BAKER HUGHES

Baker Atlas

Segmented Bond Log
Compensated Neutron
Gamma Ray

FileNo: 377534	Company	SOUTHERN CALIFORNIA GAS COMPANY		
API#No:	Well	FERNANDO FEE # 38C		
	Field	ALISO CANYON		
	County	LOS ANGELES	State	CALIFORNIA

	Location GPS CORRD: NORTHING 1935482, EASTING 6397218 NAT 83 ZONE 5; SBB&M SEC 27 TWP 4N RGE 16W	**Other Services** PERFORATE

Permanent Datum	GROUND LEVEL	Elevation 1716 ft	**Elevations**
Log Measured From	K.B. 32 ft	Above P. D.	KB 1748 ft
Drill Measured From	KELLY BUSHING		DF 1716 ft
			GL 0 ft

Date	2-25-03	
Run	ONE	
Service Order	377534	
Depth Driller	7366 ft	
Depth Logger	7279 ft	
Bottom Logged Interval	7270 ft	
Top Logged Interval	4850 ft	
Time Started	8:30	
Time Finished	12:30	
Operator Rig Time	4 HOURS	
Type of Fluid in Hole	3% KCL	
Fluid Density	8.6#	
Salinity	NA	
Fluid Level	700 ft	
Logged Cement Top	NA	
Wellhead Pressure	0 psi	
Maximum Hole Deviation	12 deg	
Nominal Logging Speed	30 fpm	
Maximum Recorded Temperature	151 degF	
Reference	SCHLUMBERGER	
	12-1-01	
Unit Location	6452 TAFT	

n making interpretations of logs, our employees will give the customer the benefit of their best judgement. But since all interpretations are opinions based on inferences from electrical or other measurements, we annot, and we do not guarantee the accuracy or correctness of any interpretation. We shall not be liable r responsible for any loss, cost, damages, or expenses whatsoever incurred or sustained by the customer esulting from any interpretation made by any of our employees.

Borehole Record		
Bit Size	From	To
.25 in	0 ft	7366 ft

Casing Record				
Size	Weight	Grade	From	To
9.625 in	47 lbm/ft	N-80	0 ft	7326 ft

Cement Data								
Job Type	From	To	Time	Date	Cement Type	Density	Volume	Additives
					G			

Remarks
-->COMPRESSIVE STRENGTH @ 2000 PSI.

Equipment Data					
n	Trip	Tool	Series Number	Serial Number	Position
	1	GR	1309XA	52632	CENTRALIZED
	1	SBT	1424XA	118166	CENTRALIZED
	1	SBT	1424PA	061280	CENTRALIZED
	1	PCM	1633EA	117109	CENTRALIZED
	1	CN	2435XA	73553	CENTRALIZED
	0				

GAMMA NEUTRON 2"

SBT NORMALIZATION RESULTS

CURVE	PARAMETER	VALUE	UNITS	TOP	BOTTOM	COMMENT
ATC1	seg1 cnormf1	0.652	db/ft	4857.352	7286.566	
ATC2	seg2 cnormf2	-0.866	db/ft	4857.352	7286.566	
ATC3	seg3 cnormf3	0.045	db/ft	4857.352	7286.566	
ATC4	seg4 cnormf4	-0.213	db/ft	4857.352	7286.566	
ATC5	seg5 cnormf5	-0.235	db/ft	4857.352	7286.566	
ATC6	seg6 cnormf6	0.616	db/ft	4857.352	7286.566	
ATC1	seg1 dnormf1	0.185	db/ft	4857.352	7286.566	Good Confidence
ATC2	seg2 dnormf2	-0.885	db/ft	4857.352	7286.566	Good Confidence
ATC3	seg3 dnormf3	-0.094	db/ft	4857.352	7286.566	Good Confidence
ATC4	seg4 dnormf4	-0.249	db/ft	4857.352	7286.566	Good Confidence

RTC6	sag6 dnormf6	1.000	db/ft	4857.352	7286.566	Good Confidence

SBT PROCESSING

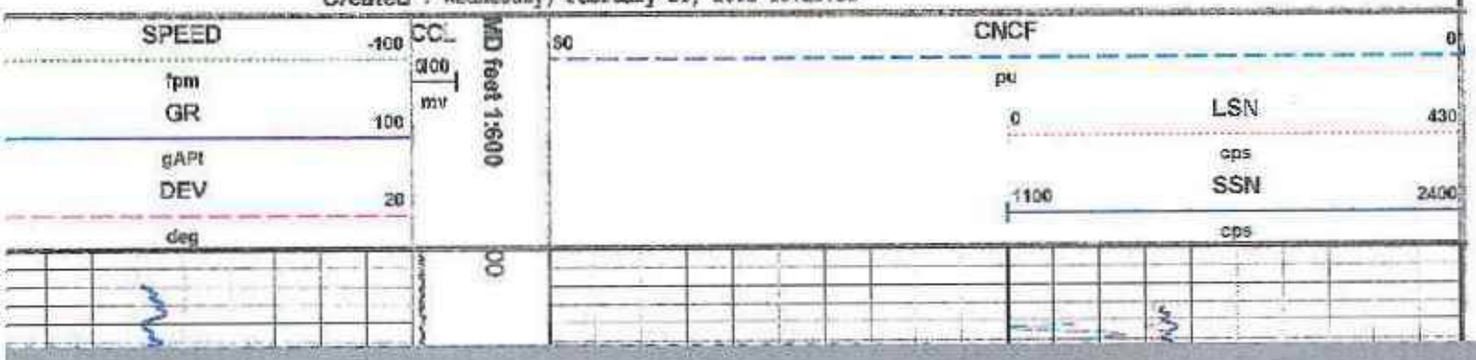
MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	TOP	BOTTOM
amp	fpamp	57.415	mv	4857.352	7287.000
amp	fpattn	2.580	d3/ft	4857.352	7287.000
atc	dbspread	4.262	d3/ft	4857.352	7287.000
atc	spacing	0.704	feet	4857.352	7287.000
cemr	casing od	9.625	inches	4857.352	7287.000
cemr	casing wt	47.000	lbm/ft	4857.352	7287.000
cemr	compress	2000.000	psi	4857.352	7287.000
CN	Bit Size	12.250	inches	4857.352	7286.566
CN	Casing Thickness	0.474	inches	4857.352	7287.000
CN	Casing/Cement Correction	Yes		4857.352	7286.566
CN	CN Chism	Yes		4857.352	7286.566
CN	Matrix	Sandstone		4857.352	7286.566
CN	Salinity	0.000	ppm	4857.352	7286.566

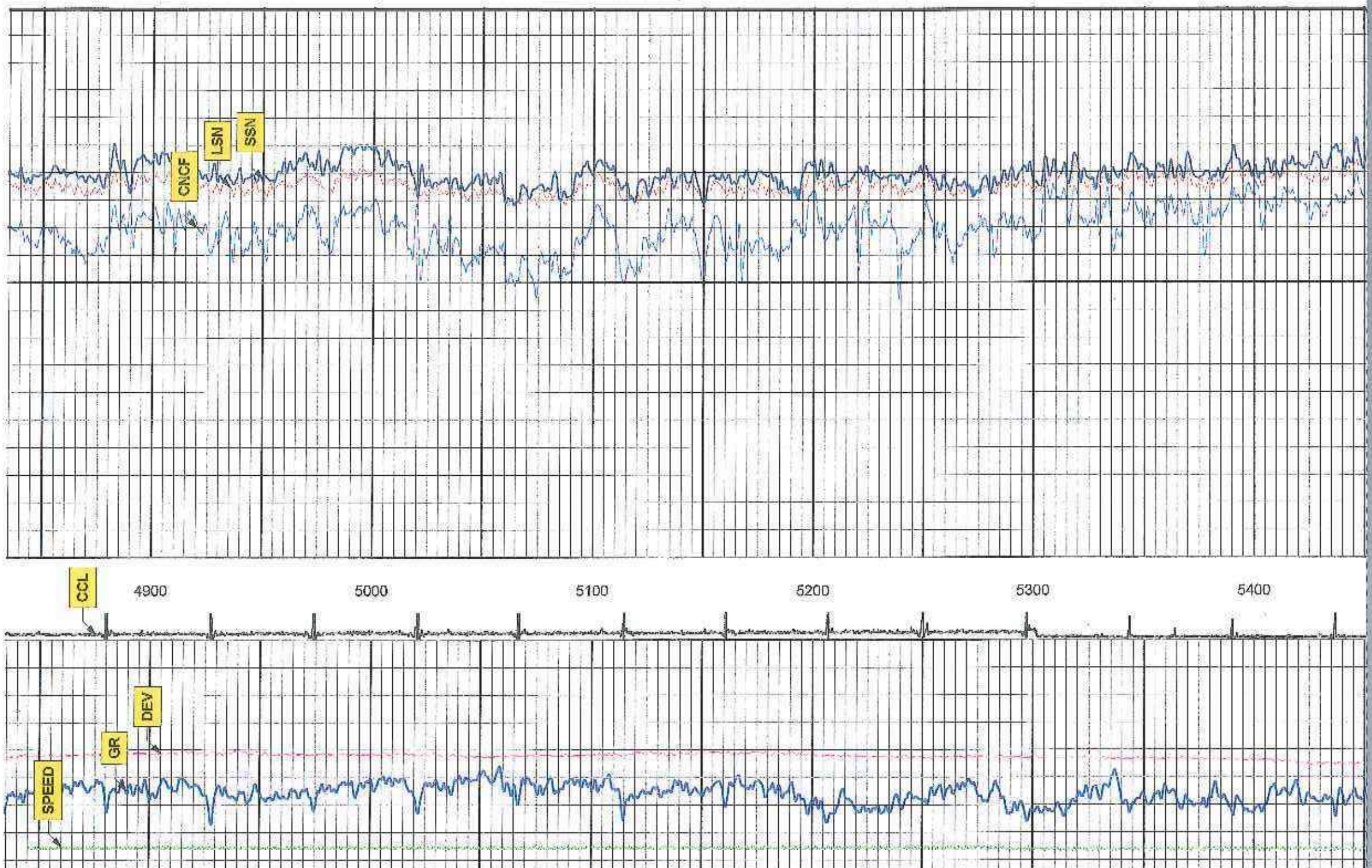
DEPTH OFFSETS

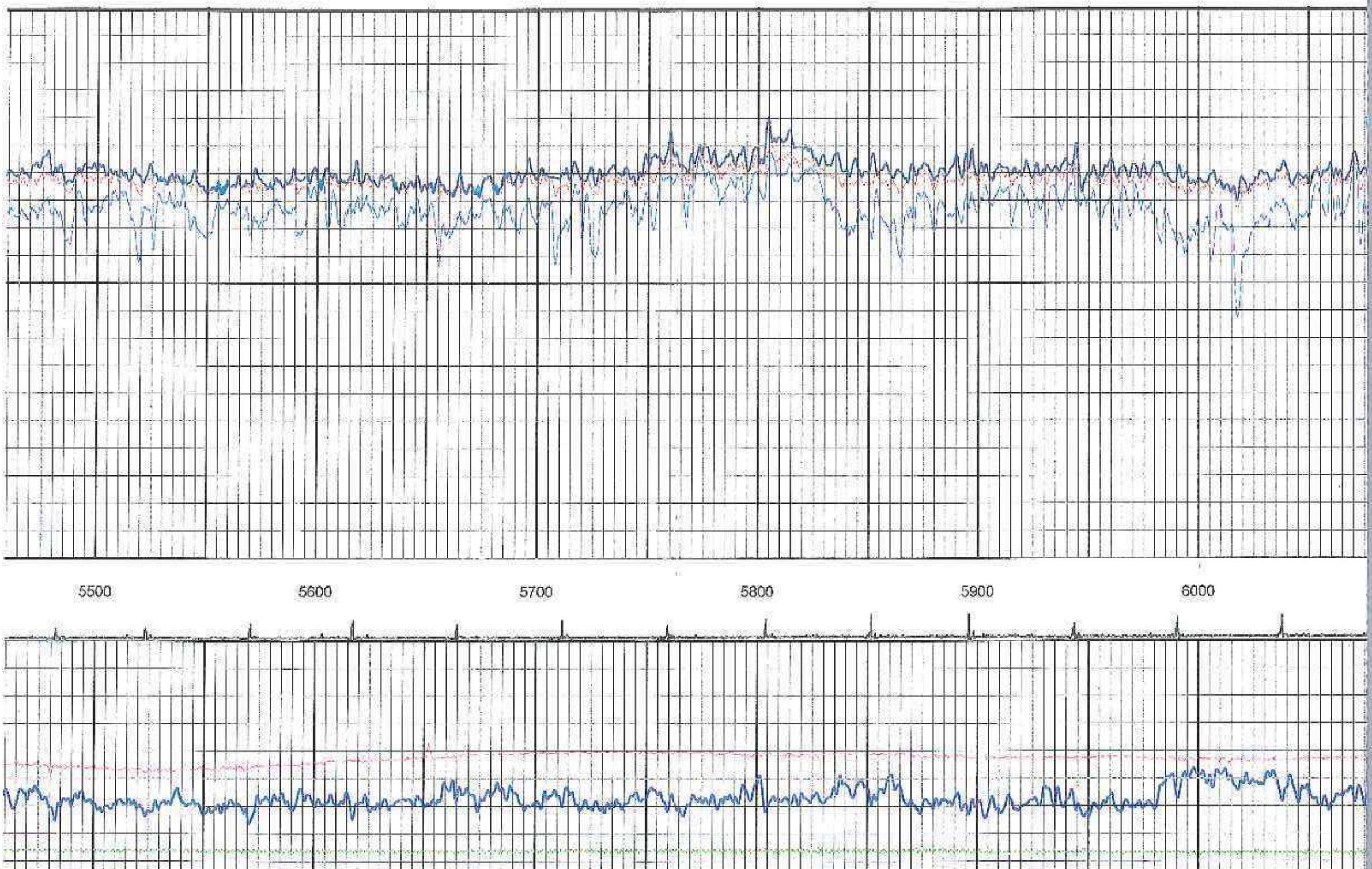
(for Acquired Curves)

