, NM 88210
District III
2000 Rio Brazos Rd., Abilene, NM 87010
District IV
1220 S. St. Francis Dr., Santa Fe, NM
87505

State of New Mexico
Energy, Minerals and Natural Resources

Form C-103

June 19, 2008

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

WELL API NO. 30-015-37239
5. Indicate Type of Lease STATE ☒ FEE ☐
6. State Oil & Gas Lease No.
7. Lease Name or Unit Agreement Name SAUSAGE SWD
8. Well Number 1
9. OGRID Number 14049
10. Pool name or Wildcat BONE SPRING

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A
DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH
PROPOSALS.)

1. Type of Well: Oil Well ☐ Gas Well ☐ Other SALT WATER DISPOSAL

2. Name of Operator

MARBOB ENERGY CORPORATION

3. Address of Operator P O BOX 227

ARTESIA NM 88211-0227

4. Well Location

Unit Letter G : 2310 feet from the NORTH line and 1650 feet from the EAST line

Section 7 Township 25S Range 30E NMPM EDDY County

11. Elevation (Show whether DR, RKB, RT, GR, etc.)

3182' GR

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK ☐ PLUG AND ABANDON ☐
TEMPORARILY ABANDON ☐ CHANGE PLANS ☐
PULL OR ALTER CASING ☐ MULTIPLE COMPL ☐
DOWNHOLE COMMINGLE ☐

SUBSEQUENT REPORT OF:

REMEDIAL WORK ☐ ALTERING CASING ☐
COMMENCE DRILLING OPNS. ☐ P AND A ☐
CASING/CEMENT JOB ☐

OTHER: ☐

OTHER: EVALUATION OF PROD POTENTIAL ☒

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

The proposed injection interval (SWD-1184) from 4400' to 6750' had no mudlog shows (cut or fluorescence). The water saturations calculated from the porosity and resistivity logs ranged from 65% to 95%. It is our opinion that this interval is non-hydrocarbon productive because of the lack of mudlog shows and the high water saturations. Please note that the interval from 5516' to 5954' has been excluded from the injection interval at the request of an offset operator (this interval had no mudlog shows). The actual injection interval 4452-5438' and 6028-6708' is not hydrocarbon productive in this area.

*Please see attached mudlog and log sections.

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Brian Collins TITLE PETROLEUM ENGINEER DATE 09/24/09

Type or print name BRIAN COLLINS E-mail address: bcollins@marbob.com PHONE: 575-748-3303

For State Use Only

APPROVED BY: _____ TITLE _____ DATE _____

Conditions of Approval (if any):

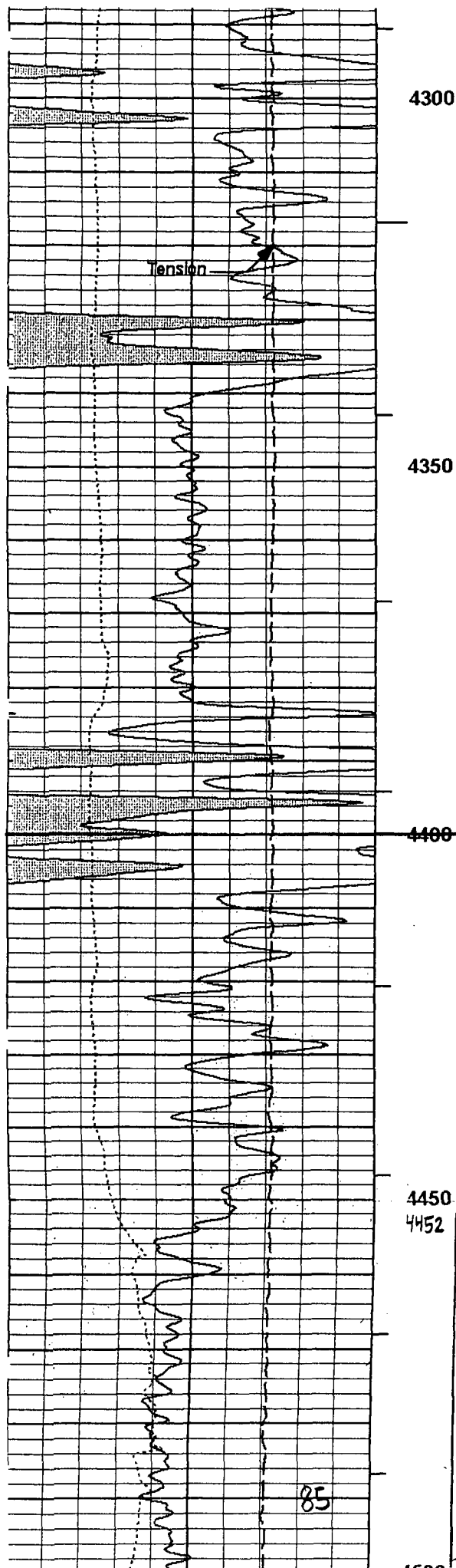
Work Log HALLIBURTON

DUAL SPACED NEUTRON SPECTRAL DENSITY

COMPANY		MARBOB ENERGY CORPORATION	
WELL		SAUSAGE SWD No. 1	
FIELD		SWD;BONE SPRING	
COUNTY		EDDY	
STATE		NEW MEXICO	
Permanent Datum		GL	Elev. 3182.0 ft
Log measured from		KB	Elev. K.B. 3196.0 ft
Drilling measured from		KB	D.F. 3195.0 ft
Date		20-Sep-09	G.L. 3182.0 ft
Run No.		ONE	
Depth - Driller		7452.00 ft	
Depth - Logger		7446.0 ft	
Bottom - Logged Interval		7382 ft	
Top - Logged Interval		200 ft	
Casing - Driller		8.625 in @ 3450.0 ft	
Casing - Logger		3442.0 ft	
Bit Size		7.875 in	
Type Fluid in Hole		BRINE	
Density	Viscosity	10.0 ppq	28.00 s/qt
PH	Fluid Loss	9.00 pH	2.0 cpm
Source of Sample		FLOW LINE	
Rm @ Meas. Temperature		0.05 ohmm @ 80.00 degF	@
Rmf @ Meas. Temperature		0.04 ohmm @ 80.00 degF	@
Rmc @ Meas. Temperature		0.07 ohmm @ 80.00 degF	@
Source Rmf	Rmc	MEAS	MEAS
Rm @ BHT		0.03 ohmm @ 130.0 degF	@
Time Since Circulation		5.0 hr	
Time on Bottom		20-Sep-09 19:44	
Max. Rec. Temperature		130.0 degF @ 7446.0 ft	@
Equipment	Location	798	HOBS, NM
Recorded By		JUSTIN LUCAS	DANIEL HEITZ
Witnessed By		BRENT MAY	

Fold here

Service Ticket No.: 6896961		API Serial No.: 30-015-37239		PGM Version: WL INSITE R2.4 (Build 20)			
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE				RESISTIVITY SCALE CHANGES			
Date	Sample No.	Type Log	Depth	Scale Up Hole	Scale Down Hole		
Depth-Driller							
Type Fluid in Hole							
Density	Viscosity						
Ph	Fluid Loss						
Source of Sample				RESISTIVITY EQUIPMENT DATA			
Rm @ Meas. Temp	@	@	Run No.	Tool Type & No.	Pad Type	Tool Pos.	Other
Rmf @ Meas. Temp.	@	@					
Rmc @ Meas. Temp.	@	@					
Source Rmf	Rmc						
Rm @ BHT	@	@					
Rmf @ BHT	@	@					
Rmc @ BHT	@	@					
EQUIPMENT DATA							
GAMMA		ACOUSTIC		DENSITY		NEUTRON	
Run No.	ONE	Run No.		Run No.	ONE	Run No.	ONE
Serial No.	10931261GR	Serial No.		Serial No.	90124257GR	Serial No.	90124257GR
Model No.	GTET	Model No.		Model No.	SDLT	Model No.	DSNT
Diameter	3.625"	No. of Cent.		Diameter	4.5"	Diameter	3.625"
Detector Model No.	T102A	Spacing		Log Type	GAM-GAM	Log Type	NEU-NEU
Type	SCINT			Source Type	Cs137	Source Type	Am241Be
Length	12"	LSA [Y/N]		Serial No.	5115GW	Serial No.	DSN-3174



4300

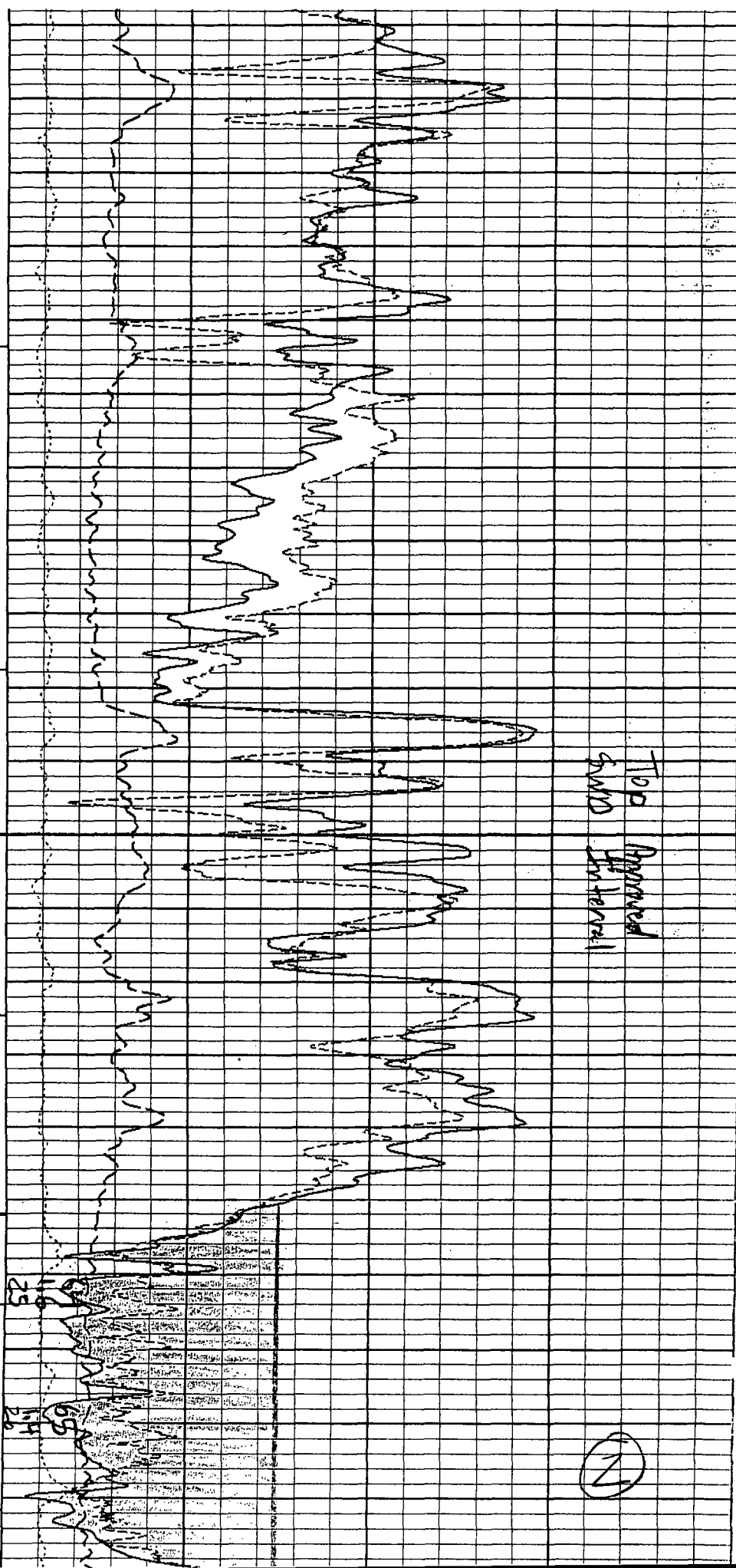
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4400

4450

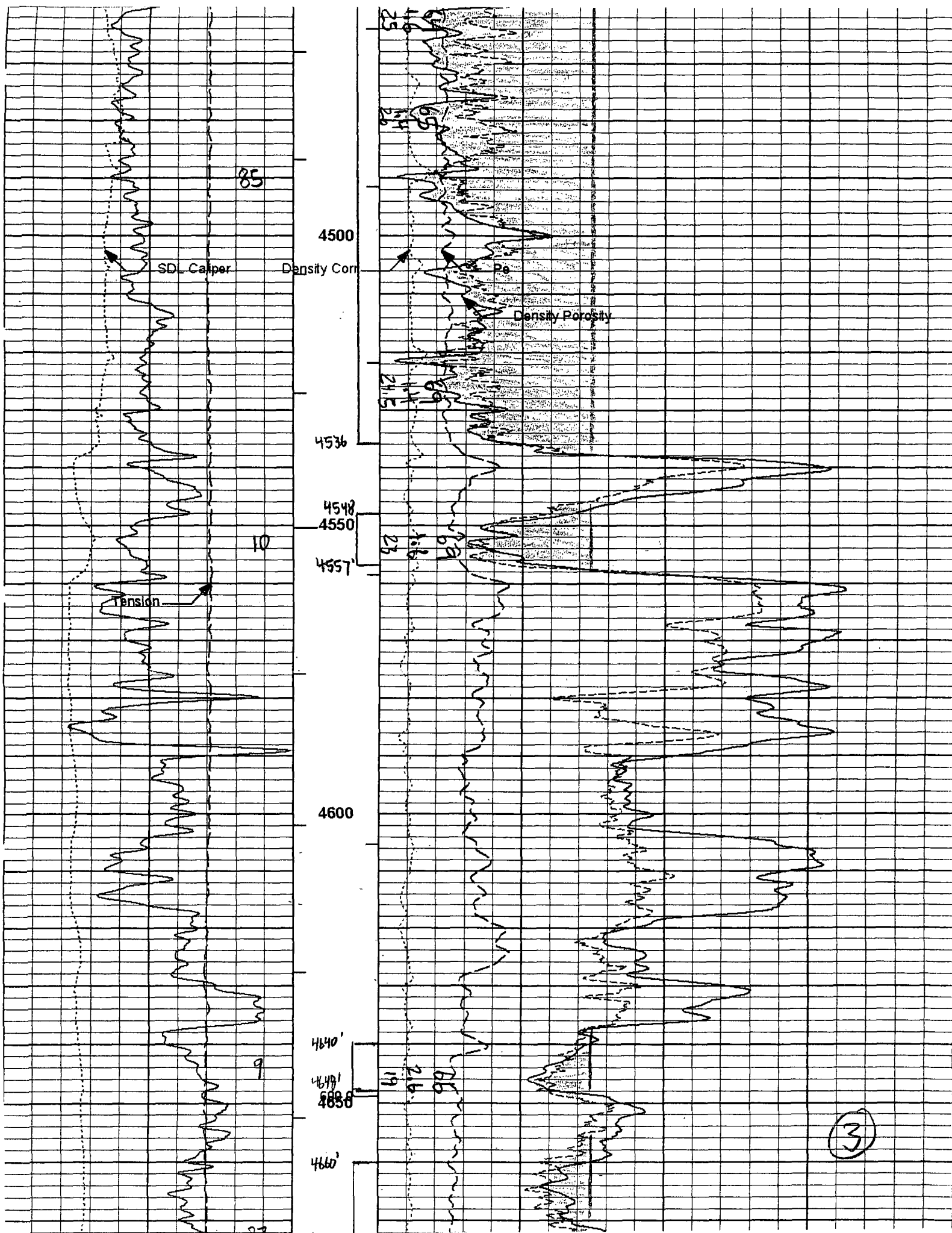
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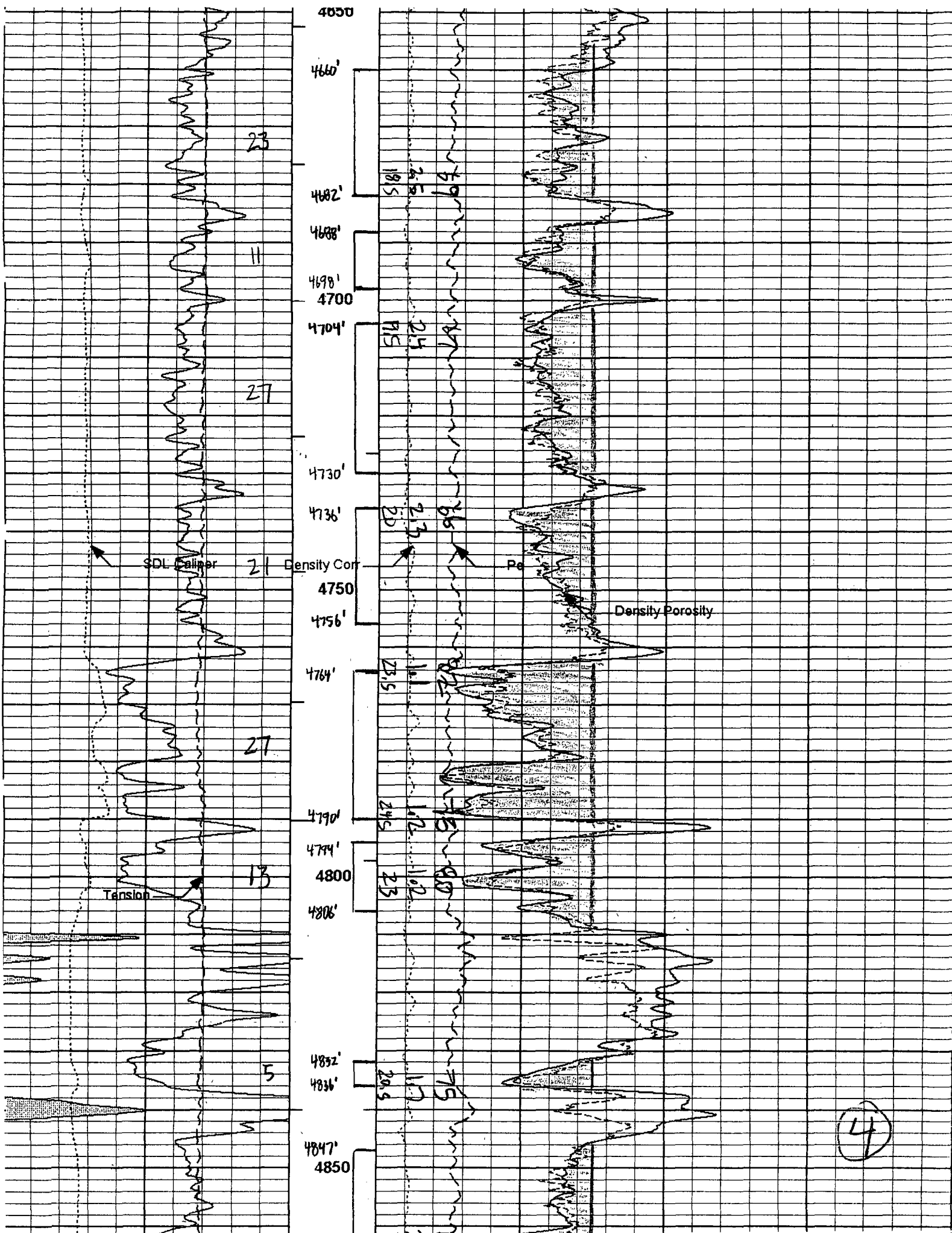
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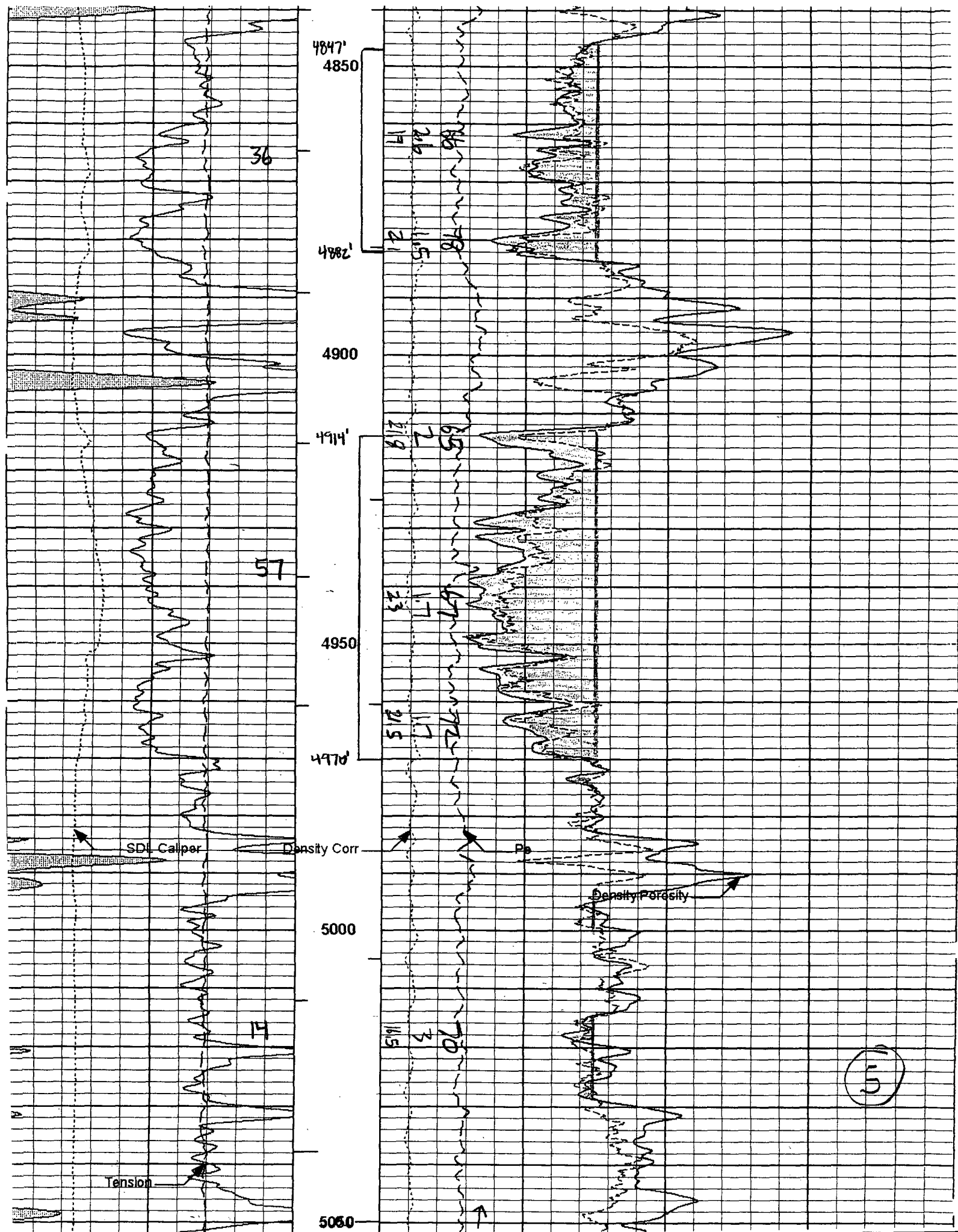


