

Tsolum River Coal Project  
Exploration Drilling Program  
February, 1994

# 001

Coal License No's:	8353 through 8400 and 8519 through 8535
Land District:	Comox Land District
Latitude and Longitude:	49°48' north 125°12' west
N.T.S.:	92 k/3 and 93 f/14
Owner:	Canadian Occidental Petroleum Ltd.
Operator:	Canadian Occidental Petroleum Ltd.
Date Completed:	May, 1994
Prepared by:	R.A. Swaren, P. Geol.

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## Summary and Recommendations

In February of 1994 Canadian Occidental drilled 6 holes for 1945 meters at a total cost of about \$150,000.00

The program identified two main seams, the 2 and 3 seam that may be of mineable thickness on the property.

The seams outcrop west of the property and dip northeast to depths of 600 meters on the eastern edge of the property.

The 2 seam quality is quite good with recoveries of 85% at 1.45 S.G. with less than 10% ash, less than 1% sulfur and 7300 cal/gm heating value.

Further drilling is required to determine the reserve potential and should be concentrated to the north of the Oyster River and only 2 miles south of it.

Other exploration areas occur in the south and south-central portions of the property which have not been explored to date.

## 1.0 **INTRODUCTION**

A 6 hole drilling program totaling 6380 feet (1,945m) was carried out by Canadian Occidental Petroleum Ltd. in February/March of 1994. This program concentrated on the section across structure following the Iron River road on the north side of the Oyster River near Campbell River, BC

The Iron River road was also the line used for an high resolution seismic program also carried out by Canadian Occidental in early 1993.

Upon completion of the program, seam numbers and formation tops were identified by C.G. Cathyl-Bickford of Westwater Mining Ltd. using the lithologs and Electro logs provided by Canadian Occidental.

The following report is a summary of the data obtained from the program.

### 1.1 **PURPOSE AND SCOPE**

The drilling program was carried out to determine the number, thickness, quality, depth and extent of coal seams present in the area targeted by the high resolution seismic program of 1993.

Not enough holes were drilled to determine reserve potential nor to evaluate the potential of the whole property.

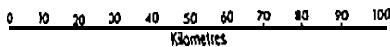
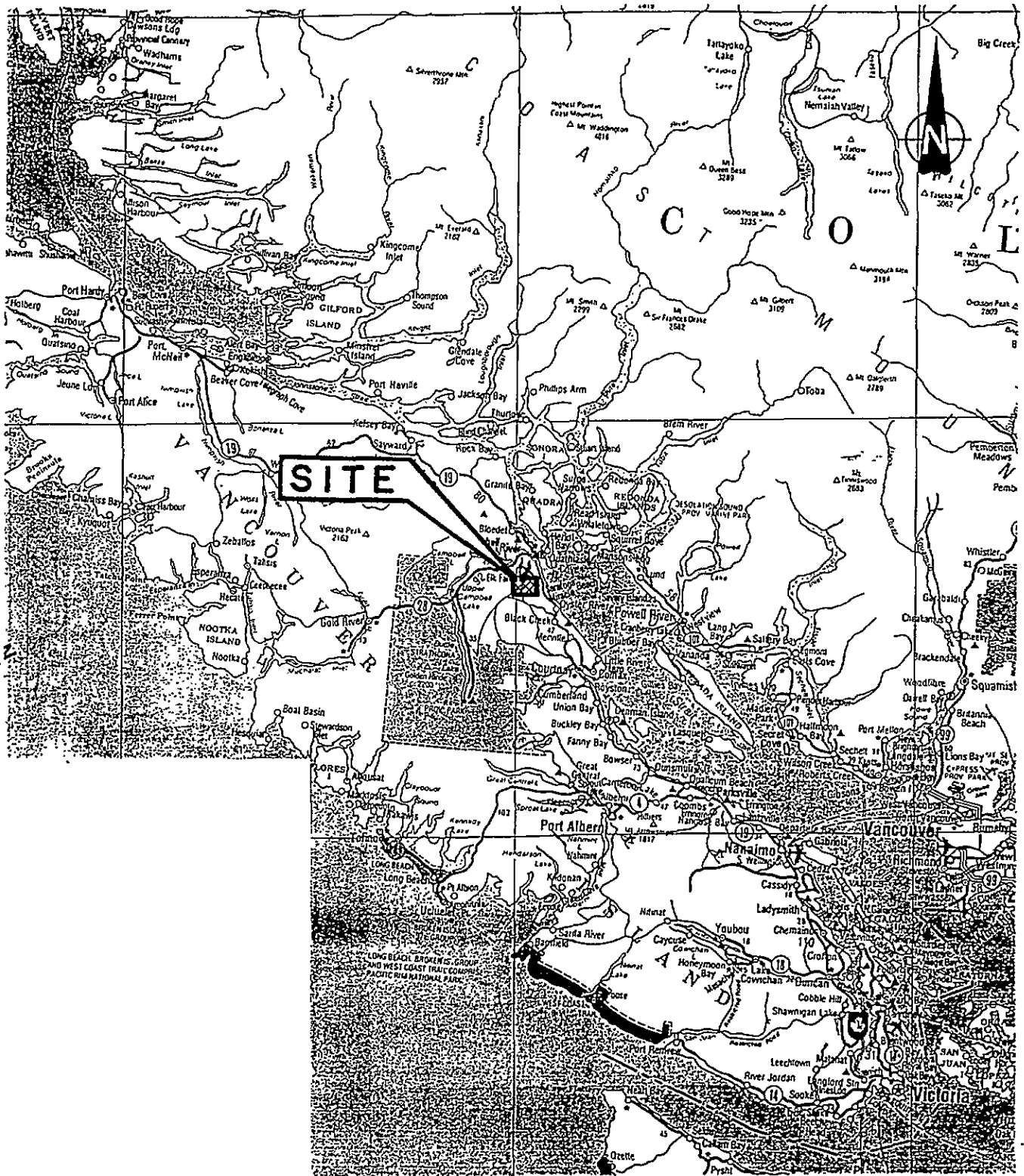
This report therefore concentrates mainly on the section drilled along the Oyster River.

### 1.2 **LOCATION EXTENT AND ACCESS**

The Tsolum River Property is located in the east-central portion of Vancouver Island, British Columbia ( Figure 1). It is situated in the Comox Land District extending from 2 kilometers north of the town of Courtenay, NW for 50 kilometers to the Campbell River airport.

The property is approximately 7 kilometers in width and has an aerial extent of 14,345 hectares (Map No. 2).





CANADIAN OCCIDENTAL PETROLEUM LTD.  
 TSOLUM RIVER  
 SITE LOCATION MAP

SCALE	DRAWN BY	DATE
M.T.S.	PROJECT NO.	May, 1993
	C 93-13	FIGURE 1

The drilling program was concentrated in the northern portion of the property near the town of Campbell River.

The property is accessed by the paved highway 19 running North/South along the eastern edge as well as a major logging road and powerline/pipeline corridor running North/South along the western edge. Many logging roads and paved rural roads run east west connecting the above major routes.

### 1.3 PHYSIOGRAPHY

the Tsolum River property is located in the low lying coastal flats of Vancouver Island. Elevations range from sea level in the east to 160 meters in the west. Generally however, the relief is low and the area quite flat except for where water courses have cut valleys down into the topography.

The Oyster River and its tributary the Little Oyster River flow west to east in the northern portion of the property and Slack Creek and the Tsolum River flow southeast draining the southern two thirds of the property.

The entire area has been logged of its original forest cover and at present second and third growth timber has reached a mature enough age to be logged again.

The predominant vegetation in the area is cedar, fir, hemlock, alder, maple and cottonwood.

### 1.4 EXPLORATION TO DATE

In 1980 Canadian Occidental carried out a preliminary geologic mapping program.

In late 1991 several coal outcrops were sampled along the western edge of the property and detailed quality analysis was carried out. (locations on Map 3 and cross-sections in Appendix F)

In February 1993 a high resolution seismic program was completed along the Iron River road north of the Oyster River in order to target the most prospective drill sites.

In February 1994 Canadian Occidental carried out a 6 hole exploration program summarized in this report.

## 1.5 EXISTING INFRASTRUCTURE

The major industries in the Campbell River area are: tourism, sport and commercial fishing, lumbering, pulp production and mining.

The major mining activities in the area at the present time are the Westmin Mine near Buttle Lake which produces copper, lead and zinc and the Quinsam Mine, located 32 kilometers west of Campbell River which produces coal.

The Quinsam Mine which obtained government approval in 1984 is producing approximately 500,000 tonnes of thermal grade coal per year from surface and underground operations although the surface mineable reserves are nearing the end of their life.

The underground mine utilizes room and pillar mining methods. The coal is then trucked to the plant where it is cleaned, trucked to the government barge loadout at Middle Point, barged to the limestone quarry owned by Holnam West Materials Ltd. on Texada Island, and finally loaded onto ships up to Panamax for export (Figure 3).

If any new coal mines were to start production in the area it would be well worthwhile to consider loading onto ships directly at Middle Point north of Campbell River.

2.0 LAND DISPOSITION

Canadian Occidental Petroleum Ltd. holds BC coal licenses on 14,345 hectares of crown land which comprises the Tsolum River property (Map No. 2).

An area of 10,944 hectares is held under British Columbia Coal Licenses 8353 through 8400. The anniversary date is May 1, 1989.

A further area of 3,401 hectares is held under BC coal licenses 8519 through 8535. The anniversary date of these licenses is January 15, 1992.

Canadian Occidental does not hold rights to surface or timber.

### 3.0 GEOLOGY

#### 3.1 GEOLOGIC SETTING

The major coal deposits of Vancouver Island, including the Comox and Nanaimo coal fields were deposited in the Late Cretaceous. The coal measures are part of the Nanaimo Group, which outcrops along the southeastern and northeastern edges of the Cretaceous to Tertiary Georgia Basin. As shown on Figure 3, the Georgia Basin is elongate to the northwest, and largely underlies the Strait of Georgia between the British Columbia mainland and Vancouver Island. A substantial portion of Eastern Vancouver Island and a smaller portion of the Puget Lowland of Washington State are underlain by up to 4,000 meters of Nanaimo Group sedimentary rocks.

The Tsolum River property is located entirely within the Comox coal field of the Georgia Basin. For that reason, only the Lithostratigraphy of that Basin will be described in this report.

The stratigraphic nomenclature of the Cretaceous rocks of the Comox coal field as reviewed by Cathyl-Bickford and Hoffman in 1991 is summarized in Figure 2.

#### 3.2 STRATIGRAPHY

The Nanaimo Group consists of siliciclastic and minor carbonate sedimentary rocks of Late Cretaceous age, which were deposited in the Georgia Basin. The contact of the Nanaimo Group with underlying pre-Cretaceous basement rocks is unconformable and in places is marked by substantial relief.

Four formations and numerous members may be recognized within the Nanaimo Group at Tsolum River. References given with each formation and member name refer to the original publication of that stratigraphic name.

##### **A. Comox Formation (Clapp, 1912):**

The Comox Formation consists of three members within the Tsolum River study area: the basal Benson, medial Cumberland and uppermost Dunsmuir Member. Coals of economic interest are concentrated in the Cumberland Member.

## EOCENE TO OLIGOCENE

Catface Intrusions: sills and dykes of dacite and fine-grained quartz diorite

## LATE CRETACEOUS (Nanaimo Group)

Lambert FM.: shale; siltstone

Denman FM.: sandstone, minor conglomerate

Cedar District FM.: shales; siltstone

Protection Fm.: sandstone, minor conglomerate

**Trent River Formation (Units 4-7)**

Royston Mb.: shale and siltstone

Tsable Mb.: conglomerate and sandstone

Browns Mb.: sandstone and siltstone, locally glauconitic

Puntledge Mb.: siltstone; minor sandstone

**Comox Formation (Units 1-3)**

Dunsmuir Mb.: sandstone; minor siltstone, shale, conglomerate and coal

Cumberland Mb.: sandstone, siltstone, shale and coal; locally  
thick coal beds

Benson Mb.: conglomerate and sandstone; red siltstone and shale

## JURASSIC AND OLDER

Basement Complex: chiefly basaltic volcanic rocks

Taken from Canadian Occidental report entitled "Tsolum River Preliminary Evaluation Update January 1992"

CANADIAN OCCIDENTAL PETROLEUM LTD.  
TSOLUM RIVER

### STRATI GRAPHIC SECTION

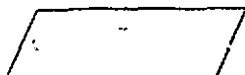





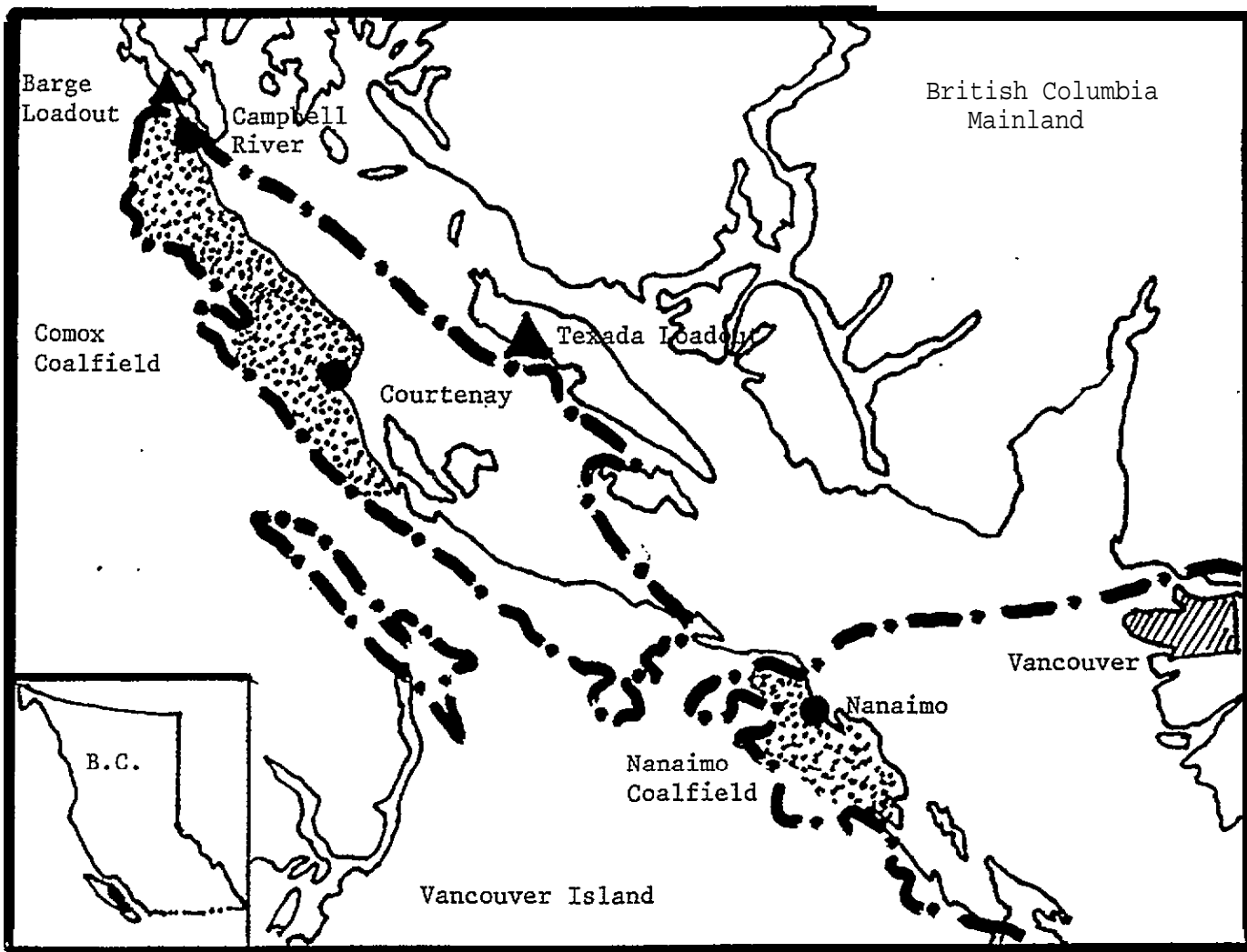
	SCALE	DRAWN BY	DATE
	N.T.S.	PROJECT	FIGURE
		C93-13	May, 1992 2

FIGURE 3 : COALFIELD LOCATION MAP

Legend

-  - Coalfields
-  - Outline of Georgia Basin
-  - Barge or Ship loadout
-  - 



**A.1 Benson Member (Clapp, 1914):**

The Benson Member consists mainly of pebble-, cobble- and boulder-conglomerate, principally composed of basaltic clasts with rare clasts of limestone, skarn and granodiorite. Occasional interbeds of green pebbly sandstone, red siltstone, and mottled, red and green shale occur in the Benson Member.

Within the Tsolum River study area, the Benson Member is up to 220m thick, but it is frequently absent due to irregular basement paleotopography. The Benson sediments were probably deposited in southwest-flowing, deeply-channelized braided streams and alluvialfans.

The Benson Member is of Turonian to early Santonian age. Its contact with pre-Cretaceous basement is unconformable.

**A.2 Cumberland Member (Bickford and Kenyon, 1988):**

The Cumberland Member consists mainly of variably-carbonaceous mudstone and siltstone with thick coal beds and occasional channel-sands. Coals in the Cumberland Member range in thickness from 30 cm to 180 cm.

Within the Tsolum River study area, the Cumberland Member is 50 to 95 m thick; it thickens to the southwest and thins to the northeast. Thickness of the Cumberland Member is controlled mainly by paleotopography on its basal contact, and to a lesser extent by postdepositional erosion at its upper contact. The Cumberland sediments were probably deposited in a complex of meandering streams, alluvial plains and coastal marshes, within a low-gradient deltaic system.

The Cumberland Member is probably of early Santonian age. Its contact with the underlying Benson Member is gradational by interbedding. Where the Benson Member is absent, the Cumberland Member directly overlies basement.

**A.3 Dunsmuir Member (Bickford and Kenyon, 1988):**

The Dunsmuir Member consists mainly of fine to medium-grained sandstone with minor thin interbeds of mudstone, siltstone and coal. Coals within the Dunsmuir Member range in thickness from 20 cm to 120 cm. The Dunsmuir coals are characteristically high in sulphur.



Within the Tsolum River study area, the Dunsmuir Member is **200** to 280 metres thick; it thickens to the north towards Campbell River. Thickness of the Dunsmuir Member is controlled partly by the depth of erosion at its basal contact. The Dunsmuir sediments were deposited within a complex of at least five stacked, northwest-striking barrier-island shorelines; environments of deposition include tidal inlets, submerged lobate tidal deltas above wave-base, sheltered back-barrier lagoons and barrier bars or barrier islands.

The Dunsmuir Member is of late Santonian age. Its contact with the underlying Cumberland Member is abrupt and locally erosional, with relief of up to 20 metres.

## **B. Trent River Formation (Clapp, 1912):**

The Trent River Formation consists of five members within the Tsolum River study area. From base to top they are the Puntledge, Browns, Royston, Oyster River and Willow Point Members.

### **B.1 Puntledge Member (Bickford and Kenyon, 1988):**

The Puntledge Member consists of dark grey to black siltstone, fine-grained sandstone and minor dark grey silty mudstone, containing an abundant fauna of ammonites, pelagic bivalves, saurians and amphibians.

Within the Tsolum River study area, the Puntledge Member is 19 to 30 metres thick. It thins to the north towards Campbell River, and thickens markedly to the south towards Courtenay. Thickness of the Puntledge Member is controlled by onlap upon the northwestward-thickening Dunsmuir Member. The Puntledge sediments were deposited in sheltered lagoons and bays, opening southwestwards into prodeltaic shelves.

The Puntledge Member is of late Santonian to early Campanian age. Its contact with the underlying Dunsmuir Member is abrupt.

### **B.2 Browns Member (Bickford and Kenyon, 1988):**

The Browns Member consists of very fine to medium-grained, light grey to greenish-grey sandstone with occasional interbeds of

sandy siltstone and minor thin coal beds. It contains a locally-abundant fauna of ammonites, bivalves and gastropods.

Within the Tsolum River study area, the Browns Member is 125 to 165 metres thick. It thins southeastward towards Courtenay, and thickens northwards towards Campbell River. Coals are rare at Oyster River, and become more frequent near Campbell River. The Browns sediments were deposited in delta-front of shelfal environments near Oyster River and Black Creek, passing northwards into a delta-top environment near Campbell River. The Browns paleodelta probably prograded to the south and southwest.

The Browns Member is of early Campanian age. Its contact with the underlying Puntledge Member is gradational by inter-tonguing.

### **B.3 Royston Member (Bickford and Kenyon, 1988):**

The Royston Member consists of dark grey to greenish-grey mudstone, siltstone and minor fine-grained sandstone. It contains abundant ammonites, bivalves, echinoderms and fish.

Within the Tsolum River study area, the Royston Member is 25 to 148 metres thick. It thins to the north and northeast, and thickens to the southeast. The Royston sediments were deposited on the slopes of a southward to southwestward-prograding delta, in submarine-fan, fan-channel and interfan environments.

The Royston Member is of early Campanian age. Its basal contact with the Browns Member is gradational by inter-tonguing.

### **B.4 Oyster River Member (Cathyl-Bickford, 1992):**

The Oyster River Member consists of grey to greenish-grey, fine-grained sandstone and siltstone with occasional pebbly stringers. It contains abundant pelagic bivalves and ammonites in its type area at Oyster River.

Within the Tsolum River study area, the Oyster River Member is 90 to 131 metres thick. It thins to the north and southeast; it cannot be recognized south of Black Creek, and it may be absent in this area. The Oyster River sediments were probably deposited in a relatively small, southwestward to southward-prograding delta. To the north near Campbell River, the Oyster River Member contains several thin coal beds, suggesting that deposition in a delta-top environment occurred in this area.

The Oyster River Member is of middle to late Campanian age. Its contact with the underlying Royston Member is gradational by inter-tonguing.

#### **B.5 Willow Point Member (Cathyl-Bickford, 1992):**

The Willow Point Member consists of dark grey mudstone and siltstone, with occasional thin, graded beds of sandstone and muddy limestone. It contains a sparse fauna of pelagic bivalves and ammonites.

Within the Tsolum River study area, the Willow Point Member is 32 to 45 metres thick, thickening southeastward to perhaps as much as 165 metres near Miracle Beach. The Willow Point sediments were deposited as part of a submarine-fan complex, probably including fanlevee and interfan environments.

The Willow Point Member is probably of Late Campanian age. Its contact with underlying units is abrupt, and may locally be erosional.

#### **C. Denman Formation (Williams, 1924):**

The Denman Formation consists of three members in its type locality on Denman Island. Only the basal Madigan Member has been recognized in the Tsolum River study area. The overlying Graham and Norman Point Members of the Denman Formation appear to be absent in the study area.

##### **C.1 Madigan Member (Cathyl-Bickford, 1992):**

The Madigan Member consists of medium to coarse-grained sandstone with occasional lenticular interbeds of siltstone and pebble-conglomerate. It is apparently unifossiliferous, apart from occasional trace-fossils at bed tops.

Within the Tsolum River study area, the Madigan Member is 47 to 50 metres thick. Lack of data precludes commentary on thickness trends. The Madigan sediments were probably deposited on offshore marine shelves below wave-base, possibly incorporating sand-wave complexes similar to those found in the modern North Sea shelf.

The Madigan Member is probably of Late Campanian age. its contact with the underlying Willow Point Member is gradational by inter-tonguing.

#### **D. Lambert Formation (Williams, 1924):**

The Lambert Formation consists of dark grey to black mudstone and siltstone with occasional thin interbeds of fine-grained sandstone and orange-weathering muddy limestone. It contains occasional pelagic bivalves and ammonites.

Within the Tsolum River study area, the Lambert Formation is at least 42 metres thick. Its top contact has not yet been determined by drilling, and indeed only subcrop to the east of the shoreline of Georgia Strait. The Lambert sediments were probably deposited in a distal submarine-fan or deep-basinal interfan environment.

The Lambert Formation is of Late Campanian to early Maastrichtian age. Its contact with the underlying Denman Formation is abrupt.

### **3.3 Drill Hole Stratigraphy**

The formation tops and coal seam roofs as identified by Cathyl-Bickford are summarized in Figure 4.

As can be seen the easternmost hole No. 94-01 started in the uppermost Lambert Formation and as the drilling moved west the lower formations were encountered along with the coal measures and basement rocks of the Karmutsen Formation.

The number 1 seam which has been identified as Y and is near the top of the Dunsmuir member of the Comox formation was numbered Y due to the fact that it is mainly carbonaceous shale and cannot be called an actual seam. The 2,3 and 4 seams are all located in the Cumberland member of the Comox formation.

As can be seen on Map No. 3, most of the surface outcrop of the Dunsmuir and Cumberland members is located just west of the Tsolum River property boundary.

Stratigraphic Tops  
 Canadian Occidental Petroleum  
 Tsolum River CO-series boreholes, 1994

FIGURE 4.

		CO-1	CO-2	CO-3	CO-4	CO-5	CO-6.
	Drift	5.0	27.0	18.8	5.5	17.4	22.5
11	Lambert Fm.	starts	.	.			
10	Denman Fm:	.	.	.			
	Madigan Mb.	47.7	.	.			
	Trent River Fm:						
9	Willow Point Mb.	85	8	.			
8	Oyster River Mb..	112.0	starts	.			
			fault @ 91.5				
7	Royston Mb.	243.1	91.5	.			
5	Browns Mb.	268.7	135.6	.			starts
			.				fault @ 75.5
4	Puntledge Mb.	393.2	279.5			starts	95.7
	Comox Fm.:	.	.				.
3	Dunsmuir Mb.:	DNR	300.5	.	starts	21.6	117.3
	M-marker		373.8	.	71.5	101.5	203.6
	Y roof		386.4	.	NP	NP	212.5
			fault @ 387.2				.
	N-marker		faulted out		78.3	119.4	214.5
	S-marker		388.6	starts	158.3	178.3	271.6
2	Cumberland Mb.:	DNR	33.5	216.3	219.4	324.0	
	2 roof		42.5	230.8	225.0	330.7	
	2A roof		49.2	NP	236.5	340.5	
	3 roof		60.0	NP	249.0	345.3	
	3A roof		64.6	NP	NP	352.0	
	4 roof		82.8	NP	NP	NP	
1	Benson Mb.		98.0	266.7	311.8	379.2	
	Karmutsen Fm.		DNR	274.2	DNR	DNR	

Preliminary: subject to revision following log/seismic correlation

C.G.Cathyl-Bickford  
 1994 May 9

Westwater Mining Ltd.  
 WR 10601/94

### 3.4 Coal Seams

The following are approximate thicknesses of the coal seam intervals in each of the drill holes. These intervals are total coal, shale rock and partings as obtained using lithologs, electrologs and core logs.

Hole 94-01  
no coal

Hole 94-02  
Y seam 386.4 - 387.2 = 0.8 m carbonaceous shale

Hole 94-03  
2 seam 42.5 - 45.8 = 3.3 m  
2A seam 49.2 - 31.0 = 1.8 m  
3 seam 60.0 - 63.3 = 3.3 m  
3A seam 64.6 - 65.4 = 0.8 m  
4 seam 82.8 - 84.2 = 1.4 m

Hole 94-04  
Y seam 24.2 - 124.7 = 0.5 m coal and shale  
2 seam 230.8 - 231.6 = 0.8 m carbonaceous shale

Hole 94-05  
Y seam 149.3 - 150.0 = 0.7 m  
2 seam 225.0 - 226.3 = 1.3 m  
2A seam 236.5 - 237.0 = 0.6 m  
3 seam 249.0 - 250.5 = 1.5 m  
3A seam not present  
4 seam not present

Hole 94-06  
Y seam 212.5 - 213.0 = 0.5 m carbonaceous shale  
2 seam 330.7 - 331.7 = 1.0 m  
2A seam 340.5 - 340.9 = 0.4 m  
3 seam 345.3 - 348.6 = 3.3 m coal and shale  
3A seam 352.0 - 353.4 = 1.4 m  
4 seam not present

From the drill hole data it can be seen that the Y or 1 seam is mainly carbonaceous shale in this area. On the section along the Iron River road

the No. 2 and No. 3 seams reach mineable thicknesses although there are thick shale and rock partings in the thicker seam intervals.

The No. 4 seam is in most cases nonexistent or at the most very thin.

Hole No. 4 which was the only hole drilled away from the Iron River road was located 4 miles south and in that particular area the seams thin and shale out.

The most prospective coal area found in this program is in the vicinity of the Oyster River and most likely to the north. There is of course the entire lower two thirds of the property open to exploration. As can be seen from the cross-sections B and C using old drill hole data there is excellent potential for finding the full suite of seams although which may or may not be of mineable thickness is unknown.

### 3.5 STRUCTURE

The 1993 the high resolution seismic program did identify many high angle east dipping faults which could also have been the result of thinning of reflecting horizons due to changes in depositional environment.

The only drill hole encountering faulting was 94-02 and this hole was drilled in an area defined as a fault area from the seismic information.

A major wrench fault with lateral and downward movement runs the length of the property along the westward edge (cross-sections and Map No. 3).

In general however the beds dip to the north east from the 1 O-I 5 dips encountered on the western edge to 0 - 3 over most of the remainder of the property.

A shallow synclinal feature has been identified by surface mapping in the N.E. portion of the property.

## 4 . 0 QUALITY

The Comox coals are generally blocky and hard, and have well developed cleat systems. The rank ranges from high volatile A bituminous to anthracite, with the higher ranks being confined to narrow belts, 1 - 3 kilometers wide, adjacent to Tertiary laccoliths. Mean random vitrinite reflectances of the Comox coals range from 0.59 to 0.99% throughout most of the coal field, and are as high as 3.21% near the laccoliths.

All of the coals have high vitinite contents which is consistent with their generally bright appearance in hand specimens.

### 4.1 **OUTCROP SAMPLE QUALITY**

During November of 1991 samples were obtained from outcrops just west of the Tsolum River property.

These sample locations are shown on the geologic map No. 3 and on the cross-sections, except sample T-001 which obtained from Quinsam's underground mine in the No. 4 seam (Quinsam's No. 1 seam).

From the float/sink tests done on the samples, a specific gravity of 1.4 was found to be optimal in producing a coal of less than 10% ash and less than 1% sulfur with heating values over 7,000 cal/gm and yields of about 70%. These were obtained from samples No. T-002 and T-003 of the No. 2 seam on the Oyster River. Positive seam identification was not possible and one sample may be from the No. 3 seam, or 2A seam.

The remaining samples T-004 to T-007 were obtained further south, to the west of the central and southern portions of the Tsolum River property where laccolithic intrusions of the Tertiary have altered and upgraded the coal seams.

The results of the quality analysis is found in Appendix D.

### 4.2 **DRILL CORE SAMPLE QUALITY**

During the 1994 drilling program an attempt was made to obtain core of the coal seams for quality analysis. The coring was undertaken blindly without the benefit of a pilot hole and without knowing the seam number or depth. Therefore, coring was attempted when coal was encountered in the cuttings and thus after much of the seam had been drilled through.

Attempts were made at coring three drill holes; 94-03, 94-04 and 94.05. Of these three holes only hole 94-03 had a modicum of success and two



samples numbered 940301 and 940302 were obtained. Sample 940301 was from the No. 2 seam and 940302 was from the 2A seam. (Core logs Appendix C and quality in Appendix D.)

Sample 940301 is the most representative of a possible mineable seam, the No. 2 seam. From the float/sink tests done on this sample a specific gravity of 1.45 was chosen to be optimal in producing a coal of less than 10% ash and 1% sulfur with a heating value over 7300 cal/gm and yields of 85%. The coal has an F.S.I. of 2 1/2.

Sample 940302 is poorer in quality and is more like the outcrop samples obtained in 1993. As a matter of interest this sample has an F.S.I. of 4.

## 5.0 RESERVES

Reserves were not calculated due to the lack of data over the eastern portions of the property. What is known is that there are possibly two mineable seams in the Oyster River area. These two seams, the 2 seam and 3 seam outcrop to the west of the property, are at approximately 200 meters depth along the western edge of the Tsolum River property and dip to a depth up to 600 meters on the eastern edge of the property as evidenced by the formations encountered in hole 94-01.

The southern portions of Tsolum River also had reserve potential as evidenced by old drill hole data incorporated into cross-sections B and C.

6.0 PROGRAM COSTS

The six hole drilling program completed a total of 1,945 meters of drilling for a total cost of \$151,622.39. The following is a summarized breakdown of costs which also include G.S.T.

Drilling

mobilization/demobilization	\$8,000.00	
319 feet cased hole @ 22.00/ft	\$7,177.50	
2475 feet open hole at 9.00/ft	\$22,275.00	
1497 feet open hole at 11.00/ft	\$16,467.00	
1260 feet open hole at 13.00/ft	\$16,380.00	
760 feet open hole at 14.00/ft	\$10,640.00	
fuel	\$7,975.00	
72.0 rig hours at 200.00/hr	\$14,400.00	
6.0 standby hrs at 120.00/hr	\$720.00	
room and board	\$5250.00	
consumables	\$5180.00	
supervision	\$4,333.25	
	Tax	
	\$8,315.84	
	Total	\$127,113.59

Electrologging

mobilization/demobilization	\$950.00	
standby rate @ 350.00/day	\$4,200.00	
logging rate @ 675.00/day	\$4,050.00	
room and board at \$1 00.00/day	\$1,800.00	
file conversion	\$280.00	
	Tax	
	\$1,393.35	
	Total	\$12,673.35

Core Supplies

bags, ties, etc.	\$195.07	
core boxes	\$500.00	
	Total	\$695.07

Road Rental

Total	\$1,300.00
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Quality Analysis

Total	\$2,553.57
-------	------------

Surveying

Total	\$2,803.40
-------	------------

Cementing

Total	\$1,749.46
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Site Preparation/Reclamation

Total	\$2,733.95
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All Costs Total	\$151,622.39
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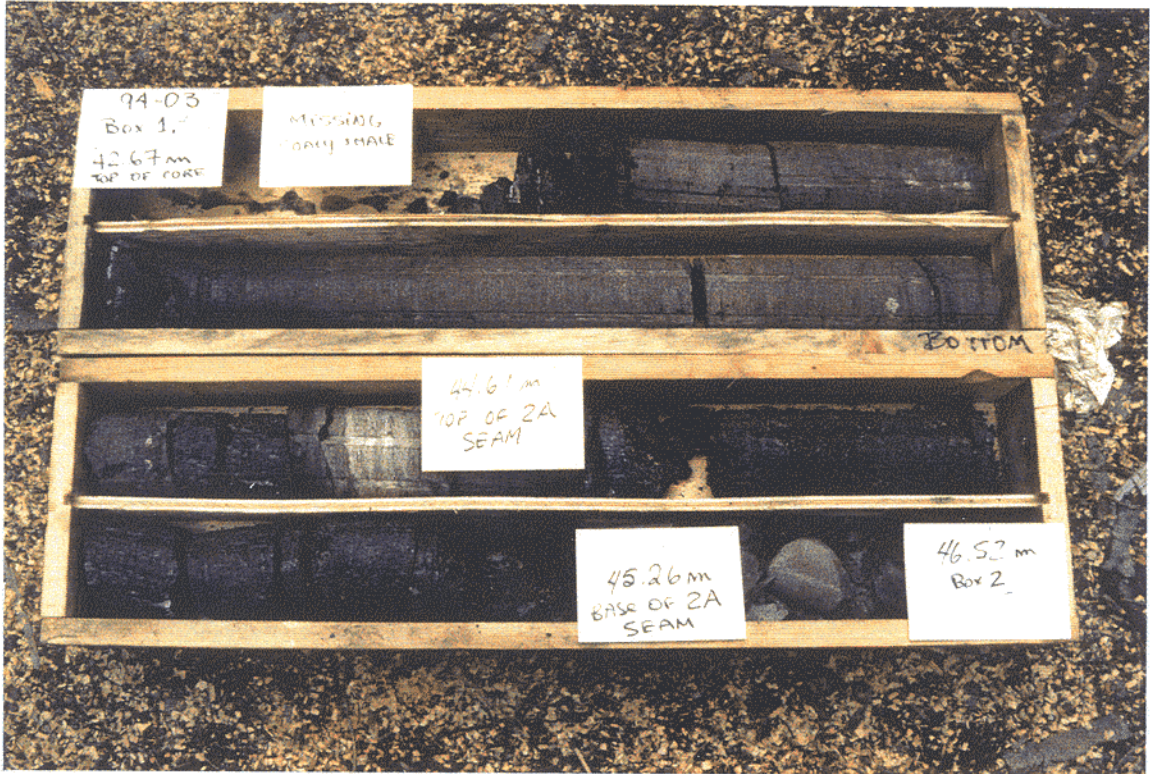
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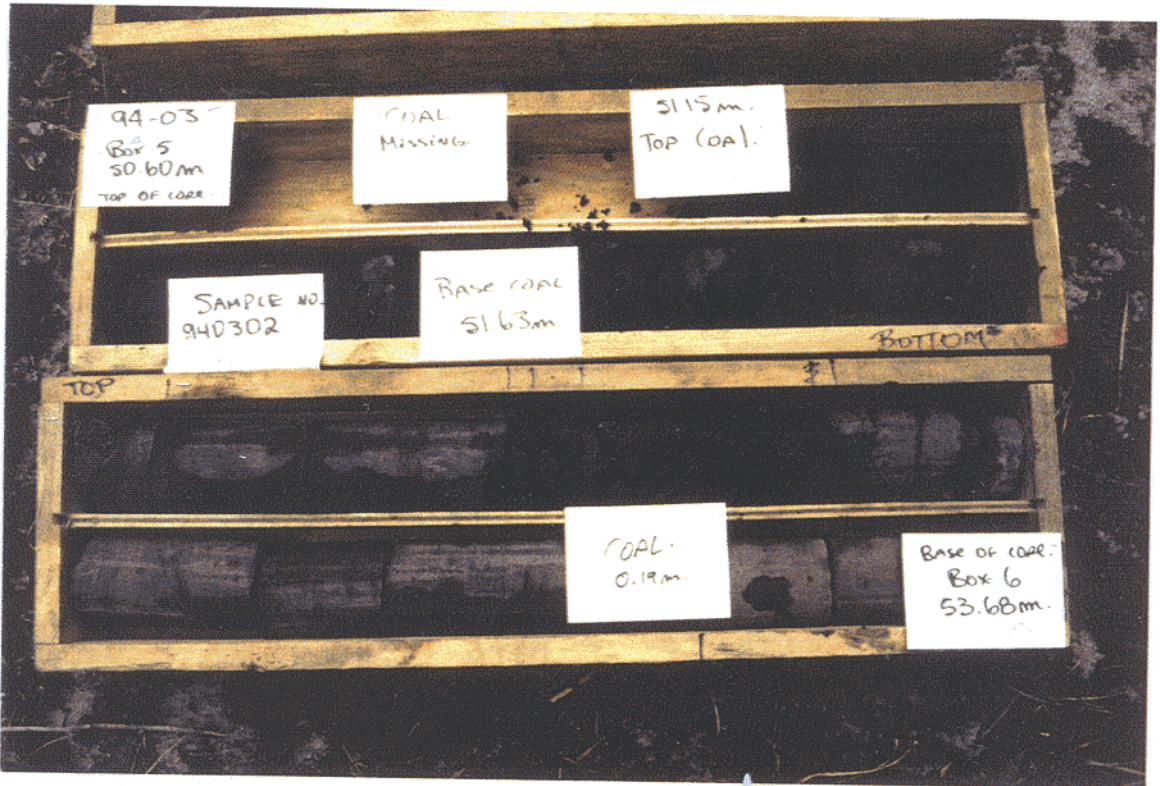


Coal Exploration Hole 9403. Core Run One



94-03 Core Run Two



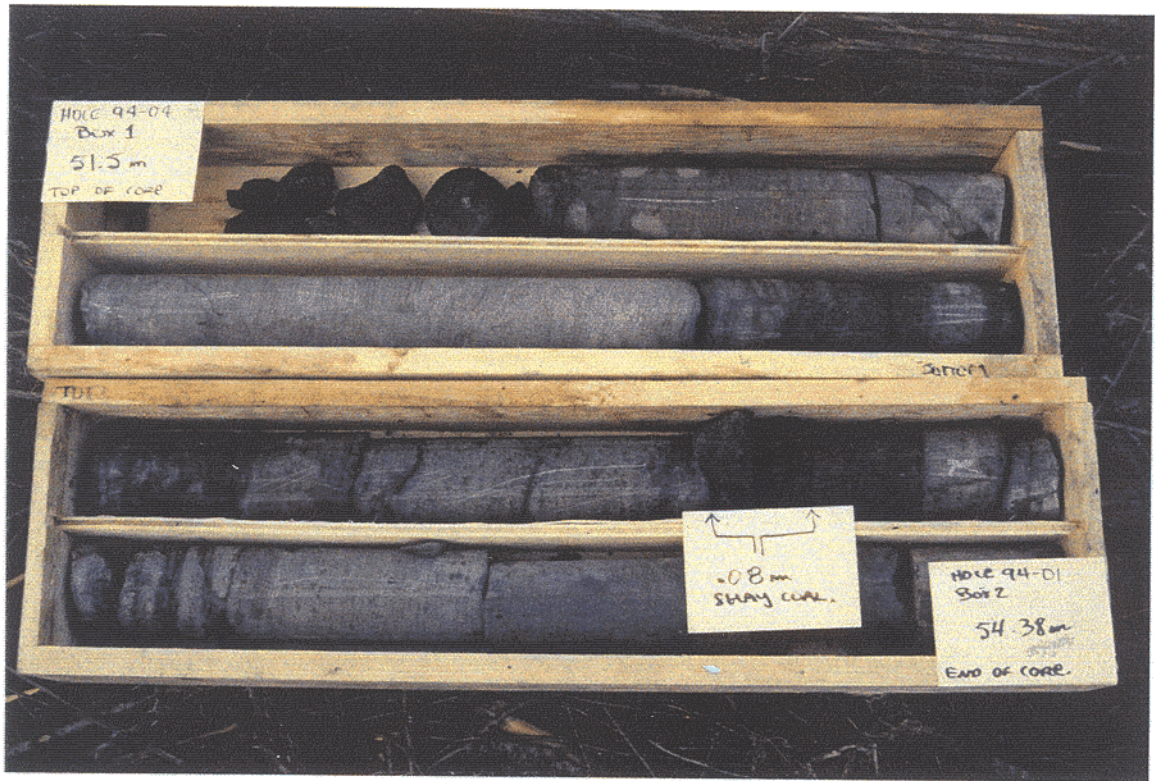


94-03 Core Run Three



Entire 10 foot Core Run In Split Tube Core Barrel





94-04 Core Run One



94-04 Core Run Two





94-04 Core Run Three



Drilling Crew at Hole 94-05

Litholog  
Hole No. 94-01

Interval (feet)				Description
From		To	Footage	
<b>0</b>	-	<b>2.0</b>	<b>2.0</b>	<b>Roadfill</b>
<b>2.0</b>	-	<b>6.0</b>	<b>4.0</b>	<b>Gravel and sand</b>
6.0	-	9.0	3.0	Clay, yellow
9.0	-	12.0	3.0	Sand, yellow
12.0	-	14.0	2.0	Sand, grey with water
14.0	-	35.0	21.0	Sandstone, fine grained and moist
35.0	-	100.0	65.0	Siltstone with shale stringers
100.0	-	135.0	35.0	Sandstone, fine grained
135.0	-	175.0	40.0	Siltstone, dark grey
175.0	-	181.0	6.0	Sandstone, fine grained
181.0	-	197.0	16.0	Sandstone, coarse, salt & pepper texture
197.0	-	240.0	43.0	Sandstone, fine grained
240.0	-	316.0	76.0	Siltstone
316.0	-	337.0	21.0	Sandstone, fine grained
337.0	-	400.0	63.0	Siltstone, shaly
400.0	-	546.0	146.0	Sandstone, fine grained with siltstone stringers
546.0	-	550.0	4.0	Sandstone, salt and pepper
550.0	-	597.0	47.0	Sandstone, fine grained
597.0	-	627.0	30.0	Siltstone
627.0	-	635.0	8.0	Sandstone, salt and pepper
635.0	-	730.0	95.0	Sandstone, fine grained
730.0	-	795.0	65.0	Conglomerate, coarse and pebbly, loosely cemented
795.0	-	827.0	33.0	Sandstone, fine grained
827.0	-	<b>835.0</b>	<b>8.0</b>	<b>Sandstone, medium grained</b>
<b>835.0</b>	-	<b>871.0</b>	<b>36.0</b>	<b>Sandstone, fine grained</b>
<b>871.0</b>	-	<b>915.0</b>	<b>44.0</b>	<b>Shale, silty</b>
915.0	-	<b>1400.0</b>	<b>485.0</b>	<b>Sandstone, fine grained with a siltstone stringer</b>

T.D. 1400 feet

Litholog  
Hole No. 94-02

Interval (feet)				Description
From		To	Footage	
0.0	-	3.0	3.0	Gravel
3.0	-	12.0	9.0	Sand and gravel
12.0	-	30.0	18.0	Till
30.0	-	76.0	46.0	Clay, grey
76.0	-	86.0	10.0	Siltstone, green and fractured
86.0	-	157.0	71.0	Sandstone, fine grained
157.0	-	1443.0	286.0	Sandstone, dark and fine grained
443.0	-	450.0	17.0	Siltstone
450.0	-	473.0	23.0	Sandstone, salt and pepper
473.0	-	558.0	85.0	Sandstone, fine grained
558.0	-	610.0	52.0	Sandstone, salt and pepper texture
610.0	-	650.0	40.0	Sandstone, fine grained
650.0	-	760.0	210.0	Sandstone, medium grained
760.0	-	907.0	147.0	Sandstone, fine grained
907.0	-	960.0	53.0	Sandstone, medium grained
960.0	-	1265.0	305.0	Sandstone, salt and pepper
1265.0	-	1271.0	6.0	Siltstone, with calcite trace
1271.0	-	1274.0	3.0	Coal, shaly with pyrite
1274.0	-	1285.0	11.0	Conglomerate, coarse and salt and pepper
1285.0	-	1350.0	65.0	Sandstone, white and coarse
1350.0	-	1400.0	50.0	Conglomerate, greenish grey

T.D. 1400 feet

Litholog  
Hole No. 94-03

Interval (feet)				Description
From		To	Footage	
0	-	16.0	16.0	Boulders
16.0	-	38.0	22.0	Gravel and boulders, yellow
38.0	-	46.0	8.0	Gravel, grey
46.0	-	62.0	16.0	Till, grey
62.0	-	84.0	22.0	Sandstone, fine grained
84.0	-	86.0	2.0	Siltstone
86.0	-	101.0	15.0	Sandstone, fine grained
101.0	-	106.0	5.0	Shale
106.0	-	112.0	6.0	Sandstone, fine grained
112.0	-	114.0	2.0	Shale carbonaceous
114.0	-	128.0	12.0	Siltstone
128.0	-	138.0	10.0	Sandstone, medium grained
138.0	-	140.0	2.0	<u>COAL</u> , shaly
140.0	-	159.0	19.0	Cored interval (see core logs)
159.0	-	164.0	5.0	Siltstone
164.0	-	166.0	2.0	<u>COAL</u>
166.0	-	176.0	10.0	Cored Interval (see core logs)
176.0	-	200.0	24.0	Shale
200.0	-	202.0	2.0	<u>COAL</u>
202.0	-	204.0	2.0	Shale
204.0	-	205.0	1.0	<u>COAL</u>
205.0	-	213.0	8.0	Shale
213.0	-	214.0	1.0	<u>COAL</u>
214.0	-	217.0	3.0	Shale
217.0	-	218.0	1.0	<u>COAL</u>
218.0	-	243.0	25.0	Shale
243.0	-	245.0	2.0	Sandstone, fine grained
245.0	-	252.0	7.0	Shale, carbonaceous
252.0	-	253.0	1.0	<u>COAL</u>
253.0	-	260.0	7.0	Shale
260.0	-	261.0	1.0	<u>COAL</u>
261.0	-	270.0	9.0	Shale
270.0	-	276.0	6.0	Sandstone, fine grained
276.0	-	277.0	1.0	Shale
277.0	-	278.0	1.0	<u>COAL</u>
278.0	-	279.0	1.0	shale
279.0	-	281.0	2.0	Sandstone, fine grained

Interval (feet)				Description
From		To	Footage	
281.0	-	290.0	9.0	Shale
290.0		292.0	2.0	Siltstone
292.0		310.0	18.0	Shale
310.0		325.0	15.0	White volcanic ash, soft crumbly
325.0		339.0	14.0	Volcanic, green
339.0		360.0	21.0	Volcanic, grey

T.D. 360 feet



Litholog  
Hole No. 94-04

Interval (feet)				
From		To	Footage	Description
0	-	18.0	18.0	Gravel and boulders
18.0	-	170.0	152.0	Sandstone, medium grained light grey
170.0	-	180.0	10.0	Cored interval (see core logs)
180.0	-	204.0	24.0	Sandstone, some grained with traces of bentonite
204.0	-	275.0	71.0	Conglomerate, water at 100 gallons per minute
275.0	-	278.0	3.0	Shale, brown and carbonaceous with <u>COAL</u> lenses
278.0	-	288.0	10.0	Sandstone, fine grained
288.0	-	290.0	2.0	Shale, carbonaceous with <u>COAL</u> lenses
290.0	-	300.0	10.0	Cored Interval (see core logs)
300.0	-	314.0	14.0	Siltstone, grey
314.0	-	322.0	8.0	Shale, carbonaceous with <u>COAL</u> traces
322.0	-	332.0	10.0	Cored interval (see core logs)
332.0	-	345.0	13.0	Shale, with <u>COAL</u> lenses
345.0	-	354.0	9.0	Sandstone, fine grained brown
354.0	-	384.0	30.0	Siltstone, dark grey
384.0	-	410.0	26.0	Sandstone, light grey
410.0	-	411.0	1.0	<u>COAL</u>
411.0	-	440.0	29.0	Shale, silty with <u>COAL</u> traces
440.0	-	500.0	60.0	Sandstone, fine grained and dark
500.0	-	503.0	3.0	Shale with <u>COAL</u> lenses
503.0	-	520.0	17.0	Siltstone, brown
520.0	-	550.0	30.0	Sandstone, white medium grained
550.0	-	554.0	4.0	Shale
554.0	-	600.0	46.0	Sandstone, white and coarse
600.0	-	602.0	2.0	<u>COAL</u> and shale
602.0	-	625.0	23.0	Siltstone, grey
625.0	-	640.0	15.0	Sandstone, grey and coarse grained
640.0	-	650.0	10.0	Siltstone, grey
650.0	-	661.0	11.0	Conglomerate, white and green
661.0	-	663.0	2.0	Shale with <u>COAL</u> traces
663.0	-	691.0	28.0	Siltstone, grey
691.0	-	747.0	56.0	Sandstone, fine grained
747.0	-	756.0	9.0	Siltstone
756.0	-	758.0	2.0	Shale, carbonaceous
758.0	-	764.0	6.0	Siltstone
764.0	-	777.0	13.0	Shale, carbonaceous with <u>COAL</u> stringers
777.0	-	783.0	6.0	Siltstone

783.0	-	808.0	25.0	Siltstone, fine grained
808.0	-	813.0	5.0	Shale with <u>COAL</u> stringers
813.0	-	885.0	72.0	Sandstone, fine grained
885.0	-	895.0	10.0	Conglomerate
895.0	-	920.0	25.0	Volcanics, green

T.D. 920 feet

Litholog  
Hole No. 94-05

Interval. (feet)				Description
From		To	Footage	
0	-	40.0	40.0	Gravel and boulders
40.0	-	57.0	17.0	Till
57.0	-	61.0	4.0	Sandstone, fine grained
61.0	-	91.0	30.0	Siltstone
91.0	-	125.0	34.0	Sandstone, salt and pepper, 1.0 gallon per minute water
125.0	-	129.0	4.0	Shale
129.0	-	134.0	5.0	Siltstone
134.0	-	151.0	17.0	Sandstone, salt and pepper
151.0	-	157.0	6.0	Shale
157.0	-	158.0	1.0	Siltstone
158.0	-	163.0	5.0	Sandstone, fine grained
163.0	-	166.0	3.0	Conglomerate
166.0	-	188.0	22.0	Sandstone, salt and pepper
188.0	-	191.0	3.0	Shale
191.0	-	192.0	1.0	Siltstone
192.0	-	195.0	3.0	Sandstone, fine grained
195.0	-	203.0	8.0	Sandstone, coarse, brown
203.0	-	256.0	53.0	Sandstone, course, salt and pepper
256.0	-	257.0	1.0	<u>COAL</u> , shaly
257.0	-	282.0	25.0	Siltstone
282.0	-	286.0	4.0	Sandstone, fine grained
286.0	-	294.0	8.0	Shale, carbonaceous
294.0	-	297.0	3.0	Siltstone
297.0	-	344.0	47.0	Sandstone, fine grained
344.0	-	345.0	1.0	Shale, with <u>COAL</u> traces
345.0	-	470.0	25.0	Sandstone, fine grained & siltstone
470.0	-	473.0	3.0	Shale
473.0	-	487.0	14.0	Siltstone
487.0	-	489.0	2.0	<u>COAL</u> , and shale
489.0	-	492.0	3.0	Shale
492.0	-	493.0	1.0	<u>COAL</u>
493.0	-	503.0	10.0	Cored interval (see core log)
503.0	-	508.0	5.0	Sandstone, fine grained with ben?
508.0	-	570.0	62.0	Siltstone
570.0	-	577.0	7.0	Volcanics, red (conglomerate ?)
577.0	-	581.0	4.0	Volcanics, green (conglomerate ?)



