UNDERGROUND INJECTION CONTROL
PERMIT APPLICATION

Ute Tribal # 17-05
1797' FNL & 620' FWL
Sec. 17, T5S-R3W
Duchesne County, Utah
API # 43-013-31674

July 2015

Prepared for:
Bruce Suchomel
Groundwater Program, Mail Code 8P-W-UIC
U.S. Environmental Protection Agency
1595 Wynkoop St
Denver, CO 80202-1129

Prepared by:
Petroglyph Energy, INC.
960 Broadway Avenue, Suite 500, P.O. Box 70019
Boise, Idaho 83707
(208) 685-7600
FAX (208) 685-7605

LIST OF ATTACHMENTS

Attachment No. 1	Area Topography Map
Attachment No. 2	Site Map
Attachment No. 3	Map of the A-Marker surface
Attachment No. 4	Cross-Sections of the injection formation
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SUMMARY DOCUMENT
UIC WELL APPLICATION
Ute Tribal 17-05
API # 43-013-31674

The following document contains information provided in support of the application for the conversion of the Ute Tribal 17-05 well to an injection well in the Green River formation in the Antelope Creek Field in Duchesne County, Utah.

The Antelope Creek Field falls within the Uintah and Ouray Indian reservations and is within Indian Country; therefore, for facilities located on the reservation, only EPA-issued UIC permits are necessary for compliance with UIC regulations.

The EPA has issued an Area Permit #UT20736-00000 for the Underground Injection Control for the Antelope Creek Field. This area permit allows for additional producing wells to be converted to injection wells for enhanced recovery.

(1) Petroglyph Energy, Inc. (Petroglyph) is the operator and only working interest owner of wells located in the Antelope creek Field, Duchesne County, Utah. Petroglyph's business address is provided below:

Petroglyph Energy, Inc.
960 Broadway Avenue, Suite 500
P.O. Box 70019
Boise, ID 83707

(2) Enclosed as Attachment No. 1 is a topographic map of a portion of the Antelope Creek Field, identifying all wells located in this area. The legal location for the Ute Tribal 17-05 is 1797' FNL & 620' FWL SW/NW Sec. 17, T5S-R3W.

(3) Attachment No. 2 is a map of the well. This map shows a circle with a ¼ mile radius centered on the Ute Tribal 17-05 well. The ¼ mile radius encompasses the area of review, AOR, within which Petroglyph is required to investigate all wells for mechanical integrity. The ¼ mile radius also identifies mineral ownership; all lands within the AOR are leased to Petroglyph by the Ute Tribe as indicated by yellow shading. The AOR has Ute Tribal 17-04, Ute Tribal 17-05A, Ute Tribal 17-12, Ute Tribal 17-12F, Ute Tribal 17-12M, and Ute Tribal 18-08 well(s) located in its ¼ mile radius.

(4) Petroglyph proposes to utilize the Ute Tribal 17-05 as an injection well for enhanced recovery in the Antelope Creek Field.

(5) Injection Zone – The injection intervals are between 3792' and 5784' True Vertical Depth and located in the lower portion of the Green River Formation. The injection zone is confined within a 1992' section between the Green River "A" Lime marker bed and the top of the Basal Carbonate in the lower part of the formation. The injection zone is composed of lenticular calcareous sandstones interbedded with low permeable carbonates and calcareous shales. The lenticular sandstones vary in thickness from 1 to 30 feet.

Confining Zone – The overall confining strata above the injection zone consists of impermeable Green River calcareous shales and continuous beds of microcrystalline dolostone. The confining zone in the Ute Tribal 17-05 is 231 feet thick.

Attachment No. 3 is a structure map of the A-Marker surface.

Attachment No. 4 is a cross-section of the injection interval and confining zone.

(6) Enclosed as Attachment No. 5 are standard analyses of produced water from three batteries that currently serve as central handling facilities for all project producing wells. The analysis of the Green River formation water from the Ute Tribal 18-08 Satellite Battery is 12805 mg/L of total dissolved solids (TDS), Ute Tribal 21-11 Satellite Battery is 15659 mg/L TDS, and Ute Tribal 34-12-D3 Satellite Battery is 14590 mg/L TDS.

Injectate in the field is a mixture of produced water and fresh make-up water. The nearest injection well is the Ute Tribal 18-01, the most recent analysis of the water being injected into the Green River formation at this location is 11210 mg/L TDS. This analysis is also included in Attachment No. 5.

(7) A summary of completion data from the Ute Tribal 17-05 and offset wells in the AOR are included in Attachment No. 6

(8) The cement bond log is included in Attachment No. 7.

(9) The open hole log for the Ute Tribal 17-05 is included in Attachment No. 8.

(10) The Antelope Creek Field is operated under a Cooperative Plan of Development between the Ute Tribe and Petroglyph Energy. At the Ute Tribal 17-05 location, all mineral owners, surface owners and operators located within the AOR ¼ mile radius have been notified of the submitted EPA application to convert to injection. Attachment No. 9 is the Affidavit of Notification to all owners.

(11) Petroglyph requests a maximum surface injection pressure of **1760**psi. The EPA Area Permit No. UT20736-00000 uses the formula:

Pm = (0.88psi/ft - 0.43psi/ft(Sg)) D

Where:
Pm = Maximum surface injection pressure
0.88psi/ft = Fracture gradient
D = Top perforation depth
0.43psi/ft = Hydrostatic pressure/hydraulic head
Sg = Specific gravity of injection fluid

For the Ute Tribal 17-05:
1760psi = (0.88psi/ft - 0.43(1.00)) 3910ft

(12) Three wellbore diagrams for the Ute Tribal 17-05 are in Attachment No. 10. One diagram is for production, one for injection, and one for Plug & Abandonment (P&A).

(13) The P&A procedure for this well is shown in Attachment No. 11.

(14) Once the draft permit is issued, Petroglyph will conduct a Mechanical Integrity Test and a static bottom-hole pressure test. The MIT procedure is contained in Attachment No. 12. The conversion work will be satisfactorily completed and submitted to the EPA on Form 7520-12. A wellbore schematic will be included with this form.

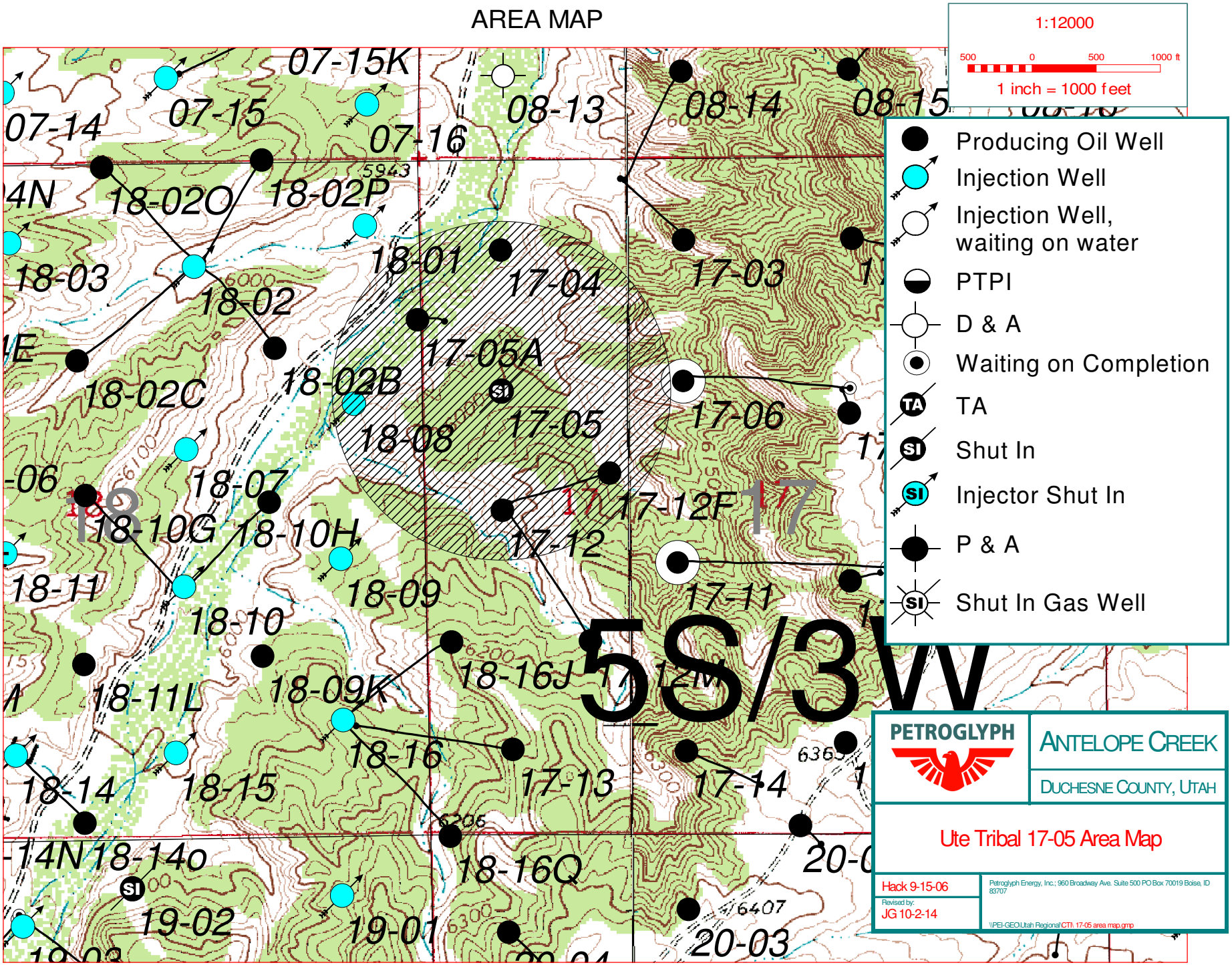
(15) Petroglyph will give proof of financial responsibility by posting a surety bond for the UIC well prior to final permit approval. A copy of this letter is contained in Attachment No. 13.

(16) Petroglyph will install various gauges on the well so that the injection pressure and tubing/casing annulus pressure can be monitored. The well will be equipped with a flow meter with a cumulative volume recorder.

ATTACHMENT NO. 1

AREA MAP

ATTACHMENT NO. 1:
AREA MAP

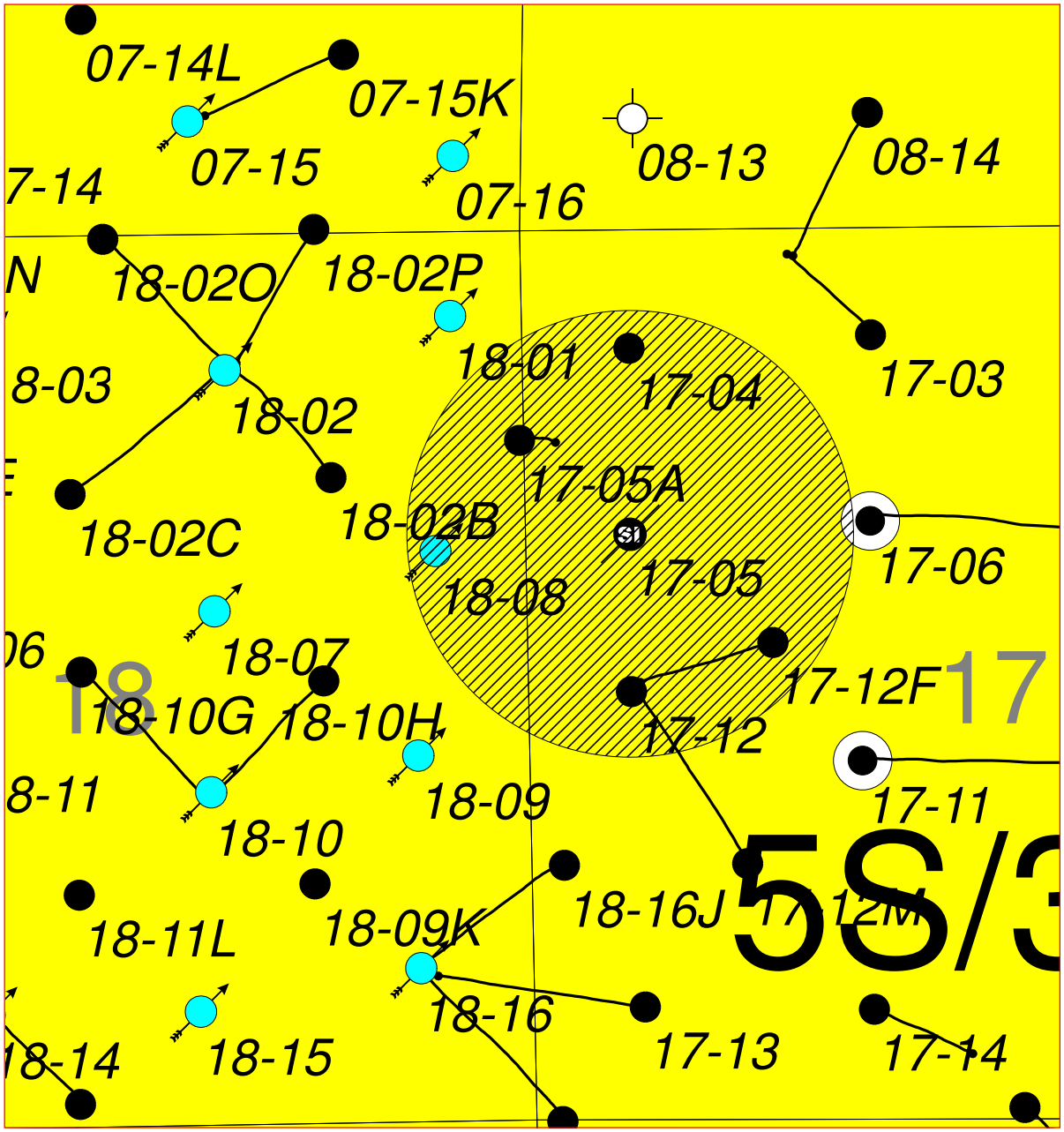


ATTACHMENT NO. 2

SITE MAP

RADIUS MAP OF ADJACENT WELLS

ATTACHMENT NO. 2:
SITE MAP



1:12000

500 0 500 1000 ft

1 inch = 1000 feet

- Producing Oil Well
- Injection Well
- Injection Well, waiting on water
- PTPI
- D & A
- Waiting on Completion
- TA
- Shut In
- Injector Shut In
- P & A
- Shut In Gas Well

PETROGLYPH

ANTELOPE CREEK

DUCHESNE COUNTY, UTAH

Ute Tribal 17-05 Plat and Quarter-mile radius map. Ute Indian lands under Petroglyph lease shown in yellow

Hack 9-15-06

Revised by:
JG 8-29-14

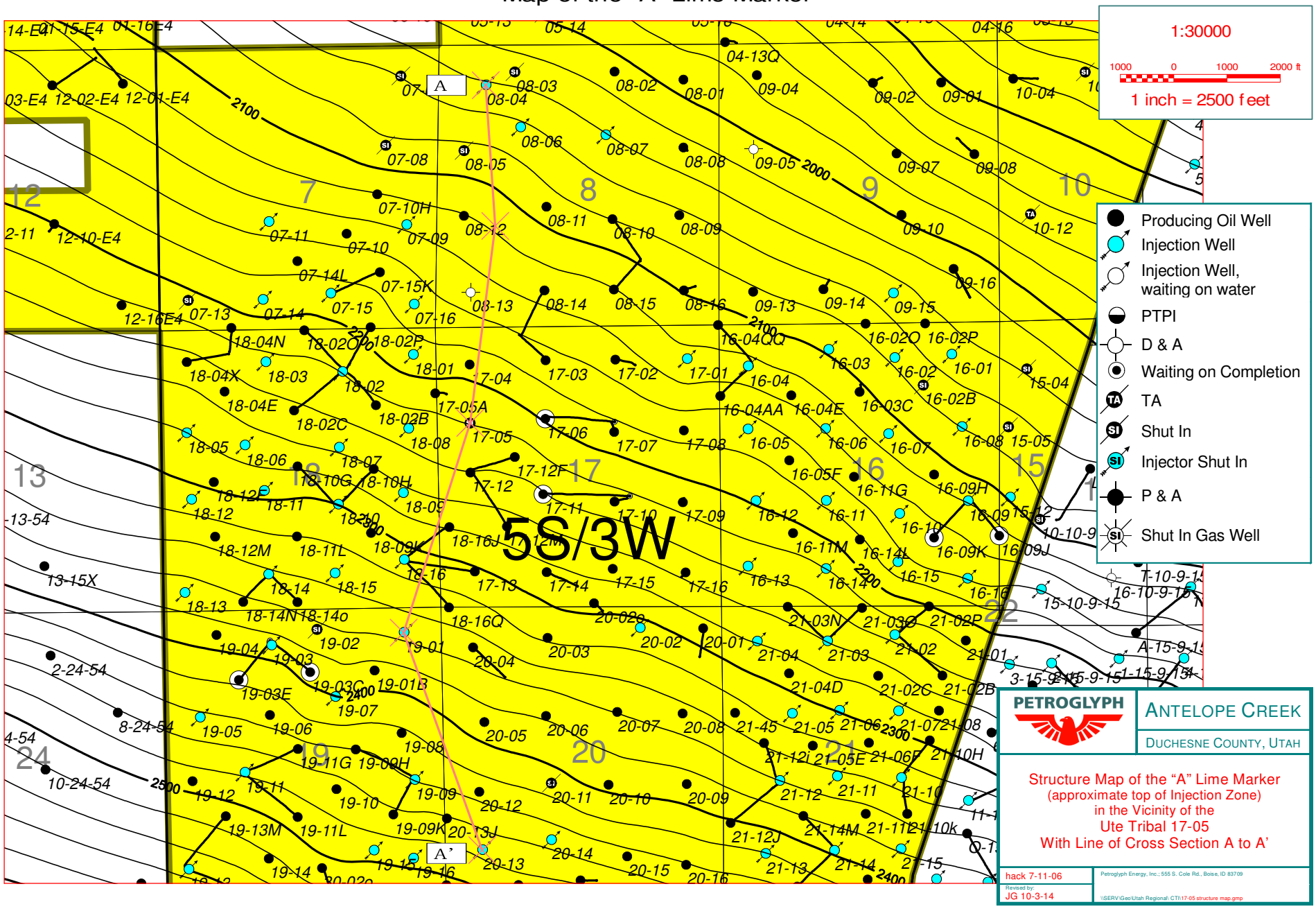
Petroglyph Energy, Inc.; 960 Broadway Ave. Suite 500 PO Box 70019 Boise, ID 83707

\\PEI-GEO\Utah Regional\CTB 17-05 quarter mile map.gmp

ATTACHMENT NO. 3

MAP OF THE A-LIME MARKER SURFACE

ATTACHMENT NO. 3:
Map of the "A" Lime Marker

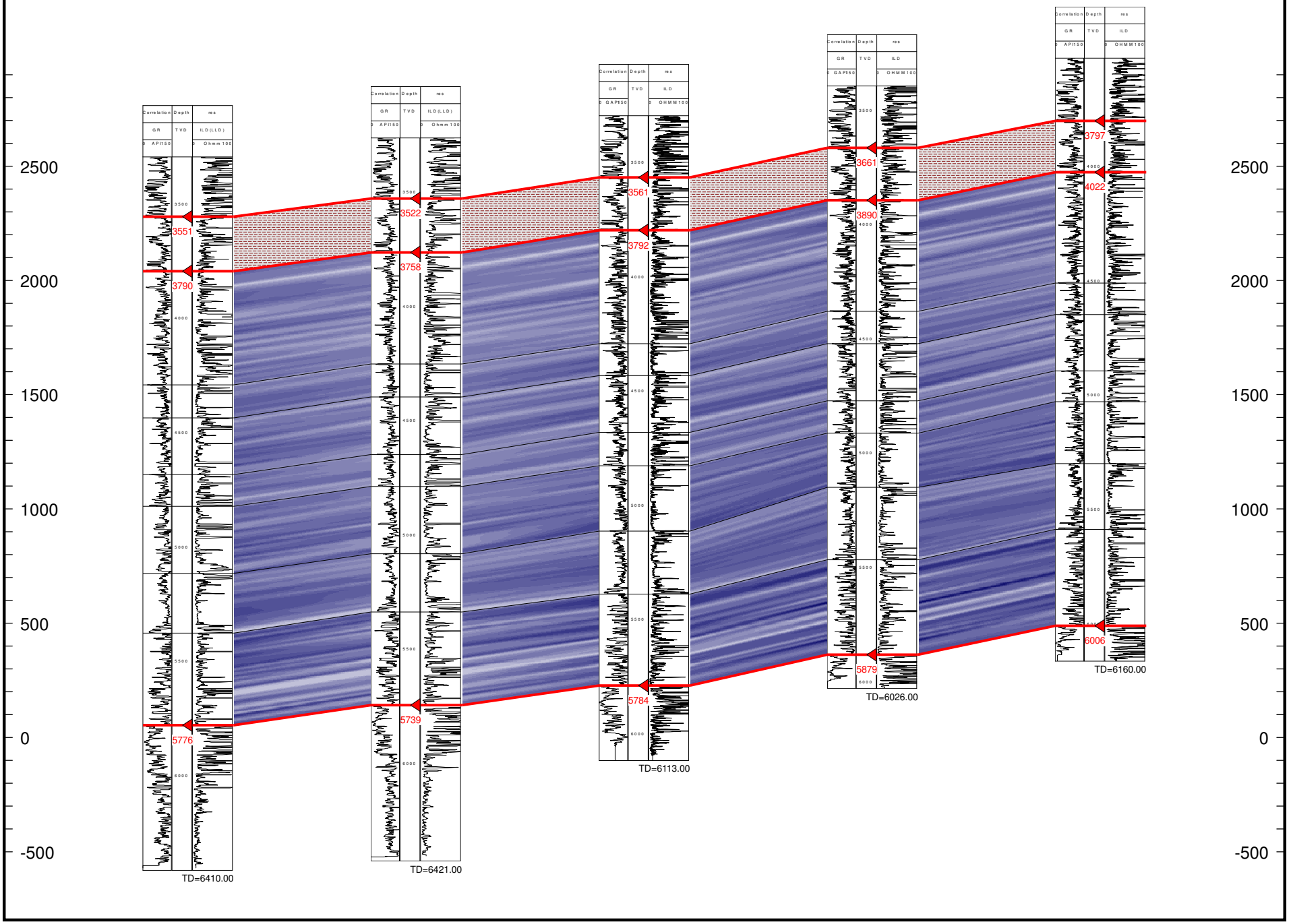


ATTACHMENT NO. 4

CROSS SECTIONS OF THE INJECTION FORMATION

Structural Cross Section A to A' in the Vicinity of Ute Tribal 17-05

43013307590000	2485 ft	43013311640000	3898 ft	43013316740000	4136 ft	43013319640000	4347 ft	43013319810000
PETROGLYPH OPERATING COMPANY INC Ute Tribal 08-04 754 FNL 888 FWL TWP: 5S - Range: 3W - Sec. 8		PETROGLYPH OPERATING Ute Tribal 08-12 2100 FSL 515 FWL TWP: 5 S - Range: 3 W - Sec. 8		PETROGLYPH OPERATING COMPANY INC Ute Tribal 17-05 1797 FNL 620 FWL TWP: 5 S - Range: 3 W - Sec. 17		PETROGLYPH OPERATING COMPANY INC Ute Tribal 19-01 473 FNL 706 FEL TWP: 5 S - Range: 3 W - Sec. 1		PETROGLYPH OPERATING COMPANY INC Ute Tribal 20-13 700 FSL 700 FWL TWP: 5 S - Range: 3 W - Sec. 2



ATTACHMENT NO. 5

WATER ANALYSIS

Multi-Chem Analytical Laboratory
1553 East Highway 40
Vernal, UT 84078

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Water Analysis Report

Production Company:	**PETROGLYPH OPERATING CO INC - EBUS**	Sales Rep:	**James Patry**
Well Name:	**UTE TRIBAL 18-08 SATELLITE, DUCHESN**	Lab Tech:	**Gary Winegar**
Sample Point:	**PLANT DISCHARGE COMPLETE**		
Sample Date:	**4/21/2015**		
Sample ID:	**WA-307075**		

Scaling potential predicted using ScaleSoftPitzer from Brine Chemistry Consortium (Rice University)

Sample Specifics	
Test Date:	4/21/2015
System Temperature 1 (°F):	60.00
System Pressure 1 (psig):	14.70
System Temperature 2 (°F):	180.00
System Pressure 2 (psig):	2000.00
Calculated Density (g/ml):	1.0061
pH:	8.50
Calculated TDS (mg/L):	12805.08
CO2 in Gas (%):	
Dissolved CO_2 (mg/L)):	0.00
H_2S in Gas (%):	
H2S in Water (mg/L):	0.00

Analysis @ Properties in Sample Specifics			
Cations	*mg/L*	*Anions*	*mg/L*
Sodium (Na):	4541.75	Chloride (Cl):	6000.00
Potassium (K):	41.78	Sulfate (SO_4):	163.00
Magnesium (Mg):	28.63	Bicarbonate (HCO_3):	1952.00
Calcium (Ca):	67.44	Carbonate (CO_3):	
Strontium (Sr):	5.41	Acetic Acid (CH_3COO)	
Barium (Ba):	0.90	Propionic Acid (C_2H_5COO)	
Iron (Fe):	2.74	Butanoic Acid (C_3H_7COO)	
Zinc (Zn):	1.29	Isobutyric Acid ($(CH_3)_2CHCOO$)	
Lead (Pb):	0.05	Fluoride (F):	
Ammonia NH_3:		Bromine (Br):	
Manganese (Mn):	0.09	Silica (SiO_2):	

Notes:

(PTB = Pounds per Thousand Barrels)

		Calcium Carbonate		Barium Sulfate		Iron Sulfide		Iron Carbonate		Gypsum CaSO4·2H2O		Celestite SrSO4		Halite NaCl		Zinc Sulfide	
Temp (°F)	PSI	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB
180	2000	1.91	56.41	0.09	0.09	0.00	0.00	2.59	1.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
166	1779	1.87	56.05	0.13	0.14	0.00	0.00	2.54	1.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
153	1558	1.83	55.66	0.19	0.19	0.00	0.00	2.49	1.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	1338	1.80	55.27	0.26	0.24	0.00	0.00	2.44	1.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
126	1117	1.77	54.86	0.33	0.29	0.00	0.00	2.38	1.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
113	897	1.74	54.46	0.42	0.33	0.00	0.00	2.32	1.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	676	1.72	54.08	0.52	0.38	0.00	0.00	2.26	1.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	455	1.71	53.72	0.64	0.41	0.00	0.00	2.20	1.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
73	235	1.69	53.39	0.77	0.45	0.00	0.00	2.14	1.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	14	1.69	53.56	0.92	0.47	0.00	0.00	2.08	1.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		Hemihydrate CaSO4~0.5H2O		Anhydrate CaSO4		Calcium Fluoride		Zinc Carbonate		Lead Sulfide		Mg Silicate		Ca Mg Silicate		Fe Silicate	
Temp (°F)	PSI	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB
180	2000	0.00	0.00	0.00	0.00	0.00	0.00	2.20	0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
166	1779	0.00	0.00	0.00	0.00	0.00	0.00	2.09	0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
153	1558	0.00	0.00	0.00	0.00	0.00	0.00	1.96	0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	1338	0.00	0.00	0.00	0.00	0.00	0.00	1.83	0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
126	1117	0.00	0.00	0.00	0.00	0.00	0.00	1.69	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
113	897	0.00	0.00	0.00	0.00	0.00	0.00	1.53	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	676	0.00	0.00	0.00	0.00	0.00	0.00	1.37	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	455	0.00	0.00	0.00	0.00	0.00	0.00	1.19	0.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
73	235	0.00	0.00	0.00	0.00	0.00	0.00	1.01	0.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	14	0.00	0.00	0.00	0.00	0.00	0.00	0.81	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Multi-Chem Analytical Laboratory
1553 East Highway 40
Vernal, UT 84078

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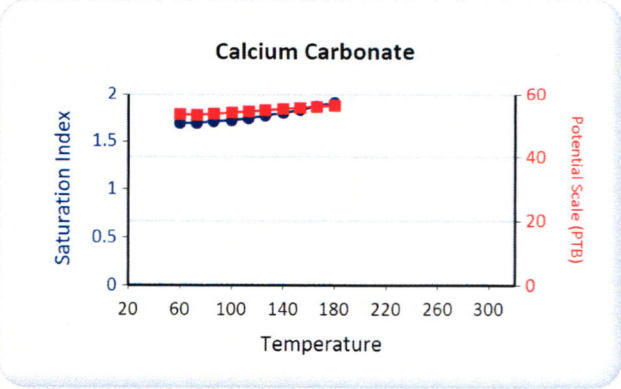
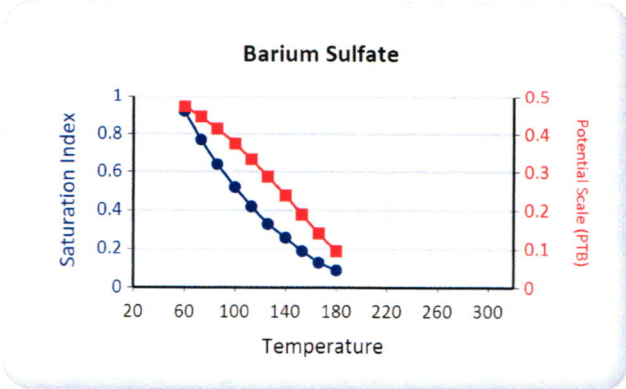
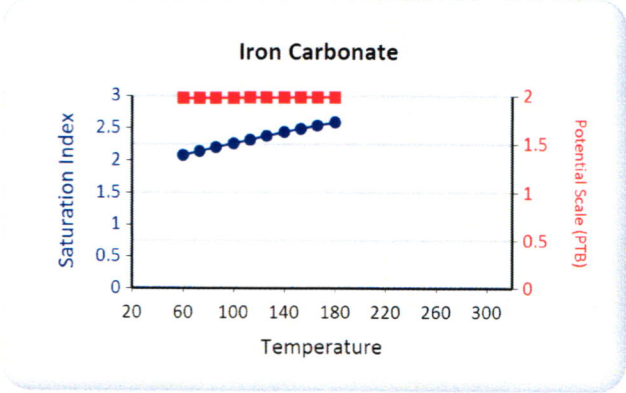
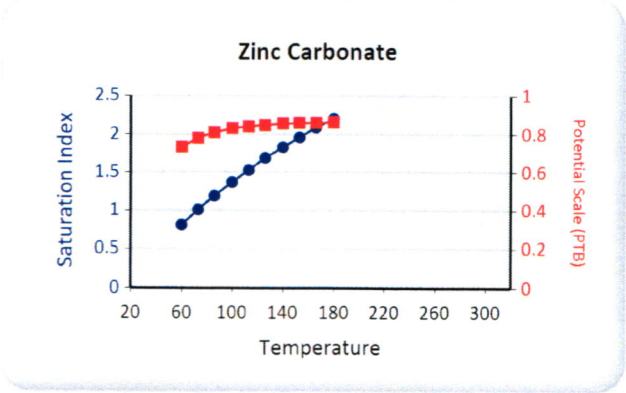
Water Analysis Report









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Production Company:	**PETROGLYPH OPERATING CO INC - EBUS**	Sales Rep:	**James Patry**
Well Name:	**UTE TRIBAL 21-11 SATELLITE, DUCHESN**	Lab Tech:	**Gary Winegar**
Sample Point:	**PLANT DISCHARGE COMPLETE**		
Sample Date:	**4/21/2015**		
Sample ID:	**WA-307071**		

Scaling potential predicted using ScaleSoftPitzer from Brine Chemistry Consortium (Rice University)

Sample Specifics	
Test Date:	4/21/2015
System Temperature 1 (°F):	60.00
System Pressure 1 (psig):	14.70
System Temperature 2 (°F):	180.00
System Pressure 2 (psig):	2000.00
Calculated Density (g/ml):	1.0081
pH:	8.70
Calculated TDS (mg/L):	15659.01
CO2 in Gas (%):	
Dissolved CO_2 (mg/L)):	0.00
H_2S in Gas (%):	
H2S in Water (mg/L):	35.00

Analysis @ Properties in Sample Specifics			
Cations	*mg/L*	*Anions*	*mg/L*
Sodium (Na):	5585.76	Chloride (Cl):	7000.00
Potassium (K):	55.43	Sulfate (SO_4):	277.00
Magnesium (Mg):	10.62	Bicarbonate (HCO_3):	2684.00
Calcium (Ca):	30.52	Carbonate (CO_3):	
Strontium (Sr):	6.47	Acetic Acid (CH_3COO)	
Barium (Ba):	1.02	Propionic Acid (C_2H_5COO)	
Iron (Fe):	1.09	Butanoic Acid (C_3H_7COO)	
Zinc (Zn):	6.88	Isobutyric Acid ($(CH_3)_2CHCOO$)	
Lead (Pb):	0.08	Fluoride (F):	
Ammonia NH_3:		Bromine (Br):	
Manganese (Mn):	0.14	Silica (SiO_2):	

Notes:

(PTB = Pounds per Thousand Barrels)

		Calcium Carbonate		Barium Sulfate		Iron Sulfide		Iron Carbonate		Gypsum CaSO4·2H2O		Celestite SrSO4		Halite NaCl		Zinc Sulfide	
Temp (°F)	PSI	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB
180	2000	1.81	26.18	0.28	0.29	3.60	0.60	2.44	0.79	0.00	0.00	0.00	0.00	0.00	0.00	11.37	3.59
166	1779	1.77	26.13	0.33	0.32	3.61	0.60	2.40	0.79	0.00	0.00	0.00	0.00	0.00	0.00	11.52	3.59
153	1558	1.74	26.09	0.39	0.36	3.63	0.60	2.35	0.79	0.00	0.00	0.00	0.00	0.00	0.00	11.68	3.59
140	1338	1.71	26.05	0.45	0.39	3.67	0.60	2.30	0.79	0.00	0.00	0.00	0.00	0.00	0.00	11.86	3.59
126	1117	1.69	26.00	0.53	0.43	3.72	0.60	2.25	0.79	0.00	0.00	0.00	0.00	0.00	0.00	12.05	3.59
113	897	1.67	25.97	0.62	0.46	3.79	0.60	2.20	0.79	0.00	0.00	0.00	0.00	0.00	0.00	12.27	3.59
100	676	1.65	25.93	0.72	0.49	3.87	0.60	2.14	0.79	0.00	0.00	0.00	0.00	0.00	0.00	12.50	3.59
86	455	1.63	25.91	0.84	0.52	3.97	0.60	2.08	0.79	0.00	0.00	0.00	0.00	0.00	0.00	12.76	3.59
73	235	1.62	25.88	0.97	0.54	4.09	0.60	2.02	0.79	0.00	0.00	0.00	0.00	0.00	0.00	13.04	3.59
60	14	1.62	25.87	1.12	0.56	4.23	0.60	1.96	0.79	0.00	0.00	0.00	0.00	0.00	0.00	13.34	3.59

		Hemihydrate CaSO4~0.5H2O		Anhydrate CaSO4		Calcium Fluoride		Zinc Carbonate		Lead Sulfide		Mg Silicate		Ca Mg Silicate		Fe Silicate	
Temp (°F)	PSI	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB
180	2000	0.00	0.00	0.00	0.00	0.00	0.00	3.15	4.62	10.72	0.03	0.00	0.00	0.00	0.00	0.00	0.00
166	1779	0.00	0.00	0.00	0.00	0.00	0.00	3.04	4.62	10.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00
153	1558	0.00	0.00	0.00	0.00	0.00	0.00	2.92	4.62	11.24	0.03	0.00	0.00	0.00	0.00	0.00	0.00
140	1338	0.00	0.00	0.00	0.00	0.00	0.00	2.79	4.62	11.54	0.03	0.00	0.00	0.00	0.00	0.00	0.00
126	1117	0.00	0.00	0.00	0.00	0.00	0.00	2.65	4.62	11.86	0.03	0.00	0.00	0.00	0.00	0.00	0.00
113	897	0.00	0.00	0.00	0.00	0.00	0.00	2.50	4.61	12.21	0.03	0.00	0.00	0.00	0.00	0.00	0.00
100	676	0.00	0.00	0.00	0.00	0.00	0.00	2.34	4.61	12.60	0.03	0.00	0.00	0.00	0.00	0.00	0.00
86	455	0.00	0.00	0.00	0.00	0.00	0.00	2.17	4.60	13.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00
73	235	0.00	0.00	0.00	0.00	0.00	0.00	1.99	4.58	13.46	0.03	0.00	0.00	0.00	0.00	0.00	0.00
60	14	0.00	0.00	0.00	0.00	0.00	0.00	1.79	4.55	13.95	0.03	0.00	0.00	0.00	0.00	0.00	0.00

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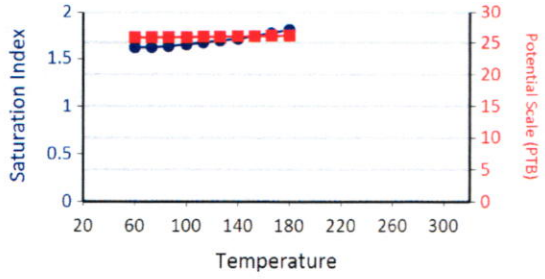
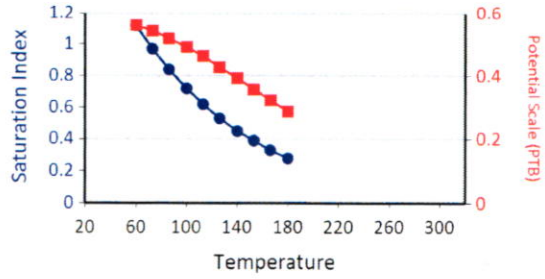
multi-chem
A HALLIBURTON SERVICE

Water Analysis Report

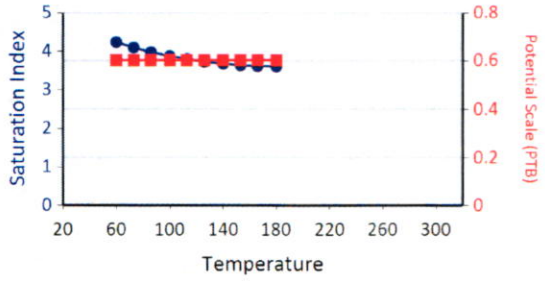
Calcium Carbonate



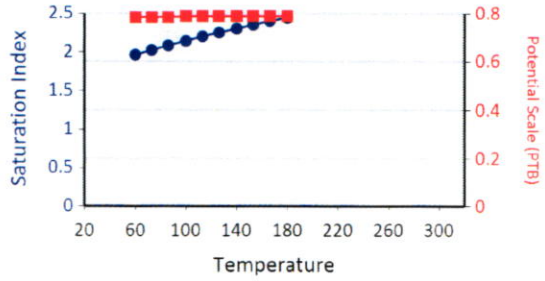
Barium Sulfate



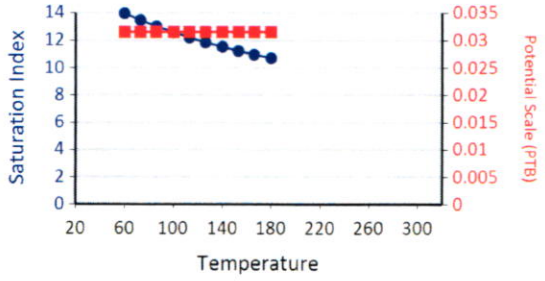
Iron Sulfide



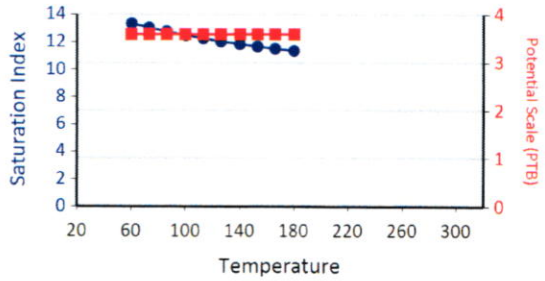
Iron Carbonate



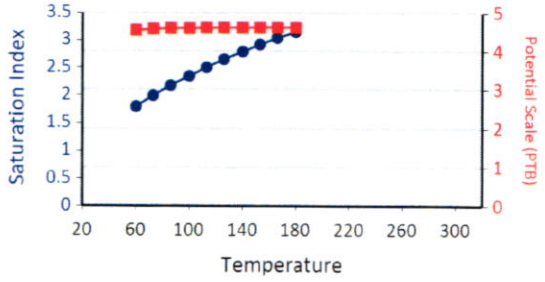
Lead Sulfide



Zinc Sulfide



Zinc Carbonate



Multi-Chem Analytical Laboratory
1553 East Highway 40
Vernal, UT 84078

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Water Analysis Report

Production Company:	**PETROGLYPH OPERATING CO INC - EBUS**	Sales Rep:	**James Patry**
Well Name:	**UTE TRIBAL 34-12D3 SATELLITE, DUCHE**	Lab Tech:	**Gary Winegar**
Sample Point:	**PLANT DISCHARGE**		
Sample Date:	**4/21/2015**		
Sample ID:	**WA-307067**		

Scaling potential predicted using ScaleSoftPitzer from Brine Chemistry Consortium (Rice University)

Sample Specifics	
Test Date:	4/21/2015
System Temperature 1 (°F):	60.00
System Pressure 1 (psig):	14.70
System Temperature 2 (°F):	180.00
System Pressure 2 (psig):	2000.00
Calculated Density (g/ml):	1.0073
pH:	8.50
Calculated TDS (mg/L):	14589.98
CO2 in Gas (%):	
Dissolved CO_2 (mg/L)):	0.00
H_2S in Gas (%):	
H2S in Water (mg/L):	0.00

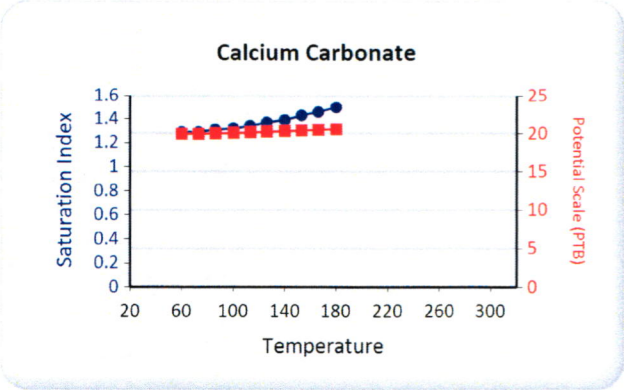
Analysis @ Properties in Sample Specifics			
Cations	*mg/L*	*Anions*	*mg/L*
Sodium (Na):	5277.36	Chloride (Cl):	7000.00
Potassium (K):	65.03	Sulfate (SO_4):	0.00
Magnesium (Mg):	7.80	Bicarbonate (HCO_3):	2196.00
Calcium (Ca):	24.60	Carbonate (CO_3):	
Strontium (Sr):	5.20	Acetic Acid (CH_3COO)	
Barium (Ba):	12.37	Propionic Acid (C_2H_5COO)	
Iron (Fe):	0.34	Butanoic Acid (C_3H_7COO)	
Zinc (Zn):	1.16	Isobutyric Acid ($(CH_3)_2CHCOO$)	
Lead (Pb):	0.04	Fluoride (F):	
Ammonia NH_3:		Bromine (Br):	
Manganese (Mn):	0.08	Silica (SiO_2):	

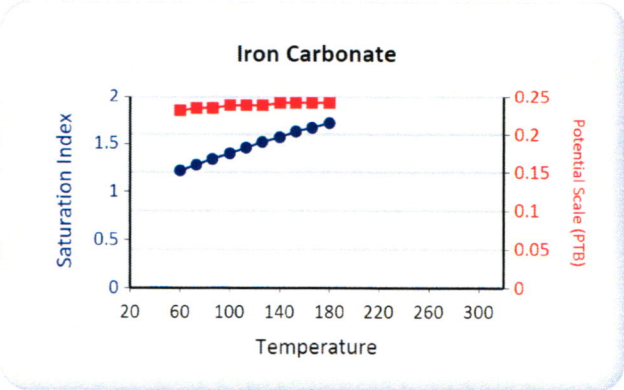
Notes:

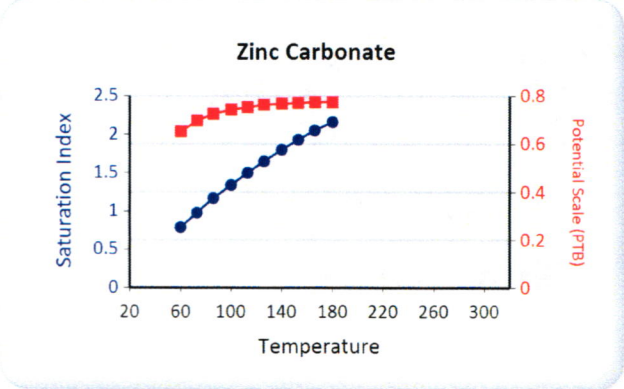
(PTB = Pounds per Thousand Barrels)

		Calcium Carbonate		Barium Sulfate		Iron Sulfide		Iron Carbonate		Gypsum CaSO4·2H2O		Celestite SrSO4		Halite NaCl		Zinc Sulfide	
Temp (°F)	PSI	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB
180	2000	1.50	20.58	0.00	0.00	0.00	0.00	1.72	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
166	1779	1.46	20.48	0.00	0.00	0.00	0.00	1.67	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
153	1558	1.43	20.39	0.00	0.00	0.00	0.00	1.63	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	1338	1.39	20.30	0.00	0.00	0.00	0.00	1.57	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
126	1117	1.37	20.21	0.00	0.00	0.00	0.00	1.52	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
113	897	1.34	20.13	0.00	0.00	0.00	0.00	1.46	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	676	1.32	20.05	0.00	0.00	0.00	0.00	1.40	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	455	1.31	19.99	0.00	0.00	0.00	0.00	1.34	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
73	235	1.29	19.93	0.00	0.00	0.00	0.00	1.28	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	14	1.29	19.93	0.00	0.00	0.00	0.00	1.22	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		Hemihydrate CaSO4~0.5H2O		Anhydrate CaSO4		Calcium Fluoride		Zinc Carbonate		Lead Sulfide		Mg Silicate		Ca Mg Silicate		Fe Silicate	
Temp (°F)	PSI	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB
180	2000	0.00	0.00	0.00	0.00	0.00	0.00	2.16	0.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
166	1779	0.00	0.00	0.00	0.00	0.00	0.00	2.05	0.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
153	1558	0.00	0.00	0.00	0.00	0.00	0.00	1.93	0.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140	1338	0.00	0.00	0.00	0.00	0.00	0.00	1.80	0.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
126	1117	0.00	0.00	0.00	0.00	0.00	0.00	1.65	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
113	897	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100	676	0.00	0.00	0.00	0.00	0.00	0.00	1.34	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
86	455	0.00	0.00	0.00	0.00	0.00	0.00	1.17	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
73	235	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
60	14	0.00	0.00	0.00	0.00	0.00	0.00	0.79	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00


Calcium Carbonate
Saturation Index
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
25
20
15
10
5
0
Potential Scale (PTB)
20 60 100 140 180 220 260 300
Temperature


Iron Carbonate
Saturation Index
2
1.5
1
0.5
0
0.25
0.2
0.15
0.1
0.05
0
Potential Scale (PTB)
20 60 100 140 180 220 260 300
Temperature


Zinc Carbonate
Saturation Index
2.5
2
1.5
1
0.5
0
0.8
0.6
0.4
0.2
0
Potential Scale (PTB)
20 60 100 140 180 220 260 300
Temperature

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Units of Measurement: **Standard**

Water Analysis Report

Production Company:	**PETROGLYPH OPERATING CO INC - EBUS**	Sales Rep:	**James Patry**
Well Name:	**UTE TRIBAL 18-01 INJ, DUCHESNE**	Lab Tech:	**Gary Winegar**
Sample Point:	**WELLHEAD**		
Sample Date:	**1/7/2015**		
Sample ID:	**WA-297509**		

Scaling potential predicted using ScaleSoftPitzer from Brine Chemistry Consortium (Rice University)

Sample Specifics	
Test Date:	1/14/2015
System Temperature 1 (°F):	160
System Pressure 1 (psig):	1300
System Temperature 2 (°F):	80
System Pressure 2 (psig):	15
Calculated Density (g/ml):	1.0046
pH:	8.30
Calculated TDS (mg/L):	11210.00
CO2 in Gas (%):	
Dissolved CO_2 (mg/L)):	0.00
H2S in Gas (%):	
H2S in Water (mg/L):	5.00

Analysis @ Properties in Sample Specifics			
Cations	***mg/L***	***Anions***	***mg/L***
Sodium (Na):	3170.91	Chloride (Cl):	6000.00
Potassium (K):	42.06	Sulfate (SO_4):	73.00
Magnesium (Mg):	16.52	Bicarbonate (HCO_3):	1830.00
Calcium (Ca):	28.33	Carbonate (CO_3):	
Strontium (Sr):	5.78	Acetic Acid (CH_3COO)	
Barium (Ba):	15.68	Propionic Acid (C_2H_5COO)	
Iron (Fe):	2.67	Butanoic Acid (C_3H_7COO)	
Zinc (Zn):	2.91	Isobutyric Acid ($(CH_3)_2CHCOO$)	
Lead (Pb):	0.06	Fluoride (F):	
Ammonia NH_3:		Bromine (Br):	
Manganese (Mn):	0.13	Silica (SiO_2):	21.95

Notes:
B=6.11 Al=.02 Li=1.73

(PTB = Pounds per Thousand Barrels)

		Calcium Carbonate		Barium Sulfate		Iron Sulfide		Iron Carbonate		Gypsum CaSO4·2H2O		Celestite SrSO4		Halite NaCl		Zinc Sulfide	
Temp (°F)	PSI	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB
80.00	14.00	1.21	21.91	1.70	9.12	3.26	1.47	2.06	1.92	0.00	0.00	0.00	0.00	0.00	0.00	11.39	1.52
88.00	157.00	1.21	21.76	1.61	9.07	3.18	1.47	2.09	1.92	0.00	0.00	0.00	0.00	0.00	0.00	11.20	1.52
97.00	300.00	1.22	21.89	1.54	9.02	3.11	1.47	2.13	1.93	0.00	0.00	0.00	0.00	0.00	0.00	11.03	1.52
106.00	443.00	1.24	22.03	1.47	8.97	3.06	1.47	2.17	1.93	0.00	0.00	0.00	0.00	0.00	0.00	10.88	1.52
115.00	585.00	1.26	22.18	1.40	8.91	3.02	1.47	2.22	1.93	0.00	0.00	0.00	0.00	0.00	0.00	10.73	1.52
124.00	728.00	1.28	22.32	1.34	8.85	2.98	1.47	2.26	1.93	0.00	0.00	0.00	0.00	0.00	0.00	10.60	1.52
133.00	871.00	1.30	22.48	1.29	8.78	2.95	1.47	2.30	1.93	0.00	0.00	0.00	0.00	0.00	0.00	10.47	1.52
142.00	1014.00	1.33	22.63	1.24	8.72	2.93	1.47	2.34	1.93	0.00	0.00	0.00	0.00	0.00	0.00	10.35	1.52
151.00	1157.00	1.35	22.78	1.20	8.65	2.91	1.47	2.38	1.93	0.00	0.00	0.00	0.00	0.00	0.00	10.24	1.52
160.00	1300.00	1.38	22.93	1.16	8.59	2.90	1.47	2.42	1.93	0.00	0.00	0.00	0.00	0.00	0.00	10.14	1.52

		Hemihydrate CaSO4~0.5H2O		Anhydrate CaSO4		Calcium Fluoride		Zinc Carbonate		Lead Sulfide		Mg Silicate		Ca Mg Silicate		Fe Silicate	
Temp (°F)	PSI	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB	SI	PTB
80.00	14.00	0.00	0.00	0.00	0.00	0.00	0.00	1.34	1.86	11.98	0.02	0.45	2.92	0.00	0.00	6.82	2.06
88.00	157.00	0.00	0.00	0.00	0.00	0.00	0.00	1.45	1.88	11.67	0.02	0.70	4.20	0.00	0.00	6.91	2.06
97.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	1.57	1.90	11.40	0.02	1.07	6.19	0.09	0.87	7.12	2.06
106.00	443.00	0.00	0.00	0.00	0.00	0.00	0.00	1.68	1.91	11.15	0.02	1.45	8.16	0.29	2.09	7.34	2.07
115.00	585.00	0.00	0.00	0.00	0.00	0.00	0.00	1.79	1.92	10.91	0.02	1.83	10.09	0.50	3.30	7.56	2.07
124.00	728.00	0.00	0.00	0.00	0.00	0.00	0.00	1.90	1.93	10.68	0.02	2.22	11.98	0.71	4.48	7.80	2.07
133.00	871.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	1.93	10.46	0.02	2.61	13.81	0.92	5.63	8.05	2.07
142.00	1014.00	0.00	0.00	0.00	0.00	0.00	0.00	2.09	1.94	10.26	0.02	3.00	15.58	1.14	6.73	8.30	2.07
151.00	1157.00	0.00	0.00	0.00	0.00	0.00	0.00	2.19	1.94	10.07	0.02	3.39	17.26	1.36	7.77	8.56	2.08
160.00	1300.00	0.00	0.00	0.00	0.00	0.00	0.00	2.28	1.95	9.89	0.02	3.78	18.83	1.58	8.73	8.82	2.08

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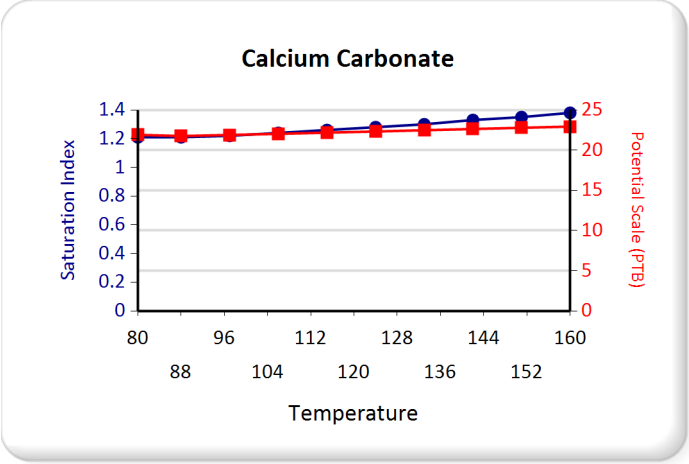
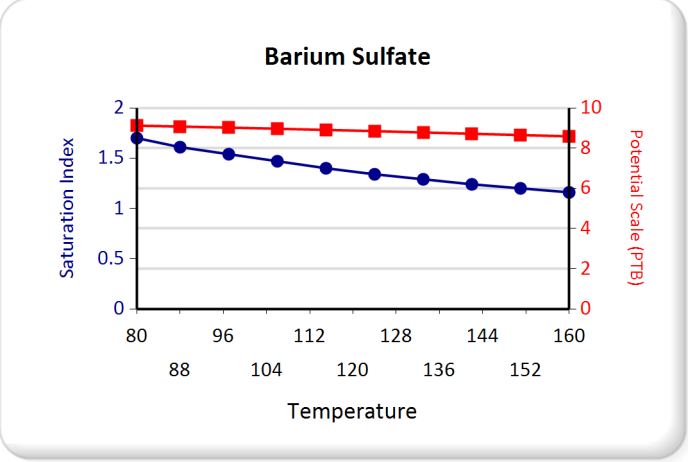
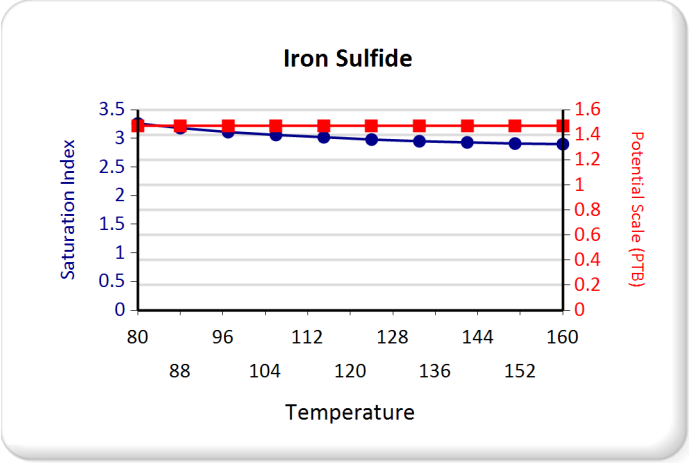
Water Analysis Report

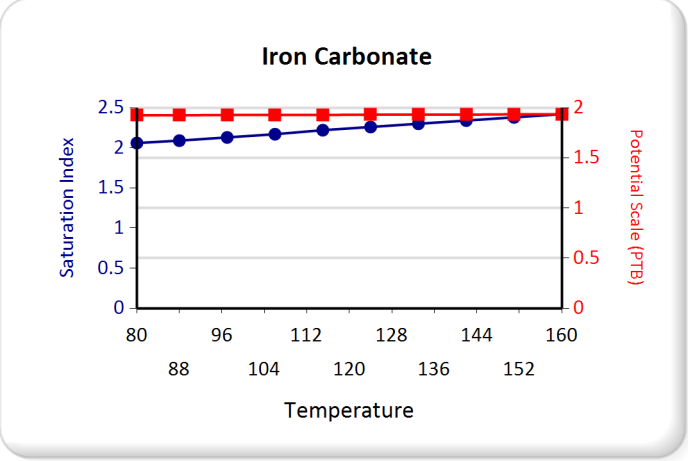
These scales have positive scaling potential under initial temperature and pressure: Calcium Carbonate Barium Sulfate Iron Sulfide Iron Carbonate Zinc Sulfide Zinc Carbonate Lead Sulfide Mg Silicate Fe Silicate

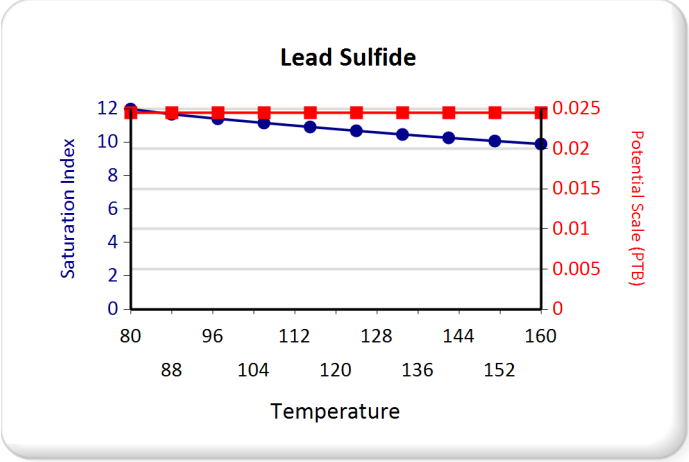
These scales have positive scaling potential under final temperature and pressure: Calcium Carbonate Barium Sulfate Iron Sulfide Iron Carbonate Zinc Sulfide Zinc Carbonate Lead Sulfide Mg Silicate Ca Mg Silicate Fe Silicate

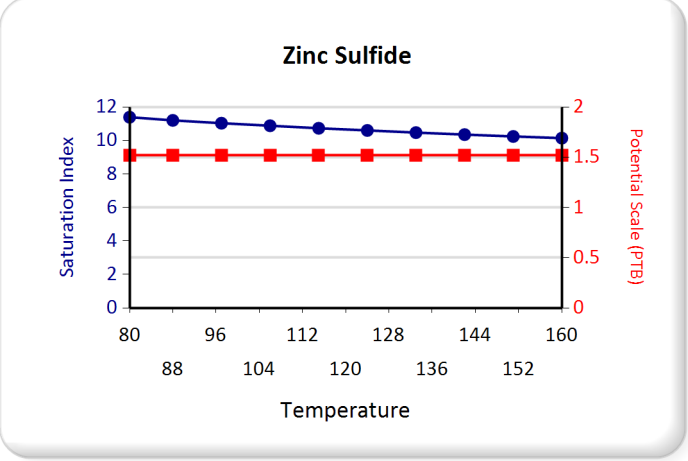












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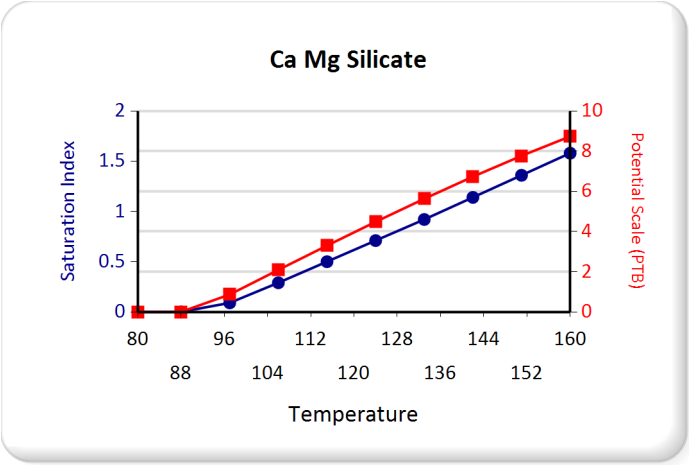
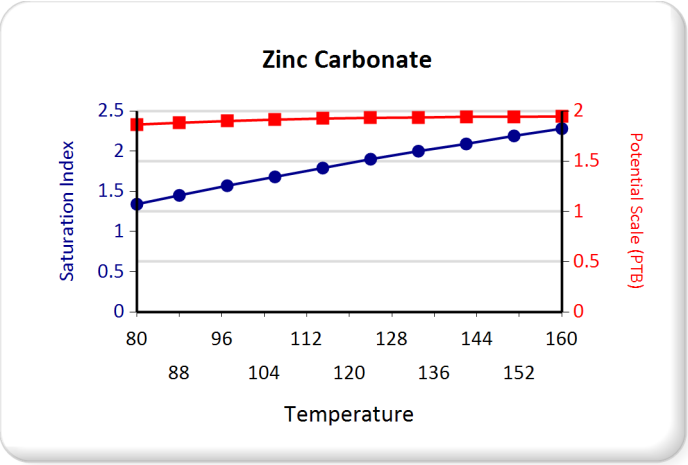
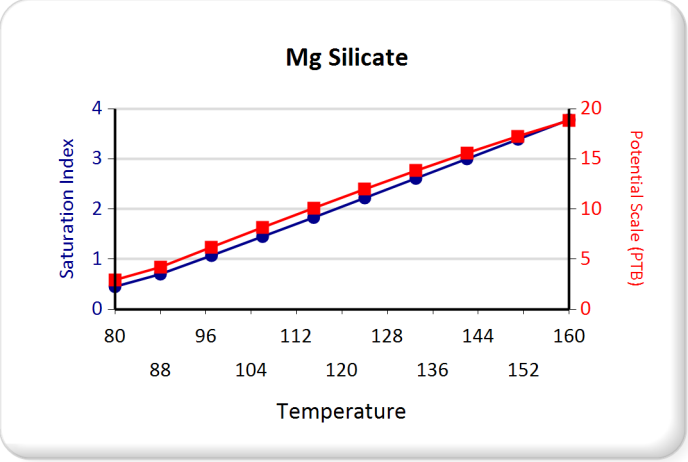
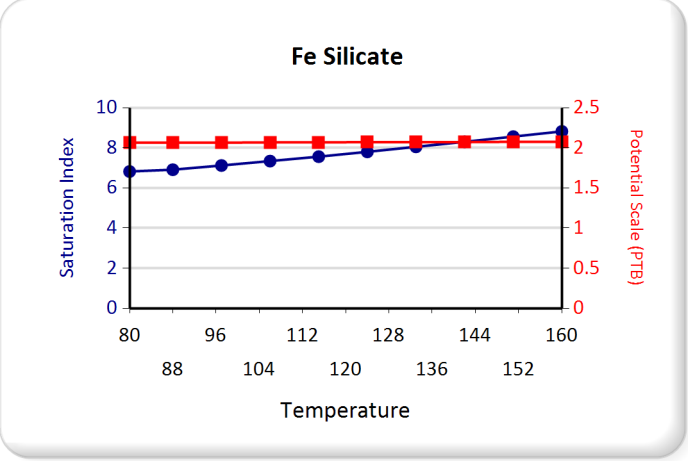
Water Analysis Report









ATTACHMENT NO. 6

COMPLETION DATA FOR ALL WELLS IN THE AOR

Well Completion Data
Ute Tribal 17-05

	Surface Casing				Production Casing			
Well	**Size (inches)**	**Depth (ft KB)**	**Cement Amount (sx)**	**Cement Top**	**Size (inches)**	**Depth (ft KB)**	**Cement Amount (sx)**	**Estimated Cement Top**
Ute Tribal 17-05	**8-5/8**	**402**	**250**	**surface**	**5-1/2**	**6106**	**355**	**3030**
Ute Tribal 17-04	8-5/8	427	350	surface	5-1/2	5822	495	surface
Ute Tribal 17-05A	8-5/8	522	450	surface	5-1/2	5890	790	surface
Ute Tribal 17-12	8-5/8	412	250	surface	5-1/2	5866	455	2250
Ute Tribal 17-12F	8-5/8	550	350	surface	5-1/2	6039	840	surface
Ute Tribal 17-12M	8-5/8	550	360	surface	5-1/2	6066	820	surface
Ute Tribal 18-08	8-5/8	300	350	surface	5-1/2	6315	1450	surface

ATTACHMENT NO. 7

CBL FOR THE UIC WELL

CONFIDENTIAL

COMPANY: PETOGLYPH OPERATING CO., INC.

WELL: UTE TRIBAL 17-05

FIELD: ANTELOPE CREEK

COUNTY: DUCHESNE STATE: UTAH

COUNTY: DUCHESNE
Field: ANTELOPE CREEK
Location: 1797' FNL & 620' FWL
Well: UTE TRIBAL 17-05
Company: PETOGLYPH OPERATING CO.

