1.2.41.022

X-RAY DIFFRACTION ANALYSES OF SELECTED SAMPLES

COASTAL INTERVAL AND ROLLINS MEMBER

DRILL CORE MWX-3

by

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This report is preliminary and has not been edited or reviewed for conformity with Bendix Field Engineering, Department of Energy, Sandia National Laboratories or U.S. Geological Survey Standards

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INTRODUCTION

Selected samples of the Coastal Interval and the Rollins Member of the Cretaceous Mesaverde Group of drill core MWX-3 were analyzed by X-ray diffraction. The 2-micrometer fraction was analyzed for clay mineralogy. The minus 200-mesh pulverized core was analyzed for bulk mineralogy.

PROCEDURES

The Coastal Interval of MWX-3 is represented by 37 samples. The Rollins Member of MWX-3 is represented by 14 samples. Clay mineralogies were analyzed for 5 samples from each of the two groups. Bulk mineralogies were analyzed for 7 Coastal Interval (MWX-3) and 3 Rollins Member samples. Procedures for these analyses are described in the report for the Coastal Interval, MWX-1.

Representative clay separates from 7536.8 and 7552.7 ft were treated with hydrochloric acid to distinguish high-iron chlorite from kaolinite.

CLAY MINERALOGY

The results of X-ray diffraction analyses are presented in Table 1. The Coastal Interval contains dominant randomly interstratified illite/smectite and minor-to-moderate amounts of regularly interstratified illite/smectite with 40 to 60 percent expandable layers. The Rollins Member contains the same major mineralogies as the Coastal Interval; however, trace to minor amounts of chlorite and kaolinite are also present above 7552.7 ft. X-ray clay patterns are in Appendix A.

BULK MINERALOGY

Quartz is the predominant mineral in the bulk X-ray patterns of the samples analyzed (Table 2). Variable amounts of dolomite, calcite, plagioclase, ankerite, and siderite are observed. Identification of ankerite was made by correlating three to six peaks from the sample to the JCPDS standard. Good correlations were observed in sample depths 6460.1, 7542.3, and 7546.2 ft. A good correlation for siderite was observed at 6468.7 ft (six peaks); siderite may be present at 6460.1 ft (four peaks). Bulk X-ray patterns for all samples are in Appendix B.

TABLE 1

CLAY MINERALOGY OF SELECTED SAMPLES, DRILL CORE MWX-3

DEPTH (Ft.)	RANDOM ILLITE/SMECTITE[1]	REGULAR ILLITE/SMECTITE[2]	CHLORITE	KAOLINITE
COASTAL INTERVAL				
6437.8	Dom	Mod	--	--
6447.7	Dom	Mod	--	--
6453.85	Dom	Min-Mod	--	--
6474.8	Dom	Min-Mod	--	--
6513.8	Dom	Min-Mod	--	--
ROLLINS MEMBER				
7536.8	Dom	Min-Mod	Tr	Tr-Min[3]
7548.7	Dom	Min-Mod	Tr	Tr-Min[4]
7552.7	Dom	Min-Mod	Tr	Tr-Min[3]
7554.7	Dom	Mod	--	--
7563.2	Dom	Min-Mod	--	--

[1]Randomly interstratified illite/smectite; variable ratios

[2]Regularly interstratified illite/smectite with 40-60 percent expandable layers

[3]Sample treated with acid

[4]Assumed from acid-treatment of samples at 7536.8 and 7552.7 ft.

TABLE 2

MWX-3 BULK MINERALOGY BY X-RAY DIFFRACTION

COASTAL INTERVAL

DEPTH (Ft.)	QUARTZ 5-490[1]	DOLOMITE 11-78	CALCITE 24-27	PLAGIOCLASE 9-456	ANKERITE 12-88	SIDERITE 29-696
6432.7	Dom	Tr	--	--	--	--
6438.9	Dom	Min-Tr	Min-Mod	--	Min	--
6460.1	Dom	Min	--	--	Min	Tr (?)
6464.5	Dom	--	Tr	Min	--	--
6468.7	Dom	Min	--	--	--	Tr
6470.8	Dom	Mod	--	Min	--	--
6507.9	Dom	Mod	--	Min	--	--
ROLLINS MEMBER						
7542.3	Dom	--	Mod-Subd	Min-Mod	Min-Mod	--
7546.2	Dom	--	Min-Mod	Min	Min	--
7556.5	Dom	--	--	Min	Min (?)	--

[1]JCPDS Card Number

Abbreviations: Dom (dominant), Subd (subdominant), Mod (moderate), Min (minor), Tr (trace)

APPENDIX A

X-RAY DIFFRACTION CHARTS FOR CLAY MINERALOGY

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Today: 10-JAN-84 10:47:36

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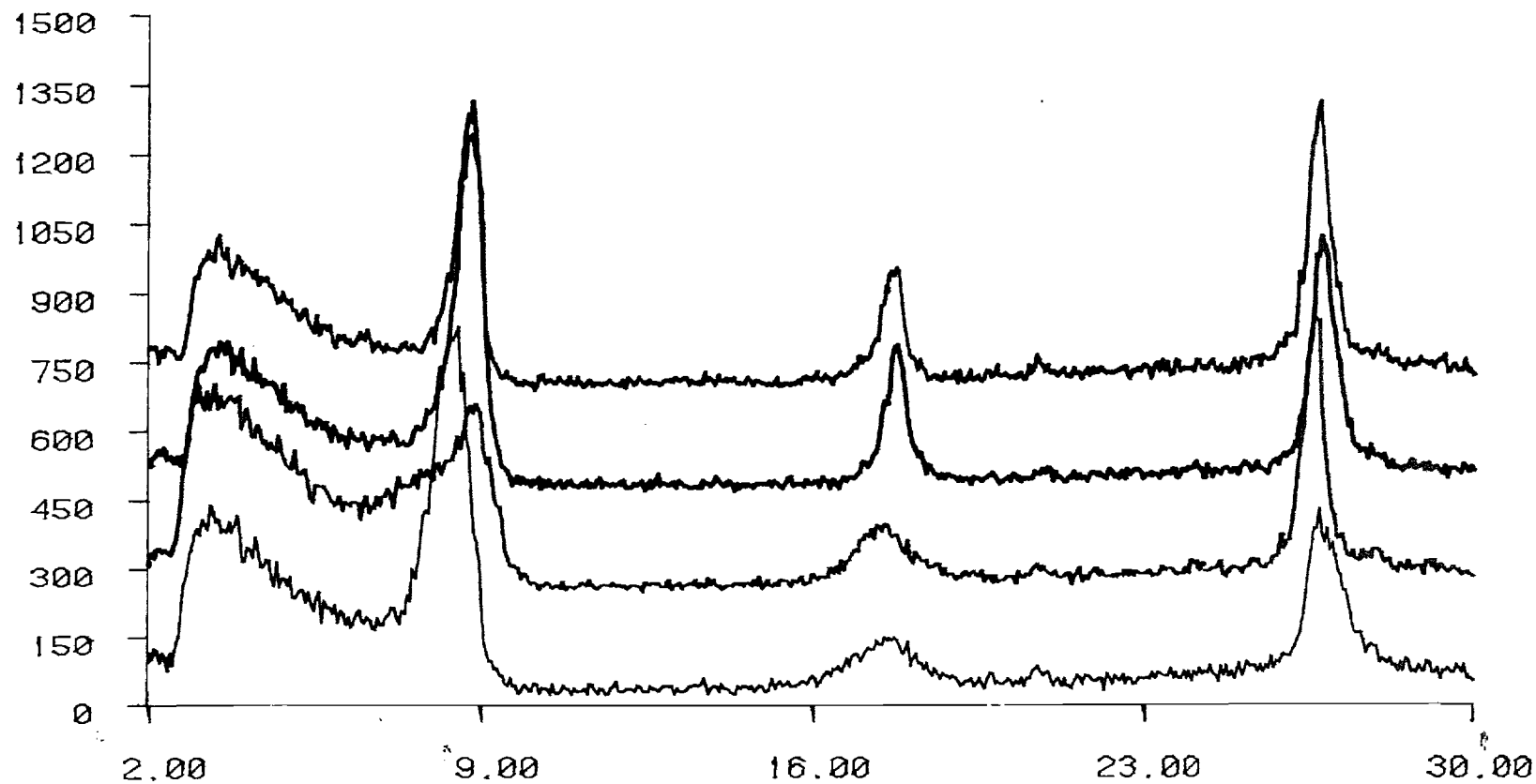

3MWX 6437.GLYCOLATEDHEATED 330HEATED 550
833. 632. 866. 639.

BENDIX

File name: DF0:Z91265.RAW

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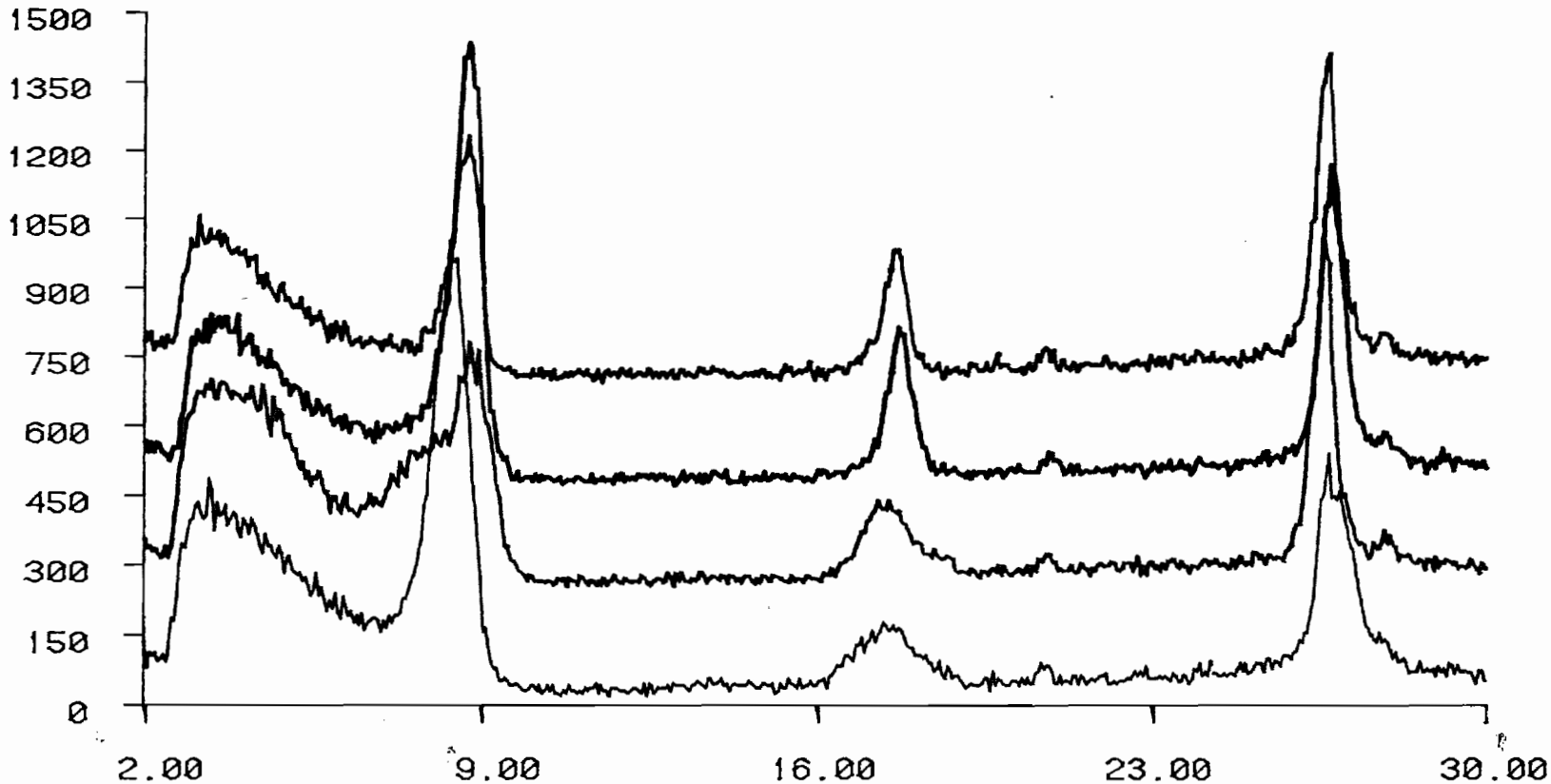
Today: 10-JAN-84 11:14:54

Sample Id: HEATED 550 3MWX 6447.7



3MWX 6447.GLYCOLATEDHEATED 330HEATED 550
971. 785. 982. 739.