581.0	-	710.0	29.0	Conglomerate
710.0	-	730.0	20.0	Shale
730.0	-	742.0	12.0	Siltstone
742.0	-	745.0	3.0	<u>COAL</u>
745.0	-	824.0	79.0	Siltstone with fine grained sandstone bands
824.0	-	825.0	1.0	Shale
825.0	-	828.0	3.0	<u>COAL</u>
828.0	-	835.0	7.0	Siltstone
835.0	-	841.0	6.0	Sandstone, fine grained
841.0	-	856.0	15.0	Siltstone
856.0	-	877.0	21.0	Conglomerate
877.0	-	892.0	15.0	Sandstone, fine grained
892.0	-	934.0	42.0	Sandstone, coarse to conglomerate
934.0	-	957.0	23.0	Sandstone, medium grained and dark
957.0	-	970.0	33.0	Conglomerate
970.0	-	980.0	10.0	Sandstone, medium dark
980.0	-	1001.0	21.0	Conglomerate
1001.0	-	1005.0	4.0	Siltstone, shaly
1005.0	-	1010.0	5.0	COAL. shaly
1010.0	-	1014.0	4.0	Siltstone
1014.0	-	1017.0	3.0	Sandstone
1017.0	-	1040.0	23.0	Volcanics, green

T.D. 1040 feet

Litholog  
Hole No. 94-06

Interval (feet)			Footage	Description
From	To			
0	-	35.0	35.0	Gravel and boulders
35.0	-	50.0	15.0	Clay, grey
50.0	-	74.0	24.0	Till and boulders
74.0	-	127.0	53.0	Sandstone, fine grained and moist
127.0	-	159.0	32.0	Sandstone, medium grained
159.0	-	161.0	2.0	Shale, Carbonaceous
161.0	-	180.0	19.0	Sandstone, fine grained
180.0	-	181.0	1.0	Shale
181.0	-	192.0	11.0	Siltstone
192.0	-	201.0	9.0	Sandstone, fine grained
201.0	-	211.0	10.0	Siltstone
211.0	-	215.0	4.0	Sandstone, fine grained
215.0	-	216.0	1.0	Shale
216.0	-	250.0	34.0	Sandstone, fine grained
250.0	-	290.0	40.0	Sandstone, coarse, salt & pepper texture
290.0	-	325.0	35.0	Conglomerate
325.0	-	353.0	28.0	Siltstone
353.0	-	357.0	4.0	Shale, carbonaceous with <u>COAL</u> traces
357.0	-	359.0	2.0	Siltstone
359.0	-	396.0	37.0	Sandstone, fine grained
396.0	-	444.0	48.0	Conglomerate
444.0	-	461.0	17.0	Siltstone
461.0	-	510.0	49.0	Conglomerate
510.0	-	599.0	89.0	Sandstone, salt & pepper
599.0	-	627.0	28.0	Sandstone, fine grained
627.0	-	660.0	33.0	Sandstone, medium grey
660.0	-	667.0	7.0	Sandstone, coarse, white
667.0	-	671.0	4.0	Sandstone, brown
671.0	-	680.0	9.0	Sandstone, fine grained, brown
680.0	-	710.0	30.0	Shale, carbonaceous with benstonite traces
710.0	-	740.0	30.0	Sandstone, salt & pepper
740.0	-	803.0	63.0	Conglomerate
803.0	-	920.0	117.0	Sandstone, fine grained with siltstone layers
920.0	-	957.0	37.0	Conglomerate
957.0	-	990.0	33.0	Sandstone, medium grained to conglomerate
990.0	-	1005.0	15.0	Volcanics? (conglomerate ?)
1005.0	-	1070.0	65.0	Conglomerate

1070.0	-	1085.0	15.0	Siltstone
1085.0	-	1089.0	4.0	COAL and shale
1089.0	-	1091.0	2.0	Siltstone
1091.0	-	1093.0	2.0	COAL
1093.0	-	1135.0	42.0	Siltstone to fine grained sandstone
1135.0	-	1143.0	8.0	COAL
1143.0	-	1150.0	7.0	Siltstone to fine grained sandstone
1150.0	-	1160.0	10.0	Shale
1160.0	-	1163.0	3.0	COAL
1163.0	-	1168.0	5.0	Shale, silty
1168.0	-	1177.0	9.0	Sandstone, medium grained, dark grey
1177.0	-	1189.0	12.0	Siltstone
1189.0	-	1192.0	3.0	COAL
1192.0	-	1218.0	26.0	Siltstone
1218.0	-	1245.0	27.0	Volcanics, red
1245.0	-	1260.0	15.0	Volcanics, green

T.D. 1260 feet

Dip at 10° Recovery 95%

Core No.	Interval (From) Meters	Interval (To) Meters	Sample No.	Composite No.	Description	Interval Thickness Meters
Run 1 Box 1	42.67	43.01			Missing coaly shale as below	0.34
Run 1 Box 1	43.01	43.08			Coaly shale. Small 2mm bright coal bands in hard shale. Calcite along cleating. Medium black to black.	0.07
Run 1 Box 1	43.08	43.43			Dark Grey to black siltstone with many carbonaceous plant inclusions throughout.	0.35
Run 1 Box 1	43.43	43.44			Coaly band black shiny and Calcite on joints	0.01
Run 1 Box 1 & 2	43.44	44.28			Hard dark grey siltstone with Carbonaceous inclusions up to .01 cm near base and Carbonaceous plant material throughout.	0.84
Run 1 Box 2	44.28	44.36			Coal: bright hard blocky, black with Pyrite on joints & cleats.	0.08
Run 1 Box 2	44.36	44.61			Siltstone: dark brown at top going to dark grey black at base.	0.25
Run 1 Box 2	44.61	45.26		940301	Coal: somewhat shaly, blocky black - minor pyrite on cleats. 2A seam or 2 rider.	0.65
Run 1 Box 2	45.26	45.75			Siltstone: hard medium grey, very minor Carbonaceous material	0.49
Run 2 Box 3 & 4	45.75	48.83			Shale - silty throughout although more at top. Thin Carbonaceous bands occur every 0.10 meters and one or two are 0.01 m thick.	3.08
82% Recovery Drilled - no core						
Run 3 Box 5	50.60	51.15			Missing. Coal as below	0.55
Run 3 Box 5	51.15	51.63		940302	Coal: Bright quite friable at top. Pyrite on cleats. One 0.04 m parting of shale near top.	0.48

Core No.	Interval (From) Meters	Interval (To) Meters	Sample No.	Composite No.	Description	Interval Thickness Meters
Run 3 Box 5	51.63	51.78			Light brown grey Bentonite with Carbonaceous shale parting at top & 0.03 m coal at base.	0.15
Run 3 Box 5 & 6	51.78	52.22			Carbonaceous shale, black hard lots of Coaly material	0.44
Run 3 Box 6	52.22	52.49			Siltstone med. grey hard	0.27
Run 3 Box 6	52.49	52.51			coal stringer	0.02
Run 3 Box 6	52.51	52.54			mudstone - brown to grey	0.03
Run 3 Box 6	52.54	52.73			Coal - bright hard breaks crumbly. Has Calcitic veining.	0.19
Run 3 Box 6	52.73	53.38			Siltstone. Med. grained grey in color	0.65
Run 3 Box 6	53.38	53.68			Fine grained med. grey sandstone	0.30

Beds flat lying 0 - 5° Box 1 recovery 98%

Core No.	Interval (From) Meters	Interval (To) Meters	Sample No.	Composite No.	Description	Interval Thickness Meters
Run 1 Box 1	51.5	51.87			Carbonaceous shale and minor coaly shale. Much of sample is missing	0.32
Run 1 Box 1	51.87	52.27			Dark brownish grey fine grained sandstone with Carbonaceous inclusions	0.40
Run 1 Box 1	52.27	52.78			Salt and pepper fine grained sandstone	0.51
Run 1 Box 1 & 2	52.78	53.34			Medium brown medium hard siltstone with coaly and carbonaceous stringers.	0.76
Run 1 Box 2	53.34	53.42			Shaly coal. Blocky fairly hard.	0.08
Run 1 Box 2	53.42	53.50			Carbonaceous shaley moderately silty mudstone. Dark brown to black	0.08
Run 1 Box 2	53.5	54.38			Medium grey silty medium hard mudstone	0.88

Core recovery 100% Drilled - no core taken

Core No.	Interval (From) Meters	Interval (To) Meters	Sample No.	Composite No.	Description	Interval Thickness Meters
Run 2 Box 3	88.39	88.46			Shaly coal. Brown streak, very hard - black.	0.07
Run 2 Box 3	88.46	88.62			Carbonaceous siltstone black, medium hard. Minor 1 mm carbonate bands	0.16
Run 2 Box 3	88.62	89.59			Medium grey brown silty mudstone with carbonaceous coaly bands of 1 mm. Core splits on bands	0.97
Run 2 Box 3 & 4	89.59	90.09			Siltstone, light grey very very minor carbonaceous bands.	0.50

Core No.	Interval (From) Meters	Interval (To) Meters	Sample No.	Composite No.	Description	Interval Thickness Meters
Run 2 Box 4	90.09	91.45			Medium grey to brown silty mudstone. Carbonaceous and coaly inclusions throughout. Medium hard.	1.36
Recovery 100%	Drilled - no	core taken				
Run 3 Box 5	98.15	98.17			Coaly shale. Poor coal. black hard.	0.02
Run 3 Box 5 & 6	98.15	101.19			Med. grey fine grained Sst with Carbonaceous inclusions hard.	3.04





**ANALYTICAL RESULTS -VANCOUVER ISLAND OUTCROP SAMPLES  
DECEMBER 1992**

CDNOXY SAMPLE NO.	OUTCROP LOCATION	COAL SEAM NO. COMOX SYSTEM	COAL SEAM NO. QUINSAM SYSTEM	LAB SAMPLE NO.	RAW COAL								CLEAN COAL COMPOSITE ANALYSIS														
					A.D.M. %	MOIST %	ASH %	VOL %	F.C. %	S %	CV CAL/GM	CI %	H.G.I.	F.S.I.	BASIS	MOIST %	ASH %	VOL %	F.C. %	S %	CV CAL/GM	F.S.I.	H.G.I.	S.G.	% YIELD		
T-001	QUINSAM U/G MINE	NO. 4 SEAM	NO. 1 SEAM	11948	SAMPLE IS COARSE COAL FRACTION FROM QUINSAM PREPARATION PLANT												1.80	16.60	35.40	46.40	0.58	6318	1-1.5	48	1.40	807	
					5.93	15.87	33.84	44.38	0.54	6040																	
					16.87	35.98	47.15	0.57	8421																		
T-002	OYSTER RIVER	NO. 2 RIDER SEAM	NO. 2 RIDER SEAM	11947	4.90	0.70	15.70	34.80	48.80	0.38	6370	0.85	—	2	adb	1.50	5.80	35.90	56.80	0.39	7204	3	45	1.40	72.5		
						5.57	14.93	33.09	48.41	0.34	6058	0.81			arb												
						15.81	35.05	49.14	0.36	6415	0.86			db	5.89	38.45	57.66	0.40	7314								
T-003	OYSTER RIVER	NO. 2 SEAM	NO. 2 SEAM	11948	5.80	1.10	14.30	33.60	51.00	0.75	6700	0.113	—	1.5	adb	1.20	8.00	34.20	55.70	0.67	7185	2	45	1.40	68.2		
						6.84	13.47	31.65	48.04	0.71	6311	0.106			arb												
						14.46	33.97	51.57	0.78	6775	0.114			db	9.01	34.62	58.38	0.68	7272								
T-004	MUREX CREEK	NO. 2 SEAM	NO. 2 SEAM	11948	5.30	0.20	18.10	9.10	72.60	4.09	6776	0.047	—	0	adb	0.30	5.60	9.00	85.10	1.68	8025	0	49	1.40	11.8		
						5.49	17.14	8.62	69.75	3.87	6417	0.045			arb												
						18.14	9.12	72.75	4.10	6780	0.047			db	5.82	9.03	85.36	1.68	8049								
T-005	DOVE CREEK	NO. 1 LOWER PART OF SEAM	NO. 3 SEAM	11950	3.30	0.20	18.60	24.20	57.00	2.90	6696	0.061	—	5.5	adb	0.20	10.60	25.00	64.20	2.73	7833	8.5	71	1.40	50.5		
						3.49	17.99	23.40	55.12	2.80	6475	0.059			arb												
						18.64	24.25	57.11	2.91	6709	0.061			db	10.62	25.05	64.33	2.74	7648								
T-006	DOVE CREEK	NO. 1 UPPER PART OF SEAM	NO. 3 SEAM	11951	3.30	0.20	14.30	25.20	60.30	2.96	7162	0.063	—	9	adb	0.30	6.10	28.30	67.30	2.22	8065	9+	83	1.40	69.6		
						3.49	13.83	24.37	58.31	2.86	6926	0.061			arb												
						14.33	25.25	60.42	2.97	7176	0.063			db	6.12	28.38	67.50	2.23	8089								
T-007	BROWNS RIVER	NO. 1 SEAM	NO. 3 SEAM	11952	5.10	0.30	9.50	25.40	64.80	2.91	7626	0.077	—	6	adb	0.70	7.10	25.80	66.40	2.07	7843	7	75	1.40	86.4		
						5.38	9.02	24.10	61.50	2.76	7237	0.073			arb												
						9.53	25.48	64.99	2.92	7649	0.077			db	7.15	25.98	66.87	2.08	7898								

NOTE: - Seam numbering is approximate except for T-001  
- Float sink analysis is included separate

**ANALYTICAL RESULTS-VANCOUVER ISLAND OUTCROP SAMPLES  
DECEMBER 1992**

CDNOXY SAMPLE NO	OUTCROP LOCATION	COAL SEAM NO. COMOX SYSTEM	COAL SEAM NO. QUINSAM SYSTEM	LAB SAMPLE NO.	ASH FUSION TEMPERATURES (degrees F.)								MINERAL ANALYSIS OF ASH										
					OXIDIZING				REDUCING				SiO <sub>2</sub>	AL <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	CaO	MgO	Na <sub>2</sub> O	K <sub>2</sub> O	P <sub>2</sub> O <sub>5</sub>	SO <sub>3</sub>	UNDET
					IDT	ST	HT	FT	IDT	ST	HT	FT											
T-001	QUINSAM U/G MINE	NO. 4 SEAM	NO. 1 SEAM	11948	2820	2845	2860	2790	2570	2615	2625	2760	40.94	33.01	1.59	3.30	18.23	0.23	0.08	0.07	0.45	4.40	0.30
T-002	OYSTER RIVER	NO. 2 RIDER SEAM	NO. 2 RIDER SEAM	11947	2190	2210	2230	2245	2080	2120	2125	2140	33.58	15.91	0.71	8.92	23.68	5.32	0.13	0.17	0.16	10.74	-0.70
T-003	OYSTER RIVER	NO. 2 SEAM	NO. 2 SEAM	11948	2750	2800+	—	—	2585	2790	2800+	—	48.92	32.50	2.11	3.57	53.2	1.24	0.18	0.37	0.55	4.05	-1.21
T-004	MUREX CREEK	NO. 2 SEAM	NO. 2 SEAM	11949	2410	2485	2470	2580	2155	2280	2340	2430	32.21	25.81	2.42	22.25	9.35	0.33	0.05	0.08	0.28	7.07	-0.17
T-005	DOVE CREEK	NO. 1 LOWER PART OF SEAM	NO. 3 SEAM	11950	2420	2485	2530	2655	2200	2280	2320	2610	37.73	25.66	0.99	15.96	9.40	0.38	0.23	1.14	0.18	9.12	0.77
T-006	DOVE CREEK	NO. 1 UPPER PART OF SEAM	NO. 3 SEAM	11951	2280	2315	2330	2405	1915	1980	2000	2090	24.68	13.88	0.67	26.31	16.62	1.82	0.09	0.60	0.35	14.71	-0.17
T-007	BROWNS RIVER	NO. 1 SEAM	NO. 3 SEAM	11952	2280	2370	2425	2550	2130	2200	2310	2530	21.58	28.32	1.38	23.39	10.58	4.21	0.15	0.42	6.92	4.25	-0.82

NOTE: -- Seam numbering is approximate except for T-001  
-- Float sink analysis is included separate

CLIENT: CANADIAN OCCIDENTAL PETROLEUM LTD.  
 PROJECT: SEVEN SAMPLES, T-001 TO T-007, RECEIVED DECEMBER 11, 1991  
 LAB NO: 11946HR - 11952HR  
 DATE: DECEMBER 13, 1991

ANALYSIS OF COAL, air dried asis

LAB NO: SAMPLE ID:	ADMX	MOISTX	ASH%	VOLX	F.C.X	SZ	CV CAL/GM	CI%	H. 6. 1.	F. S. I.	BASIS
11946HR T-001	4.40	1.60	16.60	35.40	46.40	.56	6318	--	48	1-112	adb
		5.93	15.87	33.84	44.36	.54	6040				arb
			16.87	35.98	47.15	.57	6421				db
11947HR T-002	4.90	.70	15.70	34.80	48.80	.36	6370	.085	--	2	adb
		5.57	14.93	33.09	46.41	.34	6058	.081			arb
			15.81	35.05	49.14	.36	6415	.086			db
11948HR T-003	5.80	1.10	14.30	33.60	51.00	.75	6700	.113	--	1-112	adb
		6.84	13.47	31.65	48.04	.71	6311	.106			arb
			14.46	33.97	51.57	.76	6775	.114			db
11949HR T-004	5.30	.20	18.10	9.10	72.60	4.09	6776	.047	--	0	adb
		5.49	17.14	8.62	68.75	3.87	6417	.045			arb
			18.14	9.12	72.75	4.10	6790	.047			db
11950HR T-005	3.30	.20	18.60	24.20	57.00	2.90	6696	.061	--	5-1/2	adb
		3.49	17.99	23.40	55.12	2.80	6475	.059			arb
			18.64	24.25	57.11	2.91	6709	.061			db
11951HR T-006	3.30	.20	14.30	25.20	60.30	2.96	7162	.063	--	9	adb
		3.49	13.83	24.37	58.31	2.86	6926	.061			arb
			14.33	25.25	60.42	2.97	7176	.063			db
11952HR T-007	5.10	.30	9.50	25.40	64.80	2.91	7626	.077	--	6	adb
		5.38	9.02	24.10	61.50	2.76	7237	.073			arb
			9.53	25.48	64.99	2.92	7649	.077			db

CLIENT: CANADIAN OCCIDENTAL PETROLEUM LTD.  
 PROJECT: SEVEN SAMPLES, T-001 TO T-007, RECEIVED DECEMBER 11, 1991  
 LAB NO: 11947-11952  
 DATE: DECEMBER 13, 1991

LAB NO: 11947  
 SAMPLE ID: T-002

FLOAT-SINK ANALYSIS

S. G. FRACTIONS	WT%	ASH%	CUMULATIVE	
			WT%	ASH%
-1.40	72.50	5.80	72.50	5.80
1.40 - 1.50	7.90	15.30	80.40	6.73
1.50 - 1.60	2.30	22.10	82.70	7.16
+1.60	17.30	53.00	100.00	15.09

LAB NO: 11949  
 SAMPLE ID: T-004

S. G. FRACTION	WT%	ASH%	CUMULATIVE	
			WT%	ASH%
-1.40	11.80	5.60	11.80	5.60
1.40 - 1.50	46.50	13.60	58.30	11.98
1.50 - 1.60	25.80	21.40	84.10	14.87
+1.60	15.90	34.20	109.00	17.94

LAB NO: 11951  
 SAMPLE ID: T-006

S. G. FRACTION	WT%	ASH%	CUMULATIVE	
			WT%	ASH%
-1.40	69.60	6.10	69.60	6.10
1.40 - 1.50	13.50	20.30	83.10	8.41
1.50 - 1.60	4.60	28.50	87.70	9.46
+1.60	12.30	57.50	100.00	15.37

LAB NO: 11948  
 SAMPLE ID: T-003

S. G. FRACTIONS	WT%	ASH%	CUMULATIVE	
			WT%	ASH%
-1.40	68.20	8.90	68.20	8.90
1.40 - 1.50	19.50	22.20	87.70	11.86
1.50 - 1.60	6.50	30.90	94.20	13.17
+1.60	5.80	40.90	100.00	14.78

LAB NO: 11950  
 SAMPLE ID: T-005

S. G. FRACTION	WT%	ASH%	CUMULATIVE	
			WT%	ASH%
-1.40	50.50	10.60	50.50	10.60
1.40 - 1.50	26.40	19.00	76.90	13.48
1.50 - 1.60	9.80	27.30	86.70	15.05
+1.60	13.30	45.20	100.00	19.06

LAB NO: 11952  
 SAMPLE ID: T-007

S. G. FRACTION	WT%	ASH%	CUMULATIVE	
			WT%	ASH%
-1.40	86.40	7.10	86.40	7.10
1.40 - 1.50	5.80	15.80	92.20	7.65
1.50 - 1.60	2.70	22.10	94.90	8.06
+1.60	5.10	36.70	100.00	9.52

CLIENT: CANADIAN OCCIDENTAL PETROLEUM LTD.  
 PROJECT: SEVEN SAHPLES, T-001 TO T-007, RECEIVED DECEMBER 11, 1991  
 LAB NO: 11946-11952  
 DATE: DECEMBER 17, 1991

CLEAN COAL COMPOSITE ANALYSIS

LAB NO:	SAMPLE ID:	MOIST%	ASH%	VOL%	F.C.%	S%	CV CAL/GM	F.S.I.	H.G.I.	BASIS	% YIELD	Q.S.G.
11947	T-002	1.50	5.80	35.90	56.80	.39	7204	3	45	adb	72.5	1.40
			5.89	36.45	57.66	.40	7314					
11948	T-003	1.20	8.90	34.20	55.70	.67	7185	2	45	adb	68.2	1.40
			9.01	34.62	56.38	.68	7272					
11949	T-004	.30	5.60	9.00	85.10	1.66	8025	0	49	adb	11.8	1.40
			5.62	9.03	85.36	1.66	8049					
11950	T-005	.20	10.60	25.00	64.20	2.73	7633	B-112	71	adb	50.5	1.40
			10.62	25.05	64.33	2.74	7648					
11951	T-006	.30	6.10	26.30	67.30	2.22	8065	9+	83	adb	69.6	1.40
			6.12	26.38	67.50	2.23	8089					
11952	T-007	.70	7.10	25.60	66.40	2.07	7843	7	75	adb	86.4	1.40
			7.15	25.98	66.87	2.08	7898					

ULTIMATE ANALYSIS, air dried basis

LAB NO:	SAMPLE ID:	RM%	CM	HM	N%	S%	ASH%	O/bd
11946	T-001	1.55	66.71	4.77	.50	.56	16.60	9.21
11947	T-002	1.48	77.55	5.10	1.22	.39	5.84	8.42
11948	T-003	1.22	75.85	5.06	1.35	.67	8.88	6.97
11949	T-004	.27	86.57	3.44	1.24	1.66	5.64	1.18
11950	T-005	.16	78.19	4.50	.93	2.73	10.57	2.92
11951	T-006	.26	83.27	4.81	1.25	2.22	6.06	2.13
11952	T-007	.68	81.50	4.62	1.13	2.07	7.10	2.90

CLIENT: CANADIAN OCCIDENTAL **PETROLEUM LTD.**  
 PROJECT: SEVEN **SAMPLES**, T-001 TO T-007, RECEIVED **DECEMBER** 11, 1991  
 LAB NO: 11946-11952  
 DATE: **DECEMBER** 17, 1991

MINERAL ANALYSIS **OF** ASH

LAB NO:	SAMPLE ID	SiO2	Al2O3	TiO2	Fe2O3	CaO	MgO	Na2O	K2O	P2O5	SO3	Undet.
11946	T-001	40.94	33.01	1.59	3.30	16.23	<b>.23</b>	<b>.08</b>	<b>.07</b>	<b>.45</b>	4.40	<b>.30</b>
11947	T-002	33.56	15.91	<b>.71</b>	0.92	23.68	5.32	<b>.13</b>	<b>.17</b>	<b>.16</b>	10.74	<b>-.70</b>
<b>11948</b>	T-003	48.92	32.50	2.11	3.57	5.32	1.24	<b>.16</b>	<b>.37</b>	<b>.55</b>	4.05	-1.21
11949	T-004	32.21	25.81	2.42	22.25	8.35	<b>.33</b>	<b>.05</b>	<b>.08</b>	<b>.26</b>	7.07	<b>-.17</b>
11950	T-005	37.73	25.66	<b>.99</b>	15.96	9.40	<b>.36</b>	<b>.23</b>	1.14	<b>.18</b>	9.12	<b>.77</b>
11951	T-006	24.68	13.98	<b>.67</b>	26.31	16.62	1.82	<b>.09</b>	<b>.60</b>	<b>.35</b>	14.71	<b>-.17</b>
<b>11952</b>	T-007	21.58	26.32	1.36	23.39	<b>10.58</b>	4.21	<b>.15</b>	<b>.42</b>	6.92	4.25	<b>-.82</b>

ASH FUSION **TEMPERATURES (DEG. F)**

LAB NO:	SAMPLE ID:	O X I D I Z I N G				R E D U C I N G			
		IDT	ST	HT	FT	IDT	ST	HT	FT
11946	T-001	2620	2645	2660	2790	2570	2615	2625	2760
11947	T-002	2190	2210	2230	2245	2080	2120	2125	2140
11948	T-003	2750	<b>2800+</b>	<b>--</b>	<b>--</b>	2585	2790	<b>2800+</b>	<b>—</b>
11949	T-004	2410	2465	2470	<b>2580</b>	2155	2260	2340	2430
11950	T-005	2420	2485	2530	2655	2200	2280	2320	2610
11951	T-006	2260	2315	2330	2405	1915	<b>1980</b>	2000	2090
11952	T-007	<b>2280</b>	2370	2425	2550	2130	2200	2310	2530



Birtley Coal &  
Minerals Testing  
Division

Gwil Industries Inc.  
505 - 50th Avenue S.E.  
Calgary, Alberta  
T2G 2B4

Tel (403) 253-8273  
Fax (403) 259-4720  
Telex 03-824657

INVOICE

CANADIAN OCCIDENTAL PETROLEUM LTD.  
1500, 634 - 8TH AVENUE S.W.  
CALGARY, ALBERTA  
T2P 321

Invoice No. 4695  
Date DECEMBER 31, 1991  
Your P.O. No.  
Our Job No. BC-197

ATTENTION: MR. R. SWAREN

GST #1022 355 04

DECEMBER 13 & 17, 1991 REPORT LAB NOS: 11946-11952 REFER TO CQ-91-008-A			
1. RECEIVING 7 SAMPLES, AIR DRYING, CRUSHING TO -1/ NECESSARY REPRES. SAMPLES FOR HR ANALYSIS & FLOA'	SPLITTING	JT	
	INK ETC.		N/C
2. RAW COAL ANALYSIS:			
a. 7 - ADM, PROX, S, CV, FSI @\$91.10/SET			\$637.70
b. 1 - HGI @\$52.00/EACH			\$52.00
c. 6 - Cl @\$40.45/EACH			\$242.70
3. FLOAT-SINK OF 3/4 PORTION OF RAW COAL			
a. 6 SAMPLES @ 3 SEPARATIONS/SAMPLE @\$35.00/SEPAR	ION		\$630.00
b. S.G. PREPARATION			N/C
c. 24 - ASH @\$ 9.35/EACH			\$224.40
4. CLEAN COAL COMPOSITE ANALYSIS:			
a. 6 -PROX, S, CV, FSI, HGI @\$134.30/SET			\$805.80
b. 7 - C, H, N, MAA, AFT @\$473.65/SET			\$3,315.55
c. 7 - ASH FUSION PREP OF CONES @\$23.10/SAMPLE			\$161.70
	SUB-TOTAL:		\$6,069.85
	PLUS	S.T. (7%)	\$424.89
	TOTAL		\$6,494.74

PAYMENT DUE 30 DAYS FROM INVOICE DATE.  
INTEREST @2% (24% PER ANNUM) ON OVERDUE ACCOUNTS.

*OK*  
*Ronald Swaren*

CLIENT: CANADIAN OXIDENTAL PETROLEUM LTD.  
 PROJECT: TWO COAL SAMPLES, RECEIVED MARCH 21, 1994  
 P.O. #31340  
 LAB NO: 46877 & 46878  
 DATE: MARCH 25, 1994

ANALYSIS OF COAL, air dried basis

LAB NO:	SAMPLE III	ADMX	MOISTX	ASHX	VOLX	F.C.X	SX	CAL/GM	XCI	FSI	HGI	BASIS
46877	440301	2.40	1.40	12.39	34.40	51.90	1.27	7017	.023	2	42	adb
			3.77	12.00	33.57	56.65	1.24	6849	.022			arb
				12.47	34.89	52.64	1.29	7117	.023			db
46878	940302	3.70	1.40	22.96	31.60	44.10	1.59	6029	.044	3 1/2	51	adb
			5.05	22.05	30.43	42.47	1.53	5806	.042			arb
				23.23	32.65	44.73	1.61	6115	.045			db

FLOAT-SINK ANALYSIS (SAMPLES CRUSHED TO 3/8" X 0)

LAB NO: 46877

LAB NO: 46878

5.6. FRACTION	CUMULATIVE				CUMULATIVE			
	WT%	ASH%	WT%	ASH%	WT%	ASH%	WT%	ASH%
-1.35	55.84	6.83	55.84	6.83	40.40	5.92	40.40	5.32
1.35 - 1.40	18.50	11.82	74.34	8.07	15.93	12.50	56.33	7.78
1.40 - 1.45	11.13	16.14	85.47	9.12	13.99	19.11	70.32	19.03
1.45 - 1.50	4.16	19.59	89.63	9.61	5.20	22.62	75.52	10.90
1.50 - 1.55	3.40	22.57	93.11	10.09	2.62	25.58	78.34	11.43
1.55 - 1.60	1.96	24.25	95.07	10.38	2.77	31.13	81.11	12.10
+1.60	4.33	67.14	100.00	13.18	18.89	67.16	100.00	22.50



CLIENT: CANADIAN OXIDENTAL PETROLEUM LTD  
 PROJECT: CLEAN COAL COMPOSITES  
 LAB NO: 46877 & 46678  
 DATE: MARCH 31, 1994

ANALYSIS OF COAL, air dried basis

LAB NO:		SAMPLE ID:		CLEAN COAL MAKEUP	MOISTZ	ASHZ	VOLZ	F.C.Z	SZ	CV CAL/GM	H.G.I.	F.S.I.	BASIS
46877	940301	FLOATS	81.45	YIELD=85.5%	1.17	9.22 9.33	34.95 35.36	54.66 55.31	.70 .71	7308 7395	39	2 1/2	adb db
46878	940302	FLOATS	81.45	YIELD=70.3%	1.10	10.07 10.18	35.44 35.83	53.39 53.93	1.55 1.57	7245 7326	47	4	adh db

ULTIMATE ANALYSIS, air dried basis

LAB NO:	SAMPLE ID:	N2O	C	H	N	S	ASH	Q (BY DIFF)
46877	CLEAN COAL	1.17	75.11	5.10	1.13	.70	9.22	7.57
46878	CLEAH COAL	1.10	74.30	4.93	1.24	1.55	10.07	6.81

ASH FUSION TEMPS (DEG. F)

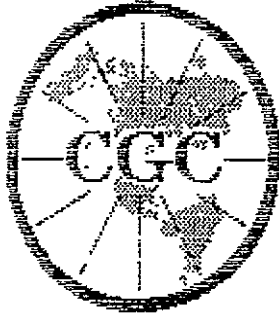
LAB NO:	OXIDIZING				REDUCING			
	IDT	ST	NT	FT	IDT	ST	HT	FT
46071	2590	2685	2725	2780	2495	2575	2640	2715
46878	2330	2380	2330	2480	2270	2385	2410	2480

MINERAL ANALYSIS OF ASH

LAB NO:	SAMPLE ID	SiO2	Al2O3	TiO2	Fe2O3	CaO	MgO	Na2O	K2O	P2O5	SO3	Undet.
46877	C.C.C.	42.22	31.75	1.85	6.81	8.56	1.38	.24	.33	.62	5.89	-.35
46878	c. c. c.	37.05	21.35	1.24	13.33	12.54	1.43	.30	.49	1.50	9.92	-.85



Birtley Coal &  
 Minerals Testing  
 Division



**GAMMA-RES-DENSITY**

COMPANY : CAN. # C C . PETRO. LTD.  
WELL : 94-01  
LOCATION/FIELD : TSOLUM RIVER  
COUNTY : CAMPBELL RIVER  
STATE : B. C.  
SECTION : TOWNSHIP RANGE :

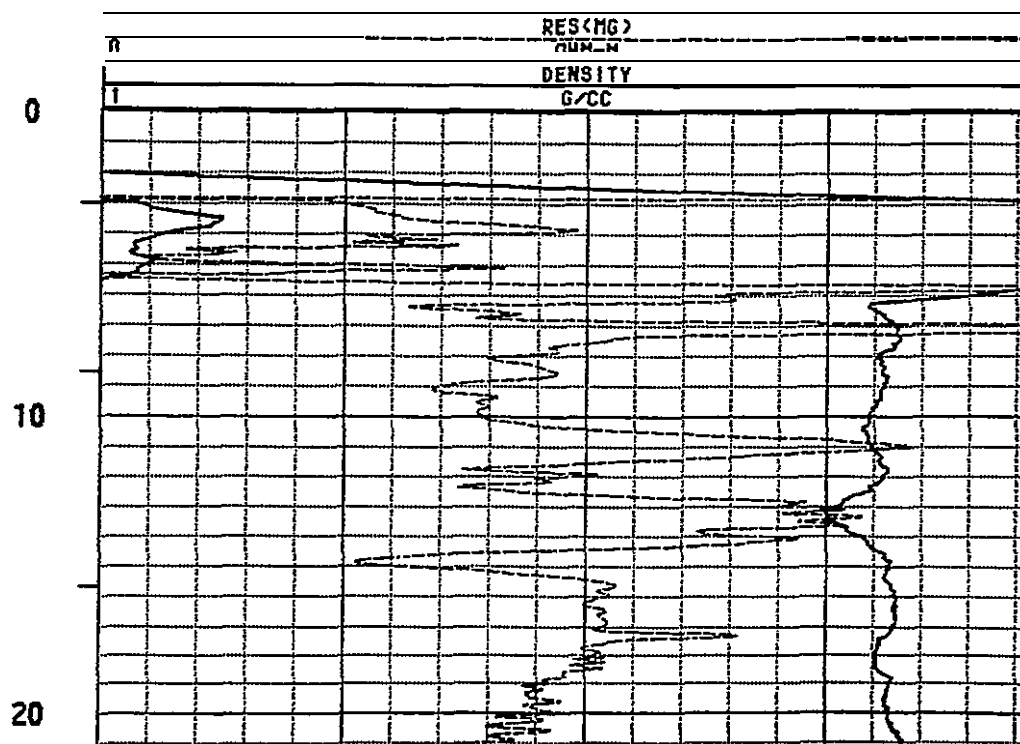
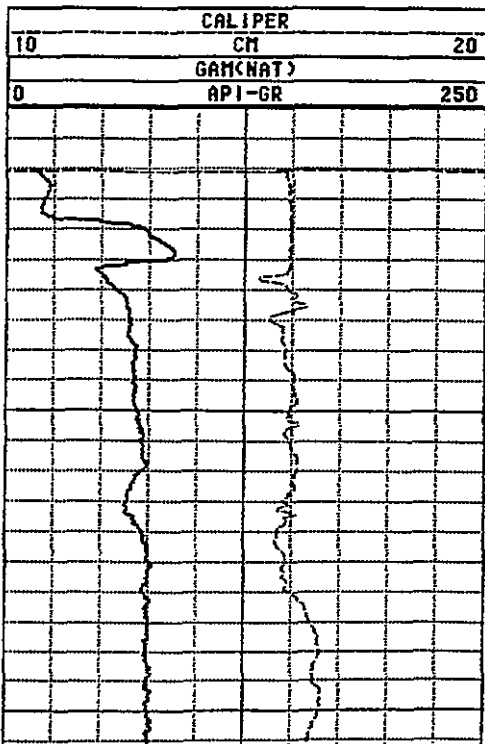
OTHER SERVICES :  
9030  
9300

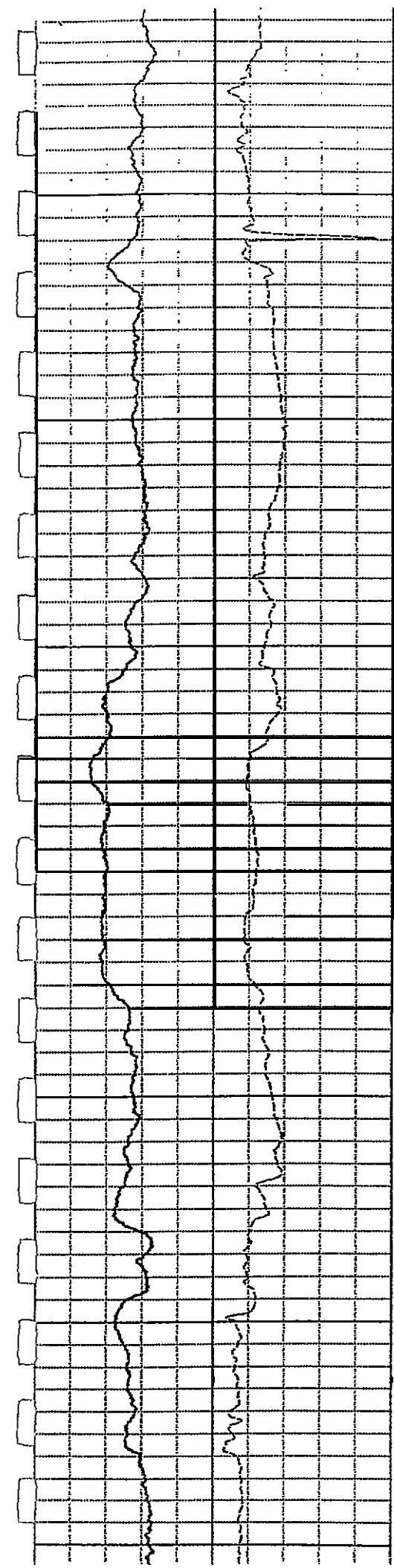
DATE : 02/17/94 PERMANENT DATUM : GL ELEVATIONS  
DEPTH DRILLER : 426.7 ELEV. PERM. DATUM: KB  
LOG BOTTOM 425.16 LOG MEASURED FROM: GL DF  
LOG TOP 2.09 DRL MEASURED FROM: GL GL

CASING DRILLER : 18 LOGGING UNIT 8903  
CASING TYPE : STEEL FIELD OFFICE CALGARY  
CASING THICKNESS: 0.12 RECORDED BY : T. LEWICKYJ

BIT SIZE : 15.0 BOREHOLE FLUID : WATER FILE : ORIGINAL  
MAGNETIC DECL. : 18 RM TYPE : 9030AA  
MATRIX DENSITY : 2.65 RM TEMPERATURE LOG : 3  
FLUID DENSITY : 1.00 MATRIX DELTA T : 173 PLOT : CANOX 8  
NEUTRON MATRIX : SANDSTONE FLUID DELTA T : 690 THRESH : 30000

REMARKS  
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30

40

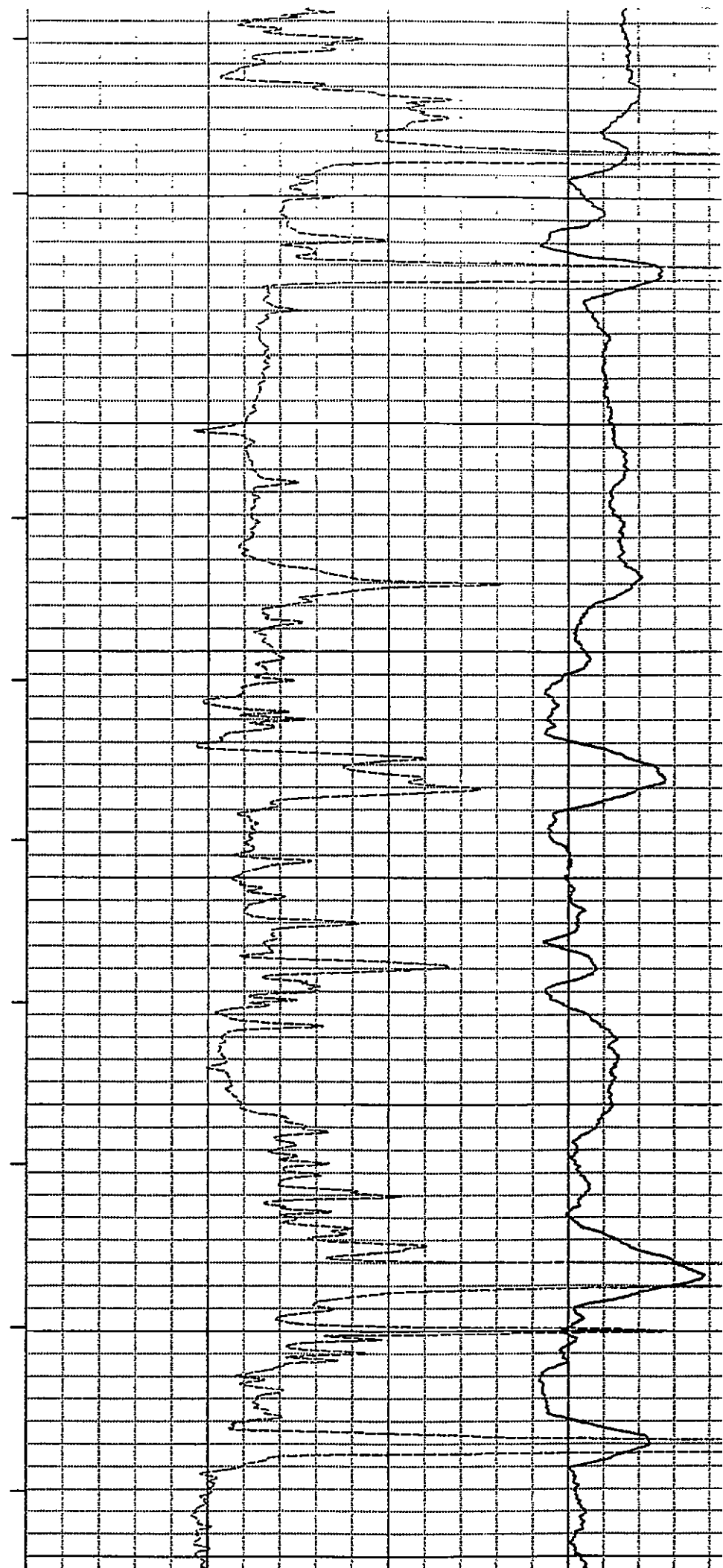
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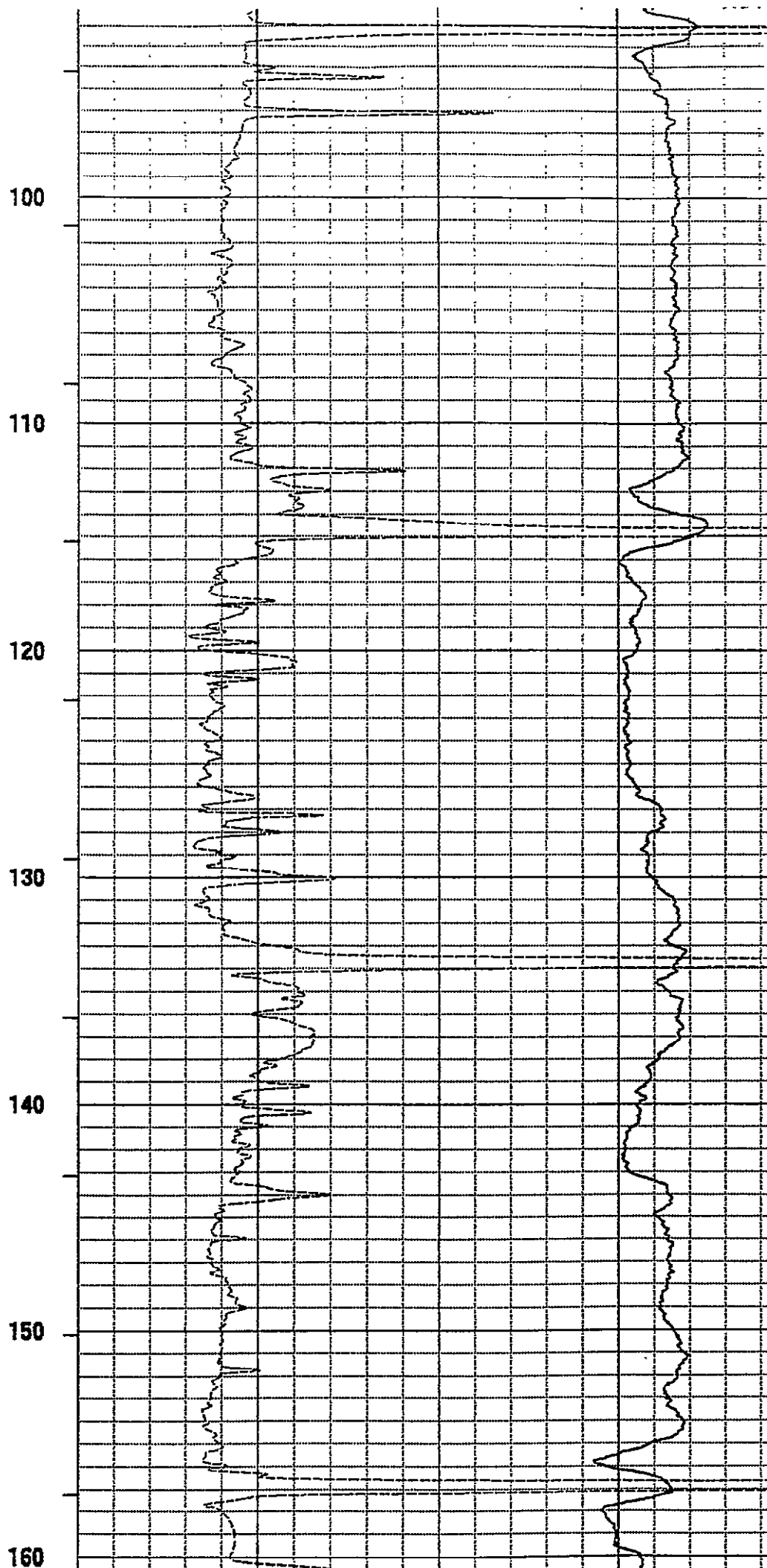
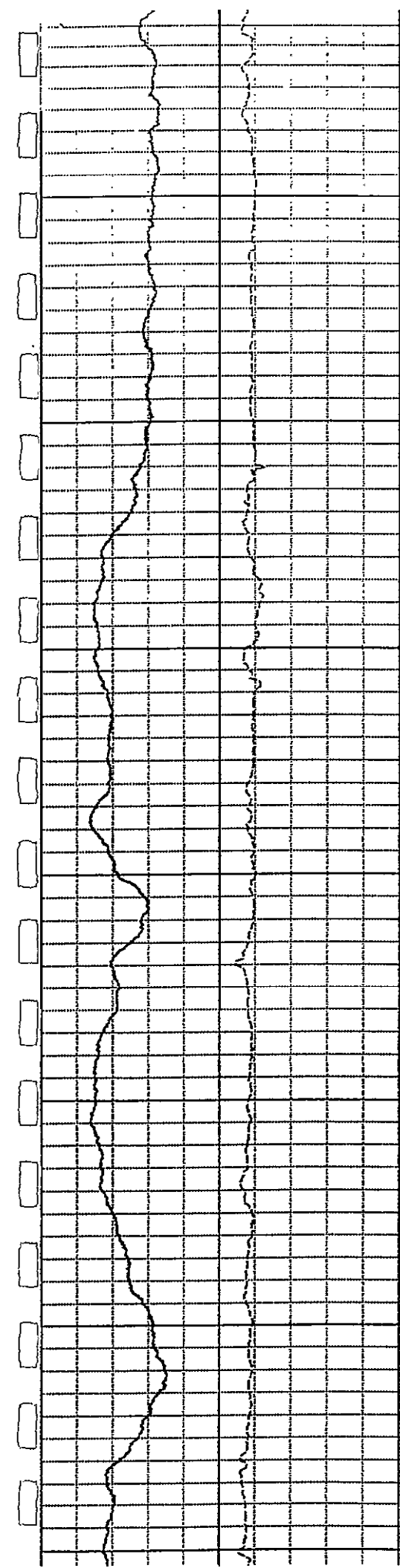
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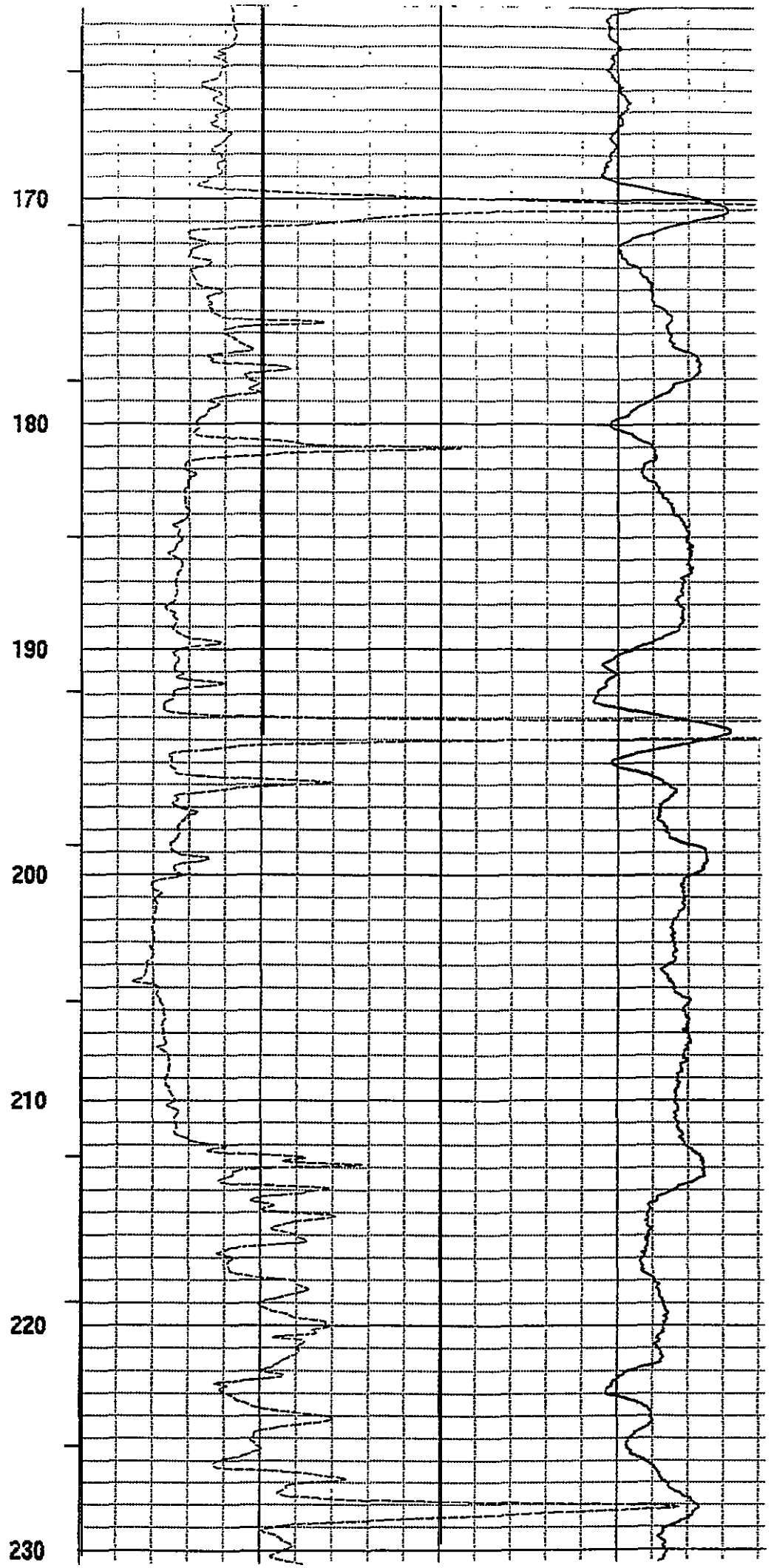
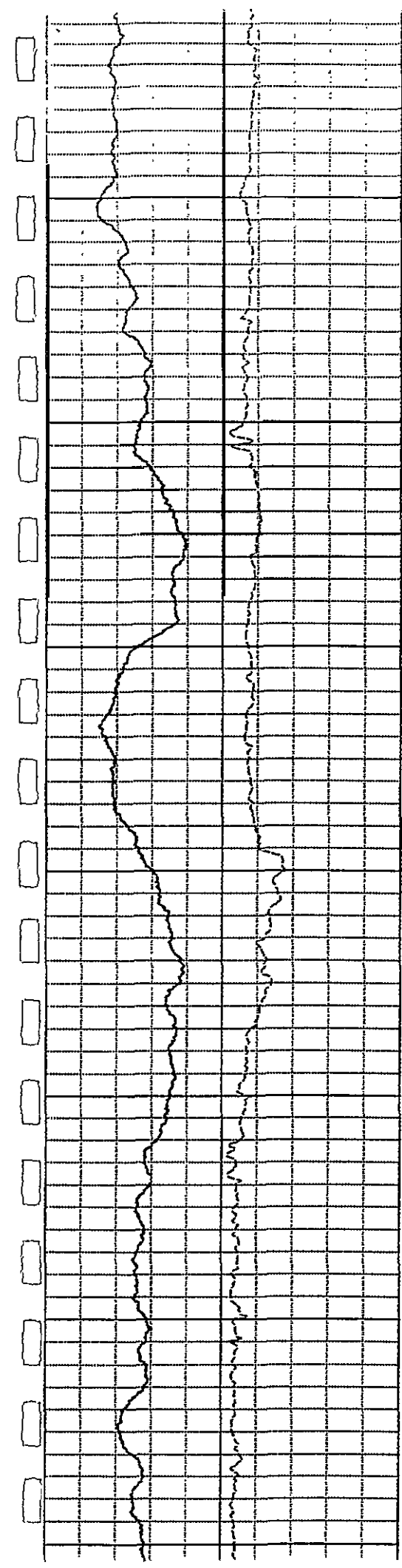
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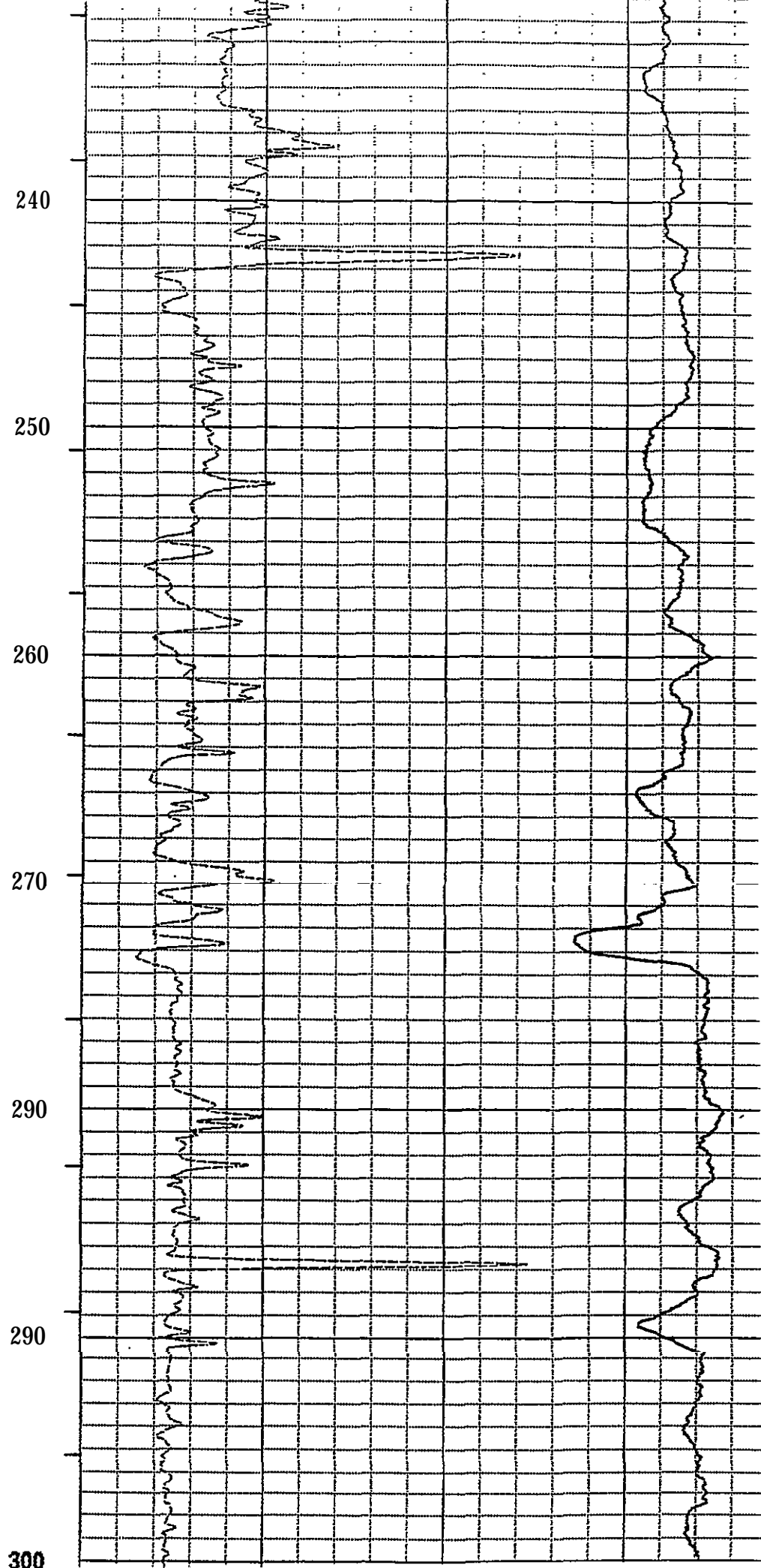
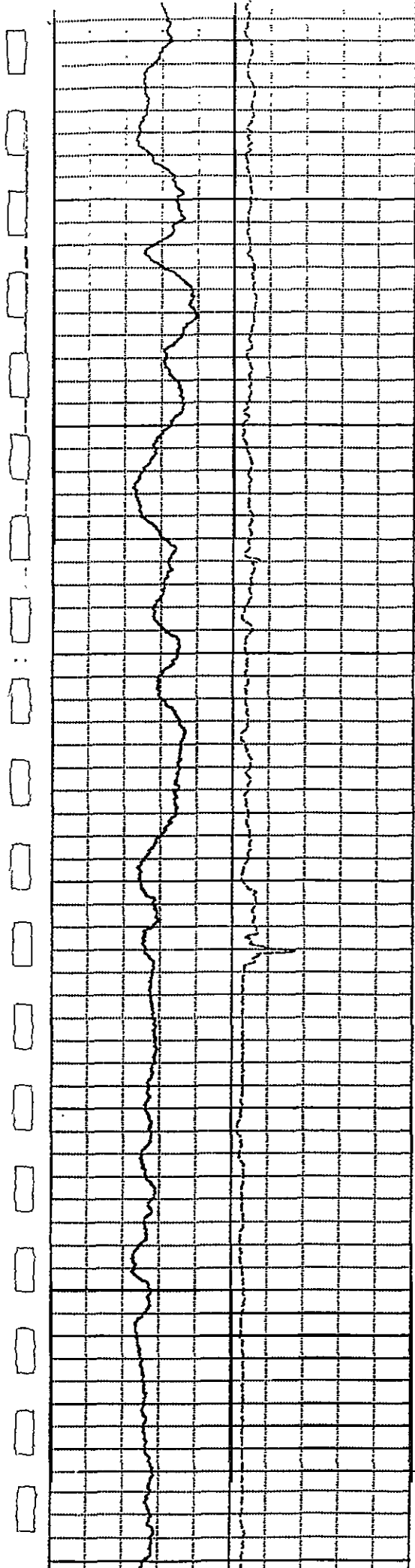
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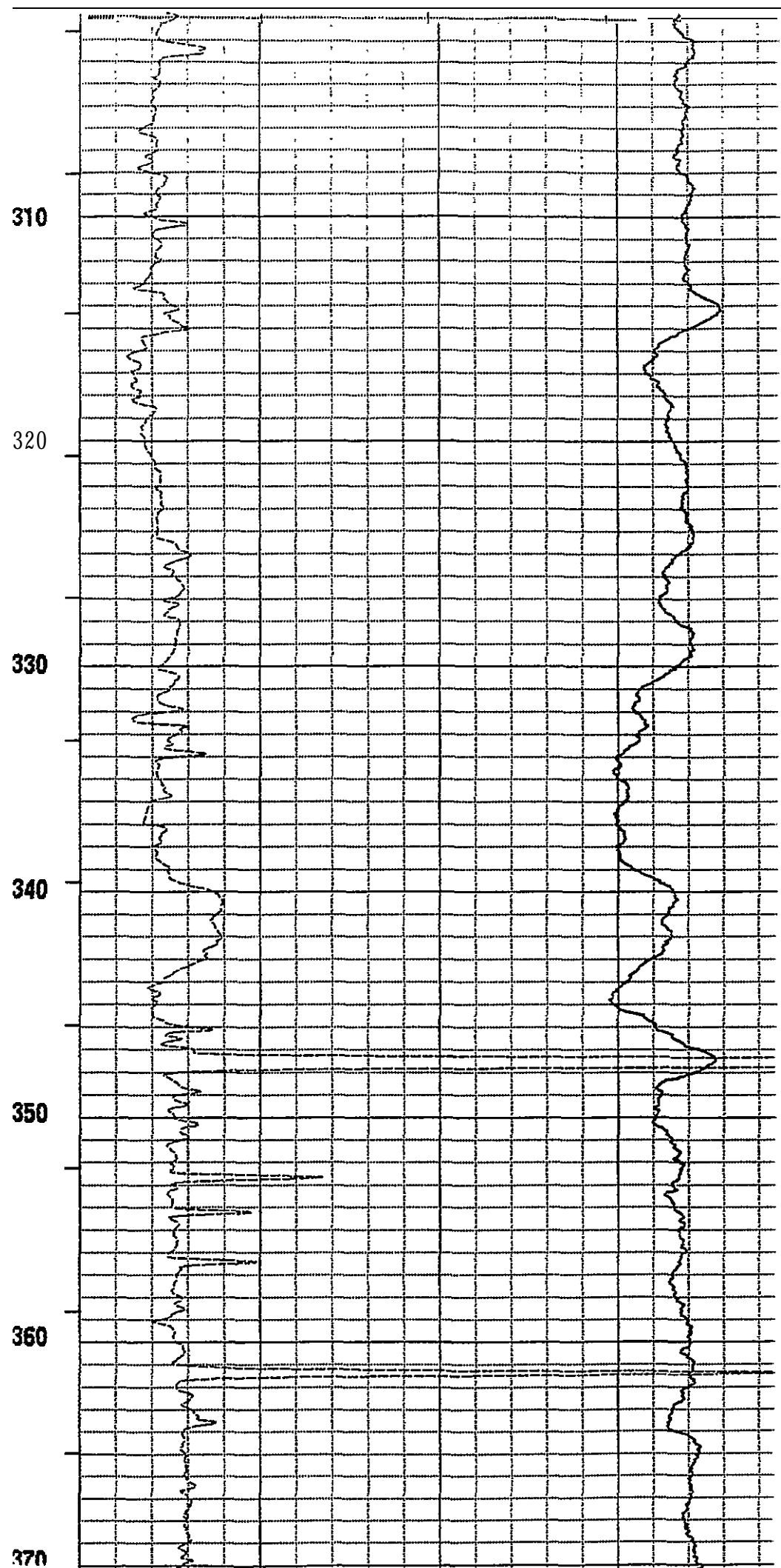
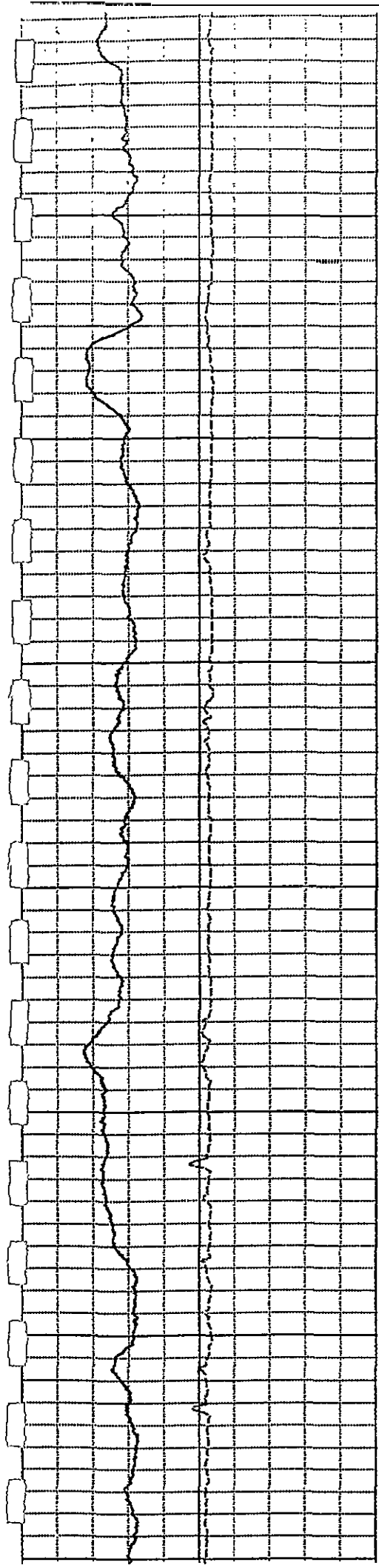
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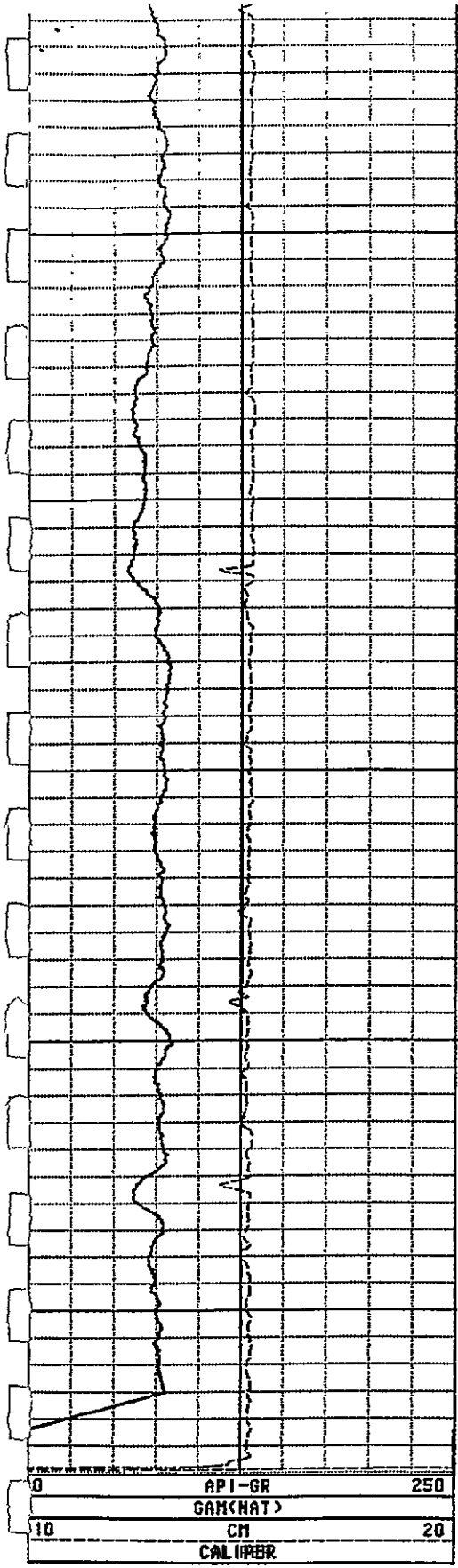