Schlumberger

CEMENT BOND LOG WITH GAMMA RAY AND COLLARS

LOCATION

1797' FNL & 620' FWL
SW / NW

Elev K.B 6011 F
G.L 6001 F
D.F 6010 F

Permanent Datum: GROUND LEVEL Elev
Log Measured From: KELLY BUSHING above Perm. Datum
Drilling Measured From: KELLY BUSHING

API Serial No	SECTION	TOWNSHIP	RANGE
N/A	9	5 S	3 W

			Run 1	Run 2
Logging Date	8-AUG-1996			
Run Number	1			
Depth Driller	6113 F			
Schlumberger Depth	6032 F			
Bottom Log Interval	6032 F			
Top Log Interval	3000 F			
Casing Driller Size @ Depth	5.500 IN @	@		@
Casing Schlumberger				
Bit Size	8.000 IN			
Type Fluid In Hole	WATER			
MUD Density / Viscosity	8.6 LB/G			
MUD Fluid Loss / PH				
MUD Source Of Sample				
RM @ Measured Temperature	@	@		@
RMF @ Measured Temperature	@	@		@
RMC @ Measured Temperature	@	@		@
Source RMF / RMC				
RM @ MRT / RMF @ MRT	@ 157 @ 157	@ @	@	
Maximum Recorded Temperatures	157 DEGF			
Circulation Stopped / Time				
Logger On Bottom / Time				
Unit Number / Location	1610			
Recorded By	R.V. WILLER			
Witnessed By	MR. GENE SEARLE			

Run 2

Run 3

Run 4

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OTHER SERVICES1	OTHER SERVICES2
OS1 PERFORATE HEGS	OS1:
OS2	OS2:
OS3	OS3:
OS4:	OS4:
OS5	OS5:

REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
THANK YOU FOR USING SCHLUMBERGER!!!!!	
LOG CORRELATED TO SWS NEUTRON DENSITY LOG RAN ON AUG-1-1996	
0 PSI ON REPEAT AND MAIN PASS.	
SHORT JOINT @ 3982-93	
CREW BLOOM	

RUN 1			RUN 2		
SERVICE ORDER #:			SERVICE ORDER #:		
PROGRAM VERSION		6B0-430	PROGRAM VERSION		
FLUID LEVEL		0 F	FLUID LEVEL		
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1	RUN 2
SURFACE EQUIPMENT	
WDM-AB SMM-AA	
DOWNHOLE EQUIPMENT	

CCL-AJ
CCL-AJ

22.2

CCL — 20.1

SGT-G
SHH-CA
SGD-R
SGC-LAA

18.0

Gamma Ray — 15.5

SLT-J
SLC-JH
SHH-CB
SLS-JF

14.5

Near — 4.5

Far — 3.5

Delta-T — 2.0

Sonde Tension — 0.0

TOOL ZERO

VAX VUV STRING DIAMETER 1.69 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN FEET

Output DLIS Files

DEFAULT	SLTJ .003	FN:2	FIELD	14-Aug-1996 13:44	6061.5 FT	284.0 FT

OP System Version: 8B0-430

MCM

SLT-J	8B0-430	SGT-G	8B0-430
CCL-AJ	8B0-430		

PIP SUMMARY

Casing Collars

Time Mark Every 60 S

Gamma Ray (GR)
0 (GAPI) 150

Casing Collar Locator (CCL)
-19 (----) 1

Transit Time 2 (TT2)
430 (US) 230

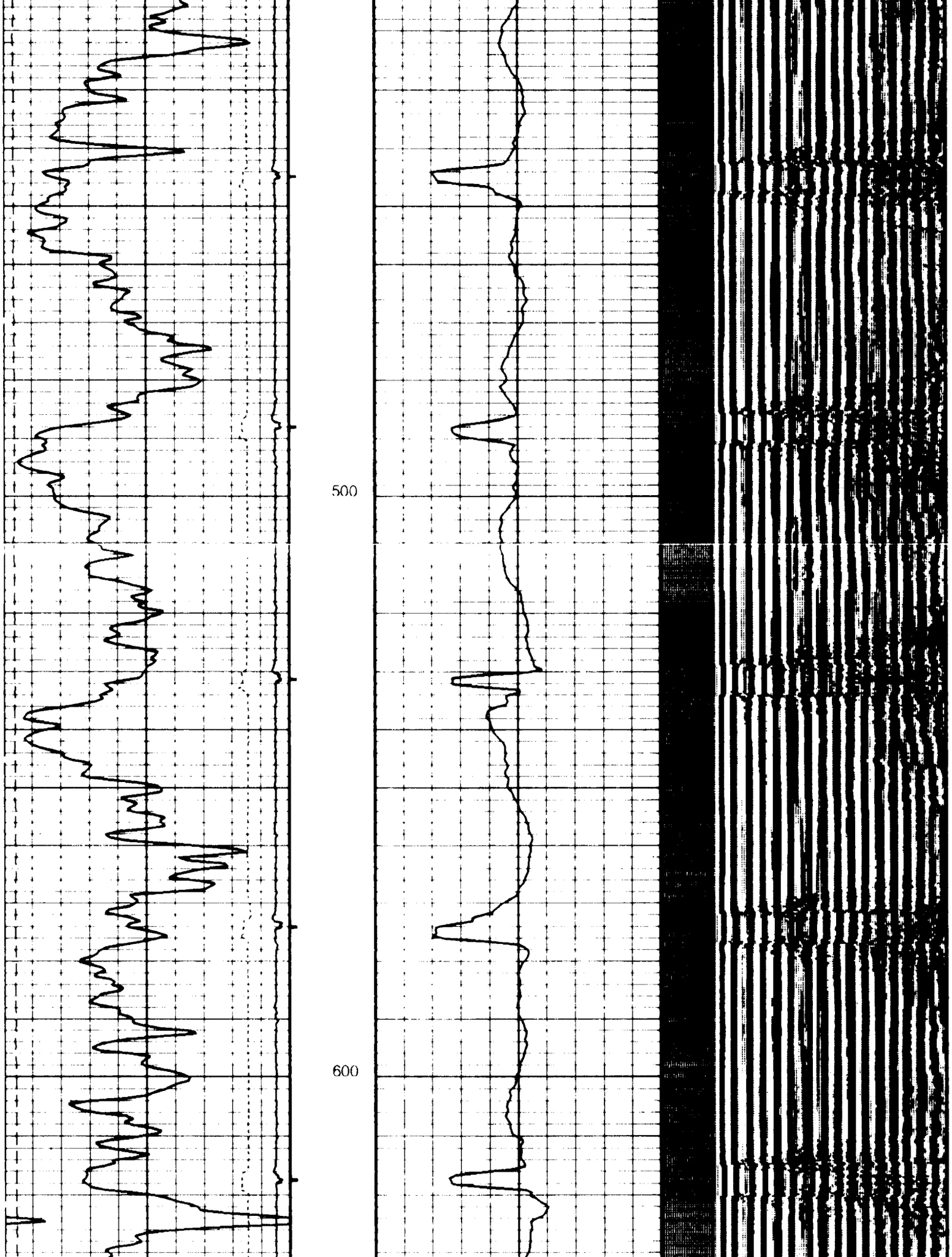
Tension (TENS)
0 (LBF) 4000

CBL Amplitude (SA2)
0 (MV) 100

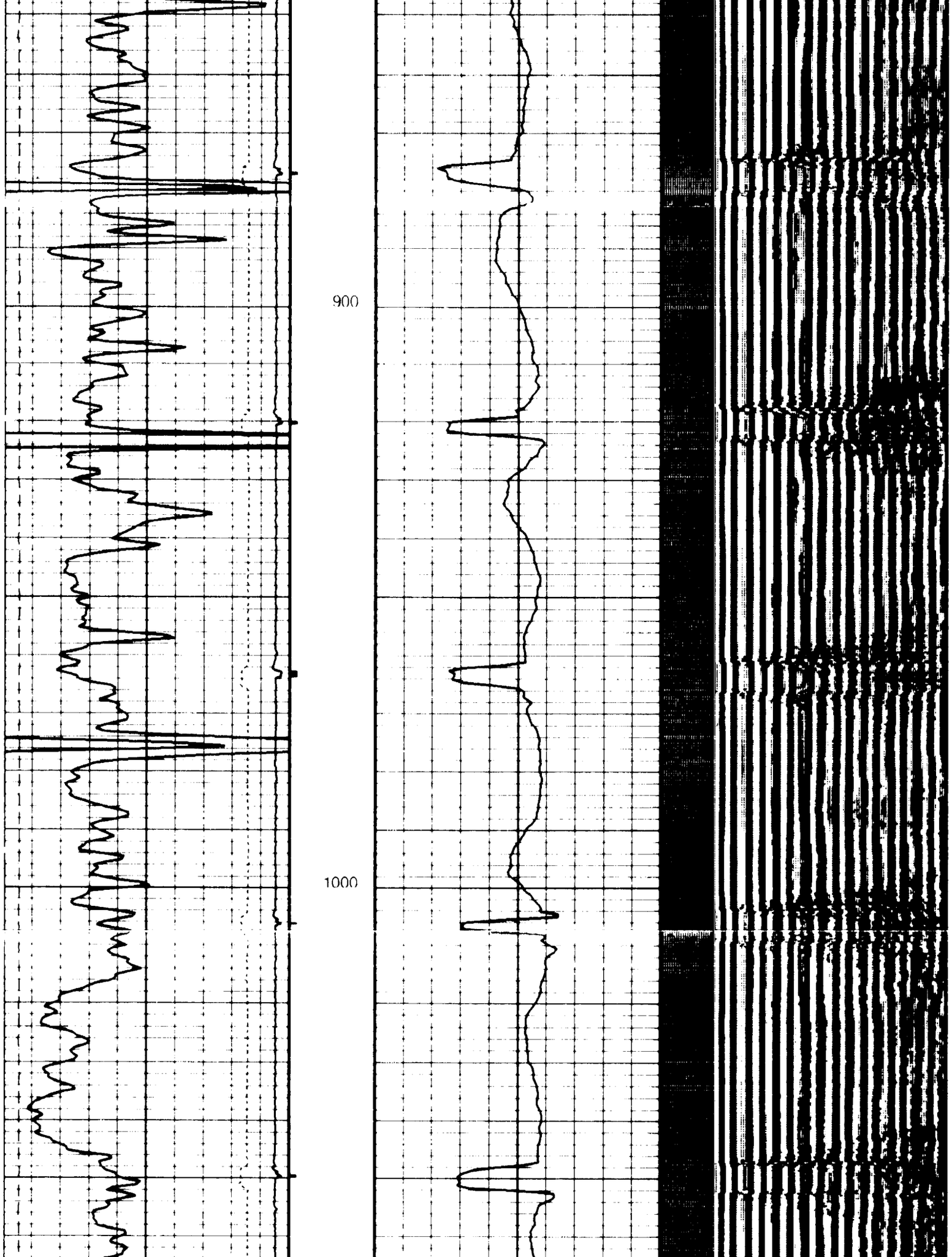
CBL Amplitude (SA2)
0 (MV) 20

Min Amplitude Max

VDL VariableDensity (VDL)
200 (US) 1200


500
600

700
800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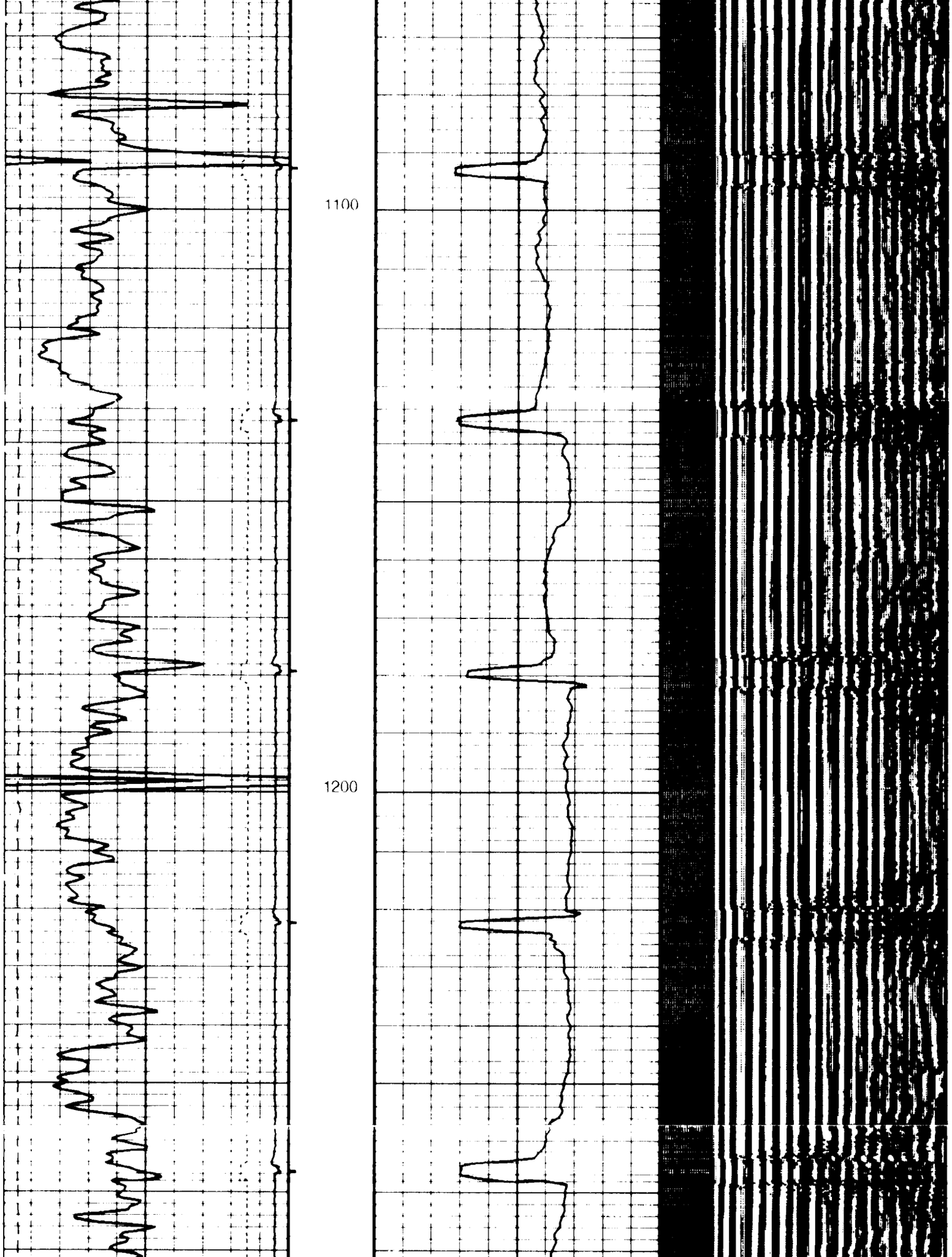
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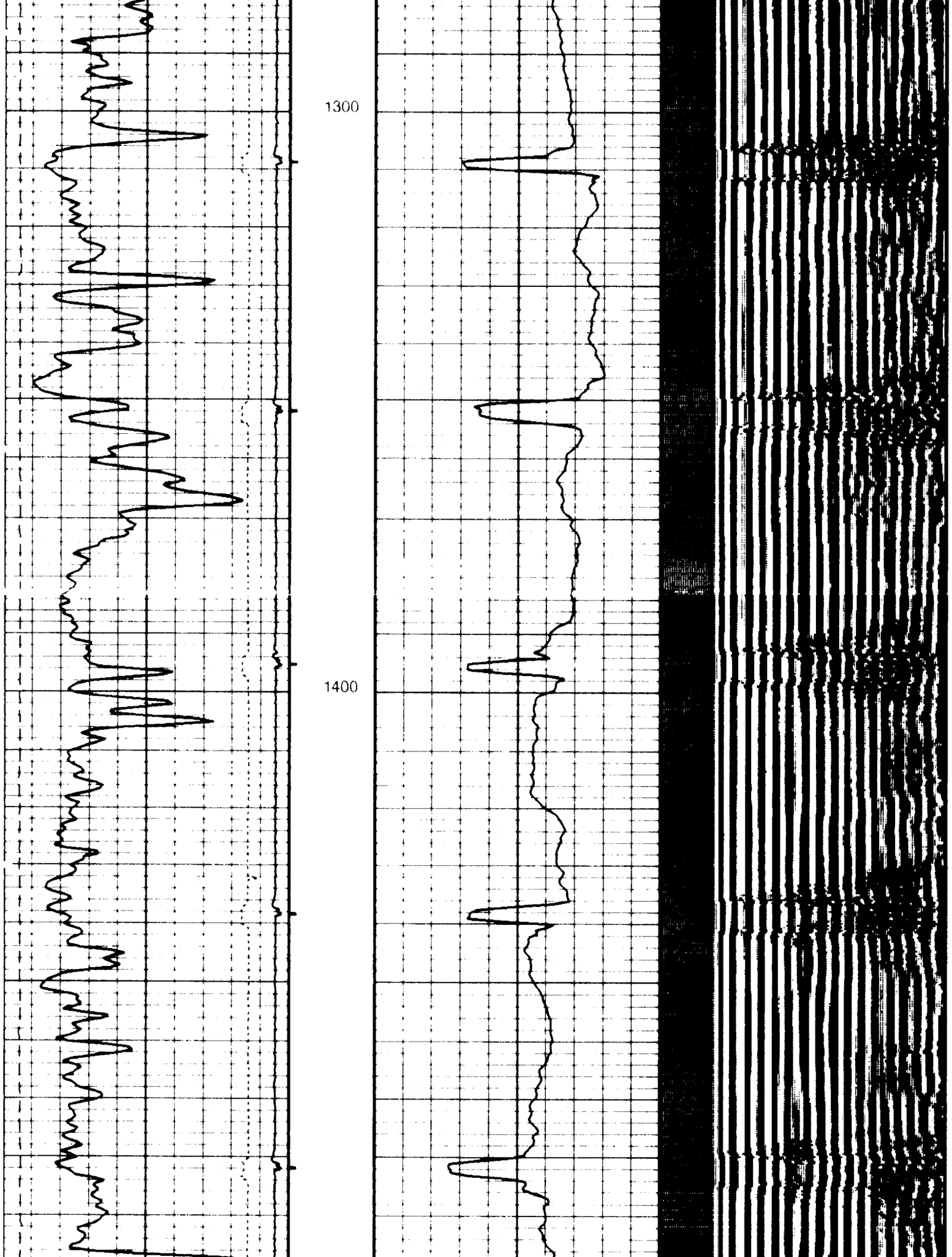
1200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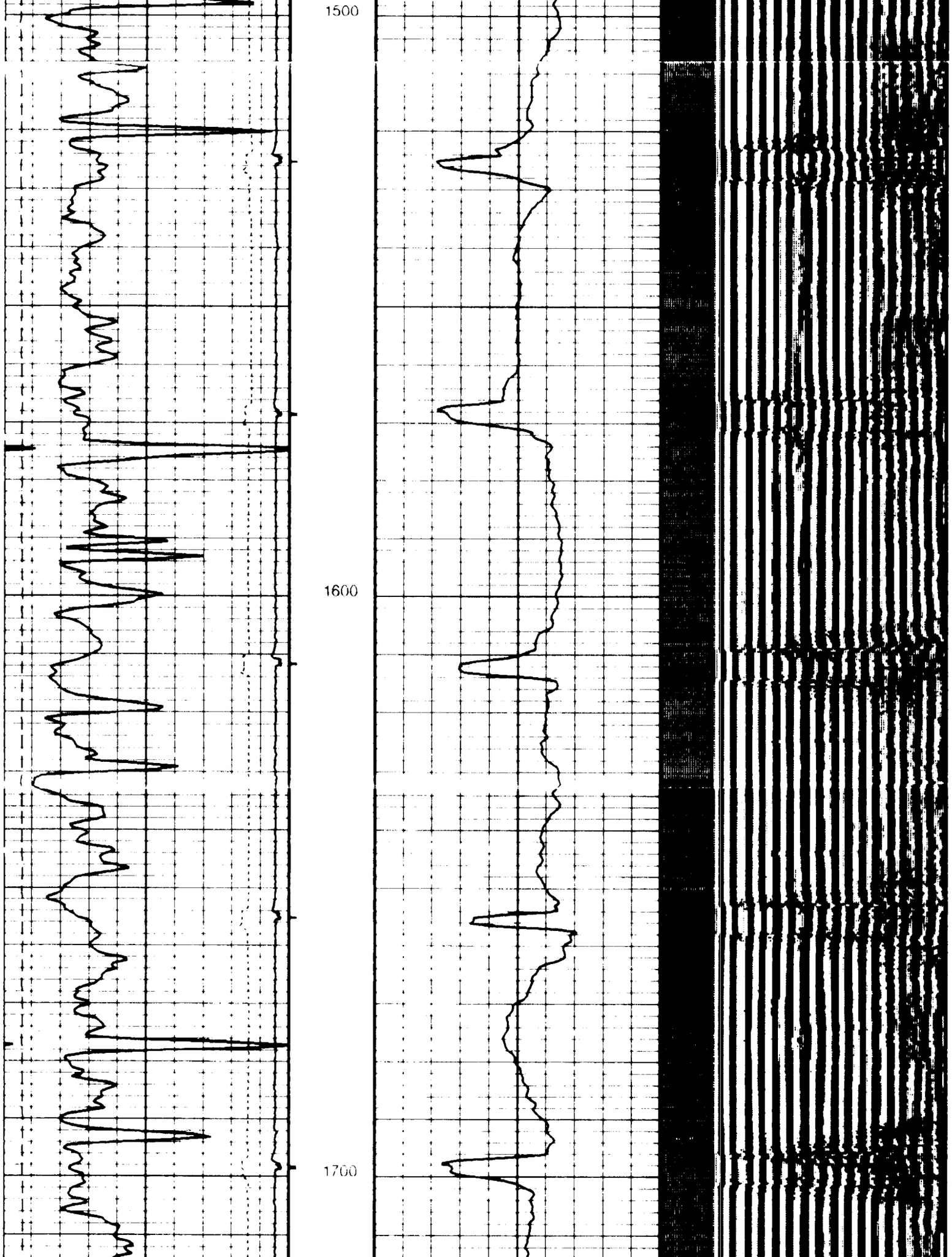
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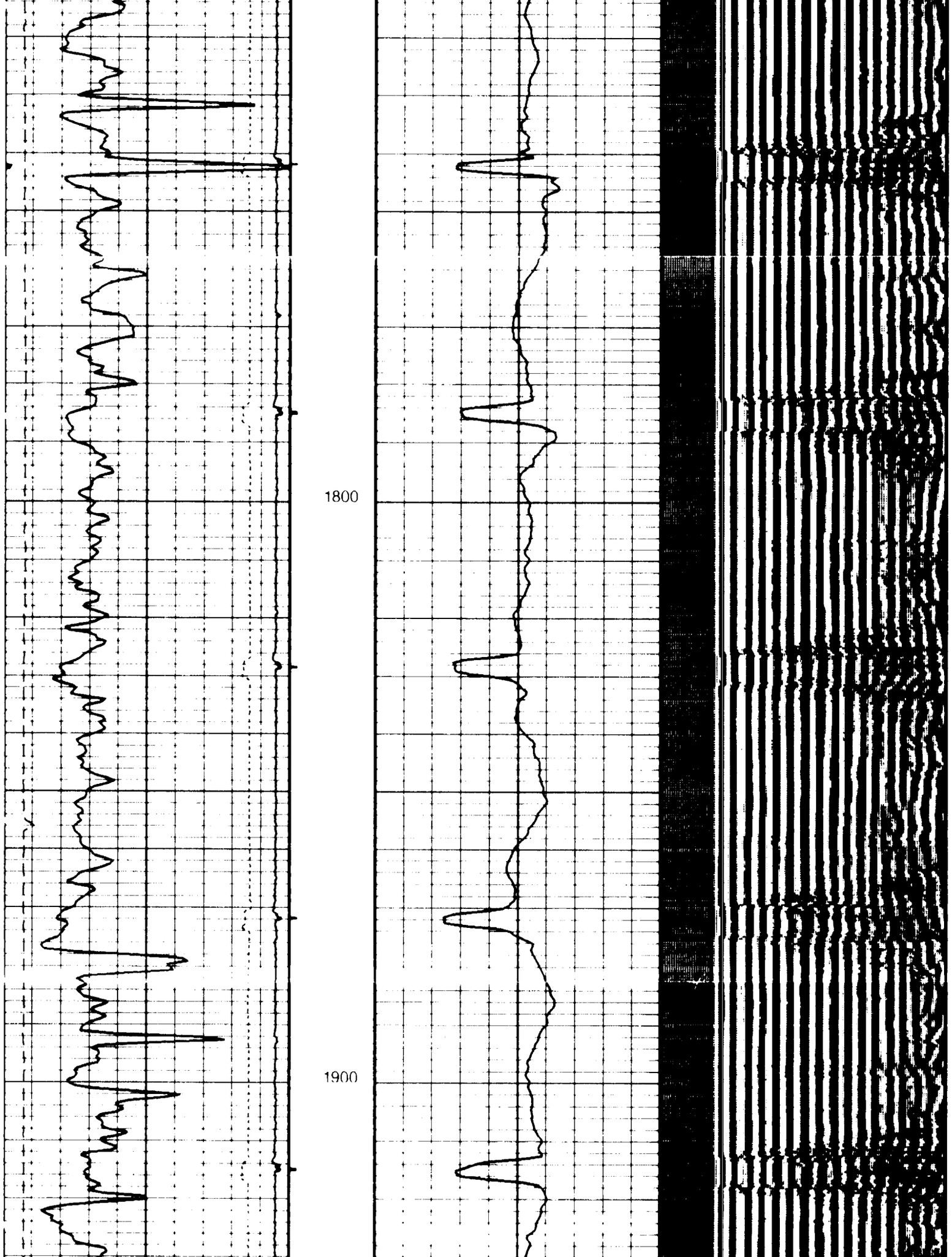
1700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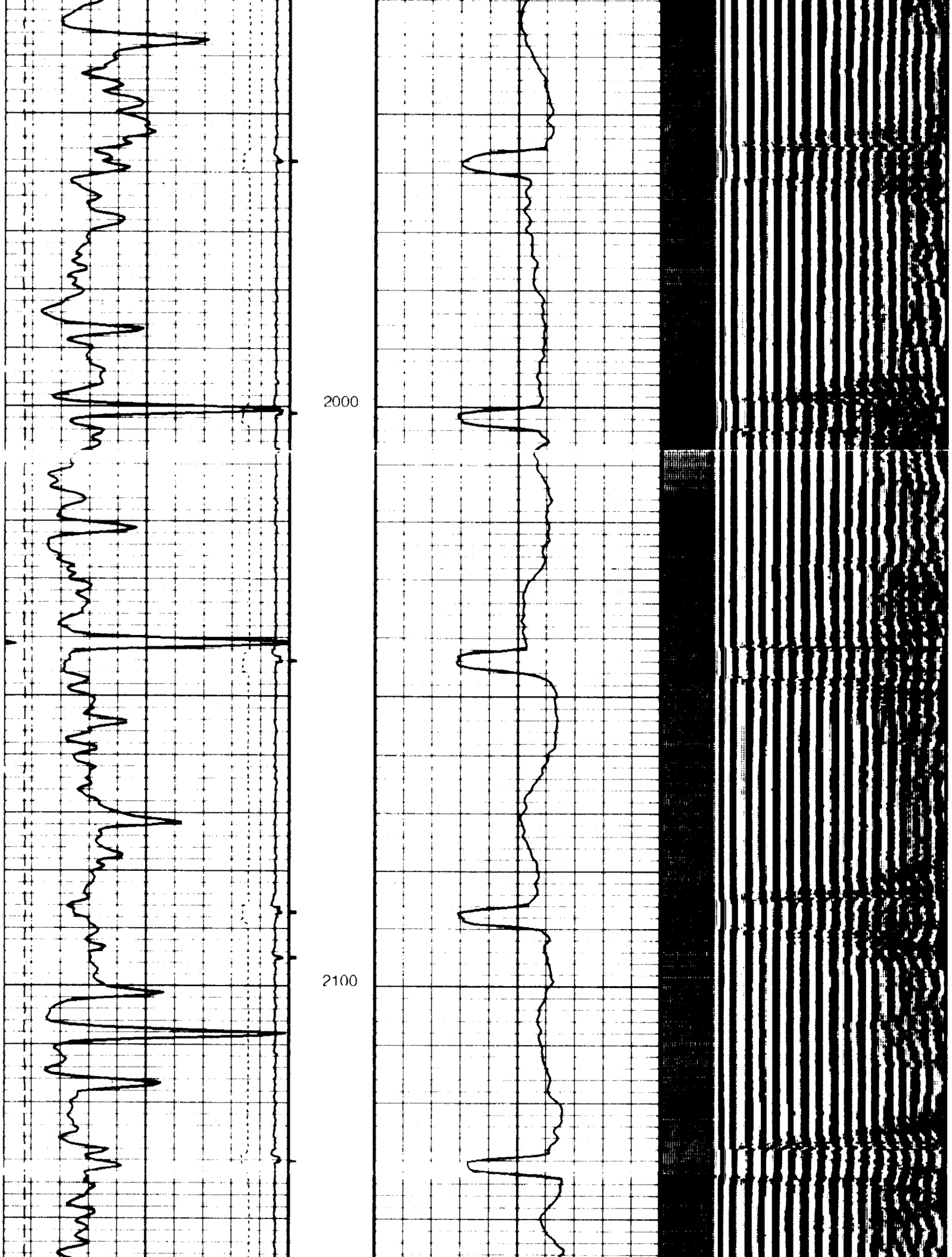
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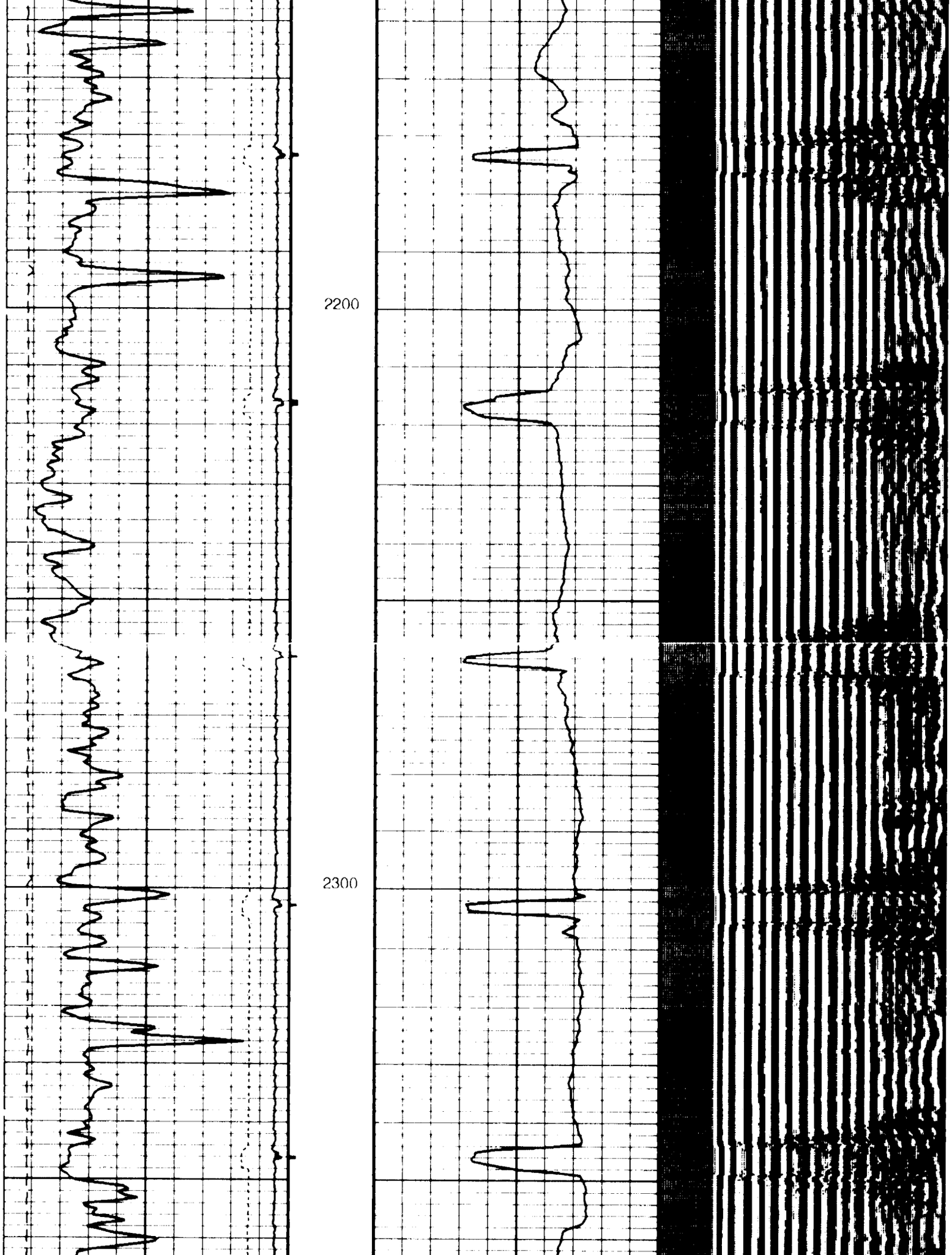
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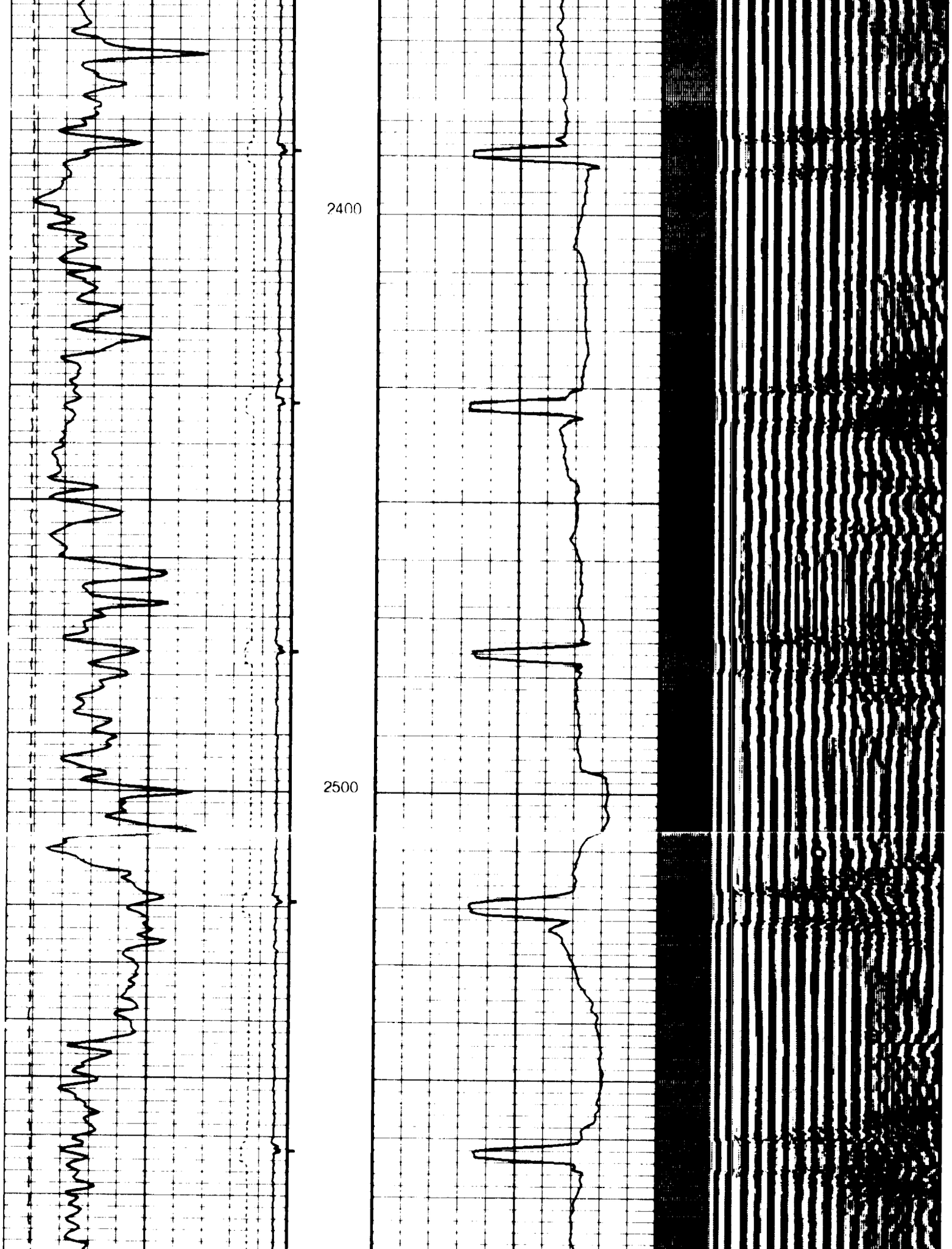
2300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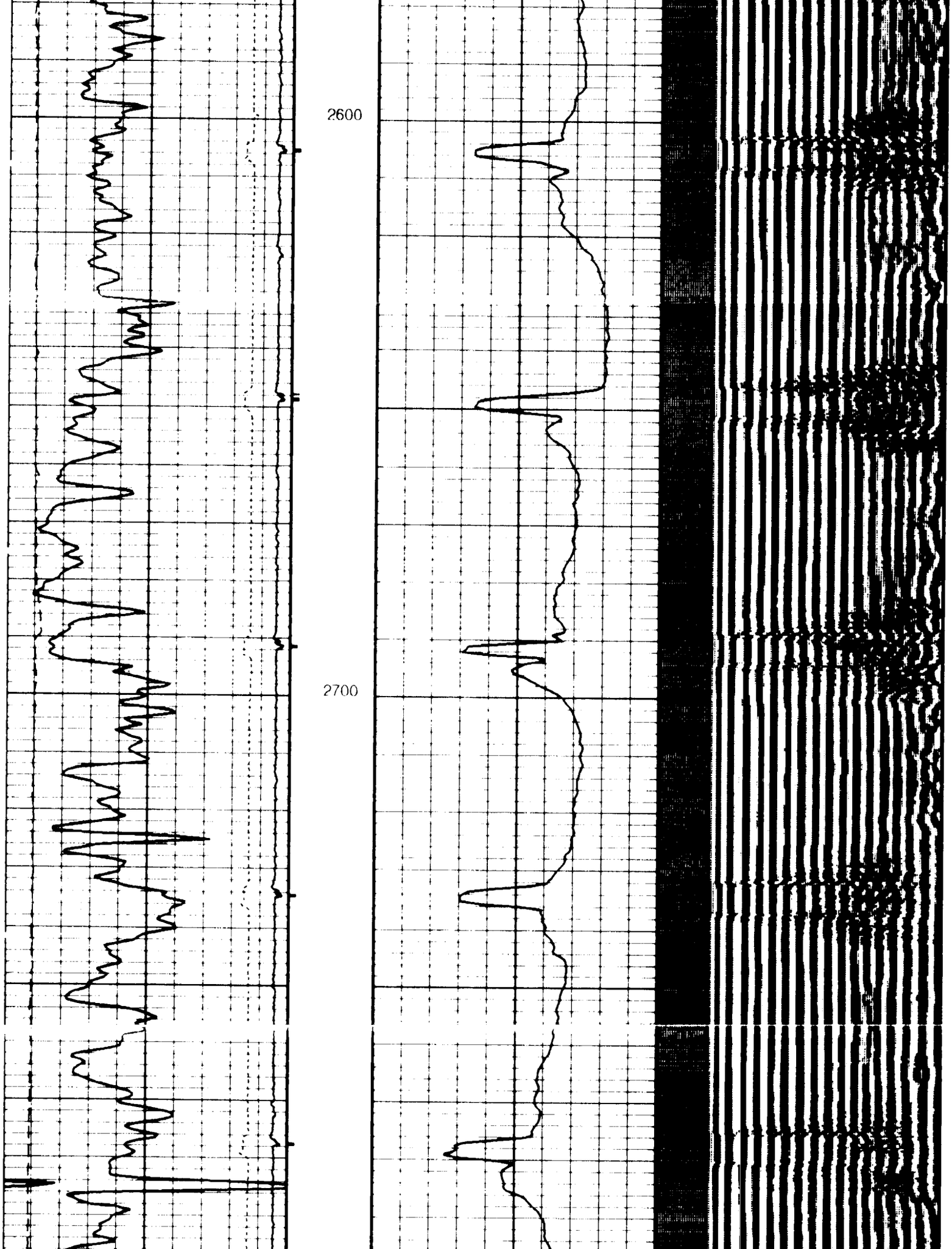
2500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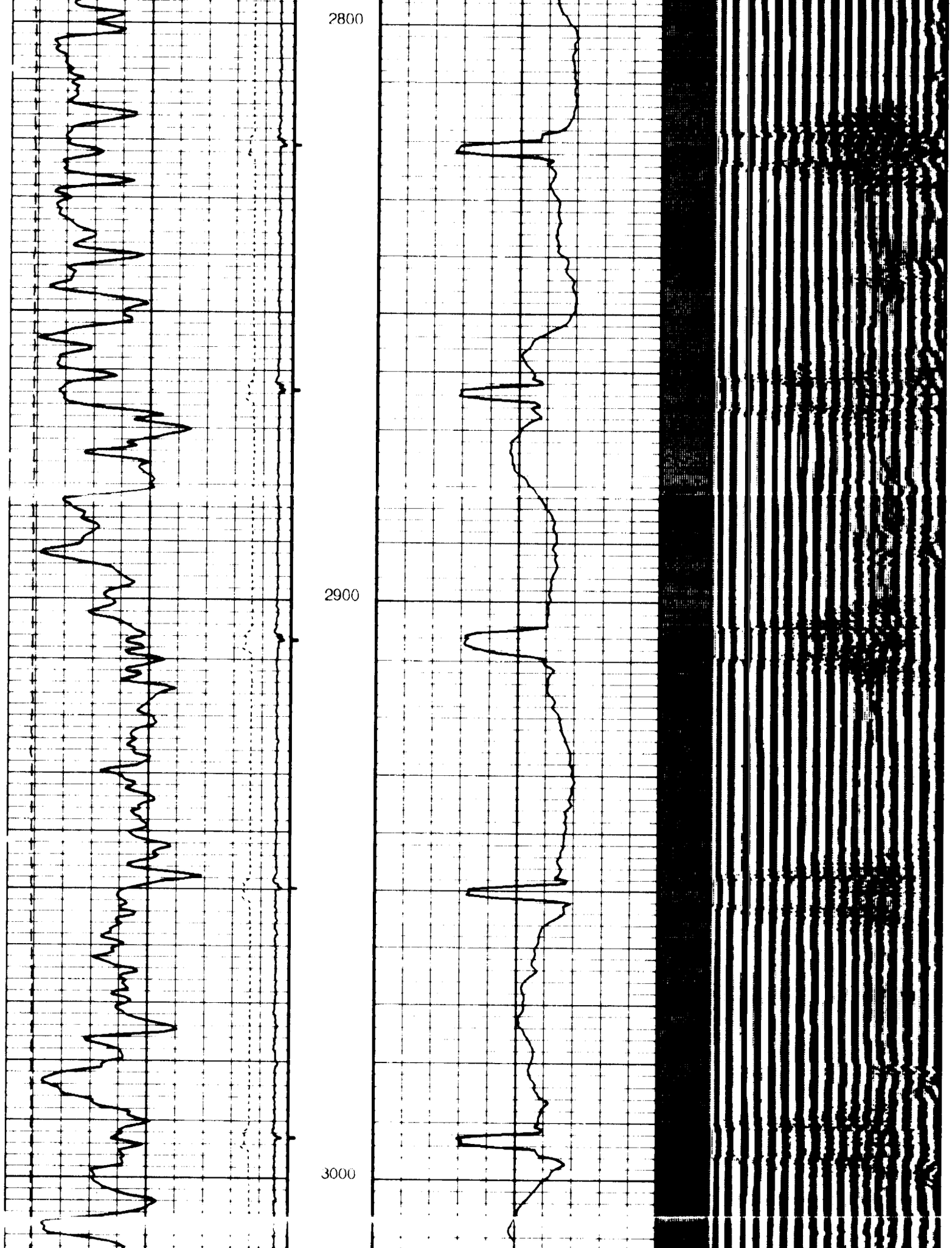
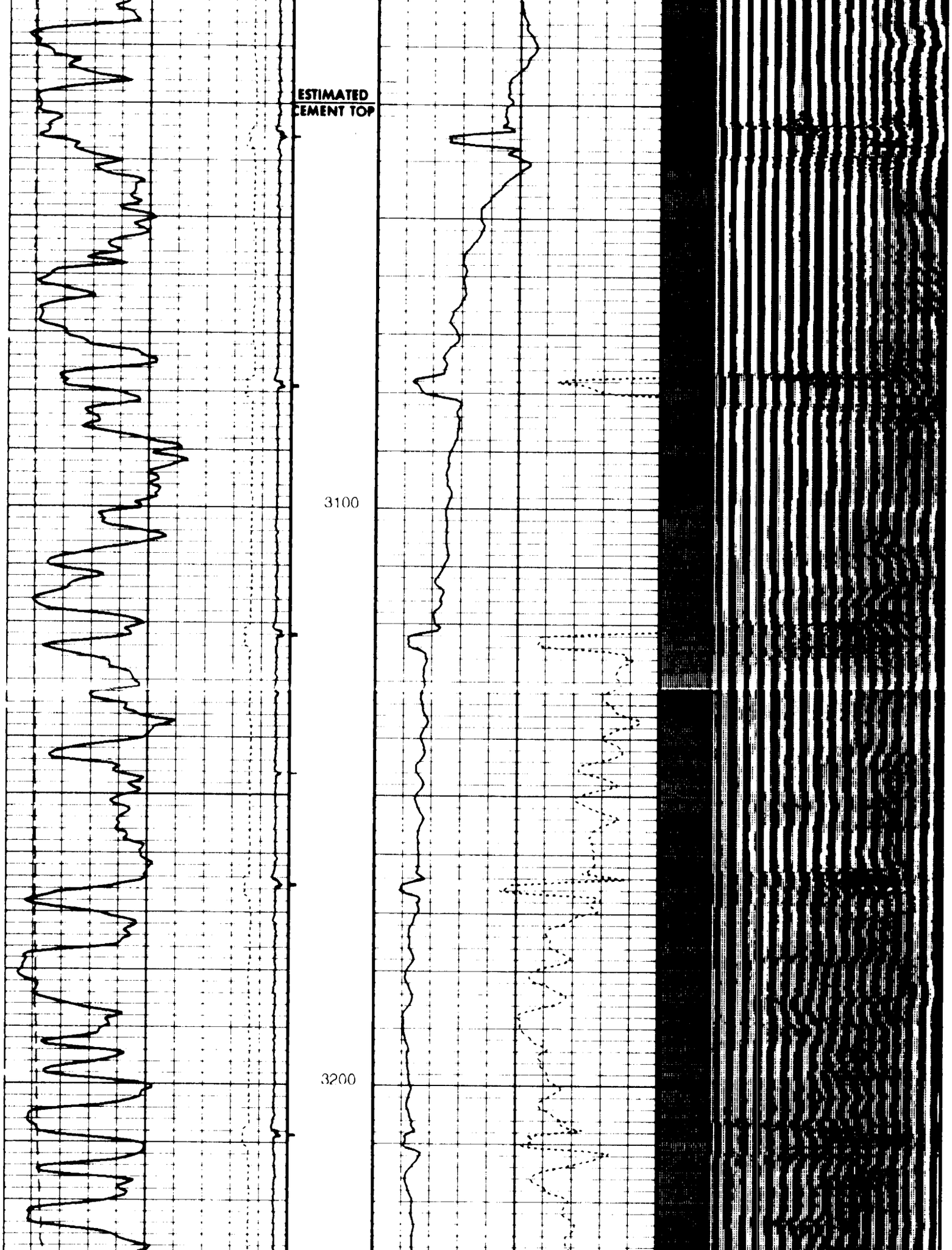
2700

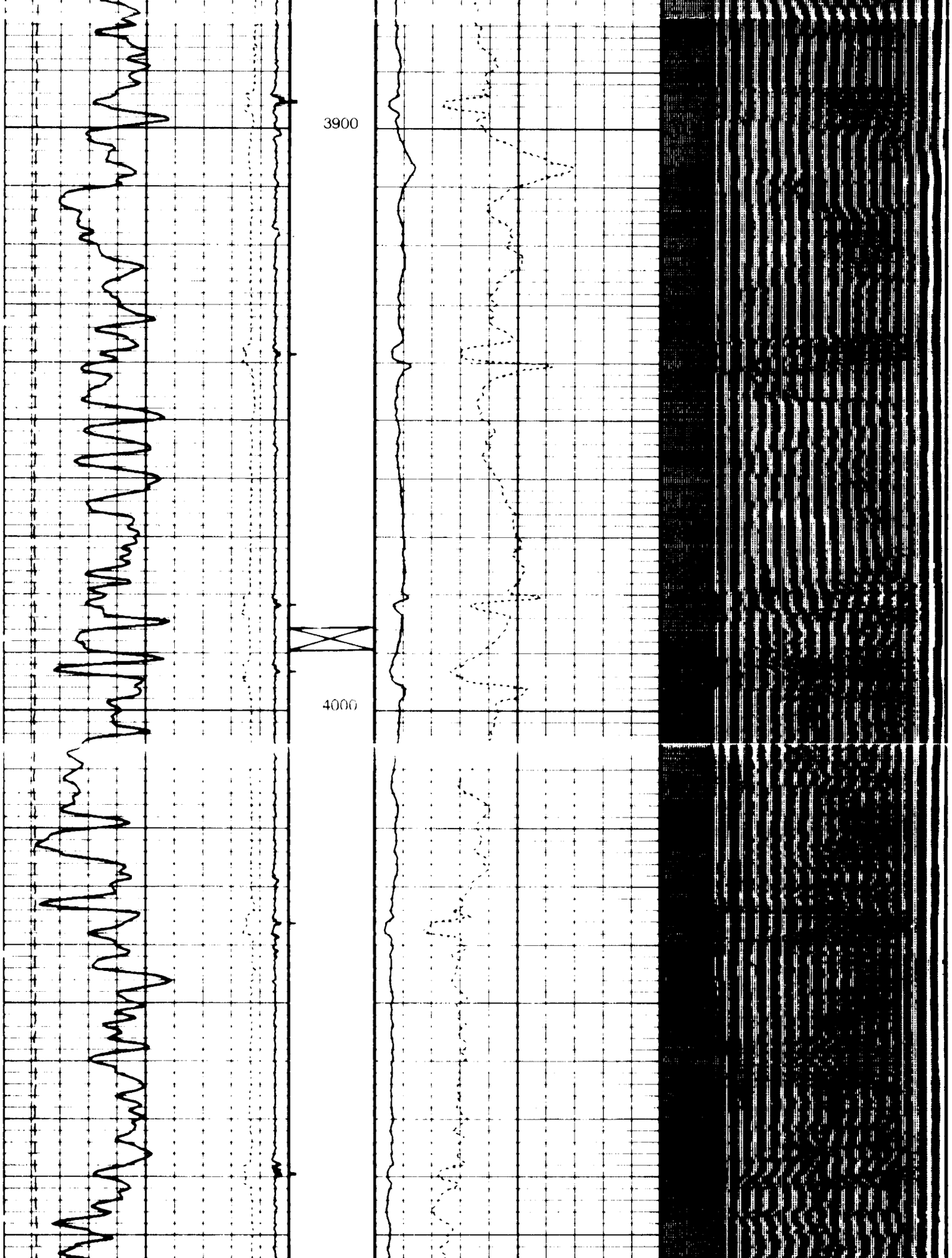

2800
2900
3000


ESTIMATED
CEMENT TOP
3100
3200

3300
3400

3500
3600

3700
3800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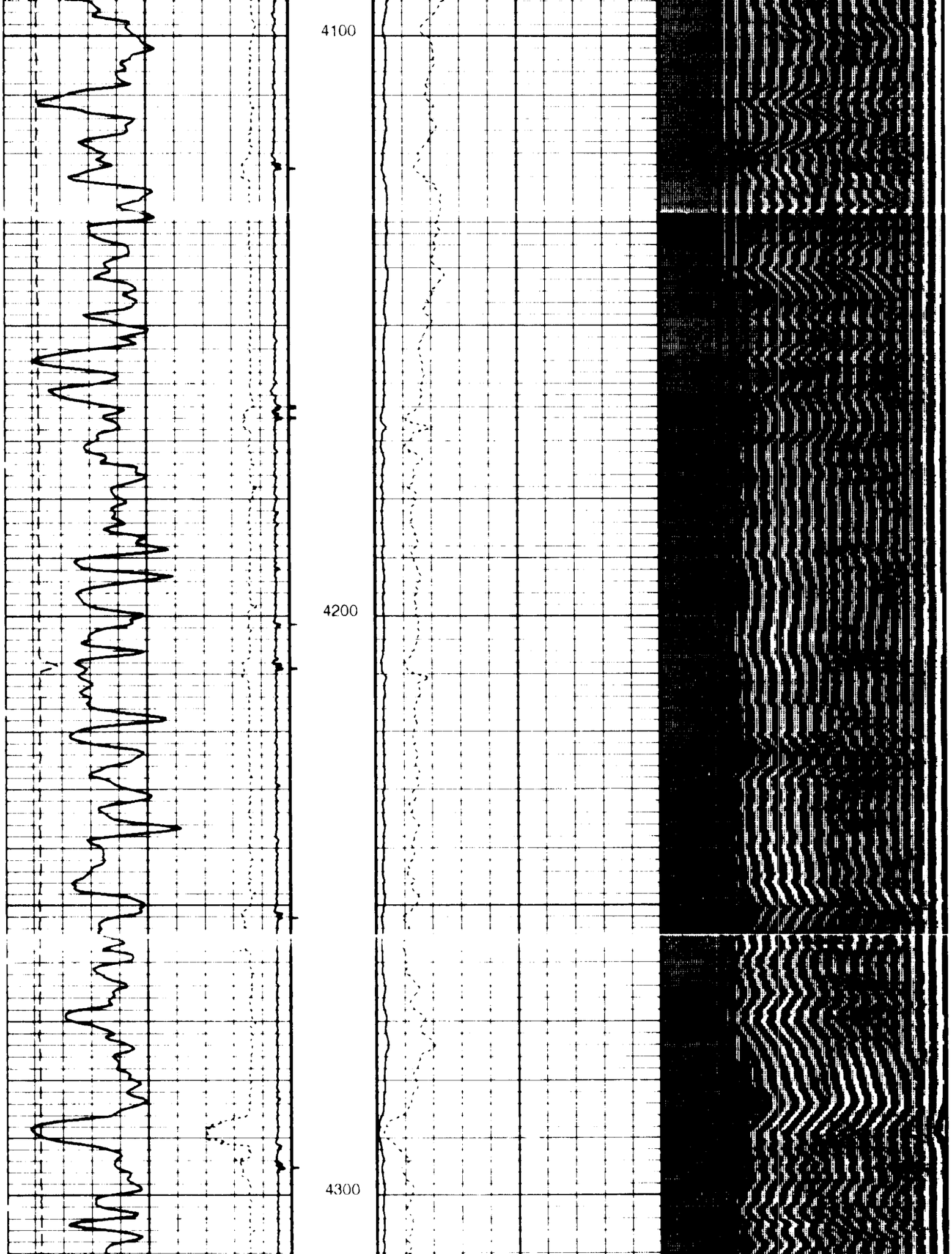
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4200
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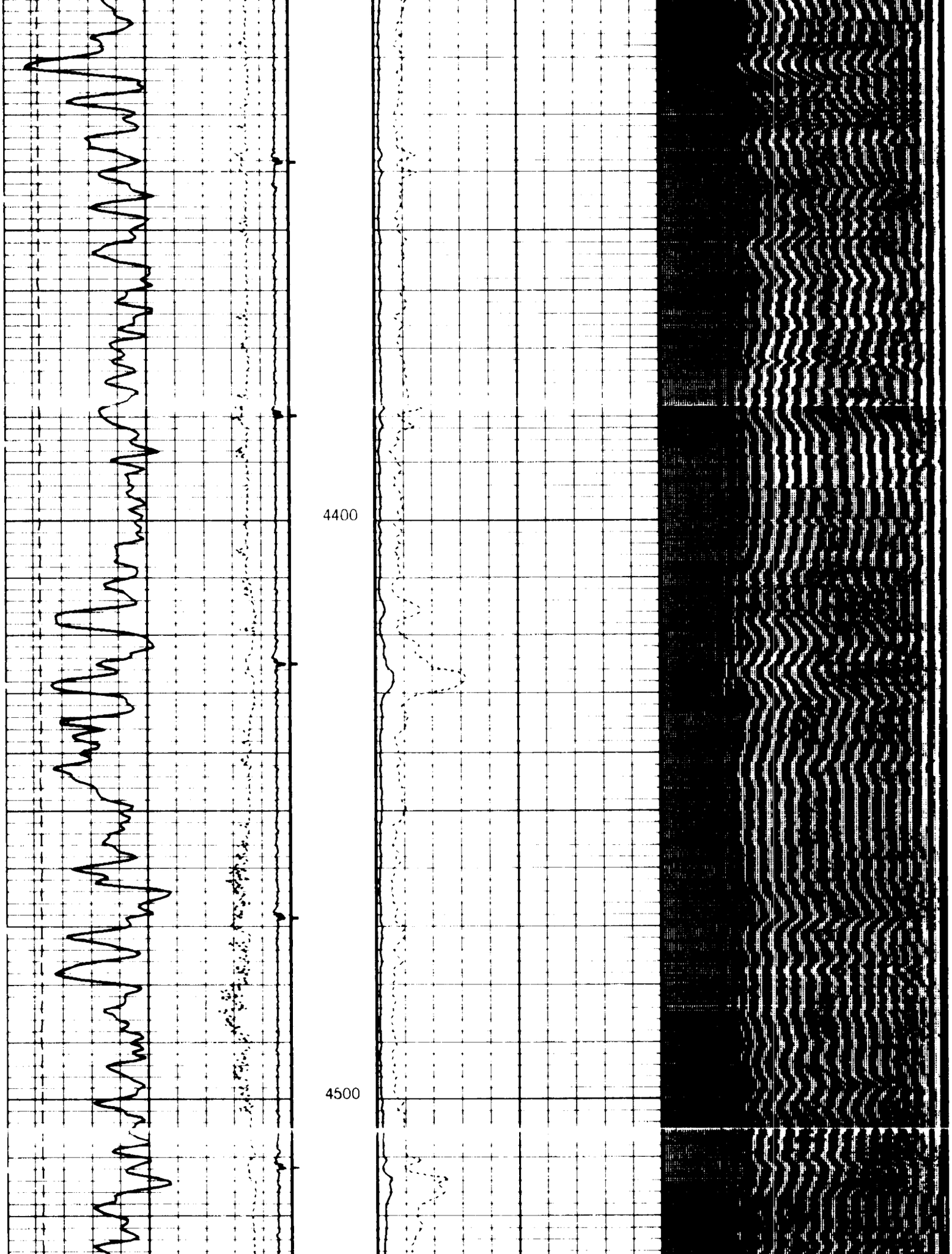
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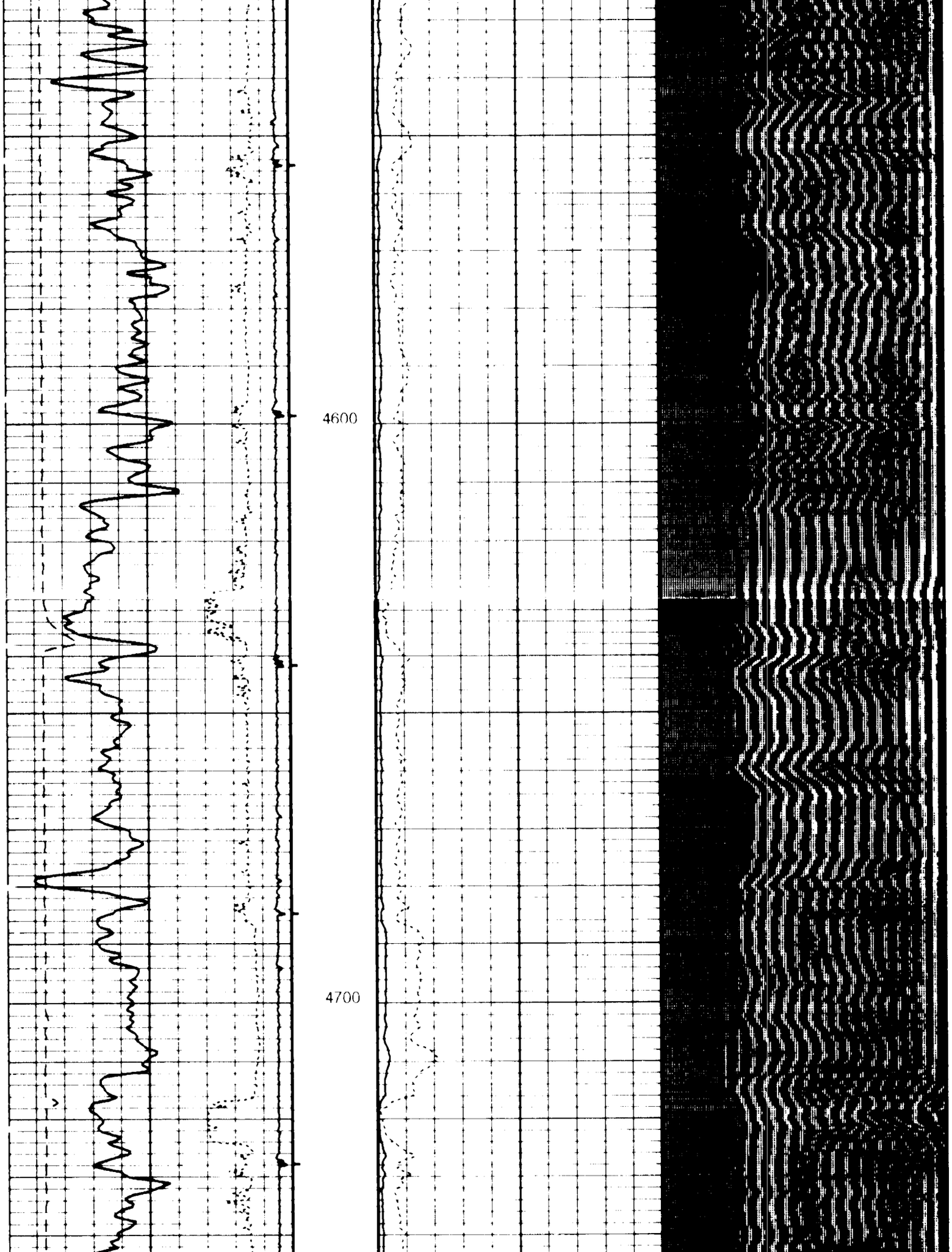
4500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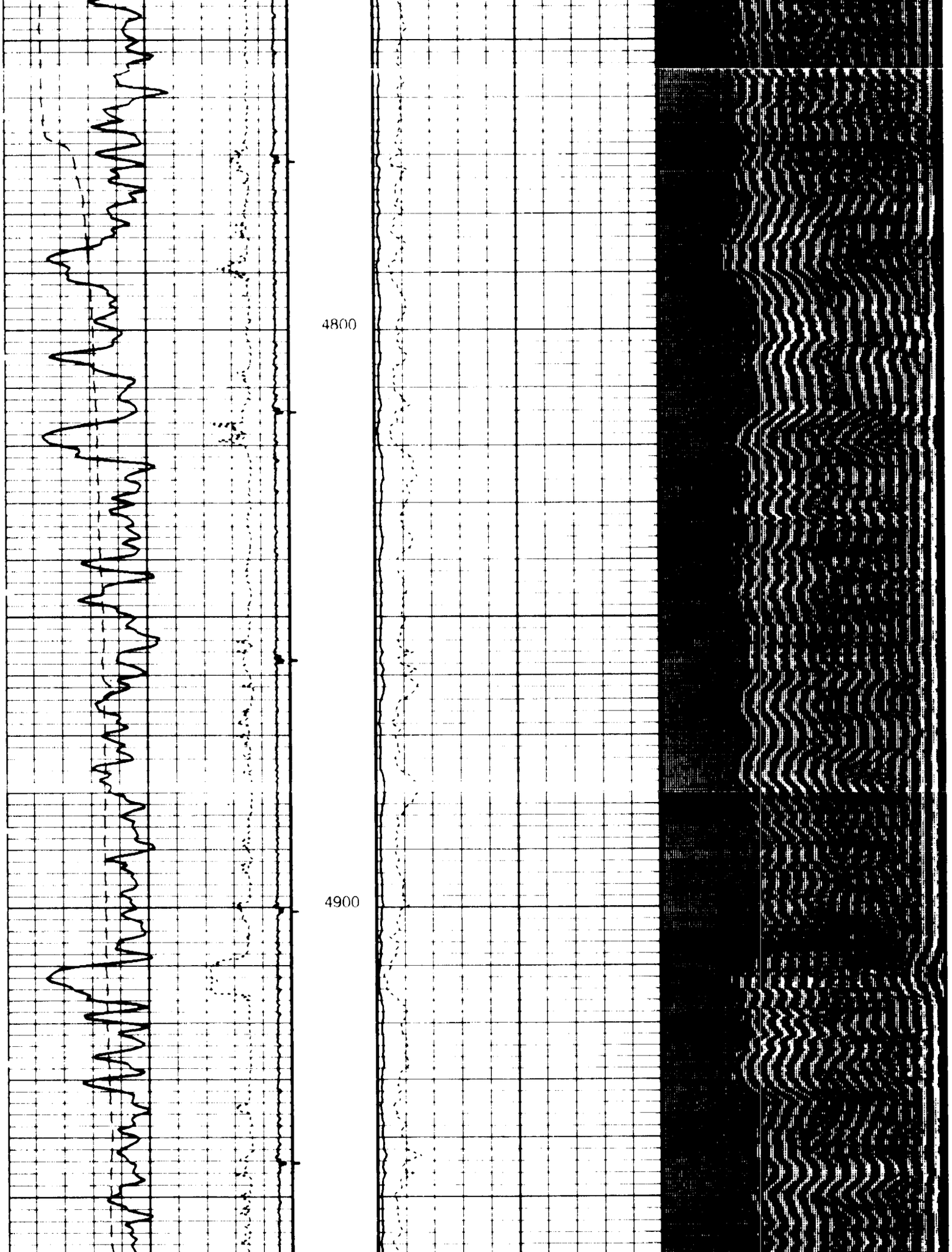
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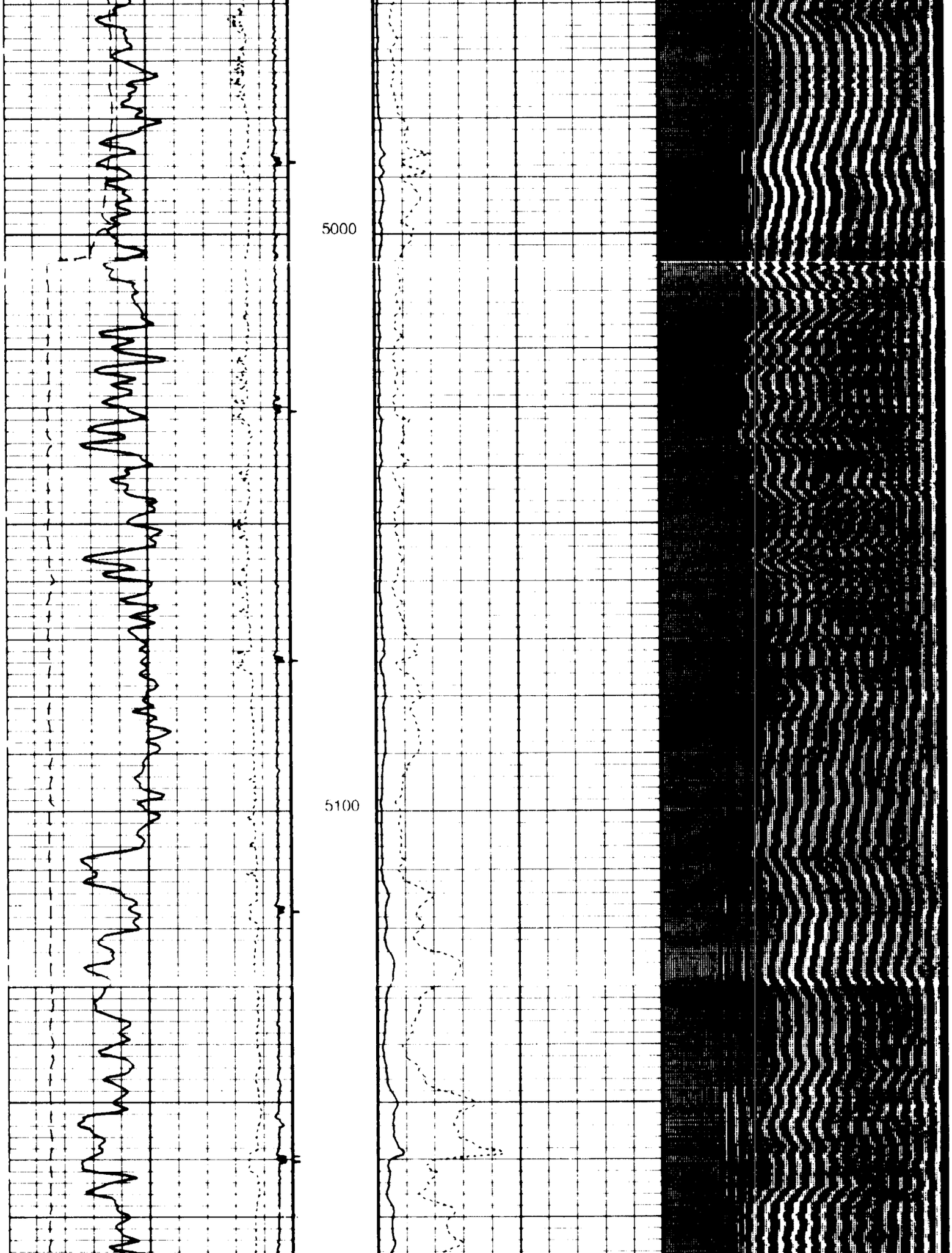
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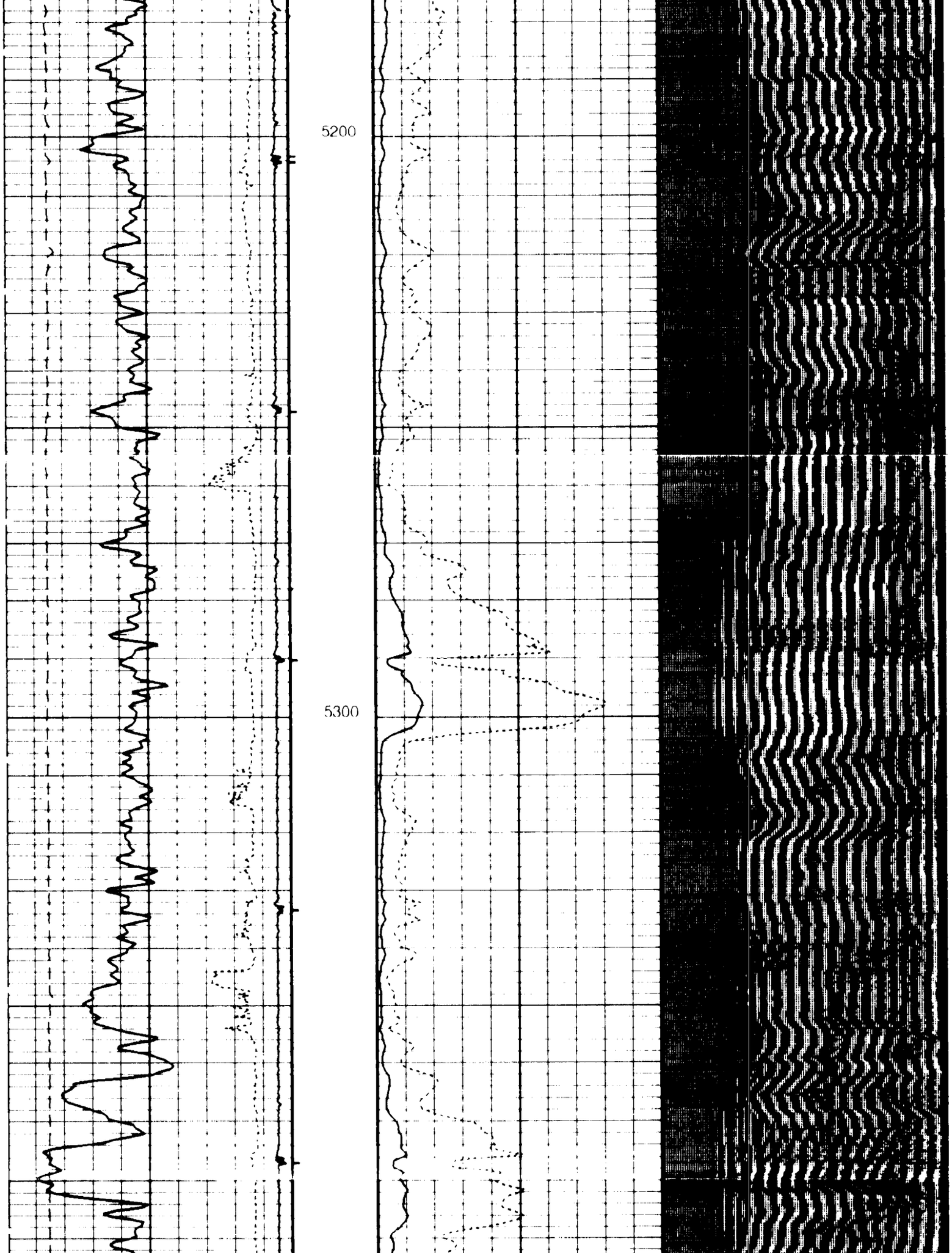
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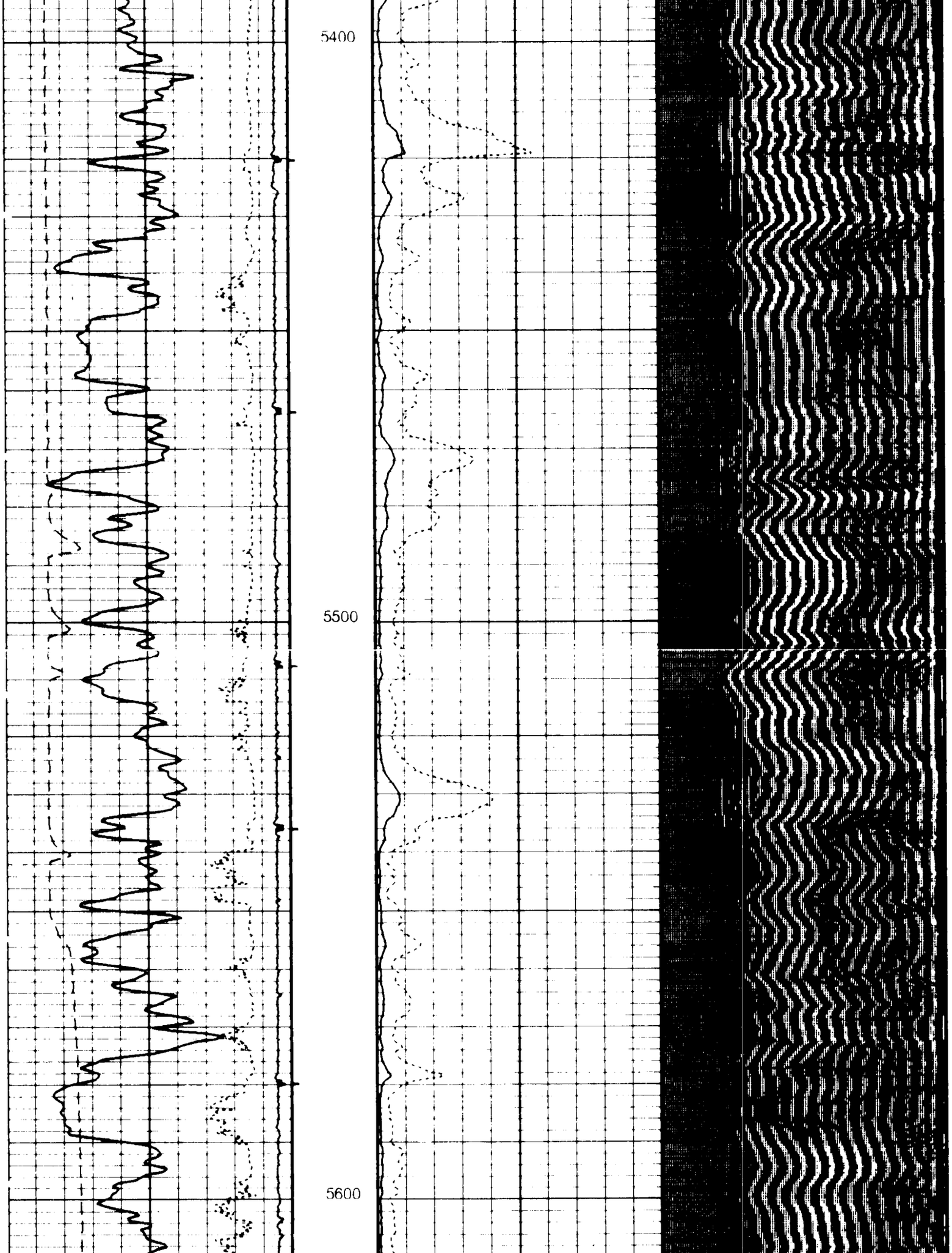
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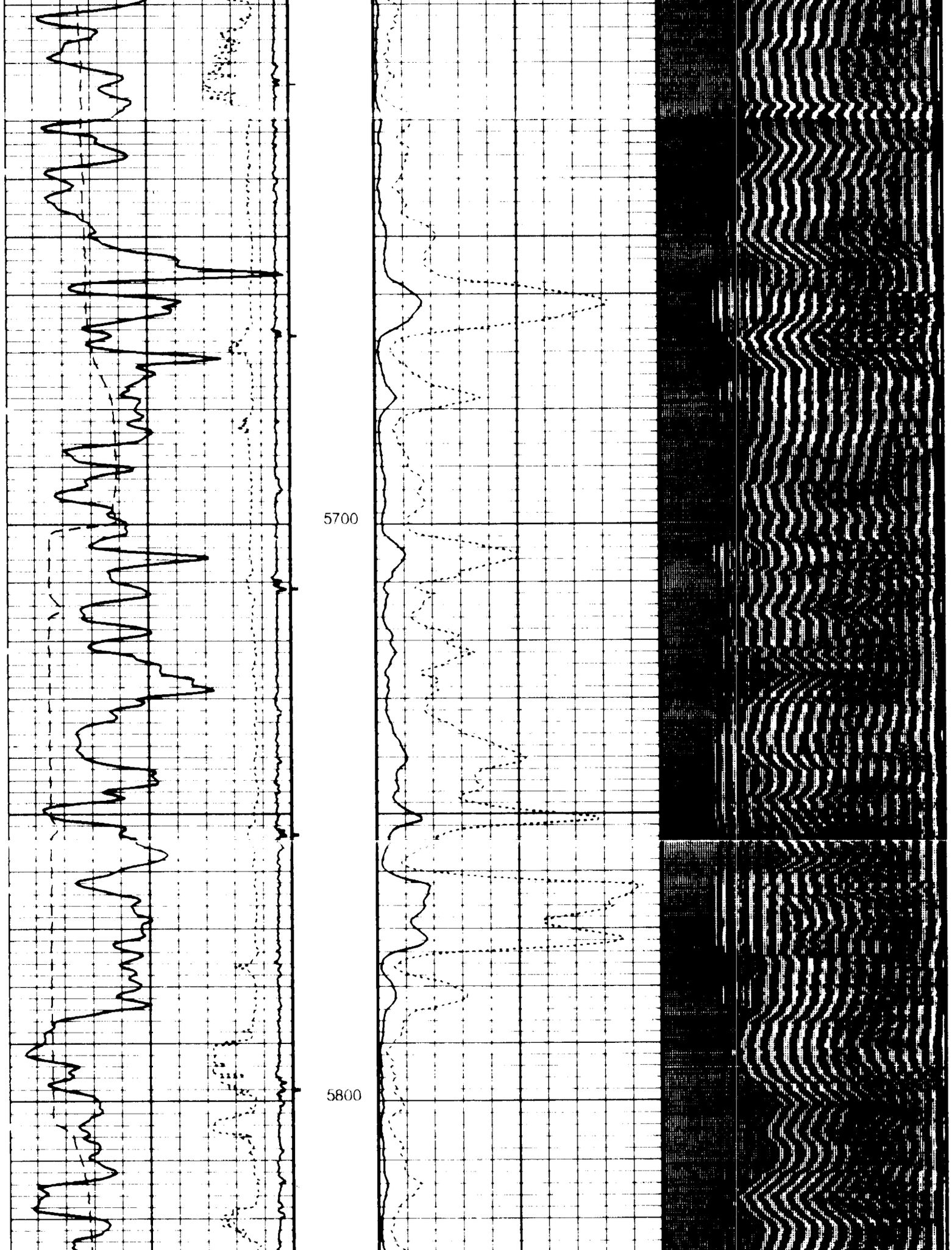
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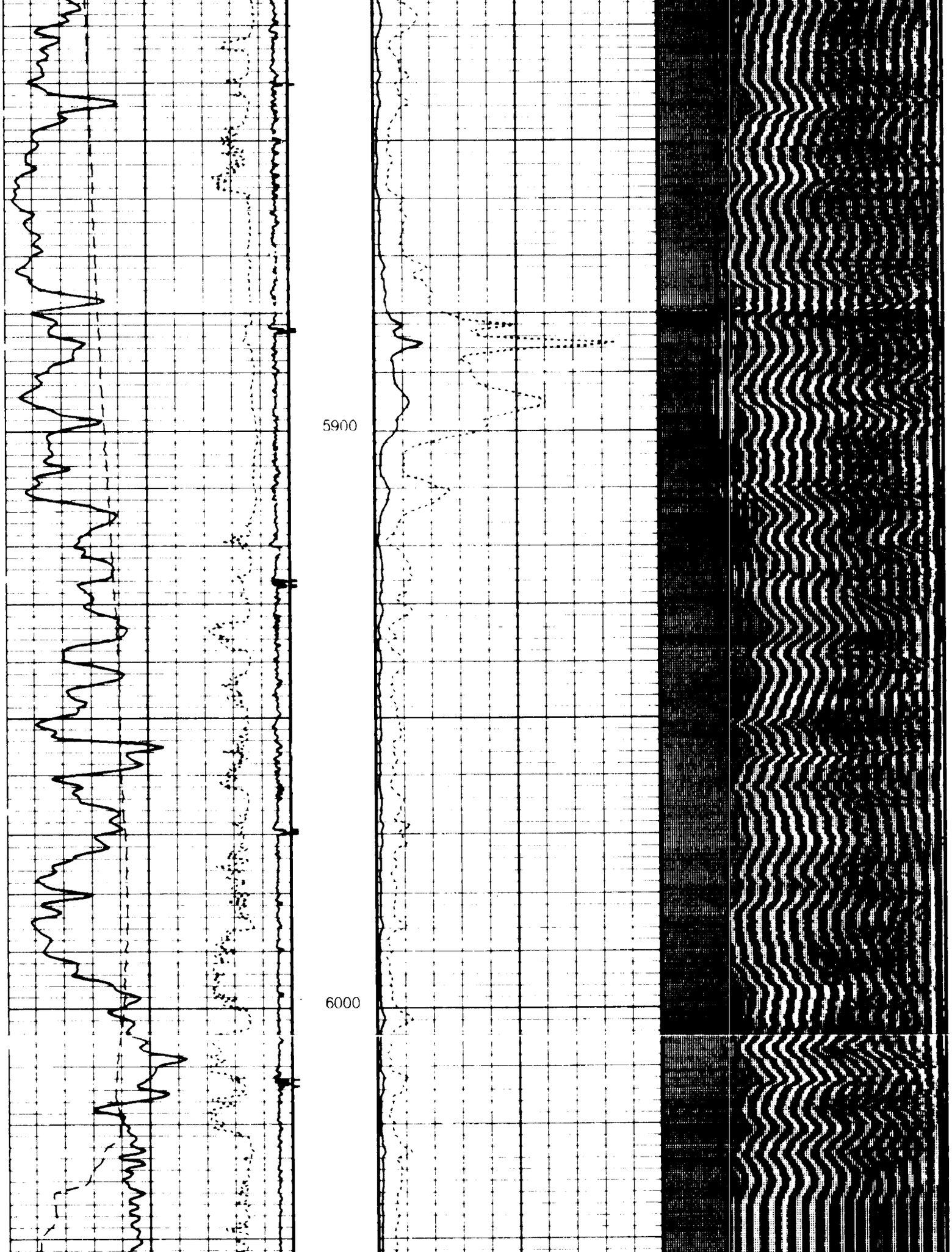
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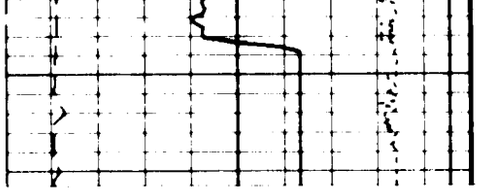
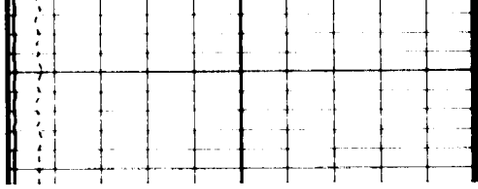
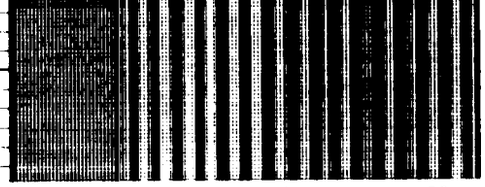