Top
Approved
SMD
Interval

②







Tension

5050

5100

5111'

20

5130'

5150

14

5200

8

SDS Galper

Density Corr

Pe

Density Porosity

← R_u 0.05

R_u 0.15 →

MS

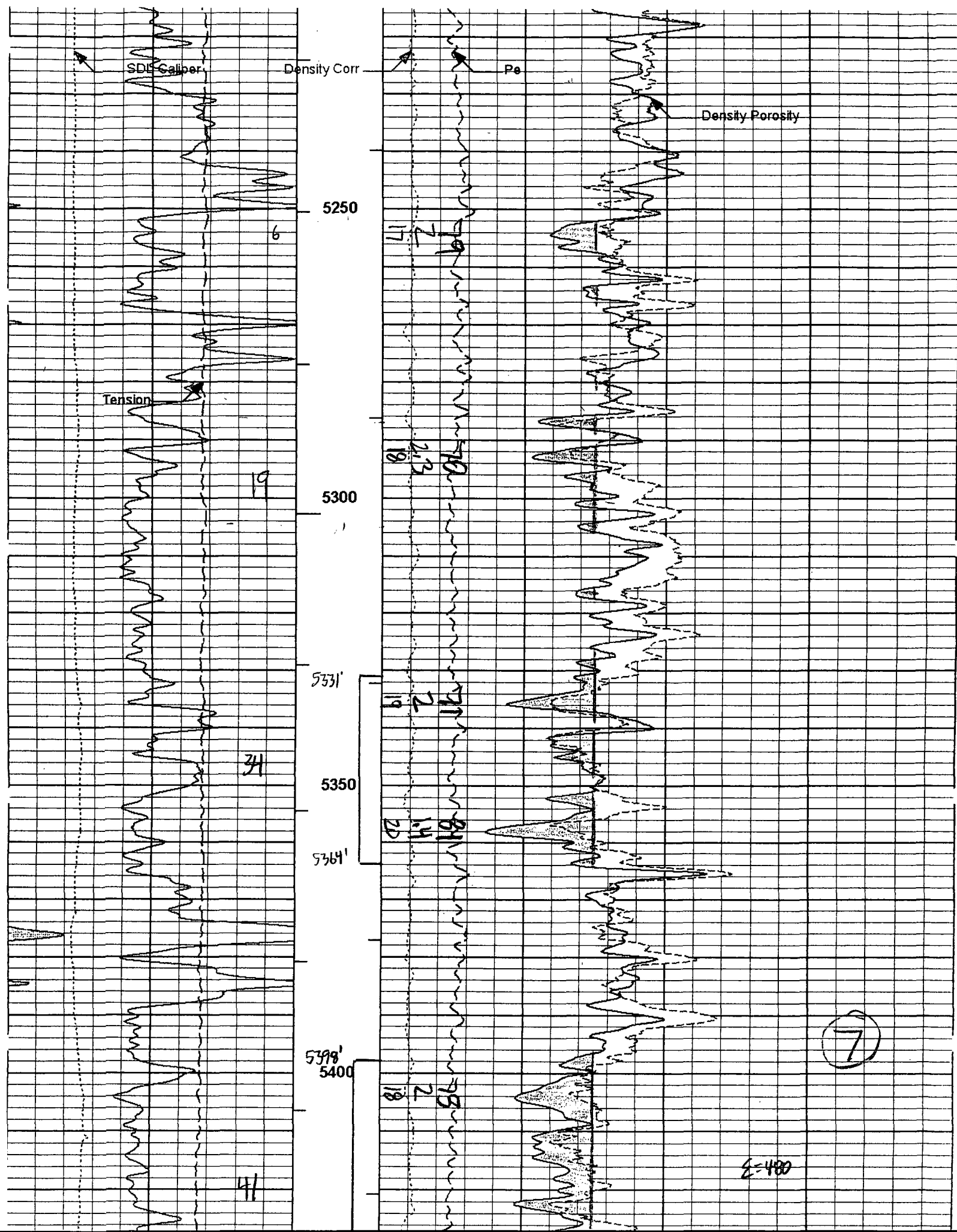
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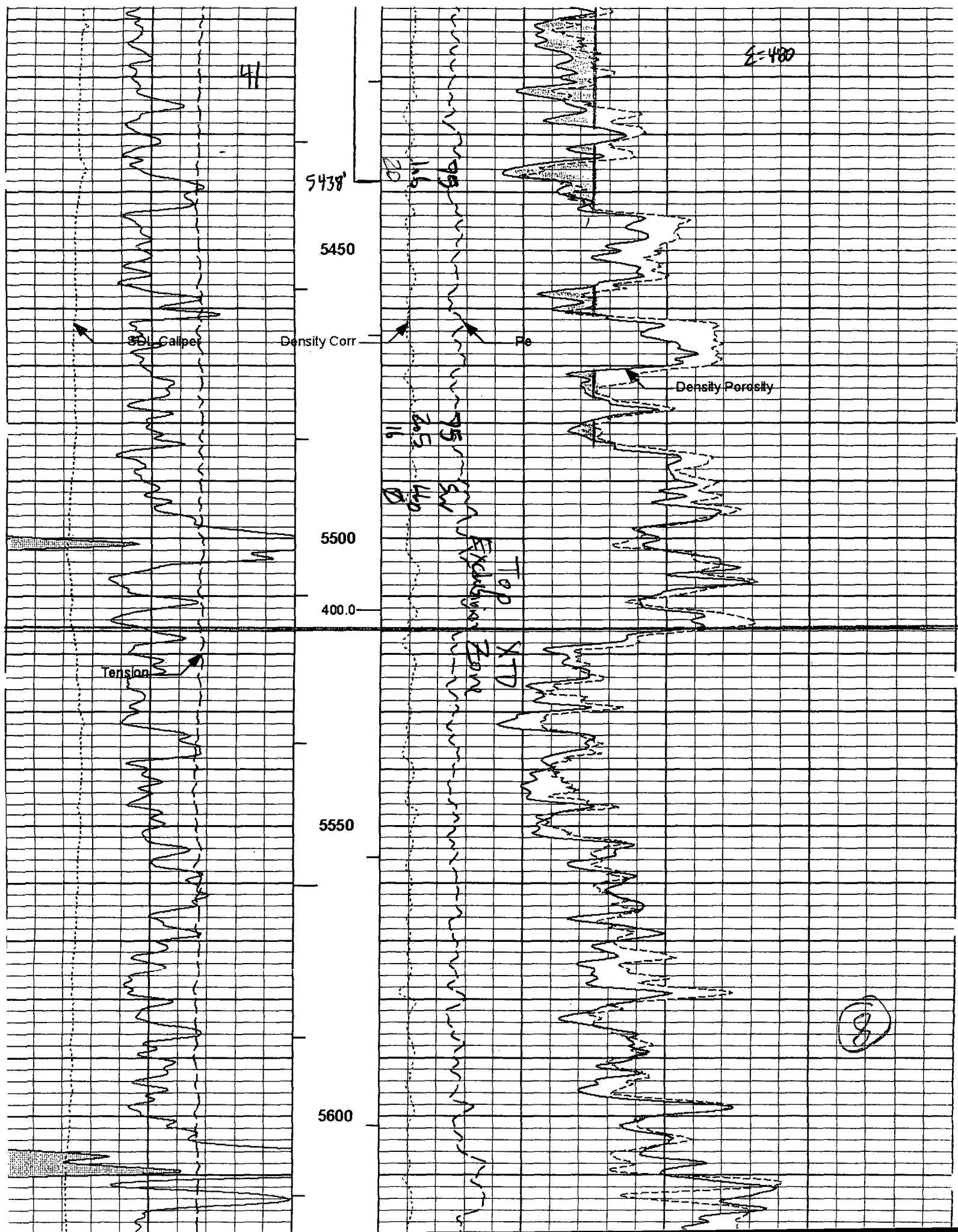
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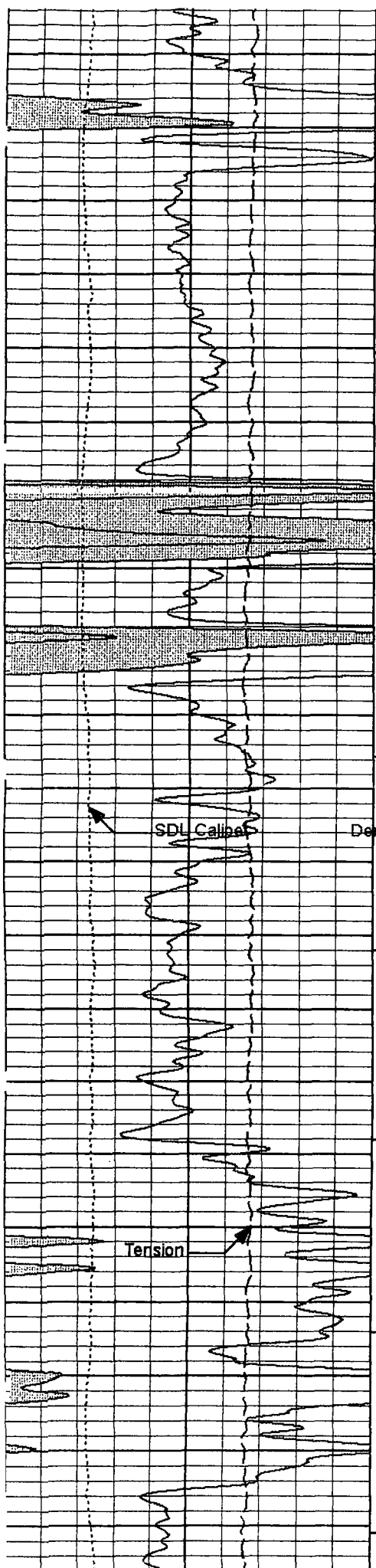
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15

6







5600

5650

5700

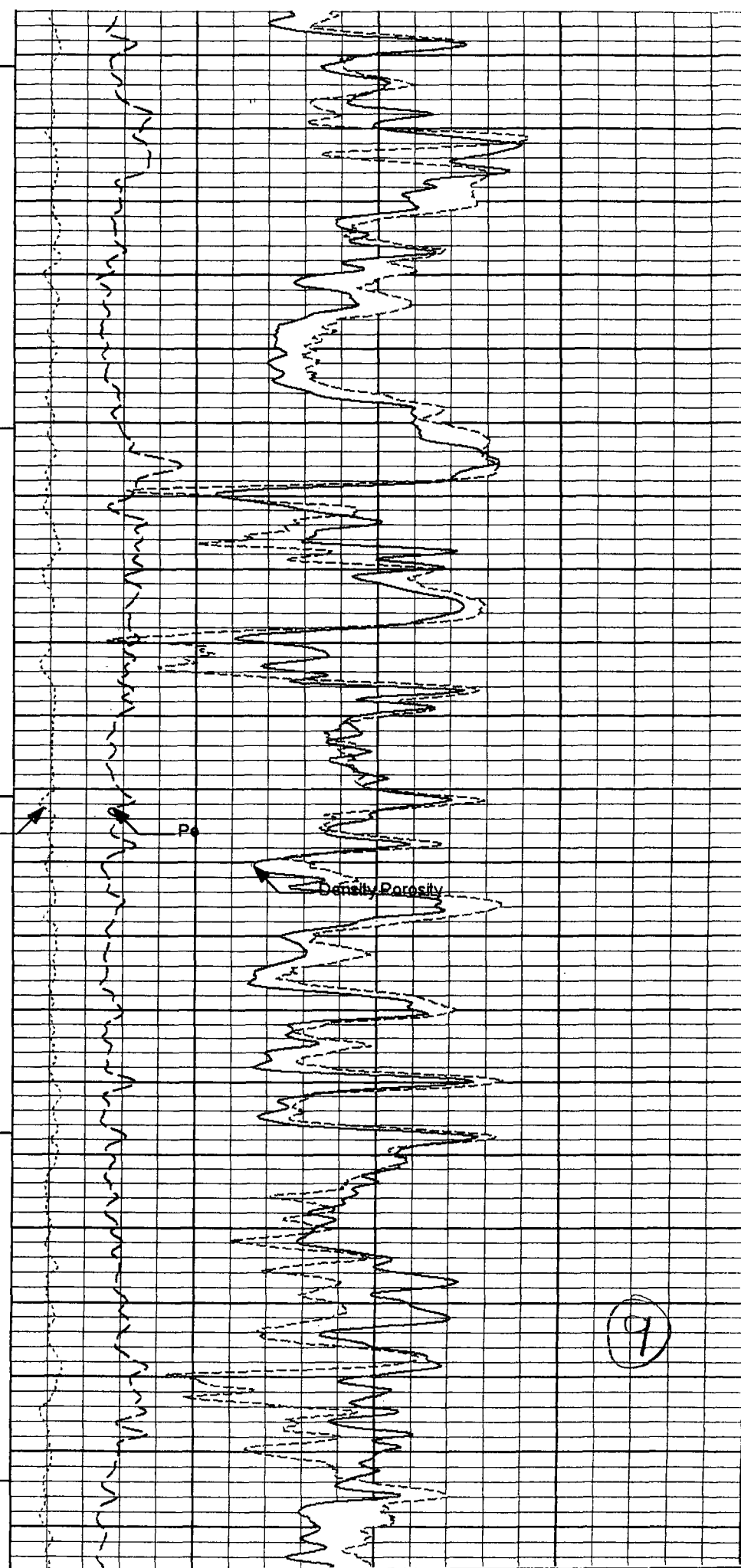
5750

5800

SDL Caliper

Density Corr.

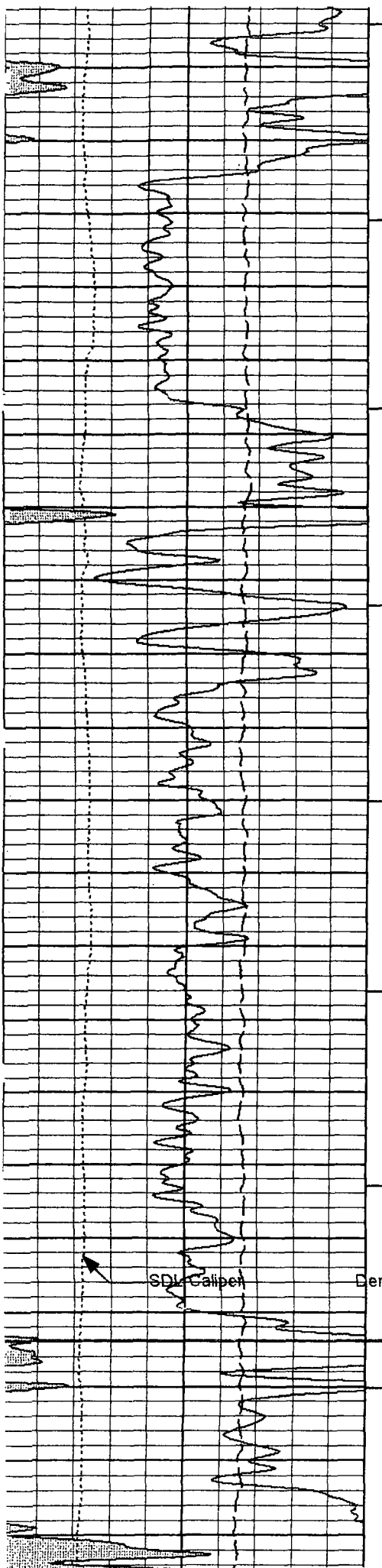
Tension



Po

Density Porosity

9



5800

5850

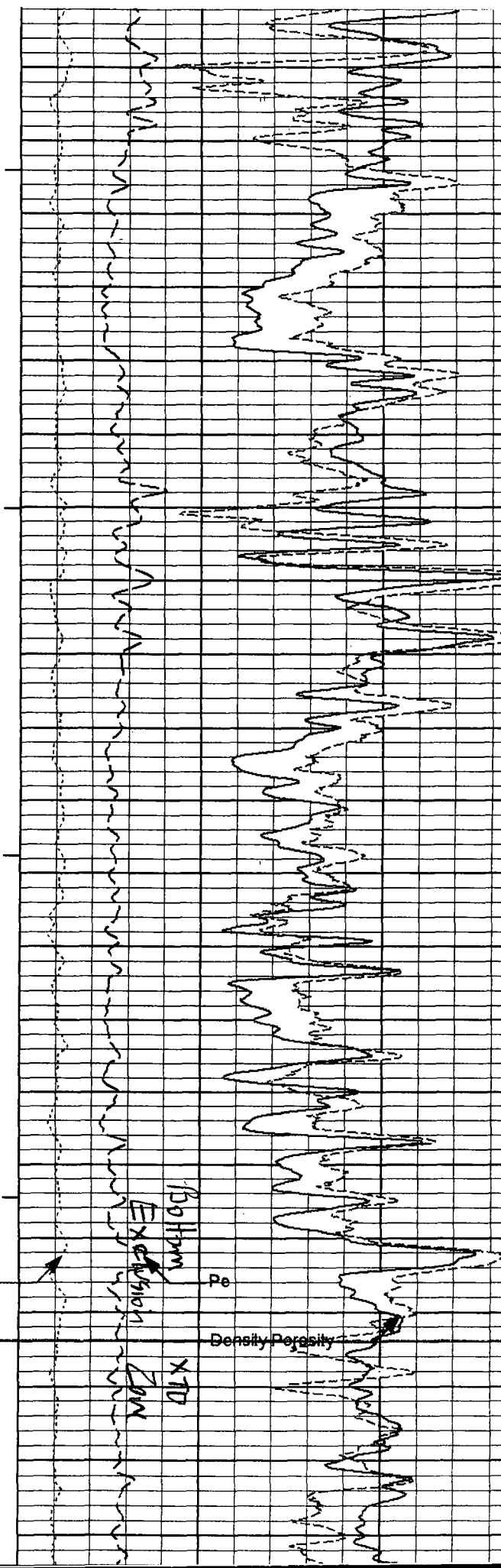
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SDI Caliper

