DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

DRILLING LOGS AND WIRELINE GEOPHYSICAL LOGS OF THE CAJON PASS WELL, SAN BERNARDINO COUNTY, CALIFORNIA

by

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Open-File Report 86-349

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1986

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

DRILLING LOGS AND WIRELINE GEOPHYSICAL LOGS OF THE CAJON PASS WELL, SAN BERNARDINO COUNTY, CALIFORNIA

D. J. STIERMAN

INTRODUCTION

This report contains data from the Cajon Pass well, the hole which is intented to be deepened to 5 km so that extensive downhole measurements and core analyses can be made on rocks adjacent to the San Andreas fault.

FEDERAL #1-26 was drilled by Arkoma Production Company of California as a natural gas wildcat. The hole is located in Cajon Pass, 33 km northwest of San Bernardino, California, approximately 4 km northeast of the San Andreas fault (fig. 1). When it became apparent that drillers had penetrated crystalline basement, the owners turned the hole over to the university and government scientists. Now referred to as the Cajon Pass well, this hole will be deepened for the purpose of investigating the structures and physical properties of rocks at seismogenic depths near the San Andreas fault.

The Cajon Pass well penetrates about 2160 ft. (660 m) of arkosic sandstone and conglomerate of the Punchbowl Formation (Woodburne and Golz, 1972) of Miocene age and extends into crystalline basement to a total depth of 5,890 feet (1,795 m). This hole is near the southern end of the rupture of the 1857 ft. Tejon earthquake, a fault segment where large earthquakes (m = 8) seem to occur at approximately 140-year intervals (Sieh, 1978, 1984). Plans to deepen this hole have generated considerable interest, particularly among scientists investigating the San Andreas fault, the tectonics of the Transverse Ranges or the chemistry of deep crustal rocks. The purpose of this report is to organize and make available to these interested parties a complete set of the available logs and other documentation of the early history of this well.

TABLE 1

SUMMARY OF DRILLING DATA FOR THE CAJON PASS WELL

Date of drilling completion: March 9, 1984

Total depth: 5,890 ft. (1795 m)

Location: 34^{o} 19' N, 117^{o} 29' W
(1313 ft. S and 1745 ft. W from NW Corner of Section 26, T3N-R6W)

Bit size: 17-1/2 in. to 507 ft.
12-1/4 in. to 1314 ft.
8-3/4 in. to 5874 ft.
8-1/2 in. to T.D.

Drilling rate (in crystalline basement) average 11-12 ft/hr.

Casing: 13-3/8 in. to 507 ft.
9-5/8 in. to 1313 ft.

Logs run: Dip log, Dual induction guard log, Compensated Density Log, 5" Sonic Log, Radioactivity Log, Caliper, Spontaneous Potential

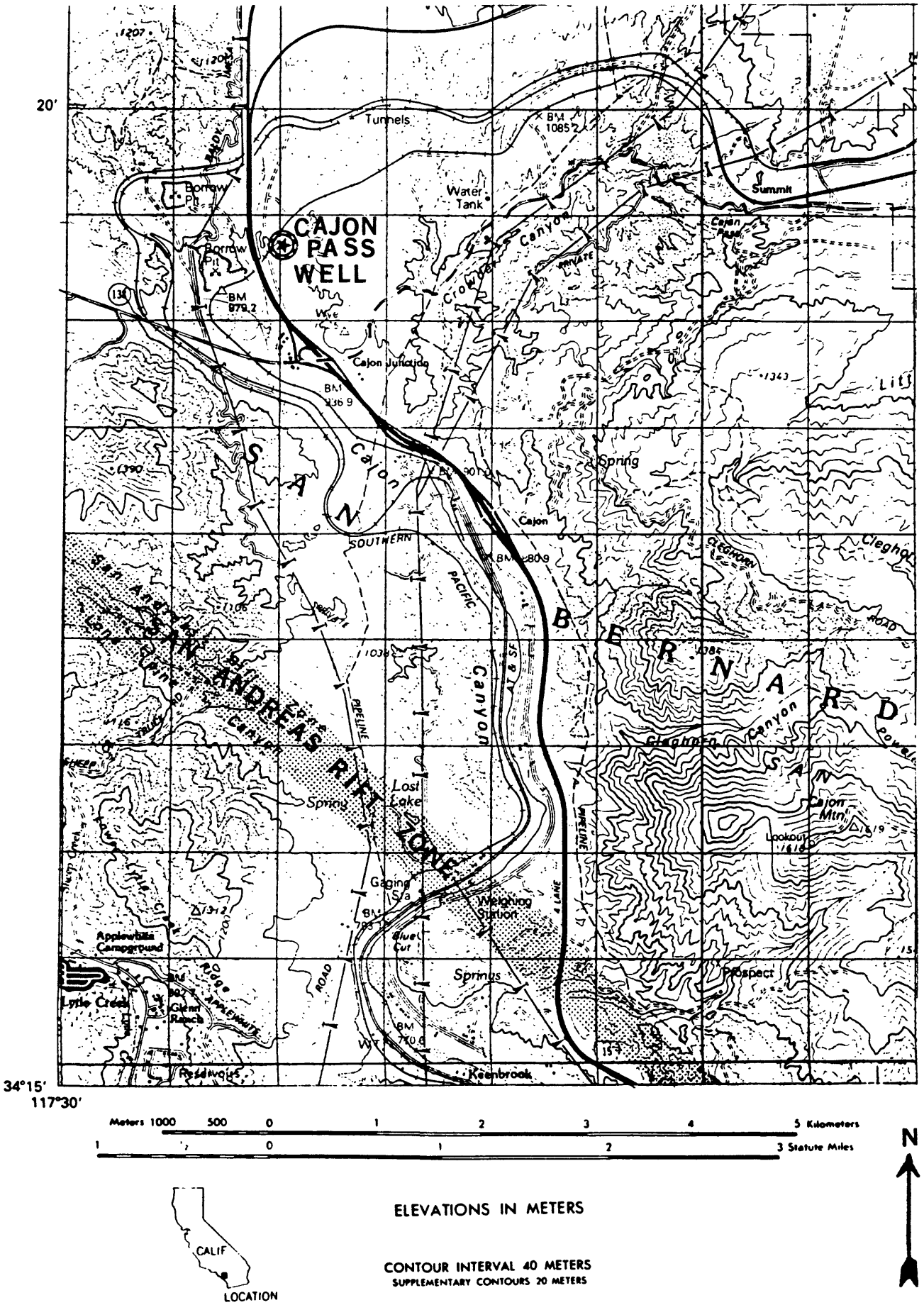


Figure 1: Location map of the Cajon Pass site.

DISCUSSION

The precise location of the basement unconformity is not obvious from examination of these logs. The Mud Log (pp. B-1 to B-15) documents a general decrease in drilling rate and increase in feldspar and quartz (at the expense of clay minerals) between 1800 feet and 2400 feet below the surface, but the drop in drilling rate is gradual and the cuttings are no doubt contaminated by erosion of the sedimentary rocks. Sonic log transit times of 53 microseconds/foot (P-wave velocity = 5.8 km/s) at 3070 ft. (936 m) (p. G-5) below the surface indicate sound crystalline rock. Above 2160 ft. (658 km), seismic velocities of 4.1 km/s or less (p. G-4) are consistent with values expected for sedimentary rocks. Between 658 and 762 m, P-wave velocity averages about 5.1 km/s; this interval may represent the weathered zone that formed when the granitic rocks were exposed. Between 762 m and 936 m, P-wave velocities between 5.1 km/s and 5.5 km/s suggest crystalline rock that is modestly fractured and weathered. Fracture zones at 756 m and 927 m separate rocks of distinct characteristics; these fractures may represent faults.

The dip log (Appendix D) shows variations in the orientation of the tool (and, hence, the hole) as a function of depth. These variations are summarized in Figure 2. Near the top of the logged interval (1500 ft. below the surface), the hole is nearly vertical. After drifting to the west between 1500 ft. and 2100 ft., the hole swings gently east-south-east to 2700 ft. At this point, dip of the hole begins to increase without changing azimuth until dip reaches 9^{o}, azimuth = 115^{o}, at 3200 ft. Between 3200 ft. and 4000 ft., dip increases as the hole's azimuth swings clockwise until maximum dip is reached at 4000 ft. From 4000 ft. to last reading at 5800 ft., dips remain between 11^{o} and 13^{o} as the dip azimuth rotates gradually clockwise.

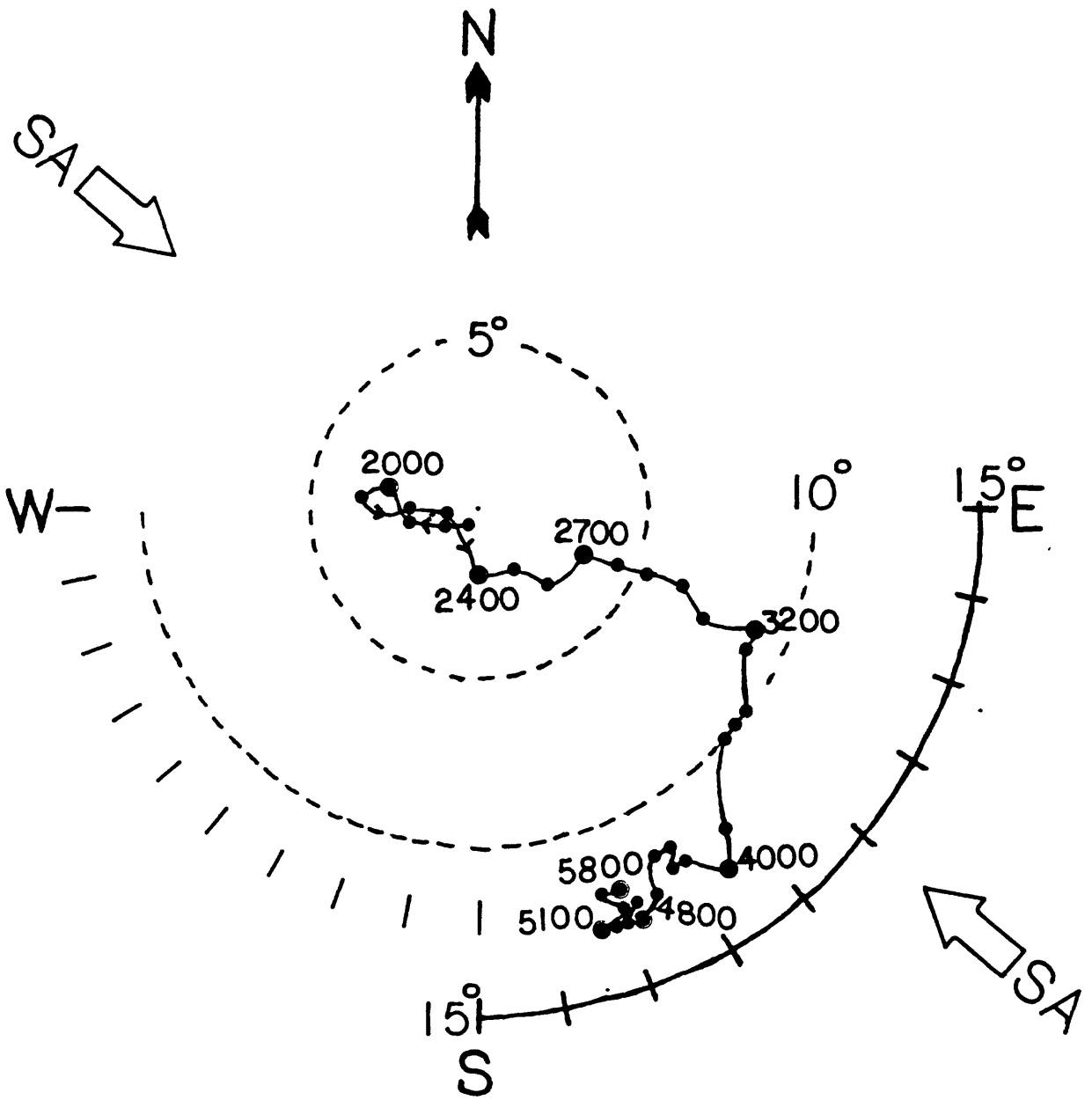


Figure 2: Dip and dip azimuth of the Cajon Pass well as a function of depth. Arrows marked "SA" show approximate strike of the San Andreas fault. Numbers indicate depth in feet for dip and plunge azimuth of inscribed dots.

ACKNOWLEDGEMENTS

Mark Zoback, Tom Moses, Don Mandel and Fred Berry supplied copies of these logs. I thank Buttes Gas and Oil and Donald J. Mandel of Arkoma Production for permission to Open-file all logs and data on Arkoma FEDERAL #1-26.

REFERENCES

Sieh, Kerry, 1978, Prehistoric Large Earthquakes Produced by Slip on the San Andreas Fault at Pallet Creek, California; J. Geophys. Res., v. 83, 3907-3939.

Sieh, Kerry, 1984, Lateral Offsets and Revised Dates of Large Prehistoric Earthquakes at Pallett Creek, southern California, J. Geophys. Res., v. 89, 7641-7670.

Woodburne, M.O. and D.J. Golz, 1972, Stratigraphy of the Punchbowl Formation Cajon Valley, southern California; Univ. California Pubs. Geol. Sciences, v. 92, 57 pp.

APPENDIX A

ARKOMA PRODUCTION COMPANY OF CALIFORNIA

FEDERAL 1-26

Sec. 26-3N-6W
Est. T.D. 7500' San Bernardino County, CA

2/11/84 Day 1 Preparing to run casing @ 507'. MIRU Hexadyne Rig #3. Spud 17 1/2" hole at 11:00 AM 2/10/84. Drill to 507'. Cut 507' in 17 1/2 hrs. Circulating and conditioning hole for casing at report time.
Mud Wt. 9 Vis. 43 Wtr. Loss 11

2/12/84 Day 2 RIH to drill out cement @ 507'. Condition hole for casing. Ran 13 jts, 507' on hook, 54.5#, J-55, ST&C Casing. Cemented regular guide shoe at 507' and insert differential baffle at 466' w/302 cu.ft. Class 'G' w/4% gel and 2% CaCl, followed by 137 cu.ft. Class 'G' w/2% CaCl. 1 top and 1 bottom rubber plug bump @ 12:53 PM w/700 psi. Approx. 75' returns on cement. Float held ok. WOC 3 hrs. Land casing and weld on 12" x 3000 psi casing head. Test weld to 2000 psi. Install 12" Class III BOPE stack and test to 1200 psi, OK. Made up bottom hole assembly and running in hole at report time.

2/13/84 Day 3 Drilling @ 854'. Wait on DOG and Federal Representative. Check pipe rams and hydril. All manifold valves individually top and bottom kelly cock and check valves at 2000 psi, OK by DOG and Federal Representative. Drill out cement and shoe at 6:00 PM. Drill 12 1/4" hole from 617' to 854'. Cut 237' in 6 1/2 hrs. Drilling ahead at report t
Mud Wt. 68 Vis. 40 Wtr. Loss 12.5

2/14/84 Day 4 Logging @ 1314'. Drill to 1,074'. Made 220' in 8 1/2 hr. Trip for Bit #3. Drill to 1314', wipe hole and condition mud for logs. Rig up Schlumberger and ran DIL/SFL/Sonic GammaRay combination log. Running Dipmeter at report time.
Mud Wt. 71 Vis. 35 Wtr. Loss 13.5

2/15/84 Day 5 WOC @ 1314'. Ran Schlumberger Dipmeter. Circulated and conditioned mud for casing. Ran 35 joints, 1318', 9 5/8", 36#, ST&C casing. Cemented regular guide shoe at 1314' and differential insert baffle at 1282' w/310 cu. ft. Class 'G' cement with 4% gel and 2% $CaCl_2$. Followed by 220 cu. ft. Class 'G' cement w/2% $CaCl_2$. Bumped plugs w/1000 psi. Cement in place at 6:20 PM. No cement returns to surface. Waited on cement. Cemented annulus thru 100' of 1" pipe w/39 cu.ft. Class 'G' cement. CIP @ 10:05 PM. Landed casing. Install 10" x 5000# RSRRA BOPE stack. WOC at report time.
Mud Wt. 70 Vis. 33 Wtr. Loss 14

ARKOMA PROD. CO. OF CALIF.

FEDERAL 1-26
San Bernardino County, CA
PAGE TWO

2/16/84 Day 6 Waiting on parts to repair rig @ 1415'. Install BOPE stack. Test same to 2450 psi. Lay down 8" drill collars and monel. Pick up 6" drill collars and monel. Tag cement at 1252'. Test BOPE and manifold valves individually for 5 minutes each at 2500 psi. Test both kelly cocks at 2500 psi. OK'd by DOG. Drill out cement and shoe. Drill hole to 1415'. Made 101' in 2 hours. POOH and pick up 5 stabilizers and lead collar. Ran to shoe and shut down waiting on parts to repair rig.
Mud Wt. 66 Vis. 38 Wtr. Loss 14

2/17/84 Day 7 Repairing rig @ 1,415'. Shut down waiting for parts and repairs.

2/18/84 Day 8 Repairing Rig @ 1314'. Shut down to repair the rig.

2/19/84 Day 9 POOH, Change Bit and BHA @ 1853'. Repaired rig until 4:00 PM. Reamed to 1415'. Survey at 1415'. Drill to 1853'. Cut 436' in 10 hrs. Surveys at 1688' and 1841'. POOH at report time to change bit and BHA.
Mud Wt. 9.4 Vis. 38 Wtr. Loss 13.4

2/20/84 Day 10 Drlg. @ 2375'. TFB #5. Drill to 2375'. Cut 522' in 20 hrs. Surveys at 1985', 2142', and 2297'. Drilling ahead at report time.
Mud Wt. 9.2 Vis. 38 Wtr. Loss 7.3

2/21/84 Day 11 Tripping @ 2521'. Drill from 2375' to 2422'. Made 47' in 2 1/2 hrs. Tripped for Bit #6. Drill to 2460'. Made 38' in 4 hours. Trip for Bit #7. Drill to 2521'. Made 61' in 6 hours. Tripping out of hole to check bit and change stabilizer at report time.
Mud Wt. 9.3 Vis. 36 Wtr. Loss 7.1

2/22/84 Day 12 Drilling @ 2787'. Drill to 2787'. Made 266' in 23 hrs. Drilling ahead at report time.
Mud Wt. 9.1 Vis. 36 Wtr. Loss 7.3

2/23/84 Day 13 Survey @ 3033'. Drill to 3033'. Made 246' in 22 hrs. Survey @ report time.
Mud Wt. 9.1 Vis. 34 Wtr. Loss 8.1

2/24/84	Day 14	Drilling @ 3133'. Trip for Bit #8. Ream hole from 2845' to 3033'. Drill to 3041'. Made 8' in 1 hr. Reamer washed. POOH and change bottom hole assembly. Drill to 3133'. Made 92' in 8 hrs. Drilling ahead at report time. Mud Wt. 9.1 Vis. 34 Wtr. Loss 8.1
2/25/84	Day 15	Drlg. @ 3450'. Drill to 3450'. Made 317' in 22 hrs. Surveys at 3338' and 3370'. Drilling at report time. Mud Wt. 9.3 Vis. 35 Wtr. Loss 8.5
2/26/84	Day 16	Changing Bit and Reamer @ 3607'. POOH looking for wash-out. Laid down 2 jts. HWP and check bit and pick up 8 3/4" reamer above bit. Drill to 3607'. Made 157' in 14 hrs. Survey at 3527'. POOH and change bit and dress reamer at report time. Mud Wt. 9.3 Vis. 37 Wtr. Loss 8.8
2/27/84	Day 17	Drlg. @ 3858'. RIH and ream from 3491' to 3607'. Drill to 3858'. Surveys at 3684' and 3841'. Drilling ahead at report time. Mud Wt. 9.2 Vis. 37 Wtr. Loss 9
2/28/84	Day 18	Drlg. @ 4128'. Made 270' in 22 1/2 hrs. Drilling at report time. Mud Wt. 9.2 Vis. 38 Wtr. Loss 9.8
2/29/84	Day 19	Tripping for Bit @ 4407'. Drill to 4407'. Made 279' in 21 3/4 hrs. TFB at report time. Mud Wt. 9.3 Vis. 38 Wtr. Loss 10.0
3/1/84	Day 20	Drilling @ 4592'. Completed trip for bit. Reamed from 4350' to 4407'. Drilled to 4592'. Made 185' in 15 1/2 hrs. Mud Wt. 9.2 Vis 37 Wtr. Loss 9.0
3/2/84	Day 21	Drlg. @ 4816'. Made 224' in 21 hrs. Drilling ahead at report time. Mud Wt. 9.3 Vis. 37 Wtr. Loss 9.2

3/3/84 Day 22 Drlg. @ 4984' Drill to 4953'. Made 137' in 15 hrs. TFB #11. Ream from 4900' to 4953'. Drill to 4972'. Worked on pump. Drill to 4984'. Made 31' in 2 1/2 hrs. Drilling at report time.
Mud Wt. 9.3 Vis. 38 Wtr. Loss 9.0

3/4/84 Day 23 Drlg. @ 5230'. Made 246' in 22 1/2 hrs.
Mud Wt. 9.3 Vis. 37 Wtr. Loss 9.2

3/5/84 Day 24 Drlg. @ 5474'. Made 244' in 23 hrs. Drilling at report time.
Mud Wt. 9.3 Vis. 39 Wtr. Loss 8.8

3/6/84 Day 25 RIH @ 5635'. Drill to 5635'. Made 161' in 14 1/2 hrs. TFB #12. RIH at report time.
Mud Wt. 9.2 Vis. 37 Wtr. Loss 8.8

3/7/84 Day 26 Coring @ 5742'. RIH with Bit #12. Drill to 5734'. Made 99' in 8 1/2 hrs. POOH and pick up Christensen Corehead MC-20. Cored from 5734' to 5742' in 4 hours. Coring at report time.
Mud Wt. 9.2 Vis. 38 Wtr. Loss 10.6

3/8/84 Day 27 Drlg. @ 5831'. Cored from 5742' to 5751', 9 hours. POOH and tripped to re-run bit #12. Reamed the cored interval from 5744' to 5751'. Drill to 5831'. Made 80' in 8 hrs. Drilling at report time
Mud Wt. 9.2 Vis. 39 Wtr. Loss 10.4

3/9/84 Day 28 Coring @ 5881'. Drill to 5875'. Made 44' in 4 1/2 hrs. POOH and pick up Christensen core gun. Wait on new core barrel 6 hours. RIH and cor from 5875' to 5881', 4 hours. Coring at report time.
Mud Wt. 9.2 Vis. 39 Wtr. Loss 11.0

3/10/84 Day 29 Logging @ 5890'. Cored from 5881' to 5890'. Chained out. Laid dow drill collars and stabilizers. Attempted to run Schlumberger DIL w/ success. Running Sonic while waiting on new DIL.
Mud Wt. 9.2 Vis. 38 Wtr. Loss: 11.0

3/11/84 Day 30 Logging @ 5890'. Ran Schlumberger Sonic/Caliper log, no charge. Rigged up Welex and ran DIL/GamaRay combination log. Ran Dipmeter. Calculating dips at report time.

3/12/84 Day 31 — Circulating @ 5890'. Ran Welex Density log, stuck with top at 1913' and bottom at 1942'. Pulled out of rope socket at 12:40 PM. Waited on fishing tools and Gamma collar locator. Ran Midway overshot but failed to hook onto fish at 1913'. Ran Gamma collar locator, fish was not at 1913' any longer. Collar locator wouldn't go below 1968'. Ran open-ended drill pipe to 1975' and collar locator inside of drill pipe. Again locator wouldn't go below 1999'. Re-ran Bit #12 and reamed the hole from 1999' to 2501'. Circulating at 2501' to prepare to run collar locator at report time.
Mud Wt. 9.2 Vis. 39 Wtr. Loss: 11.0

3/13/84 Day 32 — POOH w/wash pipe.5890'T.D. Circulated at 2501'. POOH and laid down jars. Ran Welex collar locator, could not locate fish. Wouldn't go below 2497'. Ran in hole with overshot, jars and bumper sub. Worked tools to 5857'. Worked on top of fish indicating granite boulders on top of fish. Pulled out and waited on Marcel washover shoe. Ran in hole with H-90 wash pipe, Marcel type washover shoe, jars and bumper sub. Worked on fish from 5858' to 5864'. Pulling out of hole at report time.

3/14/84 Day 33 — Laying Down Fish. Depth 5890' T.D. Pulled out of hole with washpipe. RIH with overshot, jars and bumper sub. Hooked onto fish. Chained out of hole, recovered part of fish. Ran in hole with Welex collar locator, couldn't locate remaining fish. Ran in hole with Marcel washover shoe, jars, bumper sub and wash pipe. Hooked onto fish at 5884'. Chained out of hole with fish. Laying down fish at report time. Will release rig this afternoon.

3/15/84 Day 34 — Rig Released. Lay down bottom hole assembly, drill pipe, kelly cock, rat hole and mouse hole. Clean out mud pits. Pulled BOPE stack. Installed 10" x 5000 psi x 2" x 5000 psi Xover spool with 2" flange valve on top. Released rig at 8:00 PM 3/14/84.

P.O. Box 974
Yreka, Calif.
96097

METRO-AEC

GEOLOGICAL WELLSITE SERVICES

Telephone
916 842-1377

ARKOMA PRODUCTION COMPANY OF CALIFORNIA

Federal 1-26
San Bernadino, California
1303' South and 1745' East from the NW Corner of Saction 26, T3N-R6W, San Bernadino Co., CA

API Well No.

Ground Level Elevation: 3272.0'
K.B. Elevation: 3286.0'
State Permit:

Spud Date: February 10, 1984
Date T.D. Reached: March 9, 1984
Completion Date:
Total Depth: 5890 Feet

Contractor: Hexadyne Drilling Div. Rig #3
Mud: Gel-water (Milchem)
Logging Unit: FL 201
Instruments: Hydrogen Flame Total Gas Calibrated to 100 units of gas equals 2% Meth. with Hydrogen Flame Chromatograph.

Logging Geologists: Byron Alexander
Jared Morrow
Bill Snavely

Began logging: February 10, 1984
Released: March 9, Rig-Down March 10, 1984
Well Site Geologists: Donald J. Mandel

Mud Pumps: #1 6" Liner; 8"Stroke
#2 5½ Liner; 8"Stroke

Hole Size: 17½" to 507'
12¼" to 1314'
8 3/4" to 5875'
8½" to T.D.

Casing: 13 3/8" to 507'
9 5/8" to 1313'

Auxiliary Services:
H_2S Detector; CO Analyzer
He Detector

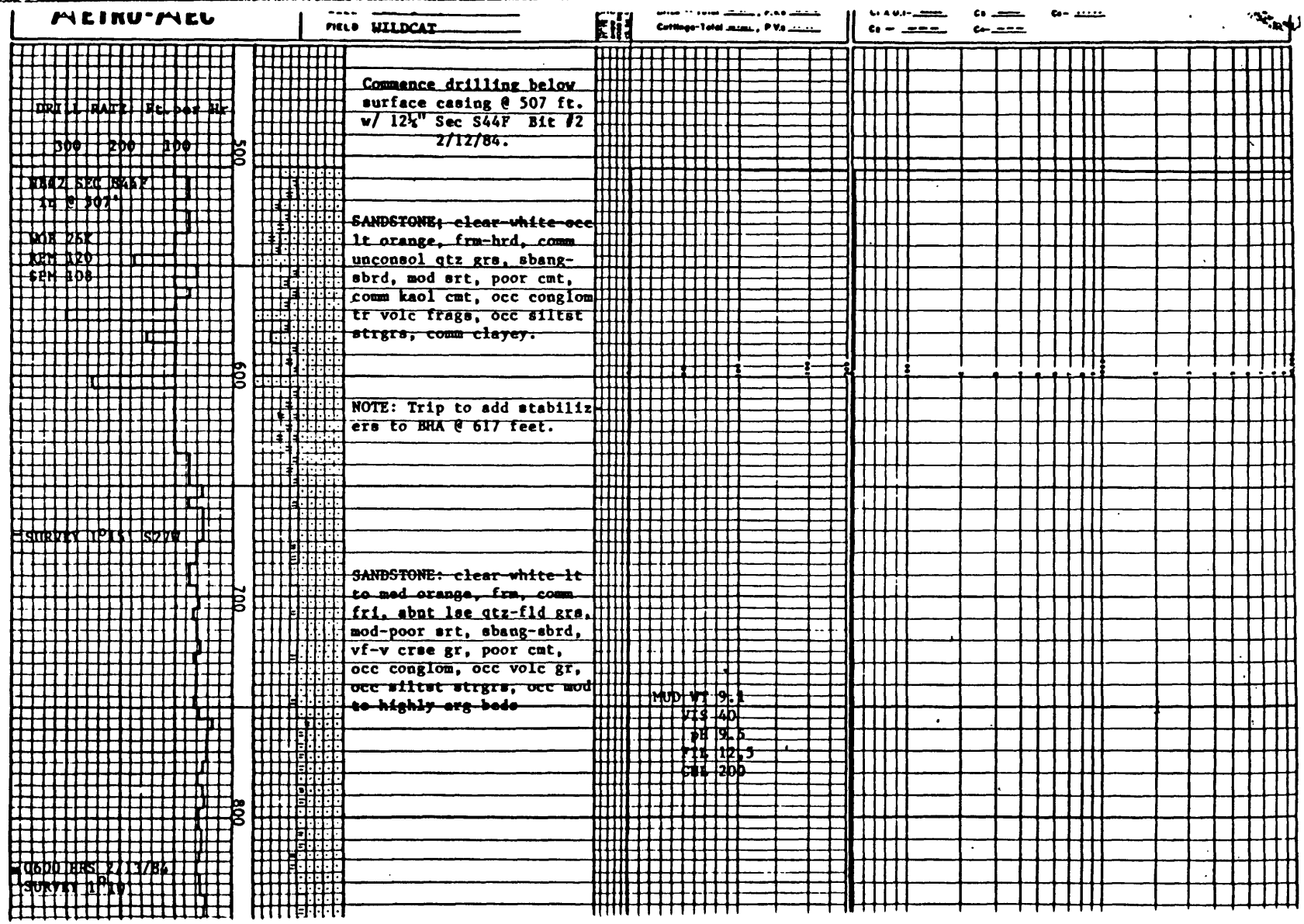
LEGEND

NB..... New Bit	Clay.....
-XXX-Y°Y- Hole Deviation	Shale.....
T.G.....Trip Gas	Siltstone.....
C.O.....Circulated Out	Sand (stone).....
C.B.....Core Bit	Conglomerate.....
Recovered / Lost Cored Interval	Coal.....
	Chert.....
Automatic Driller: Yes ☐ No ☒	Limestone
	Volcanics ☑

SHOW CLASSIFICATION

SLIGHT TRACE:.....minute amount of cut fluorescence from less than one per cent (1%) of sample.
TRACE:.....more than 1% but less than 10 % of sample show fluorescence and cut fluorescence, should be accompanied by a slight increase in gas.
STRONG TRACE:.....10% to 20% of the sample with initial and cut fluorescence and a moderate gas increase including C_4 and traces of C_5.
SHOW:.....20% to 50% of the sample with initial and cut fluorescence and fair increase in gas with quantities of C_1 through C_5.
GOOD SHOW:.....50% of the sample or more with initial and cut flor and heavy gas increase and substantial amounts of C_4 and C_5.
VERY GOOD SHOW:...majority of sample with fluorescence and cut fluorescence with heavy gas increase, large amounts of C_4 and C_5 and free oil in drilling fluid and samples.

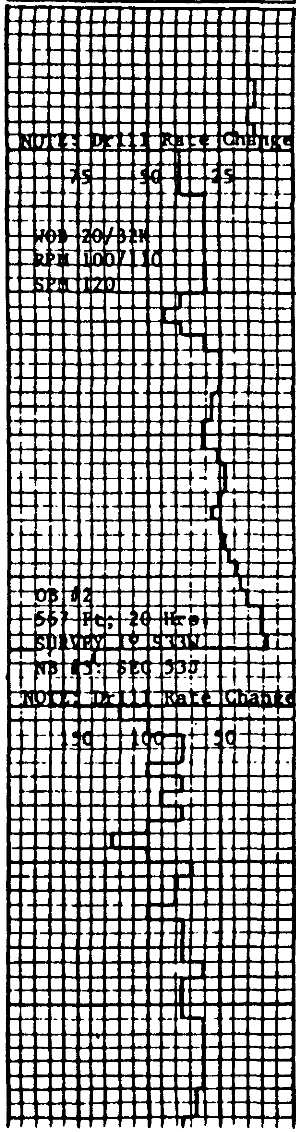
DRILL RATE feet-per-hour	DEPTH	LITHOLOGY	REMARKS	SHOWS	TOTAL GAS (UNITS) 50 100 200	ppm HYDROCARBONS IN DITCH GAS C_1 =0.1 — C_2 -- C_3 — C_4 -·- C_5 ··· 100 200 300 400 500 1,000 2,000 3,000 4,000 5,000


FIELD WILDCAT
DRILL RATE Ft. per Hr
500 200 100
BHAZ SEC S44F
Jt @ 507'
WOB 25K
RPM 120
SPM 108
SURVEY 1°@1507 S27W
0600 HRS 2/13/84
SURVEY 1°@ 1?
500
600
700
800
Commence drilling below surface casing @ 507 ft. w/ 12¼" Sec S44F Bit #2 2/12/84.
SANDSTONE; clear-white-occ lt orange, frm-hrd, comm unconsol qtz grs, sbang-sbrd, mod srt, poor cmt, comm kaol cmt, occ conglom tr volc frags, occ siltst strgrs, comm clayey.
NOTE: Trip to add stabilizers to BHA @ 617 feet.
SANDSTONE: clear-white-lt to med orange, frm, comm fri, sbnt lse qtz-fld grs, mod-poor srt, sbang-sbrd, vf-v crse gr, poor cmt, occ conglom, occ volc gr, occ siltst strgrs, occ mod to highly arg beds
MUD WT 9.1
VIS 40
pH 9.5
FL 12.5
CL 200

B-2

METRO-MEC

WELL [illegible]
FIELD Wildcat



900

SANDSTONE: wh-clr occ lt org, frm, comm fri, abnt lse qrtz grs, tr feldspar, mod-p srt, vf-crse gr, p kaol cmt, sbang-sbrd, occ conglomeritic, occ volc frags, inc drk brn sltst strgrs.

1000

SANDSTONE: wh-clr occ lt orng, frm-hrd, comm fri, abnt lse quartz grs, inc feldspars with depth, mod-p srt, f-crse gr, p kaol cmt, ang-sbrd, comm conglomeritic, comm drk brn sltst strgrs, dec clay with depth.

1200

SLTST: drk rd brn, brngy, frm, arg, sdy grdg to vf gr ss, tr carbonaceous mat tr mica, occ diss pyrite, non calc cmt, still predom sandstone.

1200

SANDSTONE: wh-clr occ lt orng, frm-hrd, comm fri, abnt lse qrtz, feldspars comm, bimodal sorting, f-crse gr, p kaol cmt, ang sbrd, occ conglomeritic, with inc siltstone, dec clay.

Drilling data	Depth	Lithology	Mud	Remarks
25 50 75	1300	SANDSTONE: wh-clr, occ tran, dec orng color, frm-hd, comm fri, abdnt lse qtz grs, bimodal srt, ang-sbrd, occ clayey, tr kaol, occ strks dk brn sdy Sltst.	MUD WT: 9.5 VIS: 35 pH: 8.5 FIL: 13.5 CHL: 700	
SURVEY 1° [illegible] @ 1314' WOB 44 SMITH SDT @ 1314' 0600 1/14-15/84				NOTE: Run 9 5/8" casing @ 1314' Run E logs @ 1314': DIL, BHCS, GR, SP, Dipmeter
	1400	SANDSTONE: wh-clr occ trans occ org, frm-hrd, poor kaol cmt, abnt lse qrtz and plag grs, fair-poorly srt, ang-sbrd, occ clay strgrs, com slty w/ intbd siltstone.	MUD WT: 8.8 VIS: 38 pH: 9.0 FIL: 14 CHL: 100	
0600 2/16-18/84 SURVEY [illegible] [illegible] 79W		SANDSTONE: Wh-clr trans occ org, frm-hrd, poor kaol cmt abnt lse qrtz and plag grs, bimodal srt, occ conglom, ang-sbrd, occ rnd, occ kaol strgrs, comm mica, comm sl[illegible] st strgrs.		NOTE: Pull into shoe to repair diesel clutch plates and other rig maintenance.
	1500	SANDSTONE: wh-clr occ trans occ lt og, frm-hrd, poor kaol cmt, abnt lse qrtz and plag grs, poor-bimodal srt, occ conglom, ang-sbrd occ rnd, occ kaol frags, comm mica, comm intbd w/ rdbrn siltstone.		
WOB 30K RPM 100 SPM 94 PP 1800	1600	SANDSTONE: wh-clr, frm-hrd, poor kaol cmt, abnt qrtz & plag grs, p srt occ conglom sbang-sbrd, comm kaol strgs w/intbd sltst		

METRO-MEC

WELL FED 1-26
FIELD WILDCAT

75 50 25

SURVEY @ 1688'
2°45' S88W

WOB 20K

SURVEY 3° N86W @ 1841'
0600 HRS 2/19/84
NB #5 HTC J-11 @ 1858'

WOB 14K
RPM 70
WOB 20-25K
RPM 90
SPM 96

SURVEY 3° N80W @ 1985'

1700

SANDSTONE: clr-wh-buff-lt orange, frm-hrd, comm fri, p kaol cmt, mod-p srt, med-v crse gr, sbang-sbrd, occ conglom, abnt lse qtz & fld gr, comm mica, occ intr igneous gr, rr volc & meta gr, intbd w/ red-brwn, occ micaceous sdy sltst & buff-wh kaol strgrs

MUD WT 9.4
VIS 38
pH 9.0
FIL 13.4
CHL 200

1800

SANDSTONE: clr-wh-buff-lt orange, frm-hrd, p kaol cmt, incr tr calc cmt, p srt, m-v crse gr, ang-sbang, w/ abnt lse gr as above, intbd w/ red-brwn to tan sltst & sdy sltst, & occ wh-buff kaol strgrs

1900

SANDSTONE: clr-wh, shades of orng, fri, pred lse qtz (70%), feld (25%), w/ tr dk grn to blk vol frag, no vis cmnt, mod srt, cr-vcr, ang-sang; Se: lt brn, red-brn, tr grn, vf-slty, sft, prob as thin interbddng; tr biot, tr kao.

2000

SANDSTONE: clr-wh, incr in shades of orange, pred qtz & feld, lse grns, no vis cmnt, med-well srt, cr-vcr, tr biot, tr kao

CARBIDE LAG @ 2048': 25 min.

PETRO-TEC

FIELD Wildcat

Cuttings-Total gas, PV ... Ca – ... C – ...

75 50 25

SURVEY 3°N83W @ 2142'

2100

SANDSTONE: clr-wh inc lt-dk gy occ rdbrn, poor kaol cmt abnt lse qtz (75-80%) and clr plag (20-25%), ang-sb rd, inc siltstone at depth comm mica, inc vf sandstone grdg to sltst, tr Kaol as frac fill.

2200

SANDSTONE: clr-wh occ tran occ rdbrn, poor kaol cmt, occ sl calc, bimodal srt, vf-med gr, qrtz (75%) plag (less than 20%), ang-sbrd, comm mica, inc volc and metamorphic frags, tr lig, comm intbd w/ vf-silty layers.

WOB 25K
RPM 80
SPM 92-95
PP 1800

SURVEY 1°30' N89W

2300

SANDSTONE: wh-clr-orng-occ lt to m gy, p kaol cmt, occ sl calc, mod srt, m-v crse, ang-sbang, predom lse gr comp of qtz (75%) & fld (20%), w/comm biotite, occ volc & meta gr, occ intbd w/lt brwn-redbrwn micaceous sdy sltst & sft wh kaol sltst

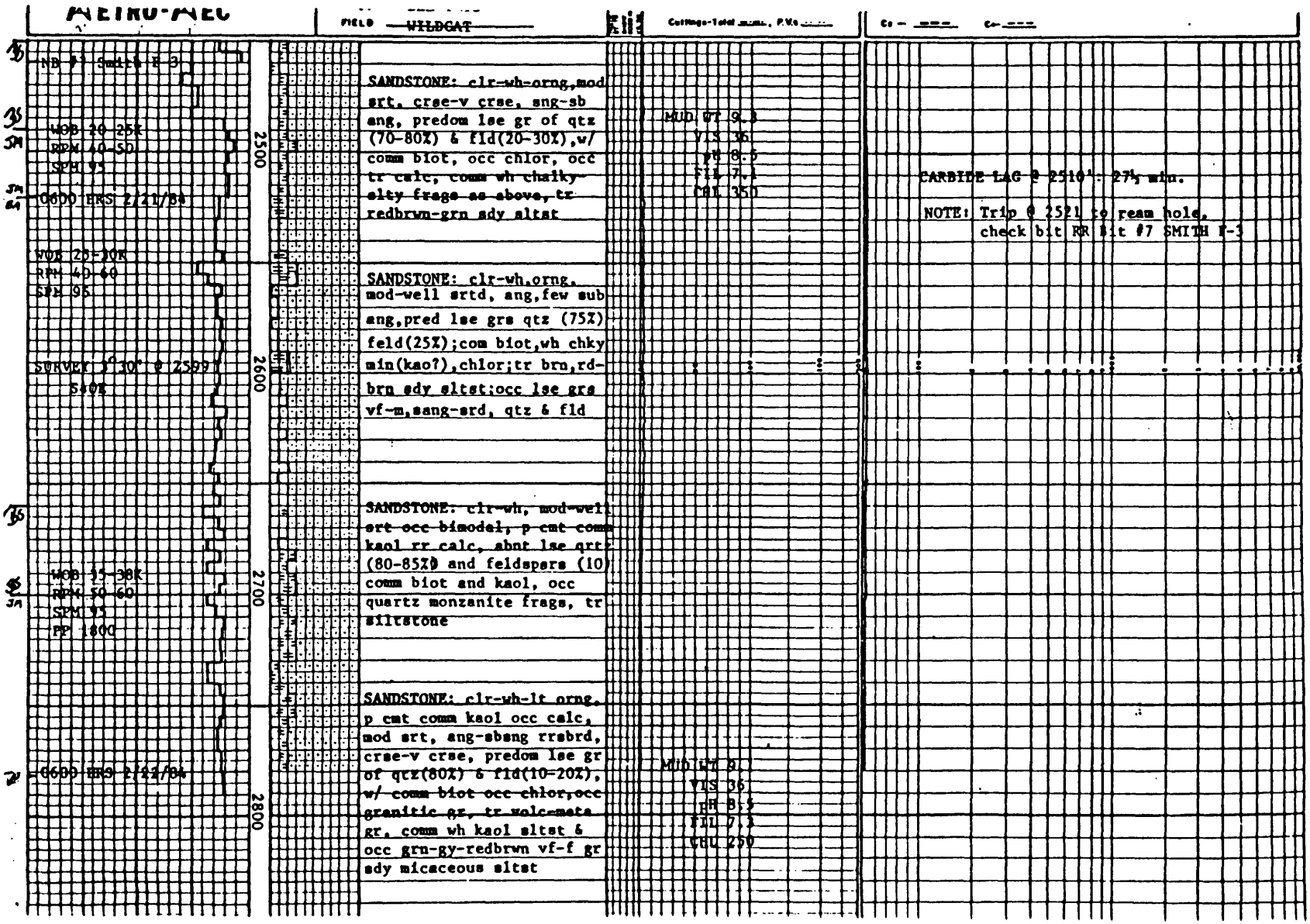
MUD WT 9.2
VIS 38
pH 8.5
FIL 7.3
CHL 390

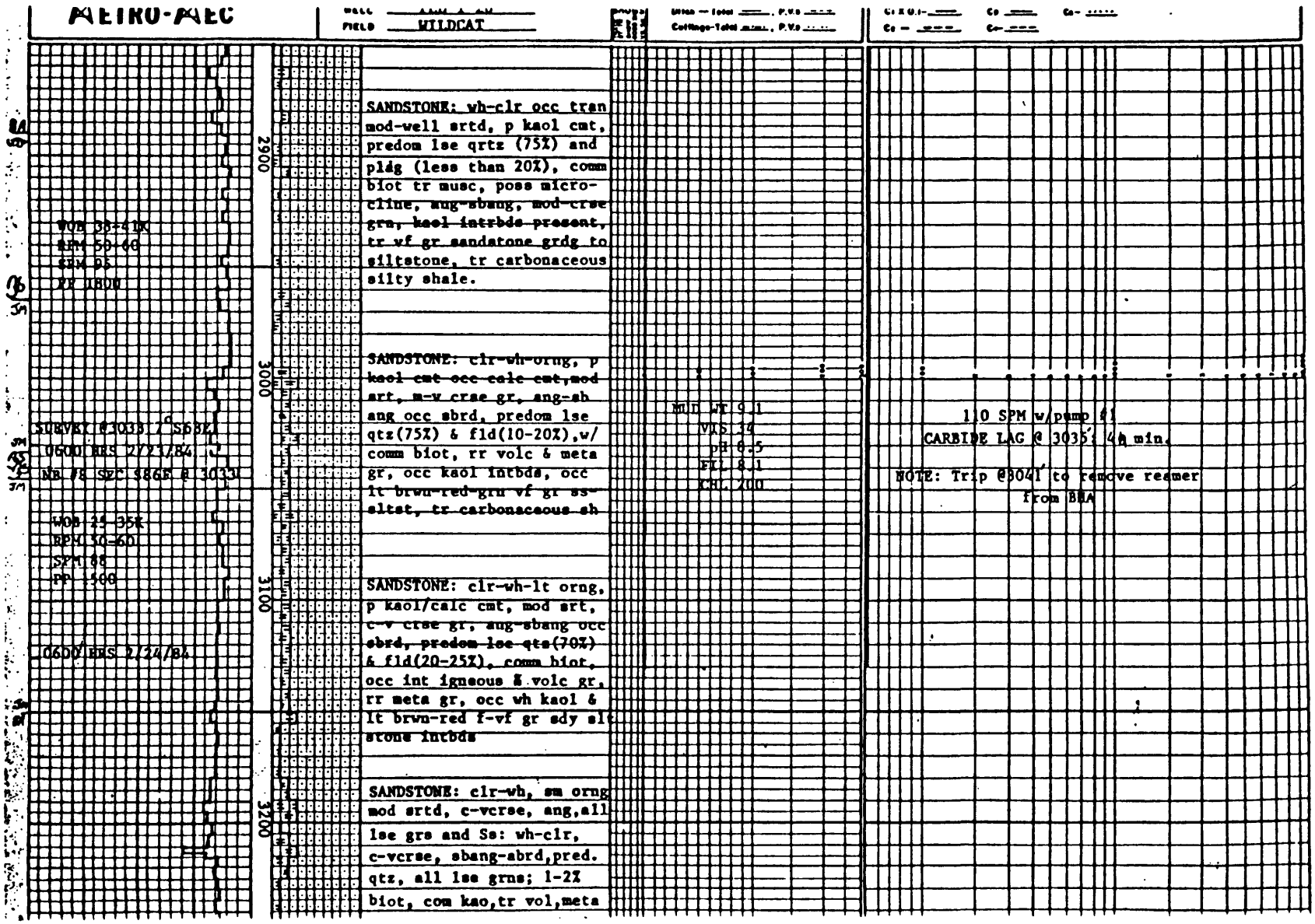
0600 HRS 2/20/84

2400

SANDSTONE: Wh-clr, orng, mod. to well srtd, cr-vcr, ang, pred lse grns qtz and feld, com biot, chlor. com wht chalky frags(zeo?)

PR #6 SMITH FDT @ 2422'


METRO-MEC
FIELD — WILDCAT —
NB #1 Smith E-3
WOB 20-25K
RPM 40-50
SPM 95
0600 HRS 2/21/84
WOB 20-30K
RPM 40-60
SPM 95
SURVEY 3° 30' @ 2589'
540'
WOB 35-38K
RPM 50-60
SPM 95
PP 1800
0600 HRS 2/22/84
2500
2600
2700
2800
SANDSTONE: clr-wh-orng,mod srt, crse-v crse, sng-sb ang, predom lse gr of qtz (70-80%) & fld(20-30%),w/ comm biot, occ chlor, occ tr calc, comm wh chalky-elty frags as above,tr redbrwn-grn sdy siltst
SANDSTONE: clr-wh,orng, mod-well srtd, ang,few sub ang,pred lse grs qtz (75%) feld(25%);com biot,wh chky min(kao?),chlor;tr brn,rd-brn sdy siltst;occ lse grs vf-m,sang-srd, qtz & fld
SANDSTONE: clr-wh, mod-well srt occ bimodal, p cmt comm kaol rr calc, abnt lse qrtz (80-85%) and feldspars (10) comm biot and kaol, occ quartz monzanite frags, tr siltstone
SANDSTONE: clr-wh-lt orng, p cmt comm kaol occ calc, mod srt, ang-sbang rrsbrd, crse-v crse, predom lse gr of qtz(80%) & fld(10-20%), w/ comm biot occ chlor,occ granitic gr, tr volc-meta gr, comm wh kaol sltst & occ grn-gy-redbrwn vf-f gr sdy micaceous sltst
MUD WT 9.3
VIS 36
pH 8.5
FIL 7.1
CHL 350
CARBIDE LAG @ 2510': 27½ min.
NOTE: Trip @ 2521 to ream hole, check bit RR Bit #7 SMITH F-3
MUD WT 9.
VIS 36
pH 8.5
FIL 7.3
CHL 250


ARCO-ALC
WELL
FIELD WILDCAT
2900
3000
3100
3200
WOB 35+4DC
RPM 50-60
SPM 95
PP 1800
SURVEY @3033 1°S63E
0600 HRS 2/23/84
NB #8 SZC 8865 @ 3033
WOB 25-35K
RPM 50-60
SPM 95
PP 1500
0600 HRS 2/24/84
SANDSTONE: wh-clr occ tran mod-well srtd, p kaol cmt, predom lse qrtz (75%) and pldg (less than 20%), comm biot tr musc, poss micro-cline, aug-sbang, mod-crse grn, kaol intrbds present, tr vf gr sandstone grdg to siltstone, tr carbonaceous silty shale.
SANDSTONE: clr-wh-orng, p kaol cmt occ calc cmt, mod srt, m-v crse gr, ang-sb ang occ sbrd, predom lse qtz(75%) & fld(10-20%), w/ comm biot, rr volc & meta gr, occ kaol intbds, occ lt brwn-red-gru vf gr ss-altst, tr carbonaceous sh
SANDSTONE: clr-wh-lt orng, p kaol/calc cmt, mod srt, c-v crse gr, aug-sbang occ sbrd, predom lse qtz(70%) & fld(20-25%), comm biot, occ int igneous & volc gr, rr meta gr, occ wh kaol & lt brwn-red f-vf gr sdy slt stone intbds
SANDSTONE: clr-wh, sm orng mod srtd, c-vcrse, ang, all lse grs and Ss: wh-clr, c-vcrse, sbang-abrd, pred. qtz, all lse grns; 1-2% biot, com kao, tr vol, meta
MUD WT 9.1
VIS 34
pH 8.5
FL 8.1
CHL 700
110 SPM w/pump #1
CARBIDE LAG @ 3035': 4½ min.
NOTE: Trip @3041' to remove reamer from BHA

METRO-MEC

FIELD WILDCAT

Cuttings-Total mins., P.V.s

Cc – Cc –

3300

WOB 35-42K
RPM 50-60
SPM 95
PP 1800

SAND: Quartz monzanite to quartz diorite in composition, phaneritic ang. xtal intergrowth, 40% qtz, 40% plag, abnt mafics (hrnblnd, biot, augite), comm kaolin (after feldspar), tr orthoclase and/or microcline, tr apatite, tr maculose hornsfels.

SURVEY 10° 45' S52E @ 3370'

3400

SANDSTONE: clr-wh-lt orng, p cmt, sl tr calc, mod srt, ang-sbang, lse gr-qtz(65%), fld(20-30%), abnt biot, com int igneous, rr volcs, meta, & mafics, comm lt red-tan (Fe oxide?) sdy sltst & wh sft sltst (kaol?)

MUD WT 9.3
VIS 35
pH 8.5
FIL 8.5
CHL 200

0600 HRS 2/25/84

NOTE: Trip @ 3454 to lay down washed out HWDP; RR Bit #8

3500

SAND: Granitoid, Quartz diorite in composition, crse ang xtln intergrowth, 60% qrtz, 20-30% plag, abnt mafics (hrnblnd, augite), abnt biot, tr musc, comm kaolin (after feldspar), tr ortho, tr hrnsfls, chlor present 3555+

SURVEY 11° S51E @ 3527'

3600

SAND(STONE): wh-clr-gy, lse gr-mod srt, ang-sbang occ sbrd, c-v crse gr of qtz & fld w/abnt xstal intgwths of biot & occ pyroxene, abnt gr of kaol(weathered after fld) w/comm chlor(after mics or mafics?), occ tr sparry calcite.

MUD WT 9.3
VIS 37
pH 8.[illegible]
FIL 8.8
CHL 200

0600 HRS 2/26/84

NB #9 Smith F57 @ 3607'

FIELD WILDCAT

CARBIDE LAG @ 3652' 57 min: 93 SPM, P #

SURVEY 10°45° S51E

3700

SAND: Granitoid in composition, phaneritic ang xtln intergrowth, 40% Qtz, 40% plg inc biot (12%), occ pyroxene (augite), inc schistose and gneissic frags, dec Kaoline, occ intbd rdbrn laminated sandy siltstones, dec chlor.

WOB 53-57K
RPM 50-60
SPM 97
PP 1800

3800

SAND: Granitoid composition w/ang-sbang xtln intergrwn gr, qtz(50-60%), fld(40%), cont'd abnt biot, occ pyroxene, rr chlor, occ mata frags, & occ-comm wh kaol, w/ occ tan-rdbrwn sdy siltstone intbds as above

MUD WT 9.2
VIS 37
pH 8.2
FTH 9.0
CHL 200

SURVEY 12° S42E
0600 HRS 2/21/84

3900

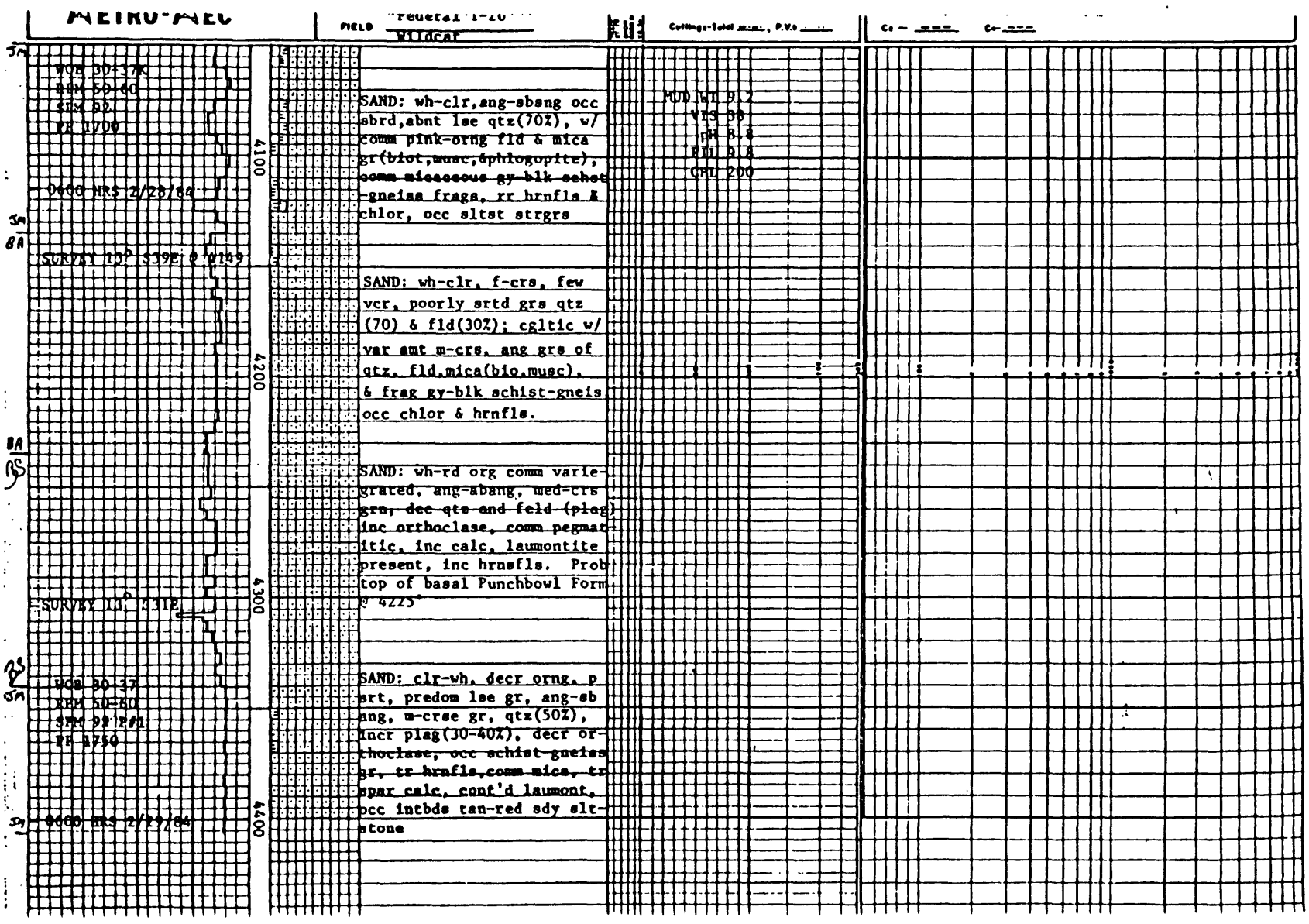
SAND: wh-clr, poorly srtd, sbang-sbrd, f-vcrs, few gran, fld (25%); with crs-vcrs, ang, frags of qtz & fld, 2-5% biot; com wh kao(?), tr grn chlorite of granitic origin; thin strks Sltst: lt brn-rd brn, mica & sdy in pt.

SAND: wh-clr, abnt ang qtz (35%), dec plag (15-20%), occ biot, occ Kaolinite, occ siltstone strgrs, cttgs occ smaller in x-section, sl calc in stringers, occ schistose frags, dec lu mrnsfls and gneissic frags

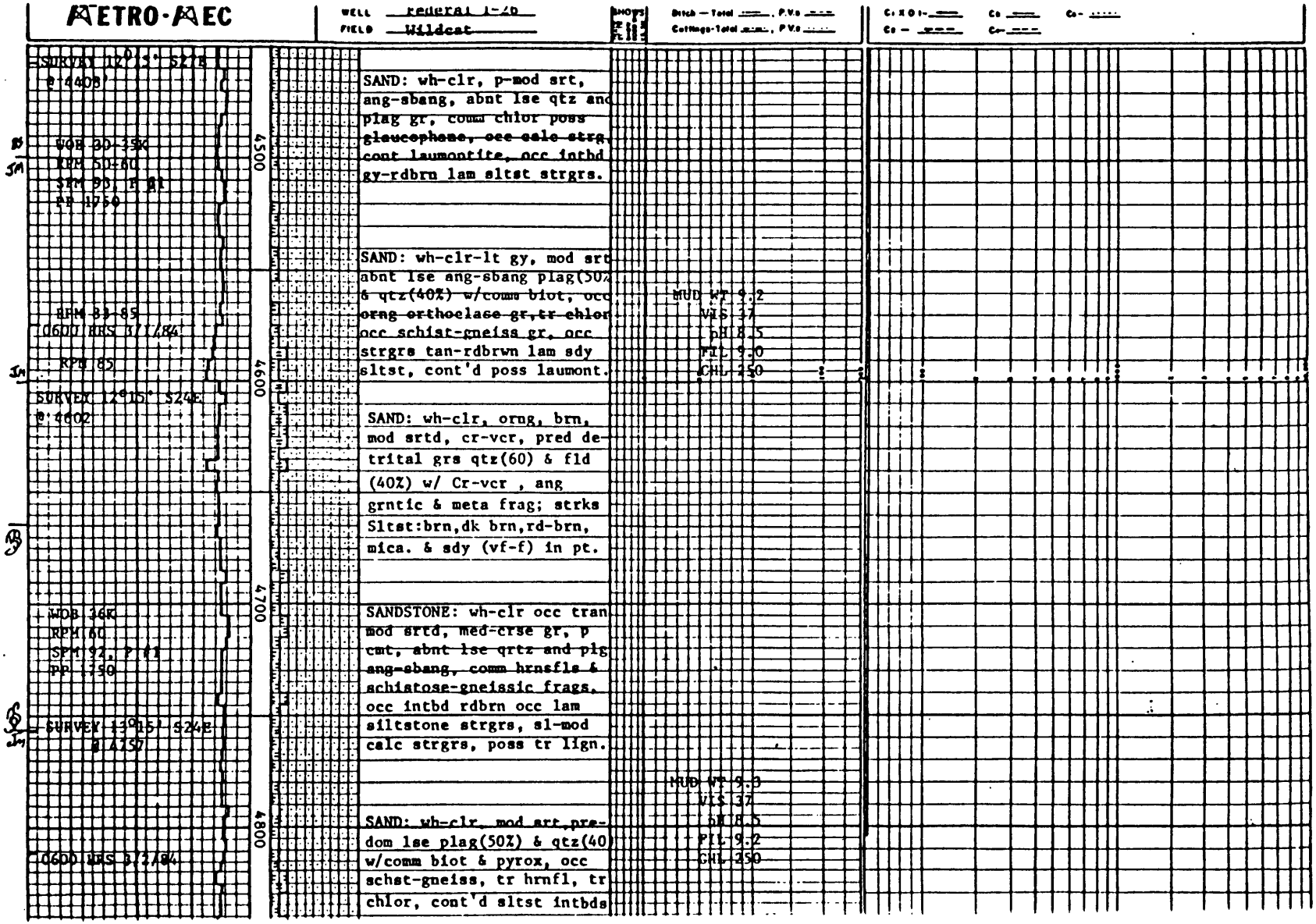
SURVEY 13° S40E

4000

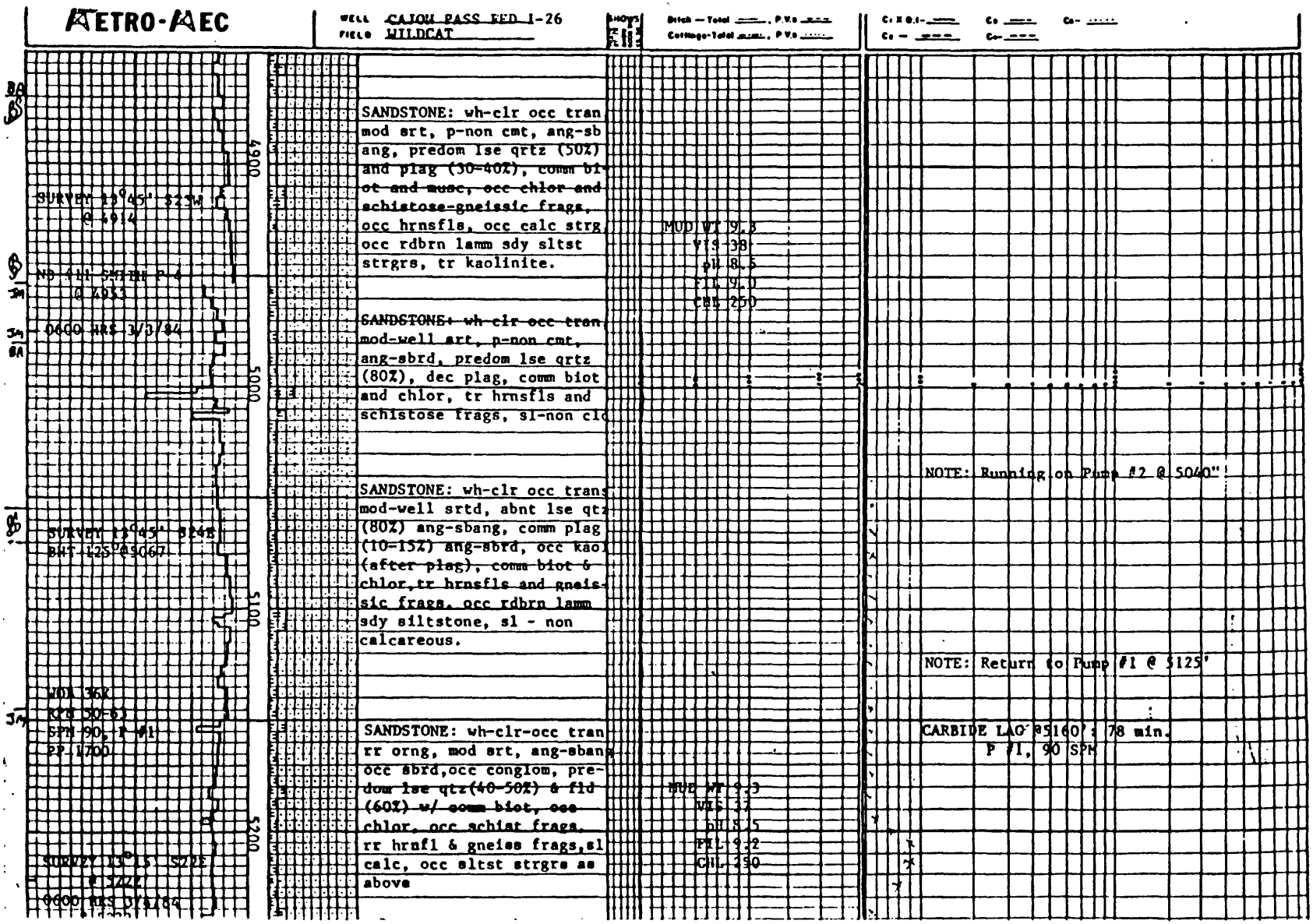
B-10


METRO-PET
FIELD Federal 1-20
Wildcat
WOB 30-37K
RPM 50-60
SPM 92
PP 1700
0600 HRS 2/28/84
SURVEY 11° S39E @ 4149
SAND: wh-clr,ang-sbsng occ sbrd,abnt lse qtz(70%), w/ comm pink-orng fld & mica gr(biot,musc,phlogopite), comm micaceous gy-blk schst-gneiss fragm, rr hrnfls & chlor, occ sltst strgrs
4100
SAND: wh-clr, f-crs, few vcr, poorly srtd grs qtz (70) & fld(30%); cgltic w/ var amt m-crs, ang grs of qtz, fld,mica(bio,musc), & frag gy-blk schist-gneis occ chlor & hrnfls.
4200
SAND: wh-rd org comm variegrated, ang-sbang, med-crs grn, dec qtz and feld (plag) inc orthoclase, comm pegmatitic, inc calc, laumontite present, inc hrnsfls. Prob top of basal Punchbowl Form @ 4225'
SURVEY 13° S31E
4300
WOB 30-37
RPM 50-60
SPM 92 PP
PP 1750
SAND: clr-wh, decr orng, p srt, predom lse gr, ang-sb ang, m-crse gr, qtz(50%), incr plag(30-40%), decr orthoclase, occ schist-gneiss gr, tr hrnfls,comm mica, tr spar calc, cont'd laumont, occ intbds tan-red sdy sltstone
0600 HRS 2/29/84
4400
MUD WT 9.2
VIS 38
pH 8.8
PVL 9.8
CHL 200

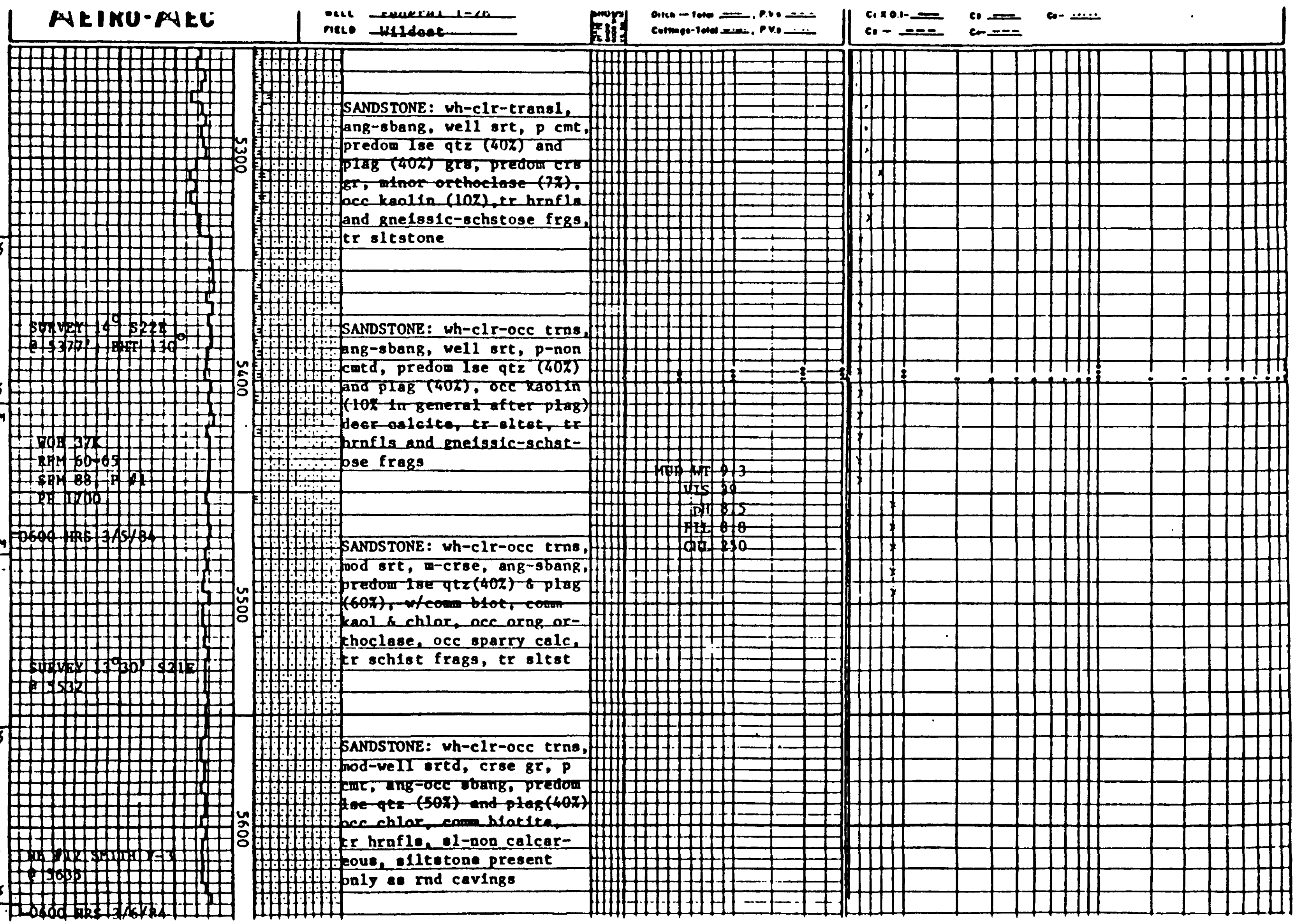
B-11

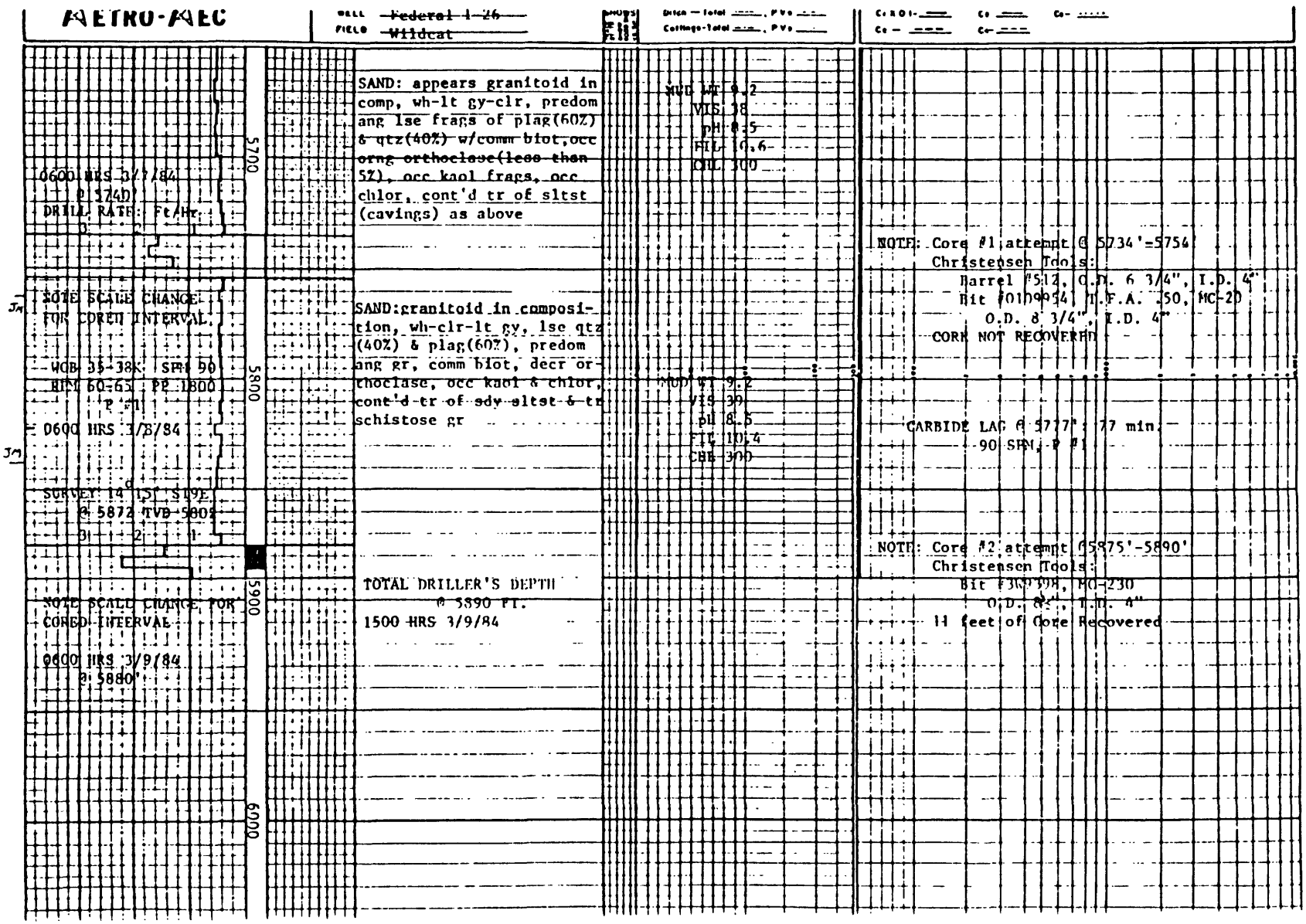

METRO-MEC
WELL Federal 1-20
FIELD Wildcat
SURVEY 12°15' S24E
@14408'
WOB 30-35K
RPM 50-60
SPM 90 @ 81
PP 1750
RPM 83-85
0600 HRS 3/1/84
RPM 85
SURVEY 12°15' S24E
@ 4602
WOB 36K
RPM 60
SPM 92, @ 81
PP 1750
SURVEY 13°15' S24E
@ 14757'
0600 HRS 3/2/84
4500
4600
4700
4800
SAND: wh-clr, p-mod srt, ang-sbang, abnt lse qtz and plag gr, comm chlor poss glaucophane, occ calc strg, cont laumontite, occ intbd gy-rdbrn lam sltst strgrs.
SAND: wh-clr-lt gy, mod srt abnt lse ang-sbang plag(50% & qtz(40%) w/comm biot, occ orng orthoclase gr, tr chlor occ schist-gneiss gr, occ strgrs tan-rdbrwn lam sdy sltst, cont'd poss laumont.
MUD WT 9.2
VIS 37
pH 8.5
PIL 9.0
CHL 250
SAND: wh-clr, orng, brn, mod srtd, cr-vcr, pred detrital grs qtz(60) & fld (40%) w/ Cr-vcr , ang grntic & meta frag; strks Sltst:brn,dk brn,rd-brn, mica. & sdy (vf-f) in pt.
SANDSTONE: wh-clr occ tran mod srtd, med-crse gr, p cmt, abnt lse qrtz and plg ang-sbang, comm hrnsfls & schistose-gneissic frags, occ intbd rdbrn occ lam siltstone strgrs, sl-mod calc strgrs, poss tr lign.
MUD WT 9.3
VIS 37
pH 8.5
PIL 9.2
CHL 250
SAND: wh-clr, mod srt, predom lse plag(50%) & qtz(40) w/comm biot & pyrox, occ schst-gneiss, tr hrnfl, tr chlor, cont'd sltst intbds

B-12


METRO-AEC
WELL CAJON PASS FED 1-26
FIELD WILDCAT
SANDSTONE: wh-clr occ tran mod srt, p-non cmt, ang-sb ang, predom lse qrtz (50%) and plag (30-40%), comm bi- ot and musc, occ chlor and schistose-gneissic frags, occ hrnsfls, occ calc strg occ rdbrn lamm sdy sltst strgrs, tr kaolinite.
MUD WT 9.3
VIS 38
pH 8.5
FL 9.0
CHL 250
SURVEY 13°45' S25W @ 4914
NO 4HI SMITH P-4 @ 4953
0600 HRS 3/3/84
4900
SANDSTONE: wh-clr occ tran mod-well srt, p-non cmt, ang-sbrd, predom lse qrtz (80%), dec plag, comm biot and chlor, tr hrnsfls and schistose frags, sl-non clc
5000
SANDSTONE: wh-clr occ trans mod-well srtd, abnt lse qtz (80%) ang-sbang, comm plag (10-15%) ang-sbrd, occ kao (after plag), comm biot & chlor, tr hrnsfls and gneis- sic fragg, occ rdbrn lamm sdy siltstone, sl - non calcareous.
NOTE: Running on Pump #2 @ 5040'
SURVEY 13°45' S24E @ 5067
BHT 125°@5067
5100
NOTE: Return to Pump #1 @ 5125'
WOB 36K
RPM 50-60
SPM 90, P #1
PP 1700
CARBIDE LAG @5160' : 78 min.
P #1, 90 SPM
SANDSTONE: wh-clr-occ tran rr orng, mod srt, ang-sbang occ sbrd, occ conglom, pre- dom lse qtz (40-50%) & fld (60%) w/ comm biot, occ chlor, occ schist fragg. rr hrnfl & gneiss frags, sl calc, occ sltst strgrs as above
MUD WT 9.3
VIS 37
pH 8.5
FL 9.2
CHL 250
SURVEY 13°15' S22E @ 5222
0600 HRS 3/4/84
5200

B-13


FIELD Wildcat
5300
SANDSTONE: wh-clr-transl, ang-sbang, well srt, p cmt, predom lse qtz (40%) and plag (40%) grs, predom crs gr, minor orthoclase (7%), occ kaolin (10%), tr hrnfls and gneissic-schstose frgs, tr sltstone
SURVEY 14° S22E @ 5377', BHT 130°
5400
SANDSTONE: wh-clr-occ trns, ang-sbang, well srt, p-non cmtd, predom lse qtz (40%) and plag (40%), occ kaolin (10% in general after plag) decr calcite, tr sltst, tr hrnfls and gneissic-schstose frags
WOB 37K
RPM 60-65
SPM 88, P #1
PP 1700
MUD WT 9.3
VIS 39
FIL 8.8
0600 HRS 3/5/84
SANDSTONE: wh-clr-occ trns, mod srt, m-crse, ang-sbang, predom lse qtz(40%) & plag (60%), w/comm biot, comm kaol & chlor, occ orng orthoclase, occ sparry calc, tr schist frags, tr sltst
5500
SURVEY 13°30' S21E @ 5532
SANDSTONE: wh-clr-occ trns, mod-well srtd, crse gr, p cmt, ang-occ sbang, predom lse qtz (50%) and plag(40%) occ chlor, comm biotite, tr hrnfls, sl-non calcareous, siltstone present only as rnd cavings
5600
@ 5635
0400 HRS 3/6/84


AETRO-AEC
WELL Federal 1-26
FIELD Wildcat
5700
5800
5900
6000
0600 HRS 3/7/84
@ 5740'
DRILL RATE: Ft/Hr
SAND: appears granitoid in comp, wh-lt gy-clr, predom ang lse frags of plag(60%) & qtz(40%) w/comm biot, occ orng orthoclase(less than 5%), occ kaol frags, occ chlor, cont'd tr of sltst (cavings) as above
MUD WT 9.2
VIS 38
pH 8.5
FIL 10.6
CHL 300
NOTE: Core #1 attempt @ 5734'-5754'
Christensen Tools:
Barrel #512, O.D. 6 3/4", I.D. 4"
Bit #01HP54, T.F.A. .50, MC-20
O.D. 8 3/4", I.D. 4"
CORE NOT RECOVERED
NOTE SCALE CHANGE FOR CORED INTERVAL
WOB 35-38K SPM 90
RPM 60-65 PP 1800
P #1
0600 HRS 3/8/84
SAND:granitoid in composition, wh-clr-lt gy, lse qtz (40%) & plag(60%), predom ang gr, comm biot, decr orthoclase, occ kaol & chlor, cont'd tr of sdy sltst & tr schistose gr
MUD WT 9.2
VIS 39
pH 8.5
FIL 10.4
CHL 300
CARBIDE LAG @ 5777' - 77 min.
90 SPM, P #1
SURVEY: 14° 15° S19E
@ 5872 TVD 5809
NOTE: Core #2 attempt @5875'-5890'
Christensen Tools:
Bit #3D39H, MC-230
O.D. 8¾", I.D. 4"
11 feet of Core Recovered
TOTAL DRILLER'S DEPTH
@ 5890 FT.
1500 HRS 3/9/84
NOTE SCALE CHANGE FOR CORED INTERVAL
0600 HRS 3/9/84
@ 5880'

Welex 5'1

DIP LOG

COMPANY: ARKOMA PRODUCTION CO.
WELL: FEDERAL 1-26
FIELD: WILDCAT
COUNTY: SAN BERNADINO STATE: CALIFORNIA

COMPANY / WELL: FIELD PRINT / FIELD / County / State

Location: 1303'S 1745'E FROM NW CORNER SEC 26

Sec. 26 Twp. 3N Rge. 6W

Other Services: DUAL IND/GUARD DENSITY

Permanent Datum: GL Elev: 3272 — Elev.: K.B. —
Log Measured From: KB — Ft. Above Perm. Datum — D.F. —
Drilling Measured From: KB — G.L. 3272

Date	3-10-84			
Run No.	ONE			
Depth—Driller	5890'			
Depth—Welex	5888'			
Btm. Log Inter.	5886'			
Top Log Inter.	1328'			
Casing—Driller	9.625 @ 1313	@	@	@
Casing—Welex	1312'			
Bit Size	8.5			
Type Fluid in Hole	GEL WATER			
Dens. | Visc.	9.2 | 39.0	|	|	|
pH | Fluid Loss	8.5 | 11.0 ml	| ml	| ml	| ml
Source of Sample	FLOWLINE			
R_m @ Meas. Temp.	[illegible] @ [illegible] °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	4.6 @ [illegible] °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	5.1 @ 52 °F	@ °F	@ °F	@ °F
Source R_{mf} R_{mc}	MEAS | MEAS	|	|	|
R_m @ BHT	[illegible] @ [illegible] °F	@ °F	@ °F	@ °F
Time Since Circ.	[illegible]			
Max. Rec. Temp.	[illegible] °F @ 5888	°F @	°F @	°F @
Equip. | Location	[illegible]	|	|	|
Recorded By	[illegible]			
Witnessed By	MR. MANDEL			

Service Ticket No/[illegible]-51 Remarks NO REPEAT SECTION DUE TO HOLE CONDITI...