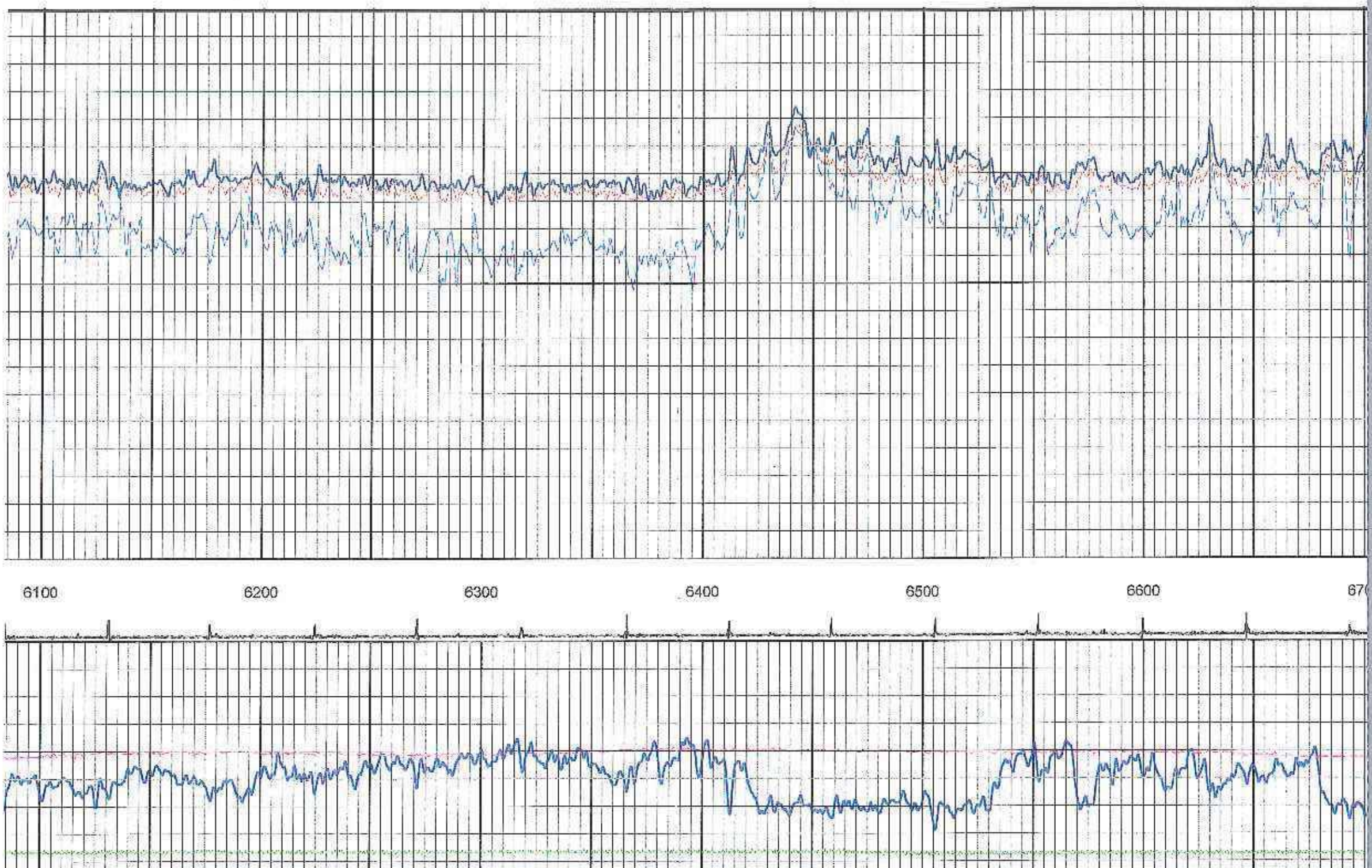
SERIES	DEPTH OFFSET	ACQUIRED CURVES					
2346XA	-46.500	CCL					
1303XA	-36.750	GR					
2435XA	-30.250	LSN					
2435XA	-29.750	NEU	SSN				
1424PA	-11.000	ATC1	ATC2	ATC3	ATC4	ATC5	ATC6
		ATAV	ATMN	ATMX	AMAV	DEV	DIMN
		DTMX	RB	XATT	YATT		
1424PA	0.000	CEV	CYQ	SIG			

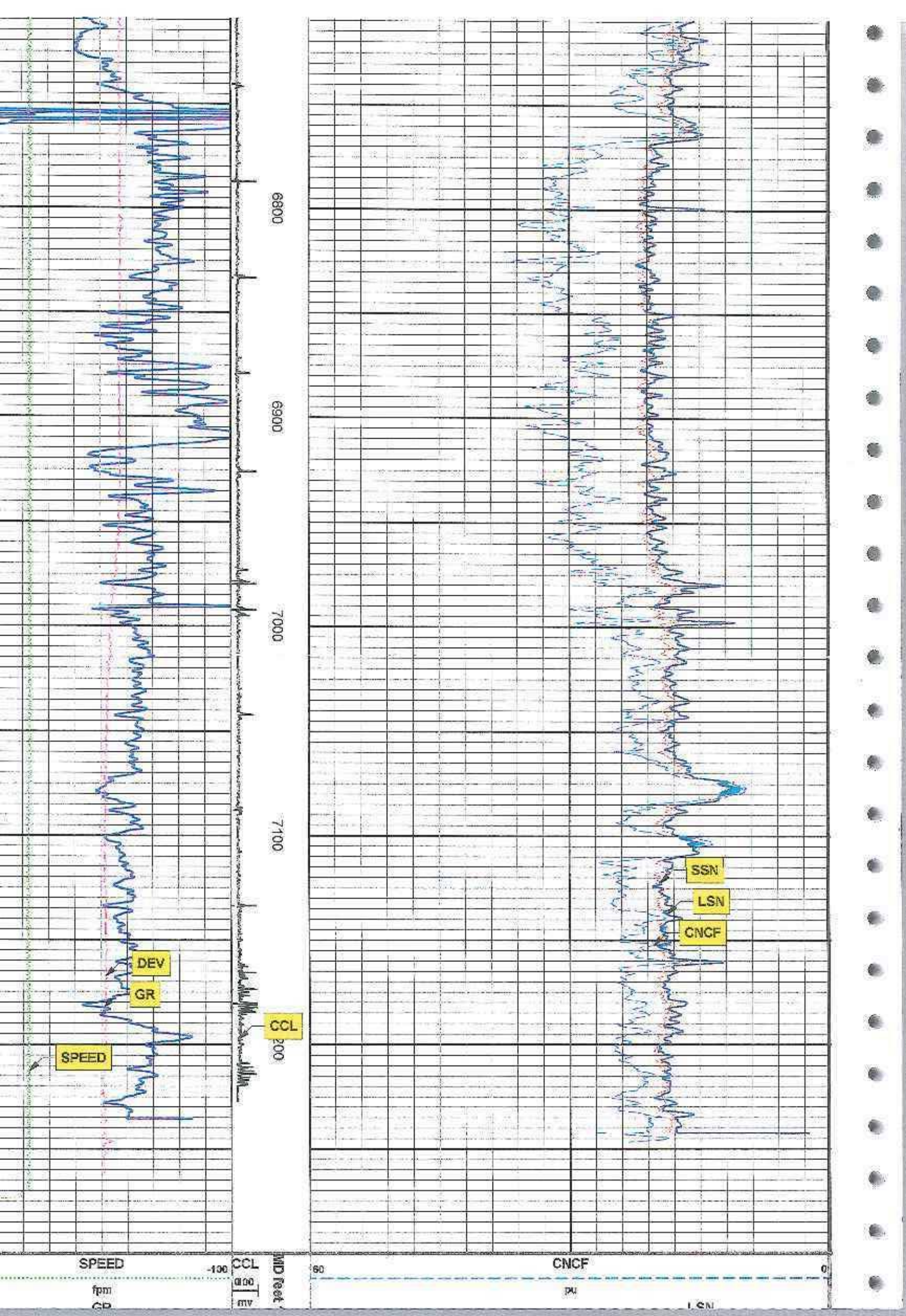
System : CASE Acquisition, v4.6.001
Program : LogpadA OCX, v5.0.080
Company Name : SOUTHERN CALIFORNIA GAS COMPANY
Well Name : FERNANDO FEE # 38C
File Name : c:\welldata\welldata\377534\main.xtf
Mode : PlotMgr 5.0.080
Interval : 4800.00 - 7300.00 feet
Created : Wednesday, February 26, 2003 10:29:35




CNCF
LSN
SSN
CCL
4900
5000
5100
5200
5300
5400
SPEED
GR
DEV


5500
5600
5700
5800
5900
6000


6100
6200
6300
6400
6500
6600


6800
6900
7000
7100
DEV
GR
SPEED
CCL
SSN
LSN
CNCF
SPEED
-100
fpm
CCL
200
mv
MD feet
60
CNCF
0
pu
LSN

GAMMA RAY NEUTRON 5"

SBT NORMALIZATION RESULTS

CURVE	PARAMETER	VALUE	UNITS	TOP	BOTTOM	COMMENT
ATC1	seg1 cnormf1	0.652	db/ft	4857.352	7286.566	
ATC2	seg2 cnormf2	-0.866	db/ft	4857.352	7286.566	
ATC3	seg3 cnormf3	0.045	db/ft	4857.352	7286.566	
ATC4	seg4 cnormf4	-0.213	db/ft	4857.352	7286.566	
ATC5	seg5 cnormf5	-0.235	db/ft	4857.352	7286.566	
ATC6	seg6 cnormf6	0.616	db/ft	4857.352	7286.566	
ATC1	seg1 dnormf1	0.185	db/ft	4857.352	7286.566	Good Confidence
ATC2	seg2 dnormf2	-0.885	db/ft	4857.352	7286.566	Good Confidence
ATC3	seg3 dnormf3	-0.094	db/ft	4857.352	7286.566	Good Confidence
ATC4	seg4 dnormf4	-0.249	db/ft	4857.352	7286.566	Good Confidence
ATC5	seg5 dnormf5	-0.037	db/ft	4857.352	7286.566	Good Confidence
ATC6	seg6 dnormf6	1.080	db/ft	4857.352	7286.566	Good Confidence

SBT PROCESSING

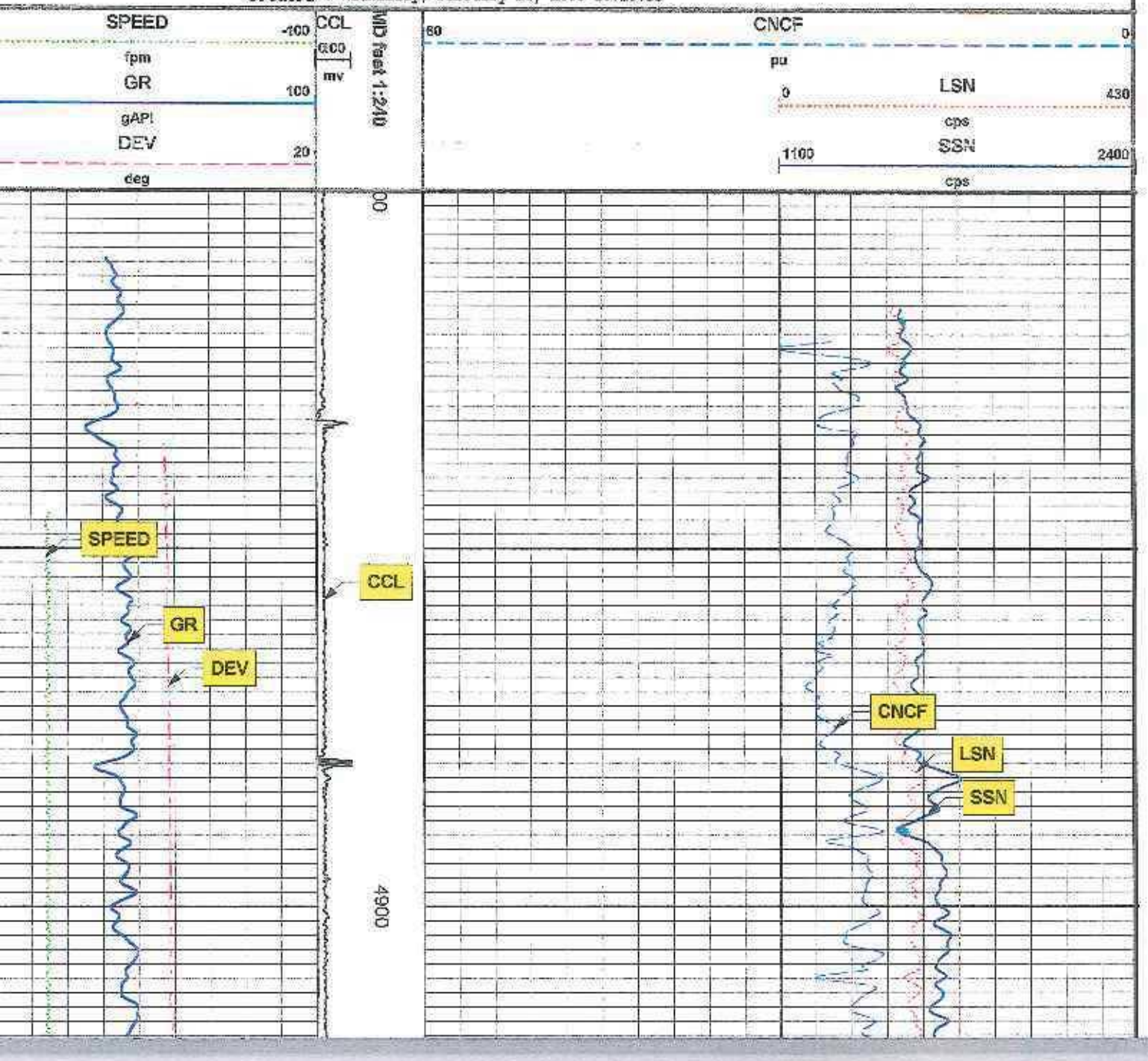
MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	TOP	BOTTOM
amp	fpamp	57.415	mv	4857.352	7287.000
amp	fpatm	2.583	dB/ft	4857.352	7287.000
atc	dbspread	4.262	dB/ft	4857.352	7287.000
atc	spacing	0.704	feet	4857.352	7287.000
cemr	casing od	9.625	inches	4857.352	7287.000
cemr	casing wt	47.000	lbm/ft	4857.352	7287.000
cemr	compress	2000.000	psi	4857.352	7287.000
CN	Bit Size	12.250	inches	4857.352	7286.566
CN	Casing Thickness	0.474	inches	4857.352	7287.000
CN	Casing/Cement Correction	Yes		4857.352	7286.566
CN	CN Chisx	Yes		4857.352	7286.566
CN	Matrix	Sandstone		4857.352	7286.566
CN	Salinity	0.000	ppm	4857.352	7286.566