Density Corr

3000

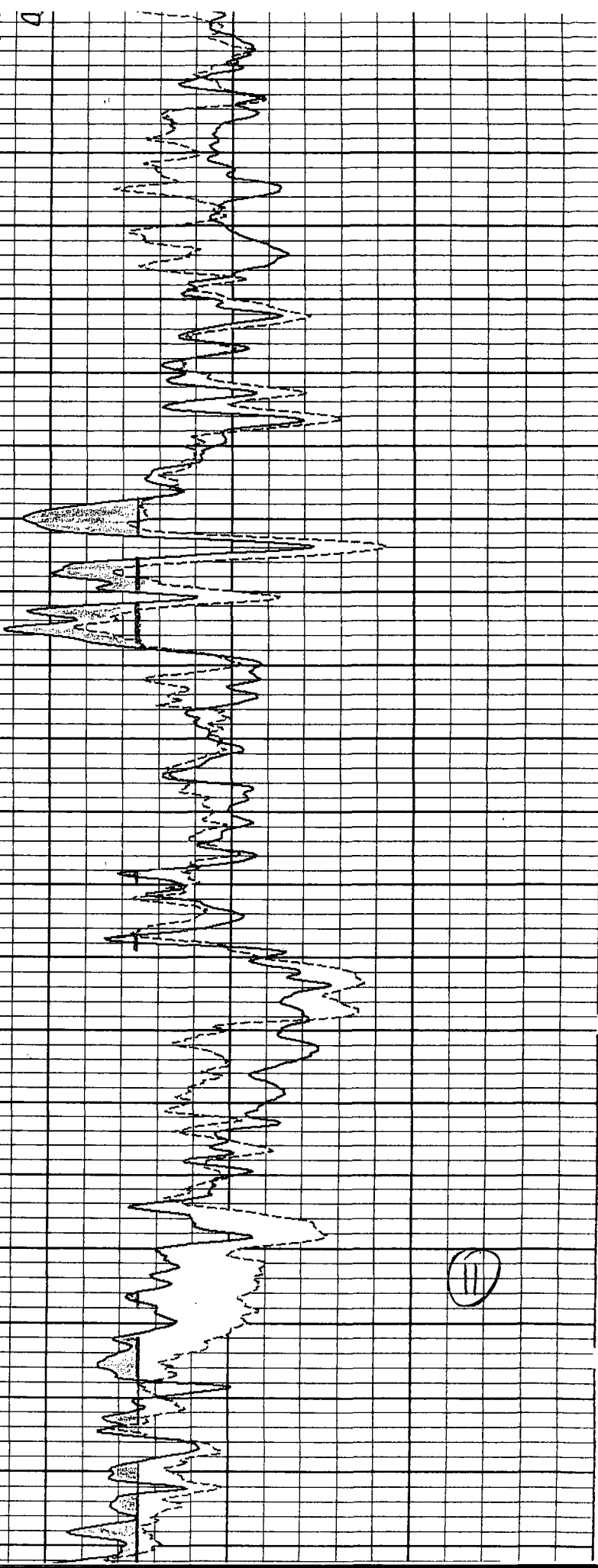
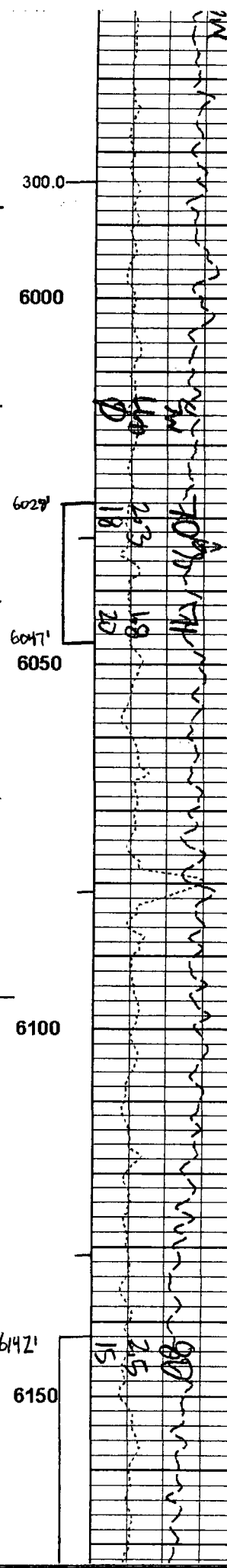
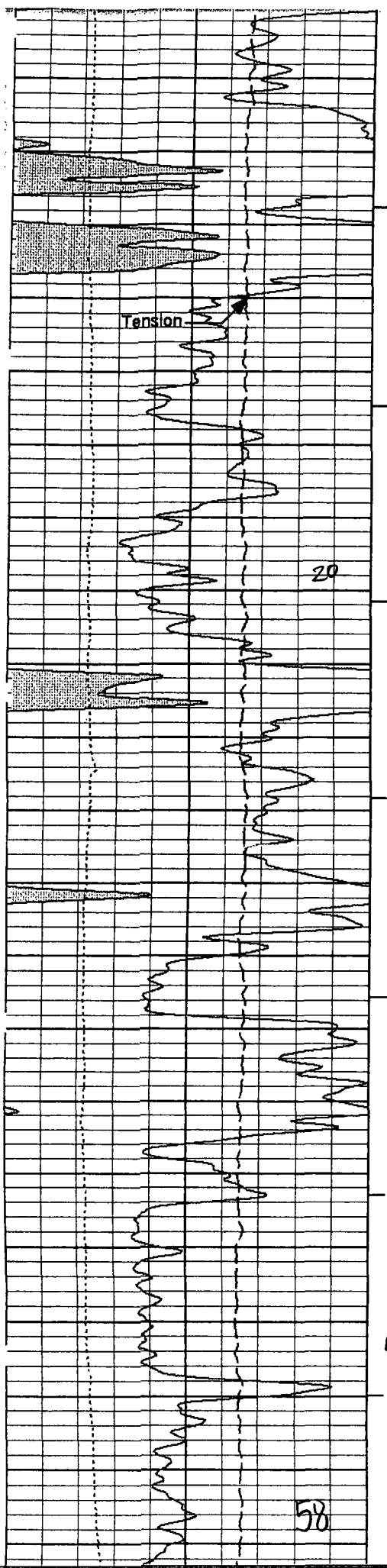


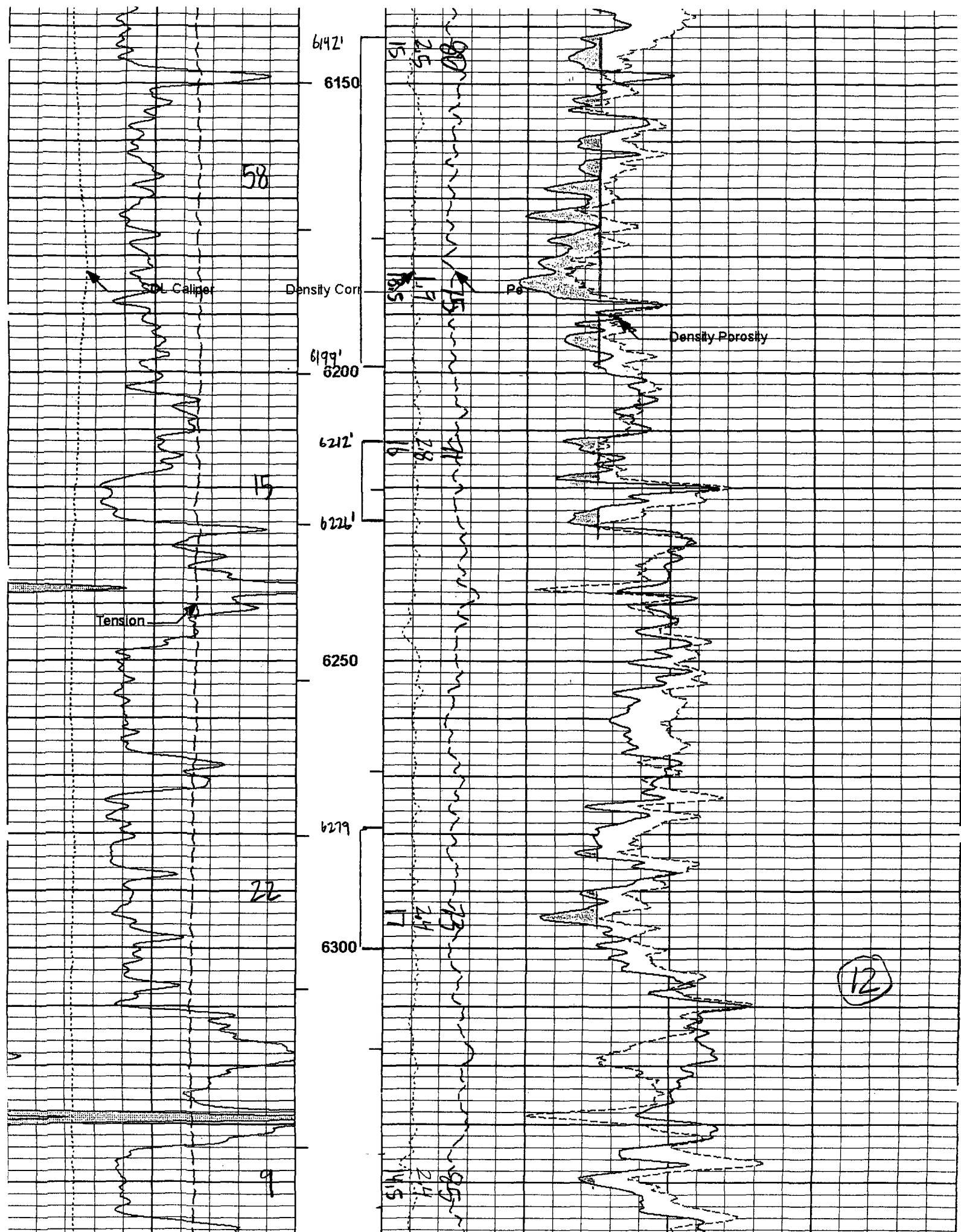
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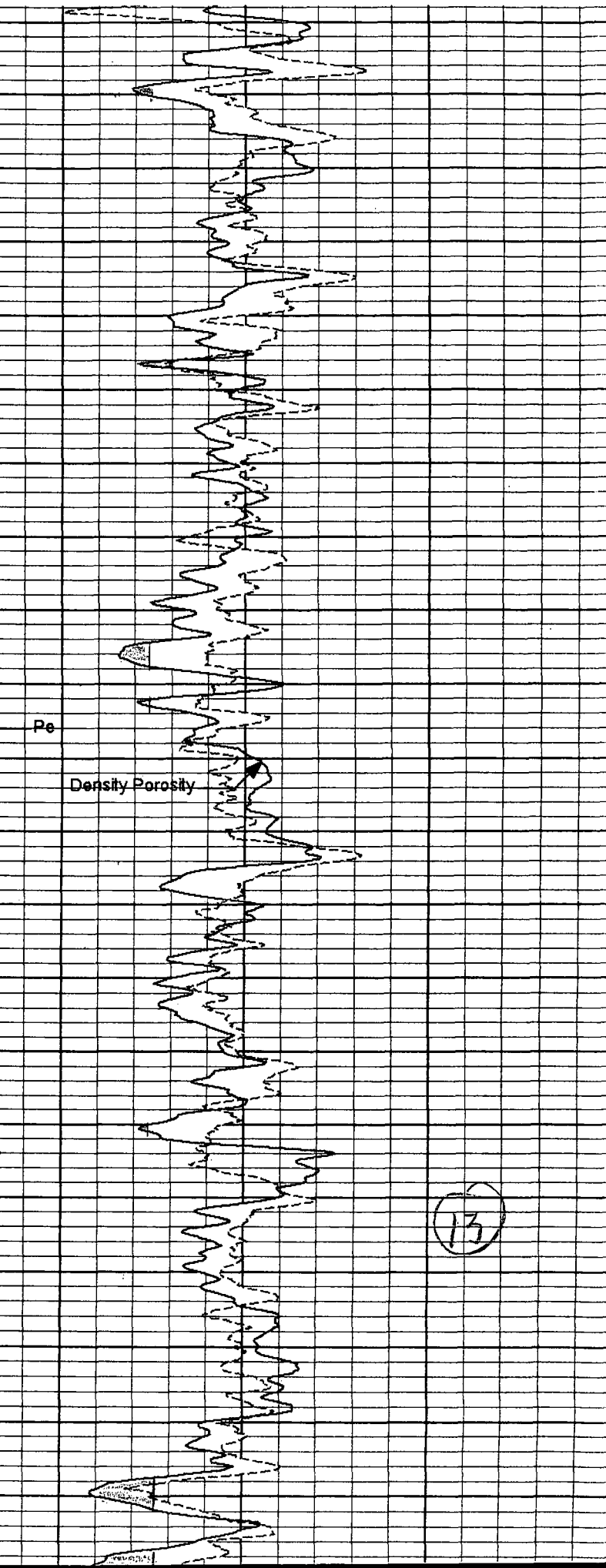
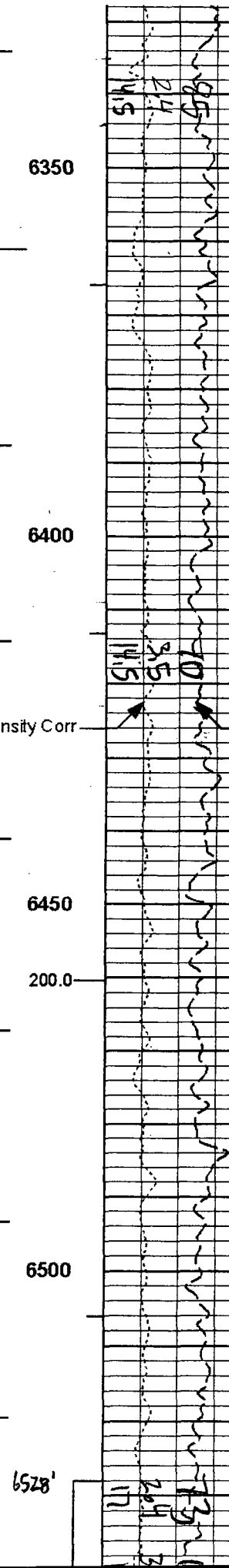
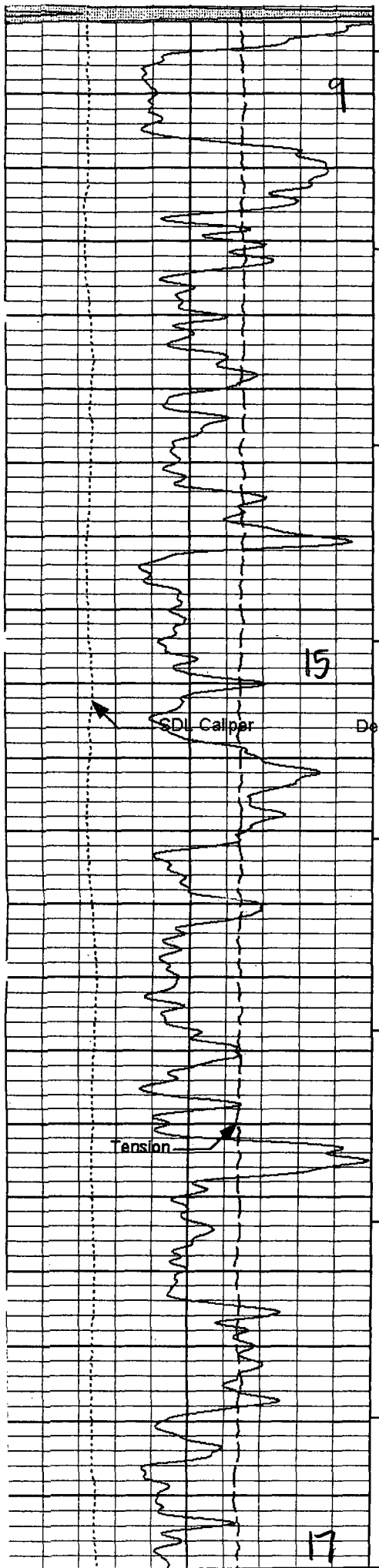
Density Porosity