Change in Mud Type or Additional Samples

Date | Sample No		
Depth—Driller		
Type Fluid in Hole		
Dens | Visc		
ph | Fluid Loss		ml
Source of Sample		
R_m @ Meas. Temp	@ F	@ F
R_{mf} @ Meas. Temp	@ F	@ F
R_{mc} @ Meas. Temp	@ F	@ F
Source R_{mf} | R_{mc}		
R_m @ BHT	1.85 @ 178 F	@ F
R_{mf} BHT	1.61 @ 178 F	@ F
R_{mc} BHT	1.62 @ 178 F	@ F

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

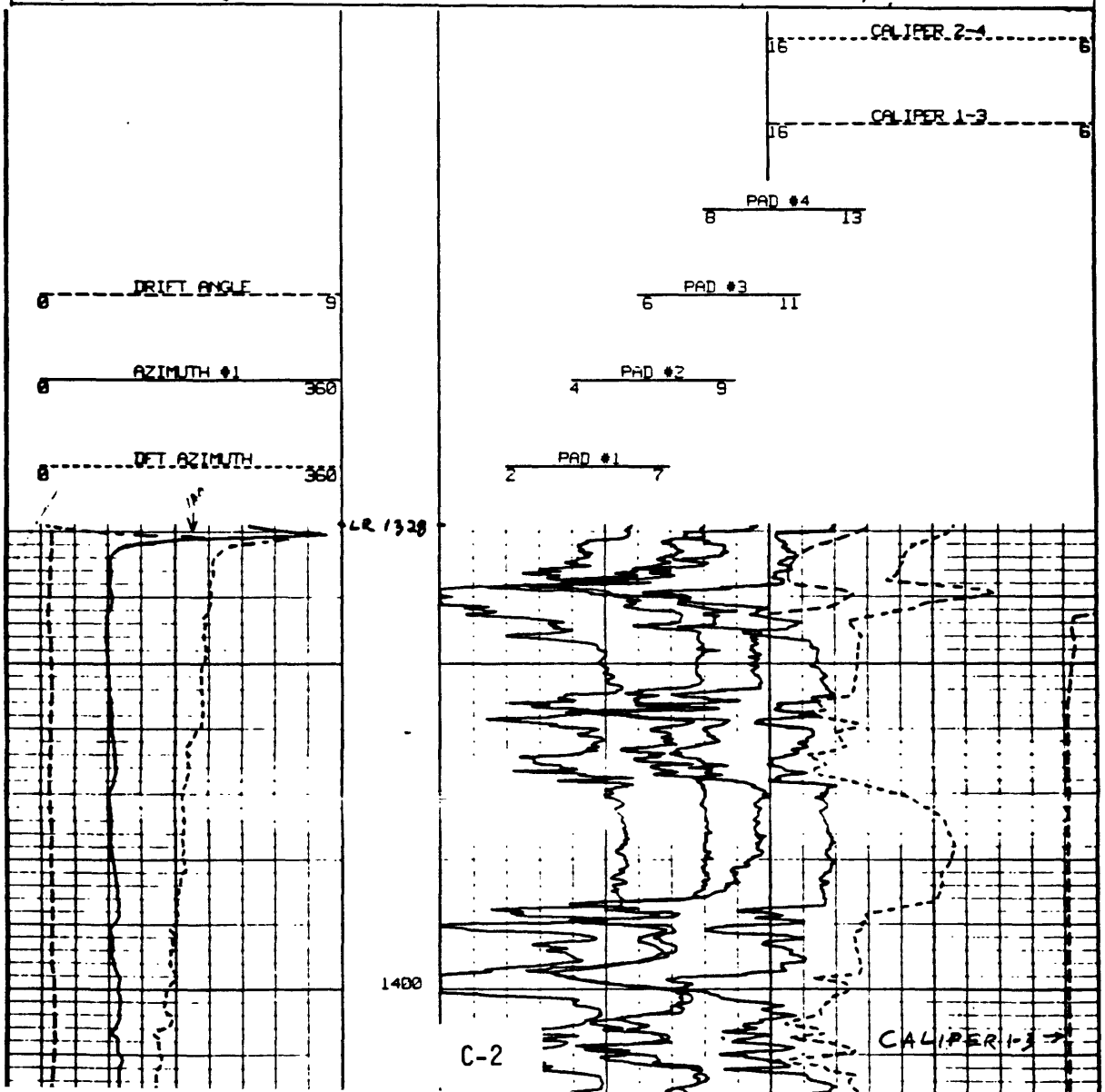
EQUIPMENT DATA

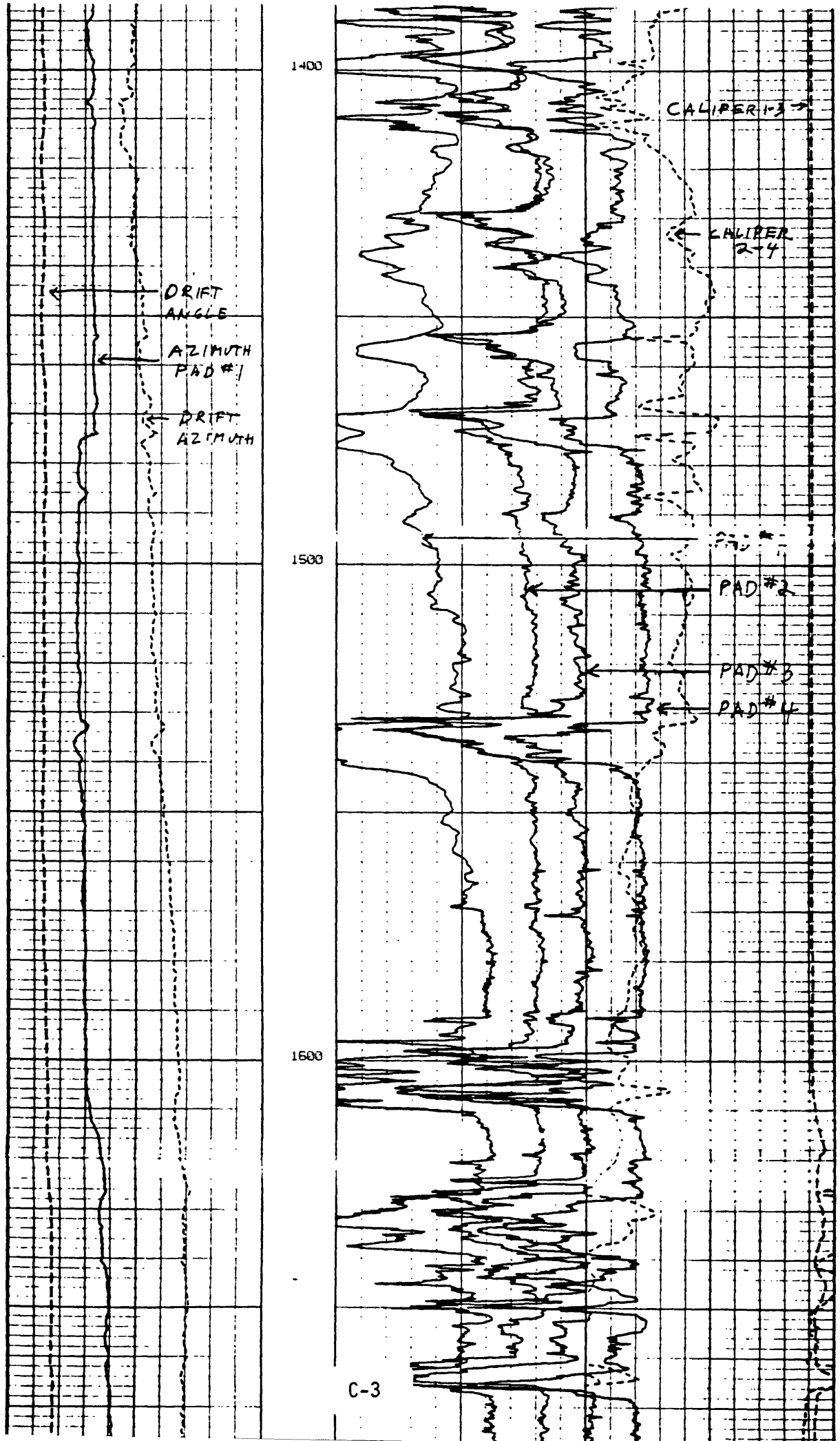
Run No	Tool Type and No	Pad Type	Tool Position	Other
ONE	DIP 76.880	—	—	—

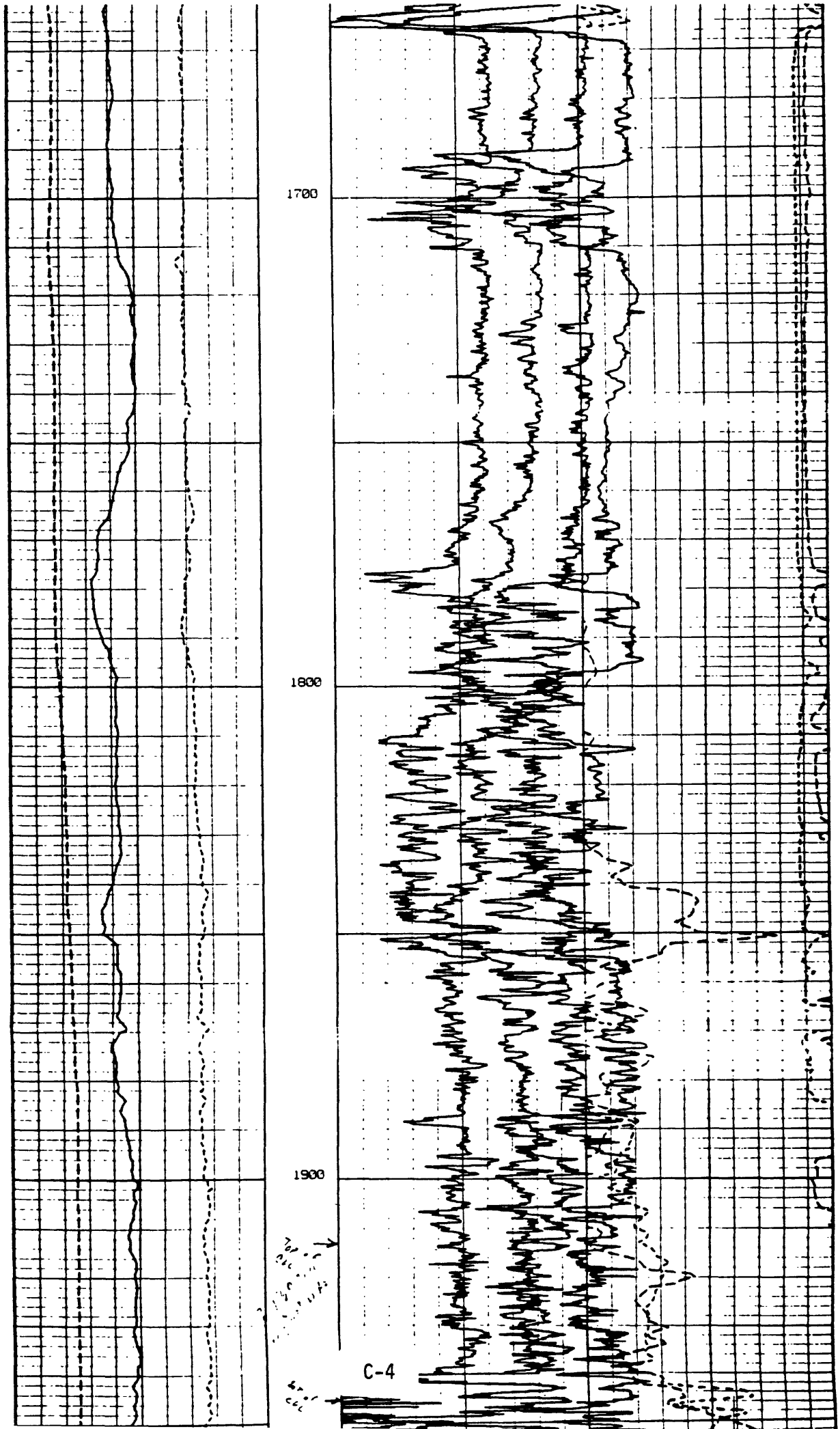
PROG. 3.09

Weex does not guarantee the accuracy of any interpretation, opinion or recommendation for data to physical rock parameters or recommendations which may be given by Weex personnel or which may appear on the log. Any interpretations, conversions or recommendations agrees that Weex is not responsible except [illegible] resulting from the use thereof.

314 - 1° - S35W	3013 - 6° 45 - S68E	4606 - 12° 15 - S24E	ROLL NO.
1415 - 1° 30 - S15W	3338 - 10° - S56E	4757 - 13° 15 - S24E	INTERVAL
1688 - 2° 45 - S74W	3370 - 10° 45 - S52E	4914 - 13° 45 - S23E	ONE 5886 - 3444
1841 - 3° - S80W	3684 - 10° 30 - S51E	5222 - 13° 15 - S24E	TWO 3744 - 1328
1785 - 3° - S86W	3241 - 12° - S42E	5532 13° 30 - S21E	
2142 - 30 - ~83W	3994 - 13° - S40E	5634 13° S19E	MAGNETIC DECLINATION
2297 - 1° 30 - S89W	4149 - 13° - S39E	5822 - 14° - S19E	
2599 - 3° 30 - S70E	4362 - 13° - S31E		
2500 - 5° - S71E	4[illegible]		

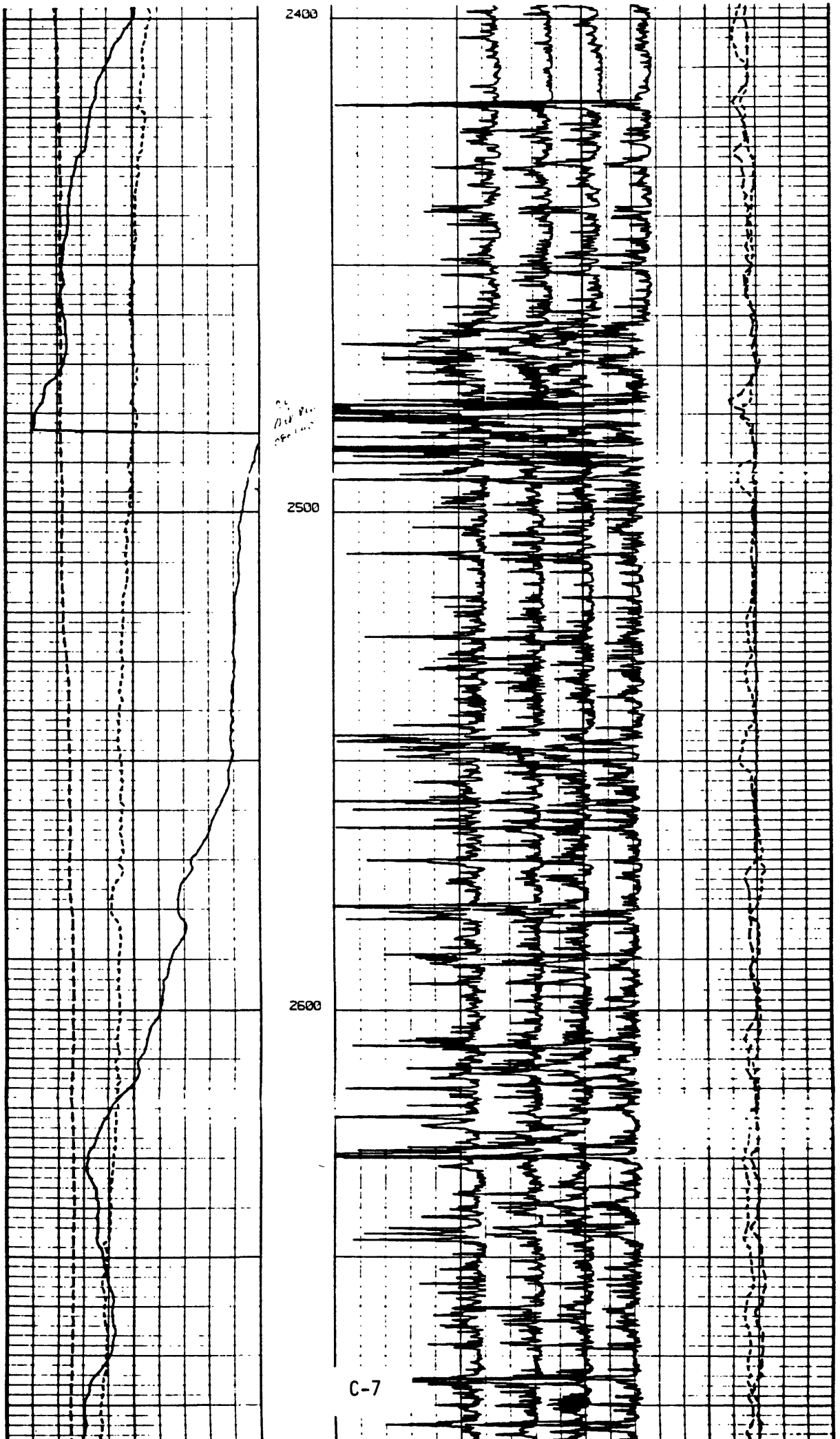


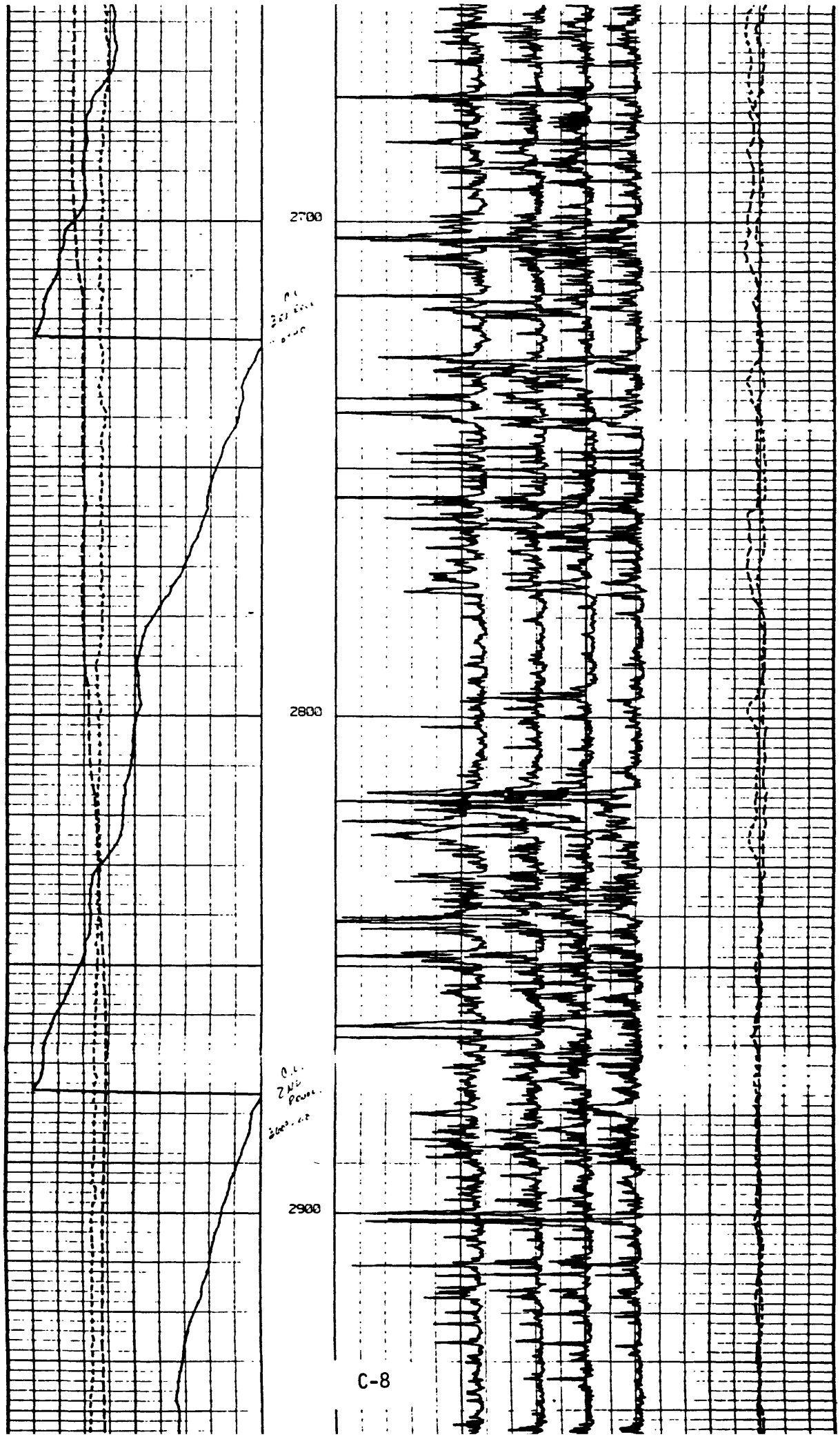

1400
1500
1600
CALIPER 1-3
CALIPER 2-4
DRIFT ANGLE
AZIMUTH PAD #1
DRIFT AZIMUTH
PAD #2
PAD #3
PAD #4
C-3

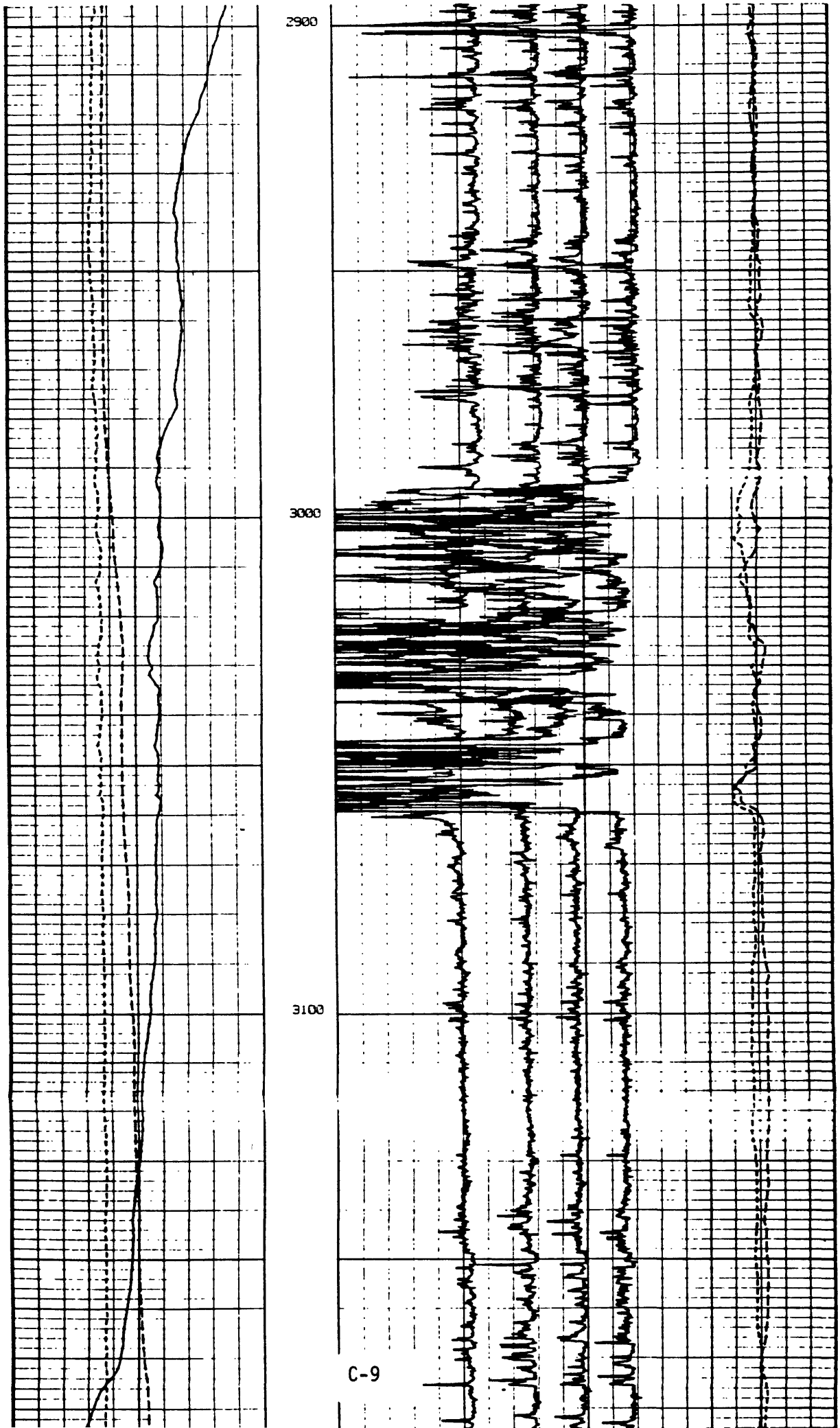

1700
1800
1900
C-4

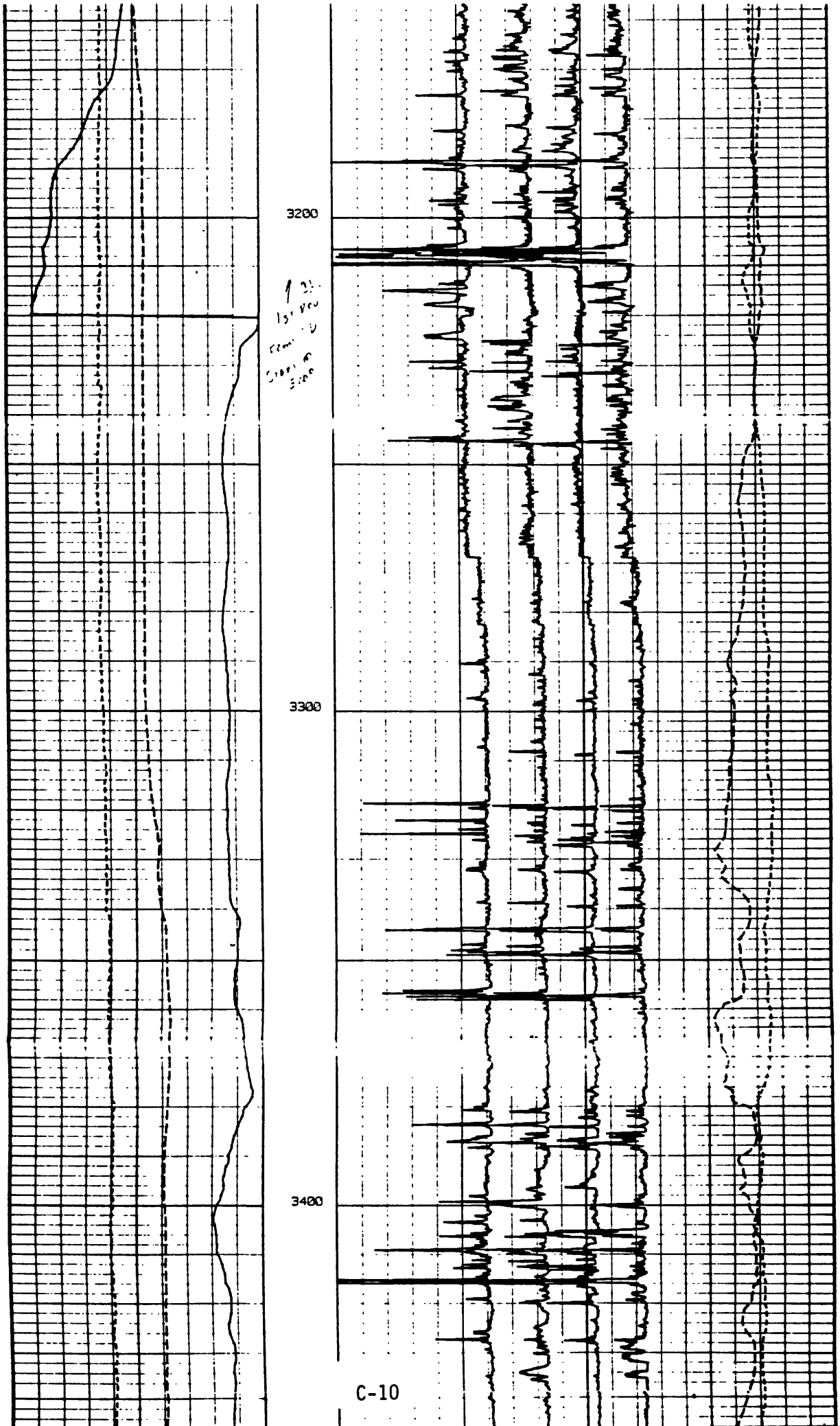
2000
2100
C-5

2300
CSG PT
2400


2400
2500
2600
C-7


2700
2800
2900


2900
3000
3100
C-9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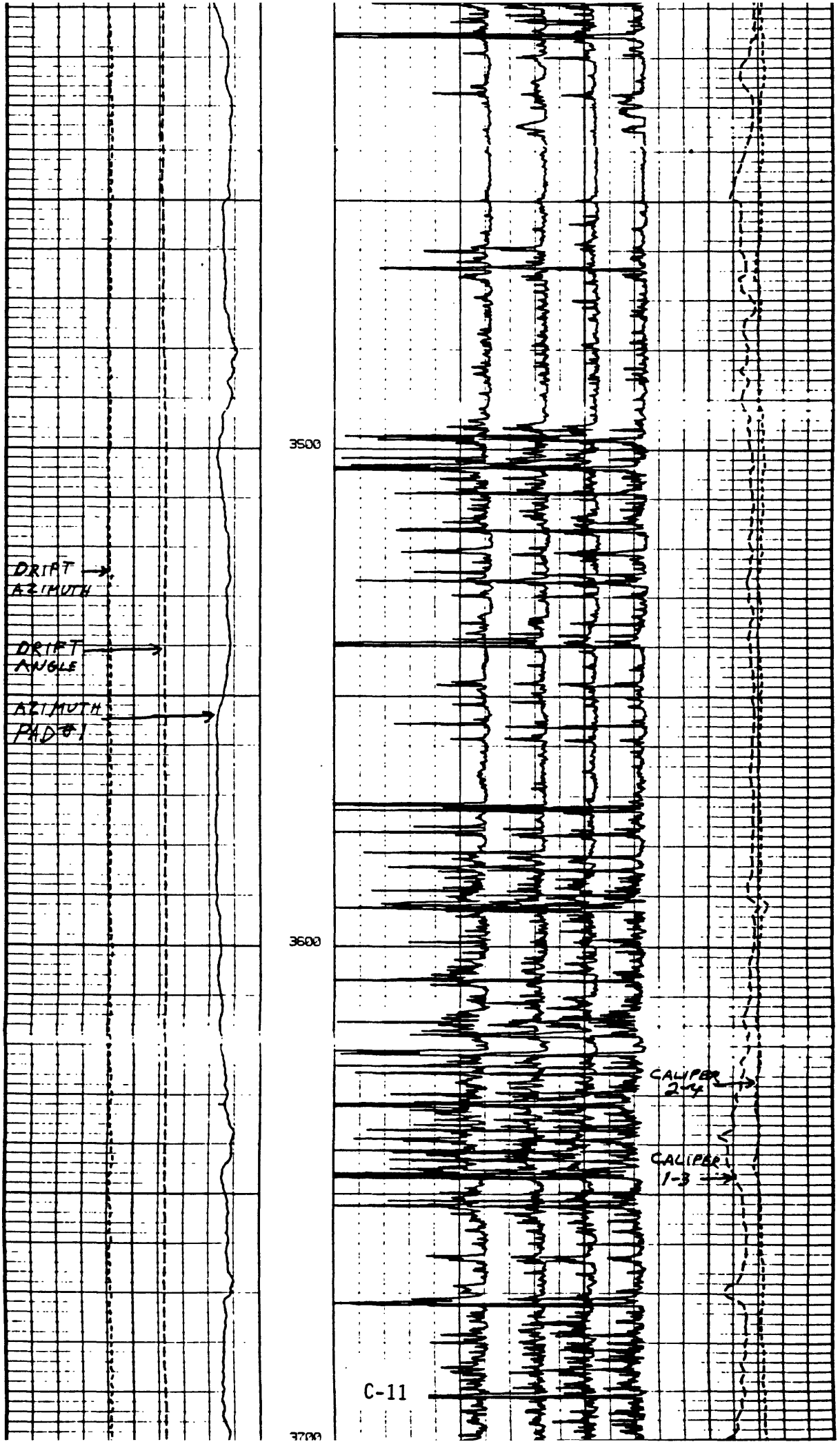
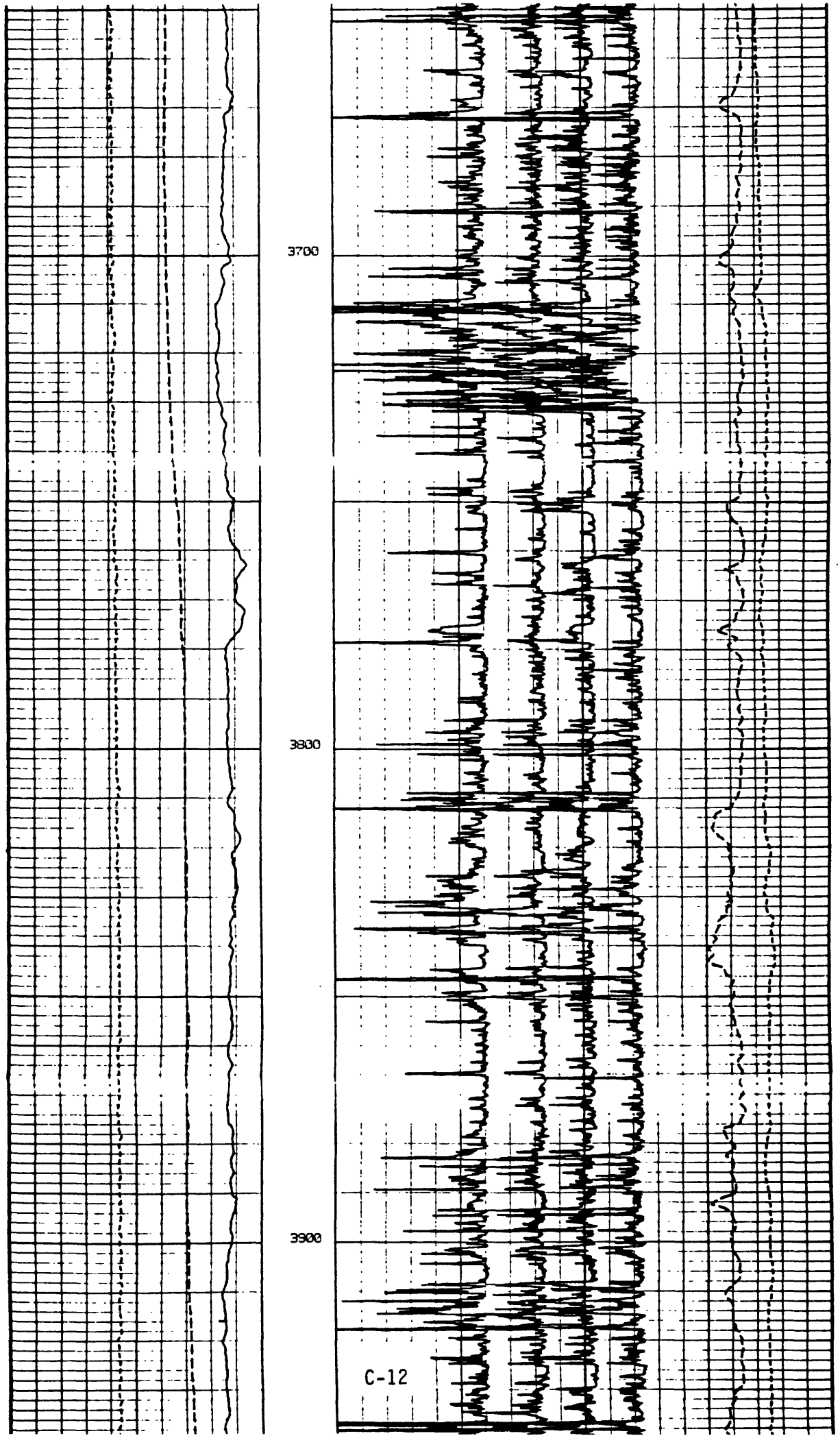

DRIFT AZIMUTH
DRIFT ANGLE
AZIMUTH PAD #1
3500
3600
3700
CALIPER 2-4
CALIPER 1-3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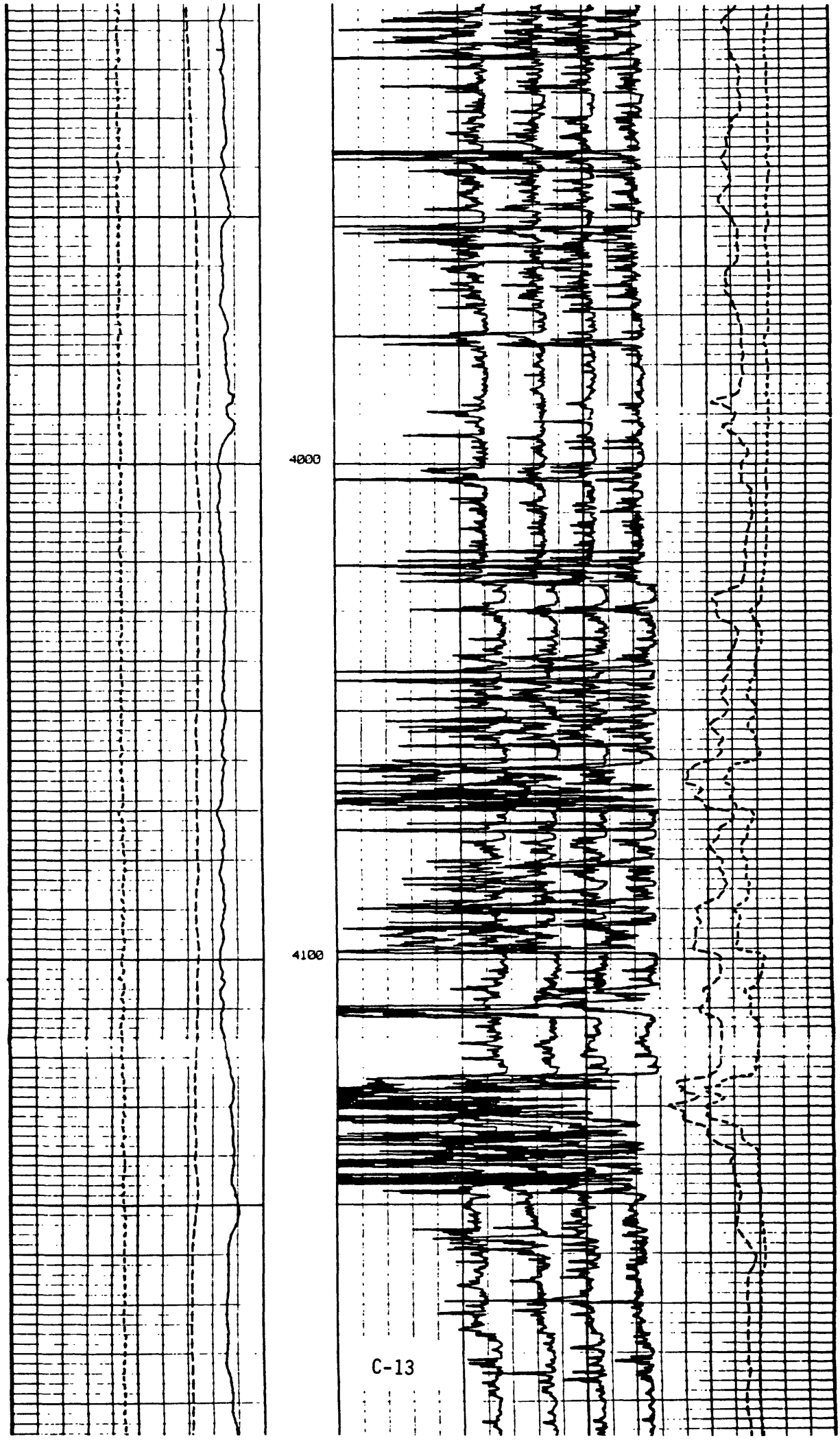
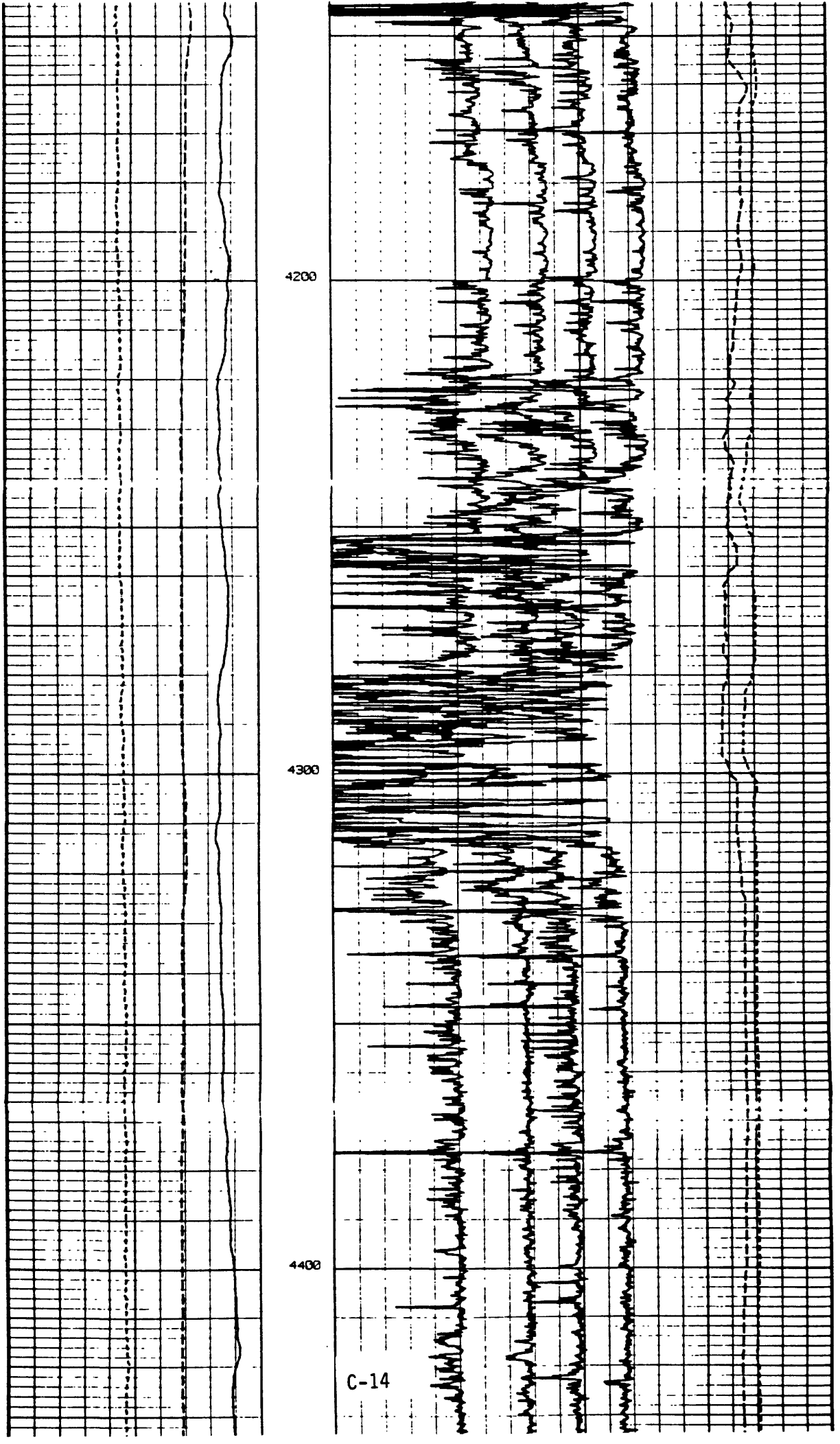
3800
3900
C-12


4000
4100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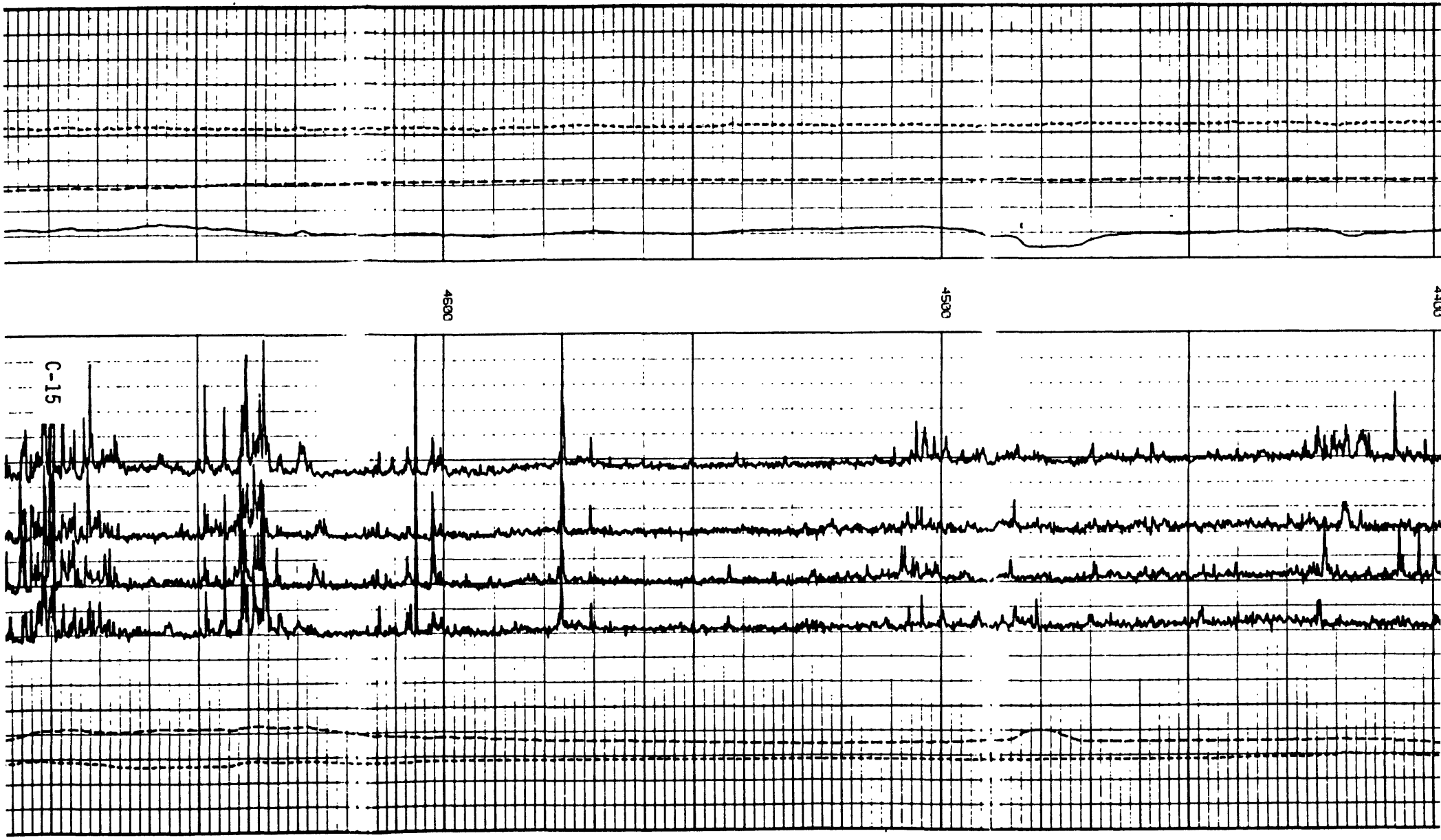
4300
4400
C-14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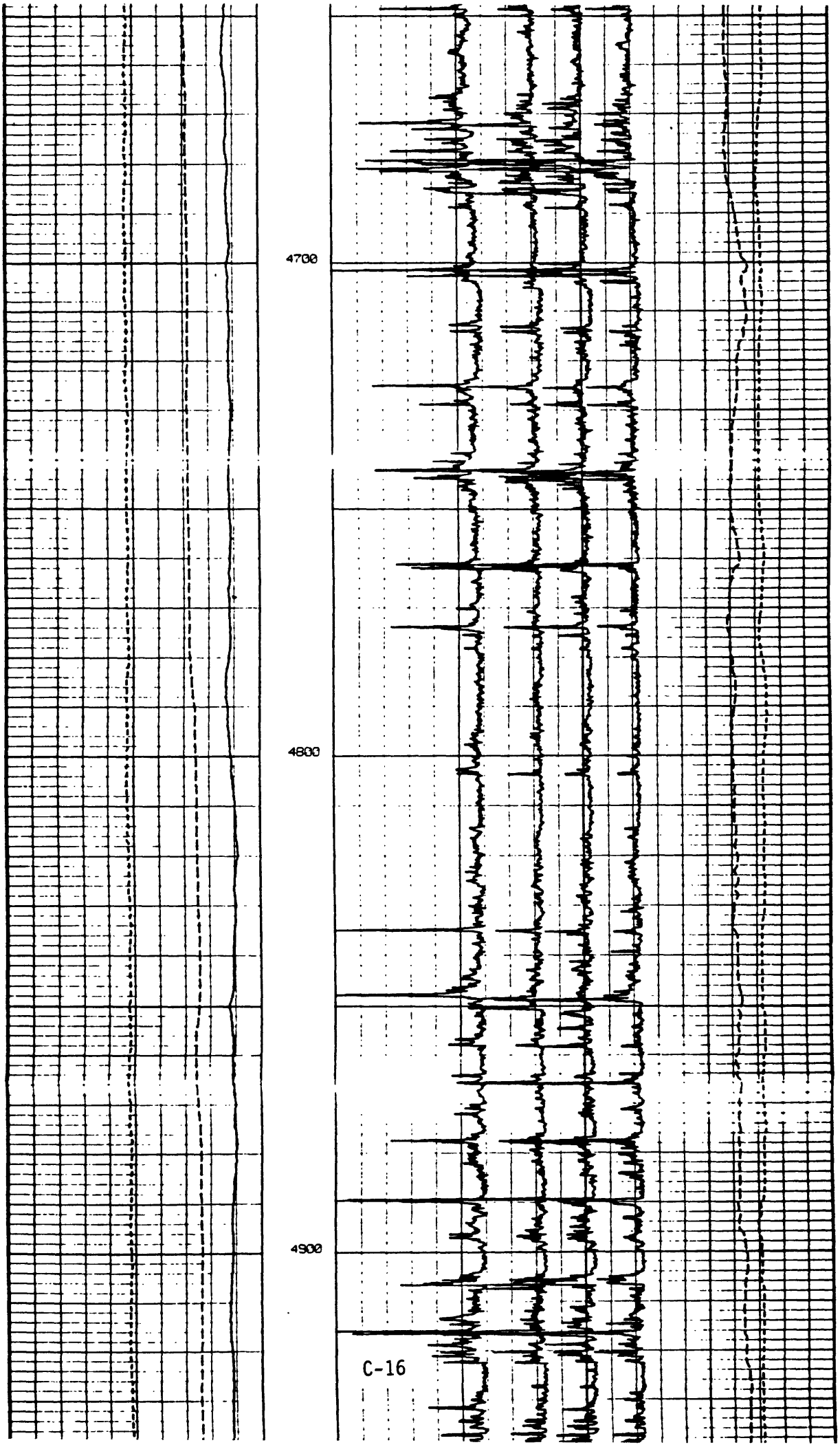
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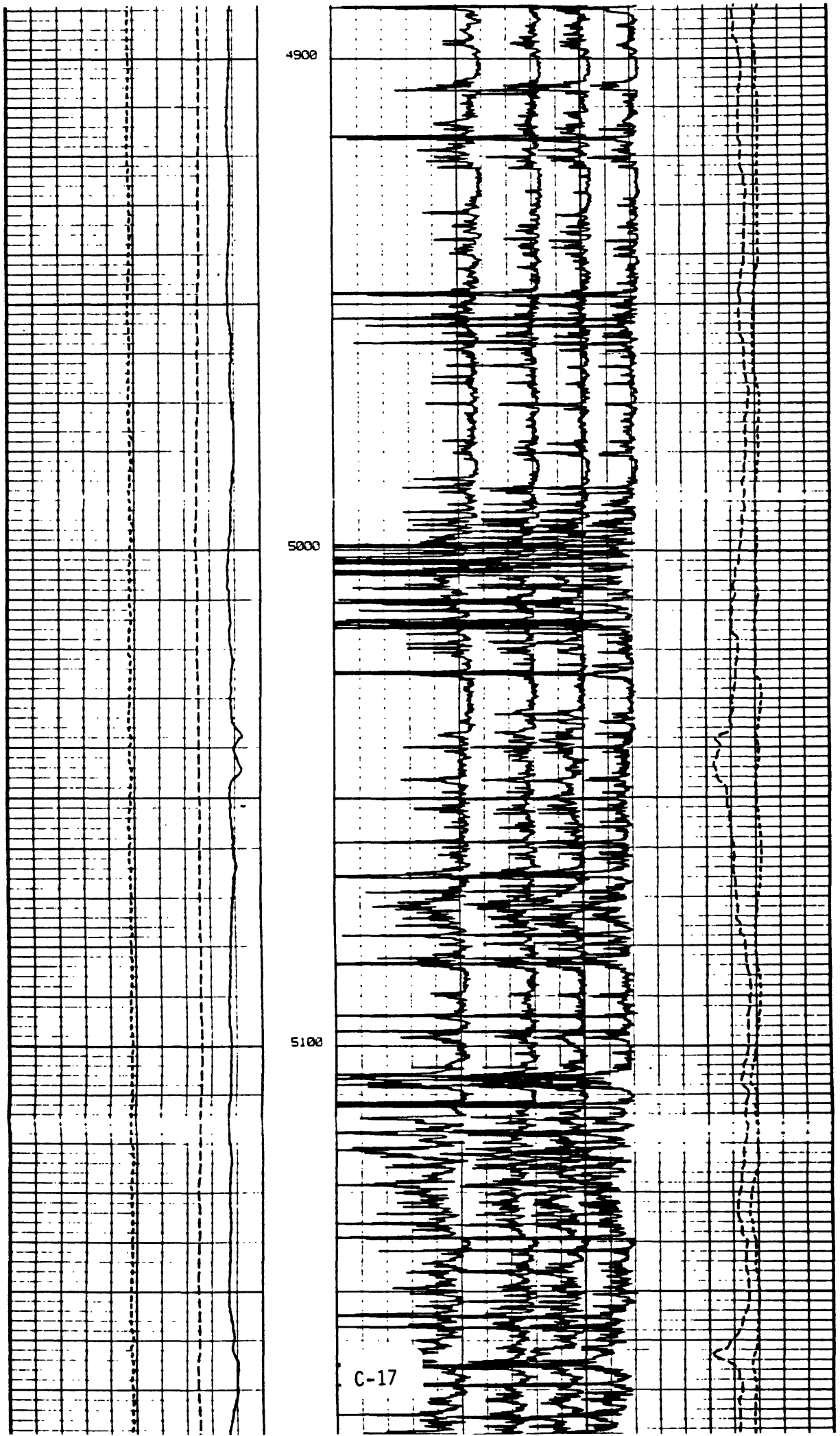
C-16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5000
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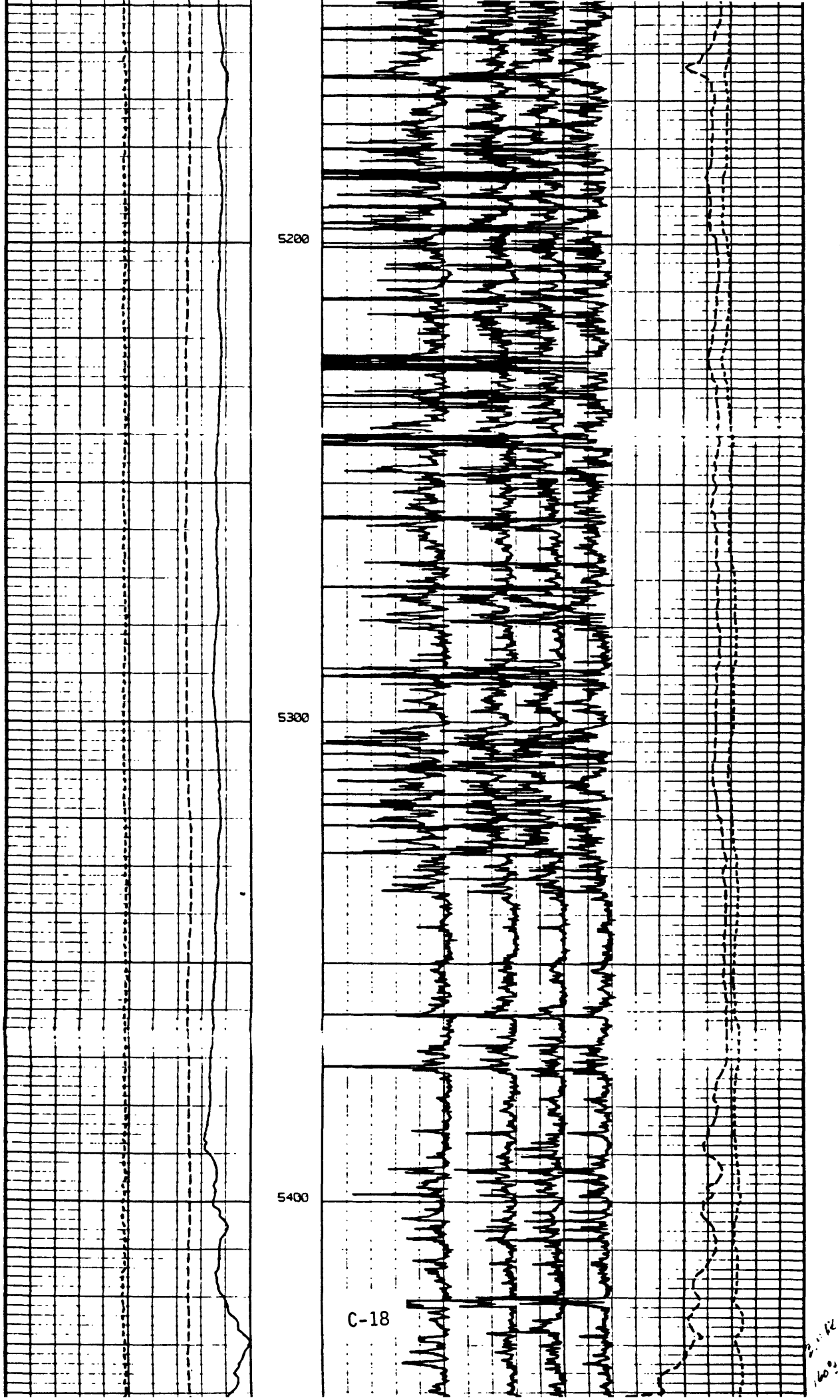
C-17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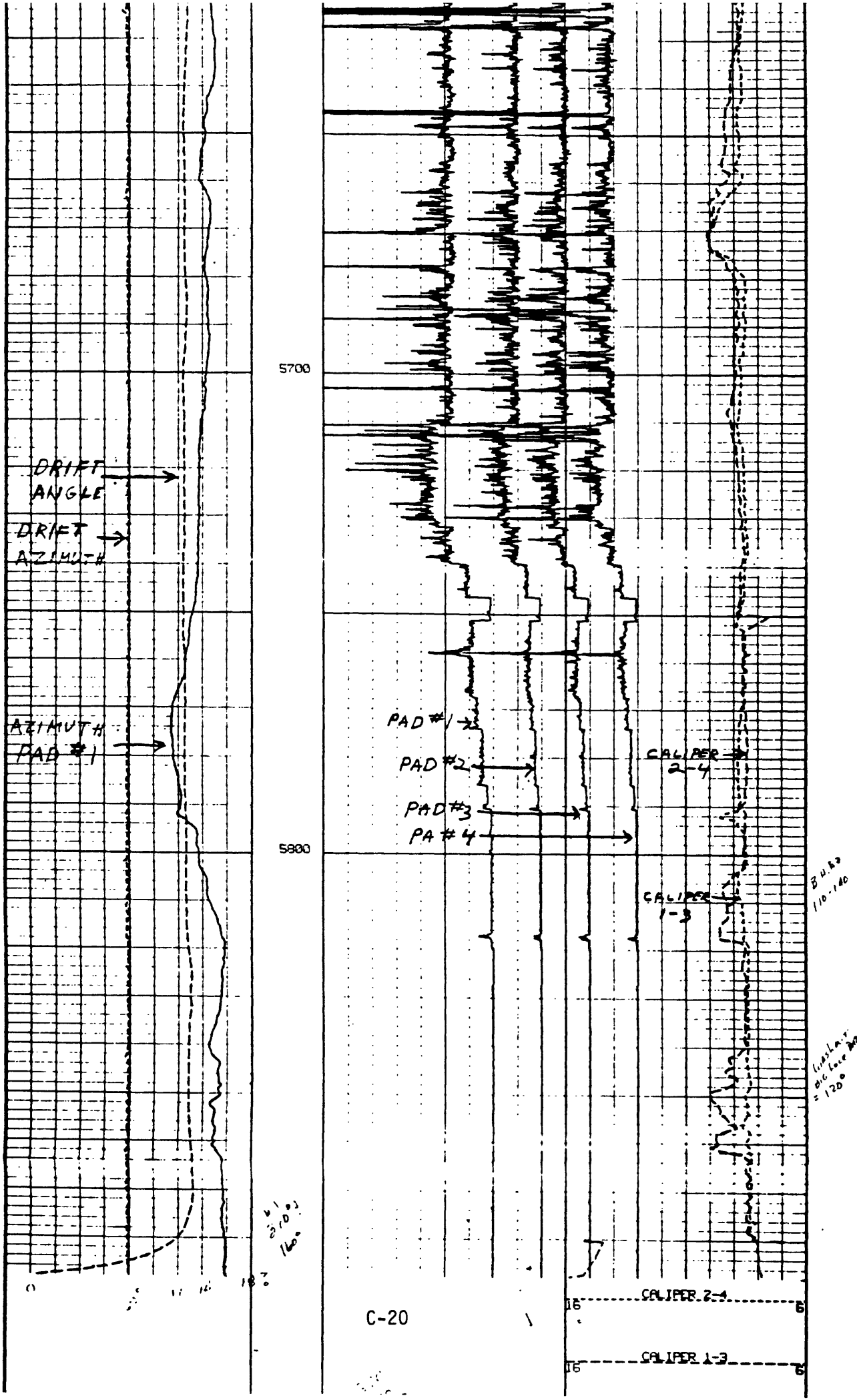
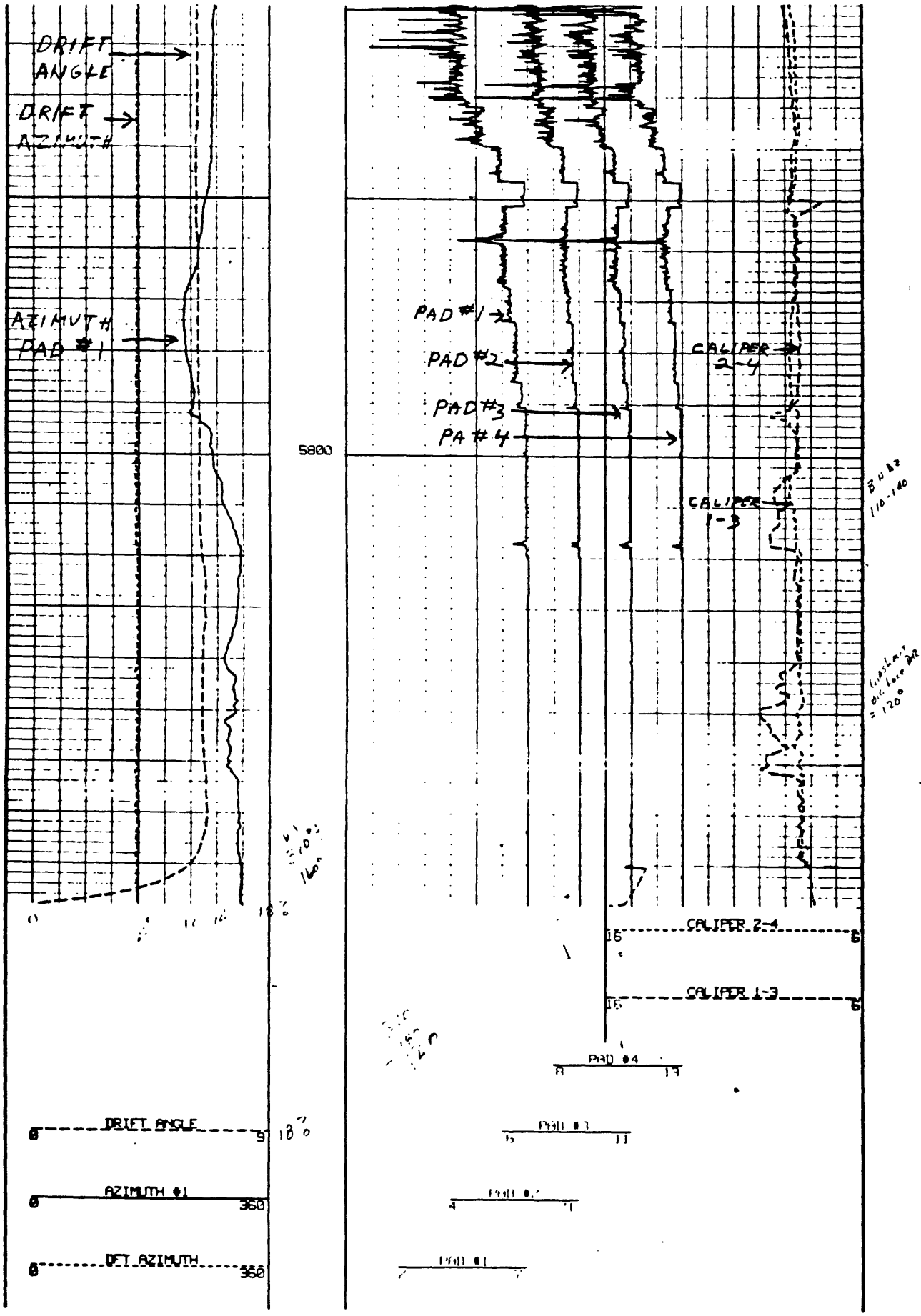
5300
5400
C-18

5400
5500
5600


5700
5800
DRIFT ANGLE
DRIFT AZIMUTH
AZIMUTH PAD #1
PAD #1
PAD #2
PAD #3
PA # 4
CALIPER 2-4
CALIPER 1-3
CALIPER 2-4
CALIPER 1-3


DRIFT ANGLE
DRIFT AZIMUTH
AZIMUTH PAD #1
PAD #1
PAD #2
PAD #3
PA #4
CALIPER 2-4
CALIPER 1-3
5800
DRIFT ANGLE
AZIMUTH #1
DET AZIMUTH
CALIPER 2-4
CALIPER 1-3
PAD #4

Welex

DIP LOG CALCULATIONS

COMPANY ARKOMA PRODUCTION CO.
WELL FEDERAL 1-26
FIELD WILDCAT
COUNTY S.B. DIN STATE CALIF

COMPANY ARKOMA PRODUCTION COMPANY

WELL FEDERAL 1-28

FIELD WILDCAT

COUNTY SAN BERNADINO STATE CALIFORNIA

Location
1303' SOUTH & 1745' EAST FROM
THE NORTHWEST CORNER OF:

Sec. 26 Twp. 3N Rge. 6W

Other Services:
DIL
C/DENS.