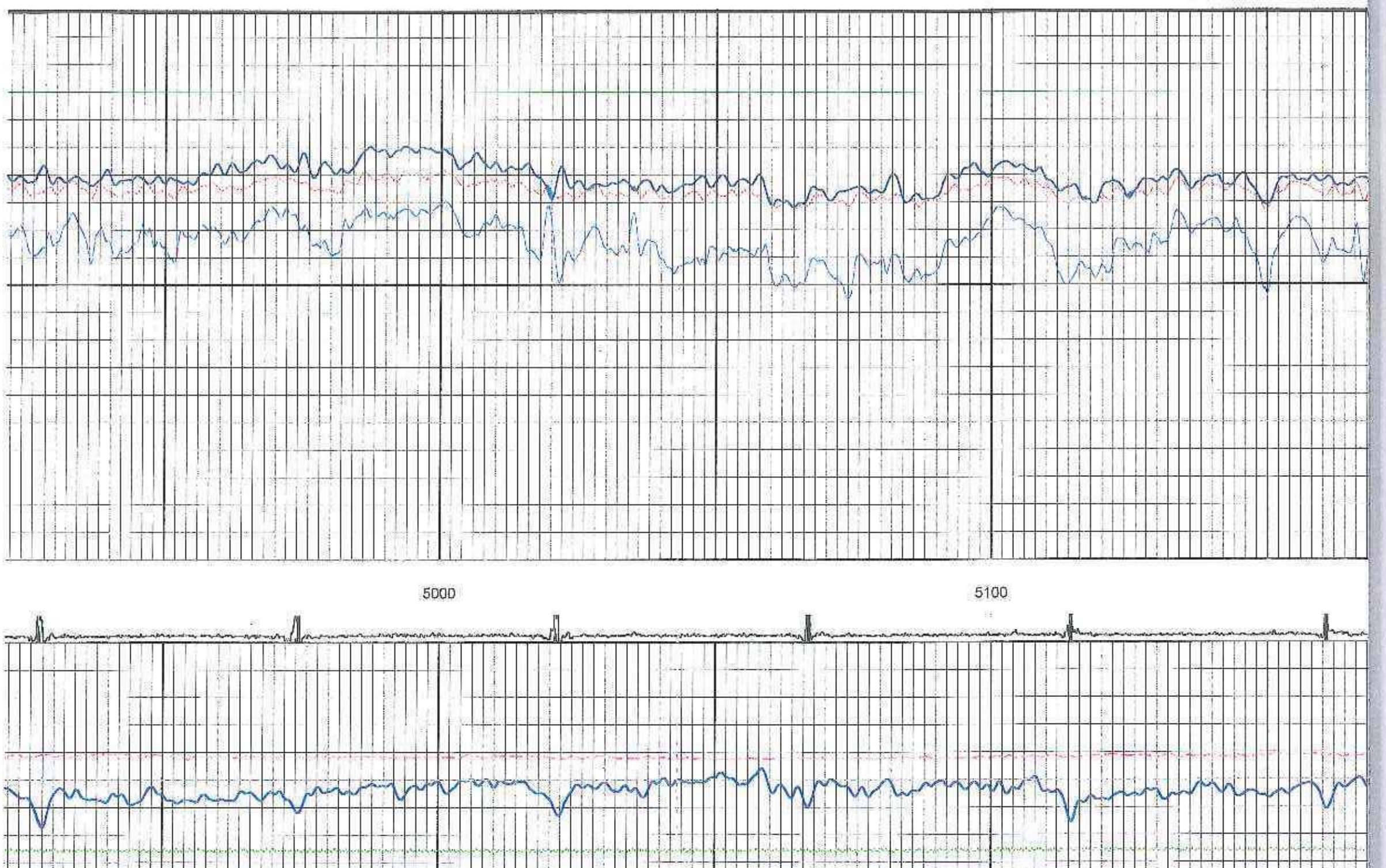
DEPTH OFFSETS

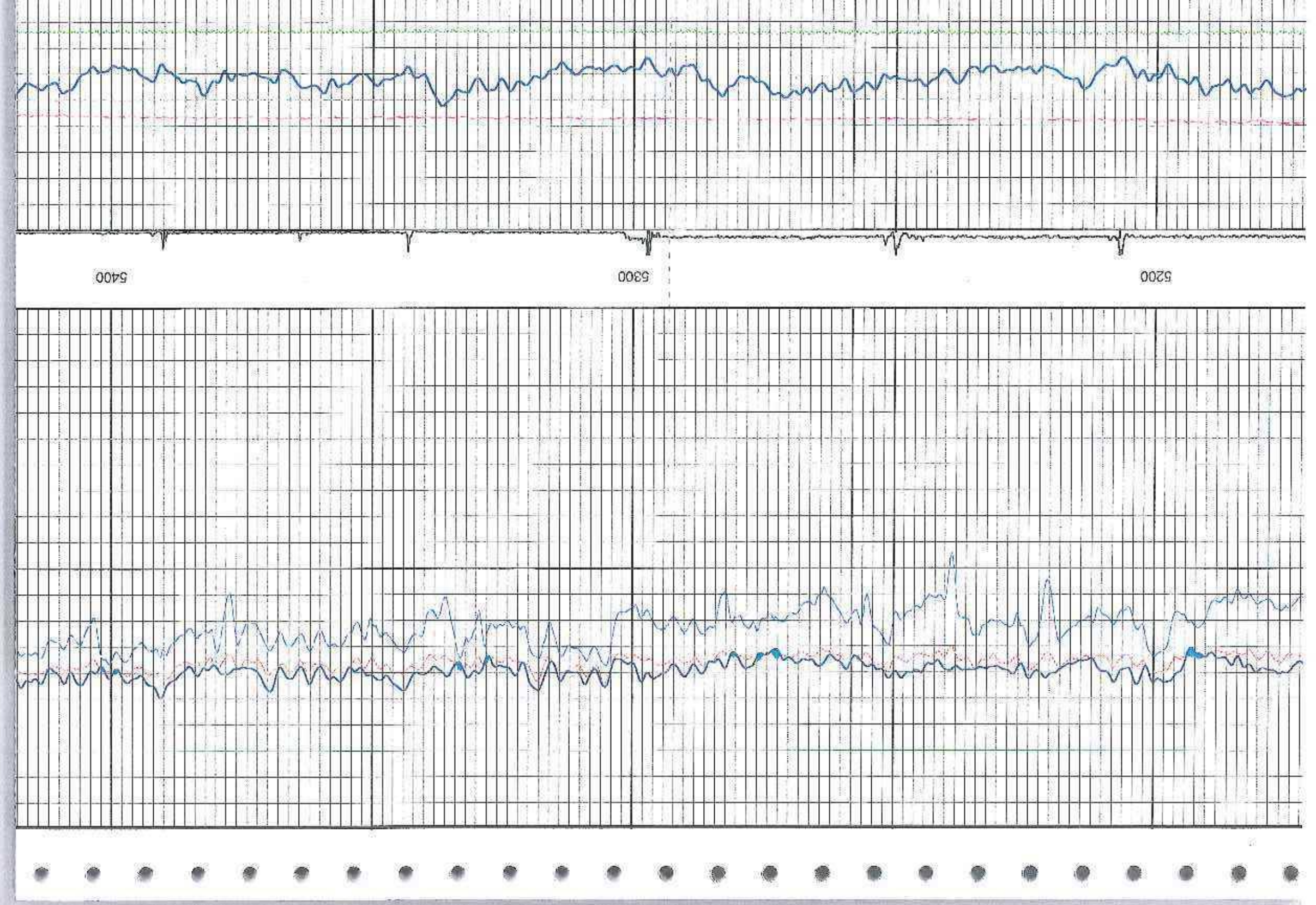
(for Acquired Curves)

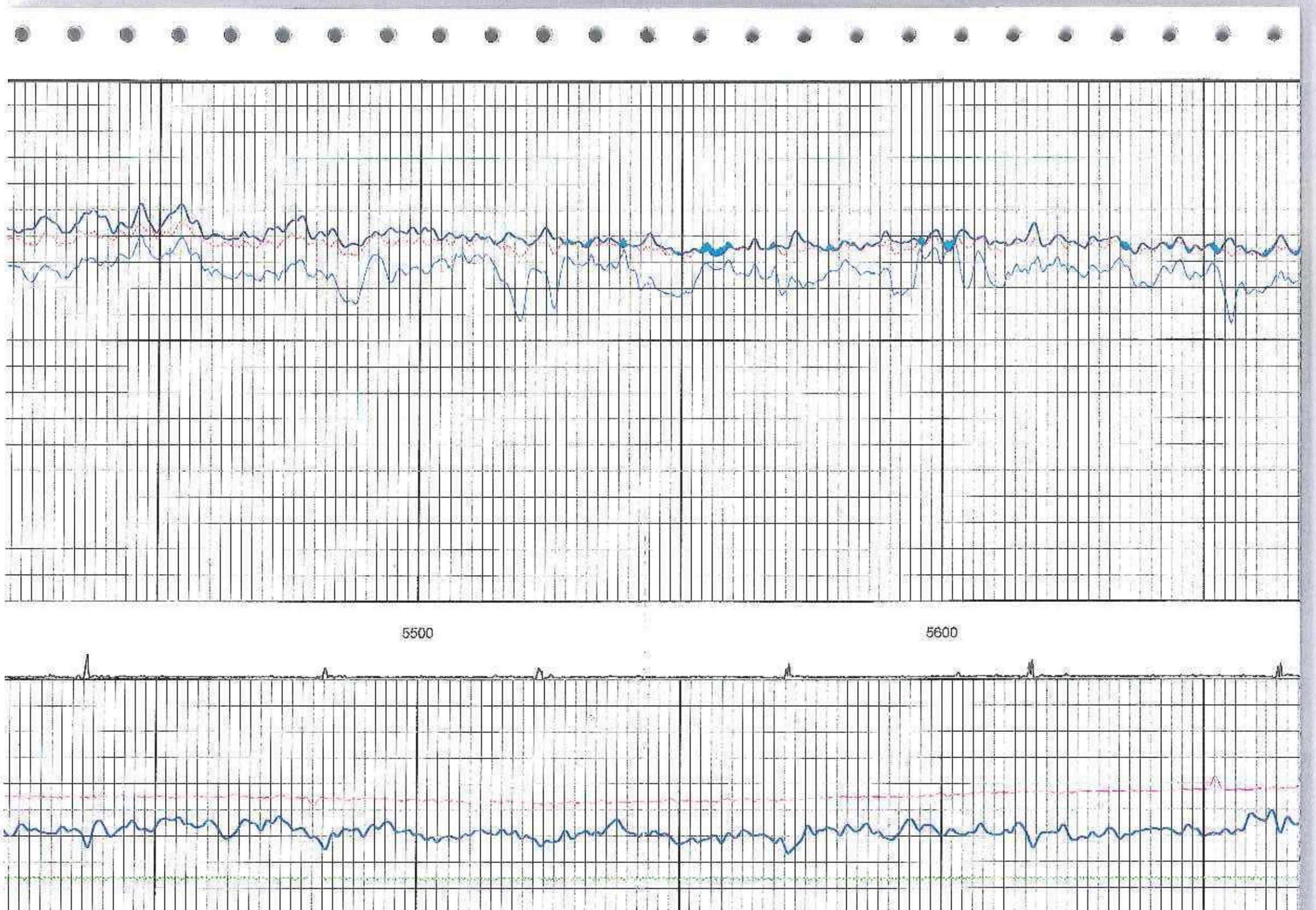
SERIES	DEPTH OFFSET	ACQUIRED CURVES					
2346XA	-46.300	CCL					
1309XA	-36.750	GR					
2435XA	-30.250	LSN					
2435XA	-29.750	NEU	SSN				
1424PA	-11.000	ATC1	ATC2	ATC3	ATC4	ATC5	ATC6
		ATAV	ATMN	ATMX	AMAV	DEV	DTMN
		DTMX	RB	XATT	YATT		
1424PA	0.000	CHV	CYC	SIG			

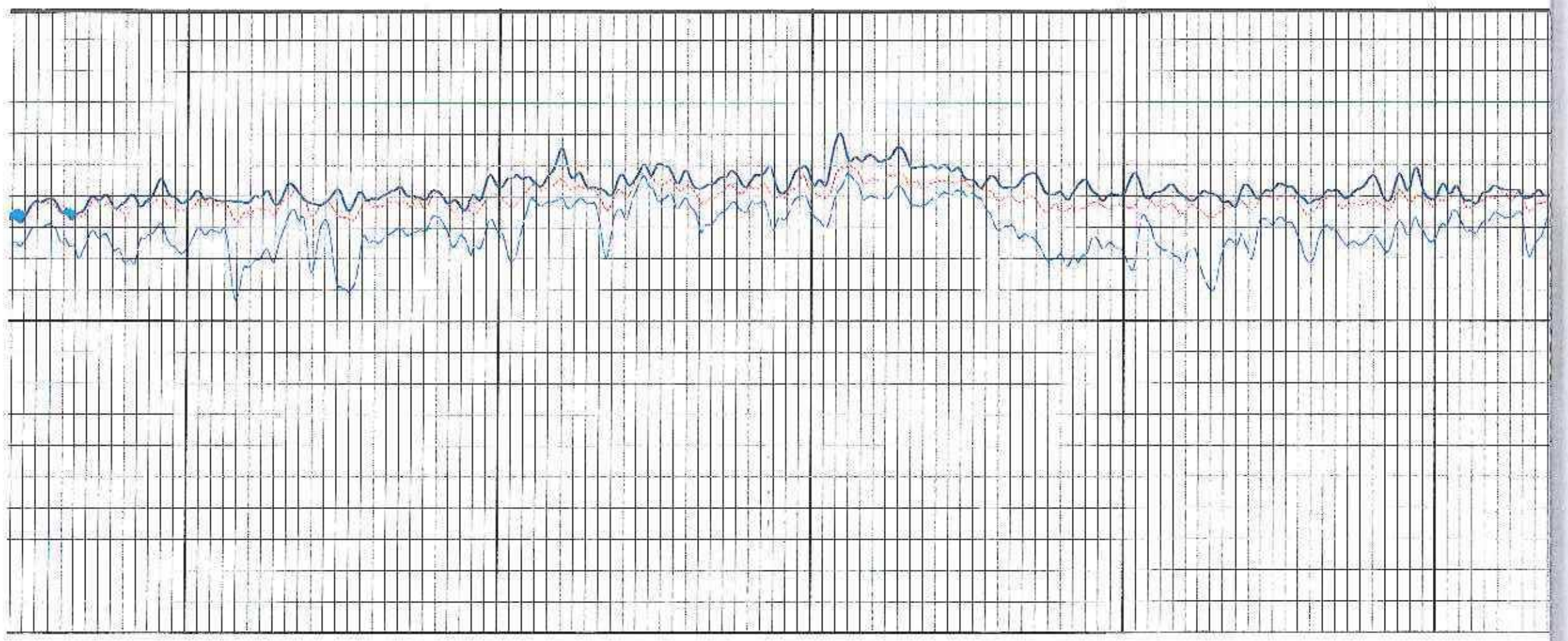
System : CASE Acquisition, v4.6.001
Program : LogpadA OCX, v5.0.080
Company Name : SOUTHERN CALIFORNIA GAS COMPANY
Well Name : FERNANDO FEE # 38C
File Name : C:\Welldata\WELLDATA\377534\Main.xtf
Mode : PlotMgr 5.0.080
Interval : 4800.00 - 7300.00 feet
Created : Wednesday, February 26, 2003 10:29:35