BENDIX

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Today: 10-JAN-84 15:33:06

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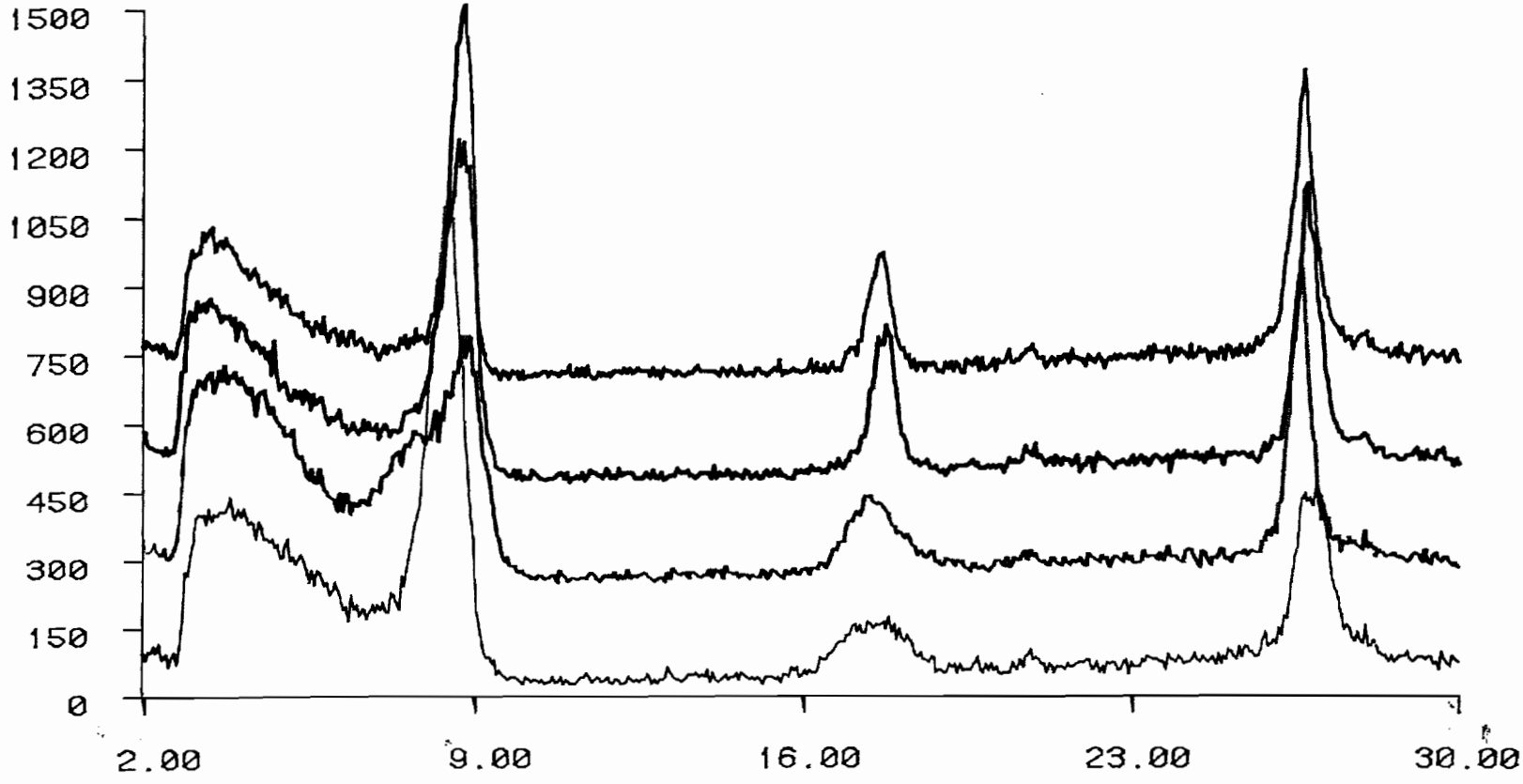

3MWX 6453.GLYCOLATEDHEATED 330HEATED 550
1079. 716. 1061. 700.

BENDIX

File name: DF0:Z91267.RAW

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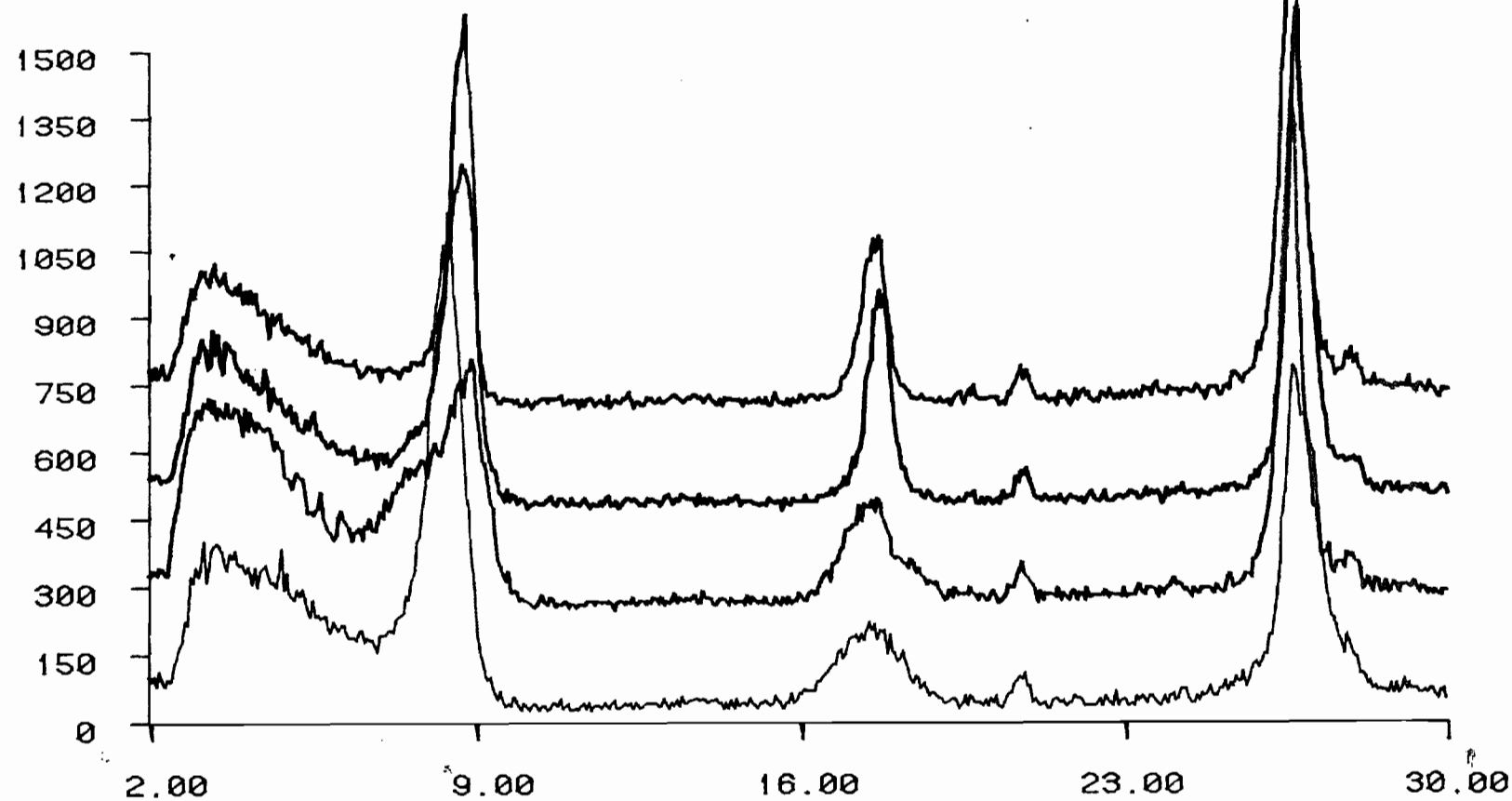
Today: 10-JAN-84 15:36:06

Sample Id: HEATED 550 3MWX 6474.8



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1138. 1161. 1147. 1217.

BENDIX

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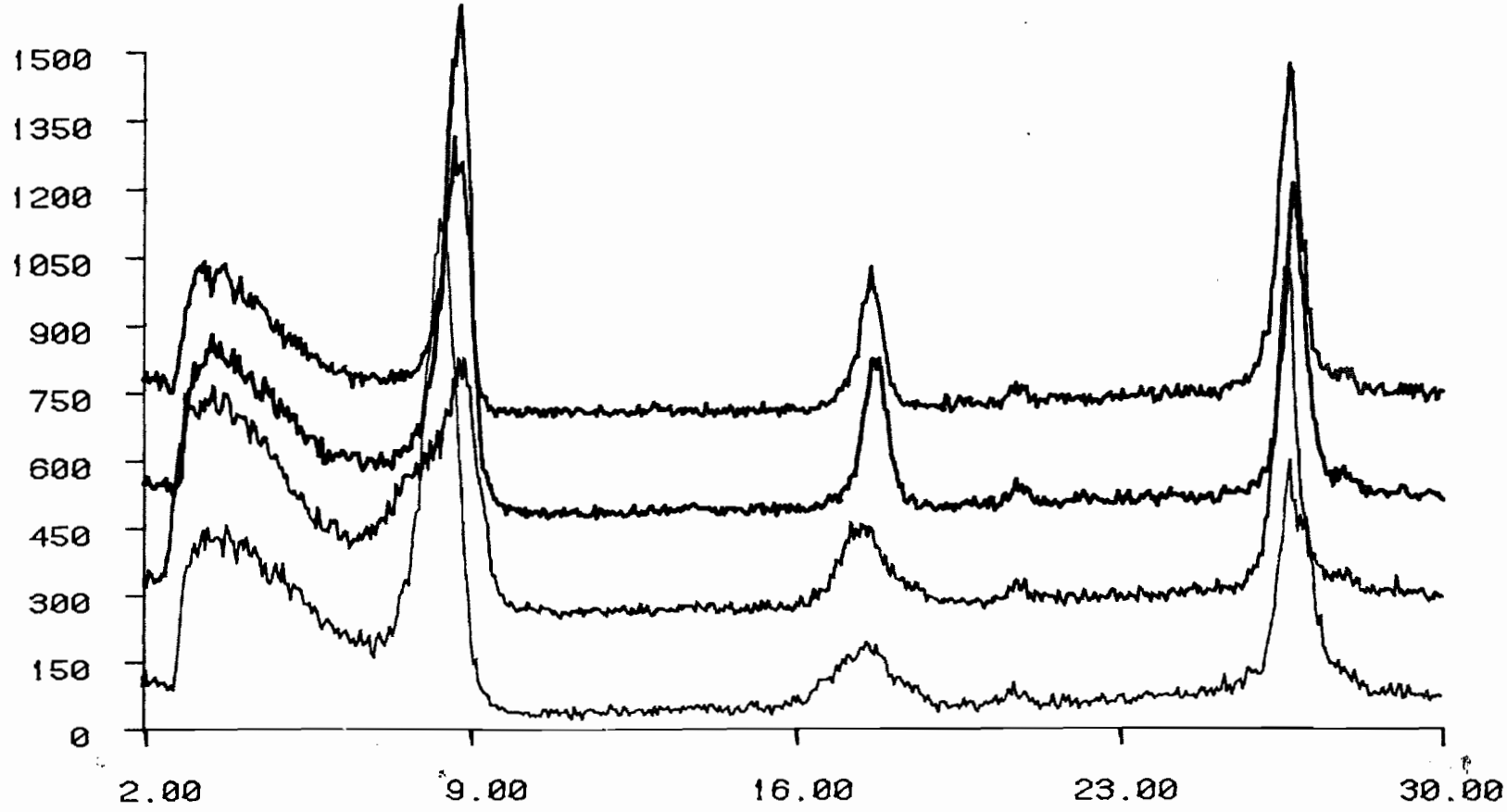

3MWX 6513.GLYCOLATEDHEATED 330HEATED 550
1141. 803. 1149. 799.