Tension (TENS)
0 (LBF) 4000

CBL Amplitude (SA2)
0 (MV) 20

Min Amplitude Max
VDL VariableDensity (VDL)
200 (US) 1200

Transit Time 2 (TT2)
430 (US) 230

CBL Amplitude (SA2)
0 (MV) 100

Casing Collar Locator (CCL)
-19 (----) 1

Gamma Ray (GR)
0 (GAPI) 150

PIP SUMMARY

⊢ Casing Collars

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value
CCLD	CCL reset delay	12 IN
CCLT	CCL detection level	0.3 V

Format: CBL_VDL Vertical Scale: 5" per 100' Graphics File Created: 14-Aug-1996 13:44

OP System Version: 8B0-430

MCM

SLT-J	8B0-430	SGT-G	8B0-430
CCL-AJ	8B0-430		

Output DLIS Files

DEFAULT SLTJ .003 FN:2 FIELD 14-Aug-1996 13:44

Output DLIS Files

DEFAULT SLTJ .002 FN:1 FIELD 14-Aug-1996 13:35 6064.5 FT 5784.5 FT

OP System Version: 8B0-430

MCM

SLT-J	8B0-430	SGT-G	8B0-430
CCL-AJ	8B0-430		

PIP SUMMARY

⊢ Casing Collars

Time Mark Every 60 S

Gamma Ray (GR)
0 (GAPI) 150

Casing Collar Locator (CCL)
-19 (----) 1

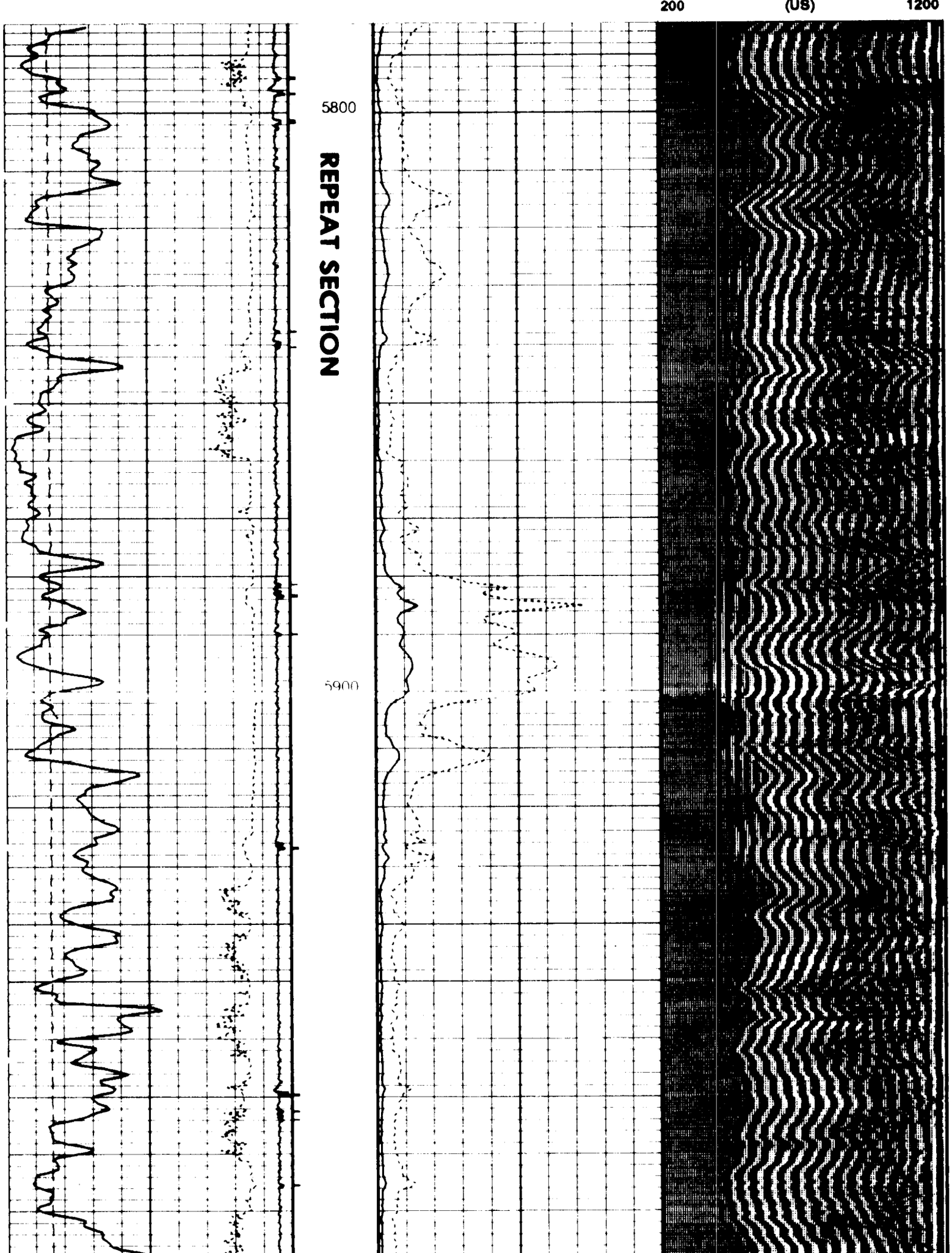
Transit Time 2 (TT2)
430 (US) 230

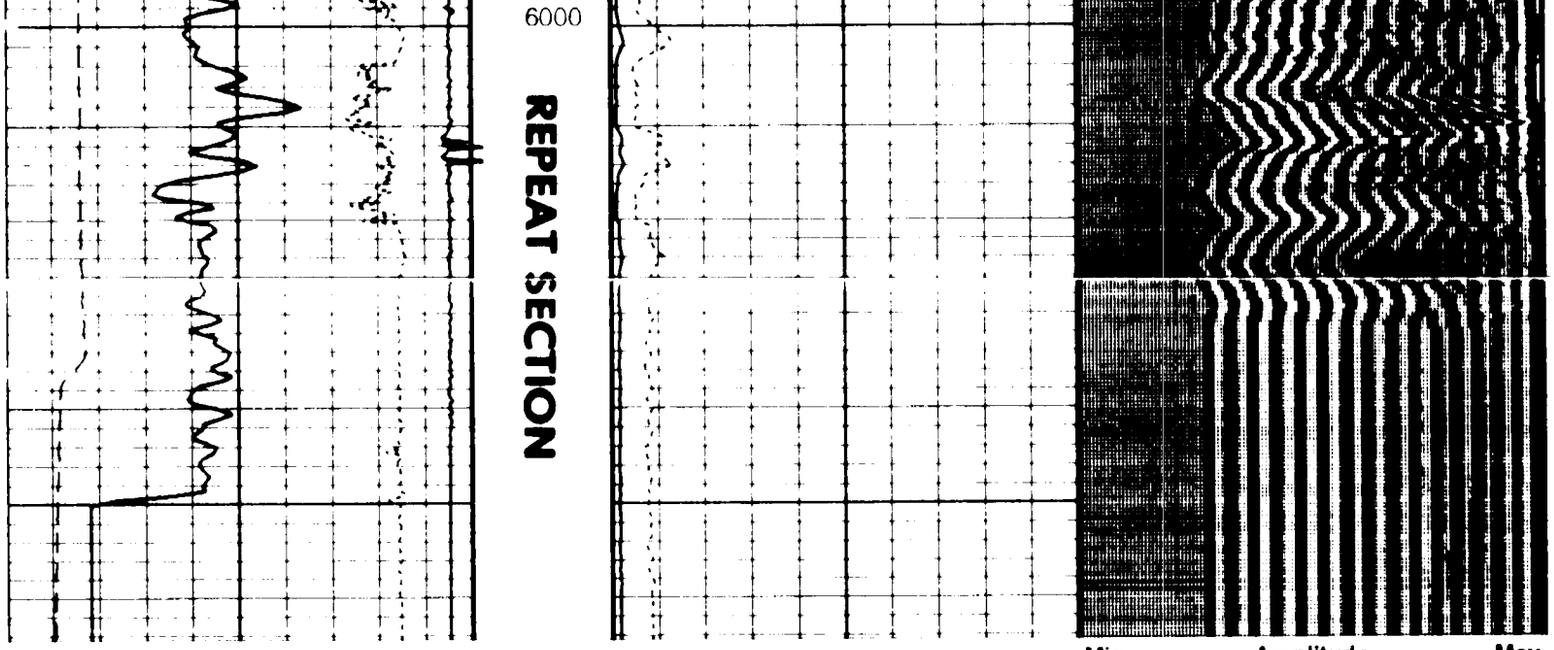
CBL Amplitude (SA2)
0 (MV) 100

Tension (TENS)
0 (LBF) 4000

CBL Amplitude (SA2)
0 (MV) 20

Min Amplitude Max
VDL VariableDensity (VDL)


200
(US)
1200
5800
REPEAT SECTION
5900



Tension (TENS)
0 (LBF) 4000

CBL Amplitude (SA2)
0 (MV) 20

VDL VariableDensity (VDL)
200 (US) 1200

Transit Time 2 (TT2)
430 (US) 230

CBL Amplitude (SA2)
0 (MV) 100

Casing Collar Locator (CCL)
-19 (----) 1

Gamma Ray (GR)
0 (GAPI) 150

PIP SUMMARY

⊢ Casing Collars

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
CCLD	CCL reset delay	12	IN
CCLT	CCL detection level	0.3	V

Format: CBL_VDL Vertical Scale: 5" per 100' Graphics File Created: 14-Aug-1996 13:35

OP System Version: 8B0-430

MCM

SLT-J	8B0-430	SGT-G	8B0-430
CCL-AJ	8B0-430		

Output DLIS Files

DEFAULT SLTJ .002 FN:1 FIELD 14-Aug-1996 13:35

COMPANY	PETOGLYPH OPERATING CO., INC.	BOTTOM LOG INTERVAL	6032 F
		SCHLUMBERGER DEPTH	6032 F
WELL:	UTE TRIBAL 17-05	[illegible]	[illegible]
FIELD:	ANTELOPE CREEK		
COUNTY:	DUCHESNE		
STATE:	UTAH		

CEMENT BOND LOG

Schlumberger

CEMENT BOND LOG WITH GAMMA RAY AND COLLARS

ATTACHMENT NO. 8

OPEN HOLE LOG FOR THE UIC WELL

COMPANY: PETROGLYPH OPERATING COMPANY

WELL: UTE TRIBAL 17-05

FIELD: ANTELOPE CREEK

COUNTY: DUCHESNE STATE: UTAH

Field: ANTELOPE CREEK
Location: 1797' FNL & 620' FWL
Well: UTE TRIBAL 17-05
Company: PETROGLYPH OPERATING CO

Schlumberger

LITHO - DENSITY
COMPENSATED NEUTRON
GAMMA RAY

LOCATION

1797' FNL & 620' FWL	Elev.:	K.B.	6011 F
SW / NW		G.L.	6001 F
		D.F.	6010 F

Permanent Datum:	GROUND LEVEL	Elev.:	6001 F
Log Measured From:	KELLY BUSHING	10.0 F	above Perm. Datum
Drilling Measured From:	KELLY BUSHING		33 CC

API Serial No.	SECTION	TOWNSHIP	RANGE
43-013-31674	9	5 S	3 W

	Run 1	Run 2	Run 3
Logging Date	1-AUG-1996		
Run Number	ONE		
Depth Driller	6113 F		
Schlumberger Depth	6106 F		
Bottom Log Interval	6060 F		
Top Log Interval	388 F		
Casing Driller Size @ Depth	8.625 IN @ 388 F	@	
Casing Schlumberger	388 F		
Bit Size	7.875 IN		
Type Fluid In Hole	KCL WATER		
MUD Density / Viscosity	8.3 LB/G / 27 S		
MUD Fluid Loss / PH	/ 10.6		
Source Of Sample	MUD TANK		
RM @ Measured Temperature	1.890 OHMM @ 73 DEGF	@	
RMF @ Measured Temperature	1.890 OHMM @ 73 DEGF	@	
RMC @ Measured Temperature	@	@	
Source RMF / RMC			
RM @ MRT / RMF @ MRT	0.974 @ 148 / 0.974 @ 148	@ / @	@
Maximum Recorded Temperatures	148 DEGF		
Circulation Stopped / Time	1-AUG-1996 / 6:30		
Logger On Bottom / Time	1-AUG-1996 / 13:13		
Unit Number / Location	8426 / VERNAL, UTAH		
Recorded By	MARVIN O. JOST		
Witnessed By	MR. KENT STRINGHAM		

Run 4

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OTHER SERVICES1	OTHER SERVICES2
OS1: AIT	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:

REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
TWO 1.5 INCH STANDOFFS RUN ON AIT FOR CENTRALIZATION.	
BOWSPRING RUN ON CNL.	
SANDSTONE MATRIX, MDEN = 2.68 G/CC.	
THANK YOU FOR USING SCHLUMBERGER !!	
SCHLUMBERGER CREW: J. SUNKEES	
S. OAKS	

RUN 1		RUN 2	
SERVICE ORDER #:	670182	SERVICE ORDER #:	
PROGRAM VERSION:	7C0-427	PROGRAM VERSION:	
FLUID LEVEL:		FLUID LEVEL:	

LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1 | RUN 2

SURFACE EQUIPMENT

CNB-AB 4209 TCM-AB
NCT-B 320
NCS-VB
GSR-U/Y

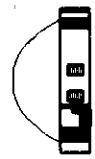
DOWNHOLE EQUIPMENT

PEH-A PEH-A				76.7
AH-64				74.9
TCC-B ECH-KC TCC-B	TelStatus CTEM		70.6	73.6
SGT-L	Gamma Ray		69.7	70.6

SGH-K
SGC-SA
SGD-TAA

CNT-H
CND-NA
NLS-KL
NSR-F 1163
CNC-HA 118
CNH-A 2912

65.1



CFTC
CNTC

60.7
60.2

LDT-D
GSR-J 1786
PGD-G 2747
NSC-E 2972
ECH-MKA 2972
DRS-B 3771
PDH-L 2757

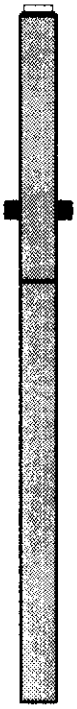
57.8

Caliper
LS
SS

43.2
43.1
42.6

AIT-B
AIC-BA
AIH-AA
AIS-BA

40.5



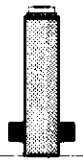
1.5 IN
Standoff

Induction
Temperatu
Power Sup

17.4

SPE-A
SPE-A

6.9



SP SPARC
Tension HV

0.5
0.0

TOOL ZERO

1.5 IN
Standoff

MAXIMUM STRING DIAMETER 6.88 IN
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN FEET

Output DLIS Files

DEFAULT	SPEA .005	FN:4	FIELD	1-AUG-1996 13:33	6114.0 FT	267.0 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 2049.92 F3

Cement Volume = 1105.33 F3 (assuming 5.50 IN casing O.D.)

Computed from 6113.0 FT to 388.0 FT using data channel(s) CALI (per GCSE parameter setting)

OP System Version: 7C0-427
DBM

AIT-B 7S427KV-537

PIP SUMMARY

- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

MAIN PASS

SANDSTONE MATRIX, 2.68 G/CC

Tension (TENS) 10000 (LBF) 0

Bulk Density Correction (DRHO) -0.25 (G/C3) 0.25

Caliper (CALI) 6 (IN) 16

Tool/Tot. Drag From D3T to STIA

Gas Effect From DPHI to NPOR

EFFECTIVE PERM WATER (LC01) 0 (MD) 20

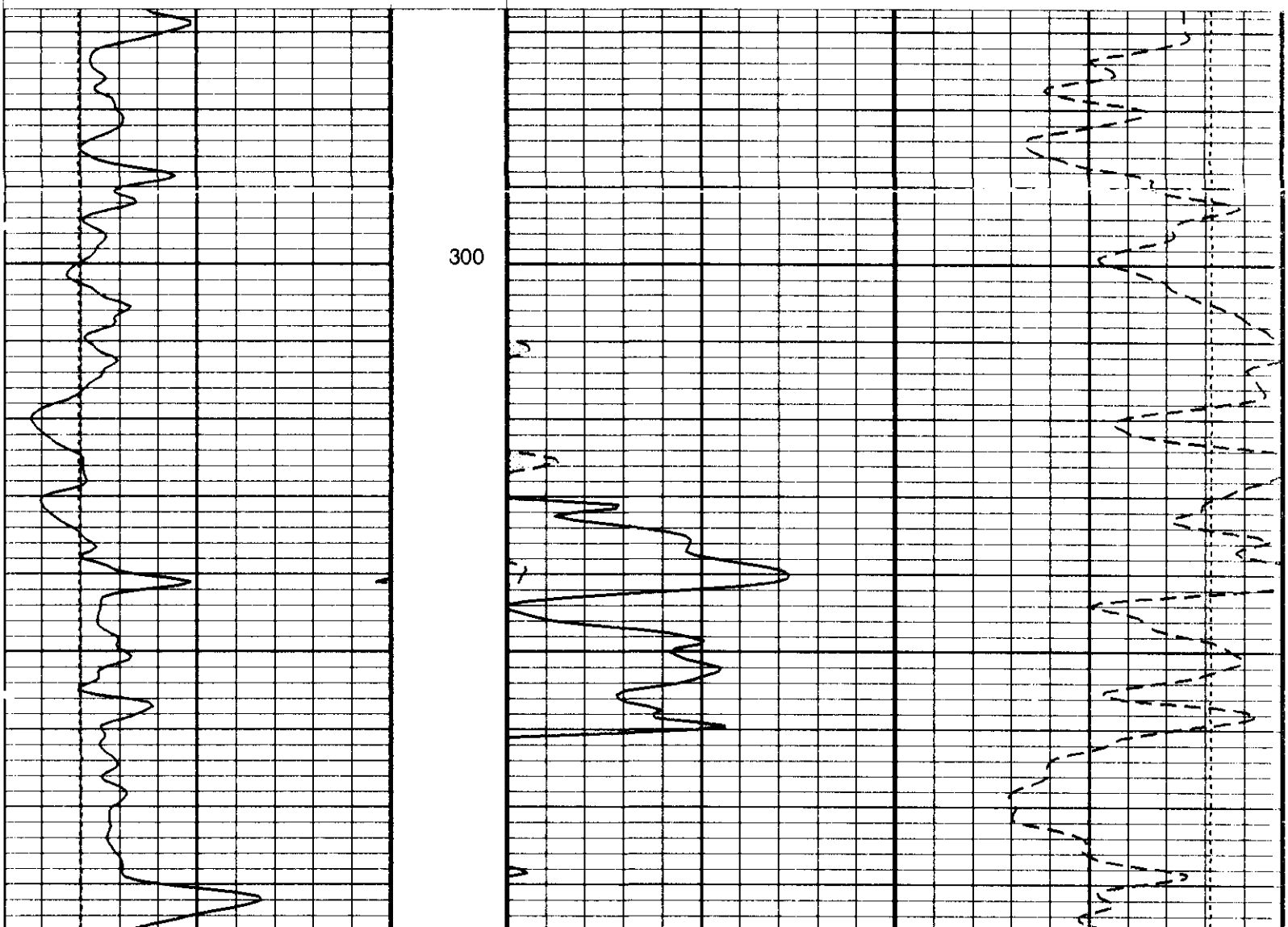
Cable Drag From STIA to STIT

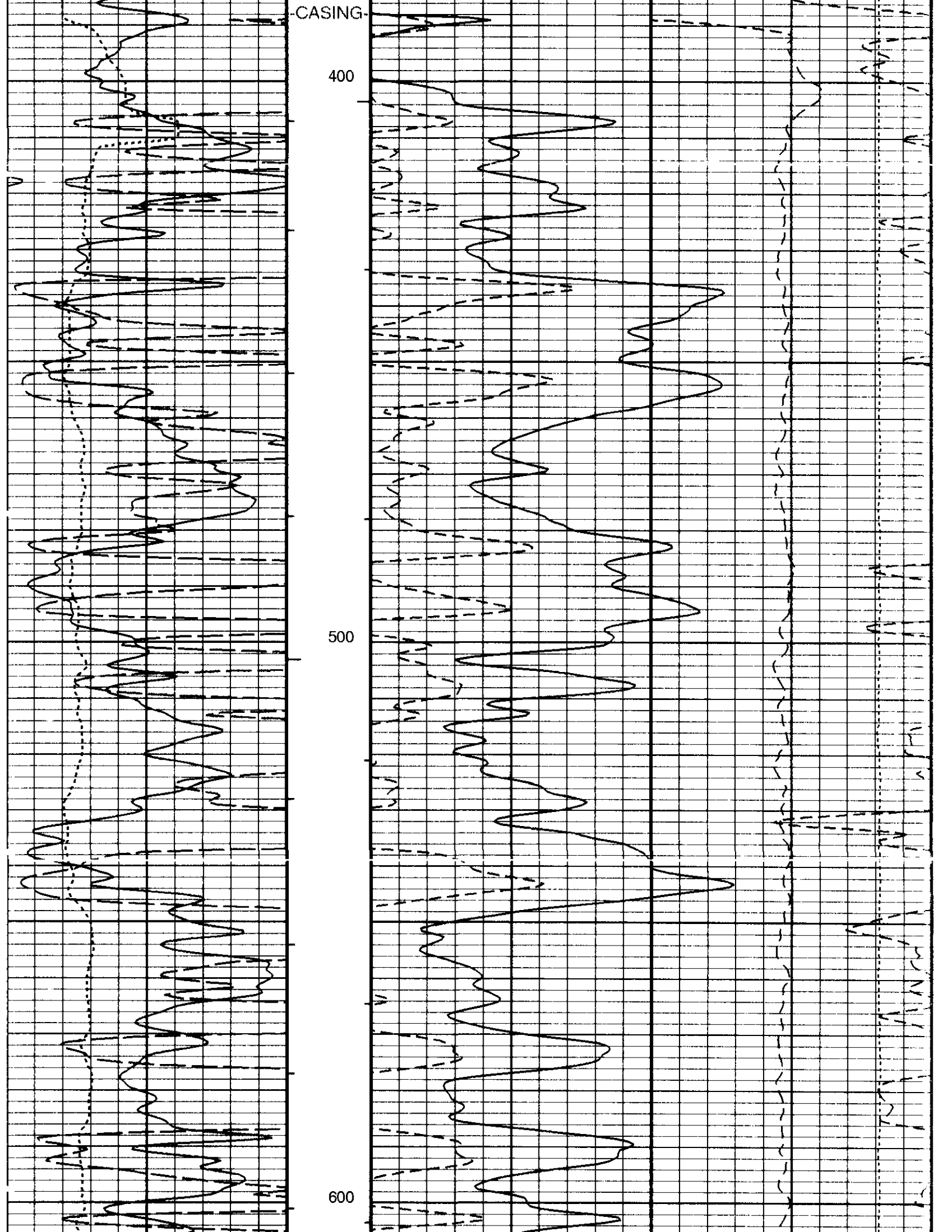
Alpha Processed Neutron Porosity (NPOR) 0.3 (V/V) -0.1