Permanent Datum G.L. Elev. 3272
Log Measured From K.B. Ft. Above Perm. Datum
Drilling Measured From K.B.

Elev. K.B. N/A
D.F.
G.L. 3272

Date	3-10-84			
Run No.	ONE			
Depth - Driller	5890			
Depth - Welex	5888			
Btm. Log Inter.	5886			
Top Log Inter.	1328			
Casing - Driller 9	5/8 @ 1313	@	@	@
Casing - Welex	1312			
Bit Size	8 1/2			
Type Fluid in Hole	GEL WATER			
Dens. / Visc.	9.2 / 39	/	/	/
pH / Fluid Loss	8.5 / 11 ml	/ ml	/ ml	/ ml
Source of Sample	FLOWLINE			
R_m @ Meas. Temp.	5.0 @ 62 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	4.6 @ 58 °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	5.1 @ 62 °F	@ °F	@ °F	@ °F
Source R_{mf} R_{mc}	MEASURED	/	/	/
R_m @ BHT	1.86@ 174°F	@ °F	@ °F	@ °F
Time Since Circ.	40 HRS.			
Max. Rec. Temp.	174°F @BHT.	°F @	°F @	°F @
Equip. / Location	2898 / SFS	/	/	/
Recorded By	K. QUALLS, D. SHARBAK			
Witnessed By	D. MANDEL			

Service Ticket No.		Remarks NO REPEAT SECTION DUE TO HOLE CONDITIONS.						
Change in Mud Type or Additional Samples								
Date / Sample No.				Run No.	1	2	3	4
Depth - Driller				Tool Type	DIP			
Type Fluid in Hole				Tool Number	76880			
				Pad Type	FORXO			
Dens. / Visc				Correlated By				
pH / Fluid Loss		ml		Computed By				
Source of Sample								
R_m @ Meas. Temp	@	F	@ F	Remarks				
R_{mf} @ Meas. Temp	@	F	@ F					
R_{mc} @ Meas. Temp	@	F	@ F					
Source R_{mf} / R_{mc}								
R_m @ BHT	1.86@	174 F	@ F					
R_{mf} @ BHT	1.61@	174 F	@ F					
R_{mc} @ BHT	1.62@	174 F	@ F					
PROGRAM 3.09								

Magnetic Declination NORTH 15° EAST

TABLE OF CONSTANTS FOR DETERMINING VERTICAL DIFFERENCE AT VARIOUS DIP ANGLES

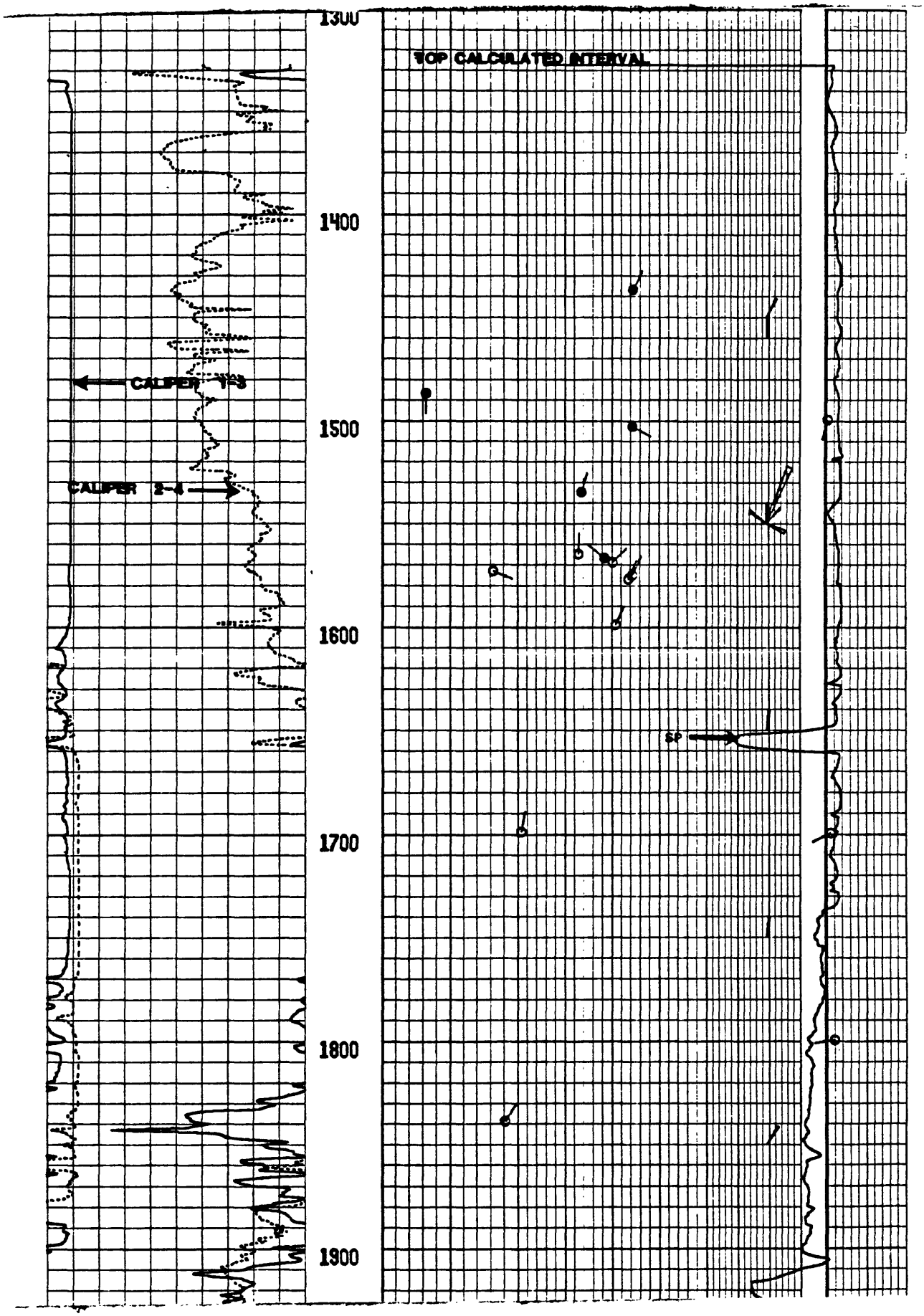
DIP ANGLES Degrees	CONSTANT	DIP ANGLES Degrees	CONSTANT	DIP ANGLES Degrees	CONSTANT	DIP ANGLES Degrees	CONSTANT
1	.0175	11	.194	21	.384	35	.700
2	.035	12	.213	22	.404	40	.839
3	.052	13	.231	23	.425	45	1.000
4	.070	14	.249	24	.445	50	1.192
5	.088	15	.268	25	.466	55	1.428
6	.105	16	.287	26	.487	60	1.732
7	.123	17	.306	27	.509	65	2.144
8	.141	18	.325	28	.531	70	2.748
9	.158	19	.344	29	.554	75	3.732
10	.176	20	.364	30	.577	80	5.671

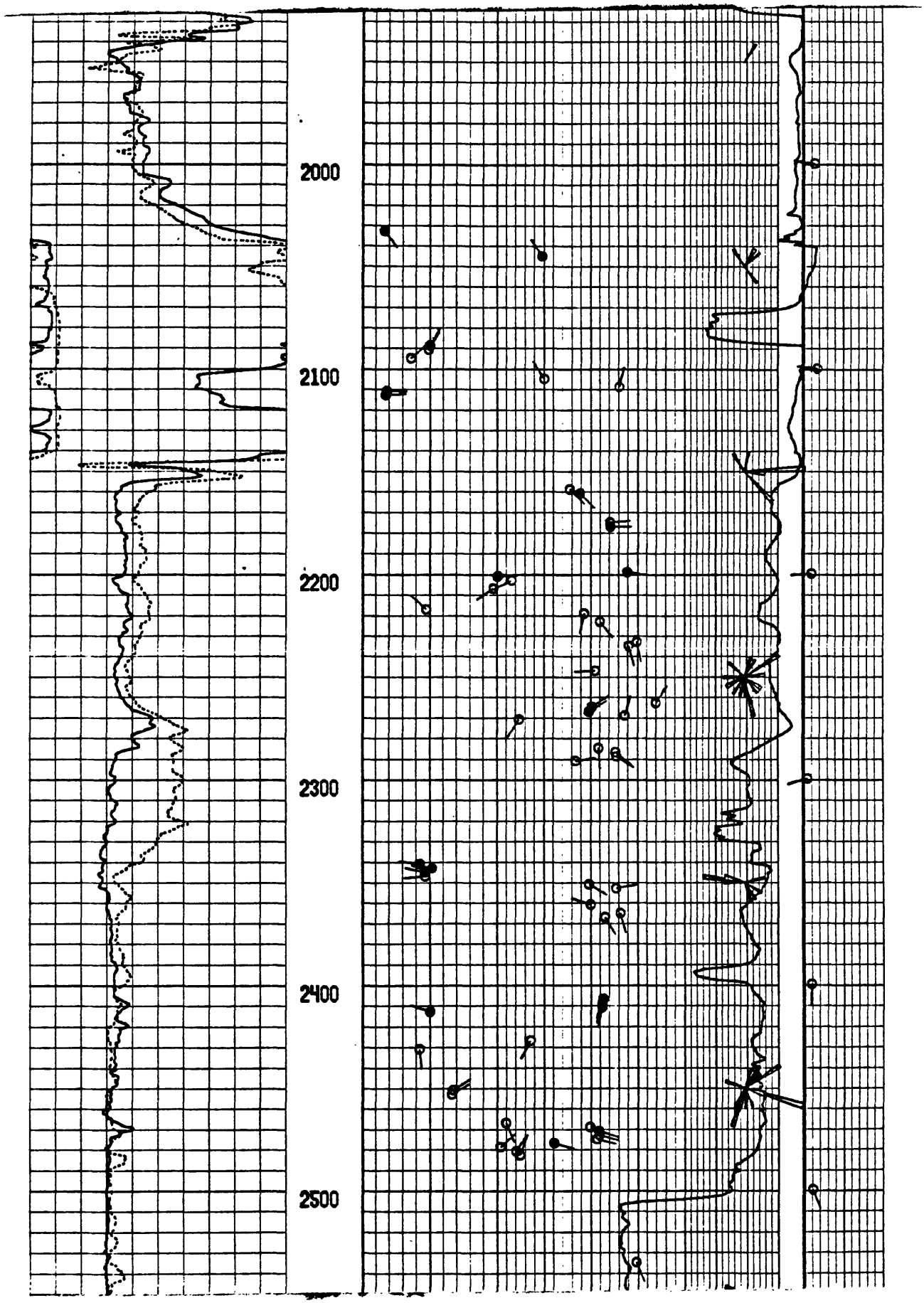
Vertical difference in feet is obtained by multiplying the constant for any given dip angle by the horizontal distance in feet.

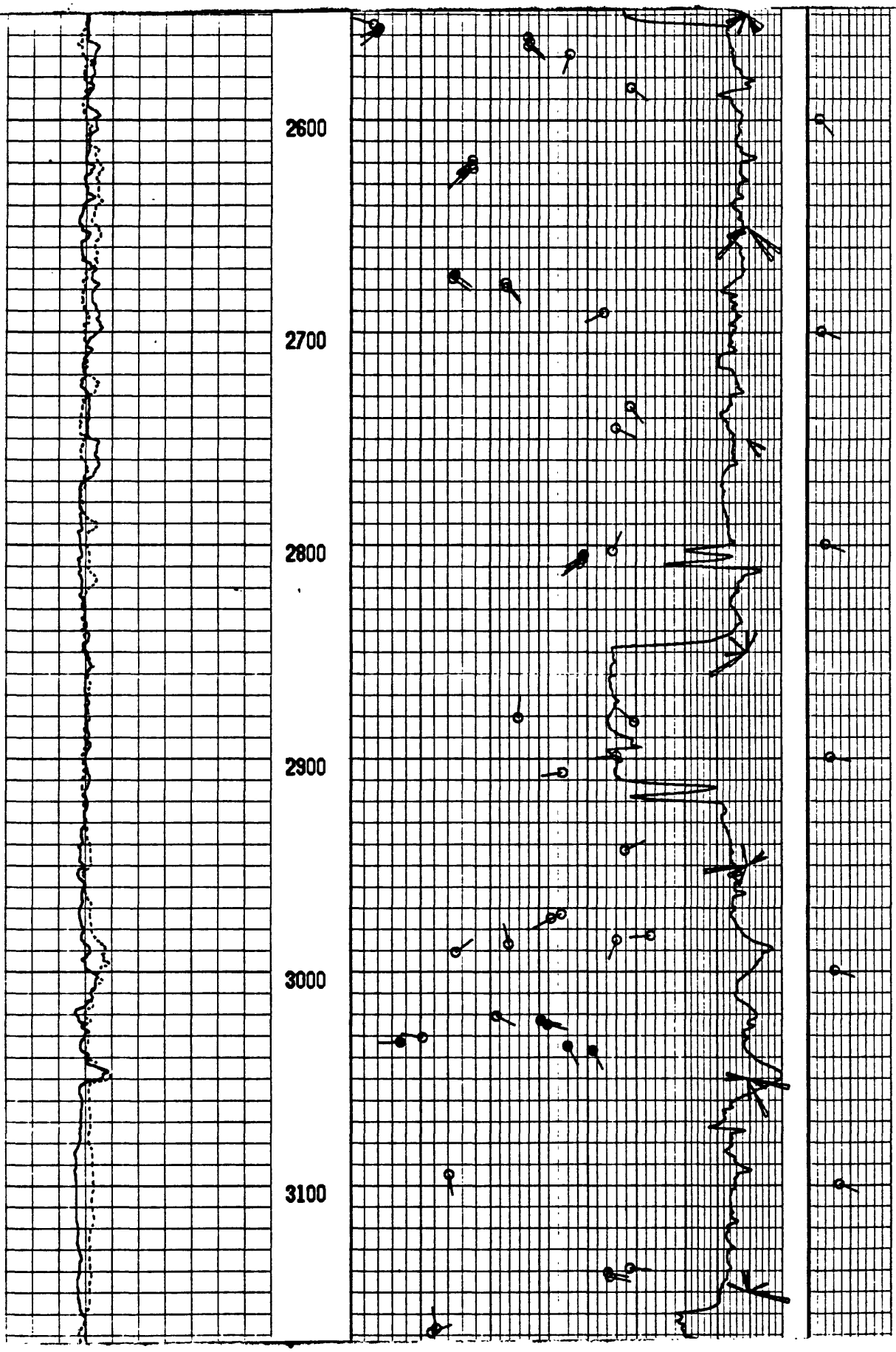
Example: Dip angle 10°. Horizontal distance 440 ft.
Vertical difference = .176 x 440 = 77.44

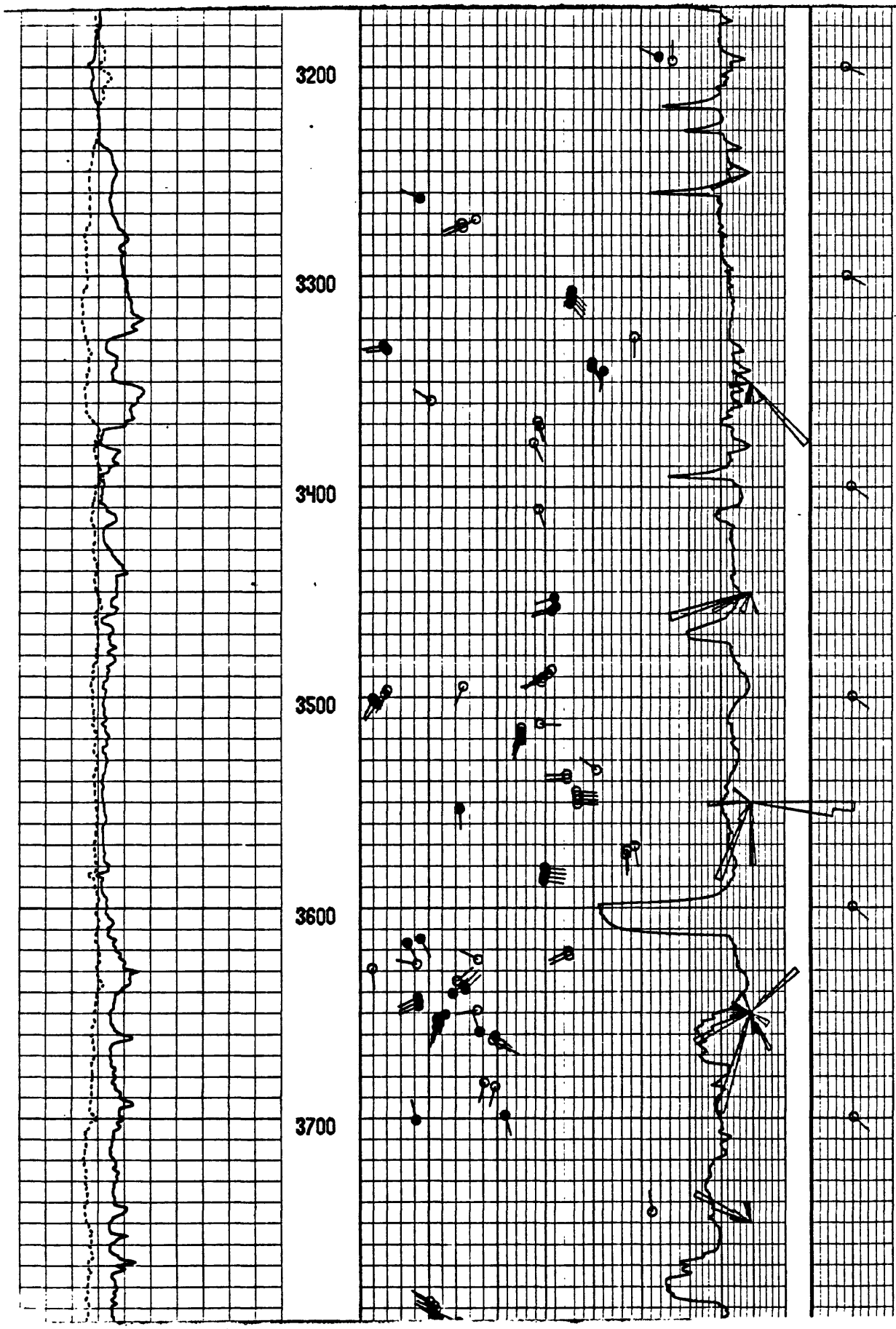
GRAPHIC PRESENTATION

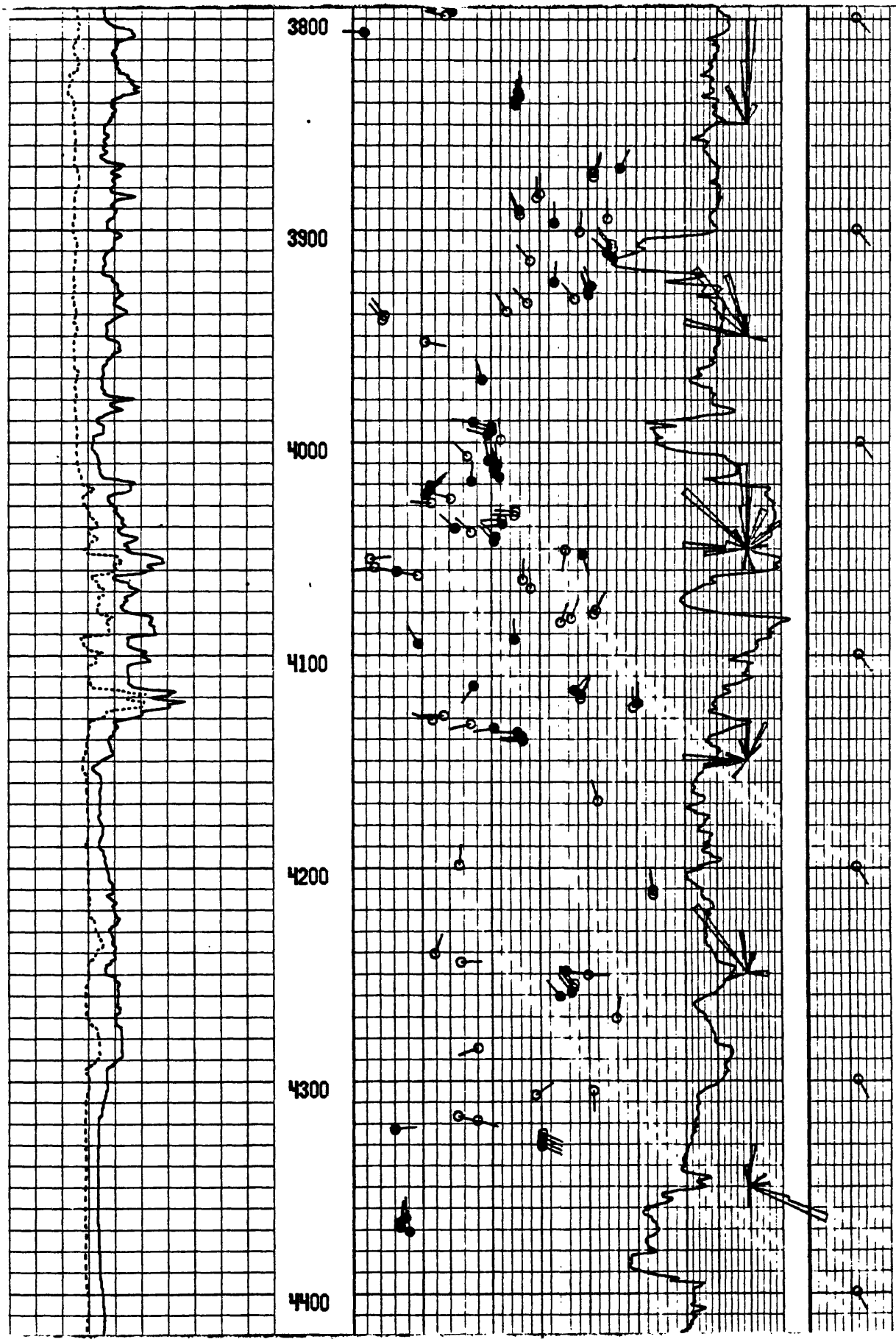
CORRELATION CURVE	DEPTH	TRUE DIP ANGLE AND AZIMUTH	DRIFT AND ORIENTATION OF TOOL
		0° 10° 20° 30° 40° 50° 60° 70° 80° 90°	0° 20

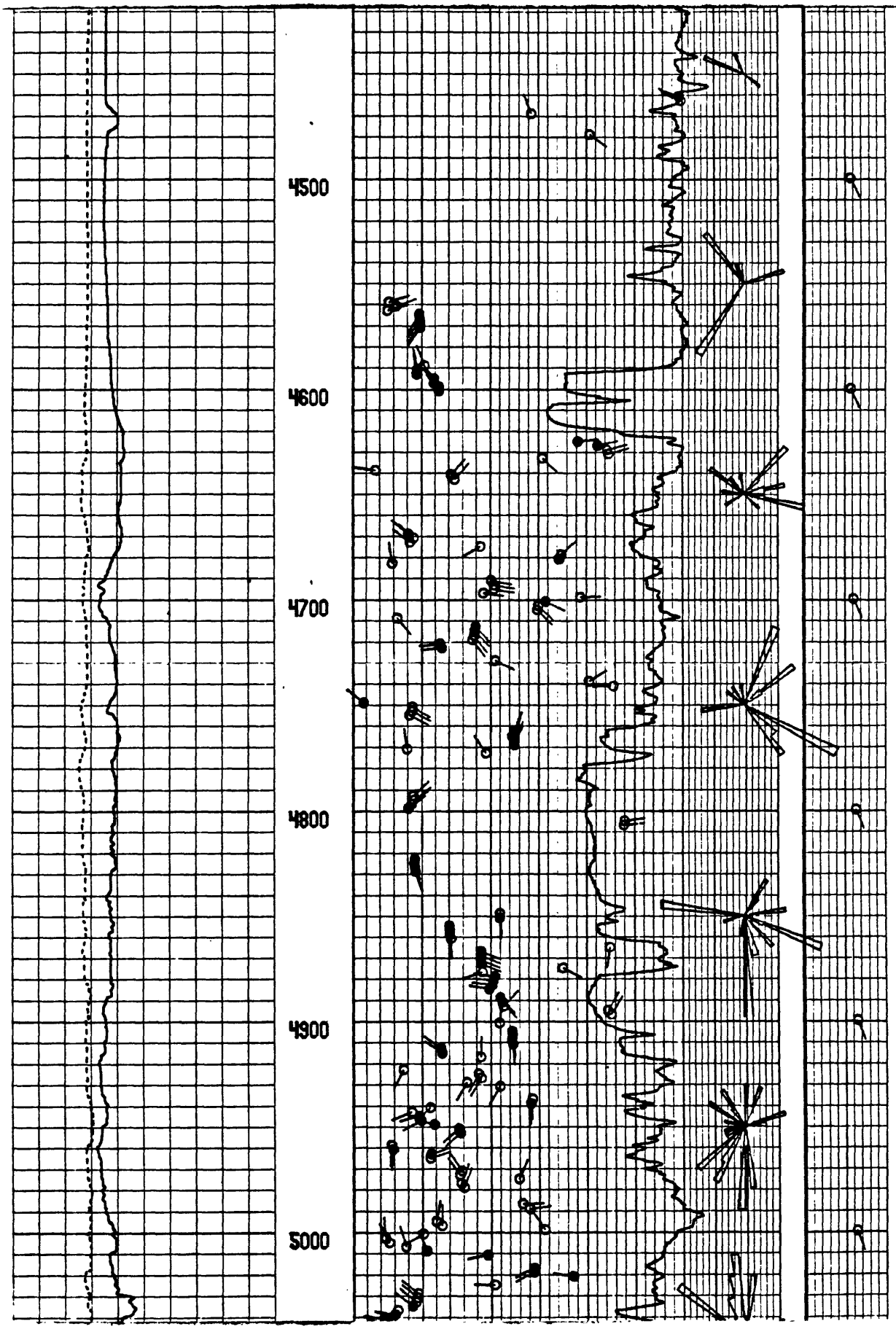

1300
1400
1500
1600
1700
1800
1900
TOP CALCULATED INTERVAL
CALIPER 1-3
CALIPER 2-4
SP

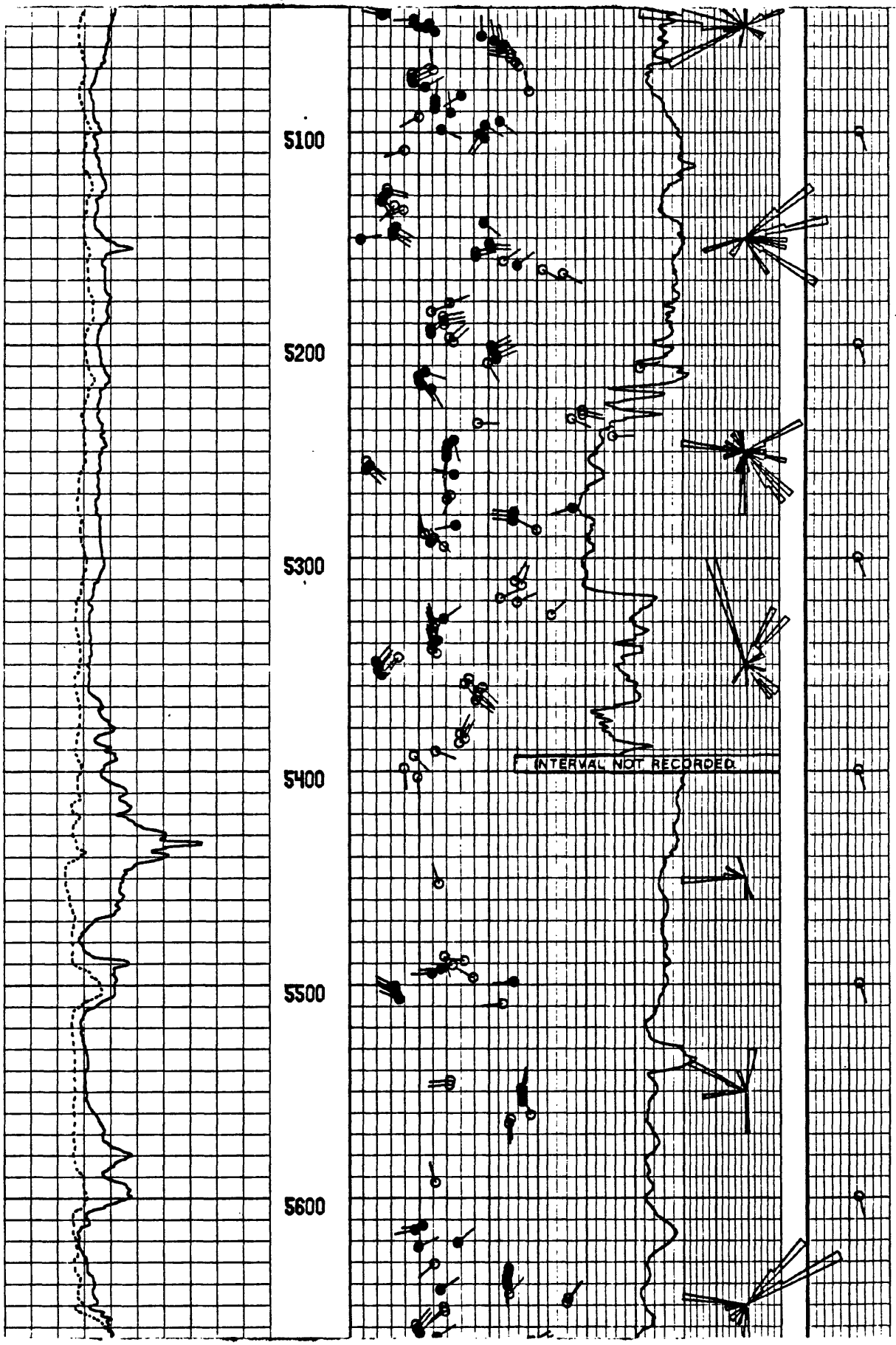

2000
2100
2200
2300
2400
2500

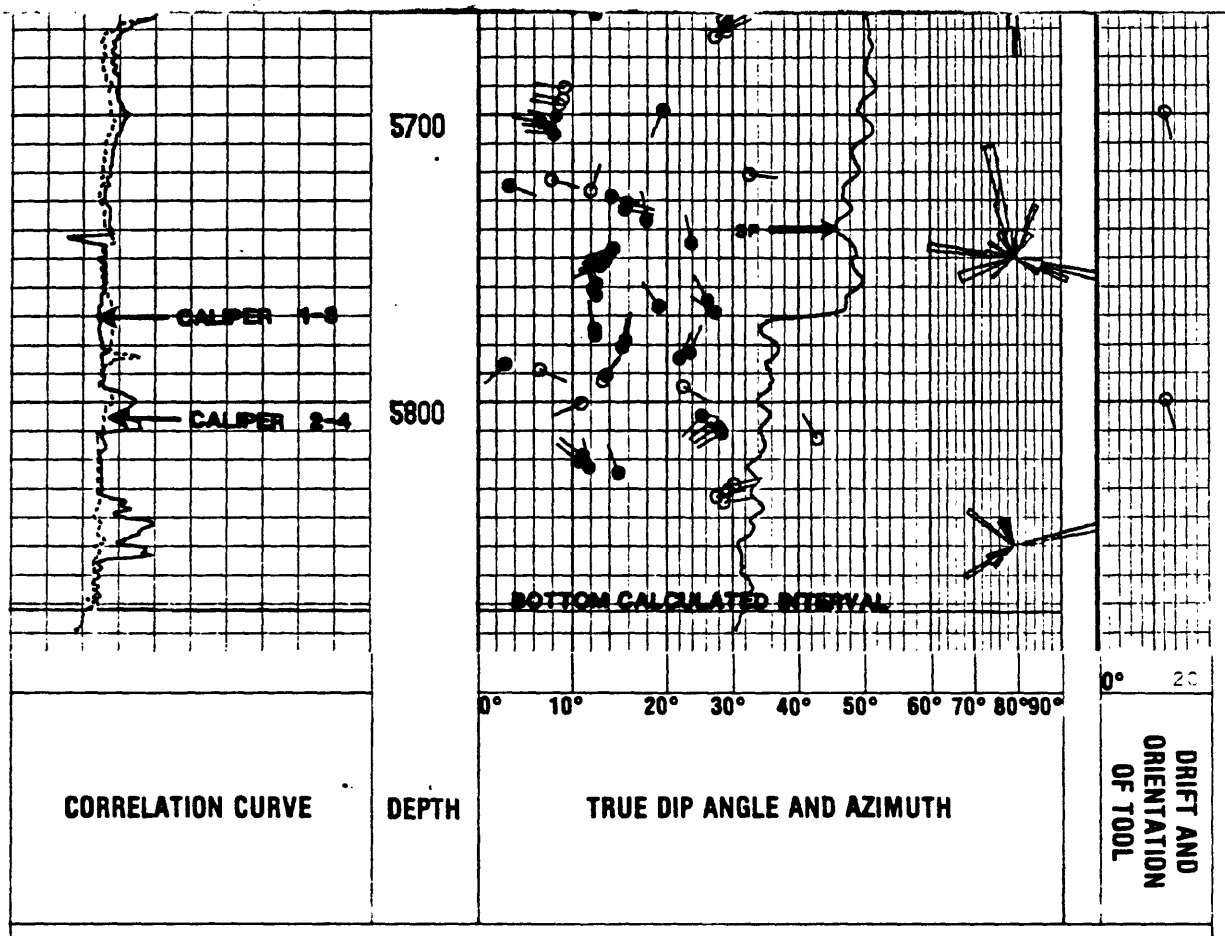

2600
2700
2800
2900
3000
3100

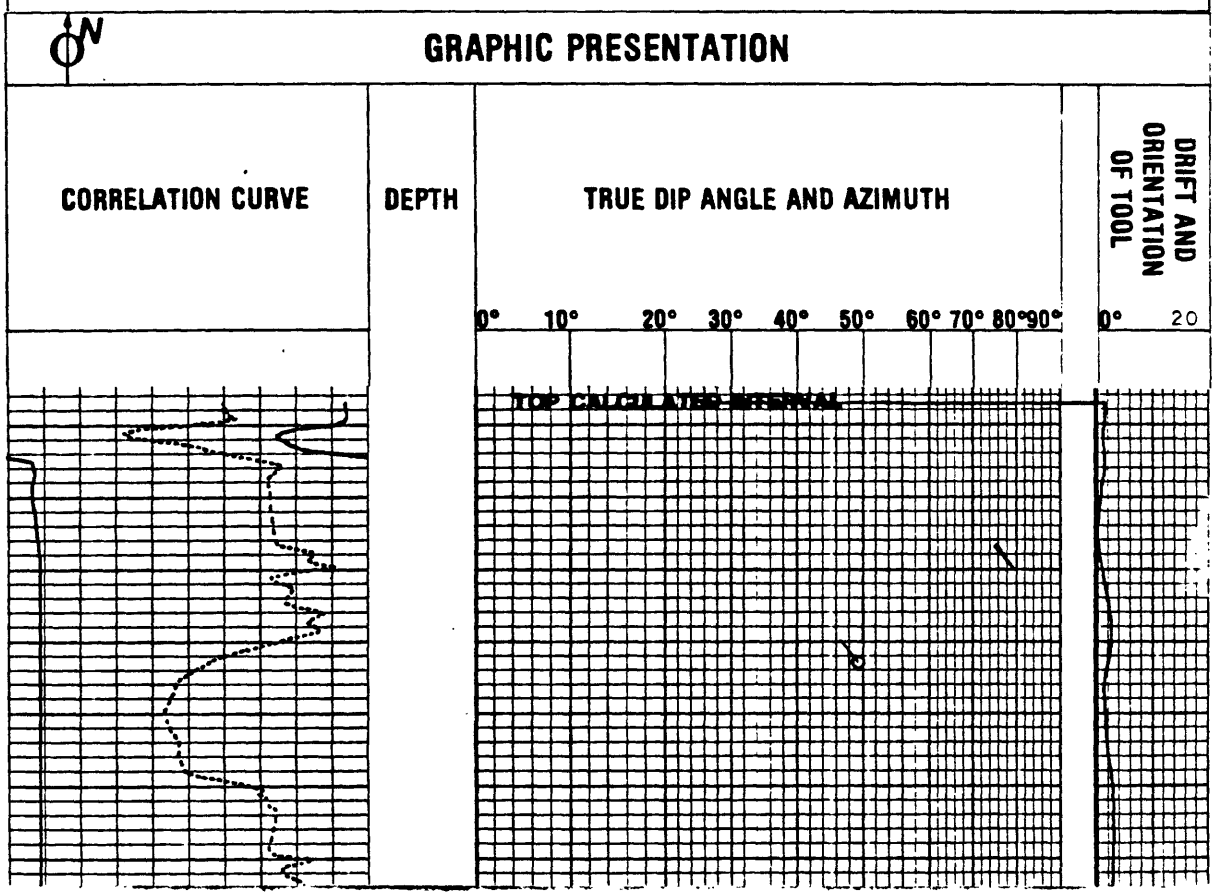

3200
3300
3400
3500
3600
3700

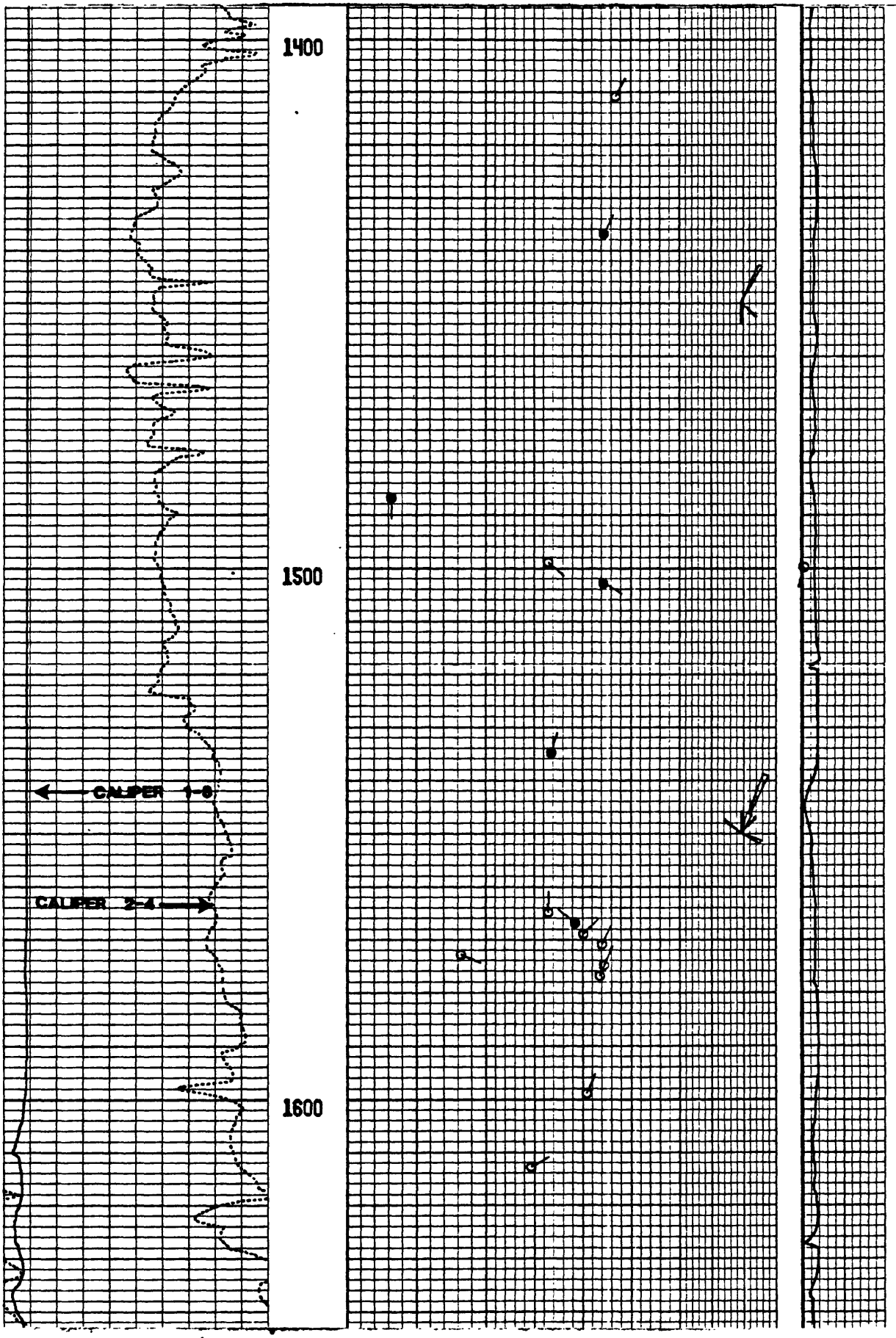

3800
3900
4000
4100
4200
4300
4400

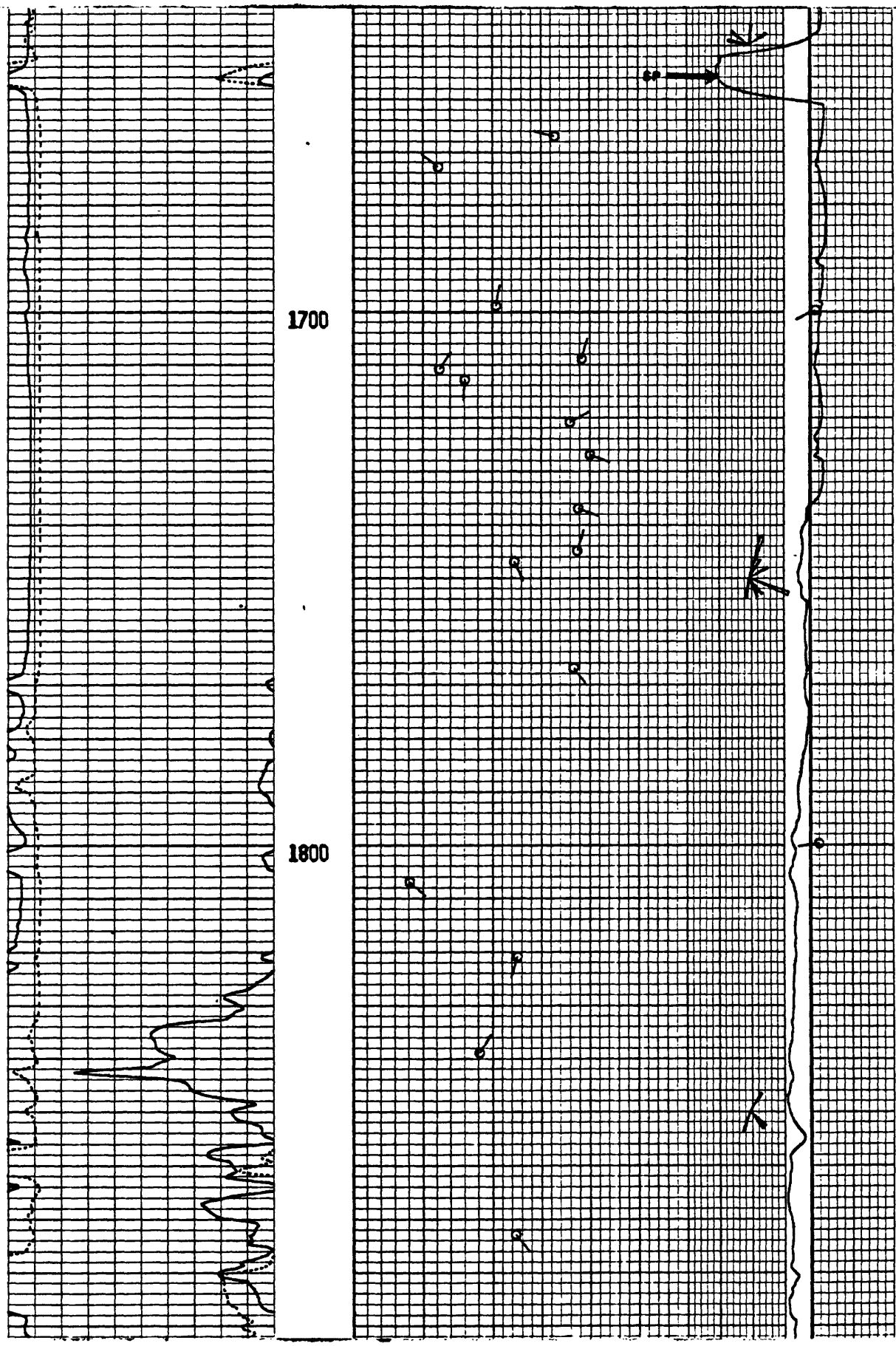

4500
4600
4700
4800
4900
5000

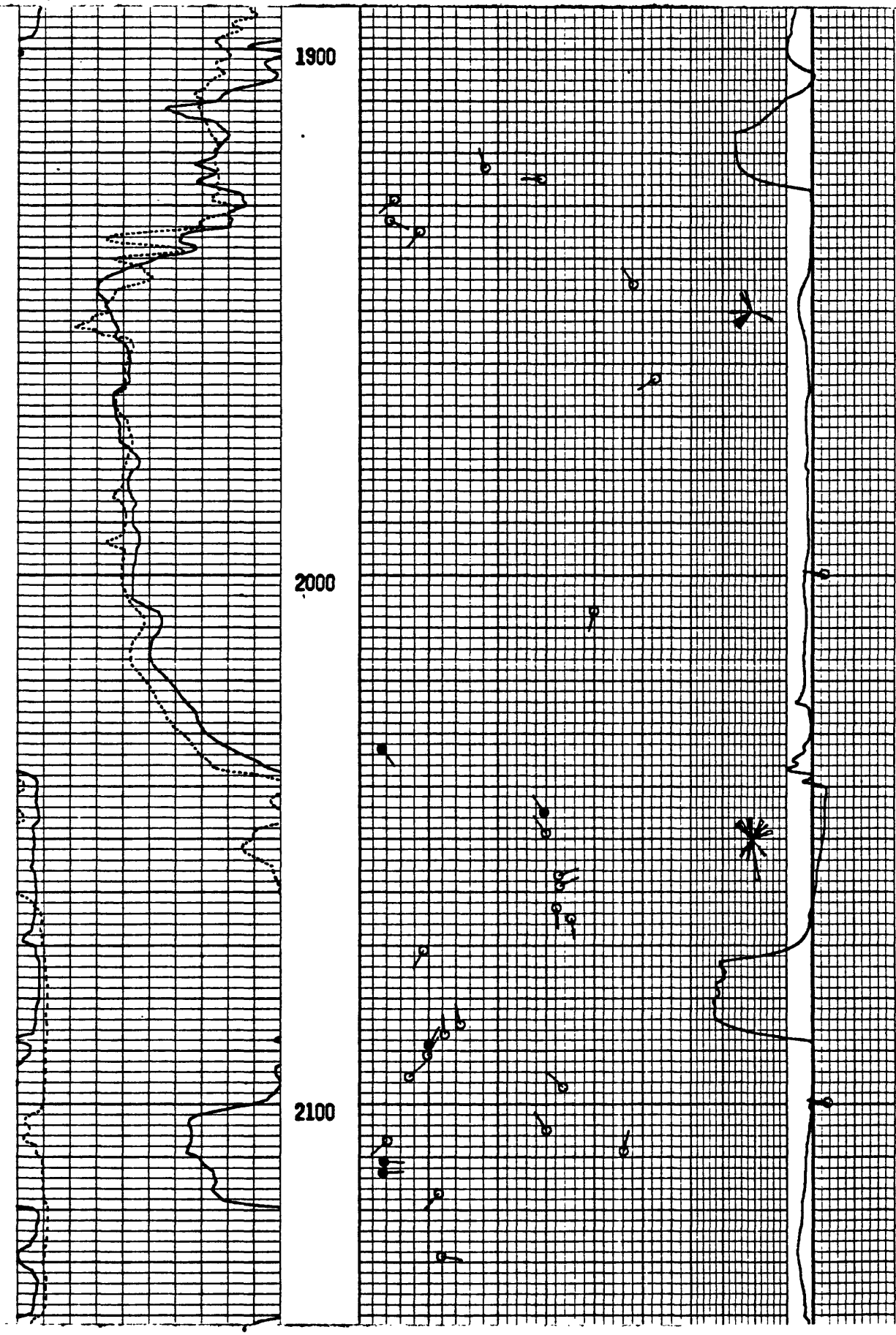

5100
5200
5300
5400
5500
5600
INTERVAL NOT RECORDED

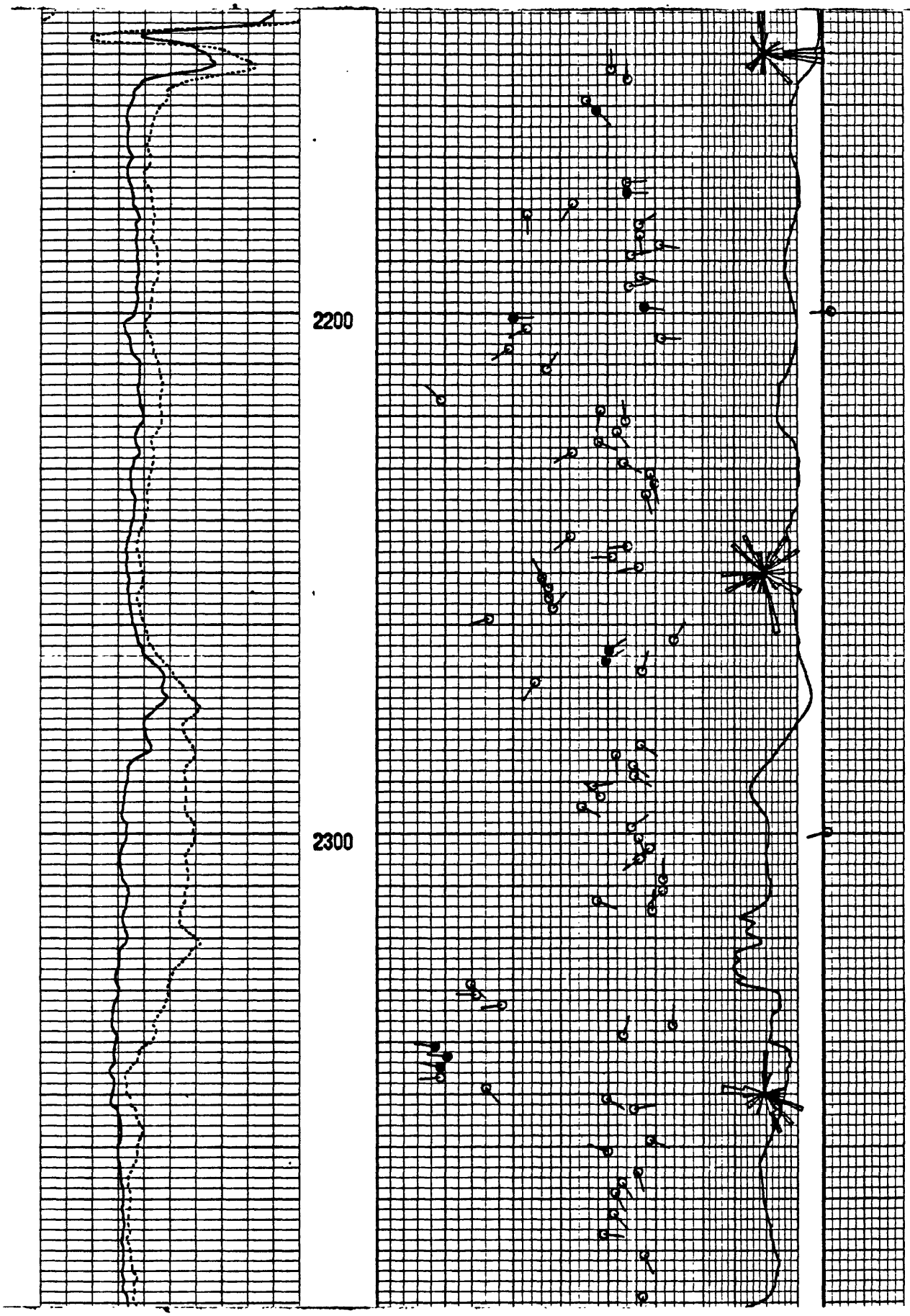

5700
CALIPER 1-3
CALIPER 2-4
5800
BOTTOM CALCULATED INTERVAL
0° 10° 20° 30° 40° 50° 60° 70° 80° 90°
0° 20
CORRELATION CURVE
DEPTH
TRUE DIP ANGLE AND AZIMUTH
DRIFT AND ORIENTATION OF TOOL


N
GRAPHIC PRESENTATION
CORRELATION CURVE
DEPTH
TRUE DIP ANGLE AND AZIMUTH
DRIFT AND ORIENTATION OF TOOL
0° 10° 20° 30° 40° 50° 60° 70° 80° 90°
0° 20
TOP CALCULATED INTERVAL


1400
1500
1600
CALIPER 1-3
CALIPER 2-4


1700
1800


1900
2000
2100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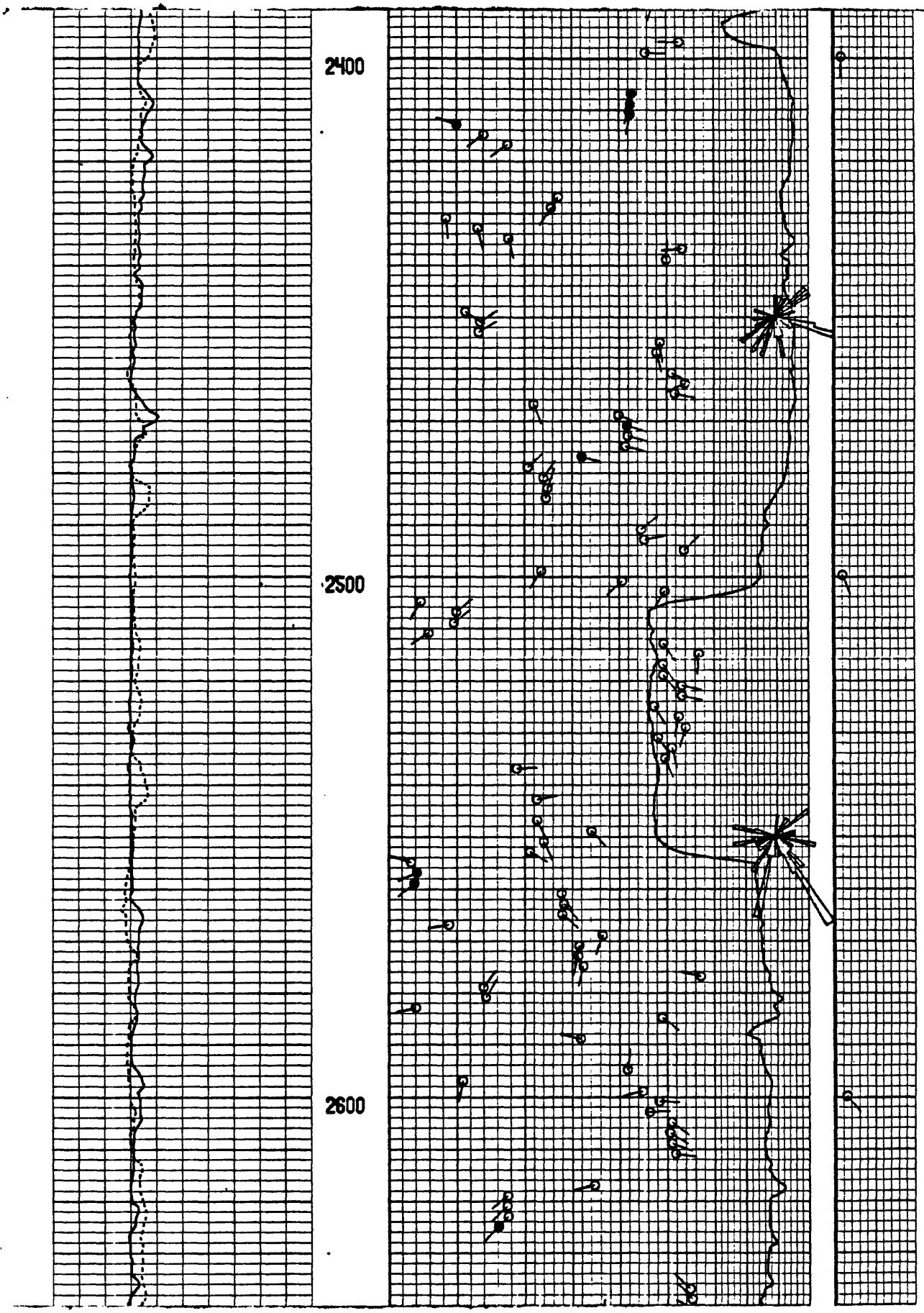
2300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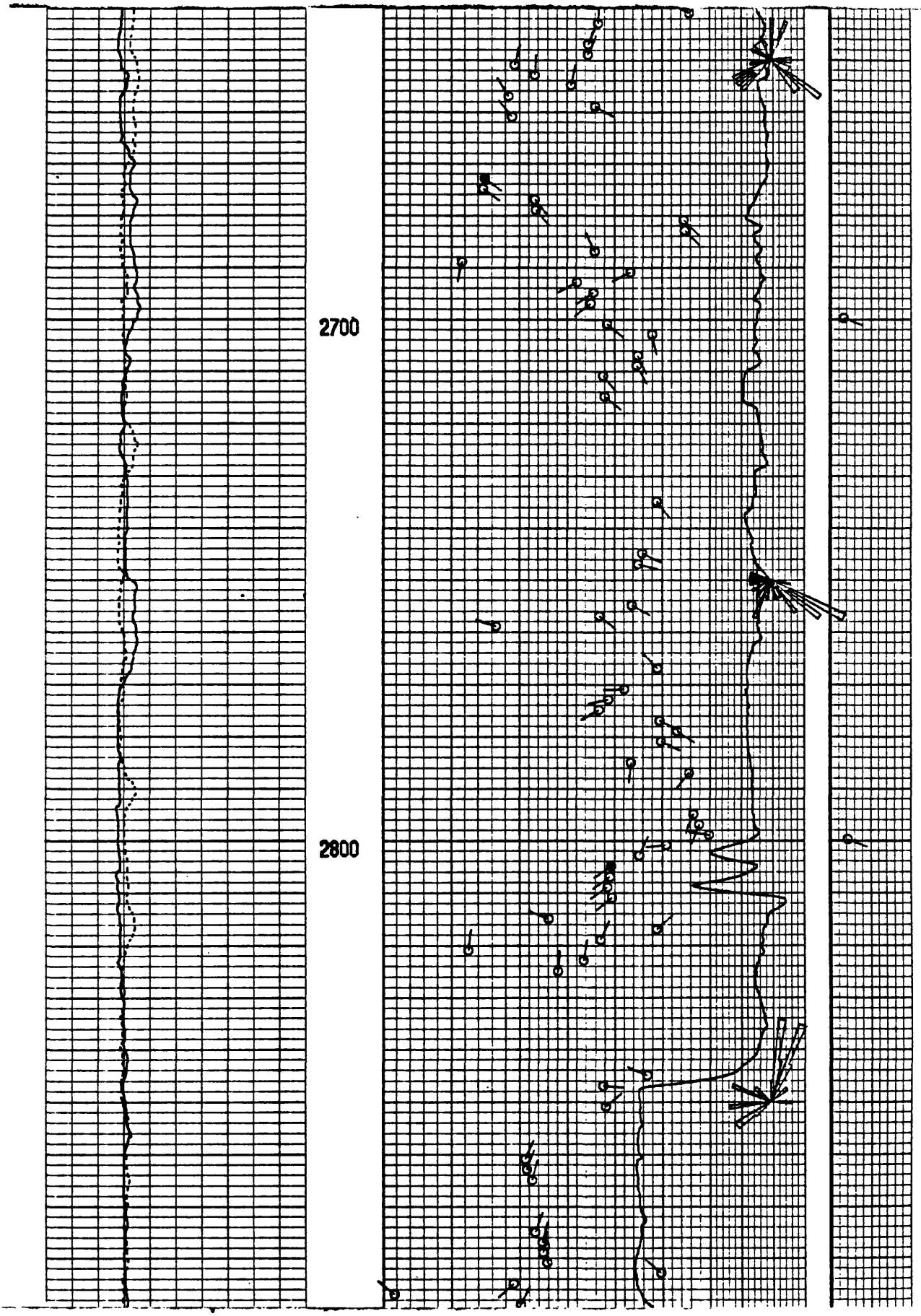
2600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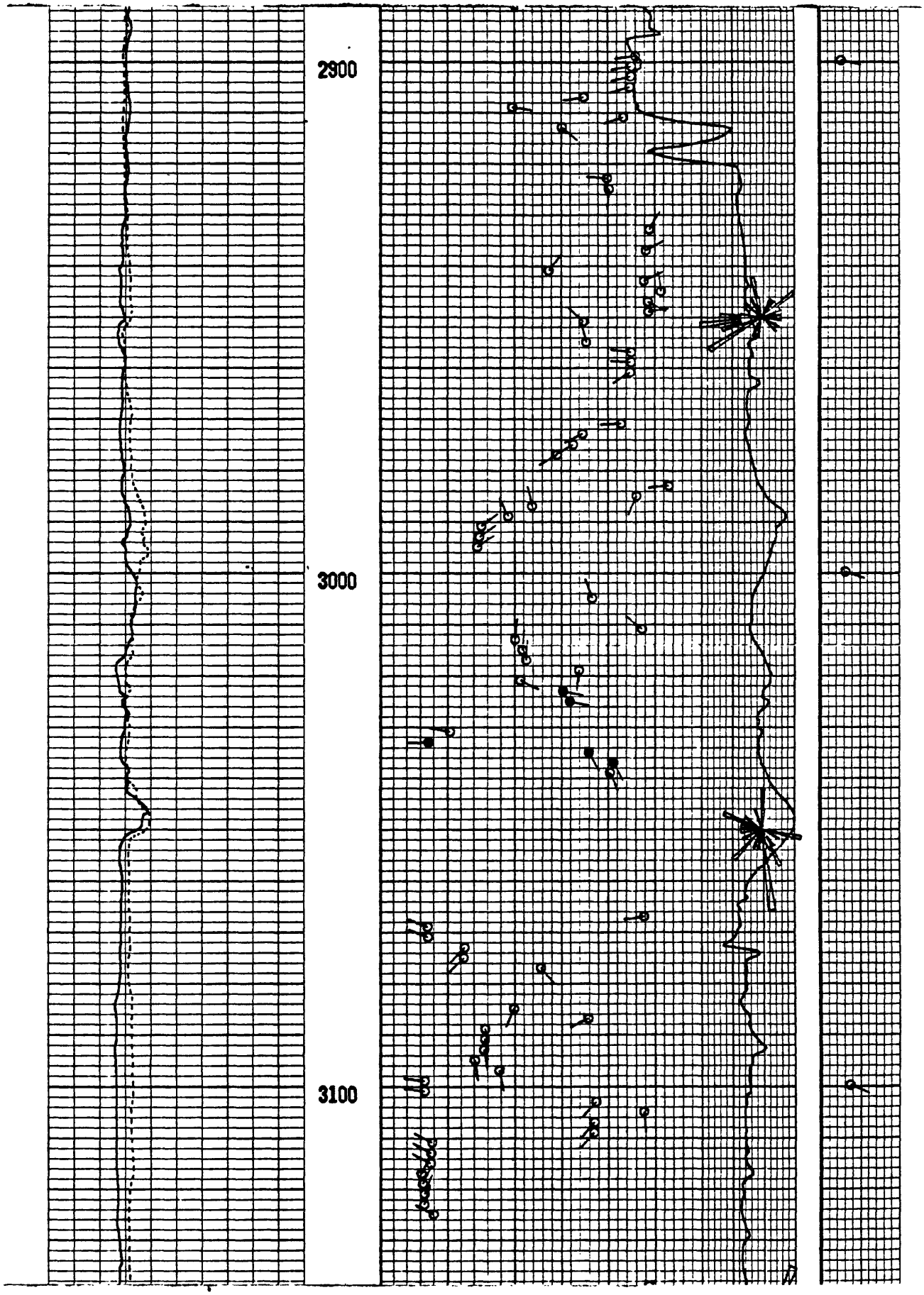
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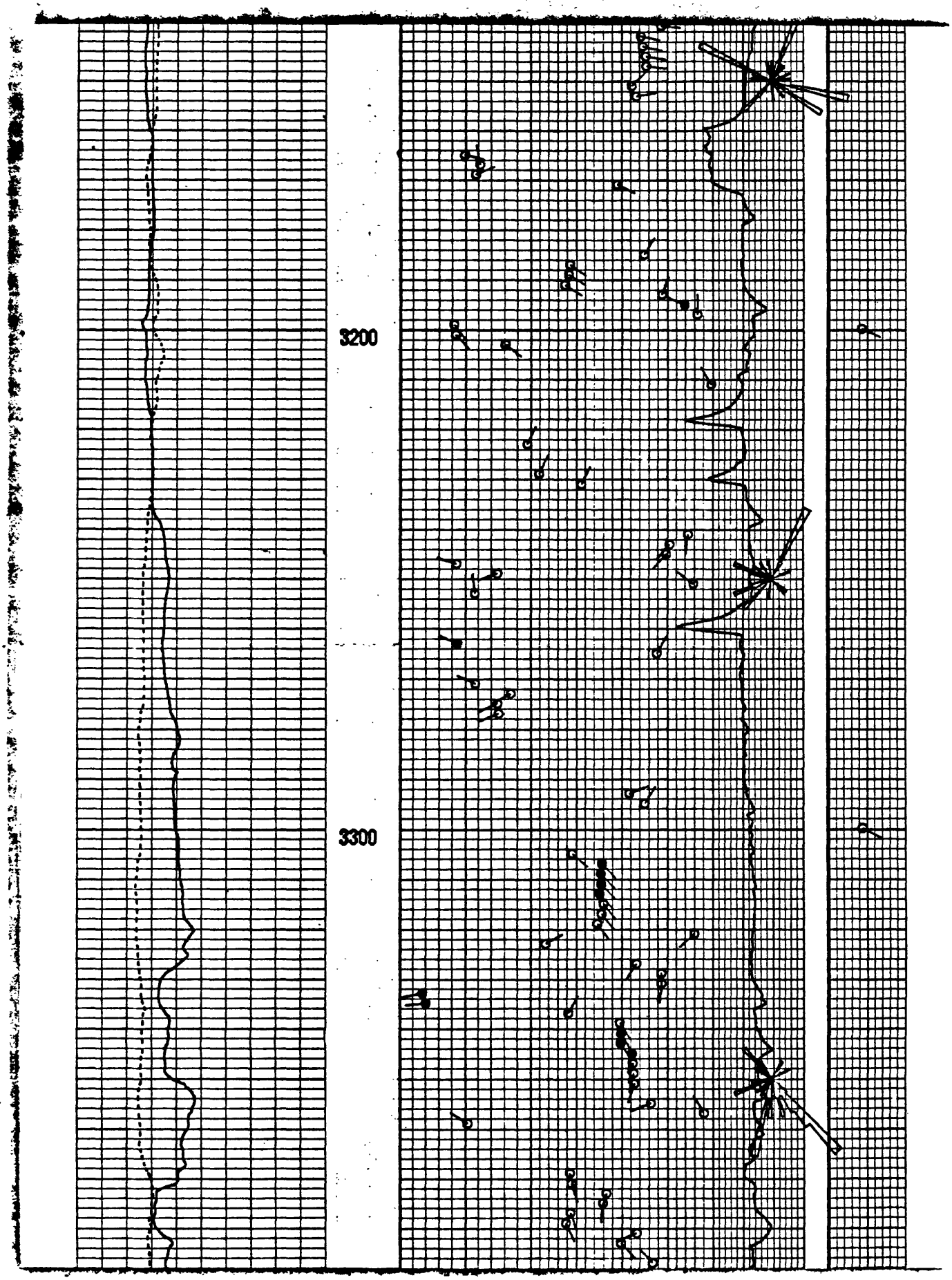
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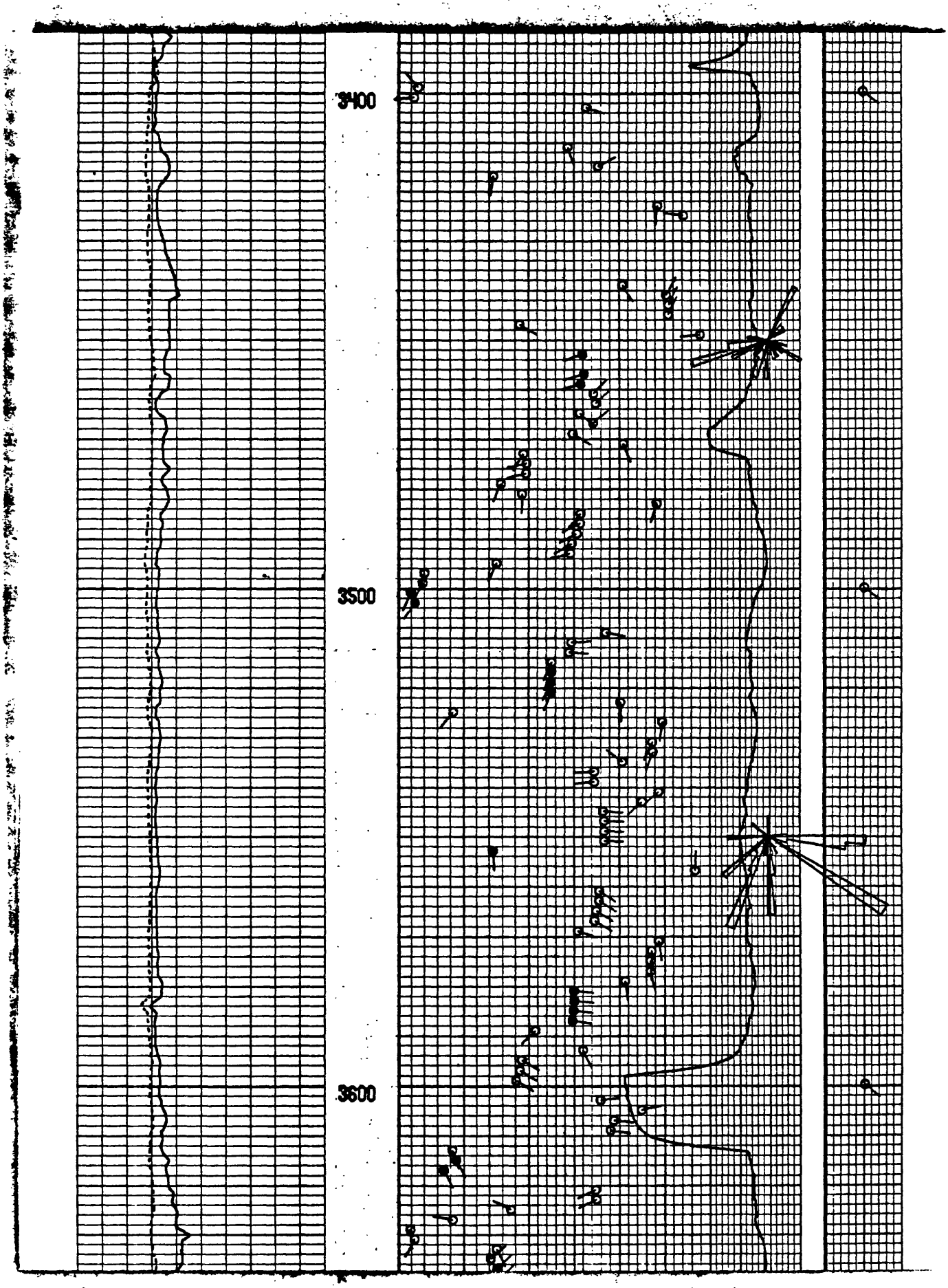
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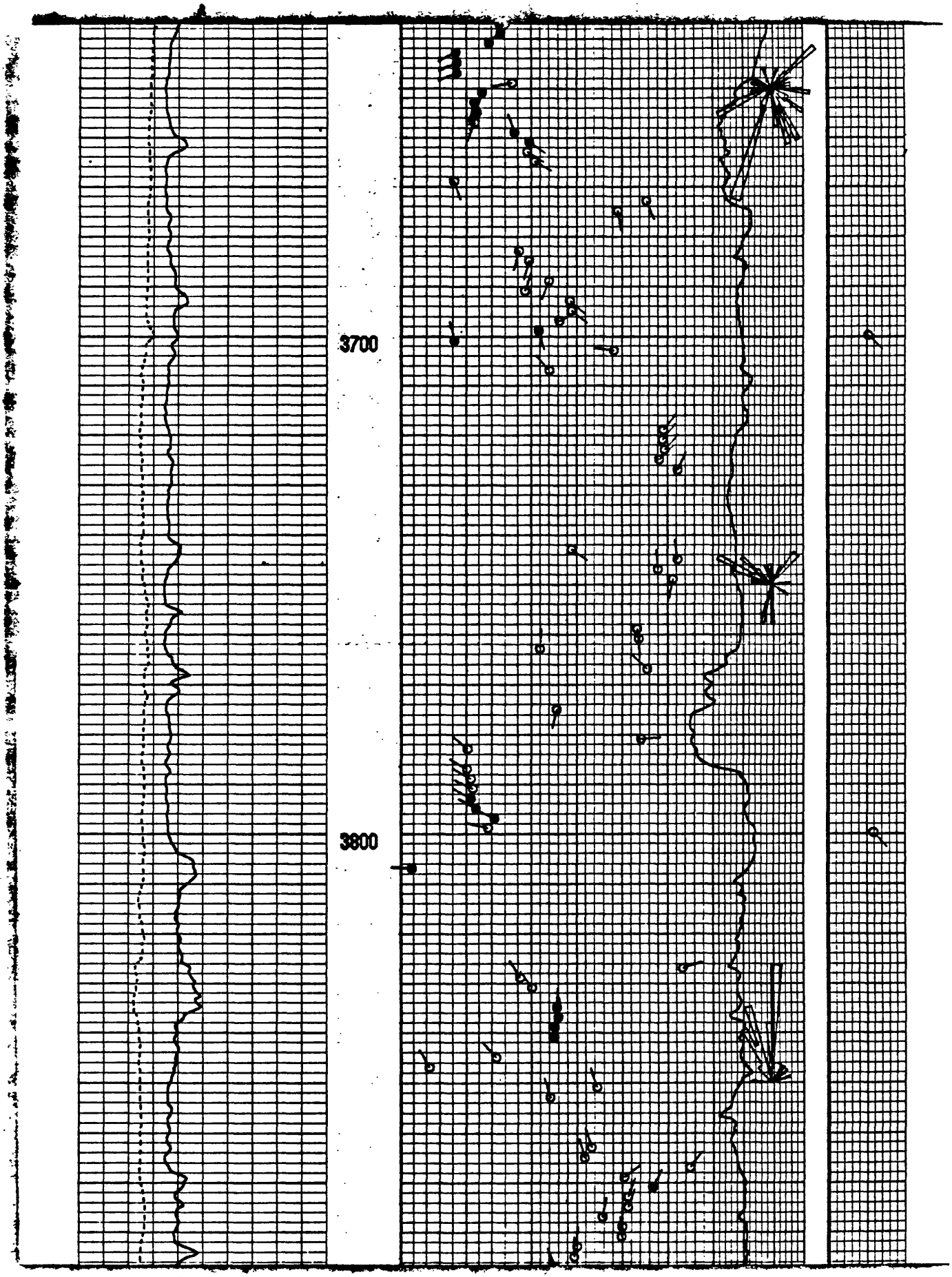
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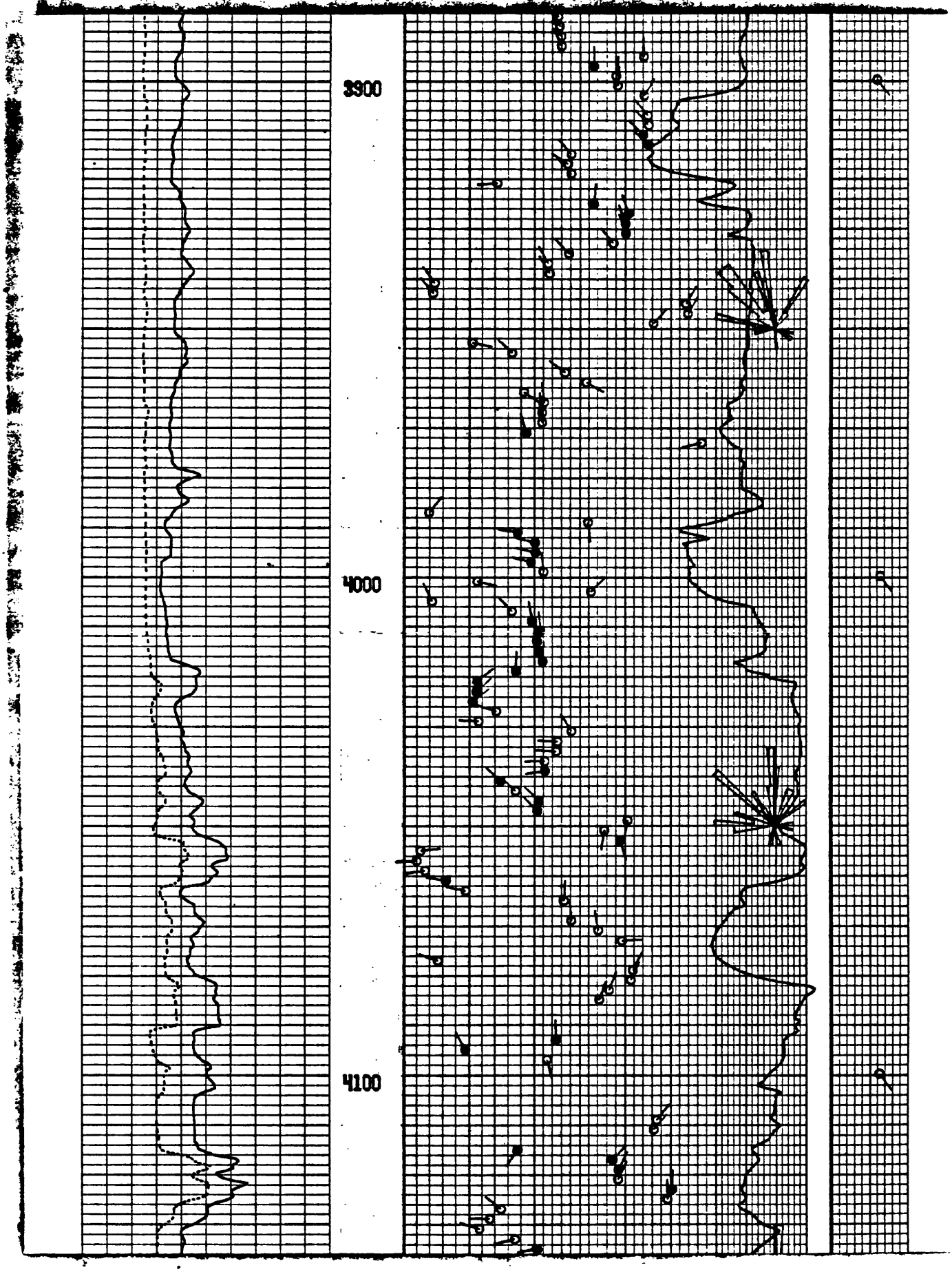
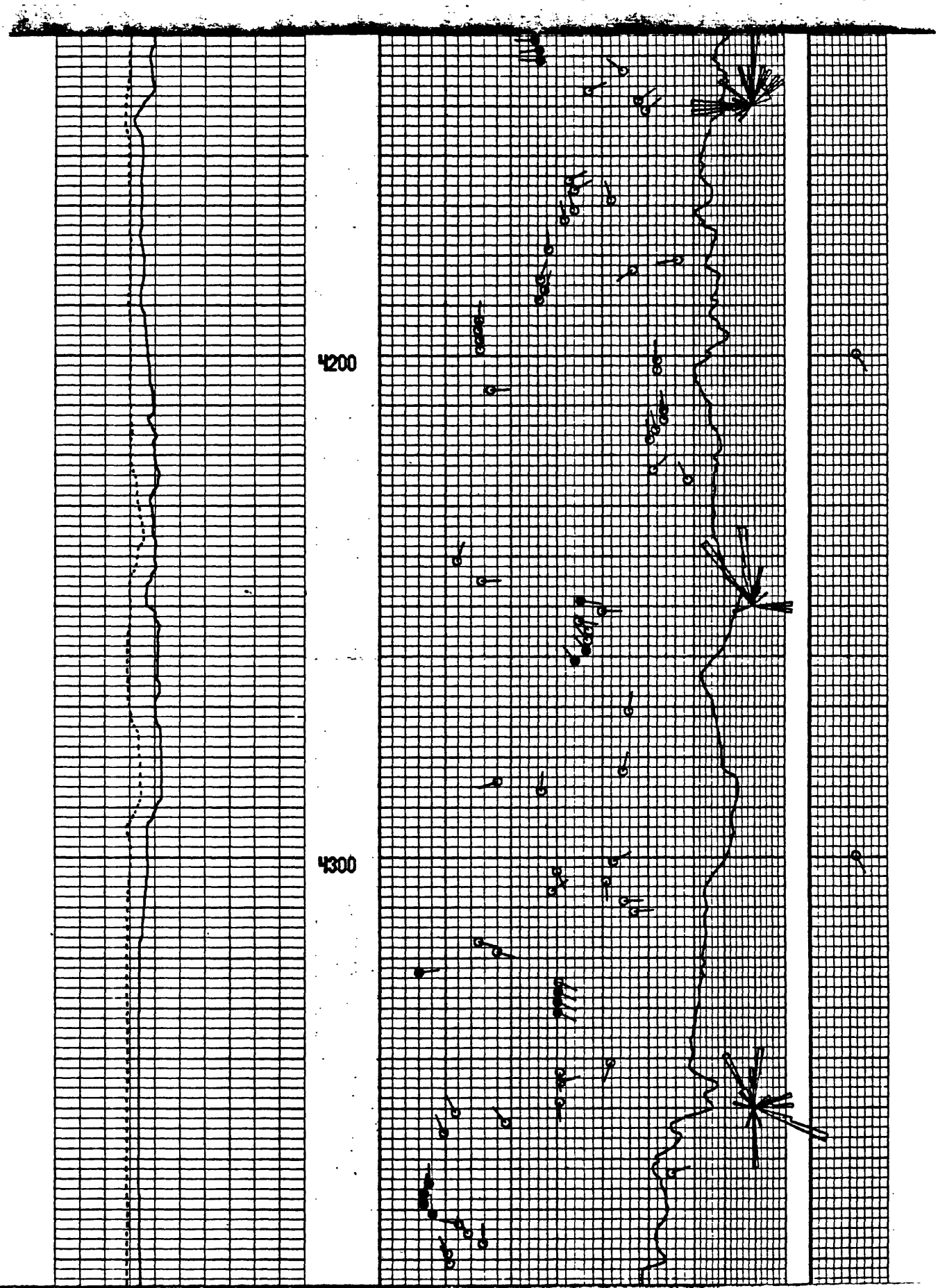
3800