BENDIX

File name: DF0:Z91269.RAW

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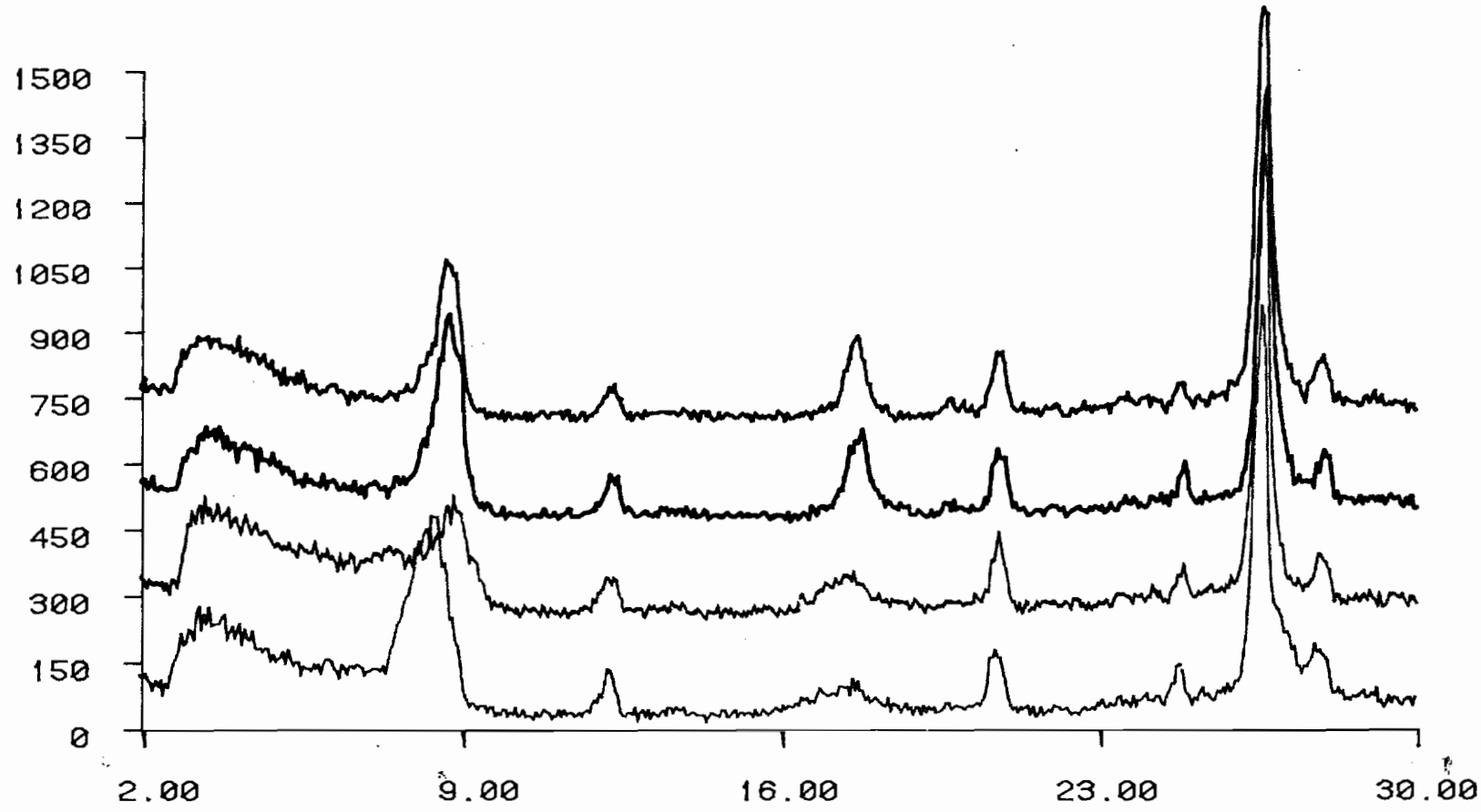

3MWX 7536.GLYCOLATEDHEATED 330HEATED 550
960. 1086. 1020. 978.

BENDIX

File name: DF0:Z91283.RAW

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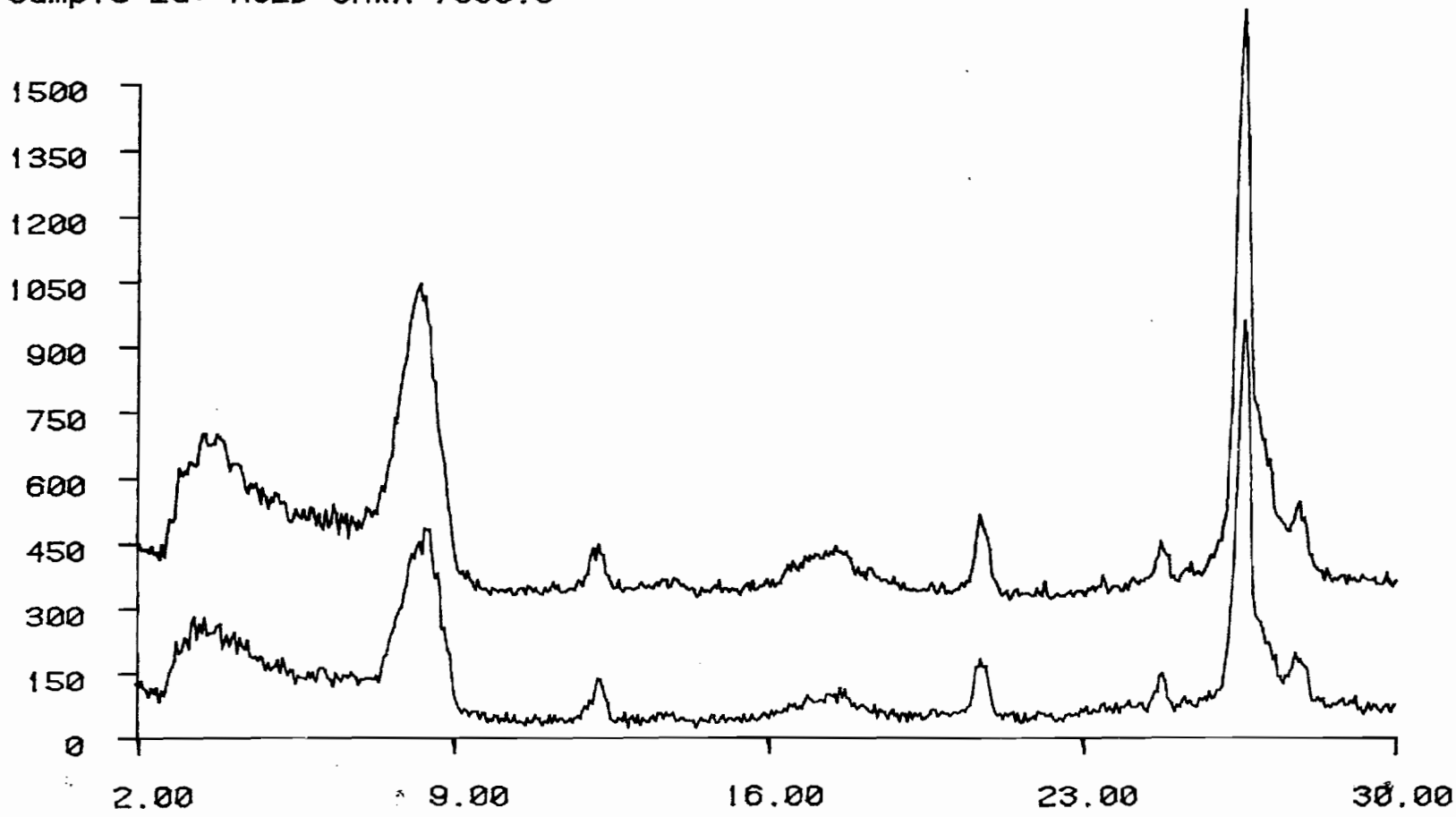
Sample Id: ACID 3MWX 7536.8



3MWX 7536.ACID 3MWX
960. 1370.

BENDIX

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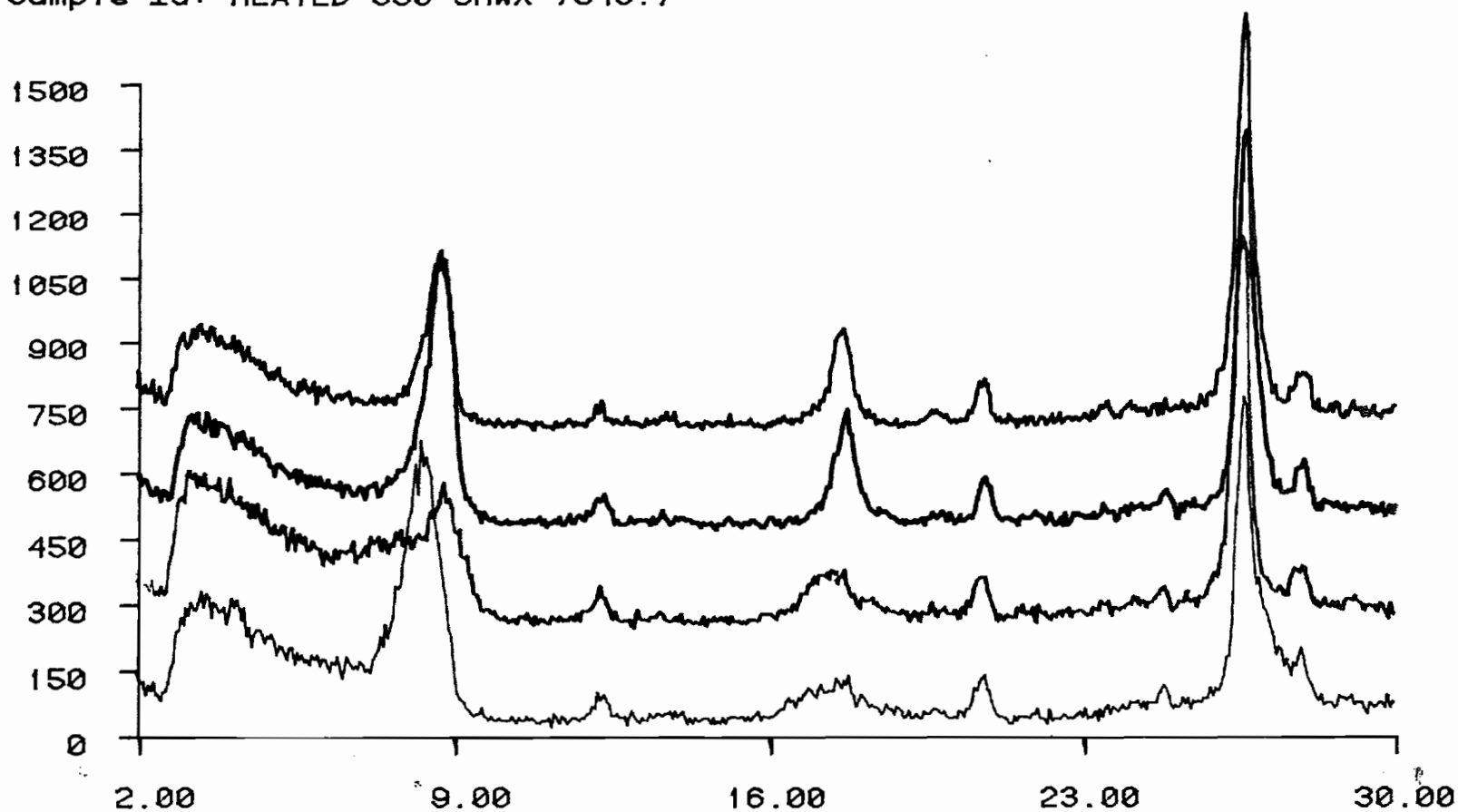

3MWX 7548.GLYCOLATEDHEATED 330HEATED 550
775. 917. 938. 987.