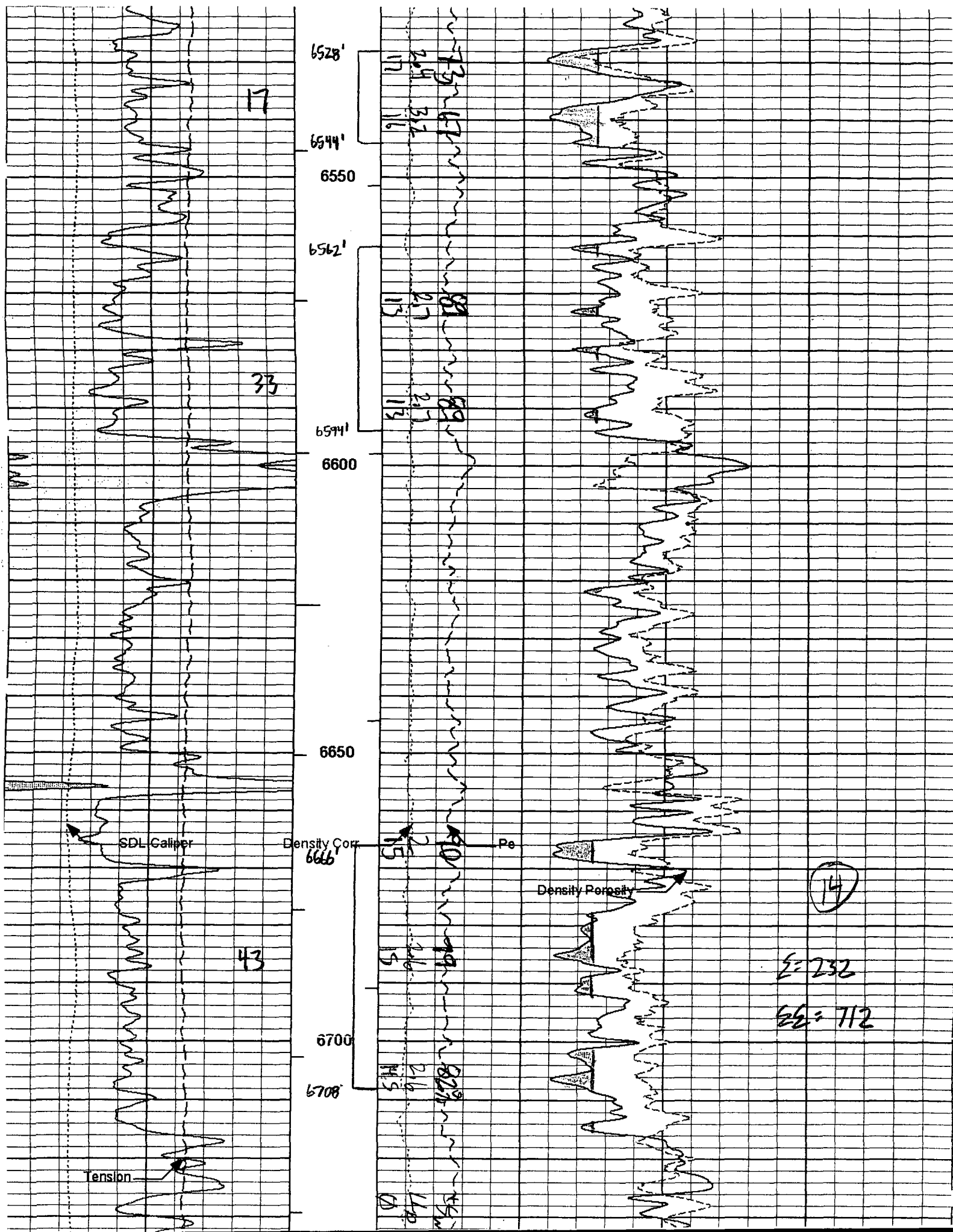
Bottom
Excursion
Zone
XTD

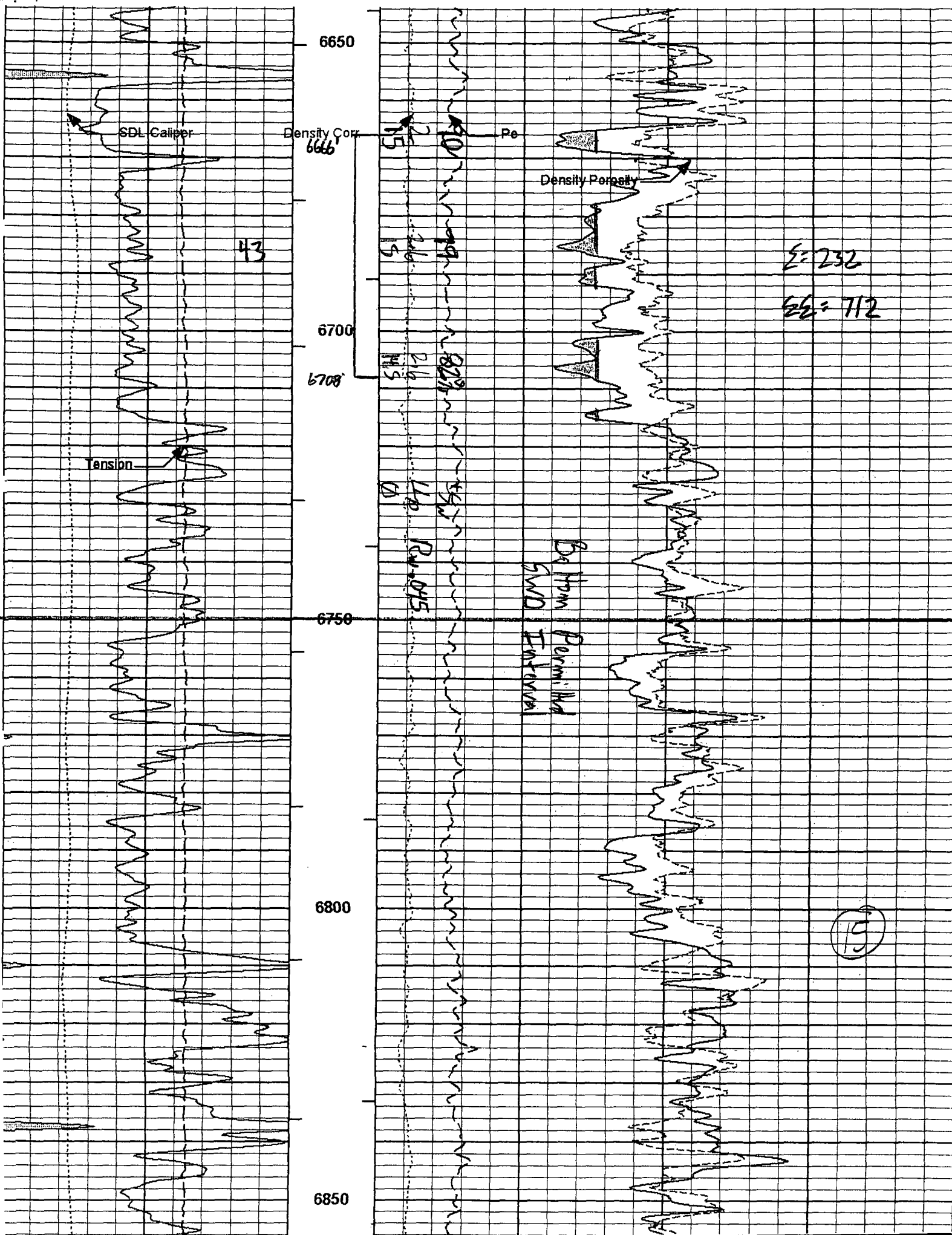
10











MORCO GEOLOGICAL SERVICES, INC

P. O. BOX 2136
CARLSBAD, NM 88221
800-748-2340

COMPANY: MARBOB ENERGY CORPORATION WELL: SAUSAGE SWD #1
FIELD: _____ COUNTY: EDDY STATE: NM
LOCATION: SEC 7-T25S-R30E
2310 FNL 1650 FEL
Interval Logged: 3000' To: 7450' G.L.: 3182' K.B: 3196'
Date Logged: 9/16/09 To: 09/20/09 Spud Date: 9/12/09
Rig: TEACO #1 Unit No.: 16
Loggers: P.MITCHELL / J.MAZZA
Api No.: 30-015-37239
Filename: SAUSAGE SWD - 1.mhw
Geologist: MARK ASHLEY

Abbreviations:

NB...New Bit DST...Drill Stem Test
CO...Circ Out DS...Directional Survey
NR...No Returns CG...Connection gas
TG...Trip Gas LAT...Logged After Trip
WOB...Wt on Bit PP...Pump Pressure
RPM...Rev/Min SPM...Strokes/Min
SG...Survey Gas DTG...Down Time Gas

Mud Data

WT...Weight V...Viscosity
PH...Acidity F...Filtrate
CHL...Chlorides SC...Solids Content

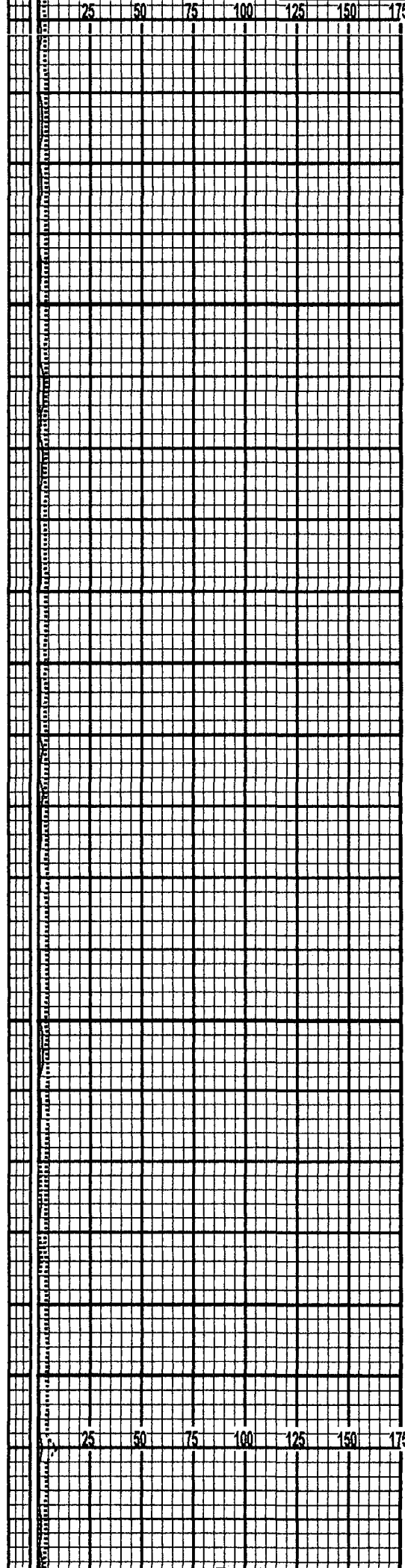
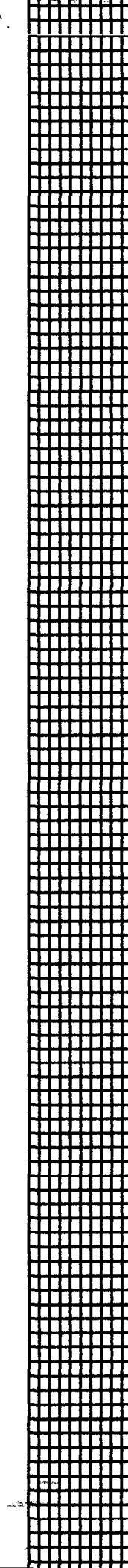
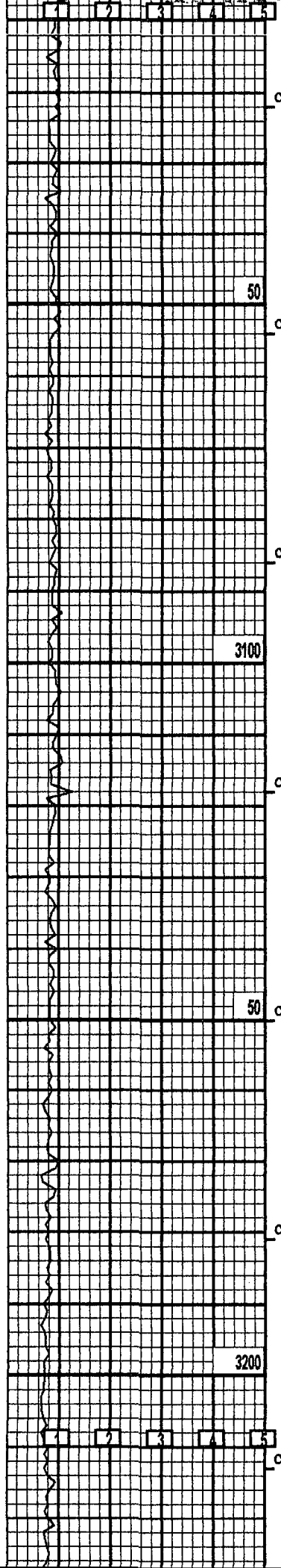
Lithology Symbols:

Anhydrite Salt Granite
 Siltstone Chert Sandstone
 Dolomite Conglomerate Limestone
 Coal Shale Bentonite
 Carb Shale Granite Wash Quartz Wash
Accessories
 Glaucinite Pyrite Fossils Oolites
 Fractures • • Cement

Gas Chromatograph Analysis:

HW
C1
C2
C3
IC4
NC4

Drilling Rate MIN/FT	Vis Por Tr / f p g	Lithology	% Oil Flu Tr / p f g p f g	Total Gas/Chromatograph	Descriptions/Remarks
DRILLING CONTRACTOR TEACO #1 SET 13 3/8" CSG @ 725' BIT #2 11" FSX 653 IN @ 725' DEV 3/4" @ 2415' PM 3000				COMMENCE TWO MAN LOGGING 9/16/09 DRILLING W/CLOSED LOOP SYSTEM CALIBRATE ALL EQUIPMENT	SALT



SALT

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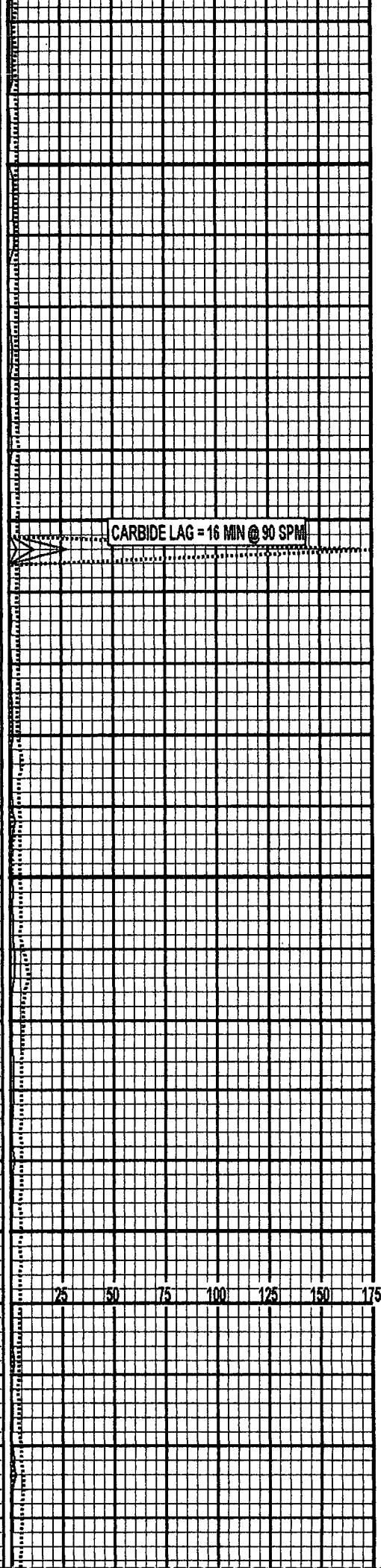
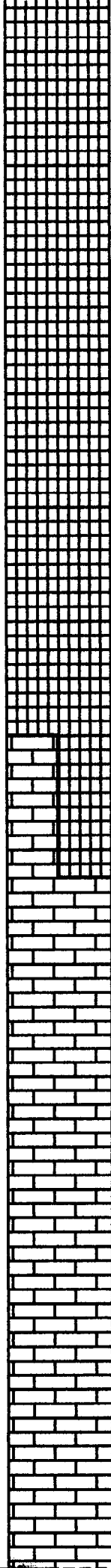
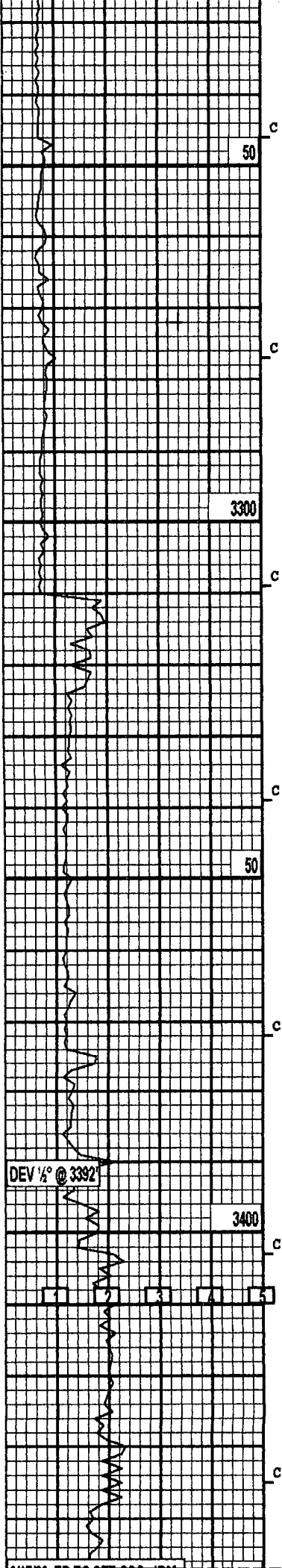
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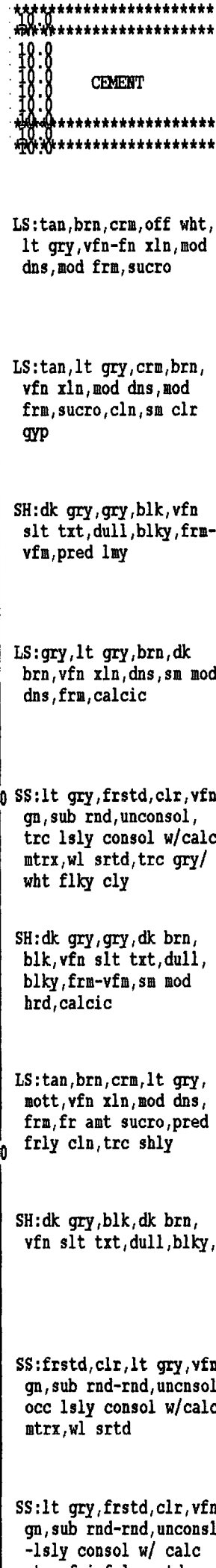
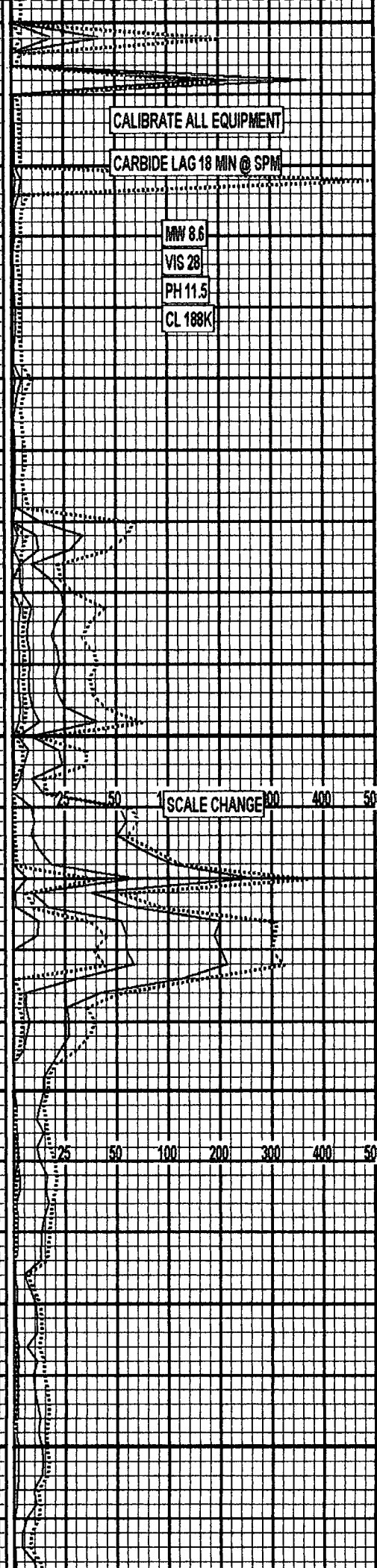
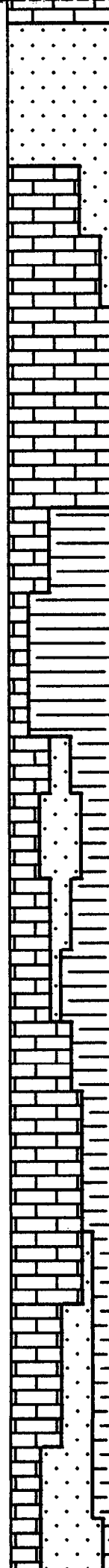
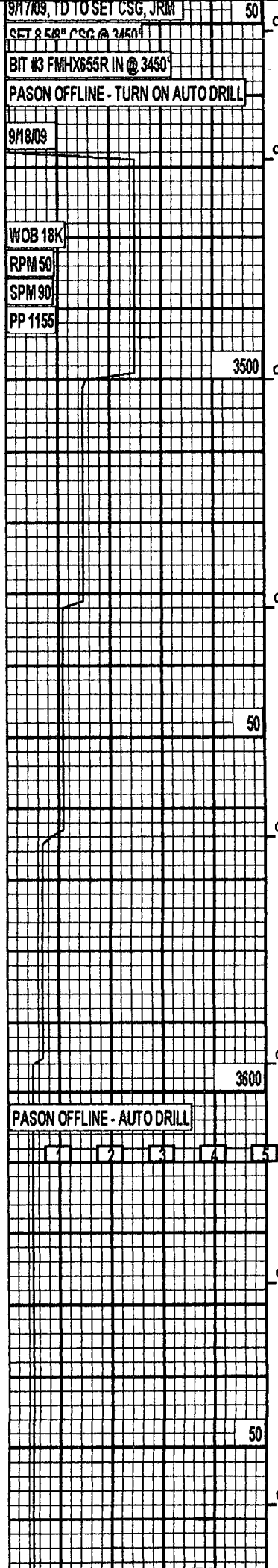
LS:off wht,crm,tn,wht,
micro-vfn xln,dns,frm-
mod hrd