Gamma Ray (GR) 0 (GAPI) 200

Stuck Stretch (STIT) 0 (F) 50

Density Porosity (DPHI) 0.3 (V/V) -0.1

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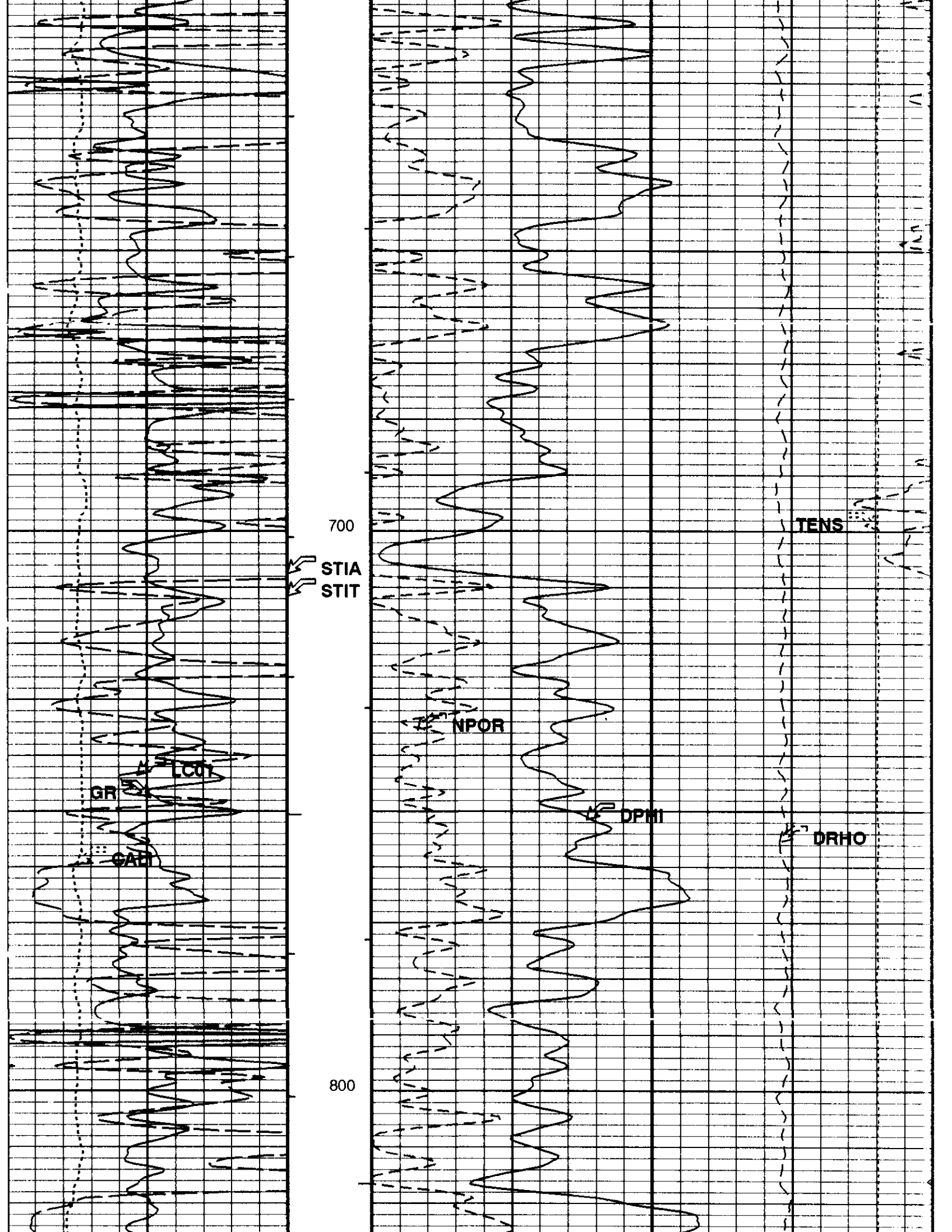
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DPHI
DRHO
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TENS
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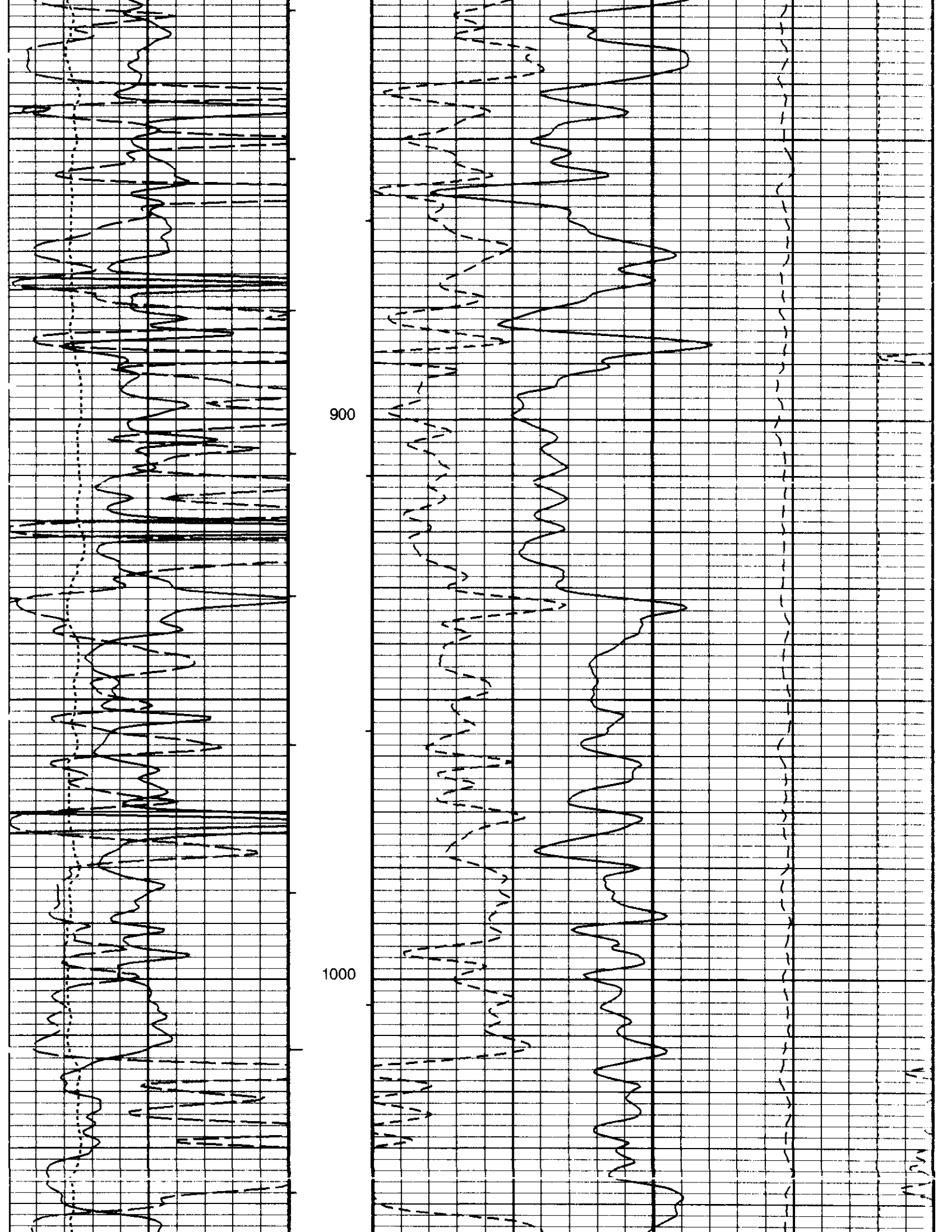
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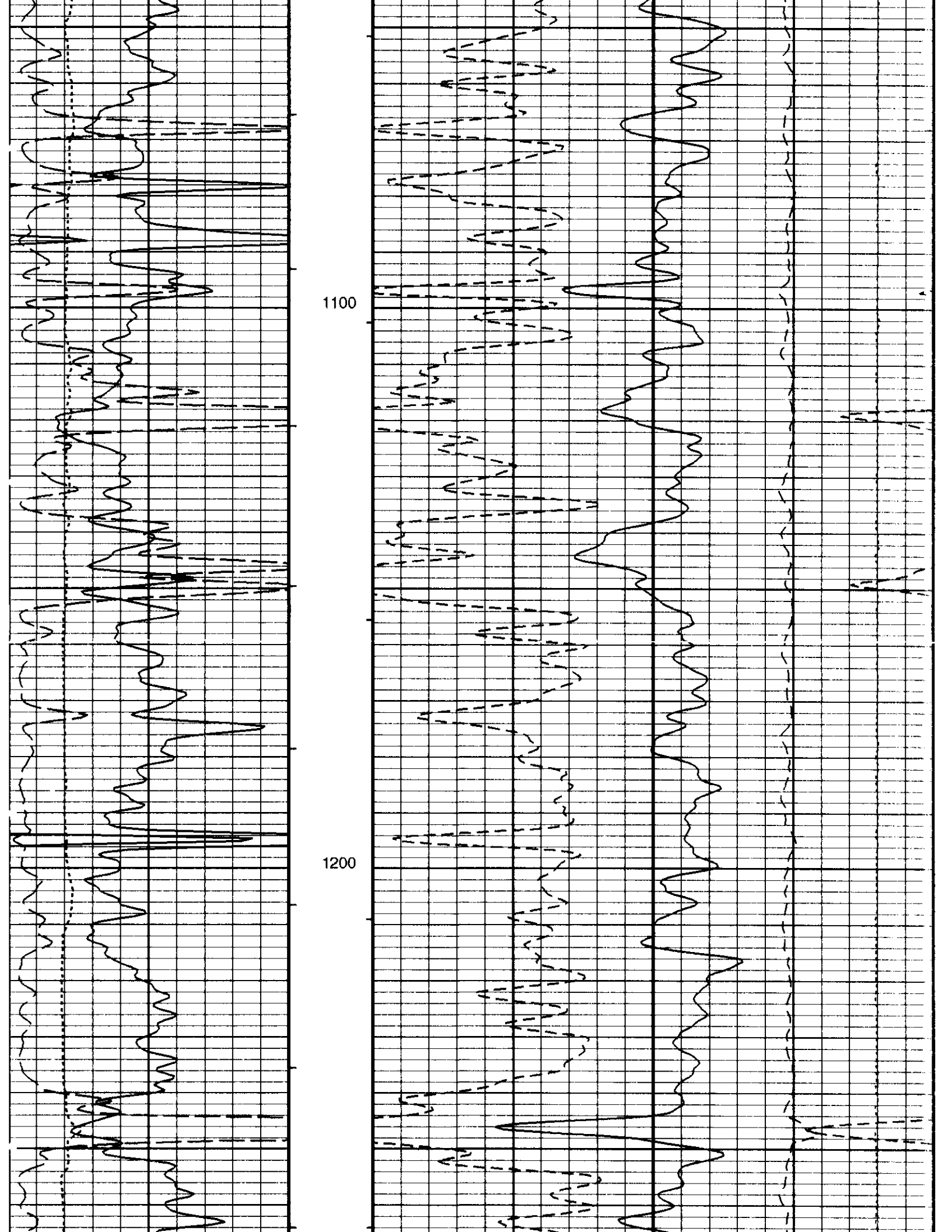
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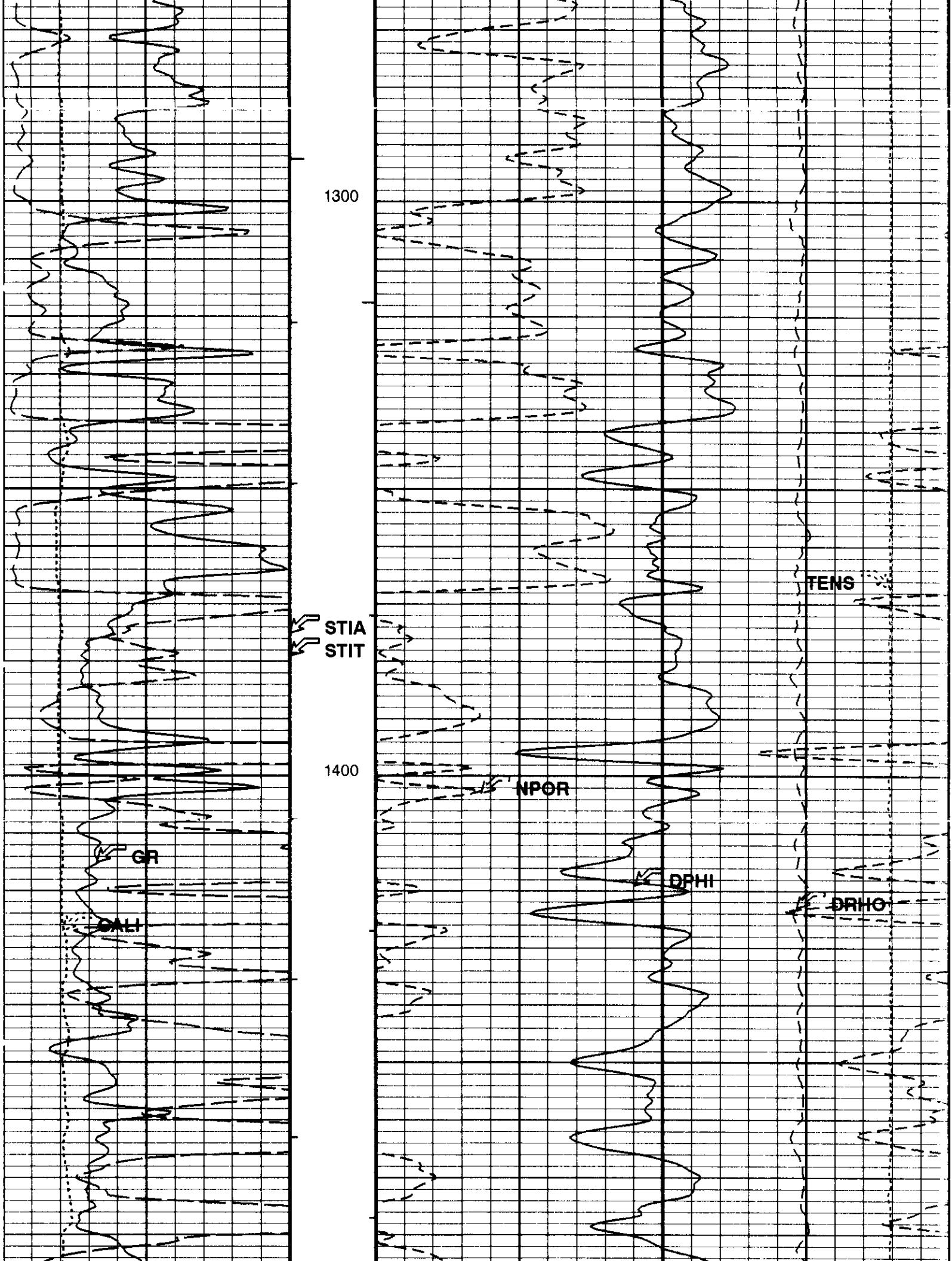
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NPOR
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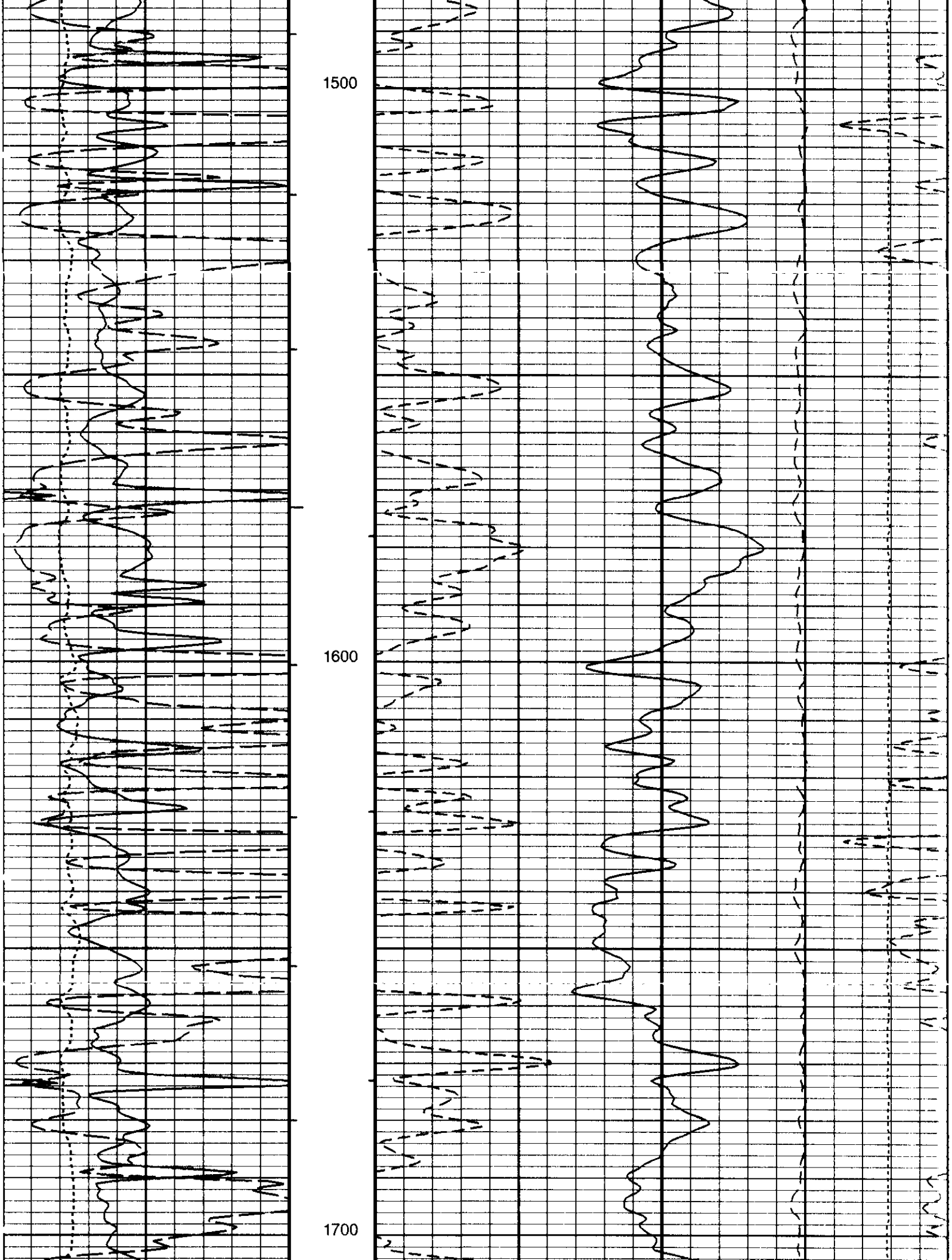
TENS
DRHO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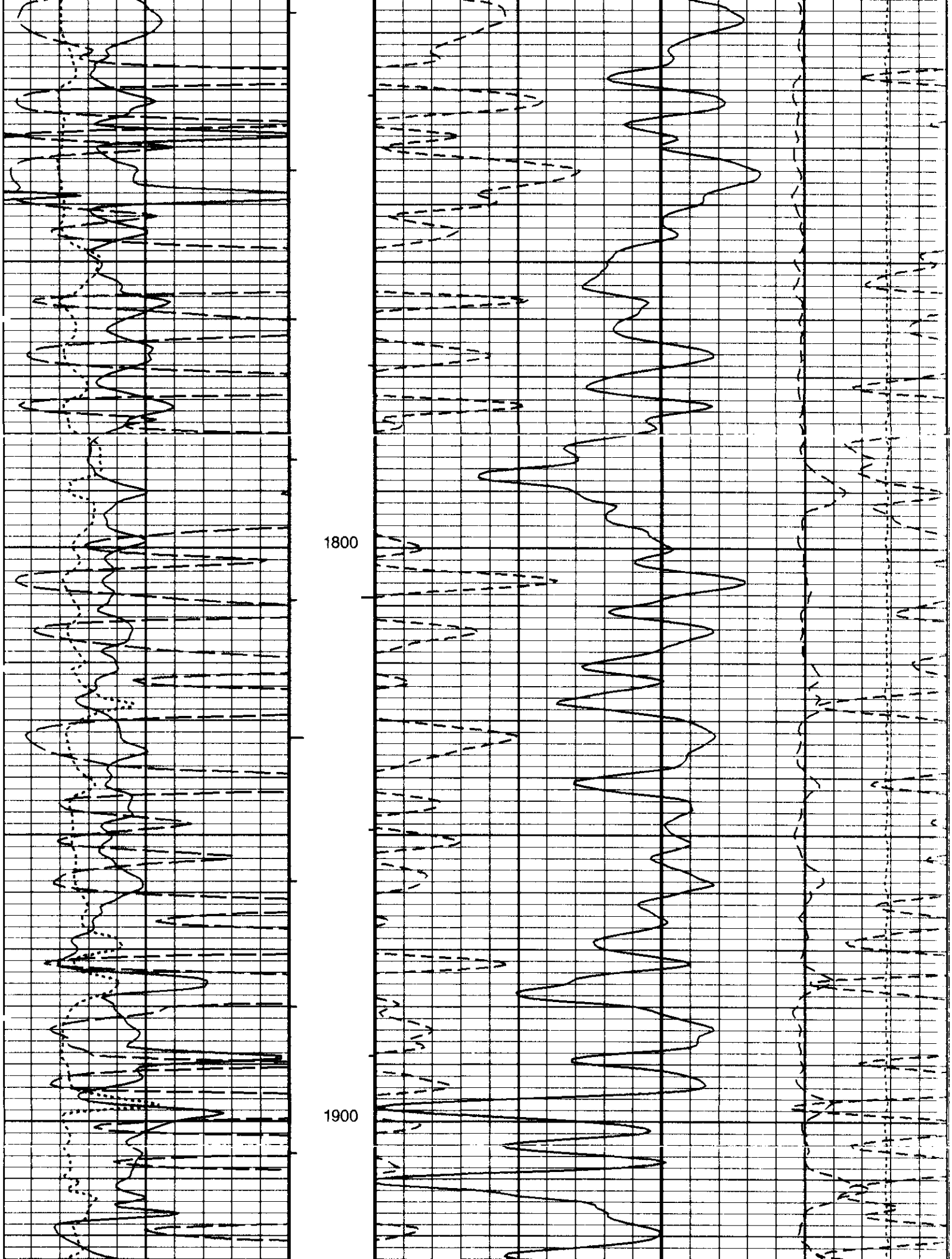
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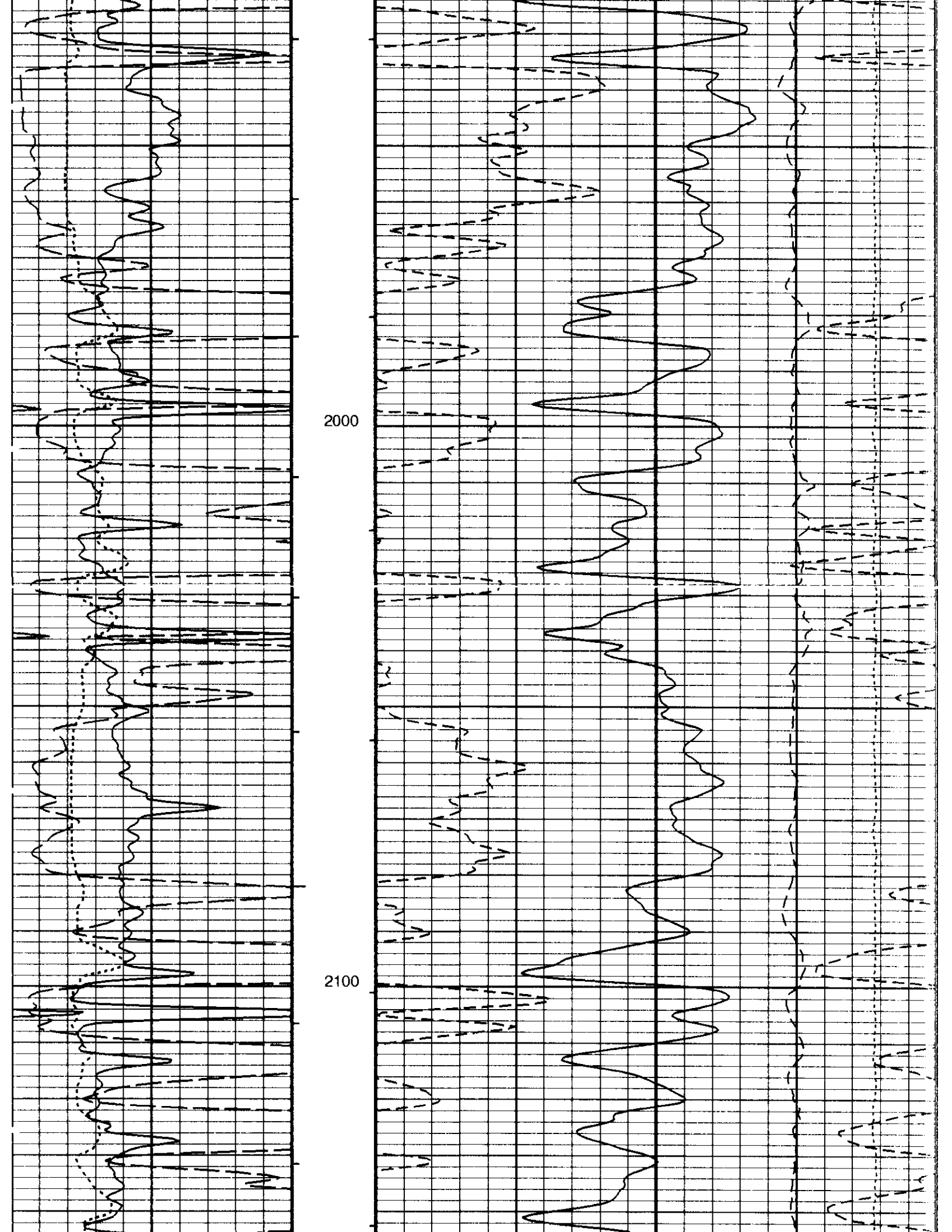
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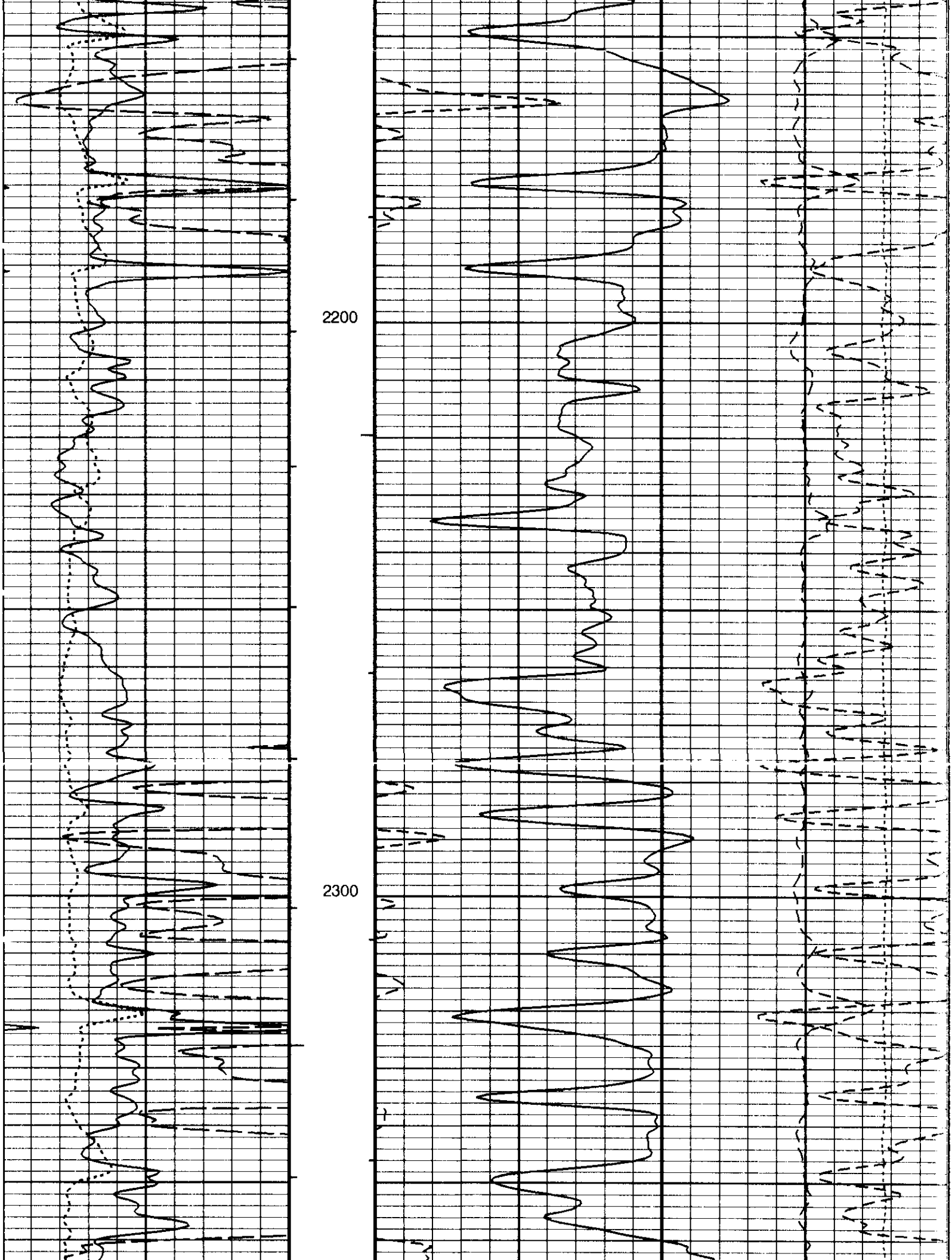
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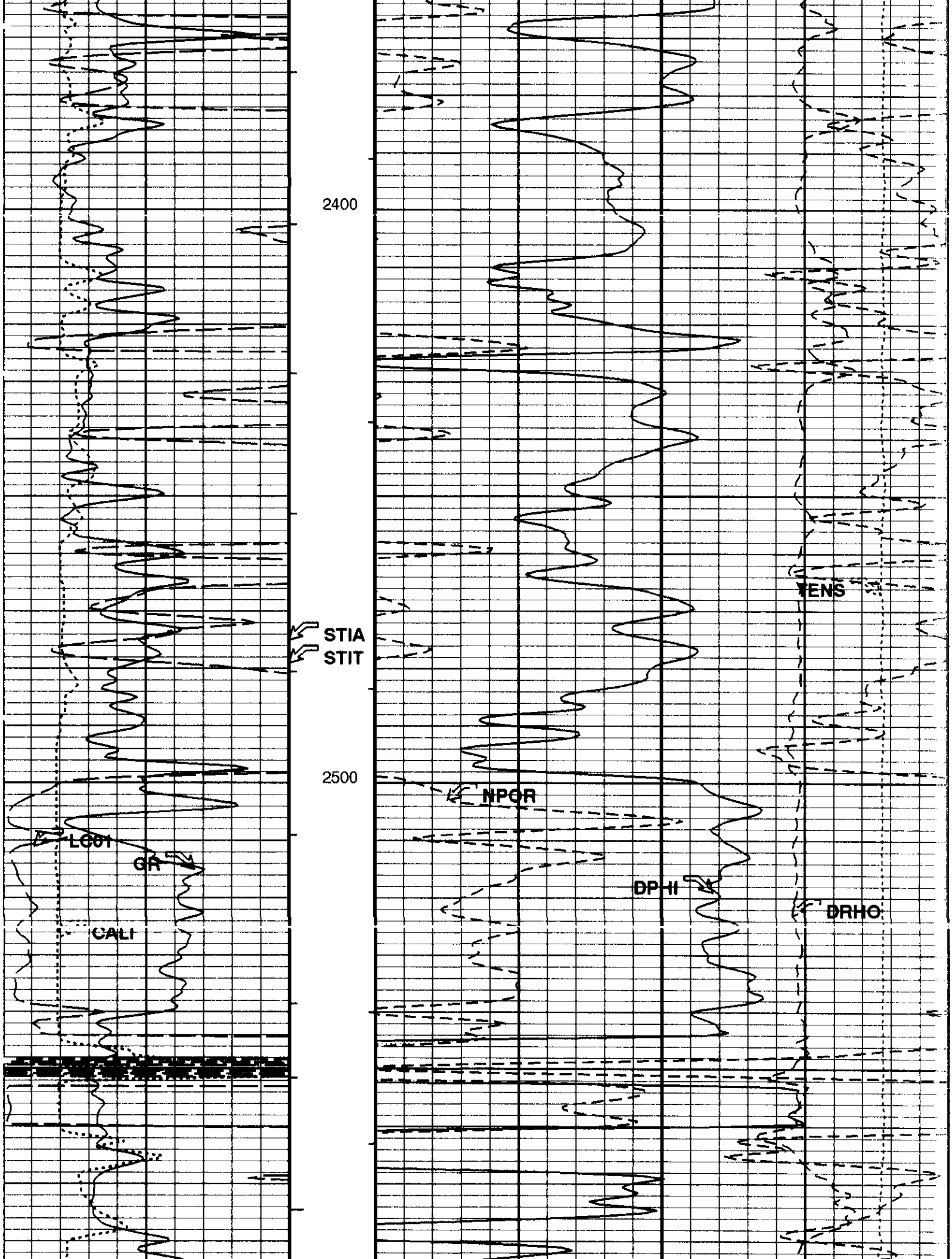
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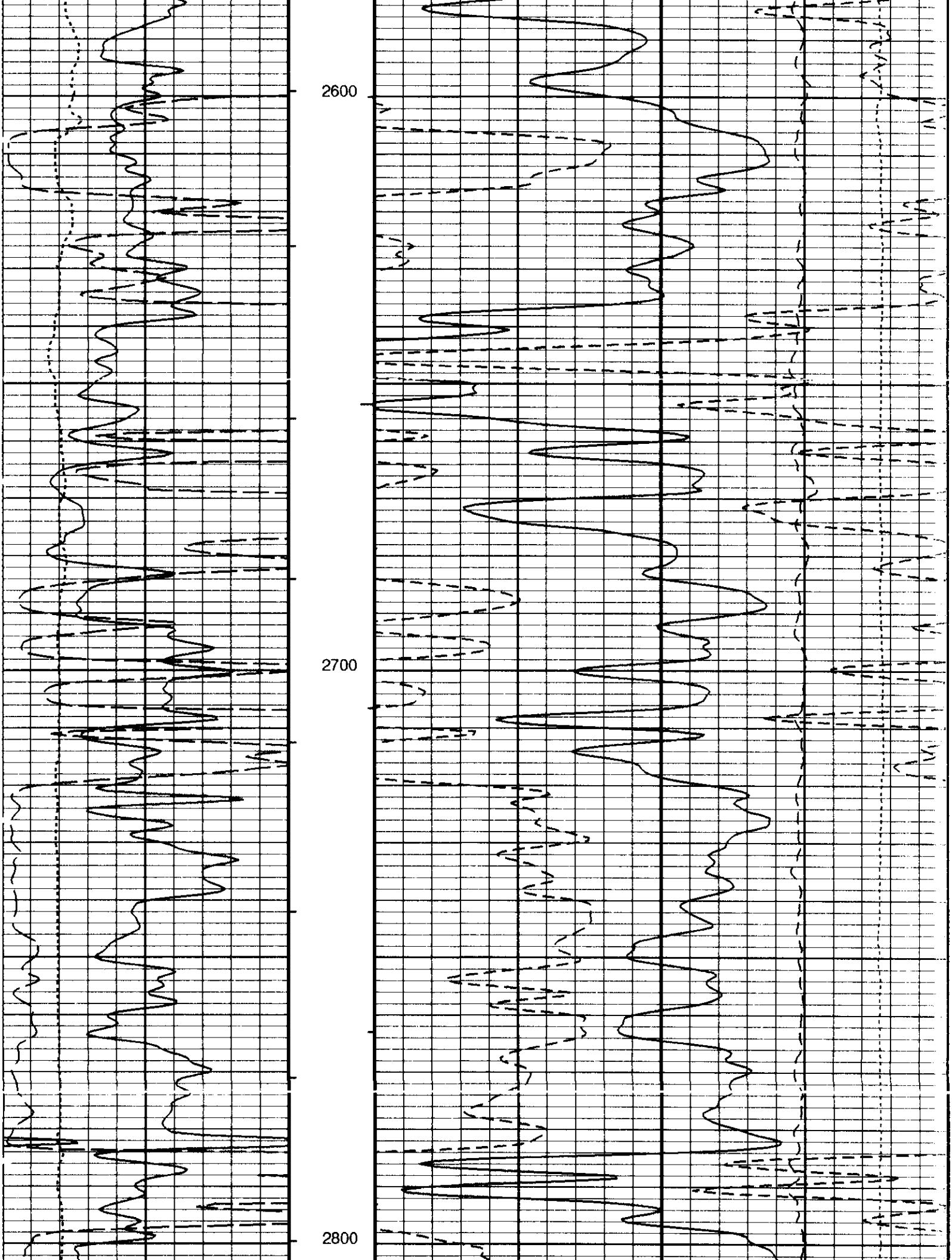
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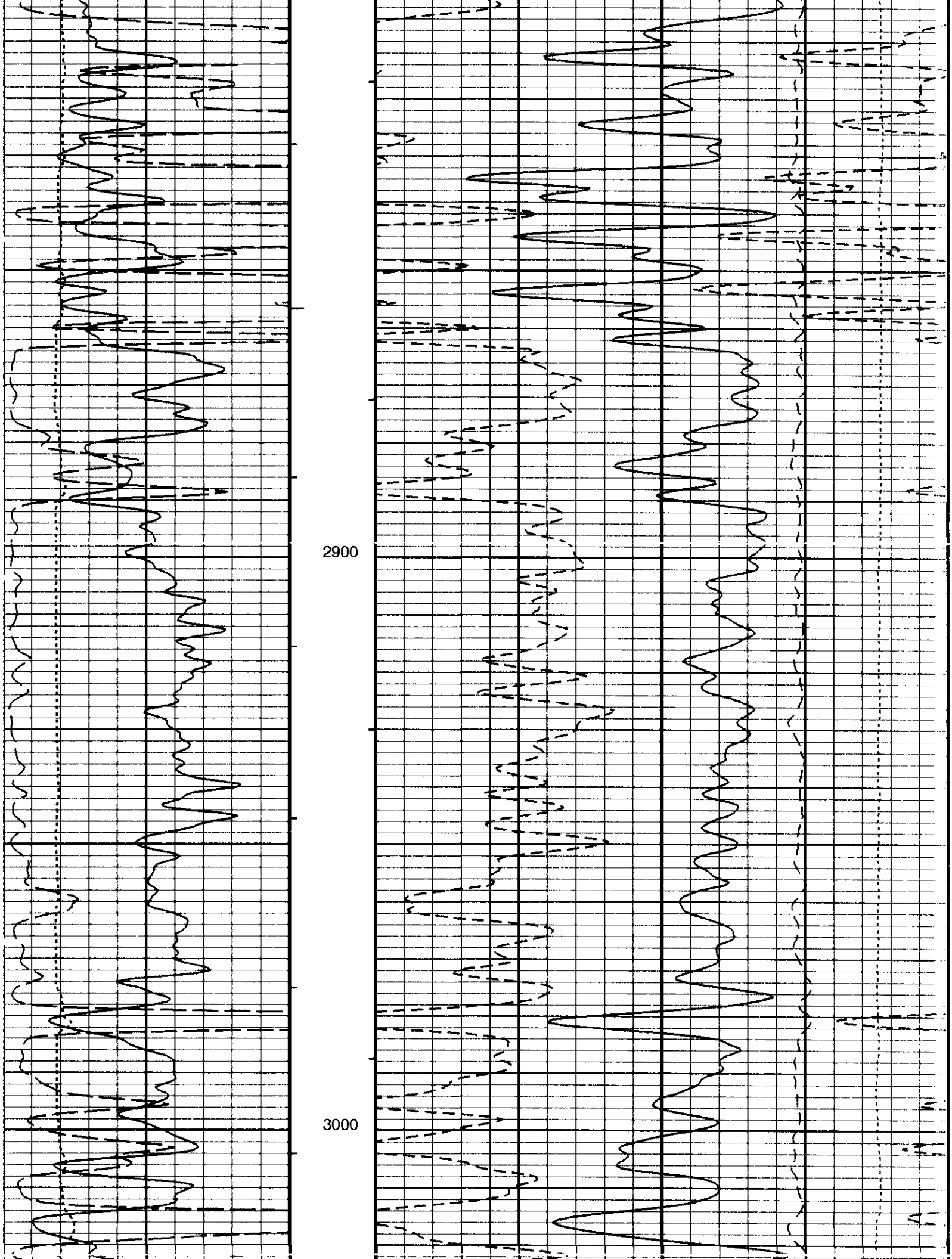
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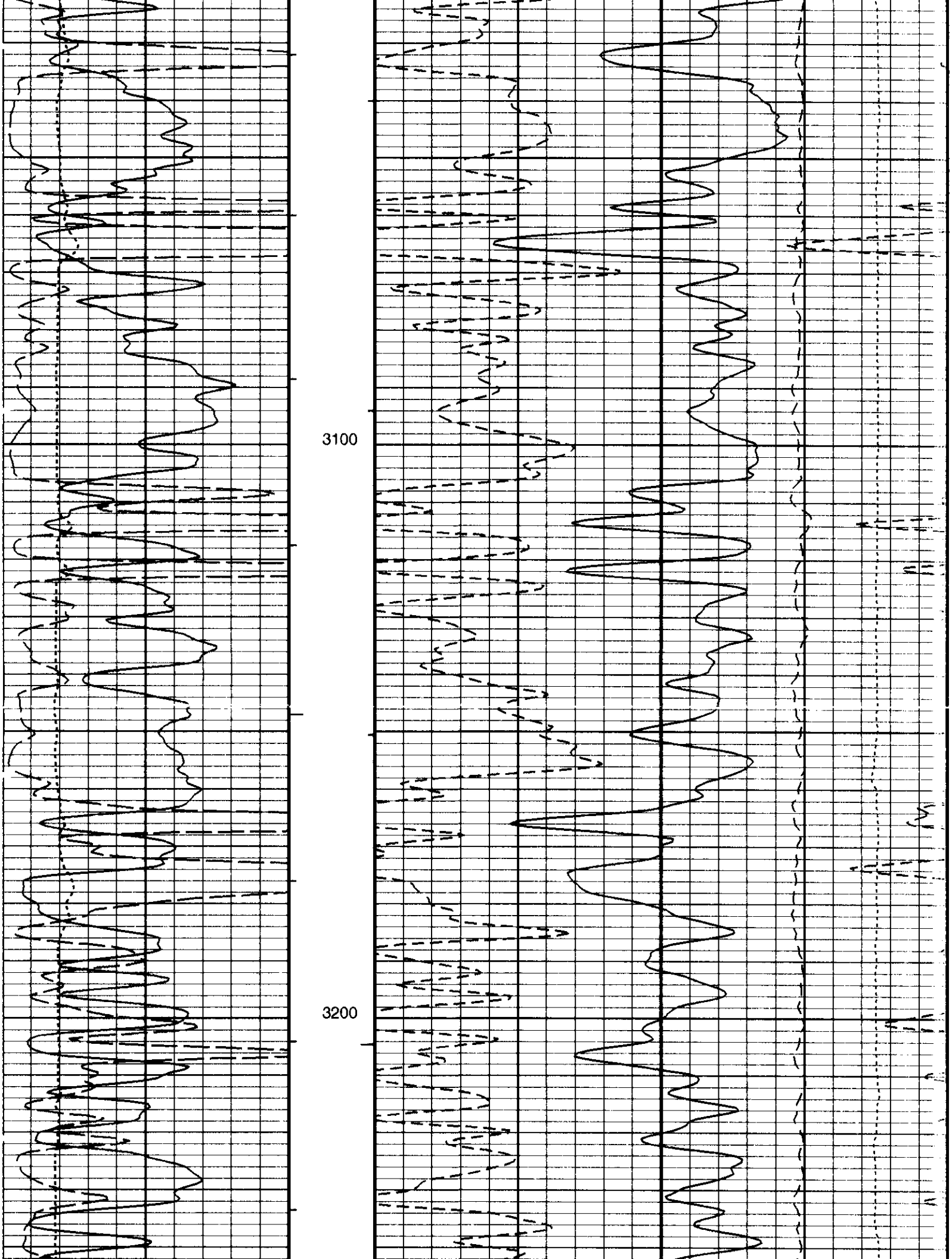
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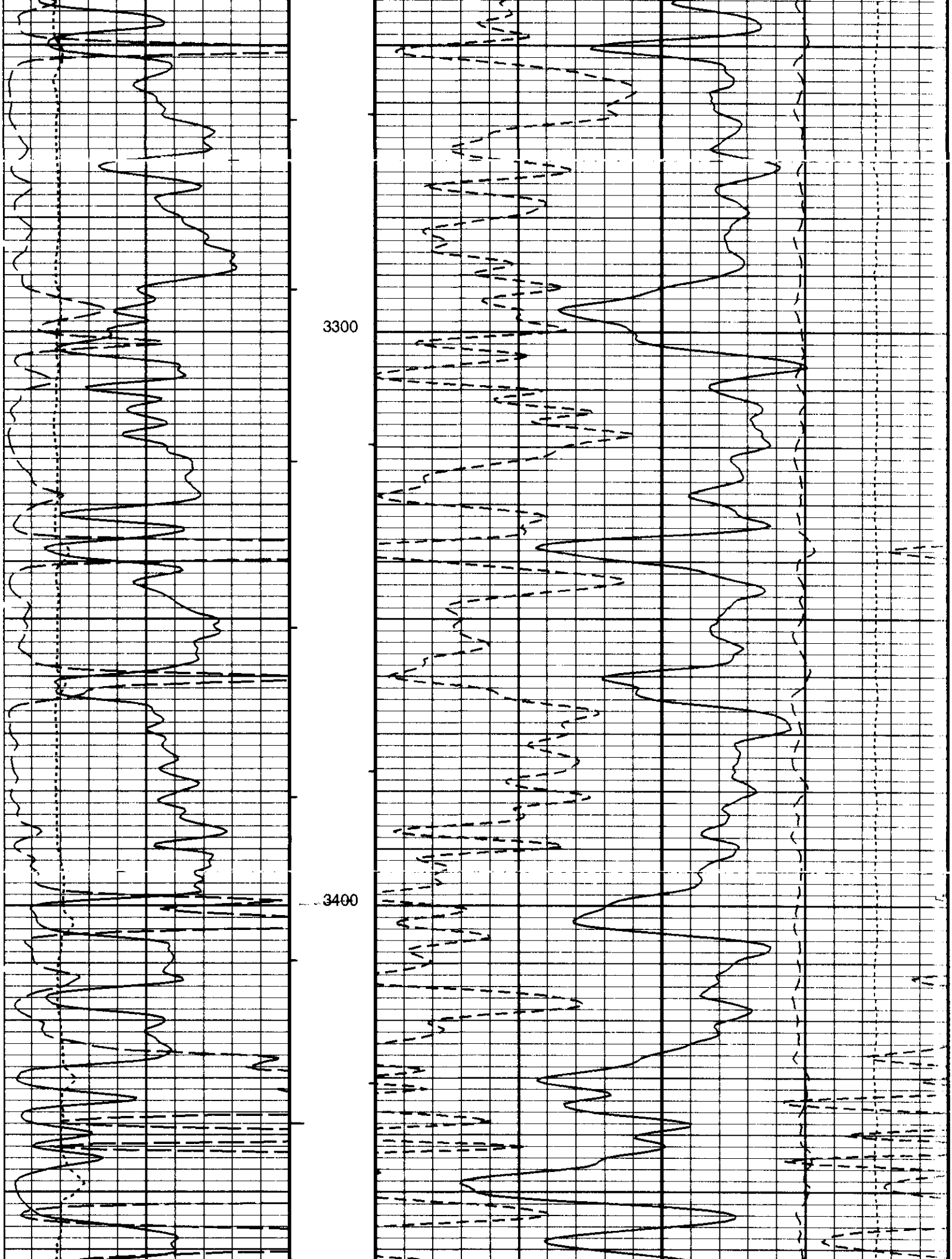
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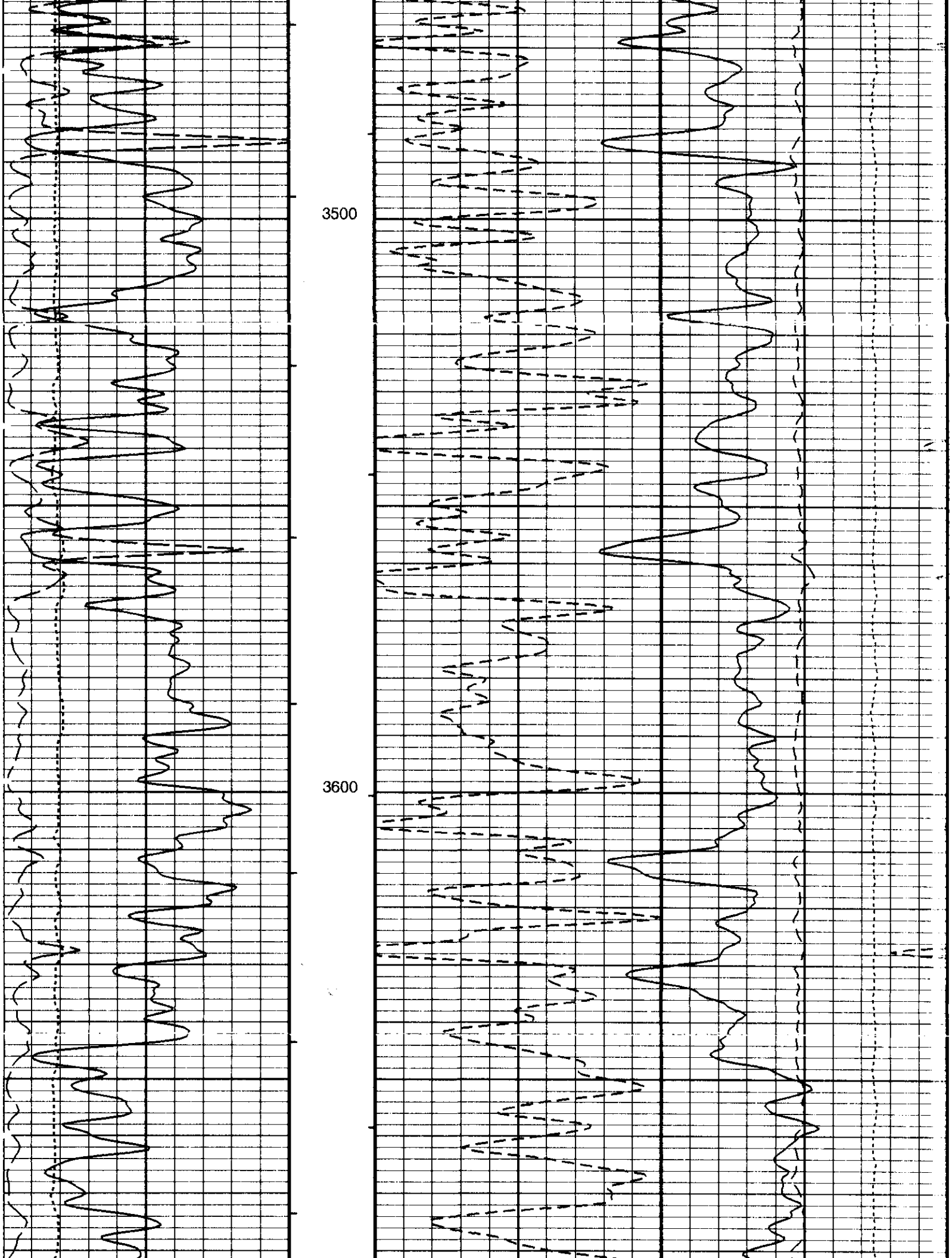
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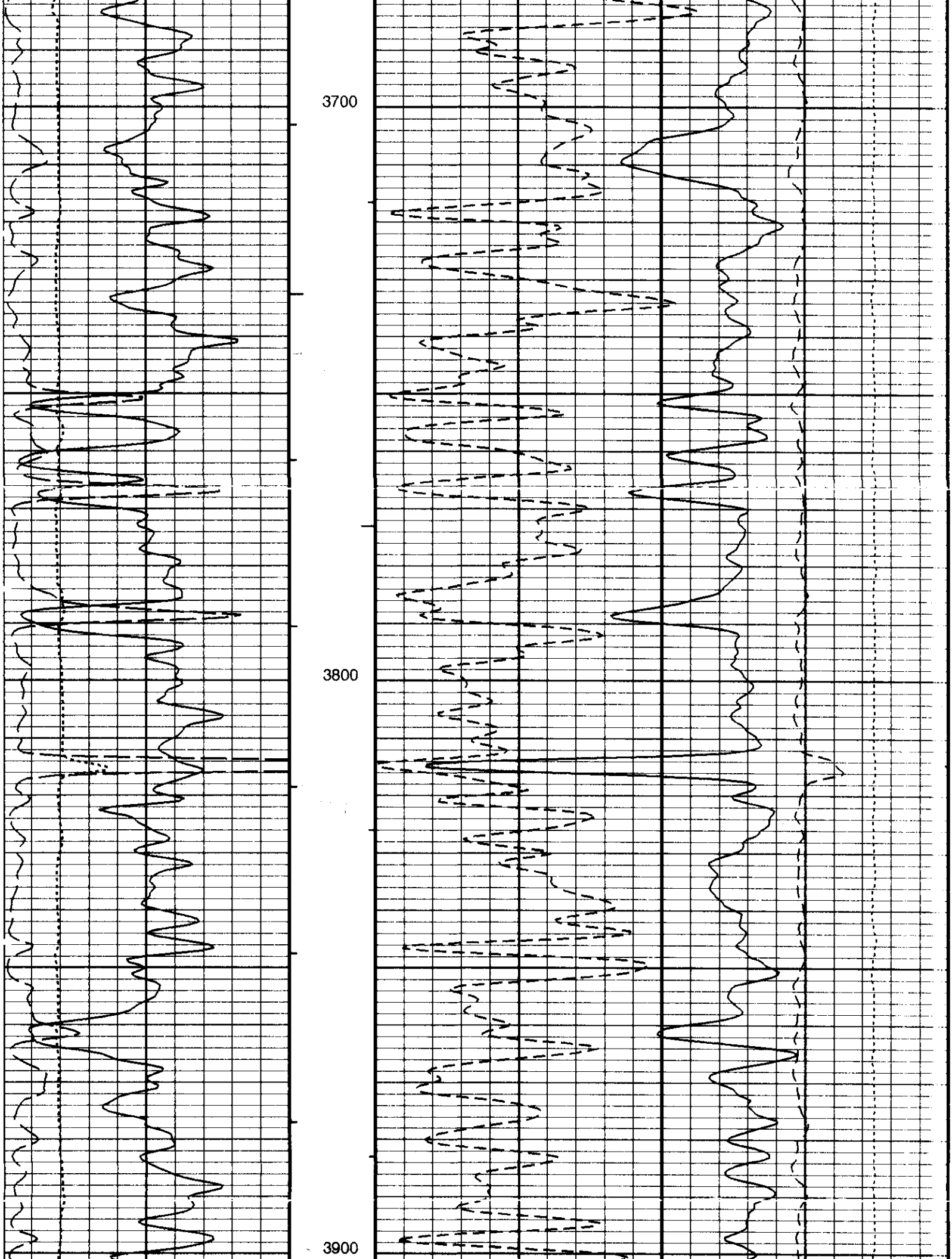
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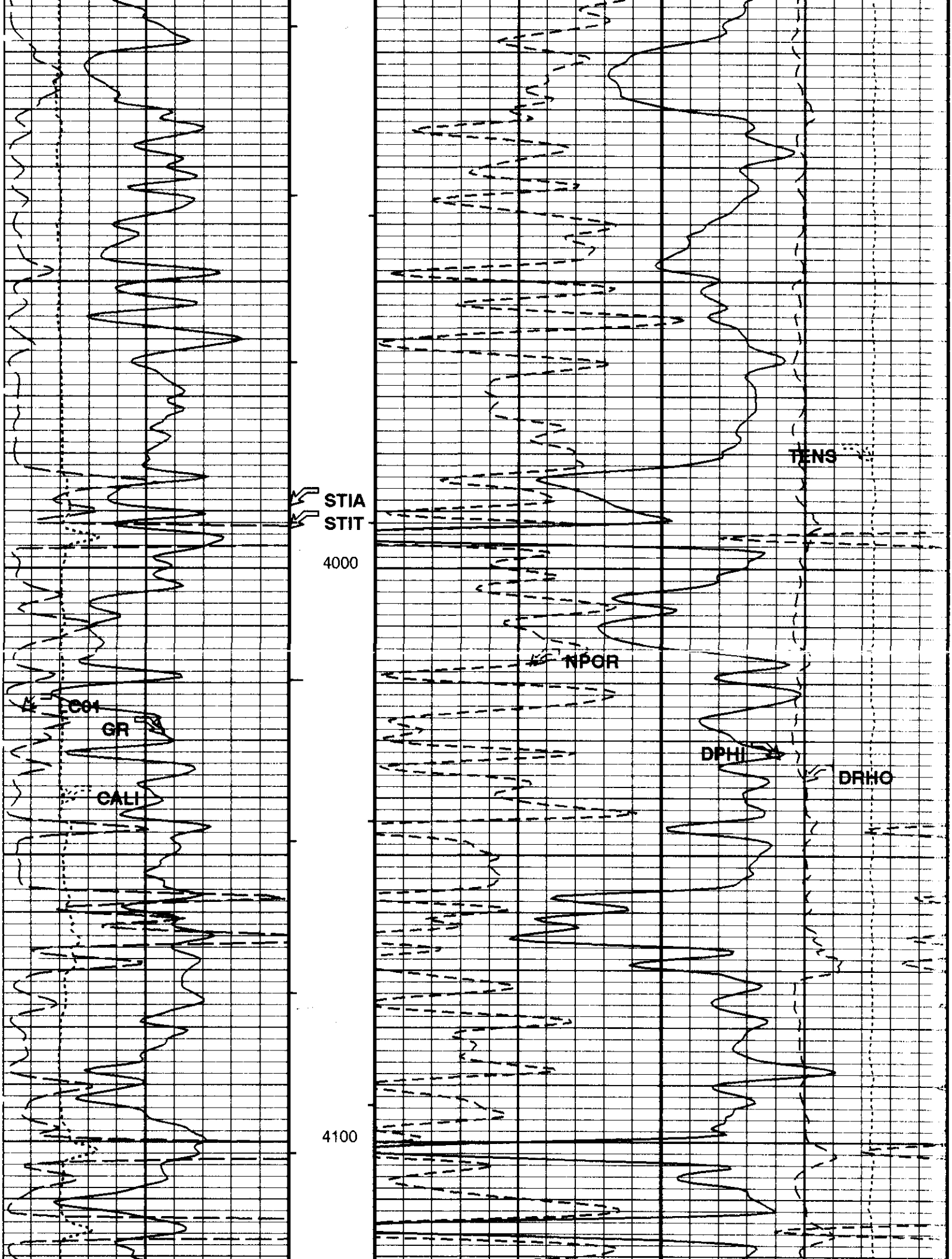
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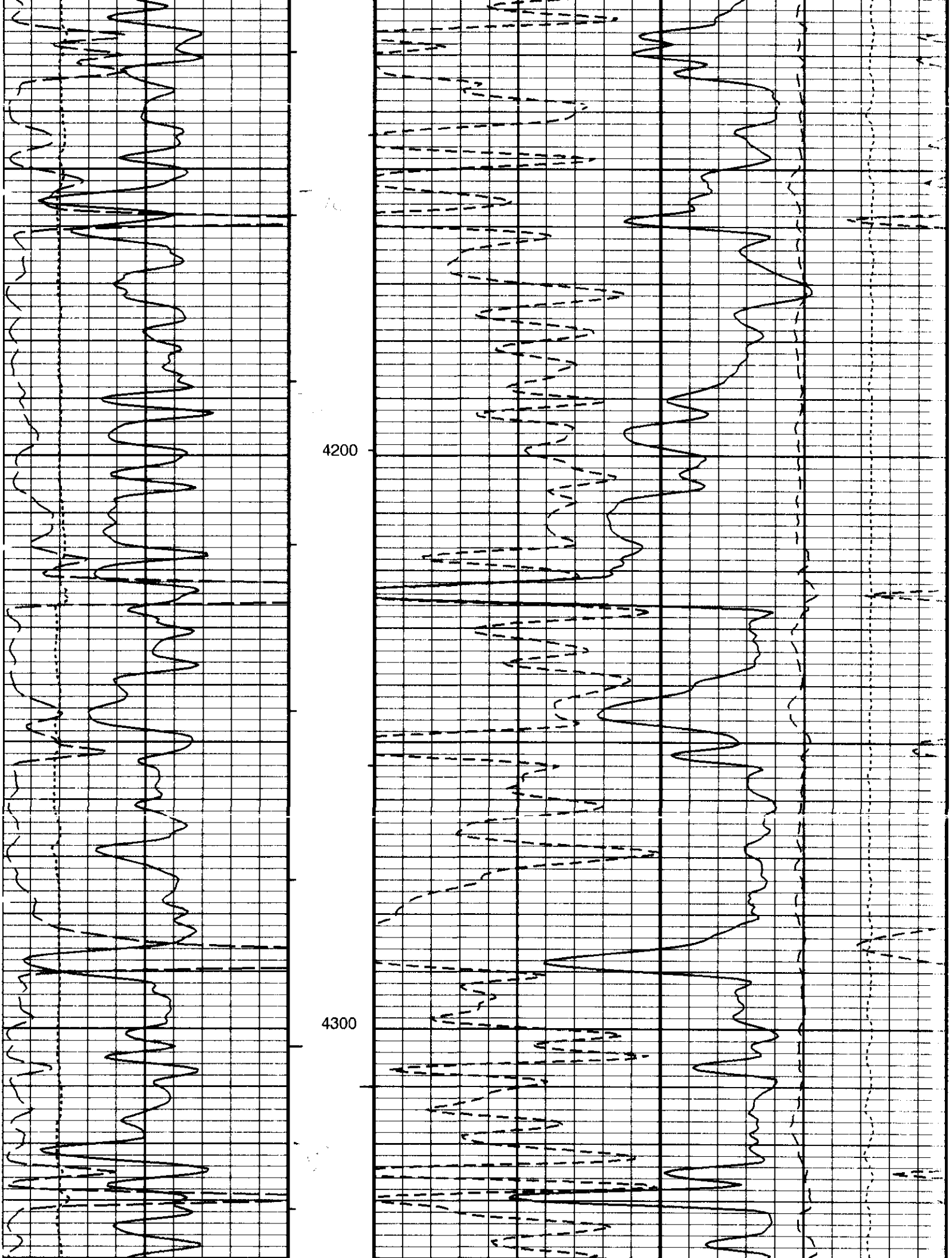
C01
GR
DPHI
DRHO
CALI
4100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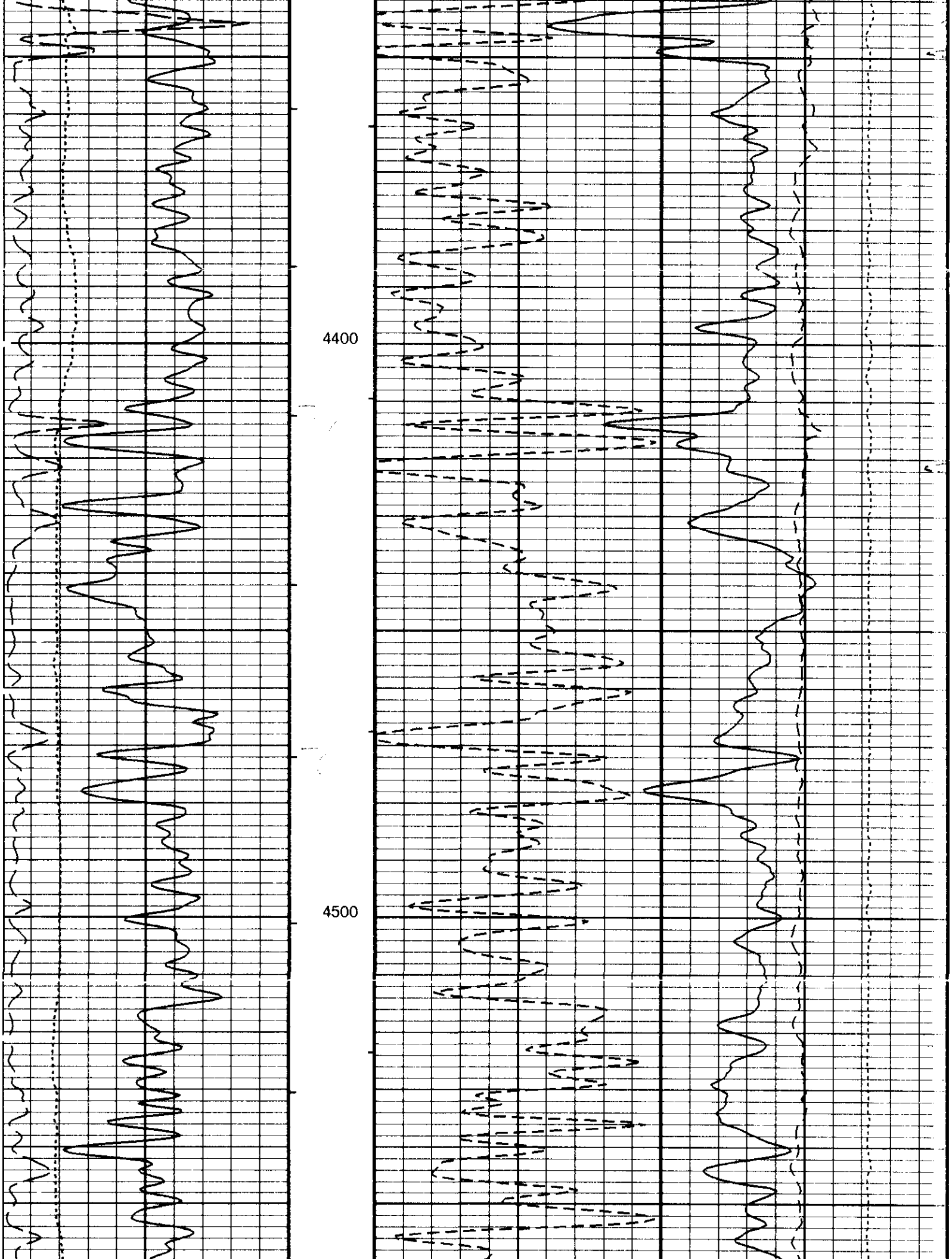
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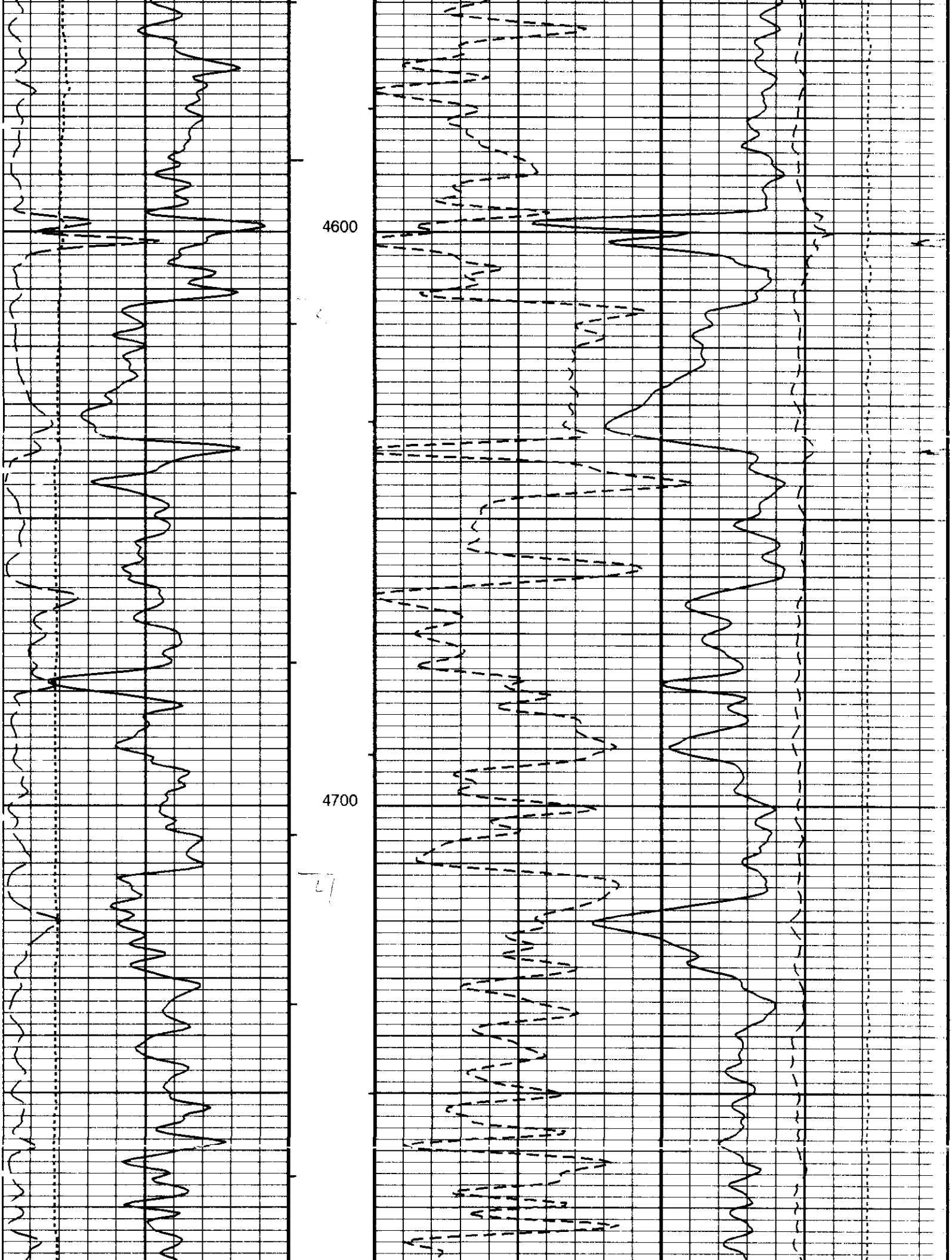
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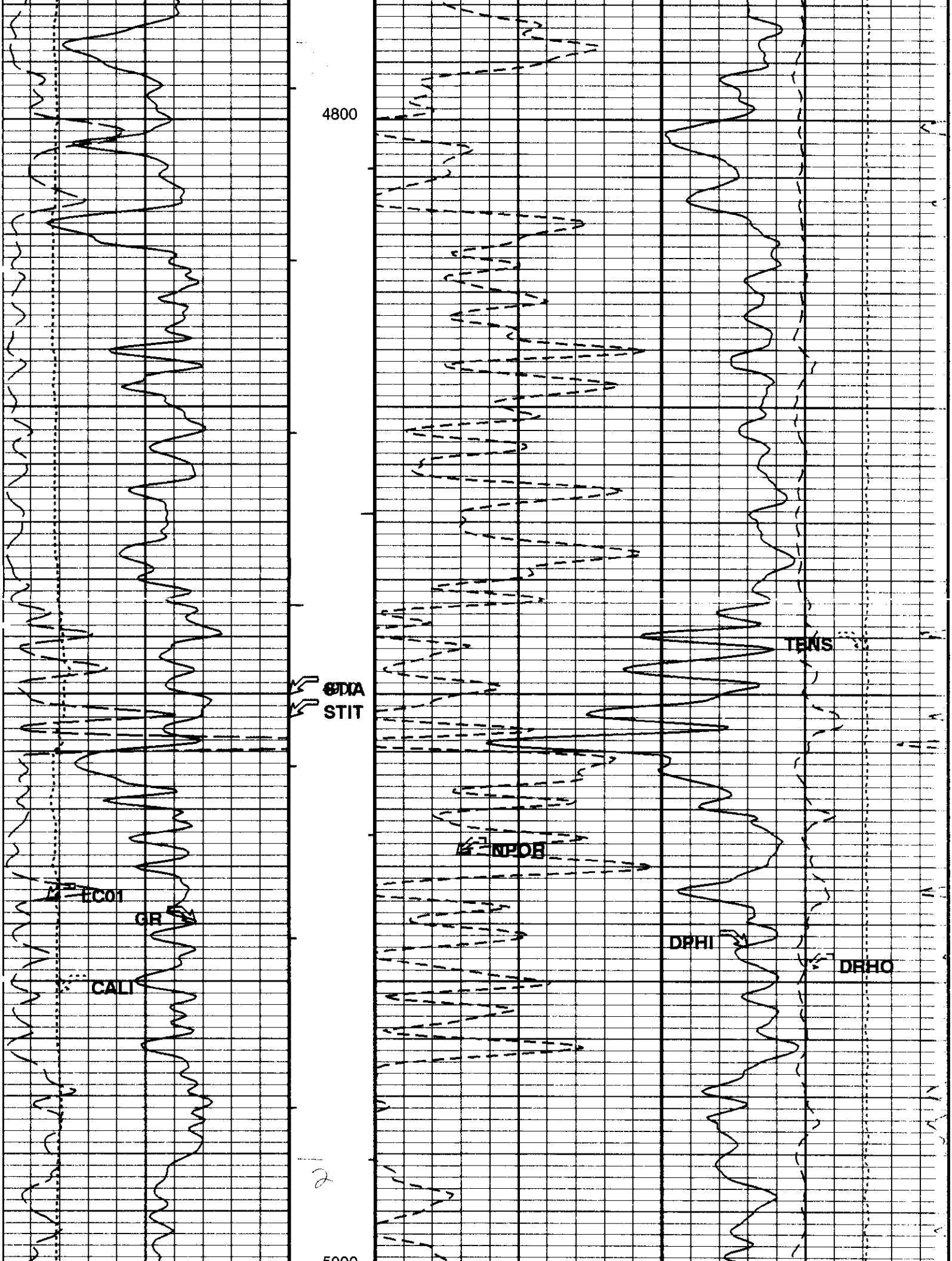
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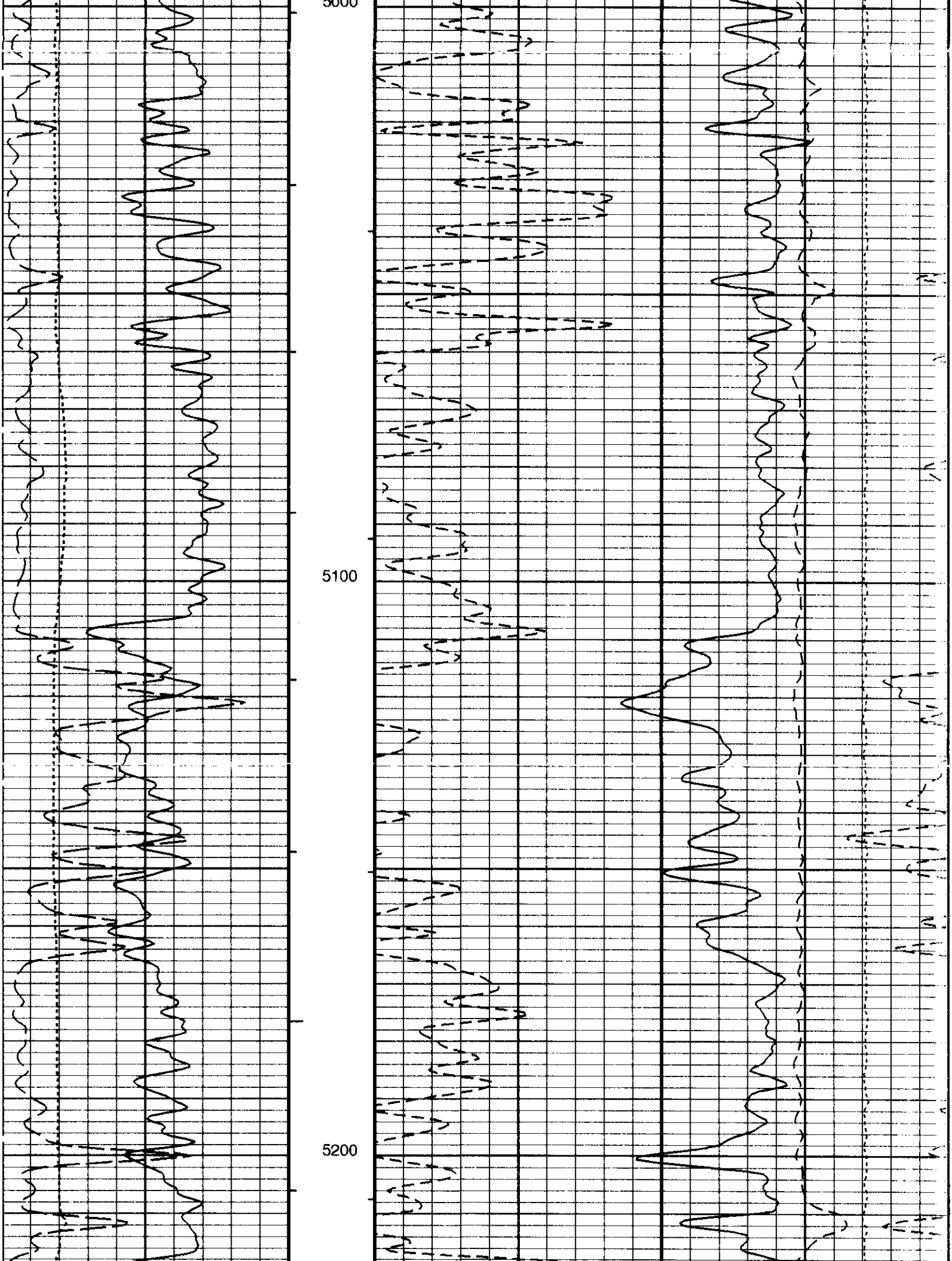
NPOR
TC01
GR
DPHI
DRHO
CALI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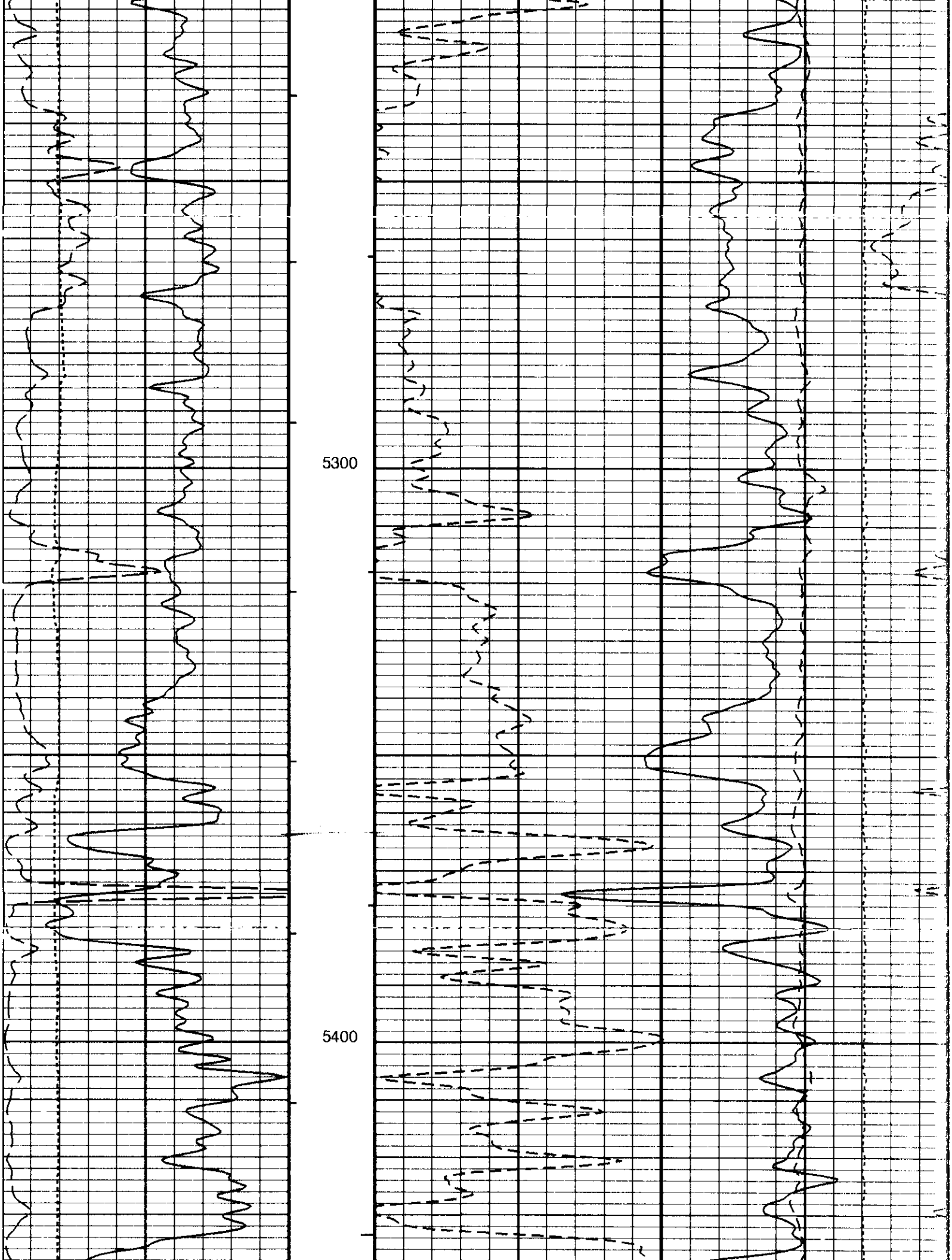
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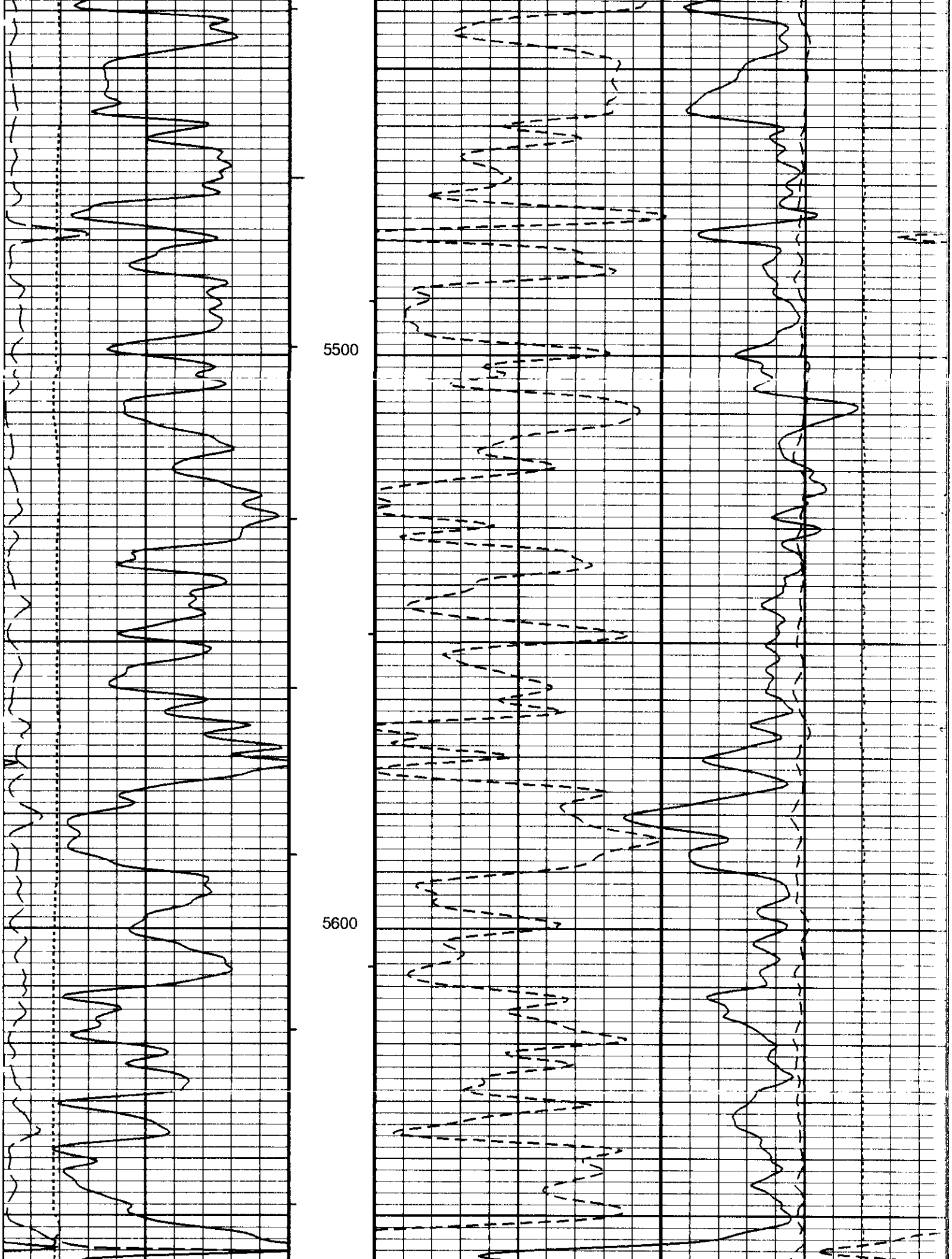
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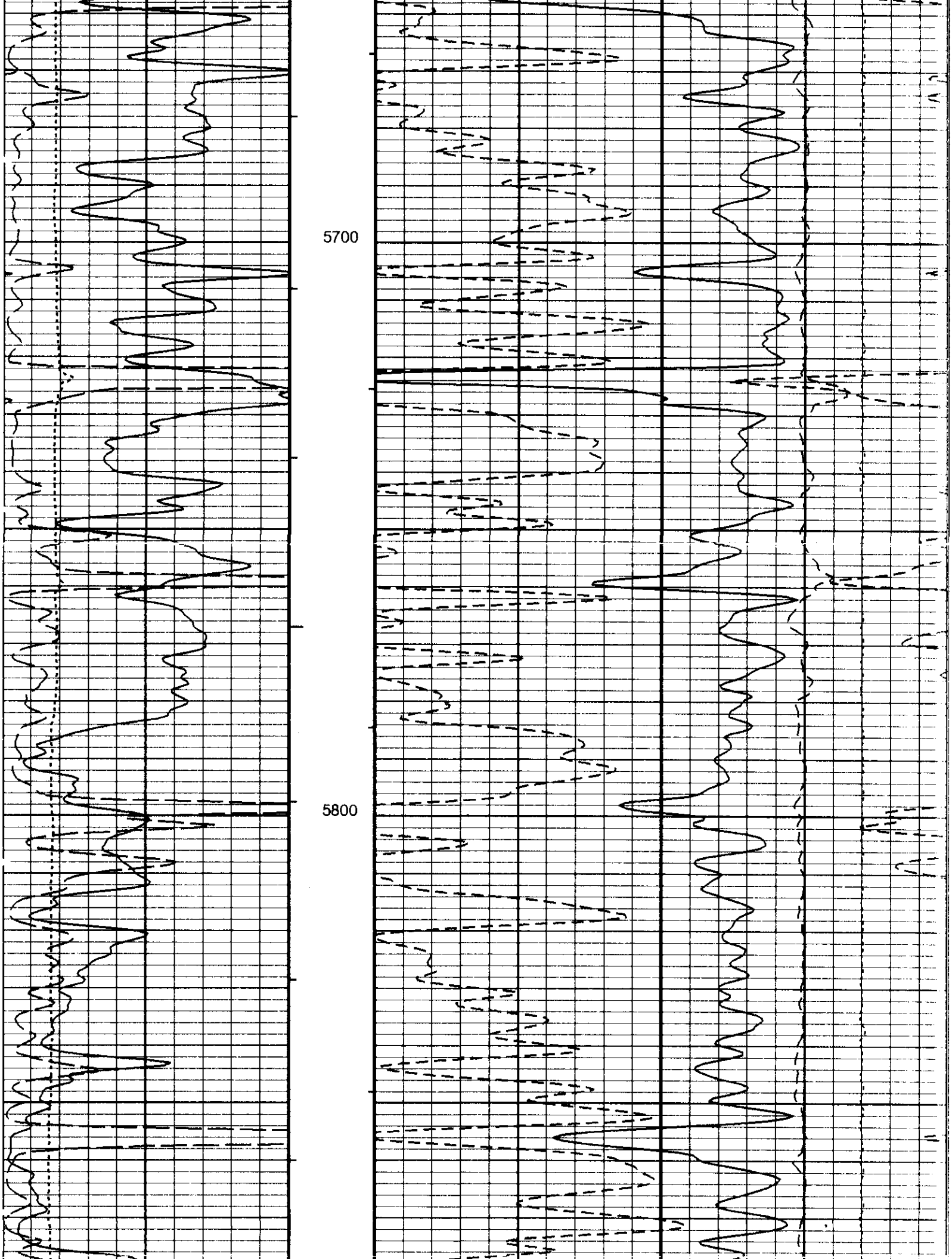
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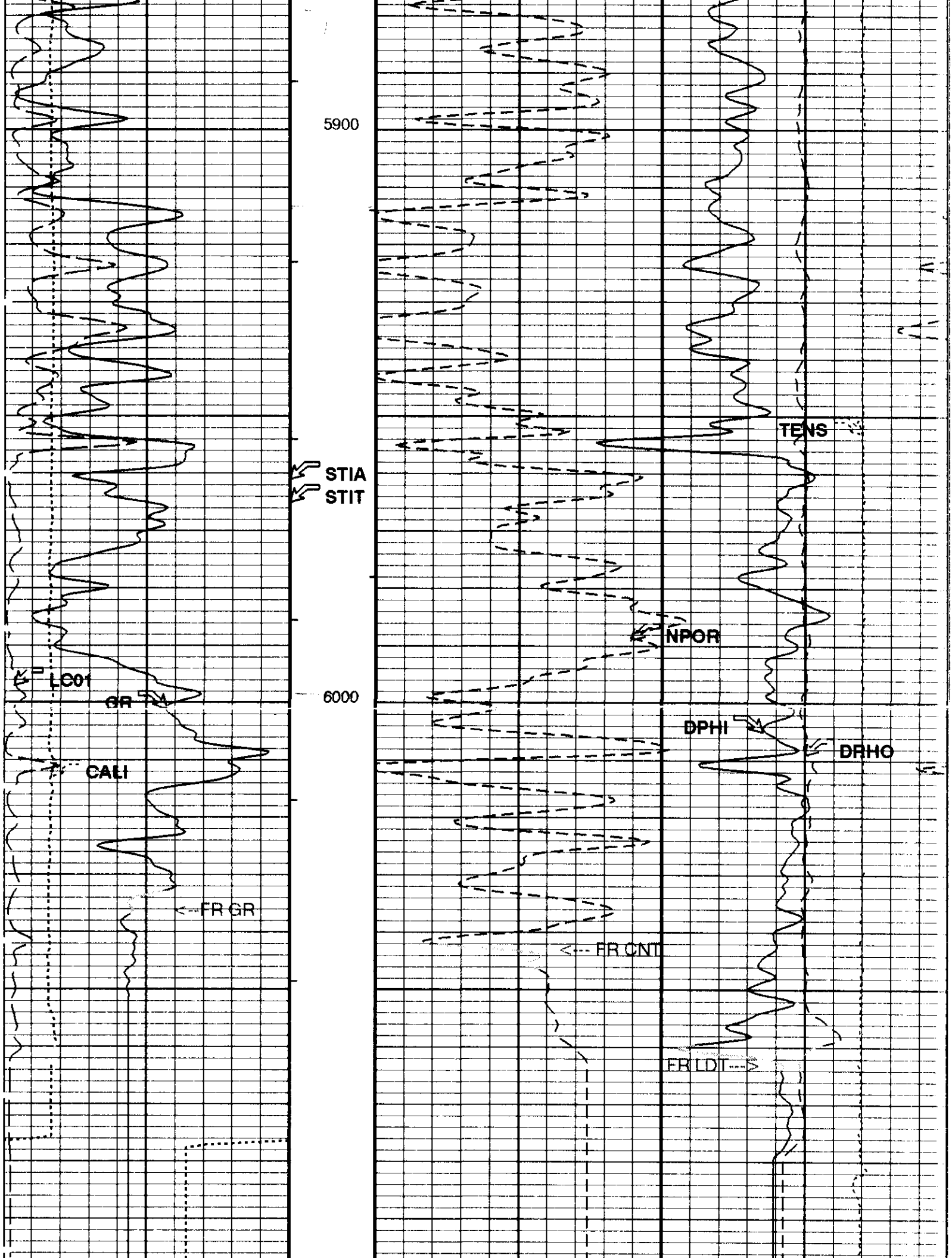
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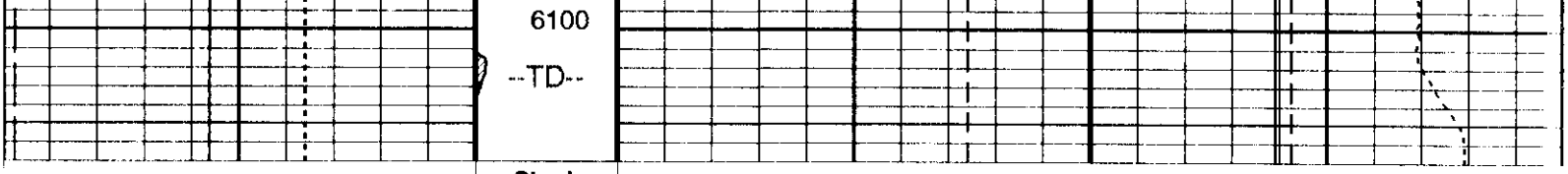
DPHI
DRHO
FR CNT
FR LDT



Gamma Ray (GR) 0 (GAPI) 200	Stuck Stretch (STIT) 0 (F) 50	Density Porosity (DPHI) 0.3 (V/V) -0.1
EFFECTIVE PERM WATER (LC01) 0 (MD) 20	Cable Drag From STIA to STIT	Alpha Processed Neutron Porosity (NPOR) 0.3 (V/V) -0.1
Caliper (CALI) 6 (IN) 16	Tool/Tot. Drag From D3T to STIA	Gas Effect From DPHI to NPOR

MAIN PASS

Bulk Density Correction (DRHO) -0.25 (G/C3) 0.25

SANDSTONE MATRIX, 2.68 G/CC

Tension (TENS) 10000 (LBF) 0

PIP SUMMARY

- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
BFM	Borehole Fluid Medium	LIQUID	
BHFL	Borehole Fluid Type	WATER	
BHS	Bore Hole Status	OPEN	
BS	Bit Size	7.875	IN
BSAL	Borehole Salinity	1600.00	PPM
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
CWEI	Casing Weight	24.00	LB/F
DFD	Drilling Fluid Density	8.30	LB/G
DHC	Density Hole Correction	BS	
DORL	Depth Offset Repeat Analysis	0.0	FT
DPPM	Density Porosity Processing Mode	HISP	
FD	Fluid Density	1	G/C3
FSAL	Formation Salinity	-50000	PPM
FSCO	Formation Salinity Correction Option	NO	
GCSE	Generalized Caliper Selection	CALI	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	1.000000e-02	DF/F
HSCO	Hole Size Correction Option	YES	
MATR	Rock Matrix Type	SANDSTONE	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MDEN	Matrix Density	2.68	G/C3
MST	Mud Sample Temperature	73.00	DEGF
MWCO	Mud Weight Correction Option	NO	
PTCO	Pressure/Temperature Correction Option	NO	
RMFS	Resistivity of Mud Filtrate Sample	1.8900	OHMM
SDAT	Standoff Data Source	SOCN	
SOCN	Standoff Distance	1.5	IN
SOCO	Standoff Corrrection Option	NO	
STKT	STI Stuck Threshold	2.5	FT
WMUD	Mud Weight	8.3	LB/G

Format: PORO Vertical Scale: 5" per 100' Graphics File Created: 1-AUG-1996 13:33

OP System Version: 7C0-427

DBM

AIT-B 7S427KV-537

Output DLIS Files

DEFAULT	SPEA .005	FN:4	FIELD	1-AUG-1996 13:33

Input DLIS Files

DEFAULT	SPEA .004	FN:3	FIELD	1-AUG-1996 13:13	6120.0 FT	5709.7 FT

Output DLIS Files

DEFAULT	SPEA .005	FN:4	FIELD	1-AUG-1996 13:33

Integrated Hole/Cement Volume Summary

Hole Volume = 119.88 F3

Cement Volume = 53.07 F3 (assuming 5.50 IN casing O.D.)

Computed from 6113.0 FT to 5708.5 FT using data channel(s) CALI (per GCSE parameter setting)

OP System Version: 7C0-427

DBM

AIT-B 7S427KV-537

PIP SUMMARY

- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

REPEAT ANALYSIS

SANDSTONE MATRIX, 2.68 G/CC

TENS_REP Curve (TENS_REP) 10000 (LBF) 0

LC01_REP Curve (LC01_REP) 0 (MD) 20

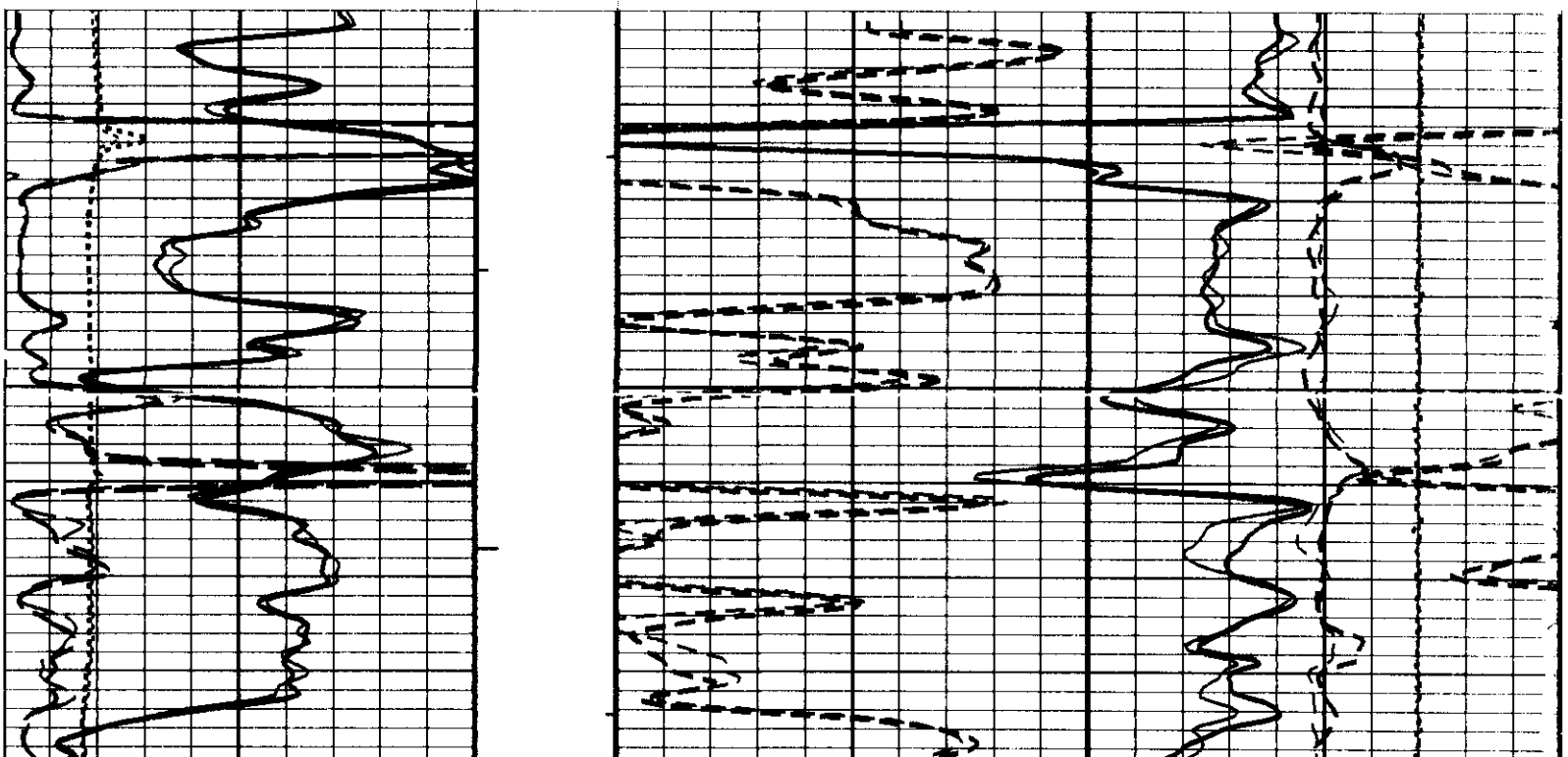
DRHO_REP Curve (DRHO_REP) -0.25 (G/C3) 0.25

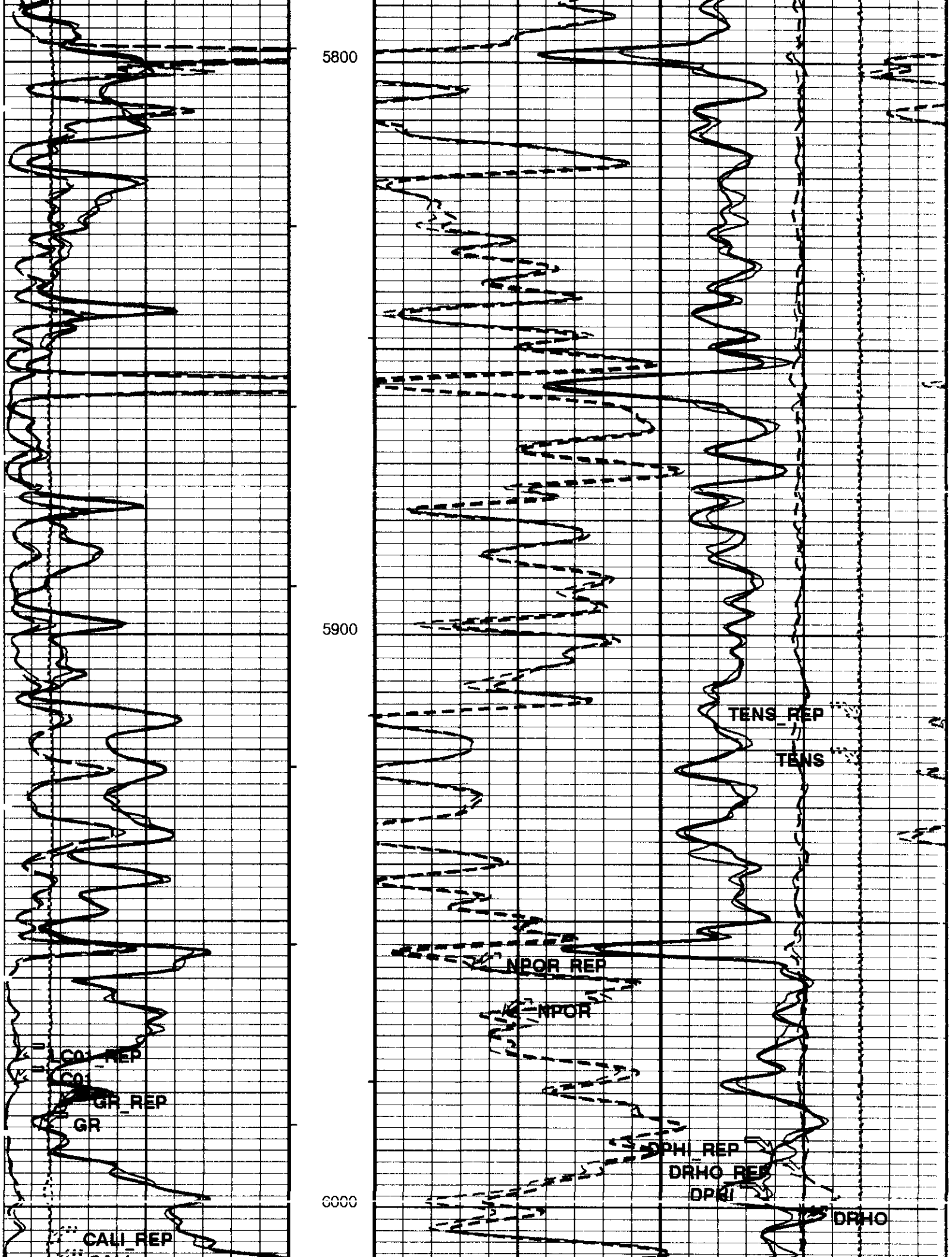
GR_REP Curve (GR_REP) 0 (GAPI) 200

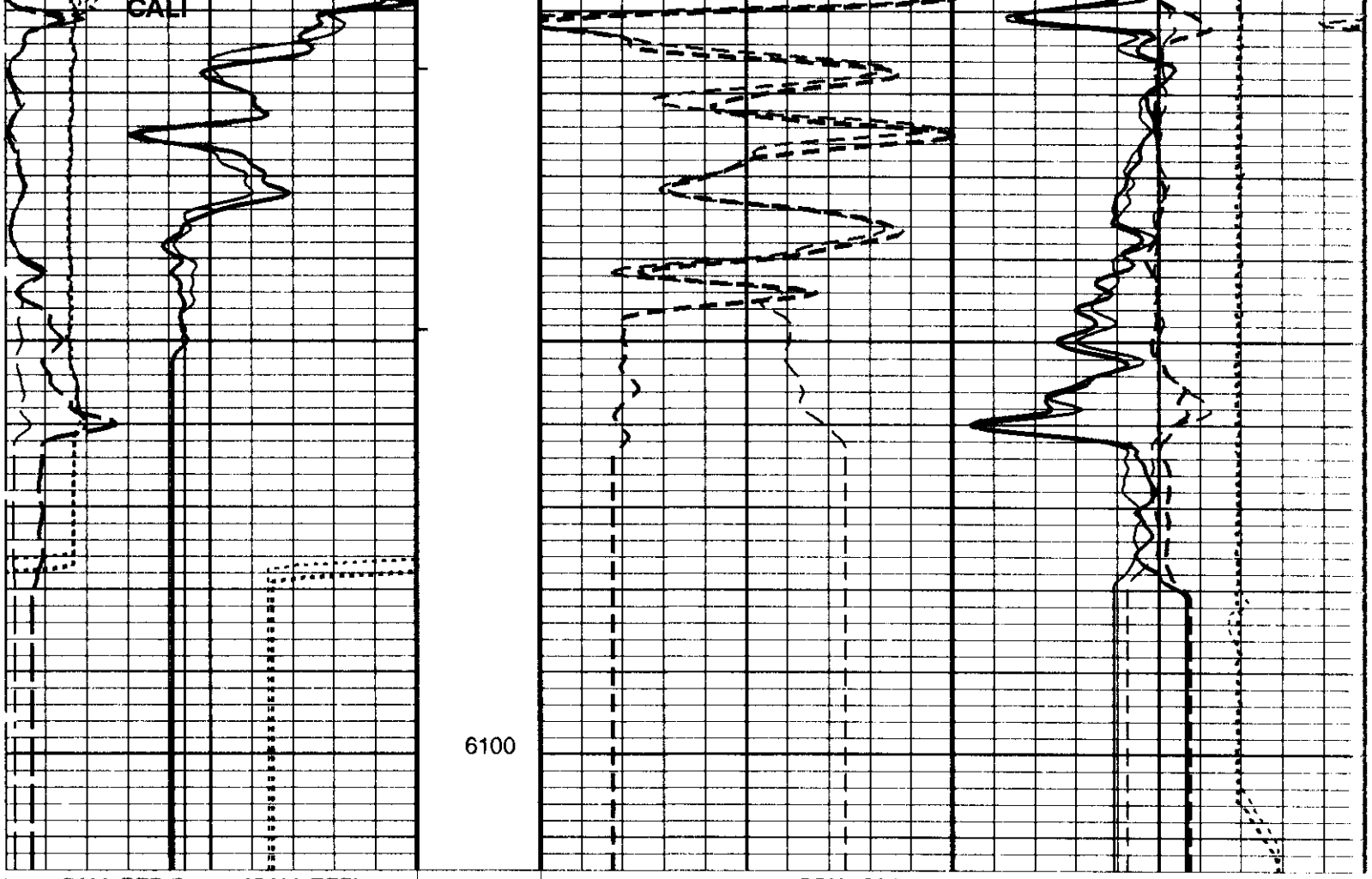
NPOR_REP Curve (NPOR_REP) 0.3 (V/V) -0.1

CALI_REP Curve (CALI_REP) 6 (IN) 16

DPHI_REP Curve (DPHI_REP) 0.3 (V/V) -0.1




5800
5900
6000
TENS_REP
TENS
NPOR_REP
NPOR
DPHI_REP
DRHO_REP
DPHI
DRHO
C01_REP
C01
GR_REP
GR
CALI_REP



CALI_REP Curve (CALI_REP)
6 (IN) 16

GR_REP Curve (GR_REP)
0 (GAPI) 200

LC01_REP Curve (LC01_REP)
0 (MD) 20

DPHI_REP Curve (DPHI_REP)
0.3 (V/V) -0.1

NPOR_REP Curve (NPOR_REP)
0.3 (V/V) -0.1

DRHO_REP Curve (DRHO_REP)
-0.25 (G/C3) 0.25

TENS_REP Curve (TENS_REP)
10000 (LBF) 0

MAIN PASS

SANDSTONE MATRIX, 2.68 G/CC

PIP SUMMARY

- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
BFM	Borehole Fluid Medium	LIQUID	
BHFL	Borehole Fluid Type	WATER	
BHS	Bore Hole Status	OPEN	
BS	Bit Size	7.875	IN
BSAL	Borehole Salinity	1600.00	PPM
BSCO	Borehole Salinity Correction Option	NO	
CCCO	Casing & Cement Thickness Correction Option	NO	
CWEI	Casing Weight	24.00	LB/F
DFD	Drilling Fluid Density	8.30	LB/G
DHC	Density Hole Correction	BS	
DORL	Depth Offset Repeat Analysis	0.0	FT
DPPM	Density Porosity Processing Mode	HISP	
FD	Fluid Density	1	G/C3
FSAL	Formation Salinity	-50000	PPM
FSCO	Formation Salinity Correction Option	NO	
GCSE	Generalized Caliper Selection	CALI	

GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	1.000000e-02	DF/F
HSCO	Hole Size Correction Option	YES	
MATR	Rock Matrix Type	SANDSTONE	
MCCO	Mud Cake Correction Option	NO	
MCOR	Mud Correction	NATU	
MDEN	Matrix Density	2.68	G/C3
MST	Mud Sample Temperature	73.00	DEGF
MWCO	Mud Weight Correction Option	NO	
PTCO	Pressure/Temperature Correction Option	NO	
RMFS	Resistivity of Mud Filtrate Sample	1.8900	OHMM
SDAT	Standoff Data Source	SOCN	
SOCN	Standoff Distance	1.5	IN
SOCO	Standoff Corrrection Option	NO	
WMUD	Mud Weight	8.3	LB/G

Format: PORO_REP Vertical Scale: 5" per 100' Graphics File Created: 1-AUG-1996 13:33

OP System Version: 7C0-427

DBM

AIT-B 7S427KV-537

Input DLIS Files

DEFAULT	SPEA .004	FN:3	FIELD	1-AUG-1996 13:13	6120.0 FT	5709.7 FT

Output DLIS Files

Output DLIS Files

DEFAULT	SPEA .005	FN:4	FIELD	1-AUG-1996 13:33	6114.0 FT	267.0 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 2049.92 F3

Cement Volume = 1105.33 F3 (assuming 5.50 IN casing O.D.)