BENDIX

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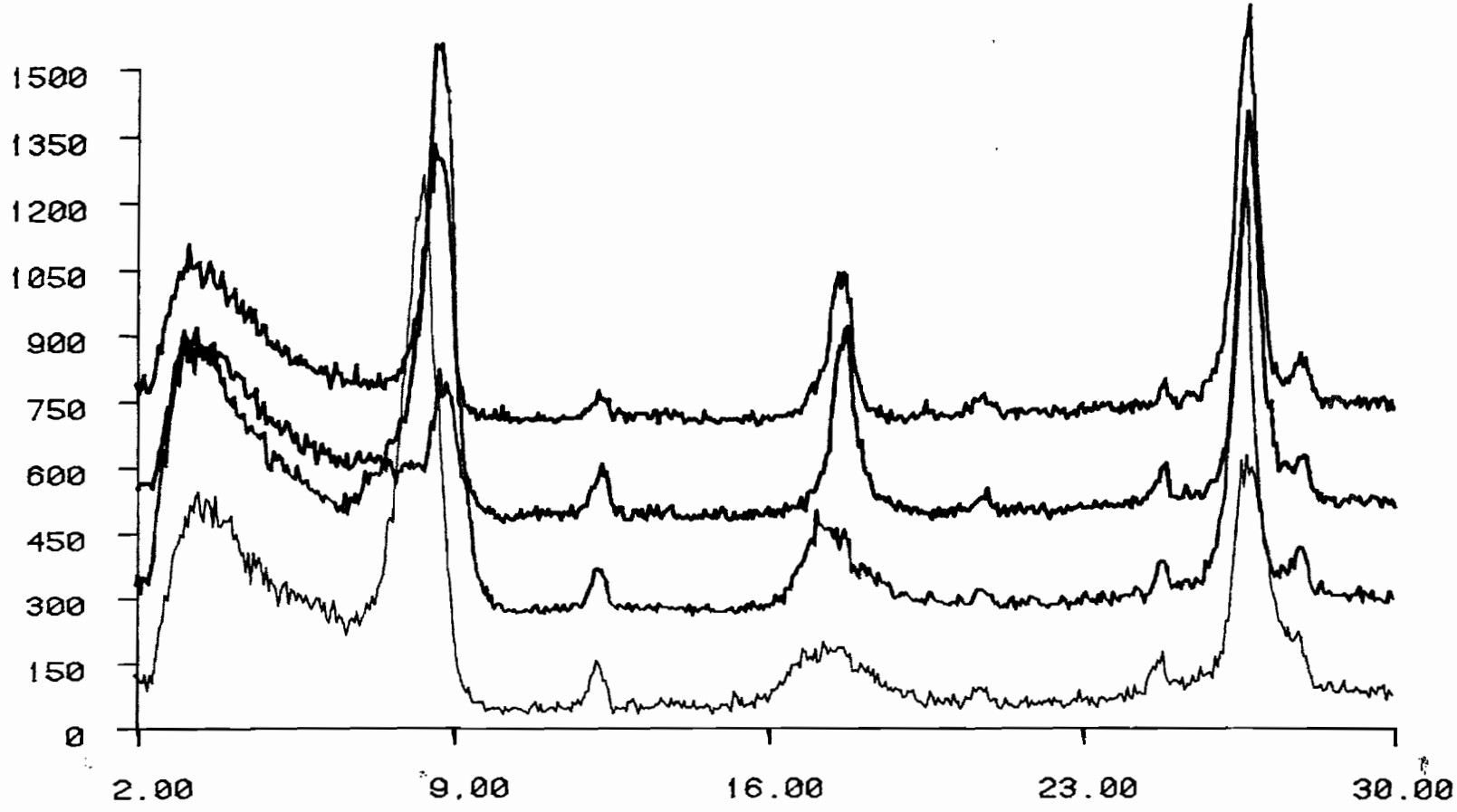

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1264. 1012. 1107. 973.

BENDIX

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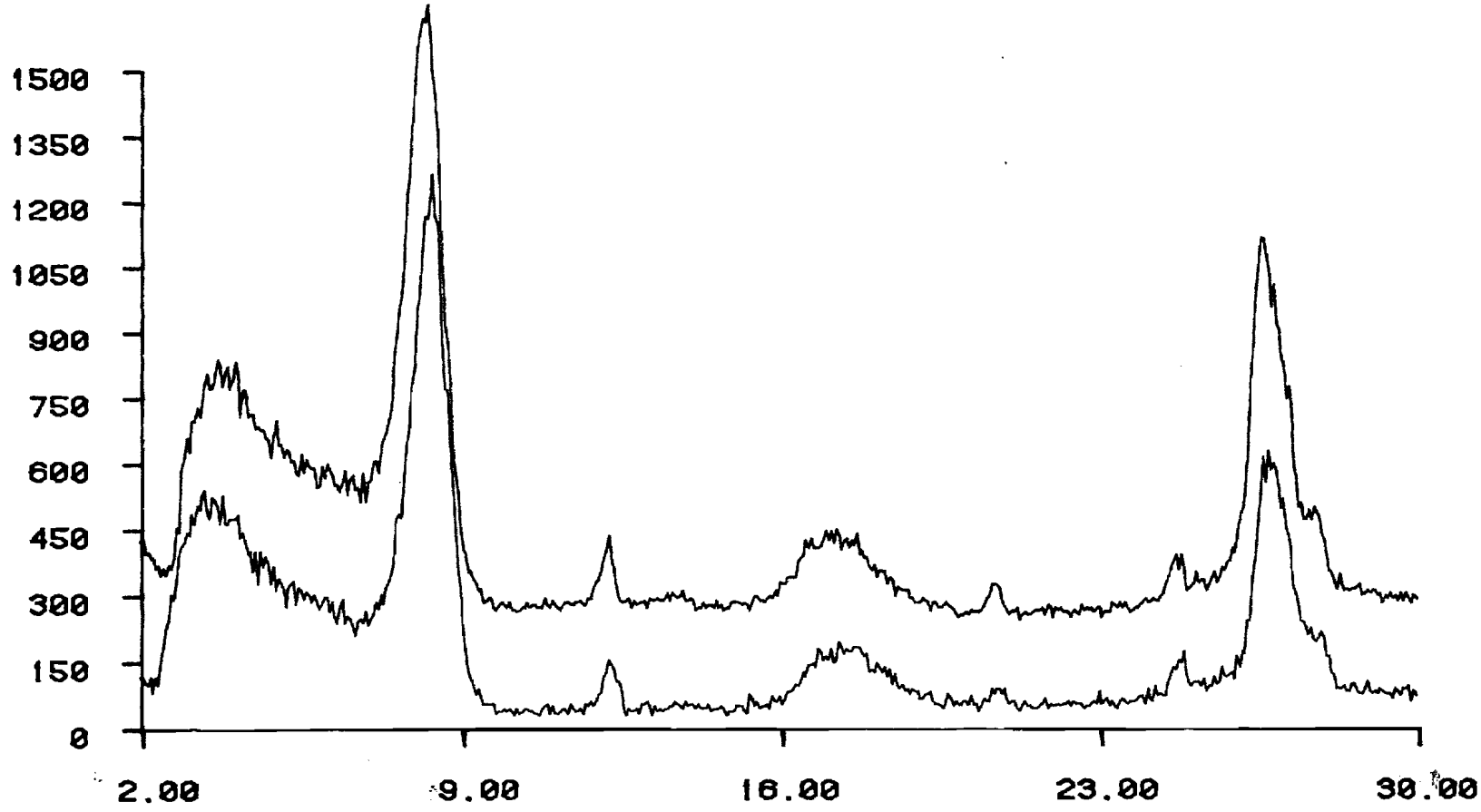

3MWX 7552.ACID 3MWX
1264. 1429.

BENDIX

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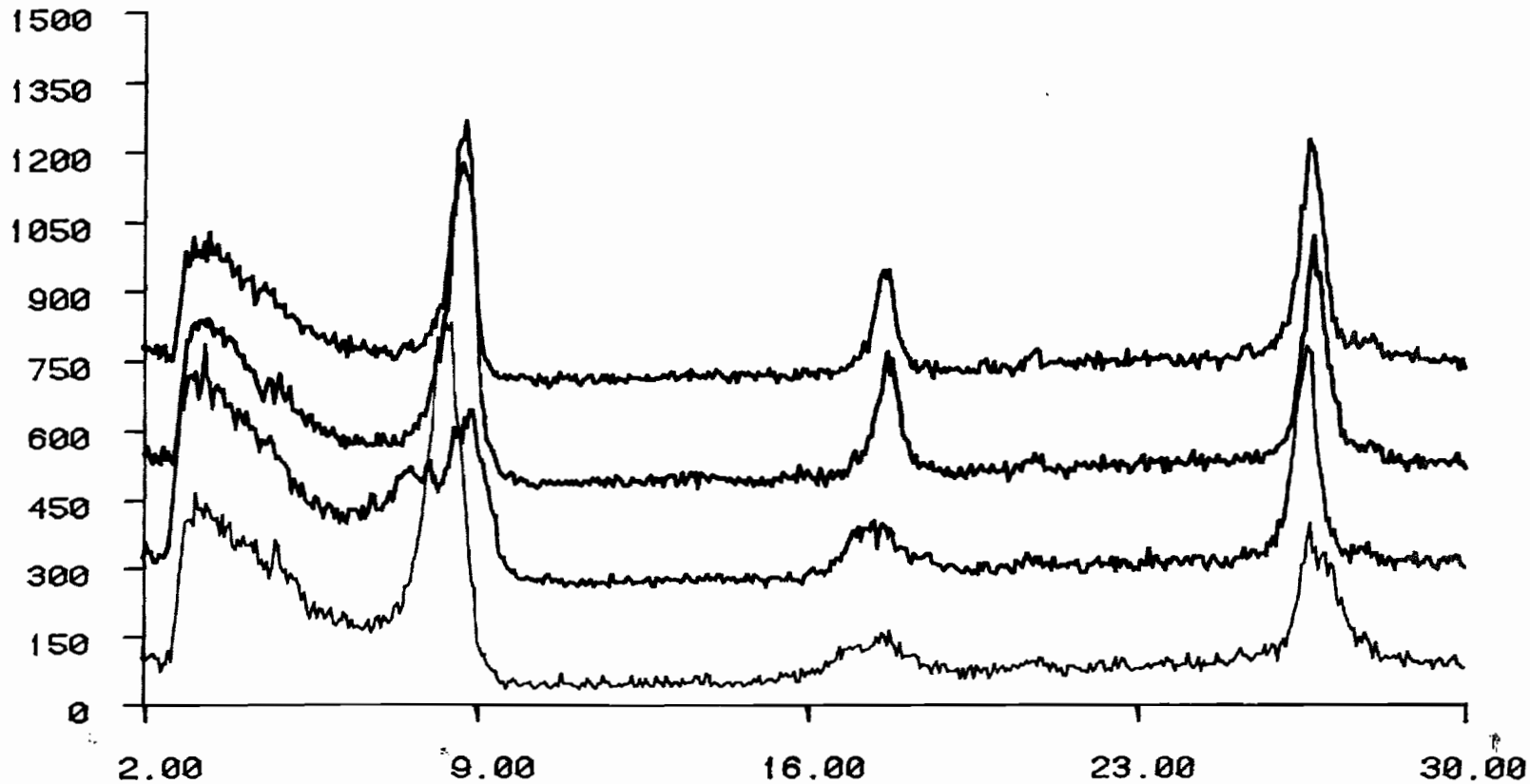

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826. 556. 818. 556.