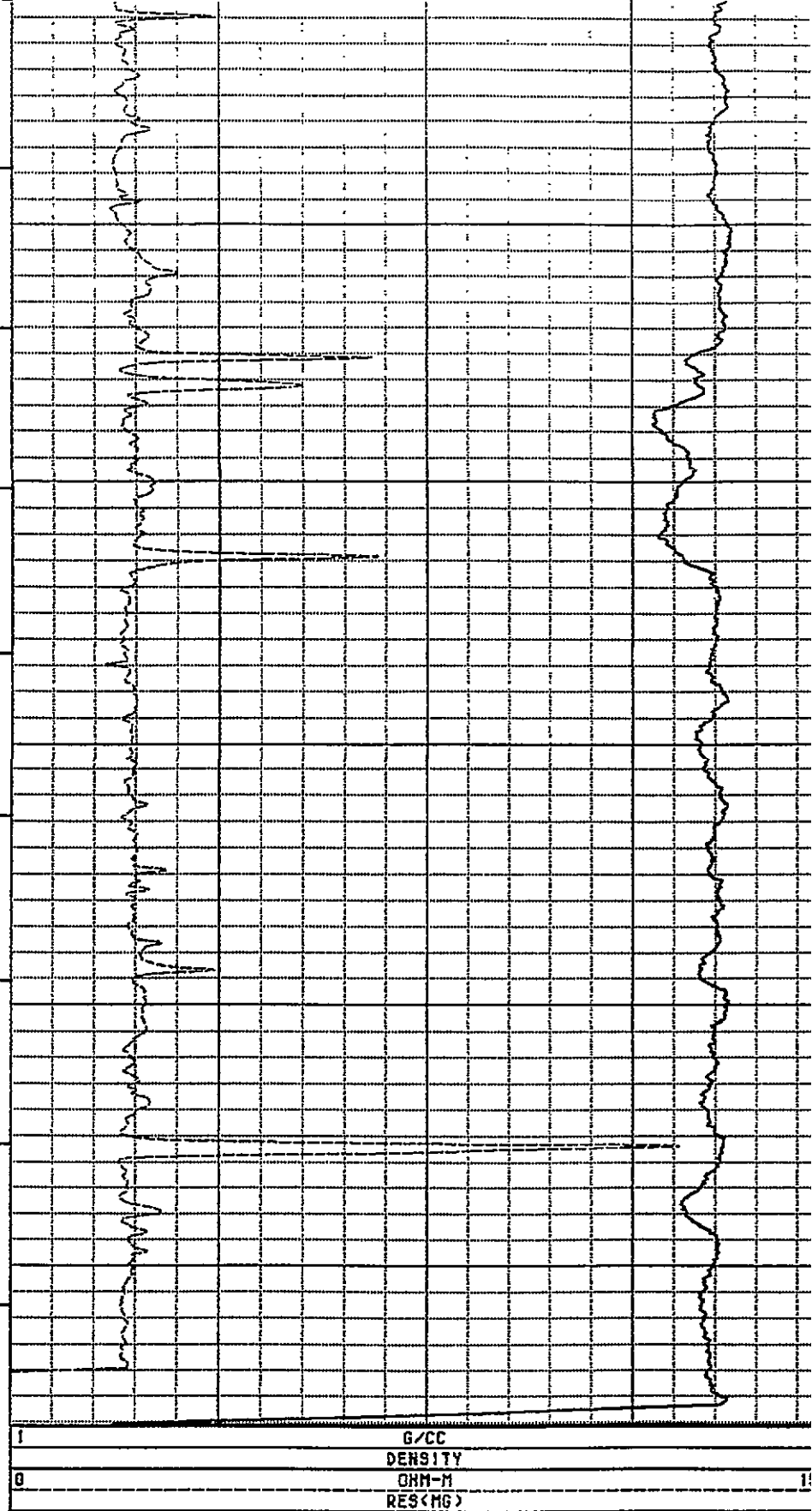


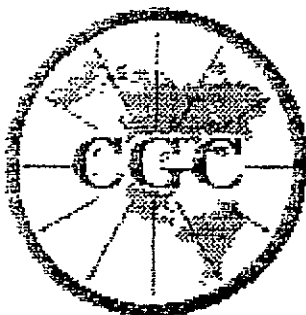






380  
390  
400  
410  
420  
426





# Century GEOPHYSICAL CORP.

## SONIC

COMPANY : CAN. OCC. PETRO. LTD.  
WELL : 94-01  
LOCATION/FIELD : TSOLUM RIVER  
COUNTY : CAMPBELL RIVER  
STATE : B.C.  
SECTION :

OTHER SERVICES:  
9030  
9300

TOWNSHIP : RANGE :

DATE : 02/17/94 PERMANENT DATUM : GL ELEVATIONS  
DEPTH DRILLER : 426.7 ELEV. PERM. DATUM: XB :  
LOG BOTTOM : 426.16 LOG MEASURED FROM: GL DF :  
LOG TOP : 0.00 BRL MEASURED FROM: GL GL :

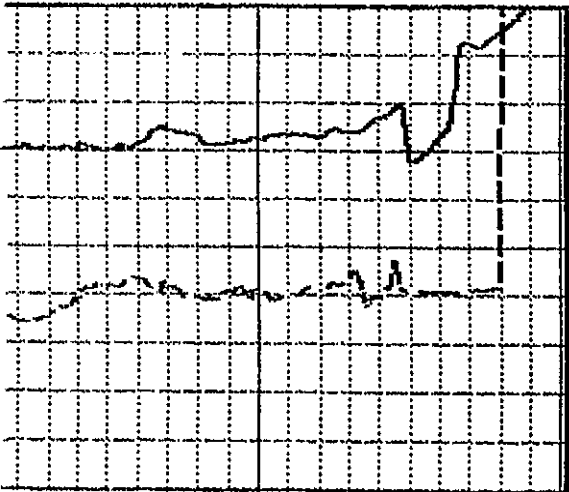
CASING DRILLER : 18 LOGGING UNIT : 8903  
CASING TYPE : STEEL FIELD OFFICE : CALGARY  
CASING THICKNESS: 0.12 RECORDED BY : T. LEWYCKYJ

BIT SIZE : 15. a BOREHOLE FLUID : WATER FILE : PROCESSED  
MAGNETIC DECL. : 18 RM TYPE : 9030AA  
MATRIX DENSITY : 2.65 RM TEMPERATURE : LOG : 5  
FLUID DENSITY : 1.00 MATRIX DELTA T : 1 7 3 PLOT : CANOXY 1  
NEUTRON MATRIX : SANDSTONE FLUID DELTA T : 6 9 6 THRESH: 30000

REMARKS

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

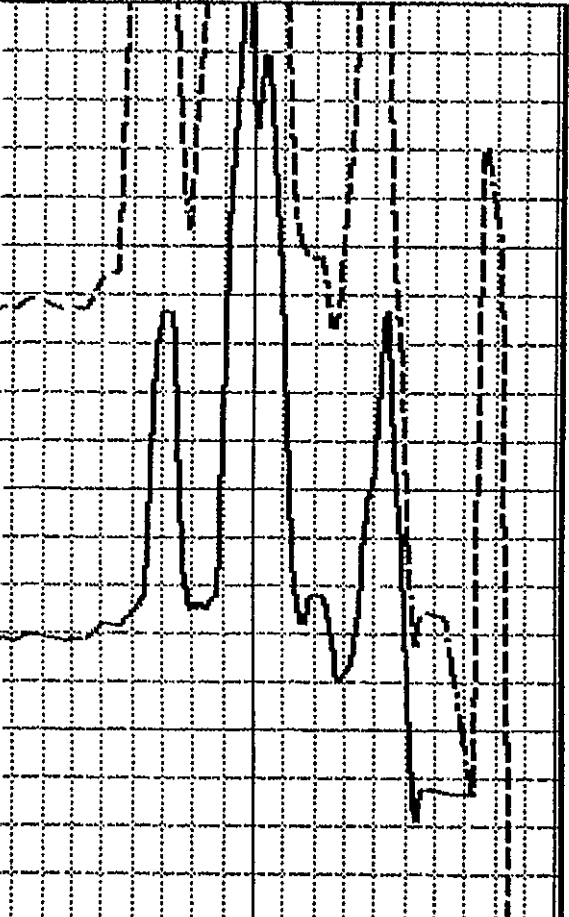
CALPER  
CM  
BARKHAT  
API-GR  
250

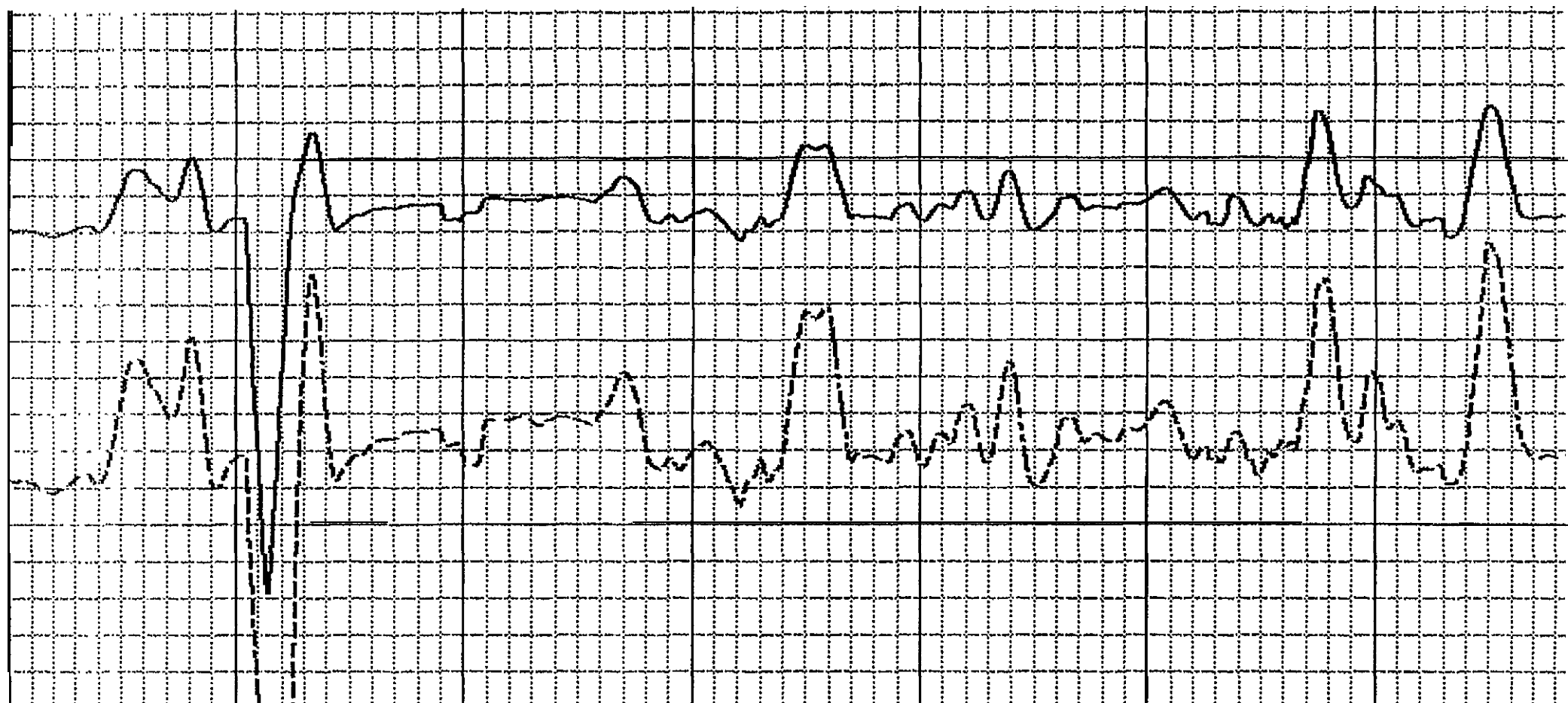


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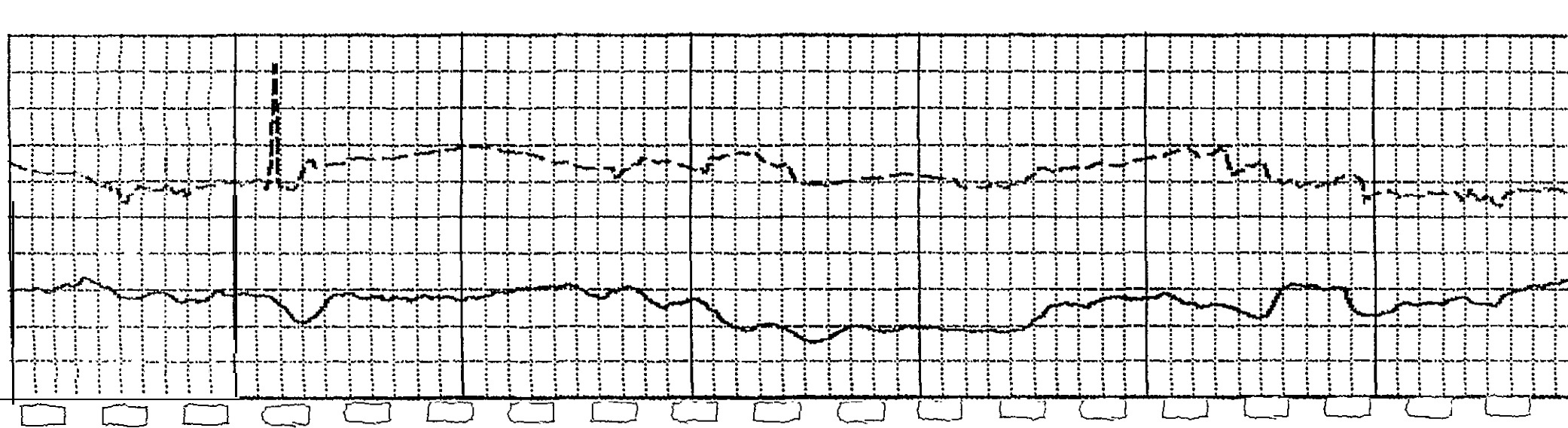
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DELTA  
USEC/M  
BHC-DELTA  
USEC/M  
500  
1000

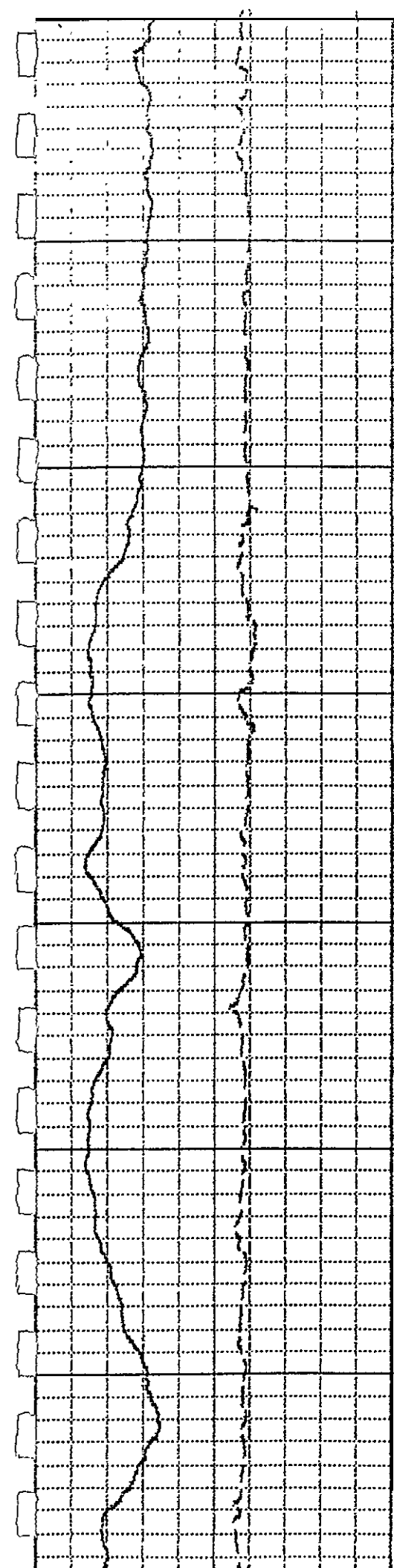




3 30 40 50 60 70 80



□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □



90

100

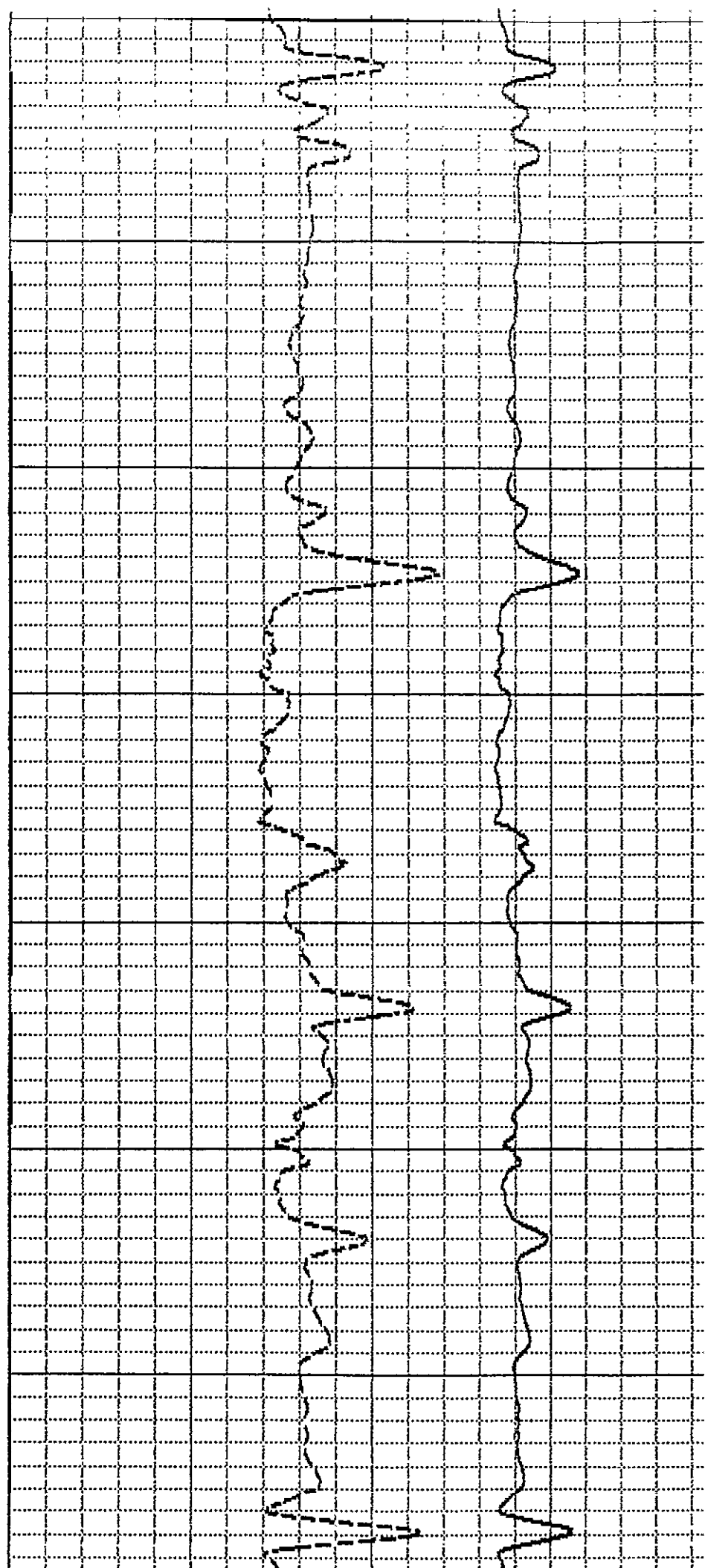
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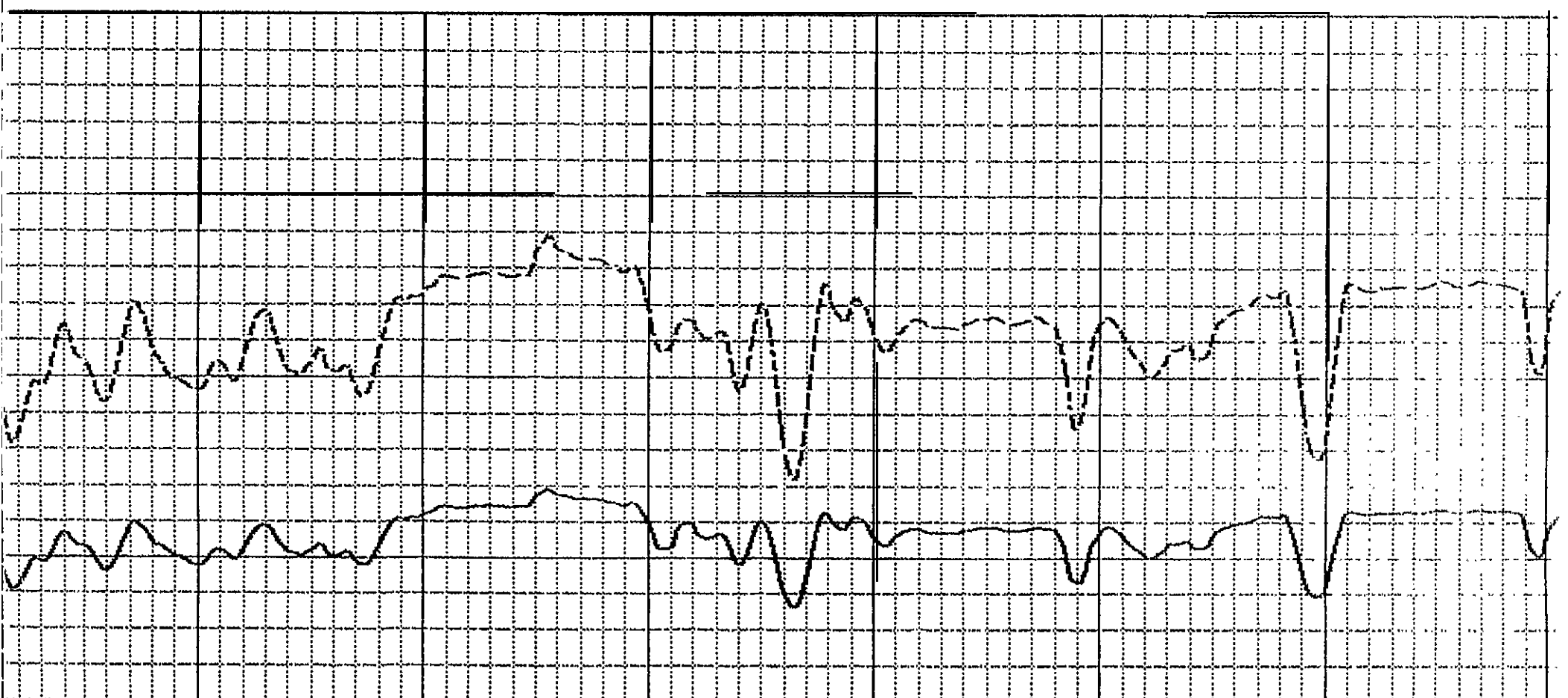
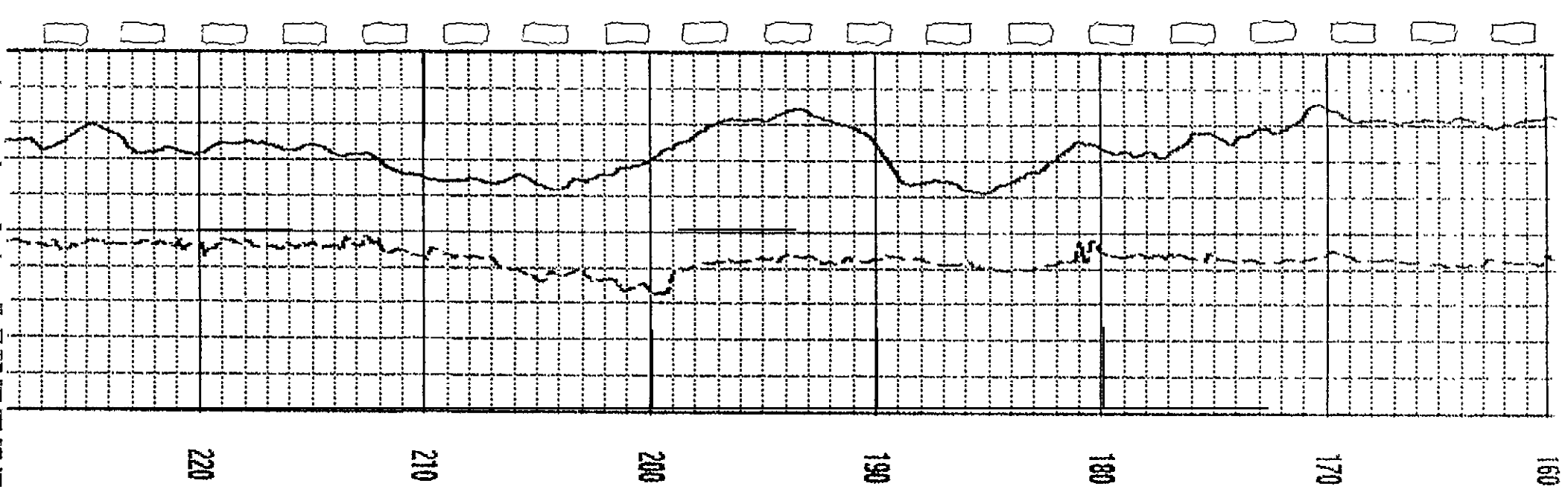
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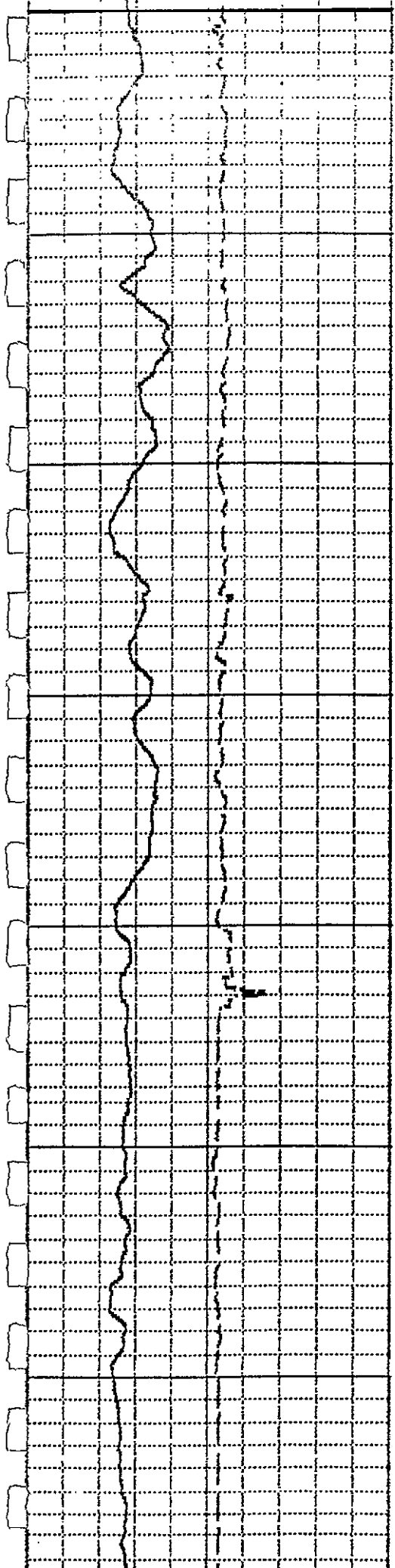
130

140

150







230

240

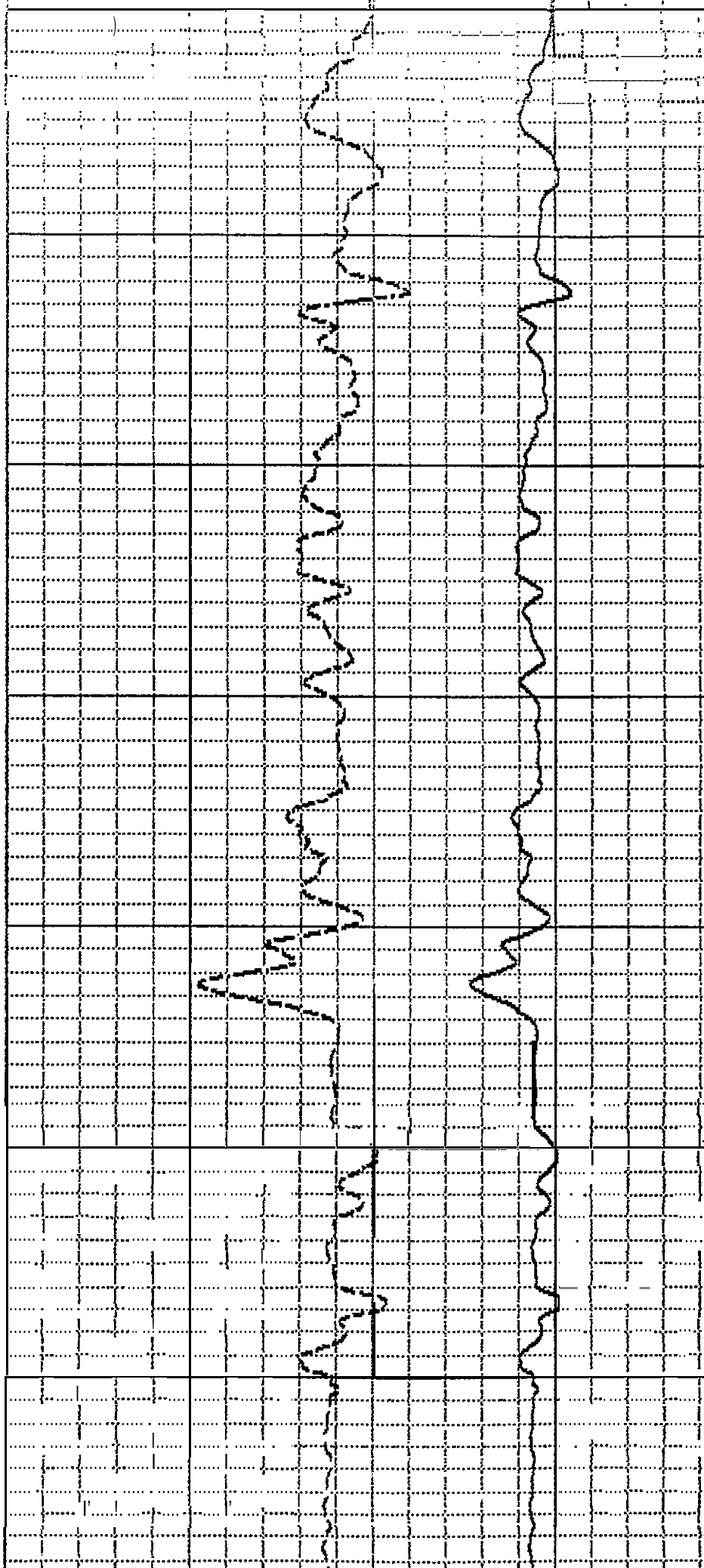
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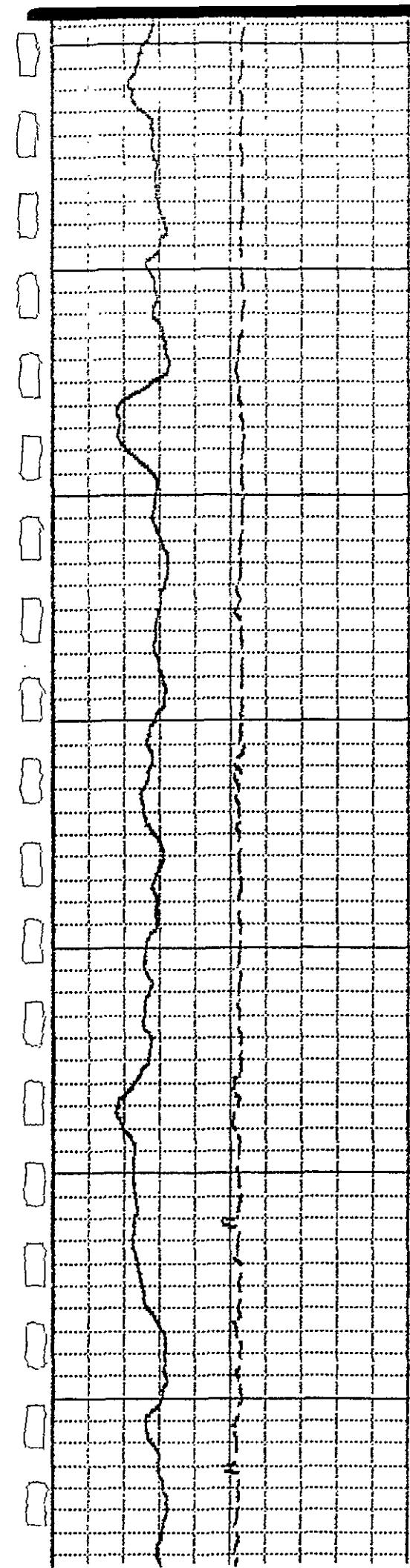
260

270

280

290





300

310

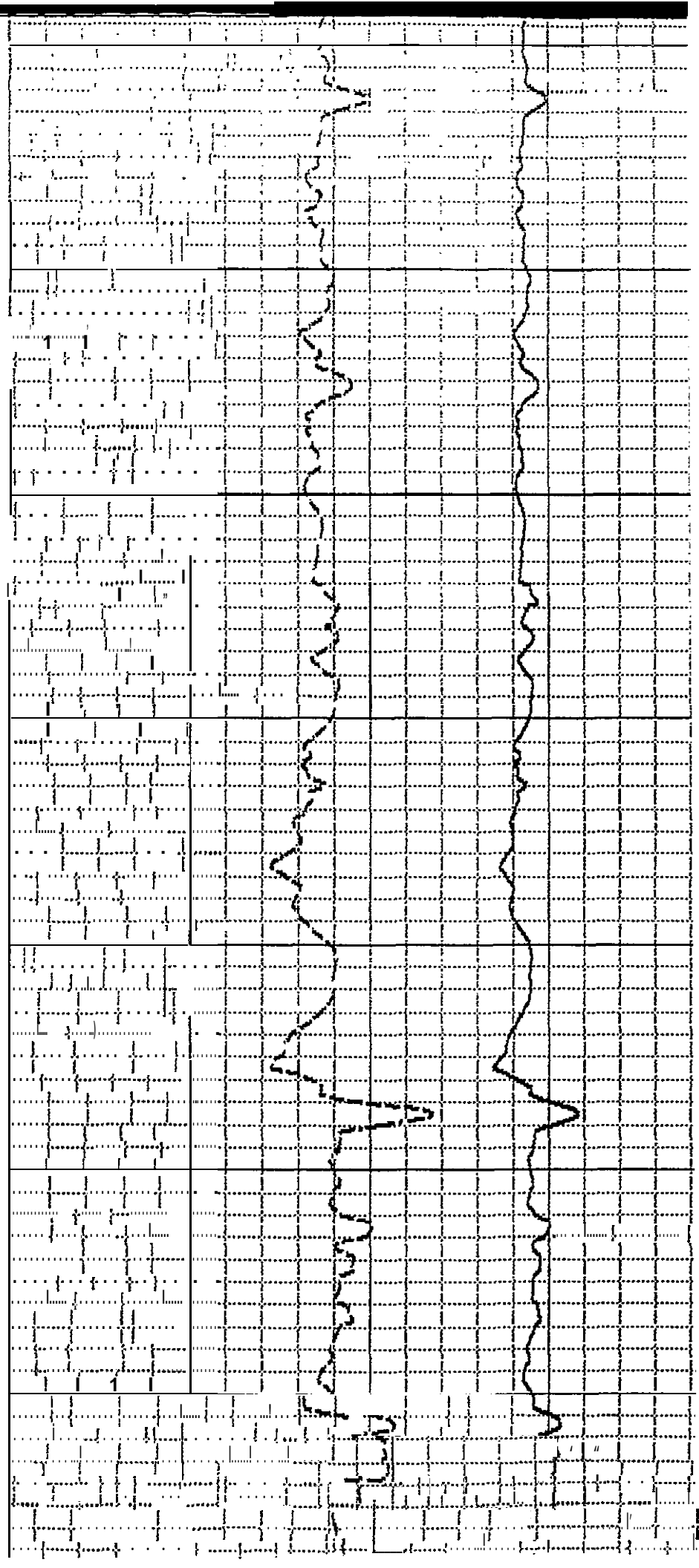
320

330

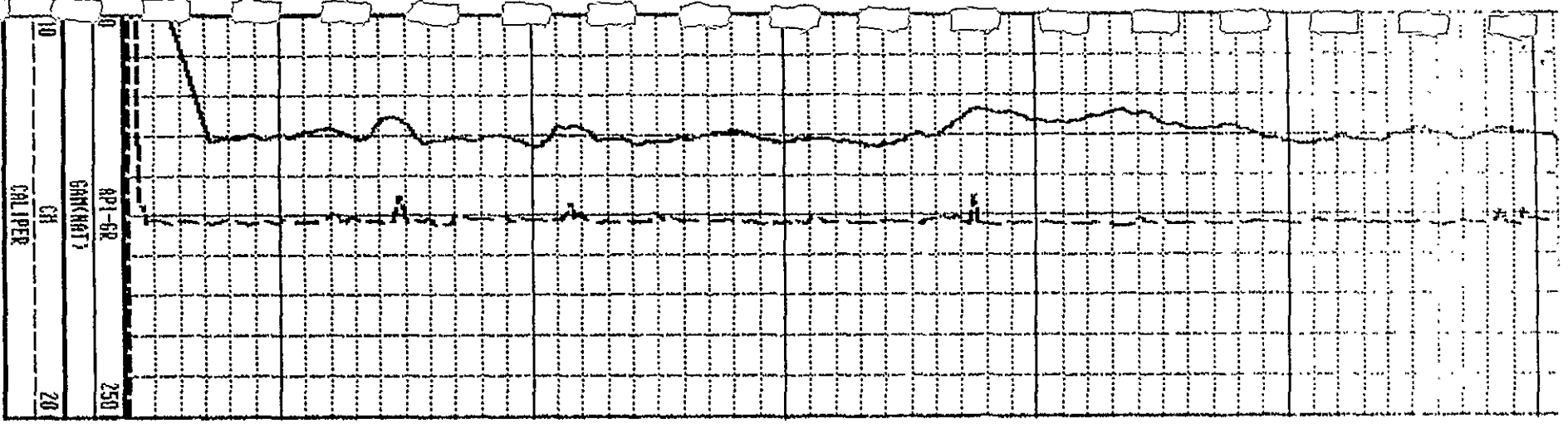
340

350

360









**Century**  
**GEOPHYSICAL CORP.**

**GAMMA-RES-DENSITY**

COMPANY : CAN. OCC. PETRO. LTD.  
WELL : 94-02  
LOCATION/FIELD : TSOLUM RIVER  
COUNTY : CAMPBELL RIVER  
STATE : B.C.  
SECTION : TOWNSHIP

OTHER SERVICES:  
9030  
9300

DATE : 02/20/94 PERMANENT DATUM : GL ELEVATIONS  
DEPTH DRILLER : 426.7 ELEV. PEE. DATUM: KB :  
LOG BOTTOM 426.20 LOG MEASURED FROM: GL DF  
LOG TOP 2.51 DRL MEASURED FROM: GL GL

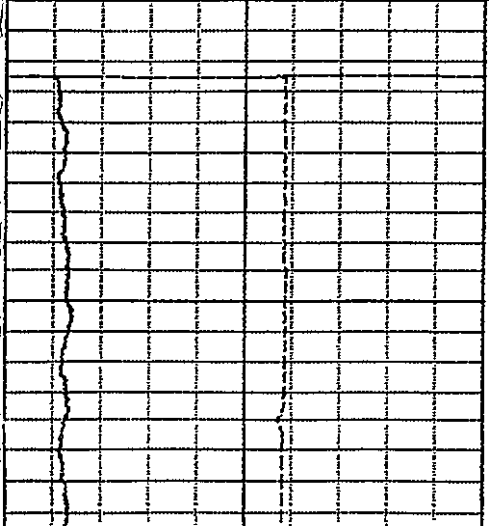
CASING DRILLER : 24 LOGGING UNIT : 8903  
CASING TYPE : STEEL FIELD OFFICE : CALGARY  
CASING THICKNESS: 0.12 RECORDED BY : T. LEWYCKYJ

BIT SIZE : 15.0 BOREHOLE FLUID : WATER FILE : ORIGINAL  
MAGNETIC DECL. : 18 RM : TYPE : 9030AA  
MATRIX DENSITY : 2.65 RM TEMPERATURE : LOG : 0  
FLUID DENSITY : 1.00 MATRIX DELTA T : 173 PLOT : CANDXY 0  
NEUTRON MATRIX : SANDSTONE FLUID DELTA T : 690 THRESH: 30000

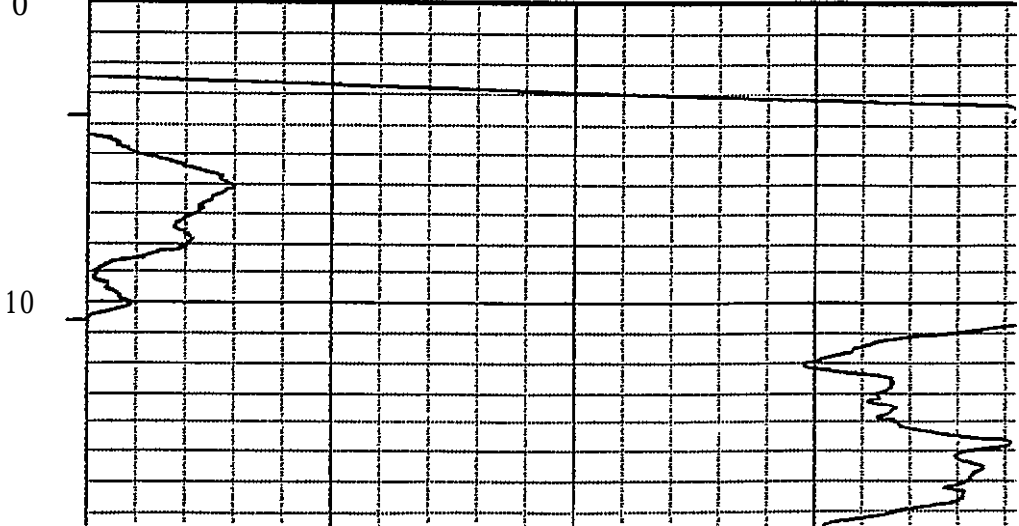
REMARKS  
OPEN HOLE

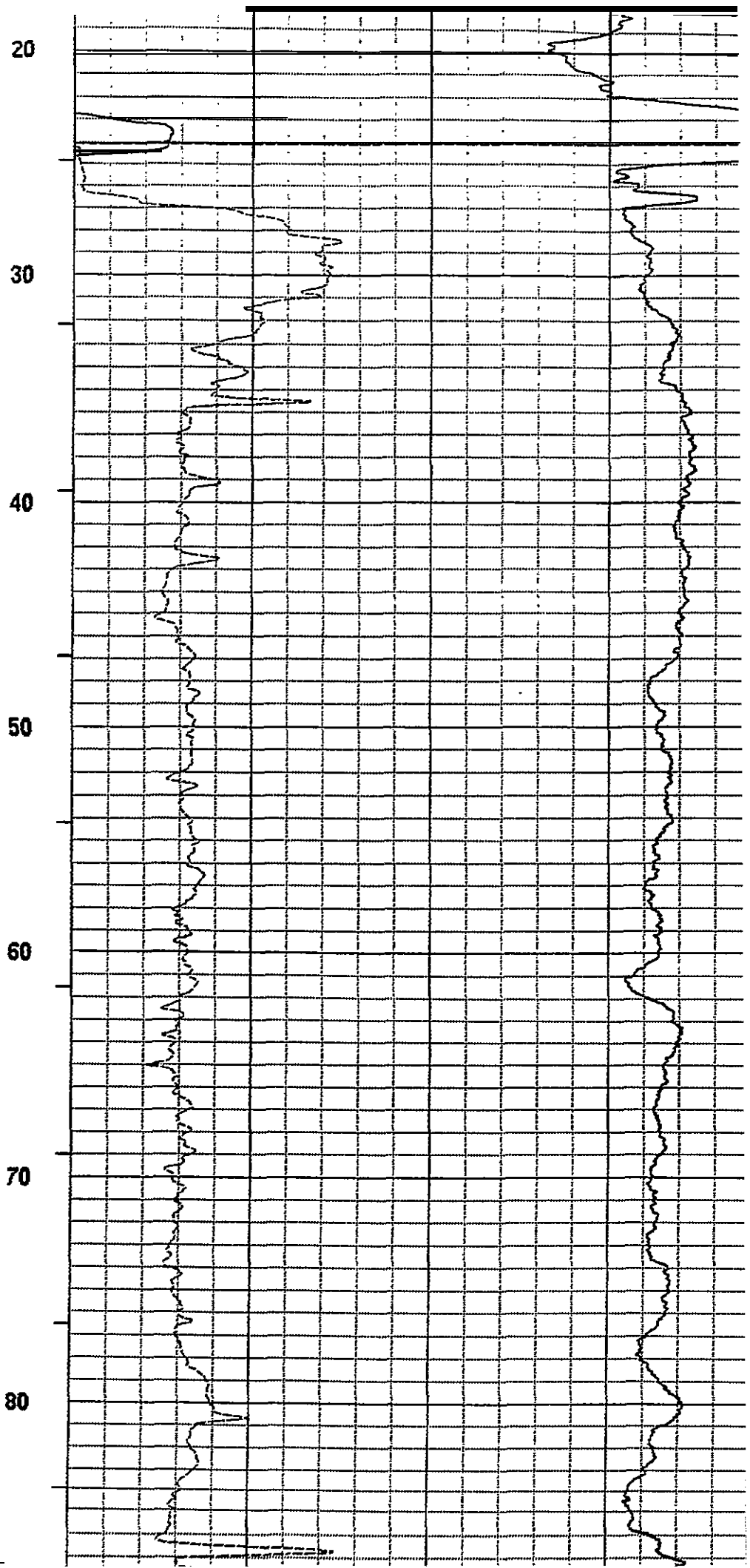
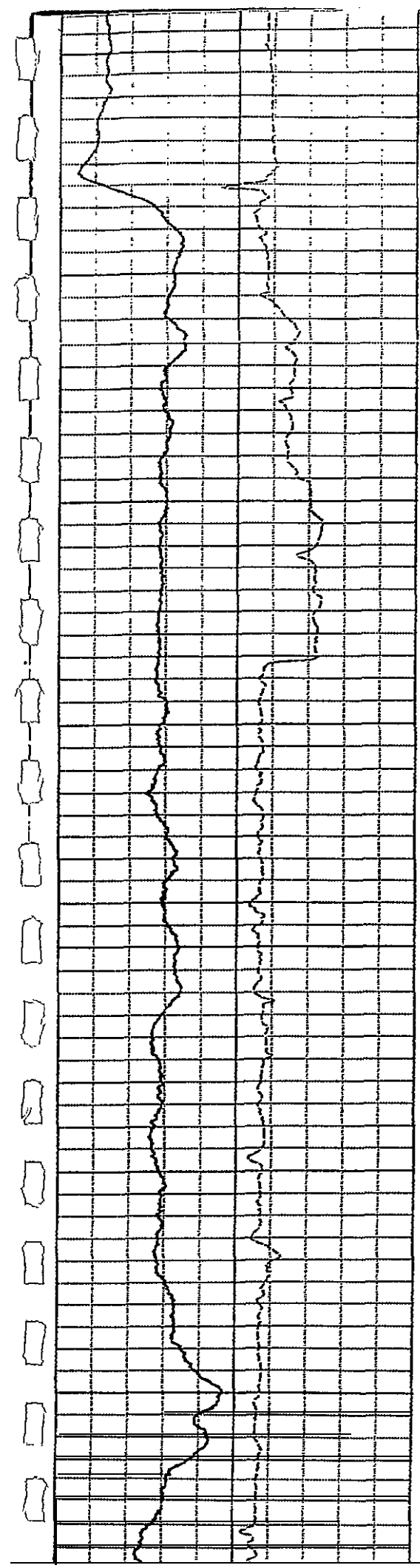
ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

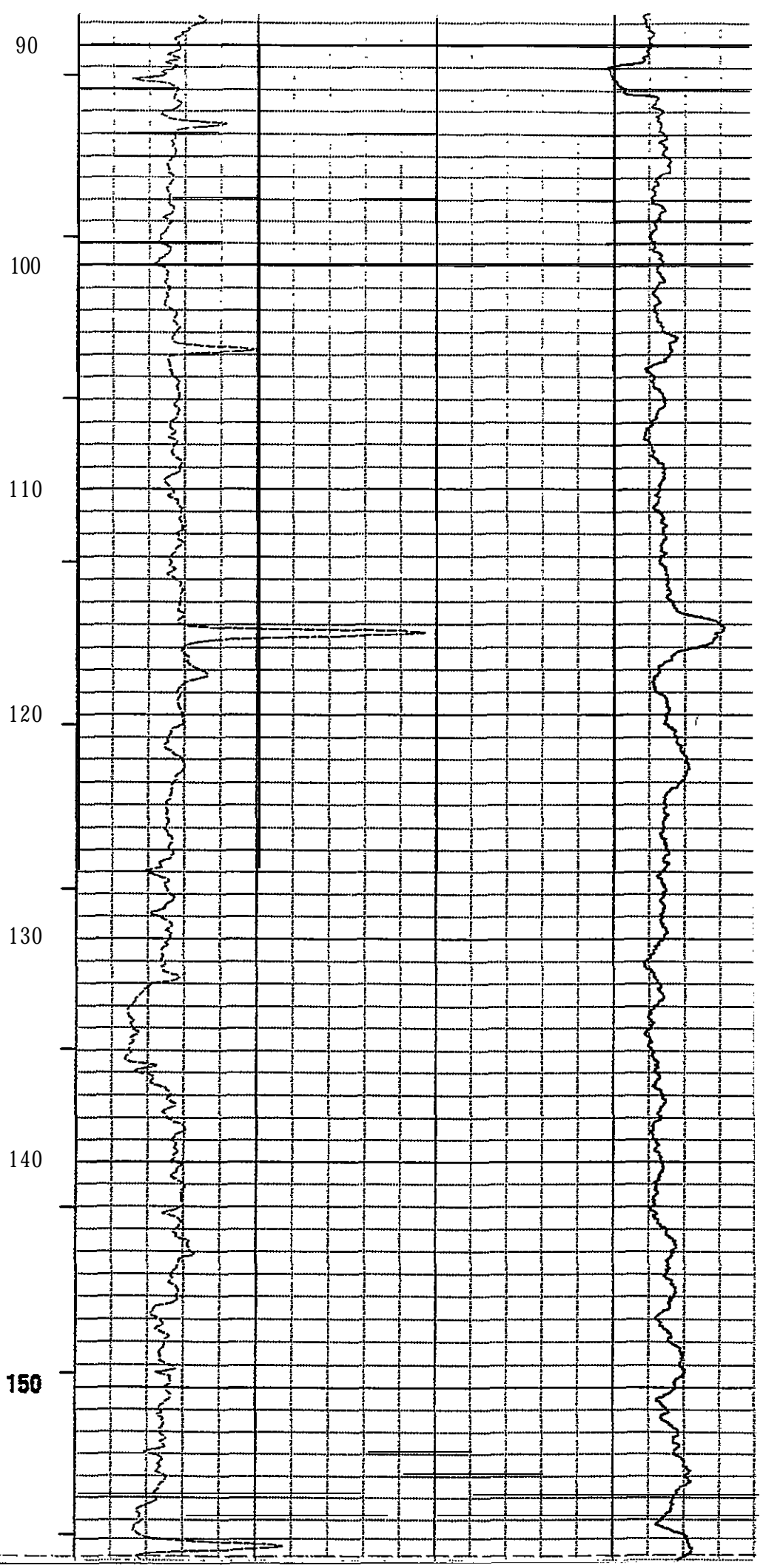
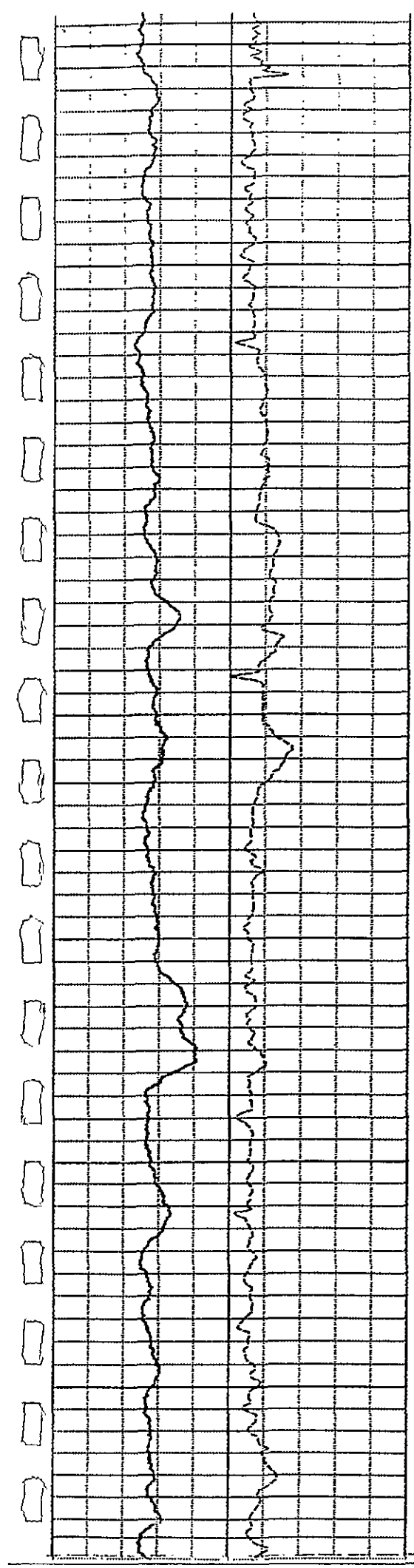
C A L I P E R		
10	CM	20
GAM(NAT)		
0	API-GR	250