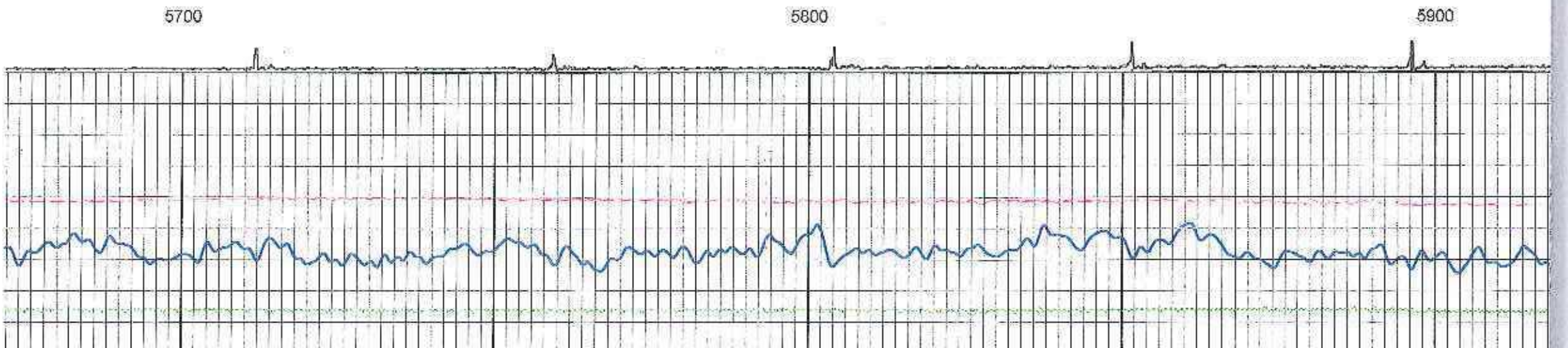


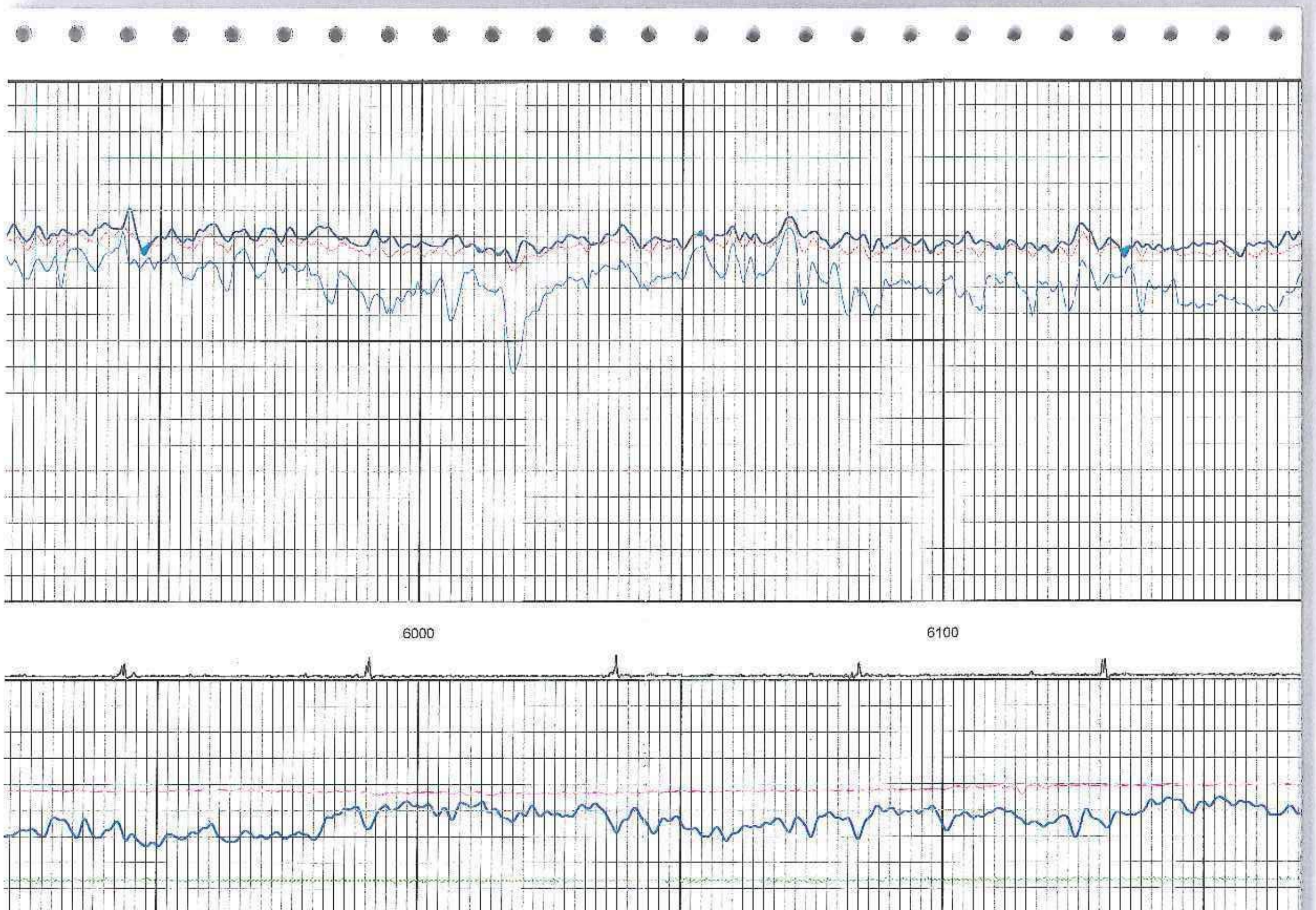

5000
5100

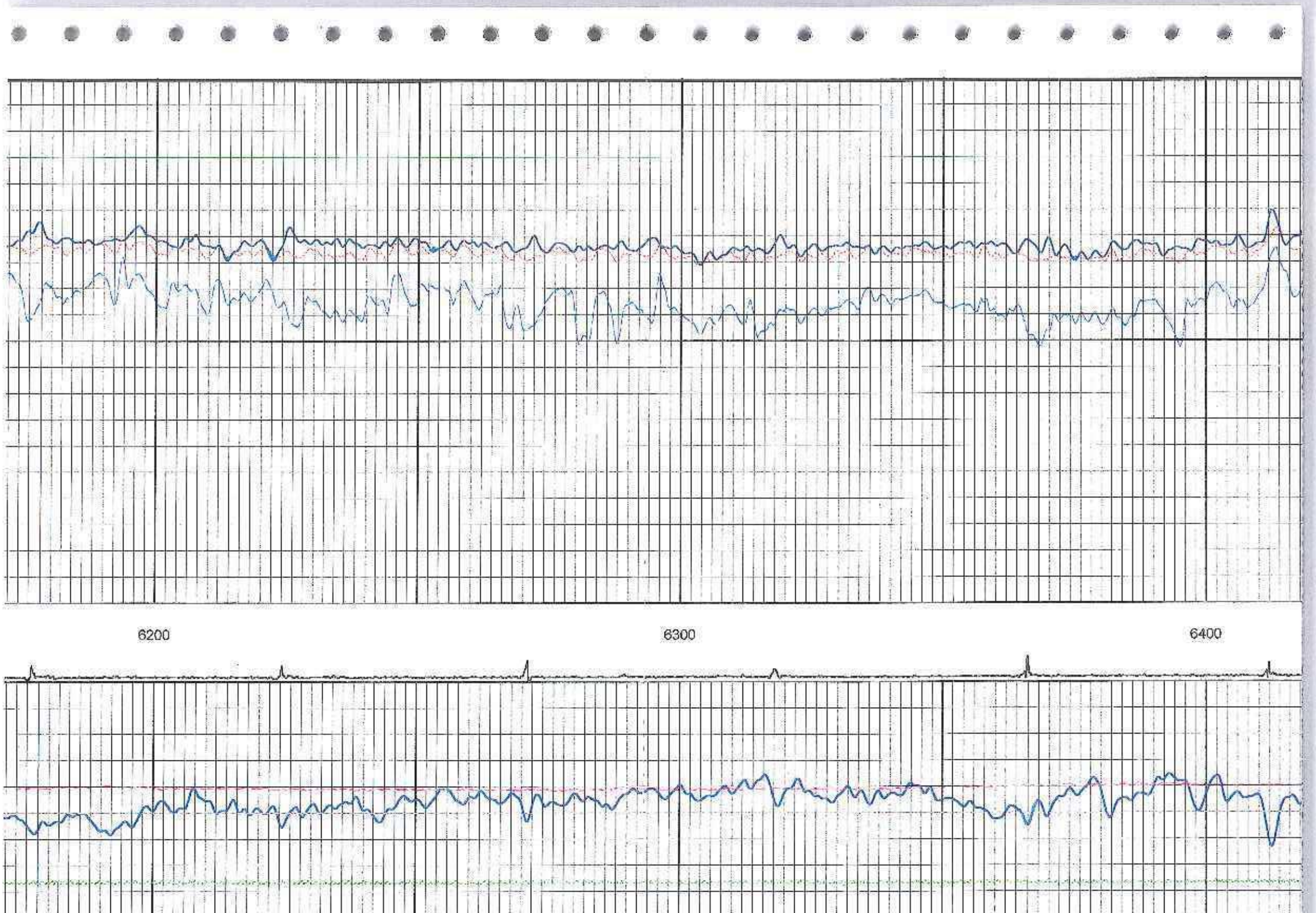

5400
5300
5200


5500
5600




5700
5800
5900

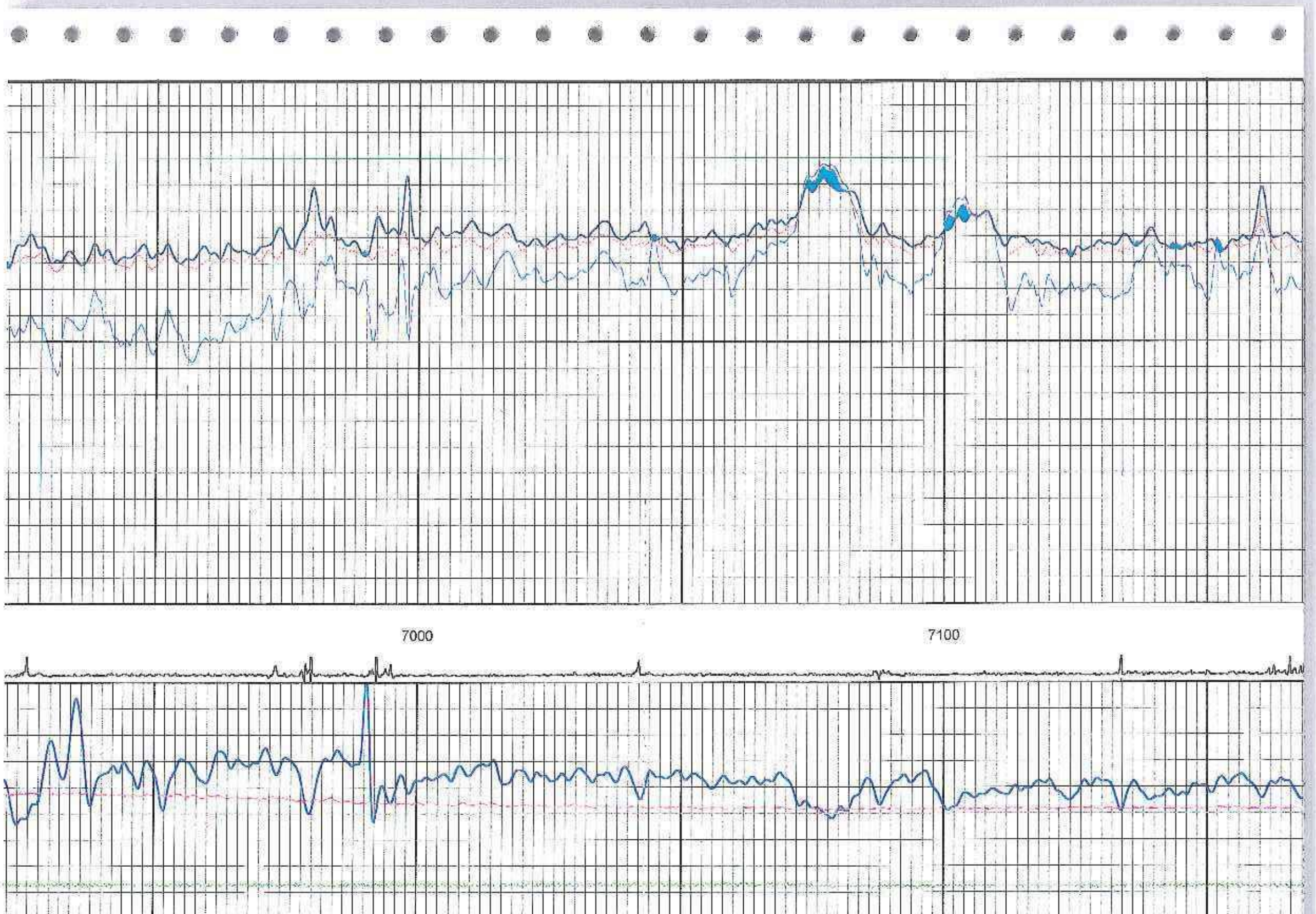

6000
6100

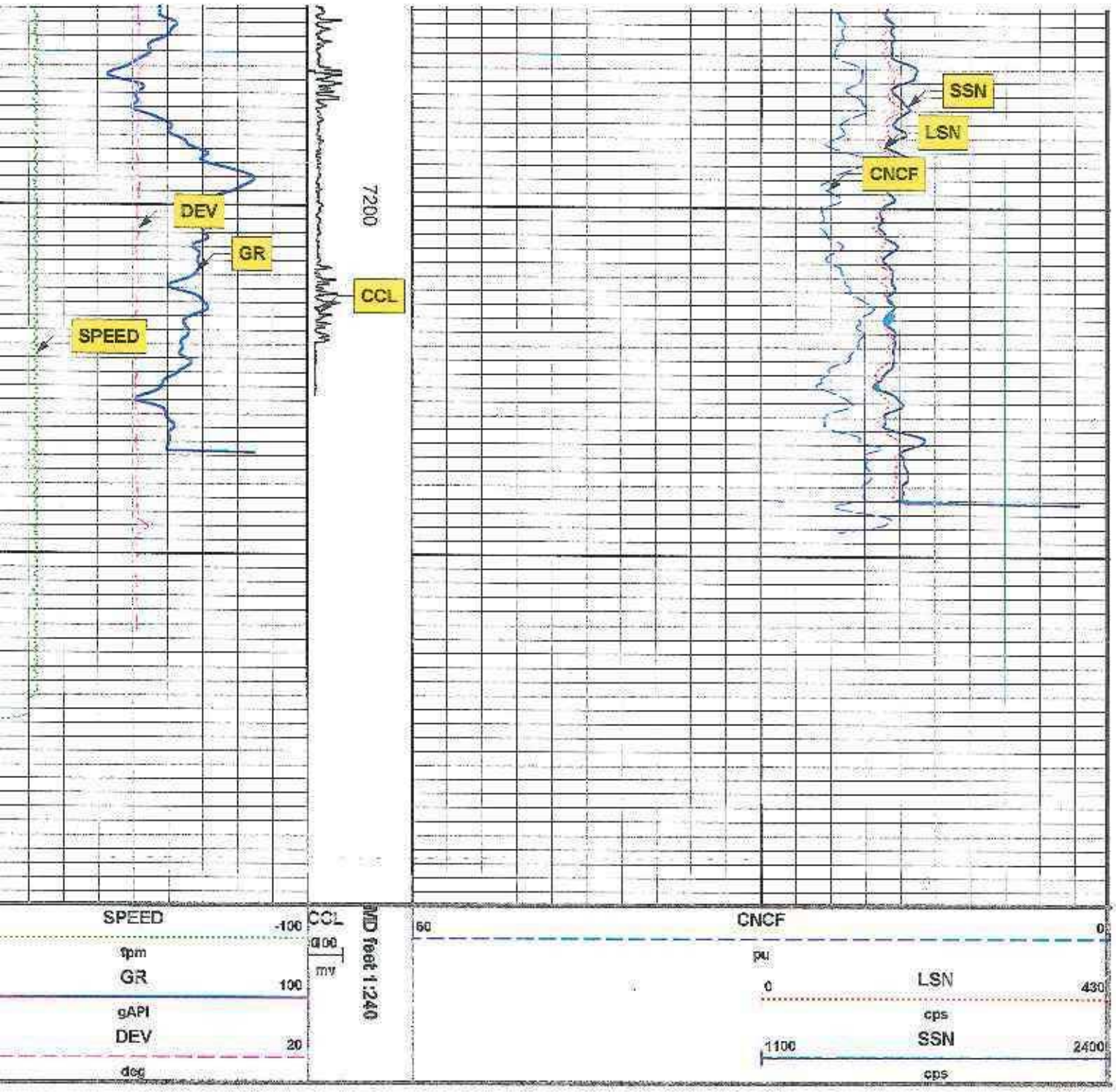

6200
6300
6400

6600

6600

6700 6800 6900


7000
7100



MAIN SECTION

SBT NORMALIZATION RESULTS

CURVE	PARAMETER	VALUE	UNITS	TOP	BOTTOM	COMMENT
ATC1	seg1 cnormf1	0.652	db/ft	4857.352	7286.566	
ATC2	seg2 cnormf2	-0.866	db/ft	4857.352	7286.566	
ATC3	seg3 cnormf3	0.045	db/ft	4857.352	7286.566	

ATC5	seq5 cnormf5	-0.235	db/ft	4857.352	7286.566	
ATC6	seq6 cnormf6	3.616	db/ft	4857.352	7286.566	
ATC1	seq1 cnormf1	0.183	db/ft	4857.352	7286.566	Good Confidence
ATC2	seq2 cnormf2	-3.985	db/ft	4857.352	7286.566	Good Confidence
ATC3	seq3 cnormf3	-0.034	db/ft	4857.352	7286.566	Good Confidence
ATC4	seq4 cnormf4	-0.249	db/ft	4857.352	7286.566	Good Confidence
ATC5	seq5 cnormf5	-0.037	db/ft	4857.352	7286.566	Good Confidence
ATC6	seq6 cnormf6	1.080	db/ft	4857.352	7286.566	Good Confidence

SBT PROCESSING

MEASUREMENT TYPE	PARAMETER	VALUE	UNITS	TOP	BOTTOM
amp	fpamp	57.415	mv	4857.352	7287.000
amp	fpatin	2.560	dB/ft	4857.352	7287.000
atc	dbspread	4.262	dB/ft	4857.352	7287.000
atc	spacing	0.704	feet	4857.352	7287.000
cemr	casing od	9.625	inches	4857.352	7287.000
cemr	casing wt	47.000	lbm/ft	4857.352	7287.000
cemr	compress	2000.000	psi	4857.352	7287.000
CN	Bit Size	12.250	inches	4857.352	7286.566
CN	Casing Thickness	0.474	inches	4857.352	7287.000
CN	Casing/Cement Correction	Yes		4857.352	7286.566
CN	CN Chism	Yes		4857.352	7286.566
CN	Matrix	Sandstone		4857.352	7286.566
CN	Salinity	0.000	ppm	4857.352	7286.566