BENDIX

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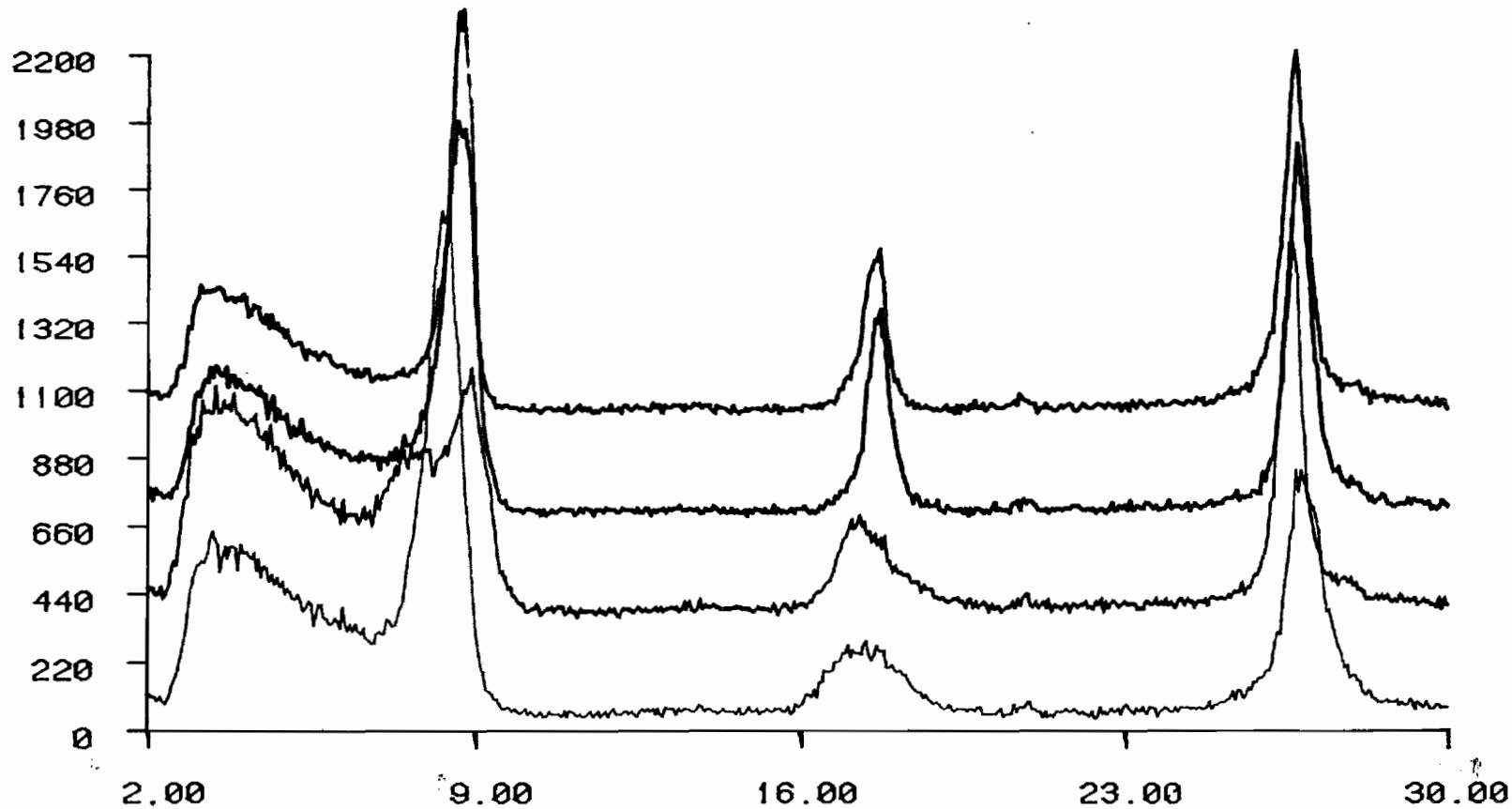

3MWX 7563.GLYCOLATEDHEATED 330HEATED 550
1720. 1247. 1689. 1218.

BENDIX

APPENDIX B

X-RAY DIFFRACTION CHARTS FOR BULK MINERALOGY

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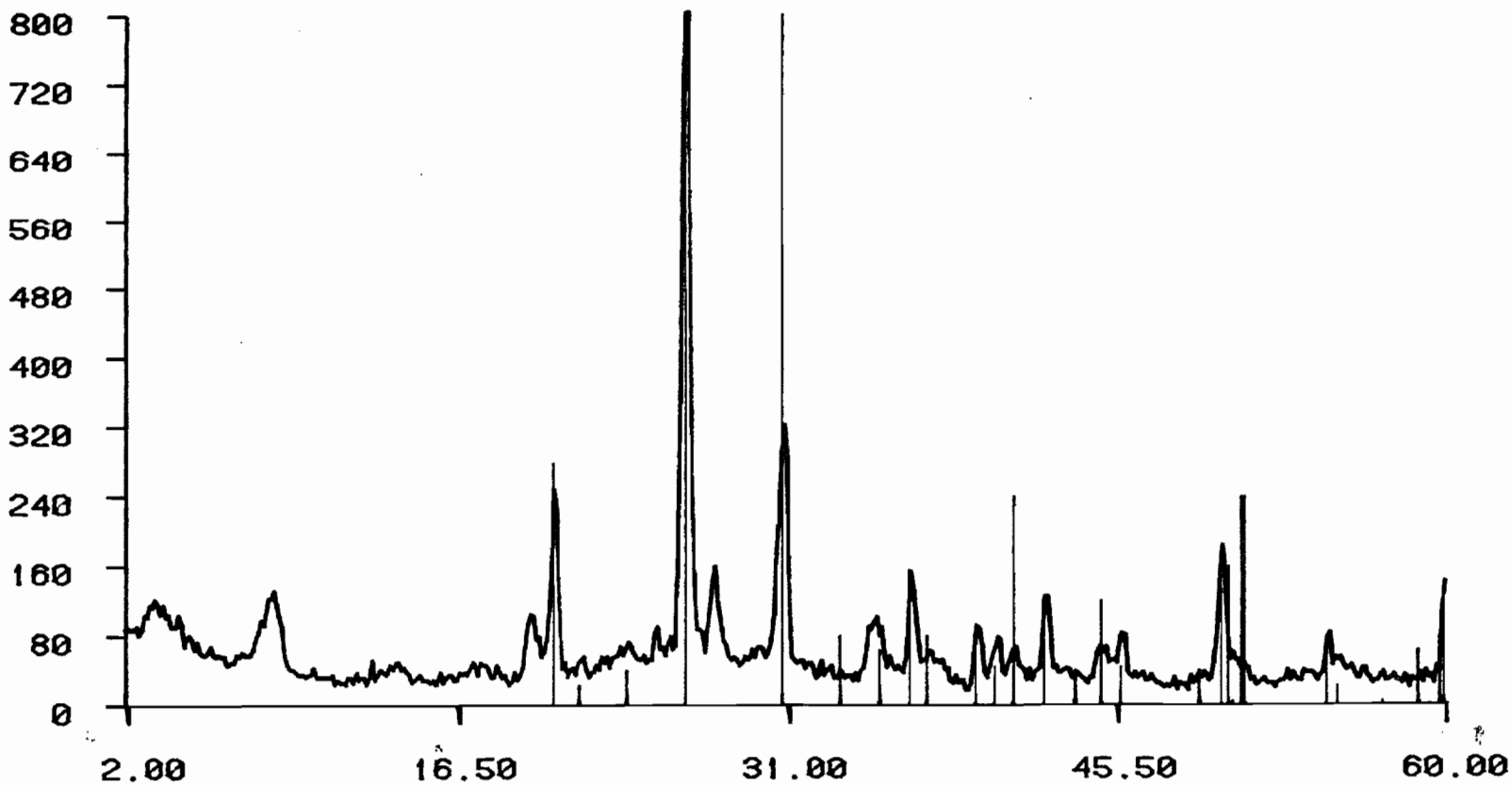

PDF 5- 490PDF11- 783MWX 6432.
0. 0. 1197.

BENDIX

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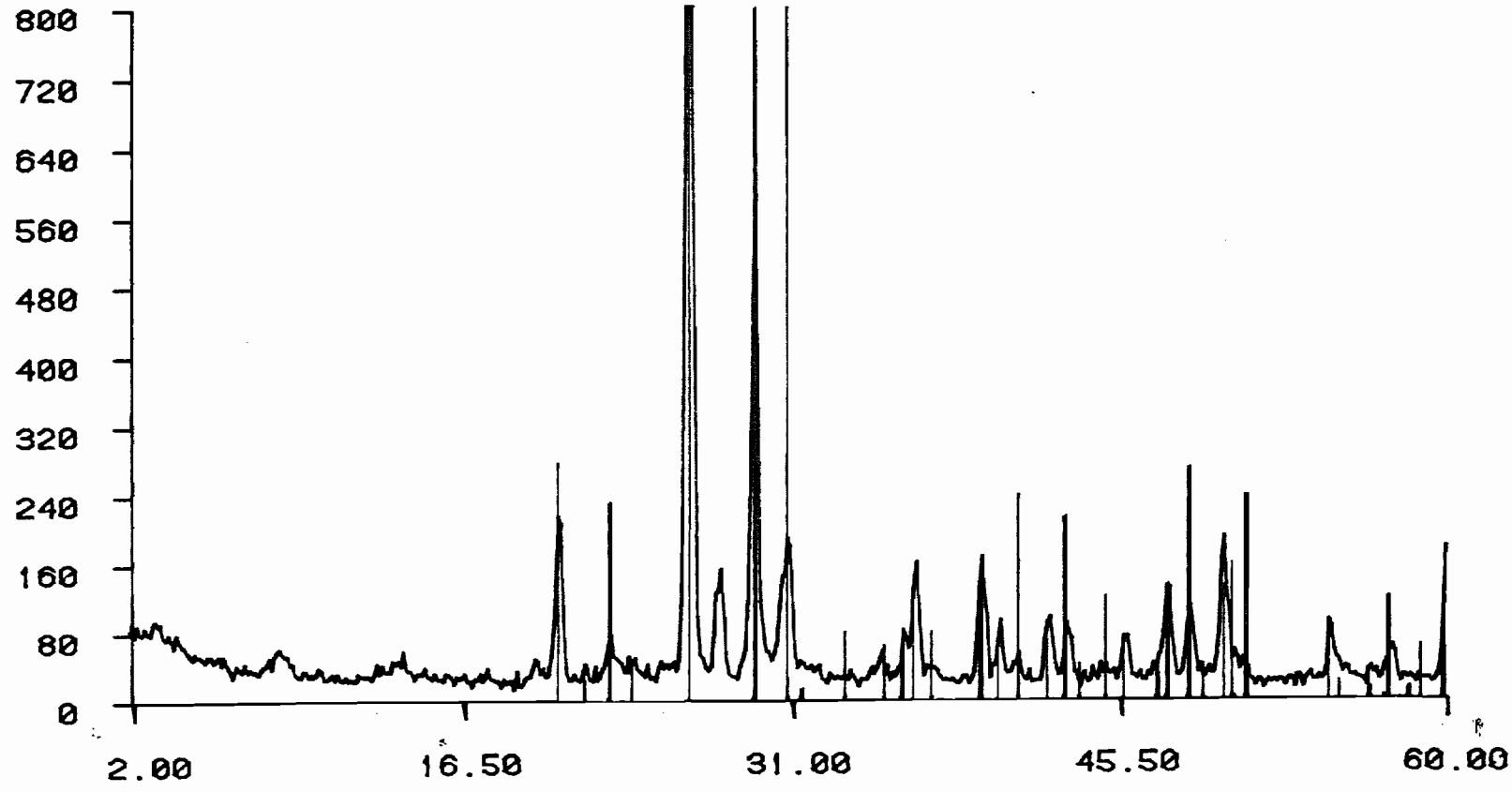

PDF 5- 490PDF11- 78PDF24- 273MWX 6438.
1197. 1197. 1197. 1677.