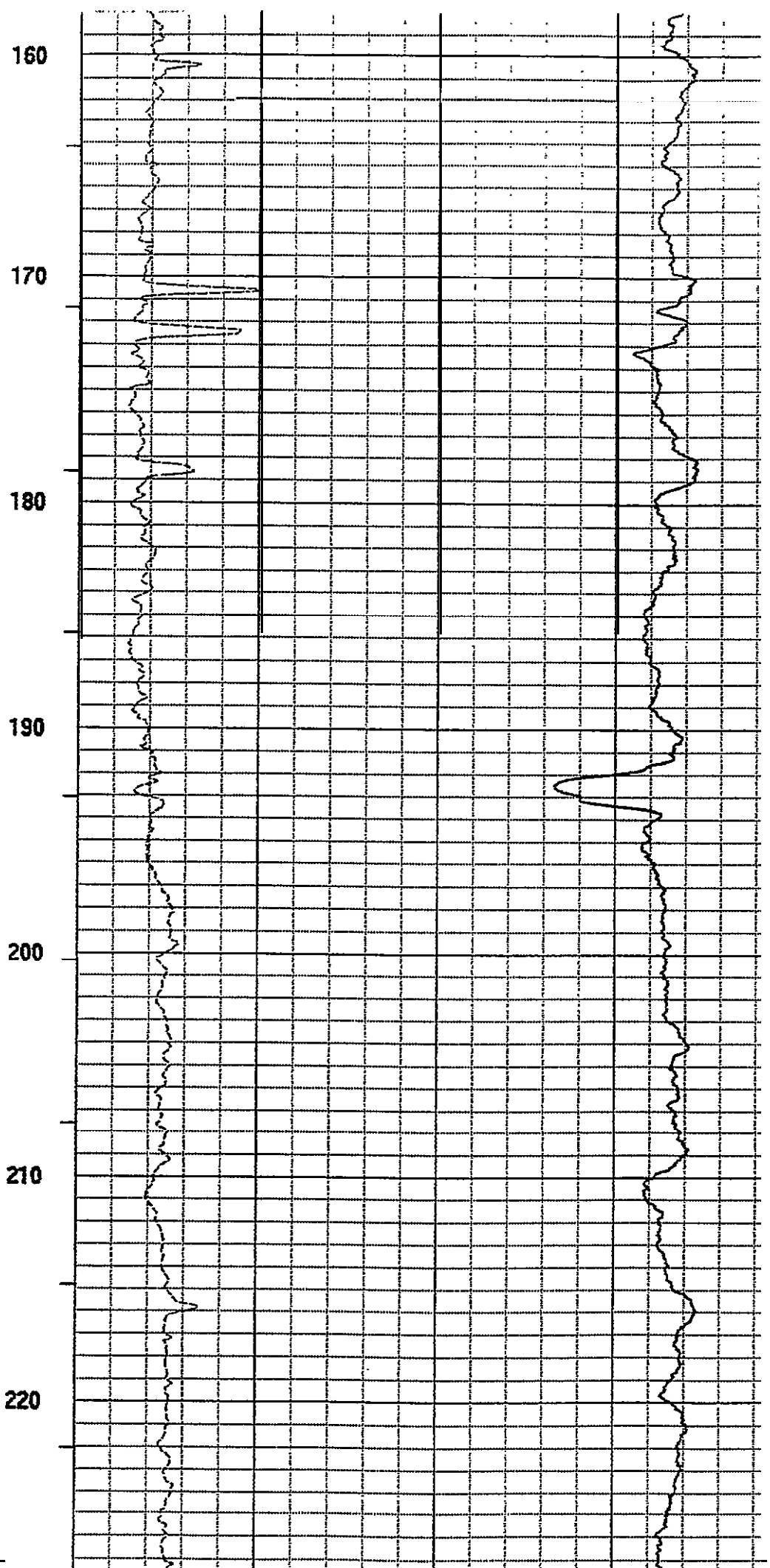
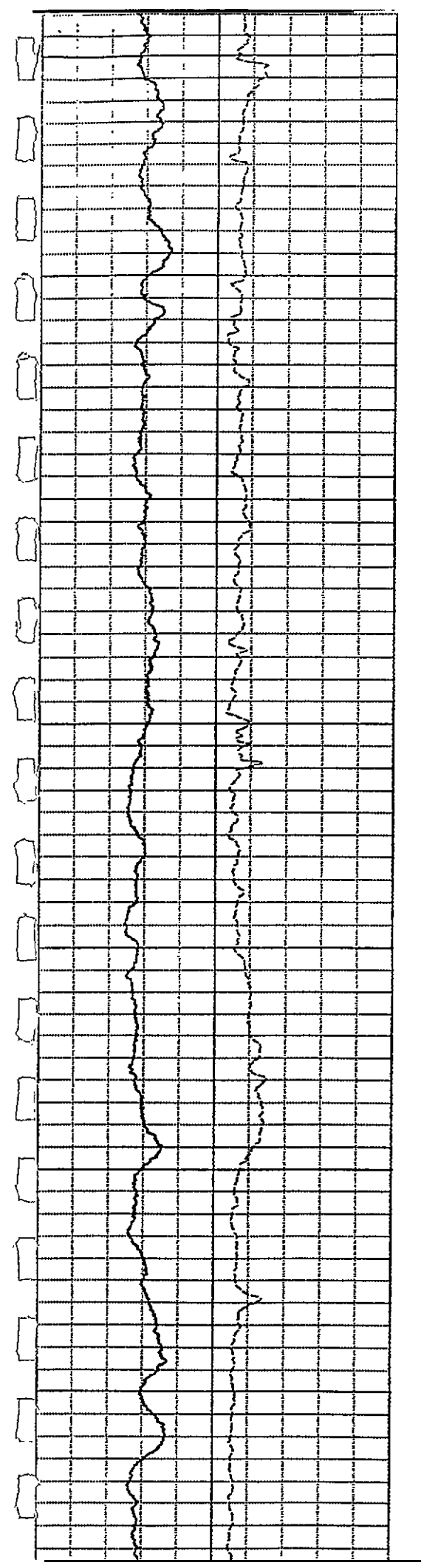


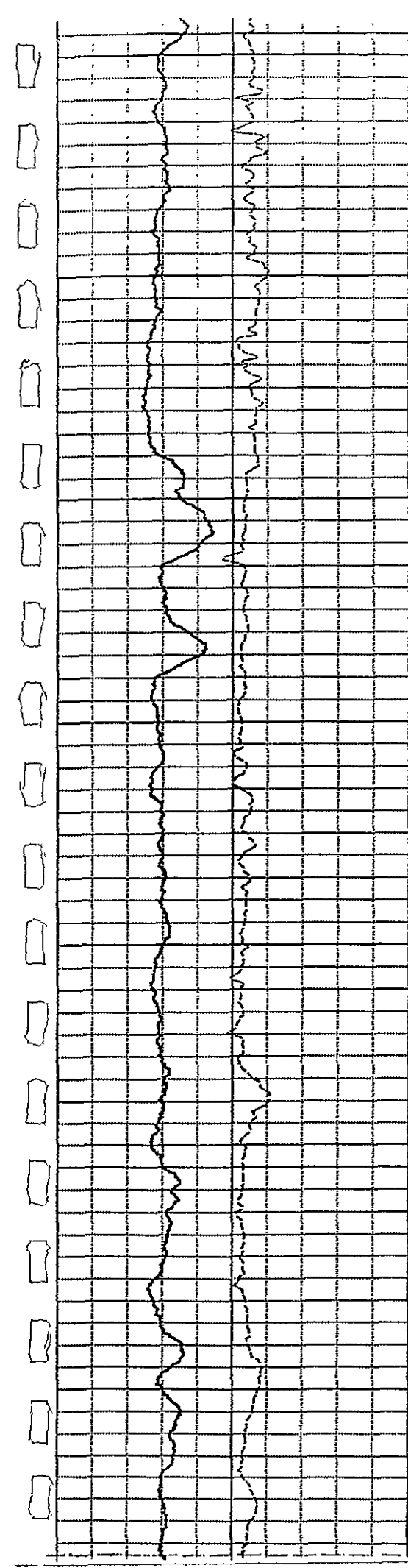
RES(CHG)	
0	OHM-M
DENSITY	
1	G/CC











230

240

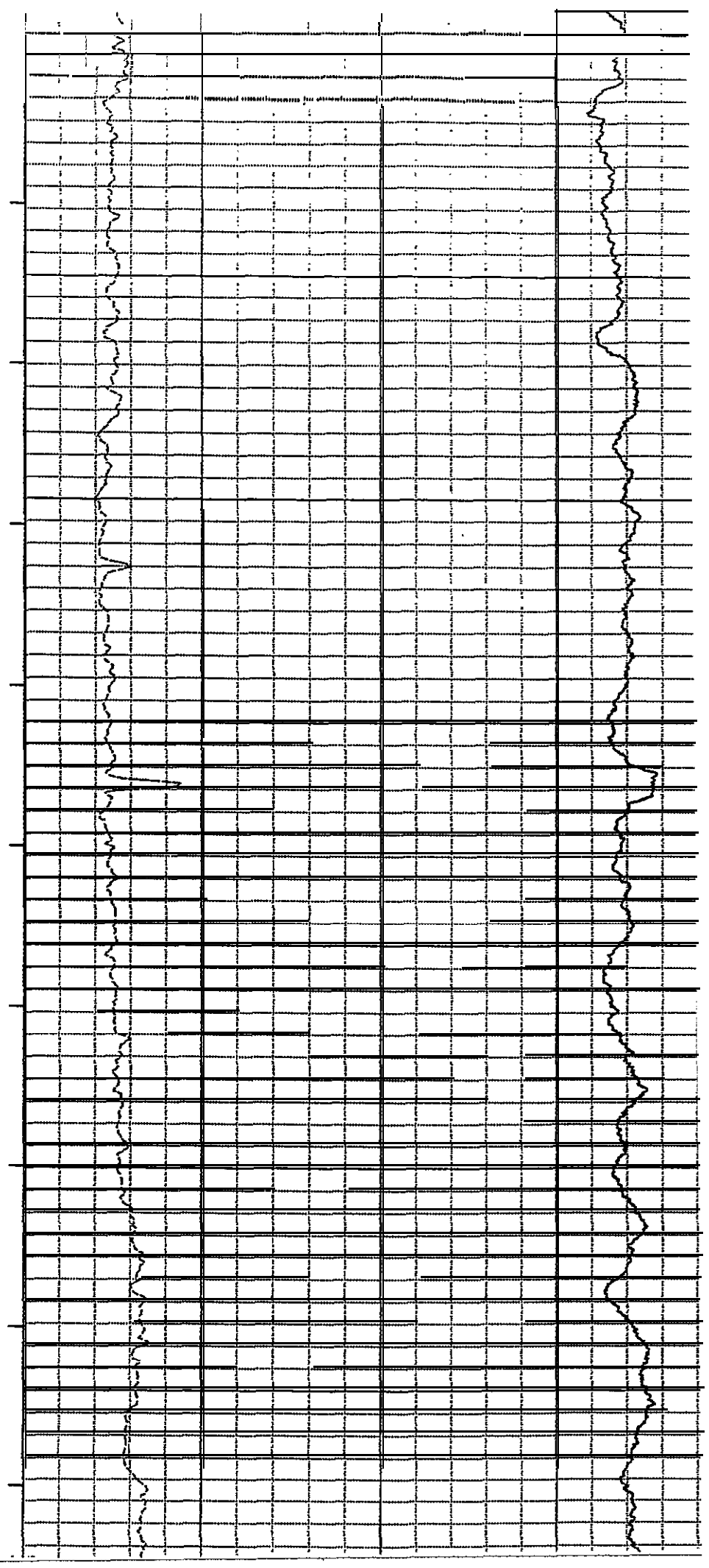
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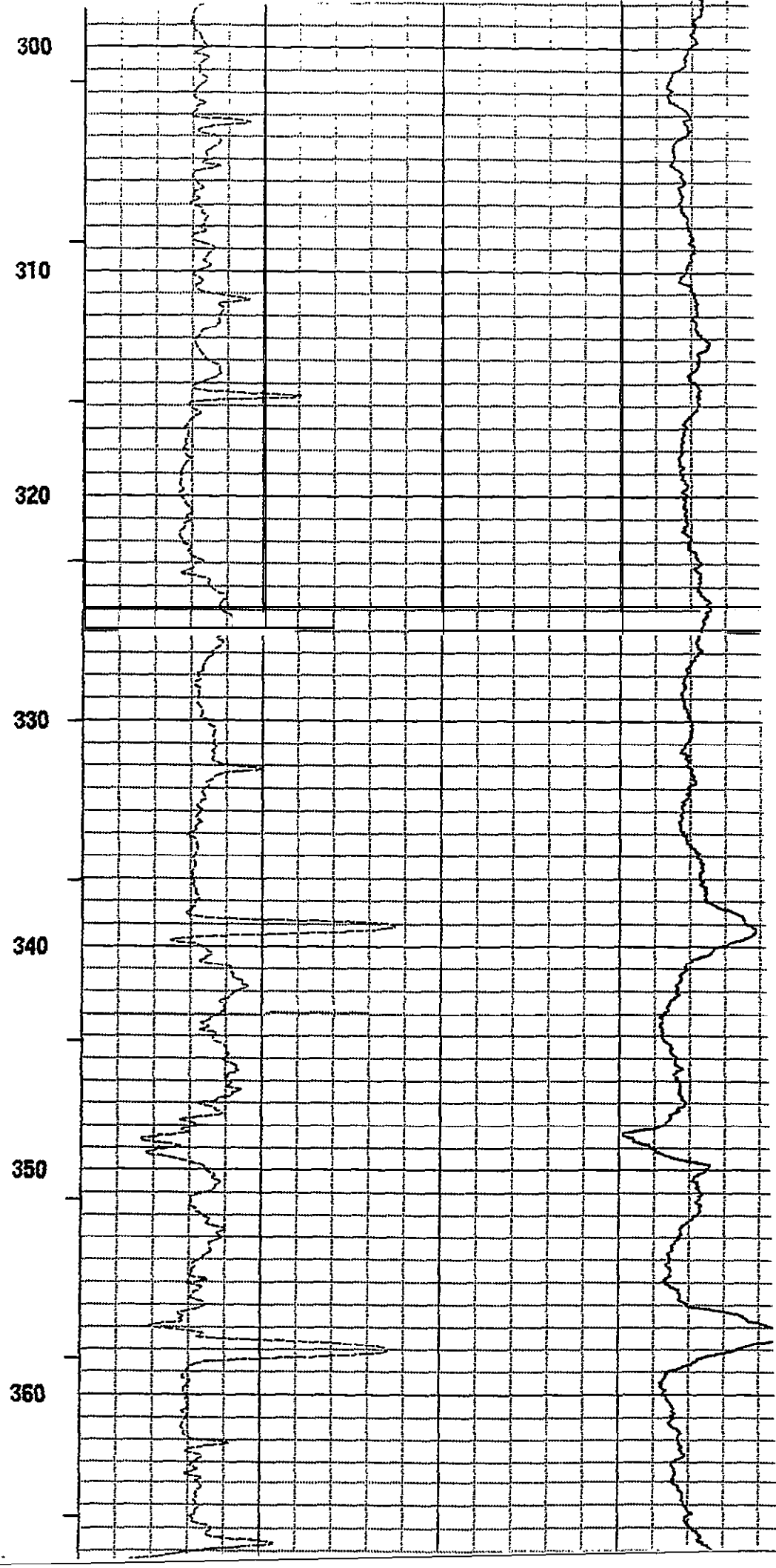
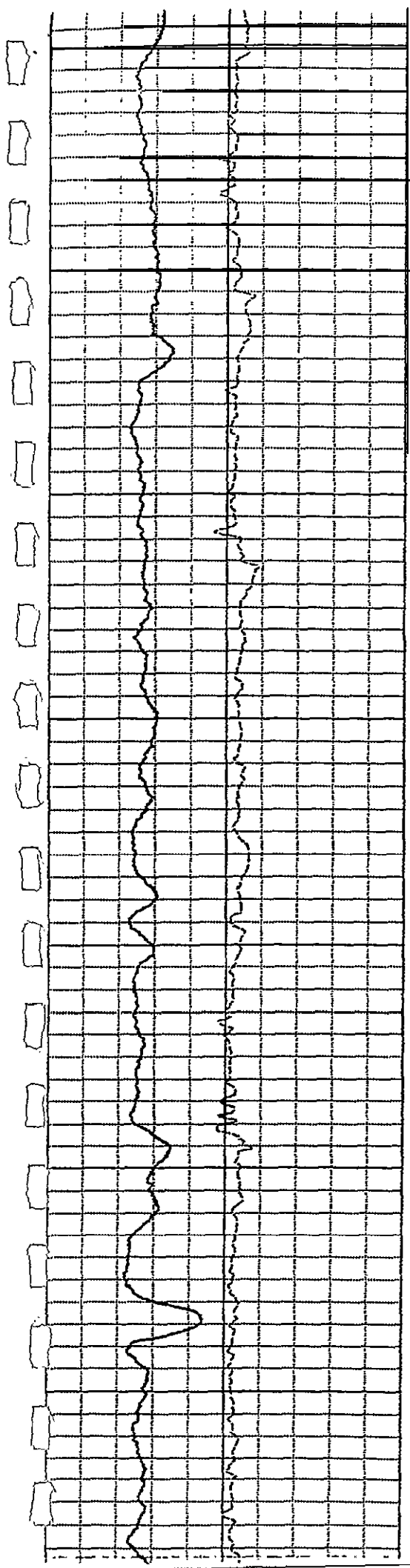
260

270

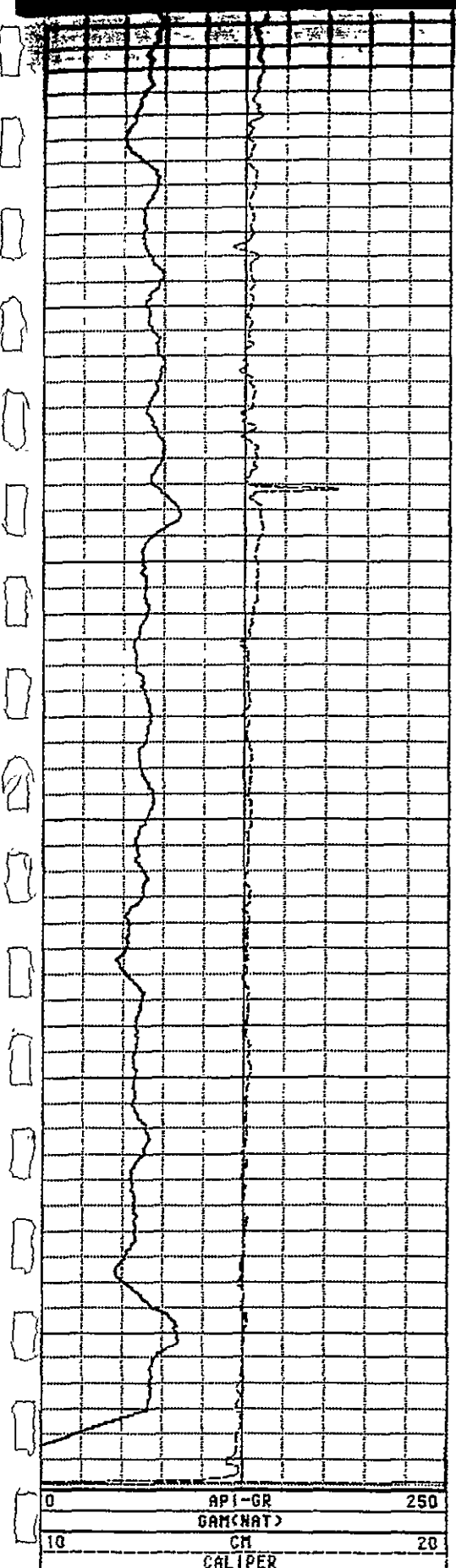
280

290









0	API-GR	250
	GAMCRAT	
10	CM	20
	CALIPER	

370

380

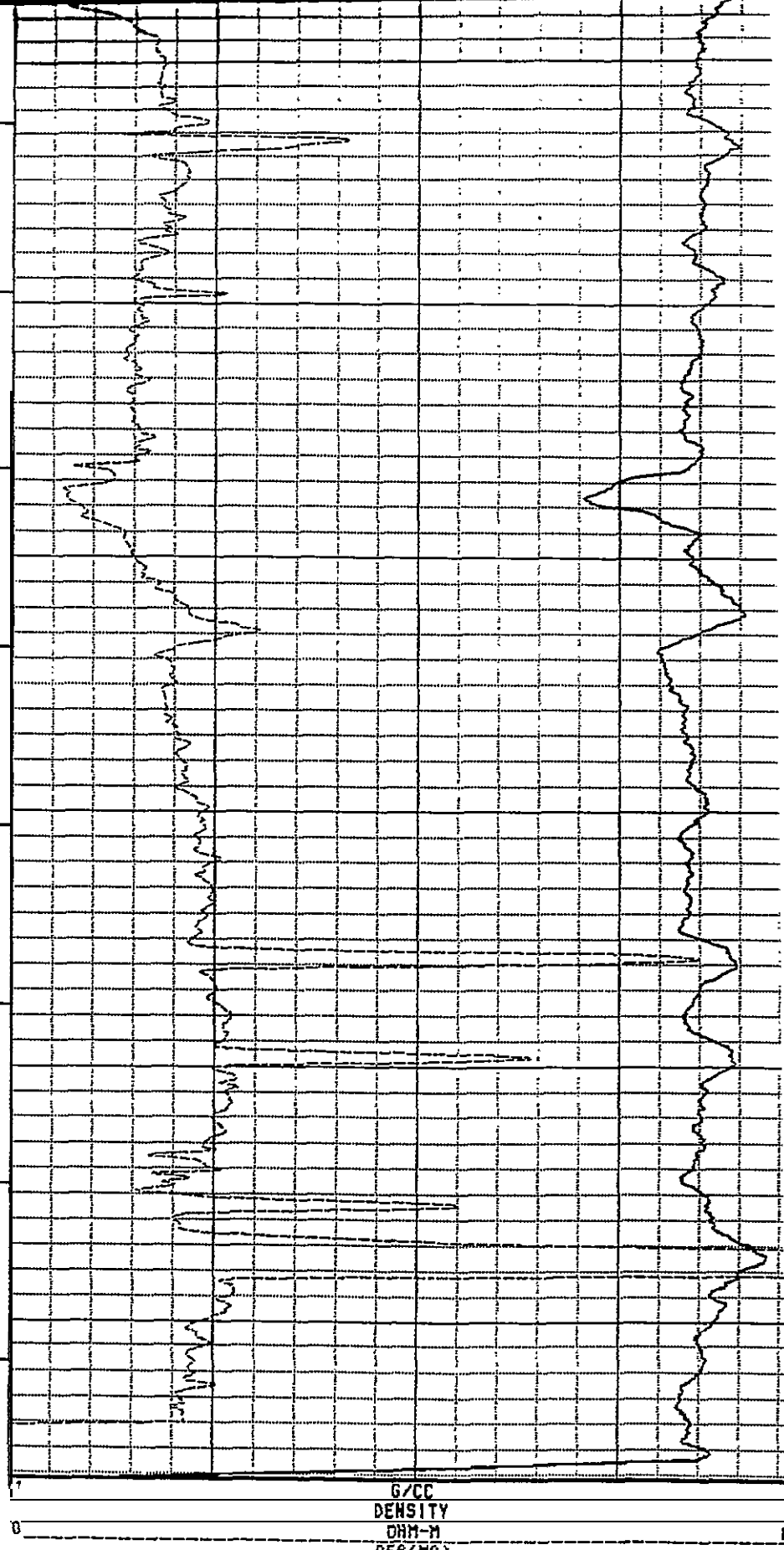
390

400

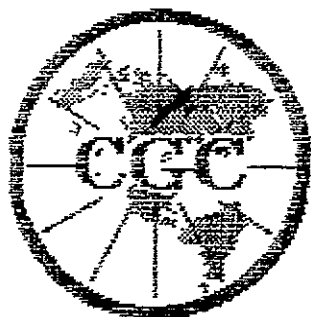
410

420

426



0	G/CC	
	DENSITY	
	DRH-M	
	RES<MG>	

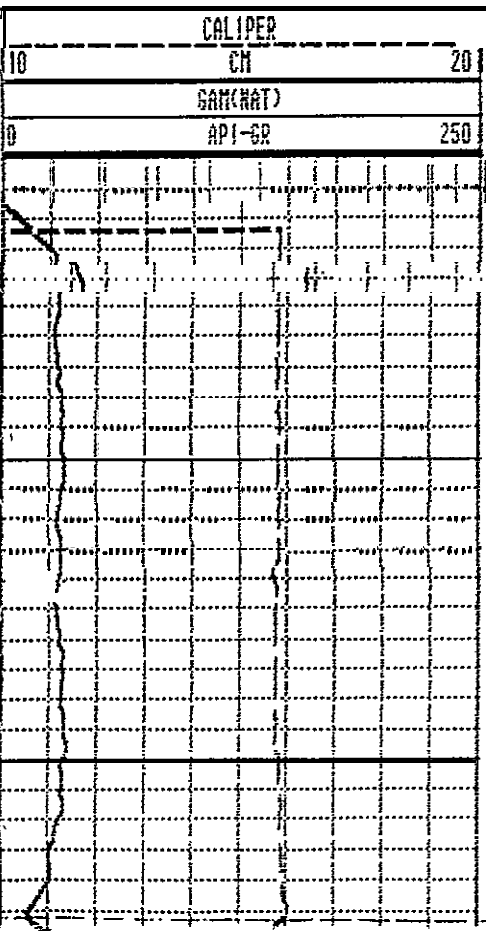


# Century GEOPHYSICAL CORP.

## SONIC

COMPANY	: CAN. OCC. PETRO. LTD.	OTHER SERVICES:	
WELL	: 94-82	9838	
LOCATION/FIELD	: ISOLUM RIVER	9300	
COUNTY	: CAMPBELL RIVER		
STATE	: B.C.		
SECTION	:	TOWNSHIP	: RANGE :
DATE	: 02/28/94	PERMANENT DATUM	: GL ELEVATIONS
DEPTH DRILLER	: 426.7	ELEV. PERM. DATUM:	KB :
LOG BOTTOM	: 426.28	LOG MEASURED FROM:	GL DF :
LOG TOP	: 8.88	DRL MEASURED FROM:	GL GL :
CASING DRILLER	: 24	LOGGING UNIT	: 8903
CASING TYPE	: STEEL	FIELD OFFICE	: CALGARY
CASING THICKNESS:	0.12	RECORDED BY	: T. LENYCKVJ
BIT SIZE	: 15.0	BOREHOLE FLUID	: WATER FILE : PROCESSE
MAGNETIC DECL.	: 18	RM	: TYPE : 9030AA
MATRIX DENSITY	: 2.65	RM TEMPERATURE	: LOG : 2
FLUID DENSITY	: 1.00	MATRIX DELTA T	: 173 PLOT : CANDXY
NEUTRON MATRIX	: SANDSTONE	FLUID DELTA T	: 690 THRESH: 30000
REMARKS	:		
OPEN HOLE	:		

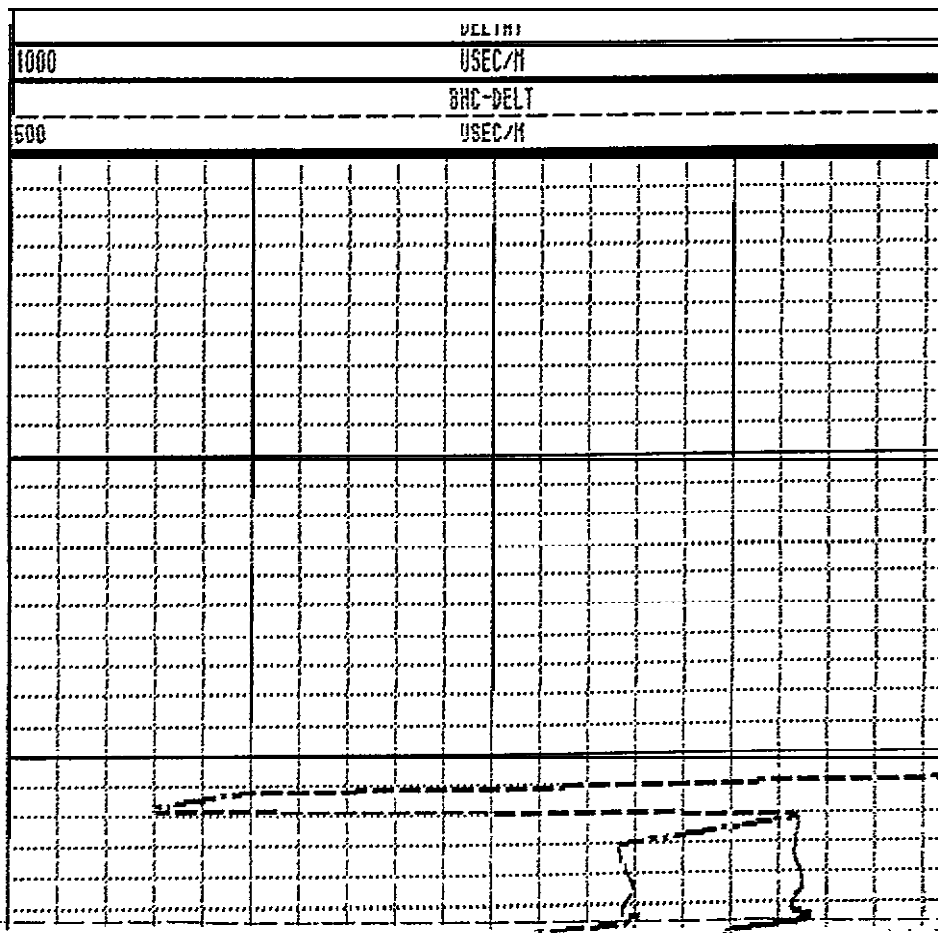
ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

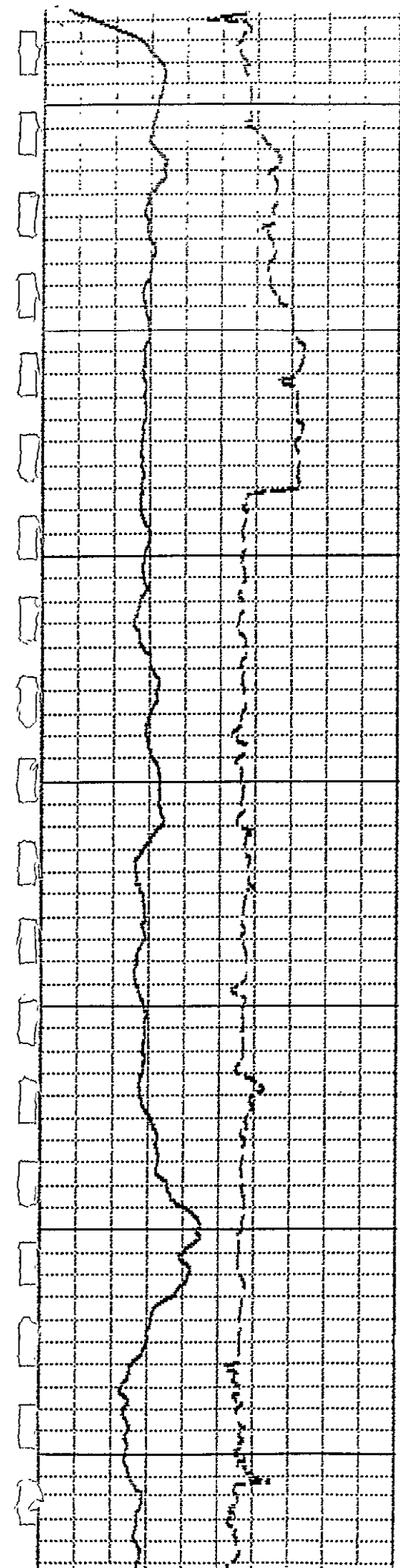


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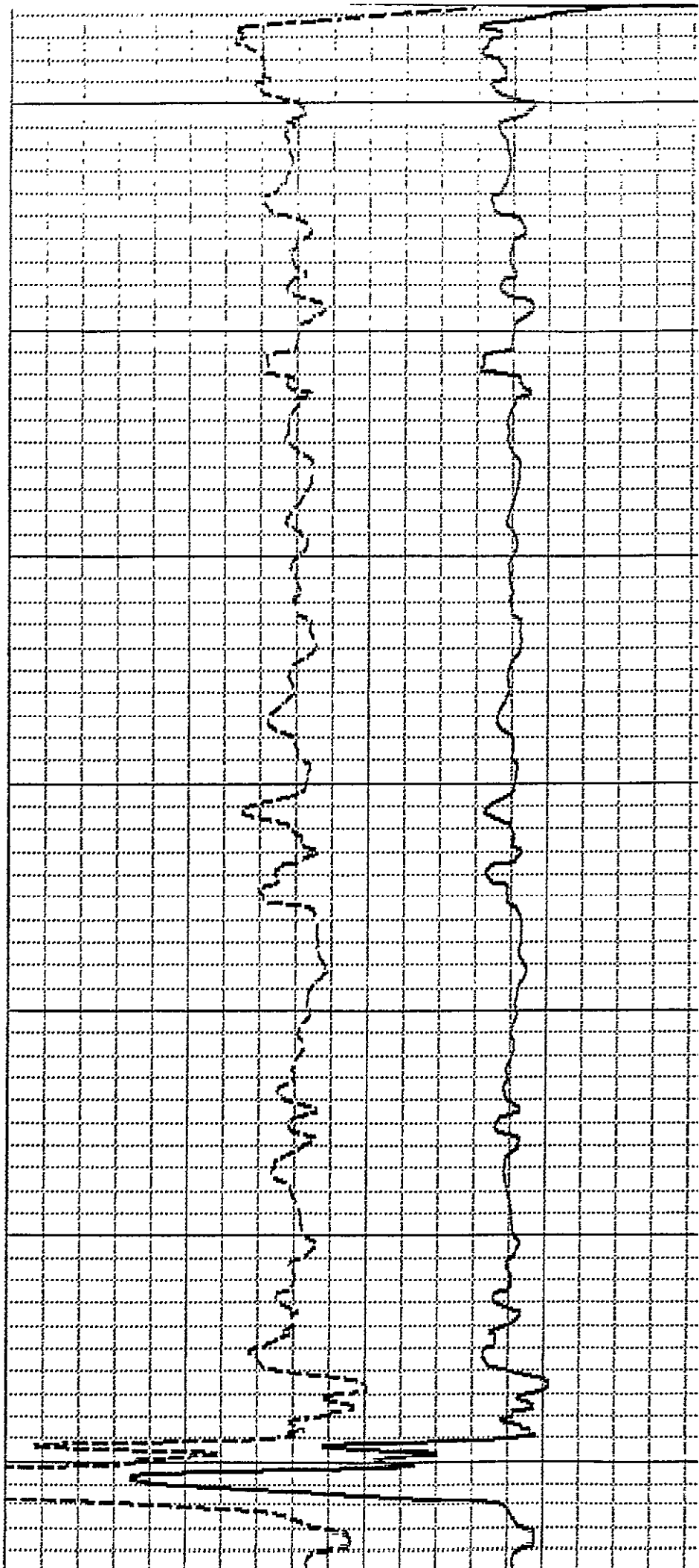
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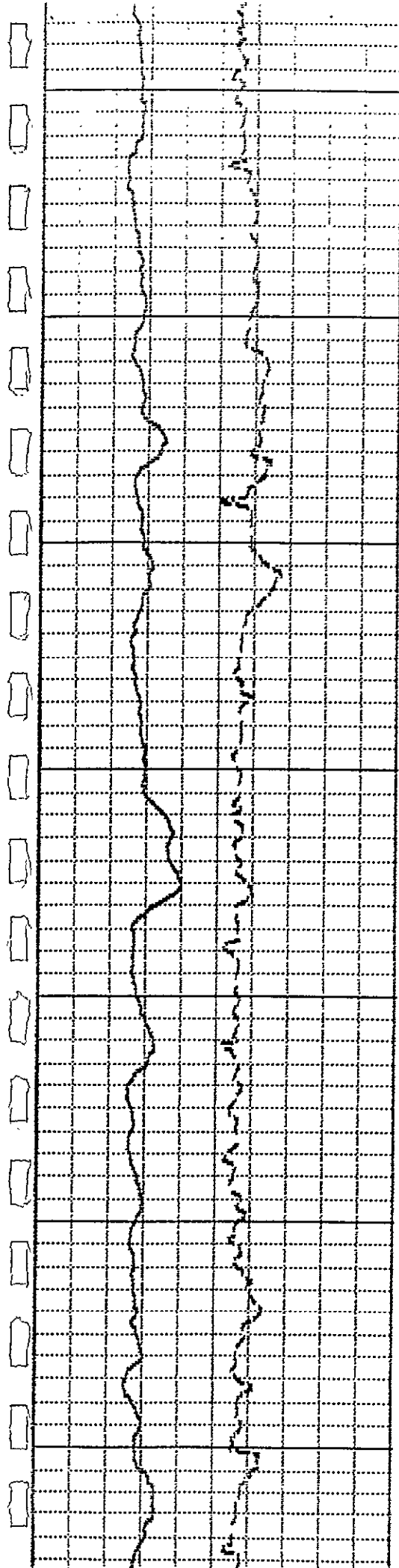
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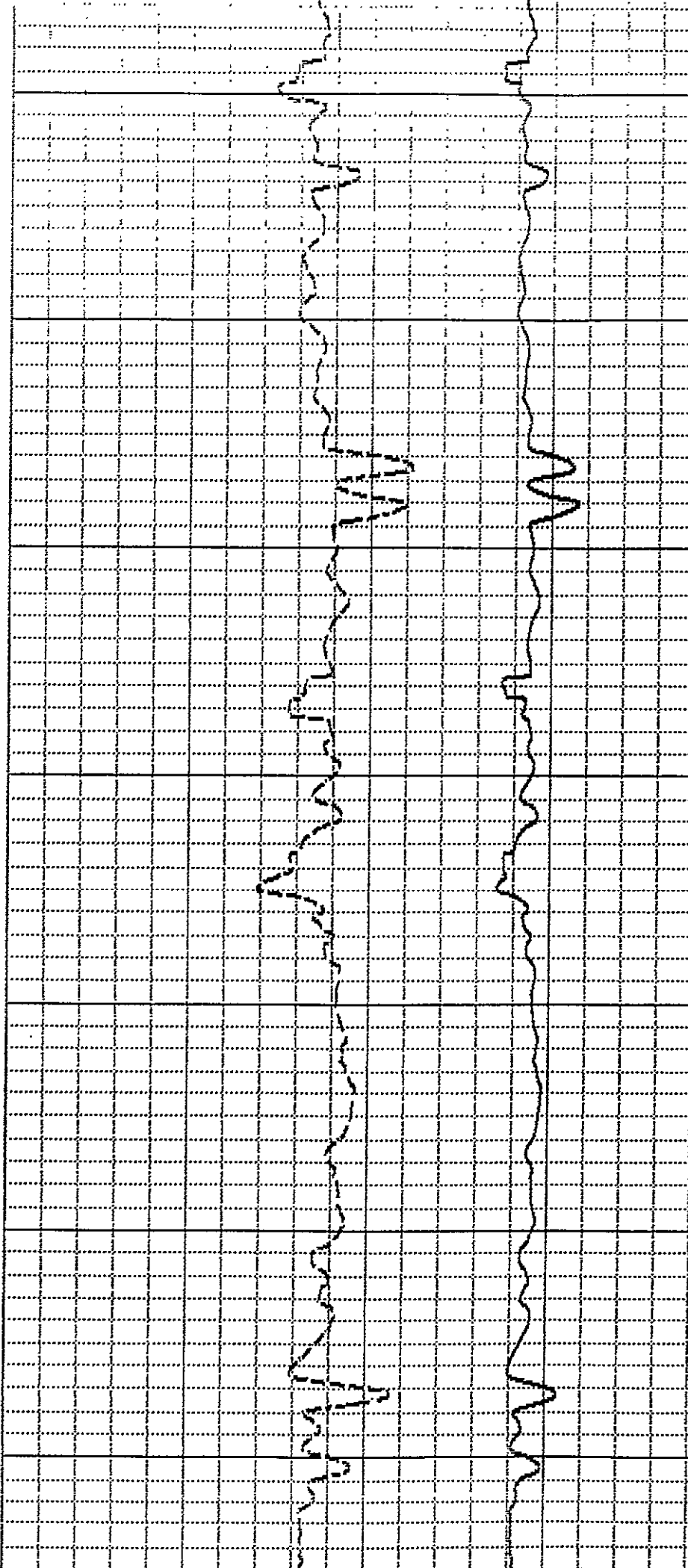


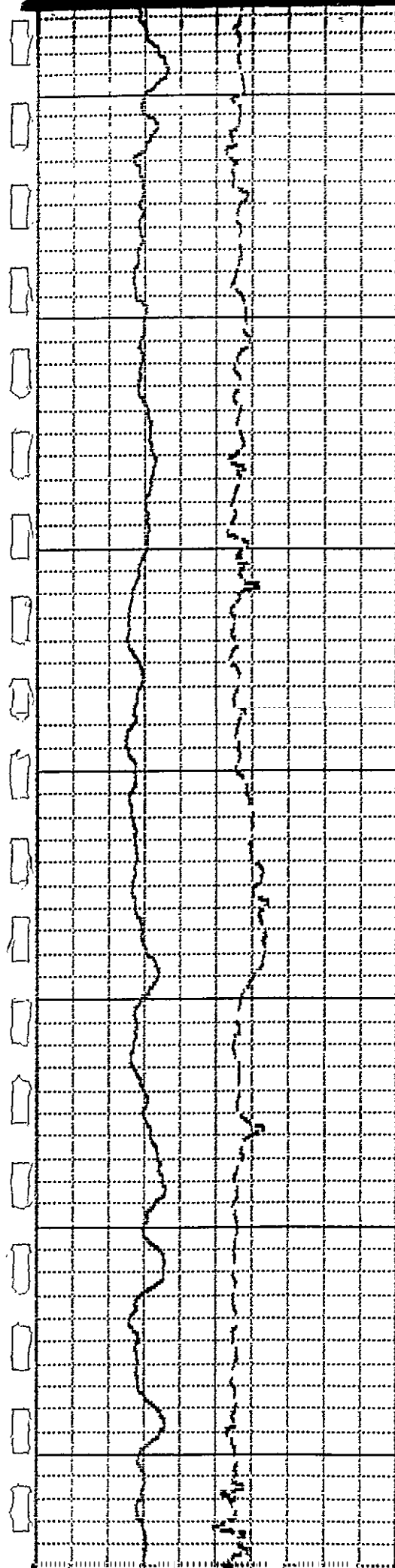
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40  
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60  
70  
80  
90





100  
110  
120  
130  
140  
150  
160





170

180

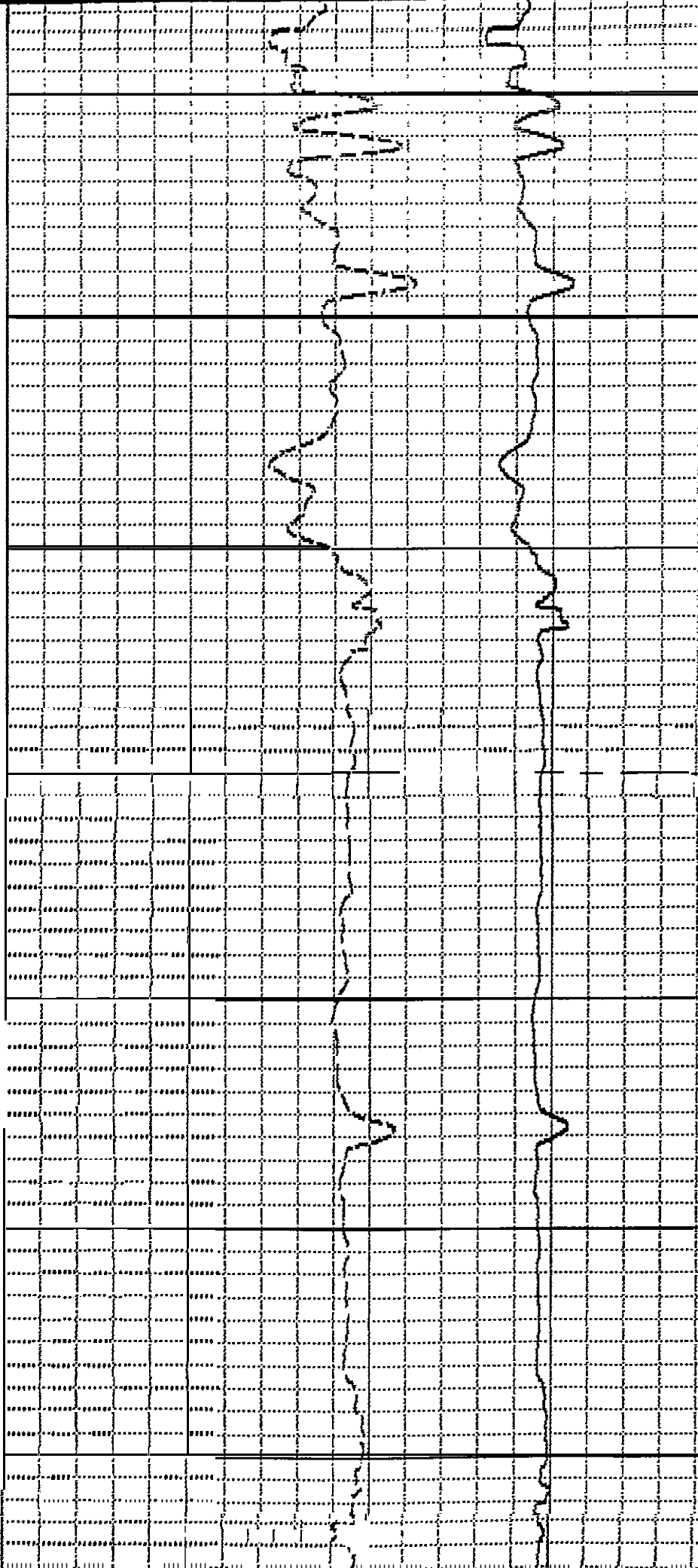
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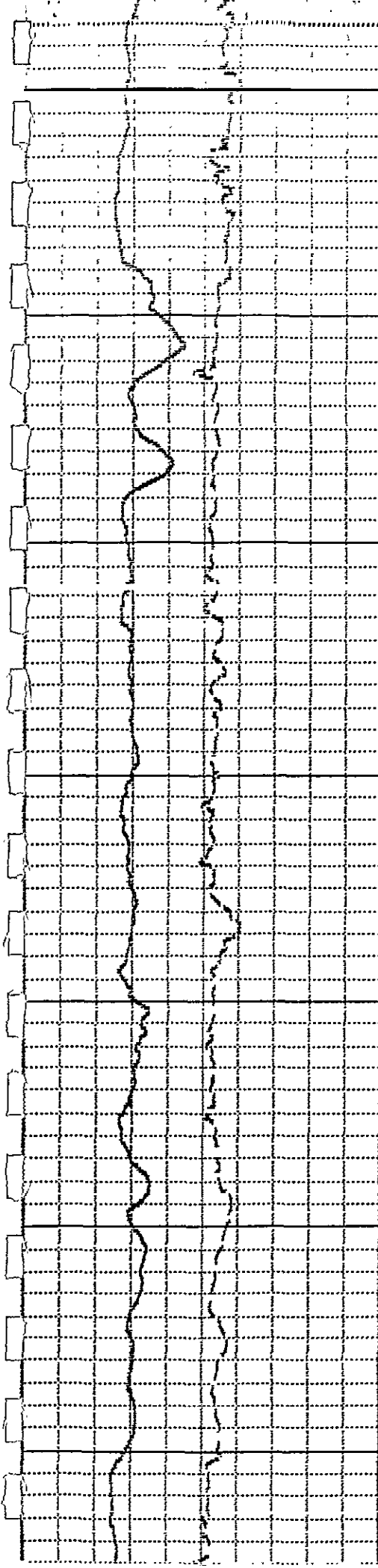
200

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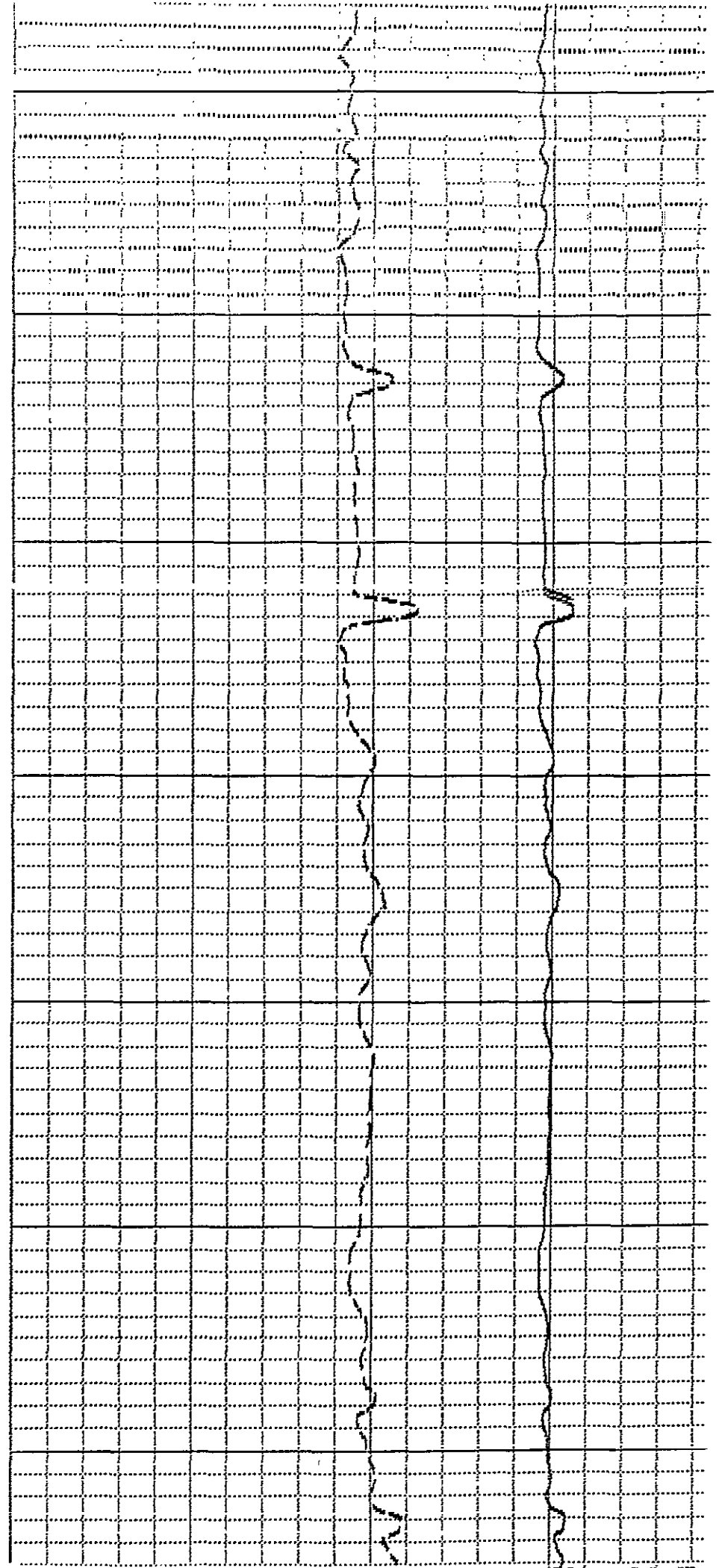
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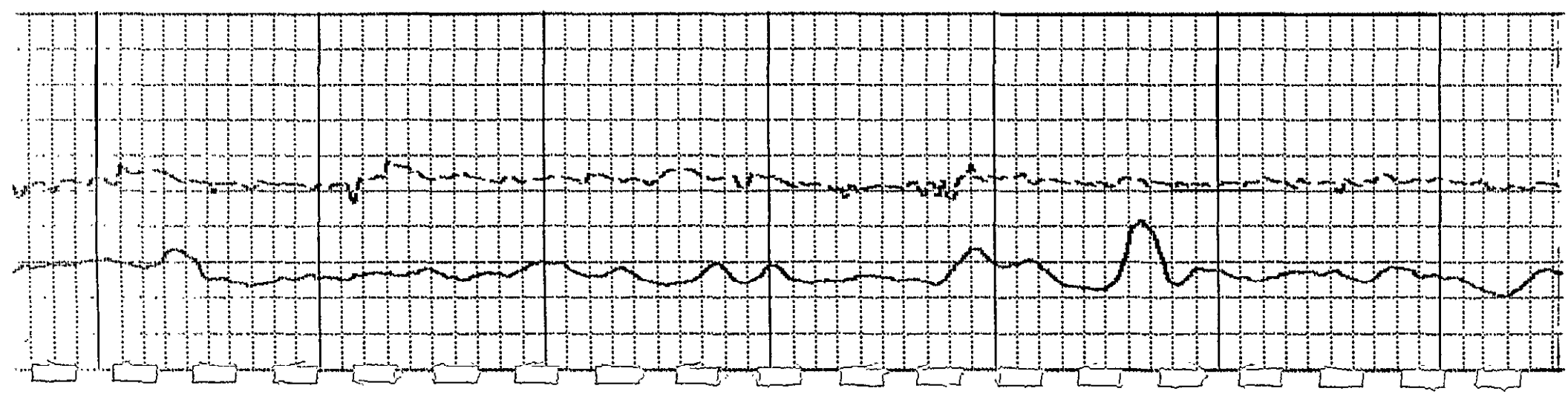
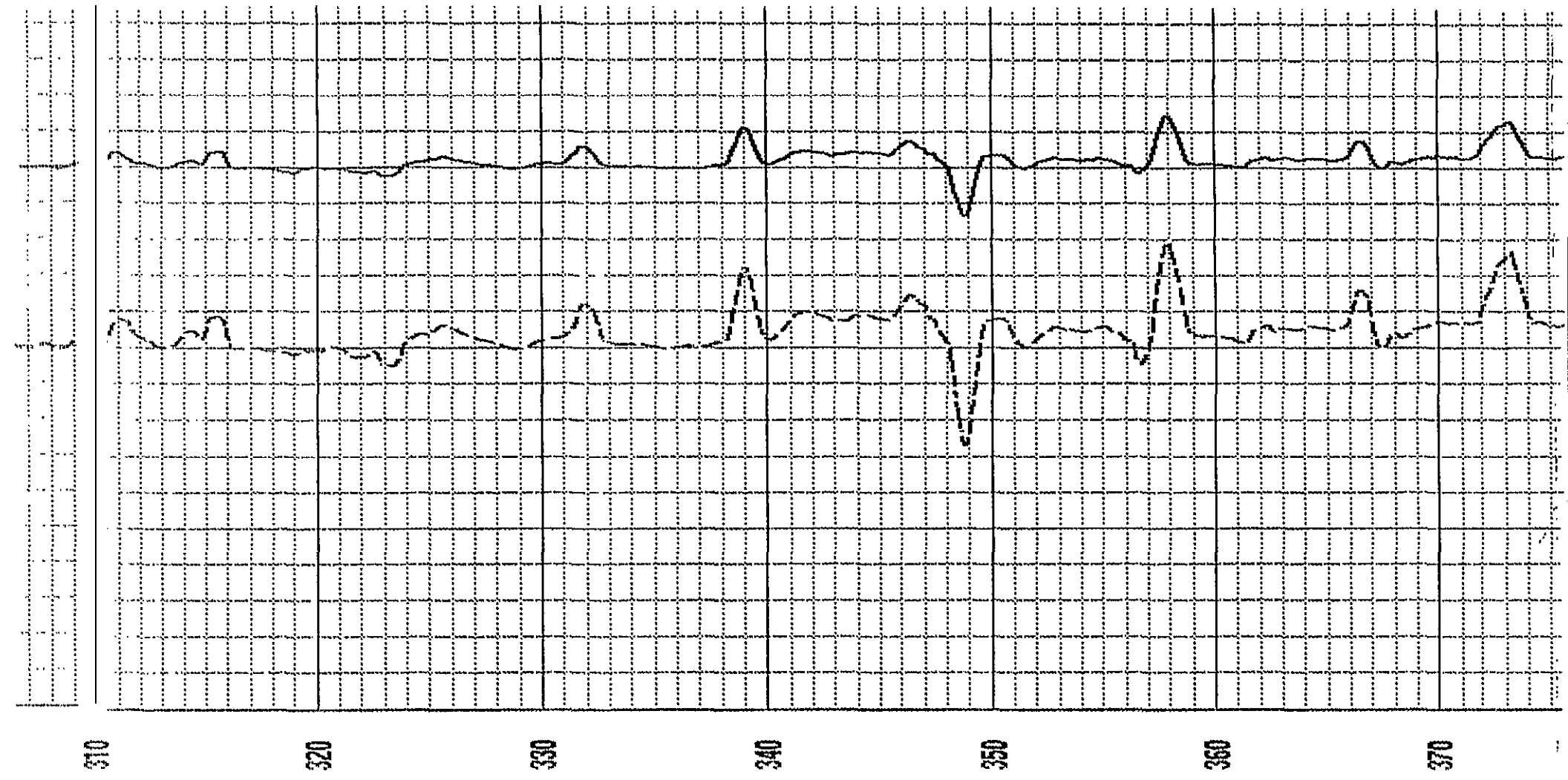
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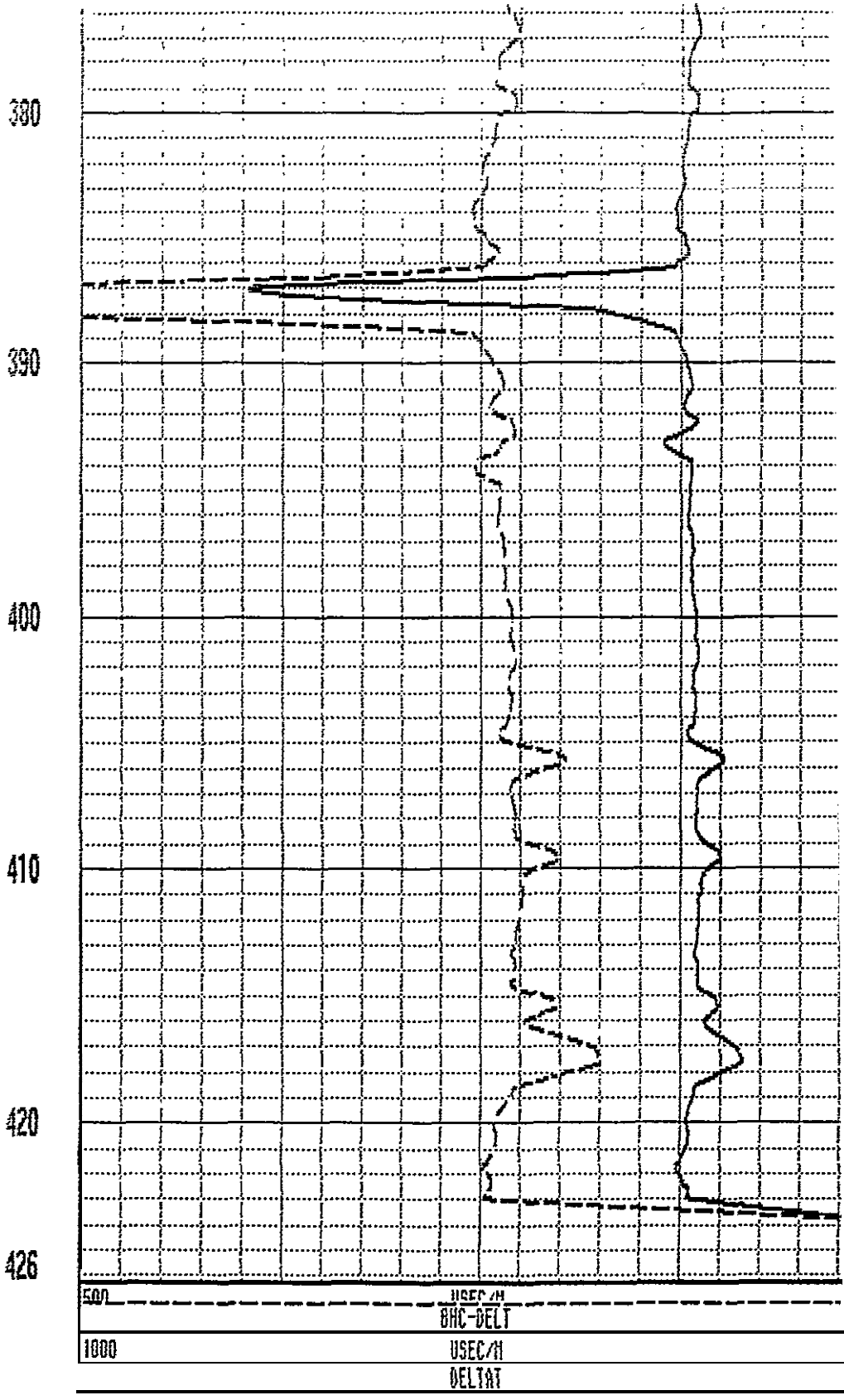
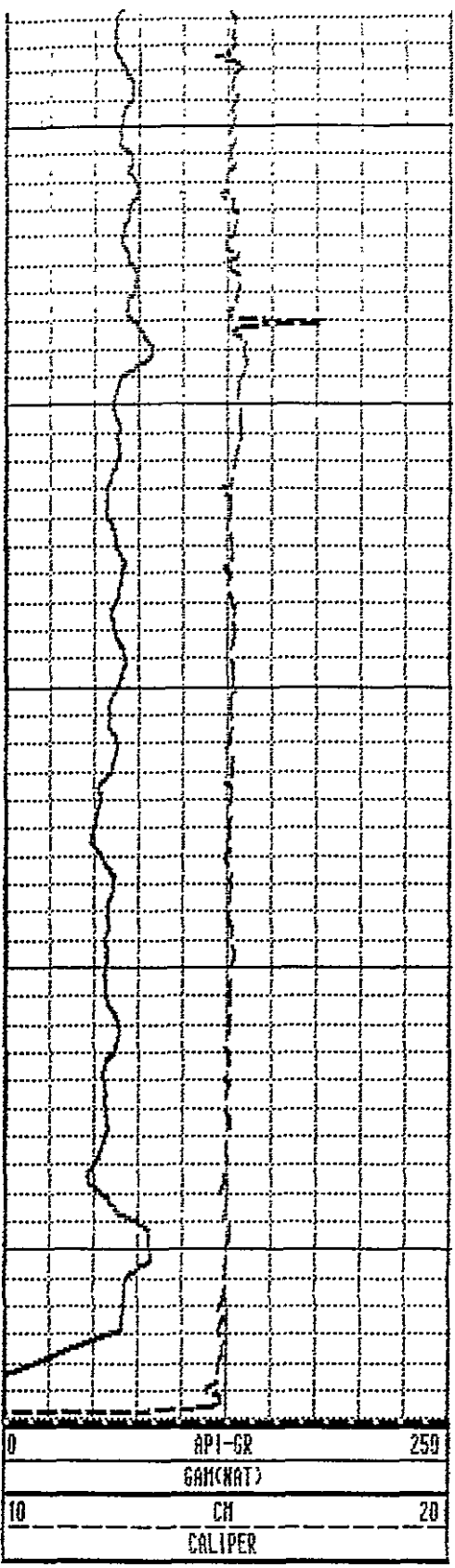