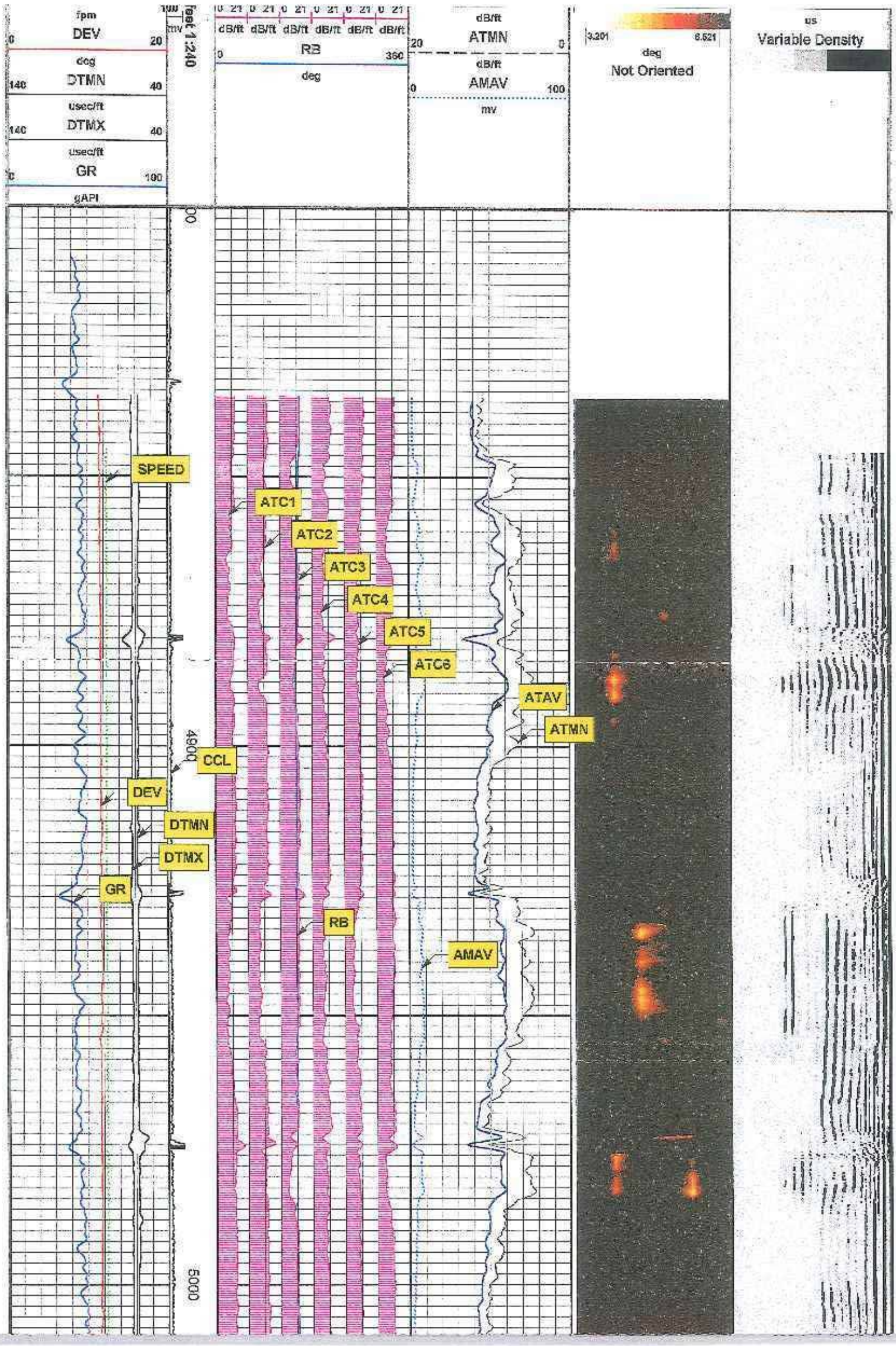
DEPTH OFFSETS

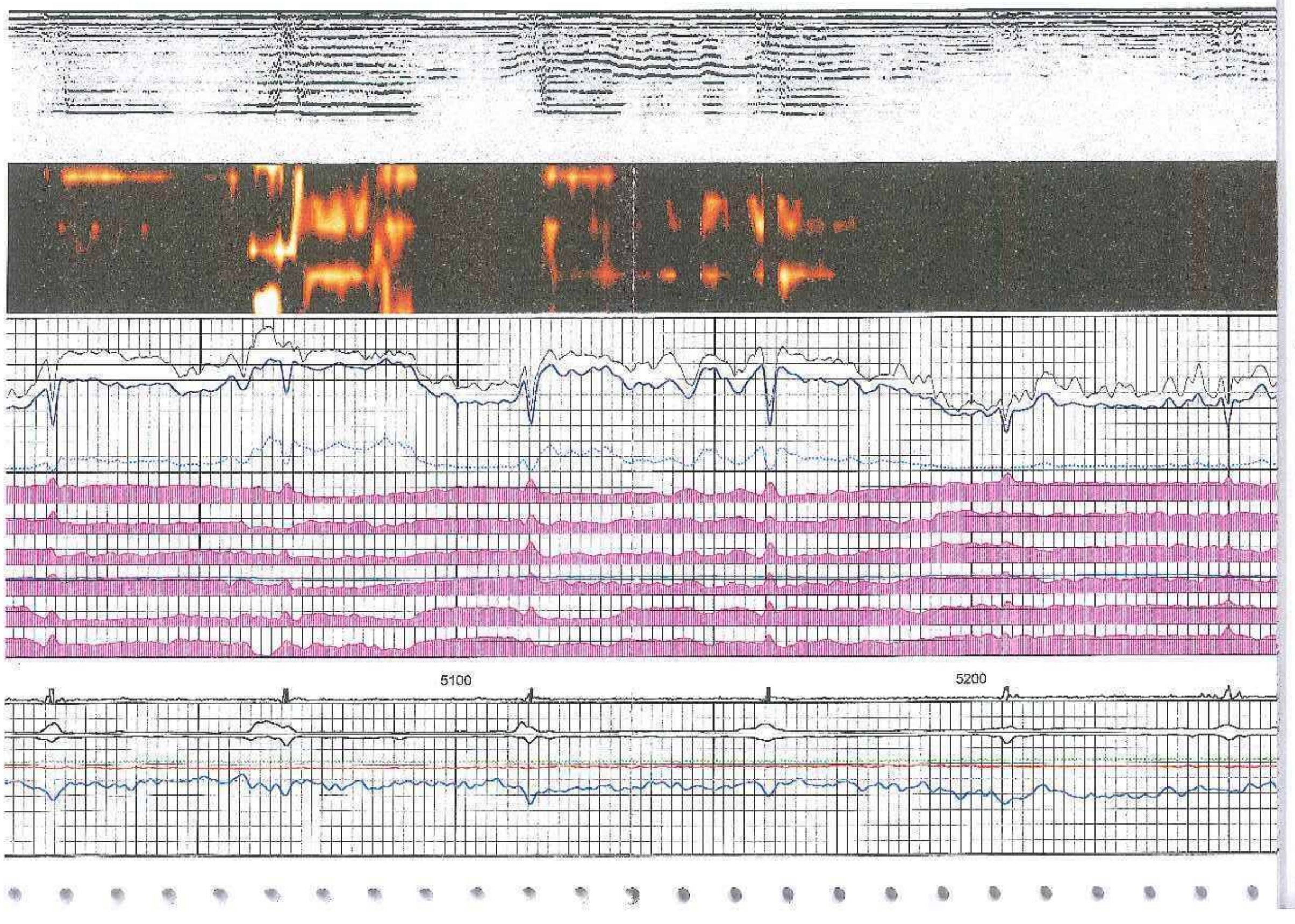
(for Acquired Curves)

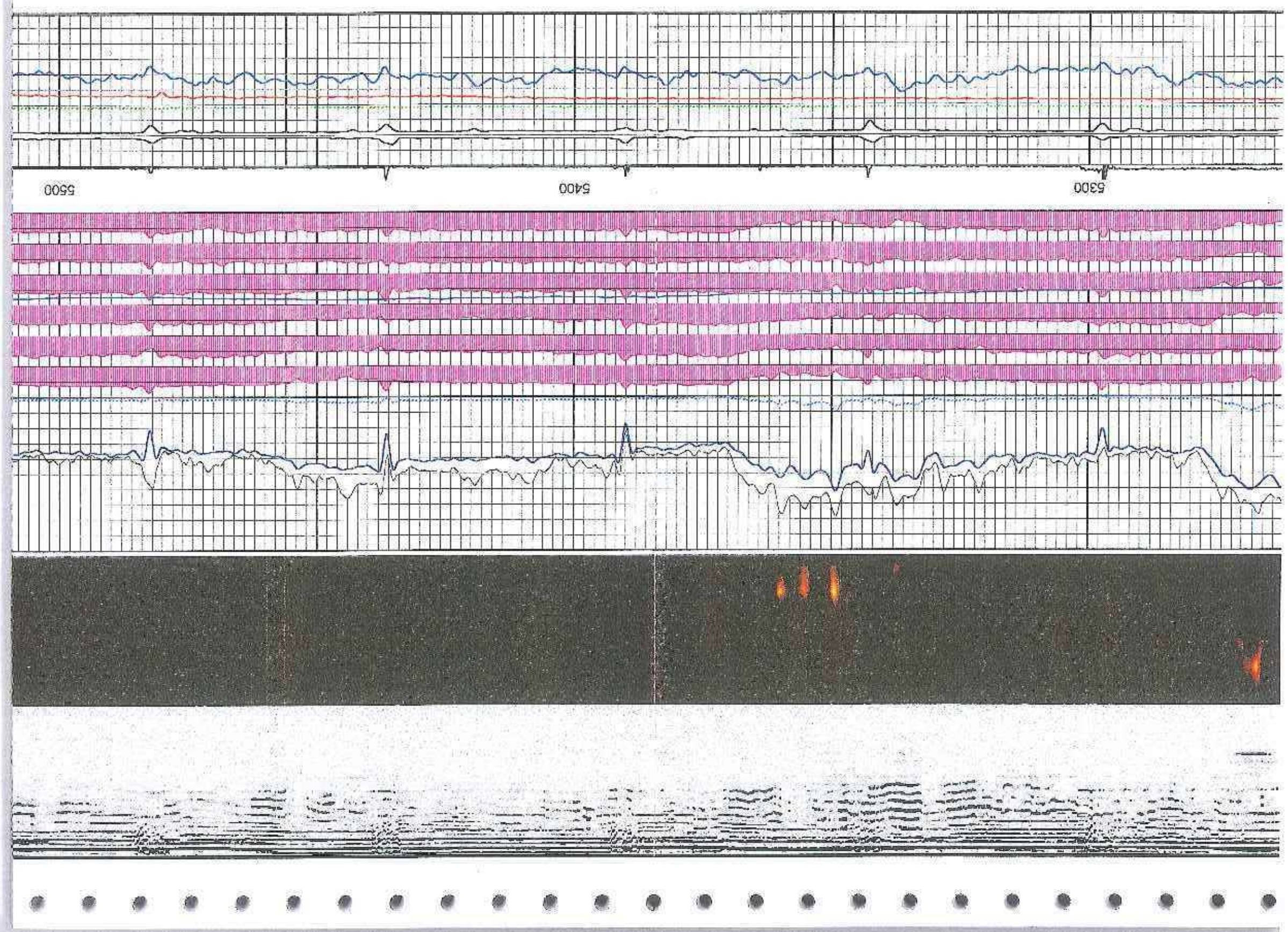
SERIES	DEPTH OFFSET	ACQUIRED CURVES					
2346XA	-46.500	CCL					
1309XA	-36.750	GR					
2435XA	-30.250	LSN					
2435XA	-29.750	SBC	SSN				
1424PA	-11.000	ATC1	ATC2	ATC3	ATC4	ATC5	ATC6
		ATAV	ATMN	ATMX	AMAV	DEV	DTMN
		DTMX	RB	XATT	YATT		
1424PA	0.000	CEV	CVQ	SIG			

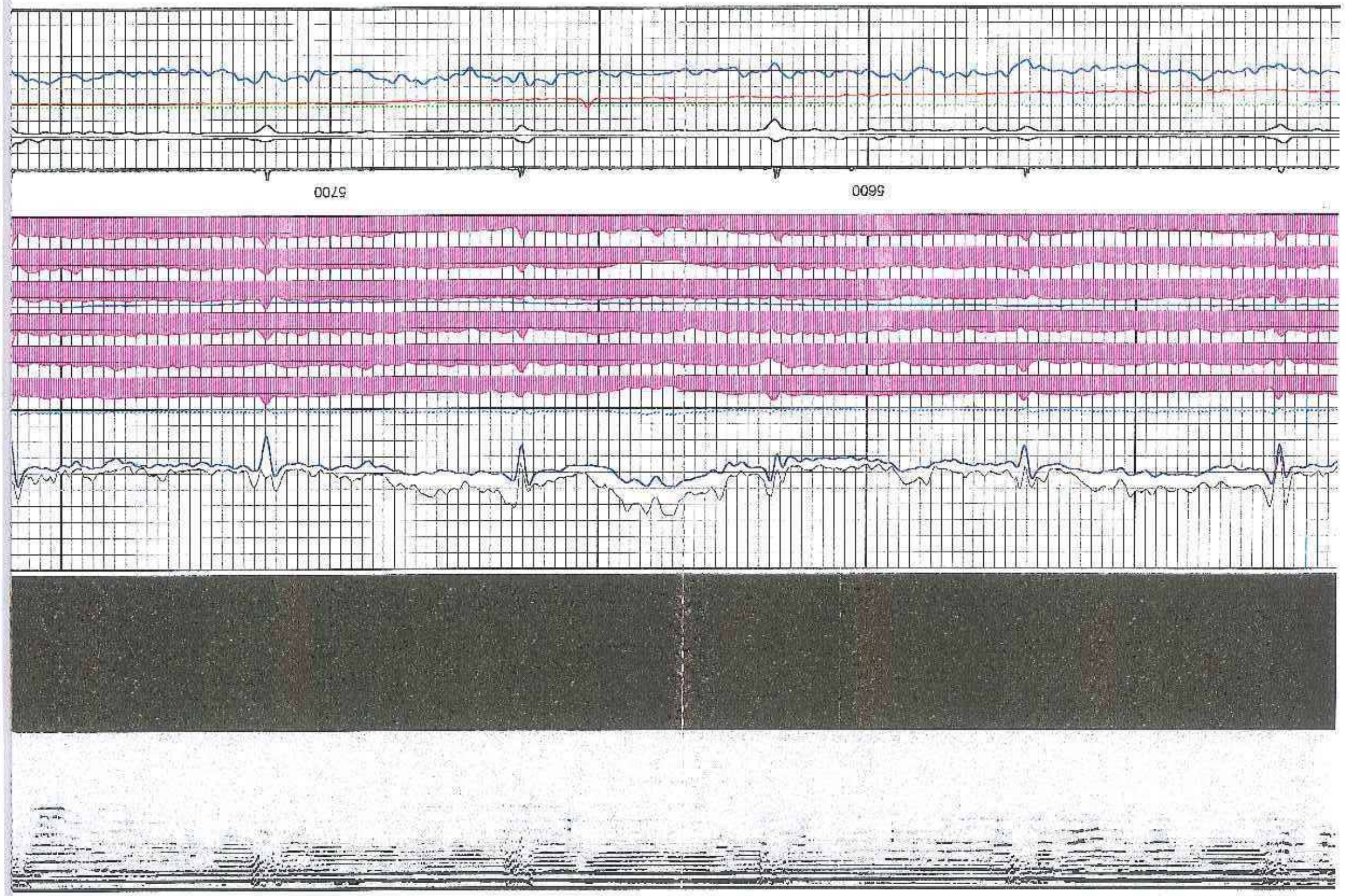
System	: CASE Acquisition, v4.6.001
Program	: LogpadA OCX, v5.0.080
Company Name	: SOUTHERN CALIFORNIA GAS COMPANY
Well Name	: FERNANDO FEE # 38C
File Name	: C:\Welldata\WELLDATA\377534\Main.xtf
Mode	: PlotMgr 5.0.080
Interval	: 4800.00 - 7300.00 feet
Created	: Wednesday, February 26, 2003 10:29:35