BENDIX

File name: DF0:Z91170.RAW

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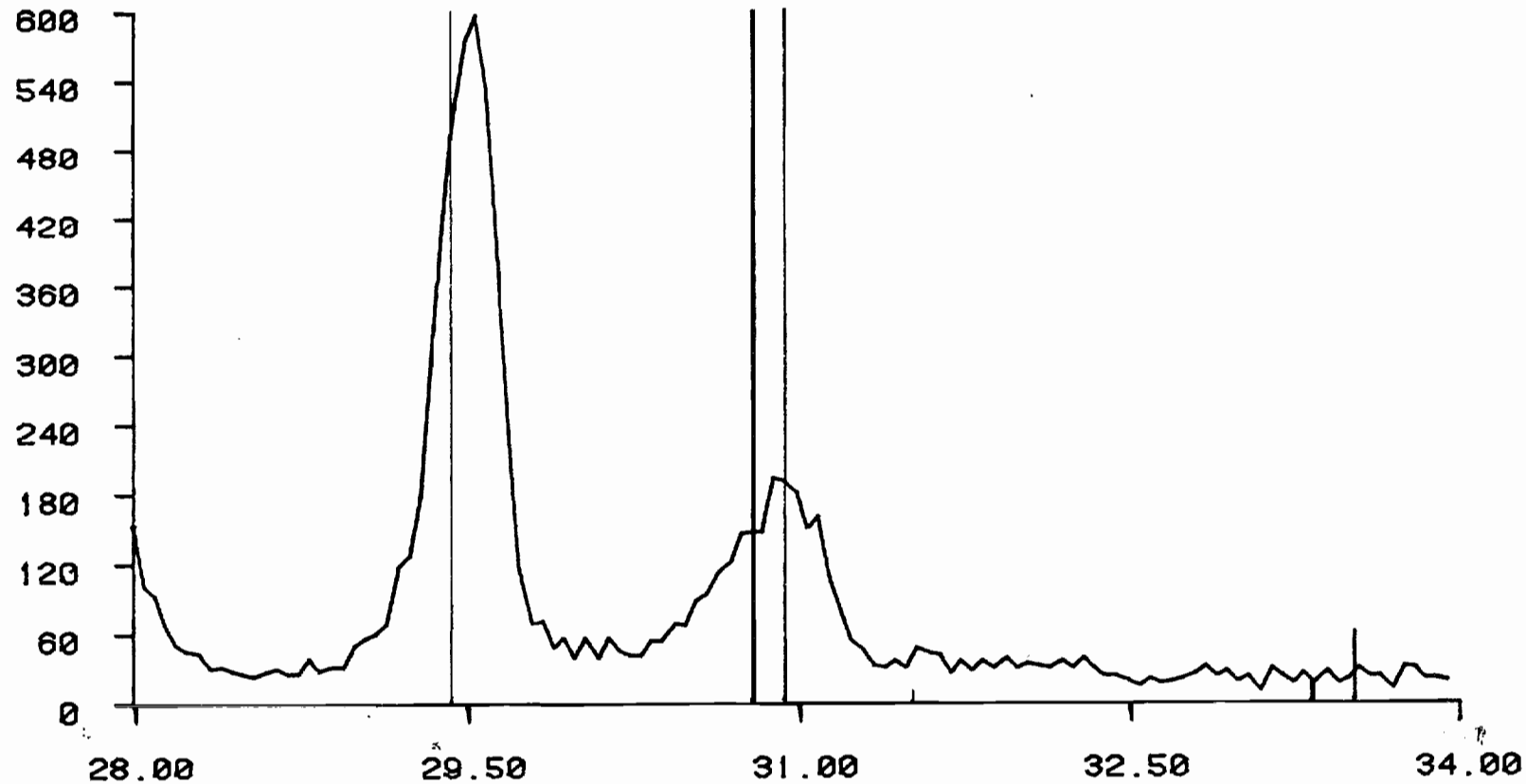
Today: 14-JAN-84 10:34:16

Sample Id: 3MWX 6438.9 BULK



PDF24- 27PDF11- 78PDF12- 883MWX 6438.
1677. 1677. 1677. 1677.

BENDIX

File name: DF0:Z91171.RAW

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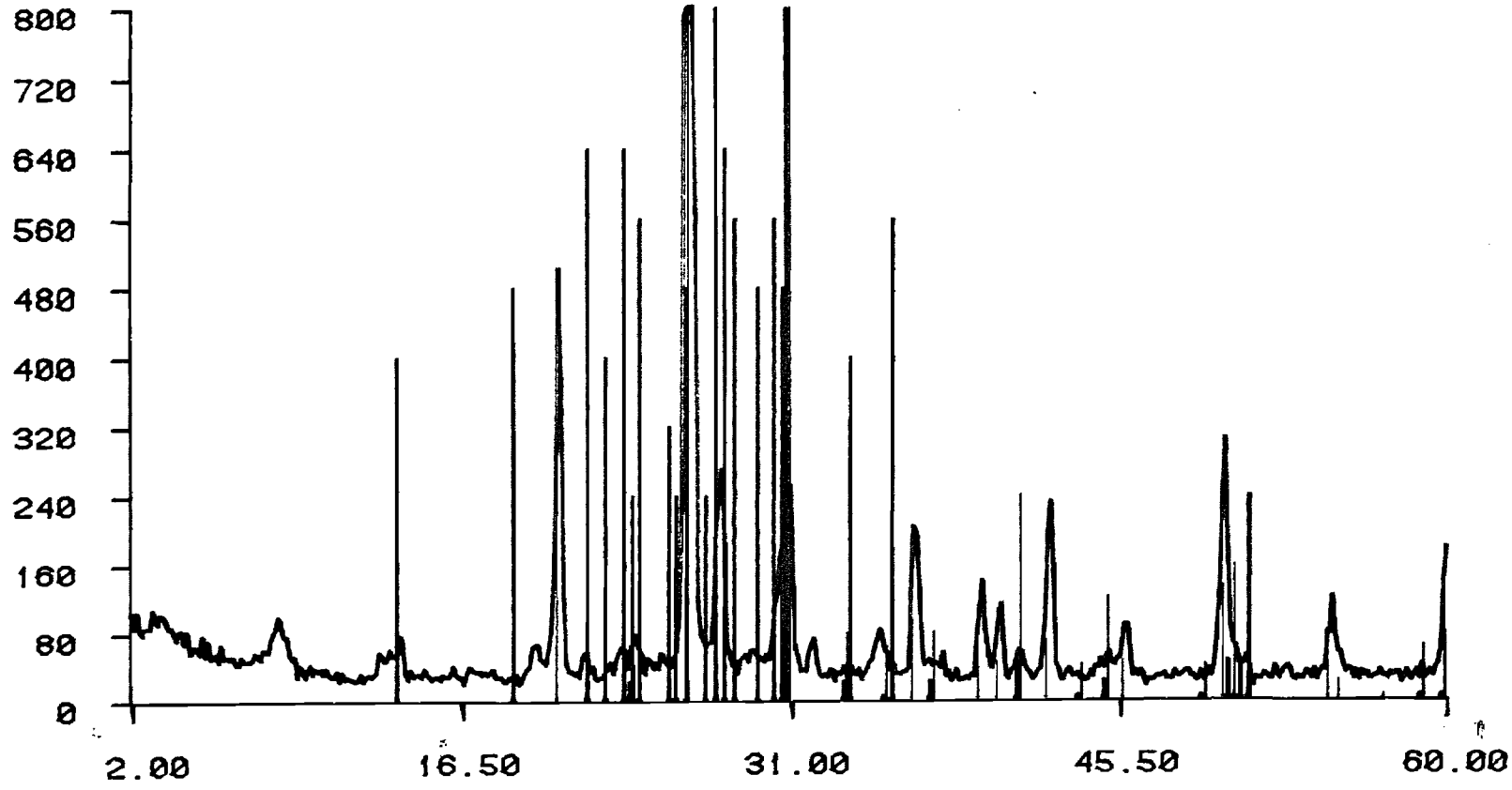

PDF 5- 490PDF11- 78PDF12- 88PDF 9- 4563MWX 6460.
1677. 1677. 1677. 1677. 1908.

BENDIX

File name: DF0:Z91171.RAW

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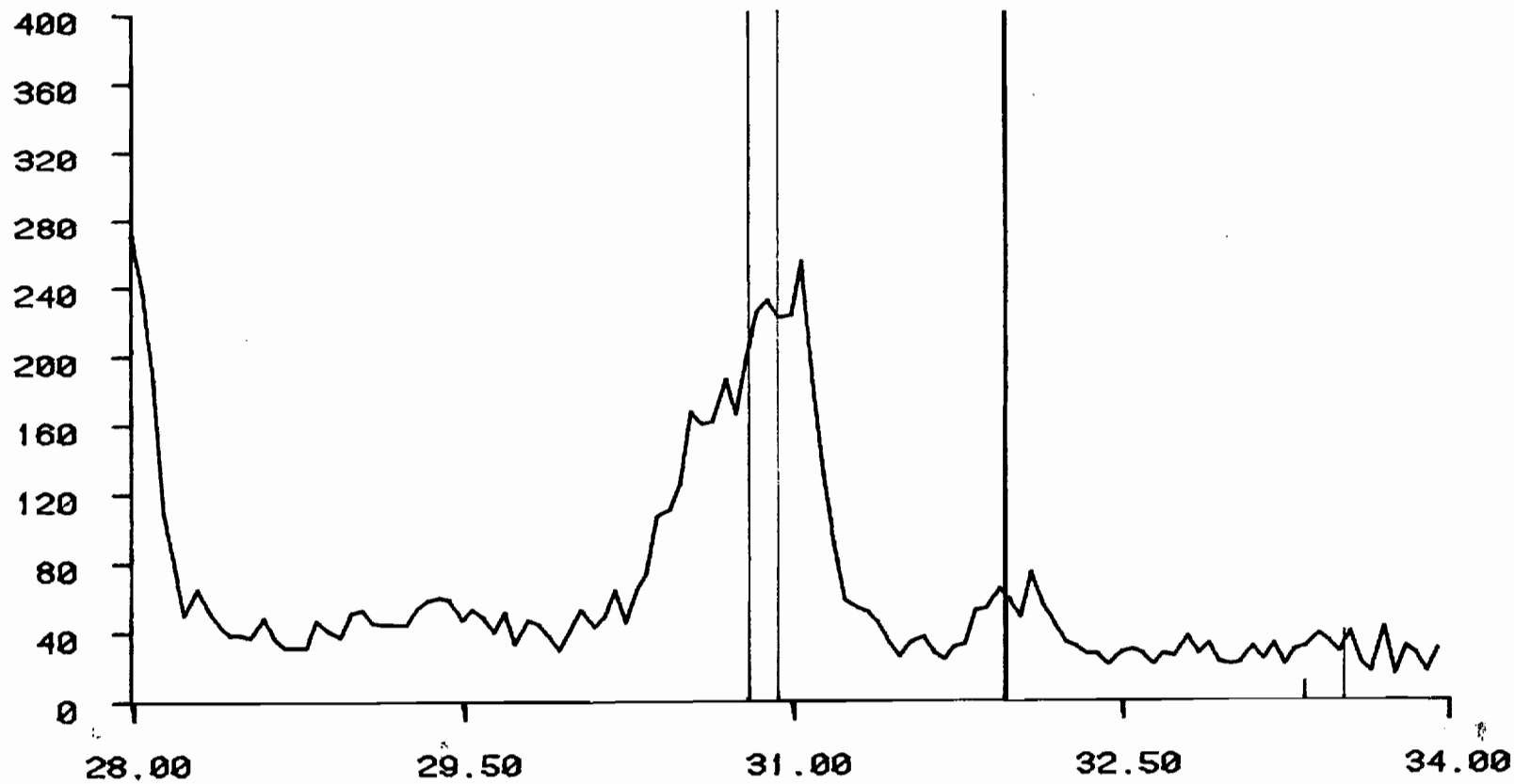

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1908. 1908. 1908. 1908.