Computed from 6113.0 FT to 388.0 FT using data channel(s) CALI (per GCSE parameter setting)

OP System Version: 7C0-427

DBM

AIT-B 7S427KV-537

PIP SUMMARY

- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

Tool/Tot. Drag From D3T to STIA

Cable Drag From STIA to STIT

Stuck Stretch (STIT)

0 (F) 50

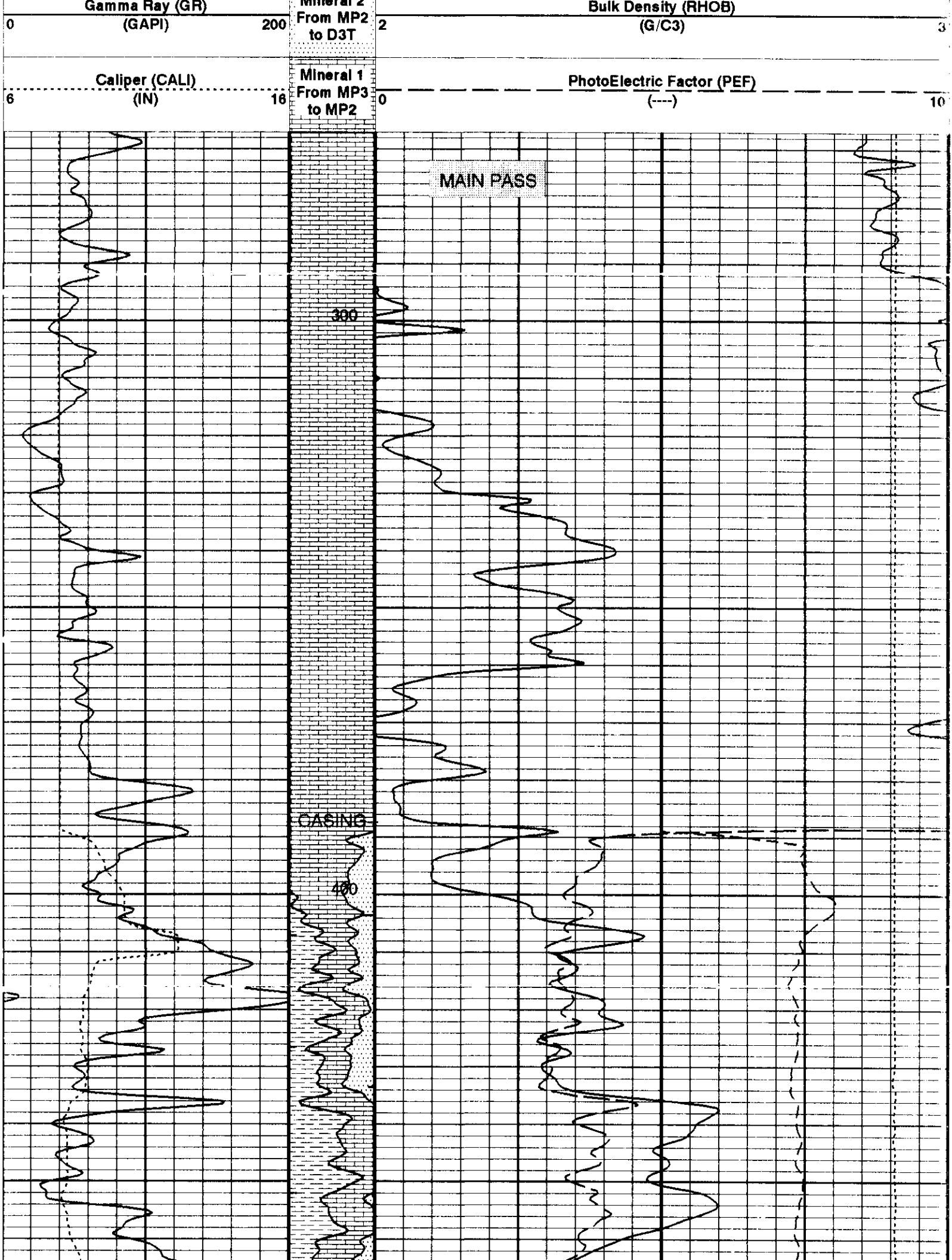
Mineral 3 From D3T to MP3

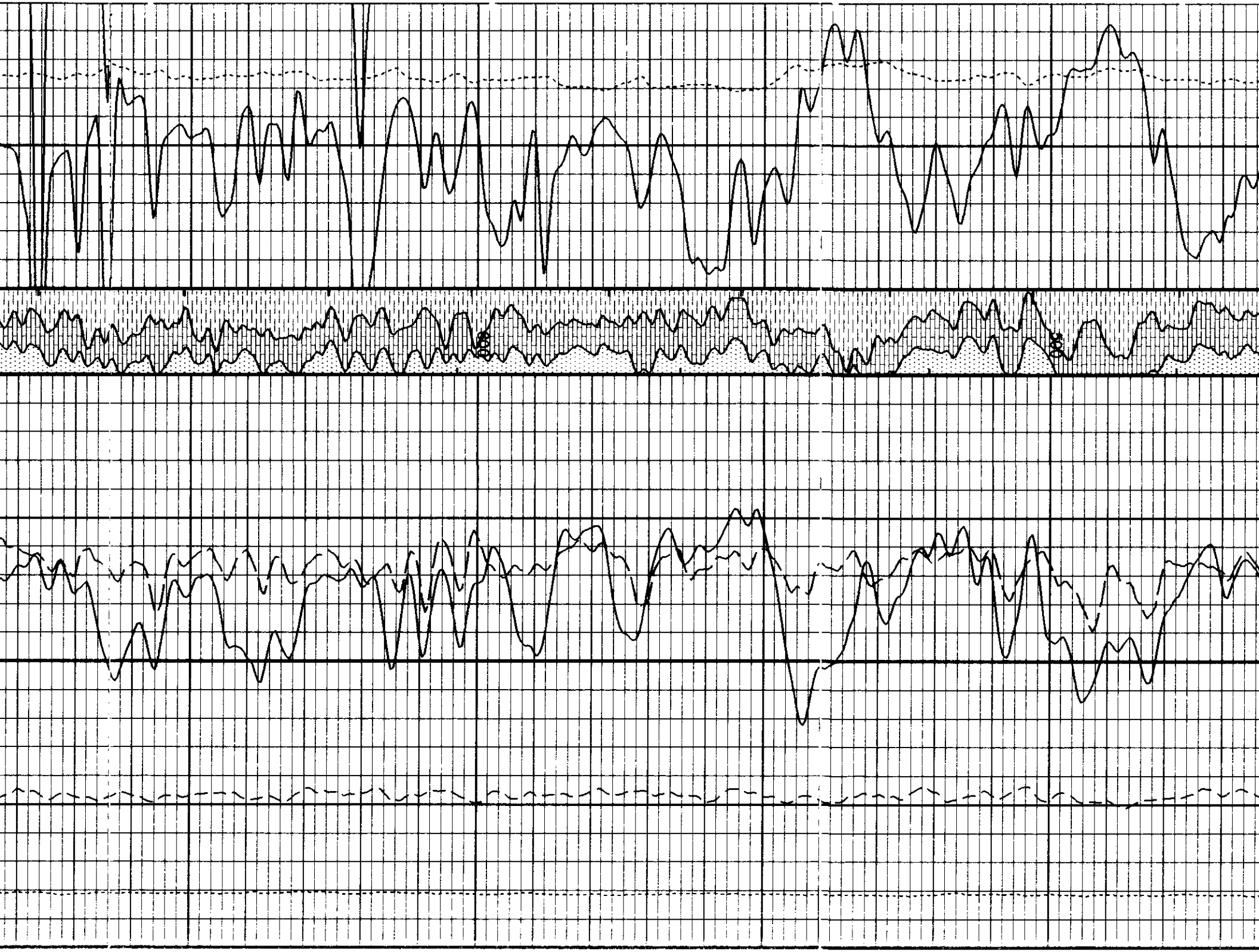
Tension (TENS)

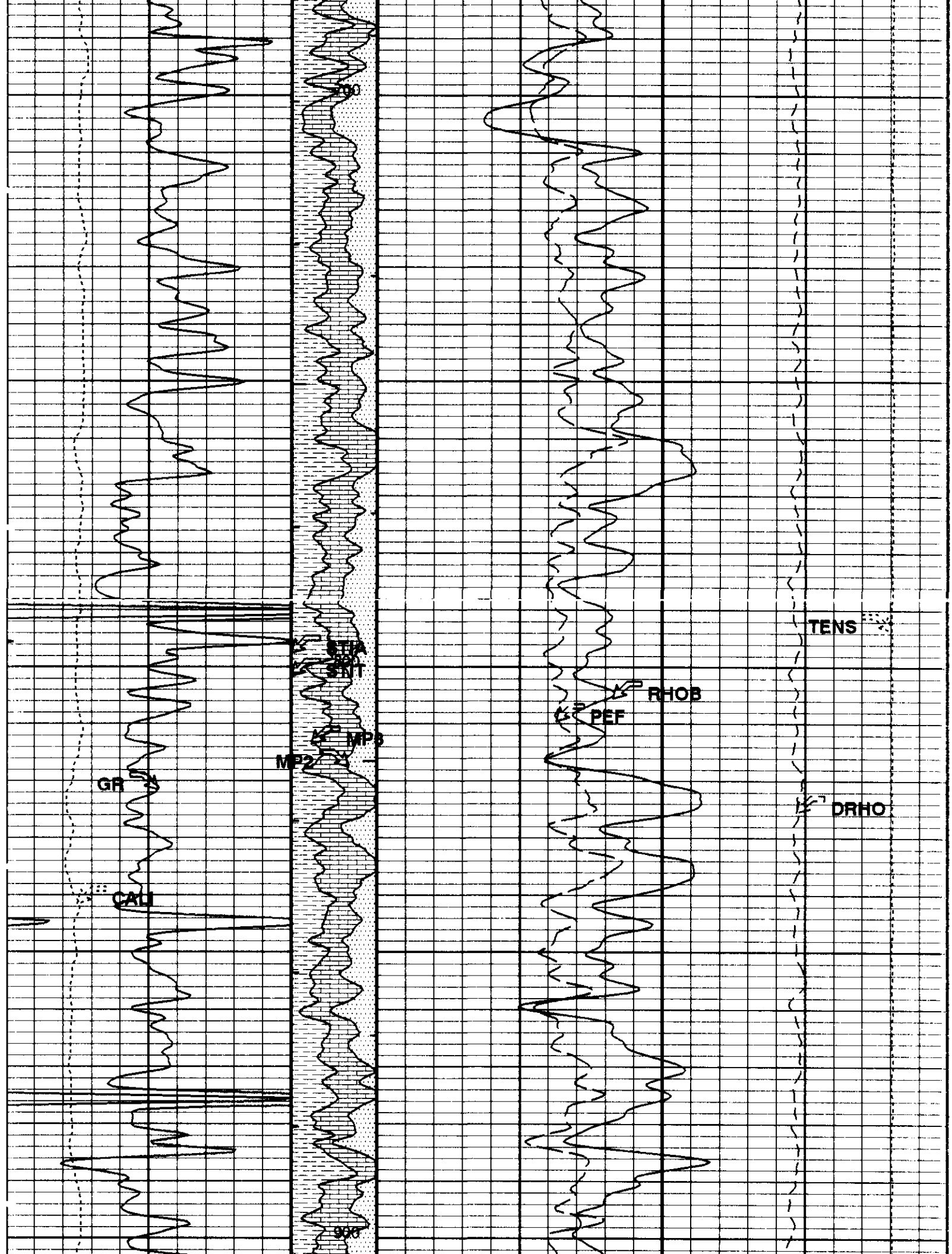
10000 (LBF) 0

Bulk Density Correction (DRHO)

-0.25 (G/C3) 0.25


Gamma Ray (GR)
0
(GAPI)
200
Mineral 2
From MP2
to D3T
Bulk Density (RHOB)
2
(G/C3)
3
Caliper (CALI)
6
(IN)
16
Mineral 1
From MP3
to MP2
PhotoElectric Factor (PEF)
0
(----)
10
MAIN PASS
300
CASING
400

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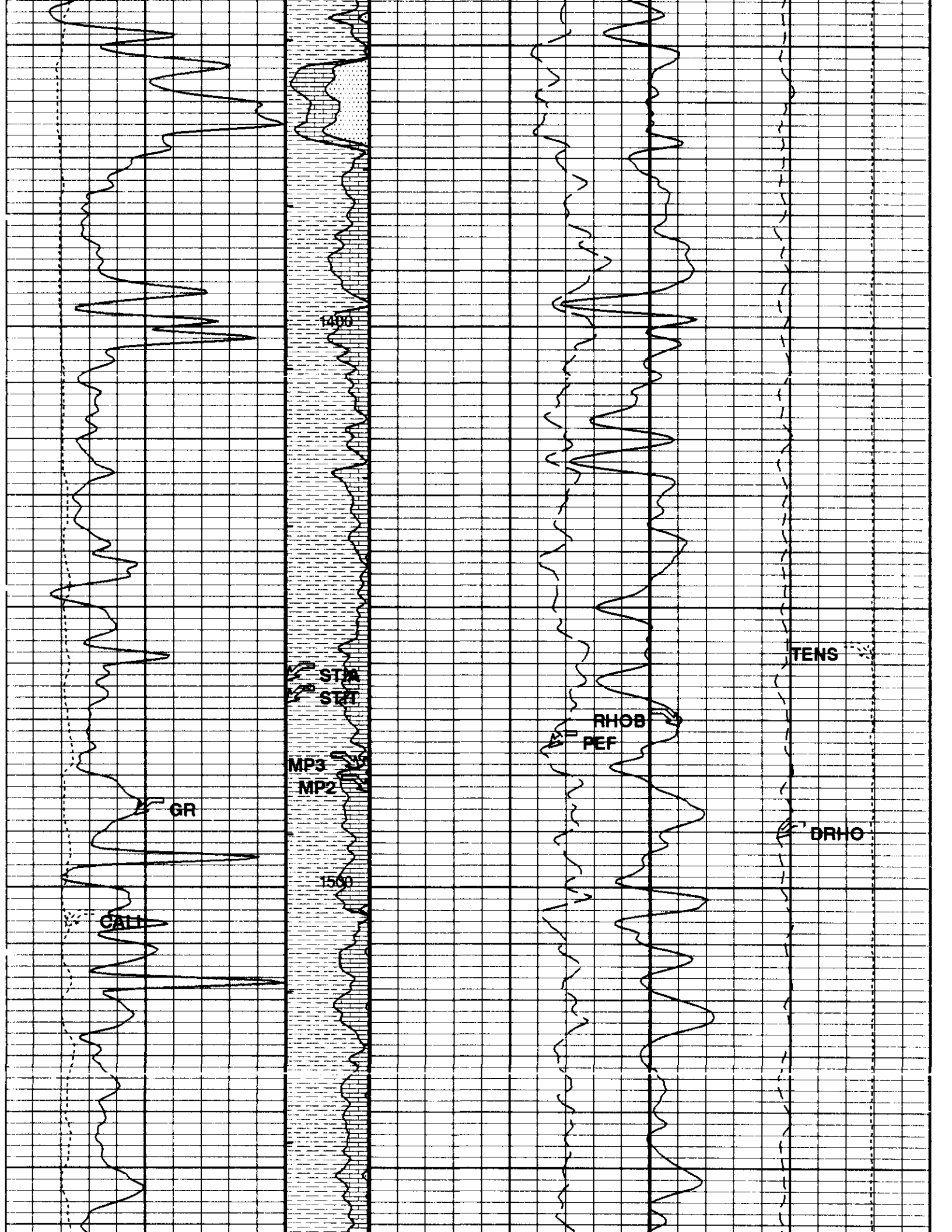
MP2
GR
CALI
900
TENS
RHOB
PEF
DRHO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MP3
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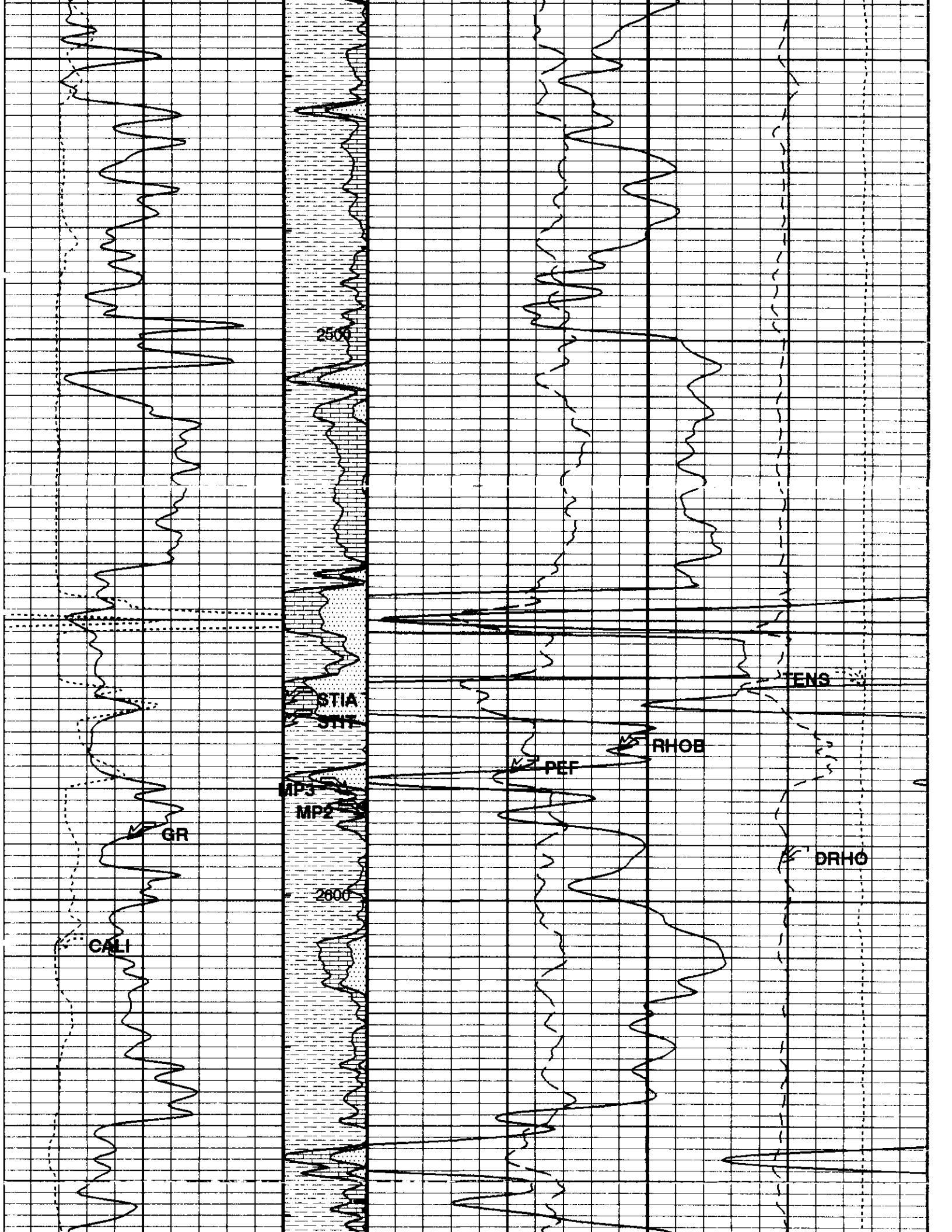
CALI
TENS
RHOB
PEF
DRHO

1700
1600

2000
1000
1000

2200
2100

2400
2300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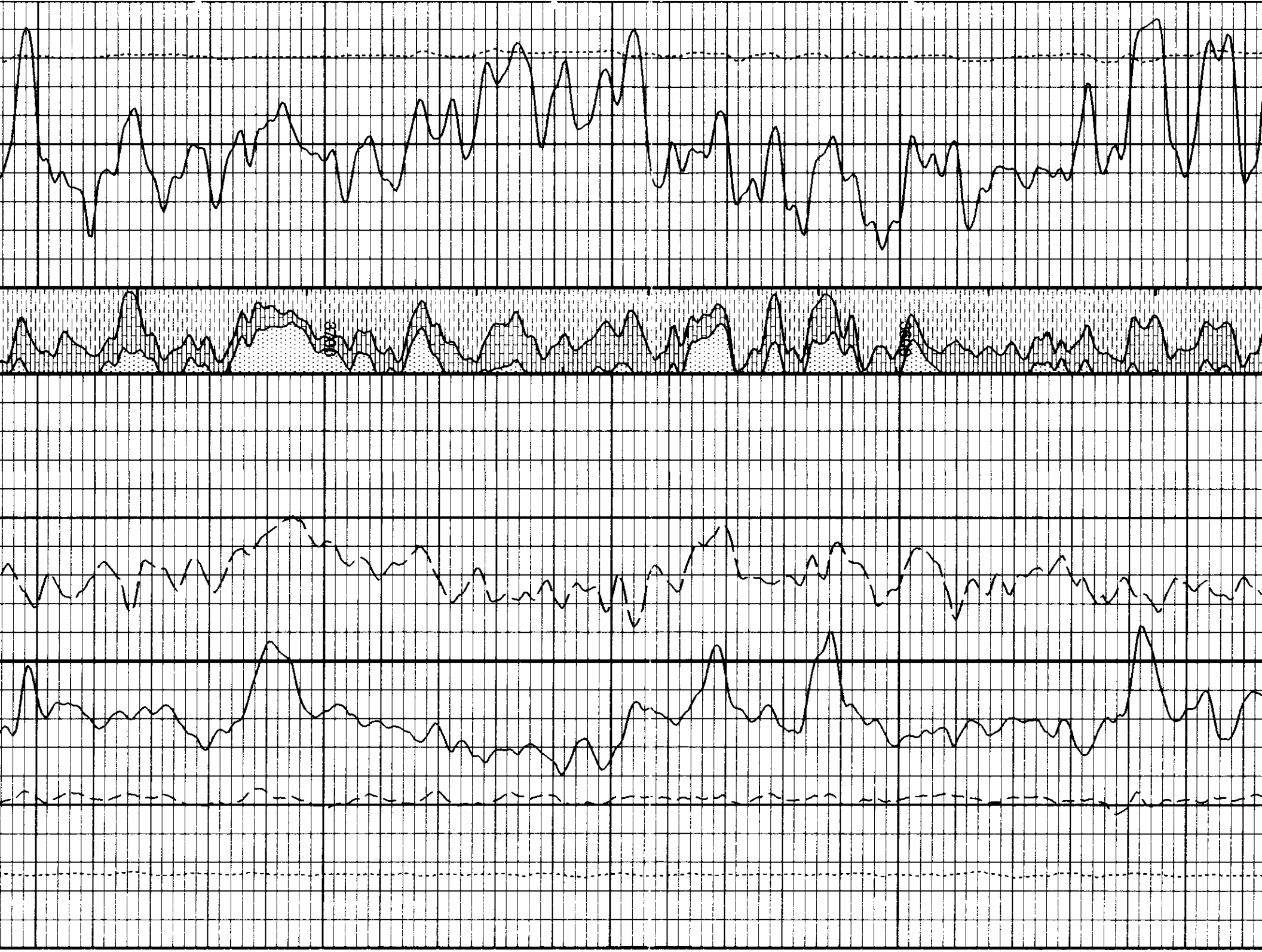
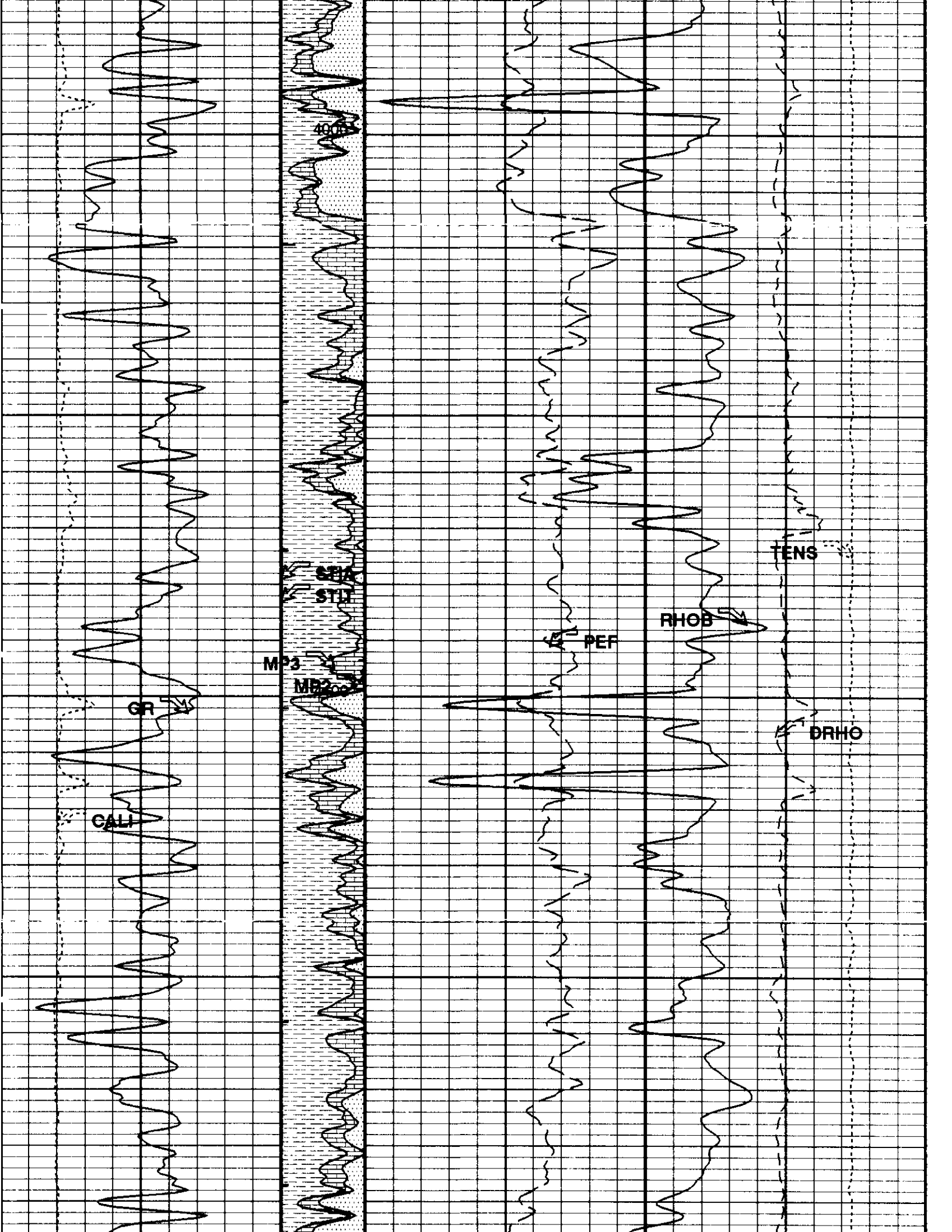
RHOB
PEF
DRHO

2800
2700

3200
3300
3400

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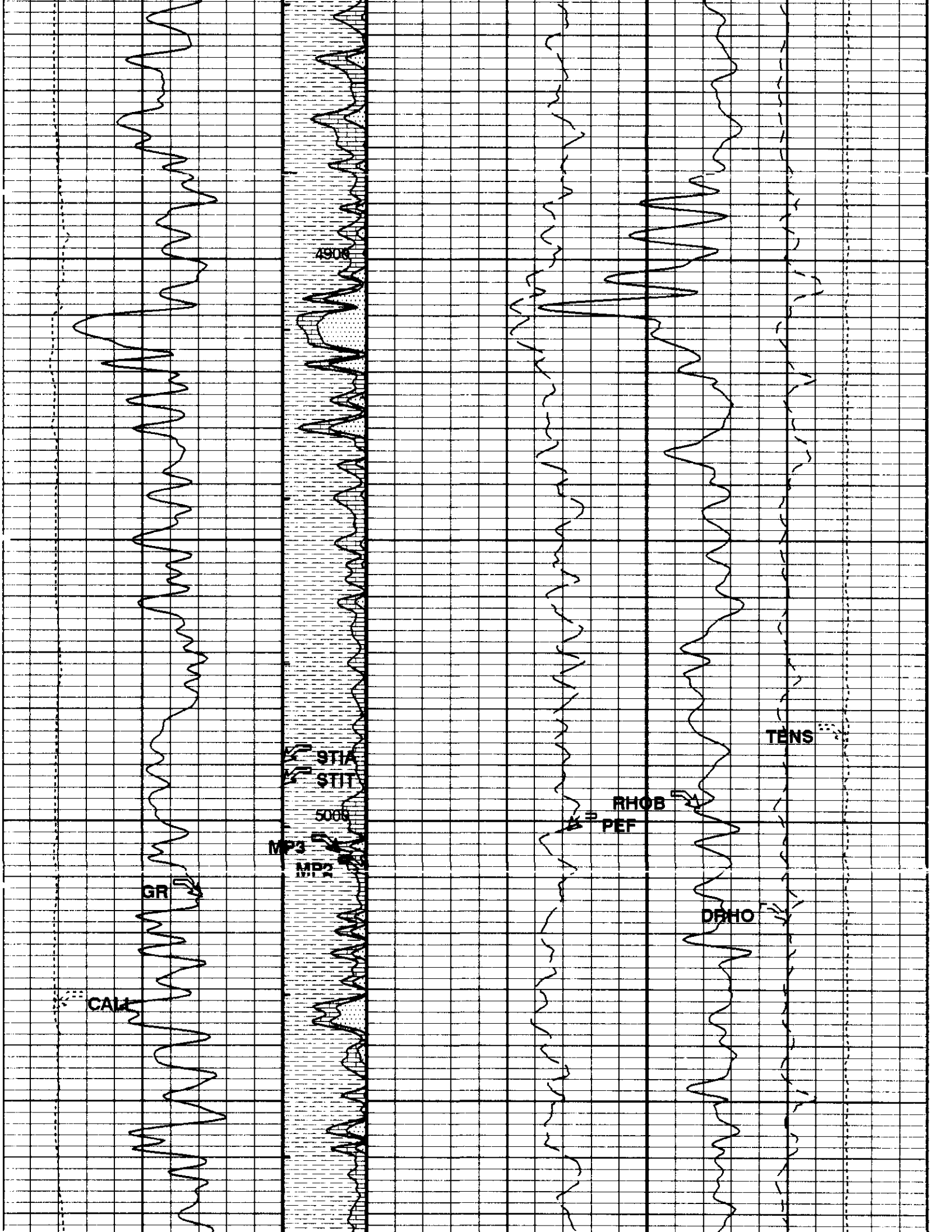
STIA
STLT
MP3
MP2
GR
CALI
PEF
RHOB
TENS
DRHO

4400
4400
4400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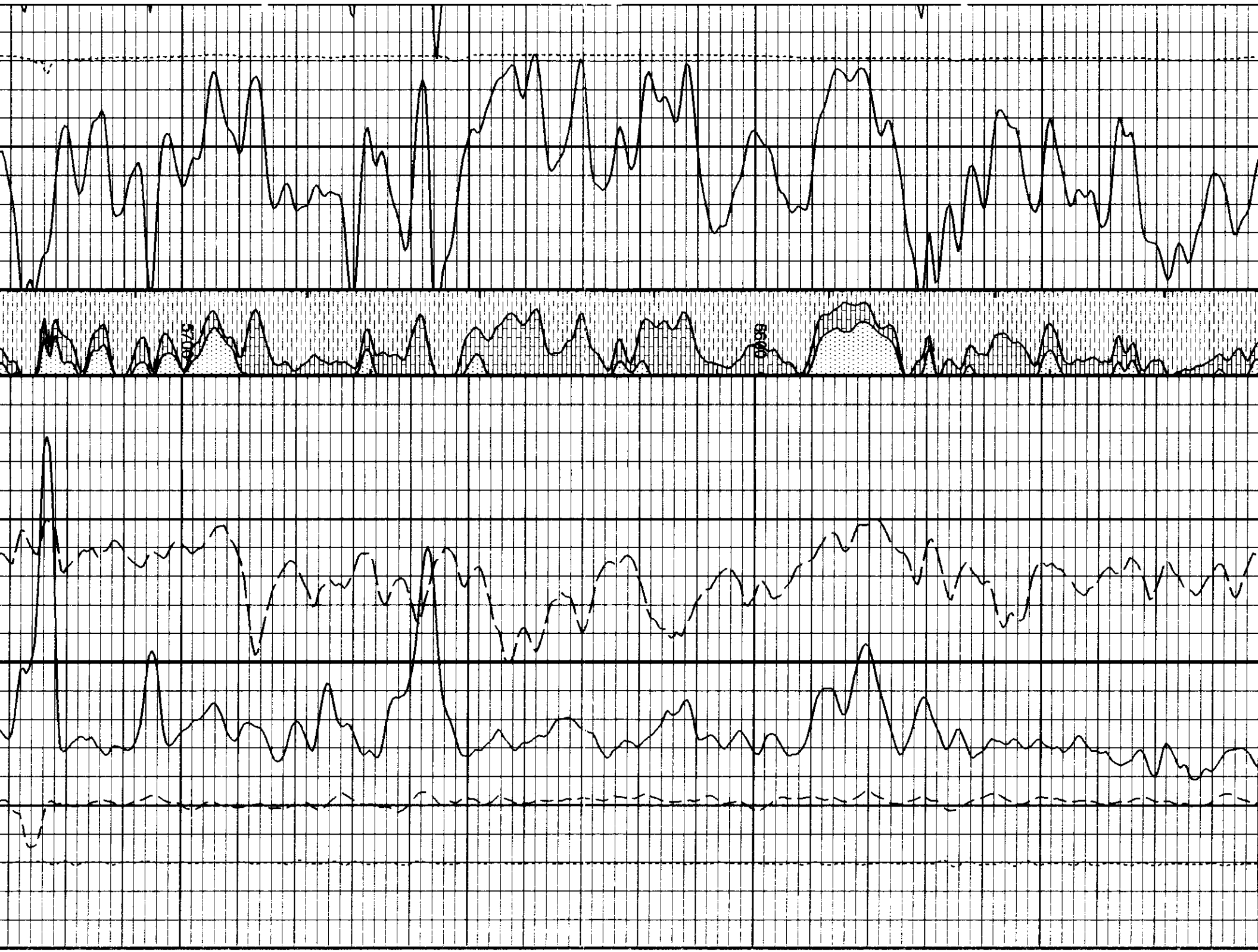
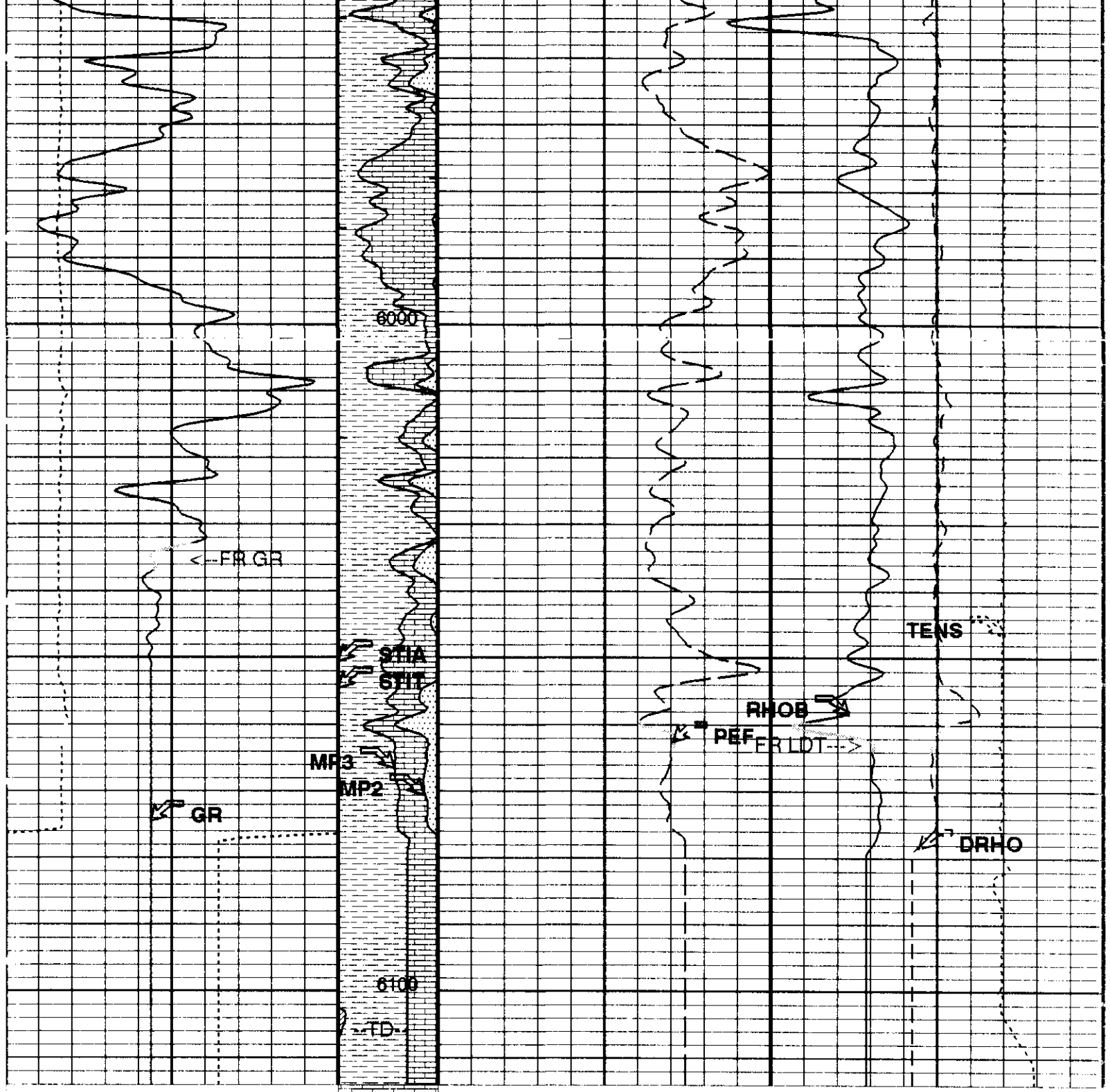
STIT
5000
MP3
MP2
GR
CALI
RHOB
PEF
DRHO
TENS

5200
5100

53000





Caliper (CALI)
6 (IN) 16

Mineral 1 From MP3 to MP2

PhotoElectric Factor (PEF)
0 (----) 10

Gamma Ray (GR)
0 (GAPI) 200

Mineral 2 From MP2 to D3T

Bulk Density (RHOB)
2 (G/C3) 3

Mineral 3 From D3T to MP3

Bulk Density Correction (DRHO)
-0.25 (G/C3) 0.25

MAIN PASS

Stuck Stretch (STIT)
0 (F) 50

Tension (TENS)
10000 (LBF) 0

Cable Drag From STIA to STIT

Tool/Tot. Drag From D3T to STIA

PIP SUMMARY

- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
BDPS	Bulk Density Processing Selector	RHOB	
BFM	Borehole Fluid Medium	LIQUID	
BHT	Bottom Hole Temperature (used in calculations)	150	DEGF
BS	Bit Size	7.875	IN
CLIM	Caliper Limit for Bad Hole	999	IN
CNPS	Corrected Neutron Porosity Selector	NPHI	
DFD	Drilling Fluid Density	8.30	LB/G
DHC	Density Hole Correction	BS	
DORL	Depth Offset Repeat Analysis	0.0	FT
DPPM	Density Porosity Processing Mode	HISP	
DRUL	DRHO Upper Limit	999	G/C3
FCAL	Caliper Presence Flag	PRESENT	
FCGR	CGR Presence Flag	PRESENT	
FD	Fluid Density	1	G/C3
FEXP	Form Factor Exponent	2	
FLDT	LDT Presence Flag	PRESENT	
FNUM	Form Factor Numerator	1	
FSON	Sonic Presence Flag	ABSENT	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
MATR	Rock Matrix Type	SANDSTONE	
MDEN	Matrix Density	2.68	G/C3
PMAX	PHI Maximum	50	PU
POUT	Porosity Output Lithology	LIMESTONE	
RG21	RHO Grain (2-Mineral Model, Min-1)	2.71	G/C3
RG22	RHO Grain (2-Mineral Model, Min-2)	2.644	G/C3
RG23	RHO Grain (2-Mineral Model, Min-3)	2.877	G/C3
RG31	RHO Grain (3-Mineral Model, Min-1)	2.71	G/C3
RG32	RHO Grain (3-Mineral Model, Min-2)	2.644	G/C3
RG33	RHO Grain (3-Mineral Model, Min-3)	2.877	G/C3
RMFS	Resistivity of Mud Filtrate Sample	1.8900	OHMM
RTLF	RT Limit Flag	NO_LIMIT	
RWF	Resistivity of Free Water	2.000000e-02	OHMM
SHT	Surface Hole Temperature	80	DEGF
STKT	STI Stuck Threshold	2.5	FT
TD	Total Depth	6113	FT
TWS	Temperature of Connate Water Sample	100.00	DEGF
UF	U Fluid	0.398	B/C3
UM21	U Matrix (2-Mineral Model, Min-1)	13.77	B/C3
UM22	U Matrix (2-Mineral Model, Min-2)	4.779	B/C3
UM23	U Matrix (2-Mineral Model, Min-3)	8.997	B/C3
UM31	U Matrix (3-Mineral Model, Min-1)	13.77	B/C3
UM32	U Matrix (3-Mineral Model, Min-2)	4.779	B/C3
UM33	U Matrix (3-Mineral Model, Min-3)	8.997	B/C3
WMUD	Mud Weight	8.3	LB/G

Format: PertLDT Vertical Scale: 5" per 100' Graphics File Created: 1-AUG-1996 13:33

OP System Version: 7C0-427

DBM

AIT-B 7S427KV-537

Output DLIS Files

DEFAULT SPEA .005 FN:4 FIELD 1-AUG-1996 13:33

Input DLIS Files

DEFAULT	SPEA .004	FN:3	FIELD	1-AUG-1996 13:13	6120.0 FT	5709.7 FT

Output DLIS Files

DEFAULT	SPEA .005	FN:4	FIELD	1-AUG-1996 13:33

Integrated Hole/Cement Volume Summary

Hole Volume = 120.72 F3

Cement Volume = 53.49 F3 (assuming 5.50 IN casing O.D.)

Computed from 6113.0 FT to 5706.0 FT using data channel(s) CALI (per GCSE parameter setting)

OP System Version: 7C0-427

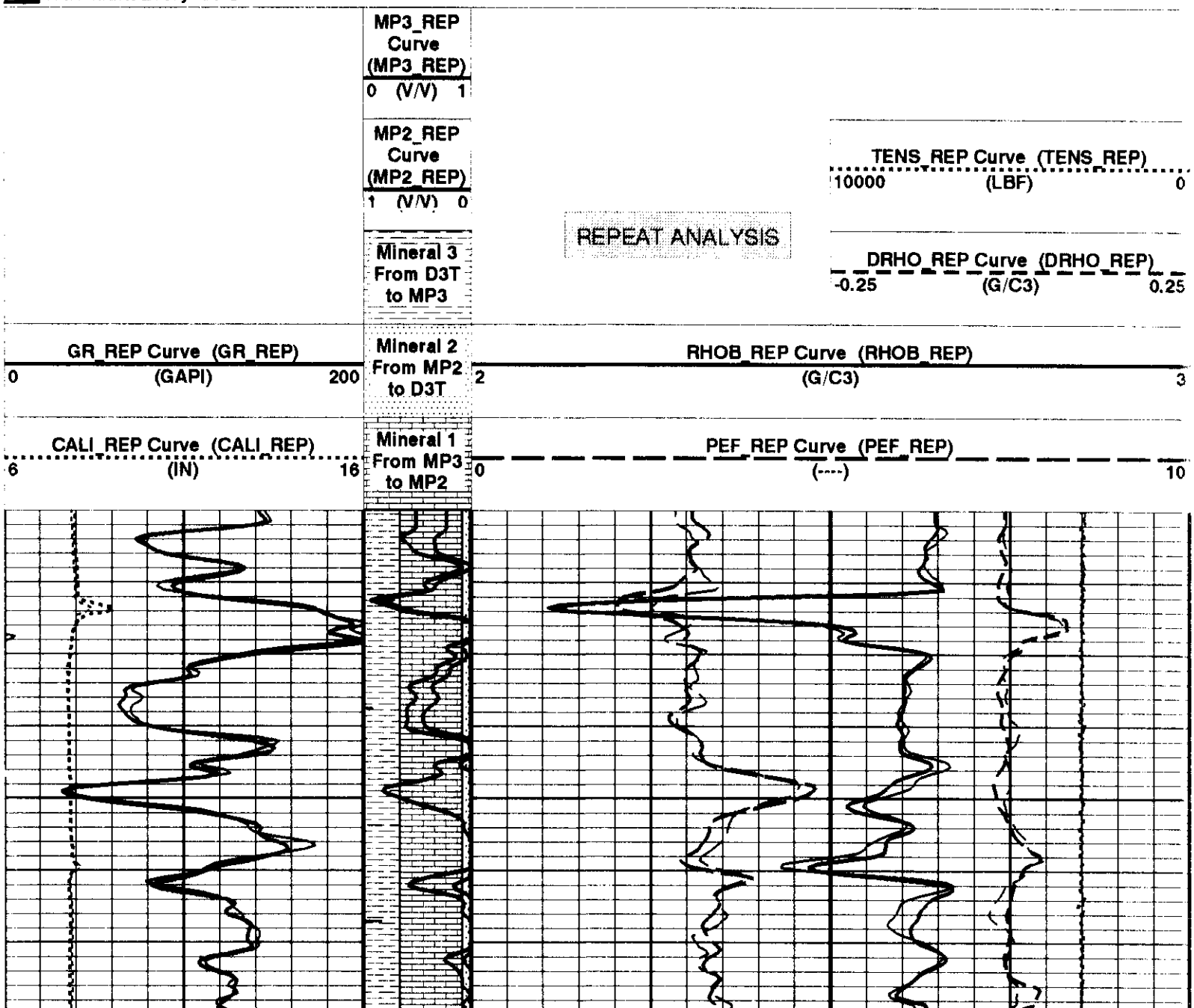
DBM

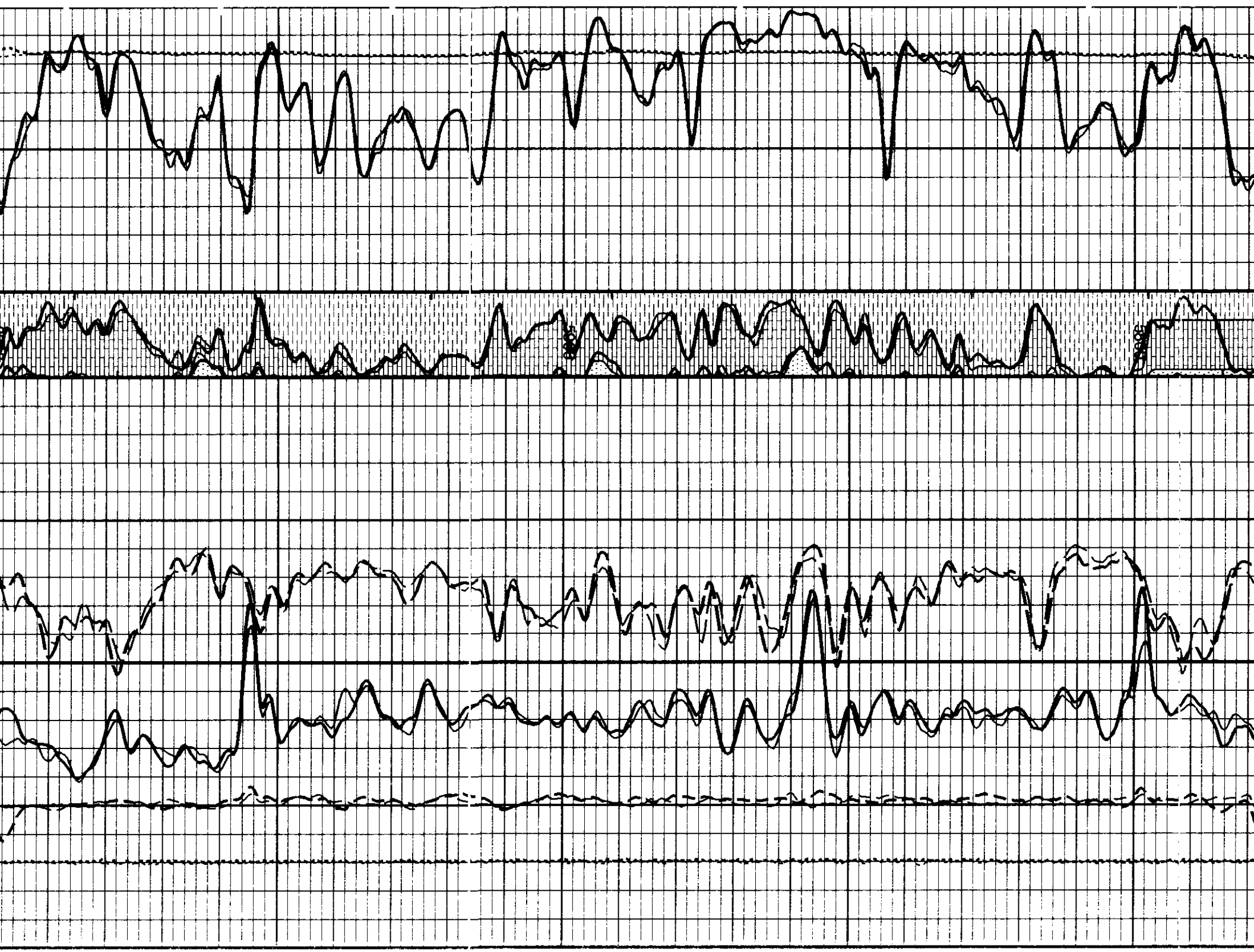
AIT-B 7S427KV-537

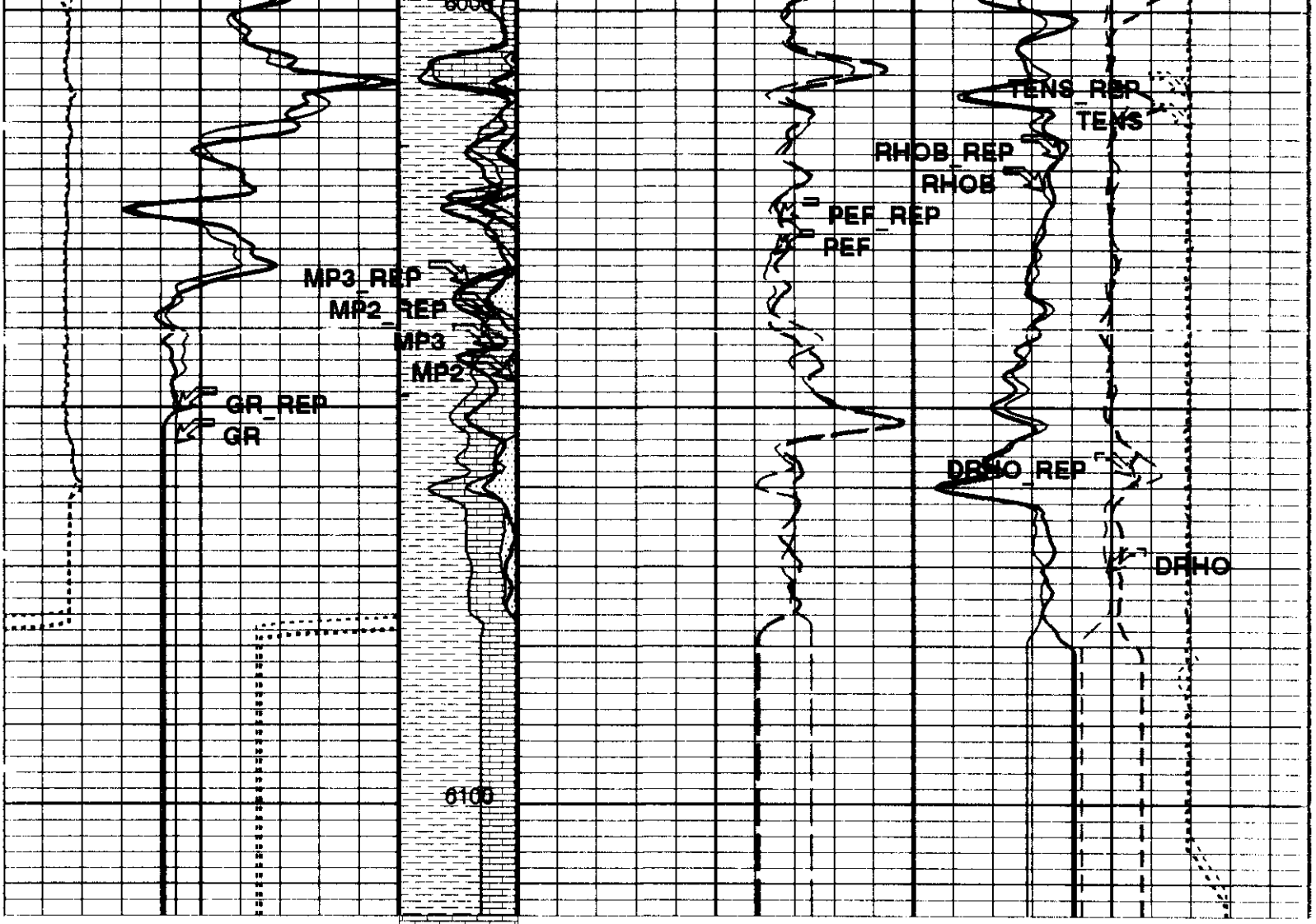
PIP SUMMARY

- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S







CALI_REP Curve (CALI_REP)
6 (IN) 16

Mineral 1 From MP3 to MP2

PEF_REP Curve (PEF_REP)
0 (----) 10

GR_REP Curve (GR_REP)
0 (GAPI) 200

Mineral 2 From MP2 to D3T

RHOB_REP Curve (RHOB_REP)
2 (G/C3) 3

Mineral 3 From D3T to MP3

DRHO_REP Curve (DRHO_REP)
-0.25 (G/C3) 0.25

REPEAT ANALYSIS

MP2_REP Curve (MP2_REP)
1 (V/V) 0

TENS_REP Curve (TENS_REP)
10000 (LBF) 0

MP3_REP Curve (MP3_REP)
0 (V/V) 1

PIP SUMMARY

- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value

BDPS	Bulk Density Processing Selector	RHOB	
BFM	Borehole Fluid Medium	LIQUID	
BHT	Bottom Hole Temperature (used in calculations)	150	DEGF
BS	Bit Size	7.875	IN
CLIM	Caliper Limit for Bad Hole	999	IN
CNPS	Corrected Neutron Porosity Selector	NPHI	
DFD	Drilling Fluid Density	8.30	LB/G
DHC	Density Hole Correction	BS	
DORL	Depth Offset Repeat Analysis	0.0	FT
DPPM	Density Porosity Processing Mode	HISP	
DRUL	DRHO Upper Limit	999	G/C3
FCAL	Caliper Presence Flag	PRESENT	
FCGR	CGR Presence Flag	PRESENT	
FD	Fluid Density	1	G/C3
FEXP	Form Factor Exponent	2	
FLDT	LDT Presence Flag	PRESENT	
FNUM	Form Factor Numerator	1	
FSON	Sonic Presence Flag	ABSENT	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
MATR	Rock Matrix Type	SANDSTONE	
MDEN	Matrix Density	2.68	G/C3
PMAX	PHI Maximum	50	PU
POUT	Porosity Output Lithology	LIMESTONE	
RG21	RHO Grain (2-Mineral Model, Min-1)	2.71	G/C3
RG22	RHO Grain (2-Mineral Model, Min-2)	2.644	G/C3
RG23	RHO Grain (2-Mineral Model, Min-3)	2.877	G/C3
RG31	RHO Grain (3-Mineral Model, Min-1)	2.71	G/C3
RG32	RHO Grain (3-Mineral Model, Min-2)	2.644	G/C3
RG33	RHO Grain (3-Mineral Model, Min-3)	2.877	G/C3
RMFS	Resistivity of Mud Filtrate Sample	1.8900	OHMM
RTLF	RT Limit Flag	NO_LIMIT	
RWF	Resistivity of Free Water	2.000000e-02	OHMM
SHT	Surface Hole Temperature	80	DEGF
TD	Total Depth	6113	FT
TWS	Temperature of Connate Water Sample	100.00	DEGF
UF	U Fluid	0.398	B/C3
UM21	U Matrix (2-Mineral Model, Min-1)	13.77	B/C3
UM22	U Matrix (2-Mineral Model, Min-2)	4.779	B/C3
UM23	U Matrix (2-Mineral Model, Min-3)	8.997	B/C3
UM31	U Matrix (3-Mineral Model, Min-1)	13.77	B/C3
UM32	U Matrix (3-Mineral Model, Min-2)	4.779	B/C3
UM33	U Matrix (3-Mineral Model, Min-3)	8.997	B/C3
WMUD	Mud Weight	8.3	LB/G

Format: PertLDT_REP **Vertical Scale: 5" per 100'** **Graphics File Created: 1-AUG-1996 13:33**

OP System Version: 7C0-427

DBM

AIT-B 7S427KV-537

Input DLIS Files

DEFAULT	SPEA .004	FN:3	FIELD	1-AUG-1996 13:13	6120.0 FT	5709.7 FT

Output DLIS Files

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Litho Density - D Wellsite Calibration - Background Measurement							
Master: Jul 29 13:31 1996 Before: Jul 31 16:42 1996 After: Aug 1 15:39 1996							
LL Background	20.00	15.98	15.70	15.96	0.2640	1.000	CPS
LU Background	76.00	61.50	61.38	61.63	0.2517	1.000	CPS
LS Background	57.00	46.73	46.38	46.77	0.3899	1.000	CPS
LITH Background	5.500	4.564	4.469	4.627	0.1582	0.5000	CPS
SS1 Background	16.00	12.19	12.23	12.28	0.05275	0.5000	CPS
SS2 Background	11.00	8.368	8.339	8.329	-0.01031	0.5000	CPS
Litho Density - D Wellsite Calibration - Tool Quality Control Information HV							
Master: Jul 29 13:31 1996 Before: Jul 31 16:42 1996 After: Aug 1 15:39 1996							
LSHV Background	1500	1557	1561	1554	-6.427	N/A	V
SSHV Background	1500	1259	1276	1257	-18.04	N/A	V
Litho Density - D Wellsite Calibration - Detectors Resolution From BKG Measurements							

Litho Density - D Wellsite Calibration - Detectors Resolution From BRG Measurements
Master: Jul 29 13:31 1996 Before: Jul 31 16:42 1996 After: Aug 1 15:39 1996

LS Resolution Background	8.000	8.780	8.824	8.794	-0.03035	N/A	
SS Resolution Background	8.000	8.622	8.601	8.628	0.02720	N/A	

Litho Density - D Wellsite Calibration - Caliper Calibration
Before: Jul 31 16:39 1996

Caliper Small Ring	8.000	N/A	8.745	N/A	N/A	N/A	IN
Caliper Large Ring	12.00	N/A	12.56	N/A	N/A	N/A	IN

Litho Density - D Master Calibration - Aluminum Measurement
Master: Jul 29 13:45 1996

LL Aluminum	90.00	99.82	--	--	--	--	CPS
LU Aluminum	135.0	151.6	--	--	--	--	CPS
LS Aluminum	155.0	175.6	--	--	--	--	CPS
LITH Aluminum	50.00	65.35	--	--	--	--	CPS
SS1 Aluminum	175.0	197.5	--	--	--	--	CPS
SS2 Aluminum	260.0	277.6	--	--	--	--	CPS

Litho Density - D Master Calibration - Litholog Measurement
Master: Jul 29 13:40 1996

LL Iron	80.00	87.12	--	--	--	--	CPS
LU Iron	120.0	133.1	--	--	--	--	CPS
LS Iron	135.0	153.7	--	--	--	--	CPS
LITH Iron	30.00	40.59	--	--	--	--	CPS
SS1 Iron	155.0	176.1	--	--	--	--	CPS
SS2 Iron	245.0	252.0	--	--	--	--	CPS

Litho Density - D Master Calibration - Spectrum Quality Ratios
Master: Jul 29 13:45 1996

QRLS Calculated	0.6500	0.6586	--	--	--	--
QRSS Calculated	0.7200	0.7117	--	--	--	--
QRLI Calculated	0.3900	0.3721	--	--	--	--
QLIR Calculated	1.390	1.409	--	--	--	--
QR Calculated	1.000	1.019	--	--	--	--

Compensated Neutron - H Wellsite Calibration - Zero Measurement
Master: May 4 08:20 1996 Before: Jul 31 16:39 1996

CNTC Background	1.000	0	0	N/A	N/A	N/A	CPS
CFTC Background	0	0.2666	0.7746	N/A	N/A	N/A	CPS

Compensated Neutron - H Wellsite Calibration - Jig Measurement
Master: May 4 08:43 1996 Before: Jul 31 16:49 1996

CNTC Jig	3068	3068	3086	N/A	N/A	N/A	CPS
CFTC Jig	1351	1351	1374	N/A	N/A	N/A	CPS
CNTC/CFTC (Jig)	2.271	2.271	2.246	N/A	N/A	N/A	

Compensated Neutron - H Master Calibration - Tank Measurement
Master: May 4 08:30 1996

Thermal Near Corr. (Tank)	6031	6154	--	--	--	--	CPS
Thermal Far Corr. (Tank)	2793	2625	--	--	--	--	CPS
CNTC/CFTC (Tank)	2.159	2.345	--	--	--	--	

Scintillation Gamma-Ray - L Wellsite Calibration - Detector Calibration
Before: Aug 1 03:04 1996

Gamma Ray Background	30.00	N/A	52.57	N/A	N/A	N/A	GAPI
Gamma Ray (Jig - Bkg)	158.9	N/A	158.9	N/A	N/A	14.44	GAPI
Gamma Ray (Calibrated)	165.0	N/A	165.0	N/A	N/A	15.00	GAPI

The CNT Master Calibration Was Done With The Following Parameters :

NCT-B Water Temperature 67.0 DEGF.
Thermal Housing Size 3.369 IN.

Litho Density - D / Equipment Identification

Primary Equipment:		
Nuclear Services Cartridge	NSC - E	2972
Powered Gamma Detector	PGD - G	2747
Gamma Source Radioactive	GSR - J	1786
Auxiliary Equipment:		
Density Resistivity Sonde	DRS - B	3771
Electronics Cartridge Housing	ECH - MKA	2972
Powered Detector Housing	PDH - L	2757

Litho Density - D Wellsite Calibration

Background Measurement

Phase	LL Background CPS	Value	LU Background CPS	Value	LS Background CPS	Value
Master		15.98		61.50		46.73
Before		15.70		61.38		46.38
After		15.96		61.63		46.77
	15.00 (Minimum) 20.00 (Nominal) 25.00 (Maximum)		58.00 (Minimum) 76.00 (Nominal) 94.00 (Maximum)		43.00 (Minimum) 57.00 (Nominal) 72.00 (Maximum)	

Phase	LITH Background CPS	Value	SS1 Background CPS	Value	SS2 Background CPS	Value
Master		4.564		12.19		8.368
Before		4.489		12.23		8.339
After		4.627		12.28		8.329
	4.000 (Minimum) 5.500 (Nominal) 7.000 (Maximum)		12.00 (Minimum) 16.00 (Nominal) 19.50 (Maximum)		8.000 (Minimum) 11.00 (Nominal) 13.50 (Maximum)	

Master: Jul 29 13:31 1996 Before: Jul 31 16:42 1996 After: Aug 1 15:39 1996

Litho Density - D Wellsite Calibration

Detectors Resolution From BKG Measurments

Phase	LS Resolution Background	Value	SS Resolution Background	Value
Master		8.780		8.622
Before		8.824		8.601
After		8.794		8.628
	5.000 (Minimum) 8.000 (Nominal) 11.50 (Maximum)		5.000 (Minimum) 8.000 (Nominal) 11.50 (Maximum)	

Master: Jul 29 13:31 1996 Before: Jul 31 16:42 1996

After: Aug 1 15:39 1996

Litho Density - D Master Calibration

Aluminum Measurement

Phase	LL Aluminum CPS	Value	LU Aluminum CPS	Value	LS Aluminum CPS	Value
Master		99.82		151.6		175.6
	70.00 (Minimum) 90.00 (Nominal) 125.0 (Maximum)		100.0 (Minimum) 135.0 (Nominal) 194.0 (Maximum)		120.0 (Minimum) 155.0 (Nominal) 217.0 (Maximum)	

Phase	LITH Aluminum CPS	Value	SS1 Aluminum CPS	Value	SS2 Aluminum CPS	Value
Master		65.35		197.5		277.6
	35.00 (Minimum) 50.00 (Nominal) 74.00 (Maximum)		125.0 (Minimum) 175.0 (Nominal) 256.0 (Maximum)		210.0 (Minimum) 260.0 (Nominal) 353.0 (Maximum)	

Master: Jul 29 13:45 1996

Litho Density - D Master Calibration

Litholog Measurement

Phase	LL Iron CPS	Value	LU Iron CPS	Value	LS Iron CPS	Value
Master		87.12		133.1		153.7
	60.00 (Minimum) 80.00 (Nominal) 114.0 (Maximum)		85.00 (Minimum) 120.0 (Nominal) 177.0 (Maximum)		100.0 (Minimum) 135.0 (Nominal) 193.0 (Maximum)	

Phase	LITH Iron CPS	Value	SS1 Iron CPS	Value	SS2 Iron CPS	Value
Master		40.59		176.1		252.0
	15.00 (Minimum) 30.00 (Nominal) 51.00 (Maximum)		105.0 (Minimum) 155.0 (Nominal) 234.0 (Maximum)		190.0 (Minimum) 245.0 (Nominal) 325.0 (Maximum)	

Master: Jul 29 13:40 1996

Litho Density - D Master Calibration

Spectrum Quality Ratios

Phase	QRLS Calculated	Value	QRSS Calculated	Value	QRLI Calculated	Value
Master		0.6586		0.7117		0.3721
	0.6000 (Minimum) 0.6500 (Nominal) 0.7000 (Maximum)		0.6200 (Minimum) 0.7200 (Nominal) 0.8200 (Maximum)		0.2900 (Minimum) 0.3900 (Nominal) 0.4500 (Maximum)	

Phase	QLIR Calculated	Value	QR Calculated	Value
Master		1.409		1.019
	1.290 (Minimum) 1.390 (Nominal) 1.450 (Maximum)		0.9800 (Minimum) 1.000 (Nominal) 1.020 (Maximum)	

Master: Jul 29 13:45 1996

Compensated Neutron - H / Equipment Identification

Primary Equipment:		
Compensated Neutron Cartridge	CNC - HA	118
Neutron Logging Source	NLS - KL	
Neutron Source Radioactive	NSR - F	1163
Compensated Neutron Box	CNB - AB	4209
Neutron Detector without Alpha Source	CND - NA	
Compensated Neutron Box	CNB - AB	4209
Auxiliary Equipment:		
Compensated Neutron Housing	CNH - A	2912
Neutron Calibration Tank	NCT - B	320

Compensated Neutron - H Wellsite Calibration

Zero Measurement

Phase	CNTC Background CPS	Value	Phase	CFTC Background CPS	Value
Master		0	Master		0.2666
Before		0	Before		0.7746
	-0.010000 (Minimum) 1.000 (Nominal) 5.000 (Maximum)			-0.010000 (Minimum) 0 (Nominal) 5.000 (Maximum)	

Master: May 4 08:20 1996 Before: Jul 31 16:39 1996

Compensated Neutron - H Wellsite Calibration

Jig Measurement

Phase	CNTC Jig CPS	Value	Phase	CFTC Jig CPS	Value	Phase	CNTC/CFTC (Jig)	Value
Master		3068	Master		1351	Master		2.271
Before		3086	Before		1374	Before		2.246
	2915 (Minimum) 3068 (Nominal) 3222 (Maximum)			1283 (Minimum) 1351 (Nominal) 1418 (Maximum)			2.231 (Minimum) 2.271 (Nominal) 2.311 (Maximum)	

Master: May 4 08:43 1996 Before: Jul 31 16:49 1996

Compensated Neutron - H Master Calibration

Tank Measurement

Phase	Thermal Near Corr. (Tank) CPS	Value	Phase	Thermal Far Corr. (Tank) CPS	Value	Phase	CNTC/CFTC (Tank)	Value
Master		6154	Master		2625	Master		2.345
	5000 (Minimum) 6031 (Nominal) 7200 (Maximum)			2075 (Minimum) 2793 (Nominal) 3125 (Maximum)			2.120 (Minimum) 2.159 (Nominal) 2.540 (Maximum)	

Master: May 4 08:30 1996

Scintillation Gamma-Ray - L / Equipment Identification

Primary Equipment:	
Scintillation Gamma Cartridge	SGC - SA
Scintillation Gamma Detector	SGD - TAA
Auxiliary Equipment:	
Scintillation Gamma Housing	SGH - K
Gamma Source Radioactive	GSR - U/Y

Scintillation Gamma-Ray - L Wellsite Calibration

Detector Calibration

Phase	Gamma Ray Background GAPI	Value	Phase	Gamma Ray (Jig - Bkg) GAPI	Value	Phase	Gamma Ray (Calibrated) GAPI	Value
Before		52.57	Before		158.9	Before		165.0
	0 (Minimum) 30.00 (Nominal) 120.0 (Maximum)			144.4 (Minimum) 158.9 (Nominal) 173.3 (Maximum)			150.0 (Minimum) 165.0 (Nominal) 180.0 (Maximum)	

Before: Aug 1 03:04 1996

COMPANY:	PETROGLYPH OPERATING COMPANY
WELL:	UTE TRIBAL 17-05
FIELD:	ANTELOPE CREEK
COUNTY:	DUCHESNE
STATE:	UTAH

BOTTOM LOG INTERVAL	6060 F
SCHLUMBERGER DEPTH	6106 F
DEPTH DRILLER	6113 F
KELLY BUSHING	6011 F
DRILL FLOOR	6010 F
GROUND LEVEL	6001 F

Schlumberger

LITHO - DENSITY
COMPENSATED NEUTRON
GAMMA RAY

COMPANY: PETROGLYPH OPERATING COMPANY

WELL: UTE TRIBAL 17-05

FIELD: ANTELOPE CREEK

COUNTY: DUCHESNE STATE: UTAH

Field: ANTELOPE CREEK
Location: 1797' FNL & 620' FWL
Well: UTE TRIBAL 17-05
Company: PETROGLYPH OPERATING CO

Schlumberger

ARRAY INDUCTION with Linear Correlation GAMMA RAY

LOCATION

1797' FNL & 620' FWL
SW / NW

Elev.: K.B. 6011 F
G.L. 6001 F
D.F. 6010 F

Permanent Datum: GROUND LEVEL Elev.: 6001 F
Log Measured From: KELLY BUSHING 10.0 F above Perm. Datum
Drilling Measured From: KELLY BUSHING

26 CC

API Serial No.	SECTION	TOWNSHIP	RANGE
43 013 31674	17 ~~9~~	5 S	3 W

	Run 1	Run 2	Run 3
Logging Date	1-AUG-1996		
Run Number	ONE		
Depth Driller	6113 F		
Schlumberger Depth	6106 F		
Bottom Log Interval	6070 F		
Top Log Interval	388 F		
Casing Driller Size @ Depth	8.625 IN @ 388 F	@	
Casing Schlumberger	388 F		
Bit Size	7.875 IN		
Type Fluid In Hole	KCL WATER		
MUD Density / Viscosity	8.3 LB/G / 27 S		
MUD Fluid Loss / PH	/ 10.6		
MUD Source Of Sample	MUD TANK		
RM @ Measured Temperature	1.890 OHMM @ 73 DEGF		
RMF @ Measured Temperature	1.890 OHMM @ 73 DEGF	@	
RMC @ Measured Temperature	@	@	
Source RMF / RMC			
RM @ MRT / RMF @ MRT	0.974 @ 148 / 0.974 @ 148	@ / @	
Maximum Recorded Temperatures	148 DEGF		
Circulation Stopped Time	1-AUG-1996 6:30		
Logger On Bottom Time	1-AUG-1996 13:13		
Unit Number / Location	8426 VERNAL, UTAH		
Recorded By	MARVIN O. JOST		
Witnessed By	MR. KENT STRINGHAM		

	Run 1	Run 2	Run 3
Logging Date			
Run Number			
Depth Driller			
Schlumberger Depth			
Bottom Log Interval			
Top Log Interval			
Casing Driller Size @ Depth		@	
Casing Schlumberger			
Bit Size			
Type Fluid In Hole			
MUD Density / Viscosity			
MUD Fluid Loss / PH			
MUD Source Of Sample			
RM @ Measured Temperature		@	
RMF @ Measured Temperature		@	
RMC @ Measured Temperature		@	
Source RMF / RMC			
RM @ MRT / RMF @ MRT	@	@	@
Maximum Recorded Temperatures			
Circulation Stopped Time			
Logger On Bottom Time			
Unit Number / Location			
Recorded By			
Witnessed By			

Run 4

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT, AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATIONS, AND WE SHALL NOT, EXCEPT IN THE CASE OF GROSS OR WILLFUL NEGLIGENCE ON OUR PART, BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO CLAUSE 4 OF OUR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE.