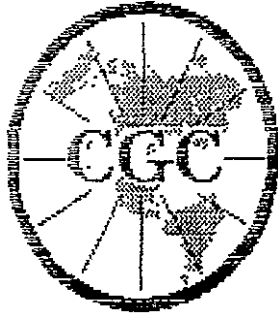
240  
250  
260  
270  
280  
290  
300











**Century**  
**GEOPHYSICAL CORP.**

**GAMMA-RES-DENSITY**

COMPANY : CAN. OCC. PETRO. LTD.  
WELL : 94-03  
LOCATION/FIELD : TSOLUM RIVER  
COUNTY : CAMPBELL RIVER  
STATE : B. C.  
SECTION

OTHER SERVICES:  
9030  
9300

TOWNSHIP

RANGE :

DATE : 02/25/94  
DEPTH DRILLER : 109  
LOG BOTTOM : 108.59  
LOG TDP : 1.00

PERMANENT DATUM : GL  
ELEV. PERM. DATUM:  
LOG MEASURED FROM: GL  
DRL MEASURED FROM: GL

ELEVATIONS  
KB :  
DF :  
GL

CASING DRILLER : 18.2  
CRS ING TYPE : STEEL  
CASING THICKNESS: 0.12

LOGGING UNIT : 8903  
FIELD OFFICE : CALGARY  
RECORDED BY : T. LEWYCKYJ

BIT SIZE : x 5 . 5  
MAGNETIC DECL. : 18  
MATRIX DENSITY : 2.65  
FLUID DENSITY : 1.00  
NEUTRON MATRIX : SANDSTONE  
REMARKS :

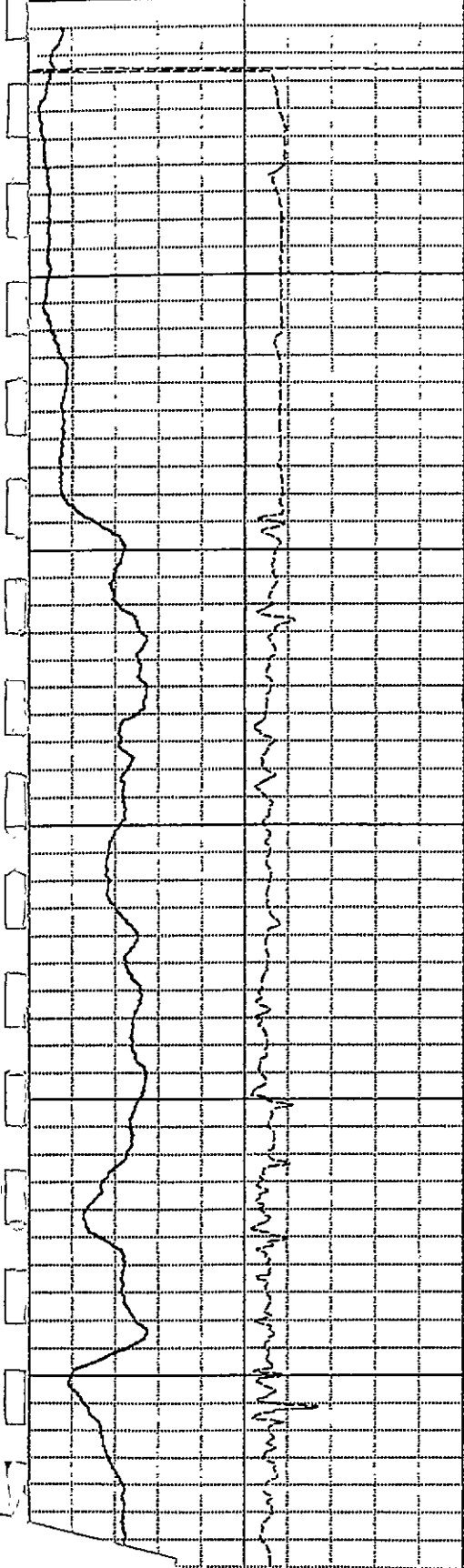
BOREHOLE FLUID : WATER  
RM  
RM TEMPERATURE  
MATRIX DELTA T : 173  
FLUID DELTA T : 690

FILE : ORIGINAL  
TYPE : 9030AA  
LOG : 0  
PLOT : CANOXY 0  
THRESH: 30000

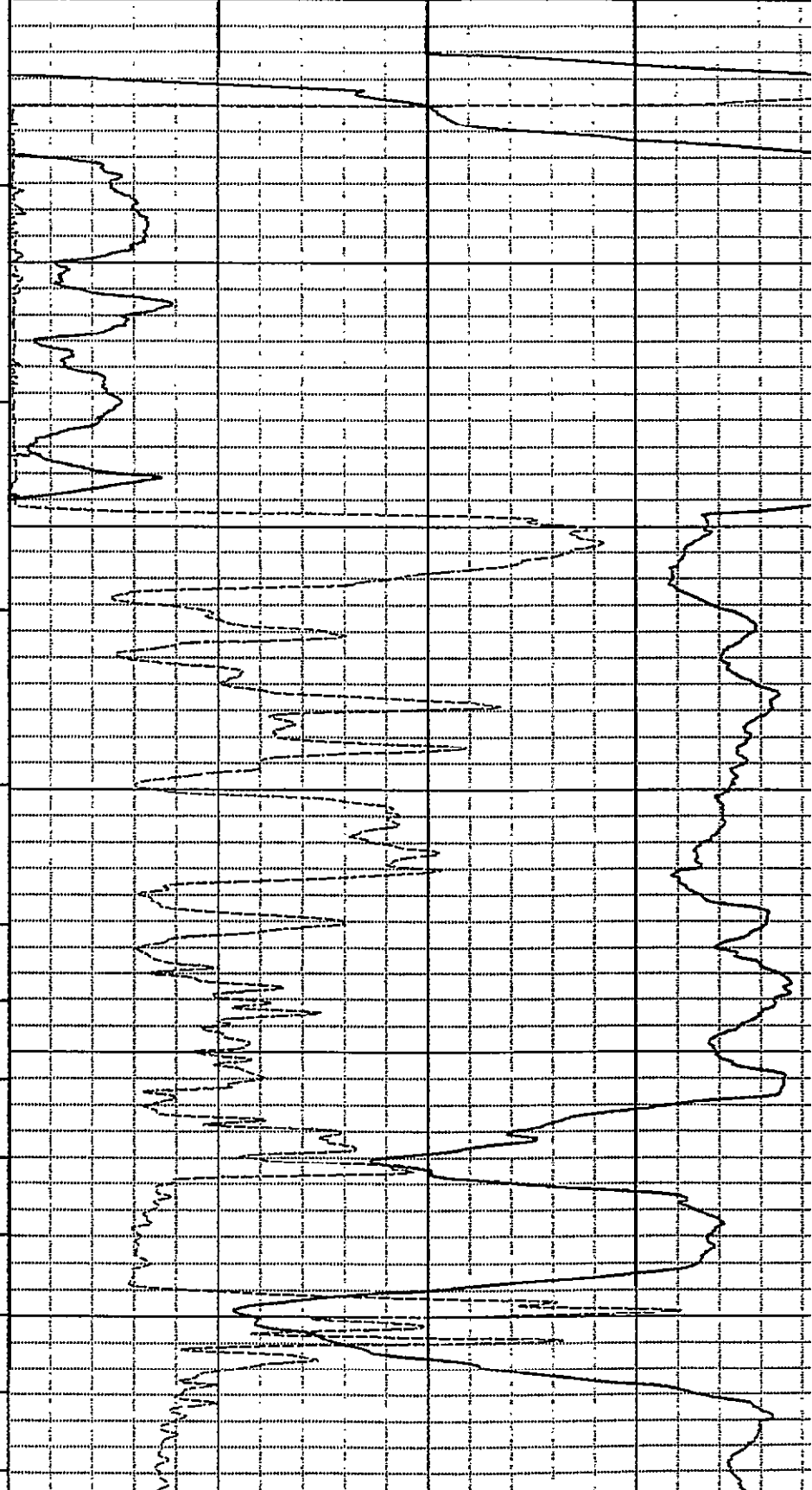
OPEN HOLE

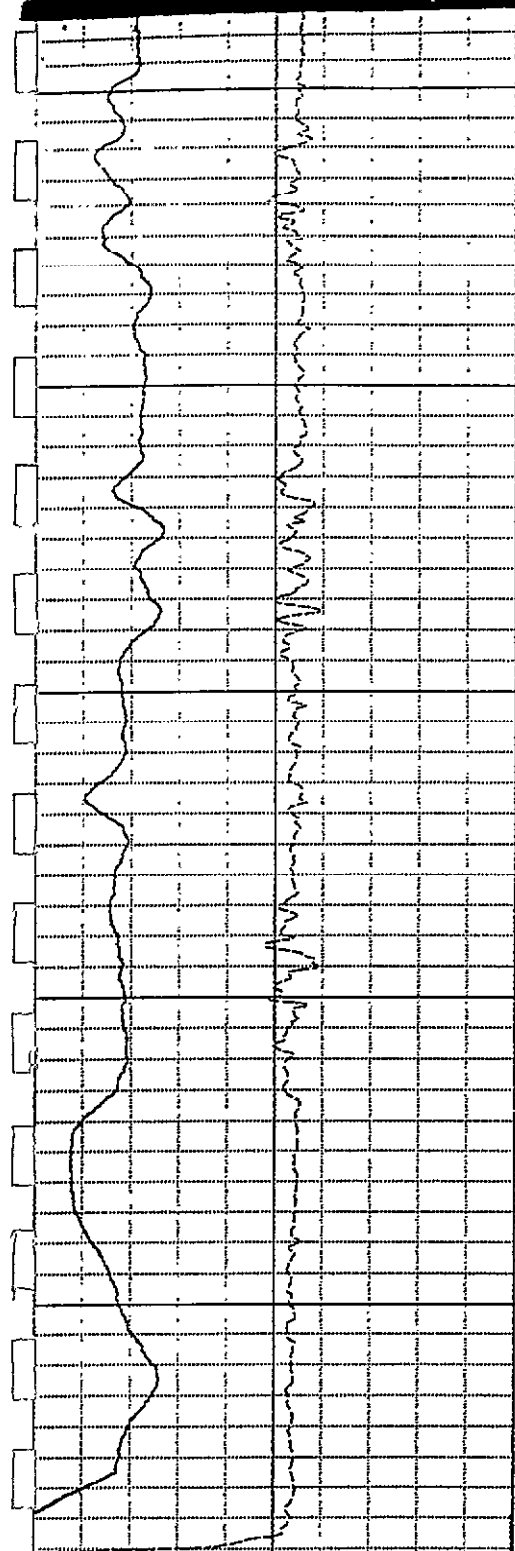
ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

CALIPER	
10	20
CM	
GAM(NAT)	
0	250
API-GR	

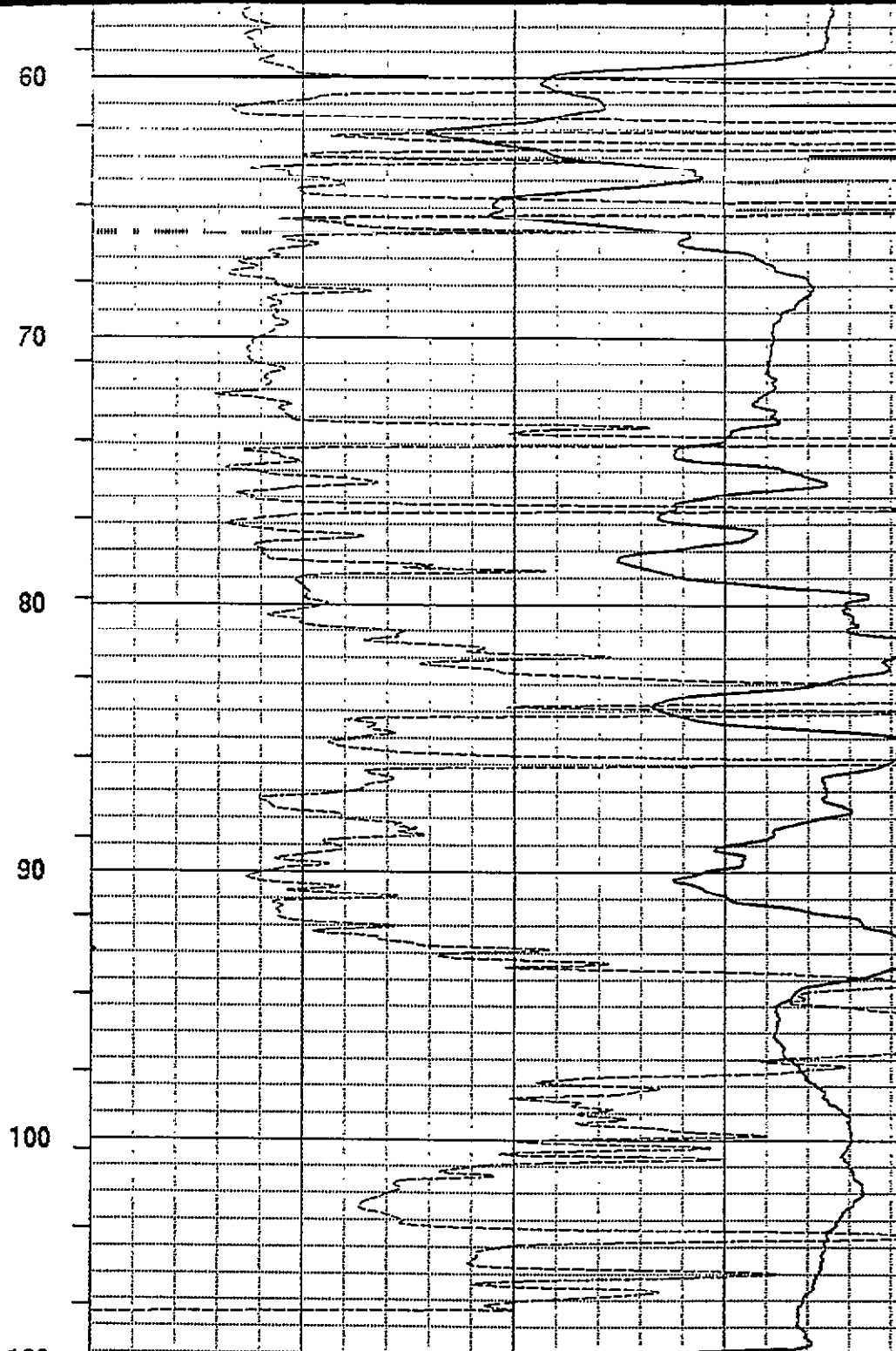


RES (MG)	
OHM-M	
DENSITY	
G/CC	

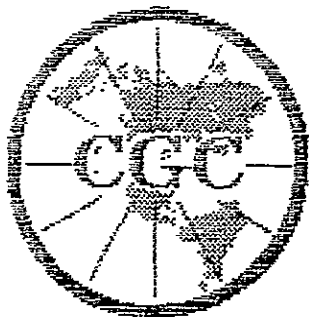




0	API GR	250
10	CM	20
	CALIPER	



0	SEC	
	DENS I - TY	
	RES (MG)	



# Century GEOPHYSICAL CORP.

**SONIC**

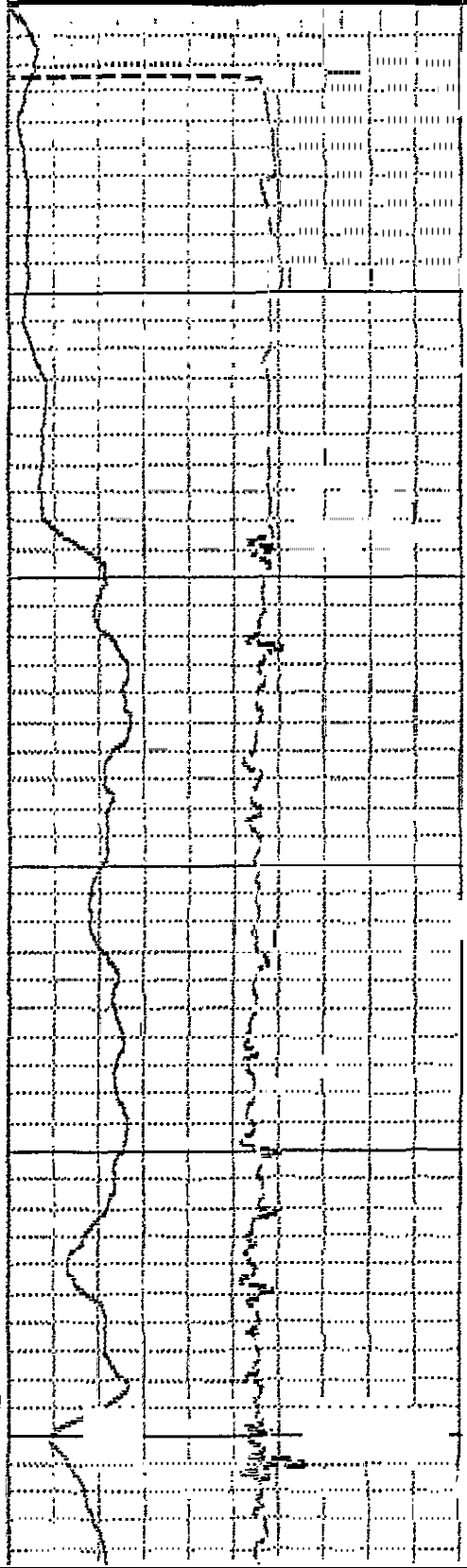
COMPANY : CAN. OCC. PETRO. LTD.  
WELL : 94-03  
LOCATION/FIELD : ISOLUM RIVER  
COUNTY : CAMPBELL RIVER  
STATE : B. C.  
SECTION : TOWNSHIP RANGE :

OTHER SERVICES:  
9030  
9300

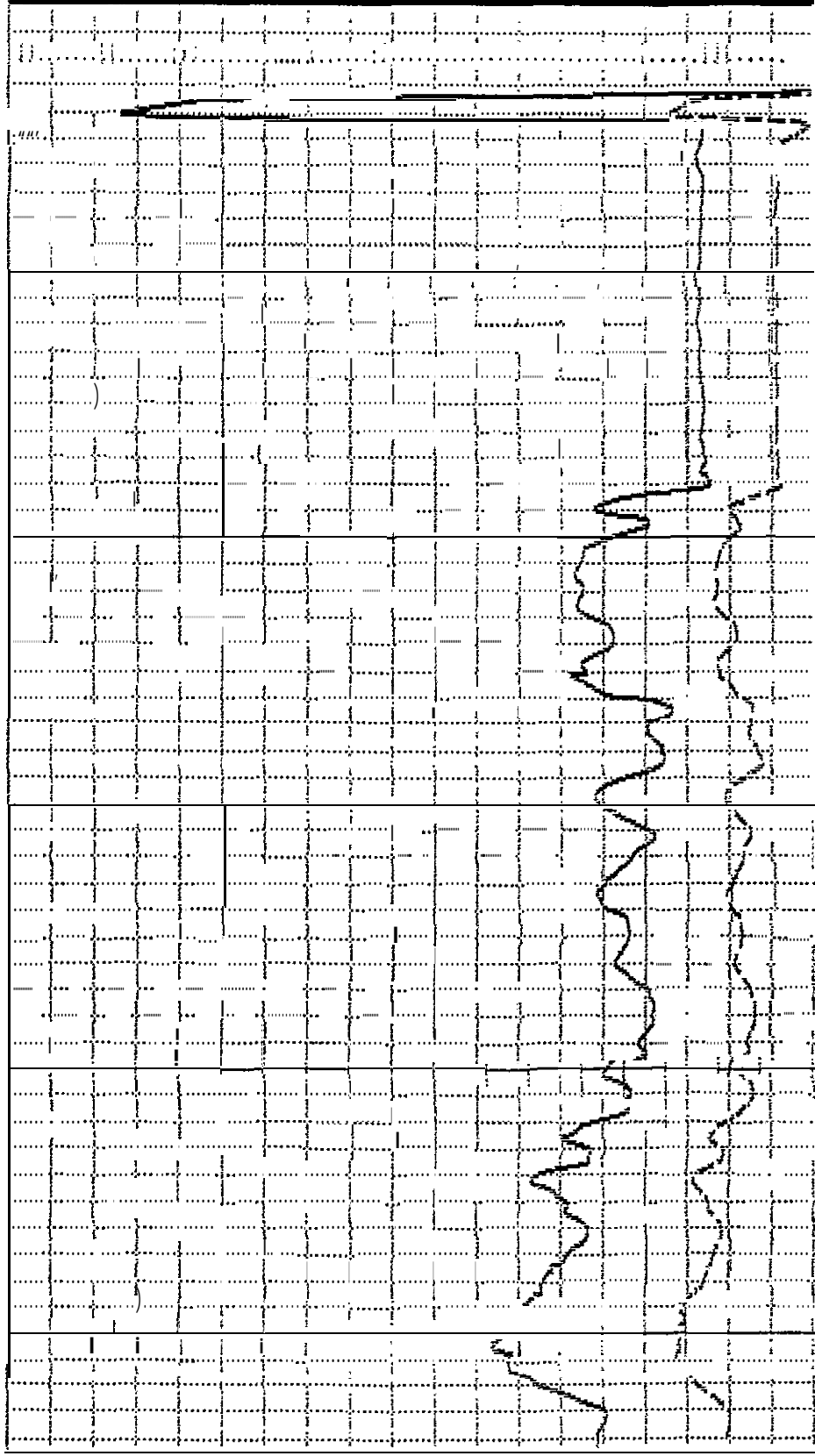
DATE : 02/25/94 PERMANENT DATUM : GL ELEVATIONS  
DEPTH DRILLER : 3.89 ELEV. PERM. DATUM: KB  
LOG BOTTOM : 108.60 LOG MEASURED FROM: GL DF  
LOG TOP : 0.00 DRL MEASURED FROM: GL GL  
CASING DRILLER : 18.2 LOGGING UNIT : 3903  
CASING TYPE : STEEL FIELD OFFICE : CALGARY  
CASING THICKNESS: 0.12 RECORDED BY : T. LEWYCKYJ  
BIT SIZE : 15.5 BOREHOLE FLUID : WATER FILE : PROCESSE  
MAGNETIC DECL. : 18 RM : TYPE : 9030AA  
MATRIX DENSITY : 2.65 RN TEMPERATURE : LOG : 2  
FLUID DENSITY : 1.00 MATRIX DELTA T : 173 PLOT : CANDXY  
NEUTRON MATRIX : SANDSTONE FLUID DELTA T : 690 THRESH : 30000  
REMARKS :  
OPEN HOLE

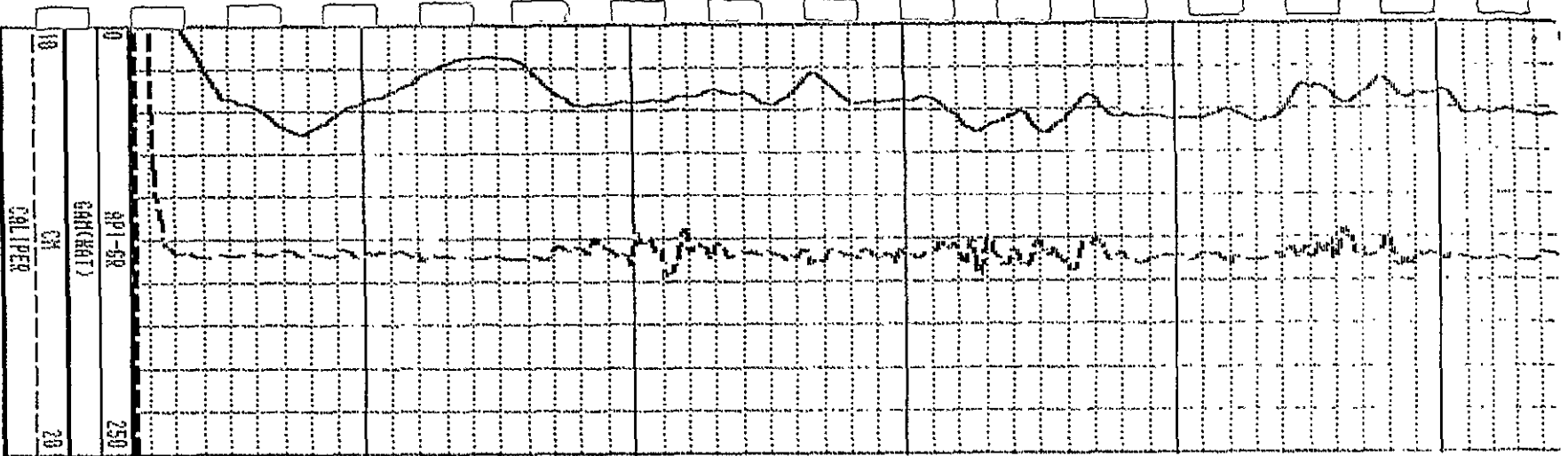
**R L L SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS**

241.058  
CM  
201  
SNCBAT  
0 350  
01-GR

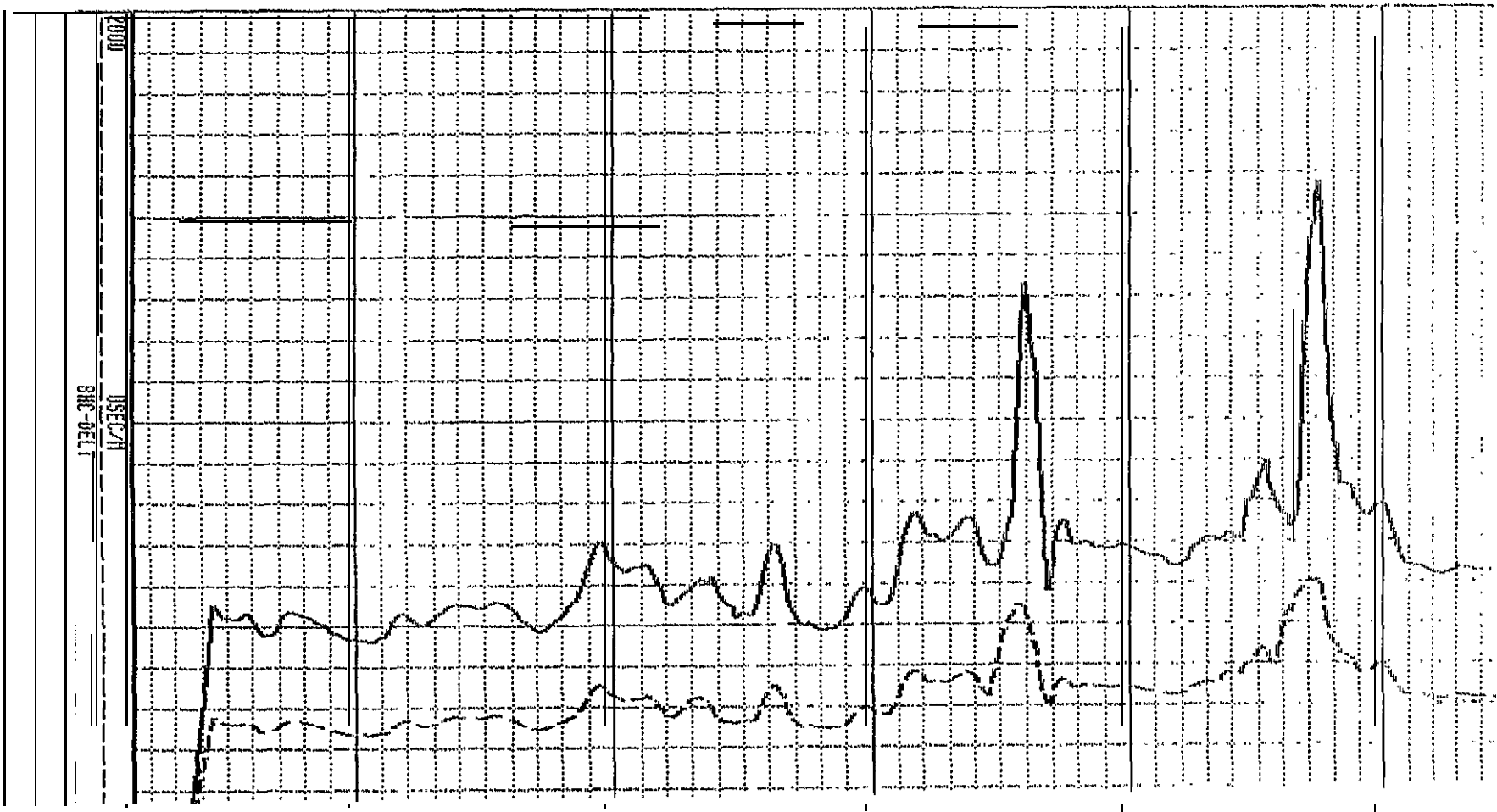


1000  
2000  
JSEC/M  
SNC-DELT  
JSEC/M





50  
 70  
 80  
 90  
 100  
 109





# Century GEOPHYSICAL CORP.

## GAMMA-RES-DENS I TY

COMPANY : CAN. OCC. PETRO. LTD.  
WELL : 94-04  
LOCATION/FIELD : TSOLUM RIVER  
COUNTY : CAMPBELL RIVER  
STATE : B.C.  
SECTION :

OTHER SERVICES:  
9830  
9300

TOWNSHIP : : RANGE :

DATE : 02/24/94  
DEPTH DRILLER : 200.6  
LOG BOTTOM : 279.34  
LOG TOP : 1.83

PERMANENT DATUM : GL  
ELEVATIONS  
ELEV. PERM. DATUM: KB  
LOG MEASURED FROM: GL DF  
DRL MEASURED FROM: GL GL

CASING DRILLER : 6.1  
CASING TYPE : STEEL  
CASING THICKNESS: 0.12

LOGGING WIT : 8903  
FIELD OFFICE : CALGARY  
RECORDED BY : T. LEWYCKYJ

BIT SIZE : 15.0  
MAGNETIC DECL. : 18  
MATRIX DENSITY : 2.65  
FLUID DENSITY : 1.00  
NEUTRON MATRIX : SANDSTONE

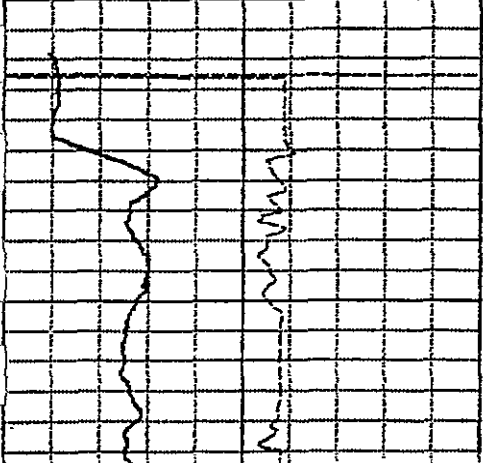
BOREHOLE FLUID : WATER  
RN  
RN TEMPERATURE :  
MATRIX DELTA T : 173  
FLUID DELTA T : 690  
FILE : ORIGINAL  
TYPE : 9830AA  
LOG : 5  
PLOT : CANOXY 0  
THRESH: 30000

REMARKS :  
OPEN HOLE

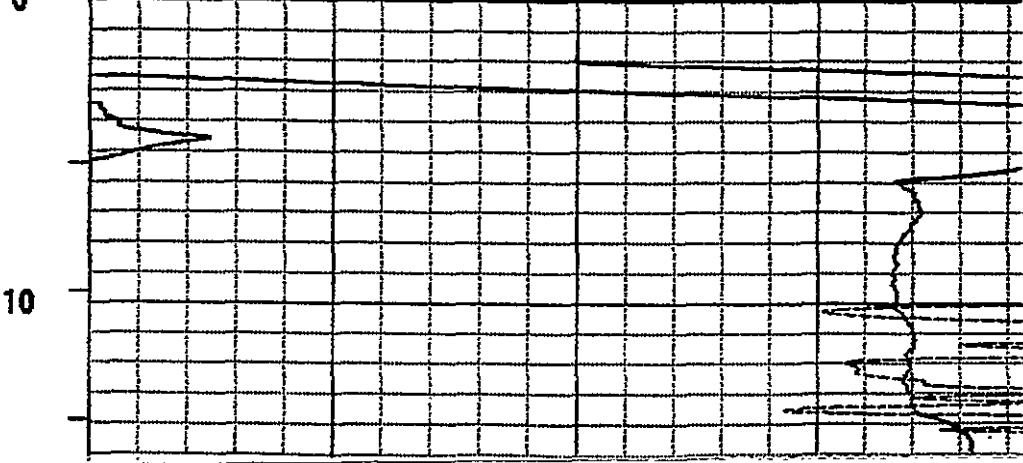
ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

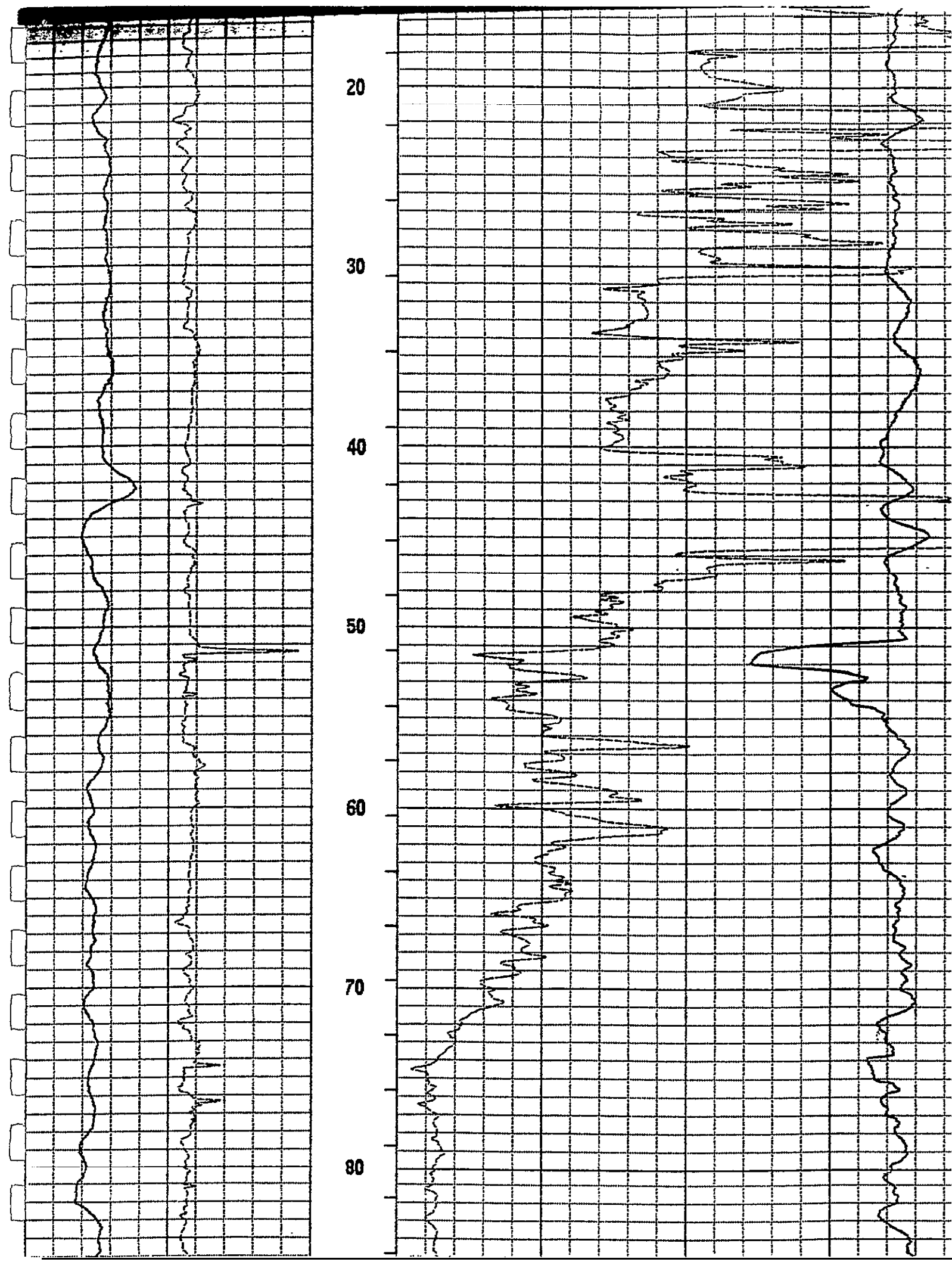


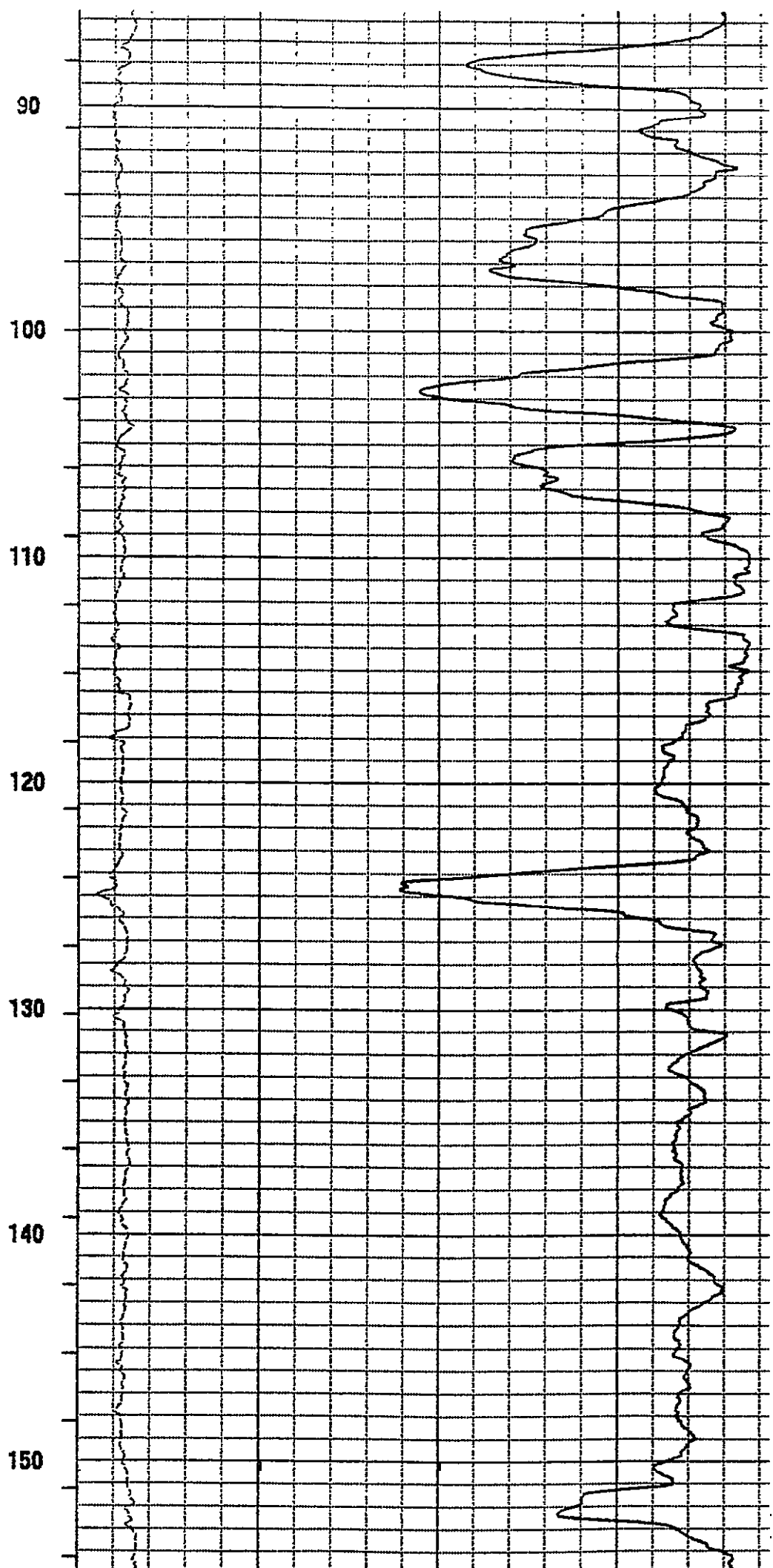
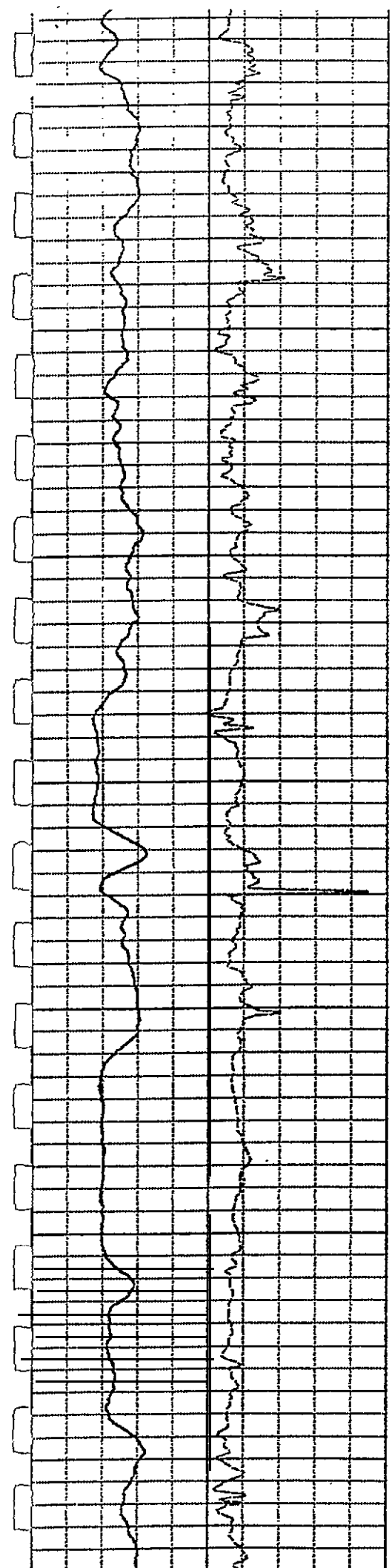
CALIPER		
10	CM	20
GAM(NAT)		
0	API-GR	250

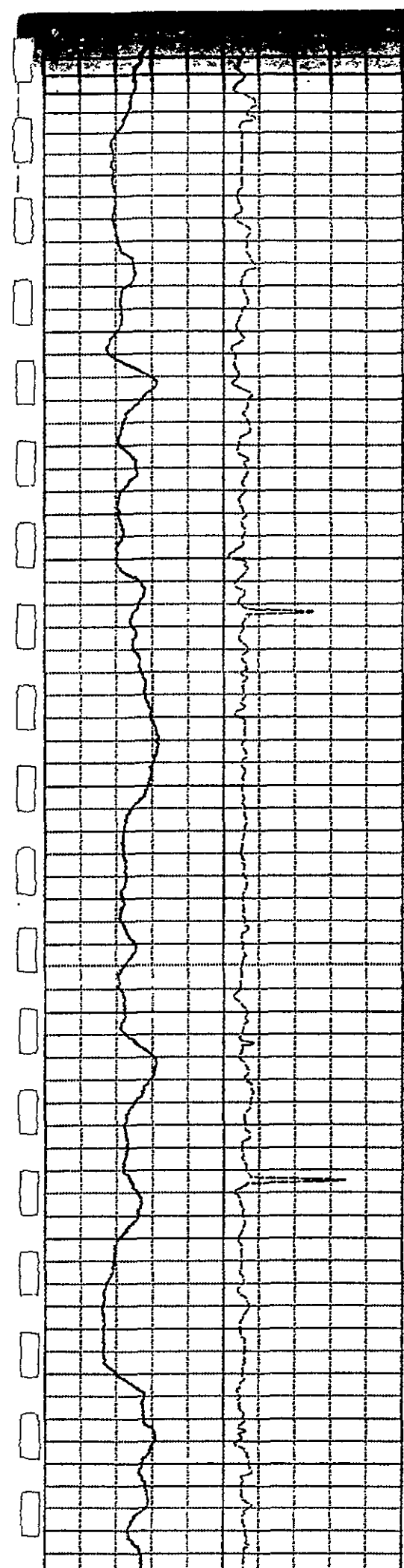


RES(MS)	
0	OHM-M
DENSITY	
1	G/CC

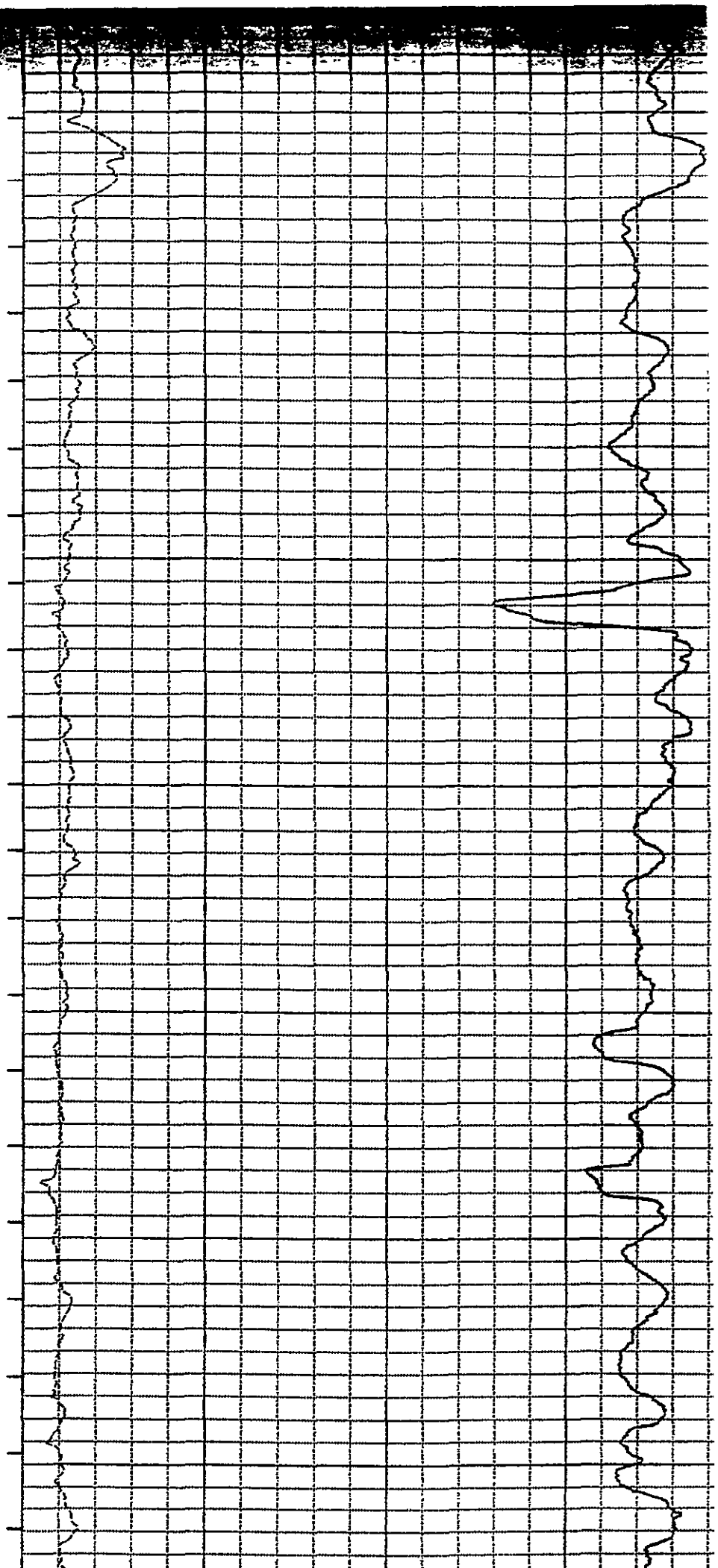








160  
170  
180  
190  
200  
210  
220



230

240

250

260

270

279

0	API-GR	250
	GAM(NAT)	
10	CM	20
	CALIPER	

1	G/CC
	DENSITY
0	OHM-M
	RES(MG)

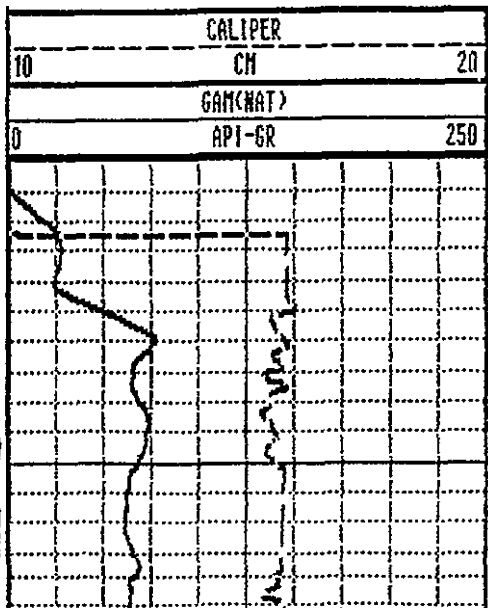


# Century GEOPHYSICAL CORP.

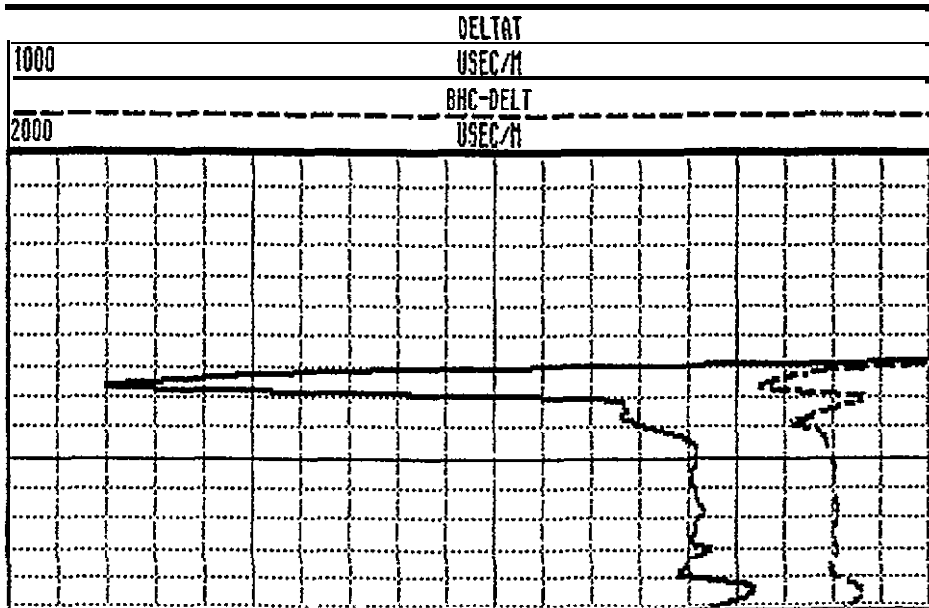
## SONIC

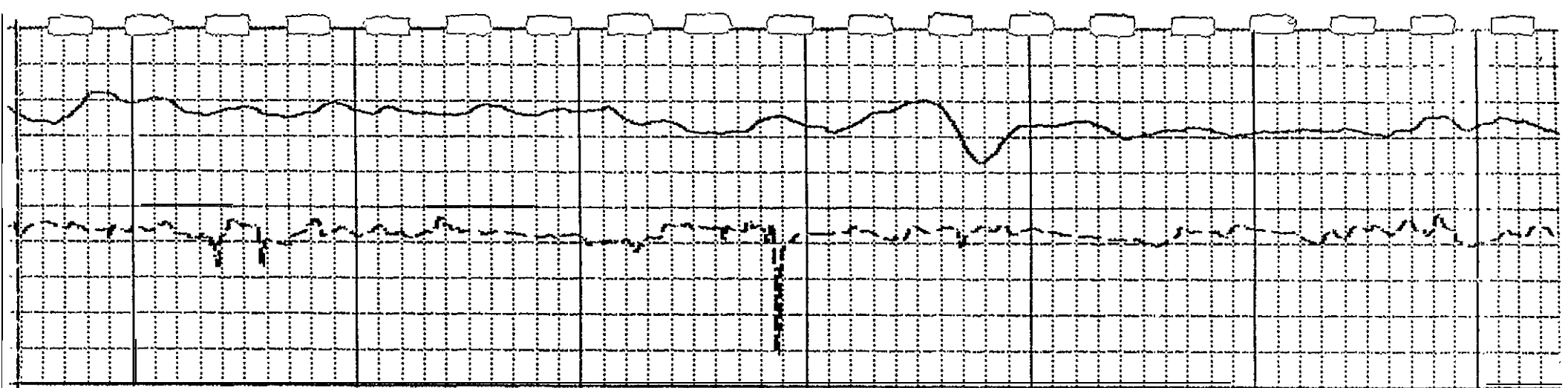
COMPANY	: CAN. OCC. PETRO. LTD.	<b>OTHER SERVICES:</b>	
WELL	: 94-04	9030	
LOCATION/FIELD	: TSOLUM RIVER	9300	
COUNTY	: CAMPBELL RIVER		
STATE	: B.C.		
SECTION	:	TOWNSHIP	: RANGE
DATE	: 02/24/94	PERMANENT DATUM	: GL ELEVATIONS
DEPTH DRILLER	: 280.6	ELEV. PERM. DATUM:	KB
LOG BOTTOM	: 279.34	LOG MEASURED FROM:	GL DF
LOG TOP	: 0.00	DRL MEASURED FROM:	GL GL
CASING DRILLER	: 6.1	LOGGING UNIT	: 8903
CASING TYPE	: STEEL	FIELD OFFICE	: CALGARY
CASING THICKNESS	: 0.12	RECORDED BY	: T. LEWYCKYJ
BIT SIZE	: 15.0	BOREHOLE FLUID	: WATER FILE : PROCESSED
MAGNETIC DECL.	: 18	RM	: TYPE : 903000
MATRIX DENSITY	: 2.65	RM TEMPERATURE	: LOG : 0
FLUID DENSITY	: 1.00	MATRIX DELTA T	: 173 PLOT : CANOXY
NEUTRON MATRIX	: SANDSTONE	FLUID DELTA T	: 690 THRESH: 30000
REMARKS	:		
OPEN HOLE	:		