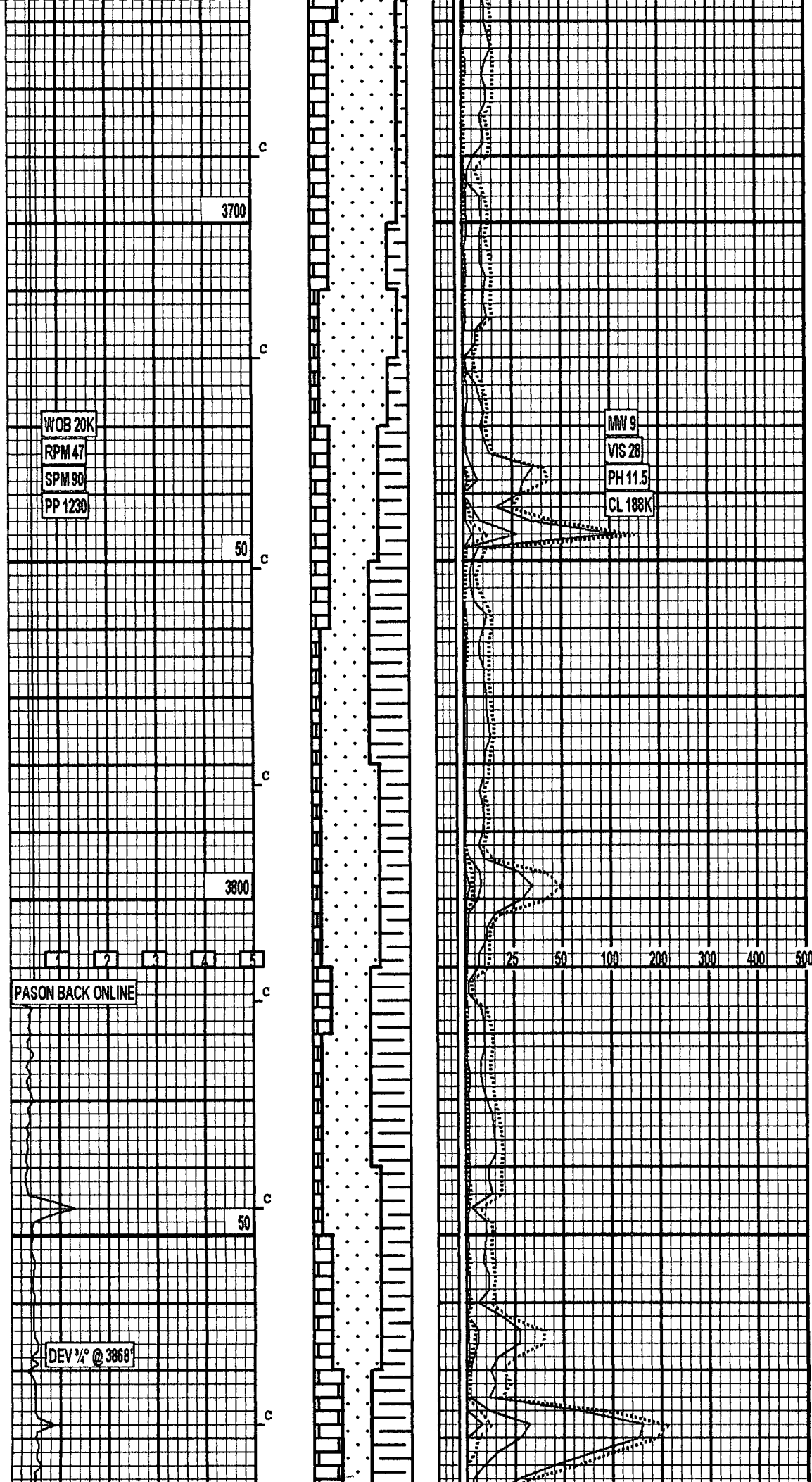
LS:off wht,wht,crm,tn,
micro-vfn xln,dns,frm-
mod hrd

LS:off wht,wht,crm,tn,
gry,micro-vfn xln,frm-
mod hrd

LS:off wht,wht,crm,tn,
lt gry,micro-vfn xln,
mod frm-frm

LS:off wht,wht,crm,lt
gry,tn,micro-vfn xln,
mod frm-frm,sme chky





mtx, rfi, rfly srt

LS: brn, tan, crm, mott, vfn
xln, mod dns-dns, trc
chky, frm, sm sucro,
frly cln

SH: dk gry, blk, vfn slt
txt, dull, blk, frm-vfm

SS: frstd, clr, lt gry, vfn
gn, sub rnd-rnd, pred
consol, sm consol w/
calc mtrx, mod srt

9.0

LS: lt gry, tan, brn, mott
vfn xln, mod dns, mod
frm-frm, sucro, frly cln

SH: blk, dk gry, dk brn,
vfn slt txt, dull, erthy
blk, frm-vfm, fnly mica

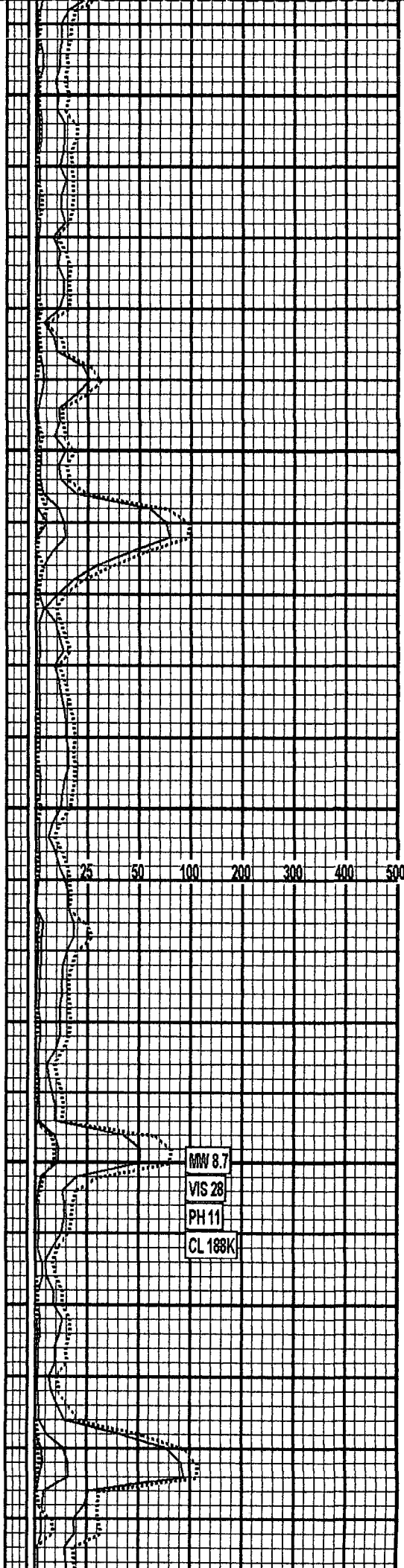
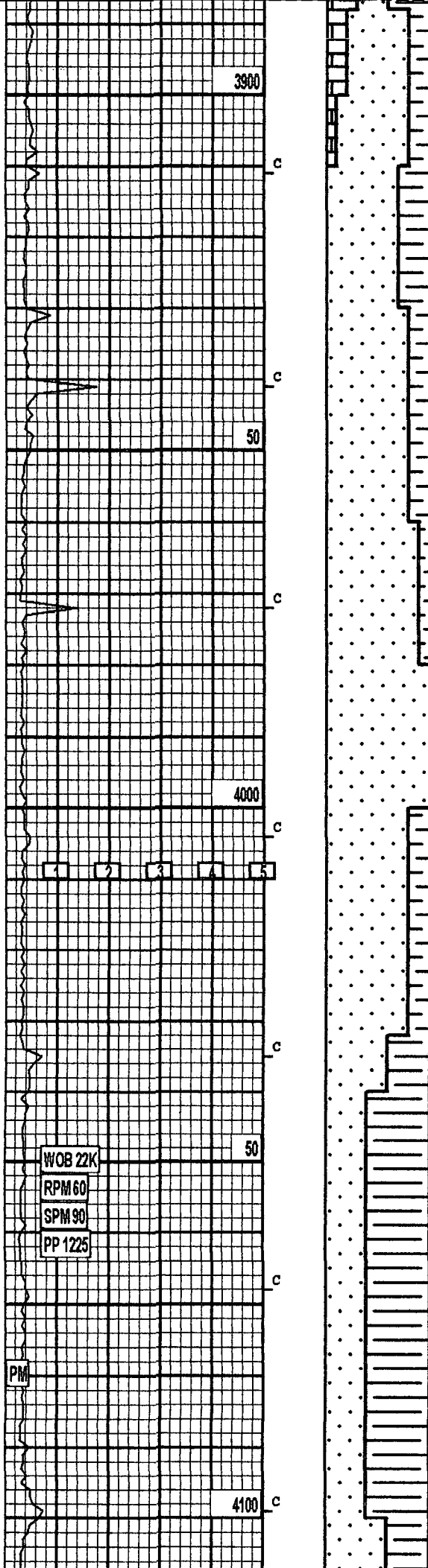
SS: frstd, lt gry, clr, vfn
gn, sub rnd-rnd, sm sub
ang, pred unconsol, sm
consol w/calc mtrx,
frly srt

LS: tan, brn, crm, lt gry,
vfn xln, mod dns, frm, sm
vfm, sucro, frly cln

SH: blk, dk gry, dk brn,
vfn slt txt, dull, erthy
blk, frm-vfm, fnly mica
sm fnly pyr

SS: lt gry, frstd, gry, clr
vfn gn, sub rnd-sub ang
sm rnd, pred consol w/
calc mtrx, sm cly mtrx,
sm unconsol, mod srt,
sm free wht/gry strkd
cly

LS: lt gry, tan, brn, off
wht, mott, vfn xln, mod
dns, frm, sm vfm, fnly
sucro



SH:dk gry,blk,dk brn,
vfn slt txt,dull,erthy
blky,frm-vfm,fnly mica
trc fnly pyr

SS:clr,frstd,lt gry,gry
vfn gn,sub rnd-rnd,sm
sub ang,pred unconsol,
sm consol w/calc mtrx,
wl srted,trc free wht-
lt gry cly

SH:blk,dk gry,vfn slt
txt,dull,erthy,blky,
frm,fnly mica

SS:frstd,lt gry,clr,gry
vfn gn,sub rnd-rnd,
pred unconsol,sm lsly
consol w/calc mtrx,fri
wl srted

SH:blk,dk gry,vfn slt
txt,dull,erthy,blky,
frm,sm fnly mica

SS:clr,frstd,lt,gry,vfn
gn,rnd,sm sub rnd,
unconsol,wl srted,trc
free wht-lt gry cly

SH:drk gry,blk,gry,
blky-flky,rthy-wxy,
frm,sme carb

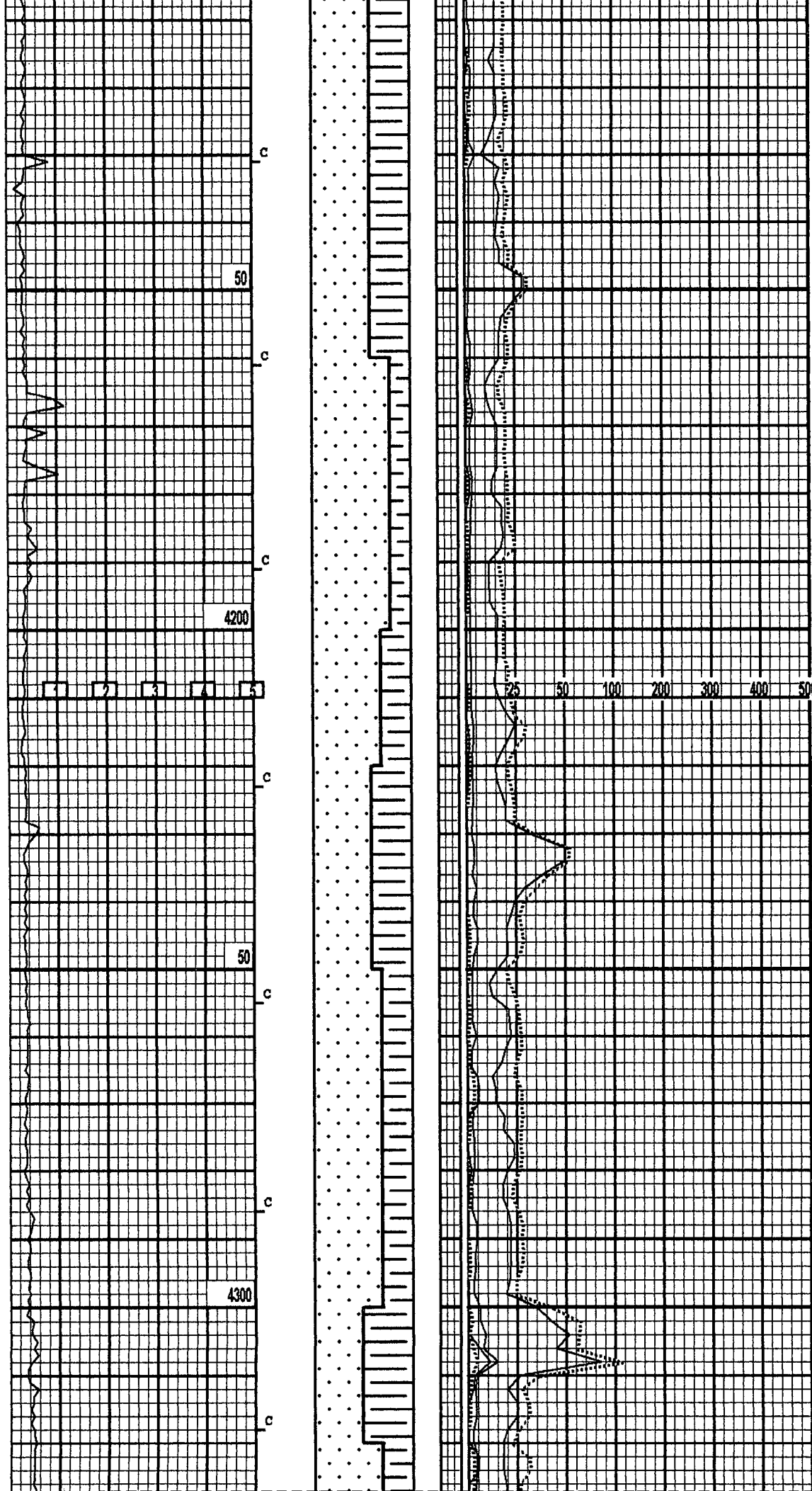
SS:clr,frstd,lt gry,vfn
gr,prd unconsol,wl
srted,subrnd-subang

SH:drk gry,blk,gry,
blky-flky,rthy-wxy
mod frm-frm,carb

SS:clr,frstd,lt gry,vfn
gr.unconsol,wl srted,
subrnd-subang

SH:drk gry,blk,gry,
blky-flky,rthy-plty
mod frm-frm,sme carb

SS:clr,frstd,lt gry,vfn



gr, lsly consol, lmy
cmt, wl srted, subrnd-
subang

SH: drk gry, blk, gry,
blky-flky, rthy-plty
mod frm-frm, sme carb

SS: clr, frstd, lt gry, vfn
gr, lsly consol, calc
cmt, wl srted, subrnd-
subang

SH: drk gry, blk, gry,
blky-flky, rthy-plty
mod frm-frm, sme
carb

SS: clr, frstd, lt gry, vfn
gr, lsly consol, calc
cmt, wl srted, subrnd-
subang

SH: drk gry, blk, gry,
blky, rthy-plty, mod
frm-frm, sme carb,
sme sndy

SS: clr, frstd, lt gry, vfn
gr, lsly consol, calc
cmt, wl srted, subrnd-
subang

SH: drk gry, blk, gry, blky
rthy-plty, mod frm-frm,
sme carb, sme sndy

SS: clr, frstd, lt gry, vfn
gr, lsly consol, calc
cmt, wl srted, subrnd-
subang

SH: drk gry, blk, gry, blky
rthy-plty, mod frm-frm,
carb

SS: clr, frstd, lt gry, vfn
gr, lsly consol, calc

DEV 3/4" @ 4331

50 c

4400

1 2 3 4 5

50 c

4500

c

c

CALIBRATE ALL EQUIPMENT

cmt,wl srted,subrnd-
subang

SH:drk gry,blk,gry,blky
rthy-plty,mod frm-frm,
carb,sme sndy

LS:off wht,wht,crm,tn,
micro-vfn xln,dns,frm-
mod hrd

SH:drk gry,blk,blky,
rthy-plty,mod frm-
frm,carb

SS:clr,frstd,lt gry,vfn
gr,lsly consol,calc
cmt,wl srted,subrnd-
subang,sme free wht
cly

SH:drk gry,blk,blky,
rthy-plty,mod frm-
frm,sme carb

SS:clr,frstd,lt gry,vfn
gr,lsly consol,calc
cmt,wl srted,subrnd-
subang

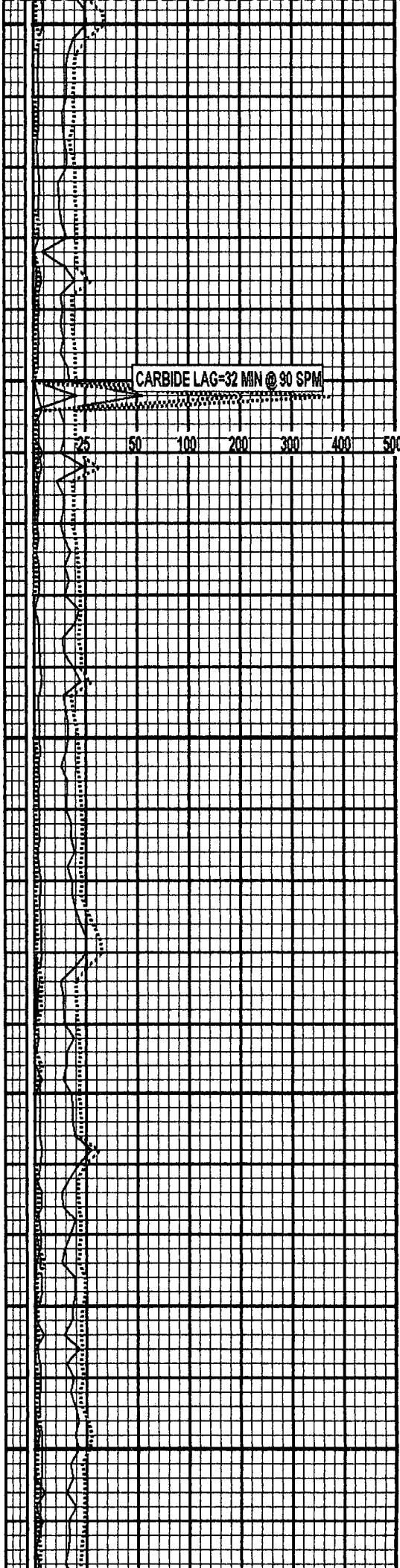
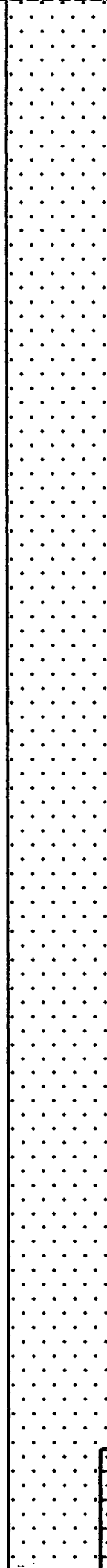
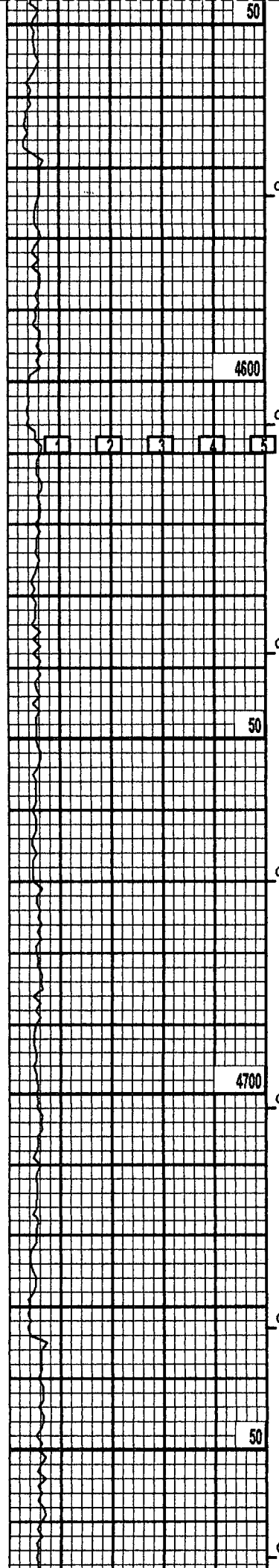
SH:drk gry,blk,gry,blky
rthy-plty,mod frm-frm
sme carb,sme sndy

SS:clr,frstd,lt gry,vfn
gr,wl consol,calc cmt
wl srted,subrnd-subang,
sme free wht cly