OTHER SERVICES1	OTHER SERVICES2
OS1: CNL/LDT	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:

REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
TWO 1.5 INCH STANDOFFS RUN ON AIT FOR CENTRALIZATION.	
BOWSPRING RUN ON CNL.	
SANDSTONE MATRIX, MDEN = 2.68 G/CC.	
THANK YOU FOR USING SCHLUMBERGER !!	
SCHLUMBERGER CREW: J. SUNKEES S. OAKS	

RUN 1		RUN 2	
SERVICE ORDER #:	670182	SERVICE ORDER #:	
PROGRAM VERSION:	7C0-427	PROGRAM VERSION:	
FLUID LEVEL:		FLUID LEVEL:	

LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

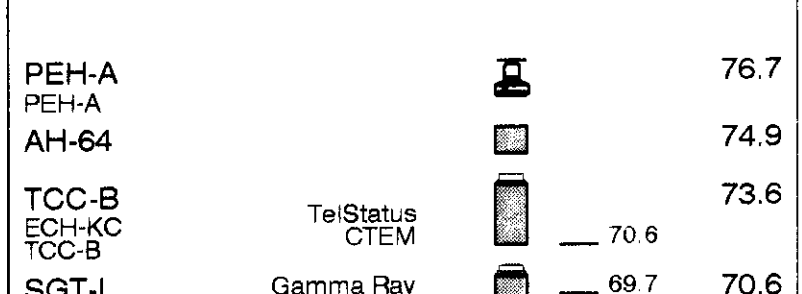
EQUIPMENT DESCRIPTION

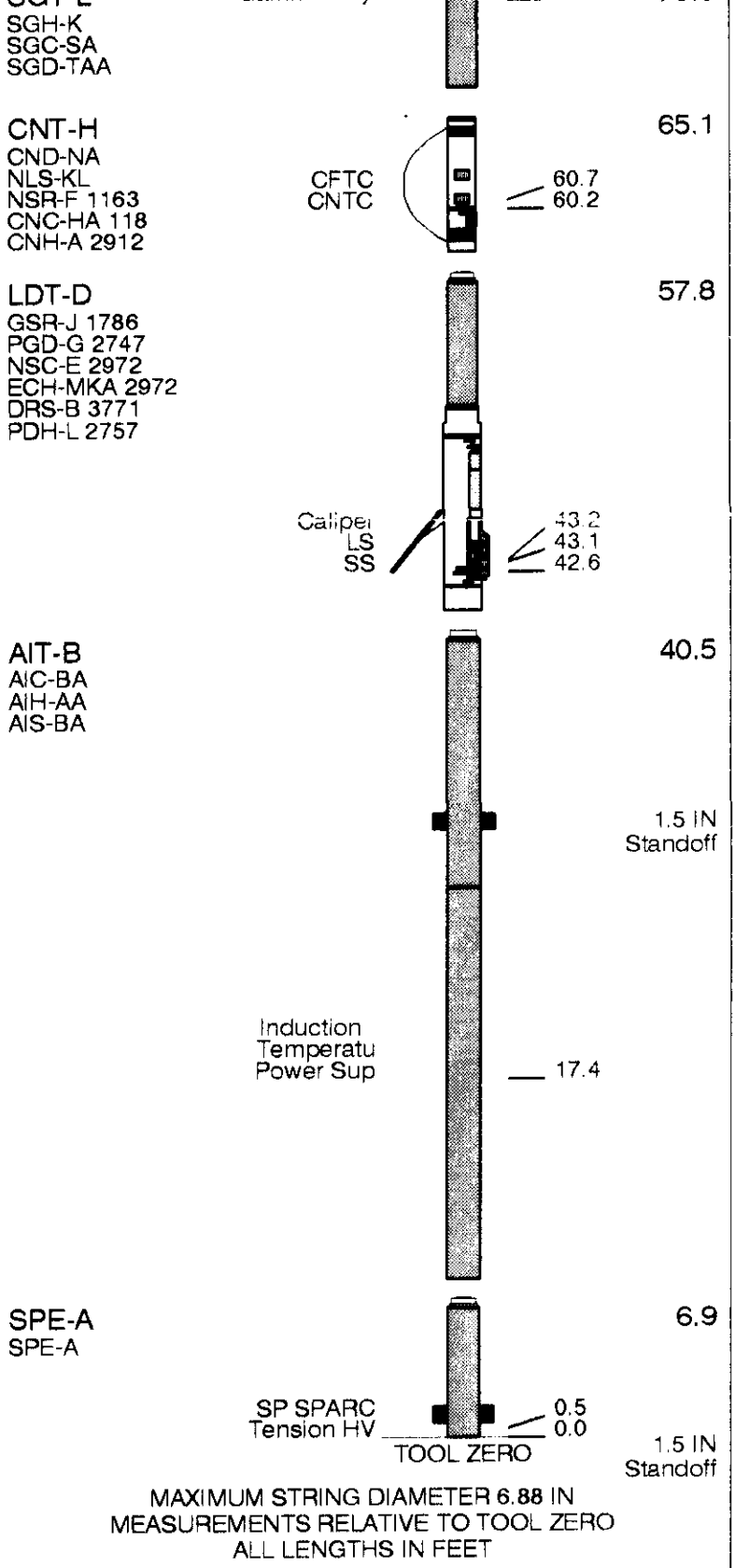
RUN 1 | RUN 2

SURFACE EQUIPMENT

CNB-AB 4209 TCM-AB
NCT-B 320
NCS-VB
GSR-U/Y

DOWNHOLE EQUIPMENT





Output DLIS Files

DEFAULT	SPEA .005	FN:4	FIELD	1-AUG-1996 13:33	6114.0 FT	267.0 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 2049.92 F3

Cement Volume = 1105.33 F3 (assuming 5.50 IN casing O.D.)

Computed from 6113.0 FT to 388.0 FT using data channel(s) CALI (per GCSE parameter setting)

OP System Version: 7C0-427

DBM

AIT-B 7S427KV-537

PIP SUMMARY

⊣ Integrated Cement Volume Minor Pip Every 10 F3

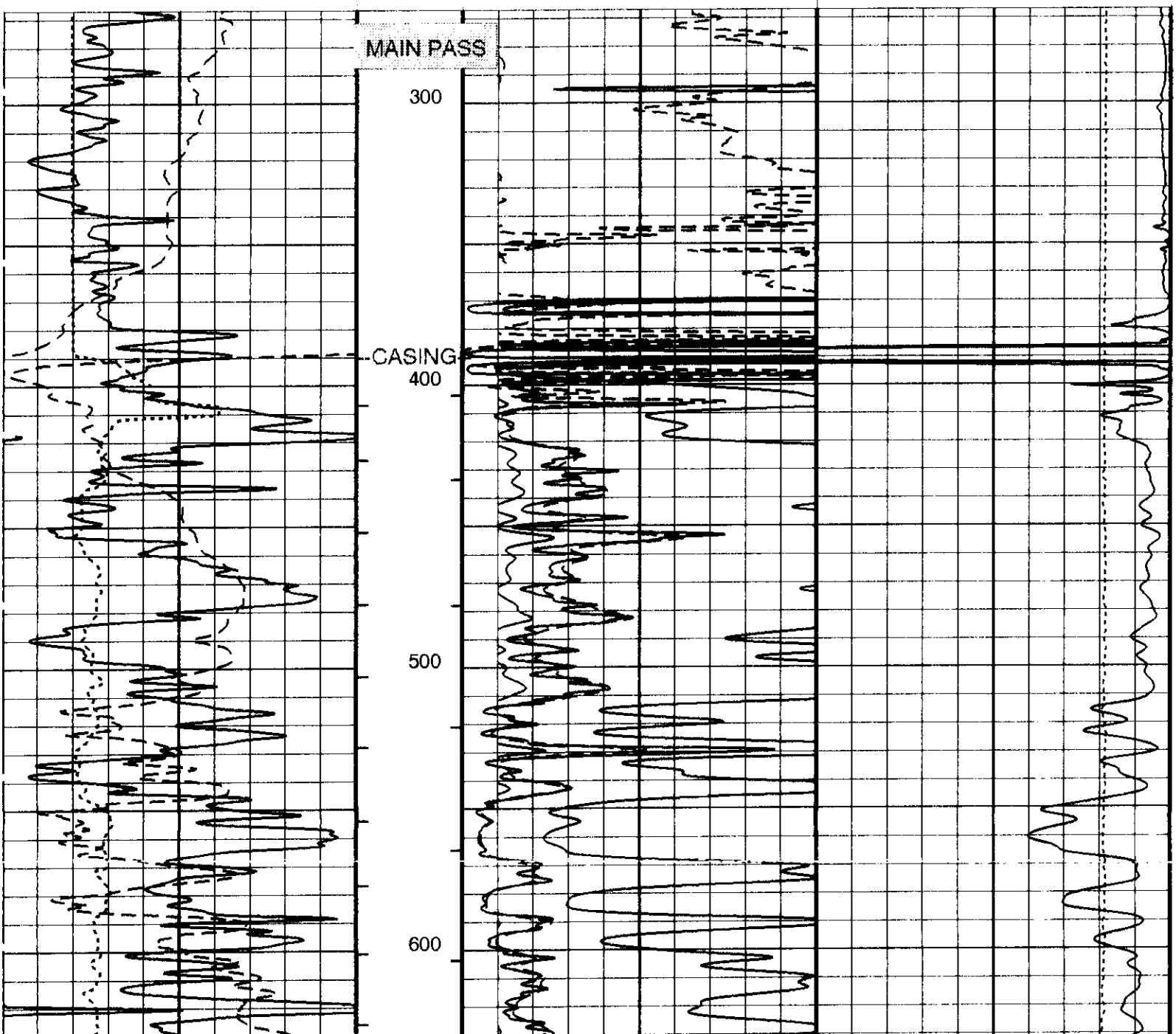
⊣ Integrated Cement Volume Major Pip Every 100 F3

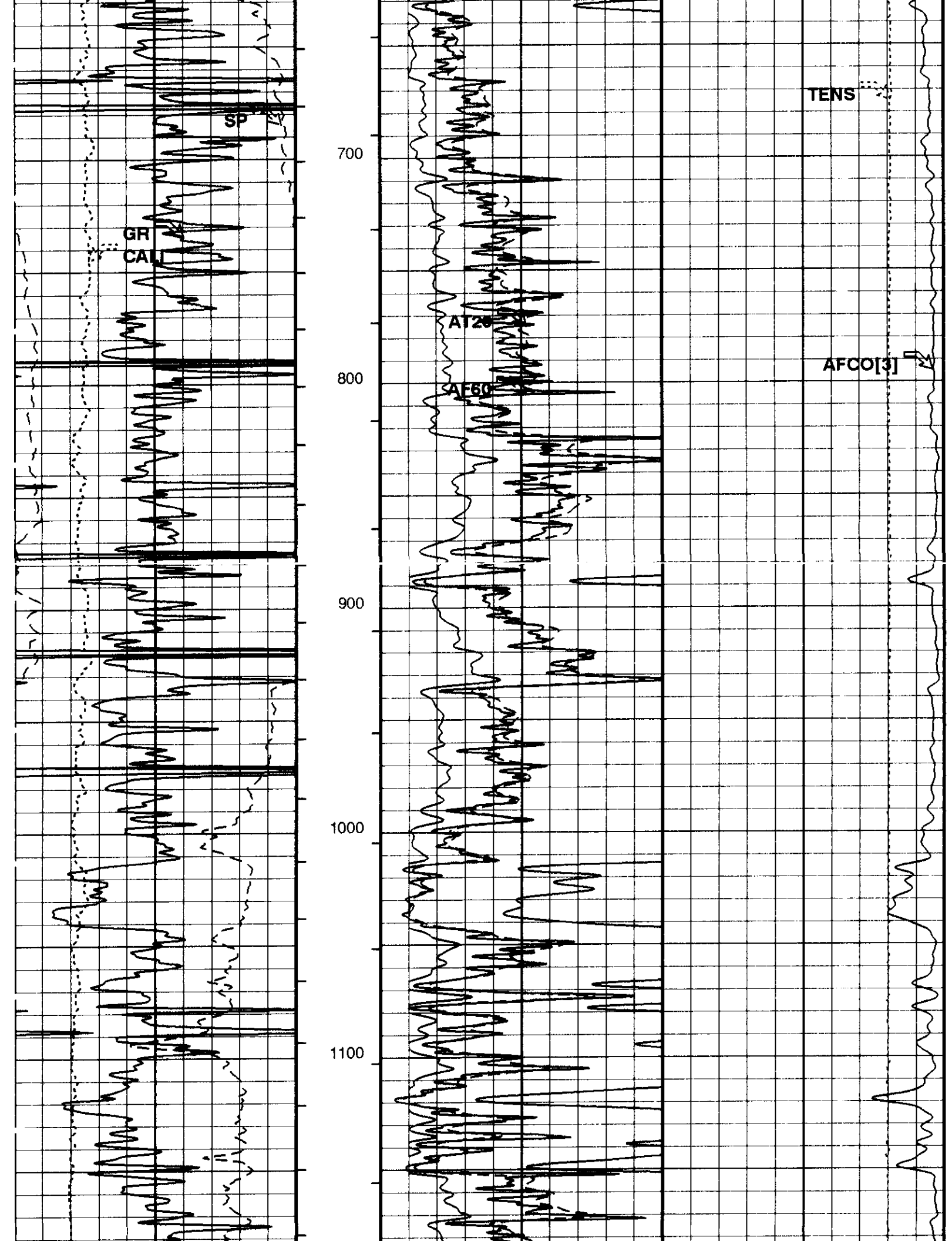
⊢ Integrated Hole Volume Minor Pip Every 10 F3

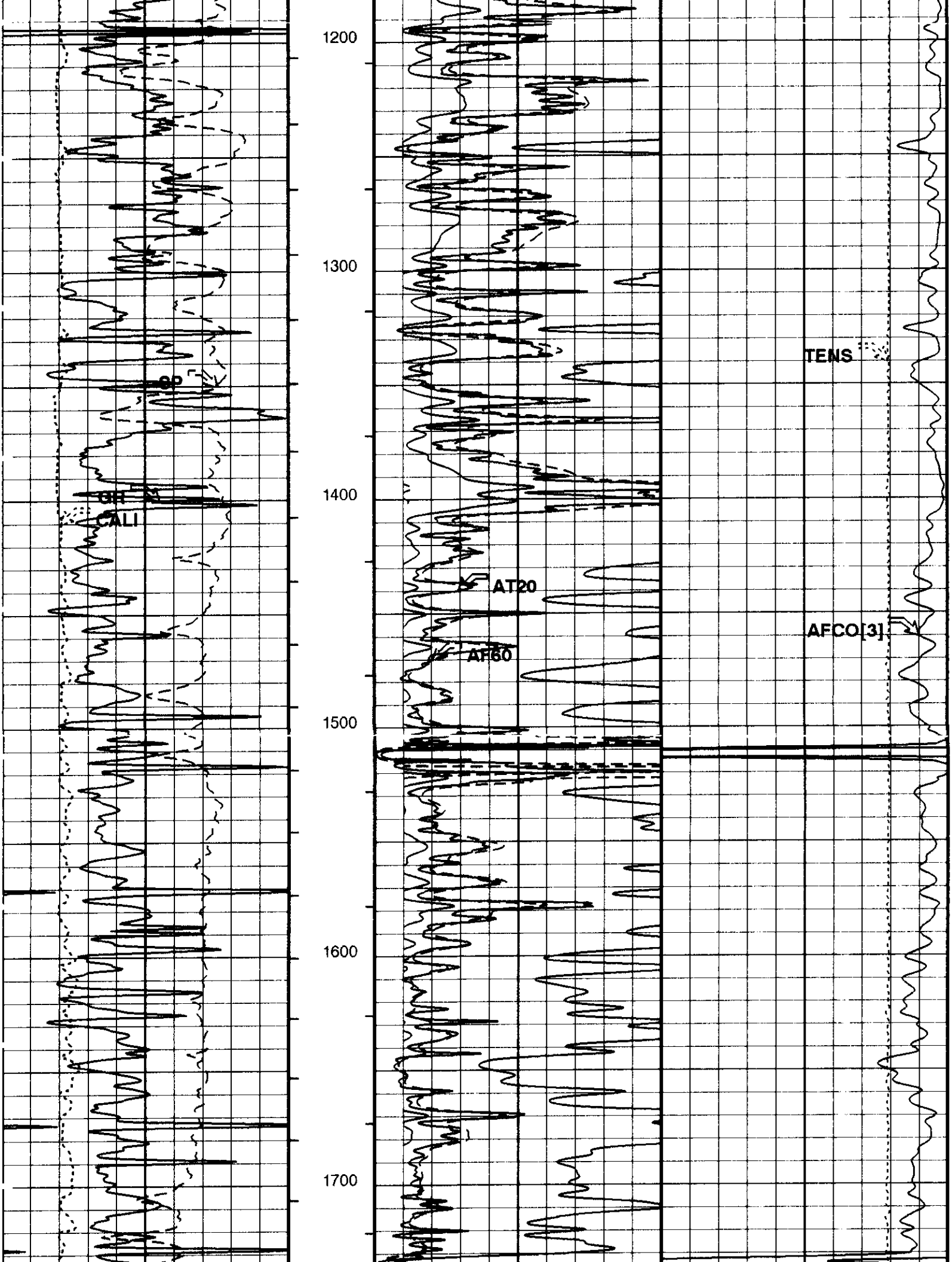
⊢ Integrated Hole Volume Major Pip Every 100 F3

Time Mark Every 60 S

Caliper (CALI)	AIT 20 Inch Investigation (AT20)	
6 (IN) 16	0 (OHMM) 100	
SP (SP)	AIT 20 Inch Investigation (AF20)	Tension (TENS)
-80 (MV) 20	0 (OHMM) 20	10000 (LBF) 0
Gamma Ray (GR)	AIT 60 Inch Investigation (AF60)	AIT 60 Inch Investigation (Conductivity) (AFCO[3])
0 (GAPI) 200	0 (OHMM) 100	500 (MM/M) 0




SP
GR
CALI
700
800
900
1000
1100
AT20
AF60
TENS
AFCO[3]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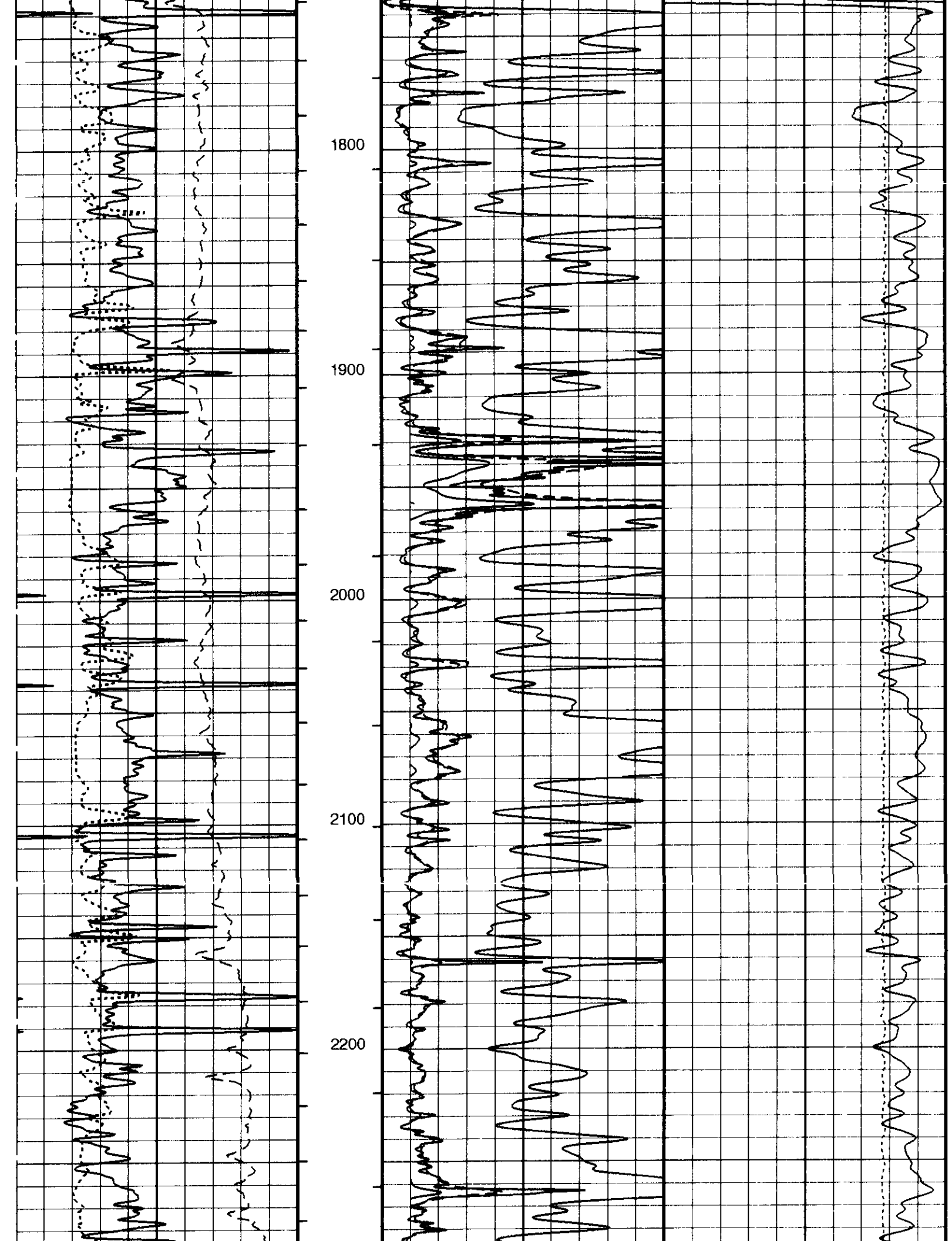
1400
1500
1600
1700
SP
GR
CALI
AT20
AF60
TENS
AFCO[3]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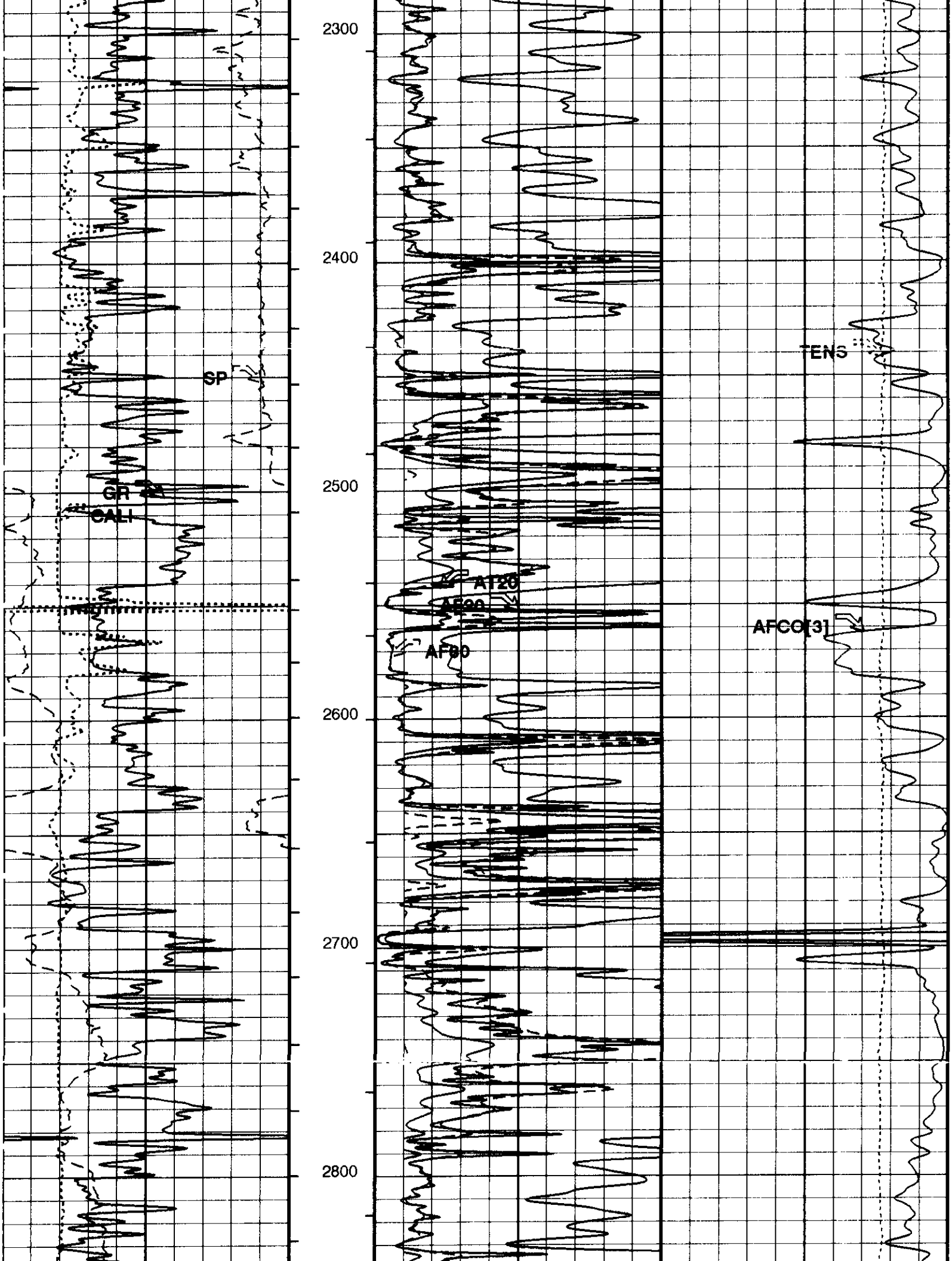
2200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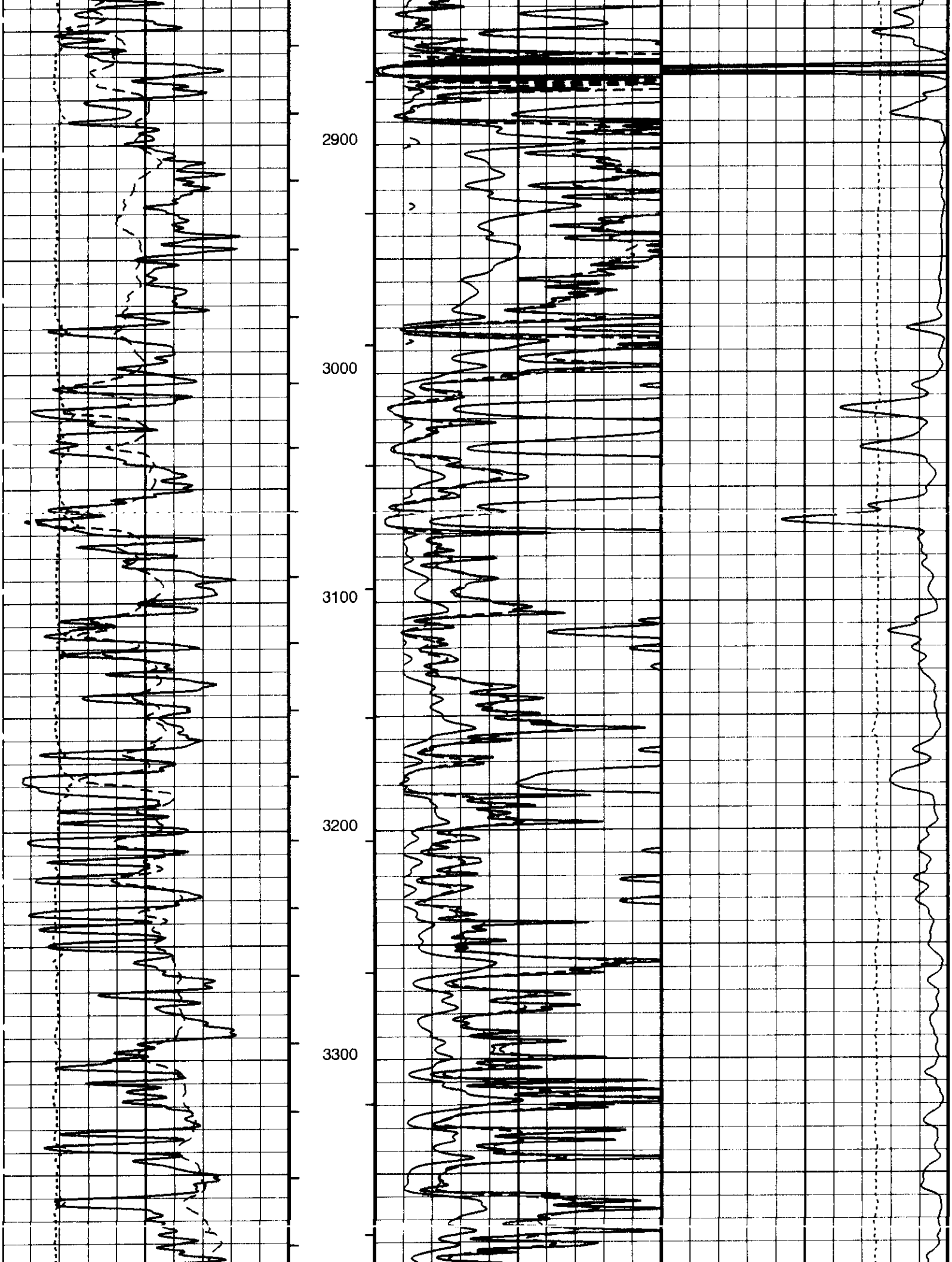
CALI
AT20
AF20
AF60
TENS
AFCO[3]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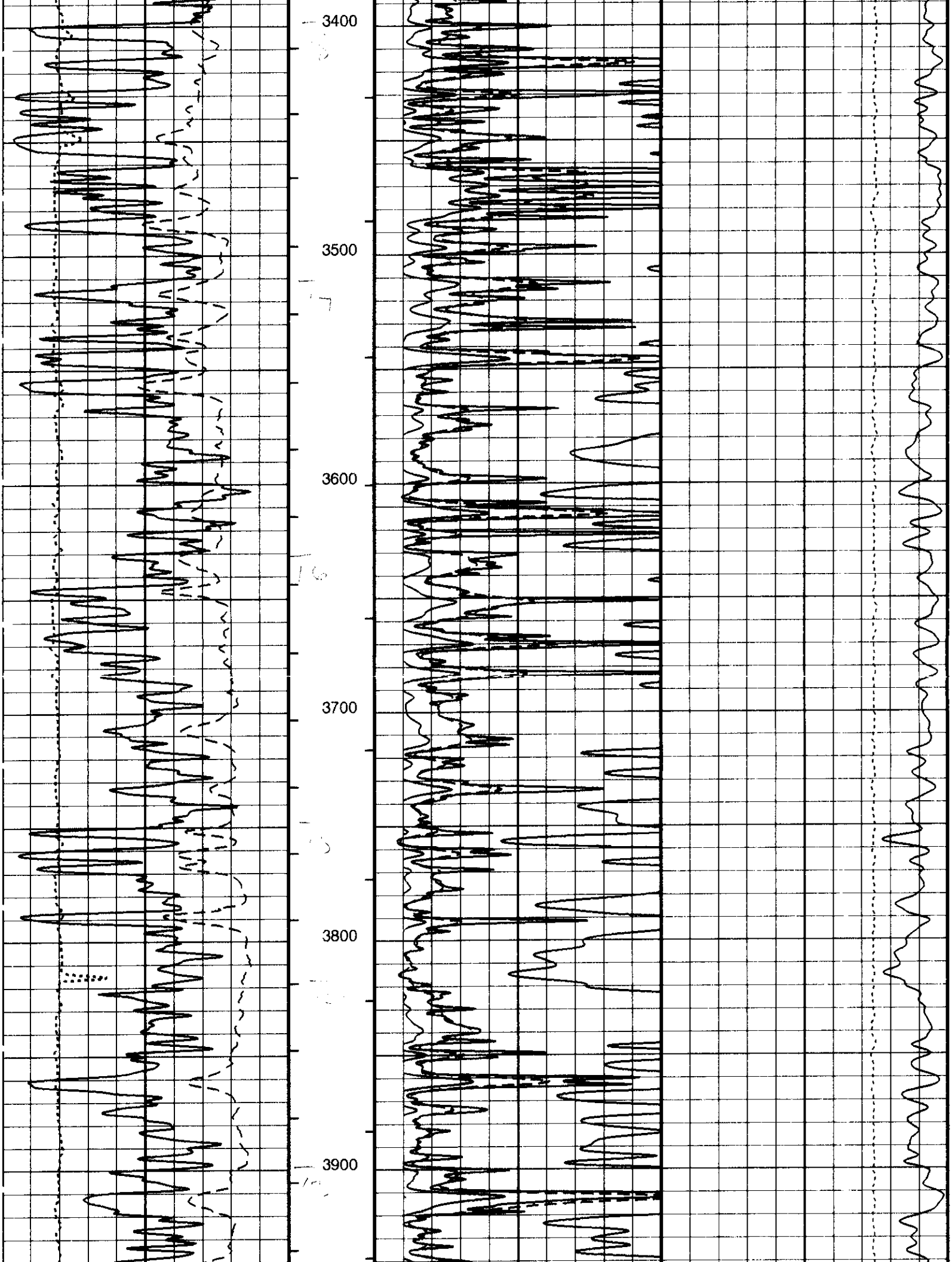
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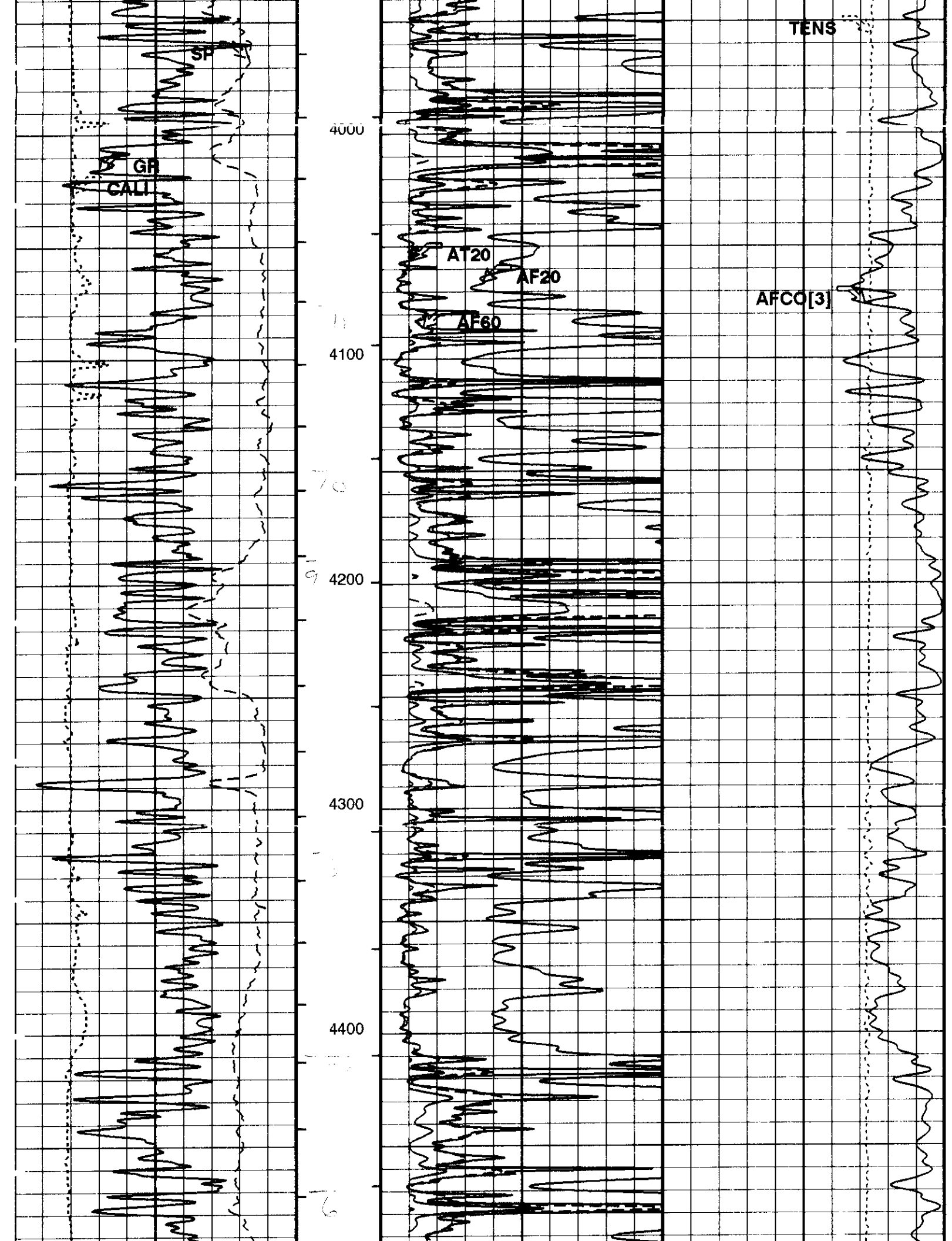
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CALI
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AT20
AF20
AF60
AFCO[3]
TENS
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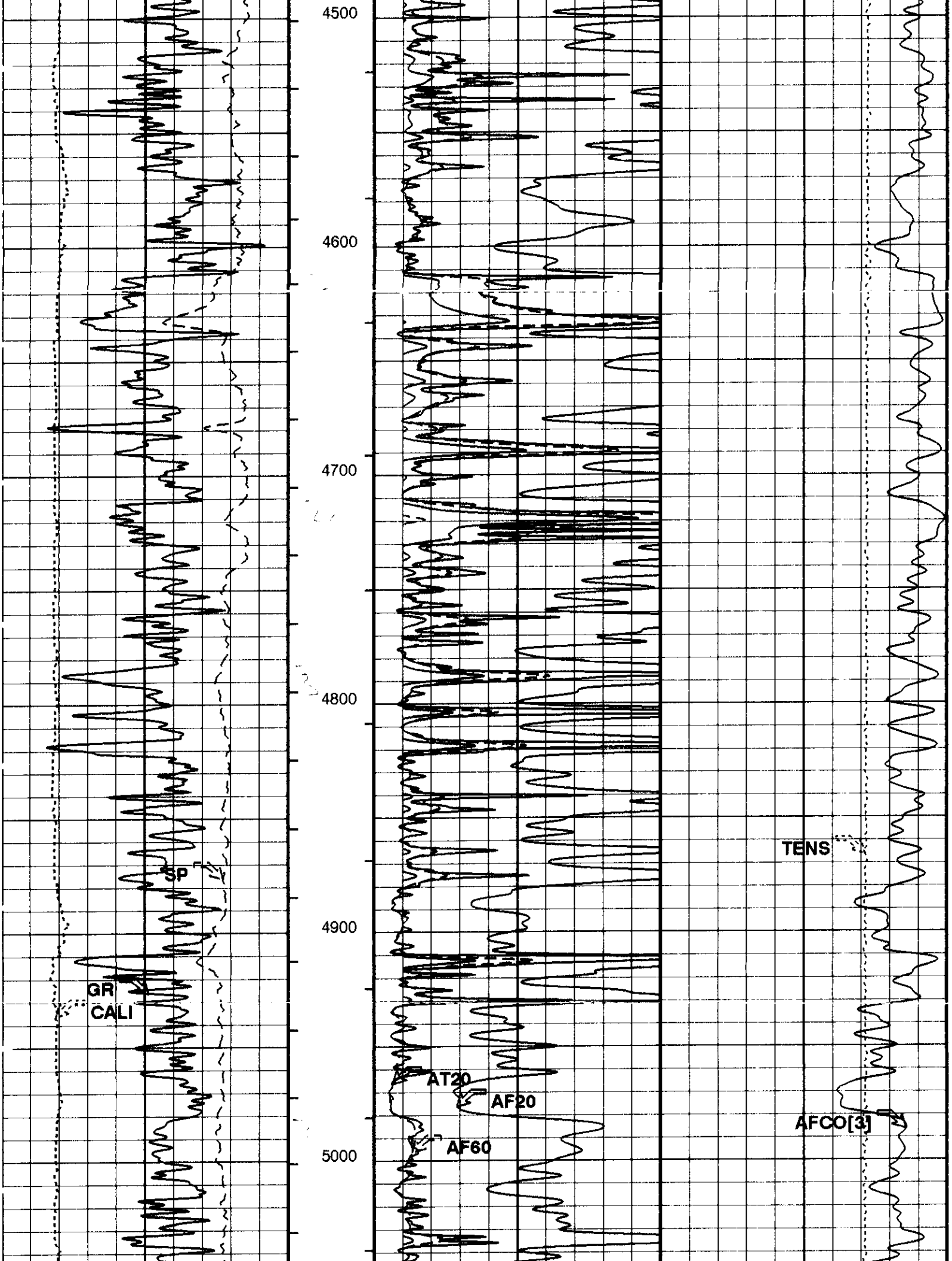
4200
4300
4400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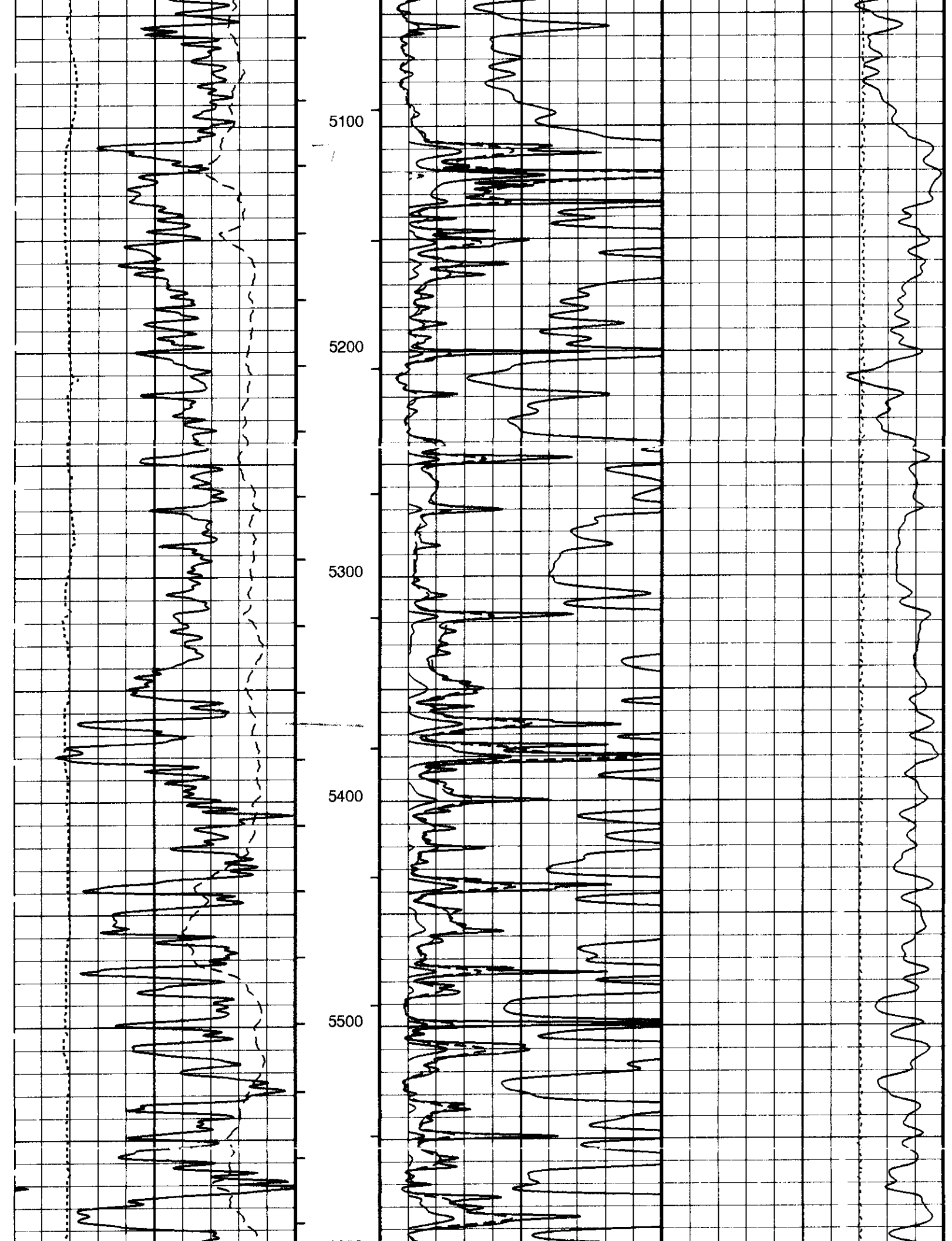
SP
GR
CALI
AT20
AF20
AF60
TENS
AFCO[3]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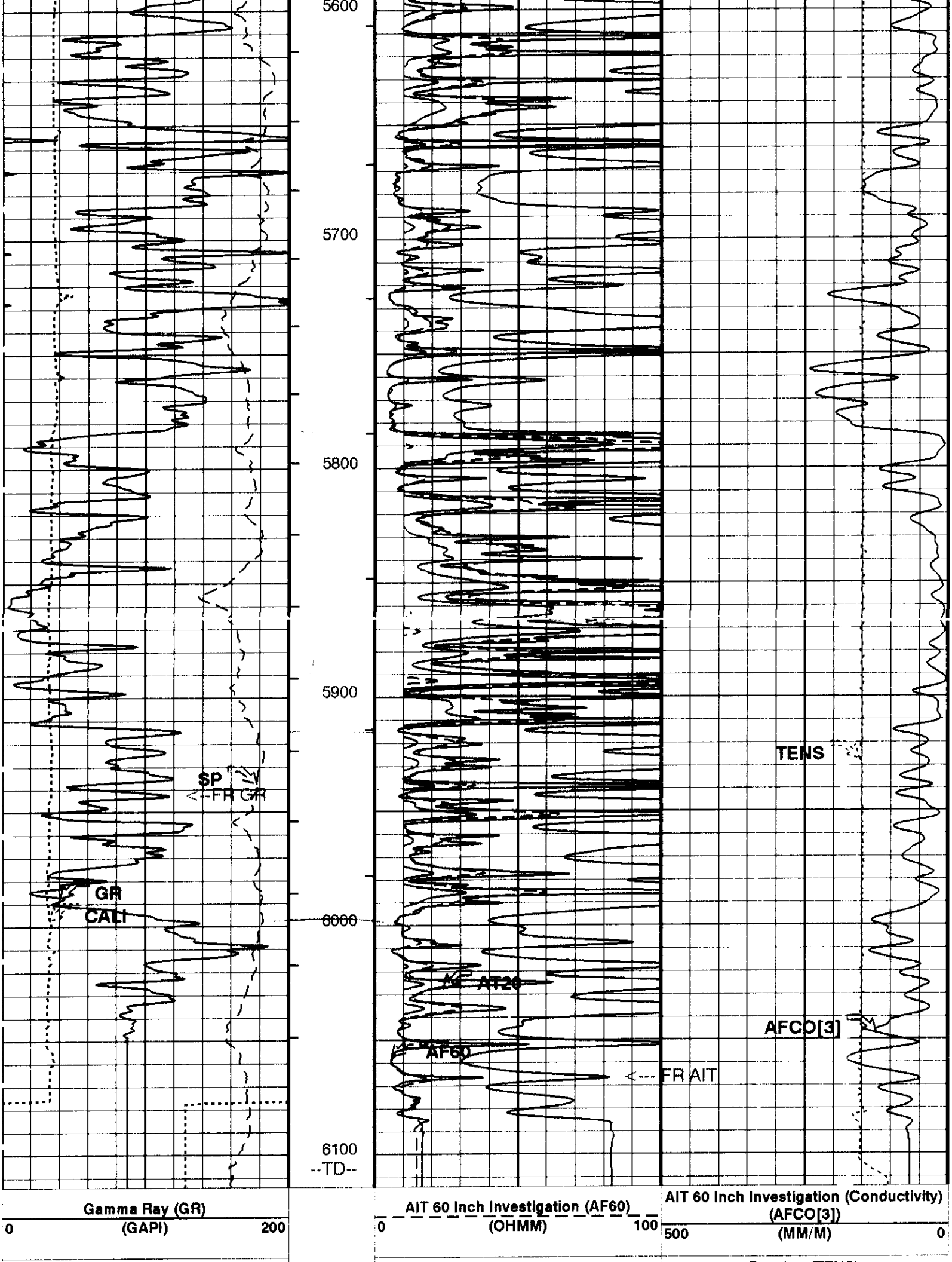

5600
5700
5800
5900
6000
6100
--TD--
SP
<--FR GR
GR
CALI
AT20
AF60
<---FR AIT
TENS
AFCO[3]
Gamma Ray (GR)
0
(GAPI)
200
AIT 60 Inch Investigation (AF60)
0
(OHMM)
100
AIT 60 Inch Investigation (Conductivity)
(AFCO[3])
500
(MM/M)
0

SP (SP)			AIT 20 Inch Investigation (AF20)			Tension (TENS)		
-80	(MV)	20	0	(OHMM)	20	10000	(LBF)	0
Caliper (CALI)			AIT 20 Inch Investigation (AT20)					
6	(IN)	16	0	(OHMM)	100			

PIP SUMMARY

MAIN PASS

⊣ Integrated Cement Volume Minor Pip Every 10 F3
⊣ Integrated Cement Volume Major Pip Every 100 F3
⊢ Integrated Hole Volume Minor Pip Every 10 F3
⊢ Integrated Hole Volume Major Pip Every 100 F3

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
ABHM	AIT Bhole Correction Mode	0_ComputeMudResistivity	
ACDE	AIT Casing Detection Enable	No	
ACEN	AIT Tool Centering Flag (in Borehole)	Centered	
ACSED	AIT Casing Shoe Estimated Depth	-50000	FT
AMRF	AIT Mud Resistivity Factor	1	
ASTA	AIT Tool Standoff	1.5	IN
BHT	Bottom Hole Temperature (used in calculations)	150	DEGF
BS	Bit Size	7.875	IN
DFD	Drilling Fluid Density	8.30	LB/G
DORL	Depth Offset Repeat Analysis	0.0	FT
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
GCSE	Generalized Caliper Selection	CALI	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GRSE	Generalized Mud Resistivity Selection	CHART_GEN_9	
GTSE	Generalized Temperature Selection	LINEAR_ESTIMATE	
MST	Mud Sample Temperature	73.00	DEGF
SHT	Surface Hole Temperature	80	DEGF
SPNV	SP Next Value	0	MV
TD	Total Depth	6113	FT

Format: AIT_4FootLin Vertical Scale: 2" per 100' Graphics File Created: 1-AUG-1996 13:33

OP System Version: 7C0-427

DBM

AIT-B 7S427KV-537

Output DLIS Files

DEFAULT SPEA .005 FN:4 FIELD 1-AUG-1996 13:33

Output DLIS Files

DEFAULT SPEA .005 FN:4 FIELD 1-AUG-1996 13:33 6114.0 FT 267.0 FT

Integrated Hole/Cement Volume Summary

Hole Volume = 2049.92 F3

Cement Volume = 1105.33 F3 (assuming 5.50 IN casing O.D.)

Computed from 6113.0 FT to 388.0 FT using data channel(s) CALI (per GCSE parameter setting)

OP System Version: 7C0-427

DBM

AIT-B 7S427KV-537

AIT Answer Product Processing Summary. Data taken with Sonde # 28 (ASNO)

***** Bhole Correction *****

Effective Mud Resistivity computed. Borehole diameter taken as input (see GCSE parameter)

Tool is run in CENTERED mode. Bit Size is 7.88 IN.

***** Input Selections to AIT Answer Product processing *****

Caliper (GCSE): CALI Mud Resistivity (GRSE): GEN_9 Temperature (GTSE): LINEAR_ESTIMATE Porosity (FPHI): DPHI

***** Other parameters used by AIT Answer Product processing *****

Mud Sample Resistivity (RMS)	1.890 OHMM	Mud Sample Temperature (MST)	73.000 DEGF
Surface Hole Temperature (SHT)	80.000 DEGF	Bottom Temperature (BHT)	150.000 DEGF
Total Depth (TD)	6113.000 FT		
Form Factor Exponent (FEXP)	2.000	Form Factor Numerator (FNUM)	1.000
Mud Filtrate Sample Resistivity (RMFS)	1.890 OHMM	Mud Filtrate Sample Temperature (MFST)	73.000 DEGF
Resitivity Connate Water (RW)	1.000 OHMM		

***** AIT Answer Product processing control parameters *****

(AAPL): 4_BholeCorr_BasicLogs_RadialProf_RadialPar

(ABHM): 0_ComputeMudResistivity (ABLM): 6_One_Two_and_Four (ARPM): 6_One_Two_and_Four

PIP SUMMARY

- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

MAIN PASS

Tension (TENS) 10000 (LBF) 0

Caliper (CALI) 6 (IN) 16

SP (SP) -80 (MV) 20

Gamma Ray (GR) 0 (GAPI) 200

AIT Outer Invasion Diameter (AOD2) 0 (IN) 60

AIT Inner Invasion Diameter (AOD1) 0 (IN) 60

Tool/Tot. Drag From D3T to STIA

Cable Drag From STIA to STIT

Stuck Stretch (STIT) 0 (F) 50

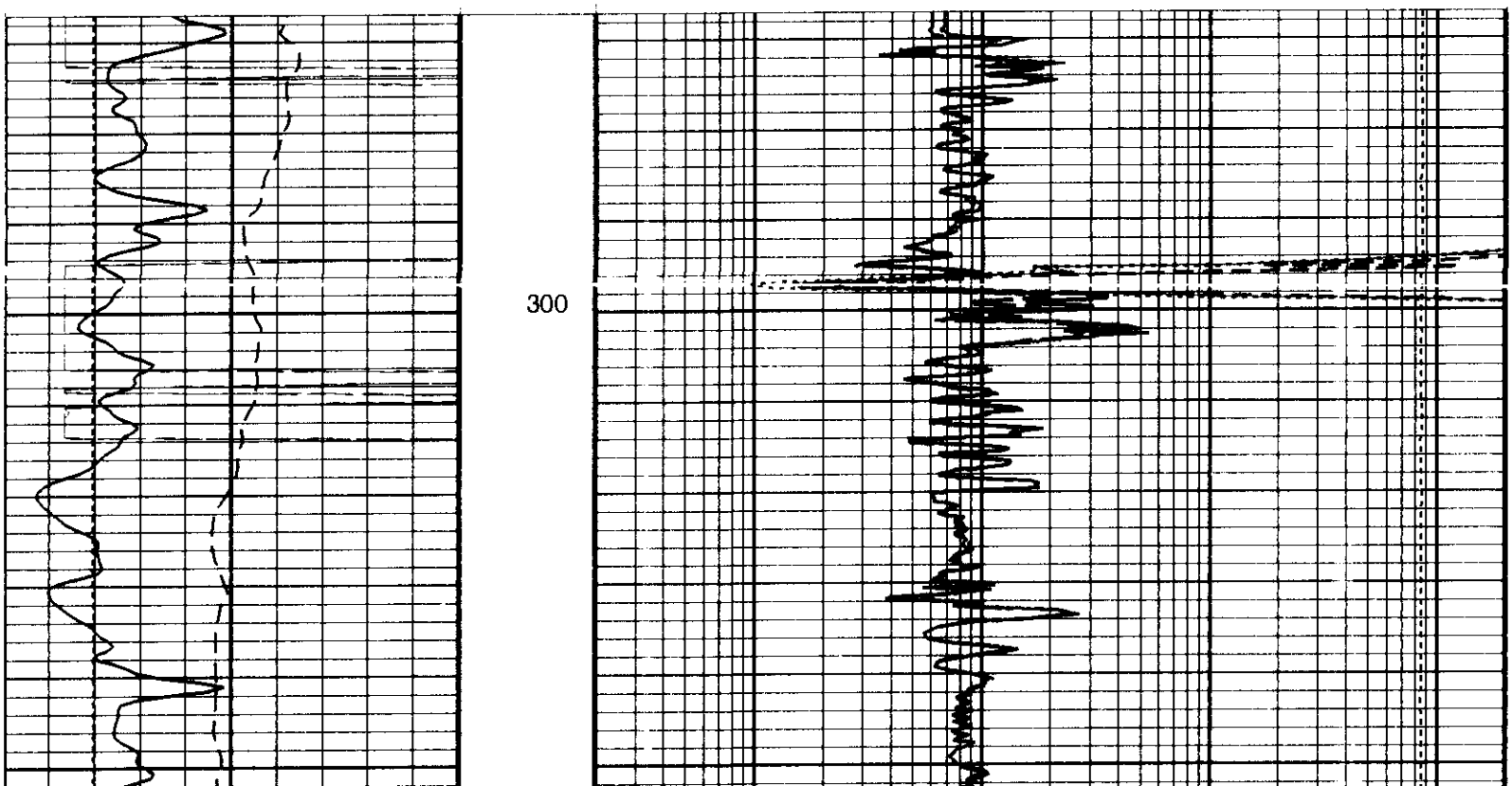
AIT 90 Inch Investigation (AO90) 0.2 (OHMM) 2000

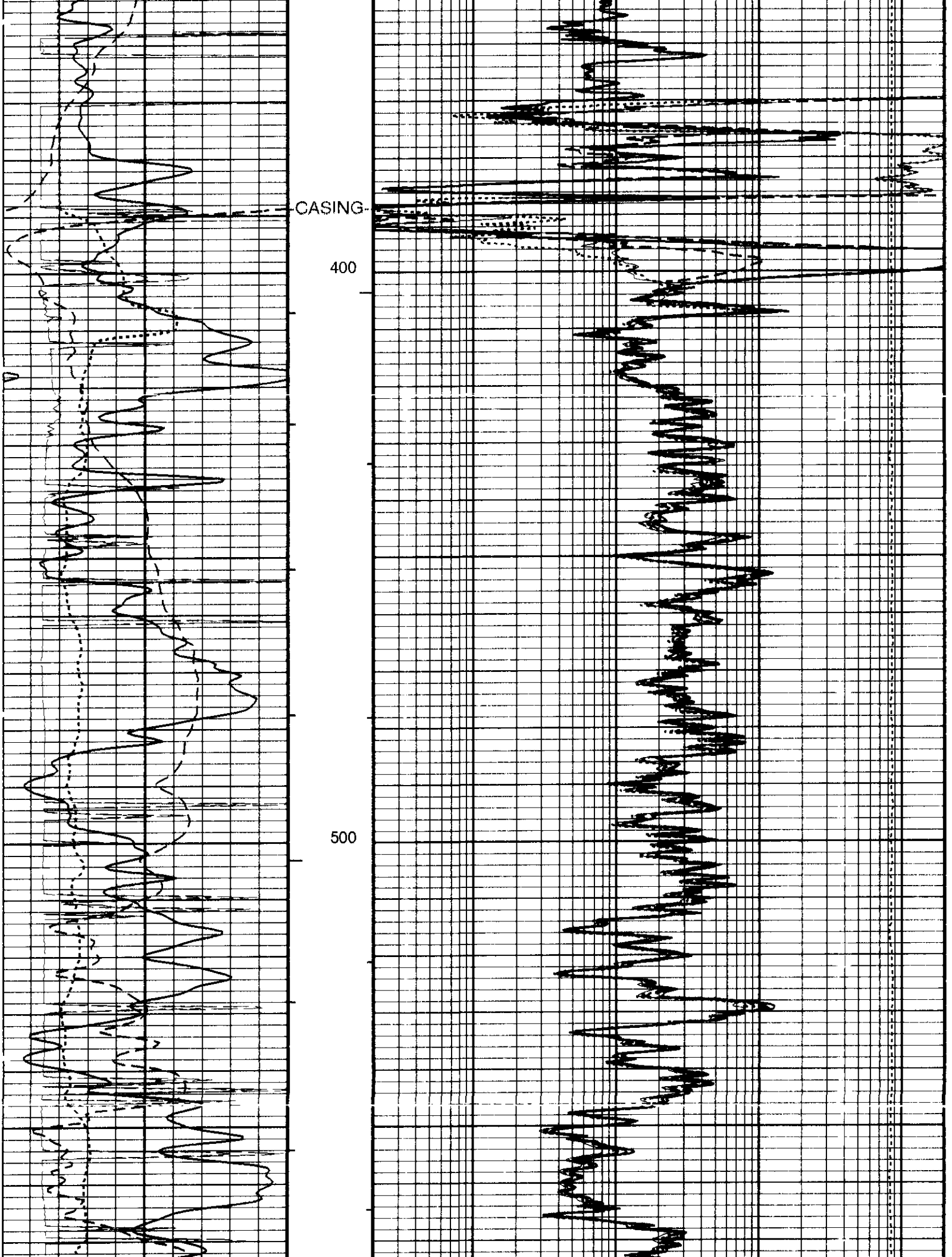
AIT 60 Inch Investigation (AO60) 0.2 (OHMM) 2000