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

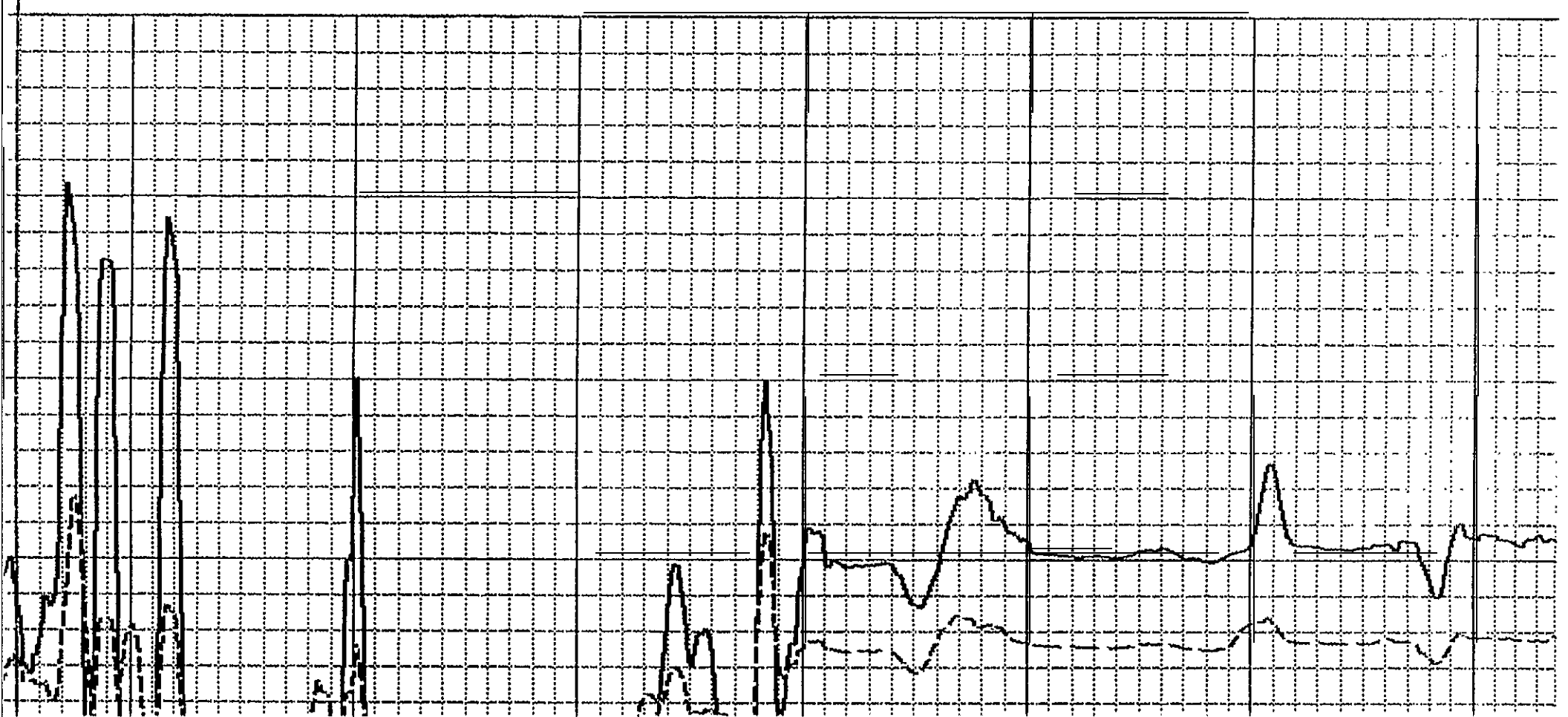


0  
10

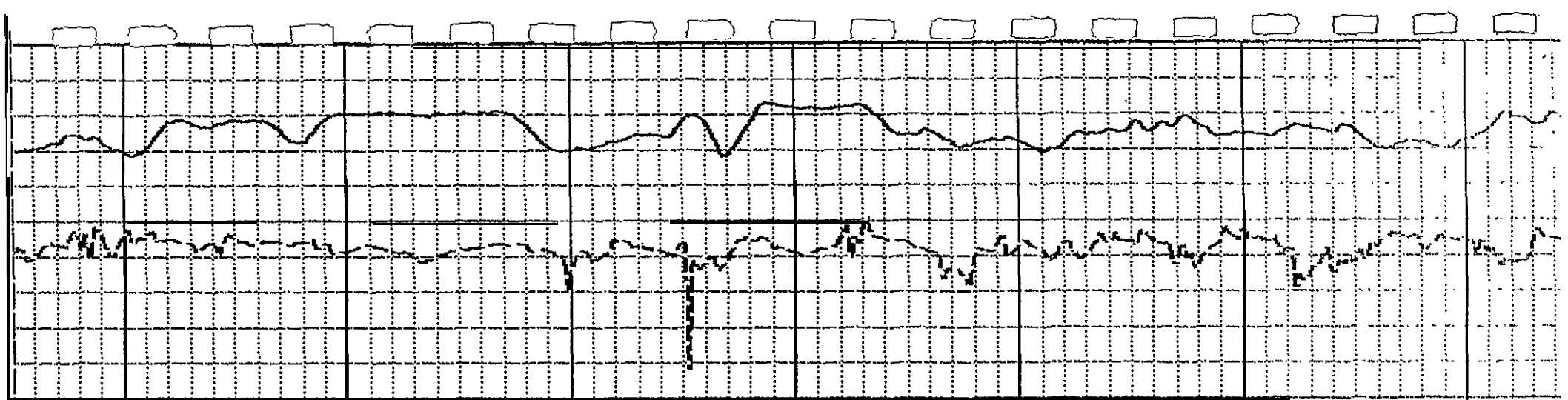




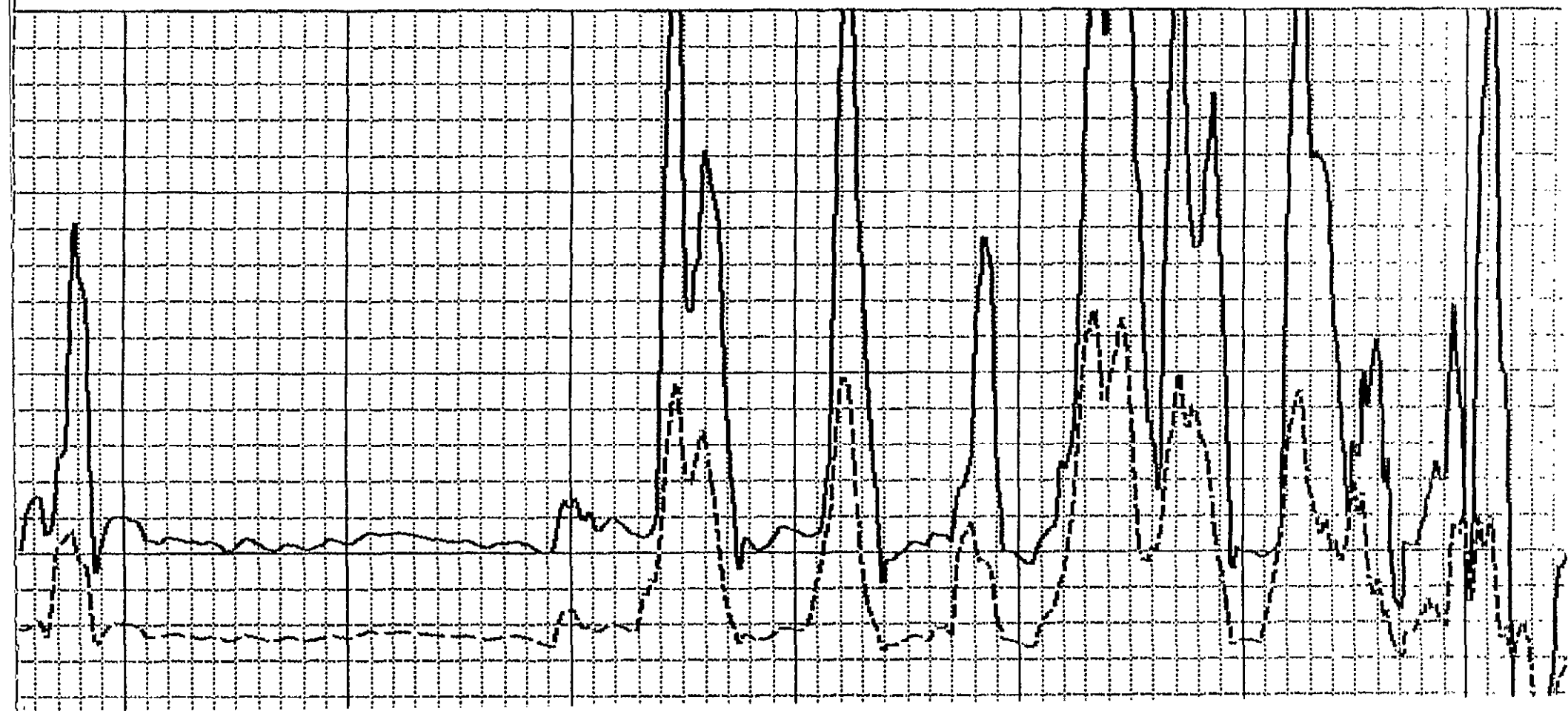
80  
70  
60  
50  
40  
30  
20

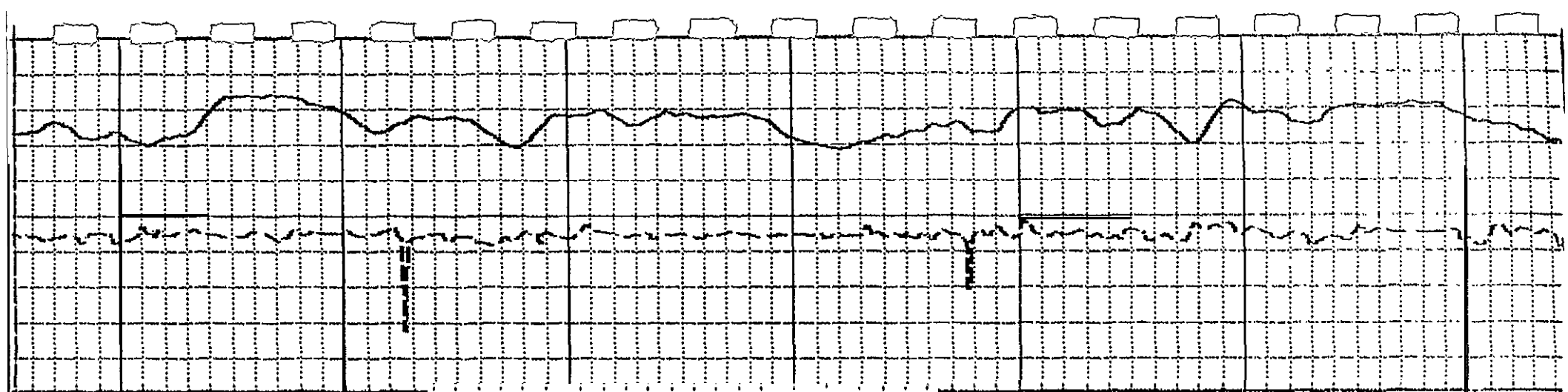






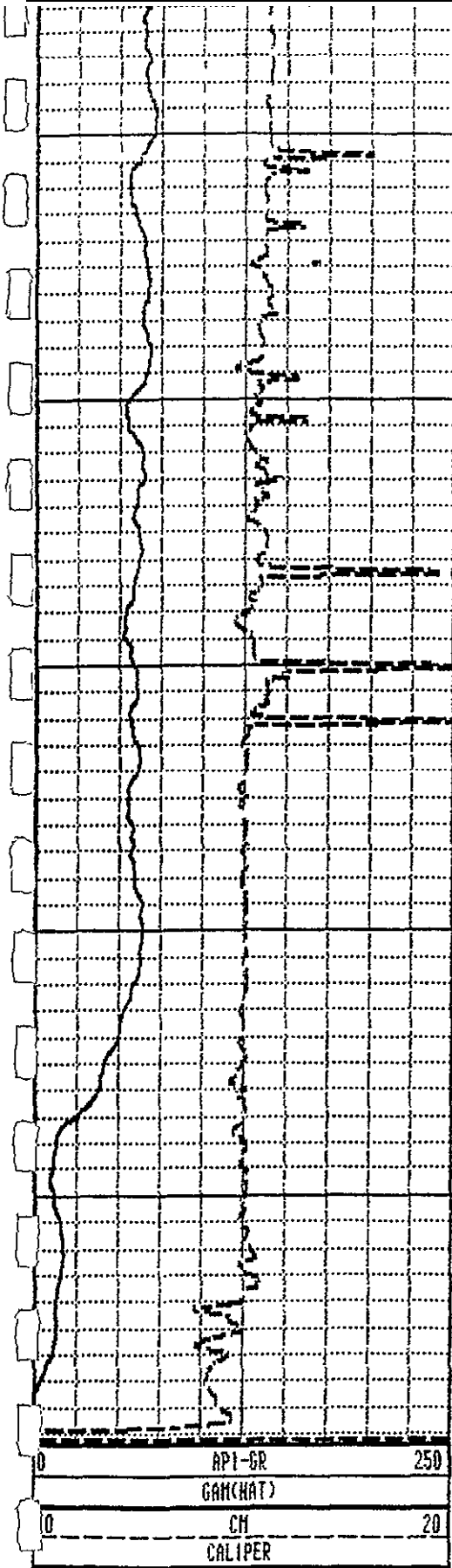
150 140 130 120 110 100 90



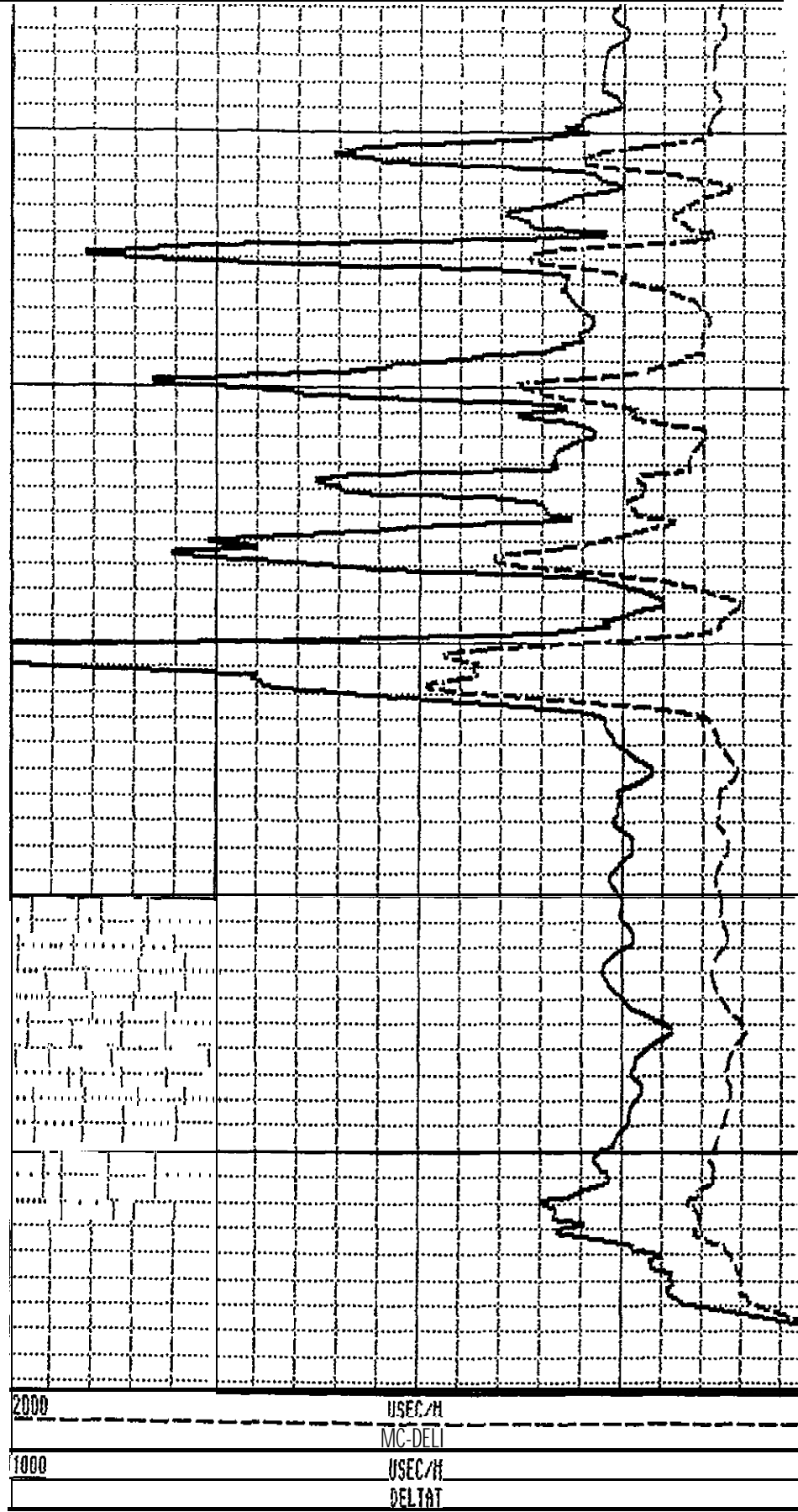


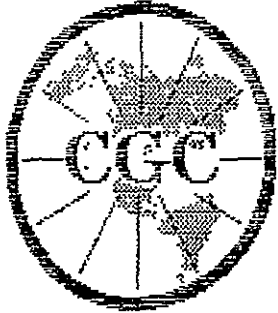
220 210 200 190 180 170 160





230  
240  
250  
260  
270  
279





**Century**  
**GEOPHYSICAL CORP.**

**GAMMA-RES-DENSITY**

COMPANY : CAN. OCC. PETRO. LTD.  
WELL : 94-05  
LOCATION/FIELD : TSOLUM RIVER  
COUNTY : CAMPBELL RIVER  
STRTE : B.C.  
SECTION :  
TOWNSHIP :  
RANGE :

OTHER SERVICES:  
9030  
9300

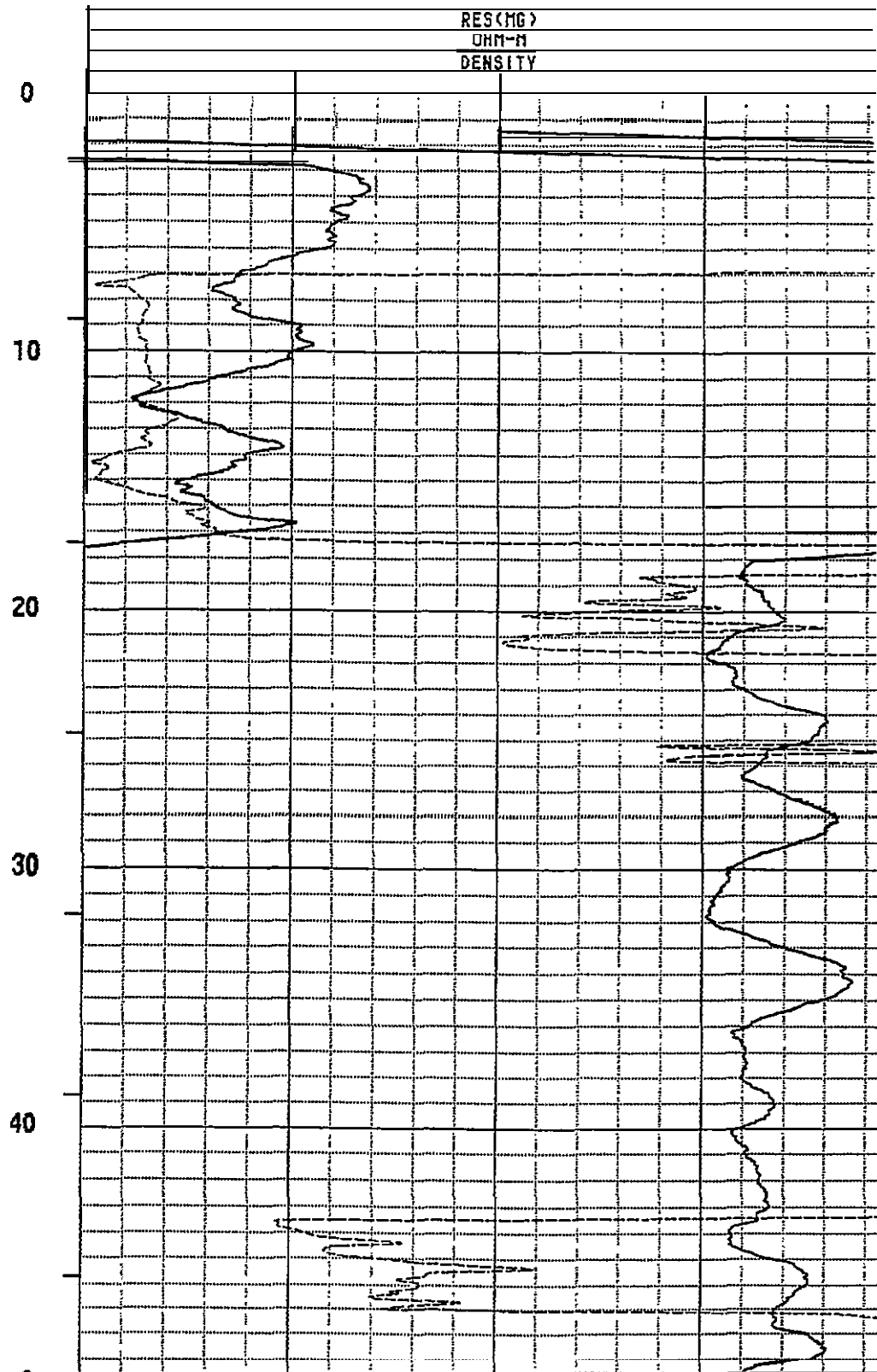
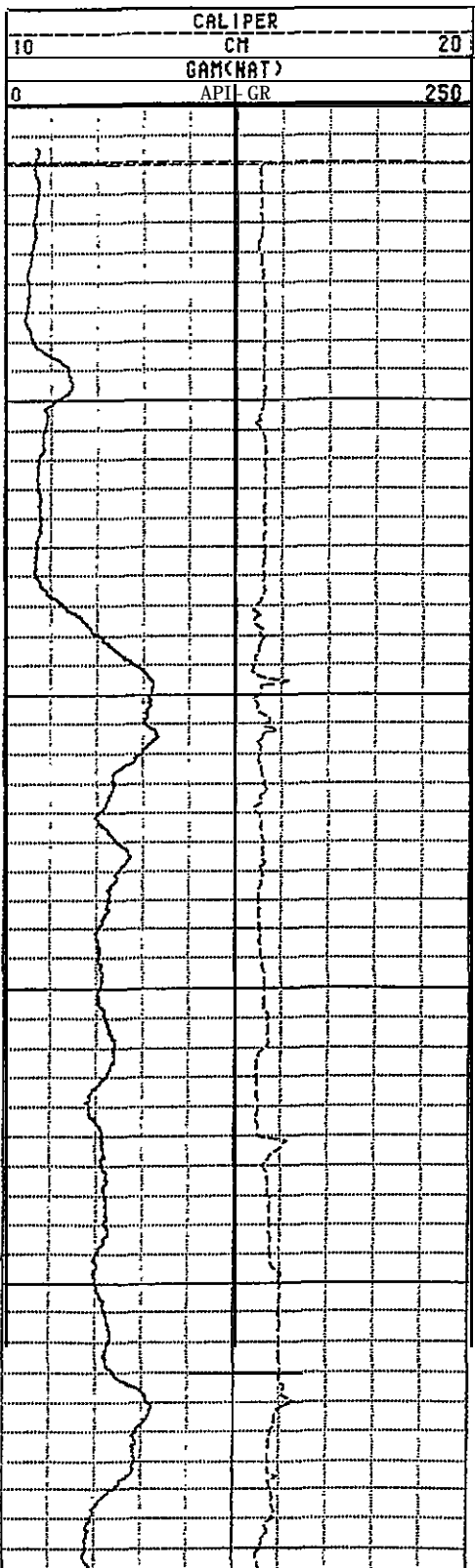
DATE : 82/28/94 PERMANENT DATUM : GL ELEVATIONS  
DEPTH DRILLER : 317 ELEV. PERM. DATUM: KB :  
LOG BOTTOM 315.42 LOG MEASURED FROM: GL DF  
LOG TOP 1.41 DRL MEASURED FROM: GL GL

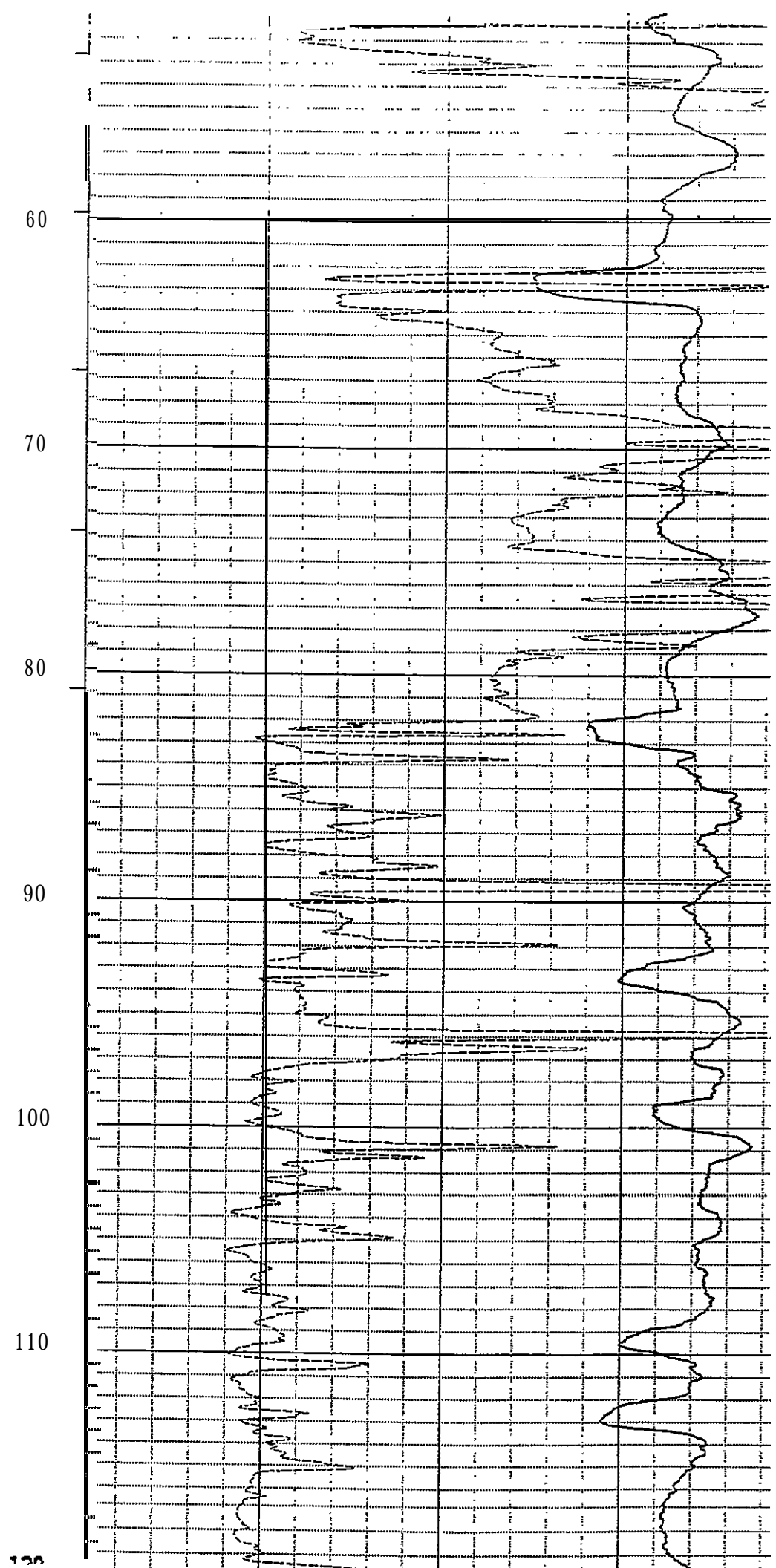
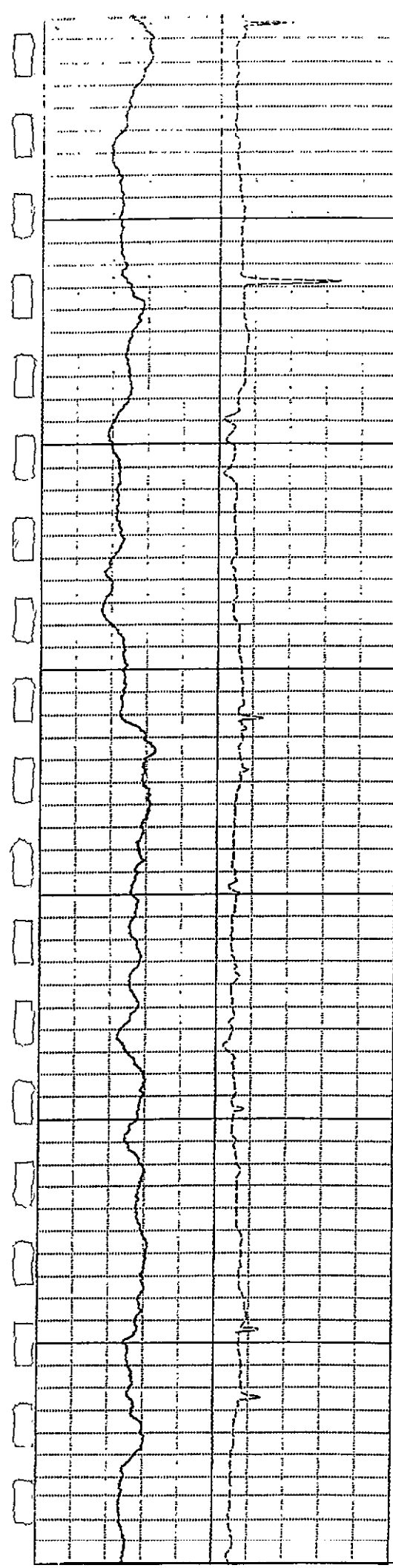
CASING DRILLER : 17.4 LOGGING UNIT 8903  
CASING TYPE : STEEL FIELD OFFICE : CALGARY  
CASING THICKNESS: 0.12 RECORDED BY T. LEWYCKYJ

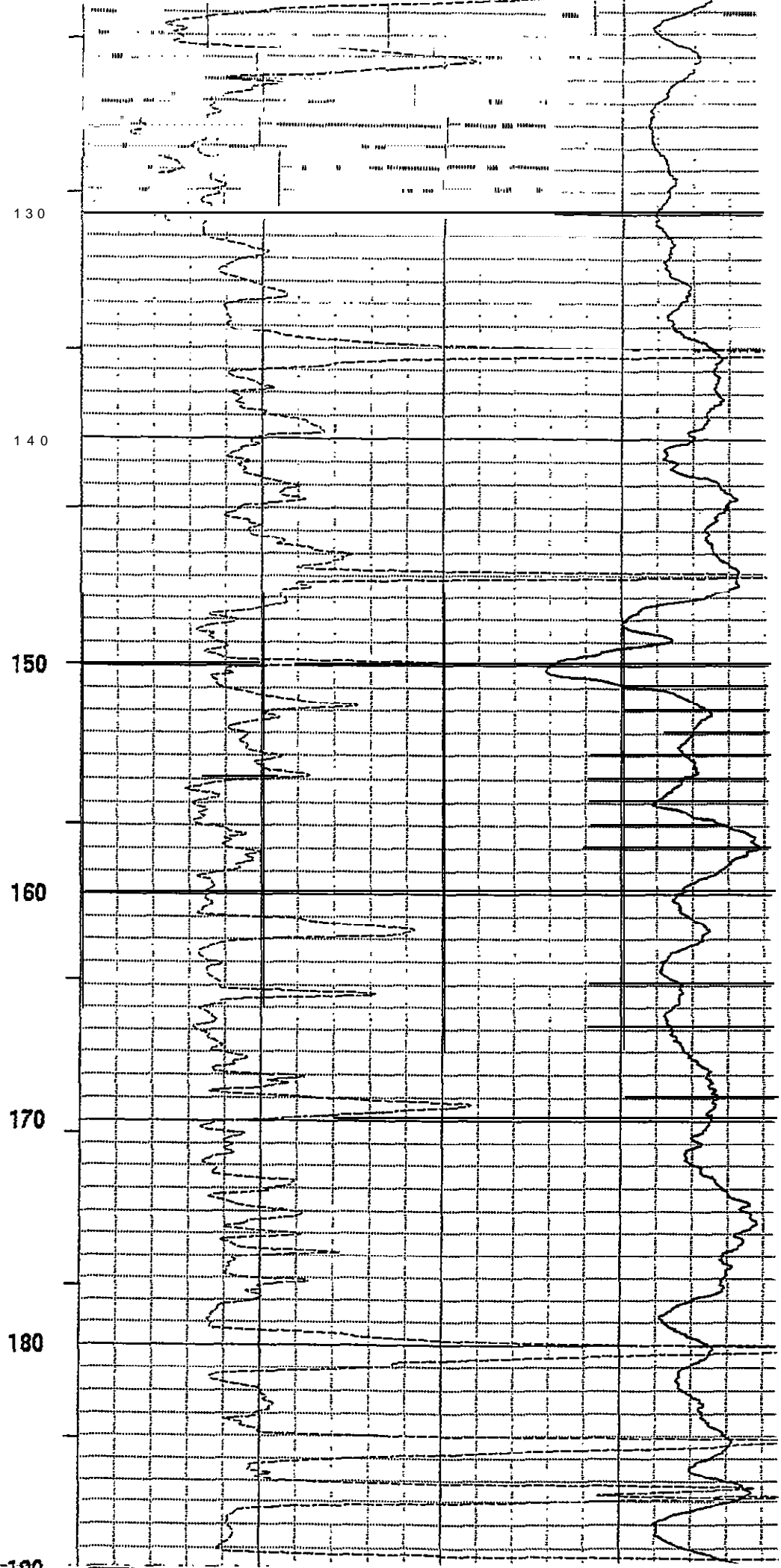
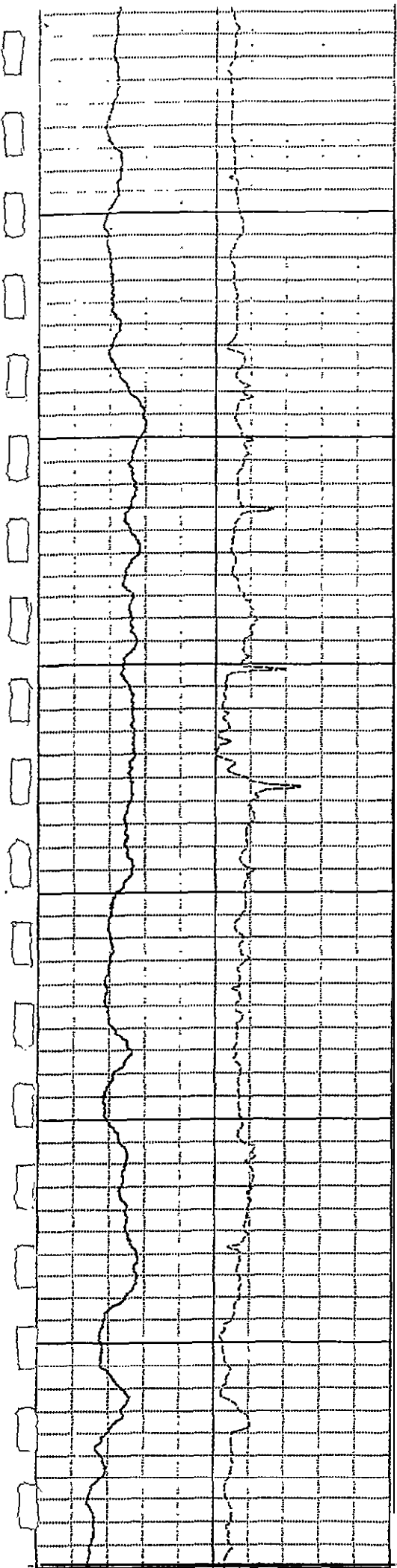
BIT SIZE : 15.5 BOREHOLE FLUID : WATER FILE : ORIGINAL  
MAGNETIC DECL. : 18 RM TYPE : 9030AA  
MATRIX DENSITY : 2.65 RM TEMPERATURE : LOG : 1  
FLUID DENSITY : 1.00 MATRIX DELTA T : 173 PLOT : CANOXY 0  
NEUTRON MATRIX : SANDSTONE FLUID DELTA T : 690 THRESH: 30000

REMARKS  
OPEN HOLE

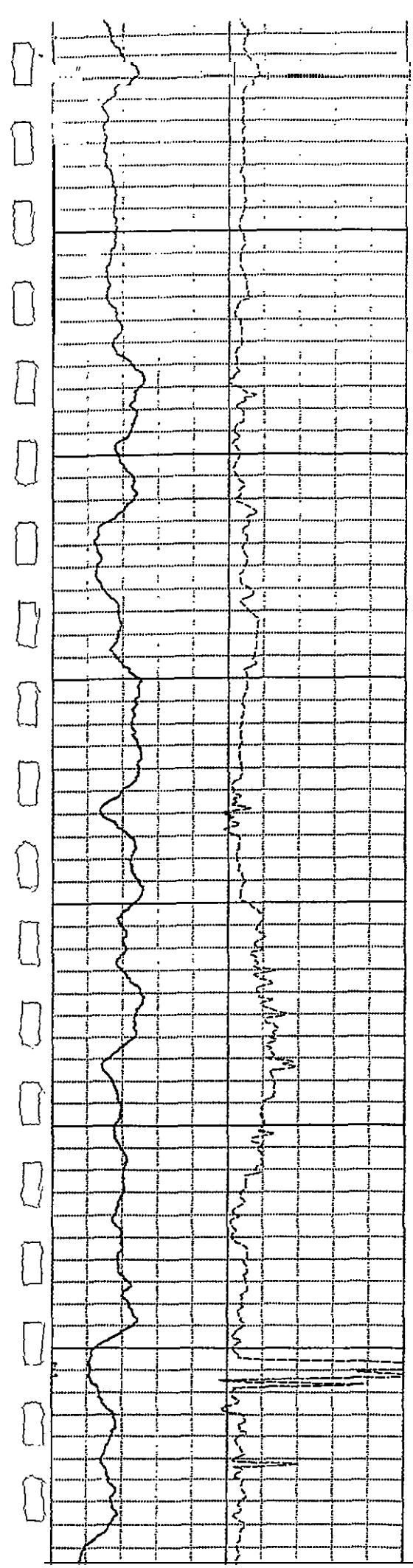
ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS











200

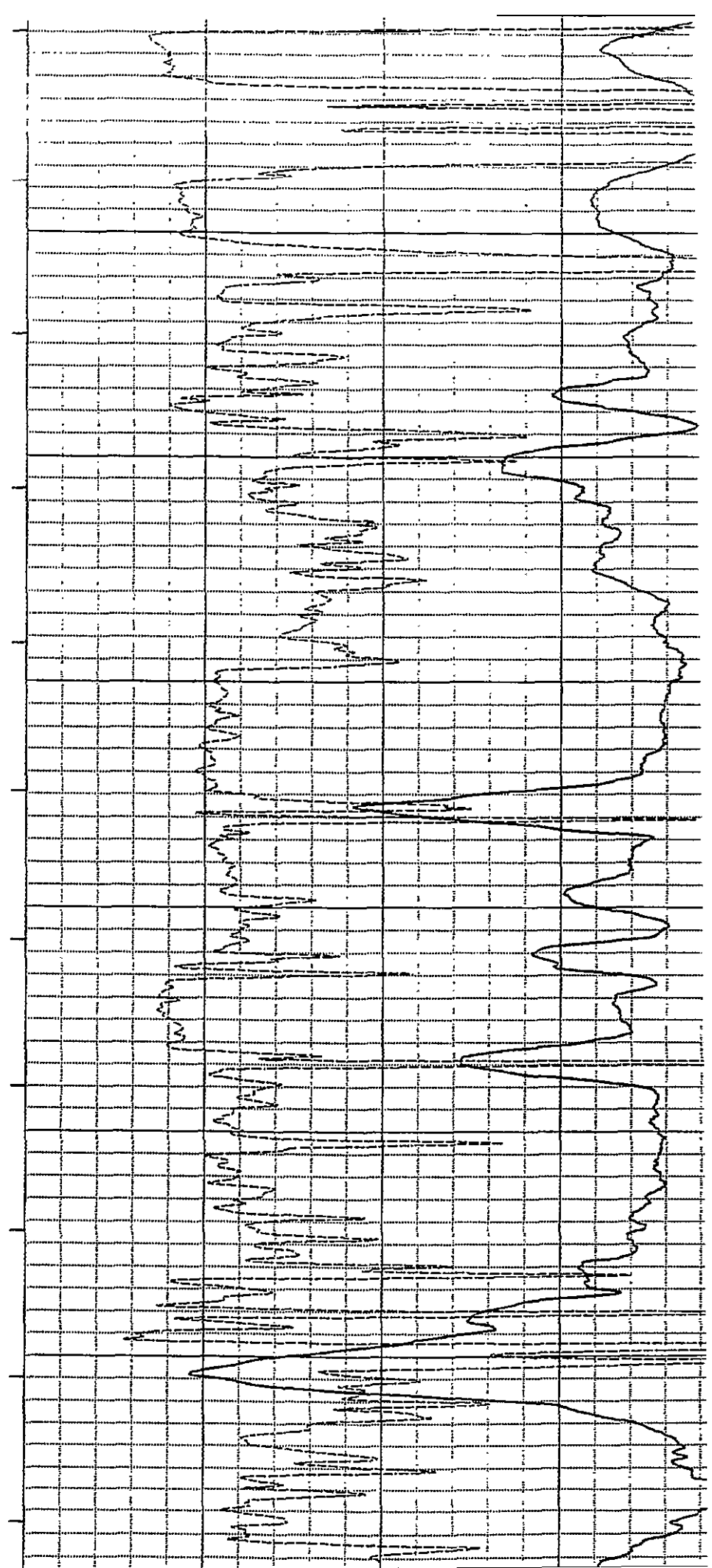
210

220

230

240

250





260

270

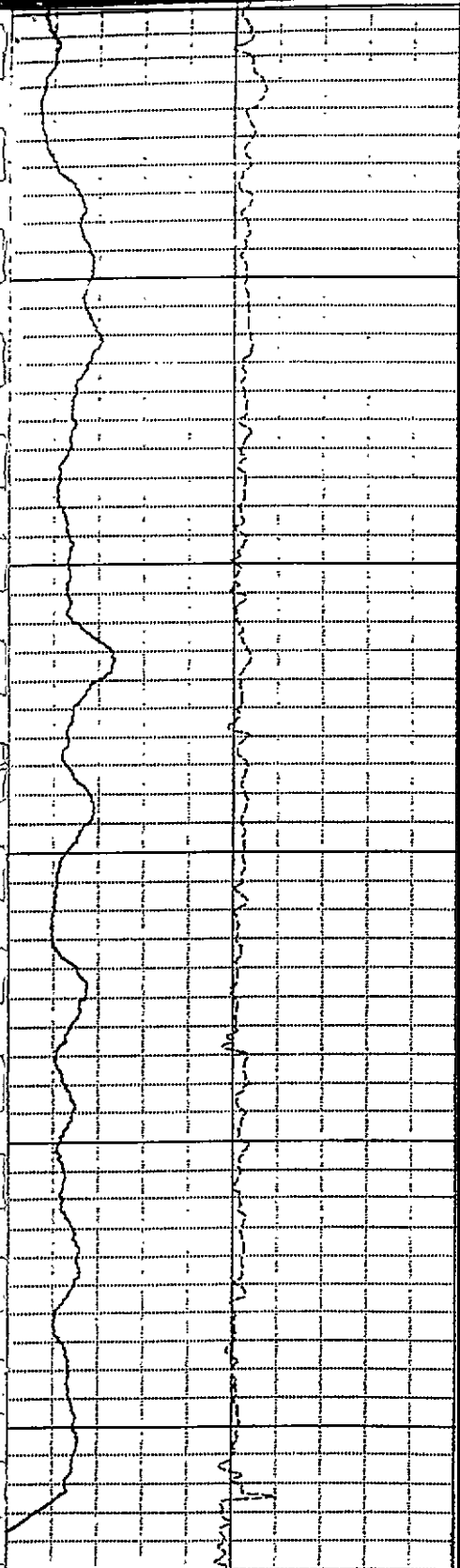
280

290

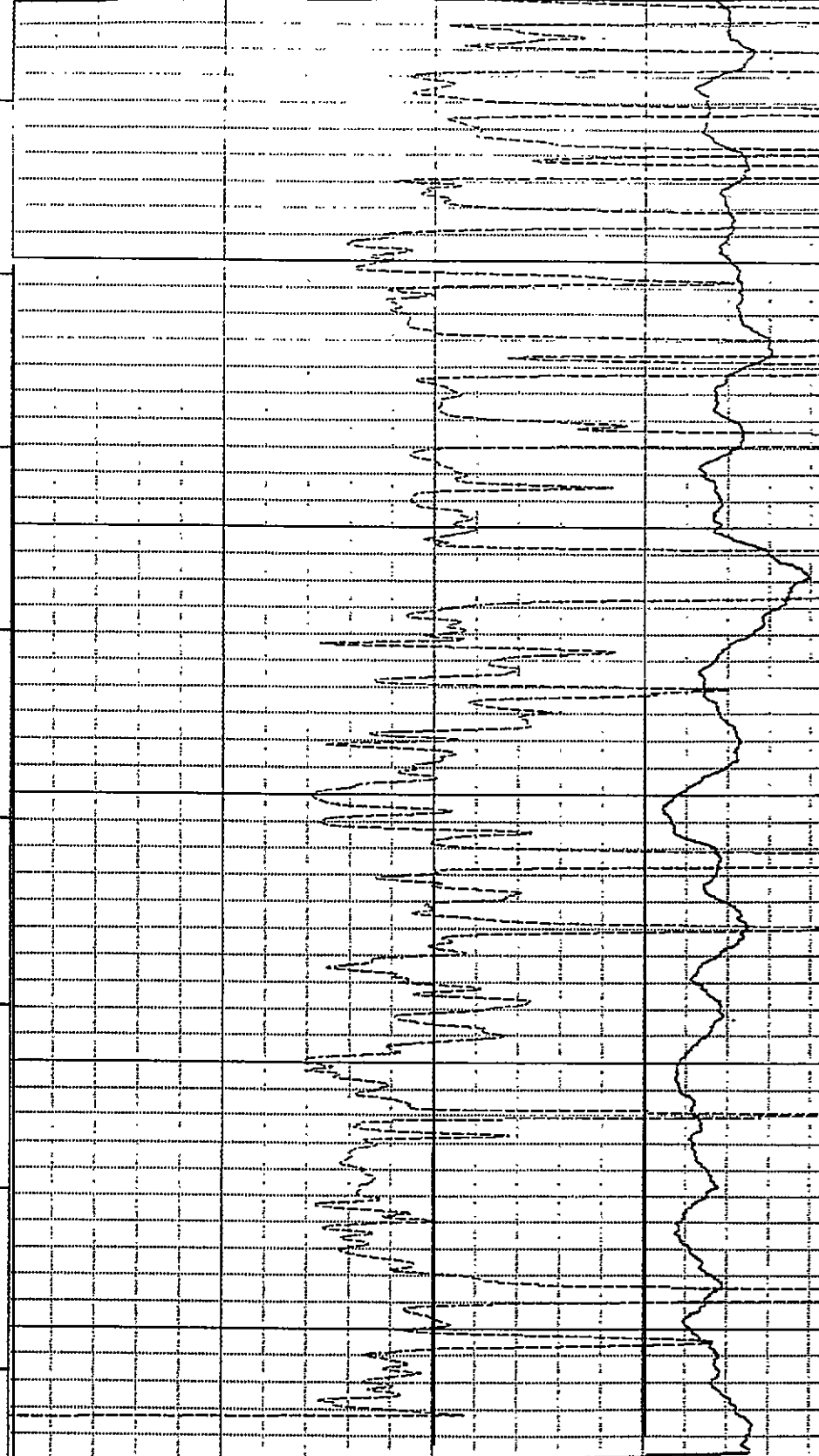
300

310

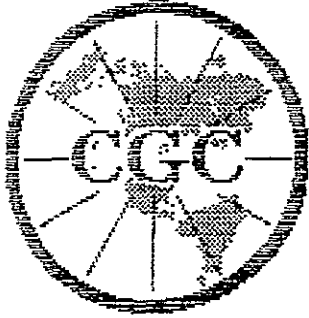
315



0 10 20  
 CM  
 CALIPER



0 10 20  
 G/CC  
 DENSITY  
 OHM-M  
 RES (MG)



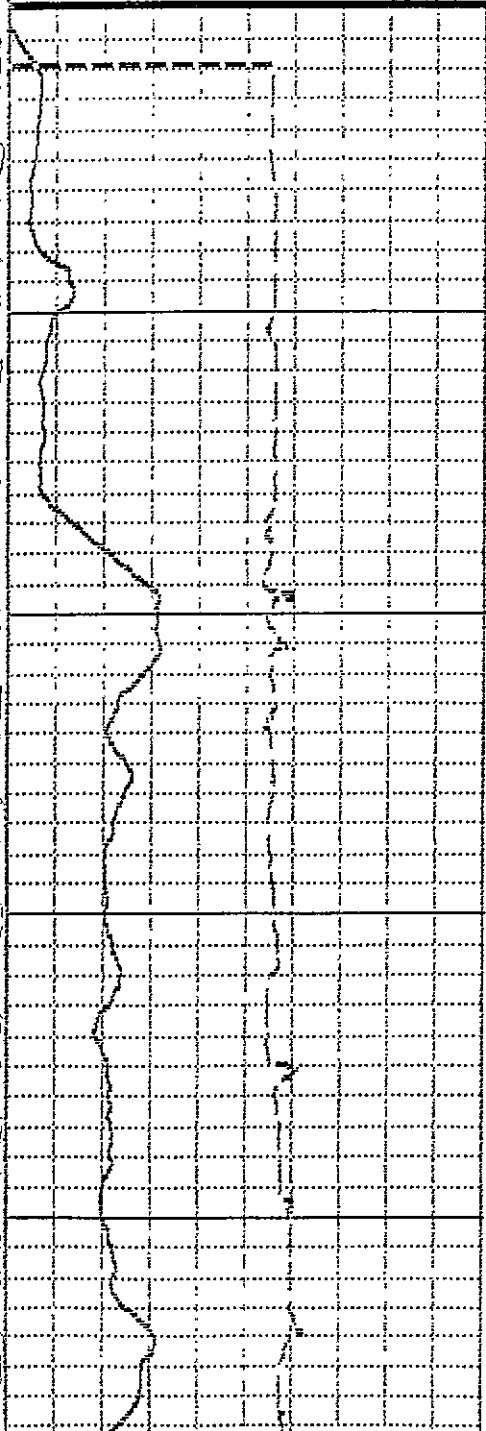
# Century GEOPHYSICAL CORP.