3900
4000
4100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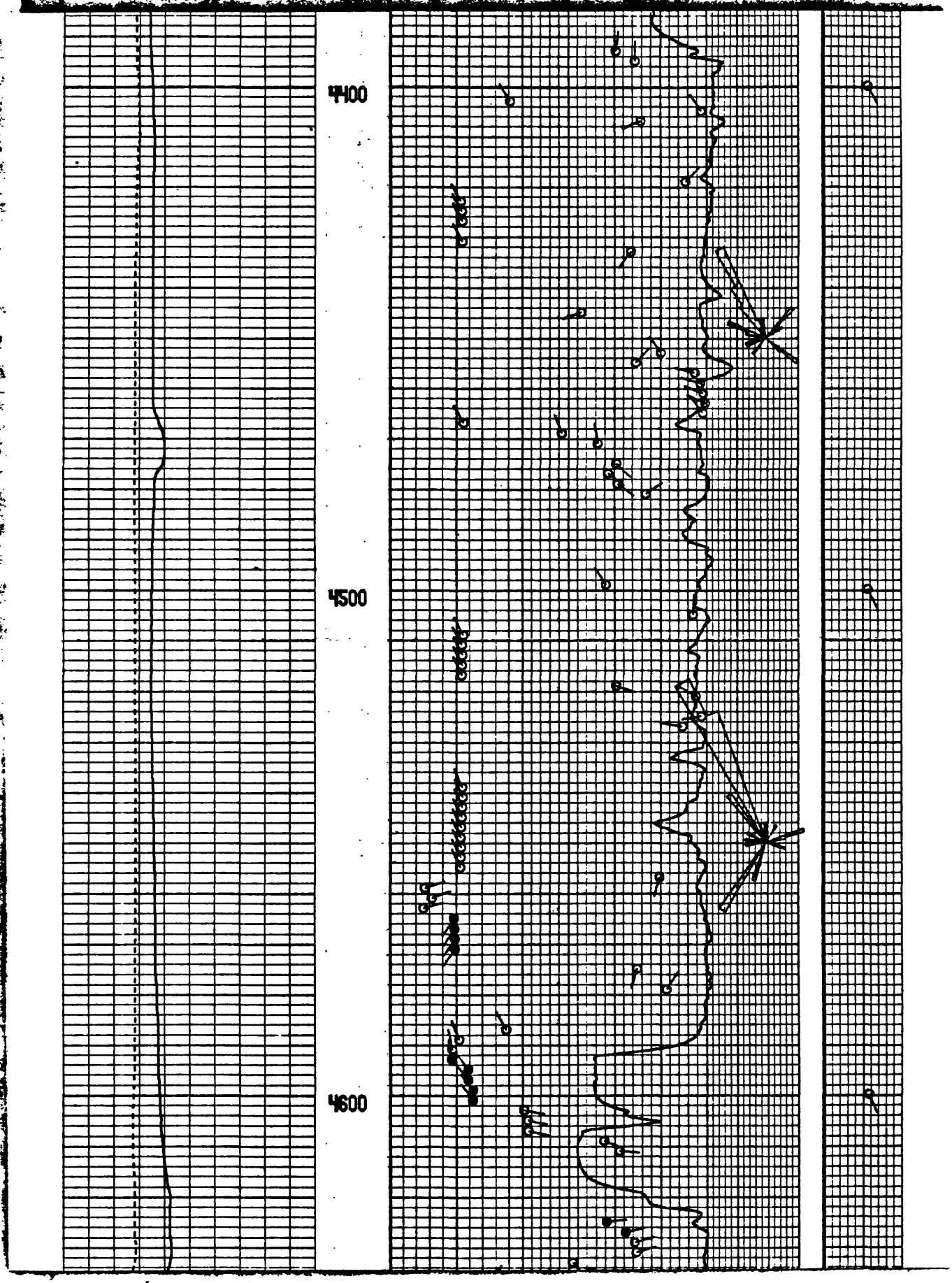
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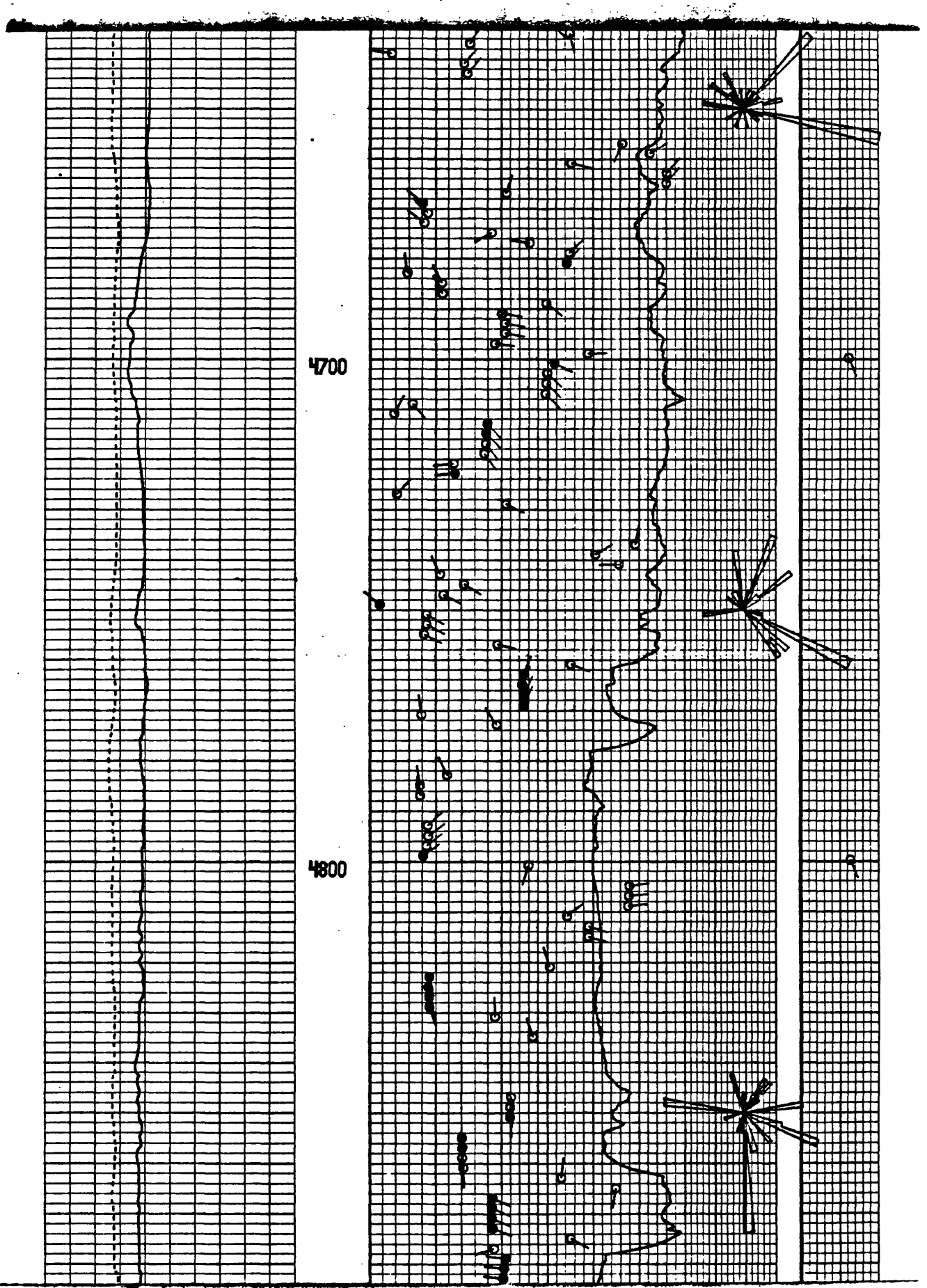
4500
4600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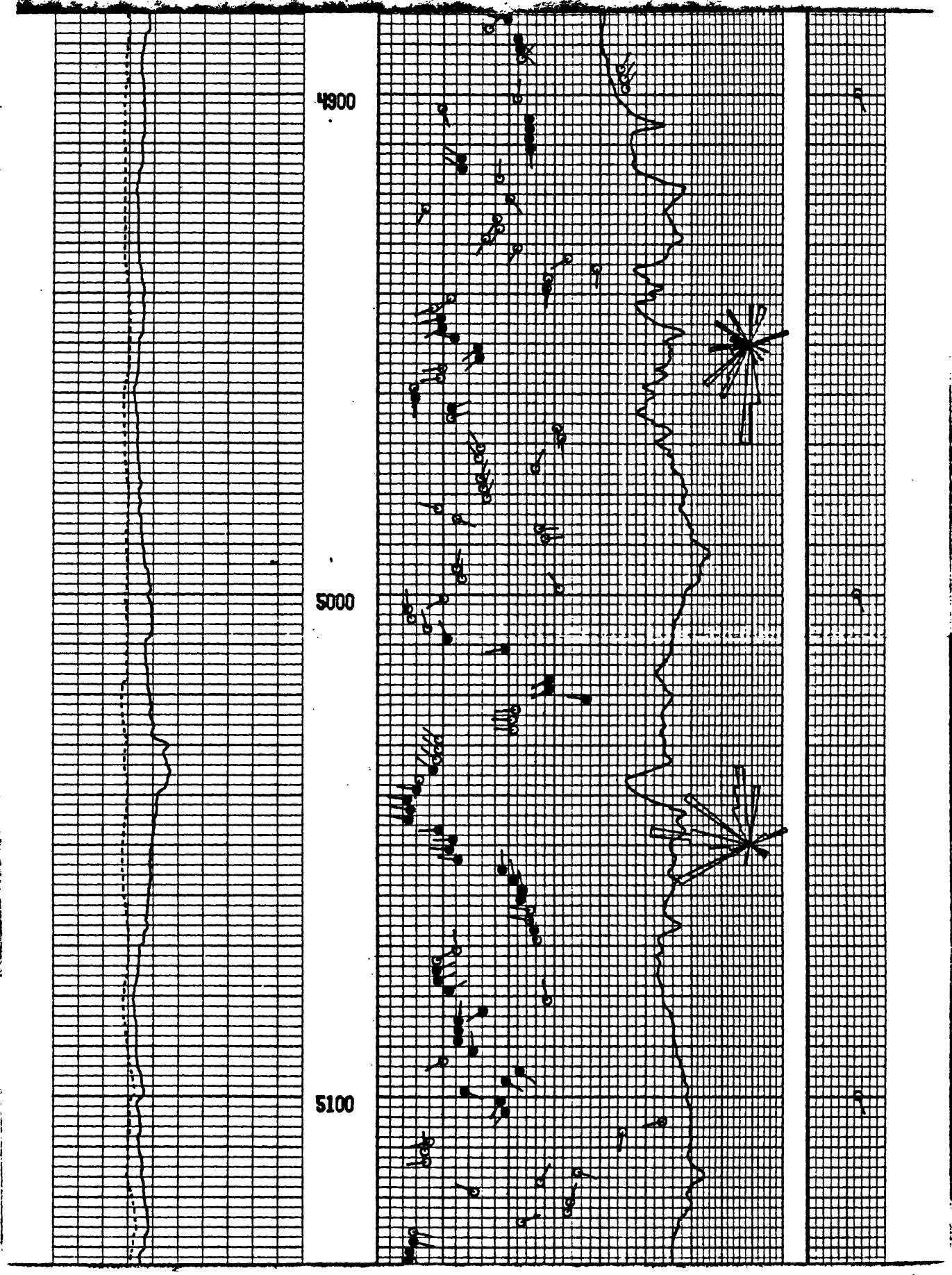
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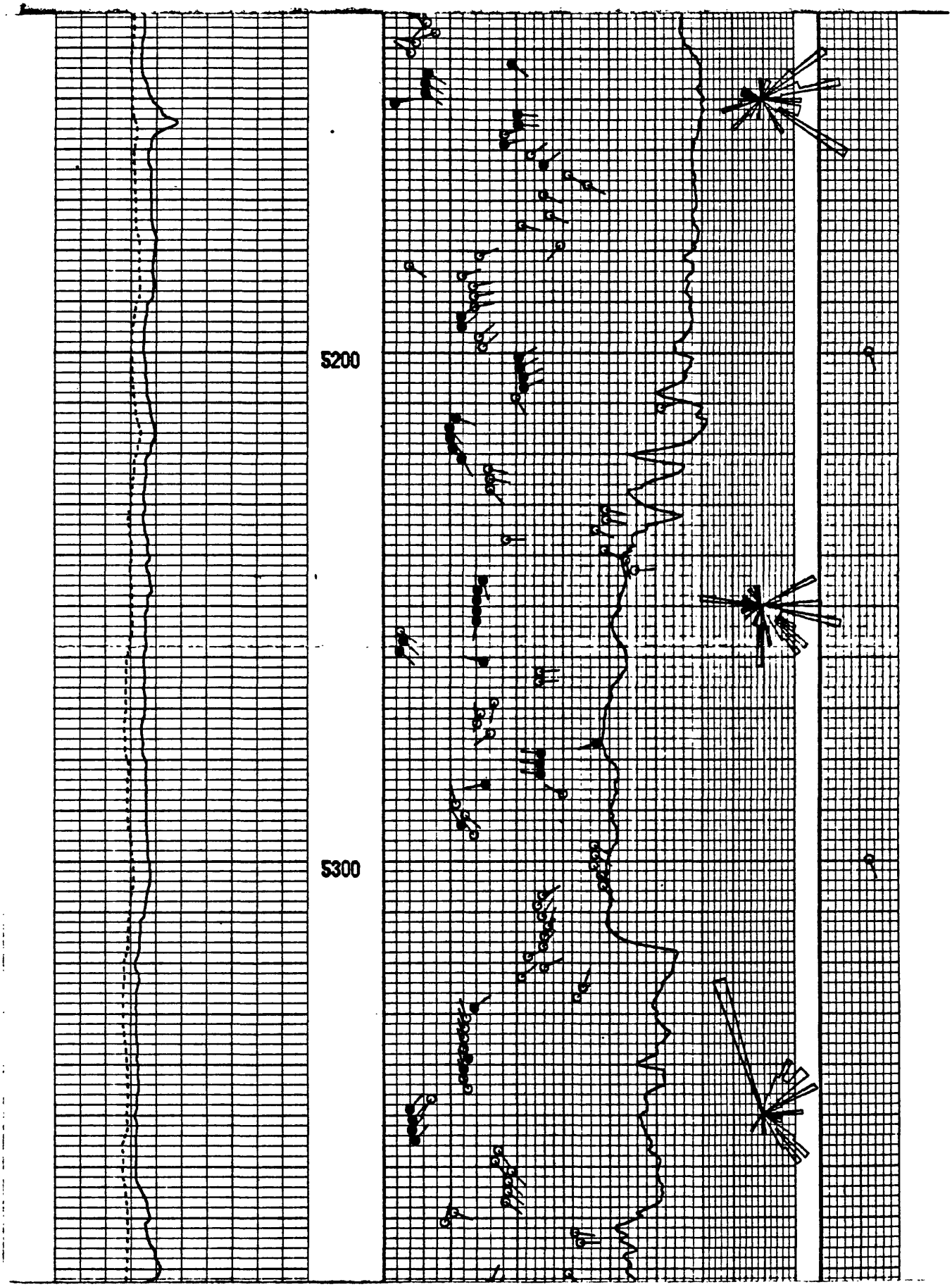
5100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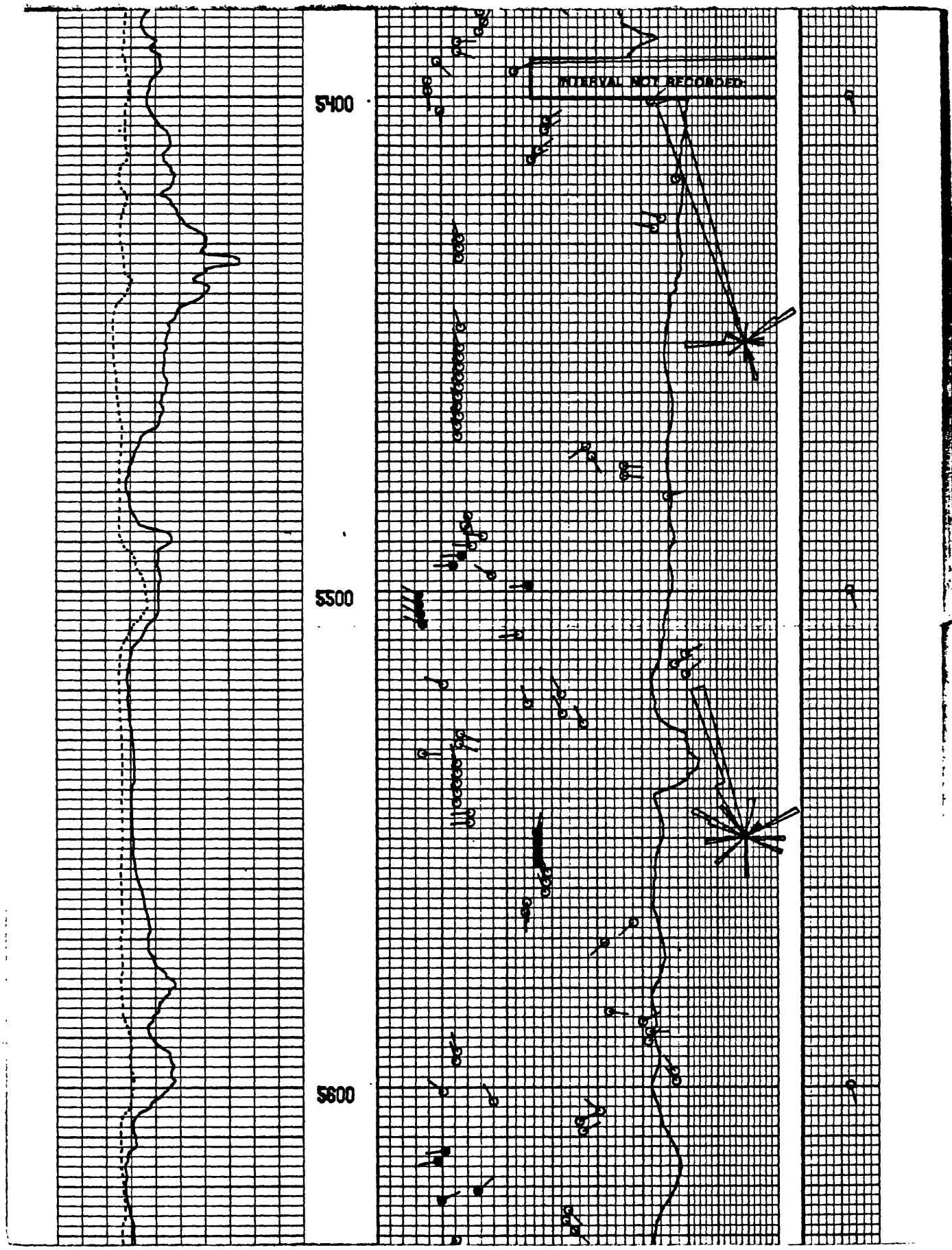
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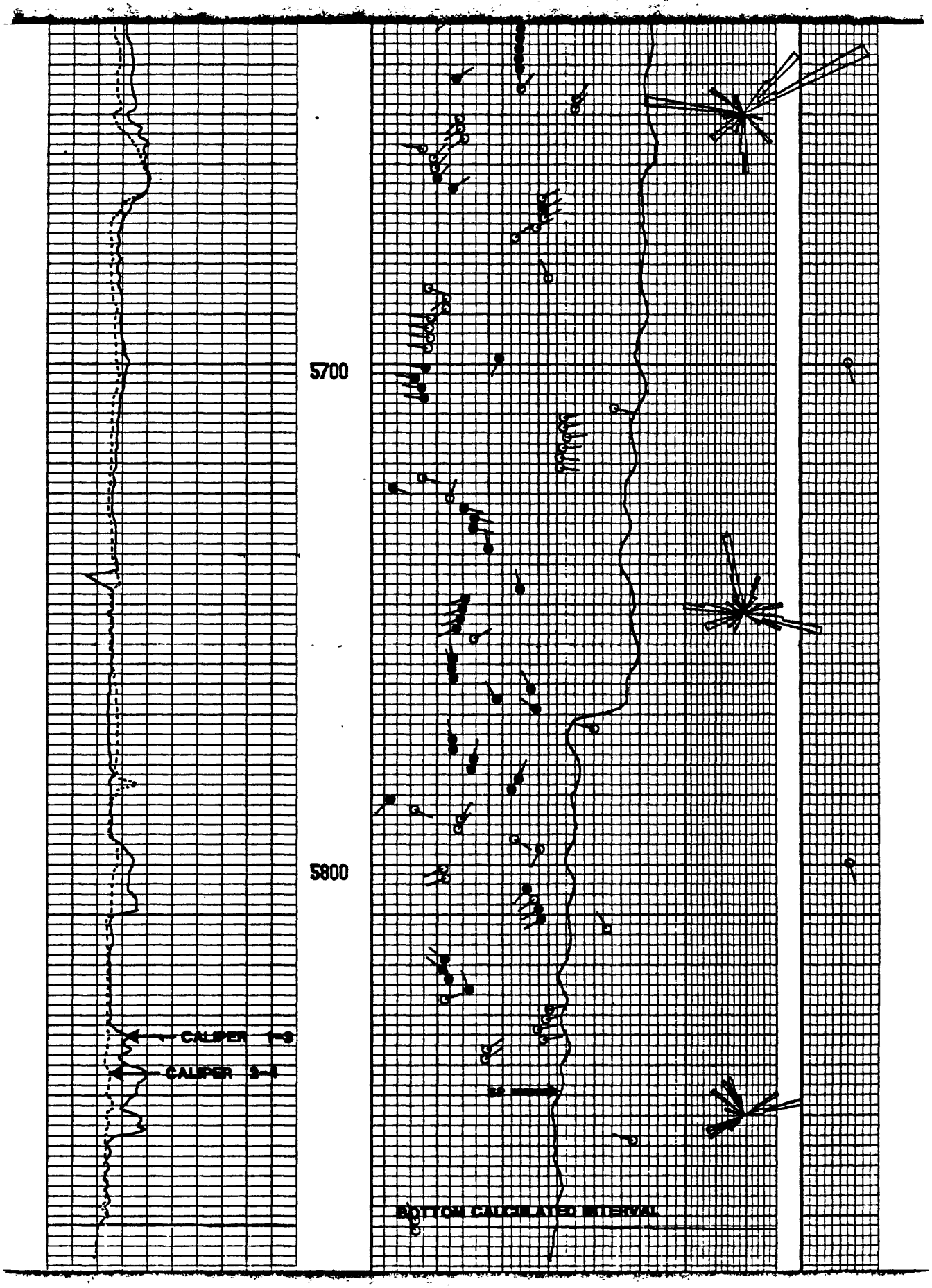
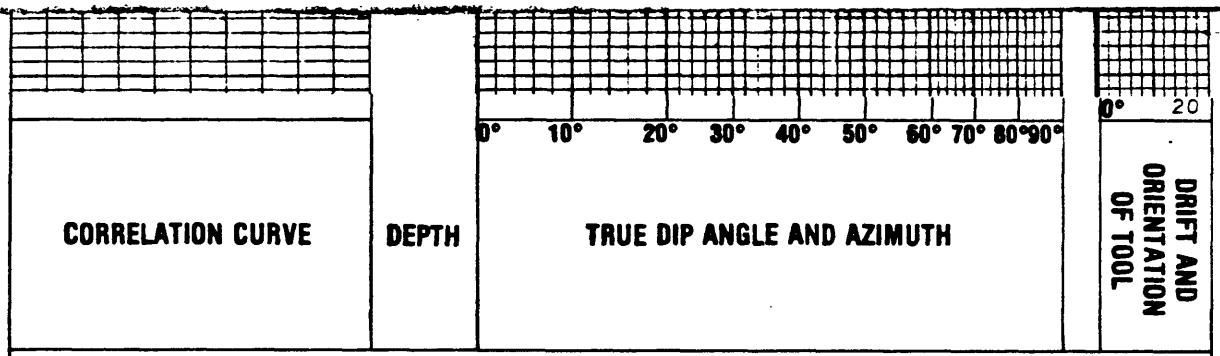
5500
5600
INTERVAL NOT RECORDED


5700
5800
CALIPER 1-3
CALIPER 2-4
BOTTOM CALCULATED INTERVAL



COMPANY	ARKOMA PRODUCTION COMPANY	**T.D. LOGGED**	5886
WELL	FEDERAL 1-26	**T.D. DRILLER**	5890
FIELD	WILDCAT	**T.D. WELEX**	5888
COUNTY	S.BERNADI**STATE** CALIFORNIA	**ELEV: K.B.**	
		D.F.	
		G.L.	3272

IGP – .19101

Welex

DUAL INDUCTION GUARD LOG

COMPANY ARKOMA PRODUCTION COMPANY
WELL FEDERAL 1-26
FIELD WILDCAT
County S. BERNADINO State CALIF

COMPANY ARKOMA PRODUCTION COMPANY

WELL FEDERAL 1-26

FIELD WILDCAT

COUNTY SAN BERNADINO STATE CALIFORNIA

Location
1303' SOUTH & 1745' EAST FROM
THE NORTHWEST CORNER OF:

Sec. 26 Twp. 3N Rge. 6W

Other Services:
DIP
C/DENS

Permanent Datum G.L. Elev. 3272
Log Measured From K.B. Ft. Above Perm. Datum
Drilling Measured From K.B.

Elev.: K.B. N/A
D.F.
G.L. 3272

Date	3-10-84			
Run No.	ONE			
Depth—Driller	5890			
Depth—Welex	5890			
Btm. Log Inter.	5888			
Top Log Inter.	1312			
Casing—Driller 9	5/8 @ 1313	@	@	@
Casing—Welex	1312			
Bit Size	8 1/2			
Type Fluid in Hole	GEL WATER			
Dens. / Visc.	9.2 / 39	/	/	/
pH / Fluid Loss	8.5 / 11 ml	/ ml	/ ml	/ ml
Source of Sample	FLOWLINE			
R_m @ Meas. Temp.	5.00 @62 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	4.60 @58 °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	5.10 @62 °F	@ °F	@ °F	@ °F
Source R_{mf} R_{mc}	MEASURED	/	/	/
R_m @ BHT	1.86 @174°F	@ °F	@ °F	@ °F
Time Since Circ.	44 HRS.			
Max. Rec. Temp.	174°F@BHT.	°F@	°F@	°F@
Equip. / Location	2898 / SFS	/	/	/
Recorded By	K. QUALLS,	D. SHARBAK		
Witnessed By	D. MANDEL			

Fold Here

Service Ticket No 185251 Remarks SP SHIFT AND SPLICE AT 5370'.

Change in Mud Type or Additional Samples		
Date / Sample No		
Depth—Driller		
Type Fluid in Hole		
Dens / Visc		
ph / Fluid Loss	ml	ml
Source of Sample		
R_m @ Meas Temp	@ °F	@ °F
R_{mf} @ Meas Temp	@ °F	@ °F
R_{mc} @ Meas Temp	@ °F	@ °F
Source R_{mf} / R_{mc}		
R_m @ BHT	1.86 @174 °F	@ °F
R_{mf} BHT	1.61 @174 °F	@ °F
R_{mc} BHT	1.62 @174 °F	@ °F

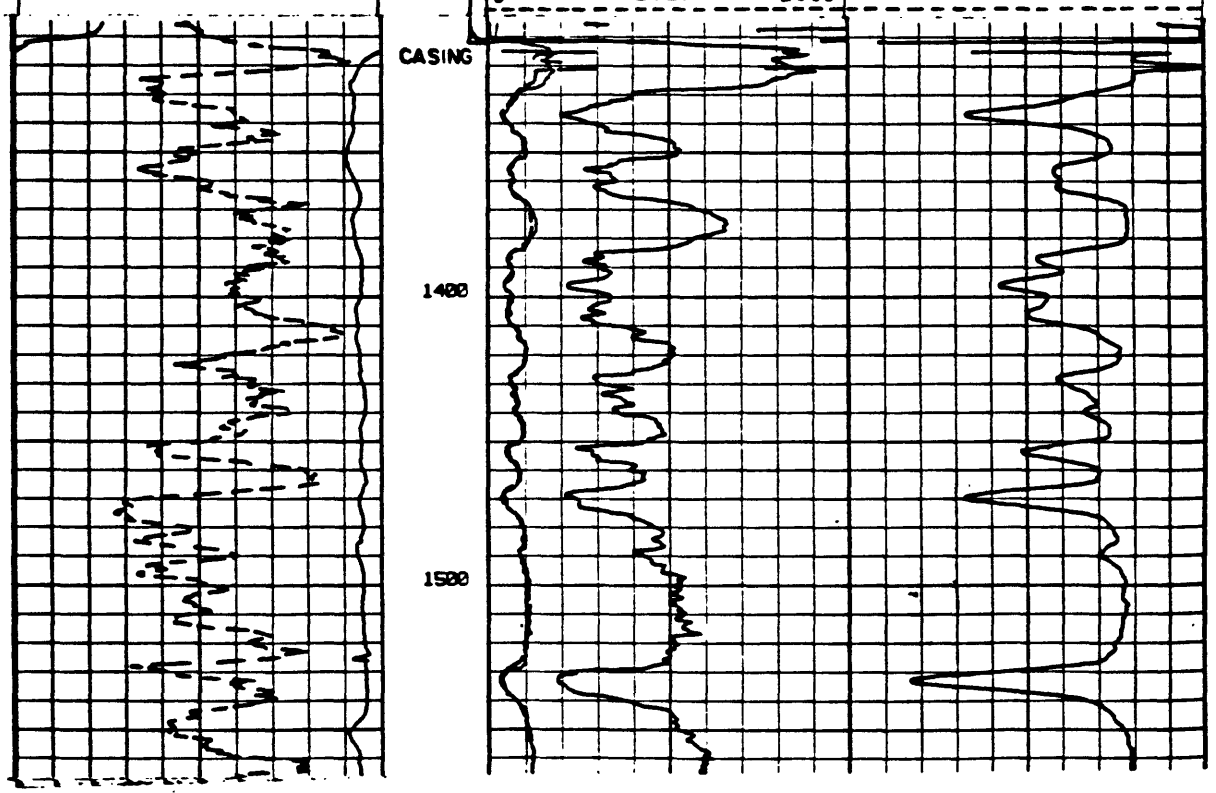
SCALE CHANGES			
Type Log	Depth	Scale Up Hole	Scale Down Hole

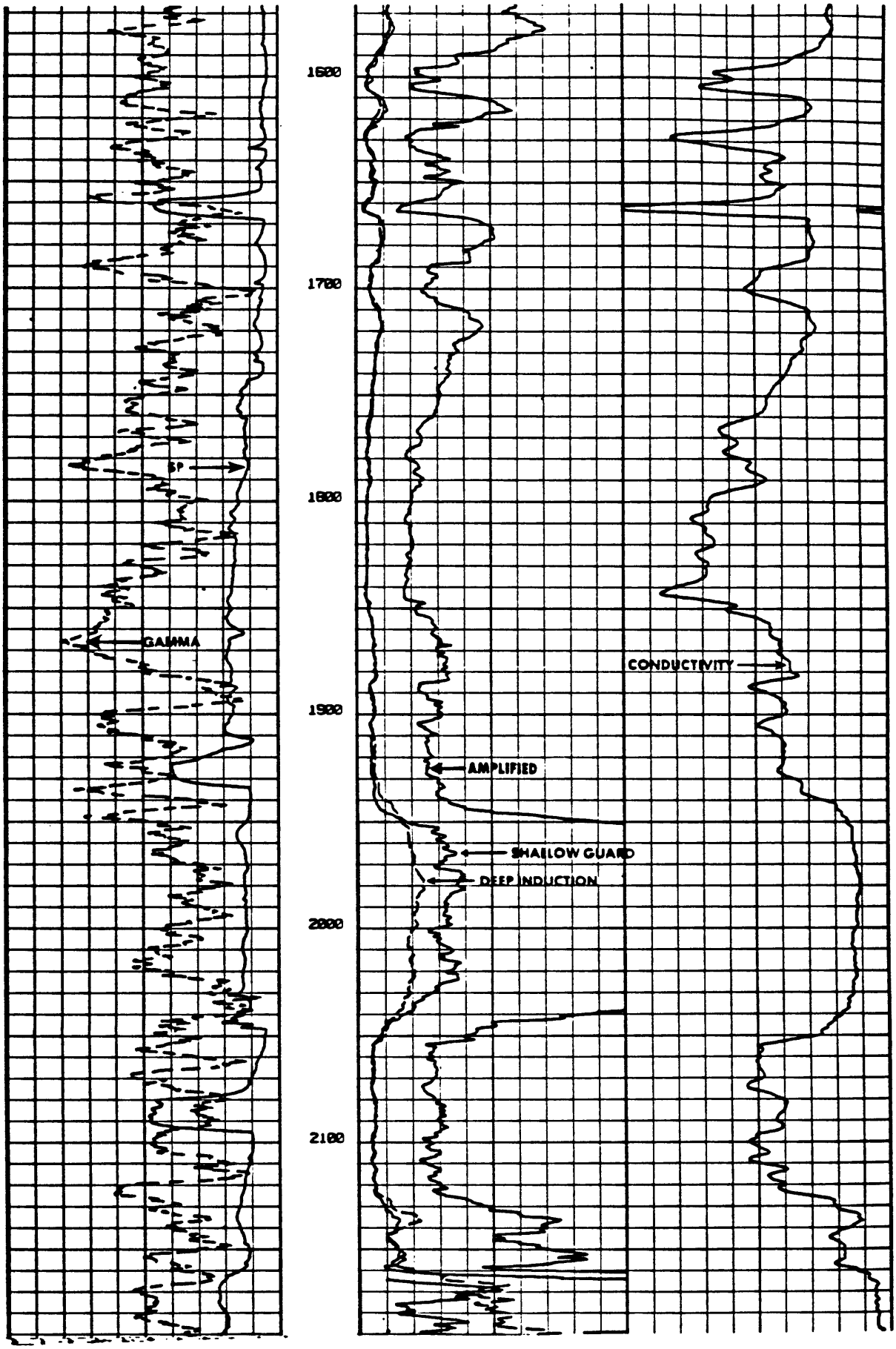
EQUIPMENT DATA				
Run No	Tool Type and No	Pad Type	Tool Position	Other
ONE	DIL 22276		FREE	
	GRD 22283		FREE	

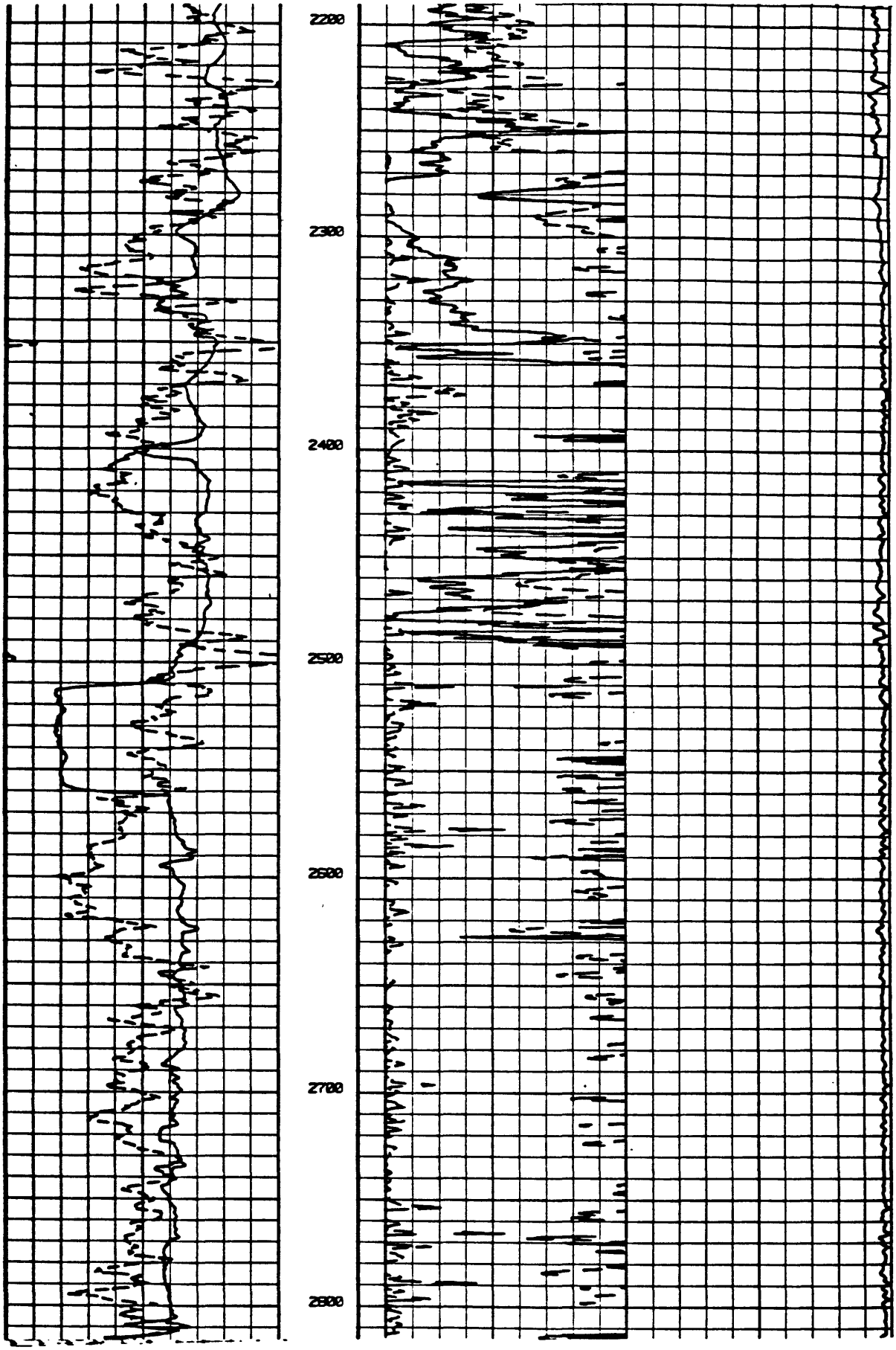
TAPE VERSION 4.13

2" = 100'

POTENTIAL MILLIVOLTS	RESISTIVITY OHMS M²/M	CONDUCTIVITY M MHOS/M
— 20 +	0 SHALLOW GUARD 200	200 DEEP INDUCTION 0
	0 O. S. 2000	400 O. S. 200
0 GAMMA 200	0 AMPLIFIED GUARD 40	
Rmf ____ at ____ °F		
	0 DEEP INDUCTION 200	
	0 O. S. 2000	




1600
1700
1800
1900
2000
2100
SP
GAMMA
CONDUCTIVITY
AMPLIFIED
SHALLOW GUARD
DEEP INDUCTION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2700
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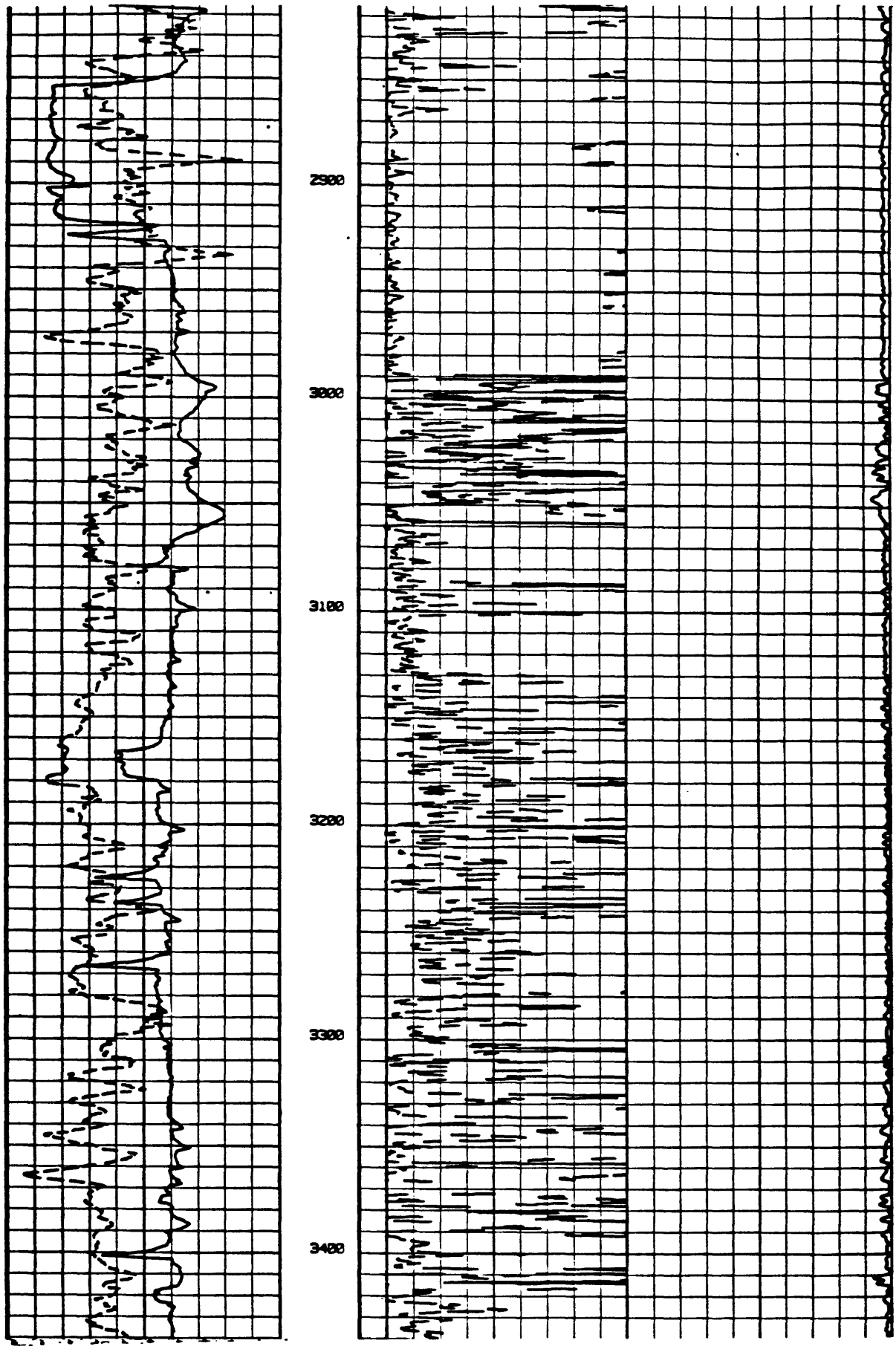
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3300
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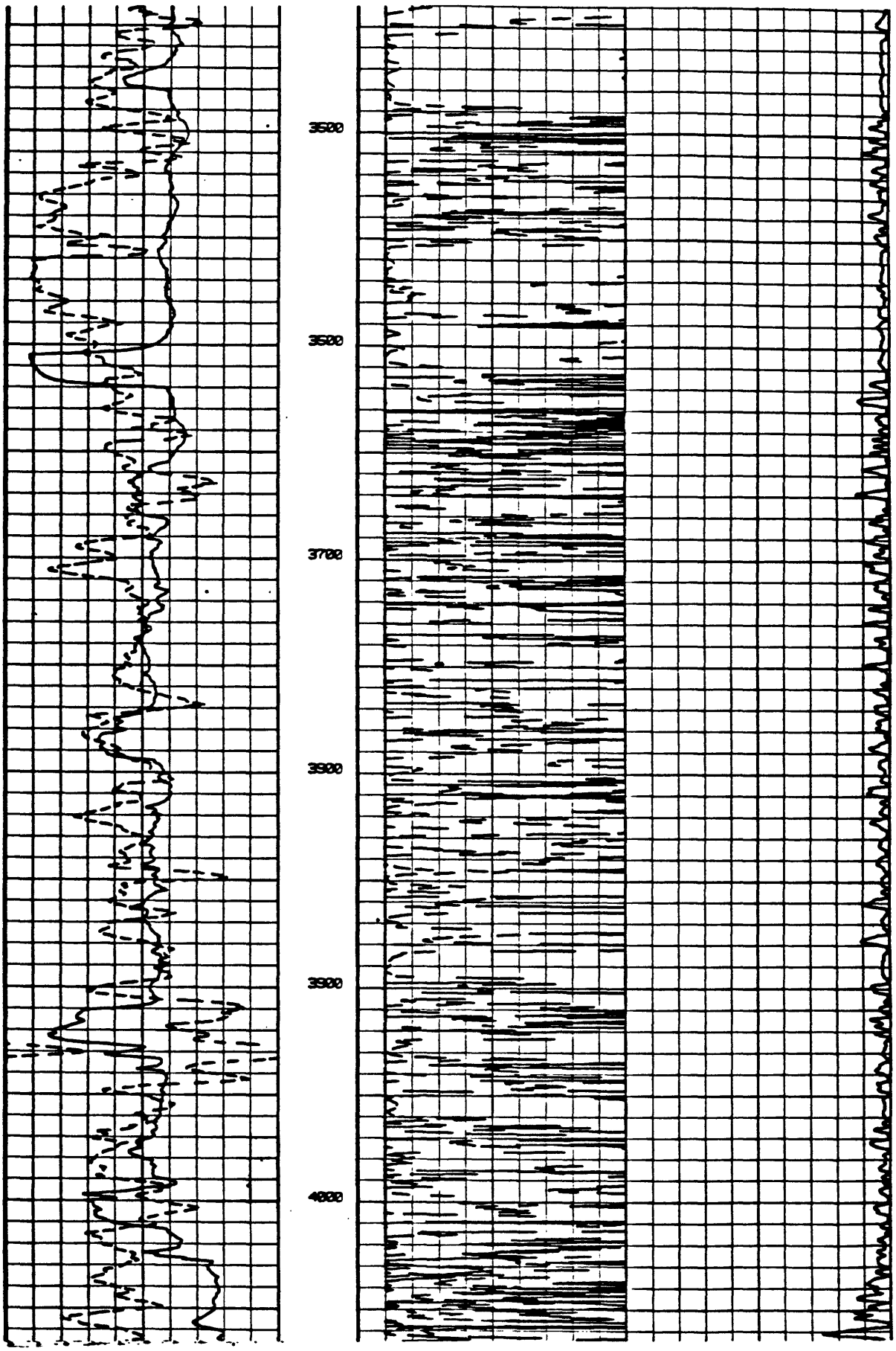
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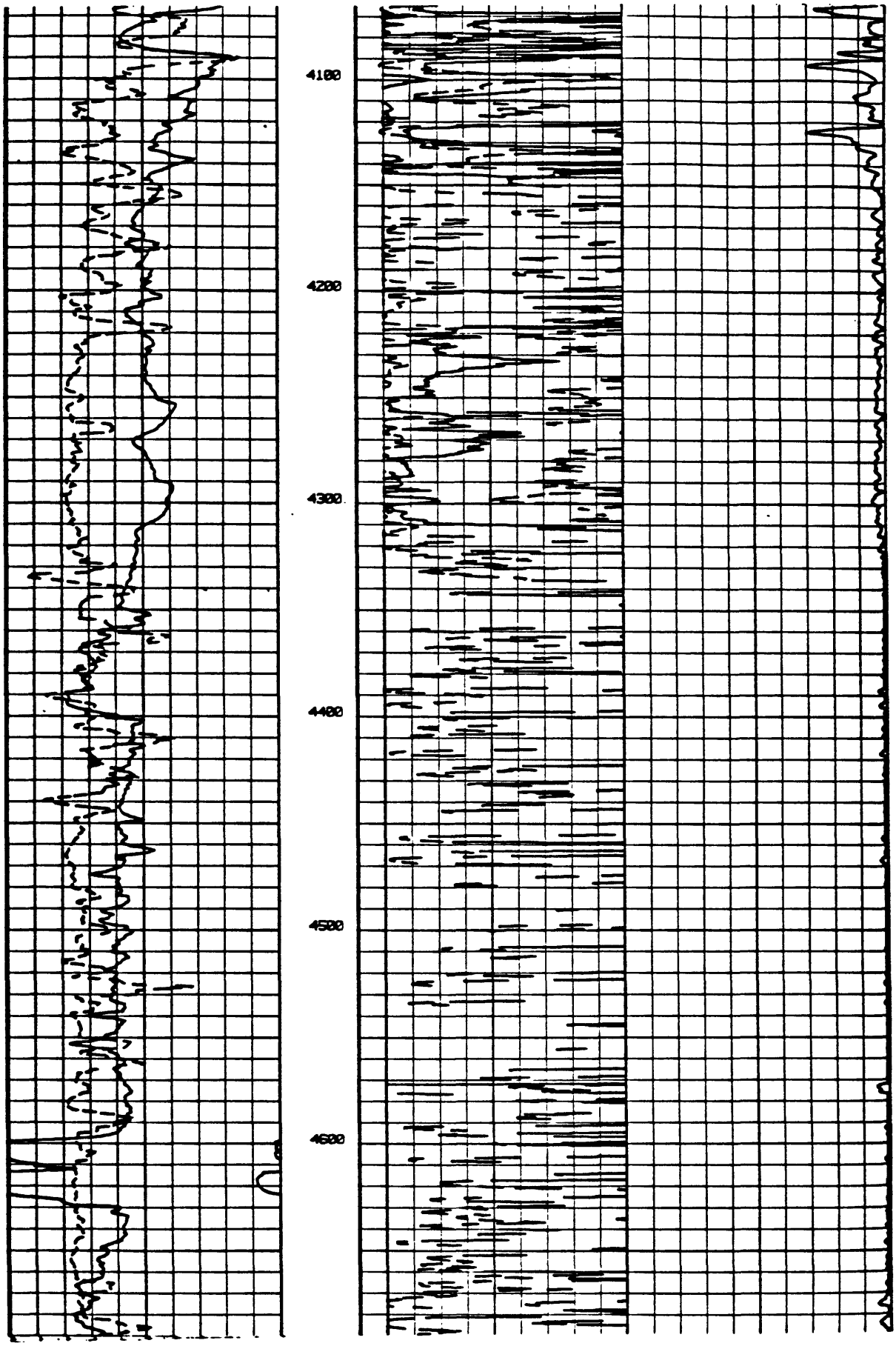
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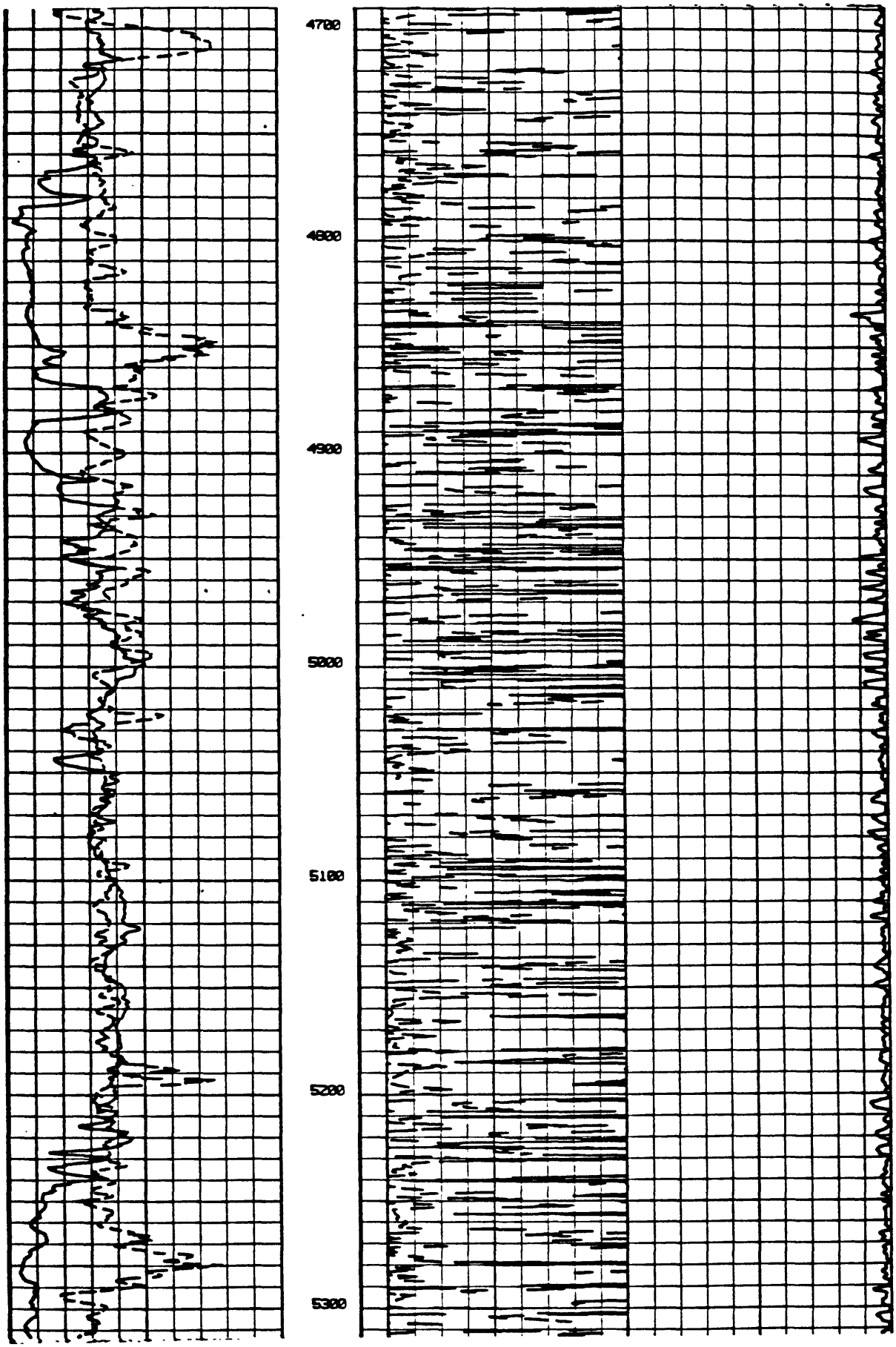
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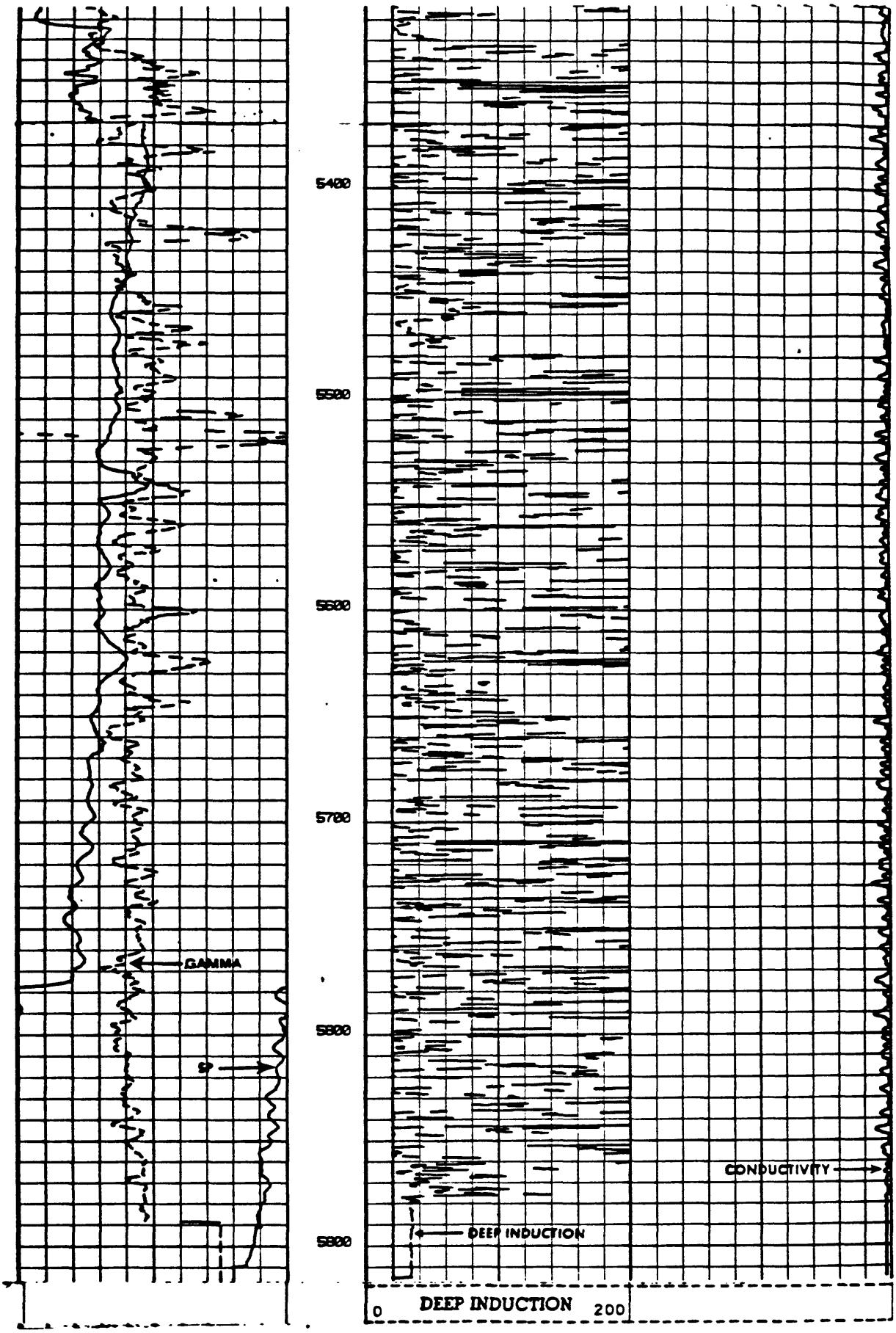
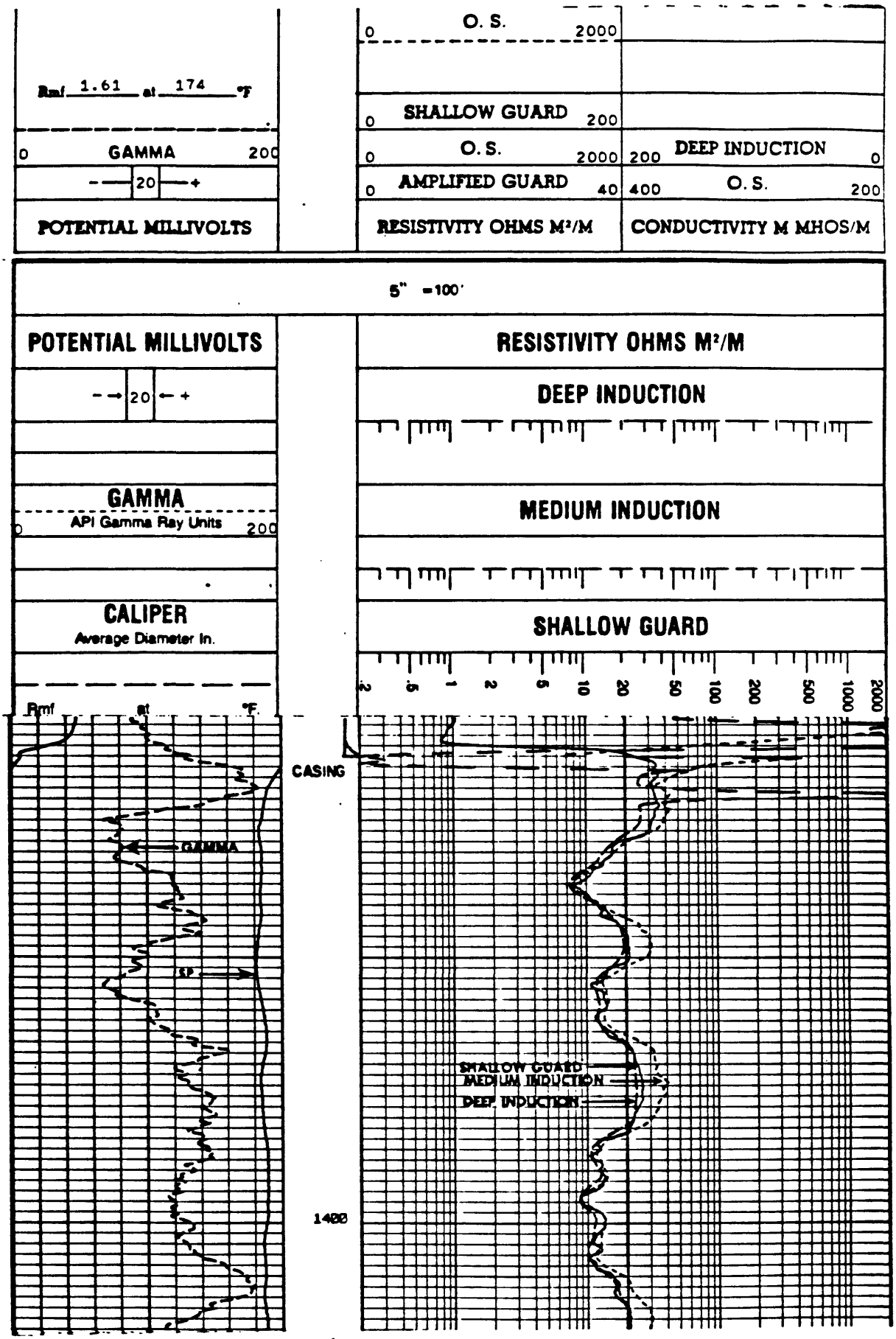
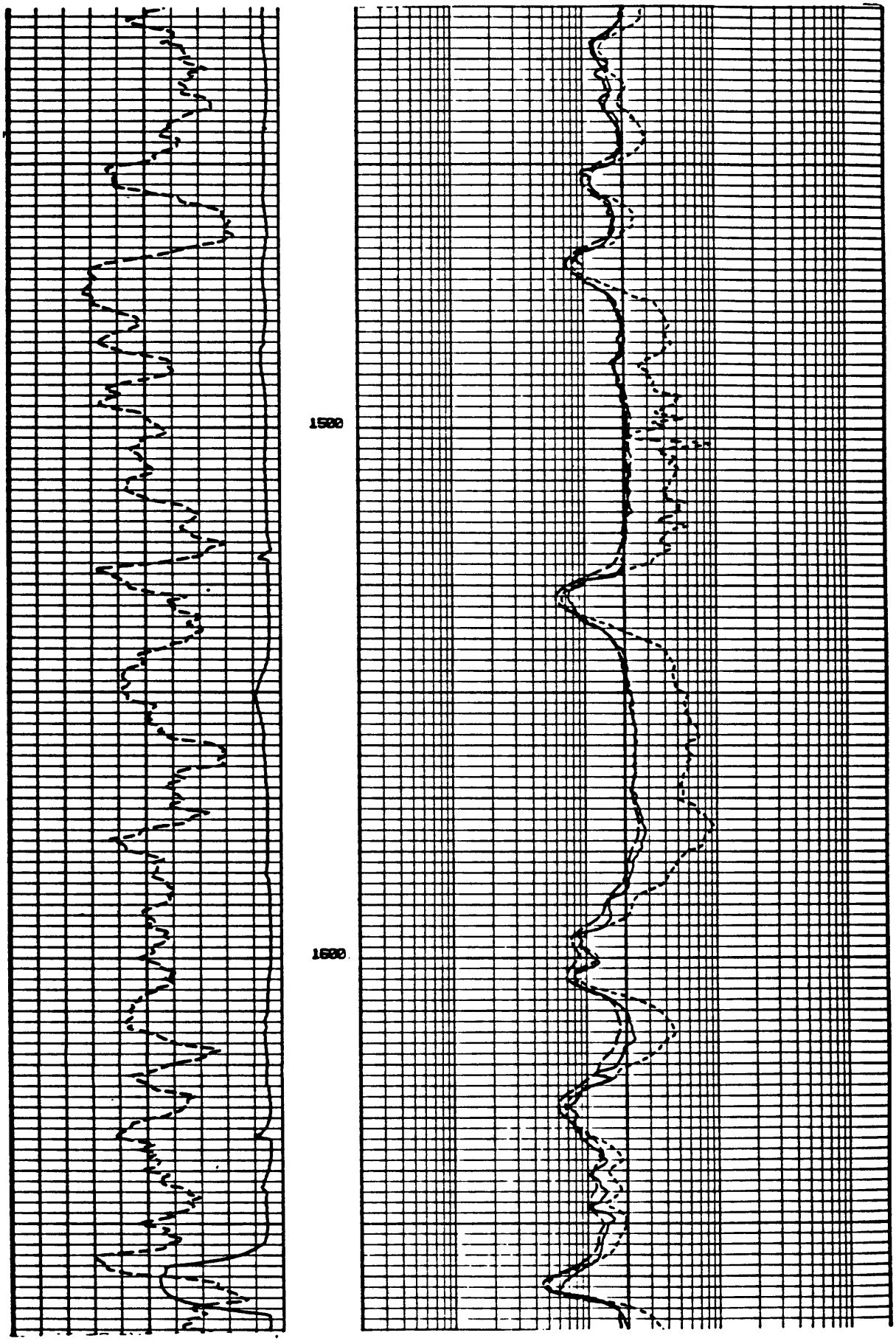