AIT 30 Inch Investigation (AO30) 0.2 (OHMM) 2000

AIT 20 Inch Investigation (AO20) 0.2 (OHMM) 2000

AIT 10 Inch Investigation (AO10) 0.2 (OHMM) 2000

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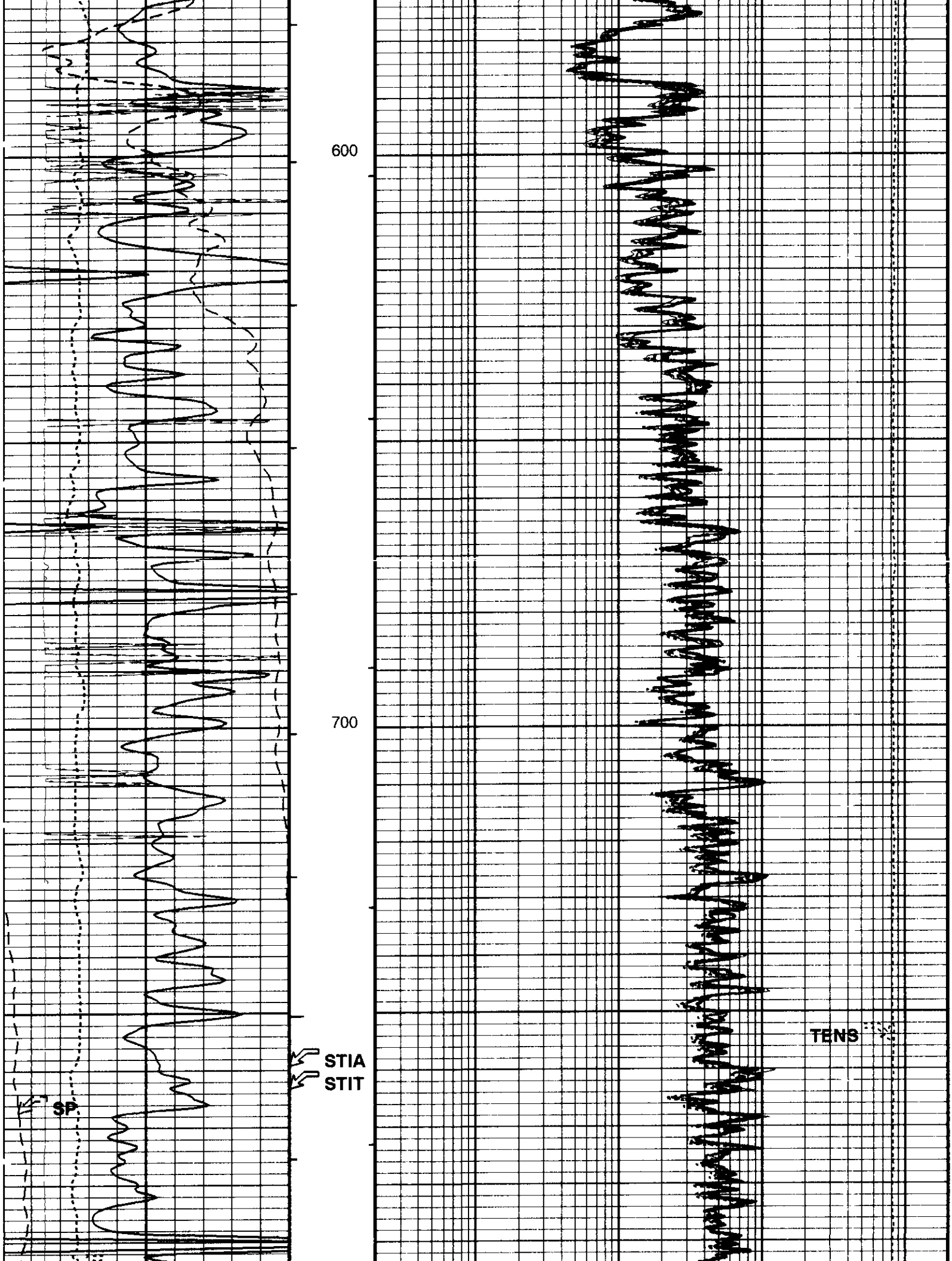
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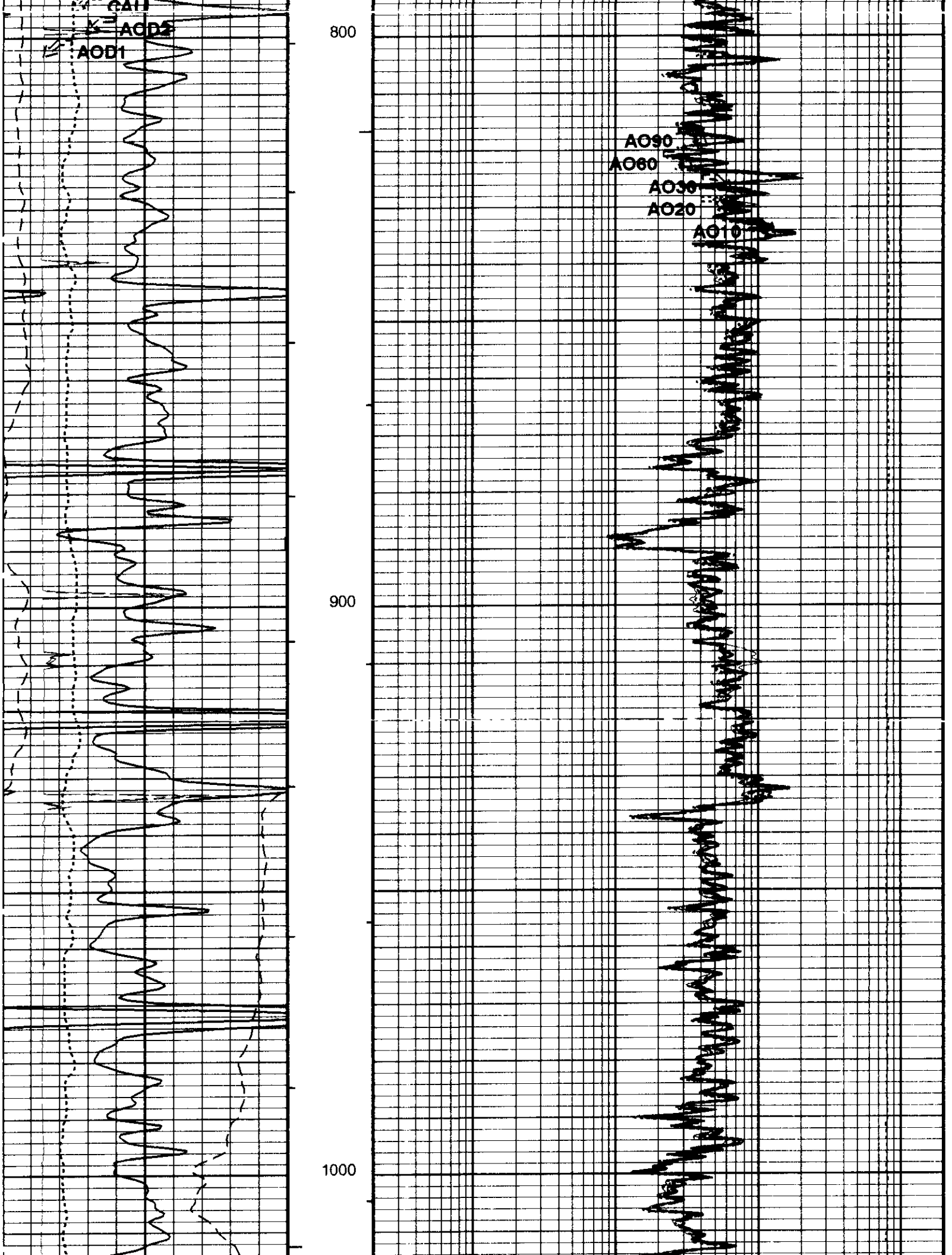
700
STIA
STIT
SP
TENS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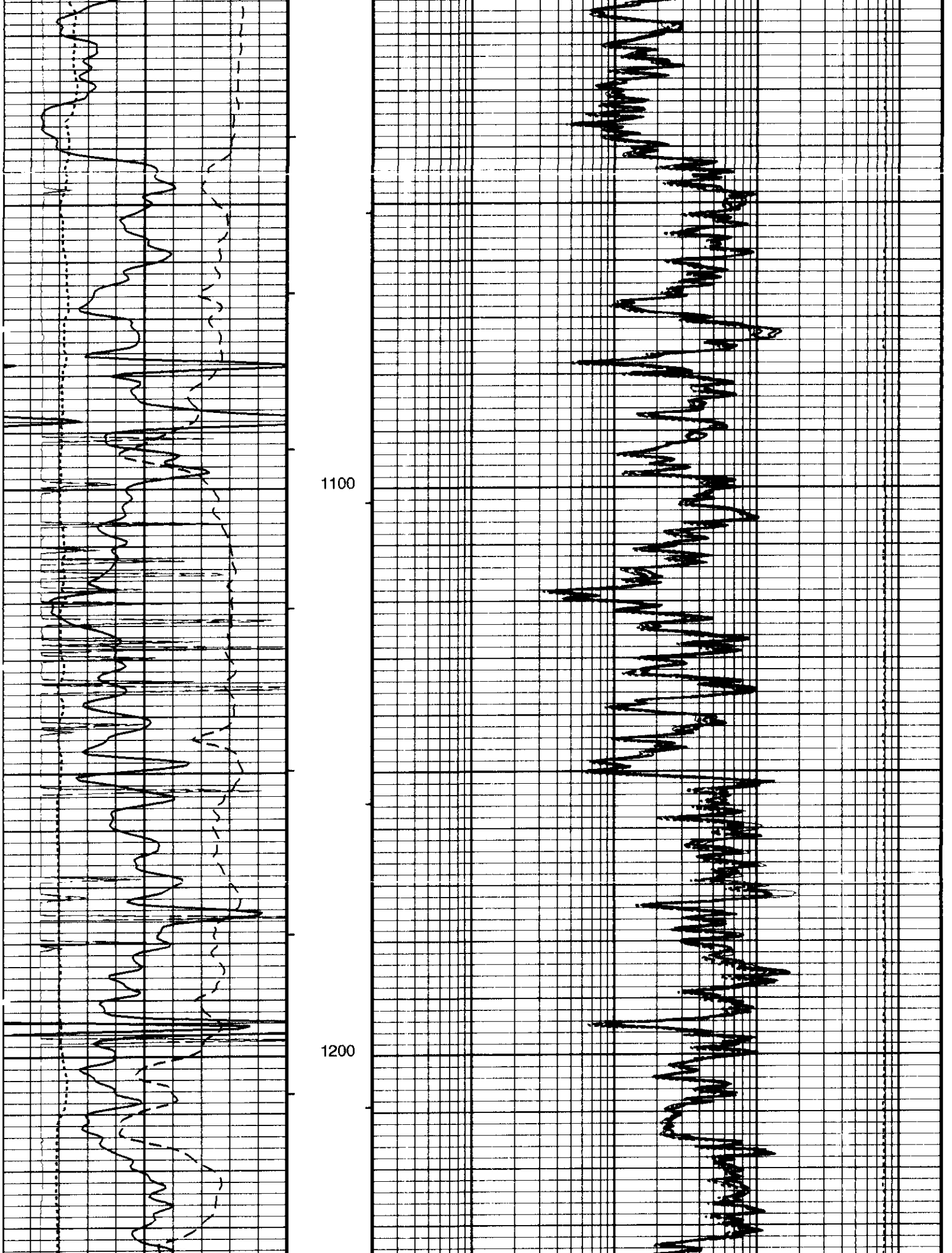
AOD2
AOD1
800
AO90
AO60
AO30
AO20
AO10
900
1000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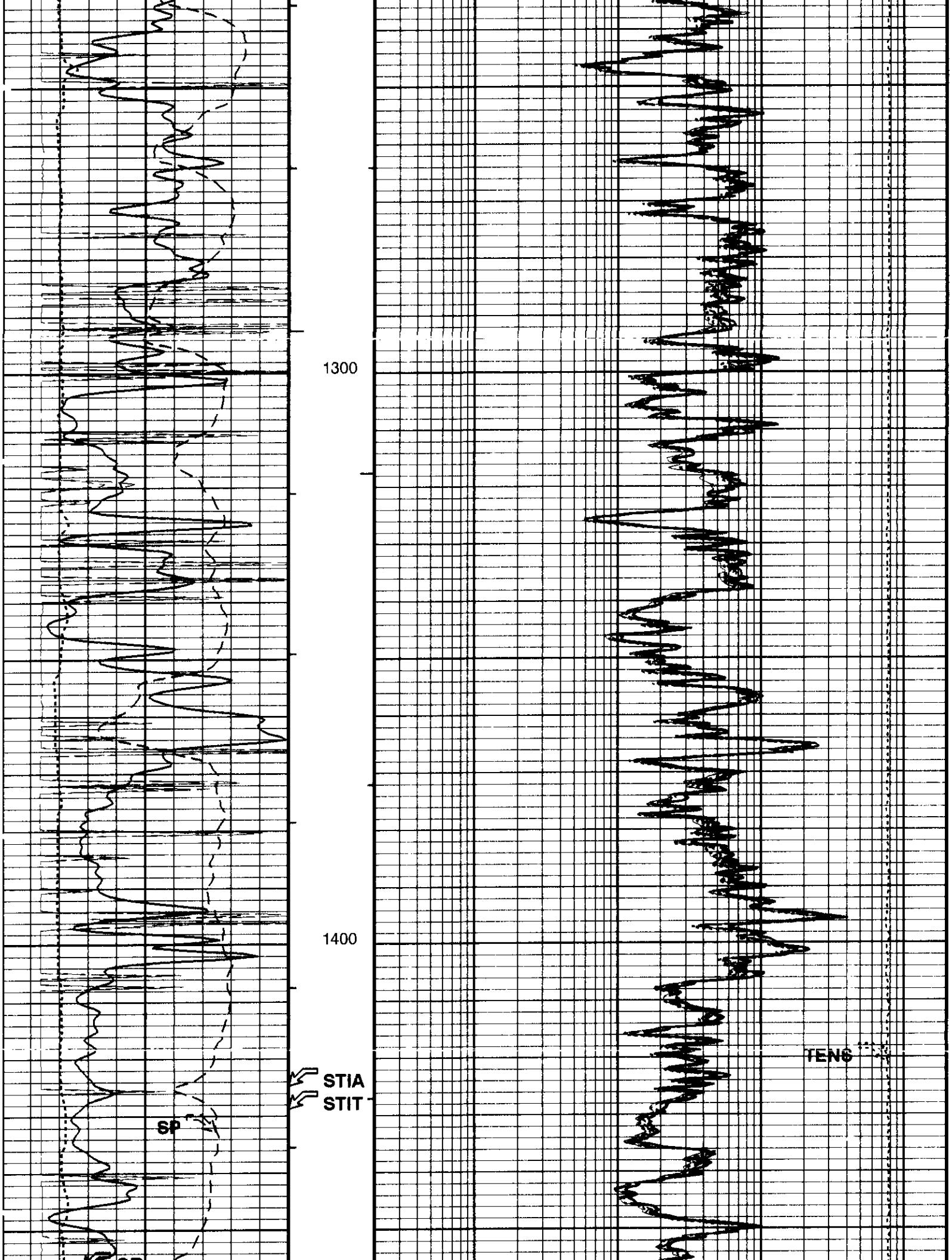
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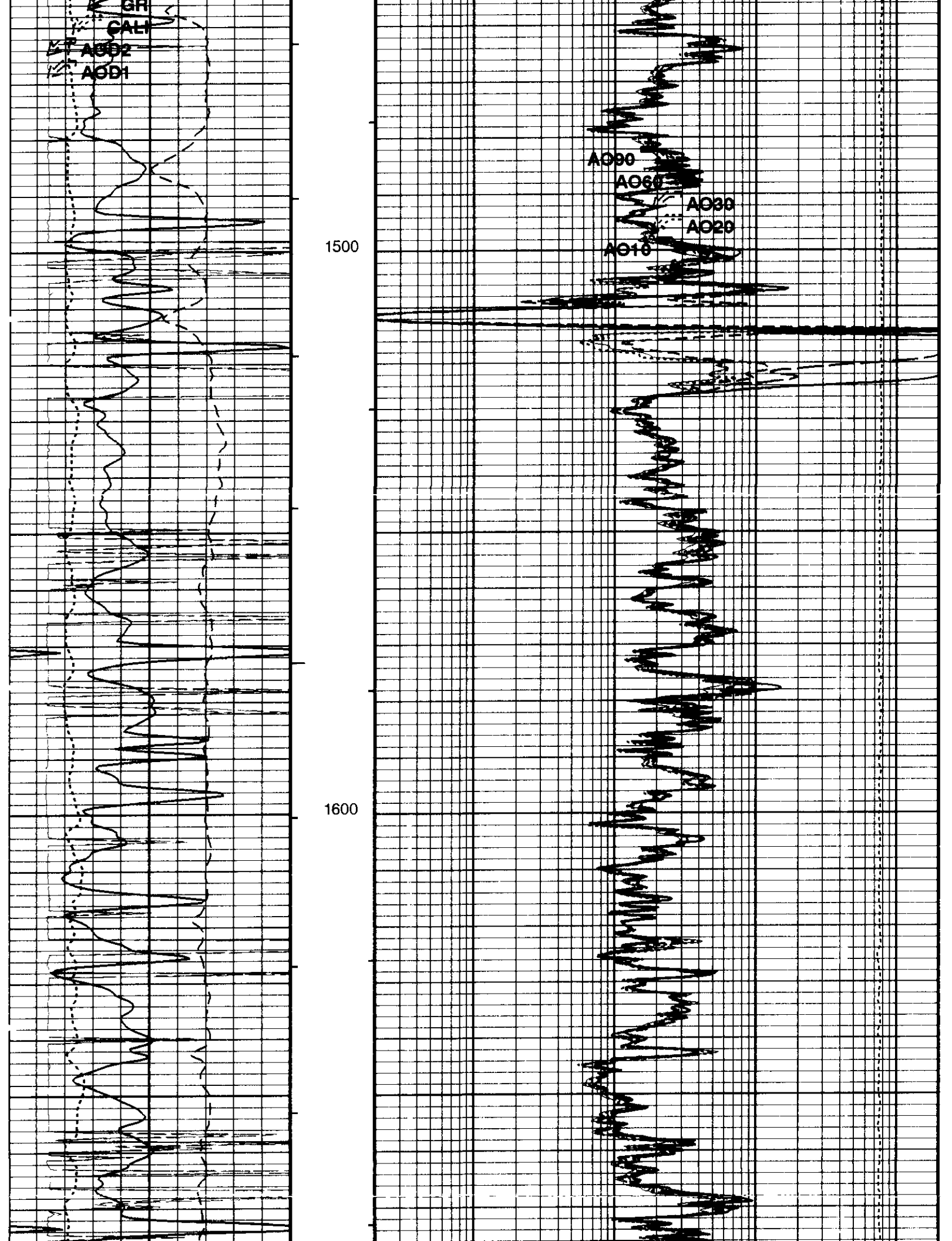
STIT
SP
TENS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AOD1
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AO10
1500
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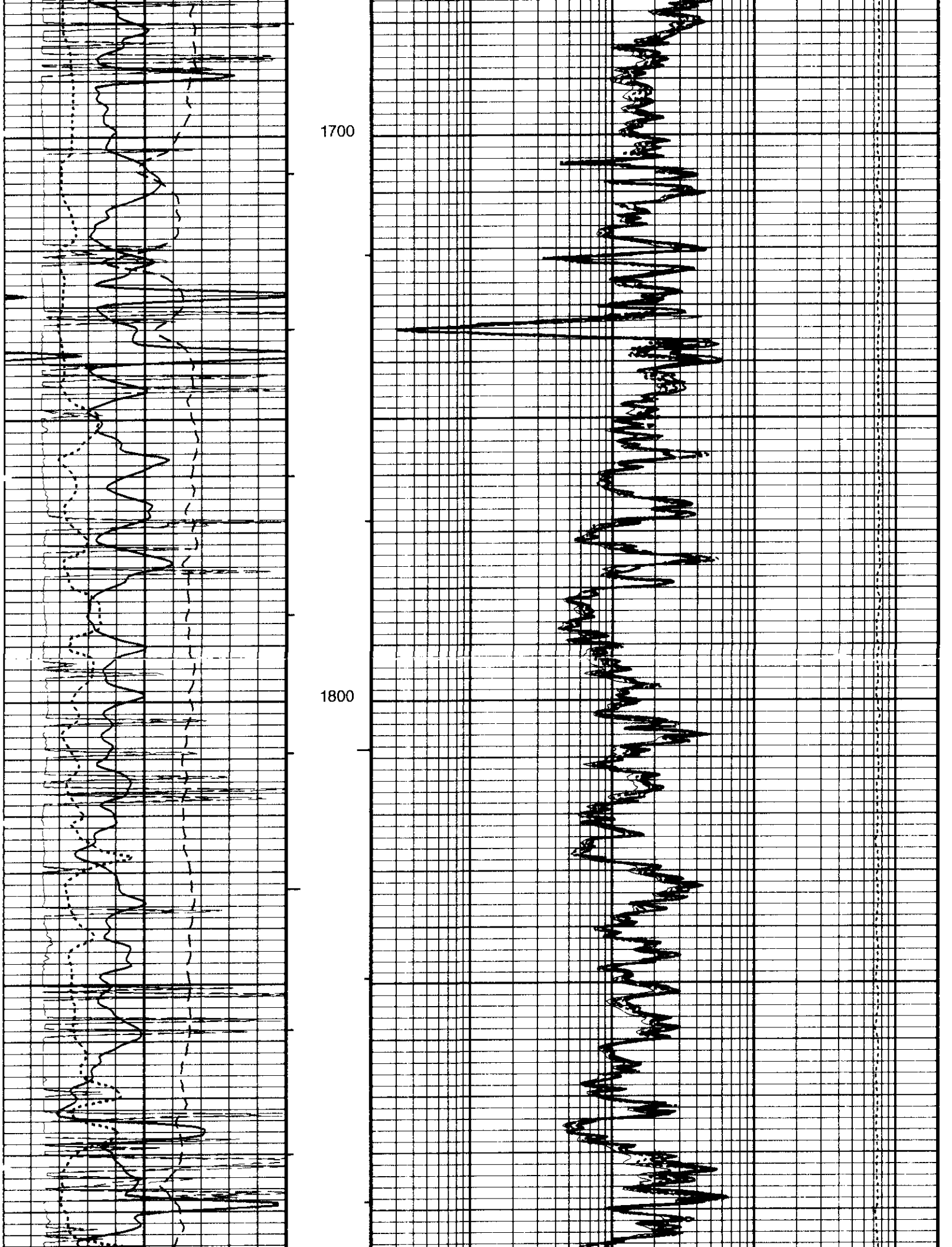
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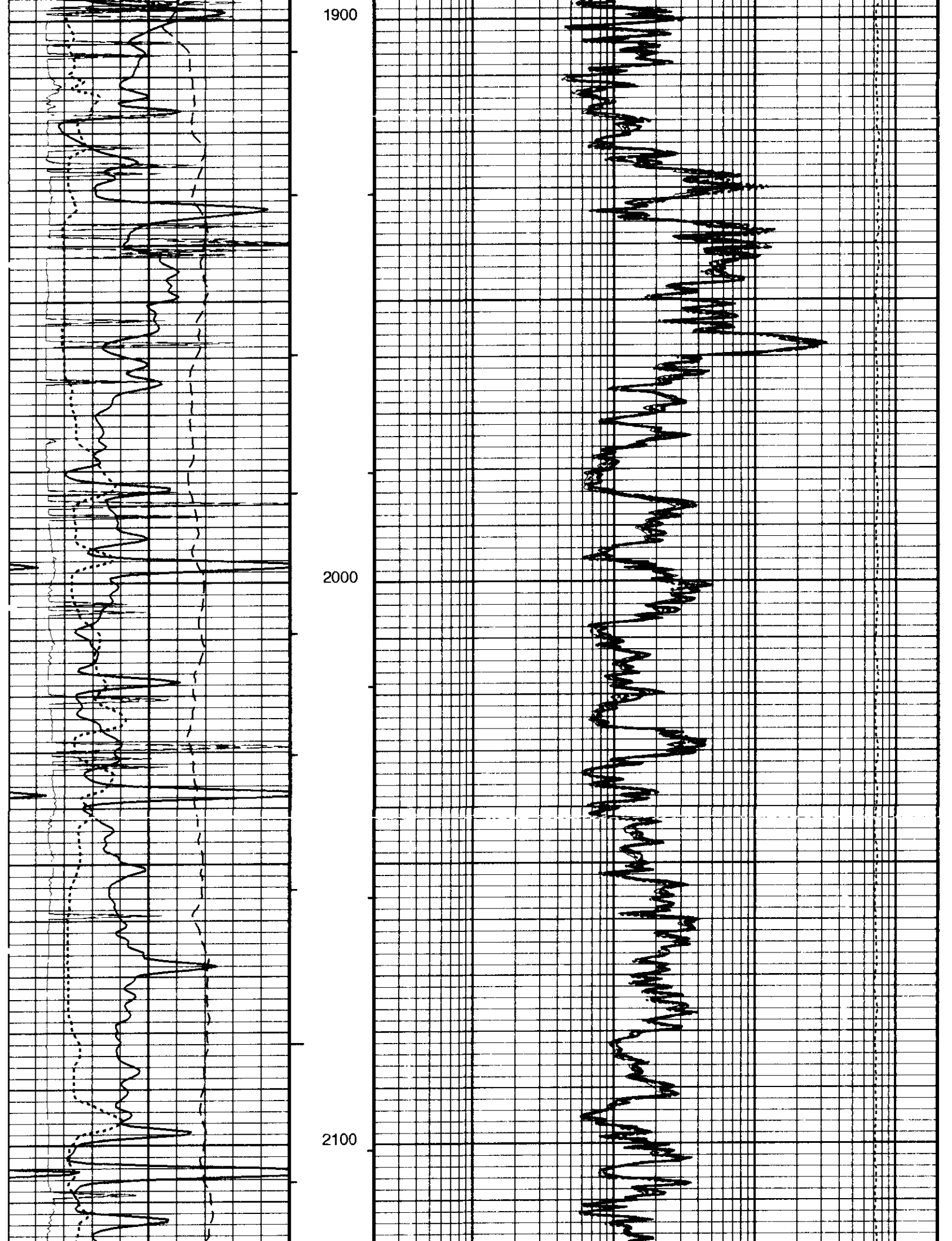
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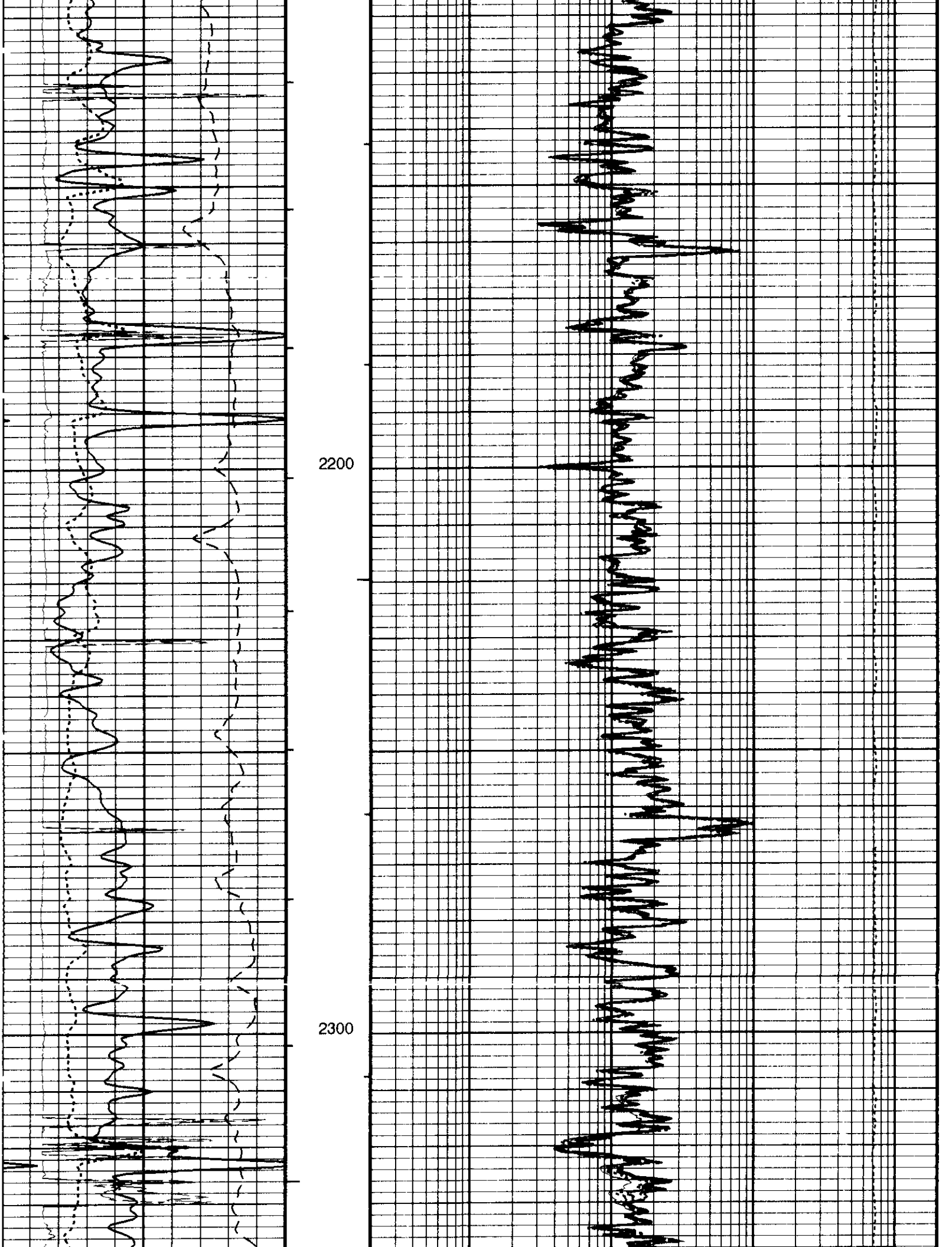
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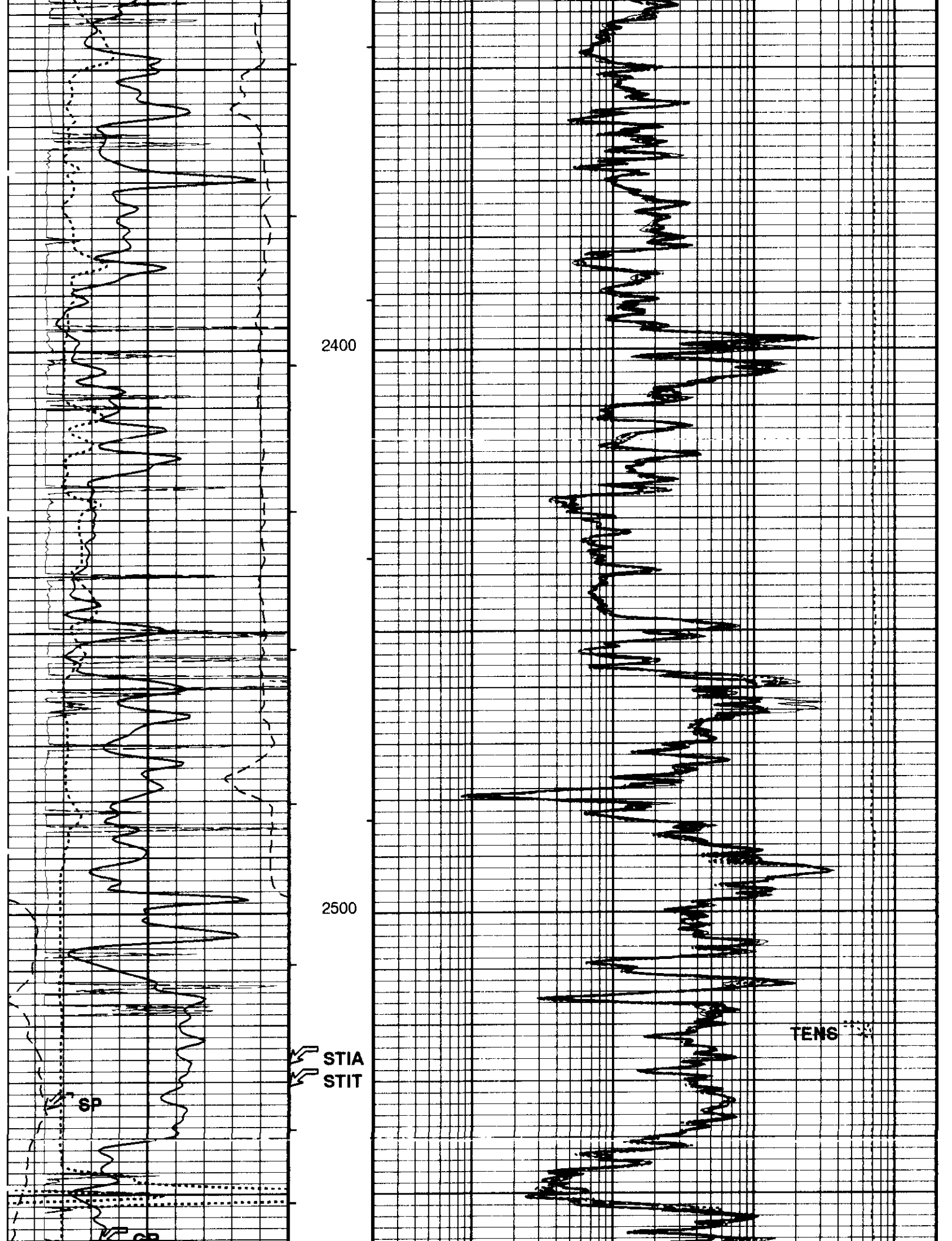
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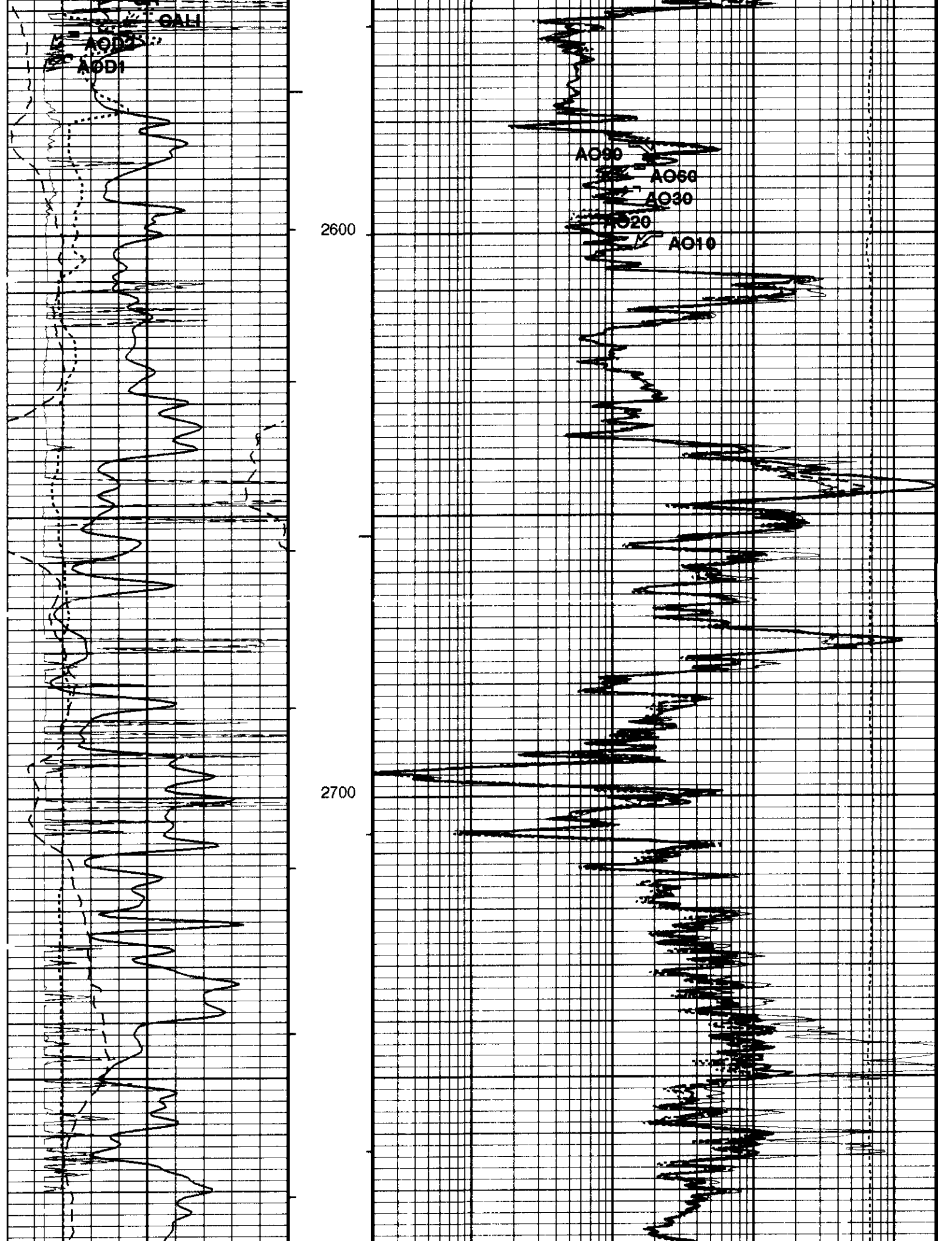
SP
TENS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AOD1
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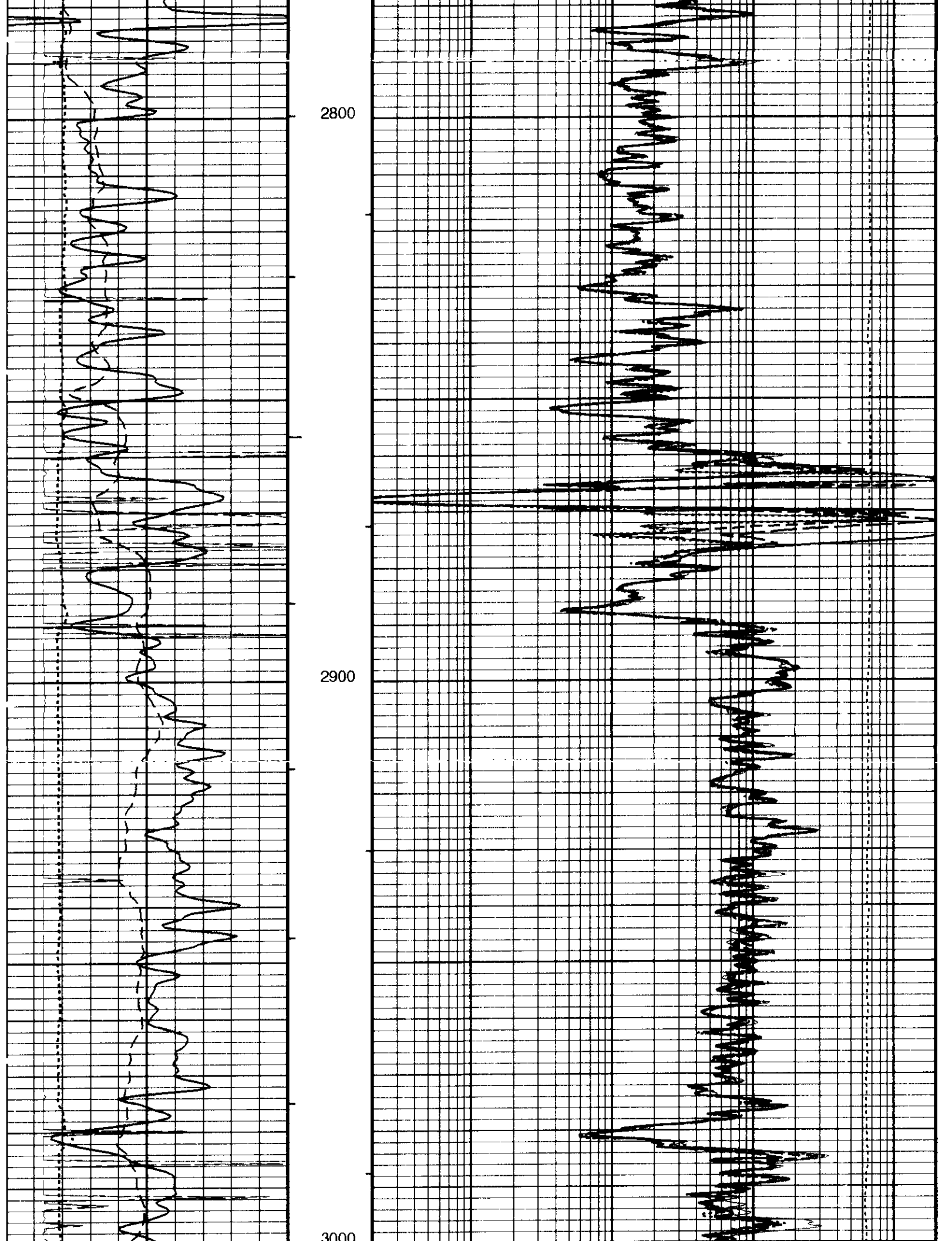
AO60
AO30
AO20
AO10
2600
2700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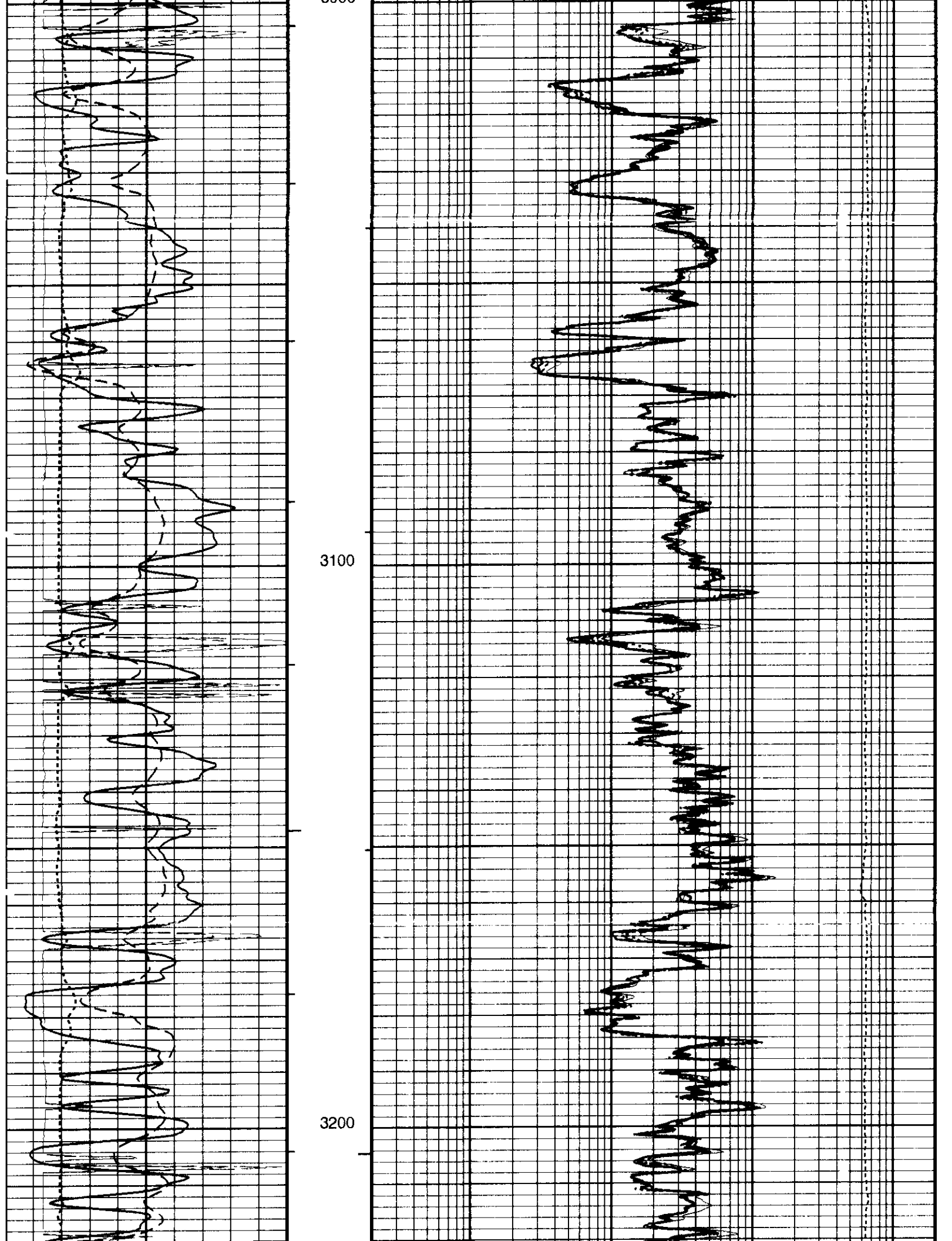
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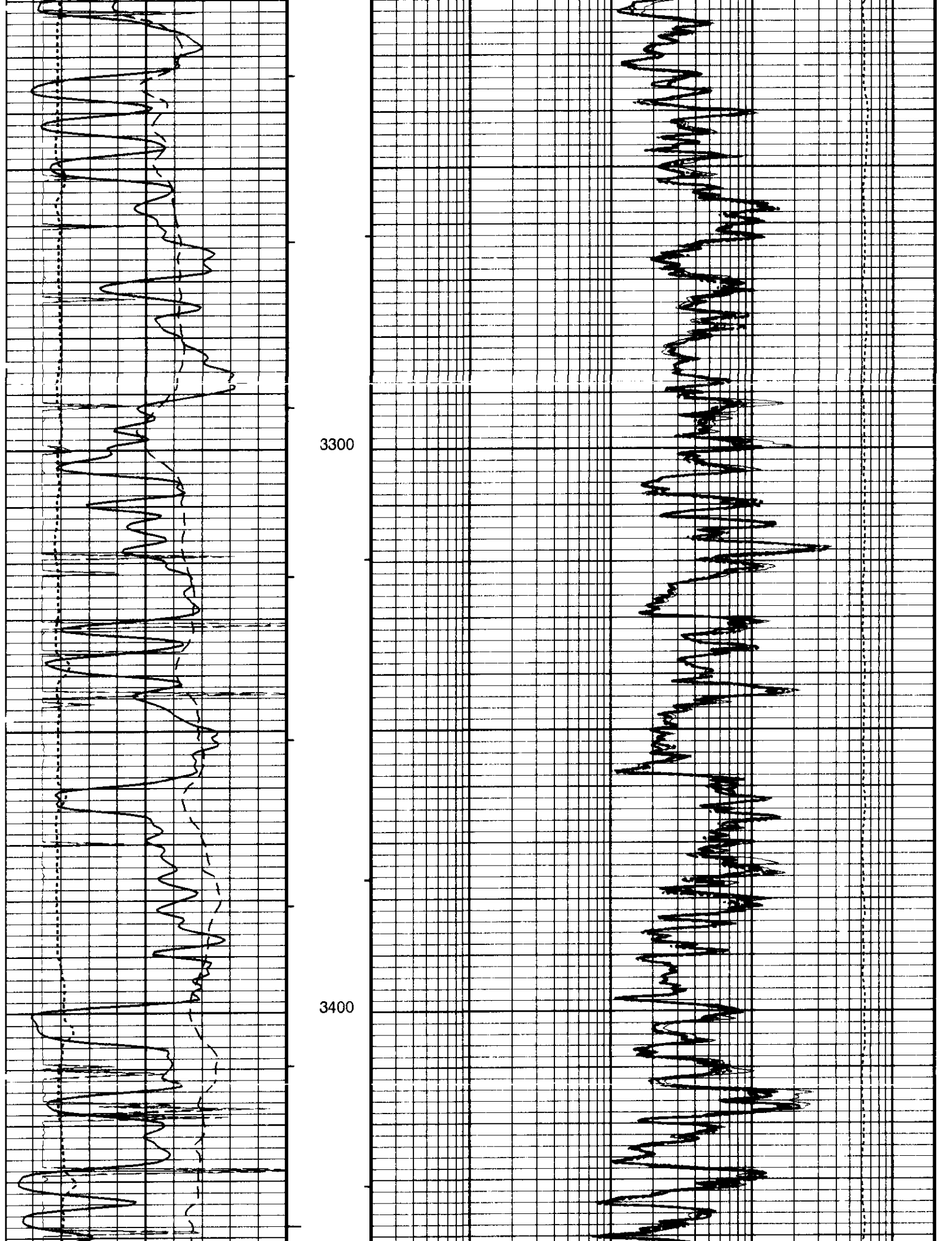
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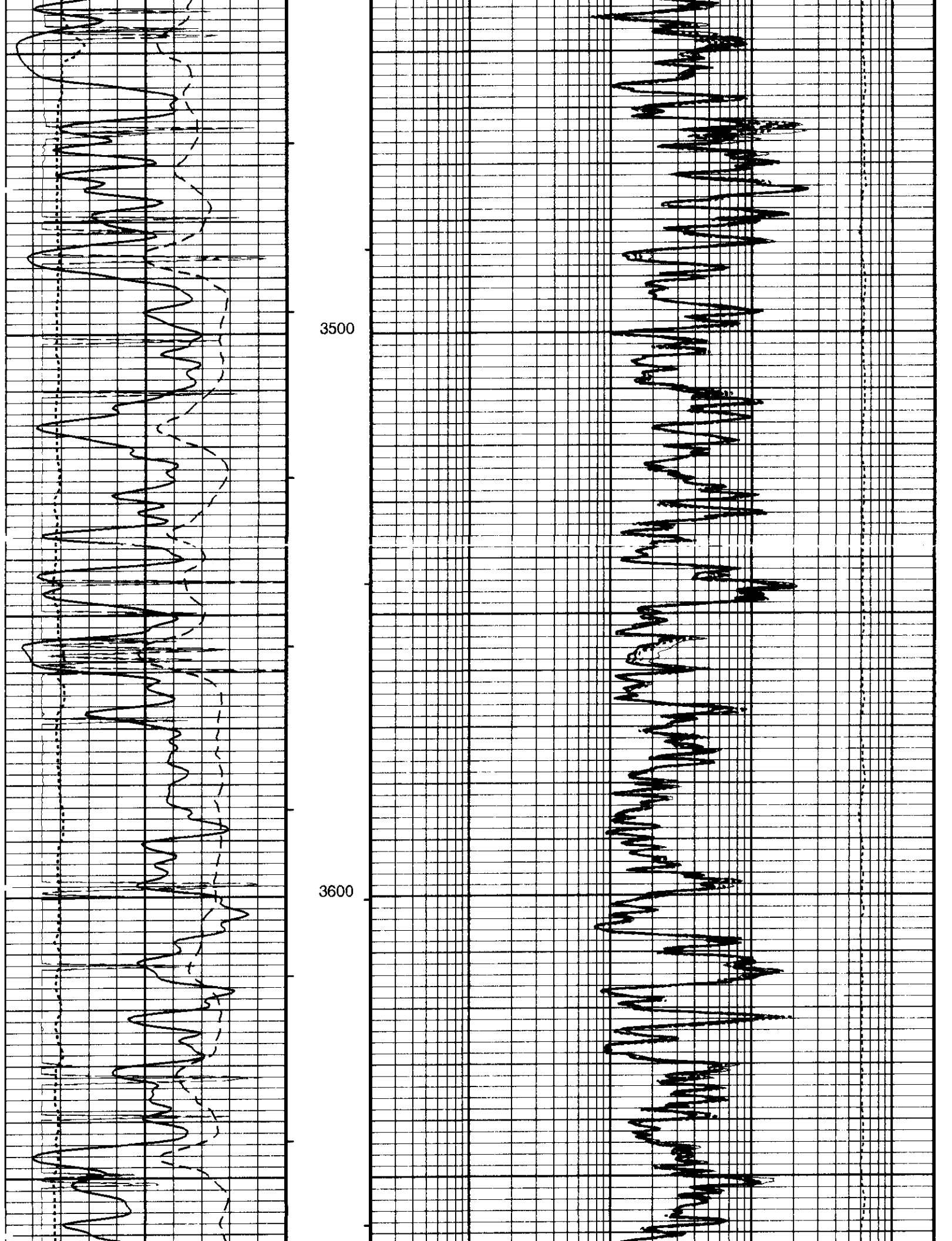
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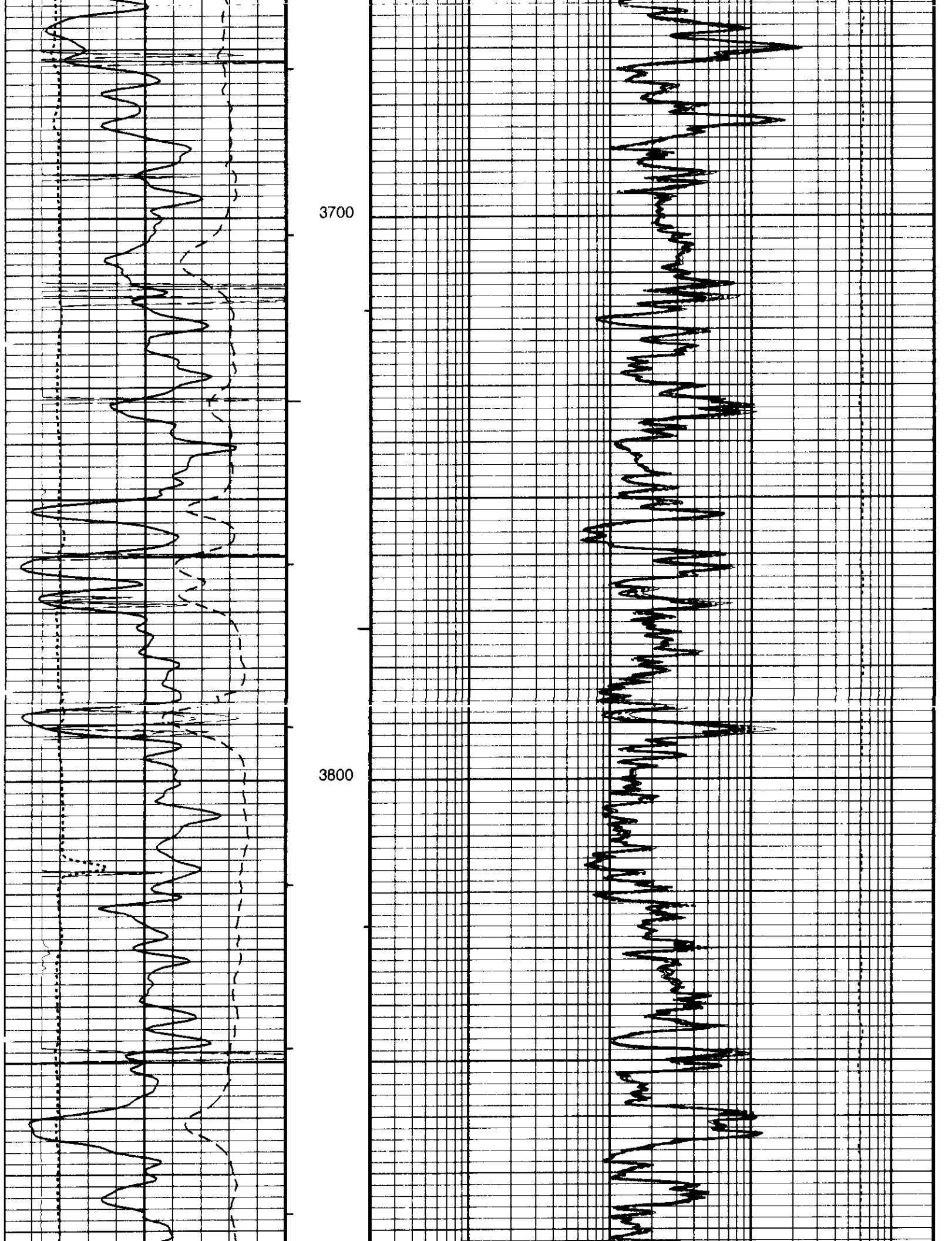
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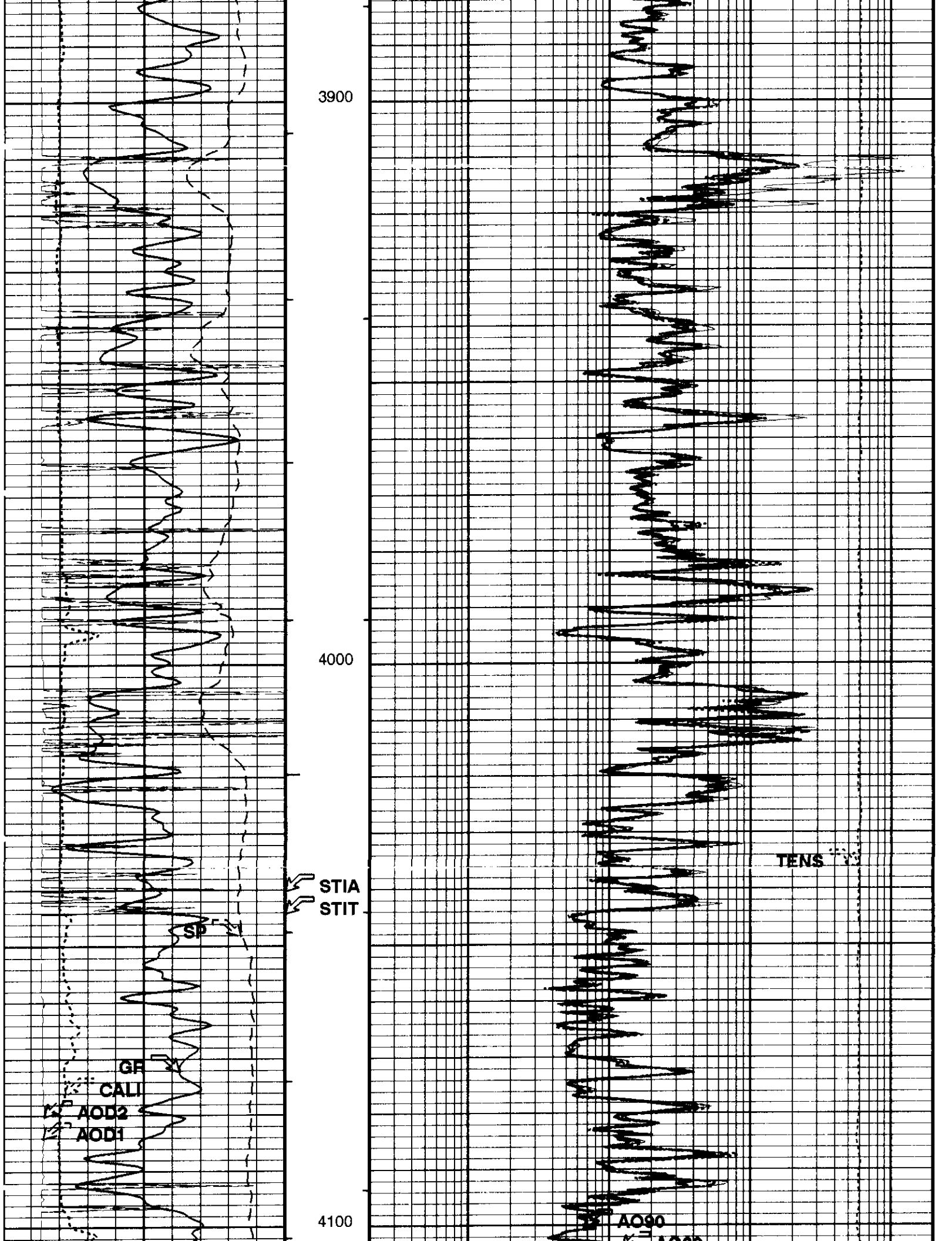
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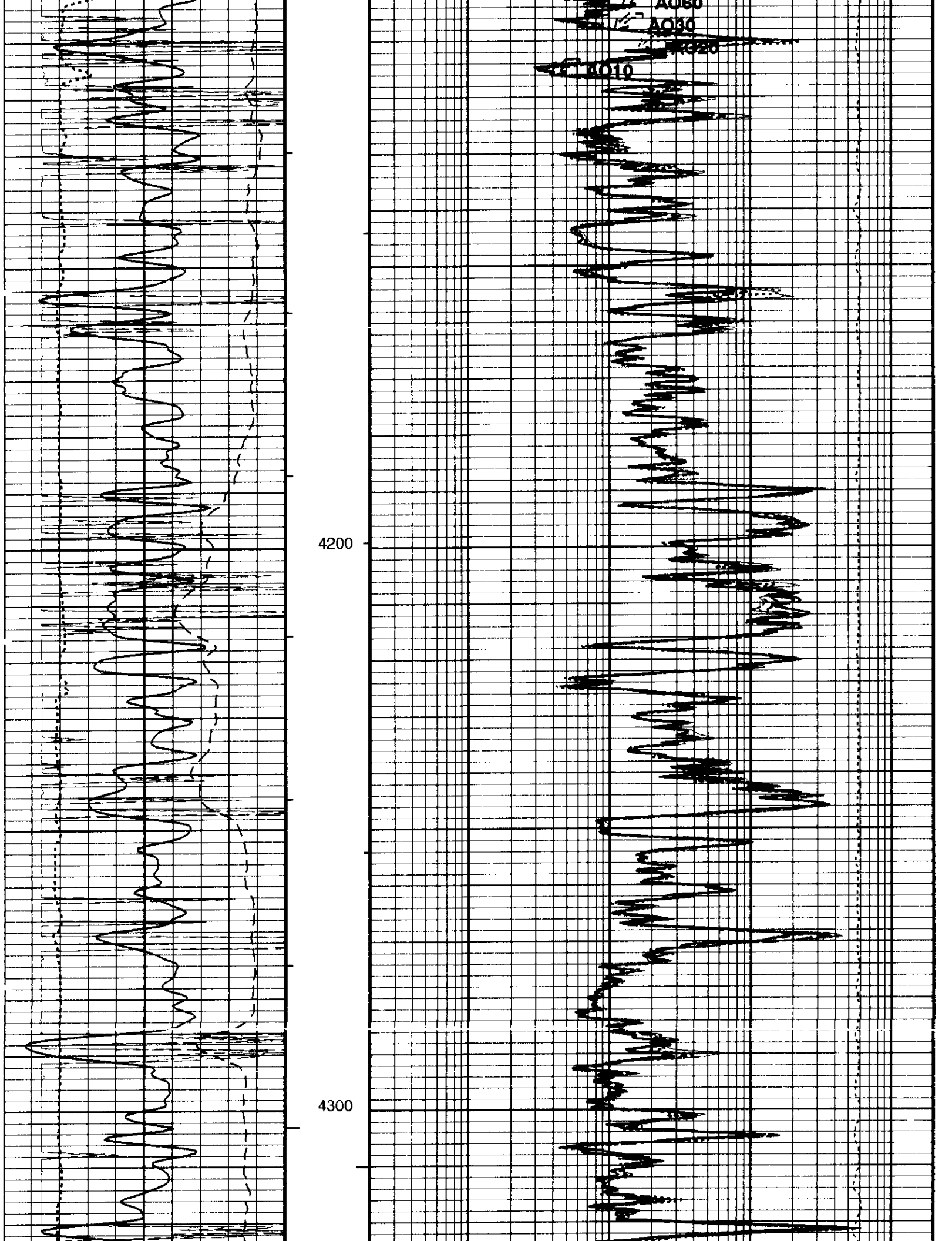
4000
4100
STIA
STIT
SP
GR
CALI
AOD2
AOD1
TENS
AO90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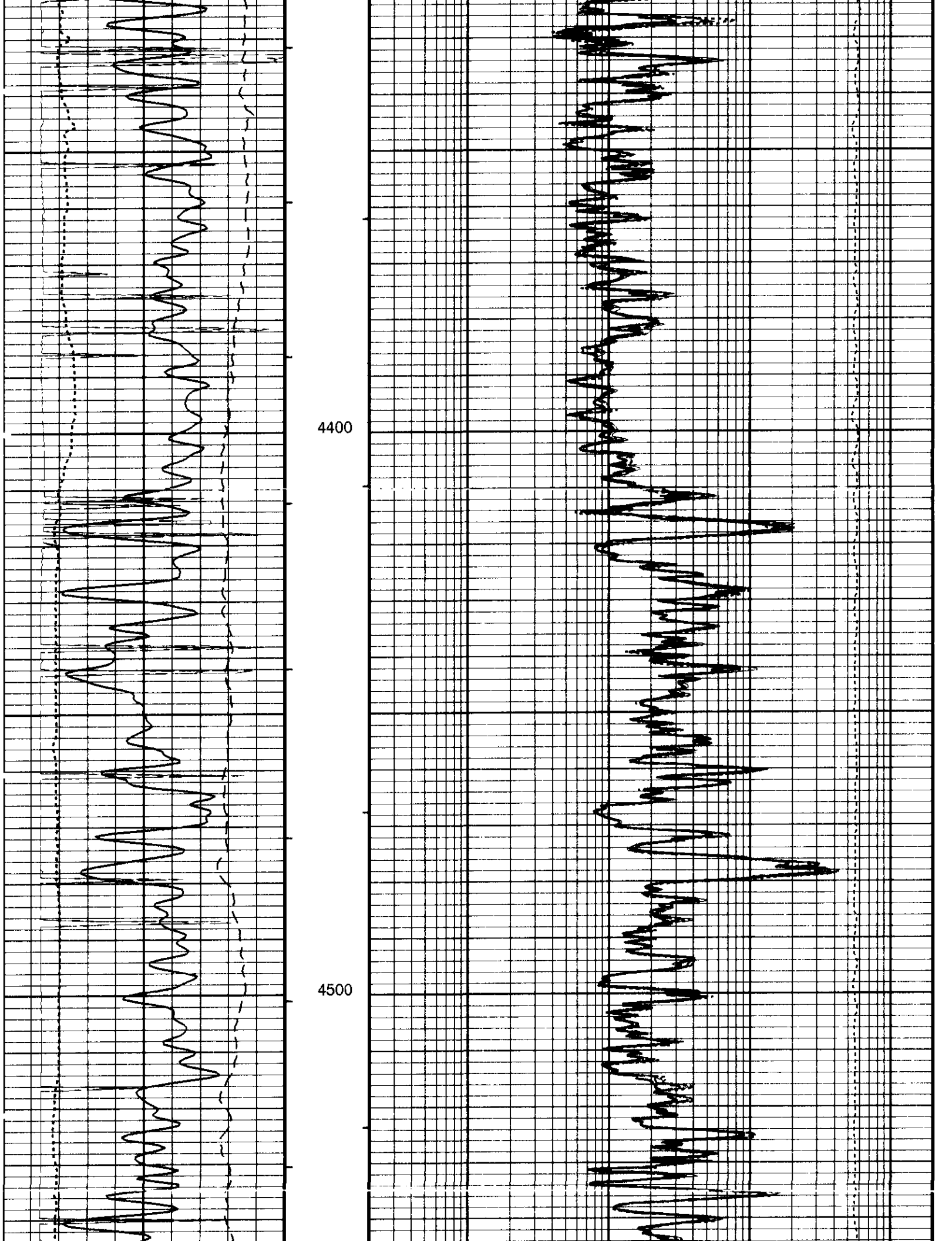
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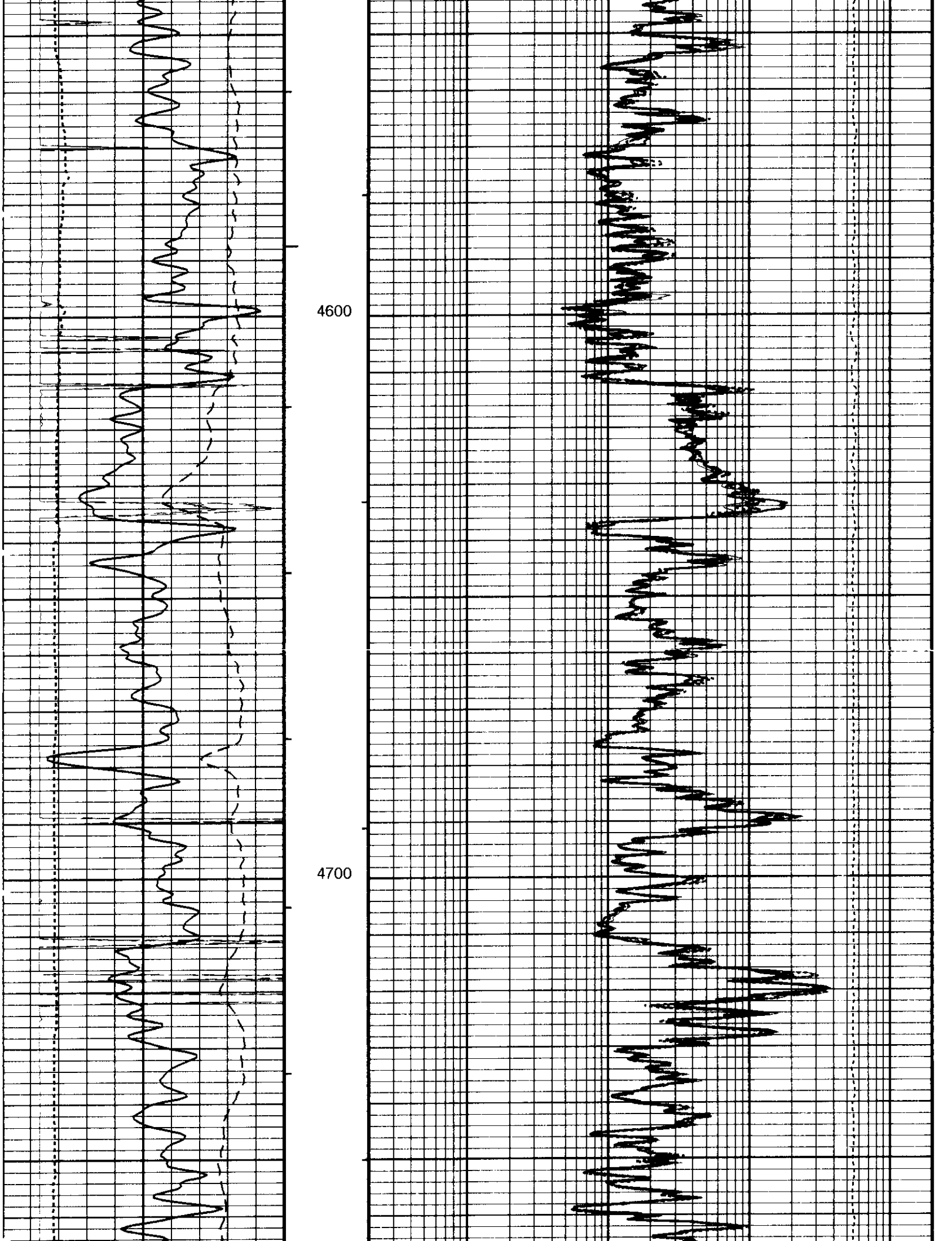
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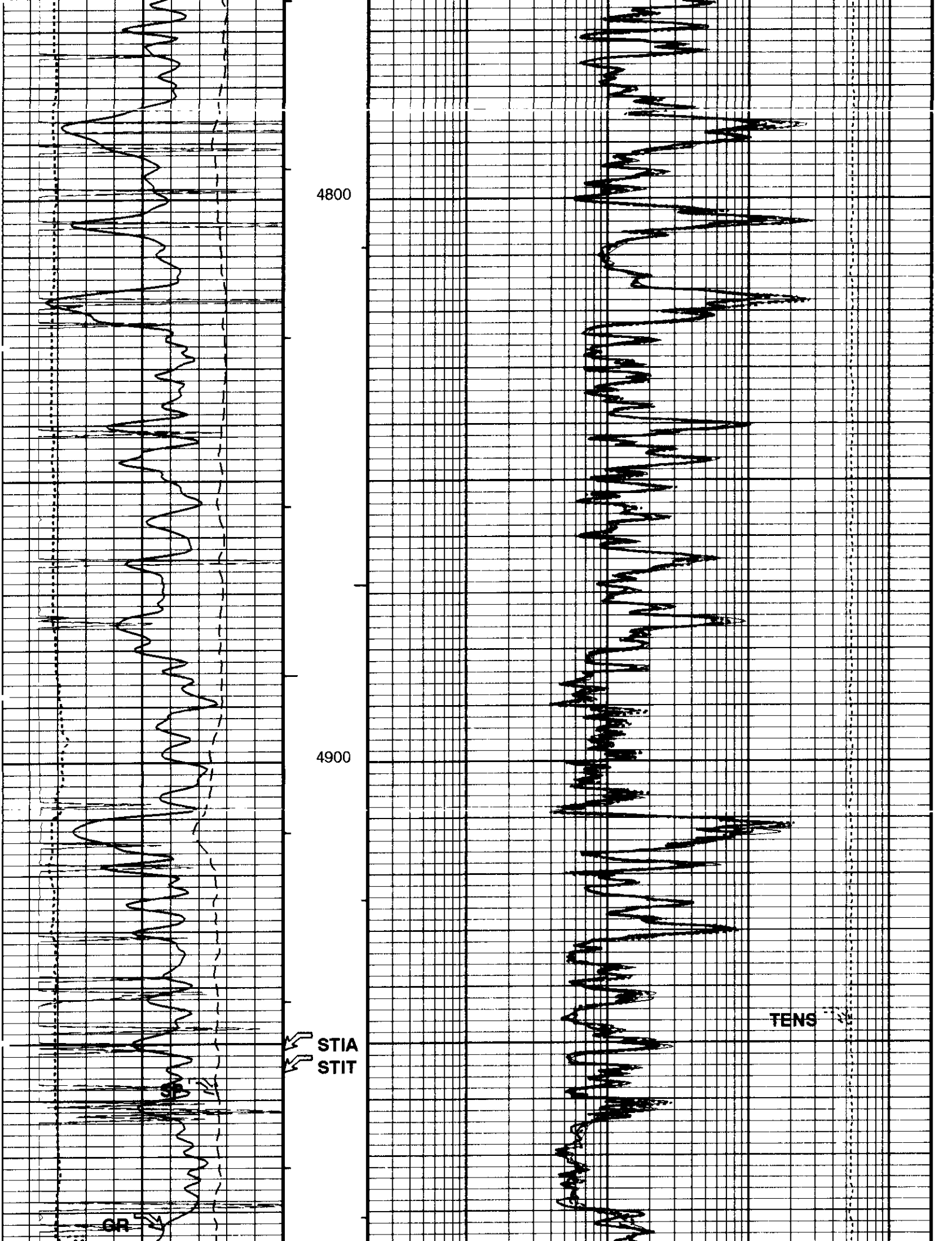
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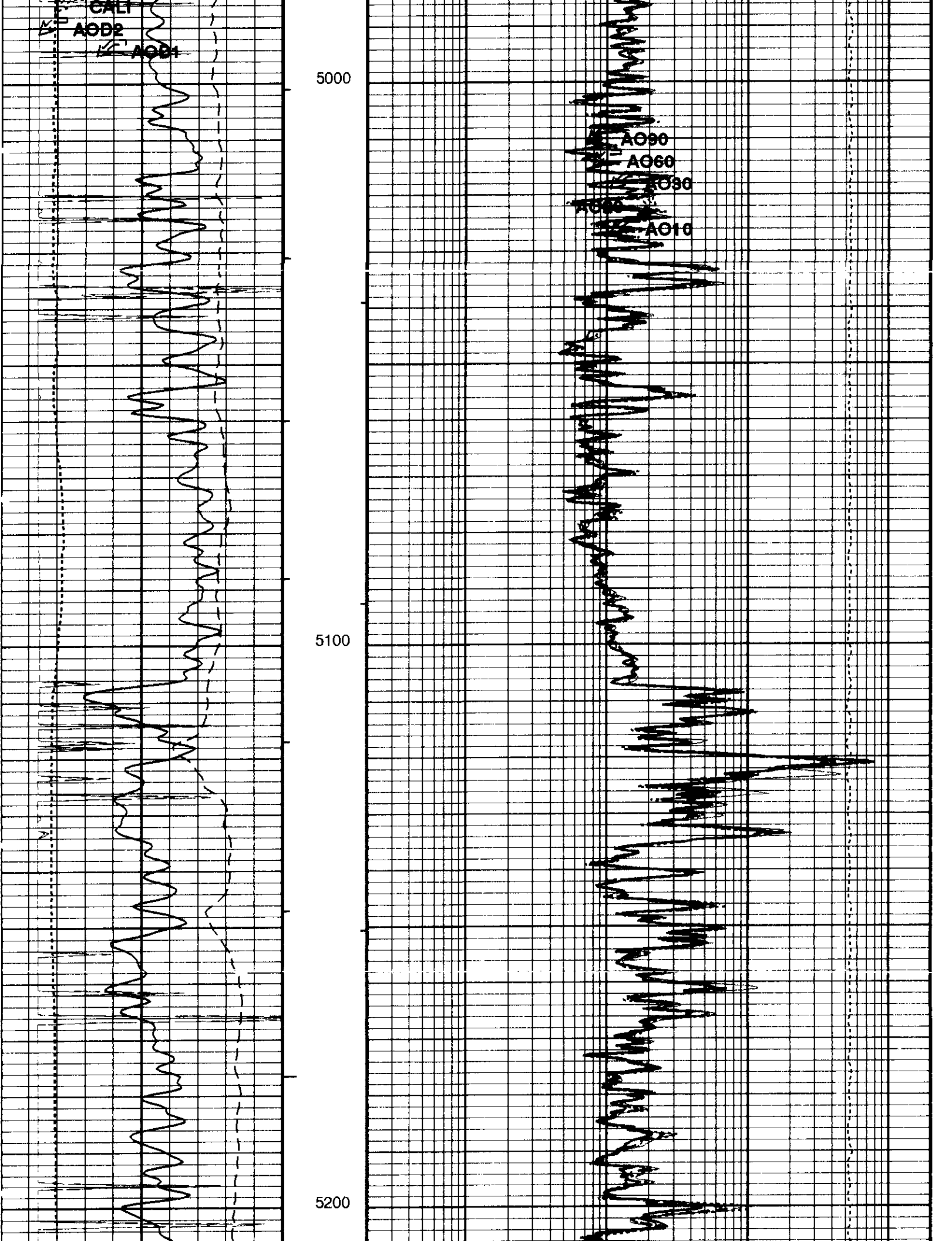
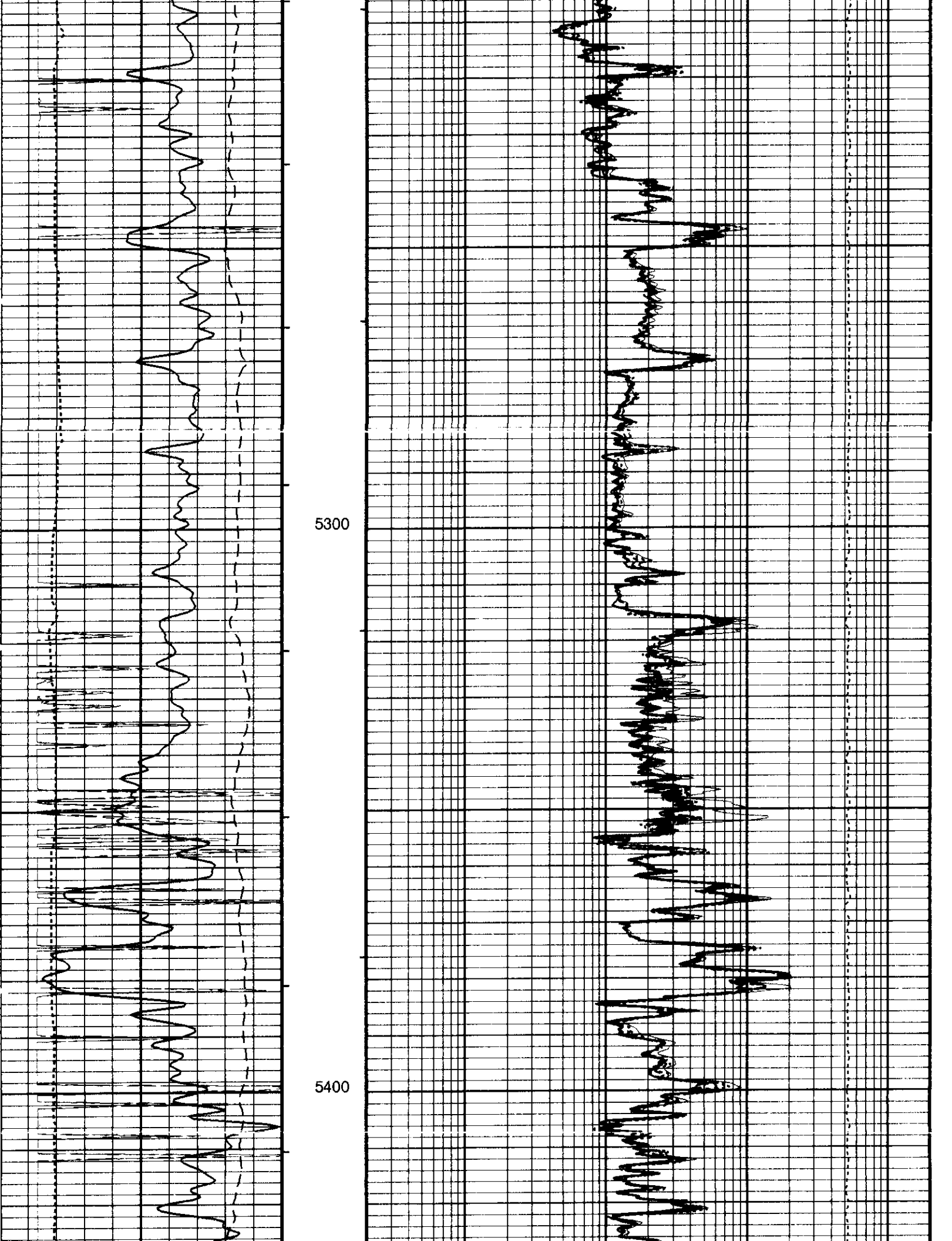
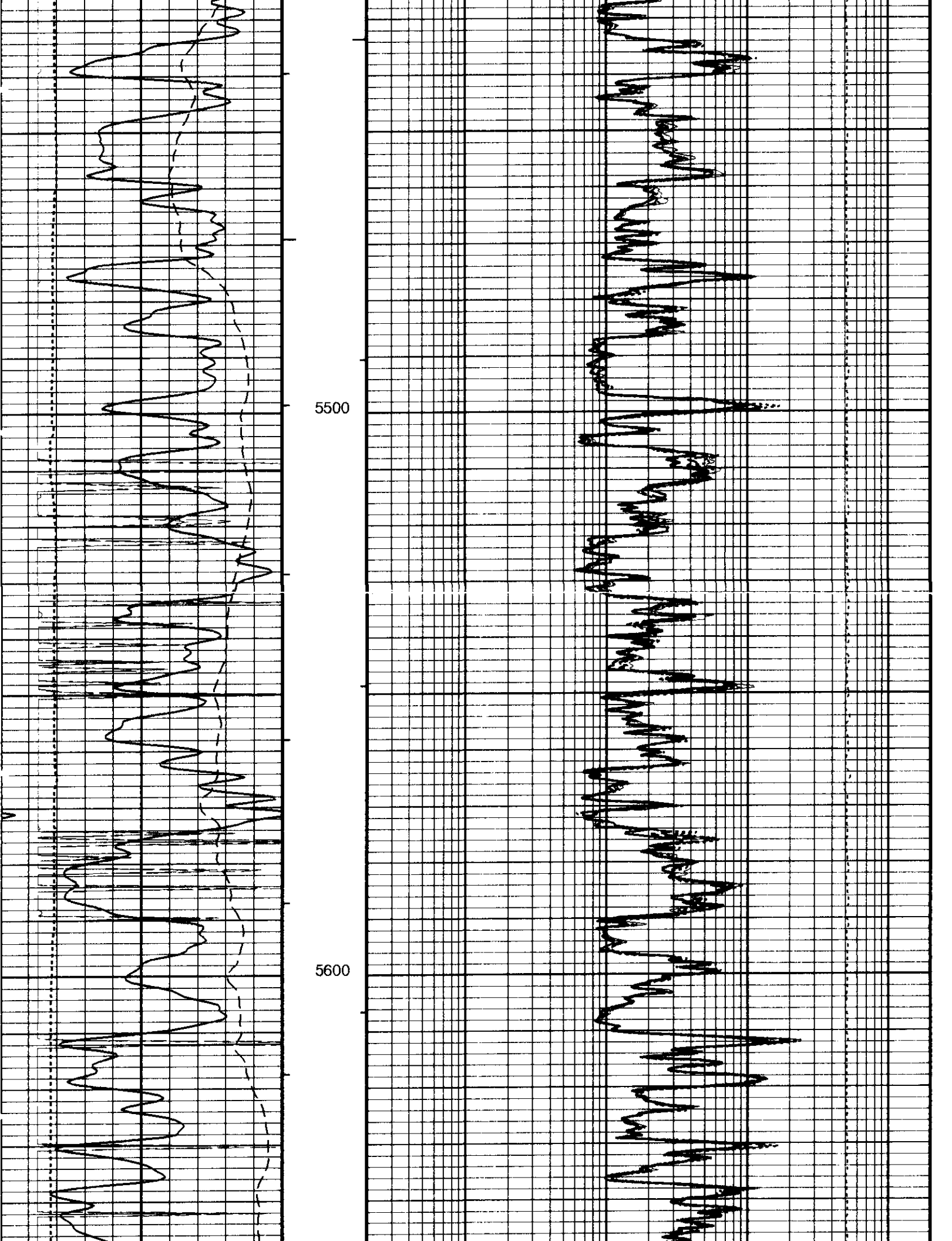
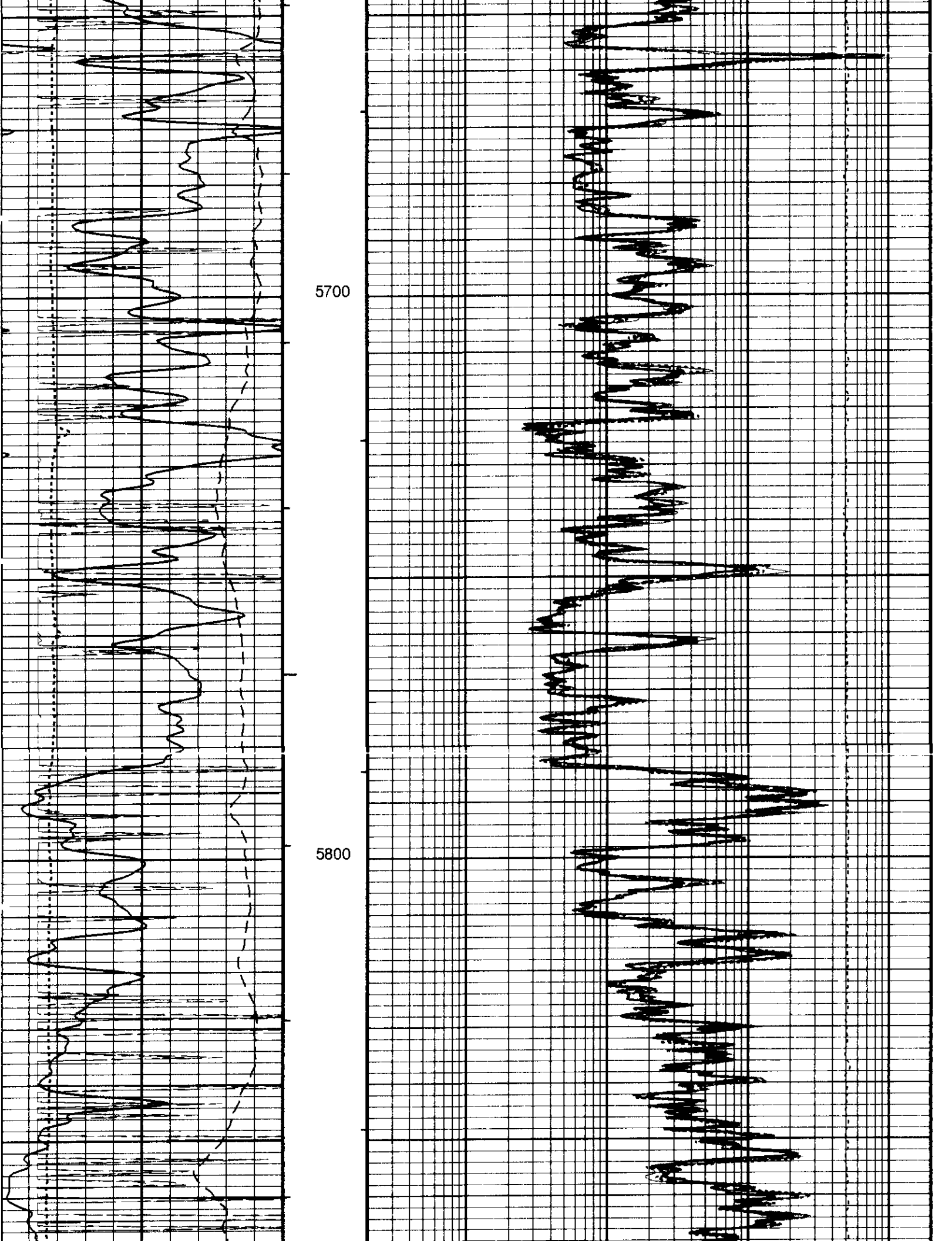
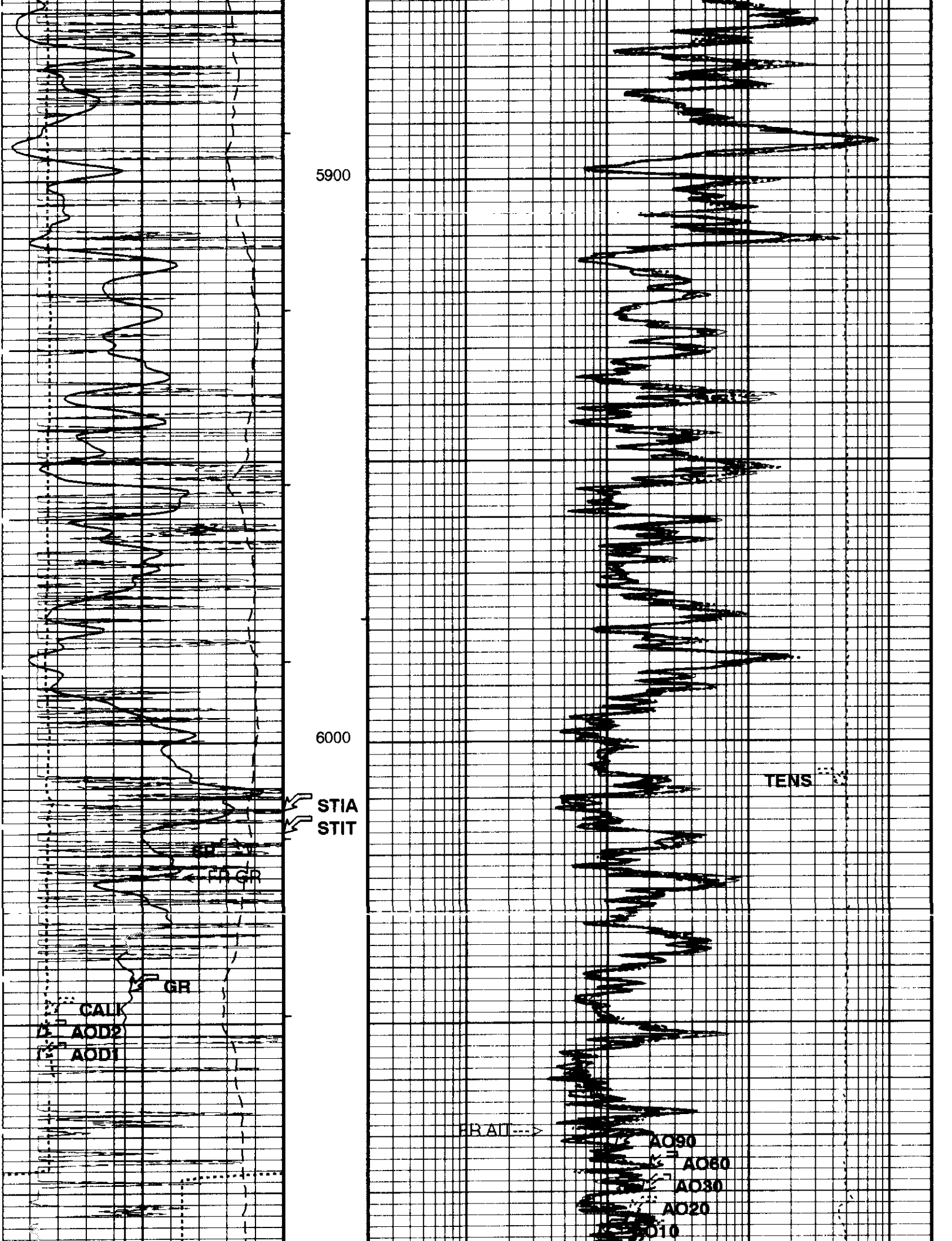
4900
STIA
STIT
SP
GR
TENS