SPEED	DCIR	ATCMTCMTCCMTCRIOD	ATAV	CommentMne	VariableDescr

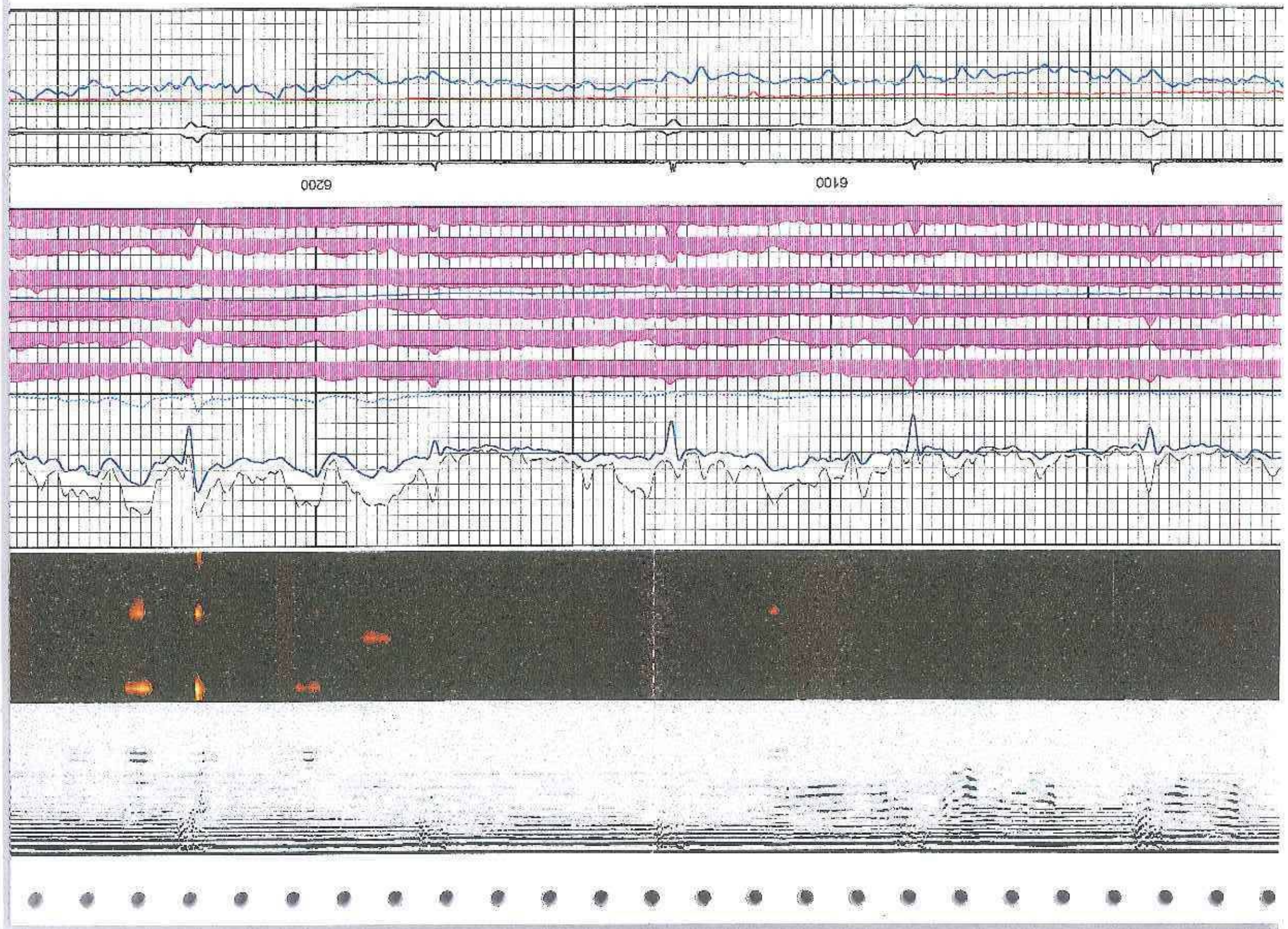

fpm
DEV
deg
DTMN
usec/ft
DTMX
usec/ft
GR
gAPI
feet 1:240
dB/ft
RB
deg
dB/ft
ATMN
dB/ft
AMAV
mv
3.201
6.521
deg
Not Oriented
us
Variable Density
SPEED
ATC1
ATC2
ATC3
ATC4
ATC5
ATC6
ATAV
ATMN
CCL
DEV
DTMN
DTMX
GR
RB
AMAV
4900
5000