SH:drk gry,blk,gry,blky
rthy-plty,mod frm-frm
sme carb,sme sndy

SS:clr,frstd,lt gry,vfn
gr,titly consol,calc
cmt,wl srted,subrnd-
subang

SS:clr,frstd,lt gry,vfn



gr,titily consol,calc
cmt,wl srted,subrnd-
subang,sme free wht
cly

SS:clr,frstd,lt gry,vfn
gr,titly consol,calc
cmt,wl srted,subrnd-
subang

SS:clr,frstd,lt gry,vfn
gr,titly consol,calc
cmt,wl srted,subrnd-
subang

SS:clr,frstd,lt gry,vfn
gr,titly consol,calc
cmt,wl srted,subrnd-
subang,sme free wht
cly

SS:clr,frstd,lt gry,vfn
gr,titly consol,calc
cmt,wl srted,subrnd-
subang

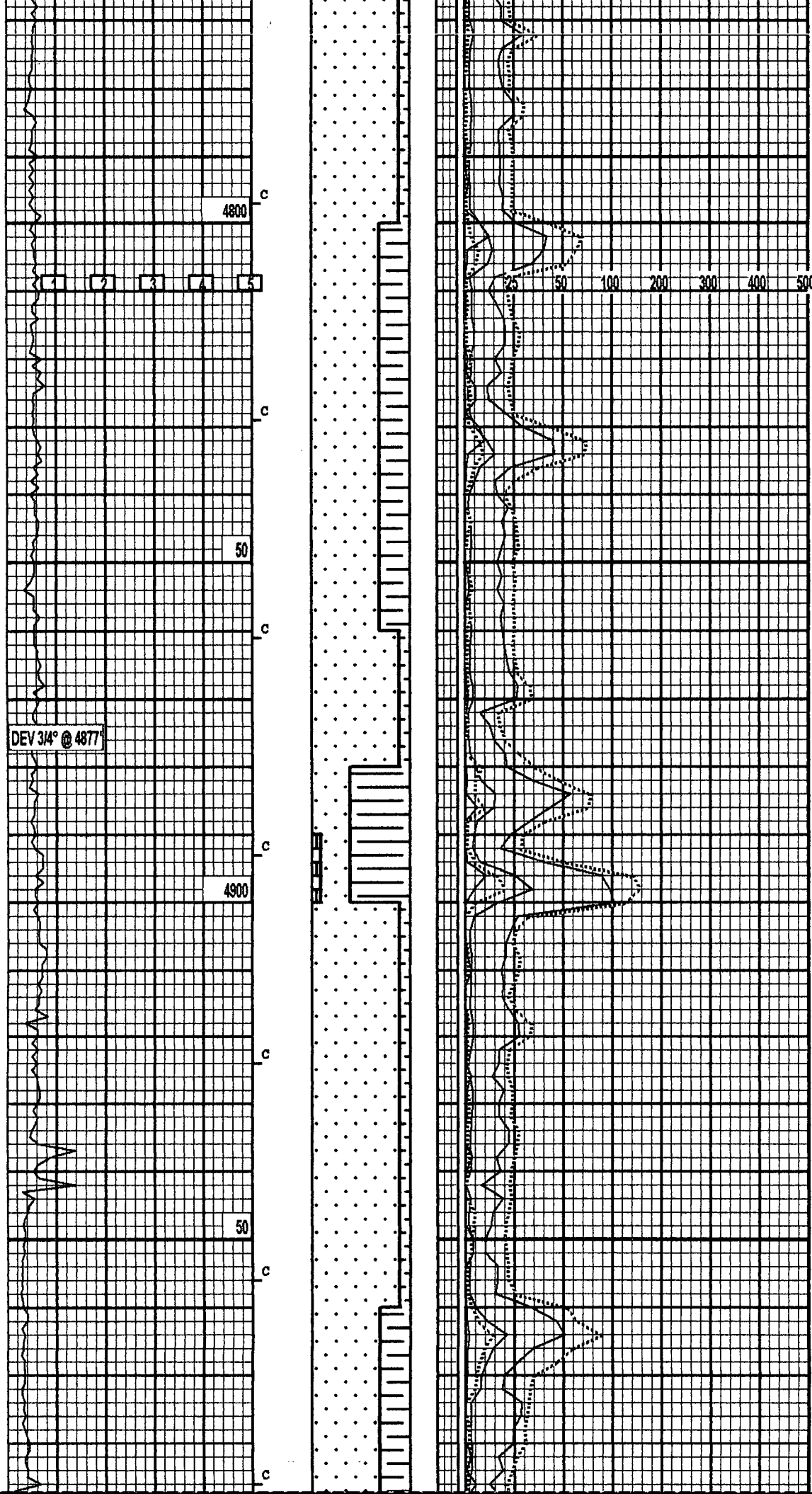
SS:clr,frstd,lt gry,vfn
gr,lsly consol,calc
cmt,wl srted,subrnd-
subang,tr fn gr

SS:clr,frstd,lt gry,vfn
gr,lsly consol,calc
cmt,fr srted,subrnd-
subang,tr ang fn gr

SS:clr,frstd,lt gry,vfn
gr,lsly consol,calc
cmt,wl srted,subrnd-
subang

SS:clr,frstd,lt gry,vfn
gr,lsly consol,calc
cmt,wl srted,subrnd-
subang

SH:drk gry,blk,gry,
blk,y,rthy-pty,mod
frm-frm,sme carb



SS:clr,frstd,lt gry,vfn
gr,lsly consol,calc
cmt,wl srted,subrnd-
subang

SH:drk gry,blk,gry,
blky,rthy-plty,mod
frm-frm,carb

SS:clr,frstd,lt gry,vfn
gr,lsly consol,calc
cmt,wl srted,subrnd-
subang

SH:drk gry,blk,gry,
blky,rthy-plty,mod
frm-frm,carb,sme
snyd

SS:clr,frstd,lt gry,vfn
gr,lsly consol,calc
cmt,wl srted,subrnd-
subang

SH:drk gry,blk,gry,
blky,rthy-plty,mod
frm-frm,carb

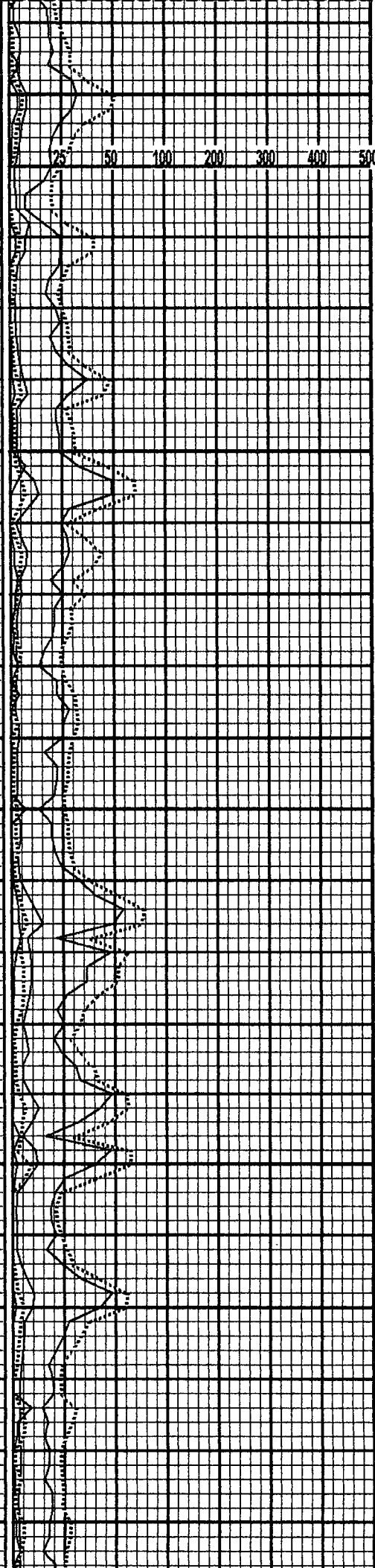
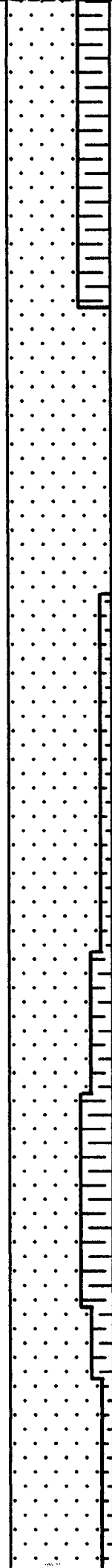
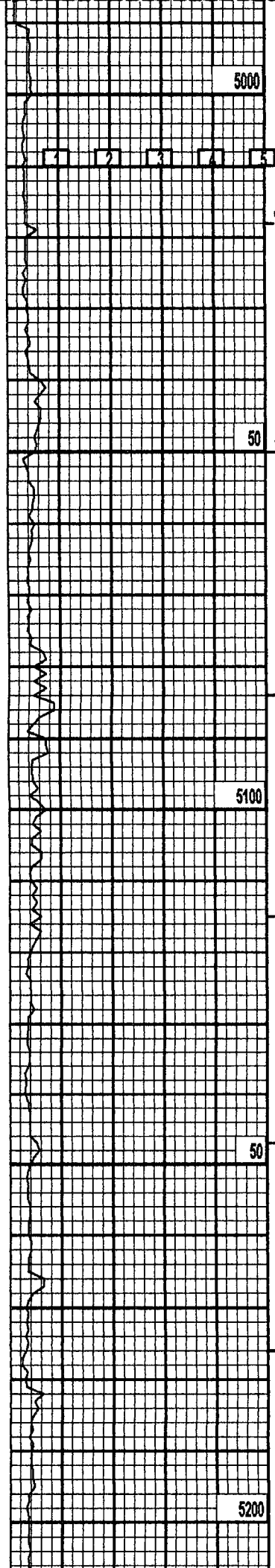
SS:clr,frstd,lt gry,vfn
gr,lsly consol,calc
cmt,wl srted,subrnd-
subang

SH:drk gry,blk,gry,
blky,rthy-plty,mod
frm-frm,sme carb

SS:clr,frstd,lt gry,vfn
gr,unconsol,subrnd-
subang,wl srted

SH:drk gry,blk,gry,
blky,rthy-plty,mod
frm-frm,carb

SS:clr,frstd,lt gry,vfn
gr,lsly consol-unconso
calc cmt,wl srted



subrnd-subang
SH:drk gry,blk,gry,
blky,rthy-plty,mod
frm-frm,carb,sme sndy

SS:clr,lt gry,frstd,vfn
gr,lsly consol,calc
cmt,wl srtd,subrnd-
subang

SS:clr,frstd,lt gry,vfn
gr,lsly consol,calc
cmt,wl srtd,subrnd-
subang

SH:drk gry,blk,blky,
rthy-plty,mod frm-
frm,sme carb,sme sndy

SS:clr,frstd,lt gry,vfn
gr,unconsol-consol,
calc cmt,fr-wl srtd,
subrnd-subang

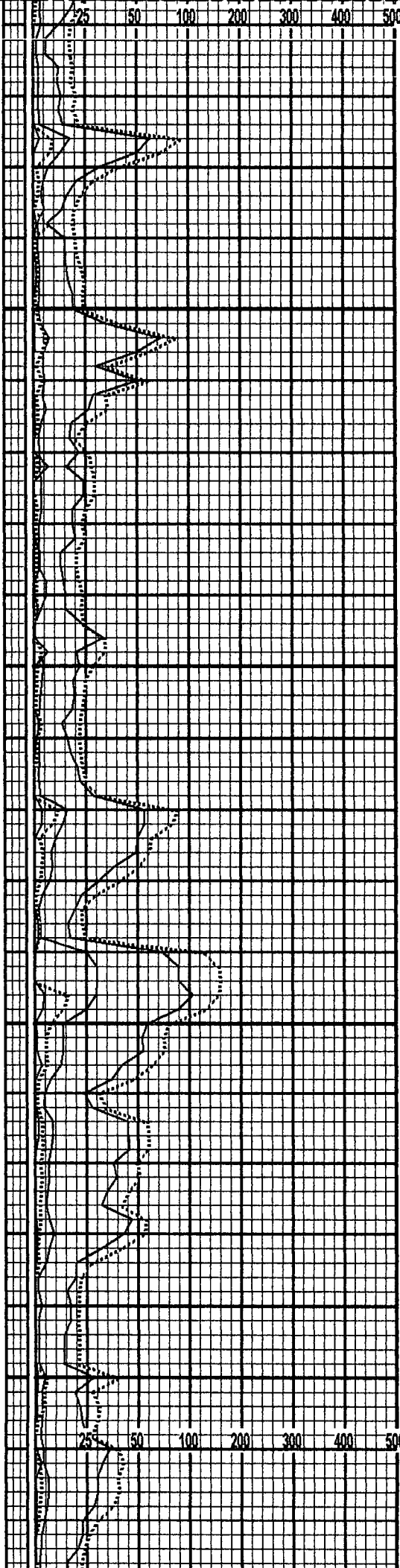
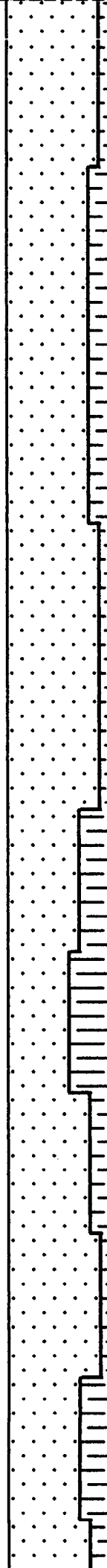
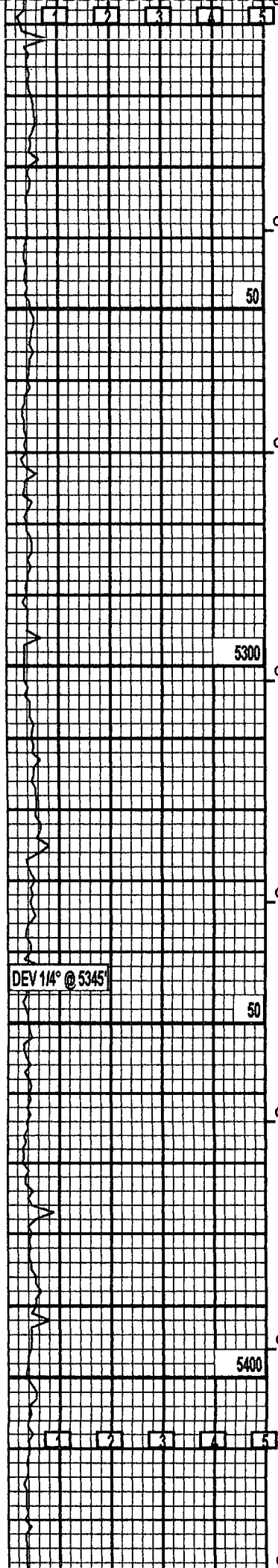
SH:drk gry,blk,brn,gry,
blky,rthy-plty,mod
frm-frm,sme carb,sme
pyr,sme sndy

SS:frstd,clr,lt gry,vfn
gr,pred lsly consol,
calc cmt,wl srtd,
subrnd-subang

SH:drk gry,blk,brn,gry,
blky,plty,mod frm-frm
sme carb,sme pyr,sme
sndy

SS:mlky,lt gry,clr,vfn
gr,pred lsly consol,
calc cmt,wl srtd,
subrnd-subang

SH:drk gry,blk,brn,gry,
blky,plty,mod frm-frm
sme carb,sme sndy



SS:mlky,lt gry,clr,vfn
gr,lsly consol,calc
cmt,wl srtd,subrnd-
subang

SH:drk gry,blk,brn,gry,
blky,rthy-plty,mod
frm-frm,sme carb,sme
pyr,sme sndy

SS:clr,frstd,lt gry,vfn
gr,lsly consol,calc
cmt,wl srtd,subrnd-
subang

SH:drk gry,blk,brn,gry,
blky,rthy-plty,mod
frm-frm,sme carb

SS:clr,frstd,lt gry,vfn
gr,unconsol,wl srtd,
subrnd-subang

SH:drk gry,blk,brn,blky
rthy-plty,mod frm-frm
sme carb

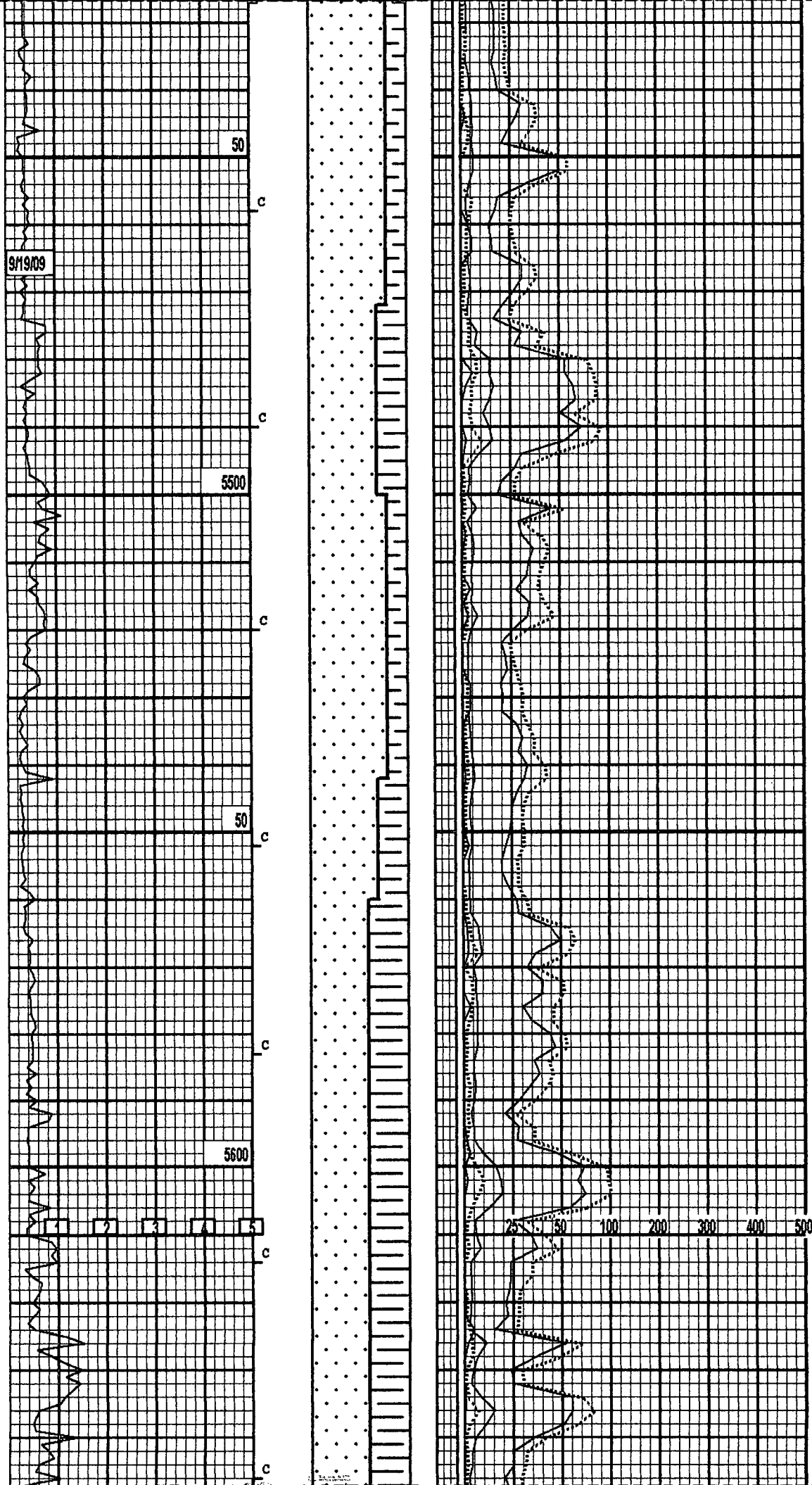
SS:clr,frstd,lt gry,vfn
gr,unconsol,wl srtd,
subrnd-subang

SH:drk gry,blk,brn,gry,
blky-rthy-plty,mod
frm-frm,carb

SS:clr,frstd,lt gry,vfn
gr,unconsol,wl srtd,
subrnd-subang

SH:drk gry,blk,brn,gry,
blky,rthy-plty,mod
frm-frm,carb

SS:clr,frstd,lt gry,vfn
gr,unconsol,wl srtd,
subrnd-subang,sme free



subrnd-subang, sme free
wht cly

SH: drk gry, blk, brn, blk
rthy-plty, mod frm-frm
sme carb

SS: clr, frstd, lt gry, vfn
gr, unconsol, wl srted,
subrnd-subang

SH: drk gry, blk, gry, brn,
blk, rthy-plty, mod
frm-frm, carb, sme sndy

SS: clr, frstd, lt gry, vfn
gr, unconsol, wl srted,
subrnd-subang, sme free
wht cly