5400
5500
5600
5700
5800
5900
GAMMA
CONDUCTIVITY
DEEP INDUCTION
0
DEEP INDUCTION
200


Rmf 1.61 at 174 °F
0 GAMMA 200
20
POTENTIAL MILLIVOLTS
0 O. S. 2000
0 SHALLOW GUARD 200
0 O. S. 2000
200 DEEP INDUCTION 0
0 AMPLIFIED GUARD 40
400 O. S. 200
RESISTIVITY OHMS M²/M
CONDUCTIVITY M MHOS/M
5" =100'
POTENTIAL MILLIVOLTS
20
GAMMA
API Gamma Ray Units
CALIPER
Average Diameter In.
RESISTIVITY OHMS M²/M
DEEP INDUCTION
MEDIUM INDUCTION
SHALLOW GUARD
0.2 0.5 1 2 5 10 20 50 100 200 500 1000 2000
Rmf at °F
CASING
GAMMA
SP
SHALLOW GUARD
MEDIUM INDUCTION
DEEP INDUCTION
1400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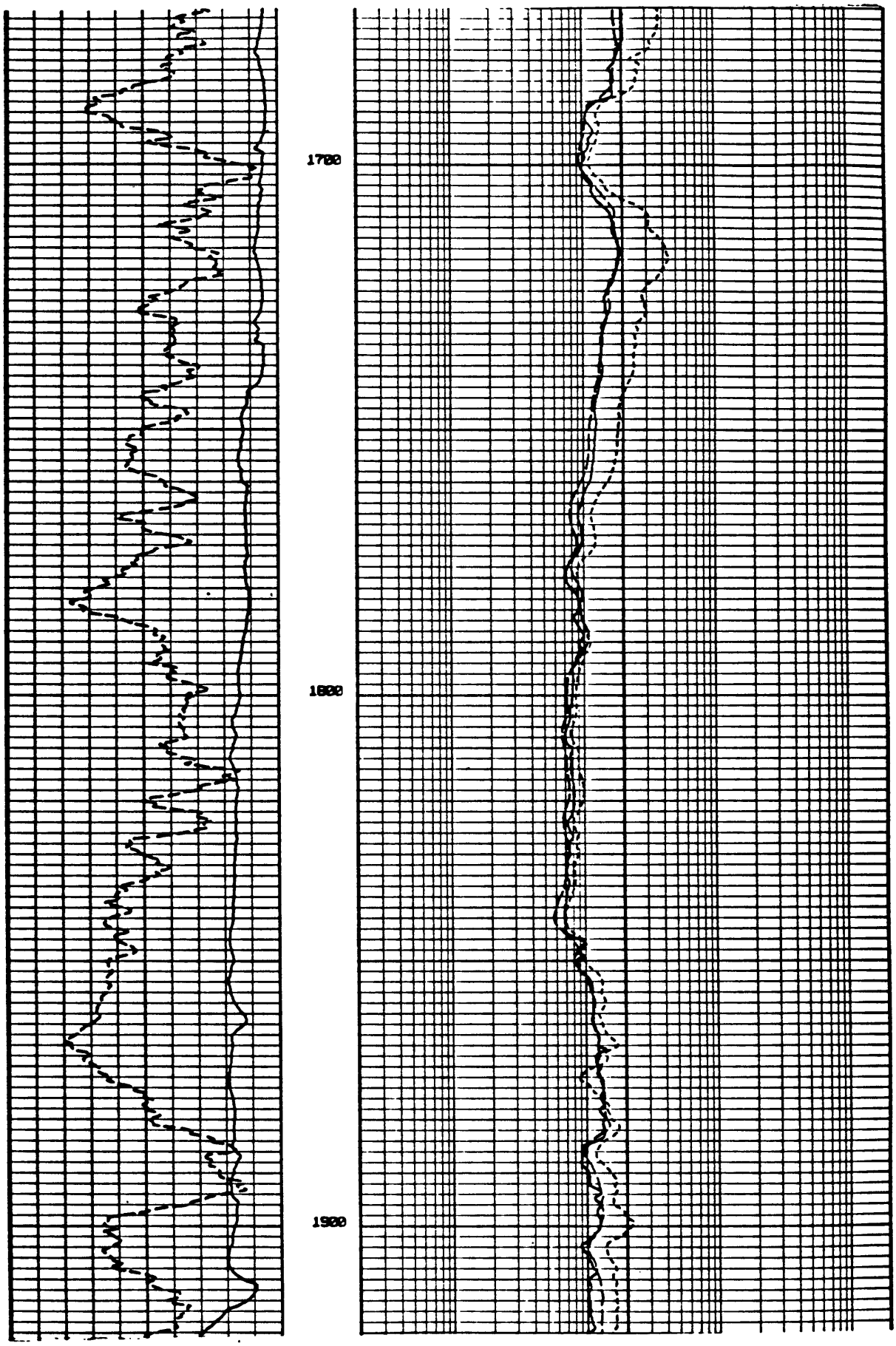
1600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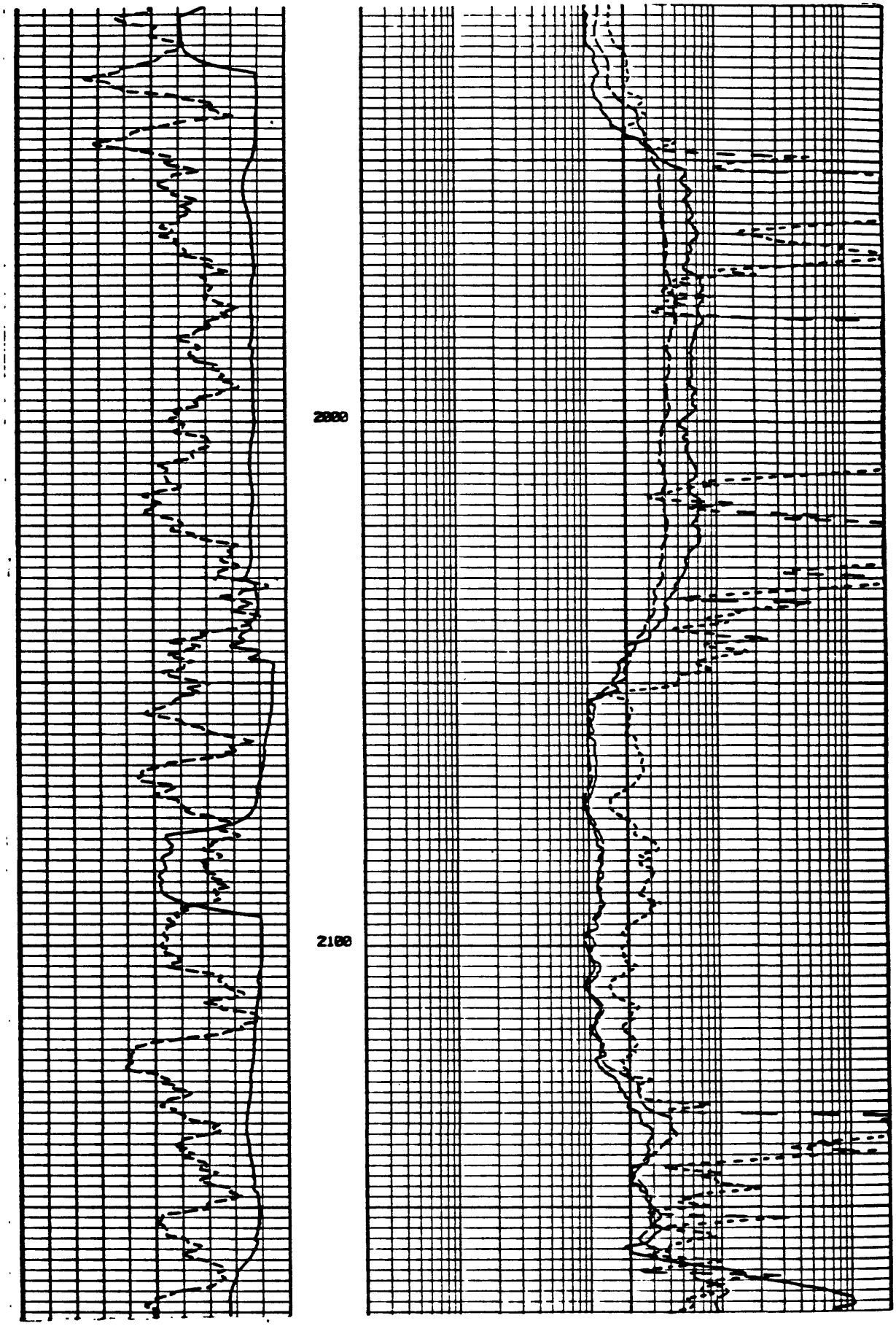
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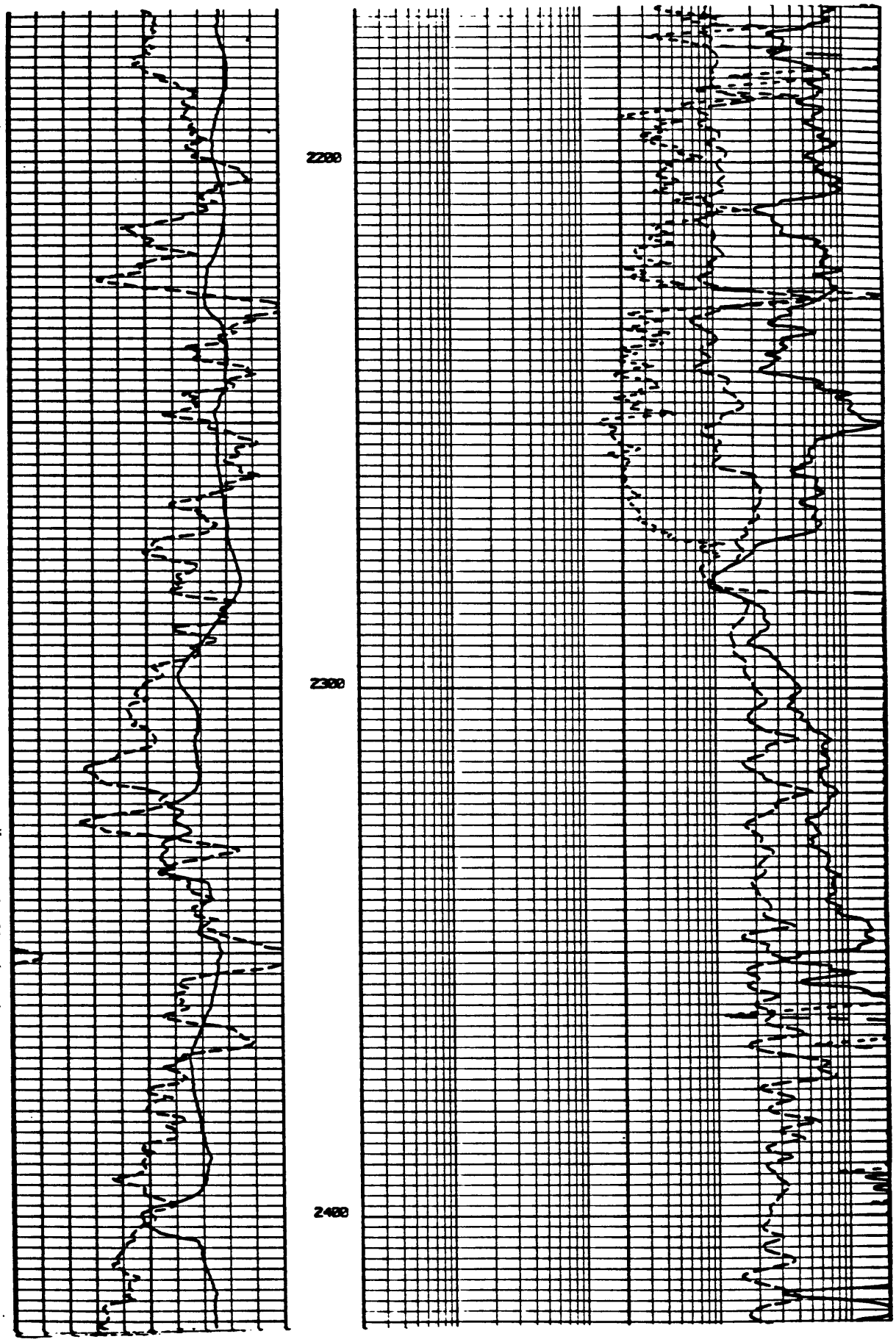
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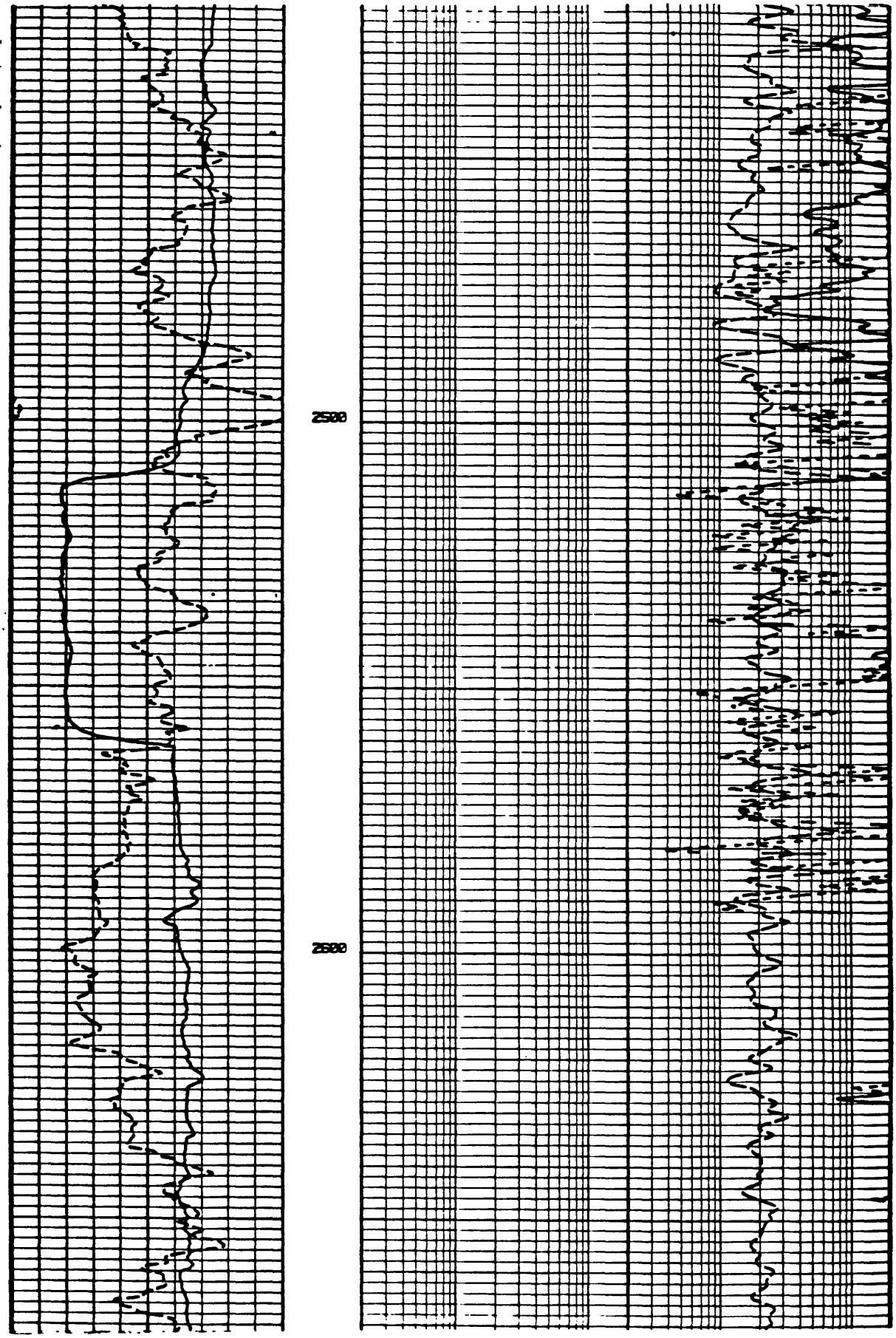
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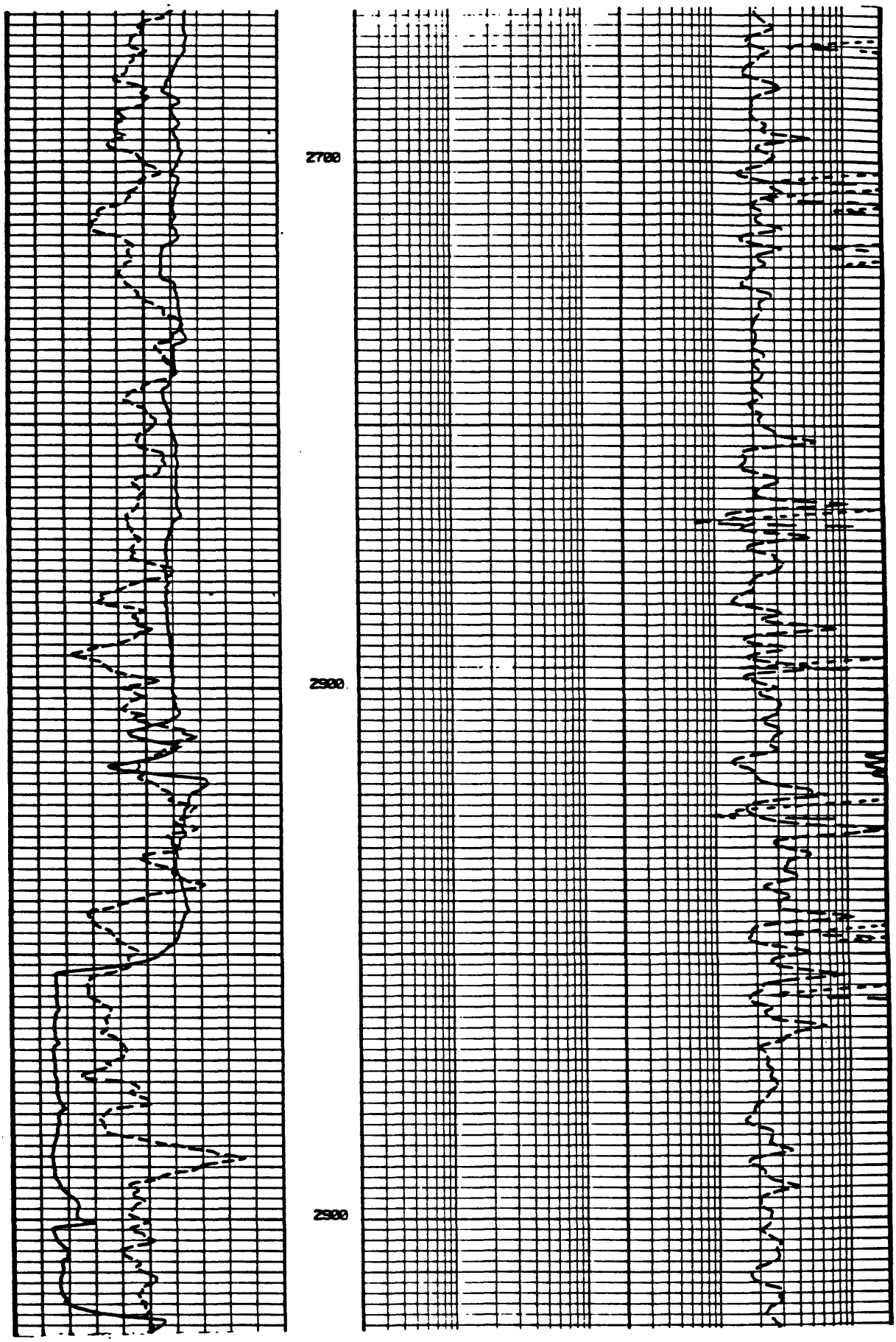
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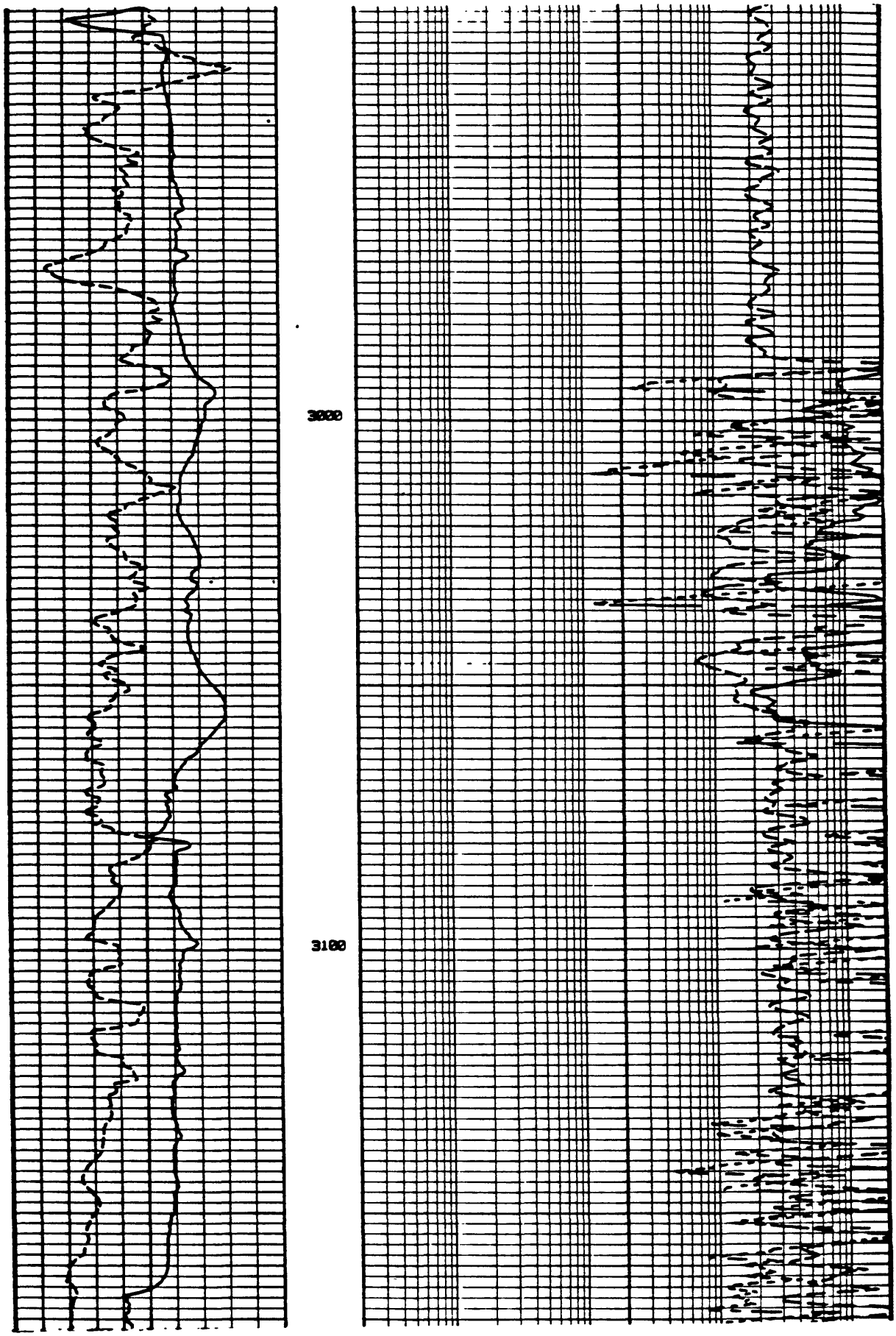
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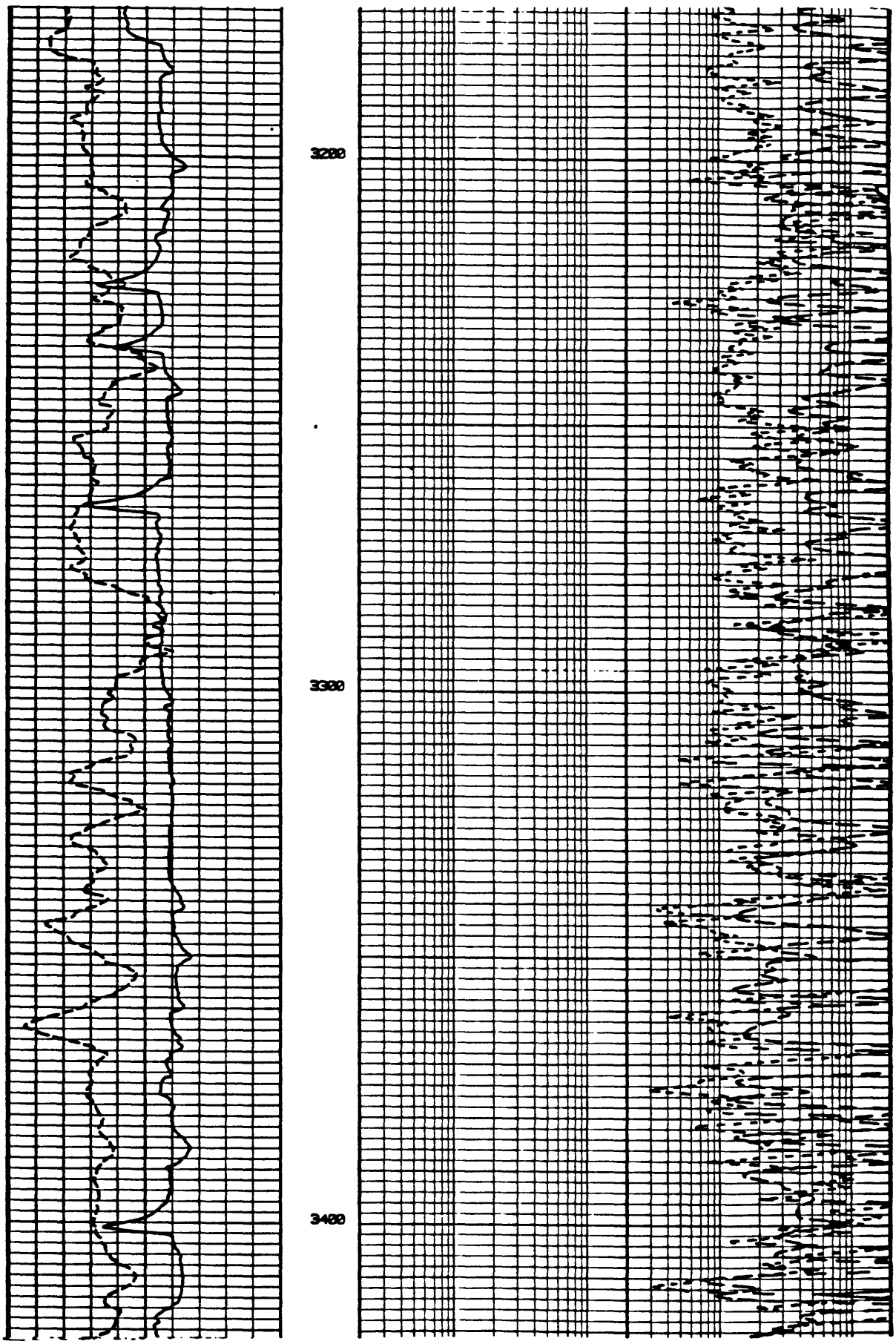
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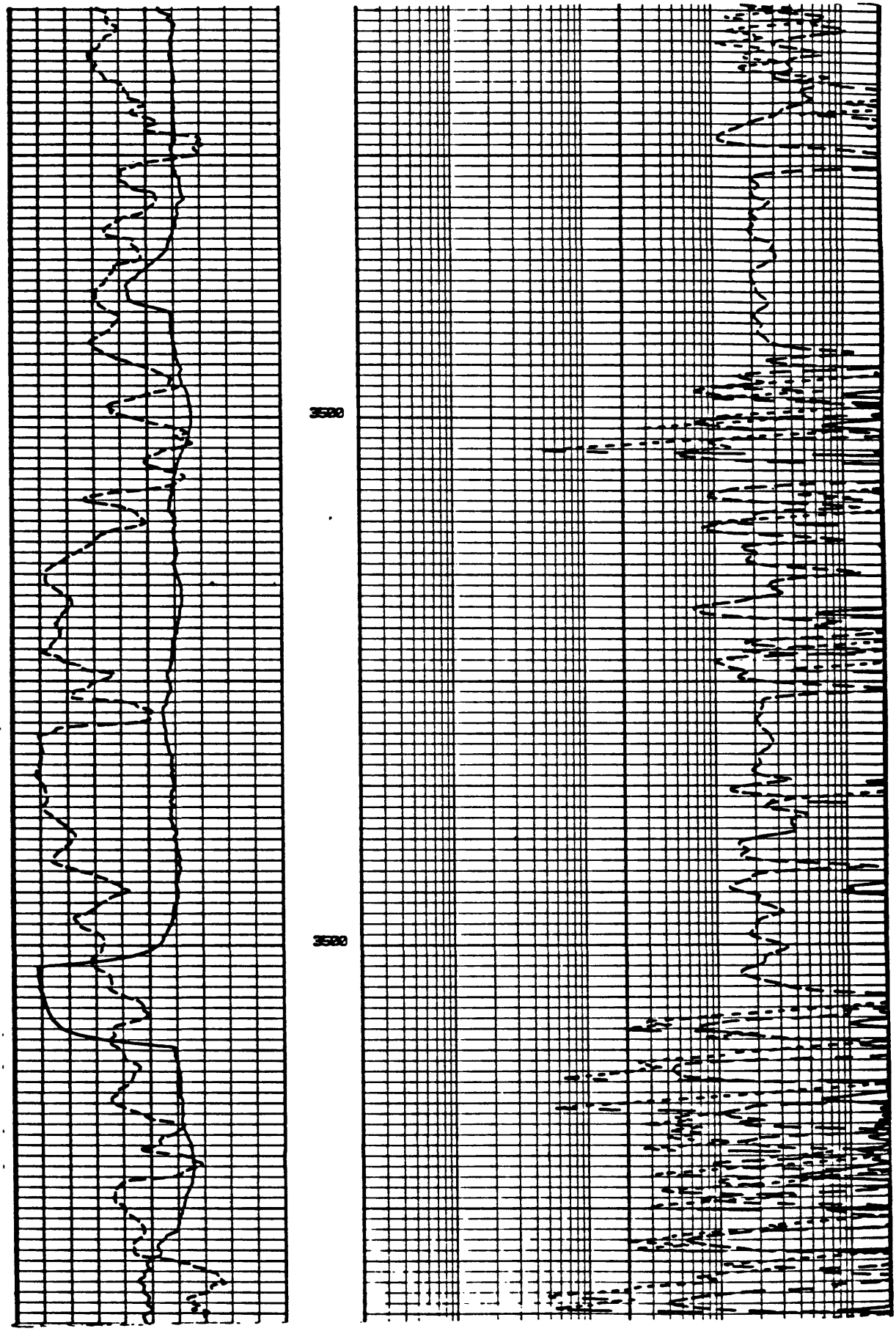
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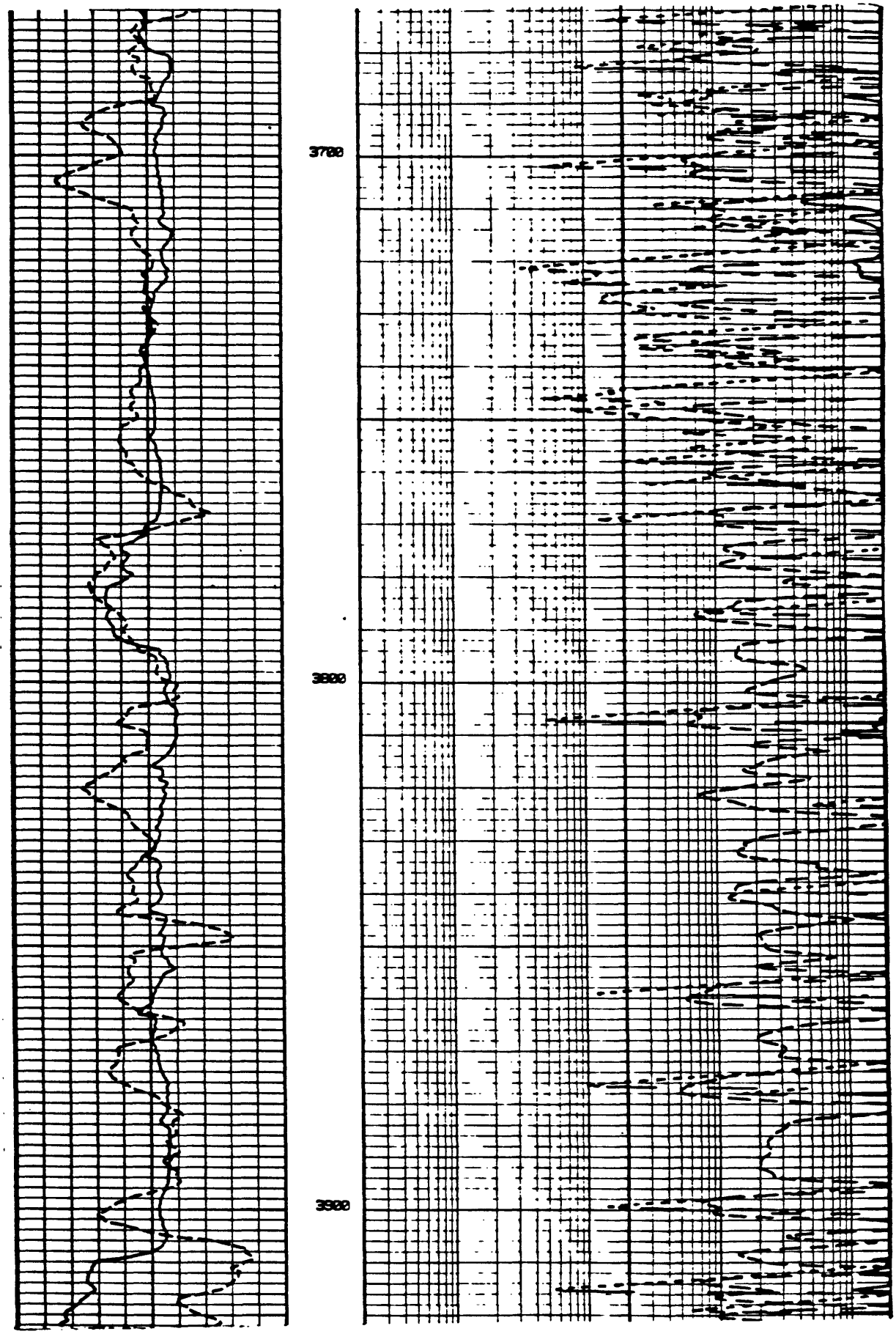
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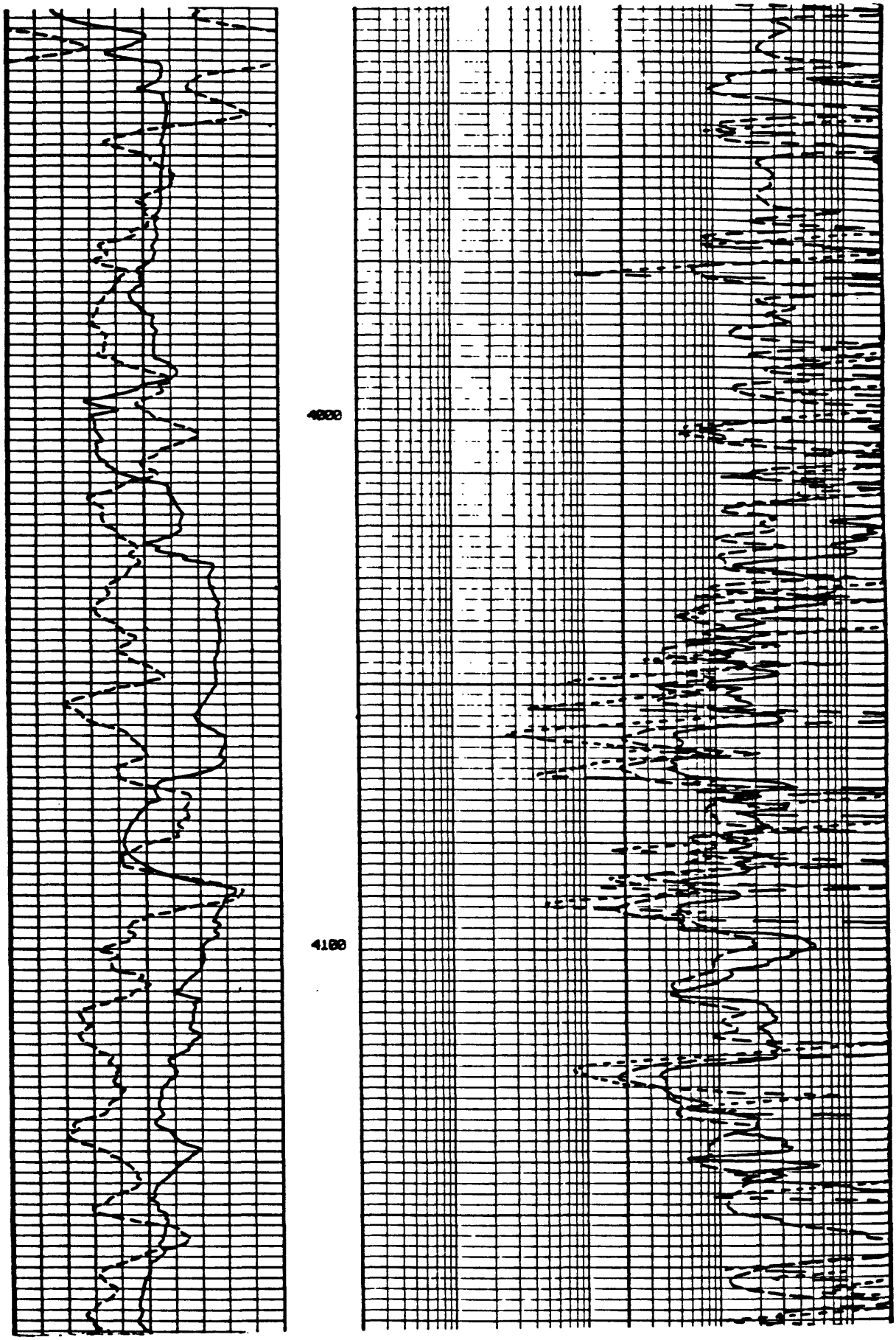
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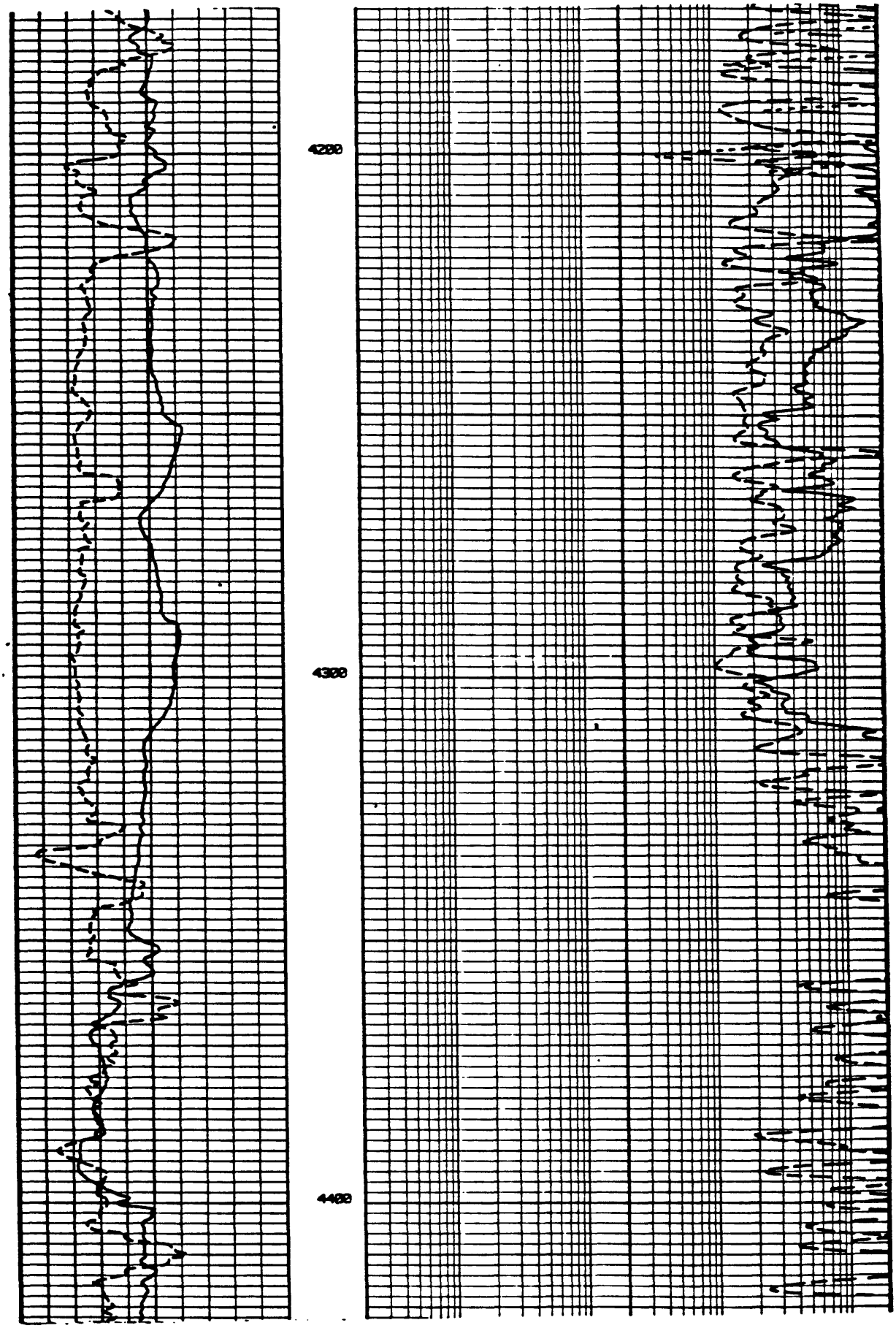
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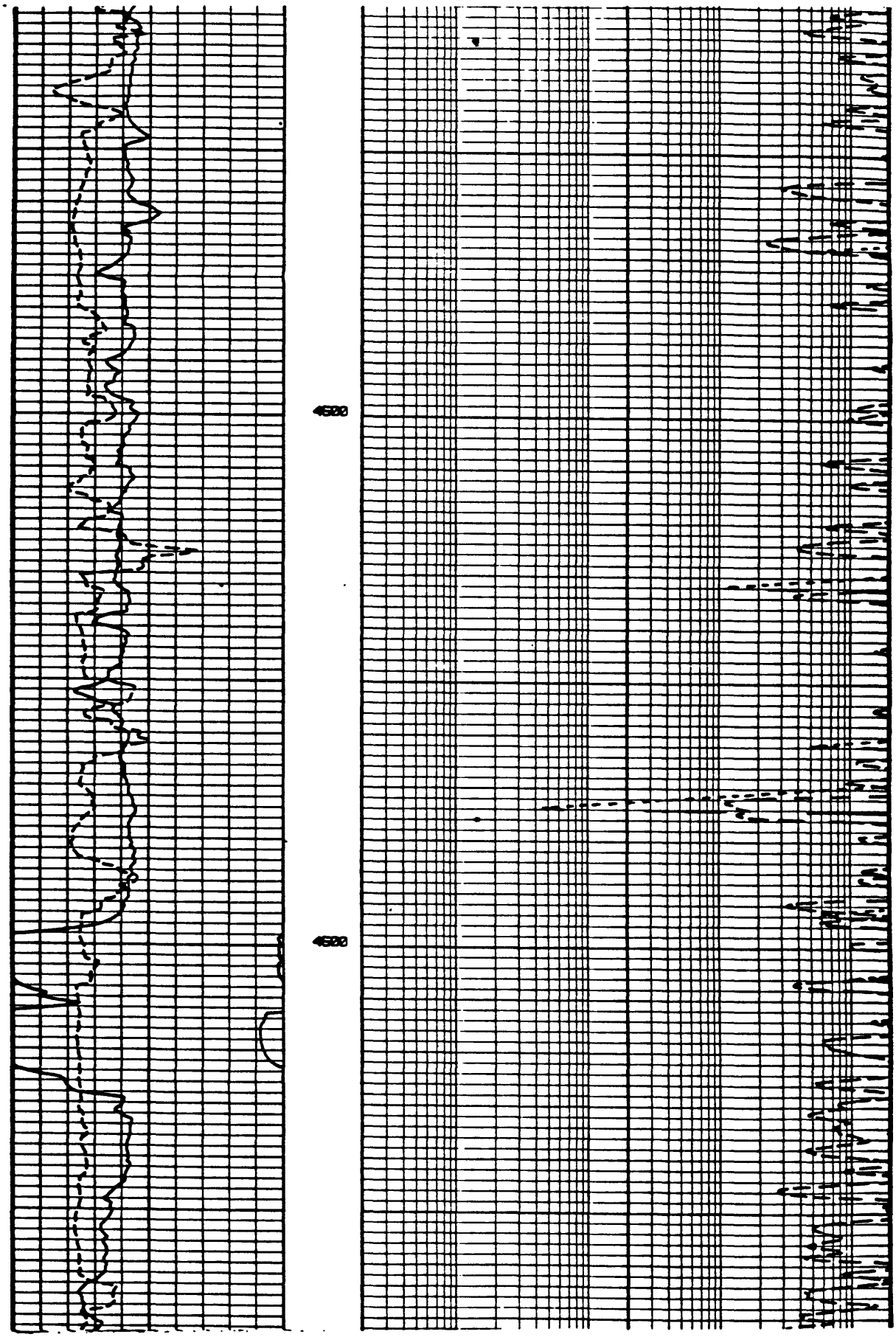
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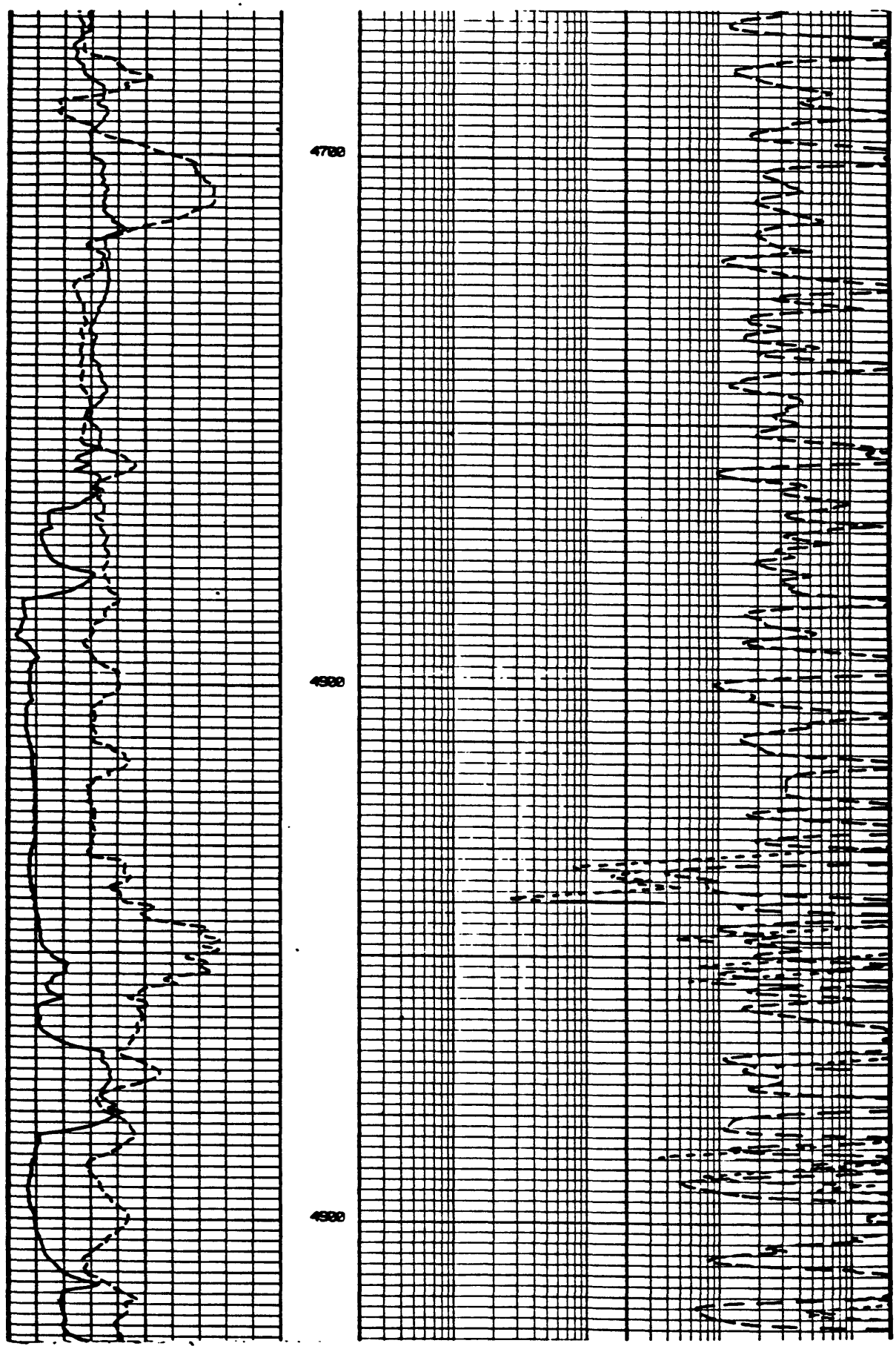
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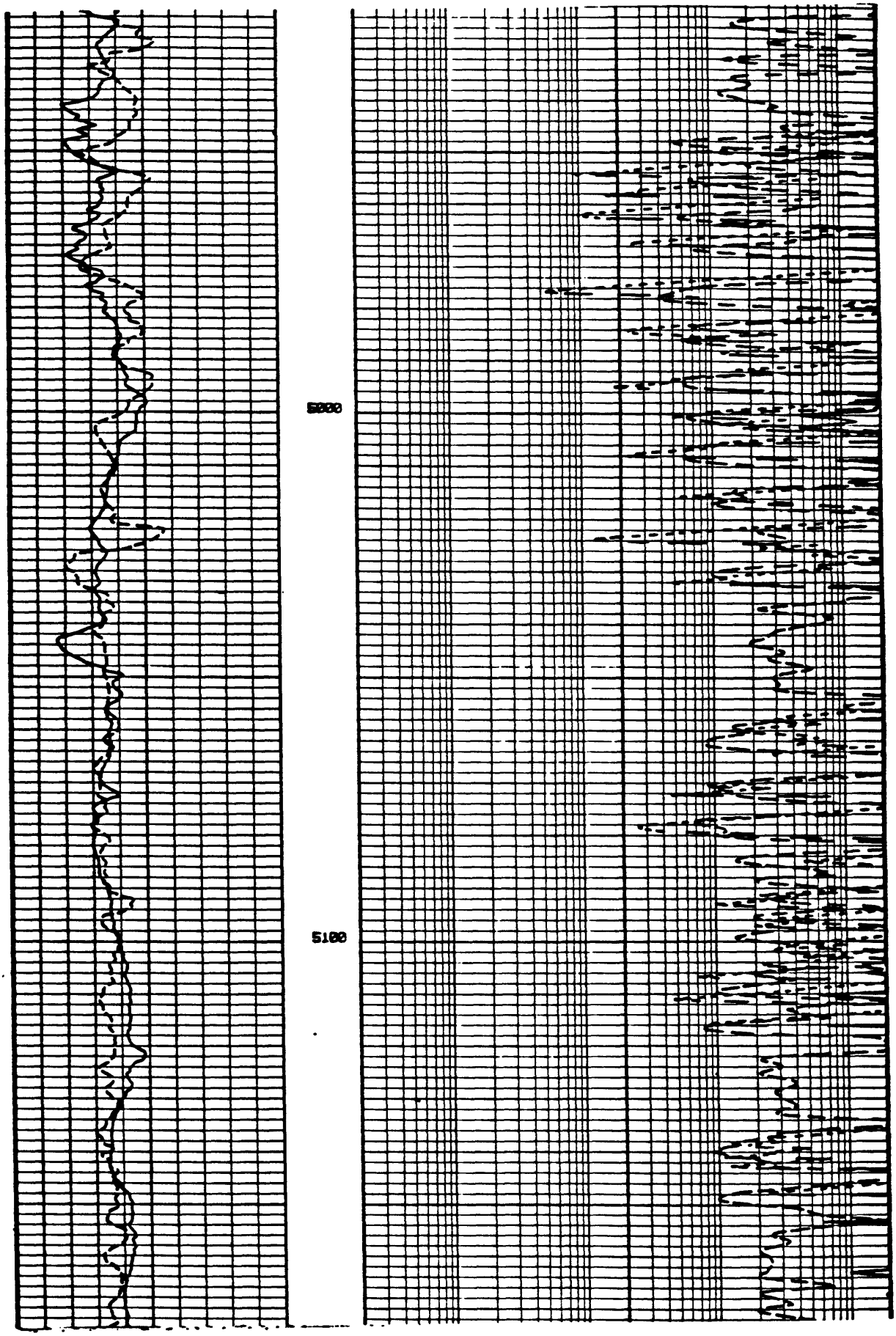
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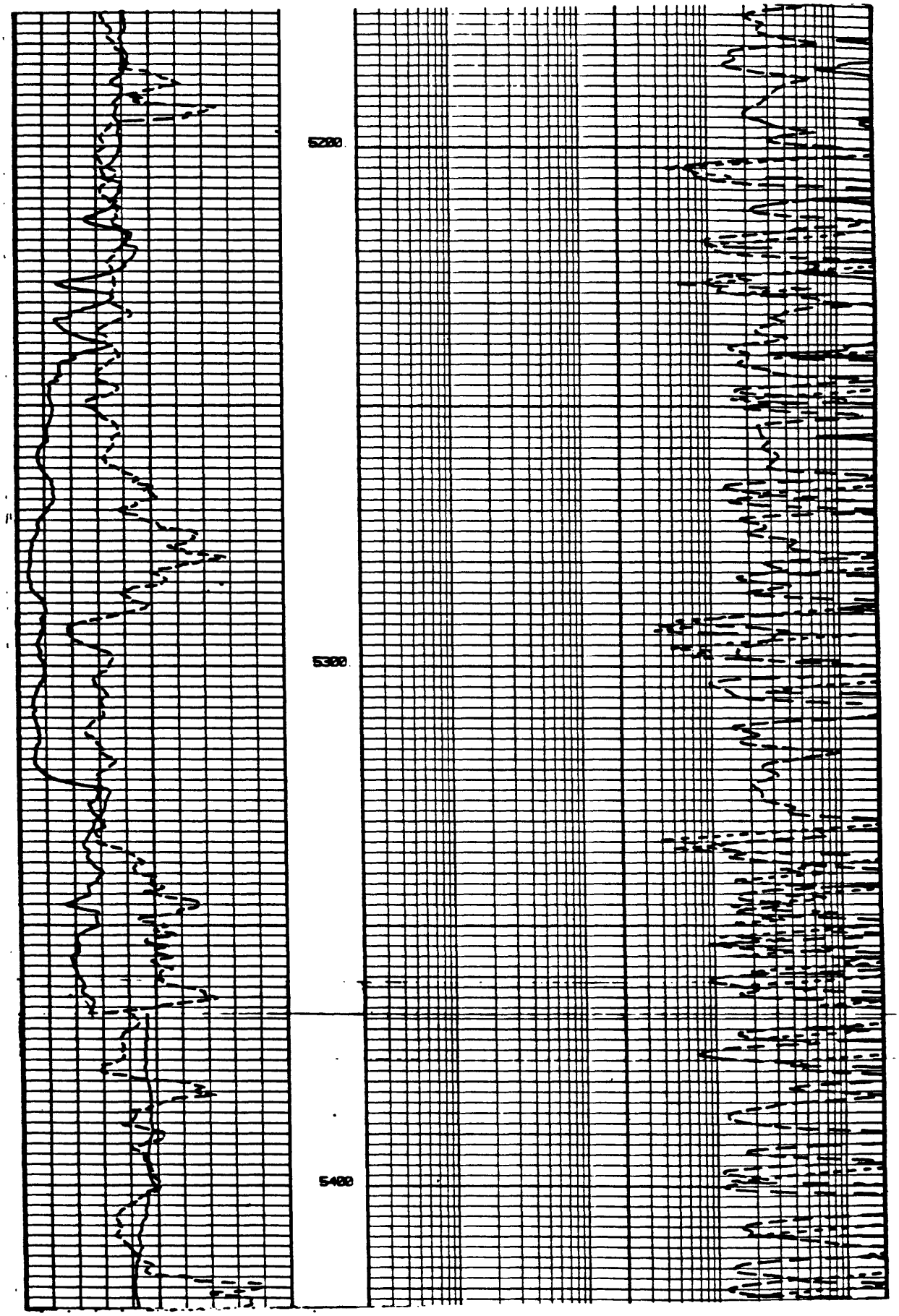
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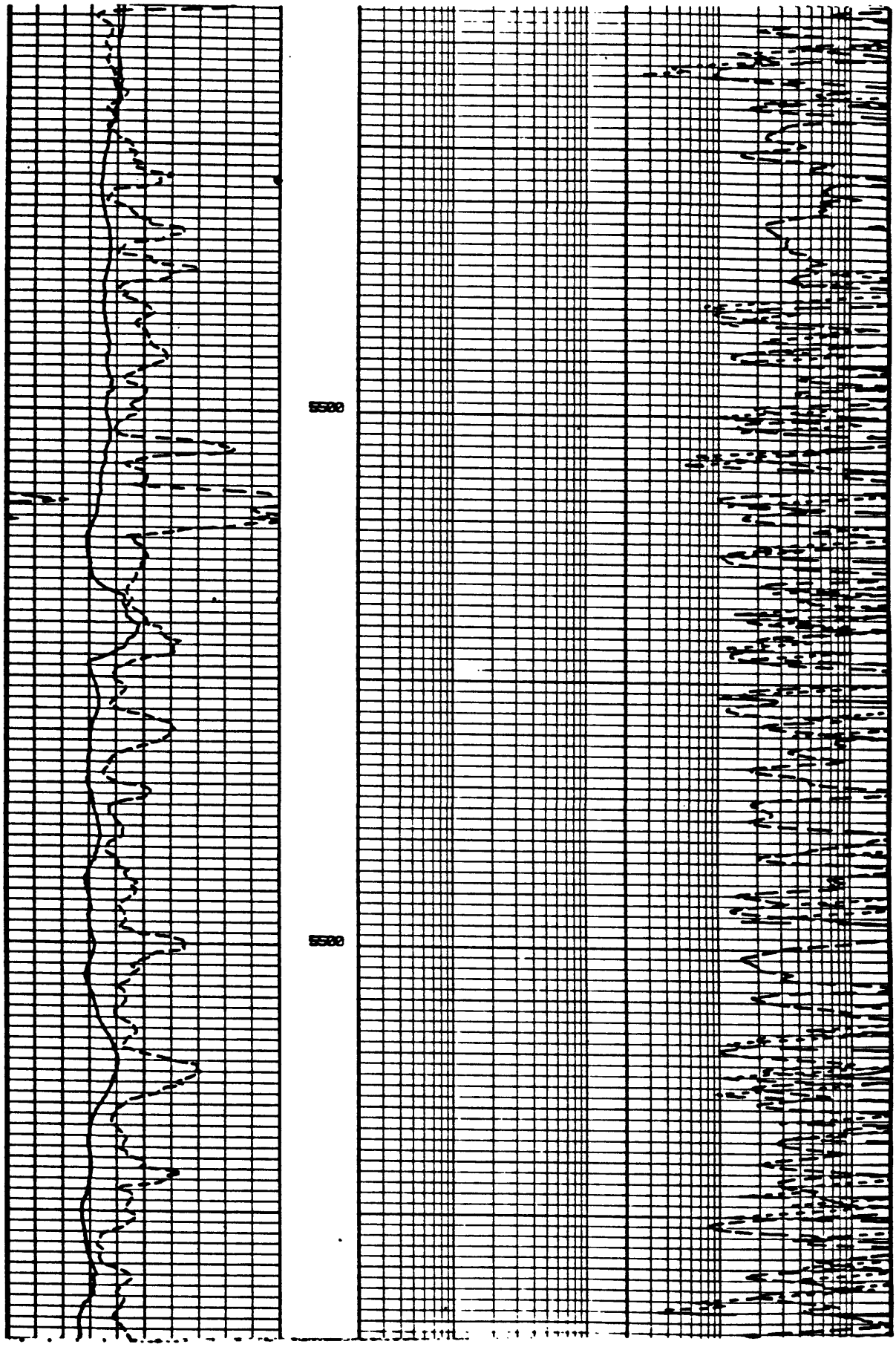
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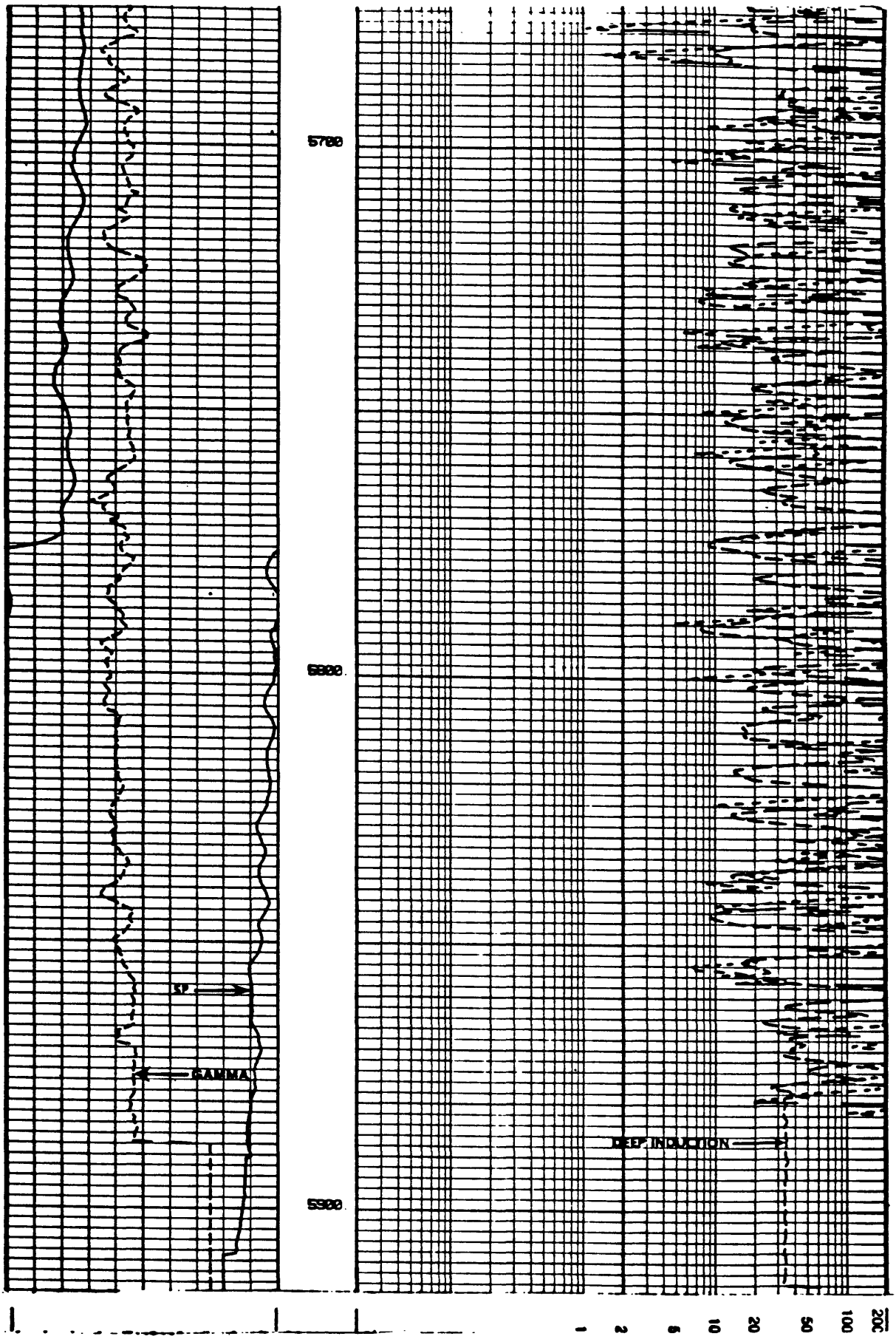
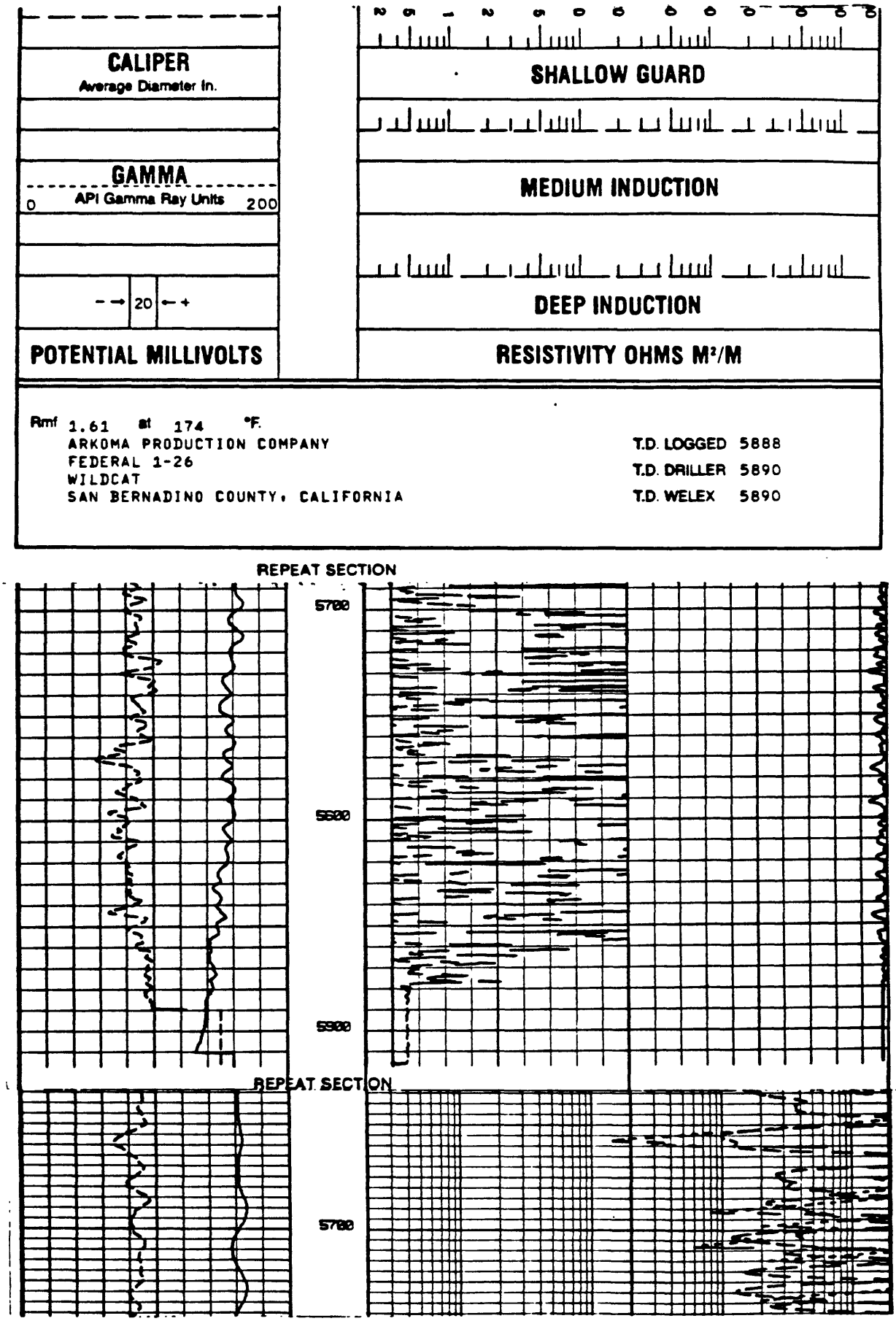
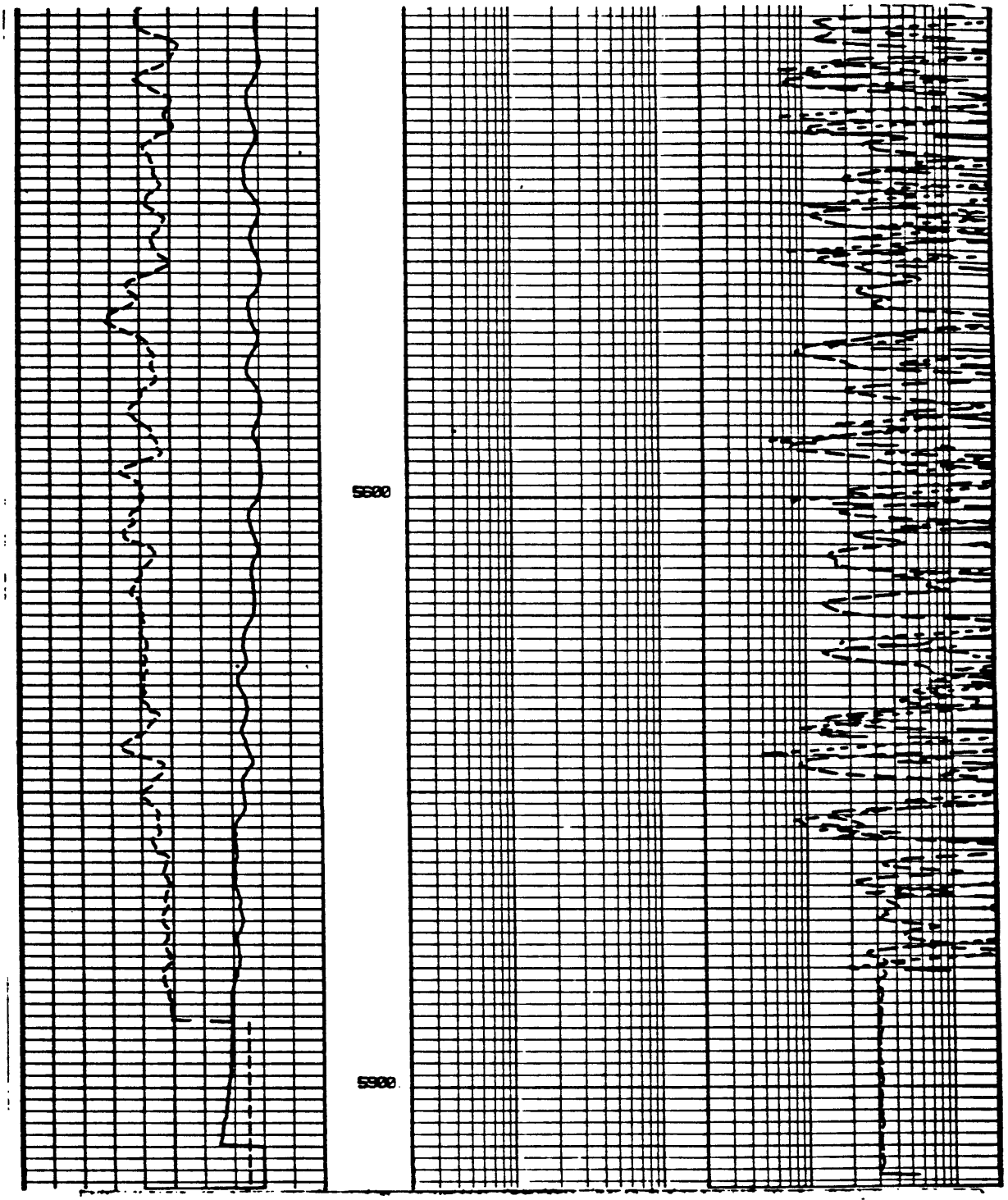

5700
5800
5900
SP
GAMMA
DEEP INDUCTION
2
5
10
20
50
100
200


CALIPER
Average Diameter In.
GAMMA
0 API Gamma Ray Units 200
20
POTENTIAL MILLIVOLTS
SHALLOW GUARD
MEDIUM INDUCTION
DEEP INDUCTION
RESISTIVITY OHMS M²/M
Rmf 1.61 at 174 °F.
ARKOMA PRODUCTION COMPANY
FEDERAL 1-26
WILDCAT
SAN BERNADINO COUNTY, CALIFORNIA
T.D. LOGGED 5888
T.D. DRILLER 5890
T.D. WELEX 5890
REPEAT SECTION
5700
5600
5900
REPEAT SECTION
5700



TRACE SURVEY	CAL	ID	TRK	SCALE L	SCALE R	DISC CHAN	MATRIX OR MATRIX	INTCP	SUMMATION OFFSET	SUMMATION T.C.	DELAY	FUNC C1	FUNC C2
LIN COND		5	3	1000..	0.	9	0.	0	0.	0.	0.	NNN	
LIN DEEP		6	2	0..	30.	10	0.	0	0.	0.	0.	NNN	
LIN GUARD		7	2	0..	30.	11	0.	0	0.	0.	0.	NNN	
AMP GUARD		8	2	0..	6.	7	0.	0	0.	0.	0.	NNN	
LOG GUARD		4	4	0.2.2000.		3	19.0383	0	0.	0.	0.	NYN	
LOG MEDIUM		3	4	0.2.2000.		2	0.24861	0	0.059	0	5.7	NFN	
LOG DEEP		2	4	0.2.2000.		1	0.22483	0	0.043	0	2.1	NSN	
TRAVEL TIME		0	3	150..	50.	9	0.	0	0.	0.	39.069	NNN	
V POROSITY		0	3	45..	-15.	12	67.	0	0.	0.	0.	NNN	
NEUTRON		0	3	0..	6400.	13	0.	0	0.	4.	62.	NNN	
N POROSITY		0	3	45..	-15.	15	LIME	0	0.	0.	0.	NNN	
CALIPER		0	1	16..	6.	4	0.	0	0.	0.	71.759	NNN	
GAMMA		0	1	50..	150.	8	0.0485	0	0.	4.	28.559	NNN	
S.P.		1	1	0..	100.	6	0.	0	0.	0.	7.6	YYN	
T.D.T		0	3	0..	10.	16	0.	0	0.	0.	0.	NNN	

Welex

COMPENSATED DENSITY LOG

COMPANY ARKOMA PRODUCTION COMPANY
WELL FEDERAL 1-26
FIELD WILDCAT
County S. BERNADINO State CALIF

COMPANY ARKOMA PRODUCTION COMPANY

WELL FEDERAL 1-26

FIELD WILDCAT

COUNTY SAN BERNADINO STATE CALIFORNIA

Location
1303' SOUTH & 1745' EAST FROM
THE NORTHWEST CORNER OF:

Sec. 26 Twp. 3N Rge. 6W

Other Services:
DIL
DIP

Permanent Datum G.L. Elev. 3272
Log Measured From K.B. Ft. Above Perm. Datum
Drilling Measured From K.B.