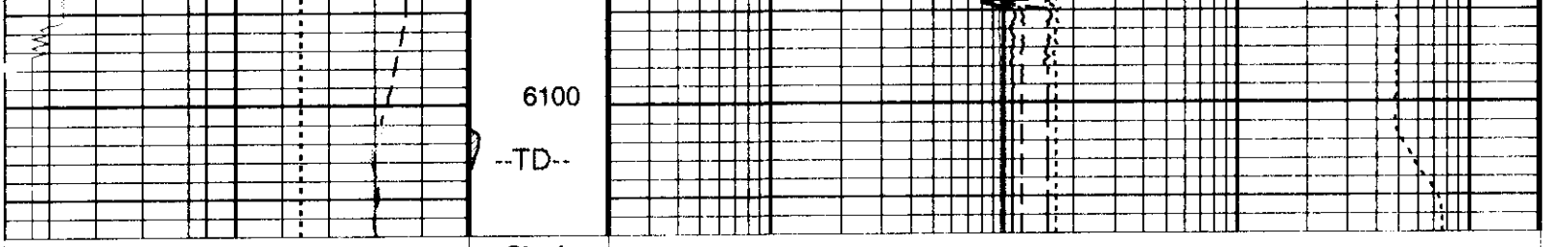

CALI
AOD2
AOD1
5000
AO90
AO60
AO30
AO10
5100
5200


5300
5400


5500
5600


5700
5800


5900
6000
STIA
STIT
GR
GR
CALK
AOD2
AOD1
TENS
RR AIT --->
AO90
AO60
AO30
AO20
AO10



AIT Inner Invasion Diameter (AOD1) 0 (IN) 60	Stuck Stretch (STIT) 0 (F) 50	AIT 10 Inch Investigation (AO10) 0.2 (OHMM) 2000
AIT Outer Invasion Diameter (AOD2) 0 (IN) 60	Cable Drag From STIA to STIT	AIT 20 Inch Investigation (AO20) 0.2 (OHMM) 2000
Gamma Ray (GR) 0 (GAPI) 200	Tool/Tot. Drag From D3T to STIA	AIT 30 Inch Investigation (AO30) 0.2 (OHMM) 2000
SP (SP) -80 (MV) 20		AIT 60 Inch Investigation (AO60) 0.2 (OHMM) 2000
Caliper (CALI) 6 (IN) 16		AIT 90 Inch Investigation (AO90) 0.2 (OHMM) 2000

MAIN PASS

Tension (TENS) 10000 (LBF) 0

PIP SUMMARY

- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

AIT Answer Product Processing Summary. Data taken with Sonde # 28 (ASNO)

***** Bhole Correction *****

Effective Mud Resistivity computed. Borehole diameter taken as input (see GCSE parameter)

Tool is run in CENTERED mode. Bit Size is 7.88 IN.

***** Input Selections to AIT Answer Product processing *****

Caliper (GCSE): CALI Mud Resistivity (GRSE): GEN_9 Temperature (GTSE): LINEAR_ESTIMATE Porosity (FPHI): DPHI

***** Other parameters used by AIT Answer Product processing *****

Mud Sample Resistivity (RMS)	1.890 OHMM	Mud Sample Temperature (MST)	73.000 DEGF
Surface Hole Temperature (SHT)	80.000 DEGF	Bottom Temperature (BHT)	150.000 DEGF
Total Depth (TD)	6113.000 FT		
Form Factor Exponent (FEXP)	2.000	Form Factor Numerator (FNUM)	1.000
Mud Filtrate Sample Resistivity (RMFS)	1.890 OHMM	Mud Filtrate Sample Temperature (MFST)	73.000 DEGF
Resitivity Connate Water (RW)	1.000 OHMM		

***** AIT Answer Product processing control parameters *****

(AAPL): 4_BholeCorr_BasicLogs_RadialProf_RadialPar

(ABHM): 0_ComputeMudResistivity (ABLM): 6_One_Two_and_Four (ARPM): 6_One_Two_and_Four

Format: AIT_BasicLogOne Vertical Scale: 5" per 100' Graphics File Created: 1-AUG-1996 13:33

OP System Version: 7C0-427

DBM

AIT-B 7S427KV-537

Output DLIS Files

DEFAULT SPEA .005 FN:4 FIELD 1-AUG-1996 13:33

Input DLIS Files

DEFAULT	SPEA .004	FN:3	FIELD	1-AUG-1996 13:13	6120.0 FT	5709.7 FT

Output DLIS Files

DEFAULT	SPEA .005	FN:4	FIELD	1-AUG-1996 13:33

Integrated Hole/Cement Volume Summary

Hole Volume = 121.90 F3

Cement Volume = 54.09 F3 (assuming 5.50 IN casing O.D.)

Computed from 6113.0 FT to 5702.5 FT using data channel(s) CALI (per GCSE parameter setting)

OP System Version: 7C0-427

DBM

AIT-B 7S427KV-537

AIT Answer Product Processing Summary. Data taken with Sonde # 28 (ASNO)

***** Bhole Correction *****

Effective Mud Resistivity computed. Borehole diameter taken as input (see GCSE parameter)

Tool is run in CENTERED mode. Bit Size is 7.88 IN.

***** Input Selections to AIT Answer Product processing *****

Caliper (GCSE): CALI Mud Resistivity (GRSE): GEN_9 Temperature (GTSE): LINEAR_ESTIMATE Porosity (FPHI): DPHI

***** Other parameters used by AIT Answer Product processing *****

Mud Sample Resistivity (RMS)	1.890 OHMM	Mud Sample Temperature (MST)	73.000 DEGF
Surface Hole Temperature (SHT)	80.000 DEGF	Bottom Temperature (BHT)	150.000 DEGF
Total Depth (TD)	6113.000 FT		
Form Factor Exponent (FEXP)	2.000	Form Factor Numerator (FNUM)	1.000
Mud Filtrate Sample Resistivity (RMFS)	1.890 OHMM	Mud Filtrate Sample Temperature (MFST)	73.000 DEGF
Resitivity Connate Water (RW)	1.000 OHMM		

***** AIT Answer Product processing control parameters *****

Playback Mode: NORMAL

PIP SUMMARY

- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

TENS_REP Curve (TENS_REP)
10000 (LBF) 0

SP_REP Curve (SP_REP)
-80 (MV) 20

GR_REP Curve (GR_REP)
0 (GAPI) 200

CALI_REP Curve (CALI_REP)
6 (IN) 16

AIT Outer Invasion Diameter (ATD2)
0 (IN) 60

AIT Inner Invasion Diameter (ATD1)
0 (IN) 60

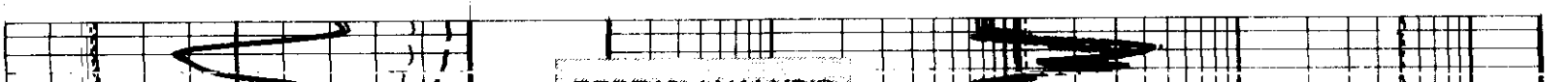
AO90_REP Curve (AO90_REP)
0.2 (OHMM) 2000

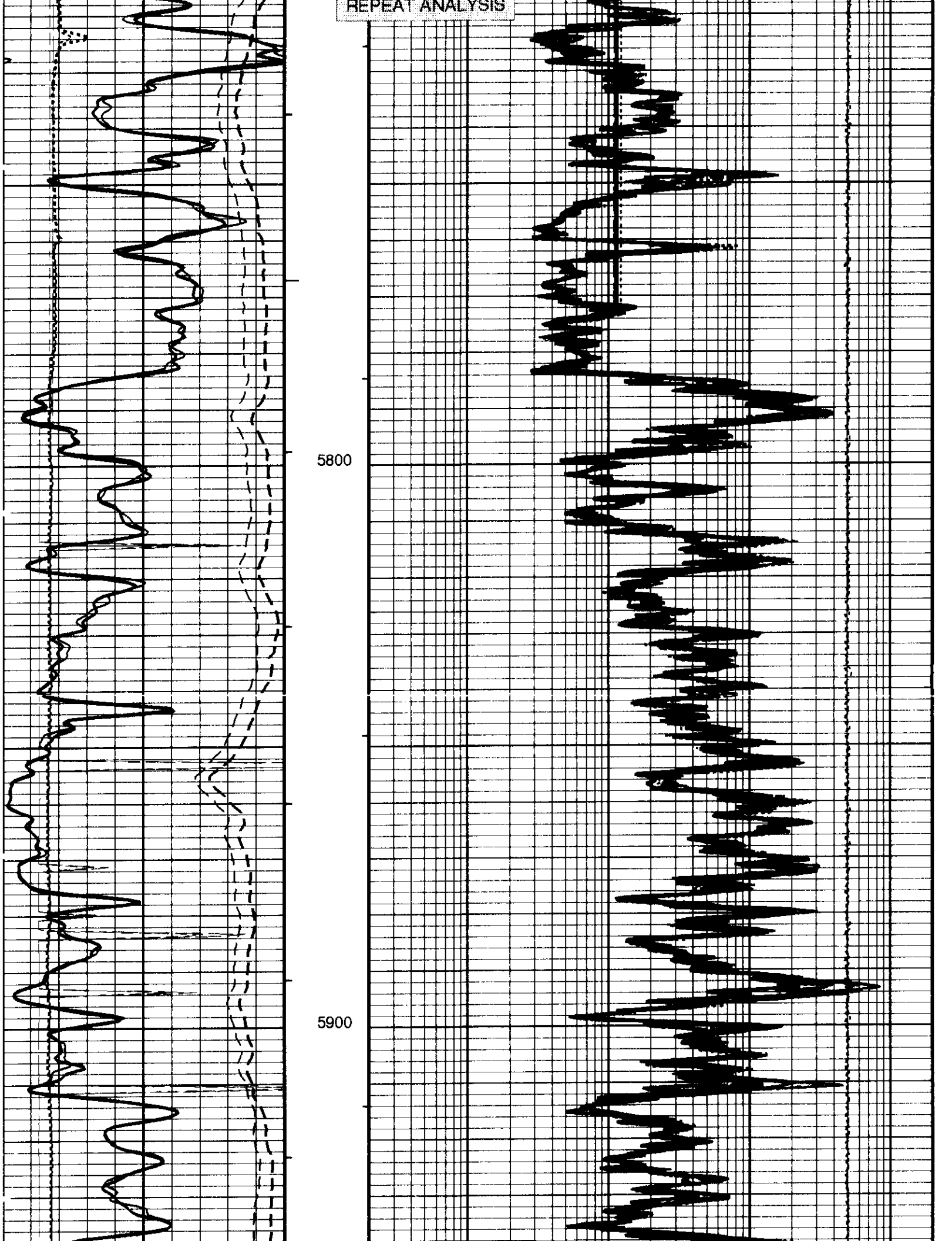
AO60_REP Curve (AO60_REP)
0.2 (OHMM) 2000

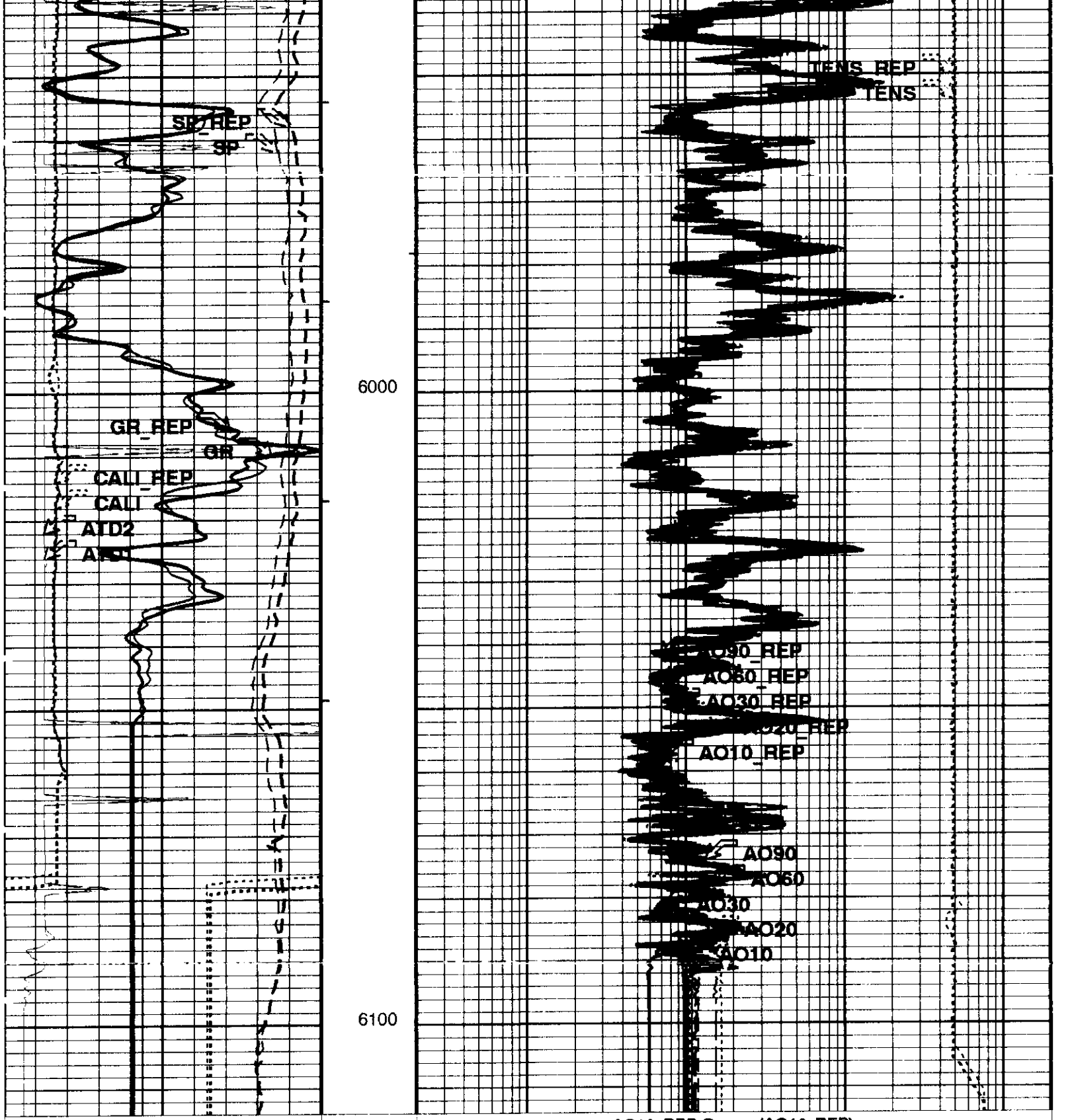
AO30_REP Curve (AO30_REP)
0.2 (OHMM) 2000

AO20_REP Curve (AO20_REP)
0.2 (OHMM) 2000

AO10_REP Curve (AO10_REP)
0.2 (OHMM) 2000




REPEAT ANALYSIS
5800
5900



AIT Inner Invasion Diameter (ATD1)
0 (IN) 60

AIT Outer Invasion Diameter (ATD2)
0 (IN) 60

CALI_REP Curve (CALI_REP)
6 (IN) 16

GR_REP Curve (GR_REP)
0 (GAPI) 200

SP_REP Curve (SP_REP)
-80 (MV) 20

AO10_REP Curve (AO10_REP)
0.2 (OHMM) 2000

AO20_REP Curve (AO20_REP)
0.2 (OHMM) 2000

AO30_REP Curve (AO30_REP)
0.2 (OHMM) 2000

AO60_REP Curve (AO60_REP)
0.2 (OHMM) 2000

AO90_REP Curve (AO90_REP)
0.2 (OHMM) 2000

TENS_REP Curve (TENS_REP)		
10000	(LBF)	0

PIP SUMMARY

- Integrated Hole Volume Minor Pip Every 10 F3
- Integrated Hole Volume Major Pip Every 100 F3
- Integrated Cement Volume Minor Pip Every 10 F3
- Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

AIT Answer Product Processing Summary. Data taken with Sonde # 28 (ASNO)

***** Bhole Correction *****

Effective Mud Resistivity computed. Borehole diameter taken as input (see GCSE parameter)

Tool is run in CENTERED mode. Bit Size is 7.88 IN.

***** Input Selections to AIT Answer Product processing *****

Caliper (GCSE): CALI Mud Resistivity (GRSF): GFN_9 Temperature (GTSE): LINEAR_ESTIMATE Porosity (FPHI): DPHI

***** Other parameters used by AIT Answer Product processing *****

Mud Sample Resistivity (RMS)	1.890 OHMM	Mud Sample Temperature (MST)	73.000 DEGF
Surface Hole Temperature (SHT)	80.000 DEGF	Bottom Temperature (BHT)	150.000 DEGF
Total Depth (TD)	6113.000 FT		
Form Factor Exponent (FEXP)	2.000	Form Factor Numerator (FNUM)	1.000
Mud Filtrate Sample Resistivity (RMFS)	1.890 OHMM	Mud Filtrate Sample Temperature (MFST)	73.000 DEGF
Resitivity Connate Water (RW)	1.000 OHMM		

***** AIT Answer Product processing control parameters *****

Playback Mode: NORMAL

Format: AIT_BasicLogOne_REP Vertical Scale: 5" per 100' Graphics File Created: 1-AUG-1996 13:33

OP System Version: 7C0-427

DBM

AIT-B 7S427KV-537

Input DLIS Files

DEFAULT	SPEA .004	FN:3	FIELD	1-AUG-1996 13:13	6120.0 FT	5709.7 FT

Output DLIS Files

DEFAULT	SPEA .005	FN:4	FIELD	1-AUG-1996 13:33

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Array Induction Tool - B Wellsite Calibration - Electronics Calibration Check - Thru Cal Mag. & Phase							
Master: Calibration out of date Apr 12 11:55 1996 Before: Aug 1 12:21 1996							
Thru Cal Magnitude - 0	0	0.5902	0.5909	N/A	N/A	N/A	V
Thru Cal Magnitude - 1	0	1.160	1.161	N/A	N/A	N/A	V
Thru Cal Magnitude - 2	0	1.444	1.437	N/A	N/A	N/A	V
Thru Cal Magnitude - 3	0	0.3891	0.3890	N/A	N/A	N/A	V
Thru Cal Magnitude - 4	0	2.114	2.104	N/A	N/A	N/A	V
Thru Cal Magnitude - 5	0	0.5753	0.5748	N/A	N/A	N/A	V
Thru Cal Magnitude - 6	0	1.471	1.464	N/A	N/A	N/A	V
Thru Cal Magnitude - 7	0	0.4459	0.4433	N/A	N/A	N/A	V
Thru Cal Magnitude - 8	0	2.209	2.200	N/A	N/A	N/A	V
Thru Cal Magnitude - 9	0	0.6473	0.6437	N/A	N/A	N/A	V
Thru Cal Magnitude - 10	0	2.189	2.178	N/A	N/A	N/A	V
Thru Cal Magnitude - 11	0	0.6441	0.6402	N/A	N/A	N/A	V
Thru Cal Magnitude - 12	0	1.938	1.927	N/A	N/A	N/A	V
Thru Cal Magnitude - 13	0	0.5712	0.5677	N/A	N/A	N/A	V
Phase - 0	0	-83.09	-84.25	N/A	N/A	N/A	DEG
Phase - 1	0	-84.25	-85.44	N/A	N/A	N/A	DEG

Phase - 2	0	73.15	72.63	N/A	N/A	N/A	DEG
Phase - 3	0	-134.5	-135.7	N/A	N/A	N/A	DEG
Phase - 4	0	72.84	72.31	N/A	N/A	N/A	DEG
Phase - 5	0	-135.2	-136.4	N/A	N/A	N/A	DEG
Phase - 6	0	2.575	2.620	N/A	N/A	N/A	DEG
Phase - 7	0	73.36	72.89	N/A	N/A	N/A	DEG
Phase - 8	0	2.375	2.416	N/A	N/A	N/A	DEG
Phase - 9	0	73.04	72.56	N/A	N/A	N/A	DEG
Phase - 10	0	-13.21	-13.11	N/A	N/A	N/A	DEG
Phase - 11	0	73.74	73.27	N/A	N/A	N/A	DEG
Phase - 12	0	-13.89	-13.80	N/A	N/A	N/A	DEG
Phase - 13	0	72.54	72.05	N/A	N/A	N/A	DEG

Array Induction Tool - B Wellsite Calibration - Electronics Calibration Check - Rel Gain Mag. & Phase
Master: Calibration out of date Apr 12 11:55 1996 Before: Aug 1 12:21 1996

ADC Rel Gain Magnitude - 0	25.00	25.06	25.05	N/A	N/A	N/A	
ADC Rel Gain Magnitude - 1	25.00	25.07	25.07	N/A	N/A	N/A	
ADC Rel Gain Magnitude - 2	25.00	25.09	25.08	N/A	N/A	N/A	
ADC Rel Gain Magnitude - 3	25.00	25.02	25.02	N/A	N/A	N/A	
ADC Rel Gain Magnitude - 4	25.00	25.03	25.02	N/A	N/A	N/A	
ADC Rel Gain Magnitude - 5	25.00	25.03	25.03	N/A	N/A	N/A	
ADC Rel Gain Magnitude - 6	25.00	25.03	25.03	N/A	N/A	N/A	
Phase - 0	0	0.4111	0.4033	N/A	N/A	N/A	DEG
Phase - 1	0	0.1896	0.1763	N/A	N/A	N/A	DEG
Phase - 2	0	0.4037	0.3898	N/A	N/A	N/A	DEG
Phase - 3	0	0.09240	0.08933	N/A	N/A	N/A	DEG
Phase - 4	0	0.2102	0.1955	N/A	N/A	N/A	DEG
Phase - 5	0	0.08055	0.07078	N/A	N/A	N/A	DEG
Phase - 6	0	0.1835	0.1819	N/A	N/A	N/A	DEG

Array Induction Tool - B Wellsite Calibration - Electronics Calibration Check - Auxilliary
Master: Calibration out of date Apr 12 11:55 1996 Before: Aug 1 12:21 1996

AIT SPA Plus	3950	3926	3925	N/A	N/A	N/A	MV
AIT SPA Zero	-50.00	-51.64	-53.75	N/A	N/A	N/A	MV
AIT Temperature Plus	4.500	4.490	4.486	N/A	N/A	N/A	V
AIT Temperature Zero	-0.05000	-0.05118	-0.05321	N/A	N/A	N/A	V

Array Induction Tool - B Wellsite Calibration - Test Loop Gain Correction
Master: Calibration out of date Apr 12 11:55 1996

Test Loop Gain Magnitude - 0	0	0.9973	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 1	0	1.002	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 2	0	1.002	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 3	0	1.003	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 4	0	1.009	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 5	0	1.014	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 6	0	0.9984	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 7	0	0.9996	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 8	0	1.026	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 9	0	1.029	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 10	0	1.021	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 11	0	1.025	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 12	0	1.026	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 13	0	1.029	N/A	N/A	N/A	N/A	
Phase - 0	0	-0.002090	N/A	N/A	N/A	N/A	DEG
Phase - 1	0	0.1160	N/A	N/A	N/A	N/A	DEG
Phase - 2	0	-0.08611	N/A	N/A	N/A	N/A	DEG
Phase - 3	0	-0.1917	N/A	N/A	N/A	N/A	DEG
Phase - 4	0	-0.09276	N/A	N/A	N/A	N/A	DEG
Phase - 5	0	-0.2248	N/A	N/A	N/A	N/A	DEG
Phase - 6	0	0.06152	N/A	N/A	N/A	N/A	DEG
Phase - 7	0	-0.009153	N/A	N/A	N/A	N/A	DEG
Phase - 8	0	0.04525	N/A	N/A	N/A	N/A	DEG
Phase - 9	0	0.2061	N/A	N/A	N/A	N/A	DEG
Phase - 10	0	0.1541	N/A	N/A	N/A	N/A	DEG
Phase - 11	0	0.3749	N/A	N/A	N/A	N/A	DEG
Phase - 12	0	-0.01014	N/A	N/A	N/A	N/A	DEG
Phase - 13	0	0.08968	N/A	N/A	N/A	N/A	DEG

Array Induction Tool - B Wellsite Calibration - Sonde Error Correction
Master: Calibration out of date Apr 12 11:55 1996

R Sonde Error Correction - 0	0	-0.9307	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 1	0	36.21	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 2	0	54.33	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 3	0	36.70	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 4	0	44.53	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 5	0	38.10	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 6	0	27.22	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 7	0	14.08	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 8	0	7.073	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 9	0	9.549	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 10	0	7.504	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 11	0	5.842	N/A	N/A	N/A	N/A	MM/M

R Sonde Error Correction - 12	0	-1.021	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 13	0	0.4008	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 0	0	-37.66	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 1	0	-48.41	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 2	0	7.276	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 3	0	-81.57	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 4	0	119.1	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 5	0	-89.20	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 6	0	12.26	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 7	0	-1.965	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 8	0	7.175	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 9	0	-18.62	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 10	0	5.245	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 11	0	-7.817	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 12	0	-9.656	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 13	0	-21.67	N/A	N/A	N/A	N/A	MM/M

Scintillation Gamma-Ray - L Wellsite Calibration - Detector Calibration
Before: Aug 1 03:04 1996

Gamma Ray Background	30.00	N/A	52.57	N/A	N/A	N/A	GAPI
Gamma Ray (Jig - Bkg)	158.9	N/A	158.9	N/A	N/A	14.44	GAPI
Gamma Ray (Calibrated)	165.0	N/A	165.0	N/A	N/A	15.00	GAPI

Array Induction Tool - B / Equipment Identification

Primary Equipment:	
Array Induction Sonde	AIS - BA
Adaptive Response Cartridge	AIC - BA
Auxiliary Equipment:	
Mass Isolated Housing	AIH - AA

Array Induction Tool - B Wellsite Calibration
Electronics Calibration Check - Thru Cal Mag. & Phase

Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Phase DEG	Nominal
0	Master	0.5902		0.5920	-83.09		-88.00
	Before	0.5909			-84.25		
1	Master	1.180		1.185	-84.25		-89.00
	Before	1.181			-85.44		
2	Master	1.444		1.399	73.15		72.00
	Before	1.437			72.63		
3	Master	0.3891		0.3960	-134.5		-138.0
	Before	0.3890			-135.7		
4	Master	2.114		2.057	72.84		71.00
	Before	2.104			72.31		
5	Master	0.5753		0.5820	-135.2		-139.0
	Before	0.5748			-136.4		
6	Master	1.471		1.423	2.575		-3.000
	Before	1.464			2.620		
7	Master	0.4459		0.4000	73.36		68.00
	Before	0.4433			72.89		
8	Master	2.209		2.111	2.375		-3.000
	Before	2.200			2.416		
9	Master	0.6473		0.5930	73.04		68.00
	Before	0.6437			72.56		
10	Master	2.189		2.111	-13.21		0
	Before	2.178			-13.11		

11	Master	0.6441	0.5930	73.74	75.00
	Before	0.6402		73.27	
12	Master	1.936	1.853	-13.89	-1.000
	Before	1.927		-13.30	
13	Master	0.5712	0.5200	72.54	74.00
	Before	0.5677		72.05	
		70.00 % (Minimum) (Nominal)	130.0 % (Maximum)	Nom -45.00 (Minimum) (Nominal)	Nom + 45.00 (Maximum)

Master: Calibration out of date Apr 12 11:55 1996 Before: Aug 1 12:21 1996

Array Induction Tool - B Wellsite Calibration

Electronics Calibration Check - Rel Gain Mag. & Phase

Idx	Phase	Value	ADC Rel Gain Magnitude	Value	Phase DEG
0	Master	25.06	0.4111		
	Before	25.05	0.4033		
1	Master	25.07	0.1896		
	Before	25.07	0.1763		
2	Master	25.09	0.4037		
	Before	25.08	0.3898		
3	Master	25.02	0.09240		
	Before	25.02	0.08933		
4	Master	25.03	0.2102		
	Before	25.02	0.1955		
5	Master	25.03	0.08055		
	Before	25.03	0.07078		
6	Master	25.03	0.1835		
	Before	25.03	0.1819		
		23.75 (Minimum) 25.00 (Nominal) 26.25 (Maximum)		-1.000 (Minimum) 0 (Nominal) 1.000 (Maximum)	

Master: Calibration out of date Apr 12 11:55 1996 Before: Aug 1 12:21 1996

Array Induction Tool - B Wellsite Calibration

Electronics Calibration Check - Auxilliary

Phase	AIT SPA Plus MV	Value	Phase	AIT SPA Zero MV	Value
Master		3926	Master		-51.64
Before		3925	Before		-53.75
	3750 (Minimum) 3950 (Nominal) 4150 (Maximum)			-100.0 (Minimum) -50.00 (Nominal) 0 (Maximum)	

Phase	AIT Temperature Plus V	Value	Phase	AIT Temperature Zero V	Value
Master		4.490	Master		-0.05118
Before		4.486	Before		-0.05321
	4.250 (Minimum) 4.500 (Nominal) 4.750 (Maximum)			-0.1000 (Minimum) -0.05000 (Nominal) 0 (Maximum)	

Master: Calibration out of date Apr 12 11:55 1996 Before: Aug 1 12:21 1996

Array Induction Tool - B Wellsite Calibration

Test Loop Gain Correction

Idx	Value	Test Loop Gain Magnitude	Value	Phase DEG
0	0.9973		-0.002090	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		-3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
1	1.002		0.1160	
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		-3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
2	1.002		-0.08611	

		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
3	1.003				-0.1917			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
4	1.009				-0.09276			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
5	1.014				-0.2248			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
6	0.9984				0.06152			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
7	0.9996				-0.009153			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
8	1.026				0.04525			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
9	1.029				0.2061			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
10	1.021				0.1541			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
11	1.025				0.3749			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
12	1.026				-0.01014			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
13	1.029				0.08968			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)

Master: Calibration out of date Apr 12 11:55 1996

Array Induction Tool - B Wellsite Calibration

Sonde Error Correction

Idx	Value	R Sonde Error Correction MM/M			Value	X Sonde Error Correction MM/M		
0	-0.9307				-37.66			
		-27.00 (Minimum)	0 (Nominal)	34.00 (Maximum)		-247.0 (Minimum)	0 (Nominal)	247.0 (Maximum)
1	36.21				-48.41			
		23.00 (Minimum)	37.00 (Nominal)	48.00 (Maximum)		-105.0 (Minimum)	0 (Nominal)	105.0 (Maximum)
2	54.33				7.276			
		43.00 (Minimum)	54.00 (Nominal)	64.00 (Maximum)		-167.0 (Minimum)	0 (Nominal)	167.0 (Maximum)
3	36.70				-81.57			
		25.00 (Minimum)	37.00 (Nominal)	46.00 (Maximum)		-101.0 (Minimum)	0 (Nominal)	101.0 (Maximum)
4	44.53				119.1			
		23.00 (Minimum)	53.00 (Nominal)	74.00 (Maximum)		-208.0 (Minimum)	0 (Nominal)	208.0 (Maximum)
5	38.10				-89.20			
		13.00 (Minimum)	47.00 (Nominal)	69.00 (Maximum)		-196.0 (Minimum)	0 (Nominal)	196.0 (Maximum)
6	27.22				12.26			
		16.00 (Minimum)	27.00 (Nominal)	37.00 (Maximum)		-31.00 (Minimum)	0 (Nominal)	31.00 (Maximum)
7	14.08				-1.965			
		4.000 (Minimum)	15.00 (Nominal)	25.00 (Maximum)		-25.00 (Minimum)	0 (Nominal)	25.00 (Maximum)
8	7.073				7.175			
		-2.000 (Minimum)	8.000 (Nominal)	18.00 (Maximum)		-43.00 (Minimum)	0 (Nominal)	43.00 (Maximum)

9	9.549	2.000 (Minimum)	11.00 (Nominal)	18.00 (Maximum)	-18.62	-32.00 (Minimum)	0 (Nominal)	32.00 (Maximum)
10	7.504	2.000 (Minimum)	8.000 (Nominal)	13.00 (Maximum)	5.245	-38.00 (Minimum)	0 (Nominal)	38.00 (Maximum)
11	5.842	1.000 (Minimum)	7.000 (Nominal)	12.00 (Maximum)	-7.817	-30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)
12	-1.021	-6.000 (Minimum)	-2.000 (Nominal)	4.000 (Maximum)	-9.656	-32.00 (Minimum)	0 (Nominal)	32.00 (Maximum)
13	0.4008	-5.000 (Minimum)	1.000 (Nominal)	6.000 (Maximum)	-21.67	-38.00 (Minimum)	0 (Nominal)	38.00 (Maximum)

Master: Calibration out of date Apr 12 11:55 1996

Array Induction Tool - B Master Calibration

Electronics Calibration Check - Thru Cal Mag. & Phase

Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Phase DEG	Nominal
0	Master	0.5902		0.5920	-83.09		-88.00
1	Master	1.190		1.195	91.25		-89.00
2	Master	1.444		1.399	73.15		72.00
3	Master	0.3891		0.3960	-134.5		-138.0
4	Master	2.114		2.057	72.84		71.00
5	Master	0.5753		0.5820	-135.2		-139.0
6	Master	1.471		1.423	2.575		-3.000
7	Master	0.4459		0.4000	73.36		68.00
8	Master	2.209		2.111	2.375		-3.000
9	Master	0.6473		0.5930	73.04		68.00
10	Master	2.189		2.111	-13.21		0
11	Master	0.6441		0.5930	73.74		75.00
12	Master	1.938		1.853	-13.89		-1.000
13	Master	0.5712		0.5200	72.54		74.00
		70.00 % (Minimum)	(Nominal) 130.0 % (Maximum)		Nom -45.00 (Minimum)	(Nominal)	Nom + 45.00 (Maximum)

Master: Calibration out of date Apr 12 11:55 1996

Array Induction Tool - B Master Calibration

Electronics Calibration Check - Rel Gain Mag. & Phase

Idx	Phase	Value	ADC Rel Gain Magnitude	Value	Phase DEG
0	Master	25.06		0.4111	
1	Master	25.07		0.1896	
2	Master	25.09		0.4037	
3	Master	25.02		0.09240	
4	Master	25.03		0.2102	
5	Master	25.03		0.08055	
6	Master	25.03		0.1835	
		23.75 (Minimum)	25.00 (Nominal) 26.25 (Maximum)	-1.000 (Minimum)	0 (Nominal) 1.000 (Maximum)

Master: Calibration out of date Apr 12 11:55 1996

Array Induction Tool - B Master Calibration

Electronics Calibration Check - Auxiliary

Phase	AIT SPA Plus MV	Value	Phase	AIT SPA Zero MV	Value
Master		3926	Master		-51.64

3750 (Minimum)	3950 (Nominal)	4150 (Maximum)	-100.0 (Minimum)	-50.00 (Nominal)	0 (Maximum)

Phase	AIT Temperature Plus V	Value	Phase	AIT Temperature Zero V	Value
Master		4.490	Master		-0.05118
4.250 (Minimum)	4.500 (Nominal)	4.750 (Maximum)	-0.1000 (Minimum)	-0.05000 (Nominal)	0 (Maximum)

Master: Calibration out of date Apr 12 11:55 1996

Array Induction Tool - B Master Calibration

Test Loop Gain Correction

Idx	Value	Test Loop Gain Magnitude			Value	Phase DEG		
0	0.9973				-0.002090			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
1	1.002				0.1160			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
2	1.002				-0.08611			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
3	1.003				-0.1917			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
4	1.009				-0.09276			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
5	1.014				-0.2248			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
6	0.9984				0.06152			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
7	0.9996				-0.009153			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
8	1.026				0.04525			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
9	1.029				0.2061			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
10	1.021				0.1541			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
11	1.025				0.3749			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
12	1.026				-0.01014			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
13	1.029				0.08968			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)		-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)

Master: Calibration out of date Apr 12 11:55 1996

Array Induction Tool - B Master Calibration

Sonde Error Correction

Idx	Value	R Sonde Error Correction MM/M			Value	X Sonde Error Correction MM/M		
0	-0.9307				-37.66			
		-27.00 (Minimum)	0 (Nominal)	34.00 (Maximum)		-247.0 (Minimum)	0 (Nominal)	247.0 (Maximum)
1	36.21				-48.41			
		23.00 (Minimum)	37.00 (Nominal)	48.00 (Maximum)		-105.0 (Minimum)	0 (Nominal)	105.0 (Maximum)
2	54.33				7.276			
		43.00	54.00	64.00		-167.0	0	167.0

	(Minimum)	(Nominal)	(Maximum)		(Minimum)	(Nominal)	(Maximum)		
3	36.70				-81.57				
	25.00 (Minimum)	37.00 (Nominal)	46.00 (Maximum)		-101.0 (Minimum)	0 (Nominal)	101.0 (Maximum)		
4	44.53				119.1				
	23.00 (Minimum)	53.00 (Nominal)	74.00 (Maximum)		-208.0 (Minimum)	0 (Nominal)	208.0 (Maximum)		
5	38.10				-89.20				
	13.00 (Minimum)	47.00 (Nominal)	69.00 (Maximum)		-196.0 (Minimum)	0 (Nominal)	196.0 (Maximum)		
6	27.22				12.26				
	16.00 (Minimum)	27.00 (Nominal)	37.00 (Maximum)		-31.00 (Minimum)	0 (Nominal)	31.00 (Maximum)		
7	14.08				-1.965				
	4.000 (Minimum)	15.00 (Nominal)	25.00 (Maximum)		-25.00 (Minimum)	0 (Nominal)	25.00 (Maximum)		
8	7.073				7.175				
	-2.000 (Minimum)	8.000 (Nominal)	18.00 (Maximum)		-43.00 (Minimum)	0 (Nominal)	43.00 (Maximum)		
9	9.549				-18.62				
	2.000 (Minimum)	11.00 (Nominal)	18.00 (Maximum)		-32.00 (Minimum)	0 (Nominal)	32.00 (Maximum)		
10	7.504				5.245				
	2.000 (Minimum)	8.000 (Nominal)	13.00 (Maximum)		-38.00 (Minimum)	0 (Nominal)	38.00 (Maximum)		
11	5.842				-7.817				
	1.000 (Minimum)	7.000 (Nominal)	12.00 (Maximum)		-30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)		
12	-1.021				-9.656				
	-6.000 (Minimum)	-2.000 (Nominal)	4.000 (Maximum)		-32.00 (Minimum)	0 (Nominal)	32.00 (Maximum)		
13	0.4008				-21.67				
	-5.000 (Minimum)	1.000 (Nominal)	6.000 (Maximum)		-38.00 (Minimum)	0 (Nominal)	38.00 (Maximum)		

Master: Calibration out of date Apr 12 11:55 1996

Scintillation Gamma-Ray - L / Equipment Identification

Primary Equipment:	
Scintillation Gamma Cartridge	SGC - SA
Scintillation Gamma Detector	SGD - TAA
Auxiliary Equipment:	
Scintillation Gamma Housing	SGH - K
Gamma Source Radioactive	GSR - U/Y

Scintillation Gamma-Ray - L Wellsite Calibration

Detector Calibration

Phase	Gamma Ray Background GAPI			Value	Phase	Gamma Ray (Jig - Bkg) GAPI			Value	Phase	Gamma Ray (Calibrated) GAPI			Value
Before				52.57	Before				158.9	Before				165.0
	0 (Minimum)	30.00 (Nominal)	120.0 (Maximum)			144.4 (Minimum)	158.9 (Nominal)	173.3 (Maximum)			150.0 (Minimum)	165.0 (Nominal)	180.0 (Maximum)	

Before: Aug 1 03:04 1996

COMPANY: PETROGLYPH OPERATING COMPANY	BOTTOM LOG INTERVAL	6070 F
	SCHLUMBERGER DEPTH	6106 F
	DEPTH DRILLER	6113 F

WELL: UTE TRIBAL 17-05

FIELD: ANTELOPE CREEK

COUNTY: DUCHESNE

STATE: UTAH

DEPTH DRILLER	6113 F
KELLY BUSHING	6011 F
DRILL FLOOR	6010 F
GROUND LEVEL	6001 F

Schlumberger

ARRAY INDUCTION
with Linear Correlation
GAMMA RAY

ATTACHMENT NO. 9

LIST OF OWNERS AND AFFIDAVIT NOTIFICATION

AFFIDAVIT OF MAILING

I, Kevin Dickey, Vice President, Operations, Petroglyph Energy, being first duly sworn, depose and state as follows: On July 24th, 2015, I caused to be mailed by certified mail, postage prepaid, return receipt requested, a copy of the Application to convert 1 well that appears on the attached sheet to water injection for enhanced recovery. It was sent to all parties who have an interest within ¼ mile radius from this well. The attached list contains the names of all parties who were notified.

Dated on this 24th day of July, 2015

Kevin Dickey

Vice President, Operations

Petroglyph Energy

The forgoing affidavit was subscribed and sworn to before me by Kevin Dickey.

This 24 day of July, 2015.

EDNA SYES NOTARY PUBLIC STATE OF IDAHO

Edna Syes

Notary Public

PETROGLYPH EXECUTIVE OFFICES

July 24th, 2015

Mineral, Surface, and Working Interest Owners

To Whom It May Concern,

On July 24th, 2015 Petroglyph Energy Inc. submitted to the Environmental Protection Agency an application requesting approval to convert 19 wells to water injection wells in an enhanced recovery program. The well(s) which were submitted are all located in Antelope Creek Field which is operated under a Cooperative Plan of Development between the Ute Tribe and Petroglyph Energy.

Owners at Well's Location	Owners within Well's ¼ mile radius
Mineral: Ute Tribe	No others
Operator: Petroglyph	No others
Surface: Ute Tribe	No others
Working Interest: Petroglyph 100%	

Anyone who would be directly and adversely affected by the authorization of the underground disposal into the Upper Green River formation may file a written request for a public hearing before the EPA. Logs and additional information on the subject wells are on file with the EPA, Groundwater Program, Mail Code 8P-W-UIC, 1595 Wynkoop St, Denver, Colorado 80202-1129.

Please contact Kevin Dickey at 208-685-7600 if you have any questions.

Sincerely,

Kevin Dickey

Vice President, Operations, Petroglyph Energy

Enclosure

PETROGLYPH OPERATING COMPANY, INC.

960 Broadway Avenue, Suite 500 ▪ P.O. Box 70019 ▪ Boise, Idaho 83707 ▪ (208) 685-7600 ▪ Fax: (208) 685-7605 ▪ www.petroglyphenergy.com

ANTELOPE CREEK FIELD

WELLS TO BE CONVERTED TO INJECTION

Well Name and Number	Footages	Section, Township, and Range
Ute Tribal 03-05	SHL: 2871' FNL & 752' FWL BHL: 2340' FNL & 684' FWL	3, T5S-R3W
Ute Tribal 03-12	2272' FSL & 575' FWL	3, T5S-R3W
Ute Tribal 08-11	2187' FSL 2011' FWL	8, T5S-R3W
Ute Tribal 08-12	2100' FSL & 515' FWL	8, T5S-R3W
Ute Tribal 09-01	770' FNL & 1059' FEL	9, T5S-R3W
Ute Tribal 09-04	585' FNL & 722' FWL	9, T5S-R3W
Ute Tribal 10-03	600' FNL & 1650' FWL	10, T5S-R3W
Ute Tribal 17-04	697' FNL & 636' FWL	17, T5S-R3W
Ute Tribal 17-05	1797' FNL & 620' FWL	17, T5S-R3W
Ute Tribal 17-12	2527' FSL & 612' FWL	17, T5S-R3W
Ute Tribal 20-06	2050' FNL & 1950' FWL	20, T5S-R3W
Ute Tribal 20-07	1980' FNL & 1980' FEL	20, T5S-R3W
Ute Tribal 20-11	1959' FSL & 2033' FWL	20, T5S-R3W
Ute Tribal 20-15	574' FSL & 1806' FEL	20, T5S-R3W
Ute Tribal 31-03	422' FNL & 2338' FWL	31, T5S-R3W
Ute Tribal 31-05	1980' FNL & 660' FWL	31, T5S-R3W
Ute Tribal 31-07	1976' FNL & 2168' FEL	31, T5S-R3W
Ute Tribal 31-12	1999' FSL & 748' FWL	31, T5S-R3W
Ute Tribal 36-08-E4	1796' FNL & 713' FEL	36, T5S-R4W

OMB No. 2040-0042 Approval Expires 11/30/2014

United States Environmental Protection Agency

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

		T/A	C
U			

Read Attached Instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started mo day year:
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 03-05

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						3	5S	3W	NW				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes i, ii, iii, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

XIV. Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

A. Name and Title *(Type or Print)*	B. Phone No. *(Area Code and No.)*
Kevin Dickey Vice President, Operations	(208) 685-7600
C. Signature	D. Date Signed
	07/27/2015

OMB No. 2040-0042 Approval Expires 11/30/2014

United States Environmental Protection Agency

EPA

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

	T/A	C
U		

Read Attached instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019

Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019

Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started mo day year:
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 03-12

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						3	5S	3W	SW				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes i, ii, iii, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

XIV. Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

A. Name and Title *(Type or Print)*: Kevin Dickey, Vice President, Operations

B. Phone No. *(Area Code and No.)*: (208) 685-7600

C. Signature: Kevin Dickey

D. Date Signed: 07/27/2015

OMB No. 2040-0042 Approval Expires 11/30/2014

United States Environmental Protection Agency

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

		T/A	C
U			

Read Attached Instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started mo day year:
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 08-11

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						8	5S	3W	SW				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes i, ii, iii, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

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Kevin Dickey, Vice President, Operations	(208) 685-7600
C. Signature	D. Date Signed
	07/27/2015

OMB No. 2040-0042 Approval Expires 11/30/2014

EPA

United States Environmental Protection Agency

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

		T/A	C
U			

Read Attached Instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019

Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019

Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started mo day year:
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 08-12

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						8	5S	3W	SW				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes i, ii, iii, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

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C. Signature: Kevin Dickey

D. Date Signed: 07/27/2015

OMB No. 2040-0042 Approval Expires 11/30/2014

United States Environmental Protection Agency

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

		T/A	C
U			

Read Attached instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started mo day year:
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 09-01

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						9	5S	3W	NE				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes I, II, III, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

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C. Signature: Kevin Dickey

D. Date Signed: 07/27/2015

OMB No. 2040-0042 Approval Expires 11/30/2014

United States Environmental Protection Agency

EPA

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

		T/A	C
U			

Read Attached instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started mo day year:
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 09-04

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						9	5S	3W	NW				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes I, II, III, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

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C. Signature: Kevin Dickey

D. Date Signed: 07/27/2015

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United States Environmental Protection Agency

EPA

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

	T/A	C
U		

Read Attached instructions Before Starting

For Official Use Only

Application approved (mo day year)	Date received (mo day year)	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019

Phone Number: (208) 685-7600

City: Boise State: ID ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019

Phone Number: (208) 685-7600

City: Boise State: ID ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started (mo day year):
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 10-03

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Latitude Min	Latitude Sec	Longitude Deg	Longitude Min	Longitude Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						10	5S	3W	NW				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes I, II, III, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

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C. Signature:

D. Date Signed: 07/27/2015

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United States Environmental Protection Agency

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

	T/A	C
U		

Read Attached Instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started mo day year:
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 17-04

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Latitude Min	Latitude Sec	Longitude Deg	Longitude Min	Longitude Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						17	5S	3W	NW				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes I, II, III, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

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Kevin Dickey, Vice President, Operations	(208) 685-7600
C. Signature	D. Date Signed
	07/27/2015

OMB No. 2040-0042 Approval Expires 11/30/2014

United States Environmental Protection Agency

EPA

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

		T/A	C
U			

Read Attached Instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019

Phone Number: (208) 685-7600

City: Boise State: ID ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019

Phone Number: (208) 685-7600

City: Boise State: ID ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started mo day year:
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 17-05

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						17	5S	3W	NW				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes I, II, III, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

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B. Phone No. *(Area Code and No.)*: (208) 685-7600

C. Signature:

D. Date Signed: 07/27/2015

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EPA

United States Environmental Protection Agency

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

		T/A	C
U			

Read Attached Instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started mo day year:
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 17-12

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						17	5S	3W	SW				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes I, II, III, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

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A. Name and Title *(Type or Print)*	B. Phone No. *(Area Code and No.)*
Kevin Dickey, Vice President, Operations	(208) 685-7600
C. Signature	D. Date Signed
	07/27/2015

OMB No. 2040-0042 Approval Expires 11/30/2014

EPA

United States Environmental Protection Agency

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

		T/A	C
U			

Read Attached Instructions Before Starting

For Official Use Only

Application approved (mo day year)	Date received (mo day year)	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019

Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019

Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started (mo day year):
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 20-06

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Latitude Min	Latitude Sec	Longitude Deg	Longitude Min	Longitude Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						20	5S	3W	NW				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes I, II, III, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

XIV. Certification

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A. Name and Title *(Type or Print)*: Kevin Dickey, Vice President, Operations

B. Phone No. *(Area Code and No.)*: (208) 685-7600

C. Signature: Kevin Dickey

D. Date Signed: 07/27/2015

OMB No. 2040-0042 Approval Expires 11/30/2014

United States Environmental Protection Agency

EPA

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

		T/A	C
U			

Read Attached Instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started mo day year:
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 20-07

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						20	5S	3W	NE				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

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Kevin Dickey, Vice President, Operations	(208) 685-7600
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	07/27/2015

OMB No. 2040-0042 Approval Expires 11/30/2014

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Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

		T/A	C
U			

Read Attached Instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started mo day year:
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 20-11

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						20	5S	3W	SW				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes i, ii, iii, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

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United States Environmental Protection Agency

EPA

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

	T/A	C
U		

Read Attached Instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019

Phone Number: (208) 685-7600

City: Boise State: ID ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019

Phone Number: (208) 685-7600

City: Boise State: ID ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started mo day year:
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 20-15

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						20	5S	3W	SE				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes I, II, III, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

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C. Signature: Kevin Dickey

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OMB No. 2040-0042 Approval Expires 11/30/2014

United States Environmental Protection Agency

EPA

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

	T/A	C
U		

Read Attached Instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

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Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started mo day year:
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 31-03

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						31	5S	3W	NW				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes I, II, III, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

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Kevin Dickey, Vice President, Operations	(208) 685-7600
C. Signature	D. Date Signed
	07/27/2015

OMB No. 2040-0042 Approval Expires 11/30/2014

United States Environmental Protection Agency

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

		T/A	C
U			

Read Attached Instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started mo day year:
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 31-05

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Latitude Min	Latitude Sec	Longitude Deg	Longitude Min	Longitude Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						31	5S	3W	NW				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

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Kevin Dickey, Vice President, Operations	(208) 685-7600
C. Signature	D. Date Signed
	07/27/2015

OMB No. 2040-0042 Approval Expires 11/30/2014

United States Environmental Protection Agency

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

		T/A	C
U			

Read Attached Instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started mo day year:
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 31-07

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						31	5S	3W	NE				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

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C. Signature	D. Date Signed: 07/27/2015

OMB No. 2040-0042 Approval Expires 11/30/2014

EPA

United States Environmental Protection Agency

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

		T/A	C
U			

Read Attached Instructions Before Starting

For Official Use Only

Application approved (mo day year)	Date received (mo day year)	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019 | Phone Number: (208) 685-7600

City: Boise | State: ID | ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started (mo day year):
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 31-12

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Latitude Min	Latitude Sec	Longitude Deg	Longitude Min	Longitude Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						31	5S	3W	SW				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

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EPA

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number

		T/A	C
U			

Read Attached Instructions Before Starting

For Official Use Only

Application approved (mo day year)	Date received (mo day year)	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019

Phone Number: (208) 685-7600

City: Boise State: ID ZIP CODE: 83707

III. Operator Name and Address

Owner Name: Petroglyph Energy, Inc.

Street Address: 960 Broadway Ave. Suite 500 PO Box 70019

Phone Number: (208) 685-7600

City: Boise State: ID ZIP CODE: 83707

IV. Commercial Facility

- [ ] Yes
- [x] No

V. Ownership

- [x] Private
- [ ] Federal
- [ ] Other

VI. Legal Contact

- [ ] Owner
- [x] Operator

VII. SIC Codes

VIII. Well Status *(Mark "x")*

- [x] A. Operating — Date Started (mo day year):
- [x] B. Modification/Conversion
- [ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

- [ ] A. Individual
- [x] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
111	1	Antelope Creek Ute Tribal 36-08-E4

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R		1 well, type R

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Latitude Min	Latitude Sec	Longitude Deg	Longitude Min	Longitude Sec	Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						36	5S	4W	NE				

XII. Indian Lands (Mark 'x')

- [x] Yes
- [ ] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

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B. Phone No. *(Area Code and No.)*: (208) 685-7600

C. Signature: Kevin Dickey

D. Date Signed: 07/27/2015

ATTACHMENT NO. 10

WELL BORE DIAGRAMS FOR THE UIC WELL

Ute Tribal 17-05 Well History

Well History:

Spud Well: 7/25/1996

Completed: 9/3/1996

First Production: 9/11/1996

Tops (KB):

BMSW* Found at 1011'

Green River 1217'

A Marker 3792'

X Marker 4288'

Douglas Creek 4428'

B Limestone 4822'

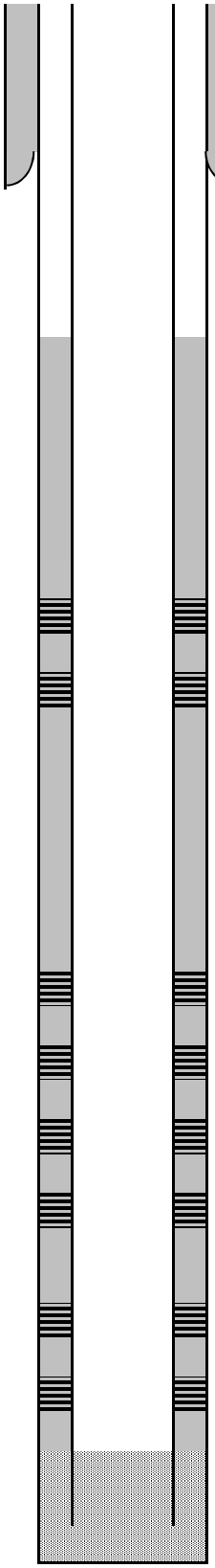
Castle Peak 5355'

Basal Carbonate 5784'

Perf History

8/29/1996

B10	4194' to 4198'
B10	4207' to 4216'
B11.1	4242' to 4247'
C05	4477' to 4479'
C06	4627' to 4636'
C08.2	4718' to 4725'
D3	4908' to 4912'
E01.2	5436' to 5440'
E01.2	5454' to 5458'
E04.2	5579' to 5582'



GL: 6001'

KB: 6011'

8 5/8" 24# Surface CSG @ 402' KB

cmt'd w/250 sx

Surface Hole size 12 1/4"

Cement top @ 3030'

5 1/2" 15.5# J-55 CSG @ 6106'

cmt'd w/355sx

Hole Size 7 7/8" bit

Perf's:

B10 4194' to 4198'

B10 4207' to 4216'

B11.1 4242' to 4247'

C05 4477' to 4479'

C06 4627' to 4636'

C08.2 4718' to 4725'

D3 4908' to 4912'

E01.2 5436' to 5440'

E01.2 5454' to 5458'

E04.2 5579' to 5582'

PBTD @ 6063' KB

TD @ 6113' KB

(Not to Scale)

Petroglyph Operating Co., Inc.

Ute Tribal #17-05

(1797' FNL & 620' FWL)

SW NW Section 17, 5S- 3W

Antelope Creek Field

Duchesne Co. Utah

API#: 43013316740000

*Plate 1 Utah Geological Survey Special Study 144. (2012). *BMSW Elevation Contour Map, Uinta Basin, Utah.* [map]. (CA 1:200,000)

Ute Tribal 17-05 Injection

Well History:

Spud Well: 7/25/1996

Completed: 9/3/1996

First Production: 9/11/1996

Tops (KB):

BMSW* Found at 1011'

Green River 1217'

A Marker 3792'

X Marker 4288'

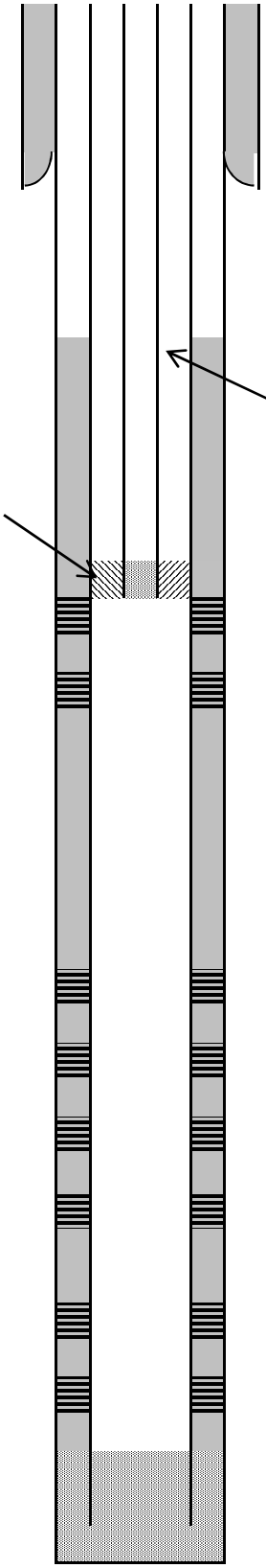
Douglas Creek 4428'

B Limestone 4822'

Castle Peak 5355'

Basal Carbonate 5784'

Injection packer @ 3820'



(Not to Scale)

GL: 6001'

KB: 6011'

8 5/8" 24# Surface CSG @ 402' KB

cmt'd w/250 sx

Surface Hole size 12 1/4"

Cement top @ 3030'

5 1/2" 15.5# J-55 CSG @ 6106'

cmt'd w/355sx

Tubing 2 7/8" 6.5# J55

Hole Size 7 7/8" bit

Perf's:

Add B04 3910' to 3920'

Add B05 3942' to 3947'

Add B06 3985' to 3990'

Add B06 4004' to 4014'

Add B10 4189' to 4191'

B10 4194' to 4198'

B10 4207' to 4216'

Add B11 4219' to 4222'

B11.1 4242' to 4247'

C05 4477' to 4479'

C06 4627' to 4636'

Add C08.1 4688' to 4691'

C08.2 4718' to 4725'

D3 4908' to 4912'

Add D3 4912' to 4915'

E01.2 5436' to 5440'

E01.2 5454' to 5458'

E04.2 5579' to 5582'

PBTD @ 6063' KB

TD @ 6113' KB

Petroglyph Operating Co., Inc.

Ute Tribal #17-05

(1797' FNL & 620' FWL)

SW NW Section 17, 5S- 3W

Antelope Creek Field

Duchesne Co. Utah

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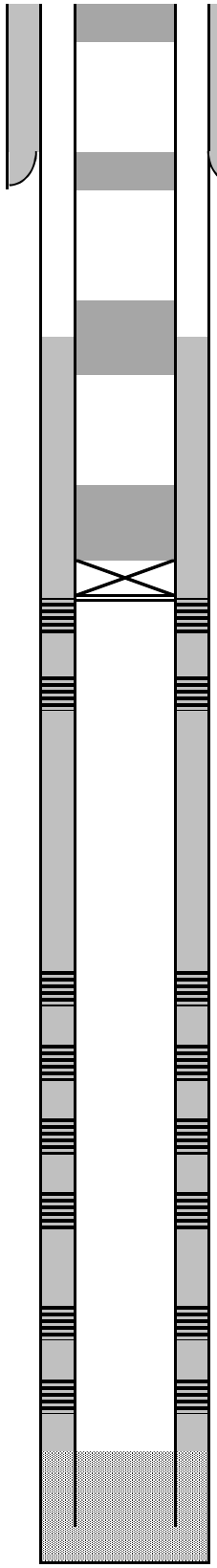
*Plate 1 Utah Geological Survey Special Study 144. (2012). *BMSW Elevation Contour Map, Uinta Basin, Utah.* [map]. (CA 1:200,000)

Ute Tribal 17-05 Plug and Abandonment



GL: 6001'
KB: 6011'

8sx Class G Cement-50' plug

8 5/8" 24# Surface CSG @ 402' KB
cmt'd w/250 sx

15sx Class G Cement-100' plug

Surface Hole size 12 1/4"

Cement top @ 3030'
5 1/2" 15.5# J-55 CSG @ 6106'
cmt'd w/355sx

30sx Class G Cement-200' plug

Hole Size 7 7/8" bit

30sx Class G Cement-200' plug
CIBP @ 4104'

Perf's:
B10 4194' to 4198'
B10 4207' to 4216'
B11.1 4242' to 4247'
C05 4477' to 4479'
C06 4627' to 4636'
C08.2 4718' to 4725'
D3 4908' to 4912'
E01.2 5436' to 5440'
E01.2 5454' to 5458'
E04.2 5579' to 5582'

PBTD @ 6063' KB
TD @ 6113' KB

Petroglyph Operating Co., Inc.
Ute Tribal #17-05
(1797' FNL & 620' FWL)
SW NW Section 17, 5S- 3W
Antelope Creek Field
Duchesne Co. Utah
API#: 43013316740000

*Plate 1 Utah Geological Survey Special Study 144. (2012). *BMSW Elevation Contour Map, Uinta Basin, Utah.* [map]. (CA 1:200,000)

(Not to Scale)

ATTACHMENT NO. 11

P&A PROCEDURE

Plug and Abandonment Procedure

Ute Tribal 17-05

43-013-31674

1. Obtain authorization from regulatory agencies for P&A procedures.

2. Set deadman. Rig up pulling unit. Rig down wellhead. Install BOP. Release packer. Trip out of hole with tubing and packer.

3. RIH Set CIBP @ 4104‘.

4. Trip in hole with tubing. Establish pump rate, spot 30sxs Class G cement on top of CIBP. This will be a 200’ plug.

5. Raise the tubing to 3030’ and set balanced 200’ cement plug using 30sxs of Class G cement.

6. Raise the tubing to 402’ and set balanced 100’ cement plug using 15sxs of Class G cement.

7. Set balanced 50’ cement plug (8 sxs of Class G cement) from 50’ to surface.

8. Cut off wellhead. Install plate and identification P&A post marker. Weld to casing.

9. File reports with the agencies and reclaim surface locations.

ATTACHMENT NO. 12

MIT PROCEDURE

Mechanical Integrity Test Procedure

Ute Tribal 17-05

43-013-31674

Integrity testing can be accomplished by pressuring up the annulus between the casing and the tubing. The pressure and duration of the test will be as required by the EPA.

Test Procedure Details:

1. Two weeks prior, notify EPA of pending work. Shut well in.
2. Record fluid level with echometer.
3. MIRU Service Unit.
4. POOH laying down rods and pump.
5. ND Wellhead. NU BOPs. POOH laying down 2 7/8" tubing.
6. RU Wireline. Add new perfs: B04 3910' to 3920', B05 3942' to 3947', B06 3985' to 3990', 4004' to 4014', B10 4189' to 4191', B11 4219' to 4222', C08.1 4688' to 4691', and D3 4912' to 4915' .
7. RD Wireline.
8. PU plug and packer and new tubing. RIH and breakdown perfs.
9. POOH. RIH with injection packer to 3820'.
10. Reverse circulate in packer fluid.
11. Set packer and ND BOPs and NU wellhead.
12. Pressure test casing-tubing annulus to 1500psi for 15 minutes.
13. RDMO.
14. Notify EPA of test, wait for approval.
15. Return to injection.

ATTACHMENT NO. 13

SURETY BOND LETTER

SURETY BOND STATEMENT

July 27, 2015

Petroglyph currently operates 111 injection wells in Antelope Creek Field under EPA UIC Area Permit UT2736-00000. The existing wells are covered by UIC Bond No. LPM 4138351.

Prior to final permit approval, Petroglyph will add a rider to the existing bond to include this well along with the other wells being submitted to EPA at this time.

Kevin Dickey

V.P., Operations

Petroglyph Energy, Inc.