BENDIX

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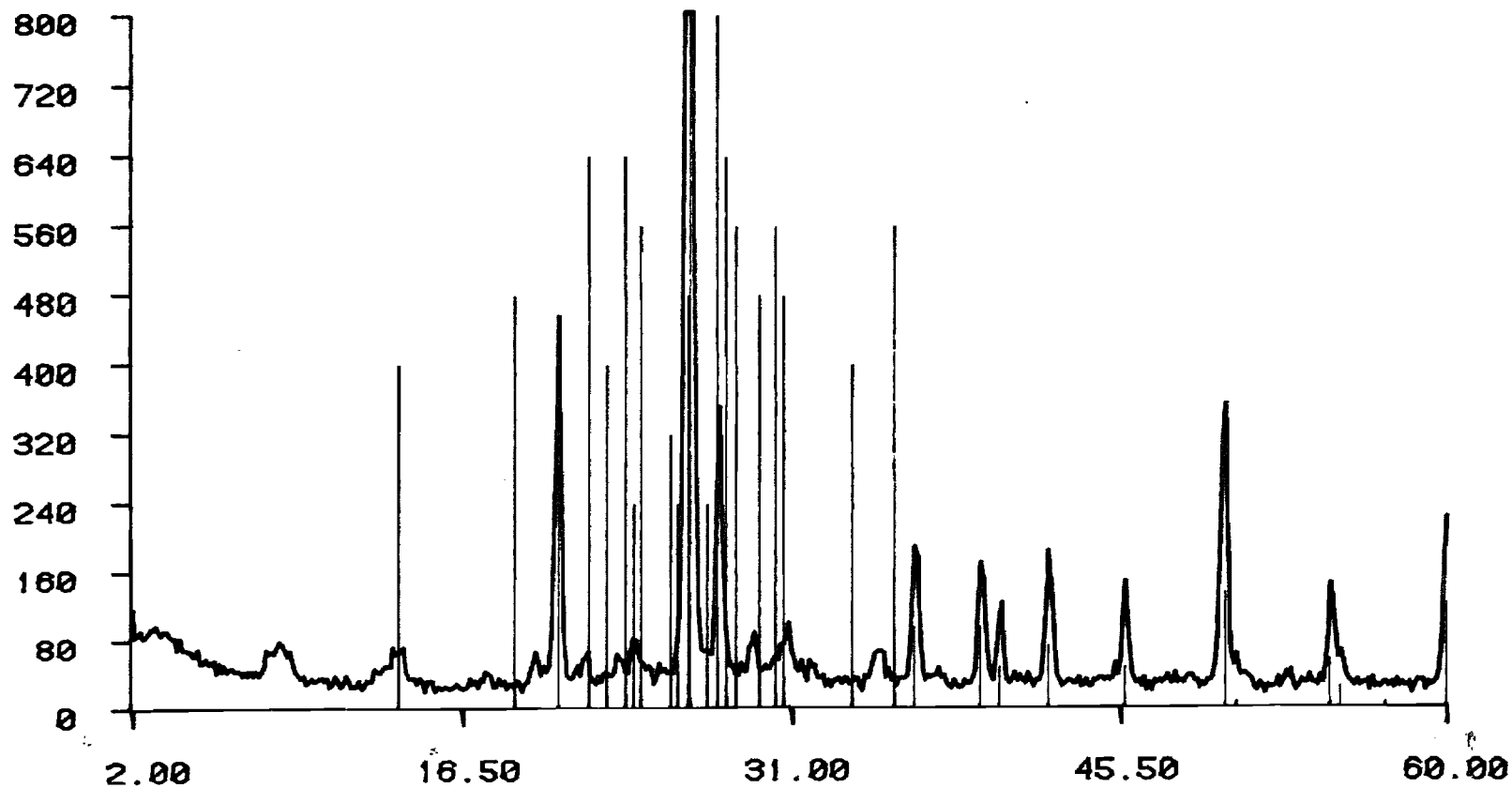

PDF 5- 490PDF 9- 4563MWX 6464.
1908. 1908. 2632.

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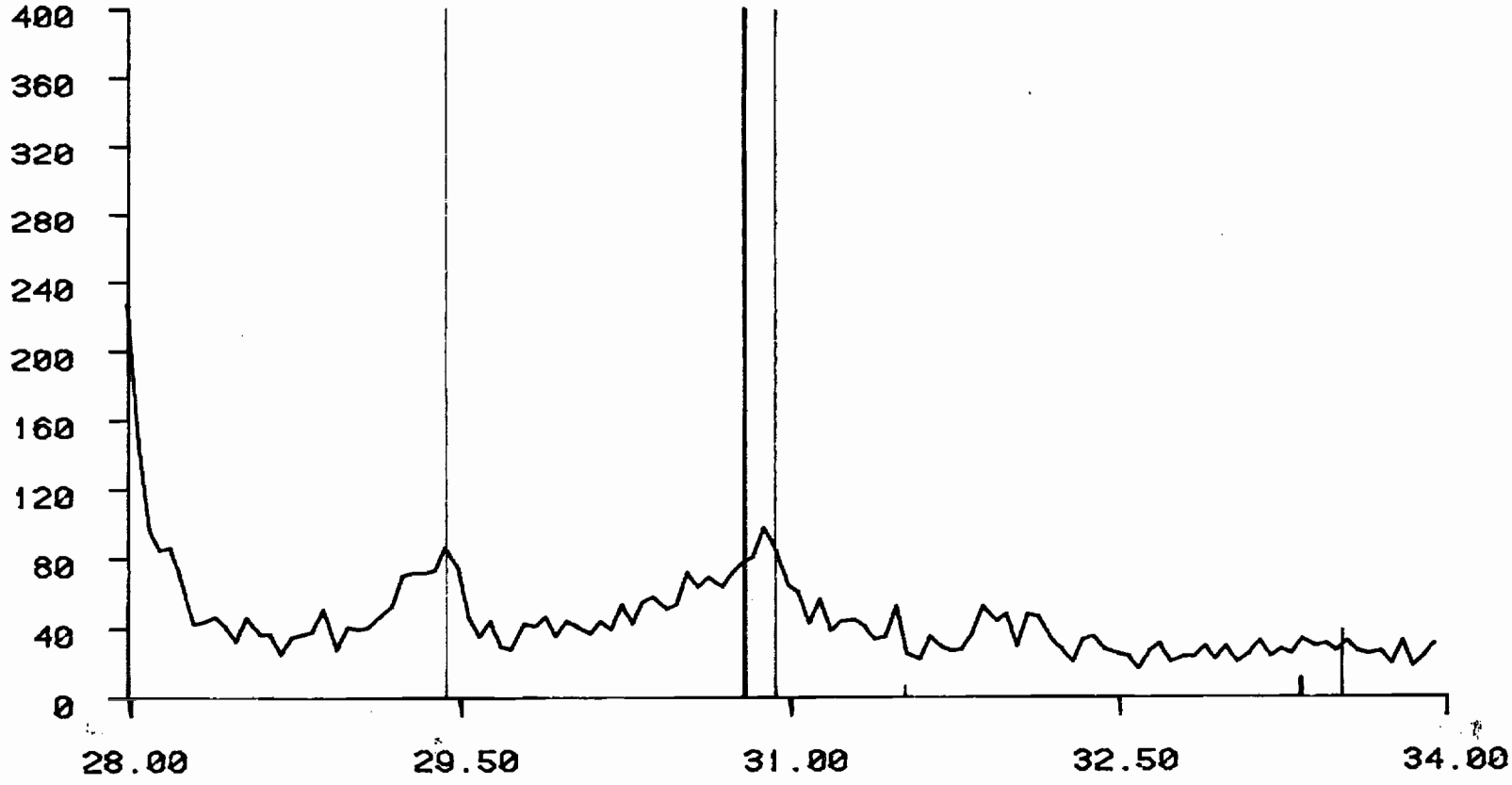
Sample Id: 3MWX 6464.5 BULK



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2632. 2632. 2632. 2632.

BENDIX

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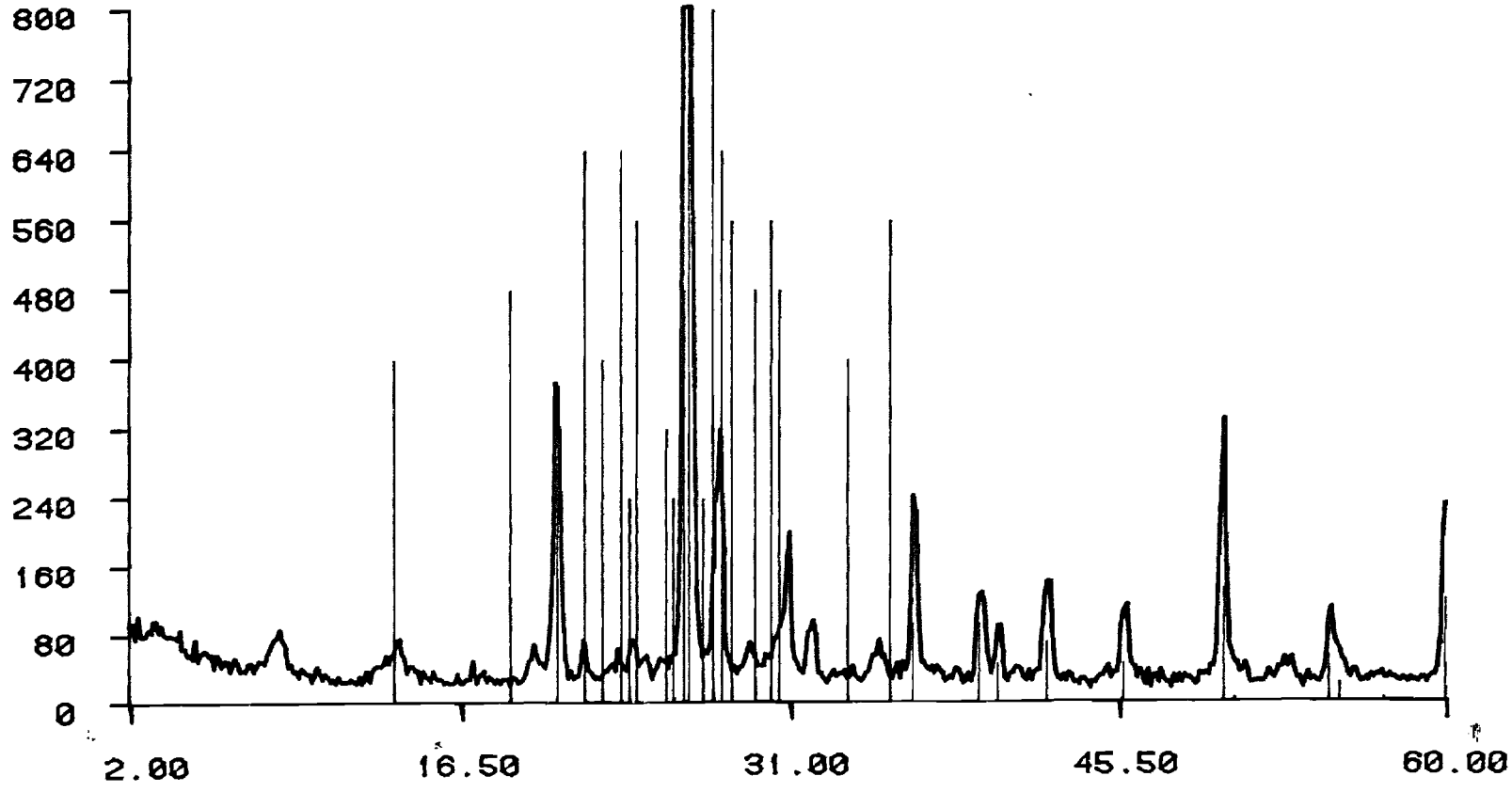

PDF 5- 490PDF 9- 4563MWX 6468.
2632. 2632. 2052.