Elev.: K.B. N/A
D.F.
G.L. 3272

Date	3-10-84			
Run No.	ONE			
Depth—Driller	5890			
Depth—Welex	5890			
Btm. Log Inter.	5888			
Top Log Inter.	1942			
Casing—Driller 9	5/8 @ 1313	@	@	@
Casing—Welex	NOT LOGGED			
Bit Size	8 1/2			
Type Fluid in Hole	GEL WATER			
Dens. / Visc.	9.2 / 39	/	/	/
pH / Fluid Loss	8.5 / 11 ml	/ ml	/ ml	/ ml
Source of Sample	FLOWLINE			
R_m @ Meas. Temp.	5.00 @ 62°F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	4.60 @ 58°F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	5.10 @ 52°F	@ °F	@ °F	@ °F
Source R_{mf} R_{mc}	MEASURED	/	/	/
R_m @ BHT	1.86 @174°F	@ °F	@ °F	@ °F
Time Since Circ.	50 HRS.			
Max. Rec. Temp.	174°F @ BHT.	°F @	°F @	°F @
Equip. / Location	2898 / SFS	/	/	/
Recorded By	K. QUALLS			
Witnessed By	D. MANDEL			

Fold Here

EQUIPMENT DATA

GAMMA RAY		GAMMA DENSITY	
Run No.	ONE	Run No.	ONE
Tool Model No.	102-A	Log Type	COMP.DENS.
Diameter	3 5/8	Tool Model No.	125
Detector Model No.	102-A	Diameter	3 5/8
Type	SCINT.	Detector Model No.	127
Length	N/A	Type	SCINT.
Distance to Source	240"	Length	N/A
		Source Model No.	DCS
GENERAL		Serial No.	DCS
Hoist Truck No.	2898	Spacing	N/A
Instrument Truck No.	2898	Type	Cs 137
Tool Serial No.	729	Strength	500 mc

LOGGING DATA

GENERAL				GAMMA RAY				GAMMA DENSITY			
Run No	Depths From	Depths To	Speed Ft/Min.	T.C. Sec.	Sens. Settings	Zero Div. L or R	API G.R. Units per Log Div.	T.C. Sec.	Sens. Settings	Zero Div. L or R	Units per Log Div.
ONE	5888	1342	30	4	0-200	L	20	4	2-3	33-L	.05

Reference Literature:

Service Ticket No. 185251 Remarks: LAST READING AT 1942' DUE TO LOST TOOL.

5" = 100'

GAMMA

0 API Gamma Ray Units 200

CALIPER

6 Average Diameter In. 16

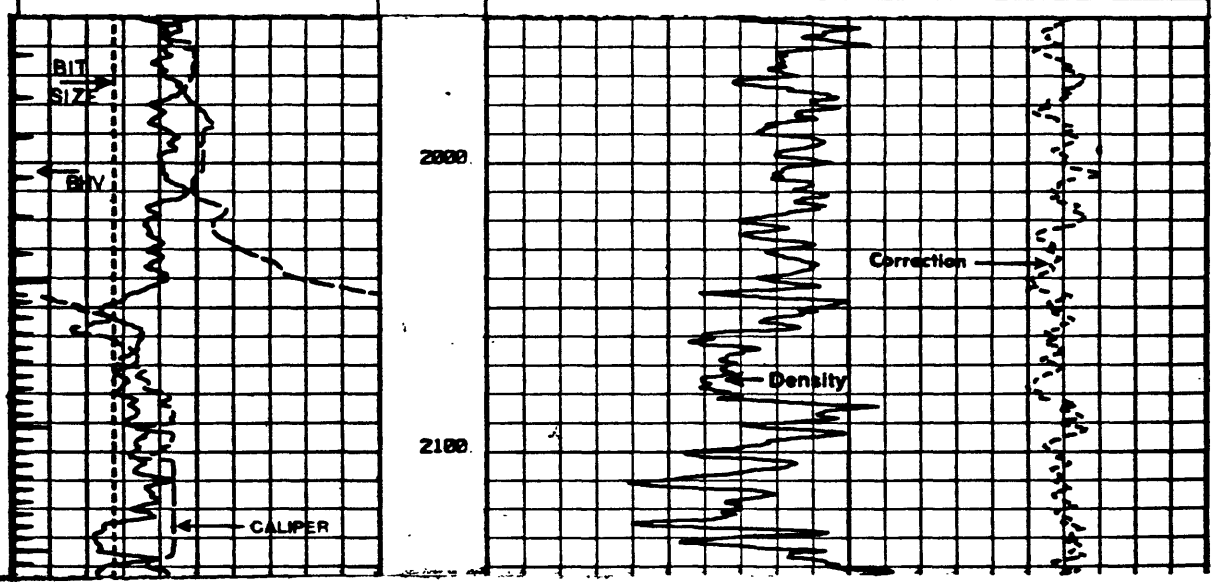
BULK DENSITY

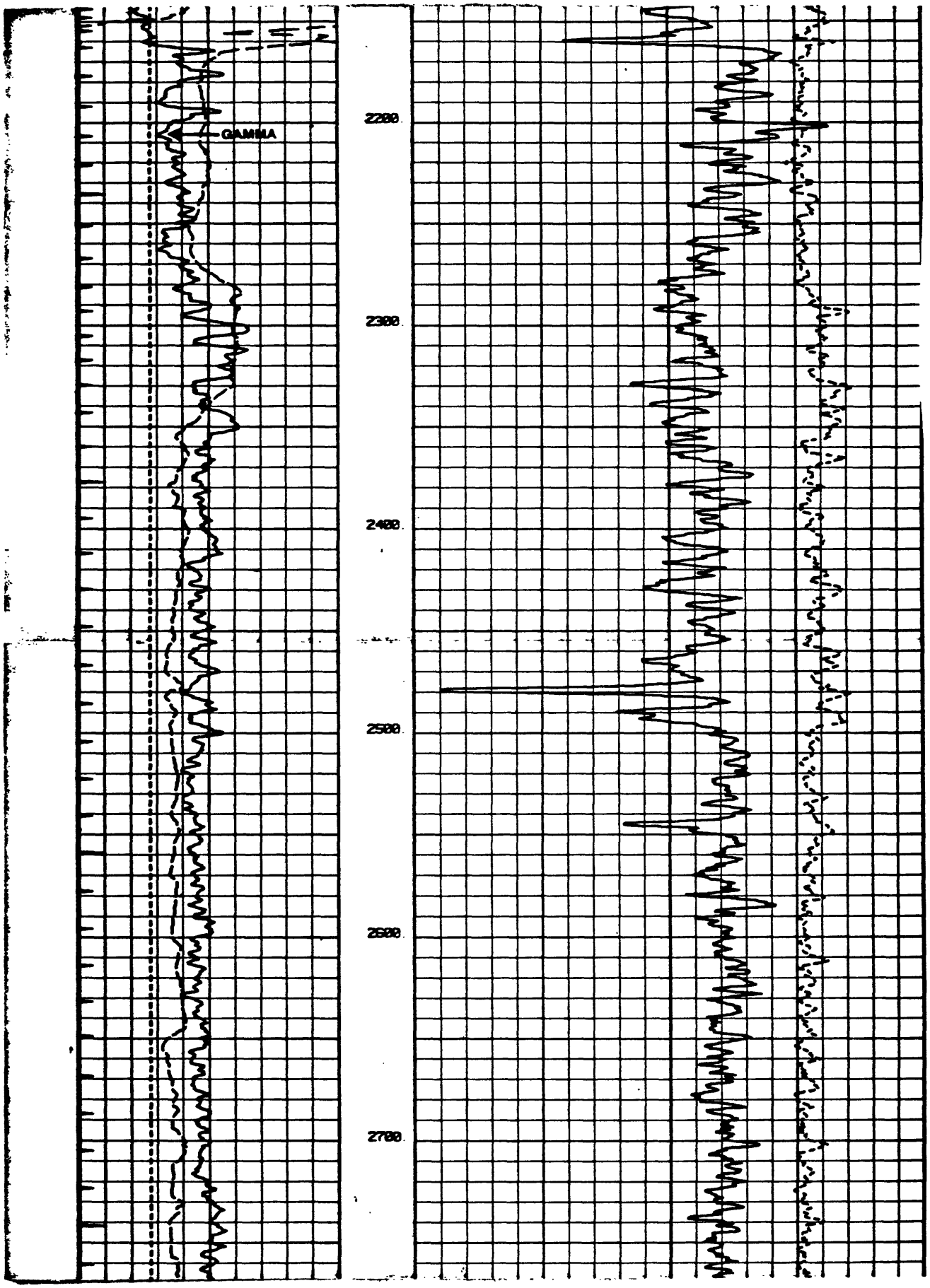
Grams/cc (when $\frac{Z}{A} = 0.5$)

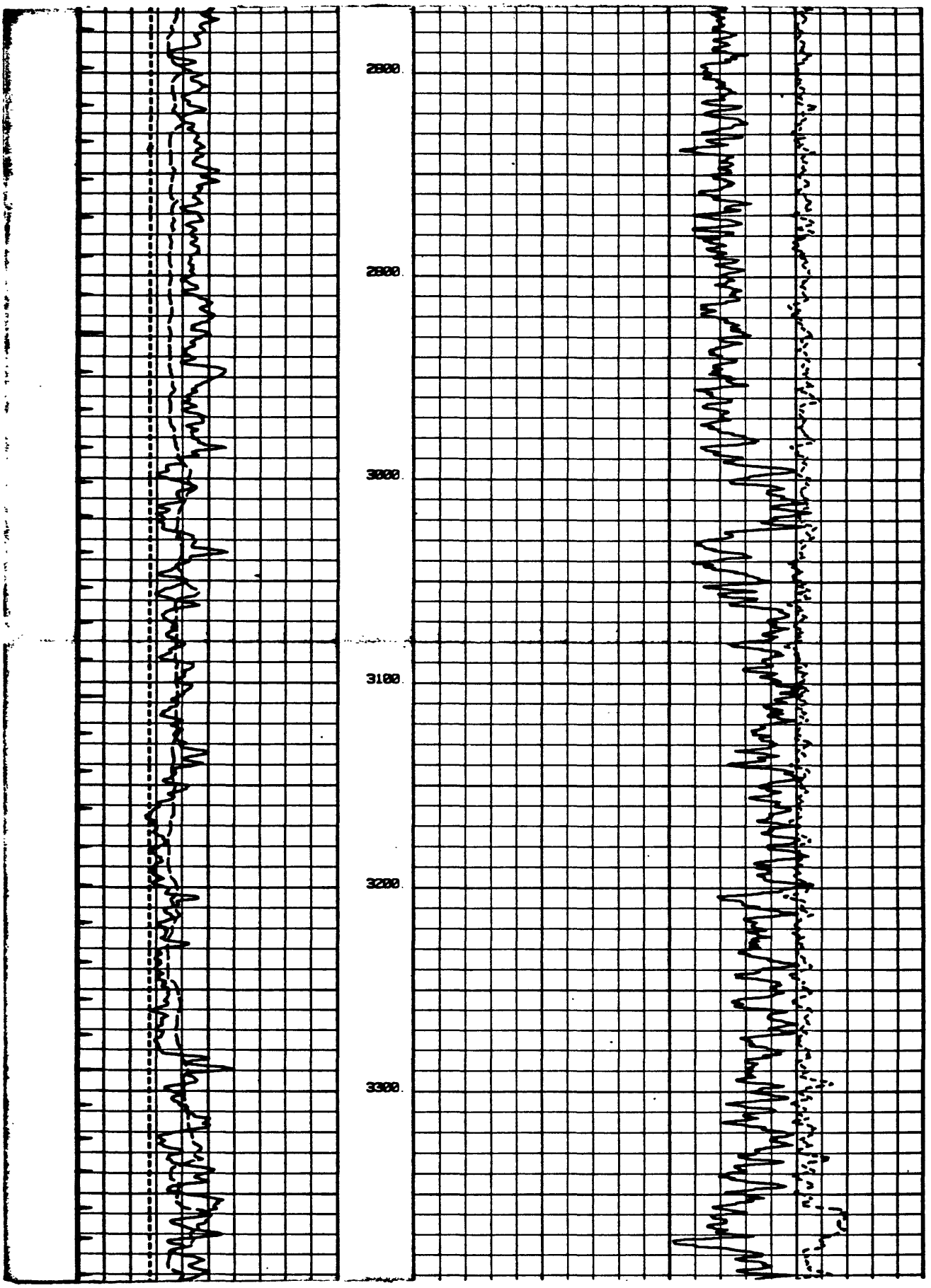
CORRECTION GMS/CC

-.25 0 +.25

1.65 2.15 2.65




GAMMA
2200.
2300.
2400.
2500.
2600.
2700.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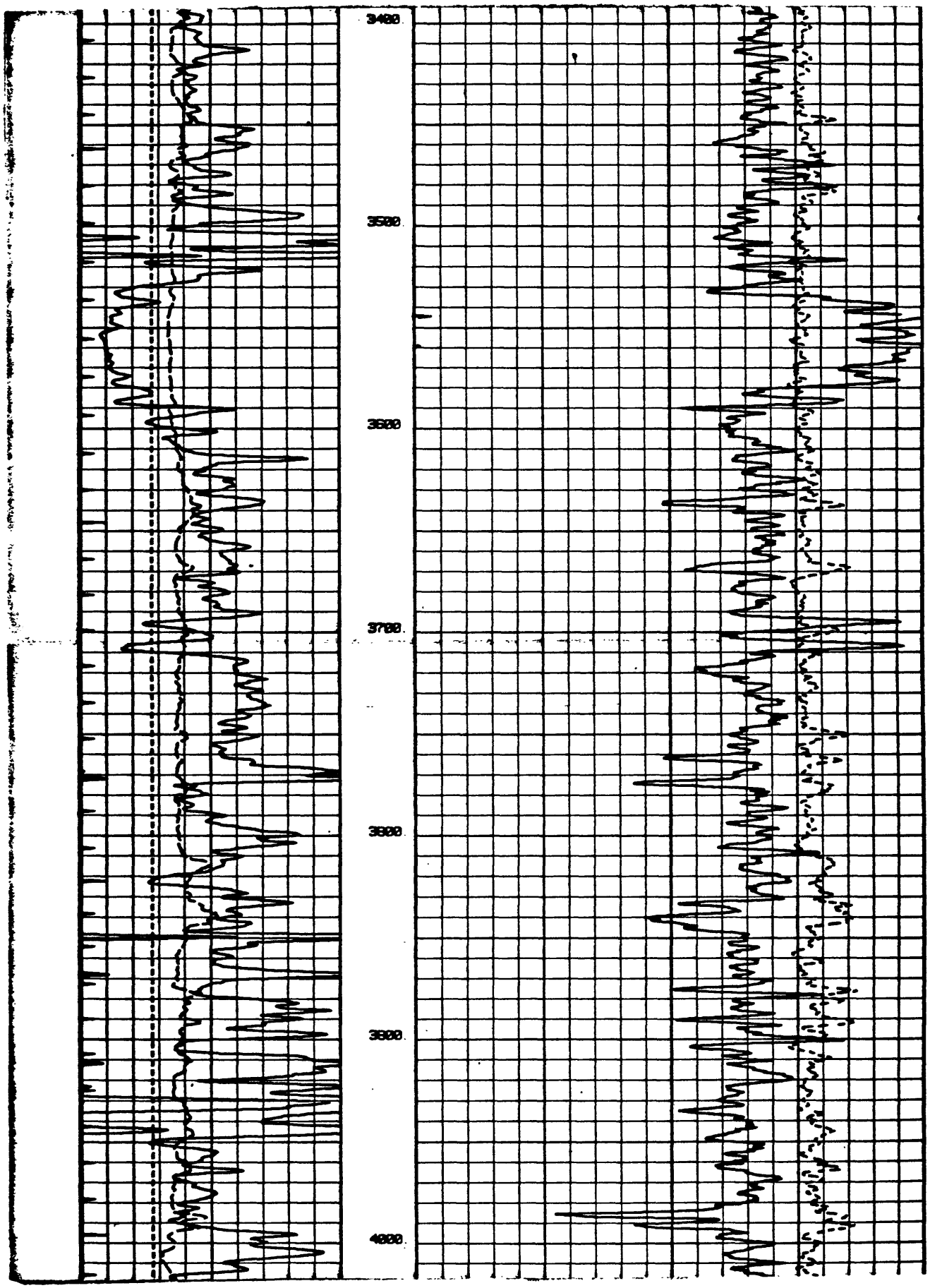
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3600
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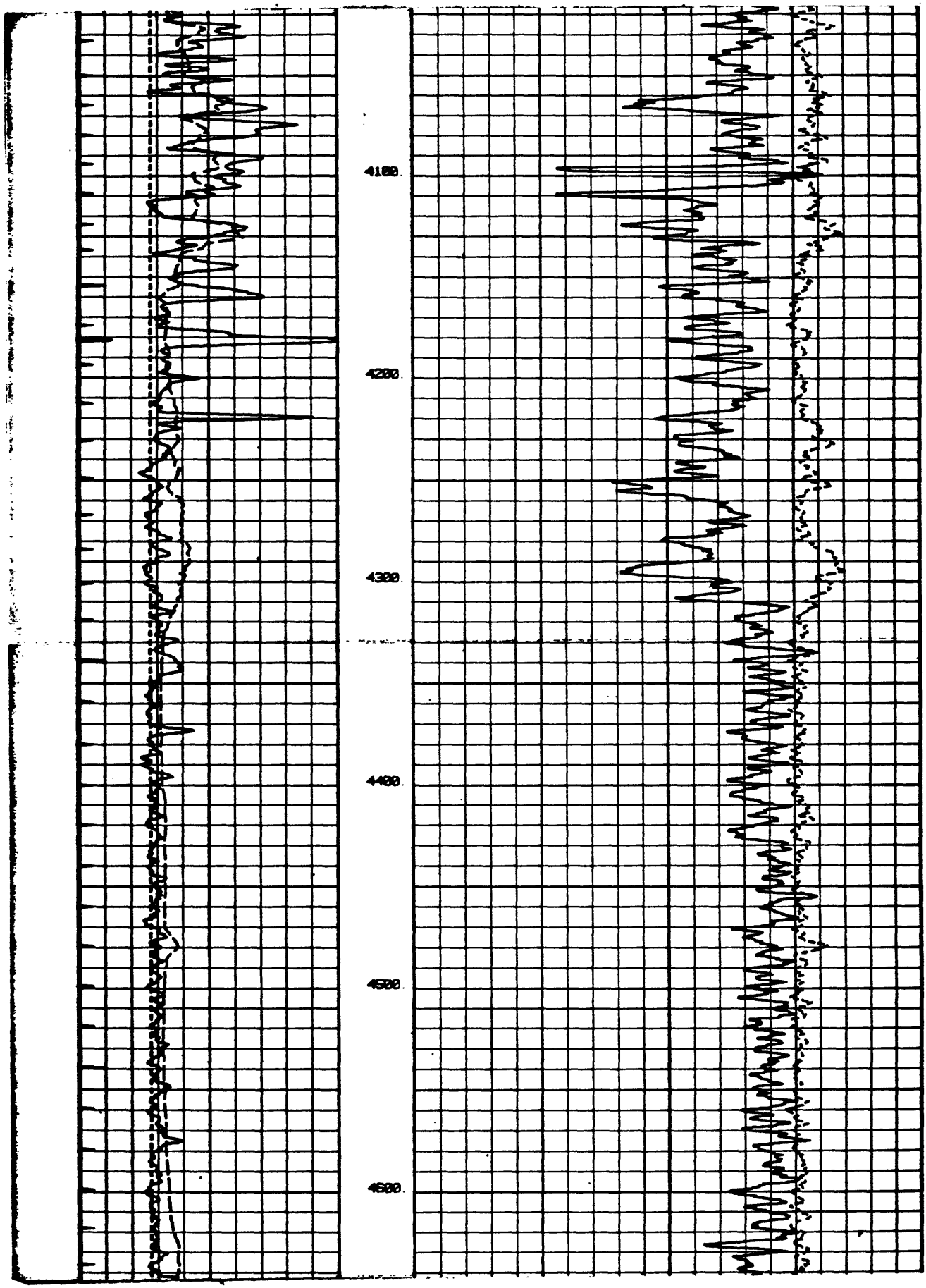
3800
3900
4000


4100.
4200.
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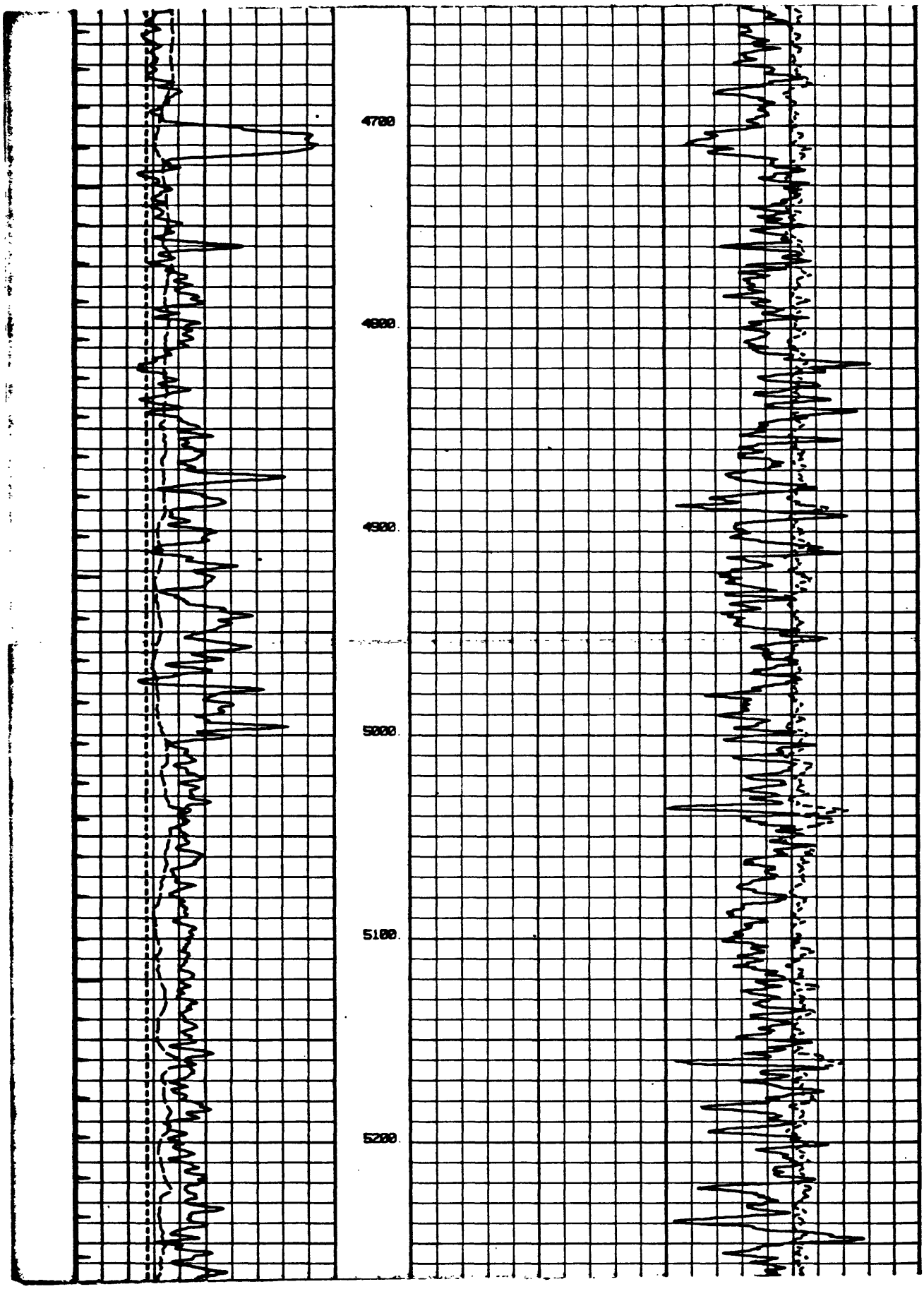
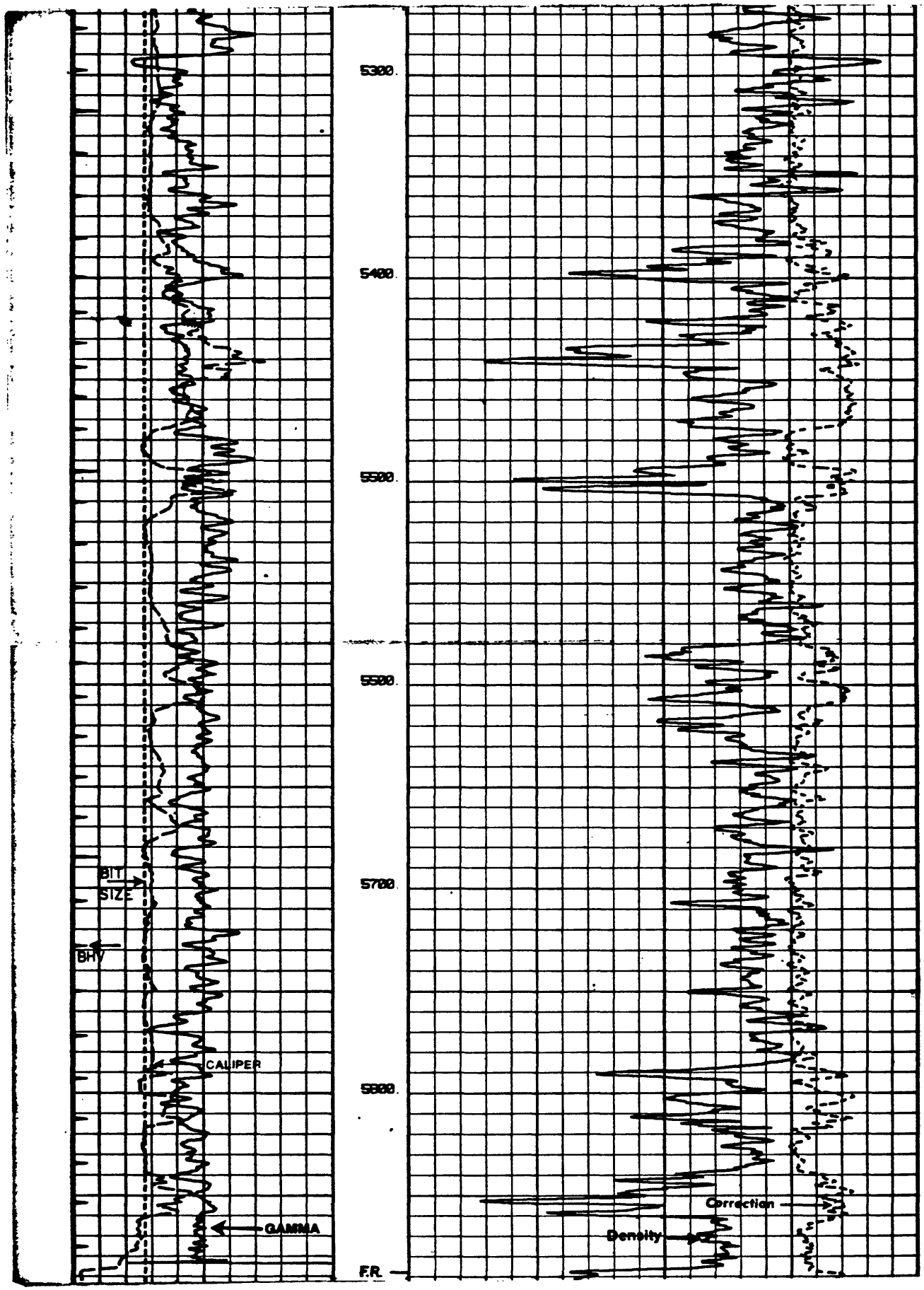
4600.


4700
4800
4900
5000
5100
5200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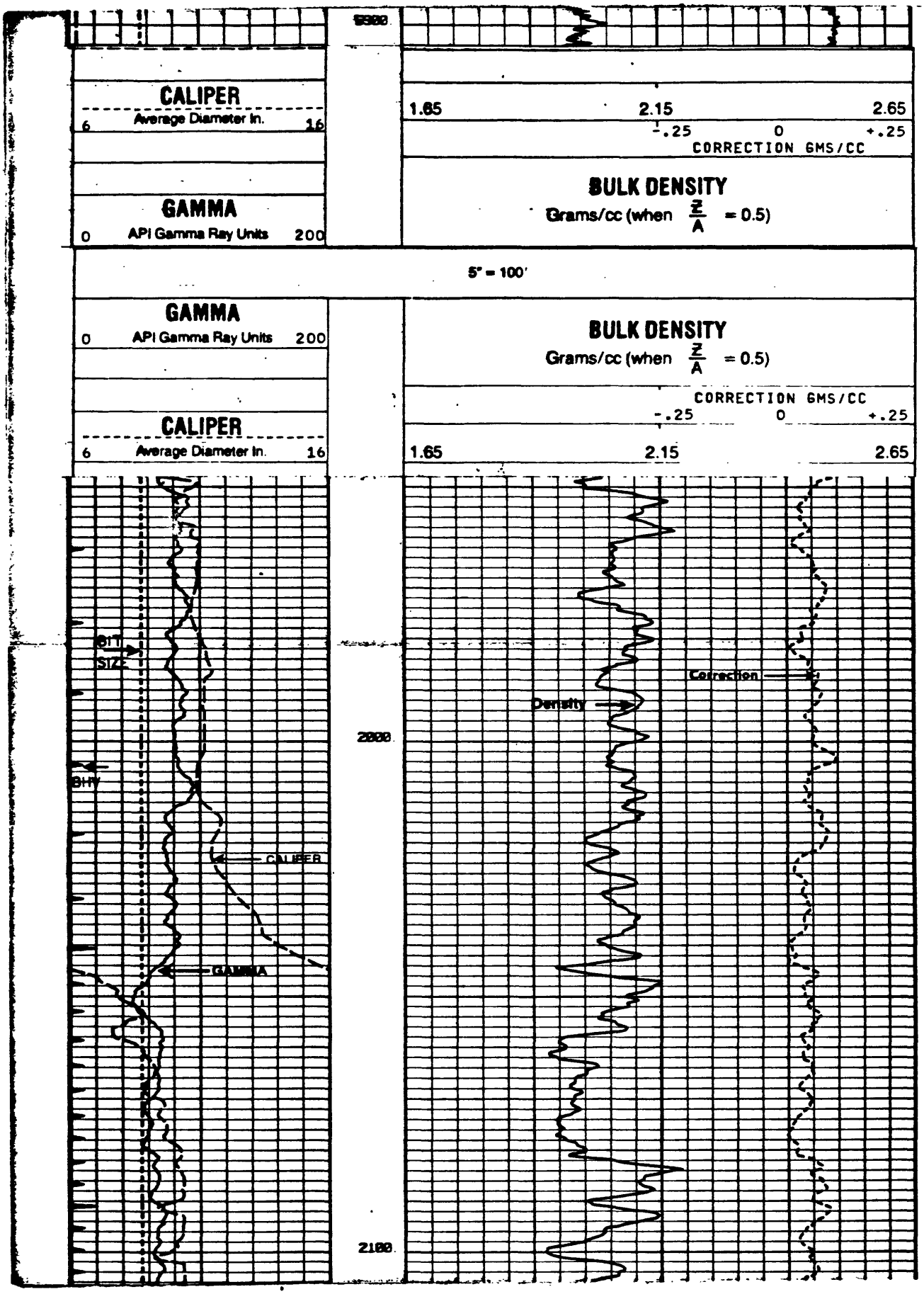
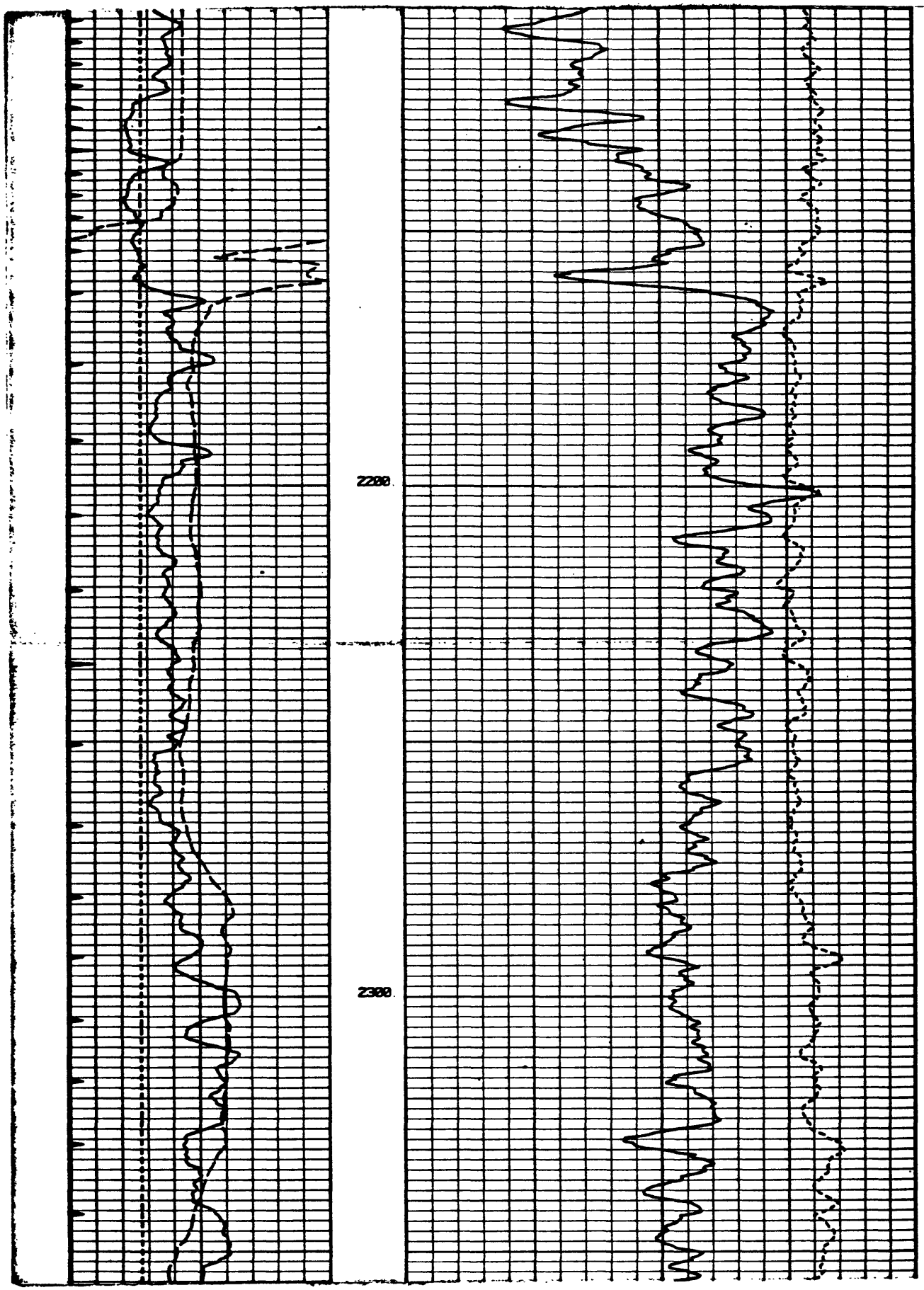
BIT SIZE
BHV
CALIPER
GAMMA
F.R.
Correction
Density


CALIPER
6 Average Diameter In. 16
GAMMA
0 API Gamma Ray Units 200
1.85 2.15 2.65
-.25 0 +.25
CORRECTION GMS/CC
BULK DENSITY
Grams/cc (when Z/A = 0.5)
5" = 100'
GAMMA
0 API Gamma Ray Units 200
CALIPER
6 Average Diameter In. 16
BULK DENSITY
Grams/cc (when Z/A = 0.5)
CORRECTION GMS/CC
-.25 0 +.25
1.65 2.15 2.65
BIT SIZE
BHV
CALIPER
GAMMA
Density
Correction
2000
2100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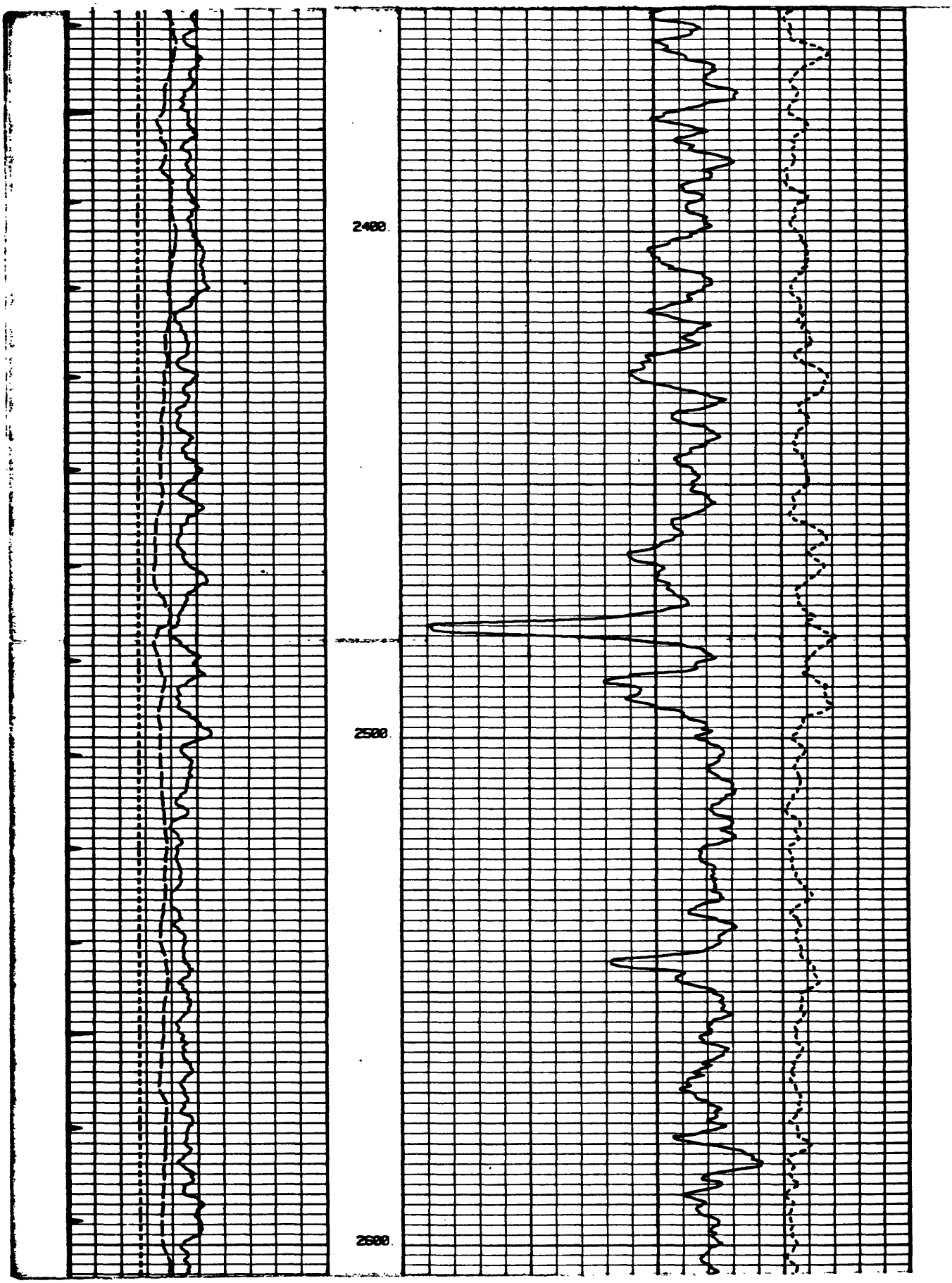
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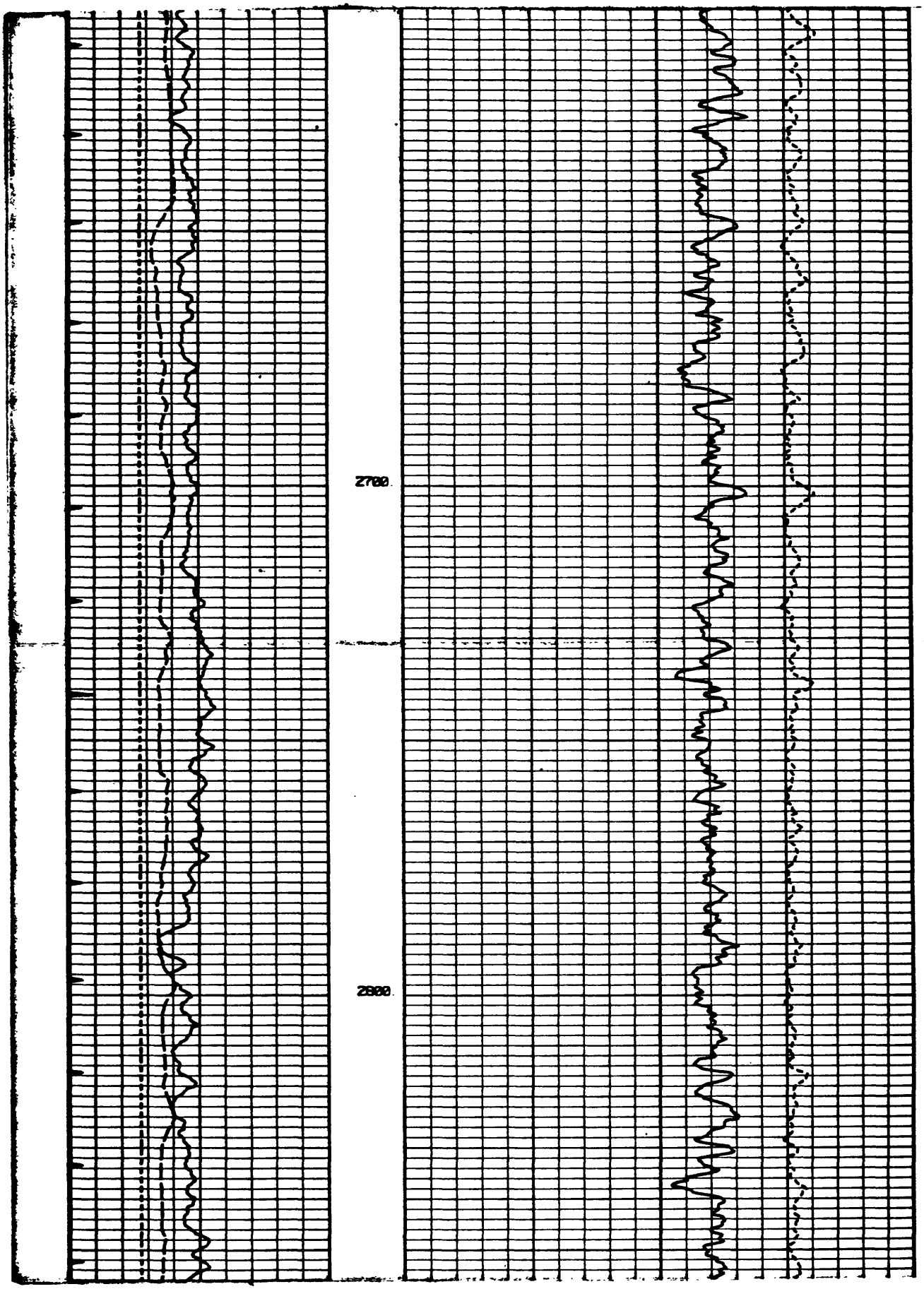
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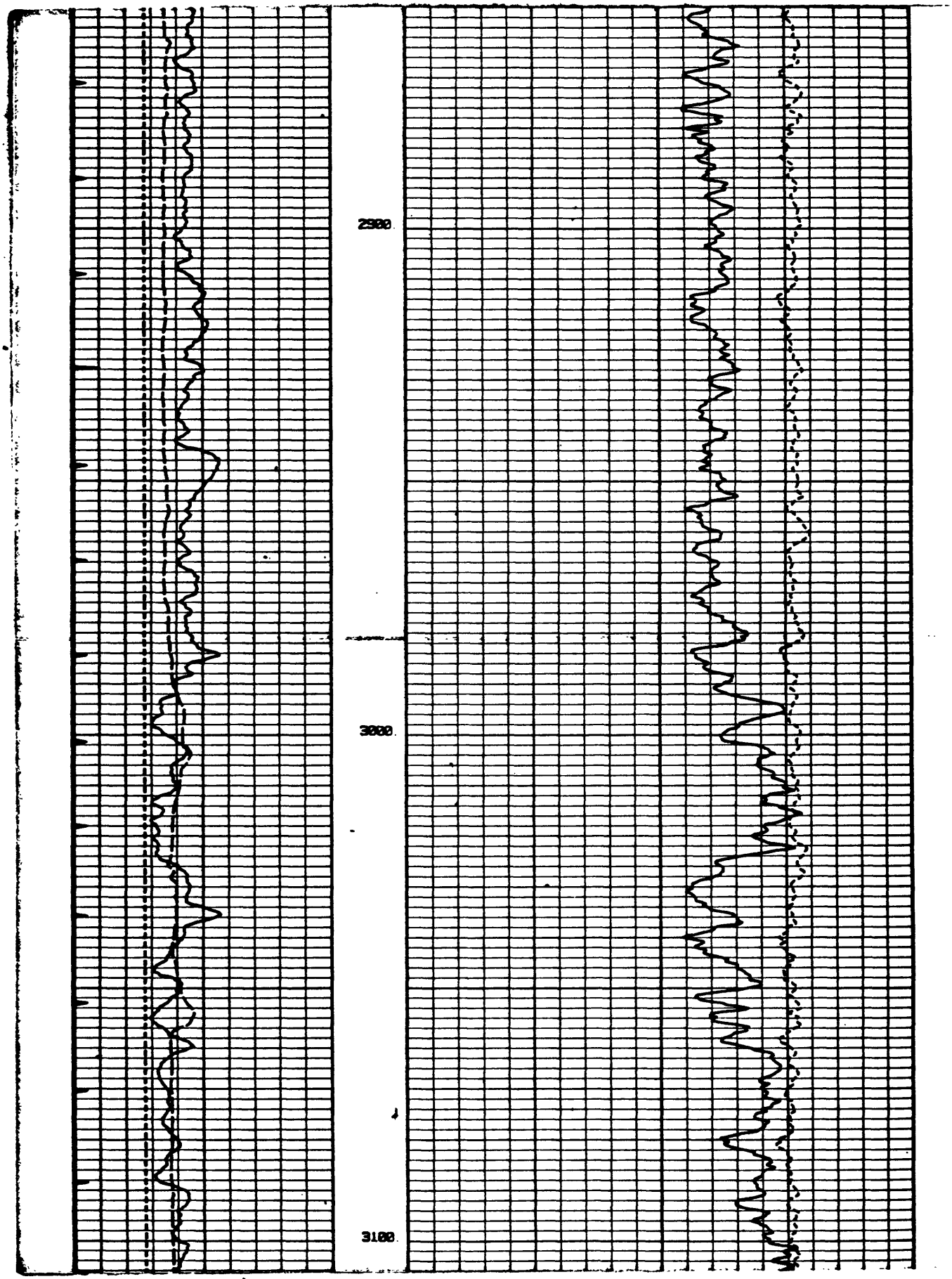
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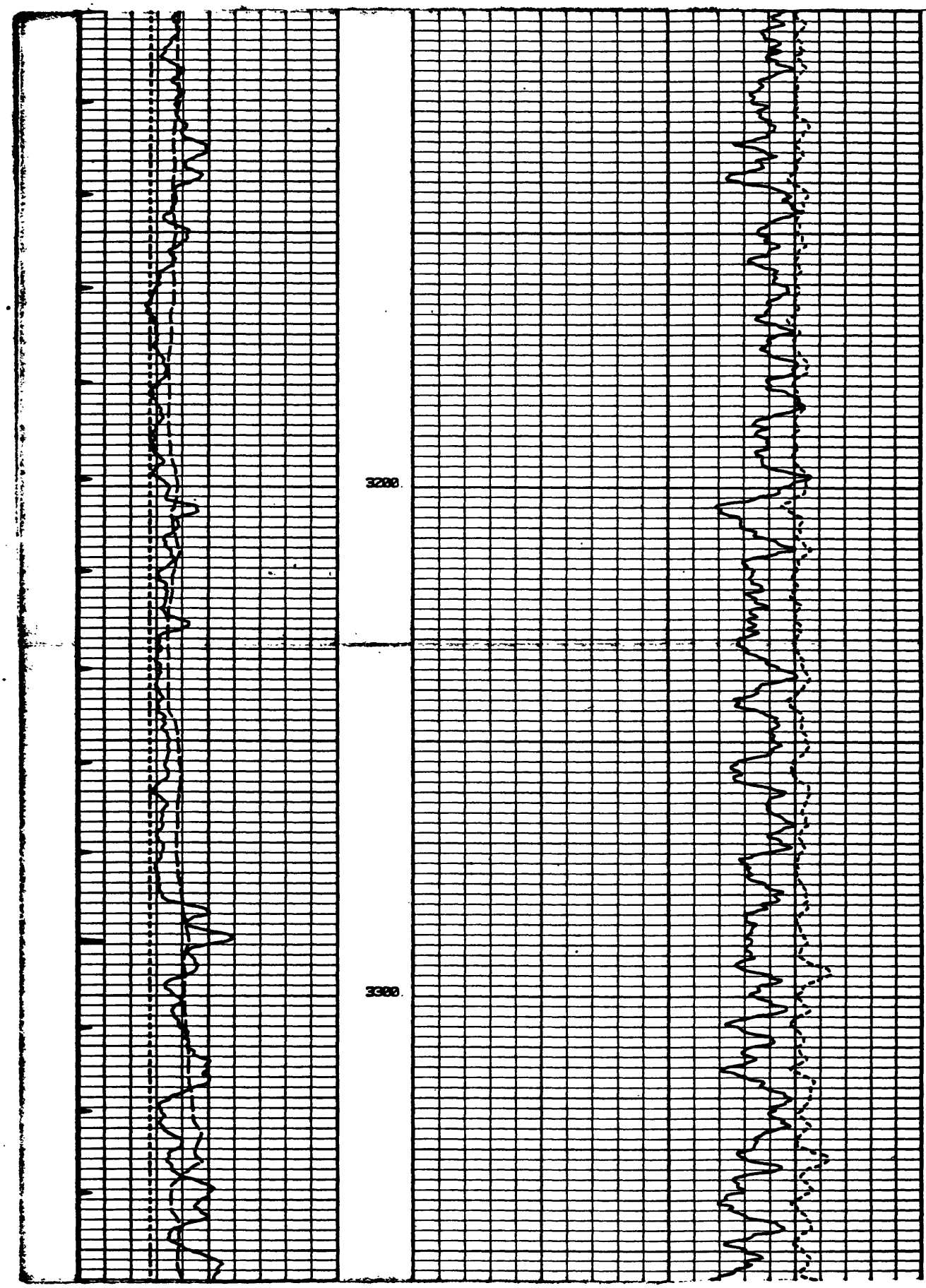
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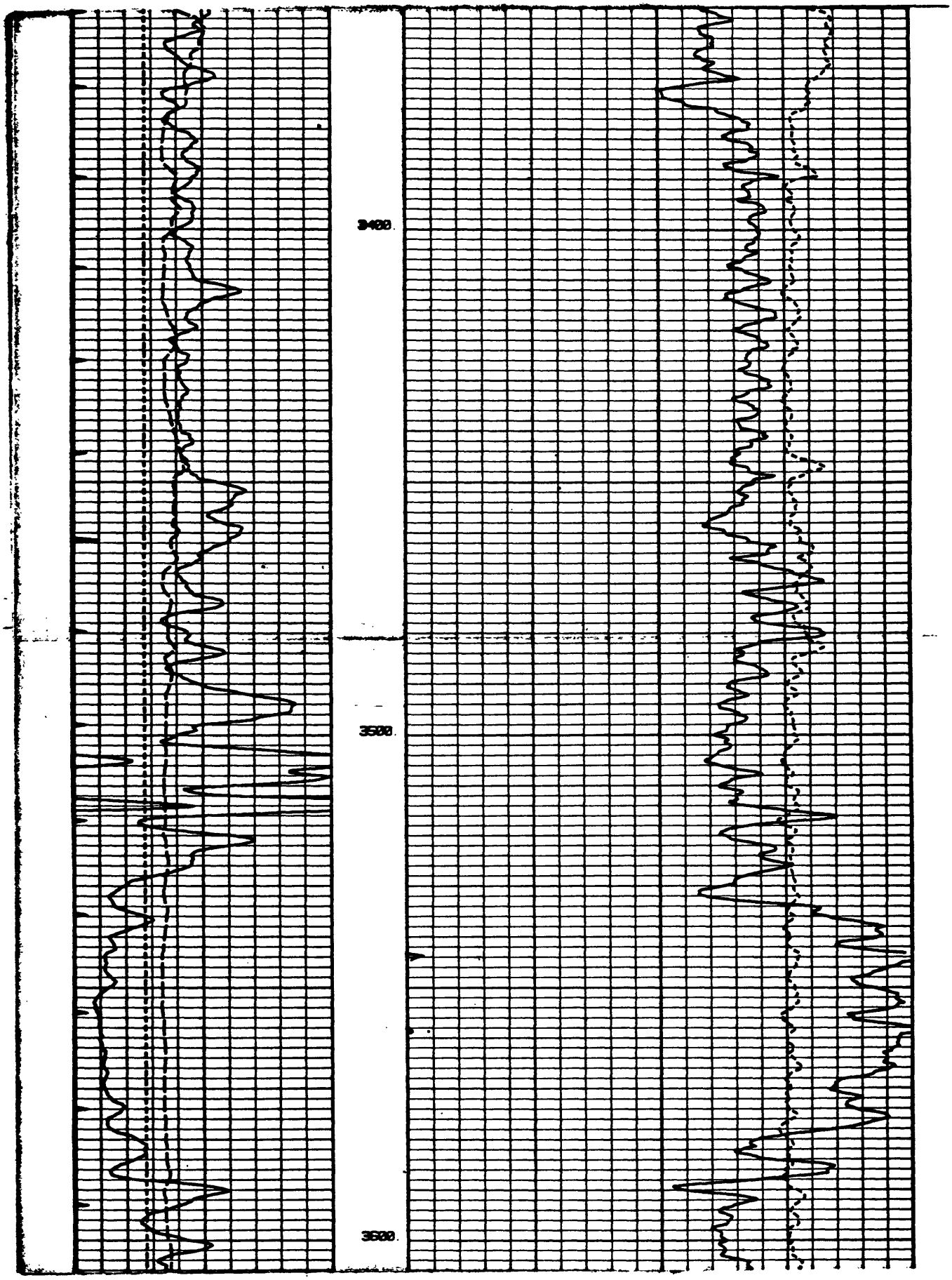
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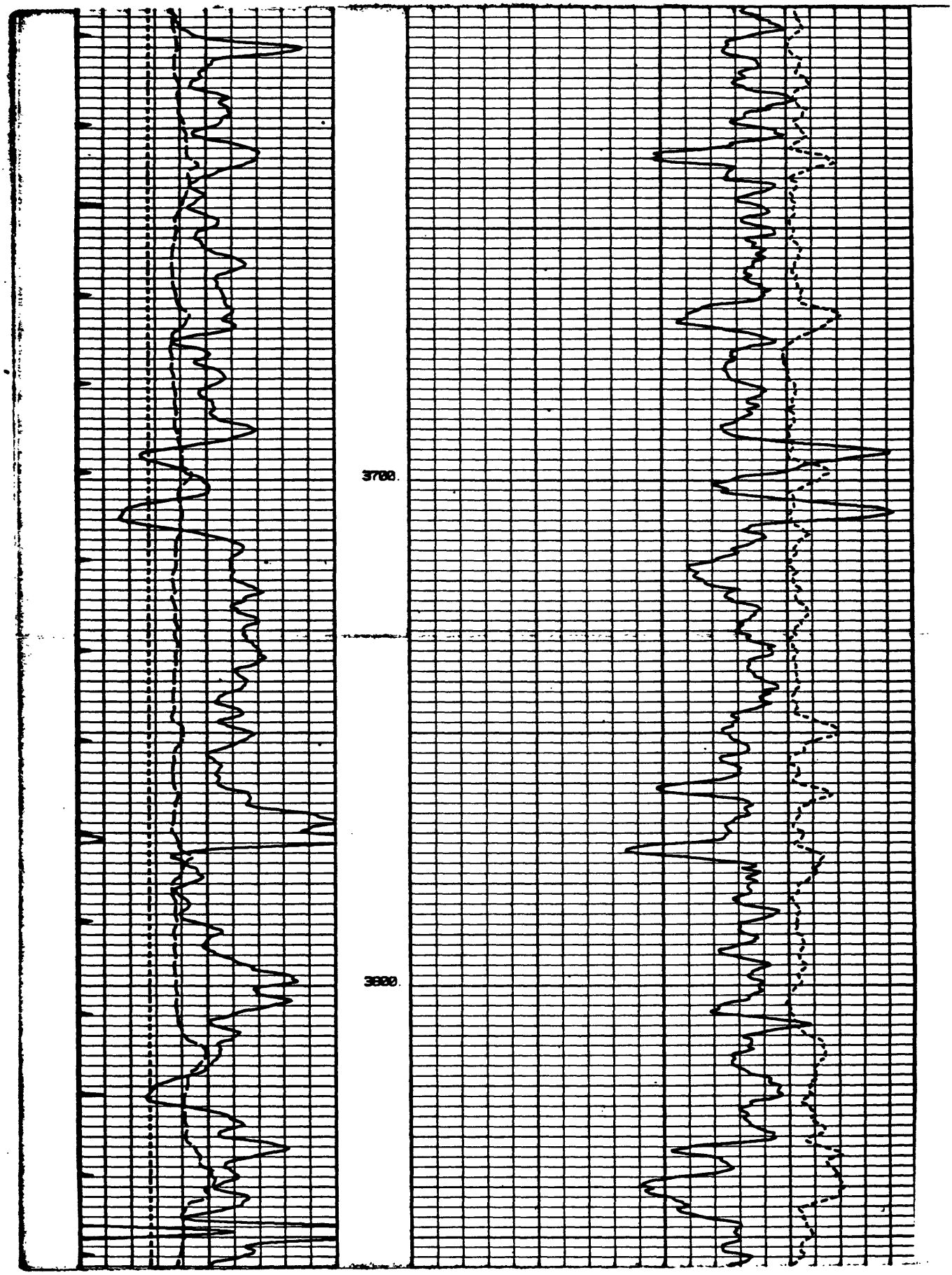
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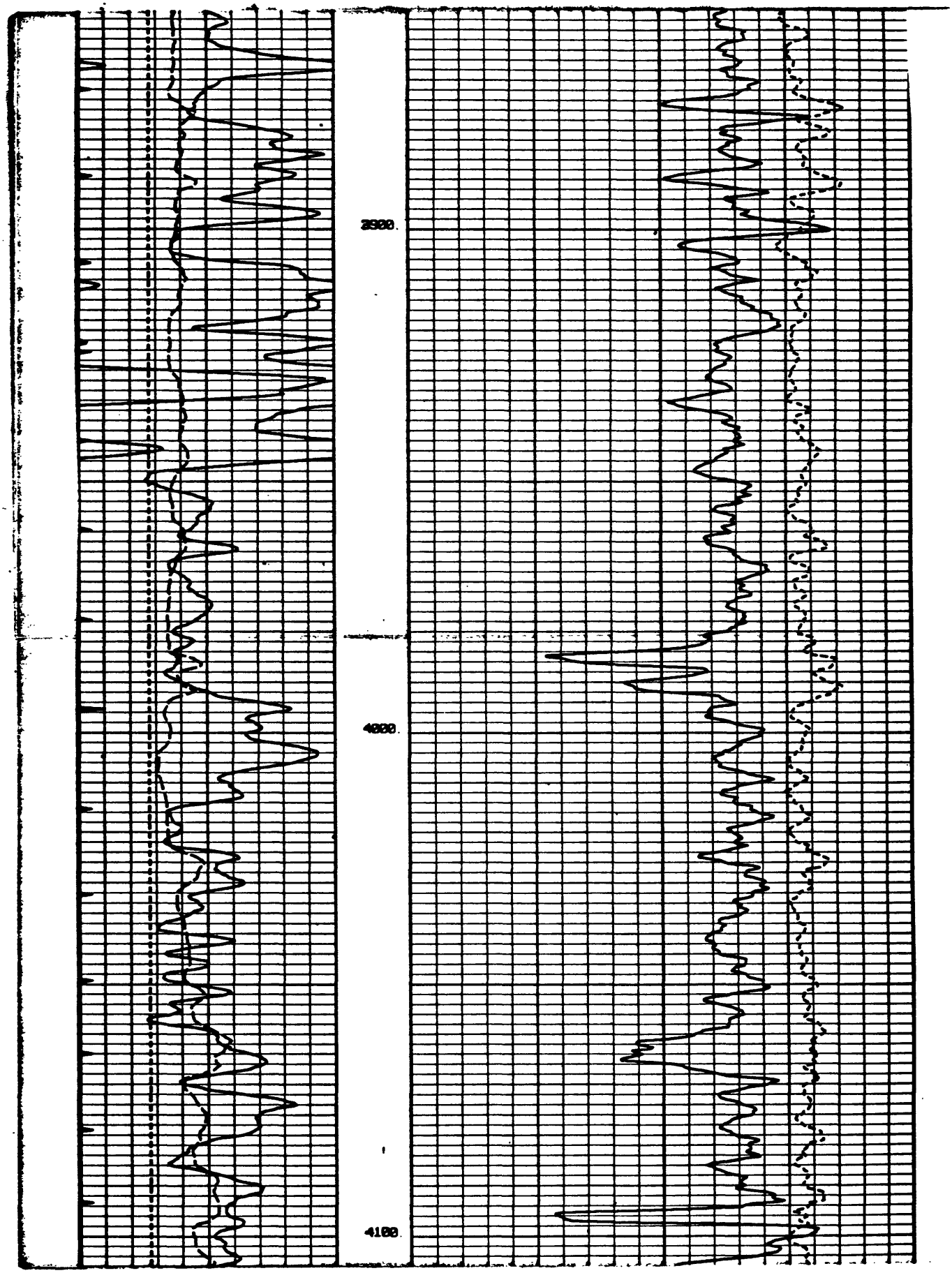
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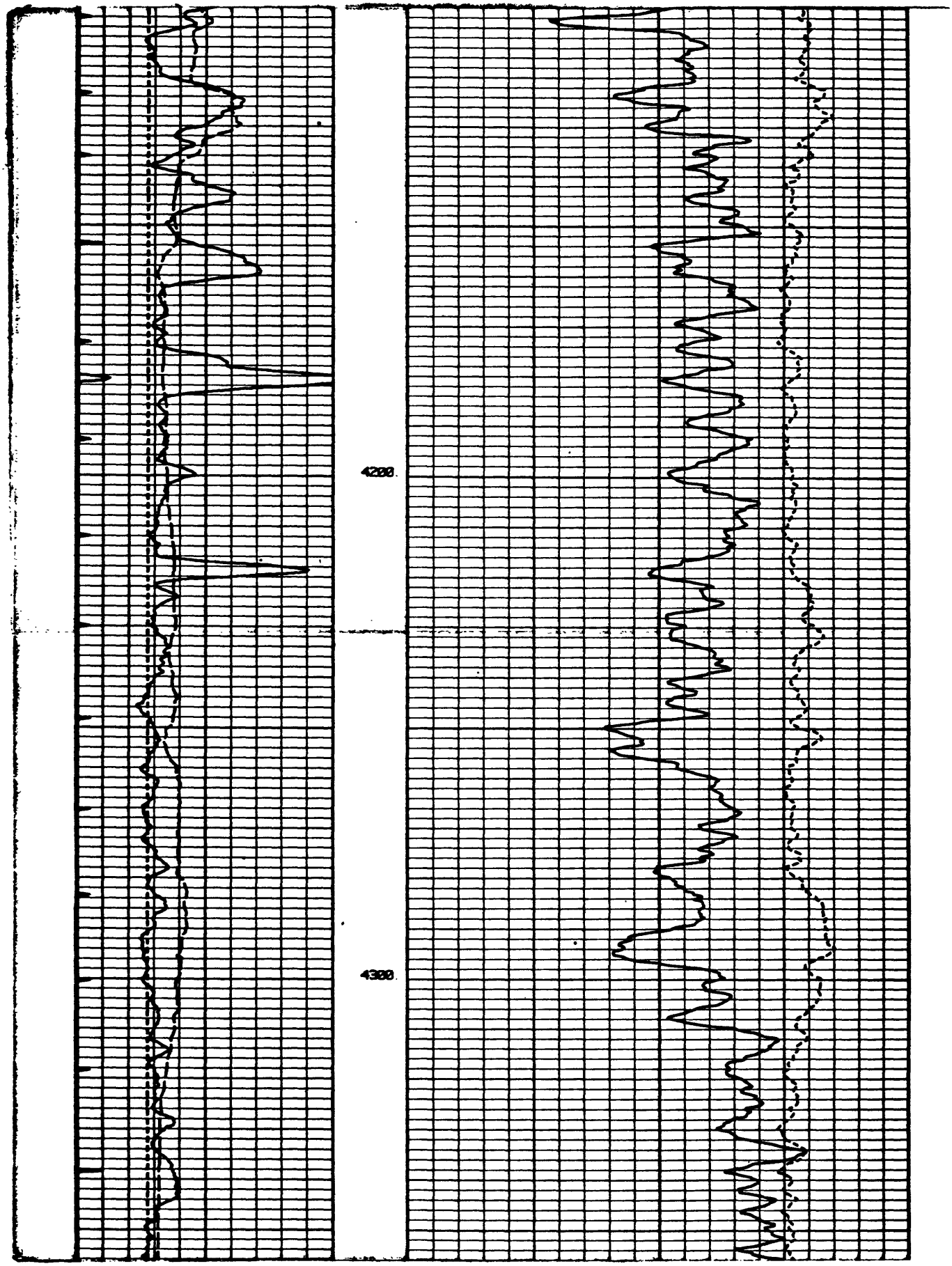
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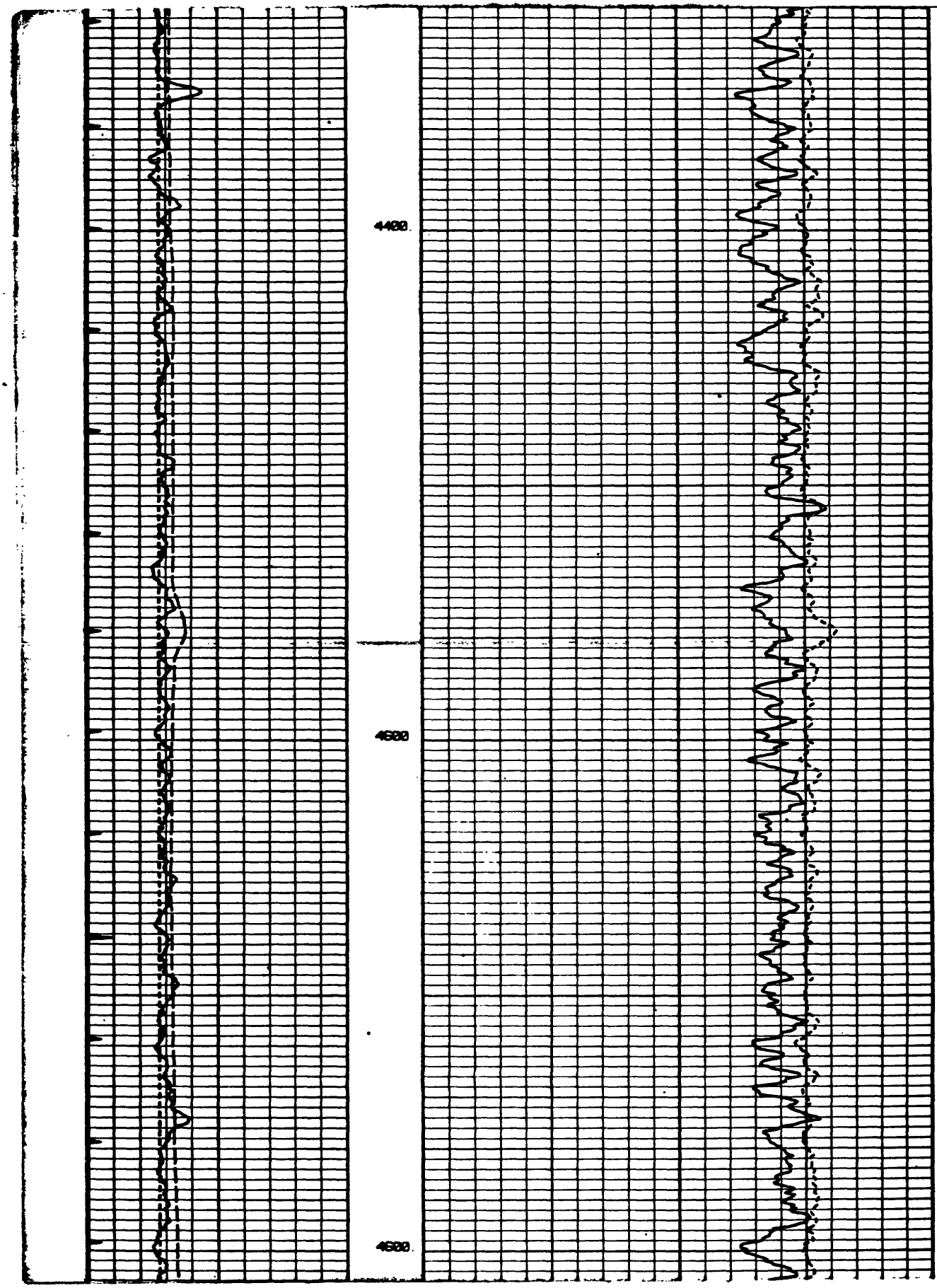
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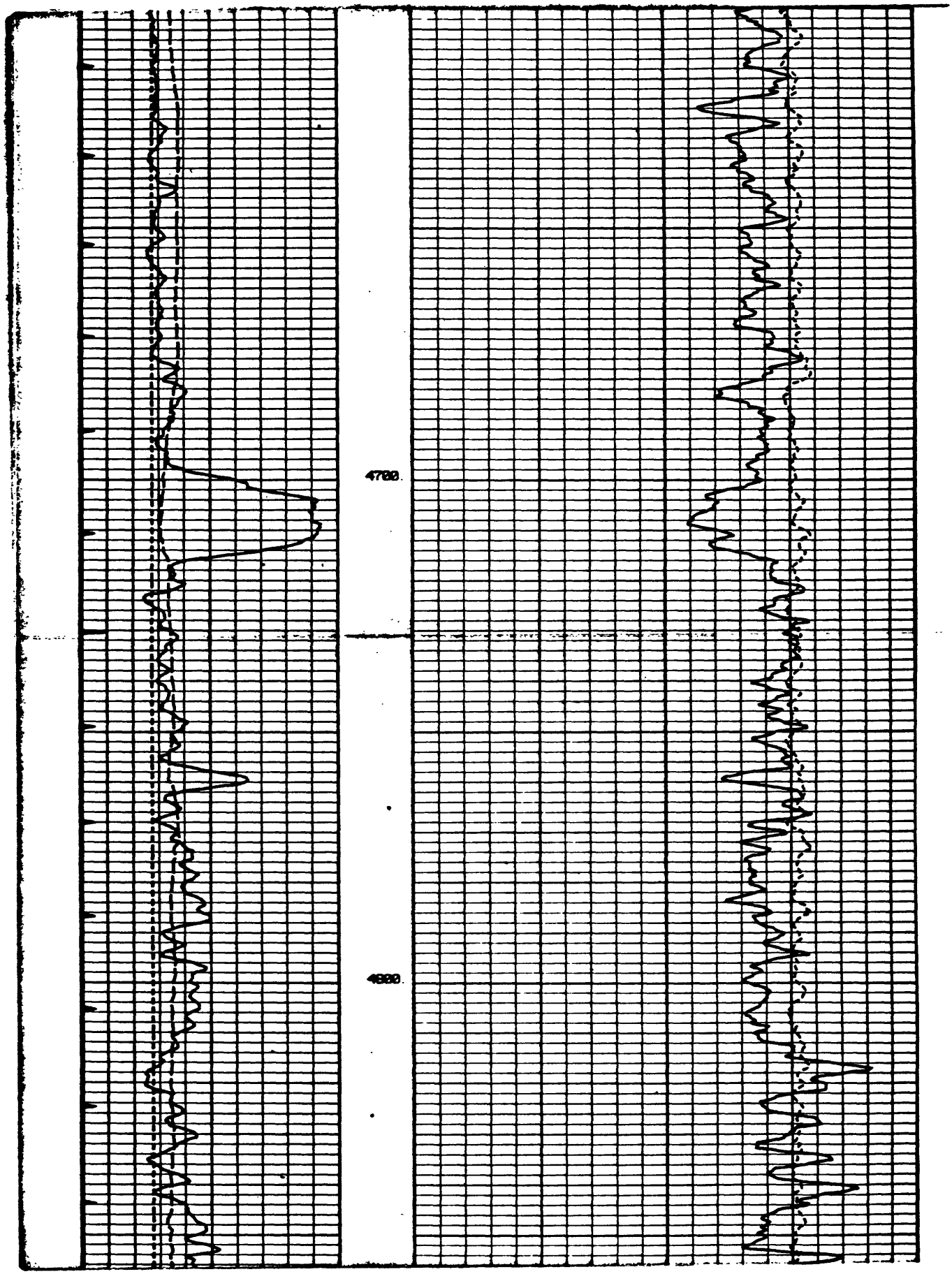
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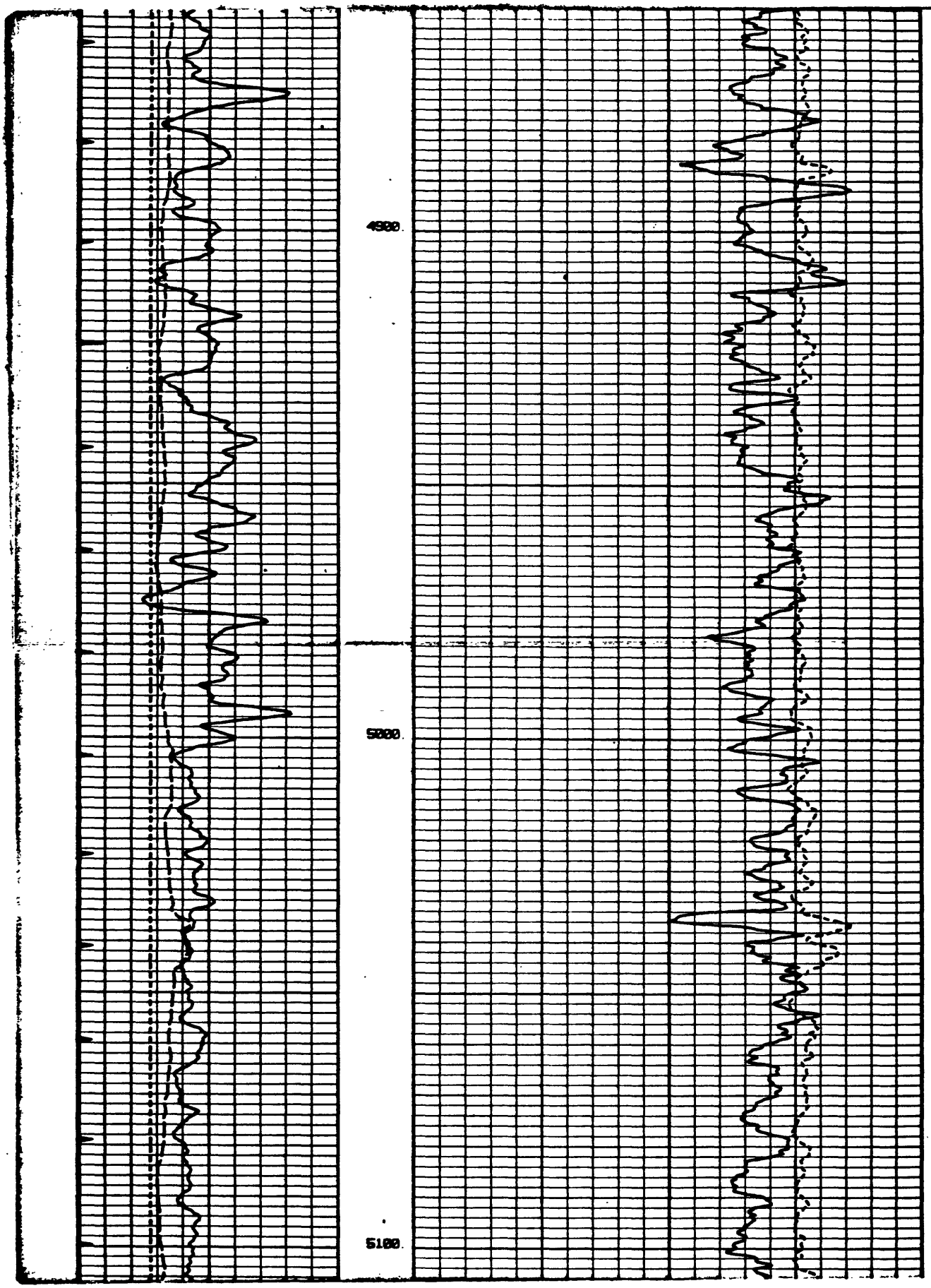
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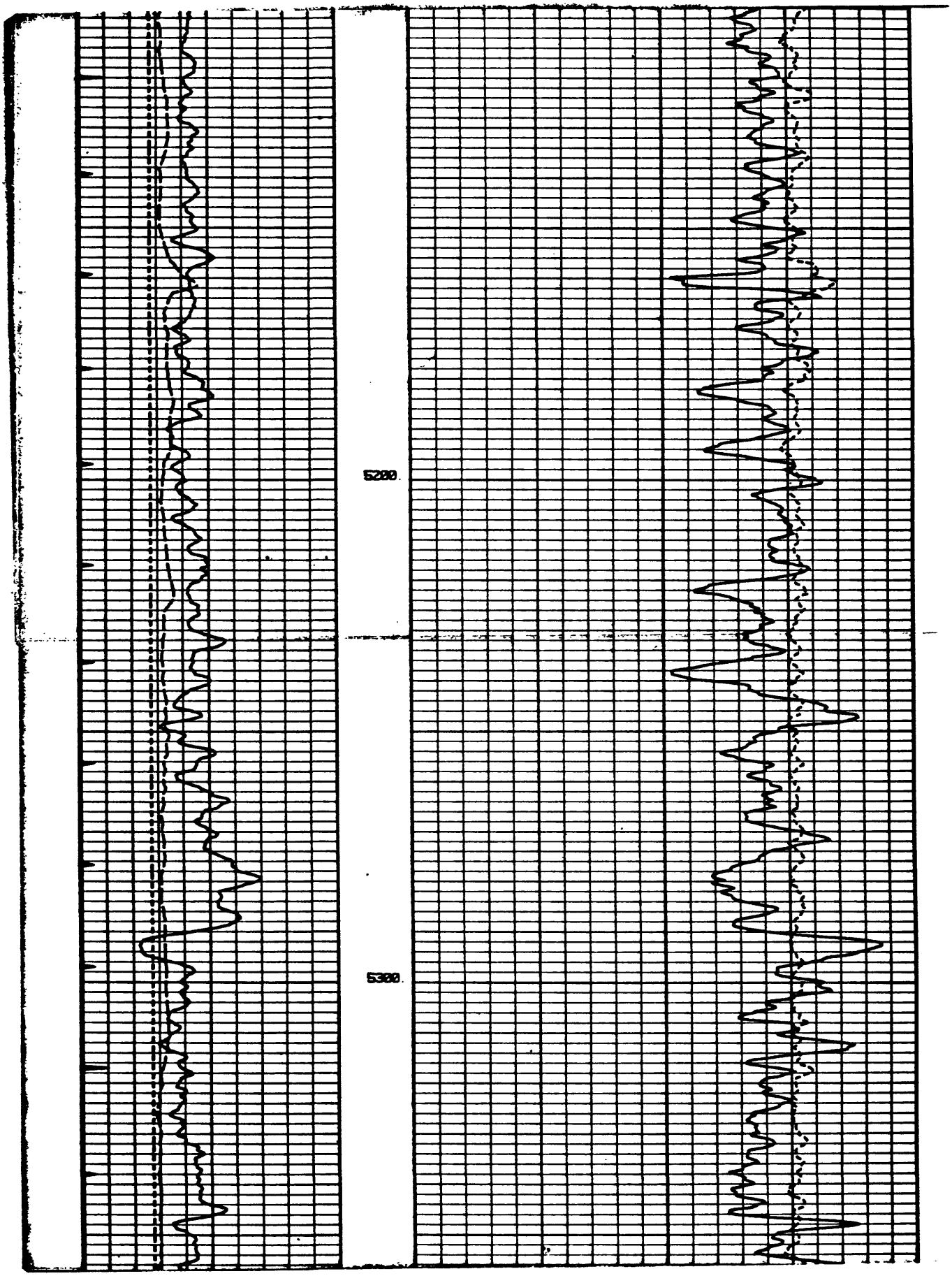
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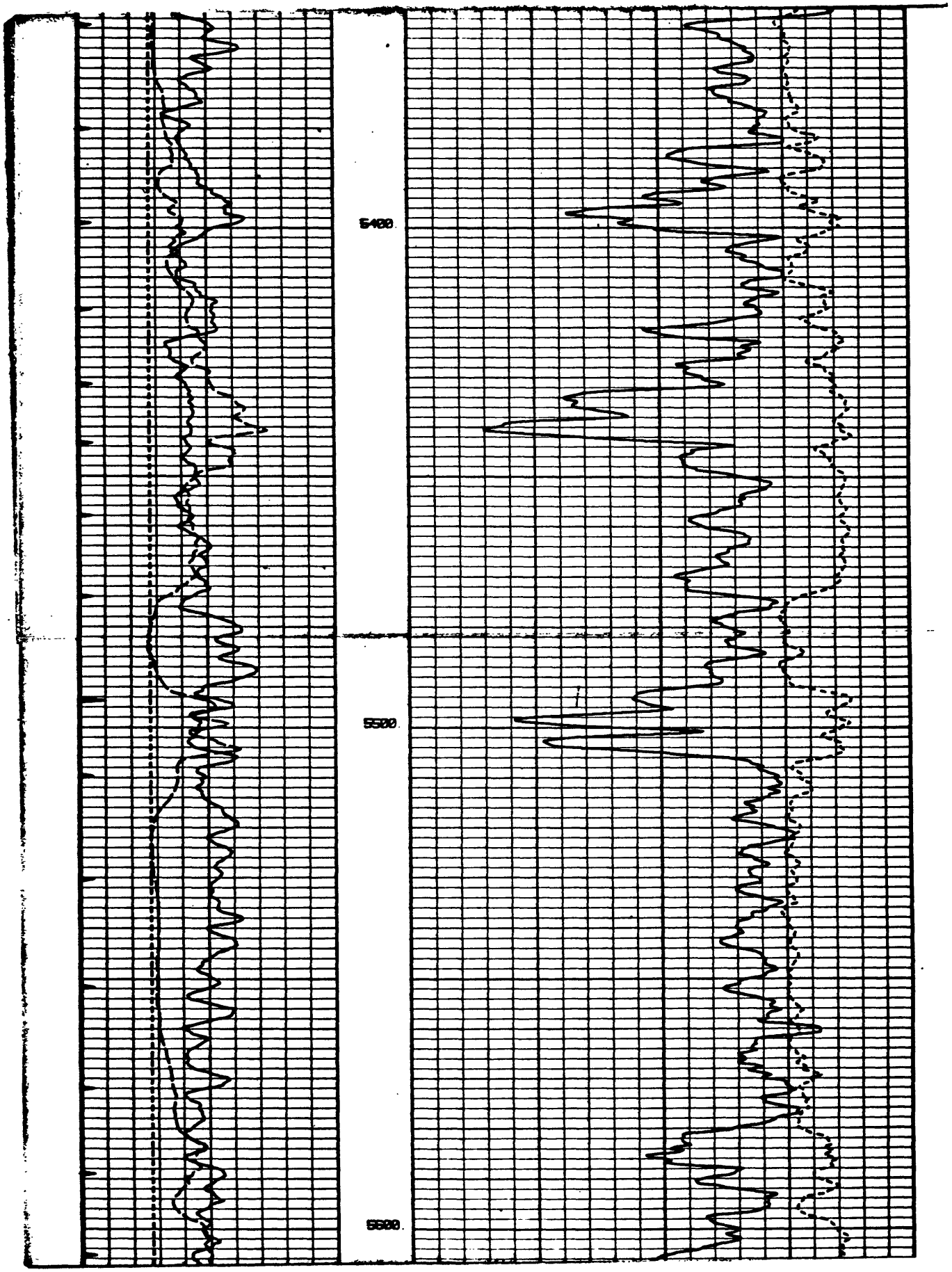
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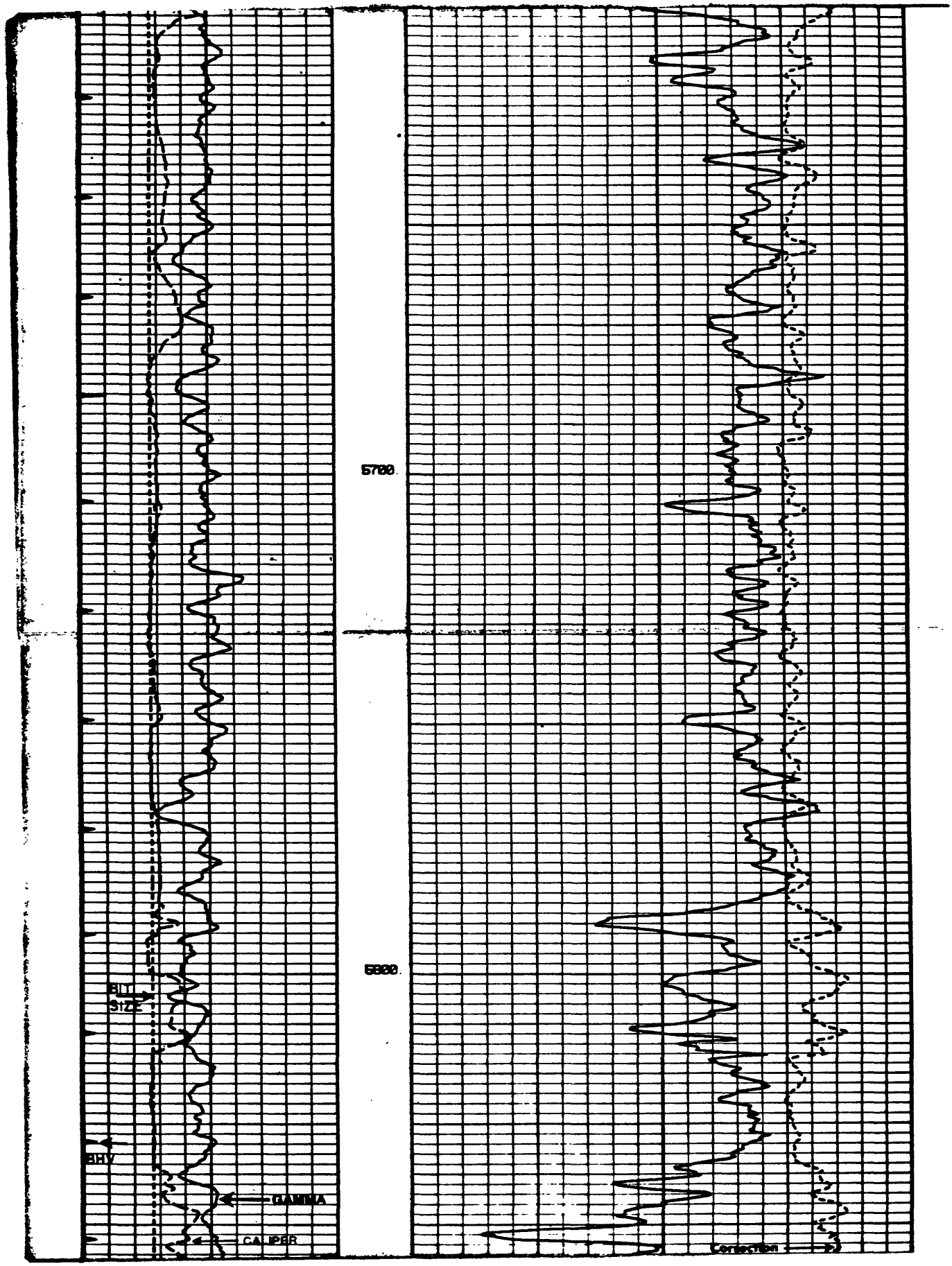
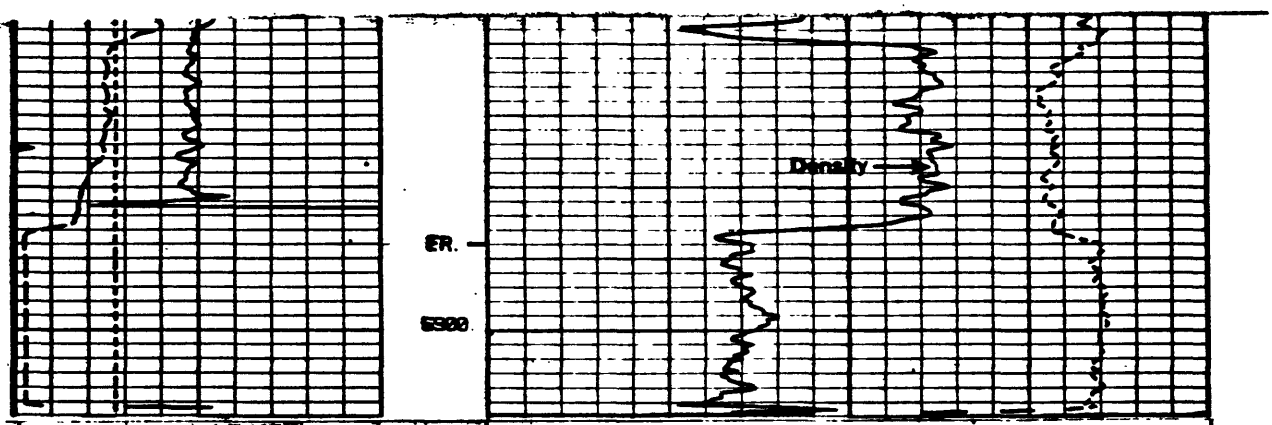