SH: drk gry, blk, brn, gry,
blk, rthy-plty, mod
frm-frm, sme carb, sme
sndy

SS: clr, frstd, lt gry, vfn
gr, unconsol, wl srted,
subrnd-subang

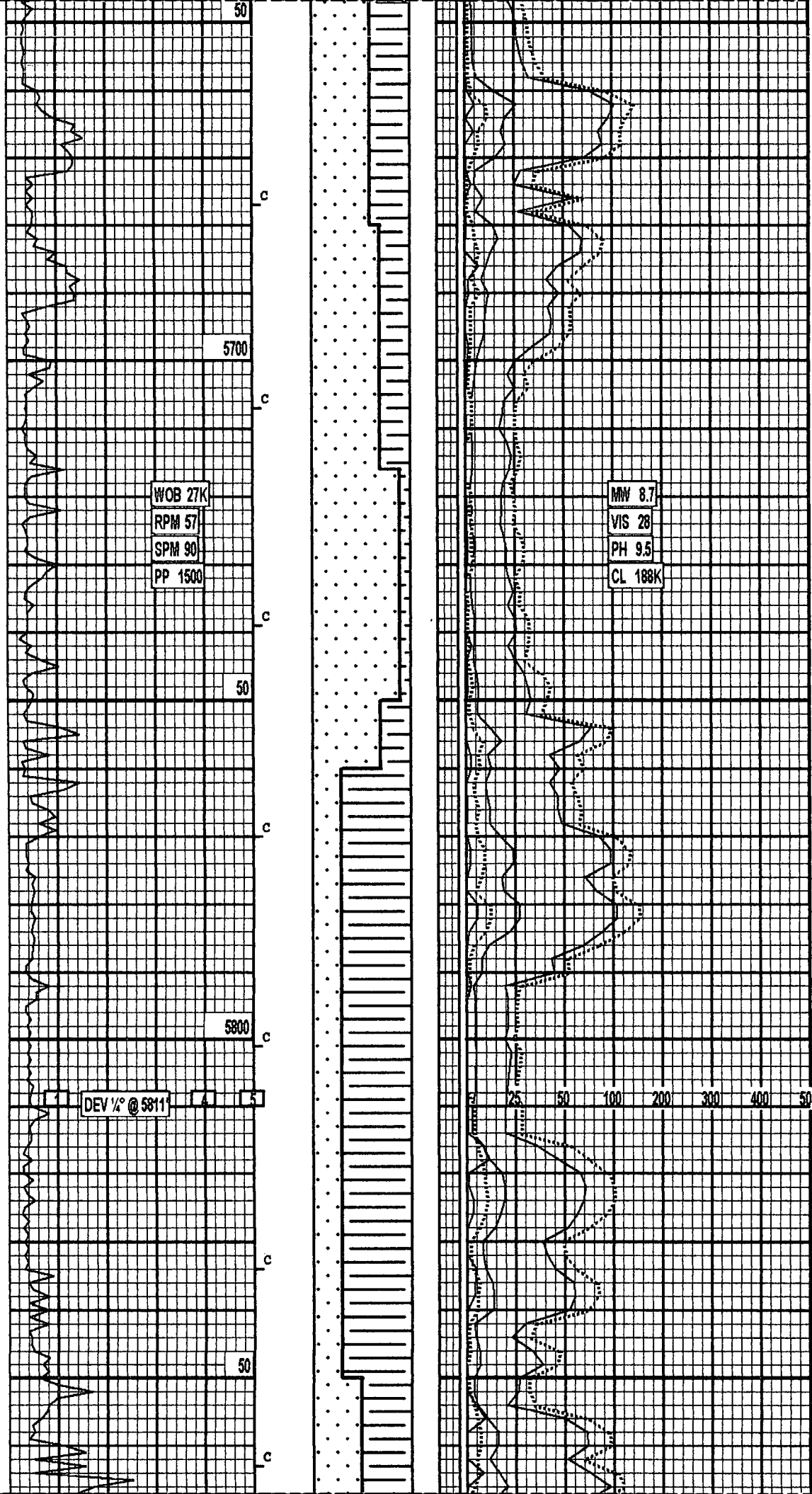
SH: blk, drk gry, brn, gry,
blk, rthy-plty, mod
frm-frm, sme mica, sme
carb, sme sndy

SS: frstd, lt gry, clr, vfn
gr, unconsol, wl srted,
subrnd-subang

SH: blk, drk gry, brn, gry,
blk, rthy-plty, mod
frm-frm, carb, sme mica

SS: clr, frstd, lt gry, vfn
gr, unconsol, wl srted,
subrnd-subang

SH: blk, drk gry, gry, brn,
blk, rthy-plty, mod
frm-frm, sme micr, carb,



sme pyr
SS:clr,frstd,lt gry,vfn
gr,unconsol,wl srtd,
subrnd-subang

SH:blk,drk gry,gry,brn,
blky,rthy-plty,mod
frm-frm,carb,sme mica

SS:clr,frstd,lt gry,vfn
gr,unconsol,wl srtd,
subrnd-subang,sme free
wht cly

SH:drk gry,blk,brn,gry,
blky,rthy-plty,mod
frm-frm,sme carb,sme
mica,sme pyr

SS:frstd,lt gry,clr,vfn
gr,titly consol,calc
cmt,wl srtd,subrnd-
subang

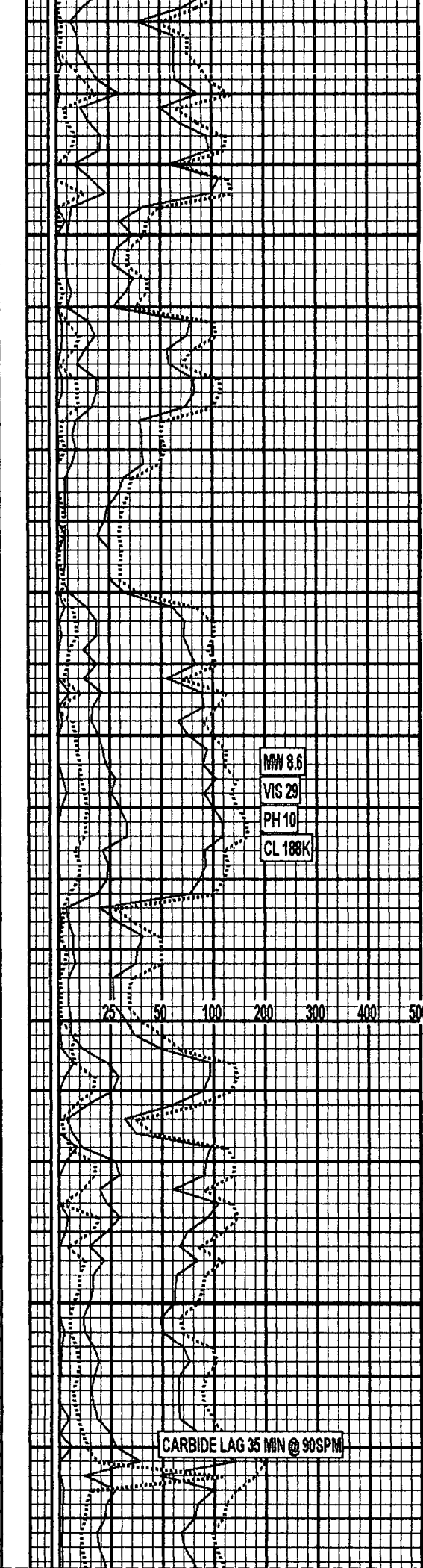
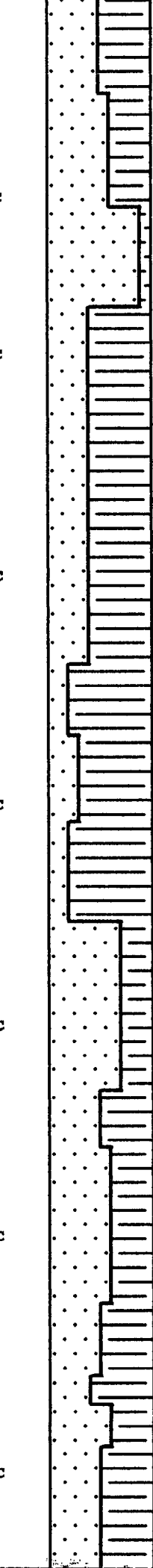
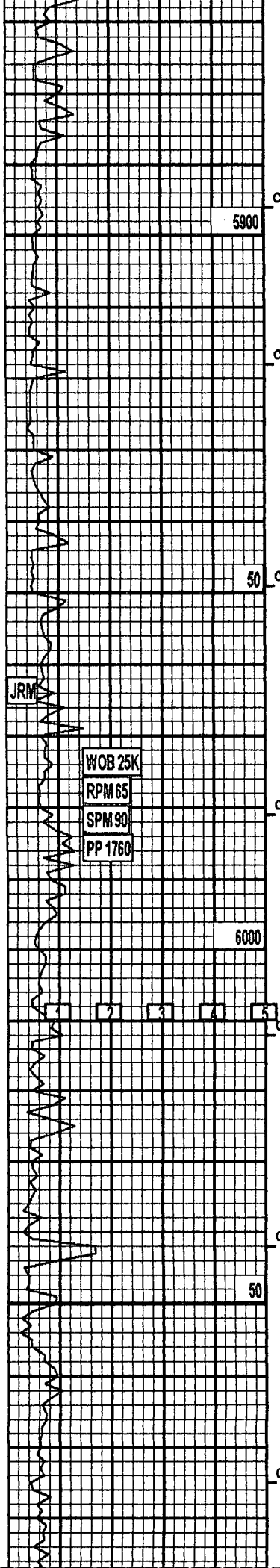
SH:drk gry,brn,blk,gry,
blky,rthy-plty,mod
frm-frm,carb,sme mica
sme pyr

8.7
SS:lt gry,frstd,clr,vfn
gr,titly consol,calc
cmt,wl srtd,subrnd-
subang

SH:drk gry,blk,brn,gry,
blky,rthy-plty,mod
frm-frm,carb,sme mica,
sme pyr

SS:frstd,lt gry,clr,vfn
gr,titly consol,calc
cmt,wl srtd,subrnd-
subang

SH:drk gry,blk,brn,gry,
blky,rthy-plty,mod
frm-frm,carb,sme mica



SS:clr,frstd,lt gry,vfn
gr,lsly consol-unconsl
calc cmt,wl srtd,
subrnd-subang

SH:drk gry,blk,brn,gry,
blky,rthy-plty,mod
frm-frm,carb,sme mica,
sme pyr

SS:lt gry,frstd,clr,vfn
gr,lsly-titly consol,
calc cmt,wl srtd,
subrnd-subang

SH:dk gry,blk,gry,vfn
slt txt,dull,erthy,
blky,mod frm-frm,sm
vfm,sm fnly mica

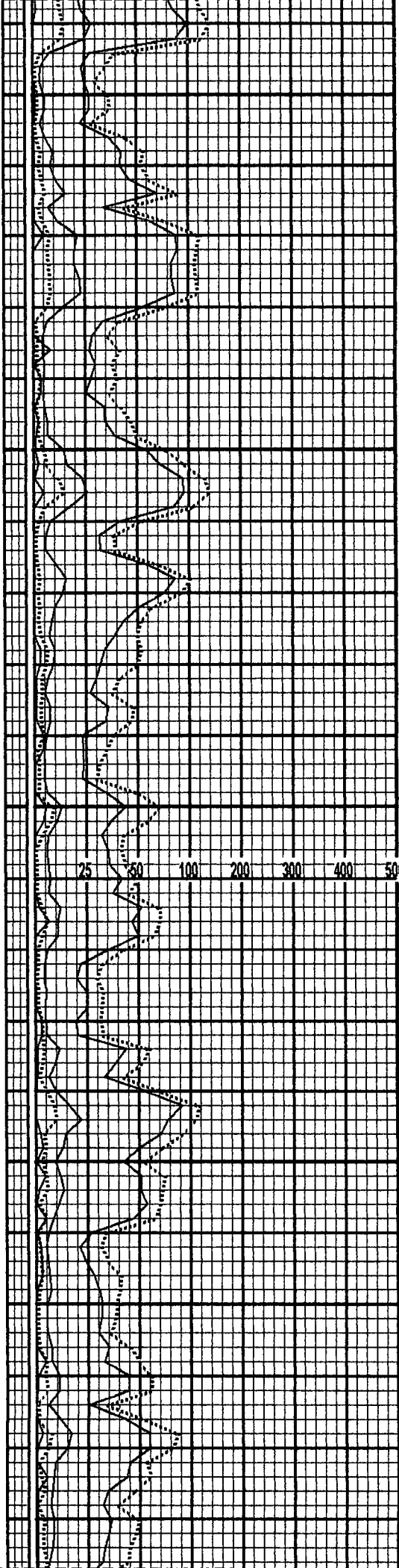
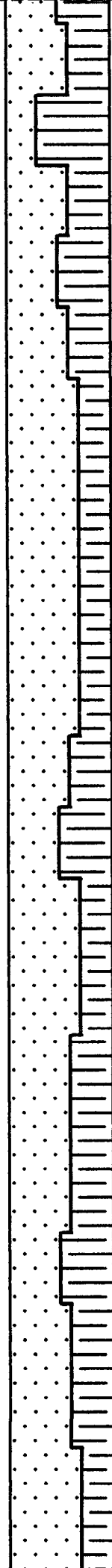
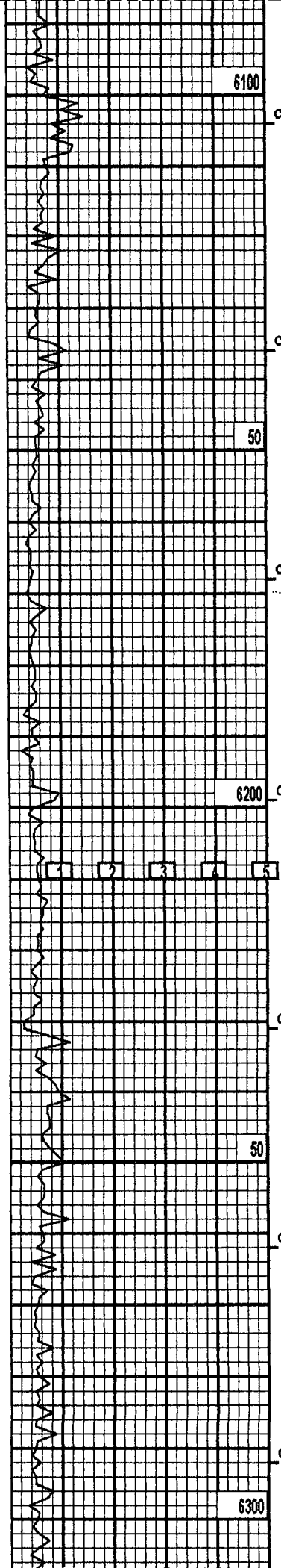
SS:lt gry,frstd,gry,clr
vfn gn,sub rnd-sub ang
pred consol w/calc
mtrx,sm wl consol w/
calc cmt,trc unconsl,
prly srtd,sm blk/gry
strkd flky cly

SH:dk gry,blk,gry,vfn
slt txt,dull,erthy-
grtty,blky,mod frm-frm
sm vfm,sm fnly mica

SS:frstd,lt gry,clr,gry
vfn gn,sub rnd-sub ang
sm rnd,unconsl-wl
consol w/calc cmt,wl
srtd,fr amt wht/gry
strkd flky cly

SH:dk gry,dk brn/gry,
blk,vfn-fn slt txt,
dull,erthy-grtty,blky,
sft-mod frm,sm frm,
fnly mica,pred aren

SS:lt gry,gry,frstd,clr
vfn gn,sub rnd-sub ang
sm ang,pred consol w/
calc/shly mtrx,sm wl
consol w/calc cmt,sm
unconsl,mod srtd,sm
fnly pyr,sm lt gry/gry
strkd flky cly



SH:dk gry,dk brn/gry,
blk,vfn slt txt,dull,
erthy,sm grtty,blky,
mod frm-vfm,fnly mica,
sm aren

SS:lt gry,gry,frstd,vfn
gn,sm fn gn,sub ang-
sub rnd,sm ang,pred
titly consol w/calc
cmt,sm consol w/calc/
shly mtrx,sm fri,mod
srted,sm wht/gry strkd
flky cly

SH:dk brn/gry,dk gry,
blk,vfn slt txt,dull,
grtty,blky,frm-vfm,sm
fnly mica,pred aren

SS:lt gry,frstd,gry,clr
vfn gn,sub ang-sub rnd
pred wl consol w/calc
cmt,sm consol w/calc/
shly mtrx,trc fri,sm
unconsol,mod srted,sm
fnly mica,sm wht/gry
strkd flky cly

SH:dk gry,blk,vfn slt
txt,dull,grtty,blky,
frm-vfm,sm fnly mica,
sm aren

SS:frstd,lt gry,clr,gry
vfn gn,sub rnd-rnd,sm
sub ang,unconsol-titly
consol w/calc cmt,sm
consol w/calc/shly
mtrx,wl srted,trc wht/
gry strkd flky cly

SH:dk brn/gry,dk gry,
blk,vfn slt txt,dull,
grtty,sm erthy,blky,
frm-vfm,sm mod frm,
fnly mica,sm fnly pyr,
sm aren

SS:frstd,clr,lt gry,gry
vfn gn,sub rnd-rnd,sm
sub ang,pred unconsol,
sm titly consol w/calc
/shly cmt,mod srted,
abunt wht/lt gry strkd
flky cly,trc yllw
fluor,no vis wet cut

DEV 1/2" @ 6309

c
50
c
c
6400
c
c
50
c
6500
c

WOB 26K
RPM 65
SPM 90
PP 1740

SH:dk gry,dk brn/gry,
blk,vfn-fn slt txt.
dull,grtty,blky,frm-
vfm,fnly mica,sm aren

SS:lt gry,frstd,gry,clr
vfn gn,sub rnd-sub ang
sm rnd,pred unconsol,
sm wl consol w/calc
cmt,mod srted,sm wht/
gry strkd flky cly

SH:dk brn/gry,dk gry,
blk,dull,erthy-grtty,
blky,frm-vfm,sm fnly
mica,trc aren

SS:frstd,clr,lt gry,vfn
gn,sub rnd-rnd,sm sub
ang,pred unconsol,sm
lsly consol w/calc/
shly mtrx,sm fri,wl
srted,abunt wht/lt gry
strkd flky cly

SH:dk gry,blk,dk gry/
brn,vfn slt txt,dull,
erthy-grtty,blky,frm-
vfm,sm fnly mica

SS:frstd,clr,lt gry,gry
vfn gn,sub rnd-sub ang
sm rnd,pred unconsol,
sm wl consol w/calc
cmt,sm w/shly mtrx,wl
srted,fr amt wht/gry
strkd flky cly