## SONIC

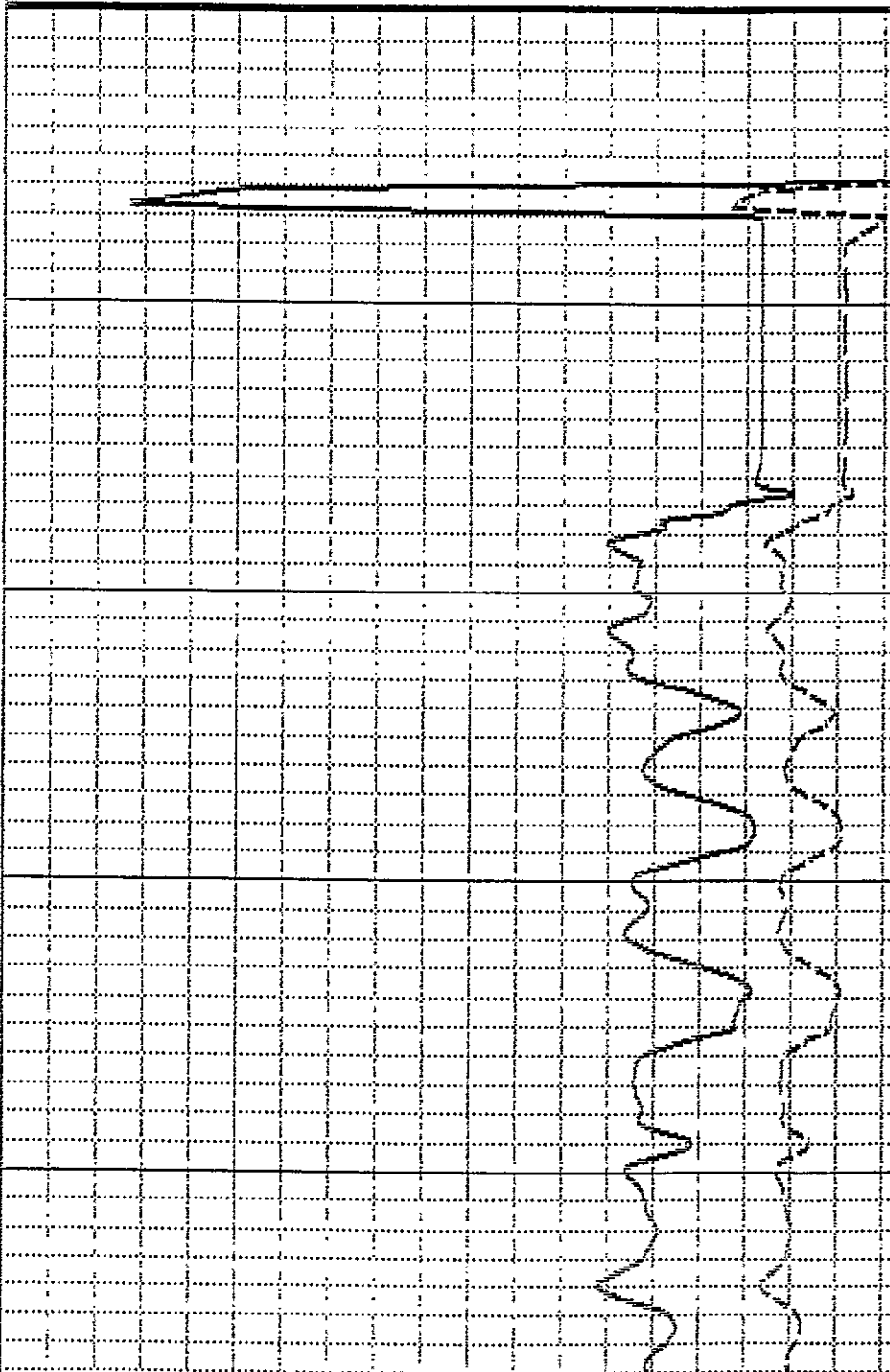
COMPANY	: CAN. OCC. PETRO. LTD.	OTHER SERVICES :	
WELL	: 94-85	9830	
LOCATION/FIELD	: TSOLUM RIVER	9380	
COUNTY	: CAMPBELL RIVER		
STATE	: B. C.		
SECTION	: TOWNSHIP	RANGE :	
DATE	: 02/28/94	PERMANENT DATUM : GL	ELEVATIONS
DEPTH DRILLER	: 317	ELEV. PERM. DATUM:	KB :
LOG BOTTOM	: 315.42	LOG MEASURED FROM: GL	DF :
LOG TOP	: 0.00	DRL MEASURED FROM: GL	GL :
CASING DRILLER	: 17.4	LOGGING UNIT : 8983	
CASING TYPE	: STEEL	FIELD OFFICE : CALGARY	
CASING THICKNESS:	0.12	RECORDED BY : T. LEWCKYJ	
BIT SIZE	: 15.5	BOREHOLE FLUID : WATER	FILE : PROCESSE
MAGNETIC DECL.	: 18	RM	TYPE : 9030AA
MATRIX DENSITY	: 2.65	RM TEMPERATURE :	LOG : 3
FLUID DENSITY	: 1.00	MATRIX DELTA T : 173	PLOT : CANOXY
NEUTRON MATRIX	: SANDSTONE FLUID DELTA T : 6.9%		THRESH: 30000
REMARKS	OPEN HOLE		

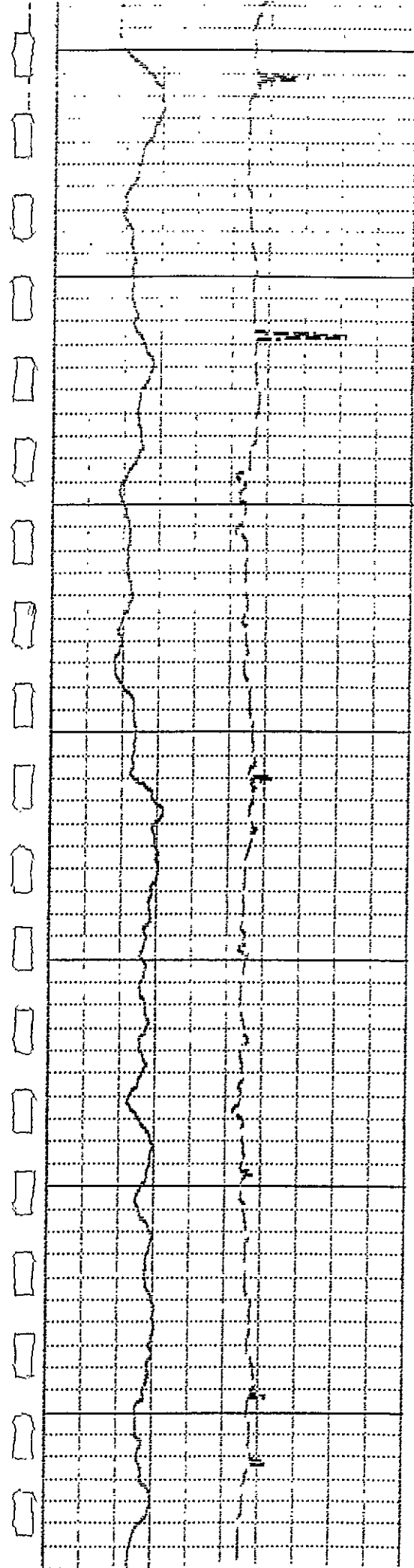
ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

CALIPER		
10	2H	20
SAR(MAT)		
10	API-GR	250

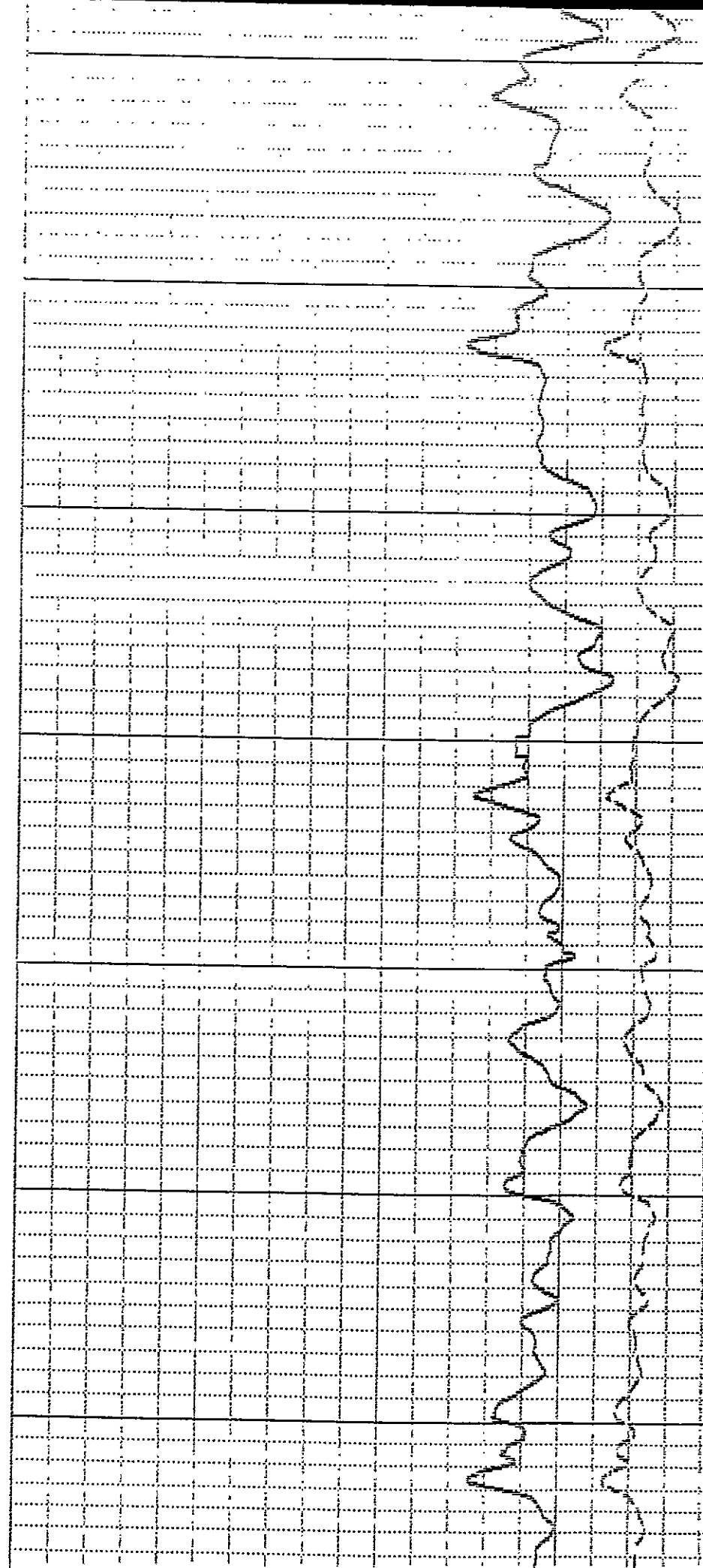


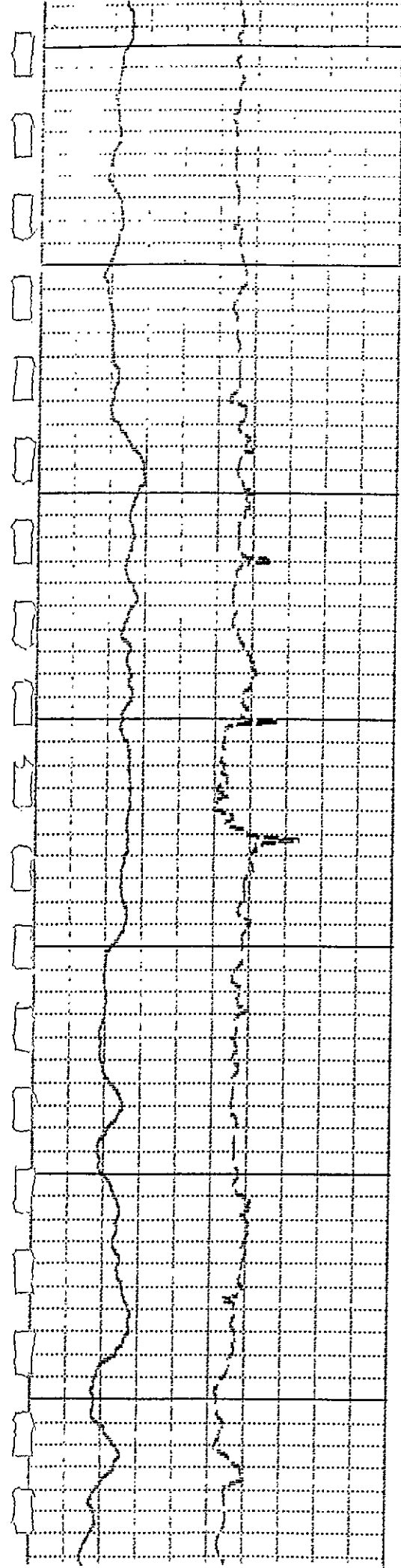
DELTA T	
1000	USEC/H
SNC-DELT	
2000	USEC/H



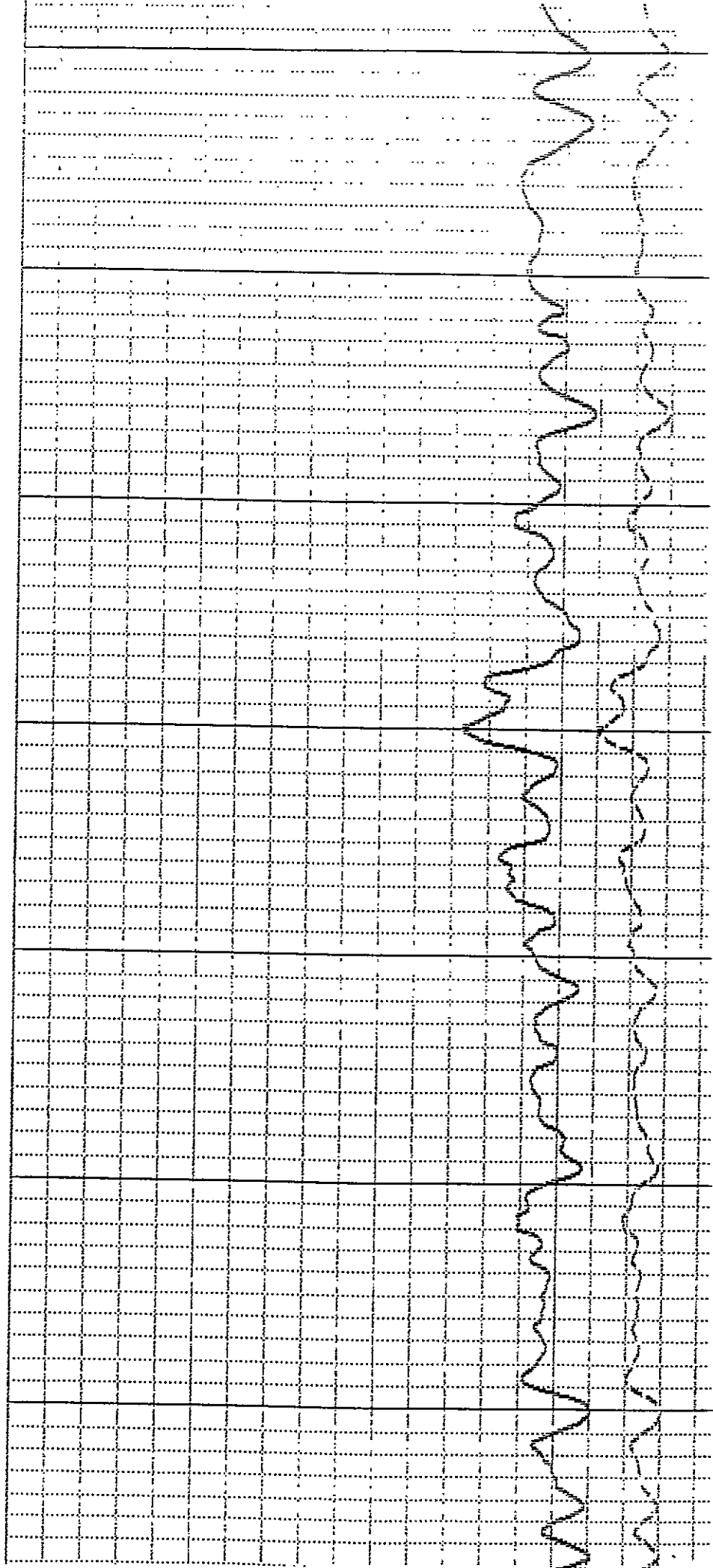


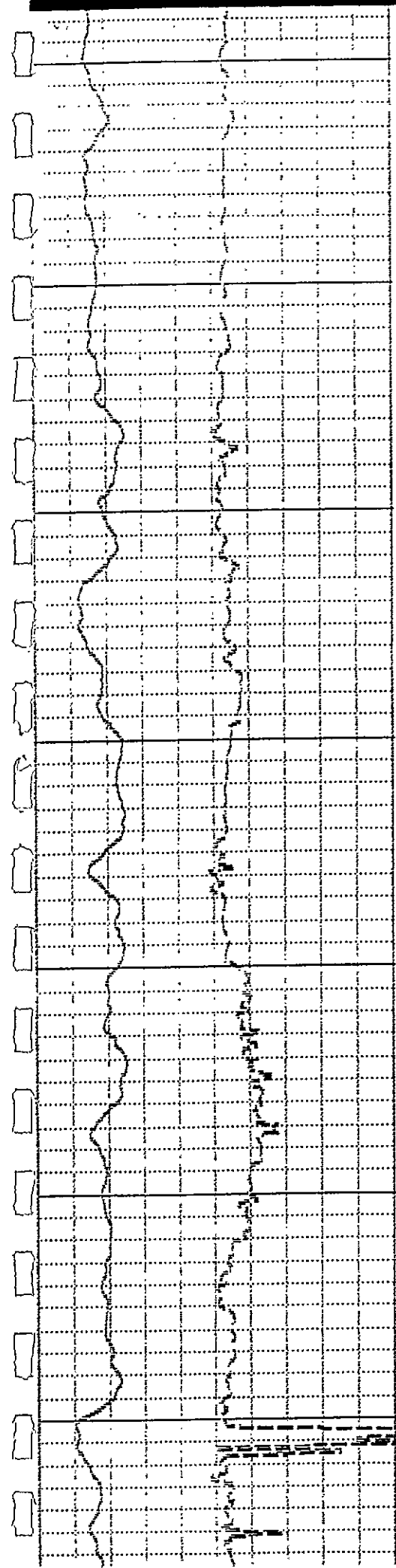
50  
60  
70  
80  
90  
100  
110



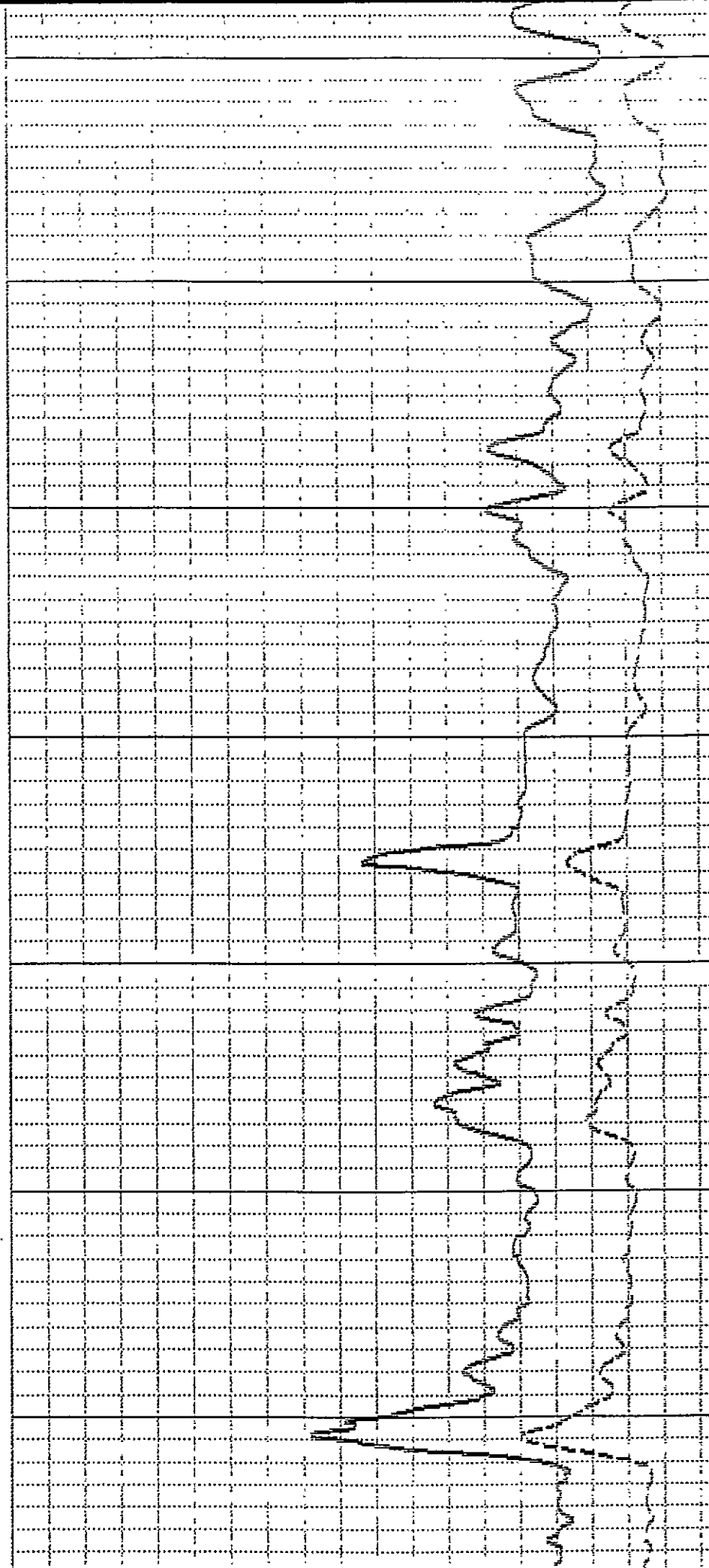


120  
130  
140  
150  
160  
170  
180





190  
200  
210  
220  
230  
240  
250



260

270

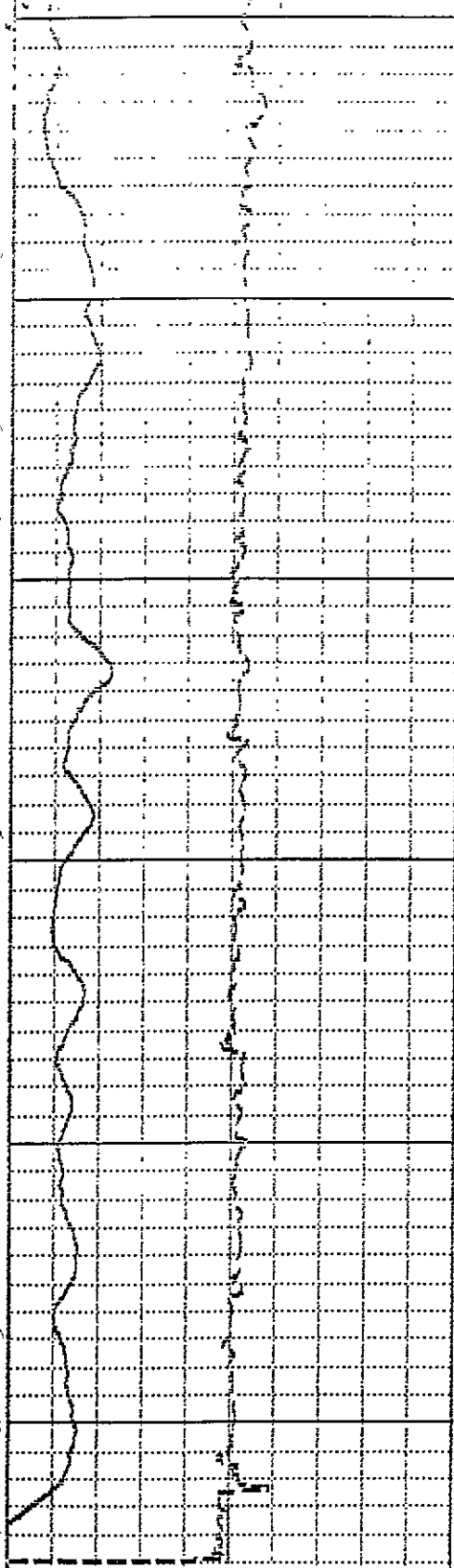
280

290

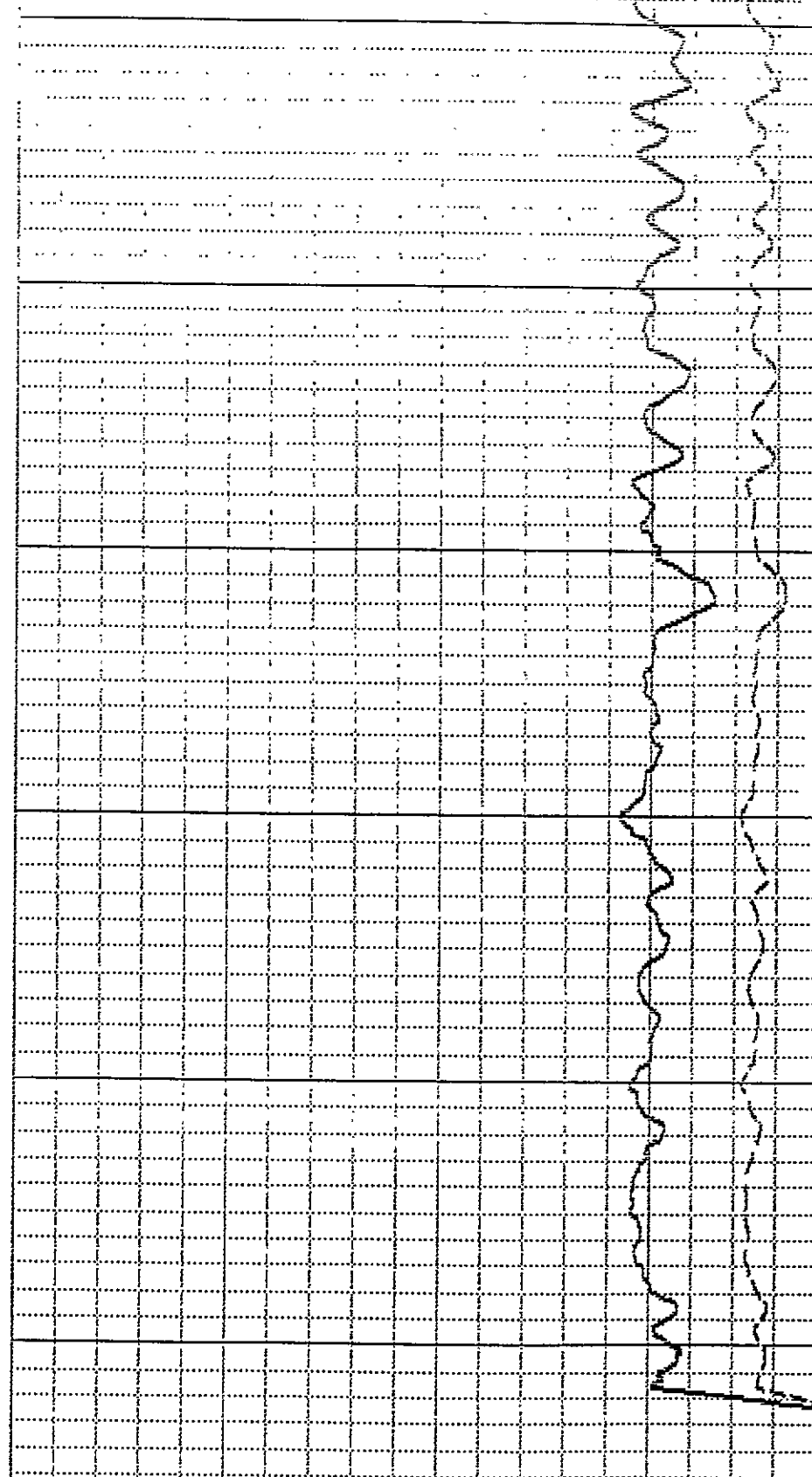
300

310

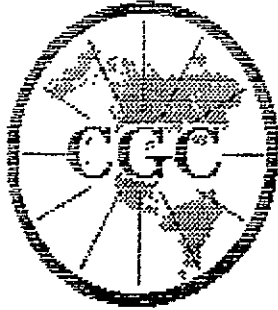
315



0	API-GR	250
	GAH(NAT)	
10	CH	20
	CALIPER	



2000	USEC/H
	BHC-DELT
1000	USEC/H
	DELTAT



**GAMMA-RES-DENSITY**

COMPANY : CAN. OCC. PETRO. LTD.  
 WELL : 94-06  
 LOCATION/FIELD : TSOLUM RIVER  
 COUNTY : CAMPBELL RIVER  
 STATE : B.C.  
 SECTION :

OTHER SERVICES:  
 9030  
 9300

TOWNSHIP : RANGE :

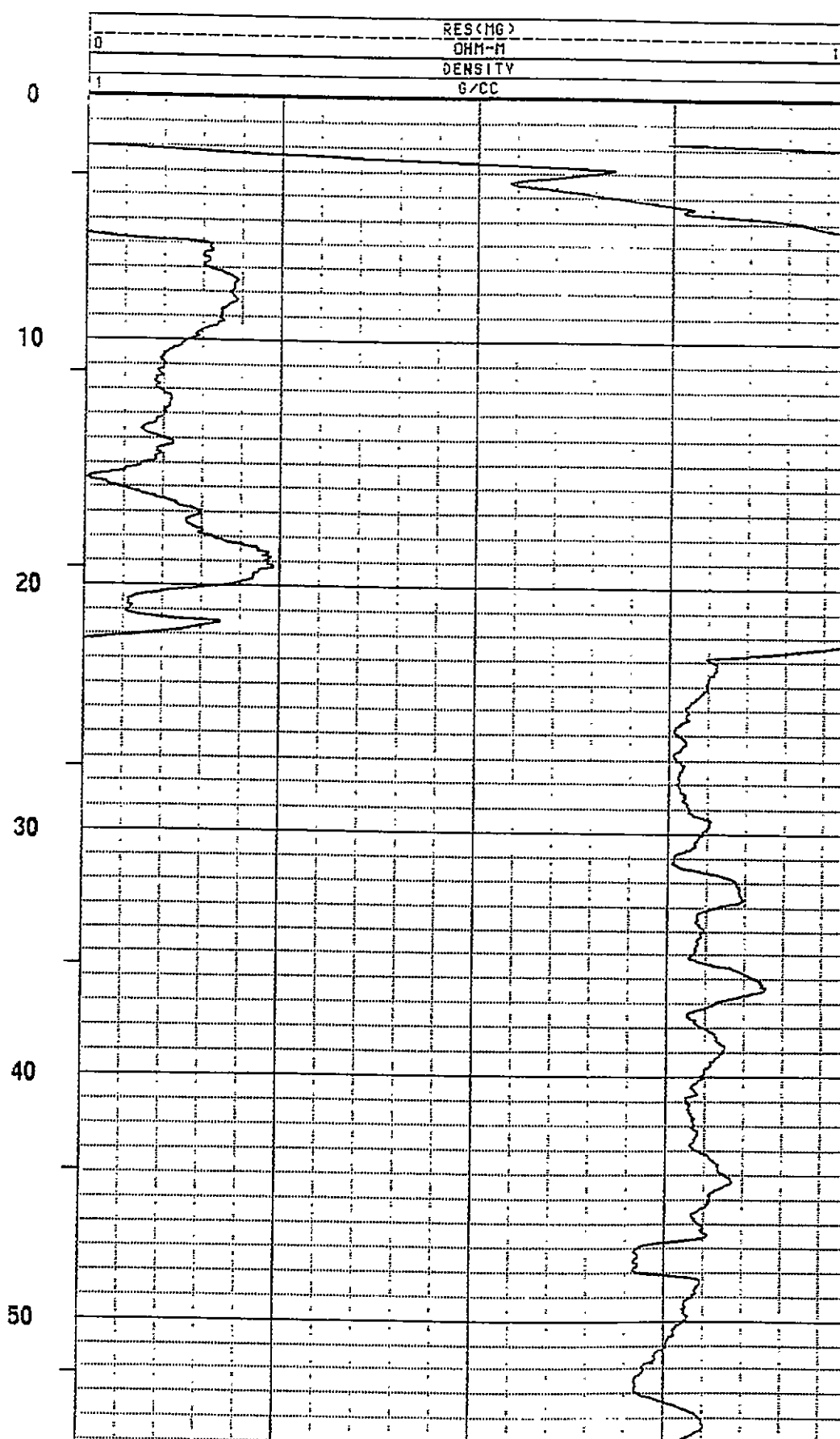
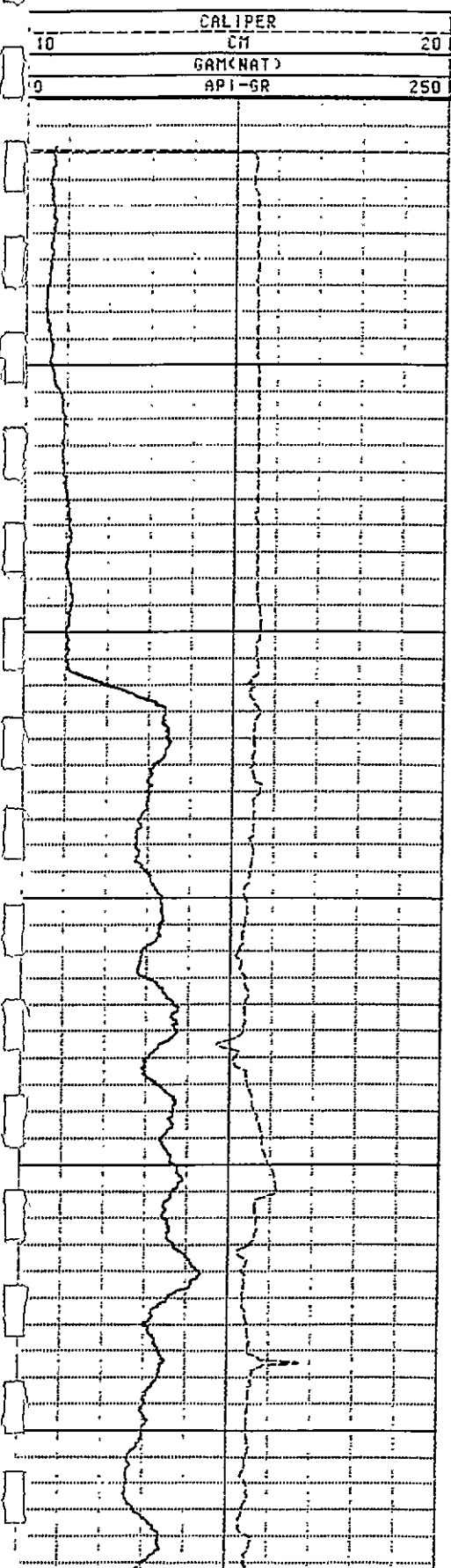
DATE : 03/05/94 PERMANENT DATUM : GL ELEVATIONS  
 DEPTH DRILLER : 384 ELEV. PERM. DATUM: KB :  
 LOG BOTTOM : 384.29 LOG MEASURED FROM: GL DF :  
 LOG TOP : 1.77 DRL MEASURED FROM: GL GL :

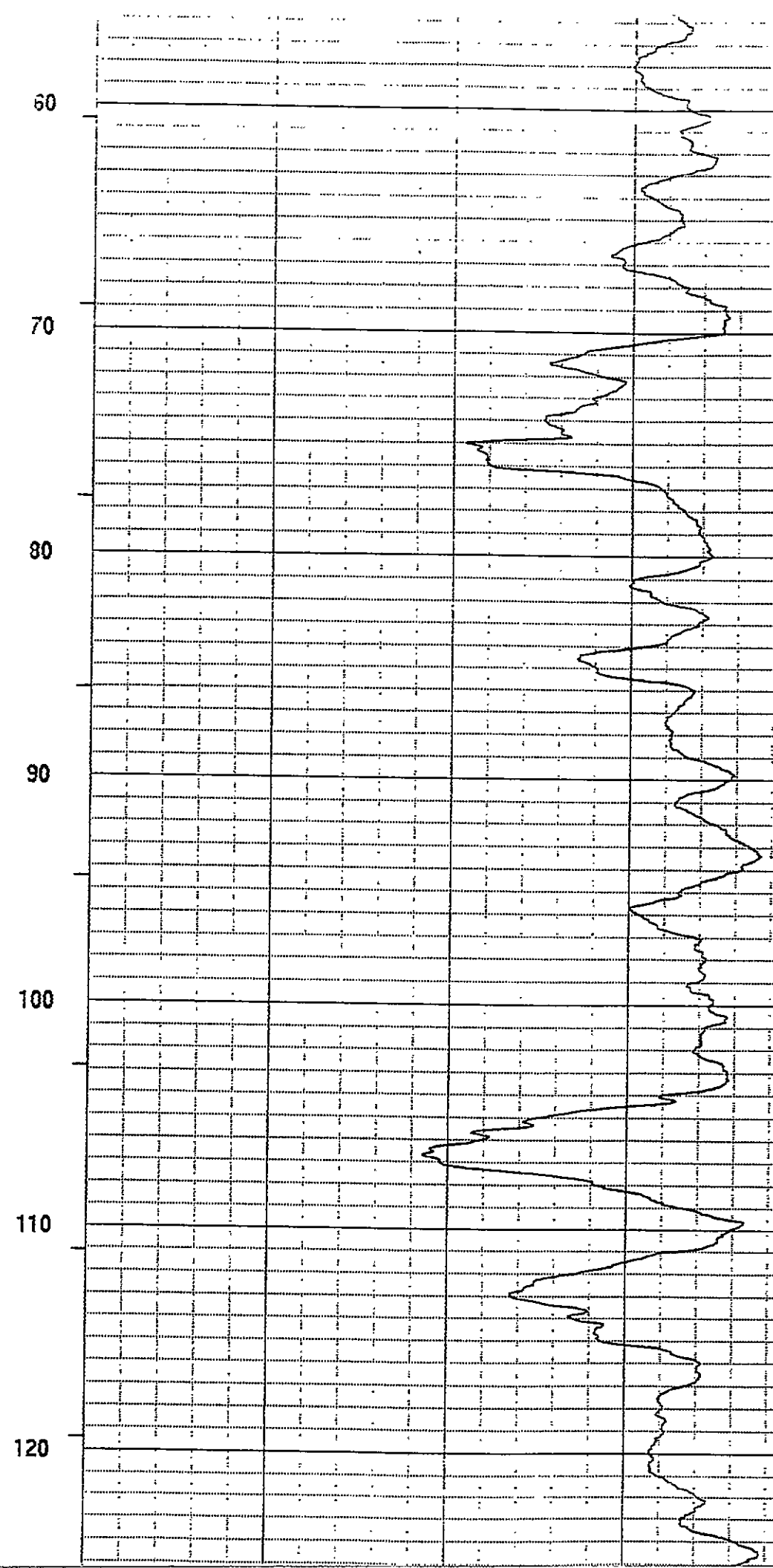
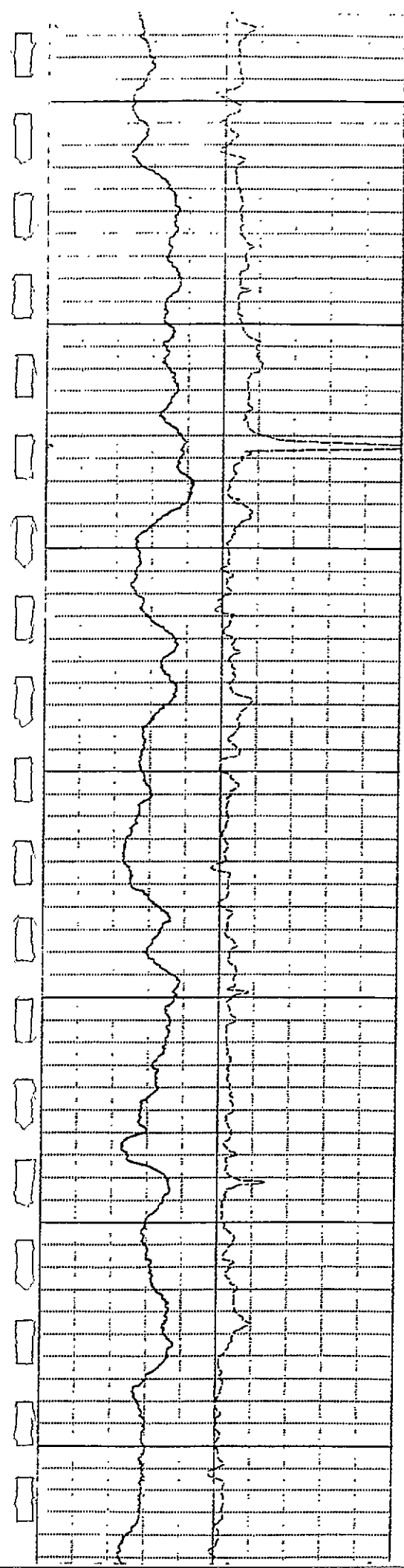
CASING DRILLER : 22.55 LOGGING UNIT : 8903  
 CASING TYPE : STEEL FIELD OFFICE : CALGARY  
 CASING THICKNESS: 0.12 RECORDED BY : T. LEWYCRYJ

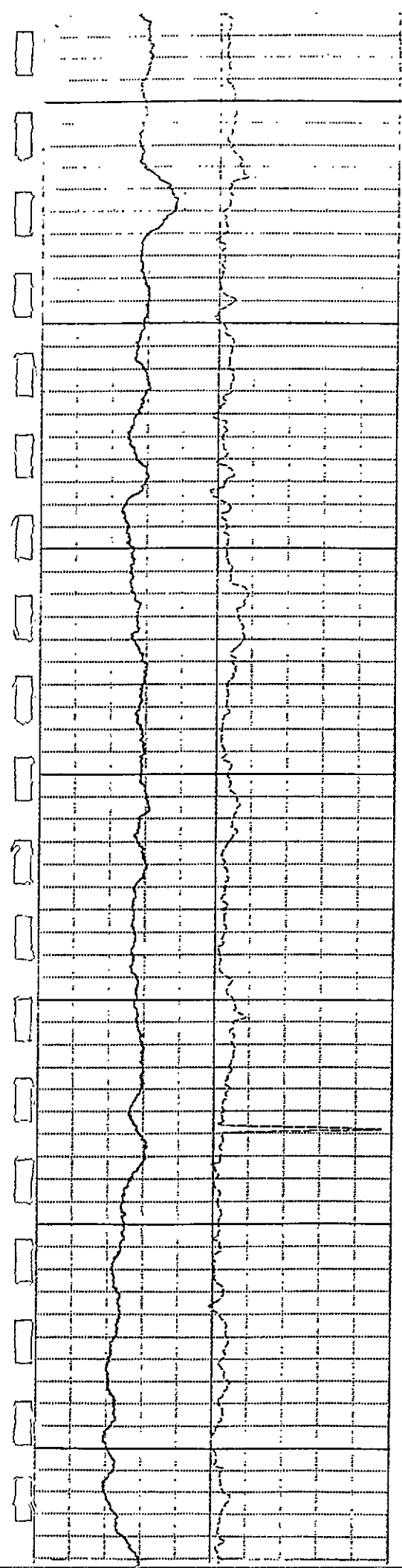
BIT SIZE : 15.5 BOREHOLE FLUID : WATER FILE : ORIGINAL  
 MAGNETIC DECL. : 18 RM : TYPE : 9030AA  
 MATRIX DENSITY : 2.65 RM TEMPERATURE : LOG : 1  
 FLUID DENSITY : 1.00 MATRIX DELTA T : 173 PLOT : CANOXY 0  
 NEUTRON MATRIX : SANDSTONE FLUID DELTA T : 690 THRESH: 30000  
 REMARKS :  
 OPEN HOLE

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS









130

140

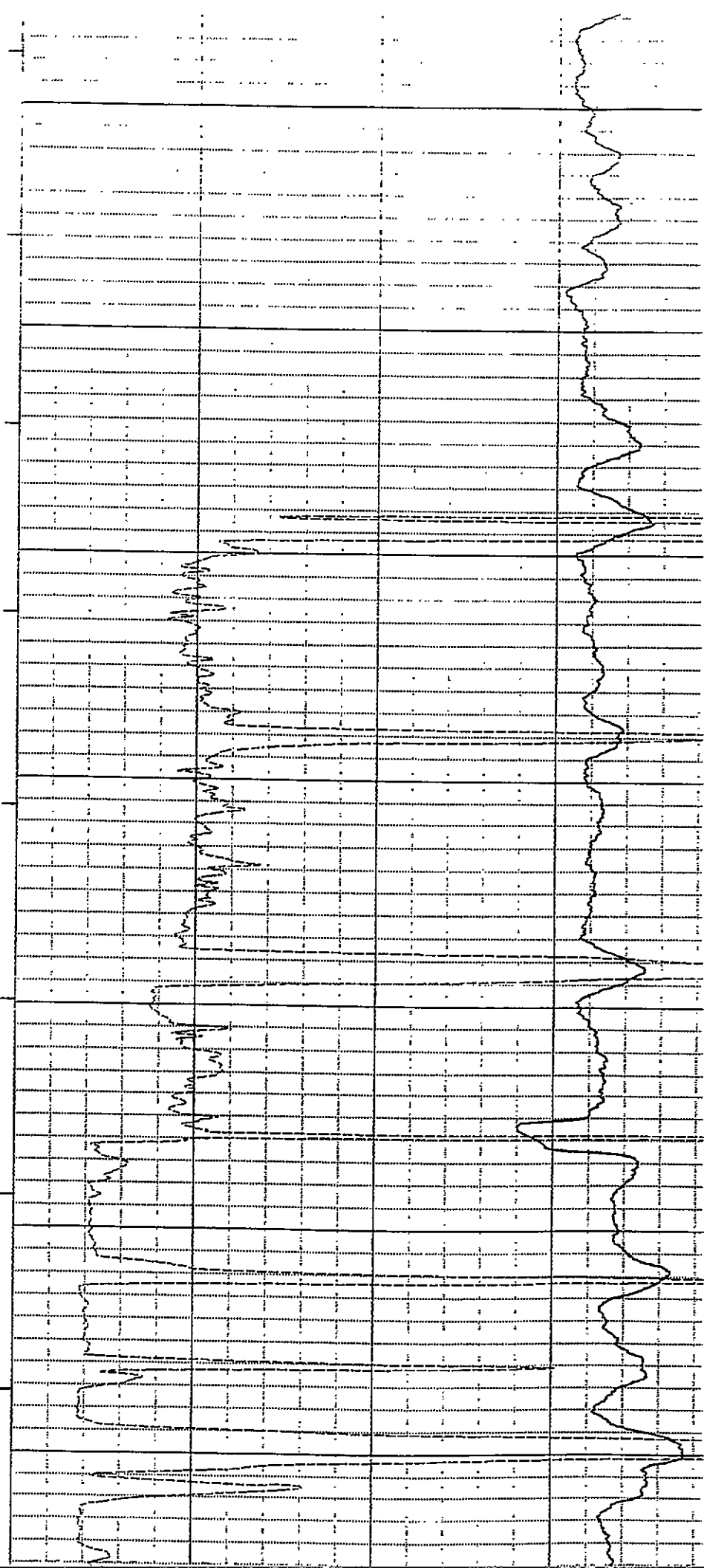
150

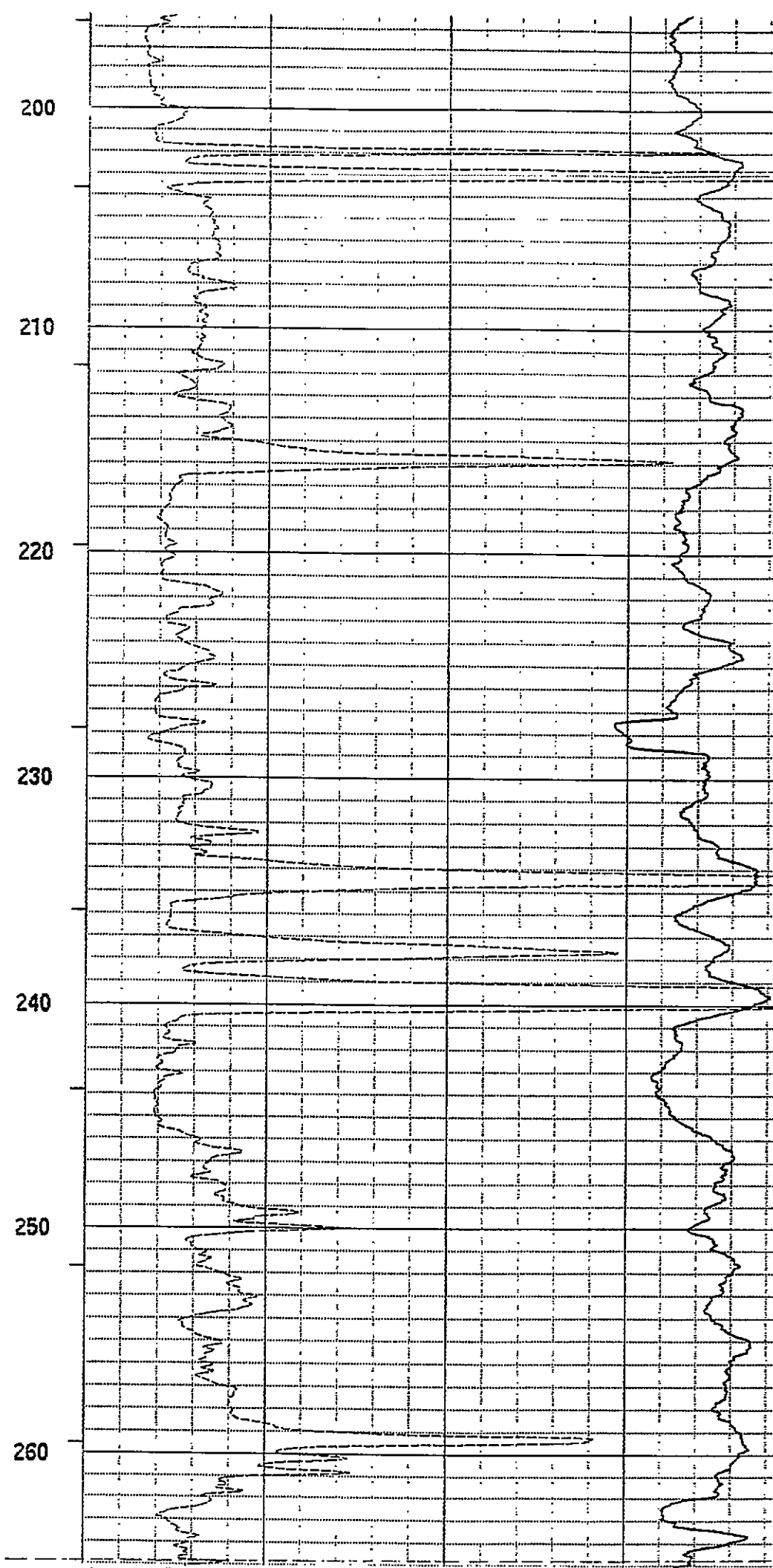
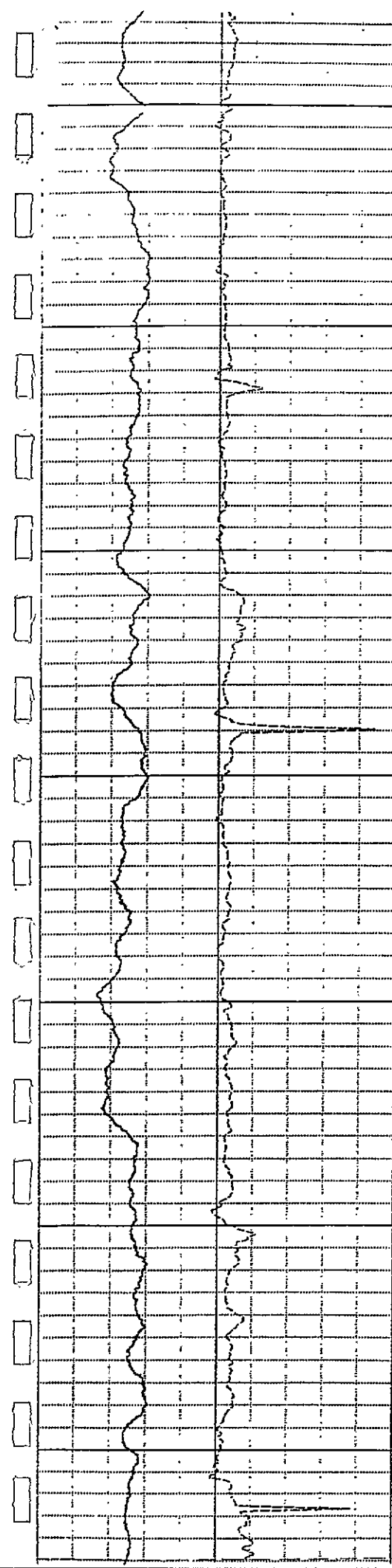
160

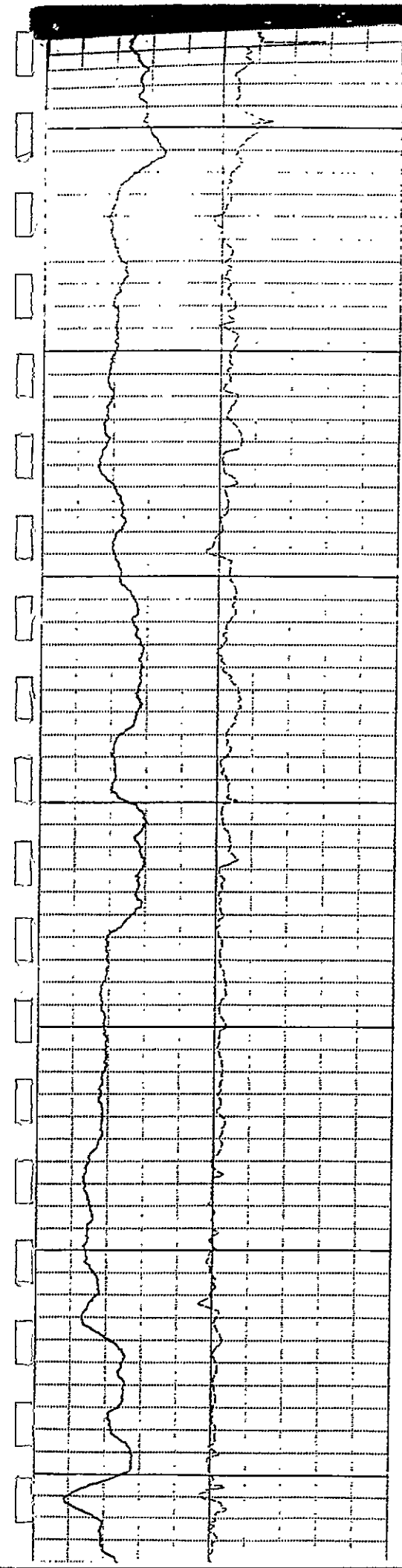
170

180

190







270

280

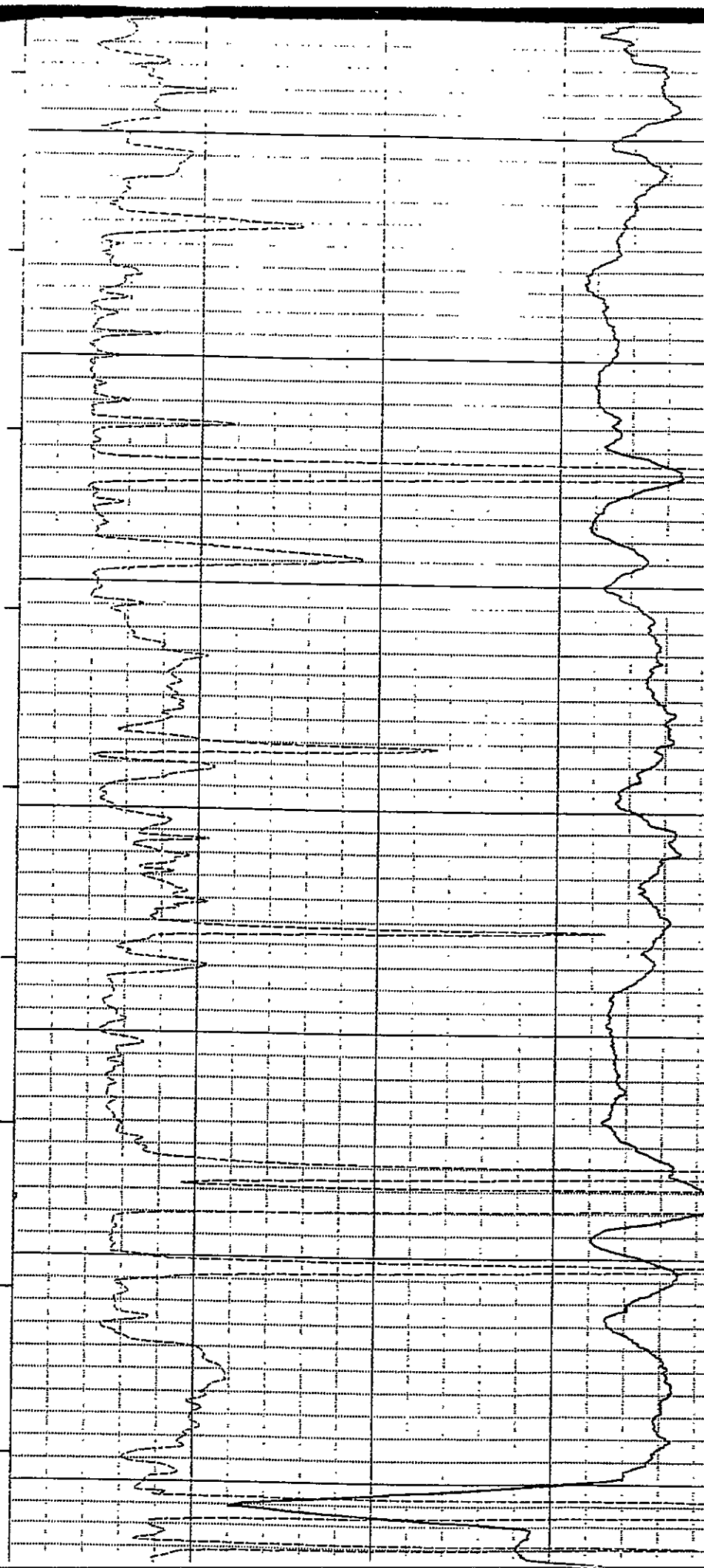
290

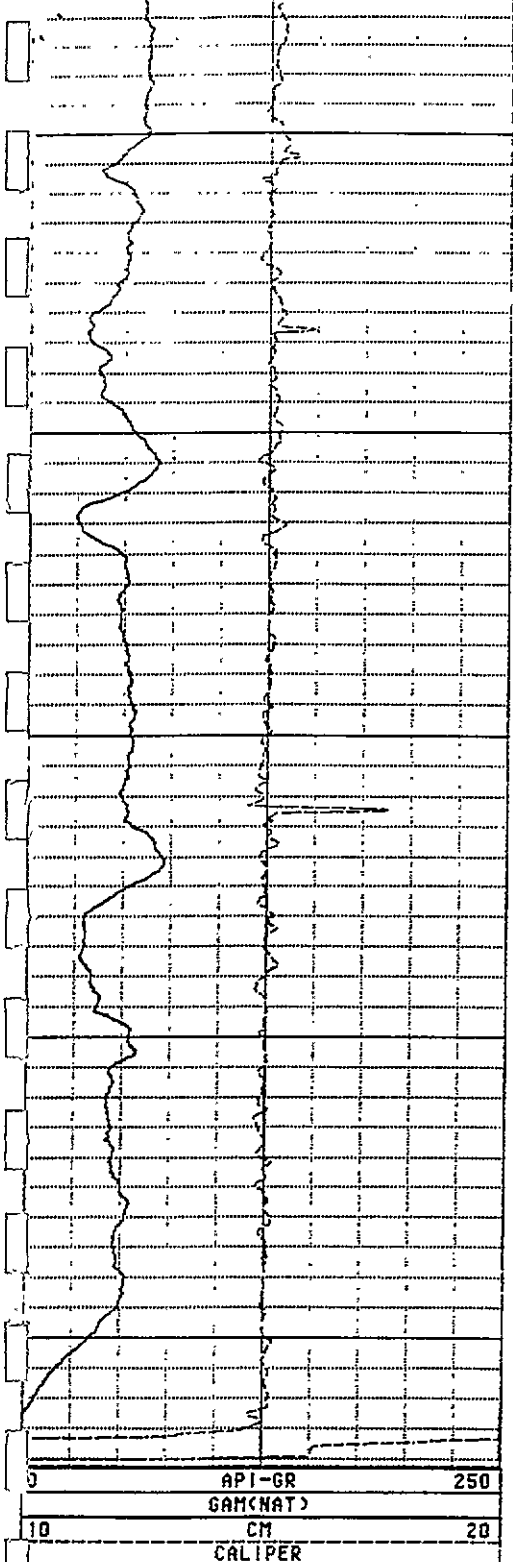
300

310

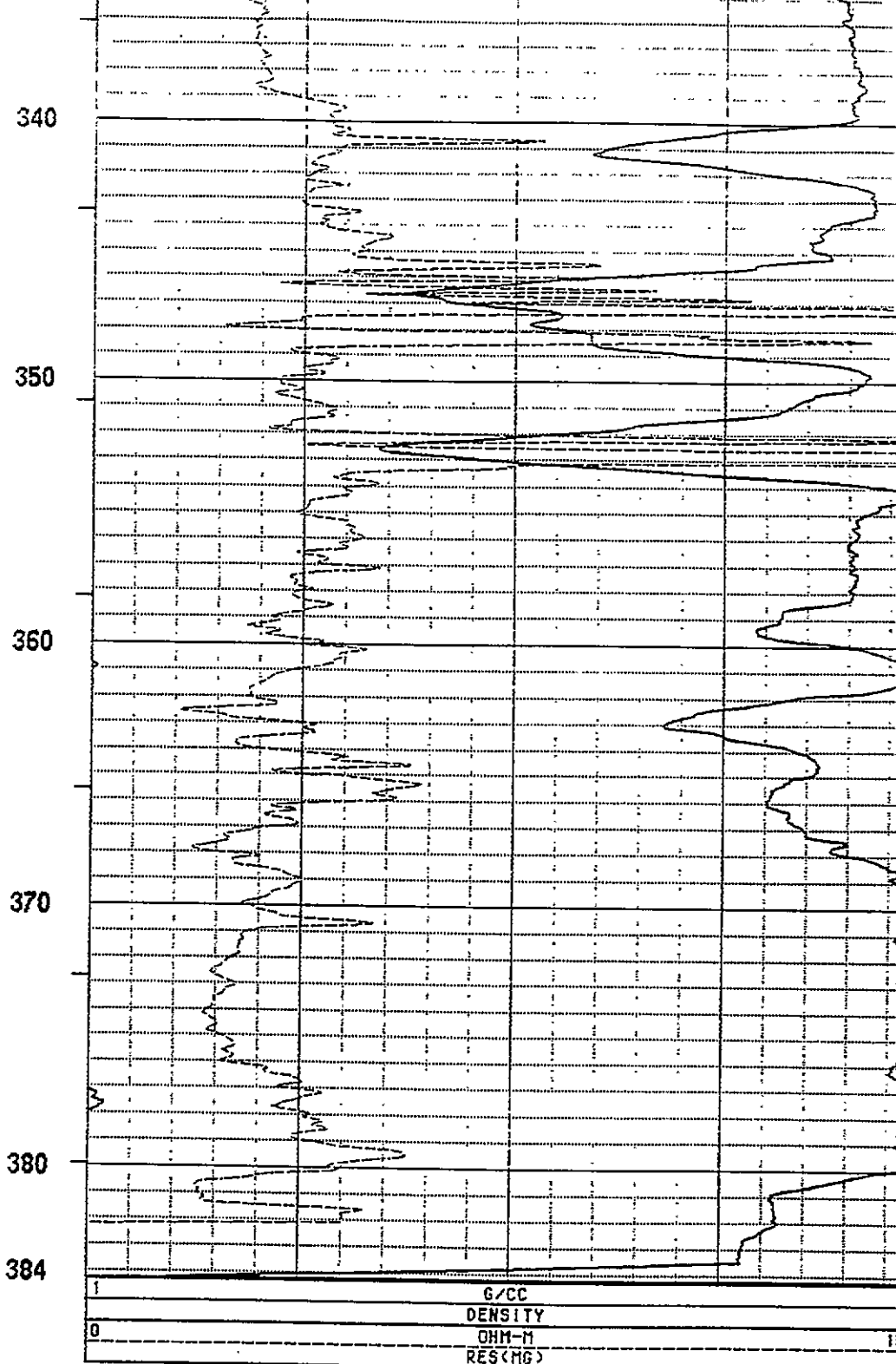
320

330

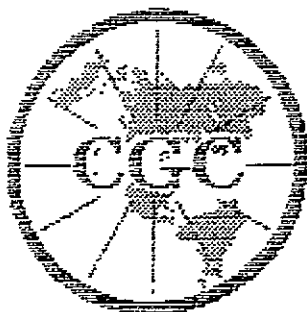




0	API-GR	250
	GAM(NAT)	
10	CM	20
	CALIPER	



1	G/CC	
	DENSITY	
0	OHM-M	
	RES(MG)	



# Century GEOPHYSICAL CORP.

## SONIC

COMPANY : CAN. OCC. PETRO. LTD.  
WELL : 94-86  
LOCATION/FIELD : TSOLUM RIVER  
COUNTY : CAMPBELL RIVER  
STATE : B.C.  
SECTION : TOWNSHIP : RANGE :