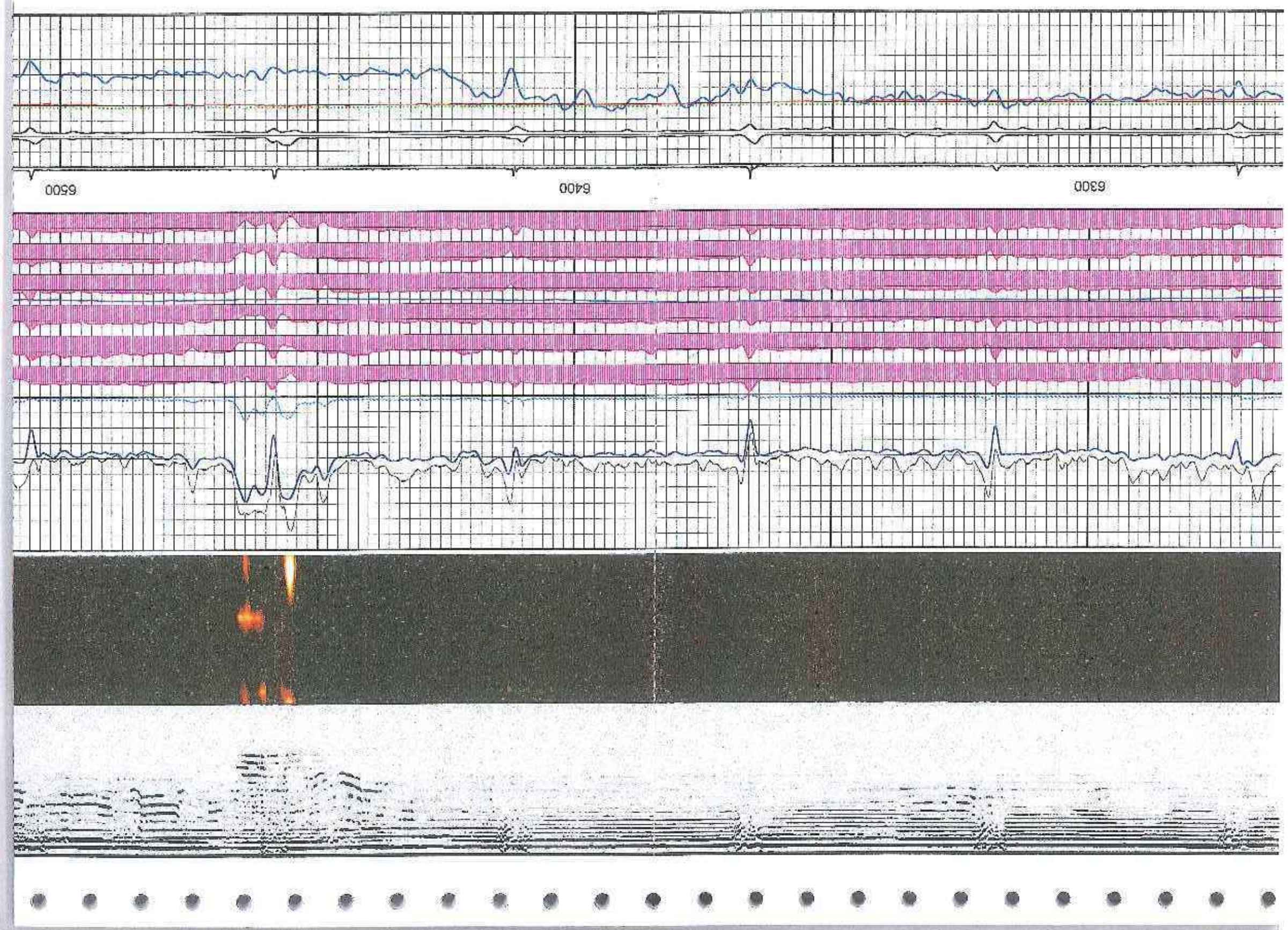

5100
5200

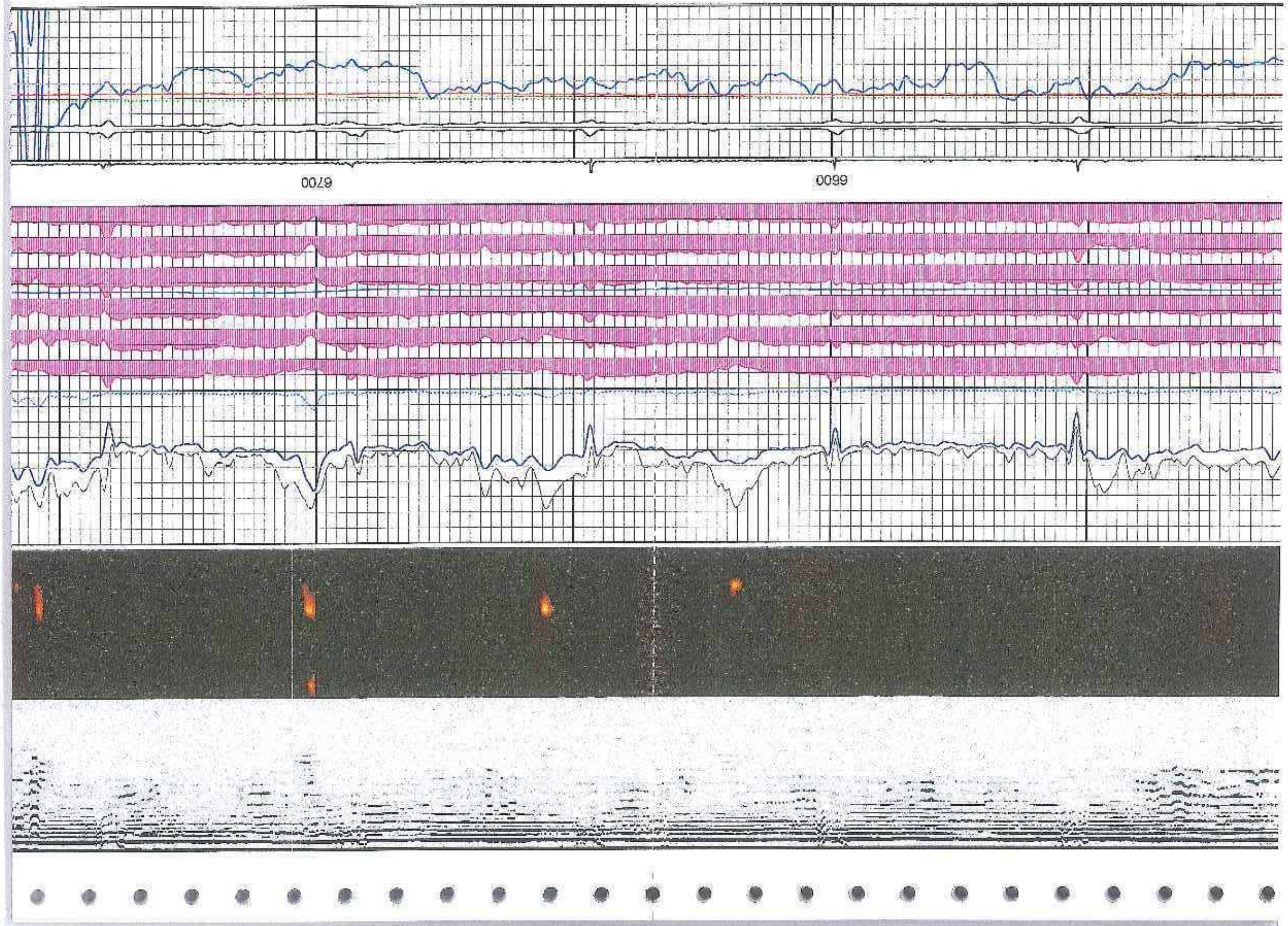

5500
5400
5300

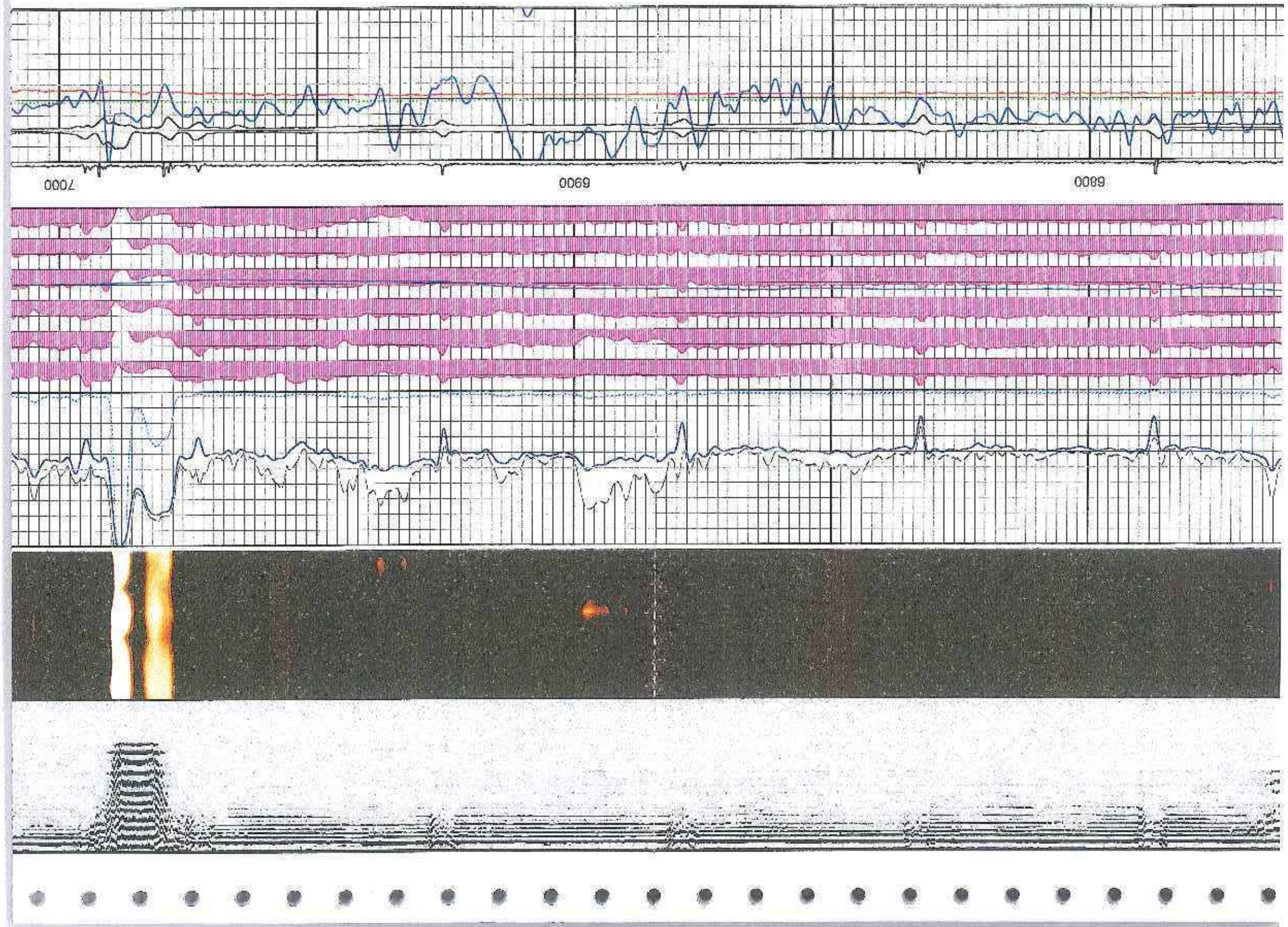

5700
5600

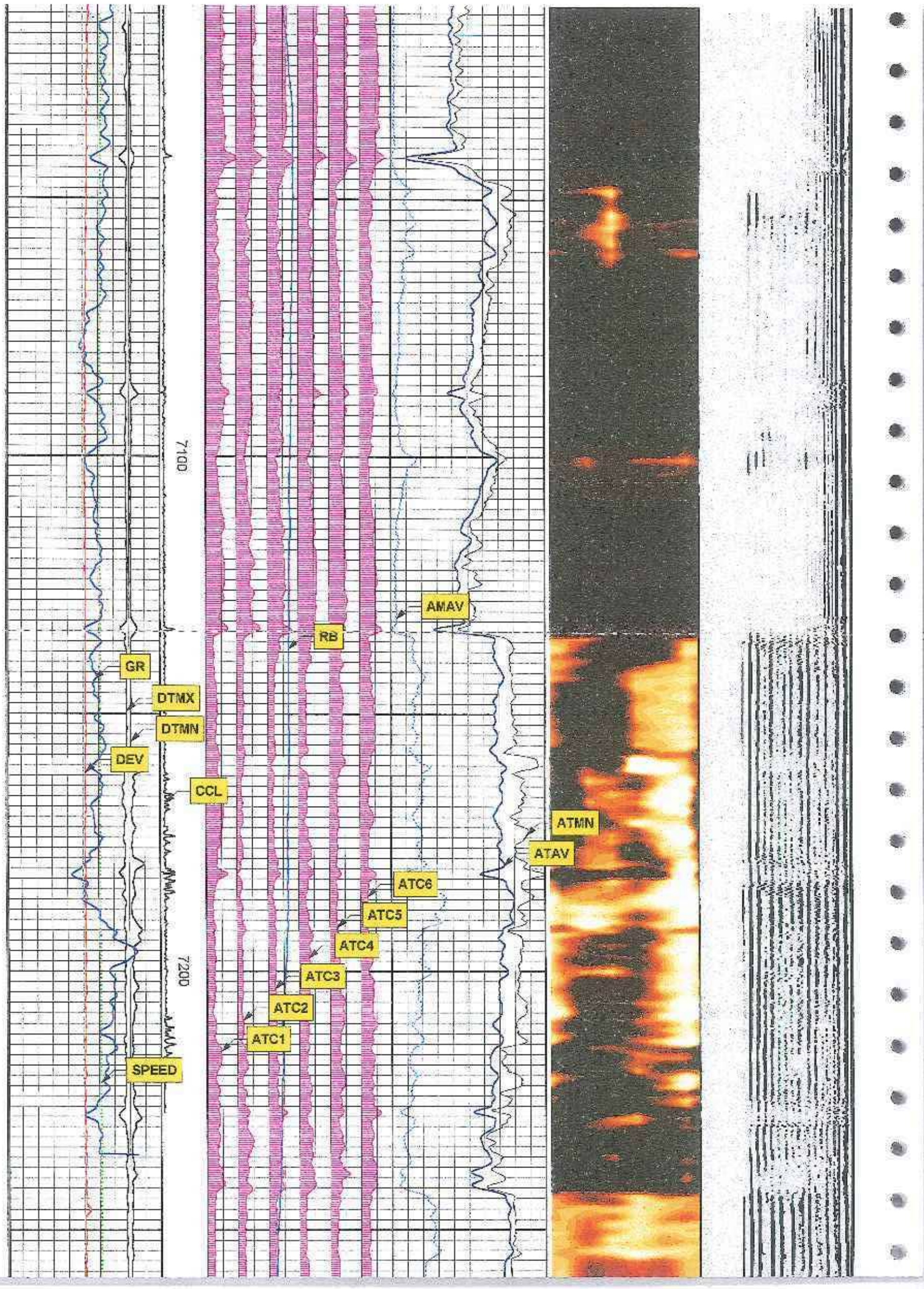
6000
5900
5800

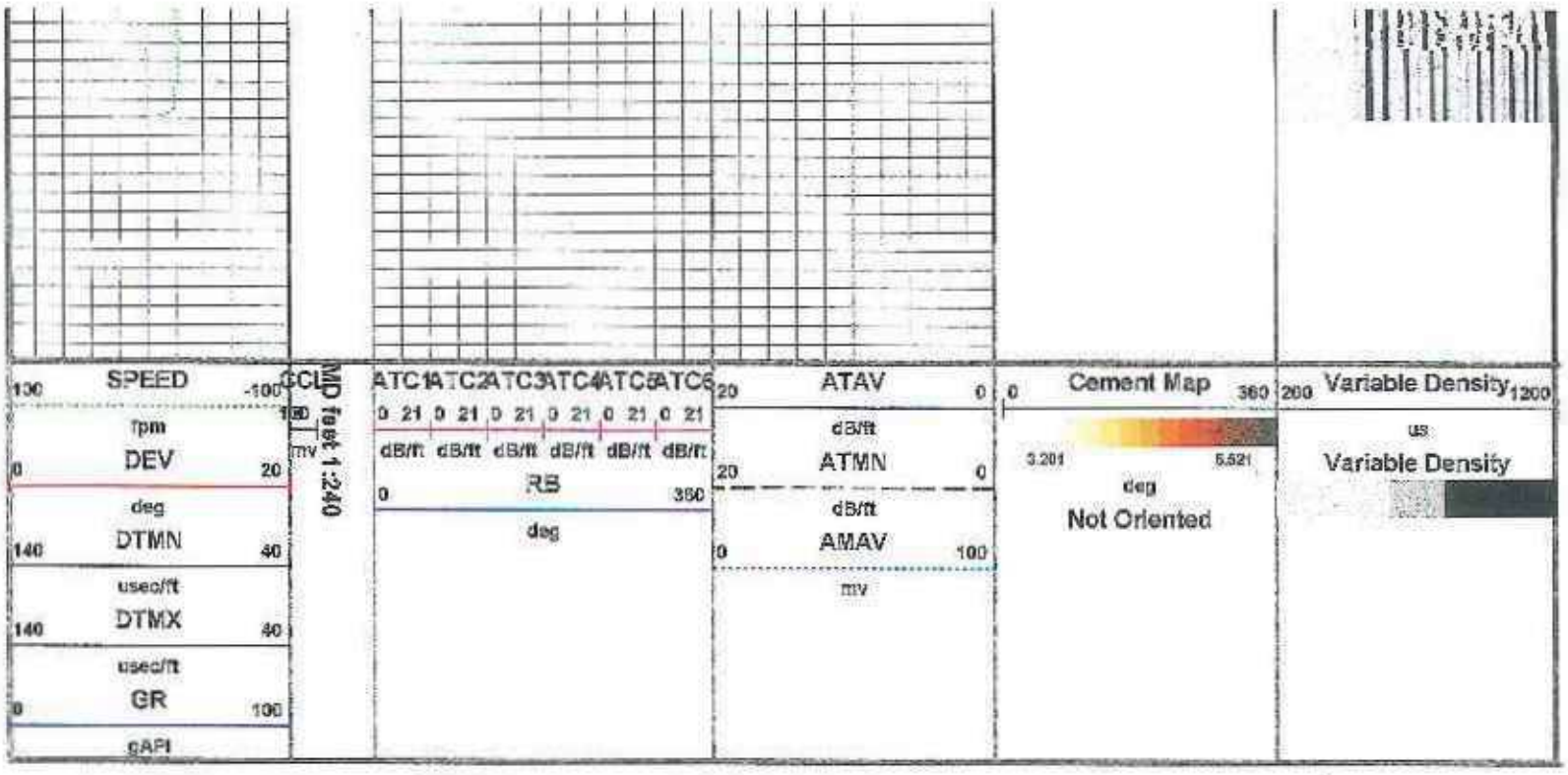

6200
6100


6500
6400
6300


6700
6600


7000
6900
6800


7100
7200
GR
DTMX
DTMN
DEV
CCL
SPEED
RB
AMAV
ATMN
ATAV
ATC6
ATC5
ATC4
ATC3
ATC2
ATC1



REPEAT SECTION

SBT NORMALIZATION RESULTS

CURVE	PARAMETER	VALUE	UNITS	TOP	BOTTOM	COMMENT
ATC1	seg1 cnormf1	0.652	db/ft	6899.901	7282.715	
ATC2	seg2 cnormf2	-0.866	db/ft	6899.901	7282.715	
ATC3	seg3 cnormf3	0.045	db/ft	6899.901	7282.715	
ATC4	seg4 cnormf4	-0.213	db/ft	6899.901	7282.715	
ATC5	seg5 cnormf5	-0.235	db/ft	6899.901	7282.715	
ATC6	seg6 cnormf6	0.616	db/ft	6899.901	7282.715	
ATC1	seg1 dnormf1	0.071	db/ft	6899.901	7282.715	Good Confidence
ATC2	seg2 dnormf2	-0.162	db/ft	6899.901	7282.715	Good Confidence
ATC3	seg3 dnormf3	-0.045	db/ft	6899.901	7282.715	Good Confidence
ATC4	seg4 dnormf4	-0.466	db/ft	6899.901	7282.715	Good Confidence
ATC5	seg5 dnormf5	-0.057	db/ft	6899.901	7282.715	Good Confidence
ATC6	seg6 dnormf6	0.662	db/ft	6899.901	7282.715	Good Confidence

SBT PROCESSING

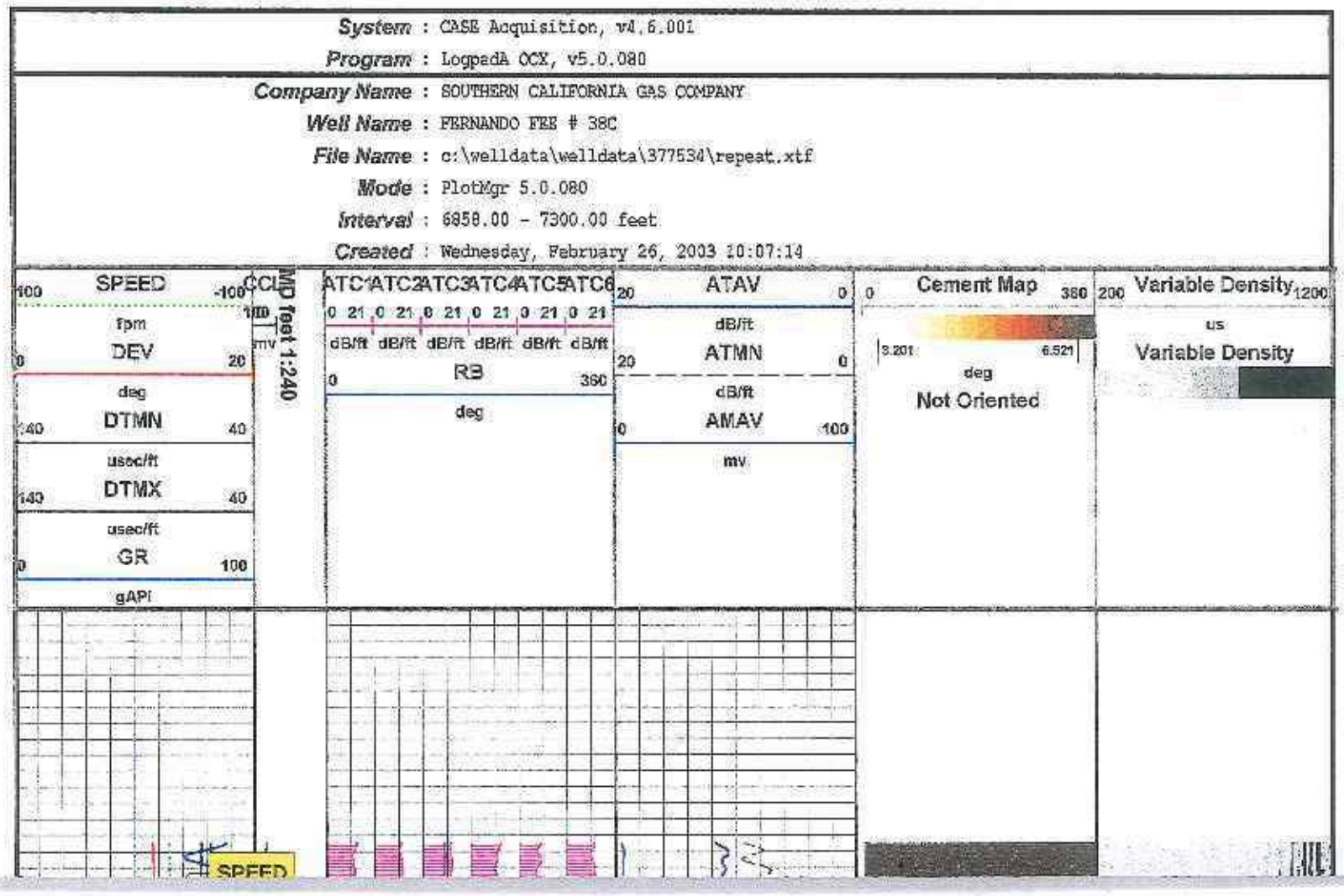
amp	fpamp	57.415	mv	6899.901	7283.000	
amp	fpattn	2.580	dB/ft	6899.901	7283.000	
atc	dbspread	4.262	dB/Ft	6899.901	7283.000	
atc	spacing	3.704	feet	6899.901	7283.000	
cemr	casing od	9.625	inches	6899.901	7283.000	
cemr	casing wt	47.000	lbm/ft	6899.901	7283.000	
cemr	compress	1000.000	psi	6899.901	7283.000	
CN	Bit Size	12.250	inches	6899.901	7282.715	
CN	Casing Thickness	0.474	inches	6899.901	7283.000	
CN	Casing/Cement Correction	Yes		6899.901	7282.715	
CN	CN Chism	Yes		6899.901	7282.715	
CN	Matrix	Sandstone		6899.901	7282.715	
CN	Salinity	0.000	ppm	6899.901	7282.715	