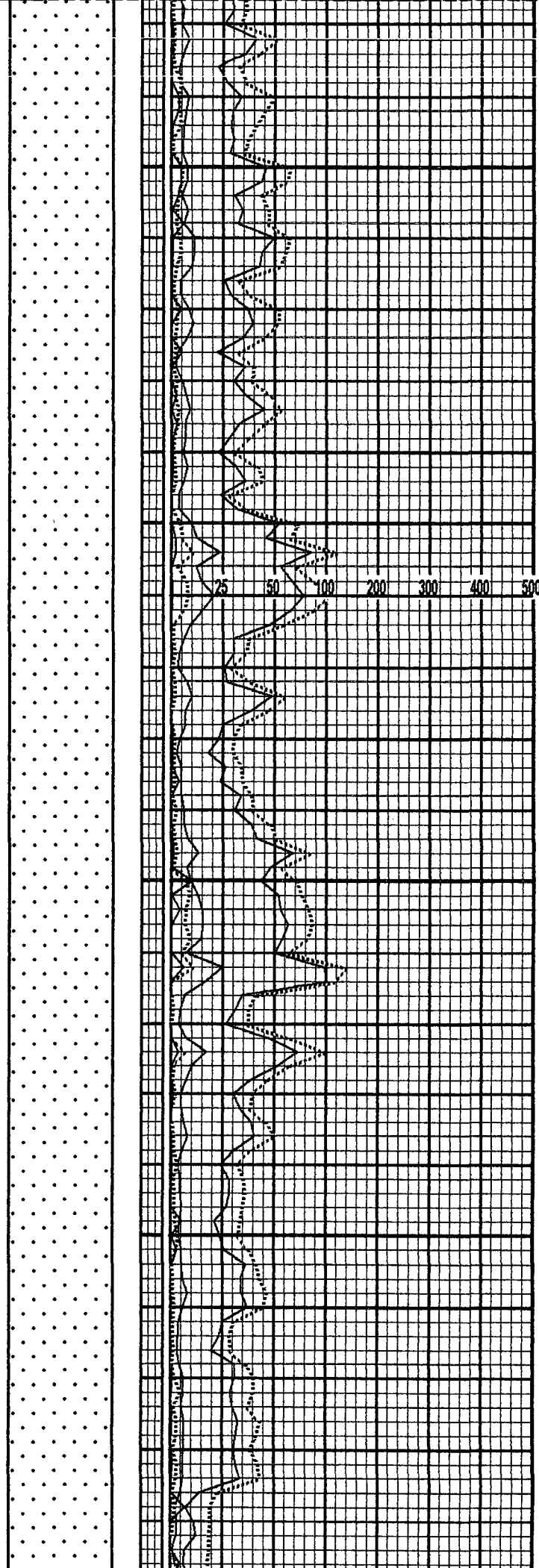
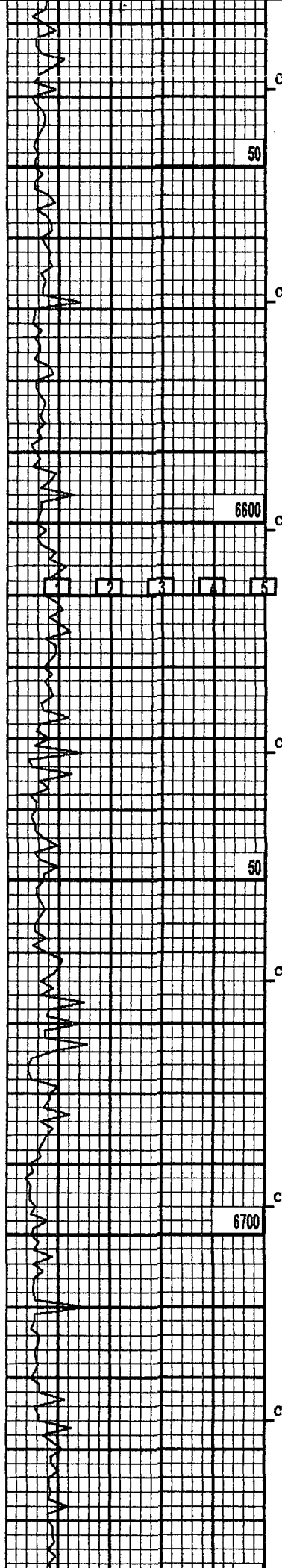
SH:dk gry,blk,vfn slt
txt,dull,erthy-grtty,
blky,frm,sm fnly mica

SS:frstd,clr,lt gry,vfn
gn,sub rnd-rnd,sm sub
ang,pred unconsol,sm
consol w/calc mtrx,wl
srted,abunt wht/lt gry
strkd flky cly

SS:clr,frstd,lt gry,vfn
gn,sub rnd-rnd,sm sub
ang,pred unconsol,sm
lsly consol w/calc
mtrx,wl srted,fr amt
wht/lt gry strkd flky
cly,abunt MF55

25 50 100 200 300 400 500

MW 8.7
VIS 29
PH 10
CL 188K



SS:clr,frstd,lt gry,vfn
gn,sub rnd-rnd,pred
unconsol,trc lsly
consol w/calc mtrx,wl
srted,abunt wht/lt gry
strkd cly,trc blk sh

SS:clr,frstd,vfn gn,sub
rnd-rnd,pred unconsol,
trc lsly consol w/calc
mtrx,trc fri,wl srtd,
abunt wht/lt gry strkd
cly,trc blk sh

SS:frstd,clr,lt gry,vfn
gn,sub rnd-rnd,sm sub
ang,unconsol,tre lsly
consol w/calc mtrx,tre
fri,wl srtd,sm wht/lt
gry strkd flky cly,occ
blk sh

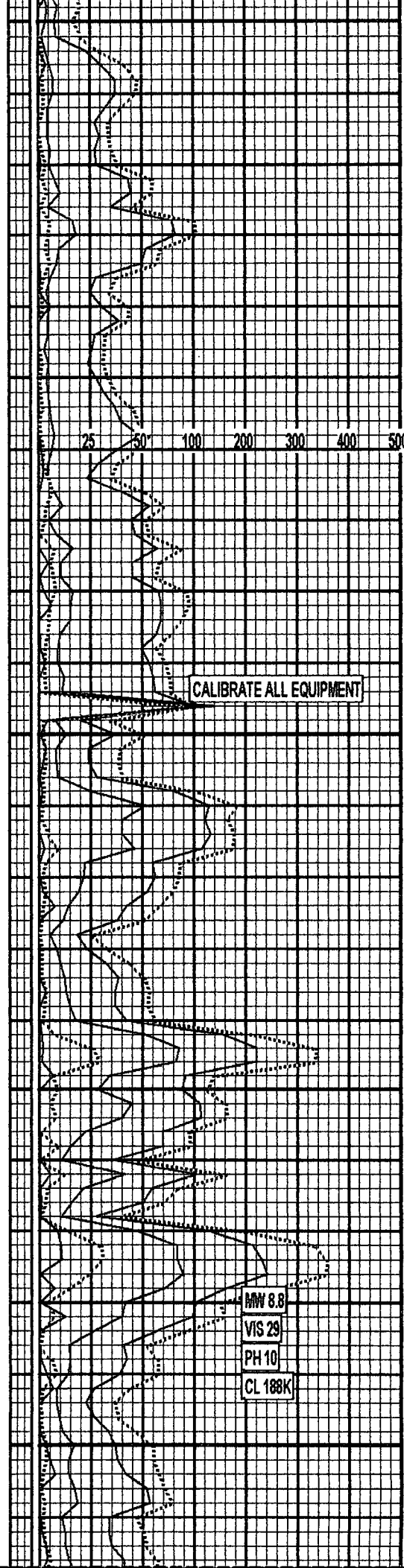
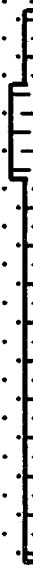
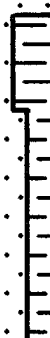
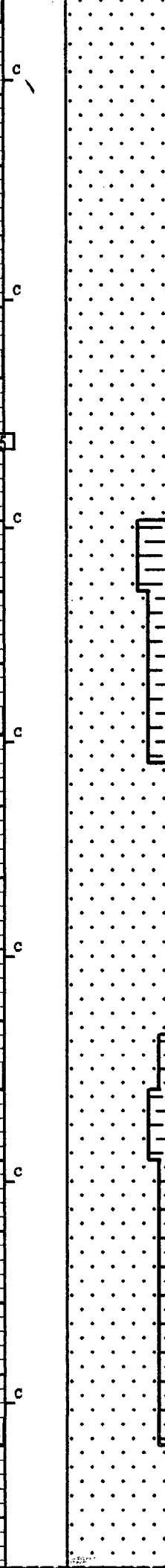
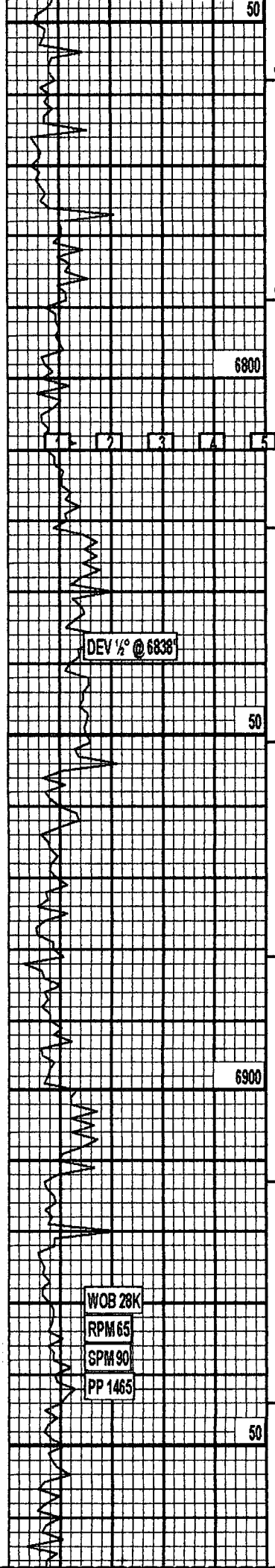
SS:frstd,clr,lt gry,vfn
gn,sub rnd-rnd,pred
unconsol,trc lsly
consol w/calc mtrx,wl
srtd,sm wht/lt gry
strkd flky cly,abunt
ME55

SS:frstd,clr,lt gry,vfn
gn,sub rnd-rnd,trc sub
ang,unconsol,wl srtd,
abunt wht/lt gry strkd
flky cly

SS:clr,frstd,lt gry,vfn
gn,sub rnd-rnd,
unconsol,mod srtd,fr
amt wht/lt gry strkd
flky cly,trc blk sh

SS:frstd,clr,lt gry,vfn
gn,sub rnd-sub ang,sm
rnd,pred unconsol,sm
lsly consol w/calc
mtrx,mod srtd,fr amt
wht/lt gry strkd flky
cly

SS:clr,frstd,lt gry,vfn
gn,sub rnd-rnd,trc sub
ang,unconsol,wl srtd,
abunt wht/gry strkd
flky cly



SS:clr,frstd,lt gry,vfn
 sm sub rnd-rnd,sm sub
 ang,unconsol,wl srted,
 about wht/gry strkd
 flky cly,trc blk flky
 sh

SS:frstd,clr,lt gry,vfn
 gn,sub rnd-rnd,sm sub
 ang,unconsol,wl srted,
 about wht/gry-blk
 strkd flky cly

SS:frstd,clr,lt gry,vfn
 gn,pred sub rnd,sm rnd
 unconsol,wl srted,about
 wht/lt gry-blk strkd
 flky cly

SH:dk brn/gry,dk gry,
 blk,vfn-fn slt txt,
 dull,erthy-grtty,blky,
 sm flky,mod frm-frm,
 sm fnly mica,trc fnly
 pyr

SS:frstd,lt gry,clr,vfn
 gn,sub rnd-sub ang,sm
 rnd,pred unconsol,trc
 consol w/calc mtrx,wl
 srted,about wht/gry
 strkd flky cly,trc blk
 sh,no vis fluor or wet
 cut

SS:frstd,clr,lt gry,gry
 vfn gn,sub rnd-rnd,sm
 sub ang,pred unconsol,
 sm titly consol w/calc
 cmt,wl srted,about wht/
 gry strkd cly,no vis
 fluor or wet cut

SH:dk gry,dk brn/gry,
 blk,vfn-fn slt txt,
 dull,erthy-grtty,blky,
 sm flky,mod frm-frm,sm
 fnly mica,trc aren

SS:frstd,clr,lt gry,vfn
 gn,sub rnd-rnd,sm sub
 ang,pred unconsol,trc
 lsly consol w/calc
 mtrx,mod srted,sm wht/
 gry strkd flky cly,no
 vis fluor or wet cut

SS:frstd,lt gry,clr,vfn

9/20/09

7000

50

7100

50

WOB 30K
RPM 60
SPM 90
PP 1545

25 50 100 200 300 400 500

gn,sub rnd-sub ang,sm
rnd,pred unconsol,trc
consol w/calc mtrx,wl
srted,sm wht/gry strkd
flky cly

SS:lt gry,frstd,clr,gry
vfn gn,sub rnd-sub ang
pred unconsol,trc
consol w/calc cmt,wl
srted,abunt wht/lt gry
strkd flky cly,occ pl
grn fluor,no vis wet
cut

SS:lt gry,frstd,gry,clr
vfn gn,sub rnd-sub ang
sm rnd,pred unconsol,
trc wl consol w/calc
cmt,wl srted,abunt wht/
gry strkd flky cly,trc
blk sh

SH:dk brn/gry,dk gry,
blk,vfn slt txt,dull,
erthy-grtty,blk,mod
frm-frm,sm vfm,sm fnly
mica,sm fnly pyr

SS:lt gry,gry,frstd,clr
vfn gn,sub rnd-sub ang
unconsol,mod srted,fr
amt wht/gry strkd flky
cly,no vis fluor or
wet cut

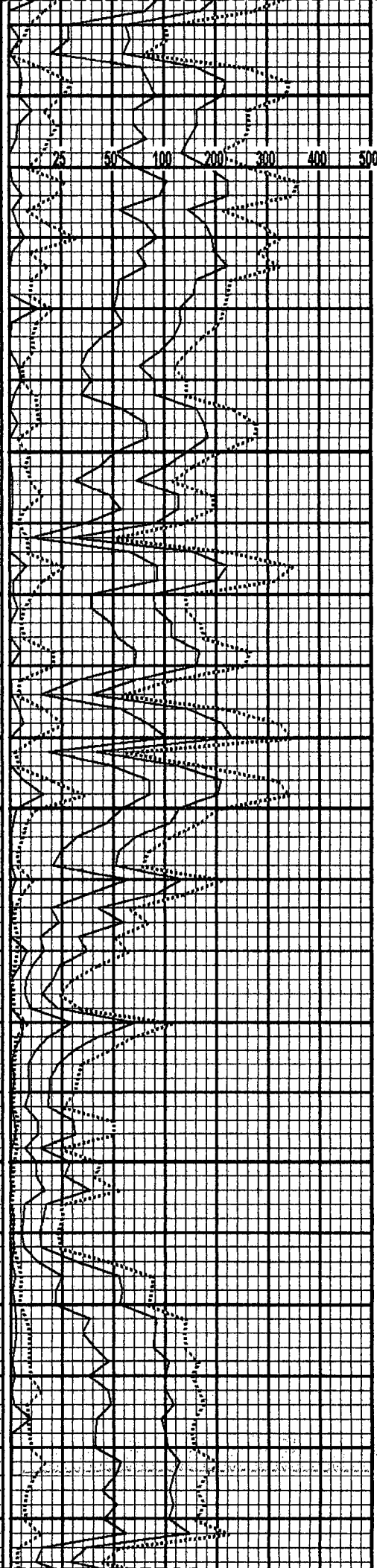
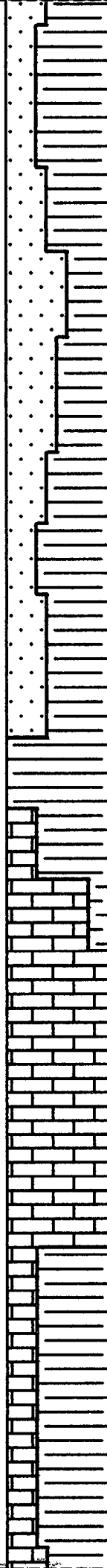
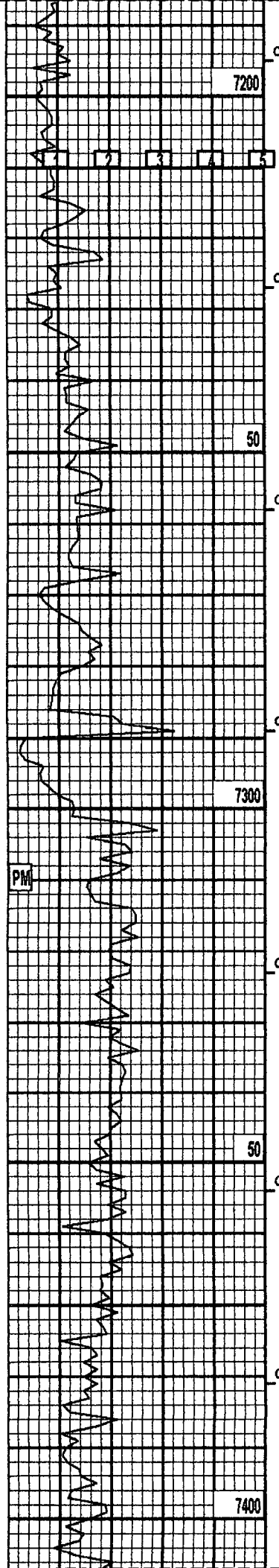
SH:dk brn/gry,dk gry,
blk,vfn slt txt,dull,
erthy-grtty,blk,sm
flky,mod frm-frm,pred
fnly pyr,sm fnly mica

EXTREMELY POOR SAMPLE
QUALITY - ABUNT MF55

MW 8.9
VIS 29
PH 10
CL 188K

SS:lt gry,frstd,gry,clr
vfn gn,sub ang,sm sub
rnd,unconsol,wl srted,
sm wht/gry strkd flky
cly,vry poor sample
quality abunt MF55

SH:dk brn/gry,dk gry,
blk,vfn slt txt,dull,
erthy-grtty,blk,sm
flky,mod frm-frm,sm
fnly mica,sm aren



SS:lt gry,gry,frstd,clr
vfn gn,sub ang,sm sub
rnd,unconsol-consol w/
calc-shly mtrx,mod
srtd,abunt wht/gry
strkd flky cly,vry pr
smple quality abunt
MF55

SH:dk gry,dk brn/gry,
blk,vfn slt txt,dull,
erthy-grtty,blky,sm
flky,mod frm-frm,sm
vfn,sm fnly mica,sm
aren

SS:frstd,lt gry,clr,vfn
gn,sub rnd-sub ang,
pred unconsol,sm wl
consol w/calc-shly cmt
wl srtd,abunt wht/gry
strkd flky cly

SH:drk gry,blk,gry,brn,
blky,rthy-plty,mod
frm-frm,carb

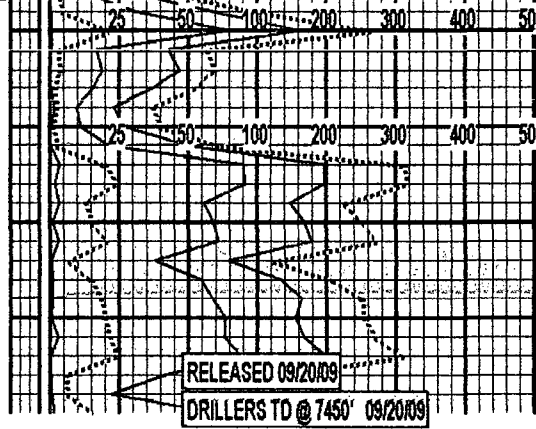
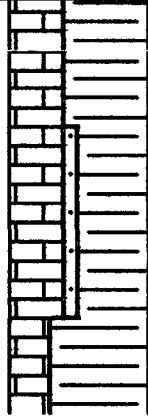
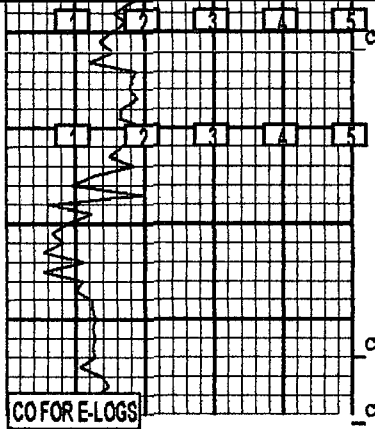
LS:gry,gry/wht mott,off
wht,wht,crm,vfn xln,
frm-mod hrd

LS:gry,gry/wht mott,off
wht,wht,crm,tn,vfn xln
frm-mod hrd

LS:lt gry,gry/wht mott,
off wht,crm,tn,brn,vfn
xln,frm-mod hrd,sme
chlky

SH:drk gry,blk,brn,gry,
blky,rthy-plty,mod
frm-frm,carb

LS:gry,off wht,crm,
brn,vfn xln,frm-
mod hrd



SH: drk gry, blk, gry, brn,
 blk, rthy, mod frm-frm,
 carb, lmy ip

SS: clr, frstd, lt gry, vfn
 gr, titly consol, calc
 cmt, wl srtd, subrnd-
 subang, no vis fluor
 or wet cut