5700.
5800.
BIT SIZE
BHV
GAMMA
CALIPER
Correction



CALIPER

6 Average Diameter in. 16

GAMMA

0 API Gamma Ray Units 200

1.65 2.15 2.65

-.25 0 +.25

CORRECTION GMS/CC

BULK DENSITY

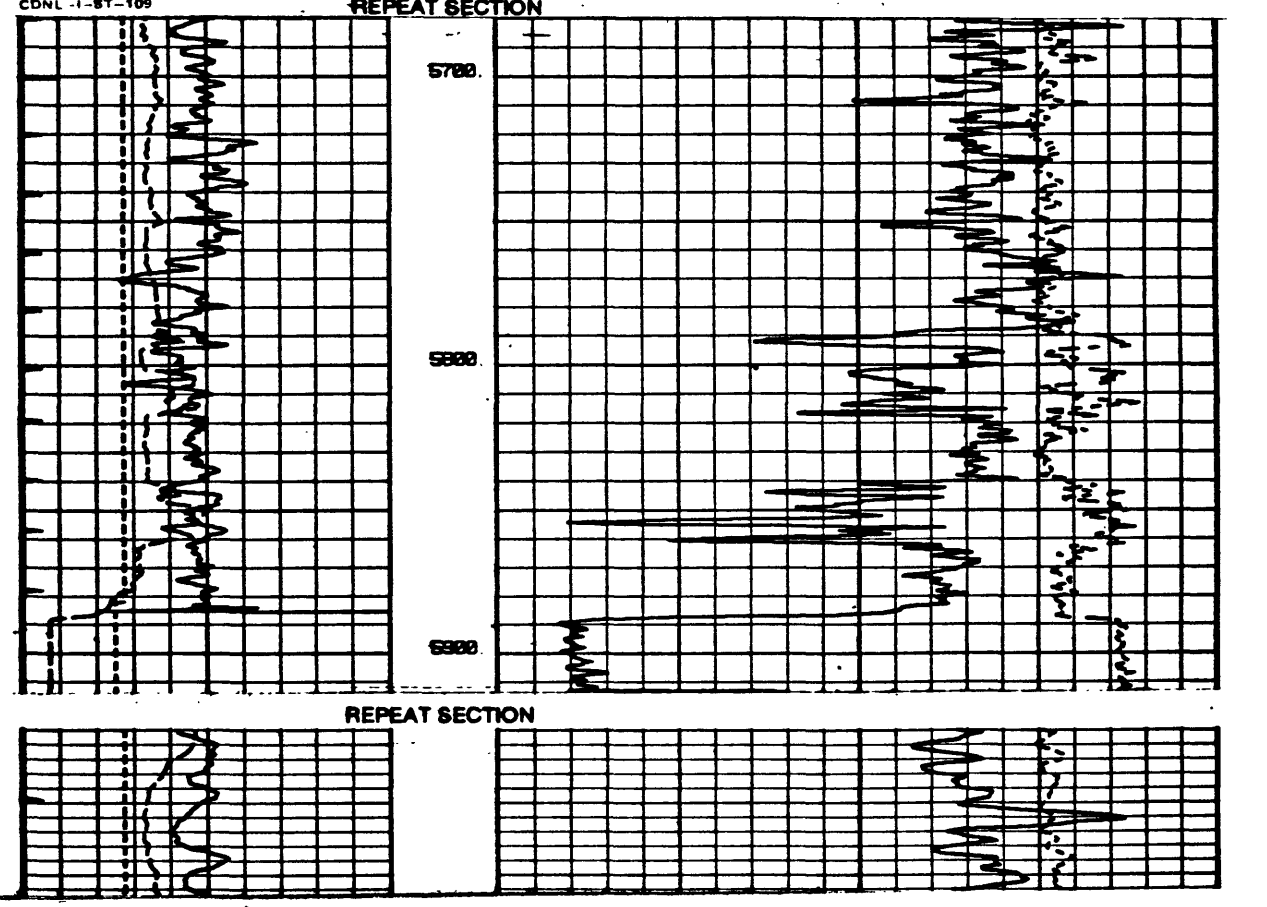
Grams/cc (when $\frac{Z}{A} = 0.5$)

ARKOMA PRODUCTION COMPANY
FEDERAL 1-26
WILDCAT
SAN BERNADINO COUNTY, CALIFORNIA

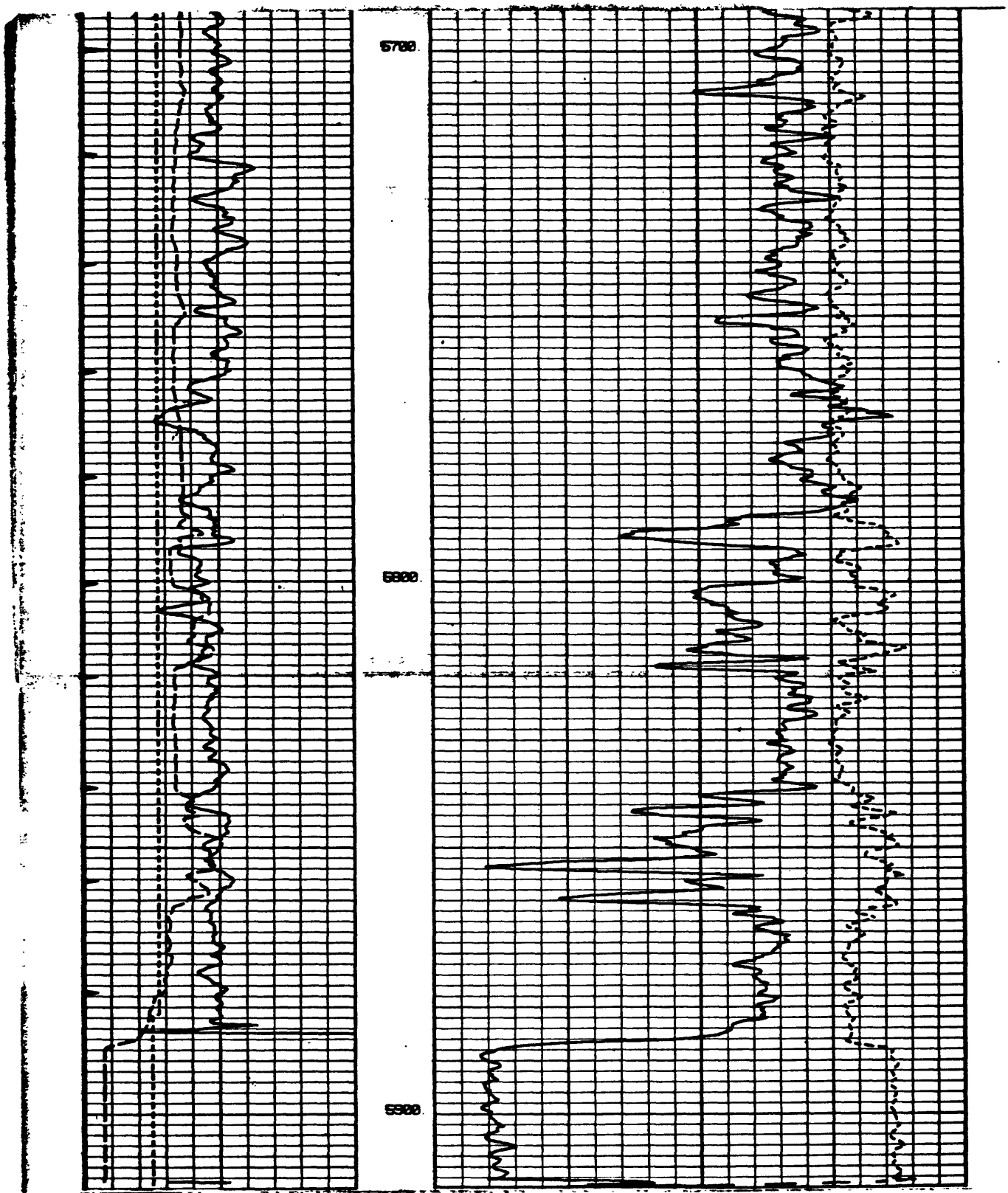
T.D. LOGGED 5888
T.D. DRILLER 5890
T.D. WELEX 5890

CDNL -I-ST-109

REPEAT SECTION



REPEAT SECTION



WELL LOCATION : BEFOFE COALS

WELL NAME : FEDERAL 1-26

WELEX DLS™ DSN DEN. CONT. VERS 3.72 01/14/83

LOG TAPE ID 35045001

DATE 03/11/84

SUMMARY

TRACE SURVEY	GALVD	TRK	SCALE L	SCALE R	DIGT CHAN	NORM OR MATRIX	INTCP	(NORM#) OFFSET	(INTCP#) T.C.	DELAY	PLOTS C1VC2
DENSITY LS	3	4	1.15	2.65	2	-0.5974	0	6.861	4.	0.	YYN
DENSITY SS	5	0	0.	0.	0	-2.6955	0	25.88	0.	0.	
CORRECTION	6	3	-0.25	0.25	3	0.	0	0.	0.	0.	
D. POROSITY	0	4	60	0	5	2.65	0	0.	0.	0.	
DSN.LS.CR	0	4	0.	.40000	9	0.	0	0.	4.	16.5	
DSN.SS.CR	0	4	0.	.40000	10	0.	0	0.	4.	15.	
DSN.RATIO	0	4	200	0.	6	0.	0	0.	0.	0.	
DSN.POR	0	4	60	0.	7	SAND	0	0.	0.	0.	
MALT POR	0	4	60.	0.	16	0.	0	0.	0.	0.	
CALIPER	1	1	6.	16.	1	0.00107	-6671	0.	0.	1.5	
B. H. VOL.	10	1	0.	10.	8	0.	0	0.	0.	0.	
GAMMA	2	1	0.	200	4	0.22552	0	0.	4.	29.5	
L. TENSION	0	3	4095	0.	12	1.	0	0.	0.	0.	
BIT SIZE	11	1	6.	16.	13	0.	0	8.5	0.	0.	
NORMAL	0	4	0.	40.	14	0.	0	0.	0.	2.	
LATERAL	0	4	0.	40.	15	0.	0	0	0.	2.	
CCL	0	1	0.	2.5	11	0.0002	-2000	0.	0.	31.5	
F CURVE	0	2	2.	.20000	0	0.81	0	2.	0.	0.	

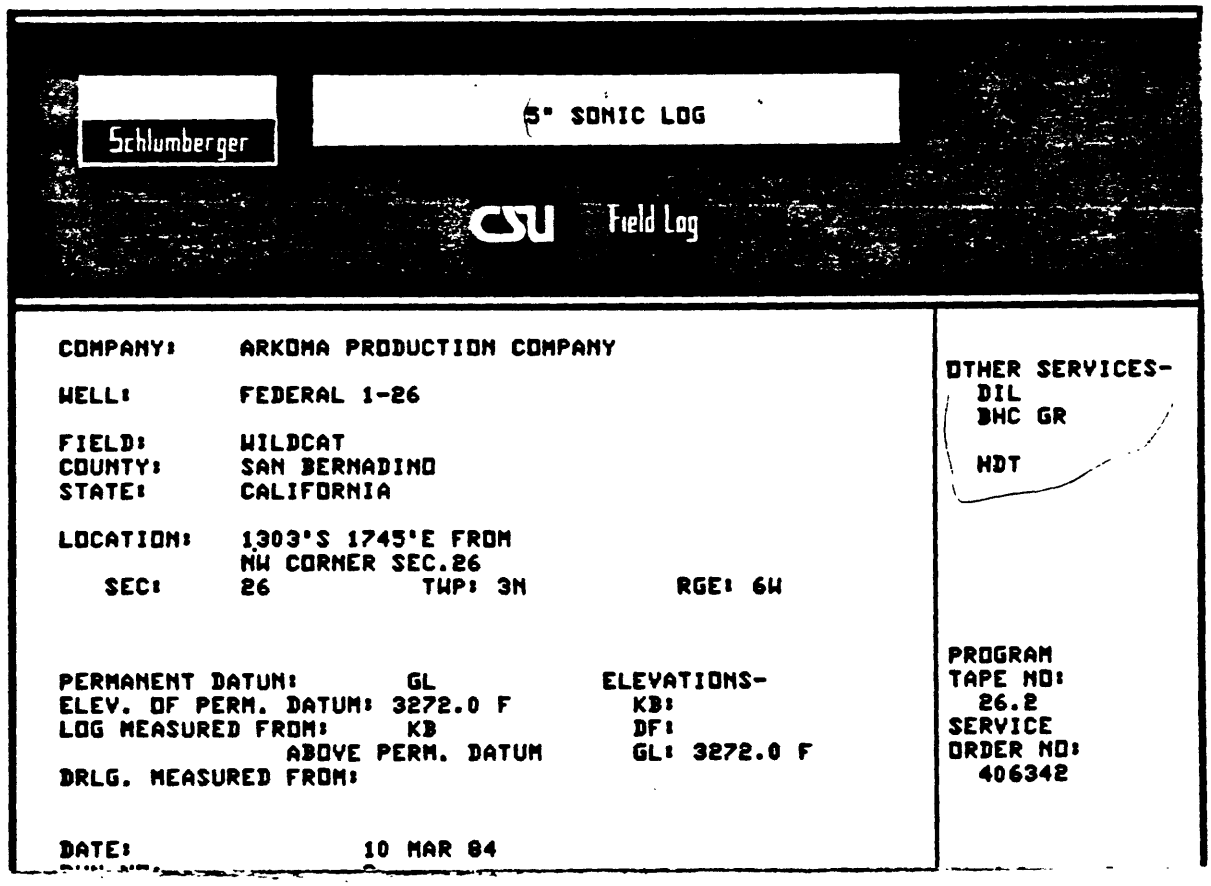
COMPENSATED DENSITY DUAL SPACE NEUTRON CALIBRATION SUMMARY
03/11/84 TAPE ID 35045001

CALIPER SUB SERIAL NUMBER -1
SMALL RING 8 TOOL VALUE 817 LARGE RING 16 TOOL VALUE 8305

GAMMA SUB SERIAL NUMBER -1
GAMMA BACKGROUND TOOL VALUE 185
GAMMA SOURCE VALUE 152 API UNITS SOURCE + BACKGROUND TOOL VALUE 839

DENSITY PAD NUMBER 729

AL SLIDE DENSITY	1.89	GM/CC	LS COUNT	1614 TOOL VALUE	4110
AL SLIDE CORRECTION	0.		SS COUNT	1415 TOOL VALUE	7347
BRASS SLIDE DENSITY	2.273	GM/CC	LS COUNT	481 TOOL VALUE	1267
BRASS SLIDE CORRECTION	-0.32		SS COUNT	829 TOOL VALUE	4484



Schlumberger

5" SONIC LOG

CSU Field Log

COMPANY: ARKOMA PRODUCTION COMPANY

WELL: FEDERAL 1-26

FIELD: WILDCAT
COUNTY: SAN BERNADINO
STATE: CALIFORNIA

LOCATION: 1303'S 1745'E FROM
NW CORNER SEC.26
SEC: 26 TWP: 3N RGE: 6W

OTHER SERVICES-
DIL
BHC GR
HDT

PERMANENT DATUM: GL
ELEV. OF PERM. DATUM: 3272.0 F
LOG MEASURED FROM: KB
ABOVE PERM. DATUM
DRLG. MEASURED FROM:

ELEVATIONS-
KB:
DF:
GL: 3272.0 F

PROGRAM
TAPE NO:
26.2
SERVICE
ORDER NO:
406342

DATE: 10 MAR 84

RUN NO: 2

DEPTH-DRILLER:	5890.0 F
DEPTH-LOGGER:	5894.0 F
BTM. LOG INTERVAL:	5892.0 F
TOP LOG INTERVAL:	1313.0 F
CASING-DRILLER:	1313 F
CASING-LOGGER:	1313 F
CASING:	9.625
BIT SIZE:	~~8.5~~ 8¾ to 5575 / 5½ to T.D.
DEPTH:	5890 F

TYPE FLUID IN HOLE:	GEL-WATER
DENSITY:	9.2 LB/G
VISCOSITY:	39.0 S
PH:	8.5
FLUID LOSS:	11.0 C3
SOURCE OF SAMPLE:	FLOWLINE
RM:	4.380 OHMM AT 85.0 DEGF
RMF:	3.450 OHMM AT 46.0 DEGF
RMC:	4.710 OHMM AT 53.0 DEGF
SOURCE RMF/RMC:	MEAS/MEAS
RM AT BHT:	2.837 OHMM AT 135. DEGF
RMF AT BHT:	1.287 OHMM AT 135. DEGF
RMC AT BHT:	1.990 OHMM AT 135. DEGF
TIME CIRC. STOPPED:	1600 3-9
TIME LOGGER ON BTM.:	0712
MAX. REC. TEMP:	135.0 DEGF
LOGGING UNIT NO:	8203
LOGGING UNIT LOC:	4404-2
RECORDED BY:	MILLER
WITNESSED BY:	ARKOMA

REMARKS:

EQUIPMENT NUMBERS-

SLS WA 1226 SLM 1320 SLC FA DILD

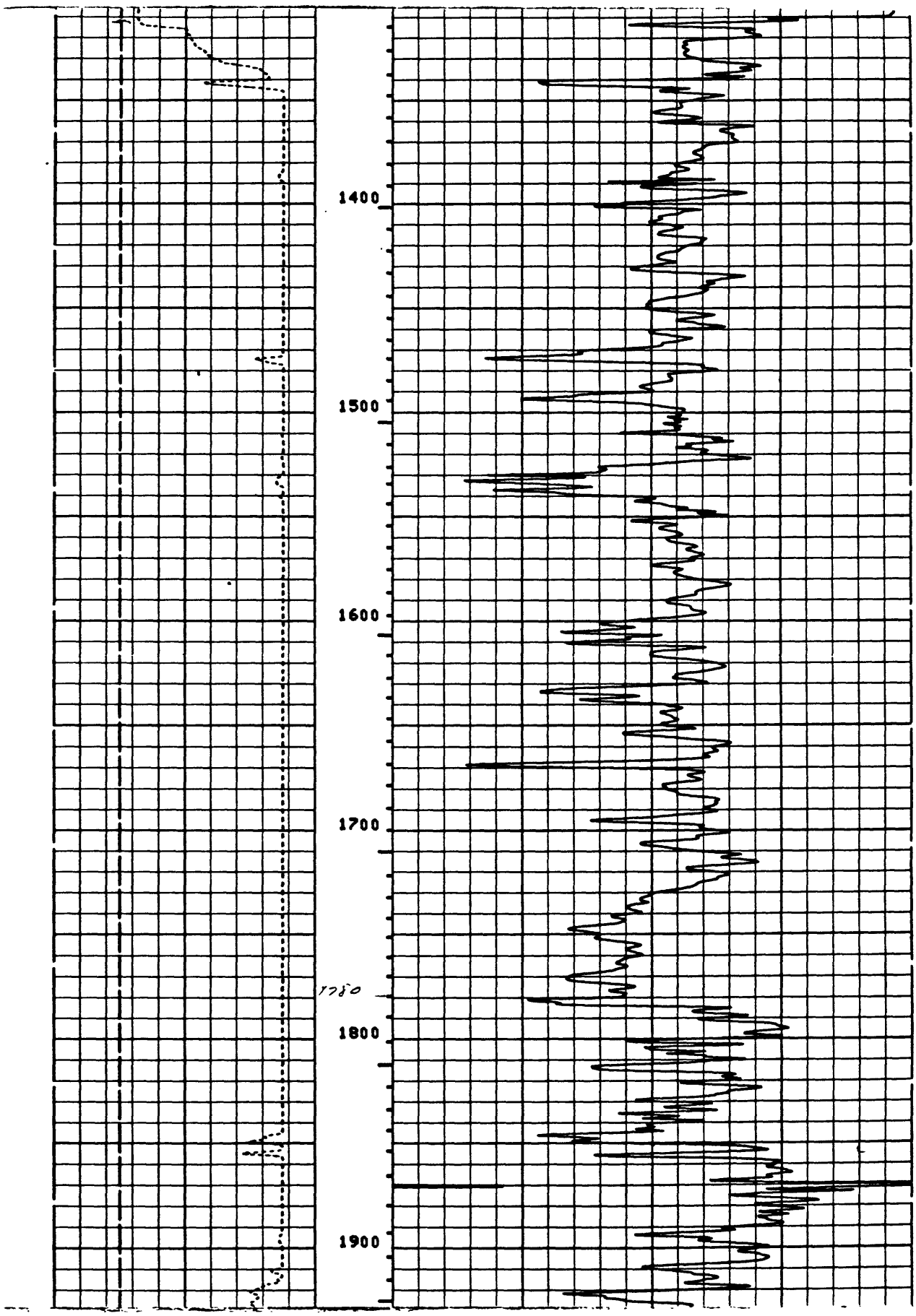
FILE 4 11-MAR-84 02:22

BS (IN)			
6.0000	16.000		
CALI(IN)			DT (US/F)
6.0000	16.000	150.00	50.000

6700

FILE 3 11-MAR-84 02:21

1300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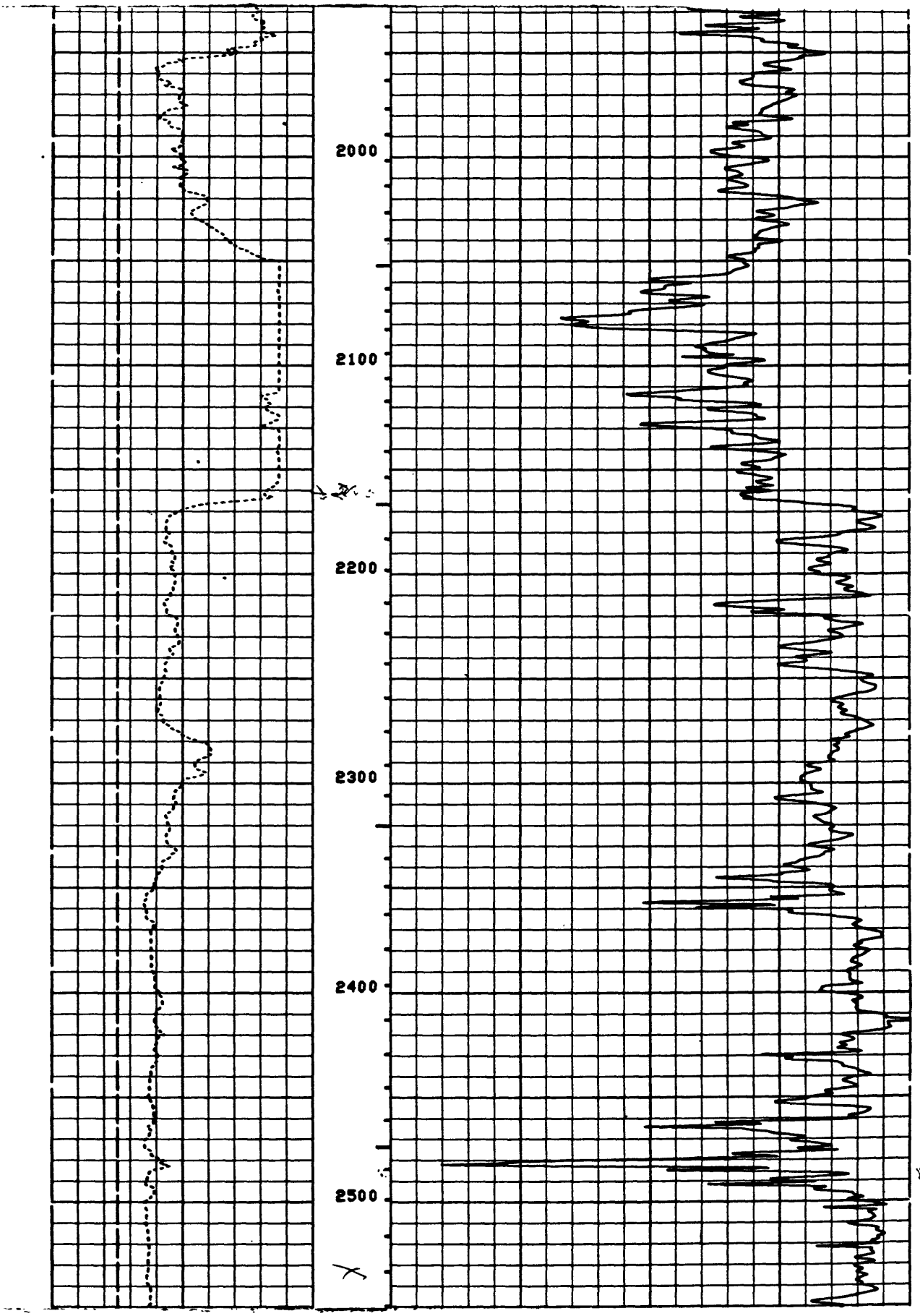
1500
1600
1700
1780
1800
1900


2000
2100
2200
2300
2400
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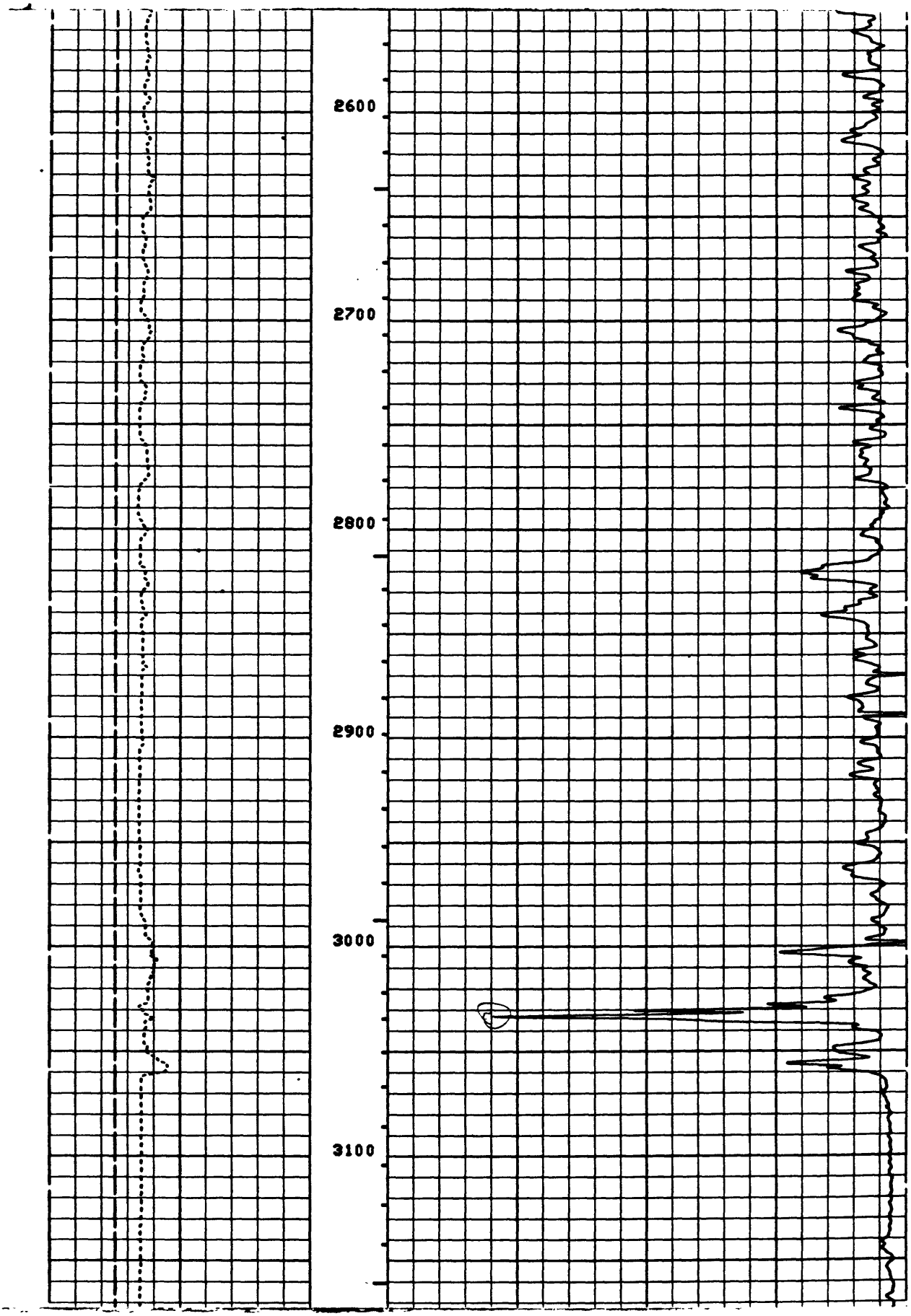
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3000
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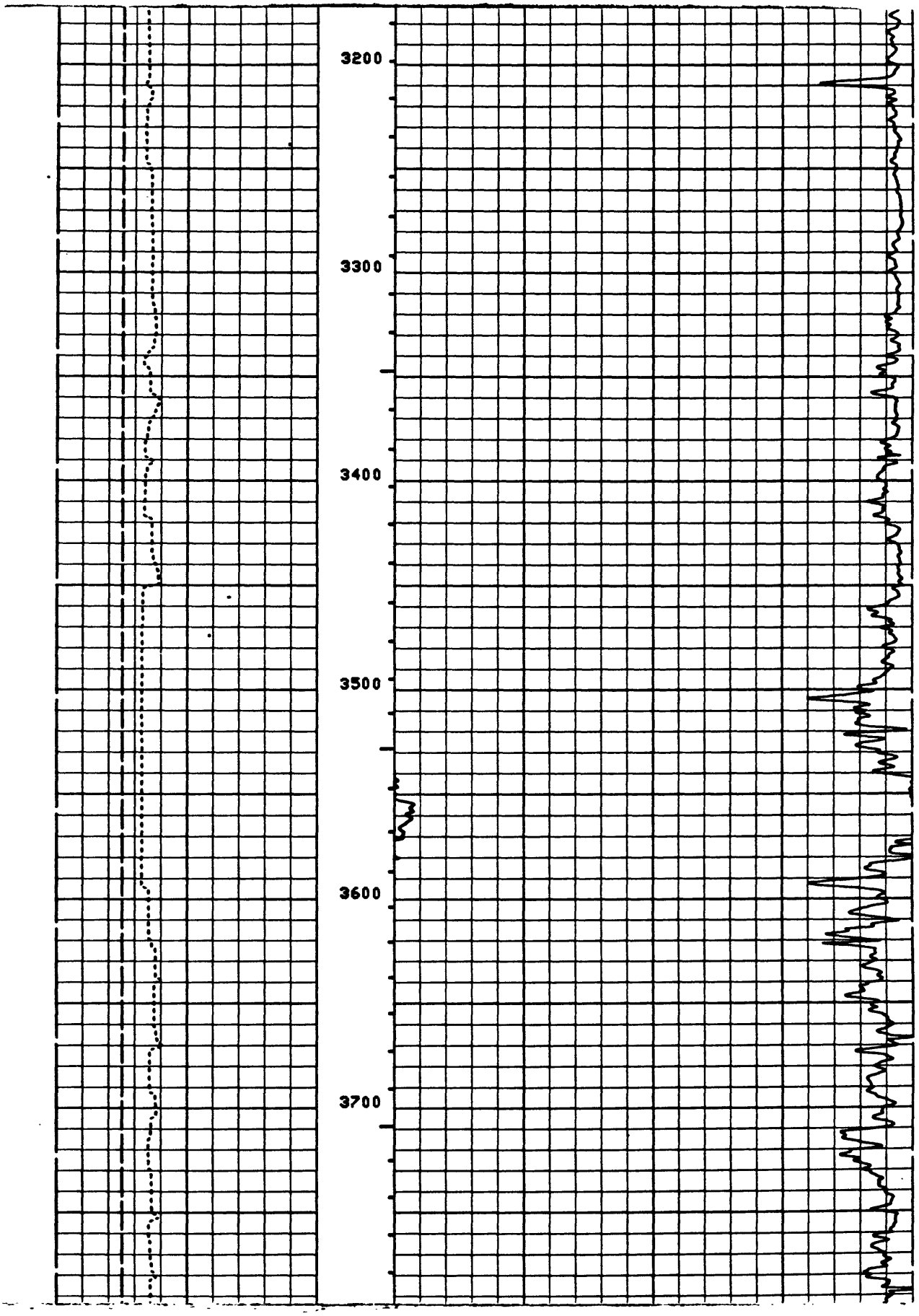
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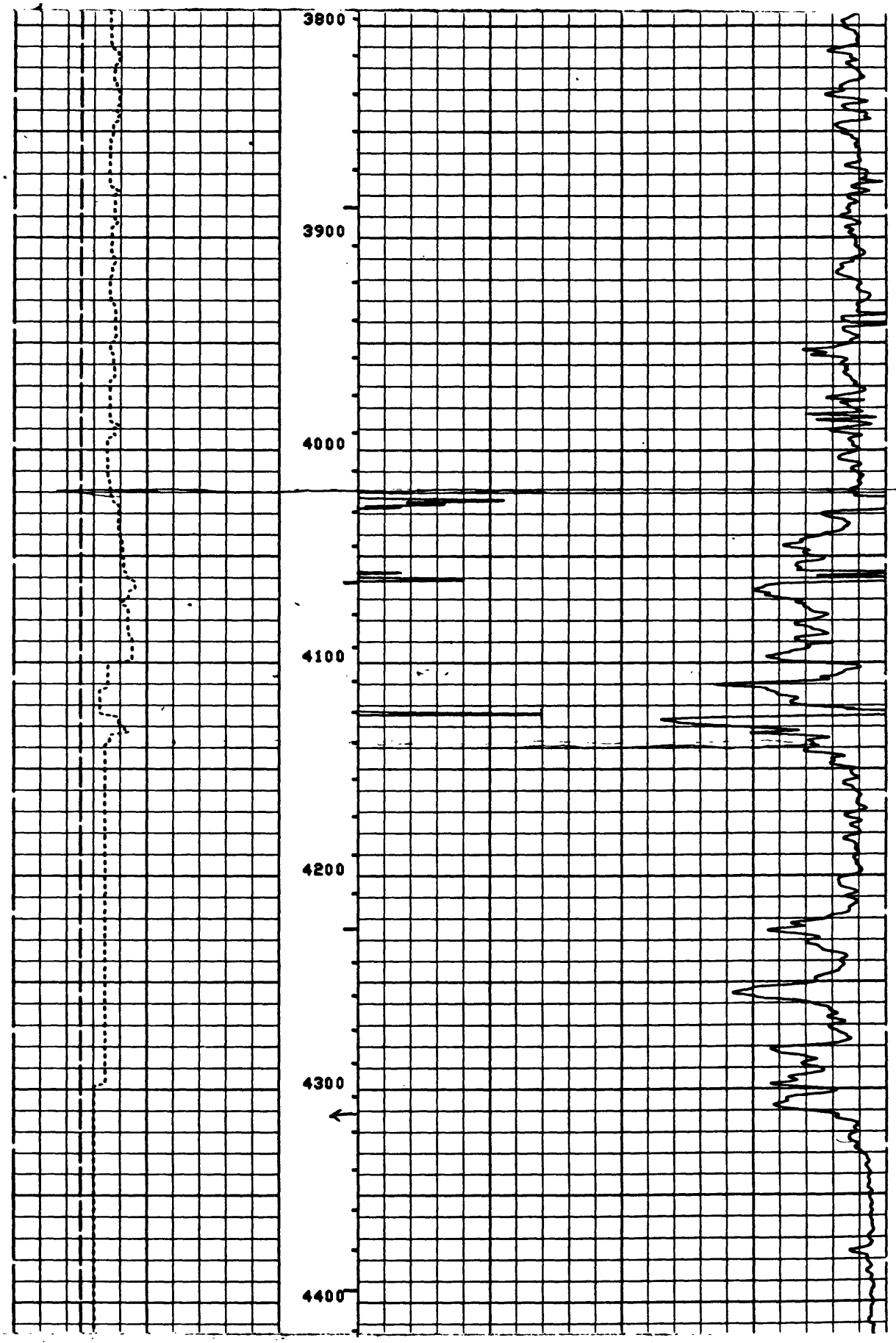
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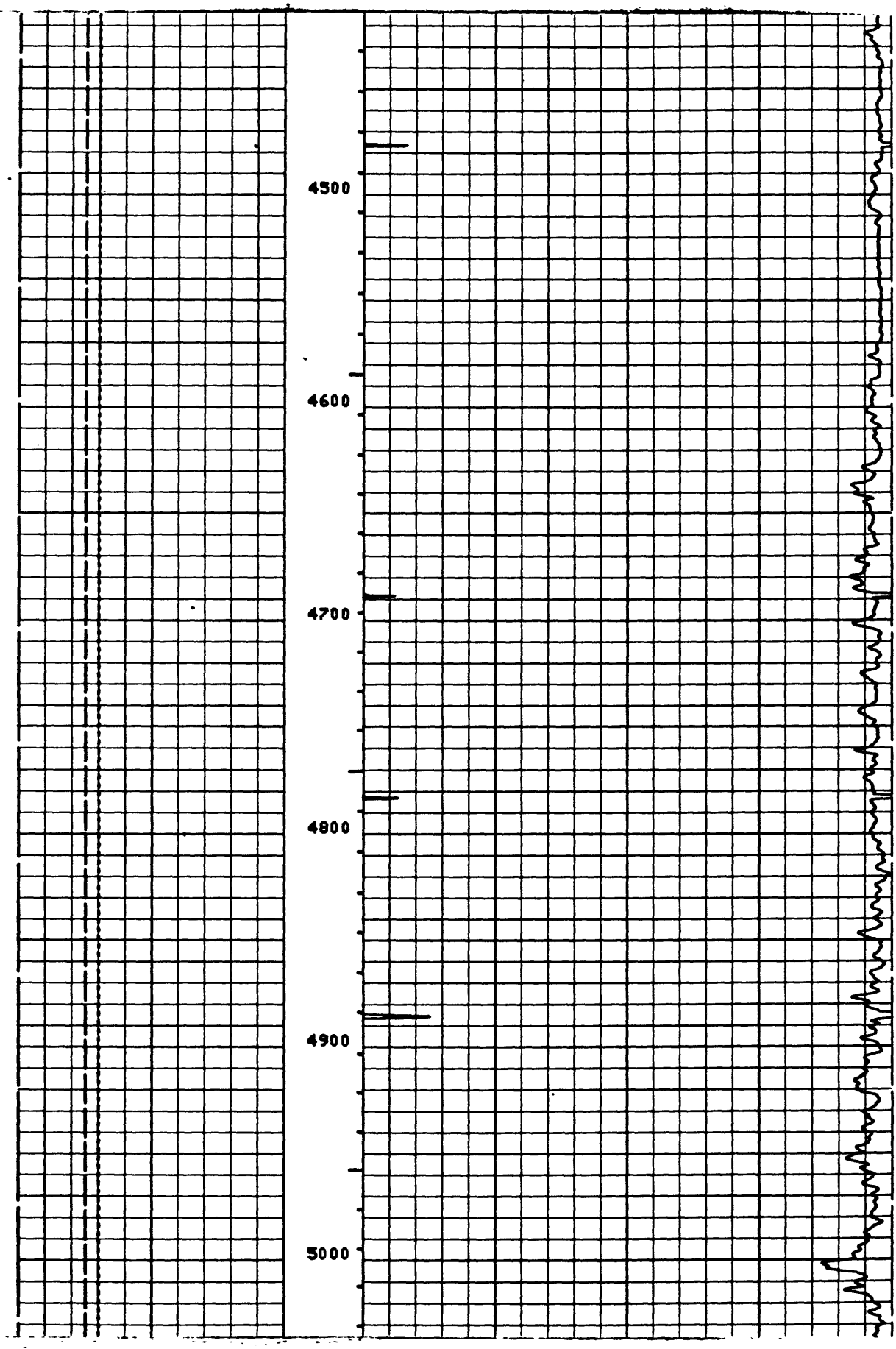
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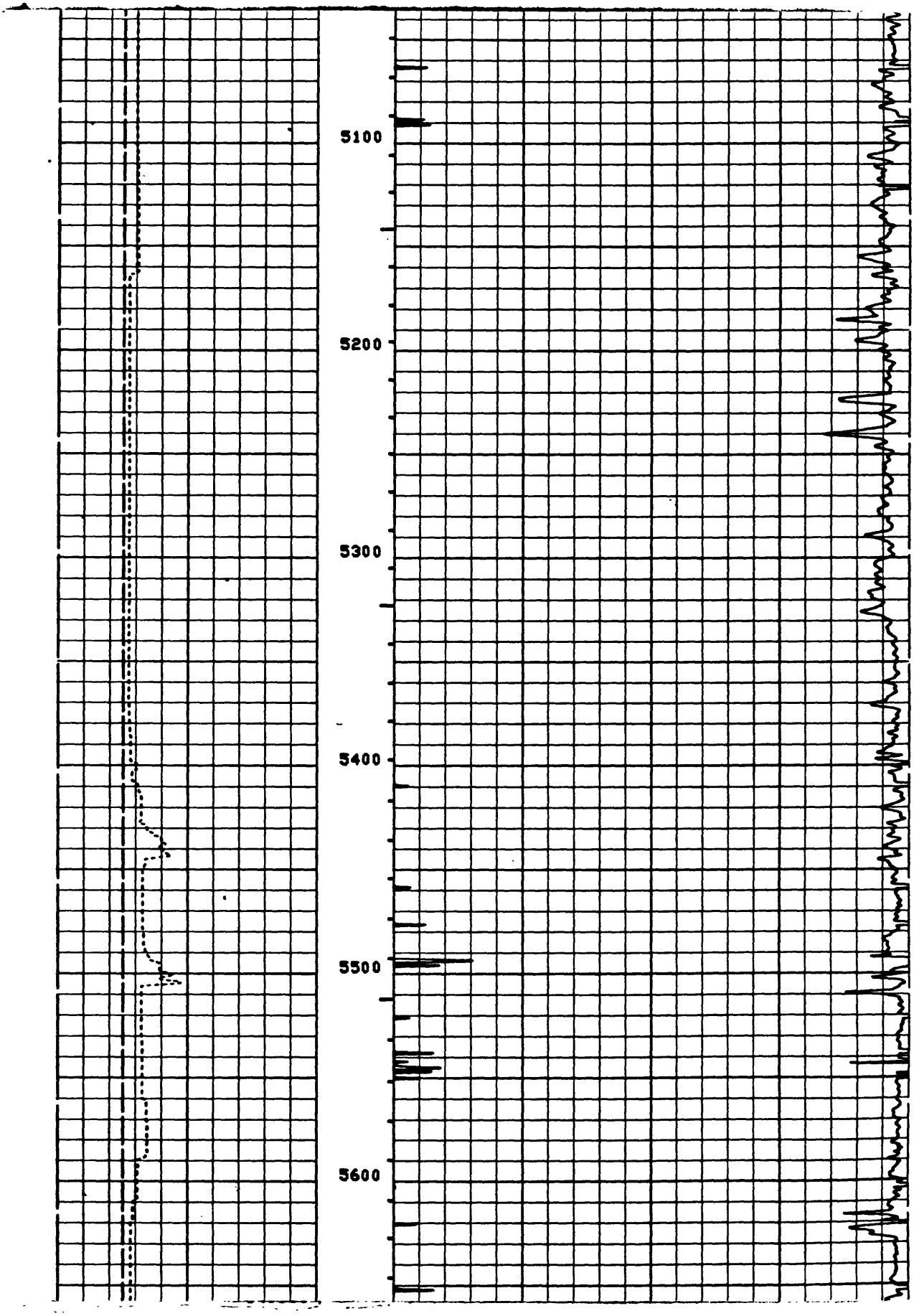
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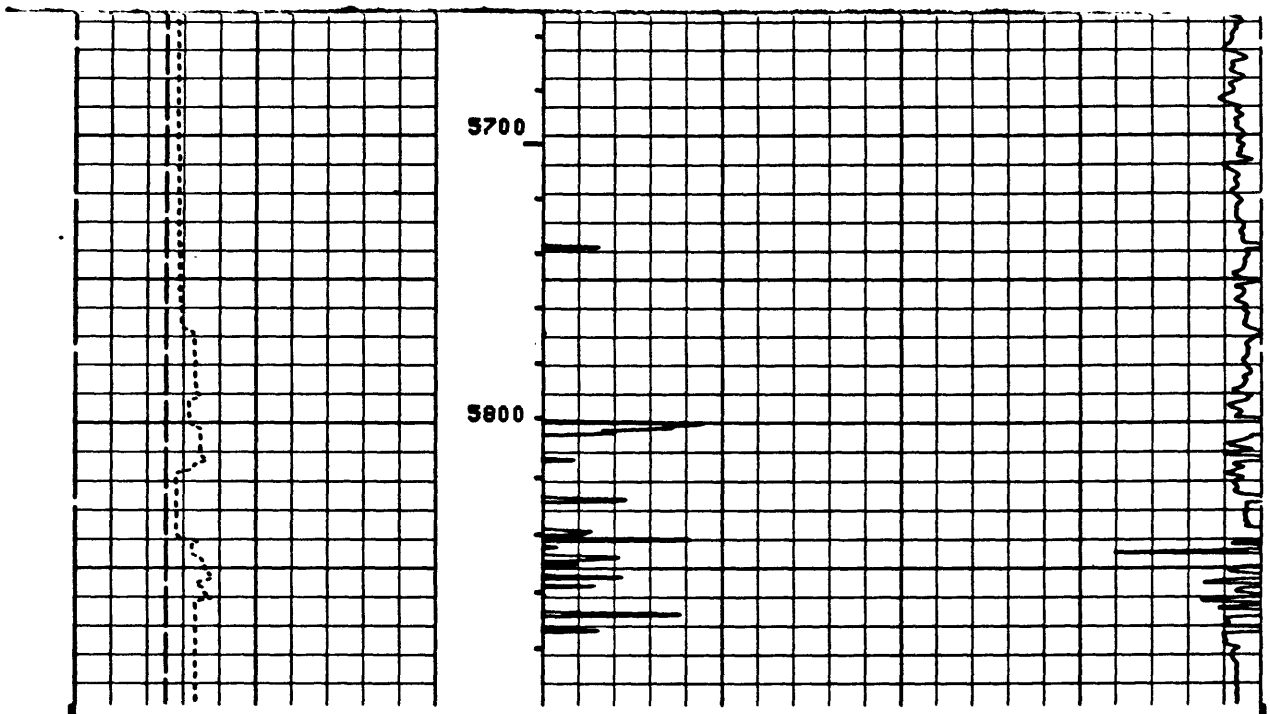


FILE 3 11-MAR-84 00:56

BS (IN)		DT (US/F)	
6.0000	16.000		
CALI(IN)			
6.0000	16.000	150.00	50.000

SENSOR MEASURE POINT TO TOOL ZERO

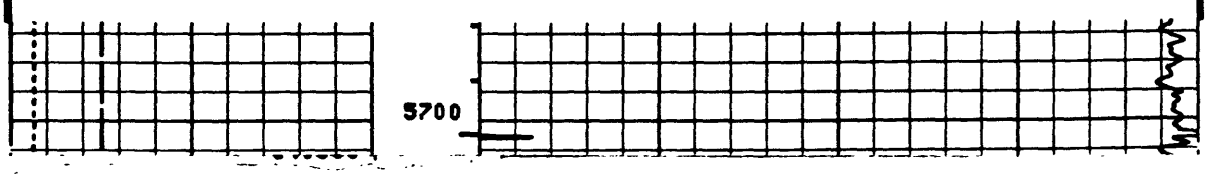
CBL	8.2	FEET	AMPL	8.2	FEET
TT3	4.5	FEET	TT4	3.5	FEET
TT1	7.2	FEET	TT2	8.2	FEET
CALI	27.3	FEET	SRAT	5.7	FEET
NOIS	0.0	FEET	TENS	3.5	FEET

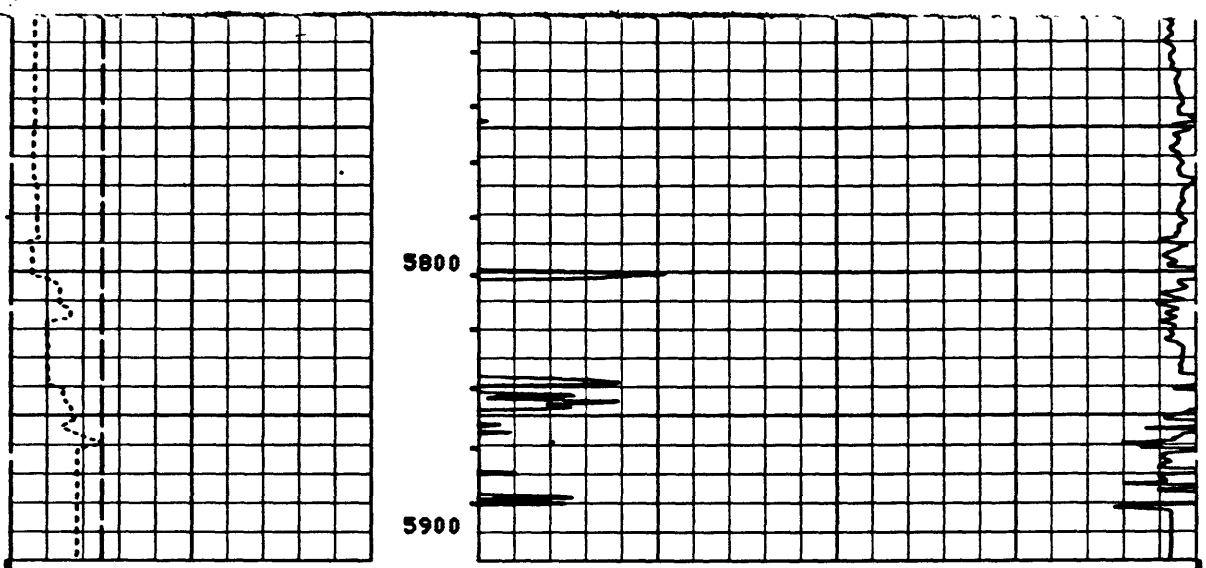
PARAMETERS

NAME	VALUE	UNIT	NAME	VALUE	UNIT
WSV1	WF1				
DSIN	5	US	DDEL	200	US
CDTS	100.000		DWCO	512	
DTF	189.000	US/F	DTM	56.0000	US/F
BHS	OPEN		FPHI	SPHI	
BS	8.50000	IN			

BS (IN)		DT (US/F)	
6.0000	16.000		
CALI(IN)			
6.0000	16.000	150.00	50.000

FILE 2 11-MAR-84 00:55





FILE 2 11-MAR-84 00:50

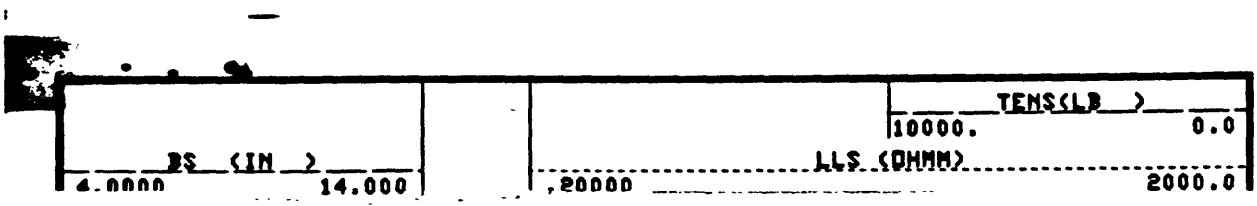
BS (IN)		DT (US/F)
6.0000 16.000		150.00 50.000
CALI(IN)		
6.0000 16.000		

SENSOR MEASURE POINT TO TOOL ZERO

CBL	8.2	FEET	AMPL	8.2	FEET
TT3	4.5	FEET	TT4	3.5	FEET
TT1	7.2	FEET	TT2	8.2	FEET
CALI	27.3	FEET	SRAT	5.7	FEET
NOIS	0.0	FEET	TENS	3.5	FEET

PARAMETERS

NAME	VALUE	UNIT	NAME	VALUE	UNIT
WSV1	WF1		DWS	16	
DSIN	5	US	DDEL	200	US
CDTS	100.000		DWCO	512	
DTF	189.000	US/F	DTM	56.0000	US/F
BHS	OPEN		FPHI	SPHI	
BS	8.50000	IN			



CORRELATION

Welex

RADIOACTIVITY LOG

COMPANY / WELL / FIELD / County / State — FIELD PRINT

COMPANY ARKOMA PRODUCTIONS

WELL FEDERAL 1-26

FIELD WILDCAT

COUNTY SAN BERNADINO STATE CALIFORNIA

Location: 1303'S 1745 E FROM

Sec. 26 Twp. 3 N Rge. 6 W

Other Services: NONE

Permanent Datum G.L. Elev. — Elev.: K.B. —

Log Measured From K.B. — Ft. Above Perm. Datum D.F. —

Drilling Measured From K.B. G.L. 32.72

Date	3-13-84		
Run No.	TWO		
Type Log	GAMMA		
Depth—Driller	5890'		
Depth—Welex	5890'		
Bottom Logged Interval	5884		
Top Logged Interval	1350'		
Type Fluid in Hole	GEL WATER		
Salinity, PPM Cl.	N/A		
Density	N/A		
Level	FULL		
Max. rec. temp., deg. F.	N/A		
Operating Rig time			
Recorded By	D. MACKENZIE		
Witnessed by			

RUN	BORE-HOLE RECORD			CASING RECORD			
No.	Bit	From	To	Size	Wgt.	From	To

LAHRA—AA. 05847

Fold Here

EQUIPMENT DATA

GAMMA RAY				NEUTRON			
Run No.	ONE			Run No			
Tool Model No.	Cosmos			Log Type			
Diameter	1 11/16			Tool Model No.			
Detector Model No.				Diameter			
Type				Detector Model No.			
Length				Type			
Distance to Source				Length			
				Source Model No			
GENERAL				Serial No			
Hoist Truck No.				Spacing			
Instrument Truck No.	2878			Type			
Tool Serial No.	275696			Strength			

LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
Run No	Depths From	To	Speed Ft/Min.	T.C. Sec.	Sens Settings	Zero Div L or R	API G.R. Units per Log Div	T.C. Sec.	Sens Settings	Zero Div. L or R	API N Units per Log Div.
ONE	5890	1350	60	1							

Reference Literature:

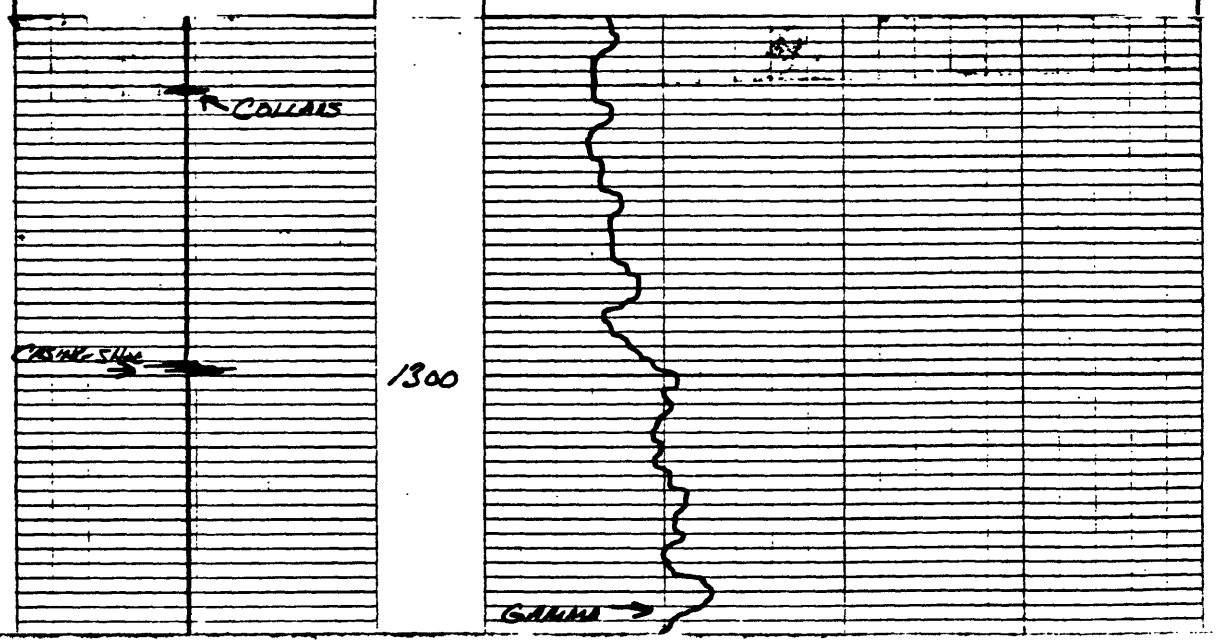
Service Ticket No. 162695 Remarks:

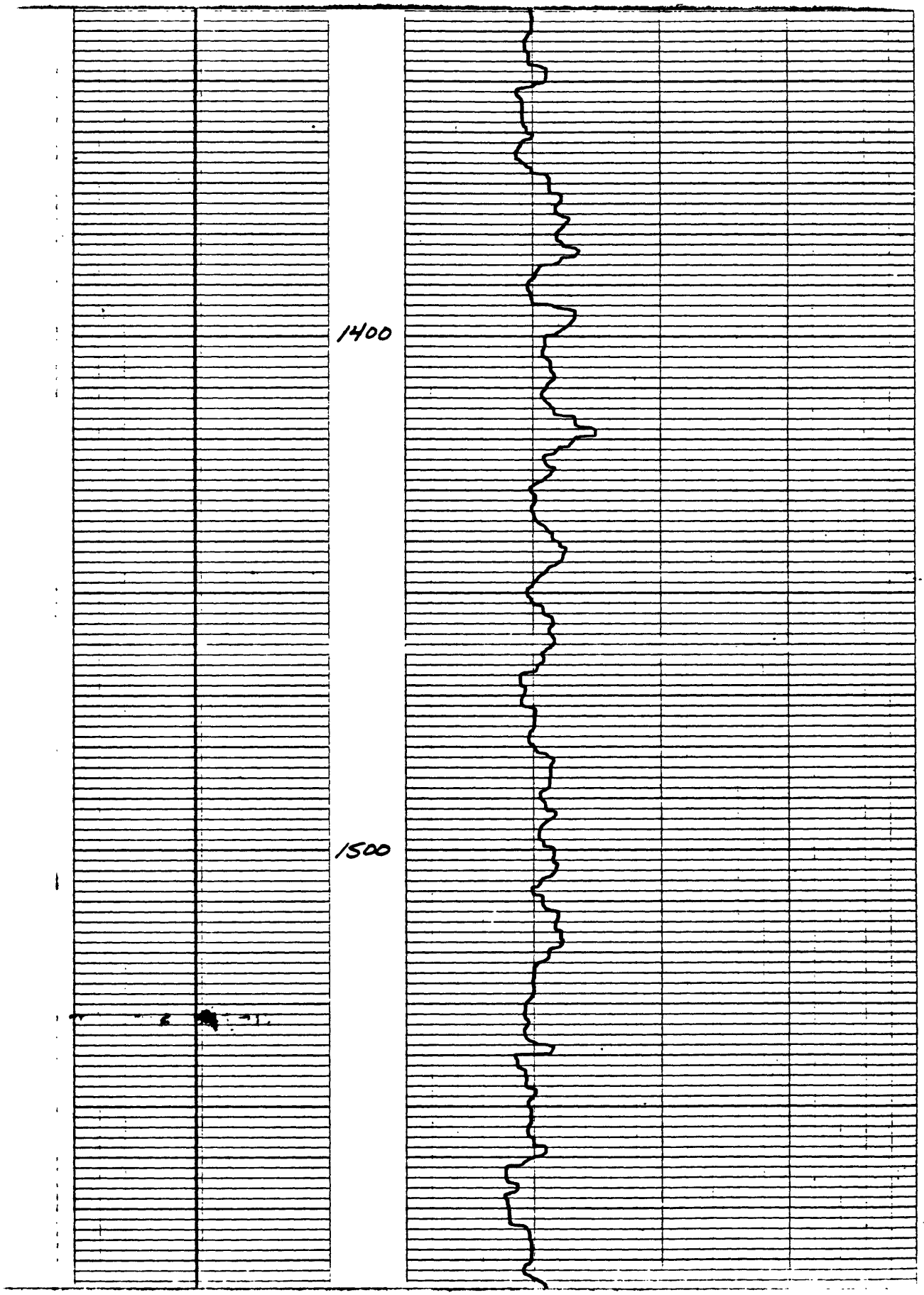
5" = 100'

COLLAR LOG

GAMMA
API Gamma Ray Units

INCREASES




1400
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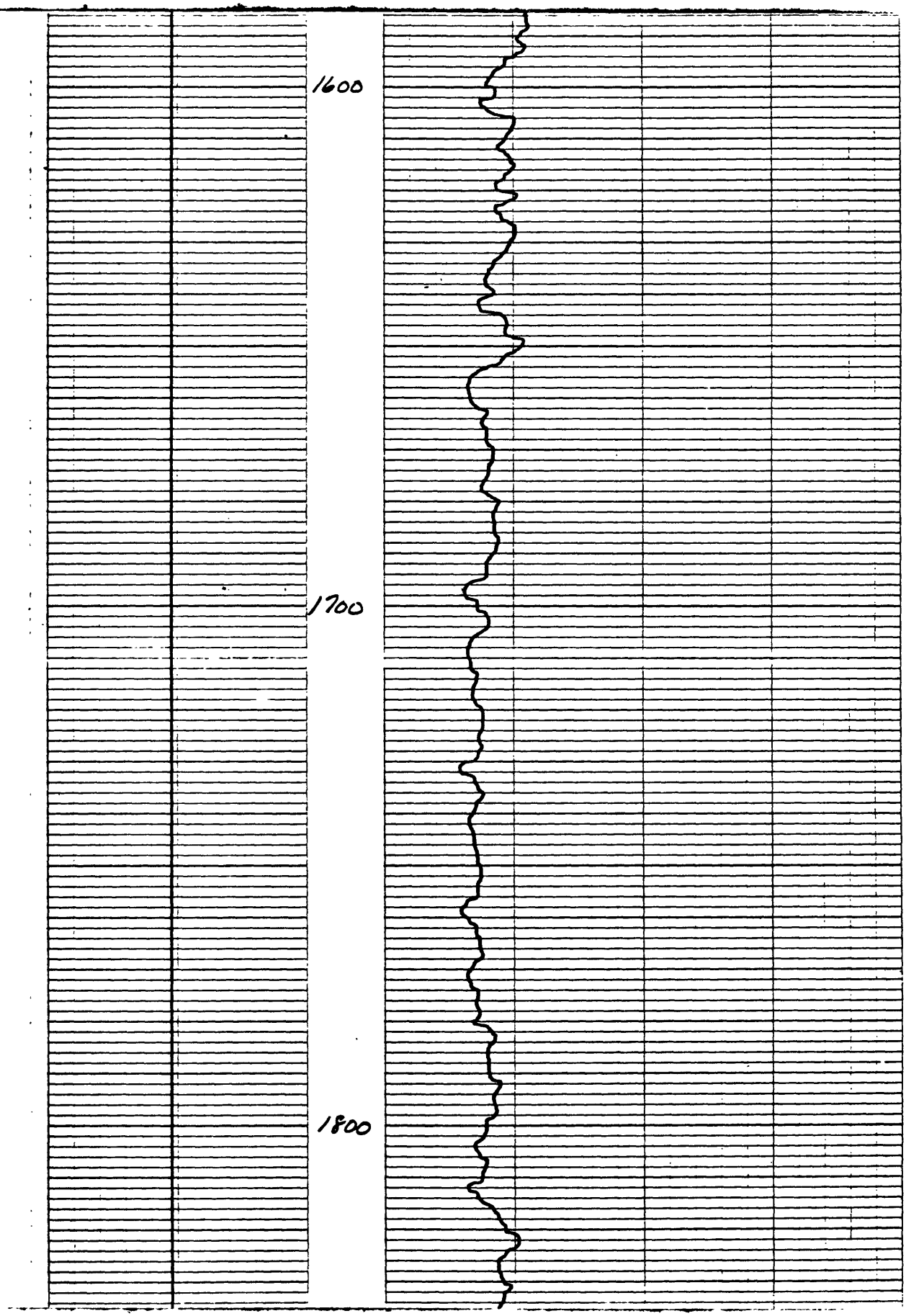
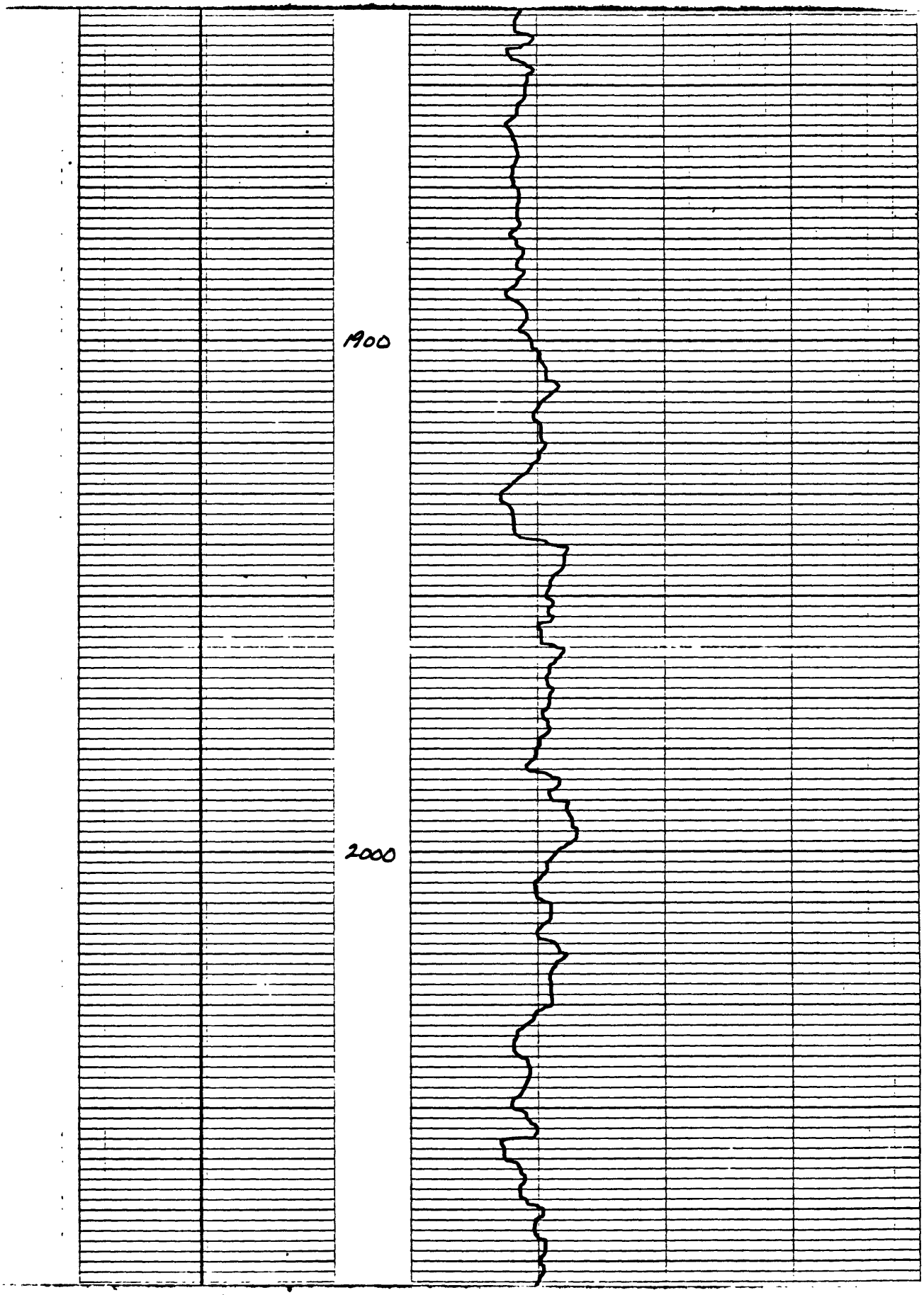

1600
1700
1800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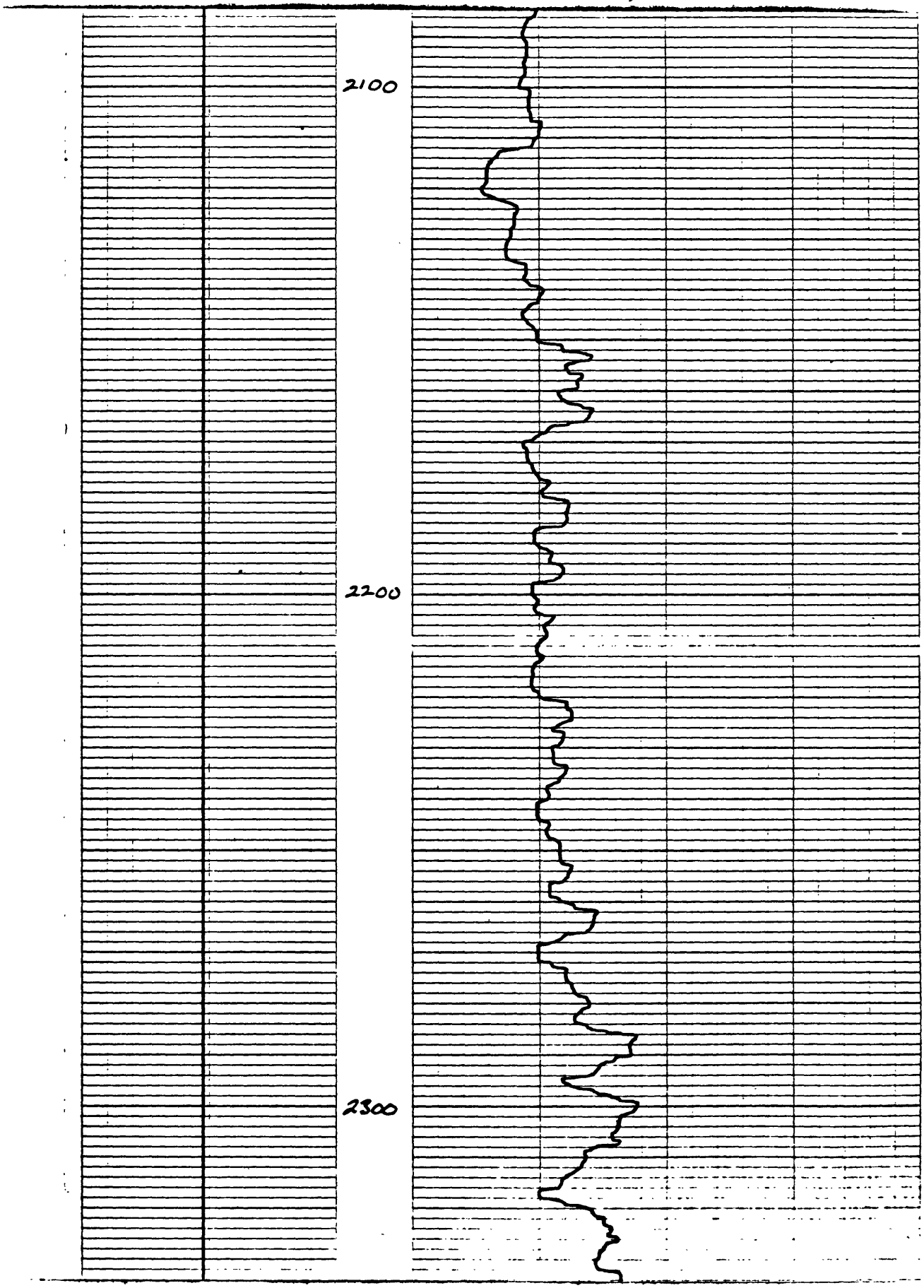
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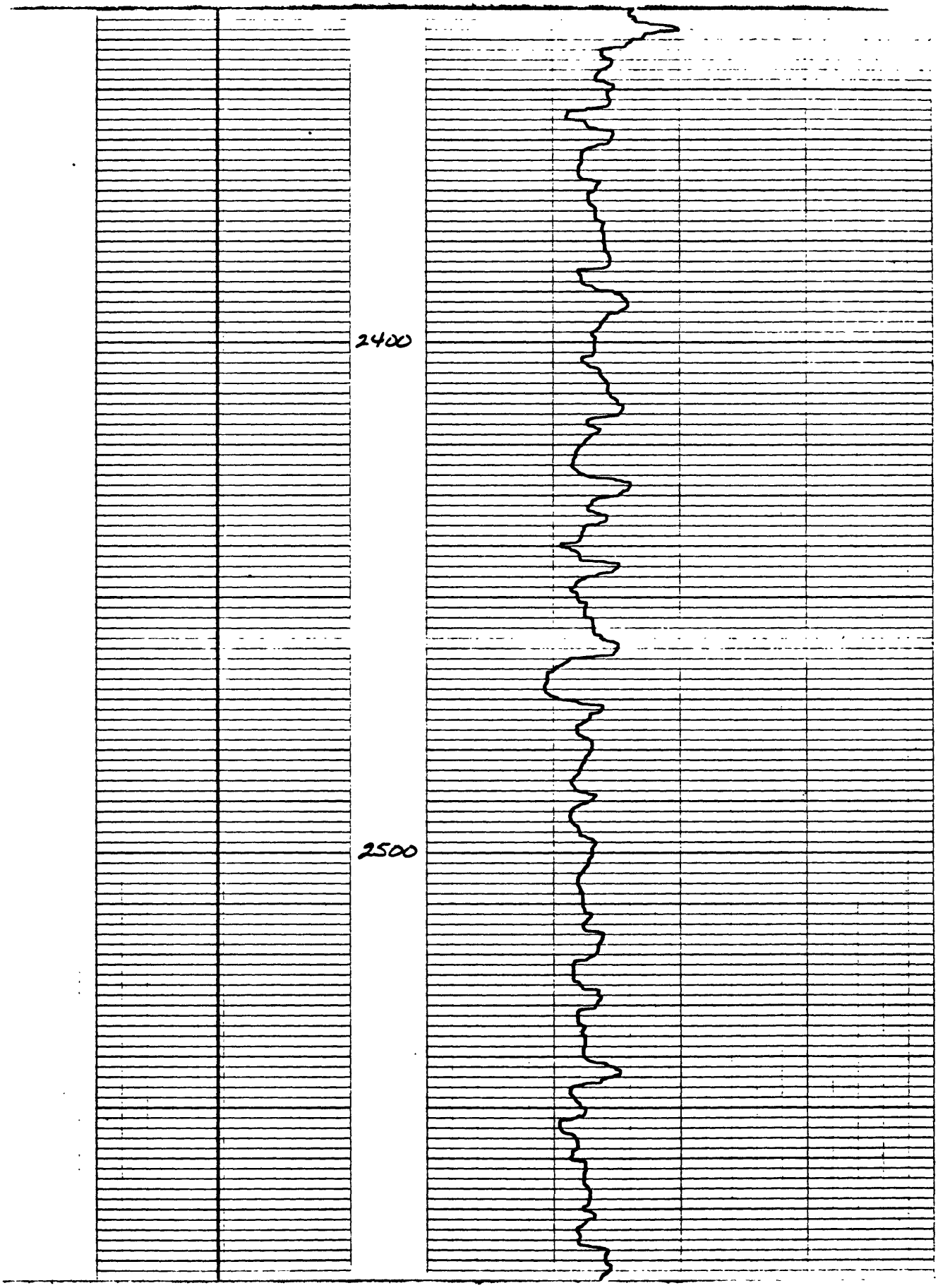
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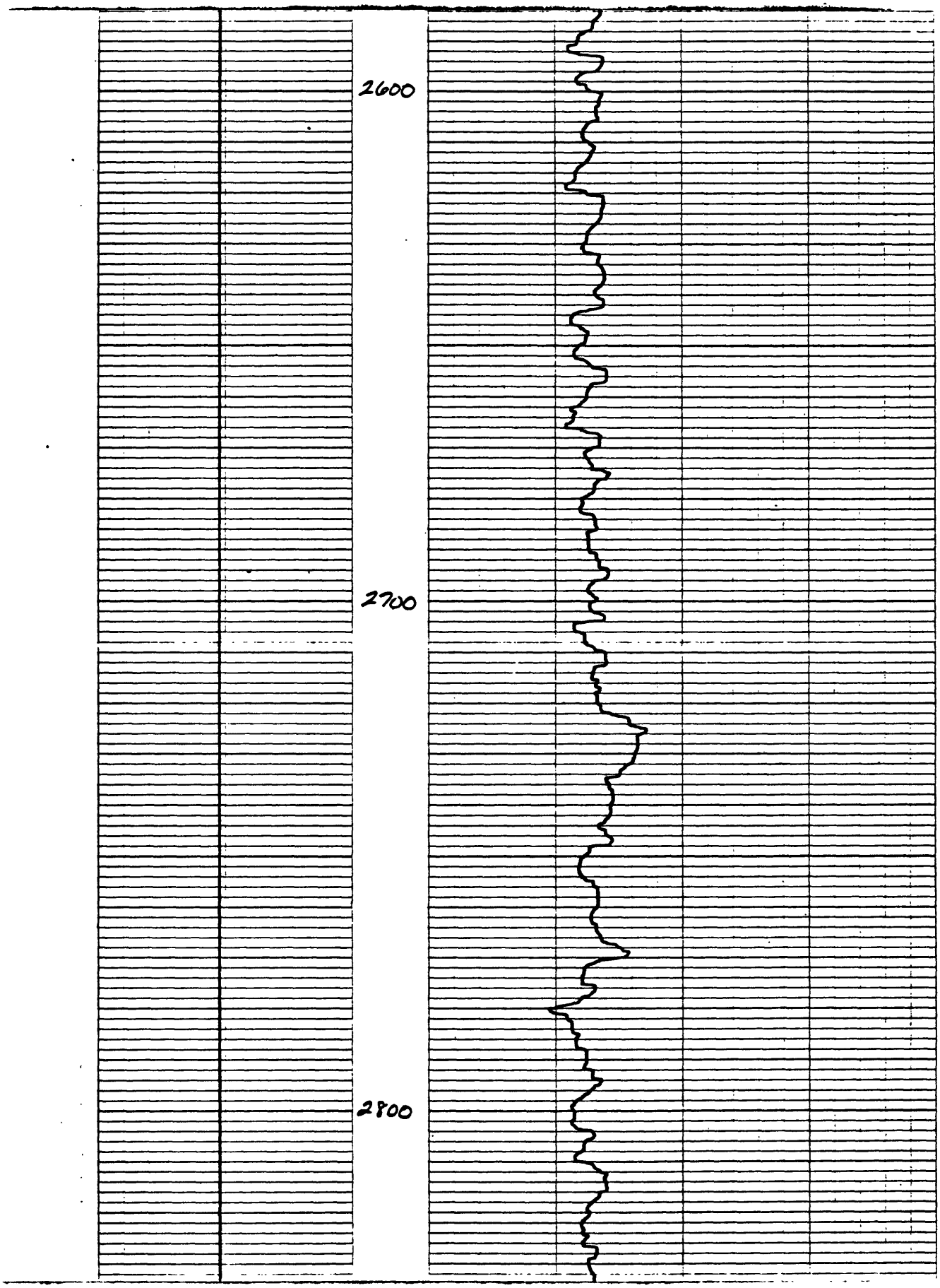
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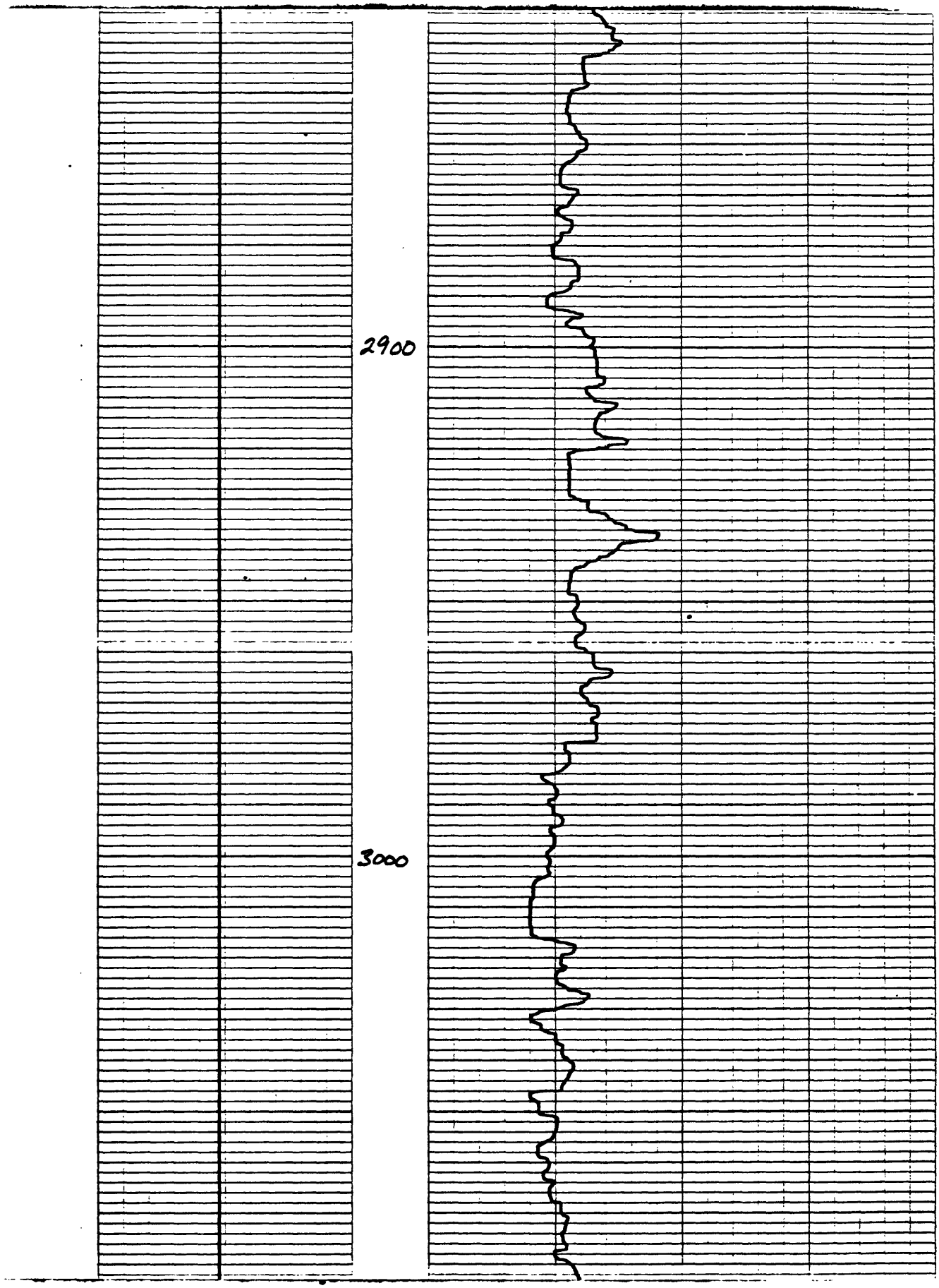
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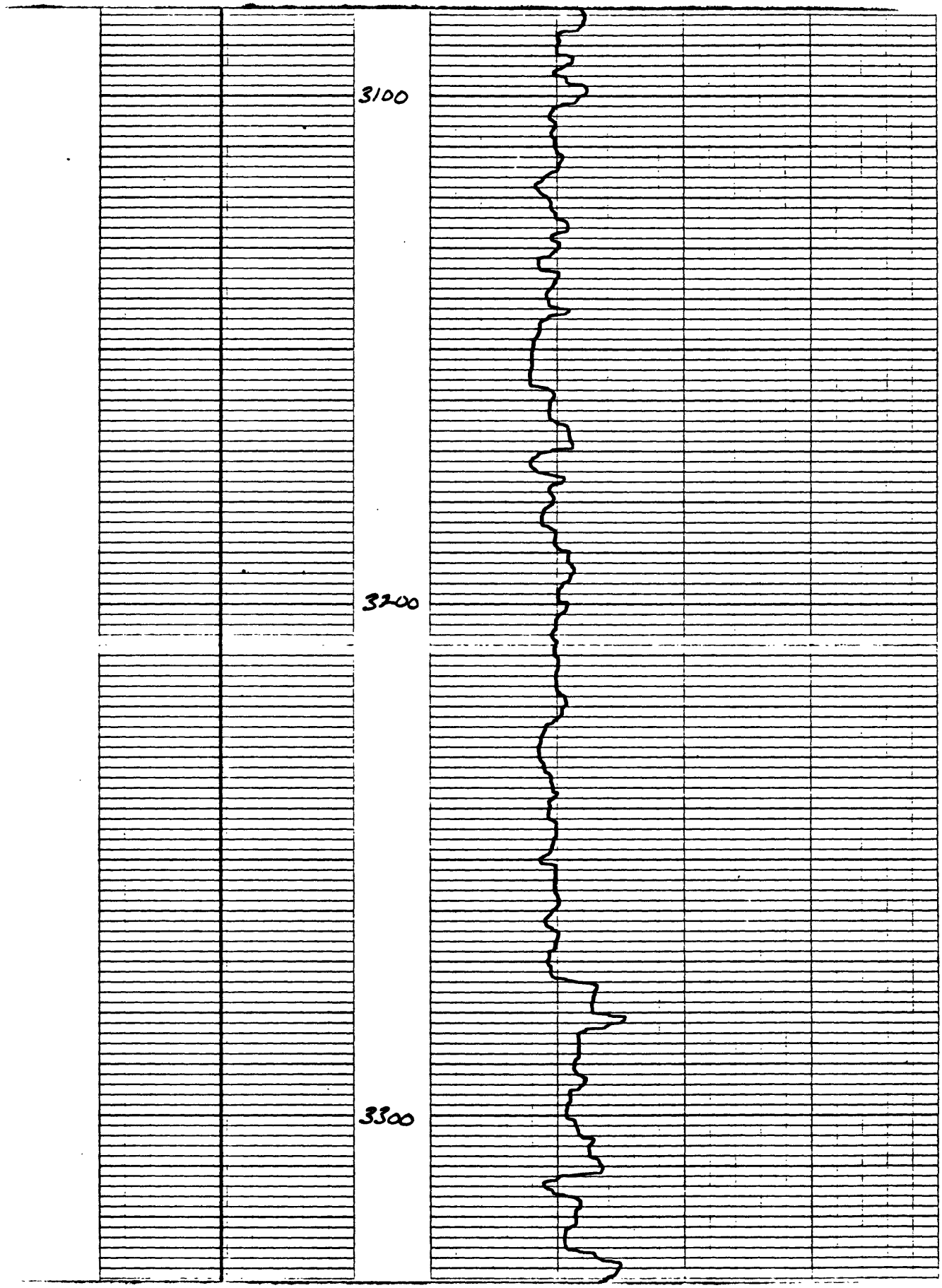
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3200
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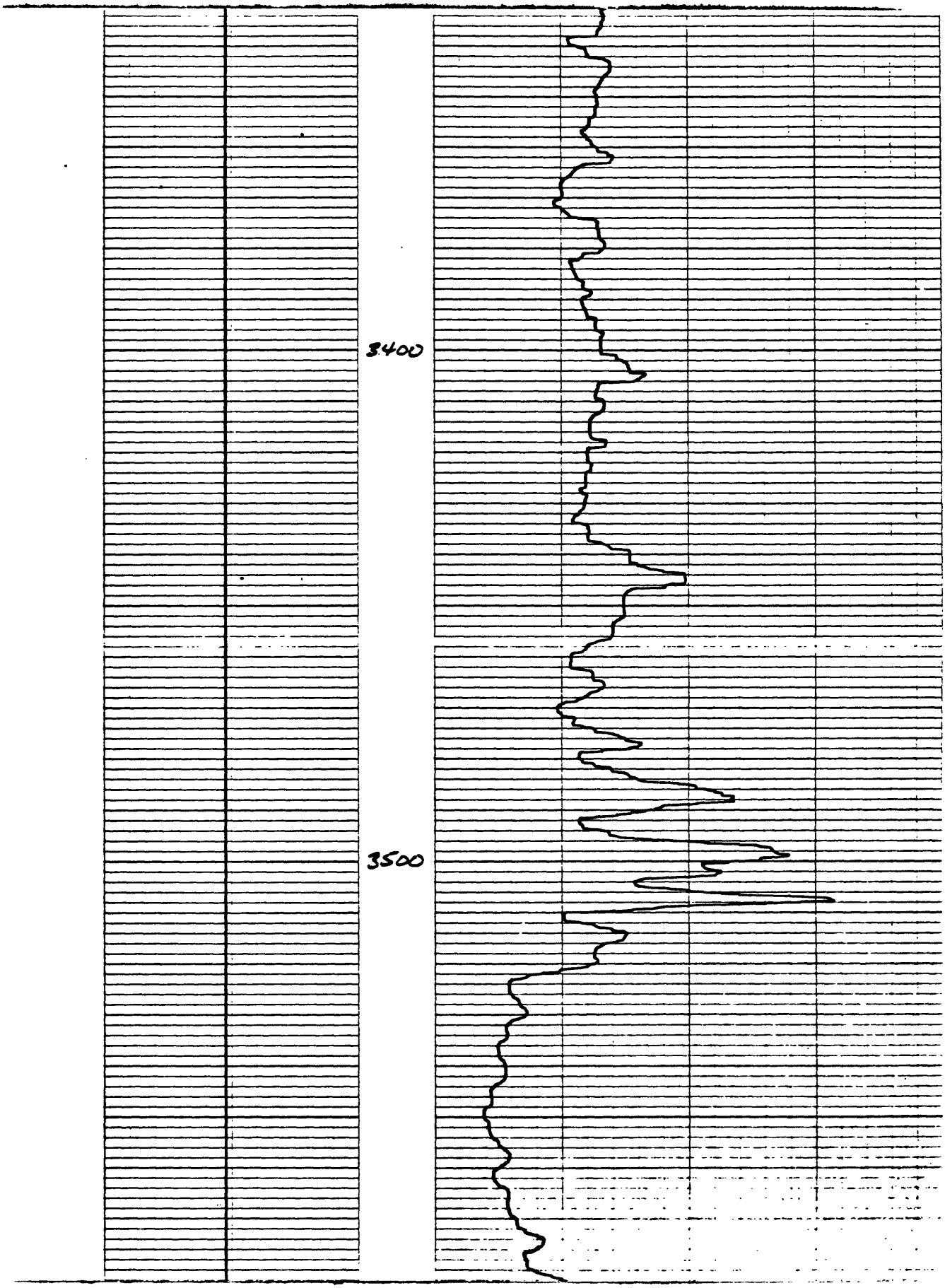
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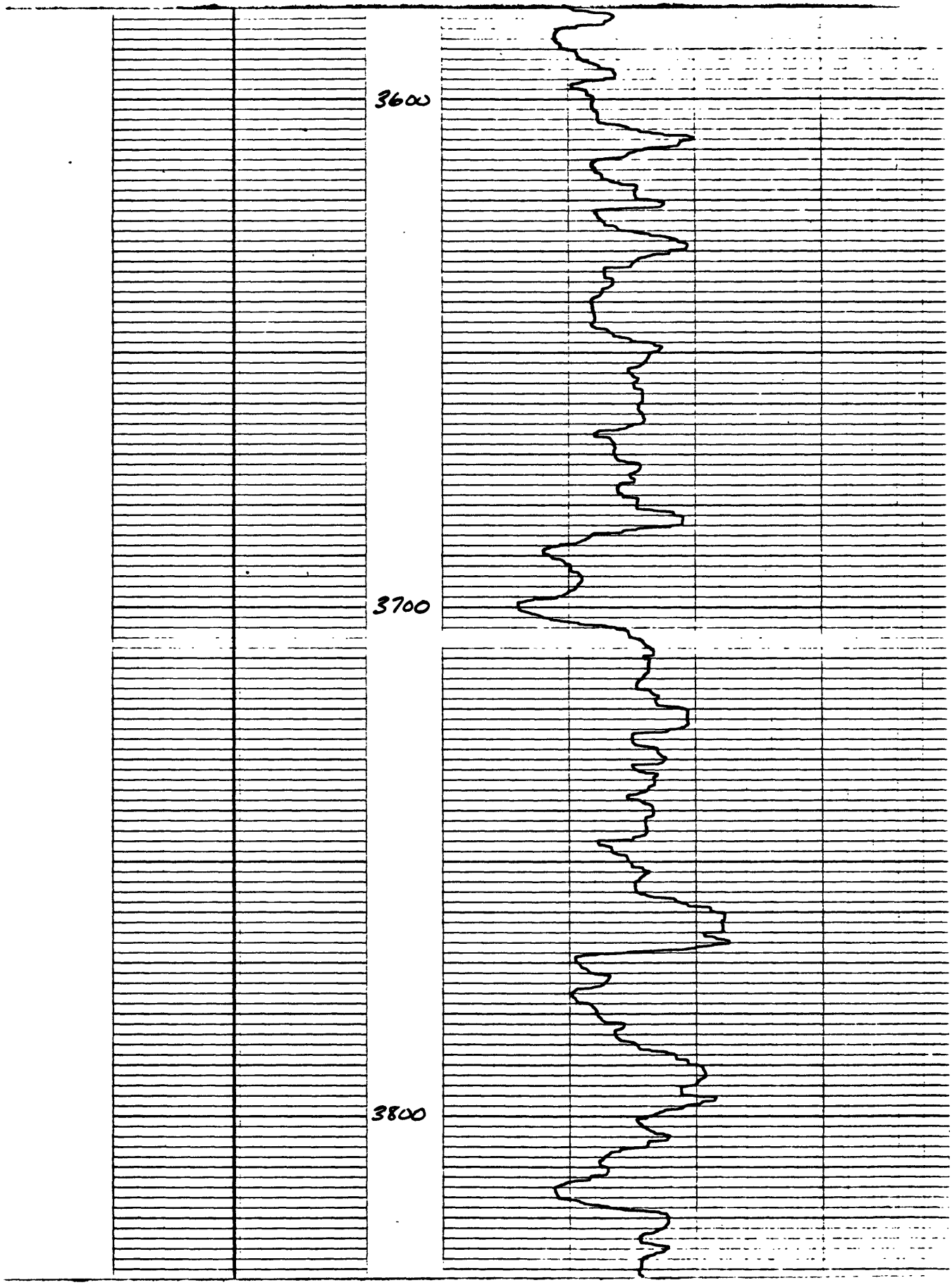
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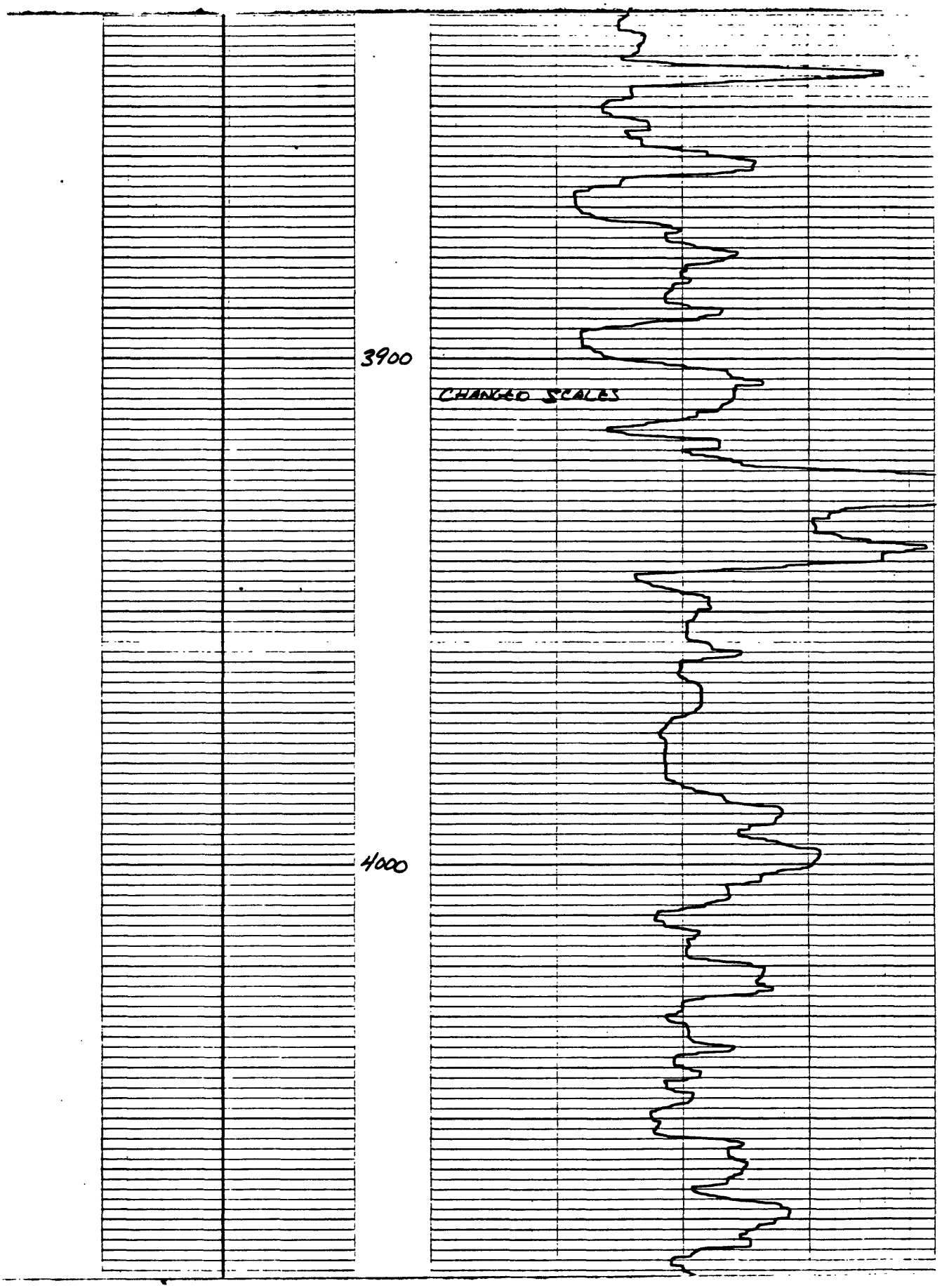
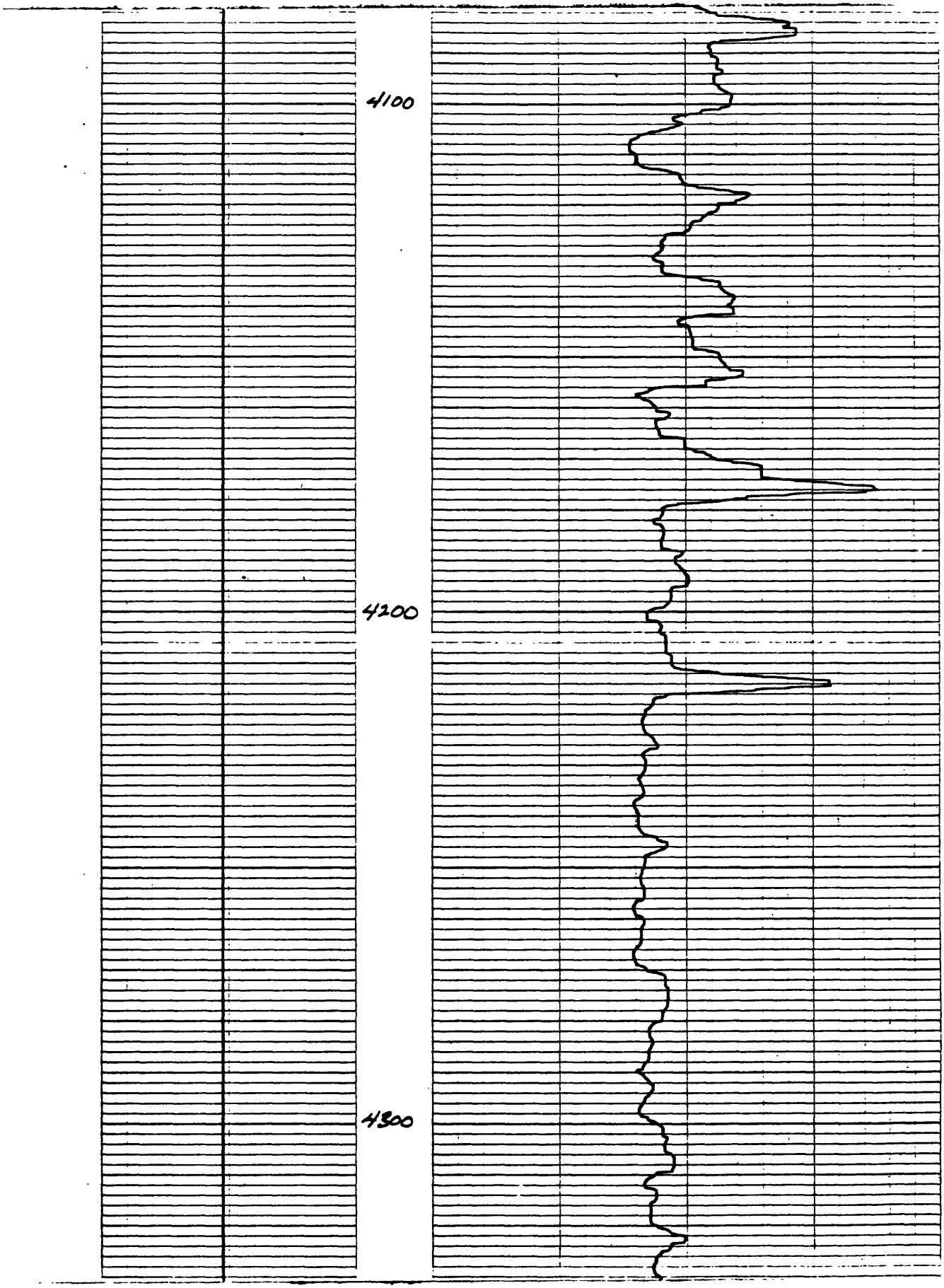

3900
CHANGED SCALES
4000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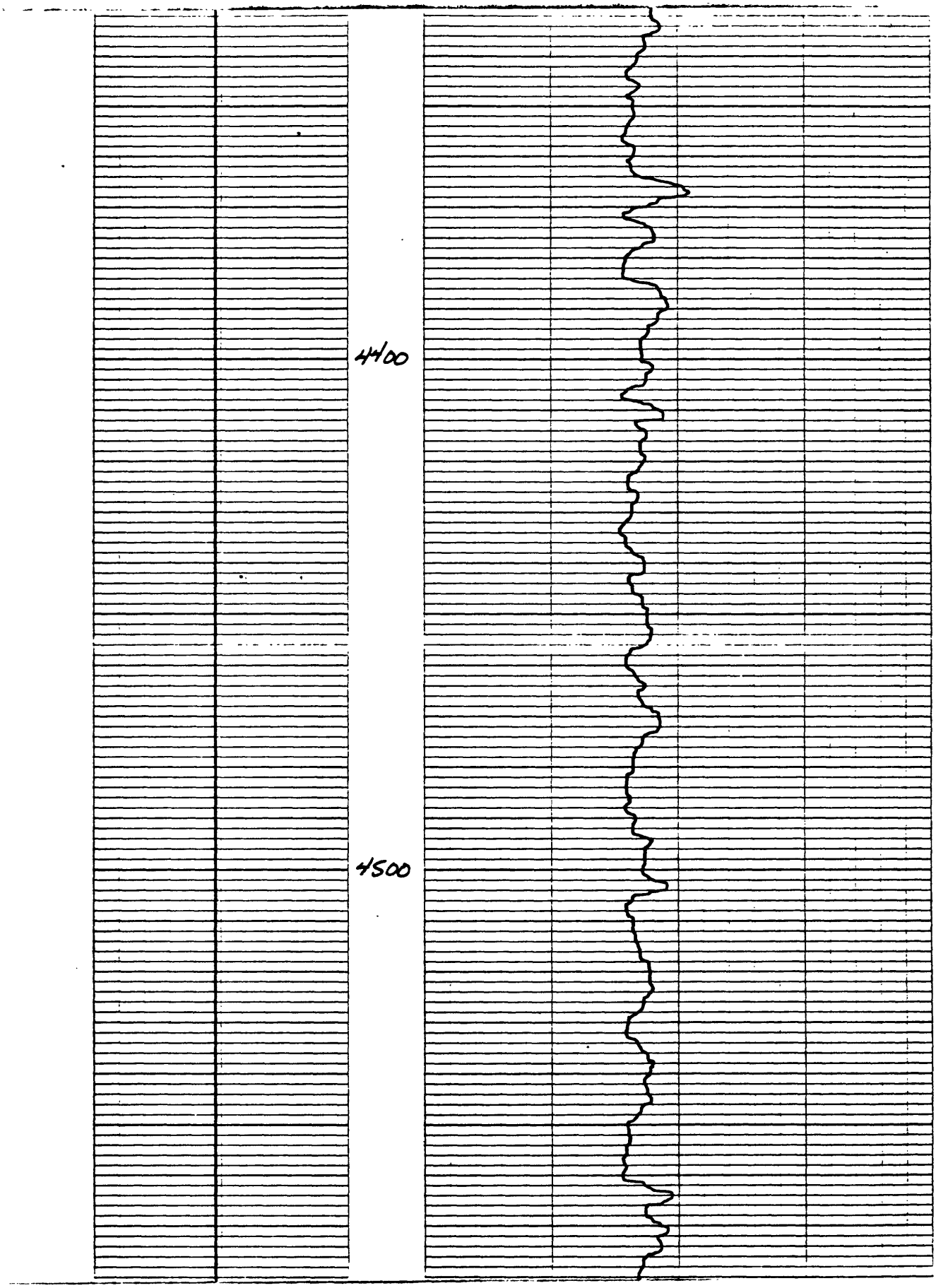
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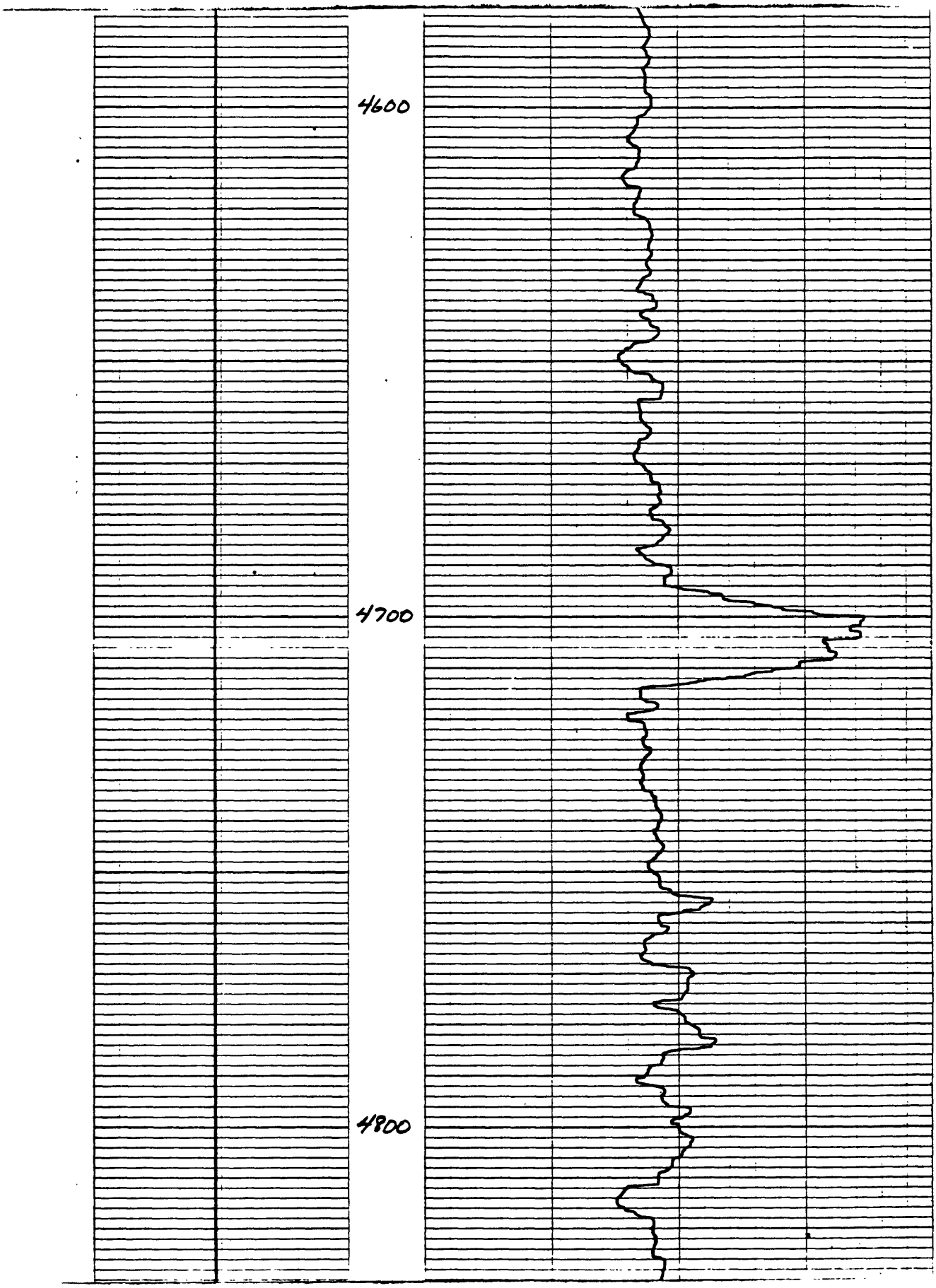
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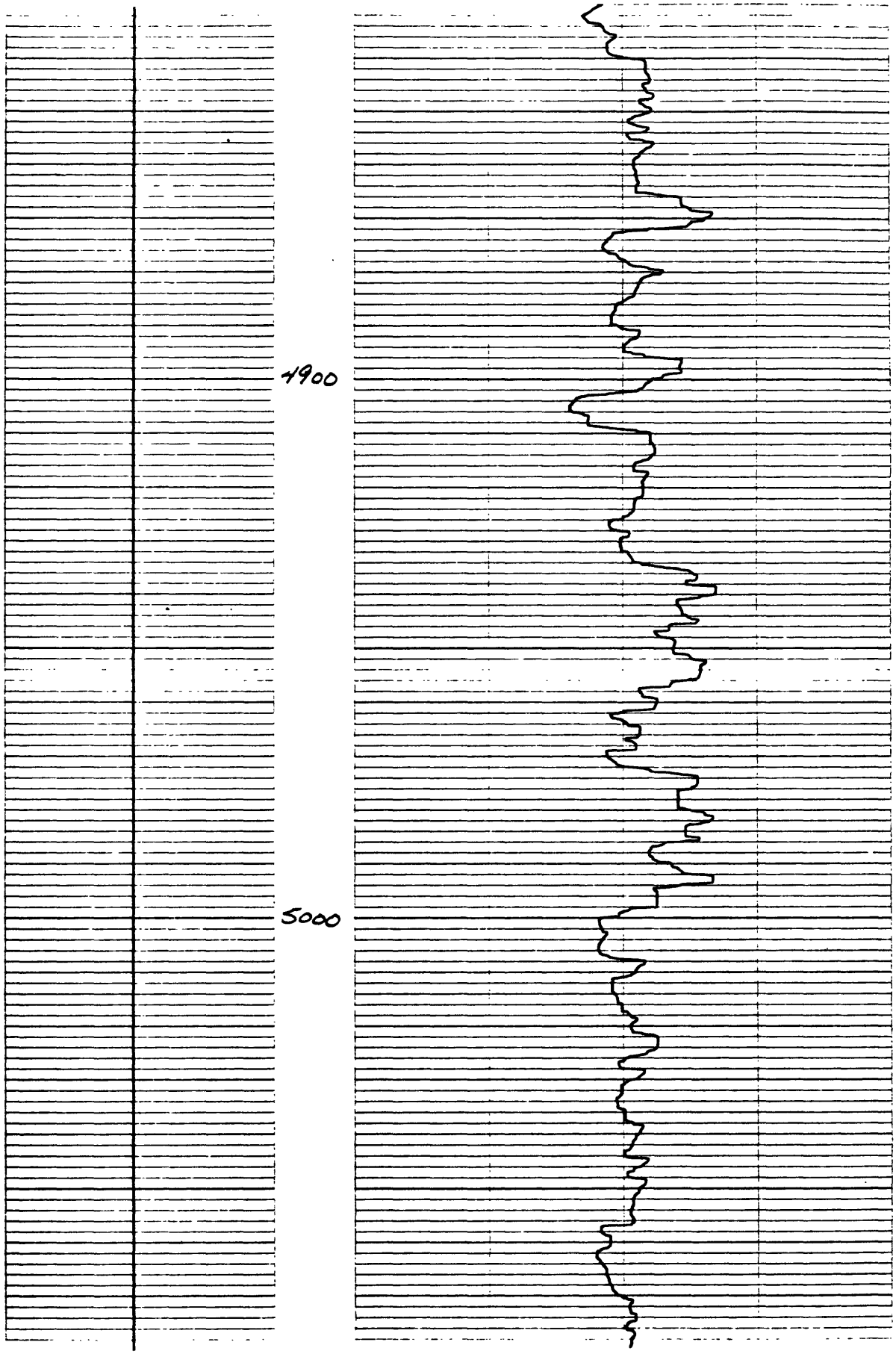
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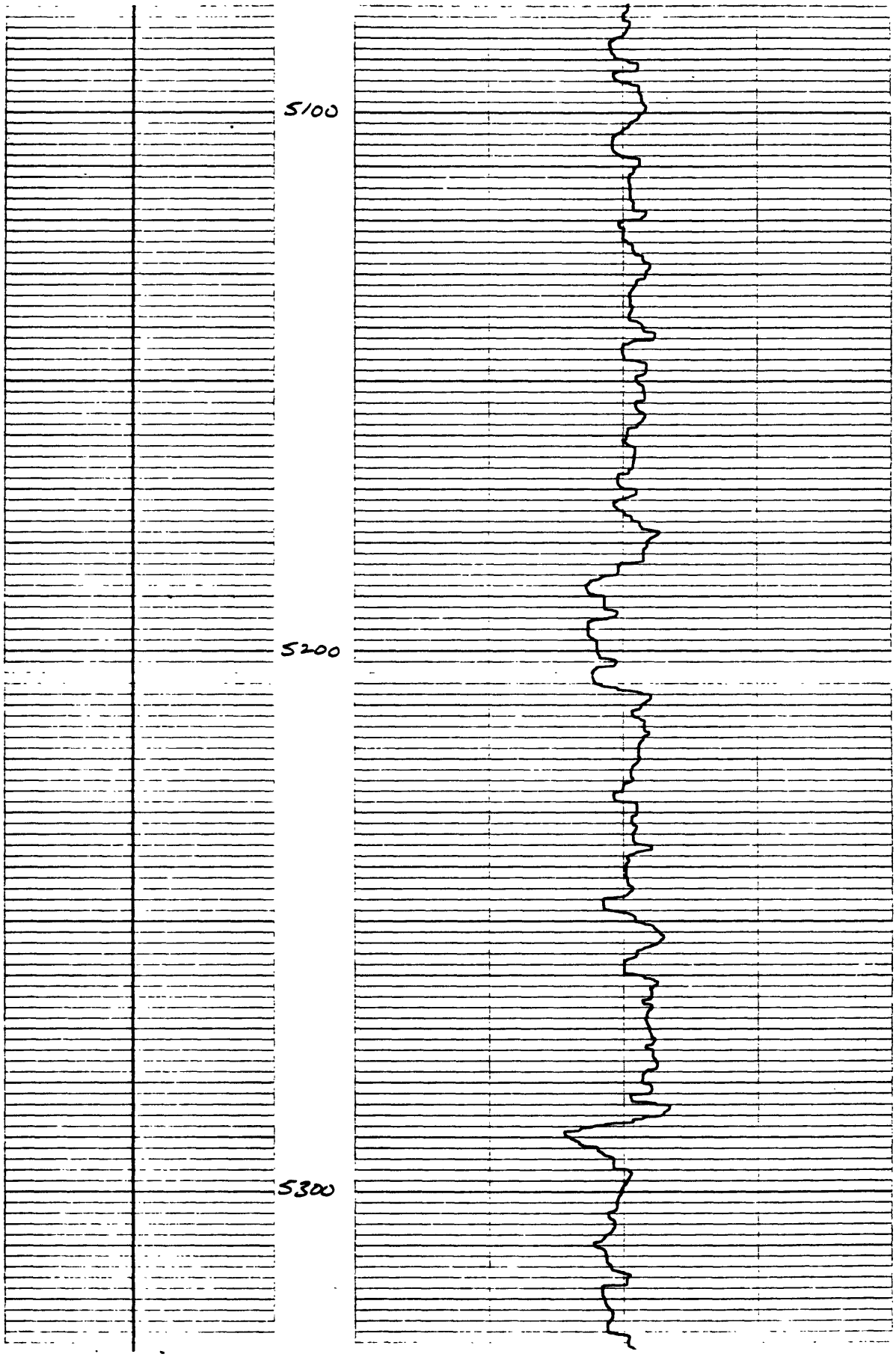
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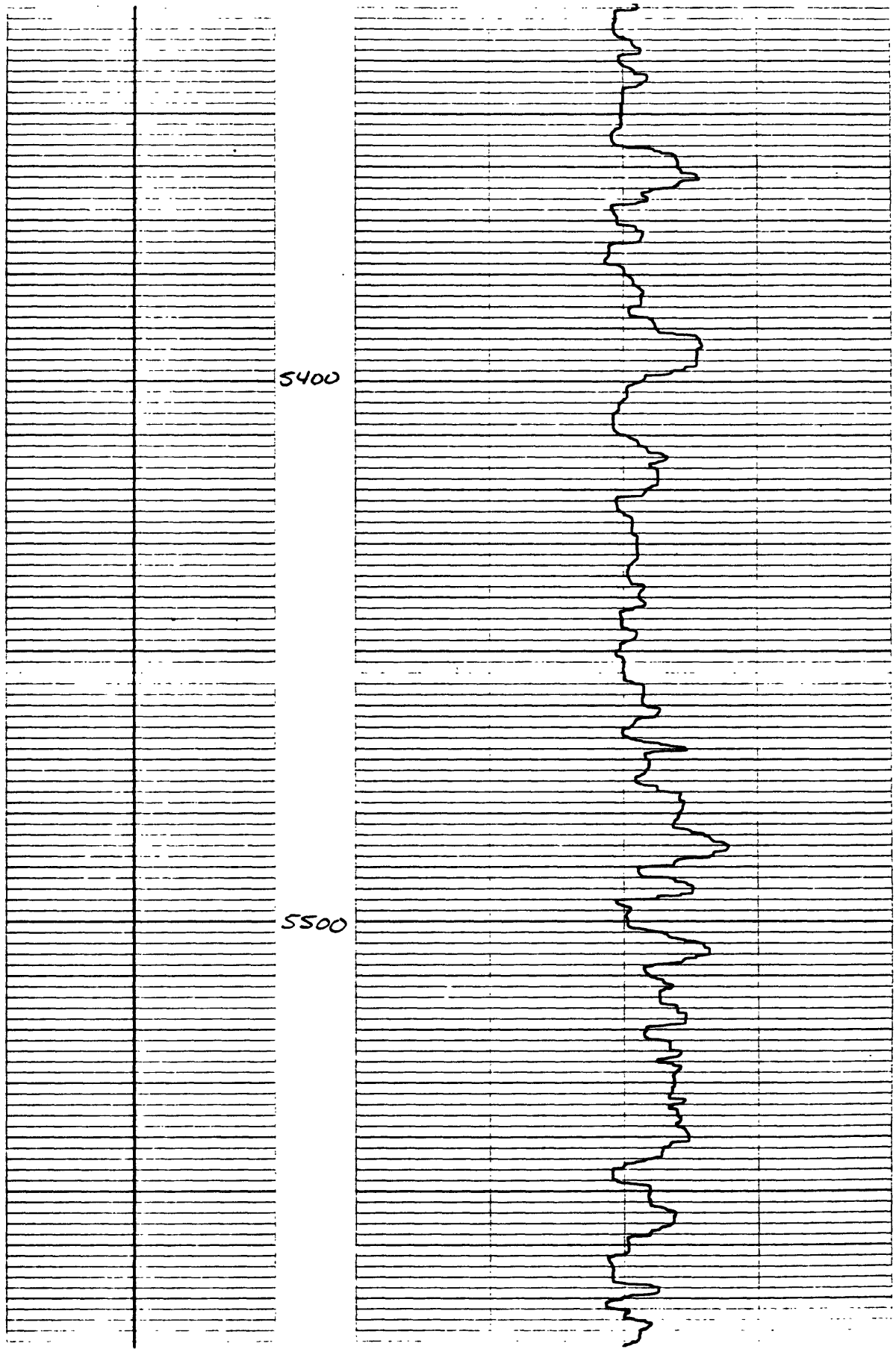
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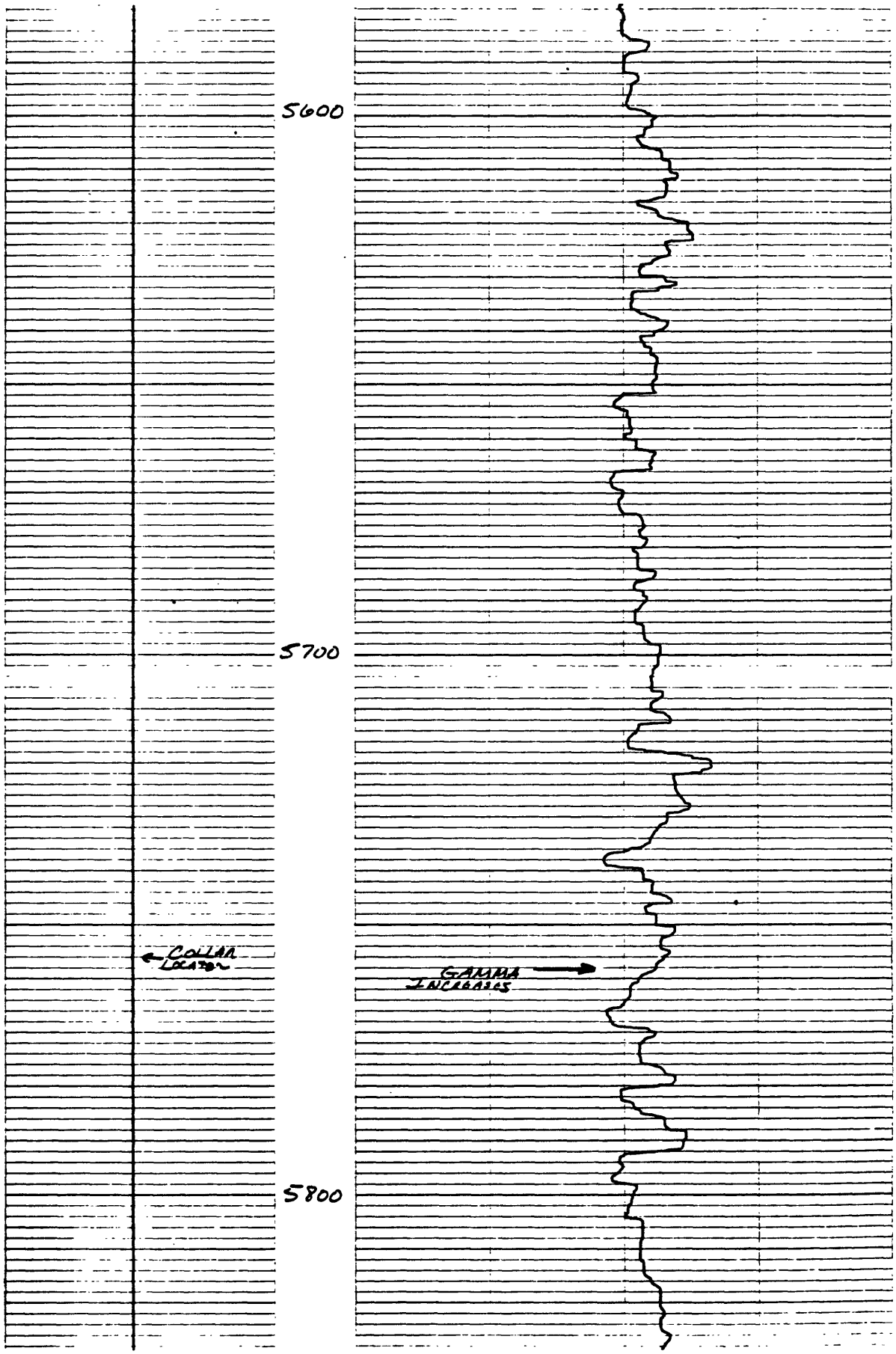
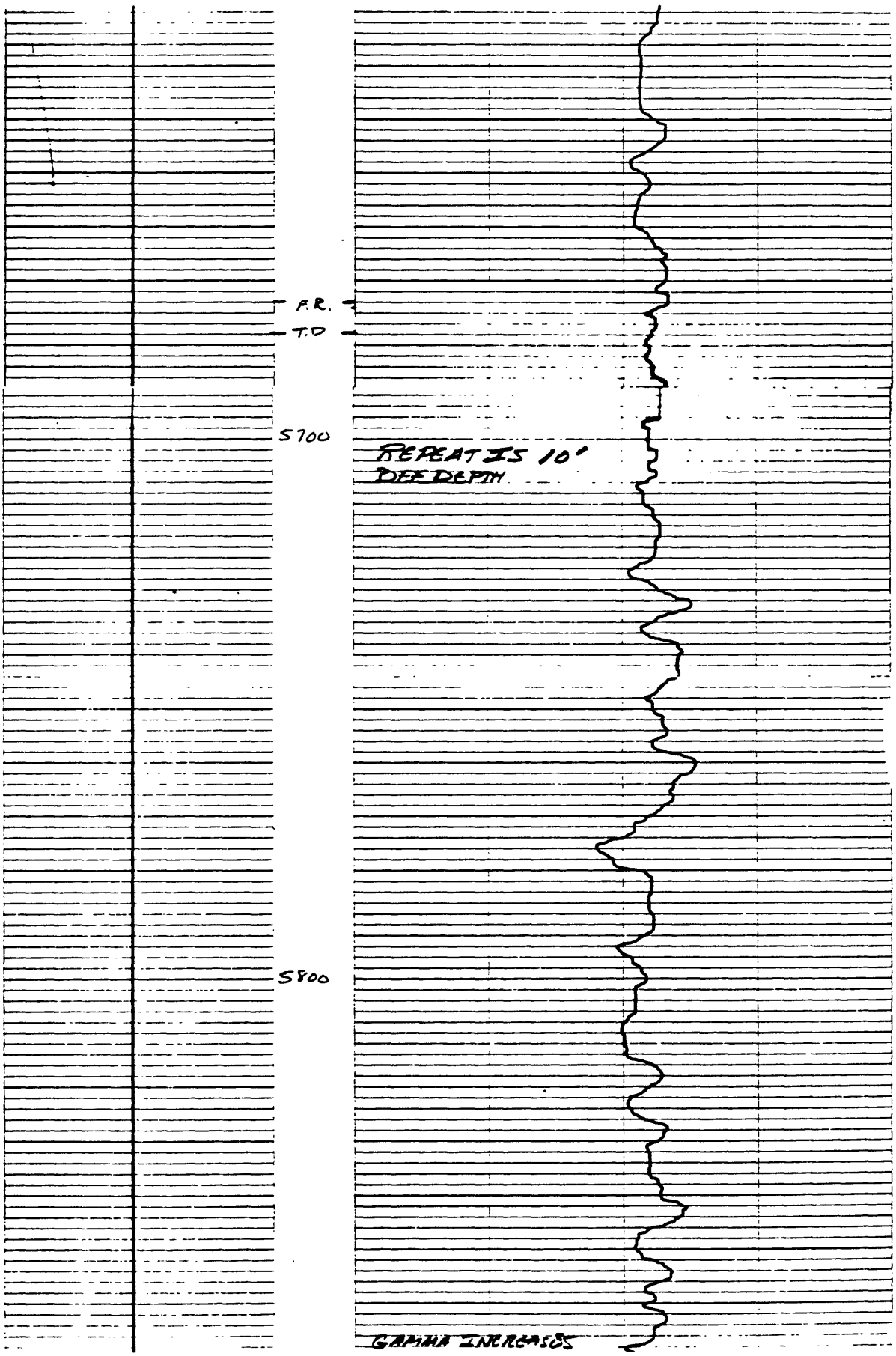

5600
5700
5800
COLLAR LOCATOR
GAMMA INCREASES


P.R.
T.D
5700
REPEAT IS 10'
DEE DEPTH
5800
GAMMA INCREASES