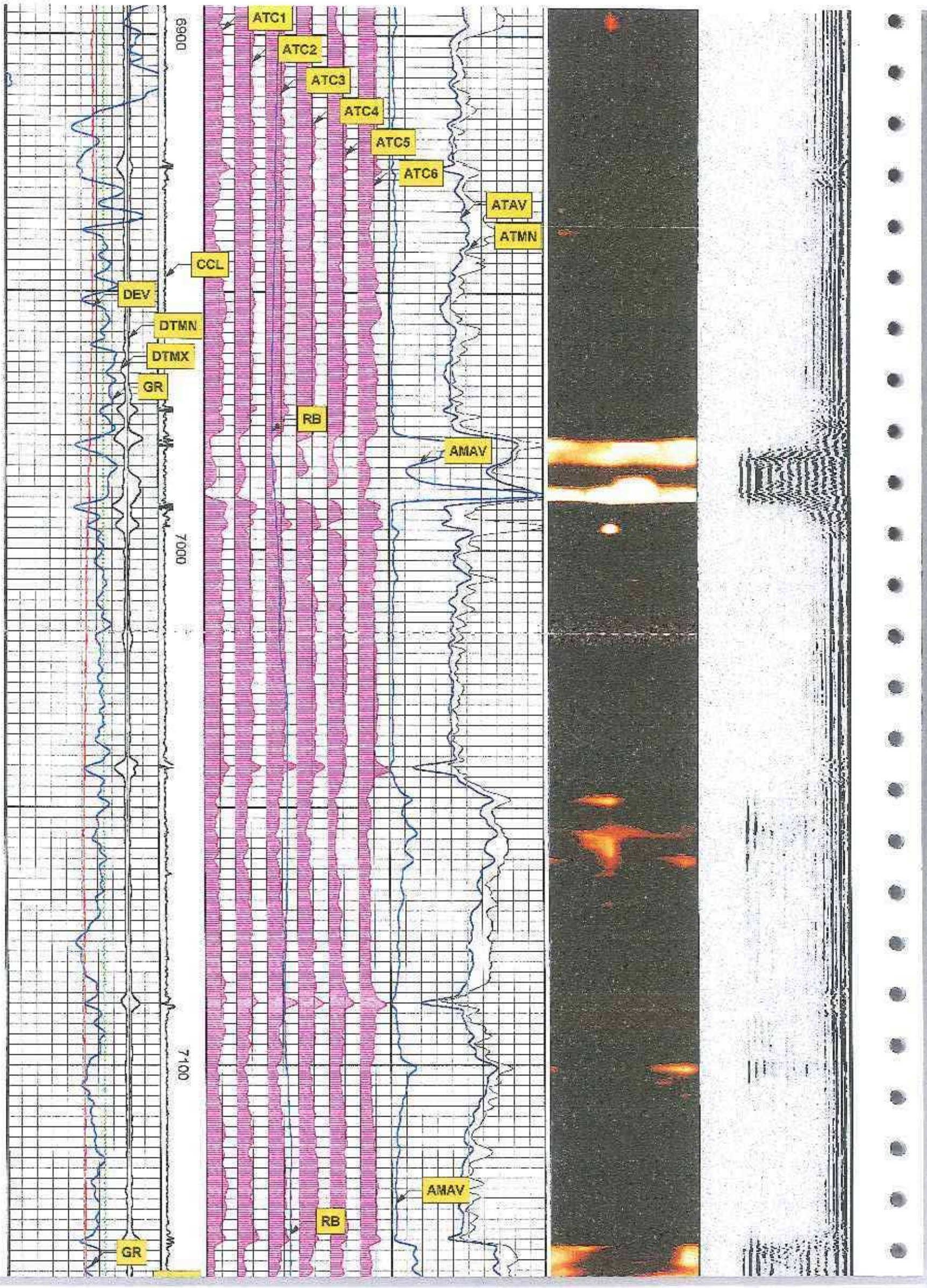
DEPTH OFFSETS

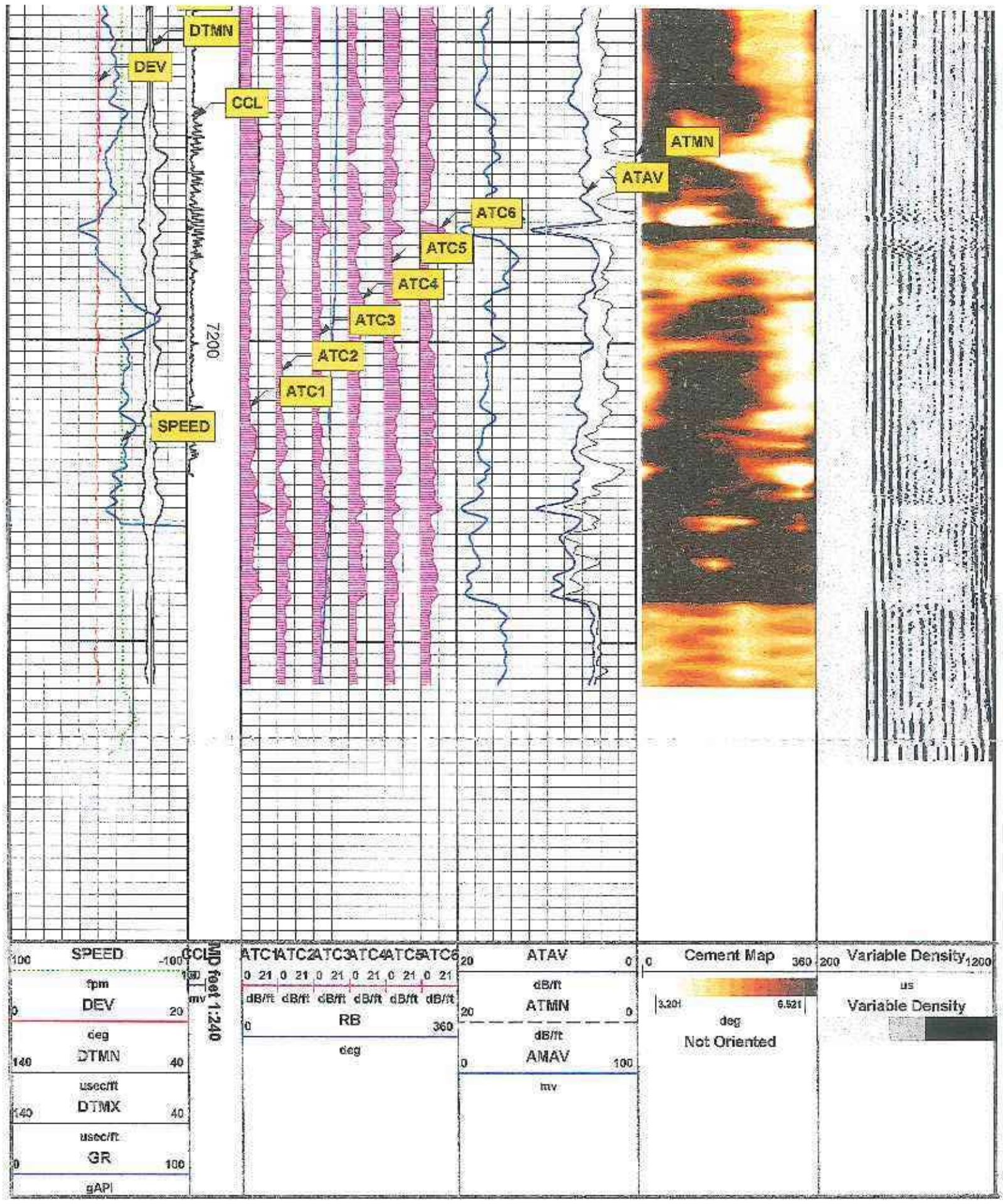
(for Acquired Curves)

SERIES	DEPTH OFFSET	ACQUIRED CURVES					
2346XA	-46.500	CCL					
1309XA	-36.750	GR					
2435XA	-30.250	LSN					
2435XA	-29.750	NEU	SSN				
1424PA	-11.000	ATC1	ATC2	ATC3	ATC4	ATC5	ATC6
		ATAV	ATMN	ATMX	AMAV	DEV	DTMN
		DTMX	RB	XATT	YATT		
1424PA	0.000	CHV	CYC	SIG			

System : CASE Acquisition, v4.6.001
Program : LogpadA OCX, v5.0.080
Company Name : SOUTHERN CALIFORNIA GAS COMPANY
Well Name : FERNANDO FEE # 38C
File Name : c:\welldata\welldata\377534\repeat.xtf
Mode : PlotMgr 5.0.080
Interval : 6858.00 - 7300.00 feet
Created : Wednesday, February 26, 2003 10:07:14



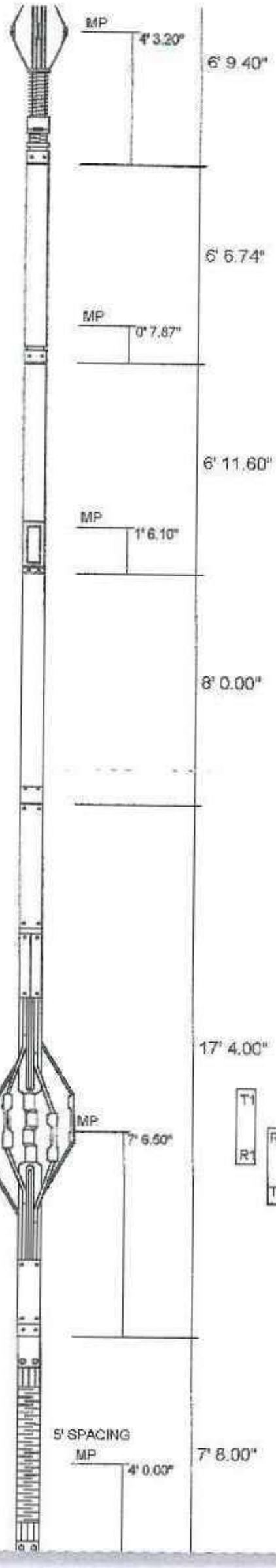

6900
7000
7100
ATC1
ATC2
ATC3
ATC4
ATC5
ATC6
ATAV
ATMN
CCL
DEV
DTMN
DTMX
GR
RB
AMAV
GR
RB
AMAV



TOOL DIAGRAM

TOTAL LENGTH 53' 3.74"
TOOL STRING MAX. O.D. 3.66 in

2346XA
(o. d. 3.36 in)
CCL 46° 9.54"

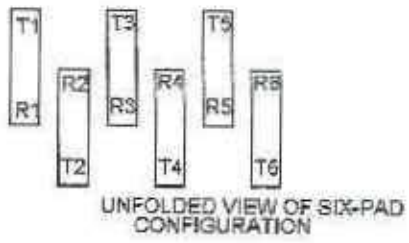


1309XA
(o. d. 3.66 in)
GR 36° 7.47"

2435XA
(o. d. 3.63 in)
CN 30° 6.10"

1633EA
(o. d. 3.38 in)

1424XA
(o. d. 3.38 in)
ATAV,ATMN 11° 2.50"



UNFOLDED VIEW OF SIX-PAD CONFIGURATION

1424PA
(o. d. 3.38 in)
VDL 0° 0.00"

CALIBRATION/VERIFICATIONS

GAMMA RAY

Calibration File: C:\CASE\CALVER\GR\52632LW.cal

CALIBRATION SUMMARY

DATE/TIME PERFORMED: Tue Jan 14 11:29:47 2003 TOOL SERIES: 1309 ASSET: 52632 SEQ: LW

Calibrator #	Background [cps]	Calibrator On [cps]	Multiplicative	Background [api]	Calibrator On [api]	Differential [api]
S2K DA402	93.22	298.44	0.731	68.14	218.14	150.00

Verification File: C:\CASE\CALVER\GR\52632LW.ver

PRIMARY VERIFICATION

DATE/TIME PERFORMED: Tue Jan 14 11:34:22 2003 TOOL SERIES: 1309 ASSET: 52632 SEQ: LW

Calibrator #	Background [cps]	Calibrator On [cps]	Multiplicative	Background [api]	Calibrator On [api]	Differential [api]
S2K DA402	93.24	296.89	0.731	68.16	217.00	148.85

RB

Calibration File: C:\CASE\CALVER\RB\061280LW.cal

CALIBRATION SUMMARY

DATE/TIME PERFORMED: Sun Feb 02 08:39:18 2003 TOOL SERIES: 1424XA ASSET: 061280 SEQ: LW

	X-Att [raw]	Y-Att [raw]	RB [deg]	X-Max [deg]	Y-Max [deg]	OFFSET [deg]
PAD 2	-394.20	217.80	359.97			
PAD 3	-79.10	375.90	90.00	-417.08	382.85	19.07

Verification File: C:\CASE\CALVER\RB\061280LW.ver

PRIMARY VERIFICATION

DATE/TIME PERFORMED: Sun Feb 02 08:42:15 2003 TOOL SERIES: 1424XA ASSET: 061280 SEQ: LW

	Pad 1	Pad 2	Pad 3	Pad 4	Pad 5	Pad 6
RB [deg]	301.84	358.16	59.49	118.37	183.34	241.24

COMPENSATED NEUTRON

Calibration File: C:\CAS~1\CALVER\CA\7355332.cal

CALIBRATION SUMMARY

DATE/TIME PERFORMED: Sun May 14 15:16:48 2000 **TOOL SERIES:** 2435XA **ASSET:** 73553 **SEQ:** 02

Calibrator #	Source #	LSN [cps]	SSN [cps]	SSN/LSN	MCF	CN Ratio	CN [gu]
2437XB 120052	SR720 40672	144.35	1923.63	13.33	1.01	13.52	72.89

PAD

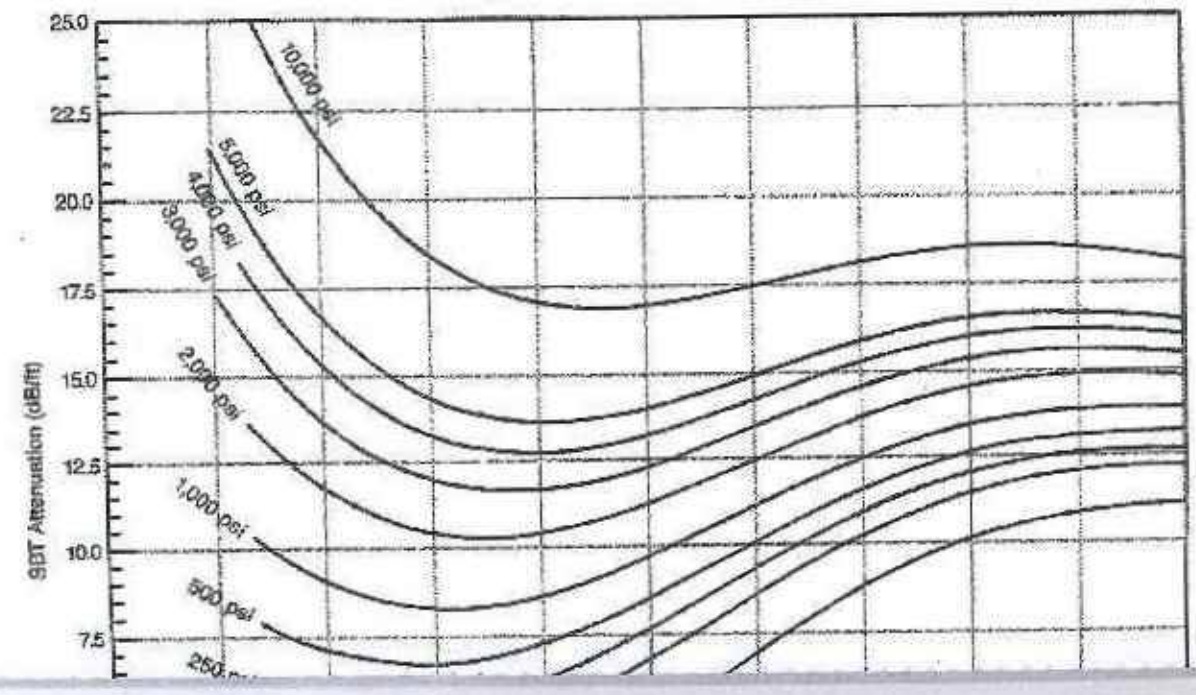
Verification File: C:\CASE\CALVER\PAD\OLDLW.VX

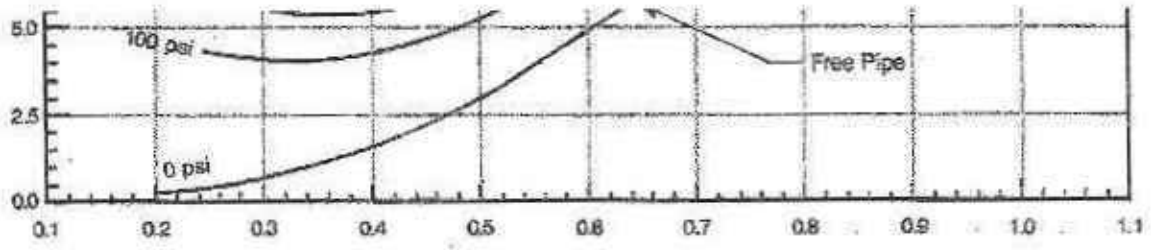
DATE/TIME PERFORMED: Thu Nov 07 14:32:14 2002 **TOOL SERIES:** 1424XA **ASSET:** OLD **SEQ:** LW

	Pad 1	Pad 2	Pad 3	Pad 4	Pad 5	Pad 6
Noise Level	2.40	2.35	2.05	2.10	1.95	2.90
PAD Sensitivity	181.80	251.75	381.30	315.60	219.70	106.30

INTERPRETATION

Cement Compressive Strength from Segmented Bond Tool Log





This chart is intended to provide an estimate of the compressive strength of bonded cement using the attenuation readings from the Segmented Bond Tool (SBT™) log.

Enter the chart on the left with the attenuation in dB/ft, while at the same time entering the casing wall thickness (in.) from the bottom of the chart. The point at which the two lines intersect is the estimated compressive strength (psi) of the bonded cement.

BAKER HUGHES Baker Atlas CASE	Company: SOUTHERN CALIFORNIA GAS COMPANY Well: FERNANDO FEE # 38C Field: ALISO CANYON County: LOS ANGELES State: CALIFORNIA		File No: 377534 API No:
	Location GPS CORRD: NORTHING 1935482, EASTING 6397 NAT 83 ZONE 5; SBB&M SEC 27 TWP 4N RGE 16W	Elevations KB 1748 ft DF 1716 ft GL 0 ft	