### OTHER SERVICES:

9030

9300

DATE : 03/05/94 PERMANENT DATUM : GL ELEVATIONS  
DEPTH DRILLER : 384 ELEV. PERM. DATUM: KB :  
LOG BOTTOM : 384.30 LOG MEASURED FROM: GL DF :  
LOG TOP : 0.20 DRL MEASURED FROM: GL GL :

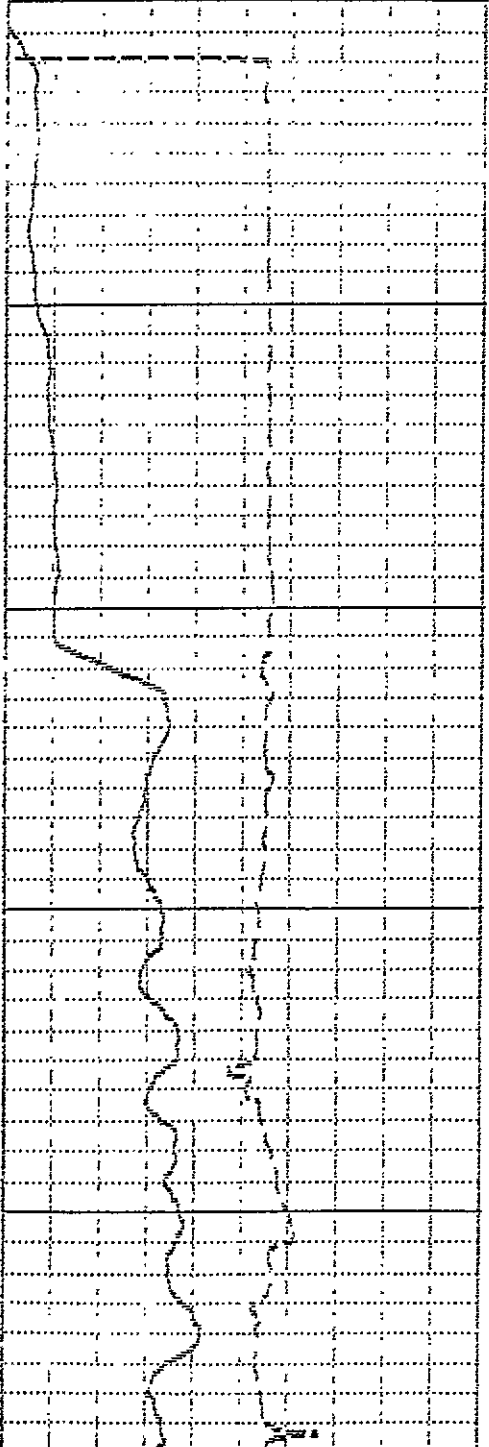
CASING DRILLER : 22.55 LOGGING UNIT : 8903  
CASING TYPE : STEEL FIELD OFFICE : CALGARY  
CASING THICKNESS: 0.12 RECORDED BY : T. LEWICKYJ

BIT SIZE : 15.5 BOREHOLE FLUID : WATER FILE : PROCESSED  
MAGNETIC DECL. : 18 RM : TYPE : 9030AA  
MATRIX DENSITY : 2.65 RM TEMPERATURE : LOG : 2  
FLUID DENSITY : 1.00 MATRIX DELTA T : 173 PLOT : CANDXY  
NEUTRON MATRIX : SANDSTONE FLUID DELTA T : 690 THRESH: 30000

REMARKS :  
OPEN HOLE

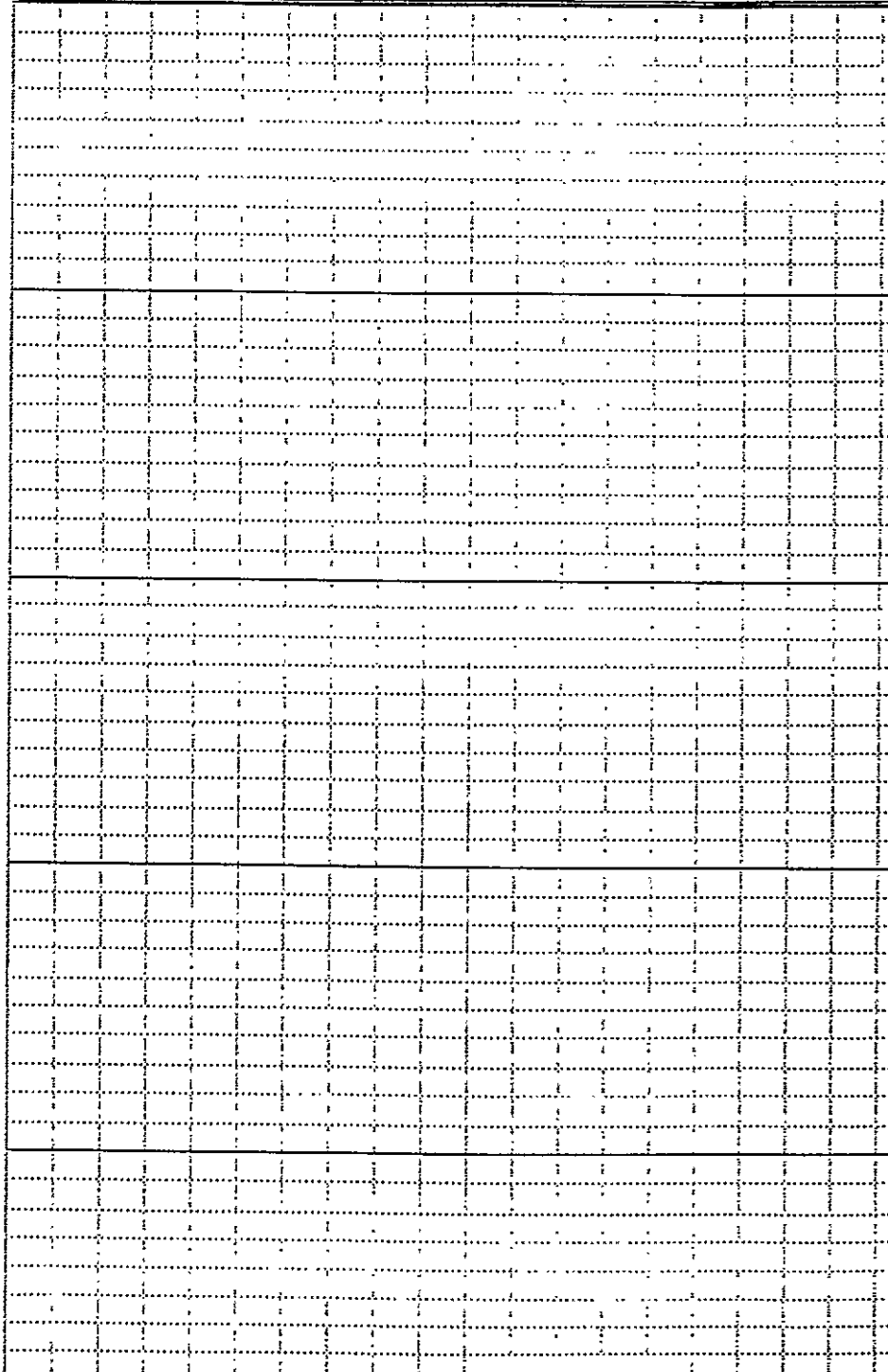
ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

CALIBER	
10	20
GAIN/UNIT	
50	250

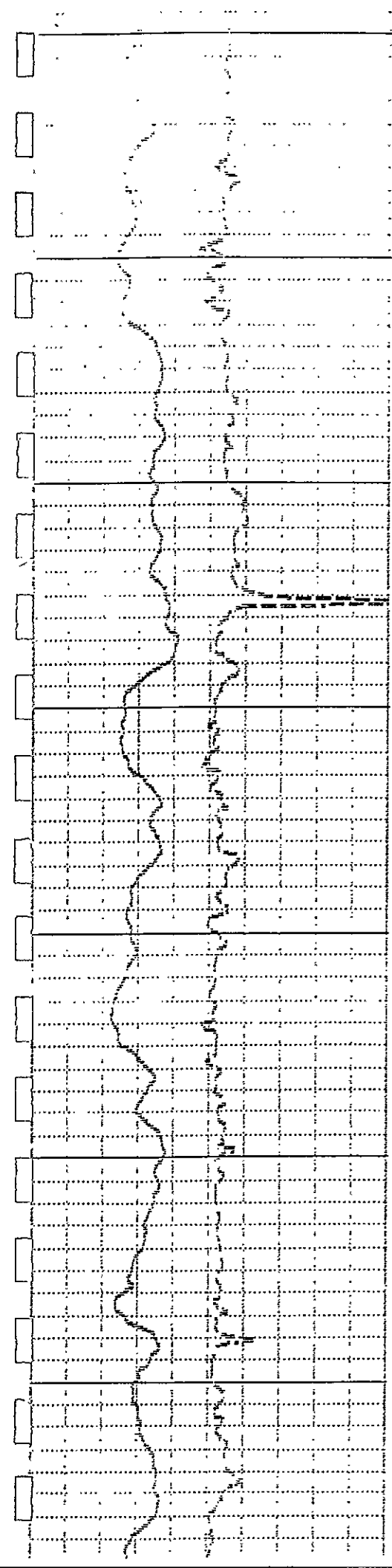


0  
10  
20  
30  
40

DELTA	
1000	USEC/M
BNC-BELT	
2000	USEC/M







55

60

65

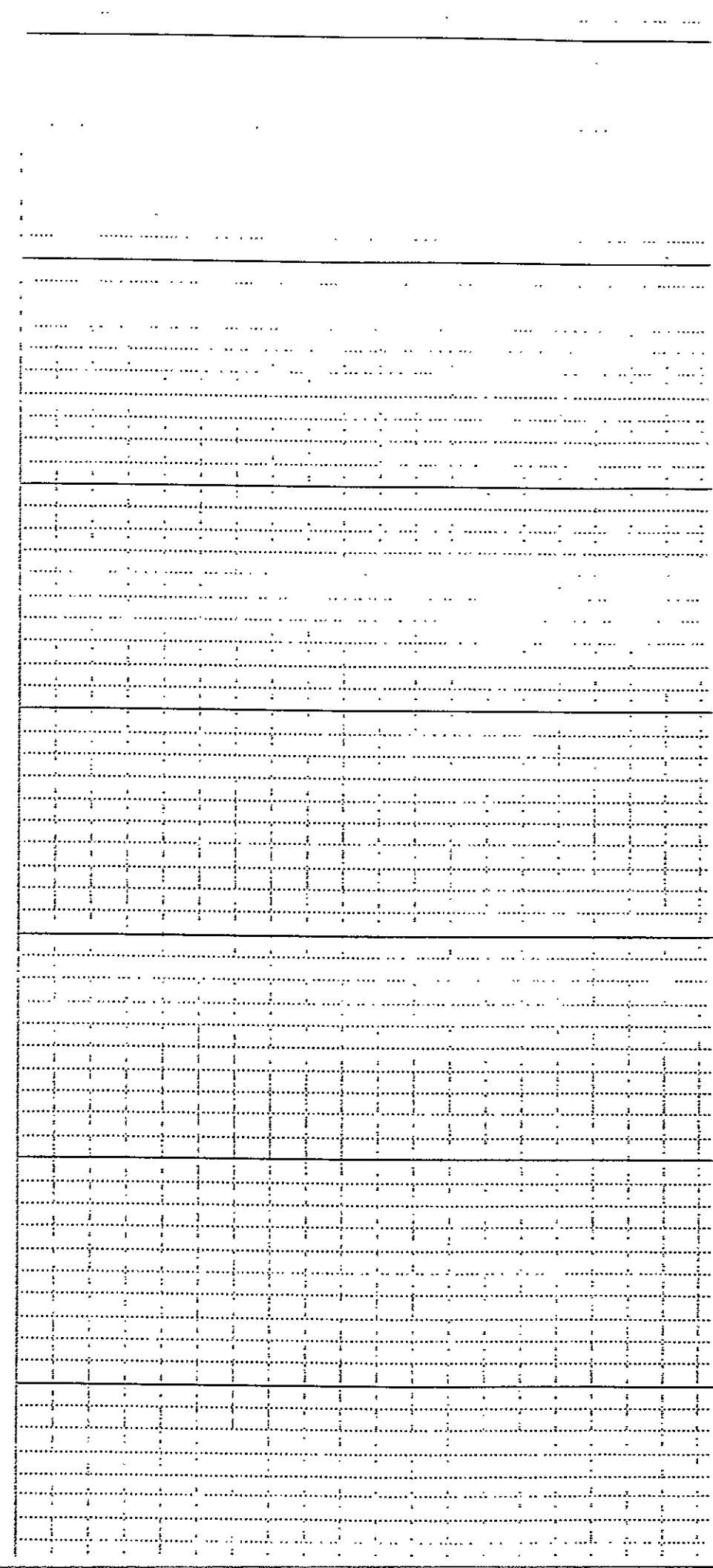
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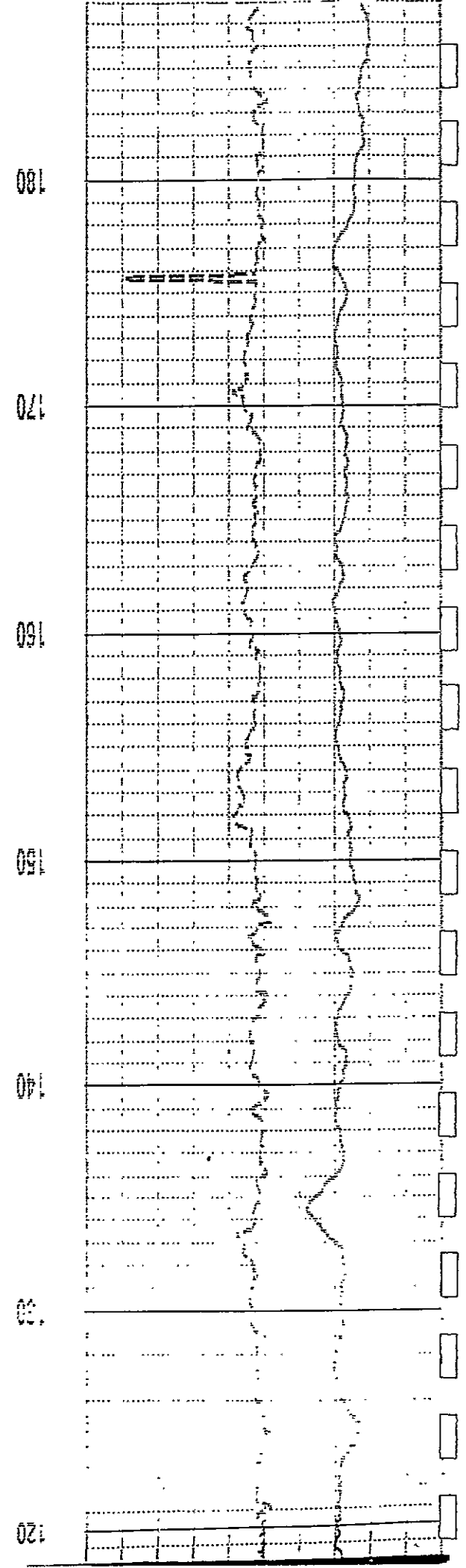
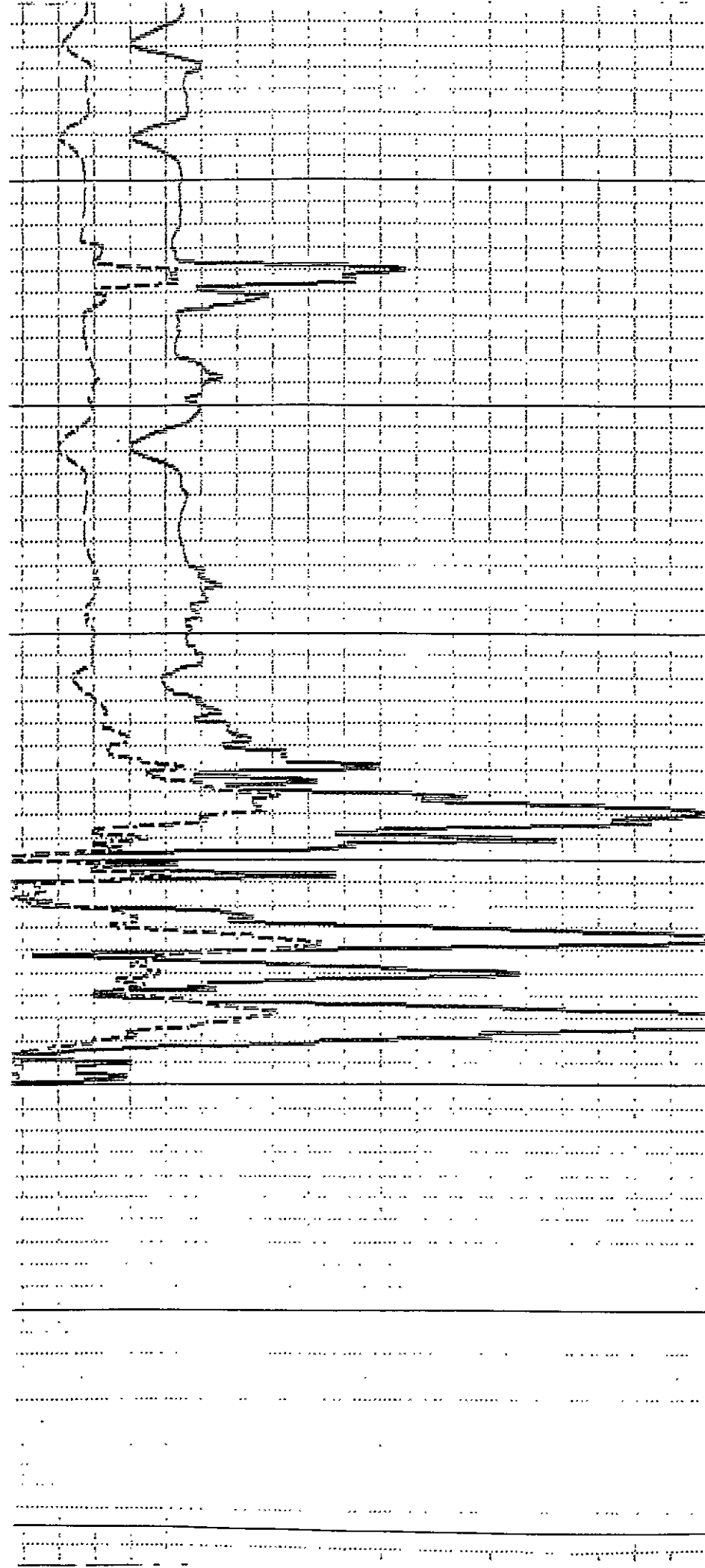
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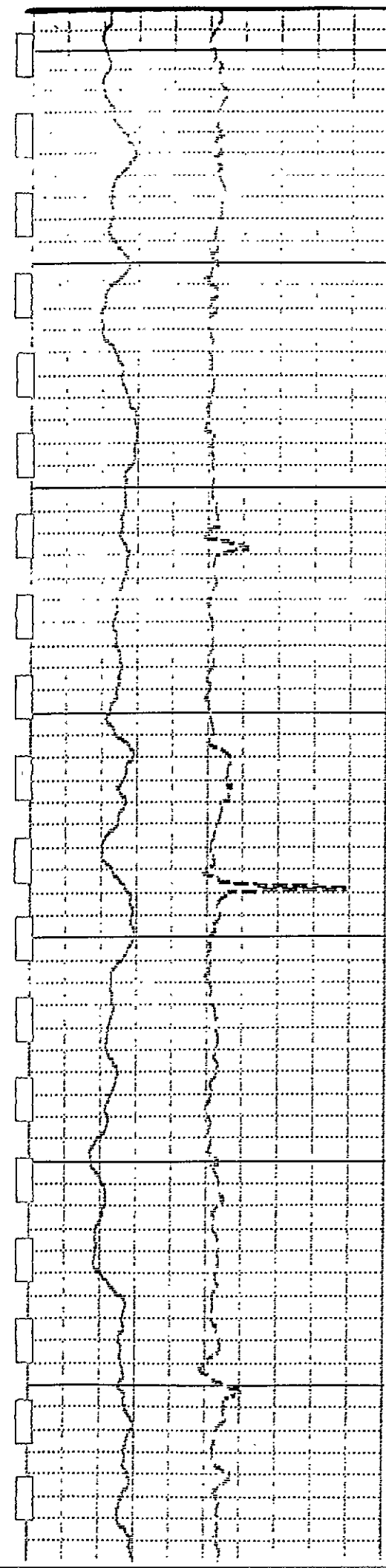
80

85

90







190

200

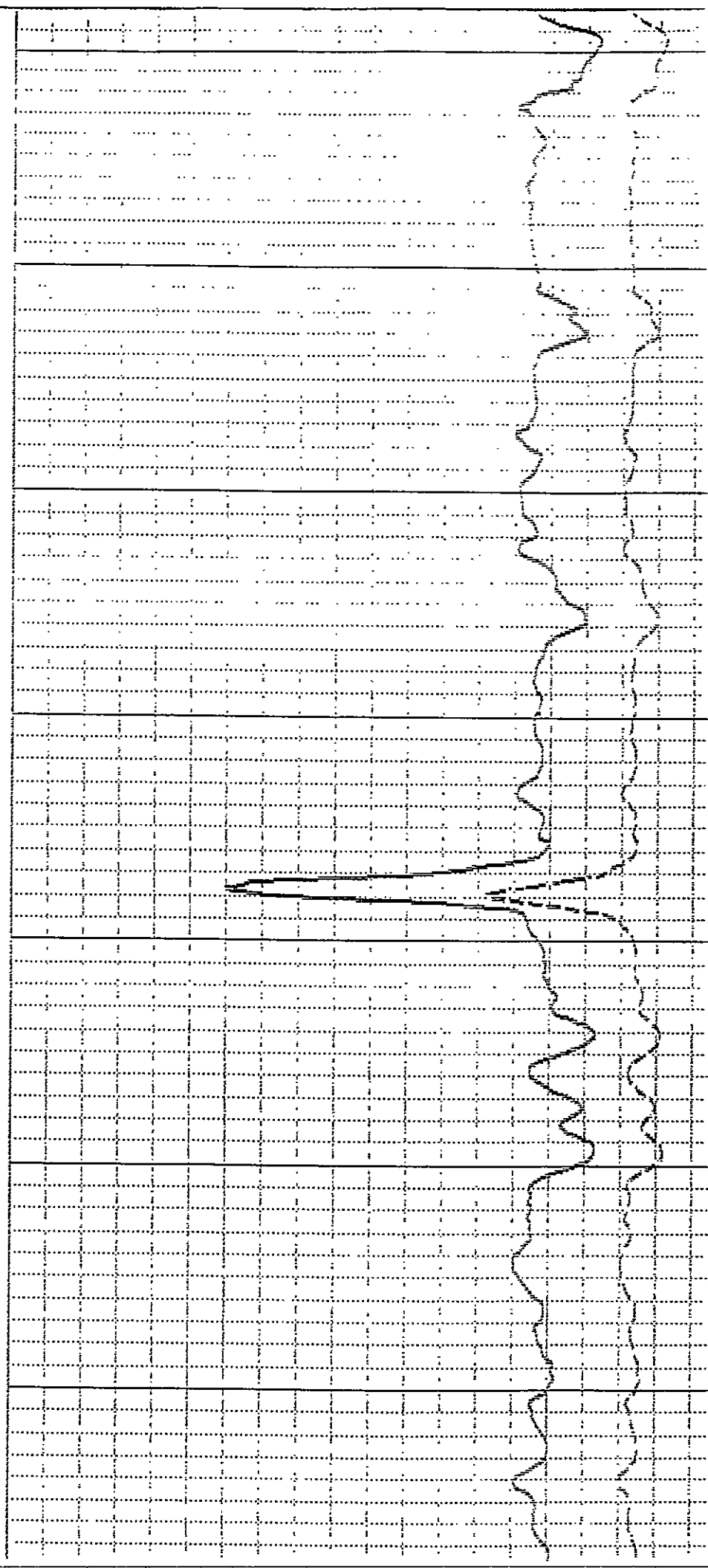
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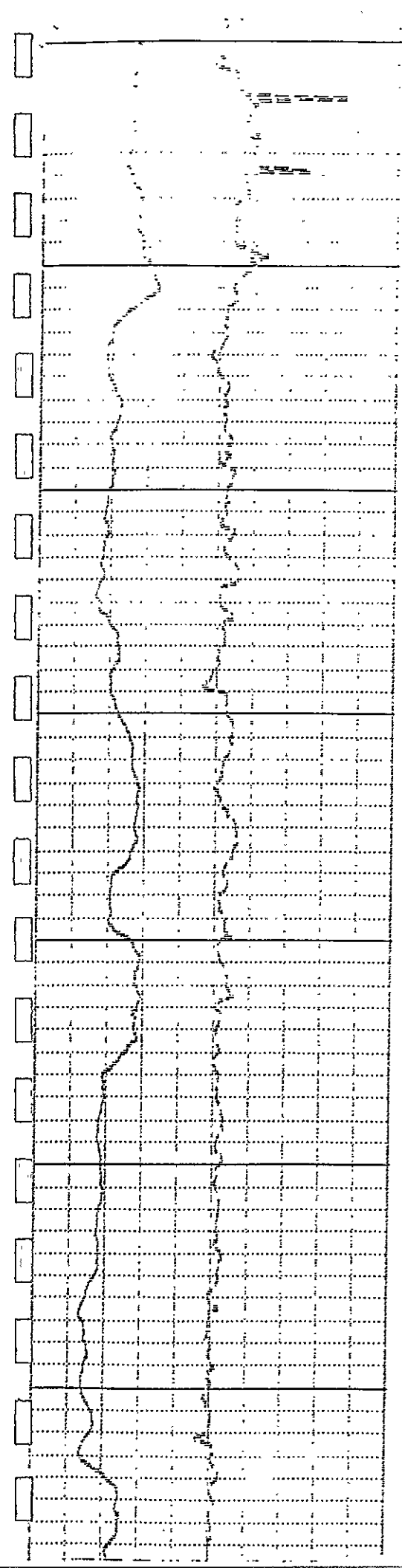
220

230

240

250





100  
100  
100

270

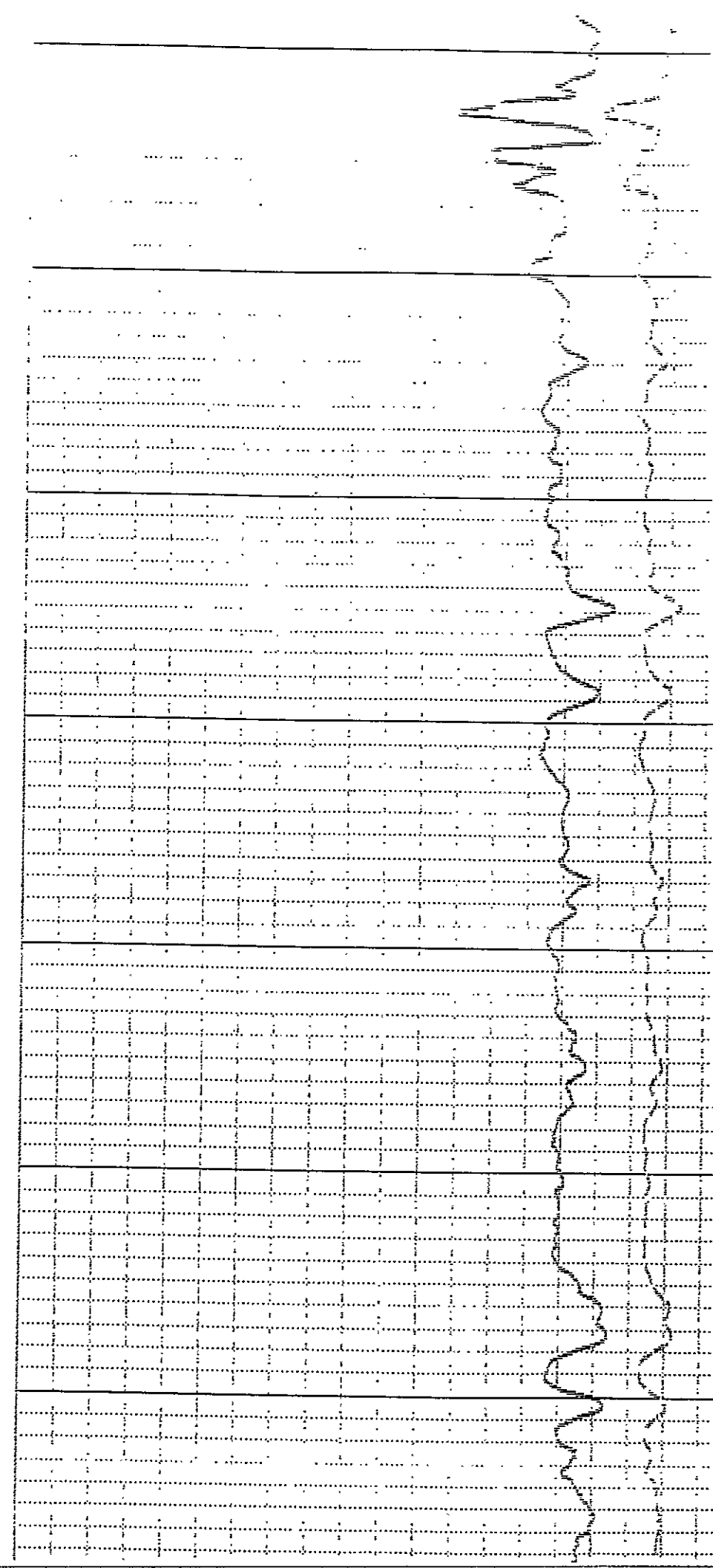
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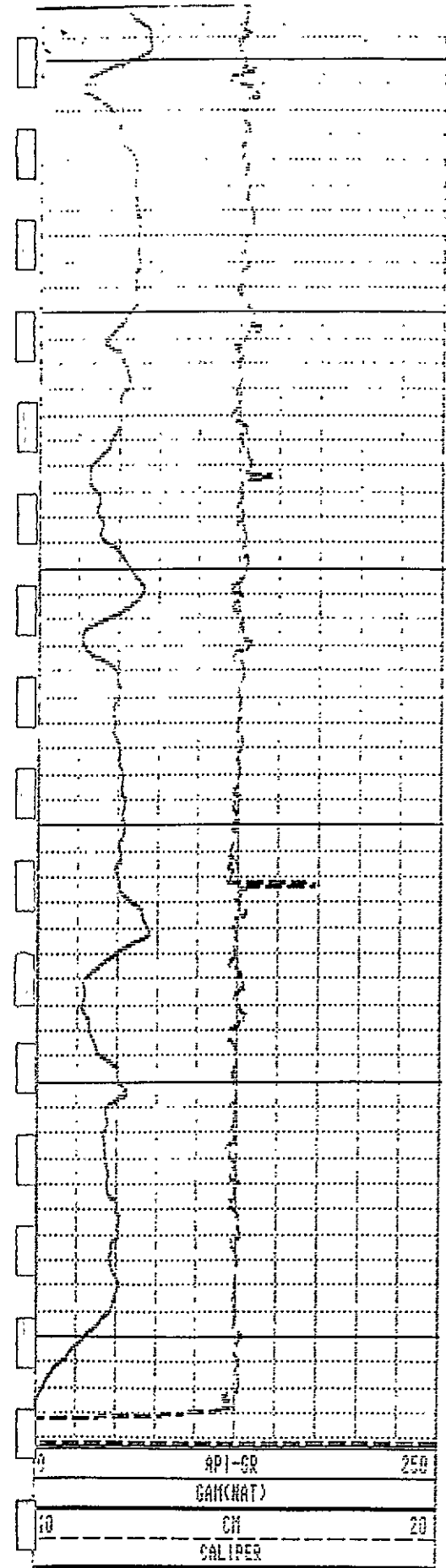
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300

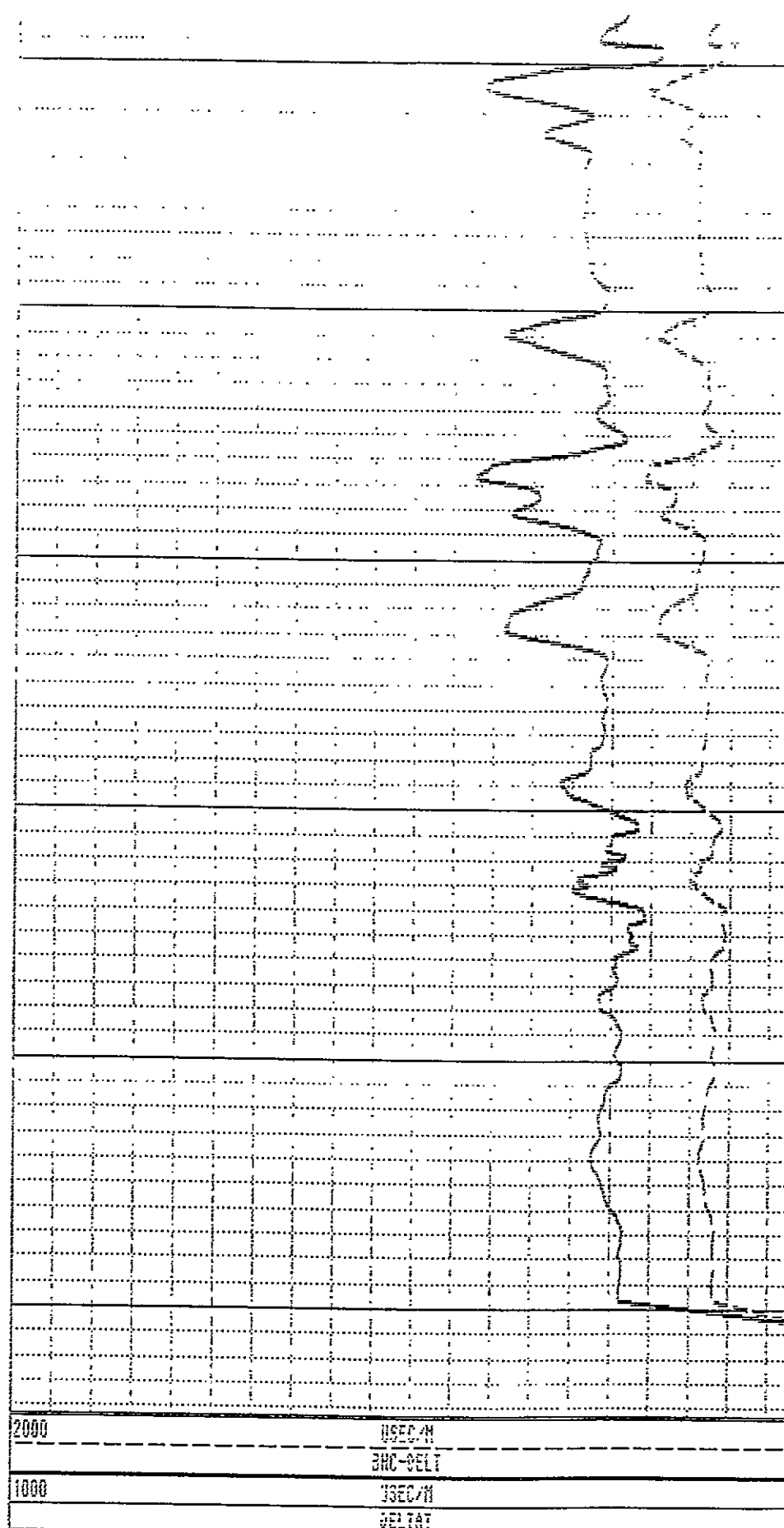
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320





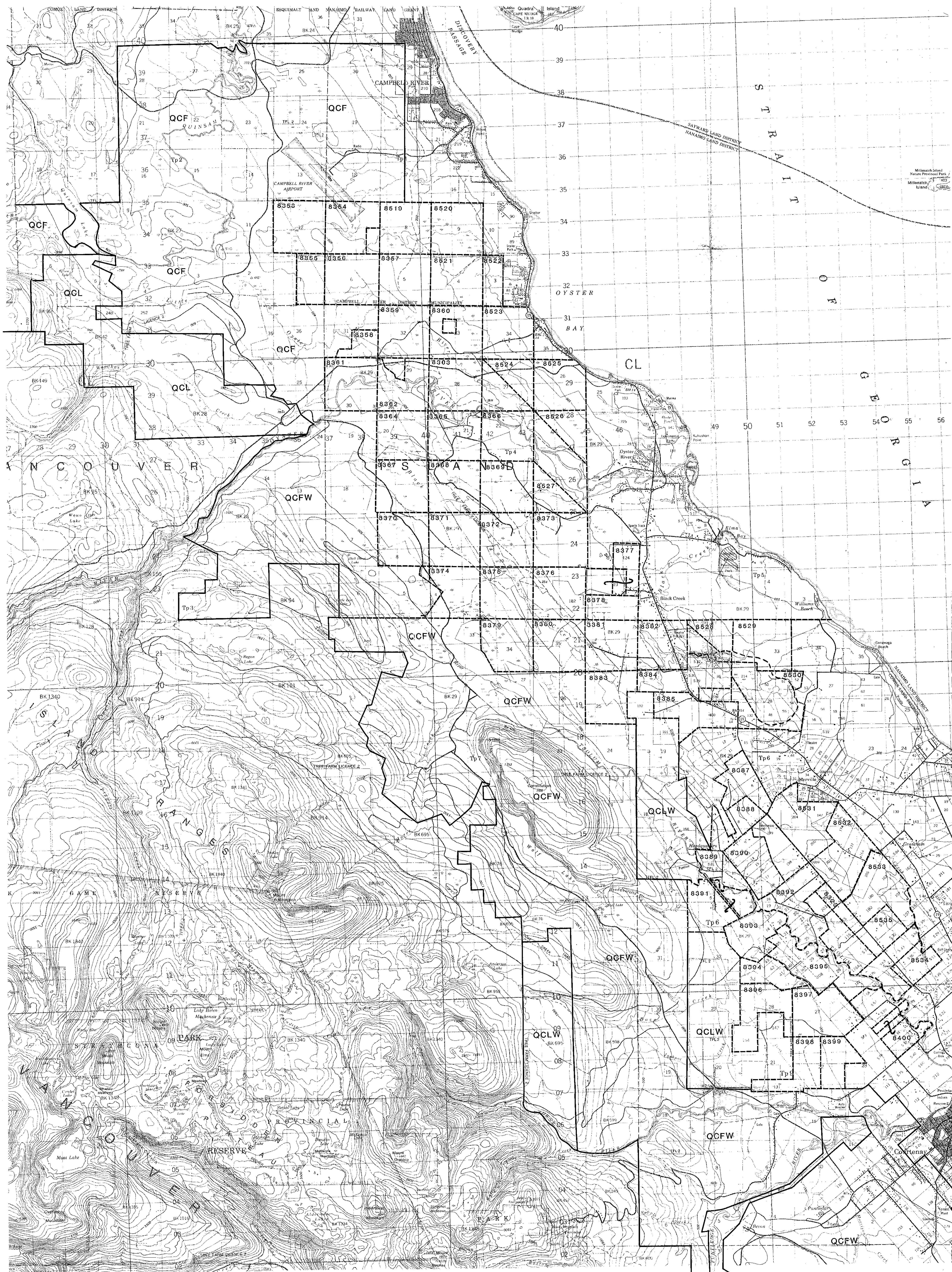
330  
340  
350  
360  
370  
380  
384



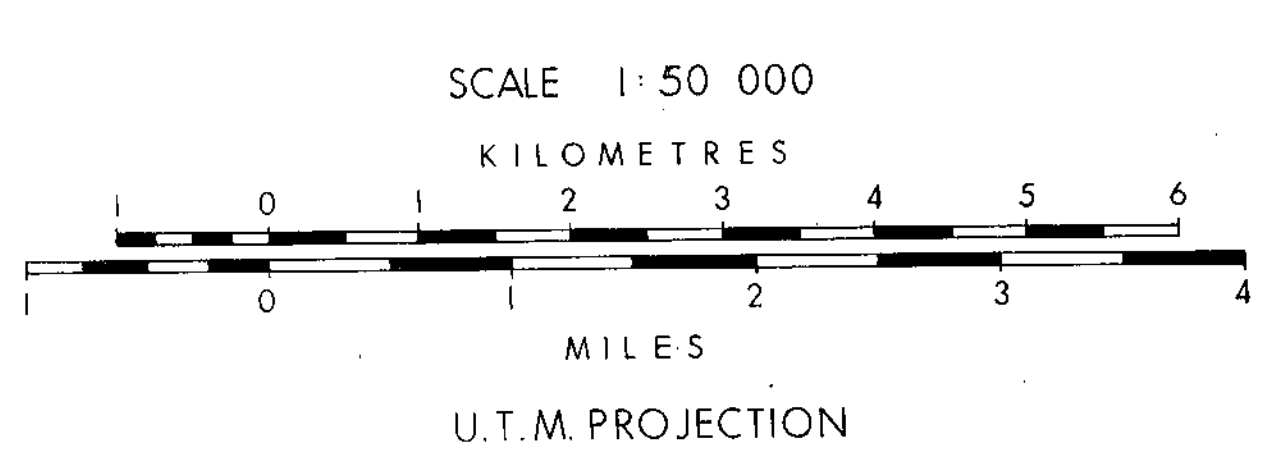
API-GR	250
GAMMA	
CM	20
CALIPER	

2000	USEC/M
	INC-DELT
1000	USEC/M
	DELTAT





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- QUINSAM COAL/BRINCO FEE SIMPLE OPTIONED FROM WELDWOOD
- QUINSAM COAL/BRINCO COAL LICENCES OPTIONED FROM WELDWOOD

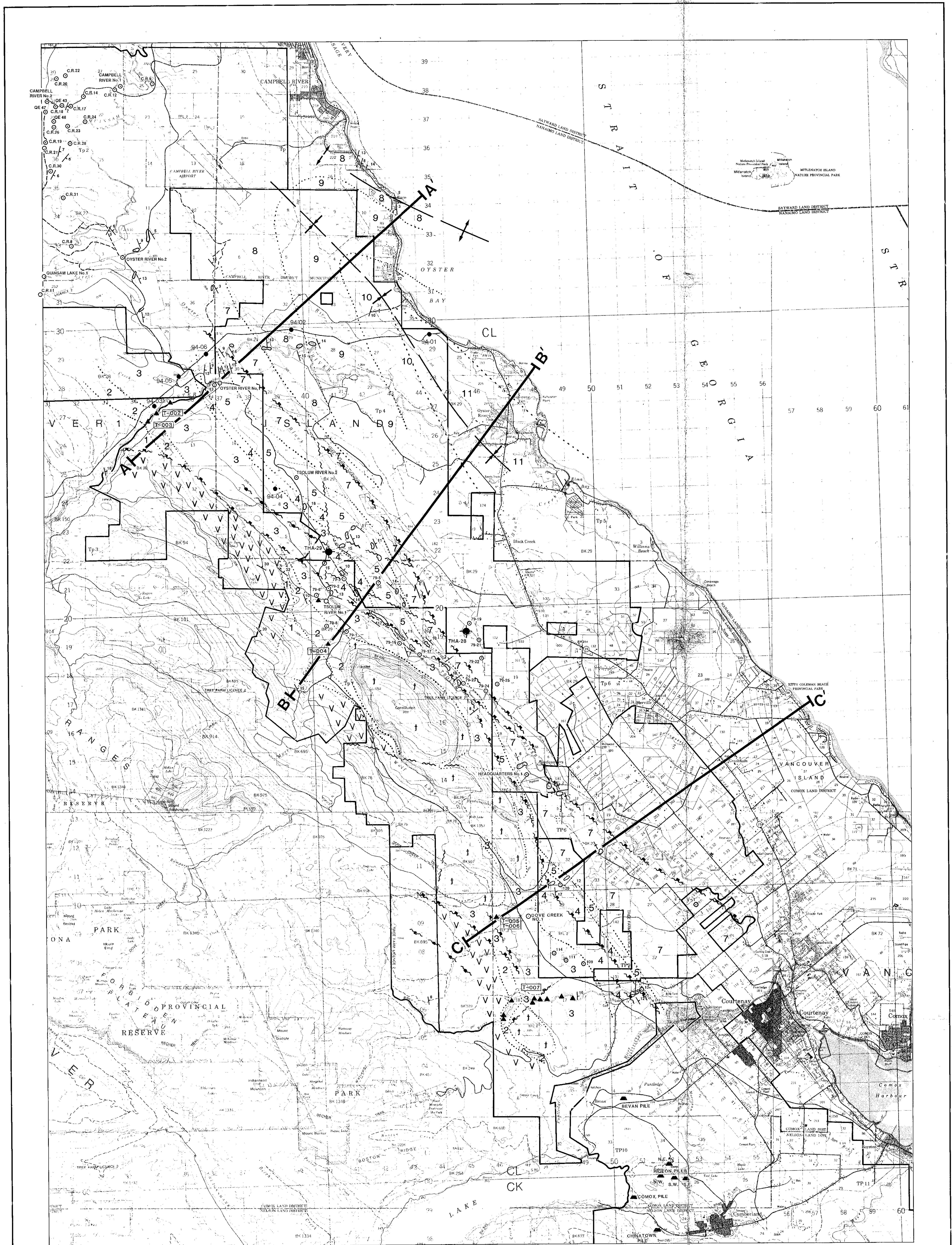


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**TSOLUM RIVER PROPERTY  
MAP 2  
COAL LICENCES  
NTS 92K/3, 92F/14**

SCALE 1:50 000	AUTHOR R. SWAREN
DATE 1994	DRAWN
REVISED	FILE No. T-0567-4111





**STRATIGRAPHIC LEGEND**

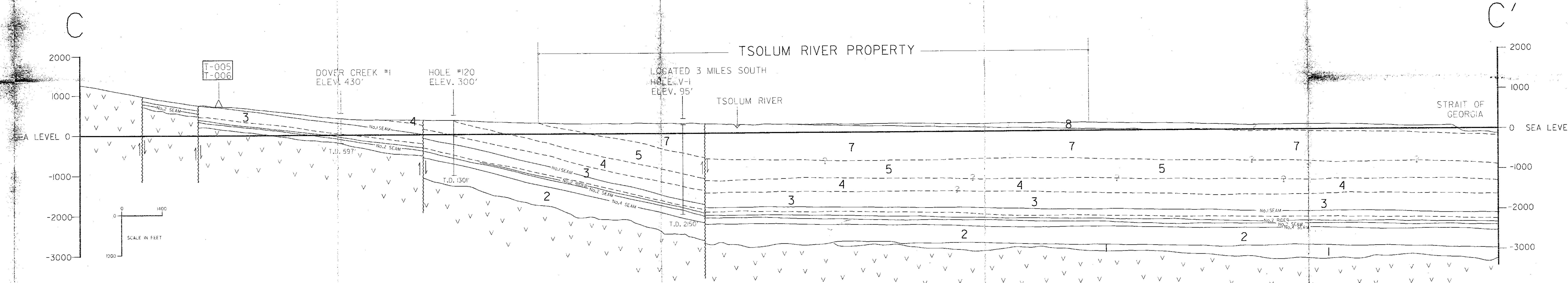
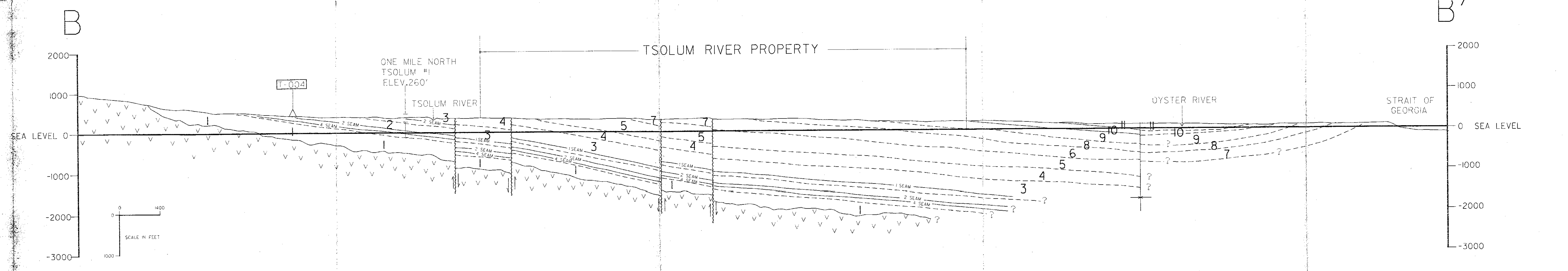
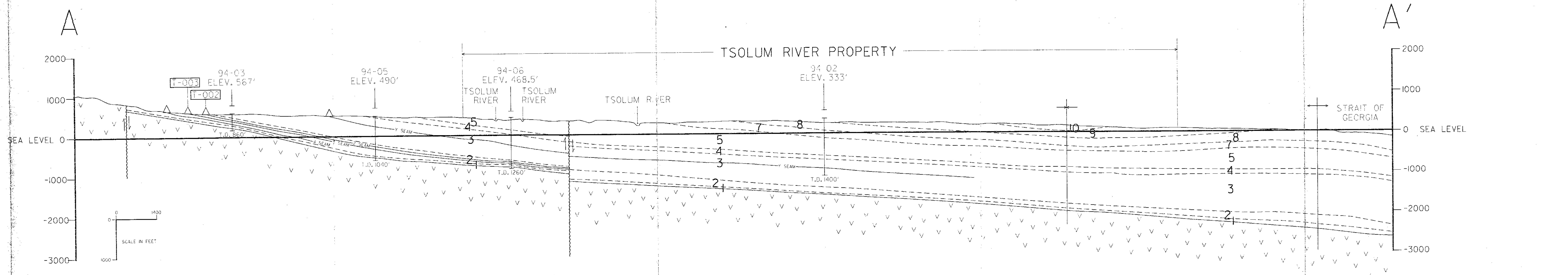
- |   |   |
|---|---|
| <b>Eocene to Oligocene</b>  | 5 Browns Mb.: sandstone and siltstone, locally glauconitic                      |
| † Catface intrusions: sills and dykes of dacite and fine-grained quartz diorite | 4 Puntledge Mb.: siltstone; minor sandstone                                     |
| <b>LATE CRETACEOUS (Nanaimo Group)</b>  | Comox Formation (Units 1-3)   |
| 11 Lambert Fm.: shale; siltstone  | 3 Dunsuir Mb.: sandstone; minor siltstone, shale, conglomerate and coal         |
| 10 Denman Fm.: sandstone, minor conglomerate                                    | 2 Cumberland Mb.: sandstone, siltstone, shale and coal; locally thick coal beds |
| 9 Cedar District Fm.: shale; siltstone  | 1 Benson Mb.: conglomerate and sandstone; red siltstone and shale               |
| 8 Protection Fm.: sandstone, minor conglomerate                                 | <b>JURASSIC AND OLDER</b>   |
| Trent River Formation (Units 4-7)   | V Basement Complex: chiefly basaltic volcanic rocks                             |
| 7 Royston Mb.: shale and siltstone  |   |
| 6 Tsable Mb.: conglomerate and sandstone  |   |

**SYMBOLIC LEGEND**

- |   |                          |
|---|--------------------------|
| ↘ Dip/direction                                 | <b>FAULTS</b>            |
| ▲ Old coal piles                                | ~ Extensional (normal)   |
| ▲ T-004 Coal outcrop sample site; December 1991 | ~ Transform (tear)       |
| <b>DRILL HOLES</b>                              | <b>FOLDS</b>             |
| ○ Mid 1970's Weldwood hole                      | ↑ Anticline              |
| ○ Weldwood 1979 rotary drill hole               | ↓ Syncline               |
| ◆ THA-29 Novacorp 1985 methane drill hole       | ↔ Cross-section location |
| ● 94-02 Canadian Oxy 1994 drill hole            |                          |

Canadian Occidental Petroleum Ltd.	
<b>TSOLUM RIVER NORTH</b>	
<b>MAP 3</b>	
<b>GEOLOGY AND</b>	
<b>DRILL HOLE LOCATIONS</b>	
<b>NTS 92K/3, 93F/14</b>	
SCALE 1:50 000	AUTHOR Ron Swaren
DATE 1994	DRAWN
REVISED	FILE No. 4040T560





**STRATIGRAPHY**

**LATE CRETACEOUS (NANAIMO GROUP)**

- 11 LAMBERT Fm.: SHALE, SILTSTONE
- 10 DENMAN Fm.: SANDSTONE, MINOR CONGLOMERATE
- 9 CEDAR DISTRICT Fm.: SHALE, SILTSTONE
- 8 PROTECTION Fm.: SANDSTONE, MINOR CONGLOMERATE

**TRENT RIVER FORMATION (UNIT 4-7)**

- 7 ROYSTON Mb.: SHALE, SILTSTONE
- 6 TRIBLE Mb.: CONGLOMERATE, SANDSTONE
- 5 BROWNS Mb.: SANDSTONE AND SILTSTONE; LOCALLY GLAUCONITIC
- 4 PUNTLEDGE Mb.: SILTSTONE, MINOR SANDSTONE

**COMOX FORMATION (UNITS 1-3)**

- 3 DUNSMUIR Mb.: SANDSTONE, MINOR SILTSTONE, SHALE, CONGLOMERATE AND COAL
- 2 CUMBERLAND Mb.: SANDSTONE, SILTSTONE, AND COAL; LOCALLY THICK COAL BEDS
- 1 BENSON Mb.: CONGLOMERATE AND SANDSTONE, RED SILTSTONE AND SHALE

**JURASSIC AND OLDER**

- VV BASEMENT COMPLEX: CHIEFLY BASALTIC VOLCANIC ROCKS

**SYMBOLS**

- I DRILL HOLE
- △ COAL OUTCROP SAMPLE LOCATION DECEMBER 1991
- ||| NORMAL FAULT
- FORMATION CONTACT
- - - COAL SEAM
- ⊕ ⊖ AXIS OF ANTICLINE / SYNCLINE

**Canadian Occidental Petroleum Ltd.**

**TSOLUM RIVER COAL PROPERTY**

**GEOLOGICAL CROSS-SECTION**

SCALE: 1"=1000' VERT.	AUTHOR: R. SWAREN
DATE: MAY 13, 1994	DEPT.: ALTERNATE FUELS
DRAFTING: P. HARTNETT	FILE No.: C2445.B08