BENDIX

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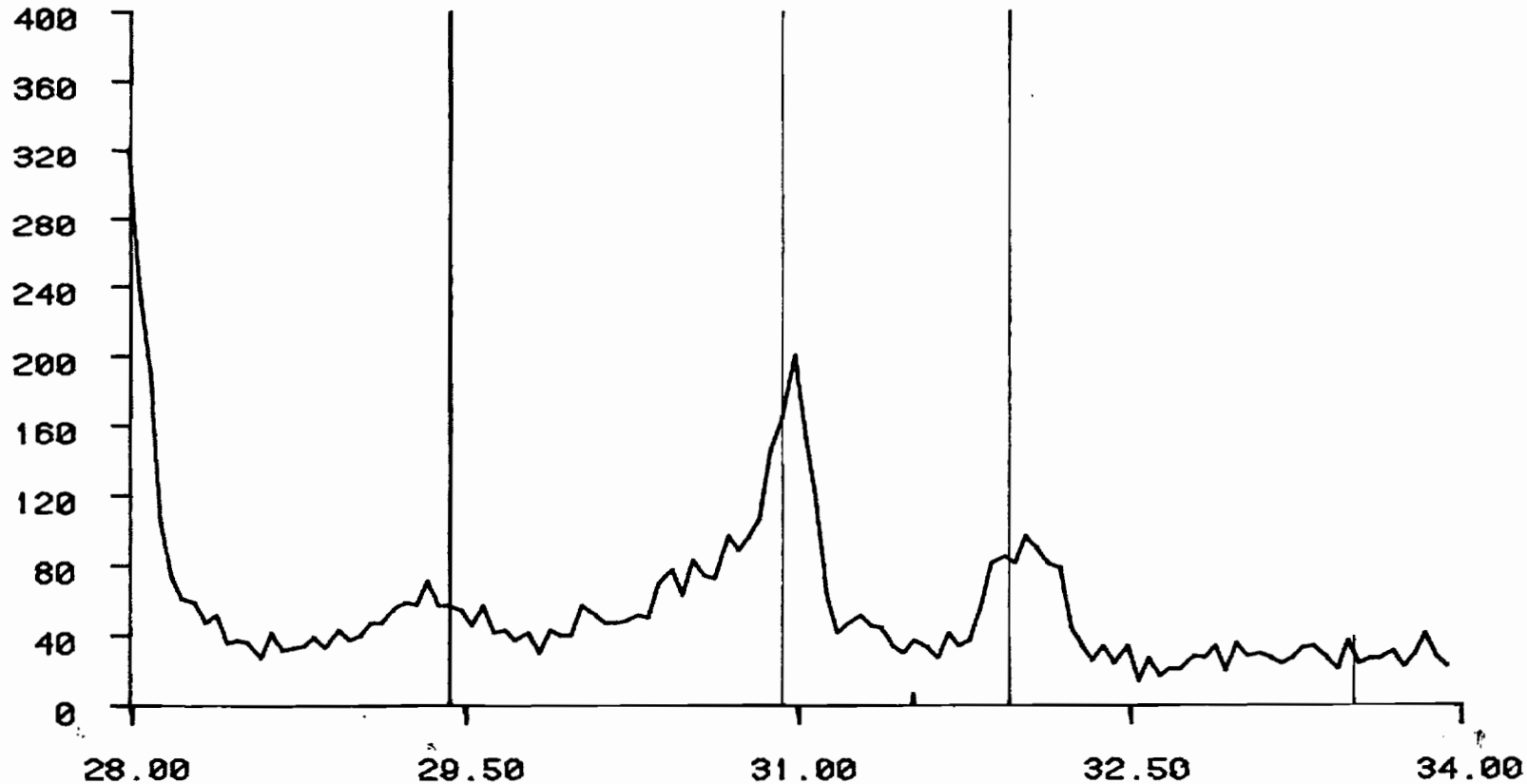
Sample Id: 3MWX 6468.7 BULK



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2052. 2052. 2052. 2052.

BENDIX

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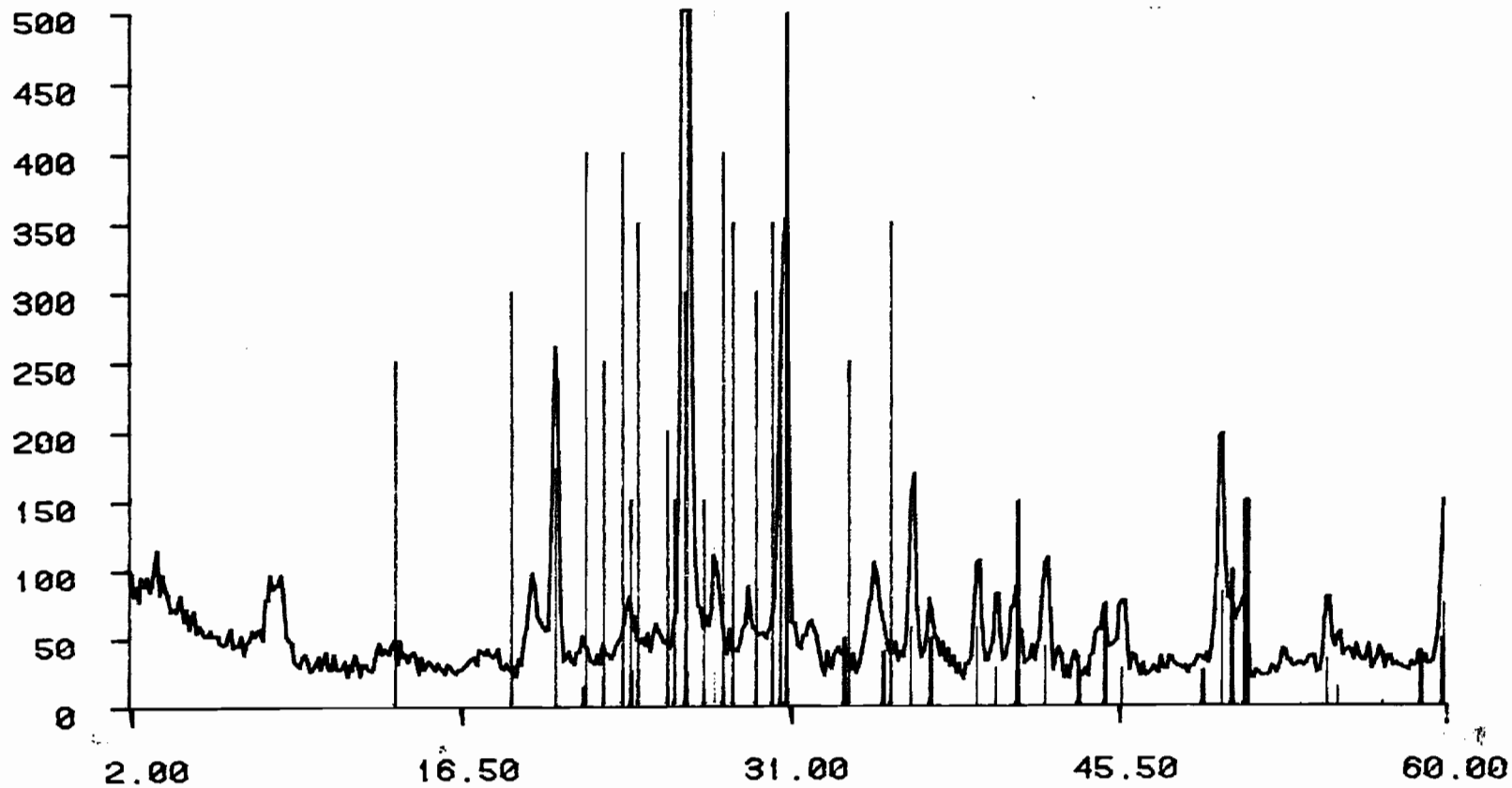

PDF 5- 490PDF 9- 456PDF11- 783MWX 6470.
0. 0. 0. 1108.

BENDIX

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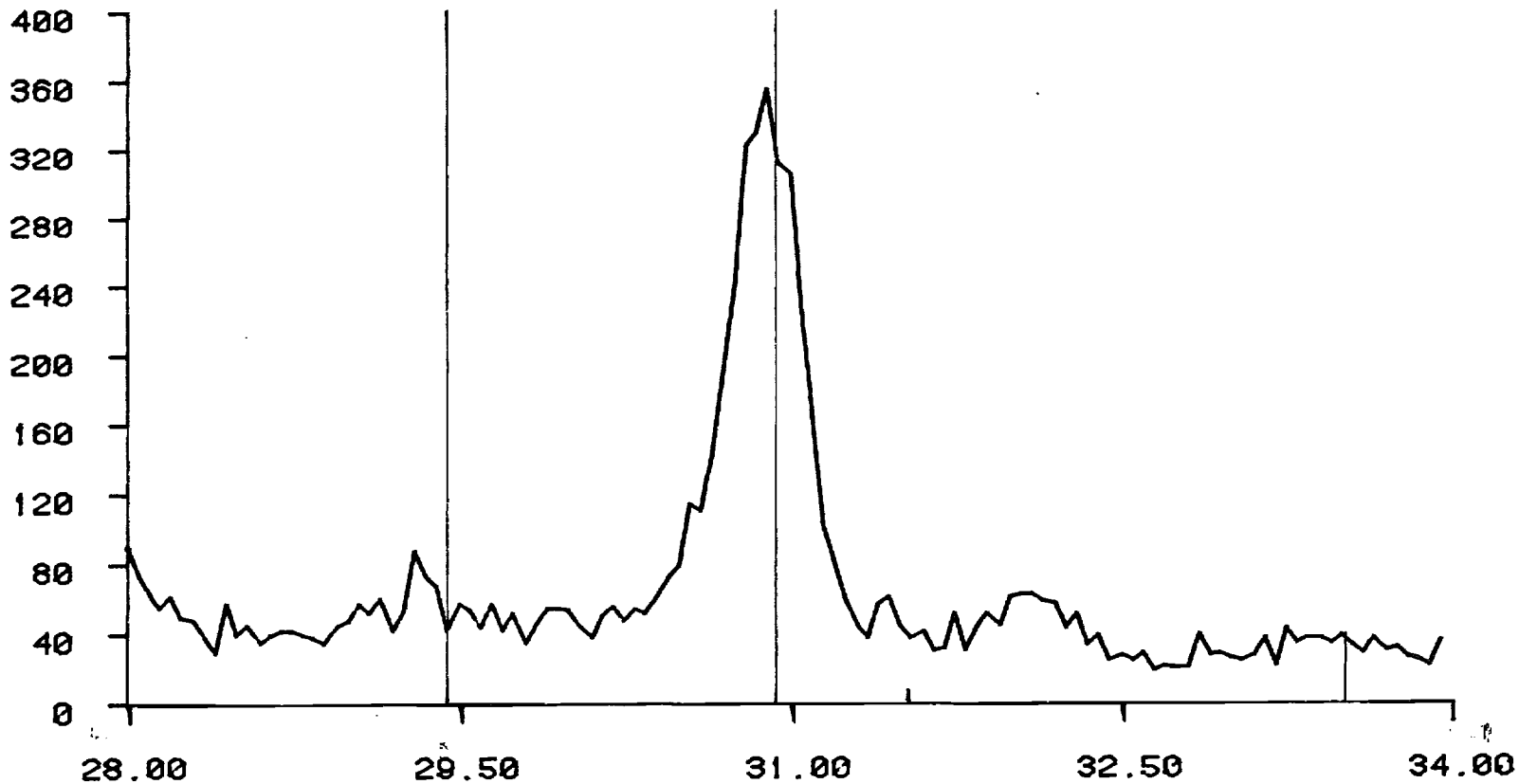

PDF11- 78PDF24- 273MWX 6470.
1108. 1108. 1108.

BENDIX

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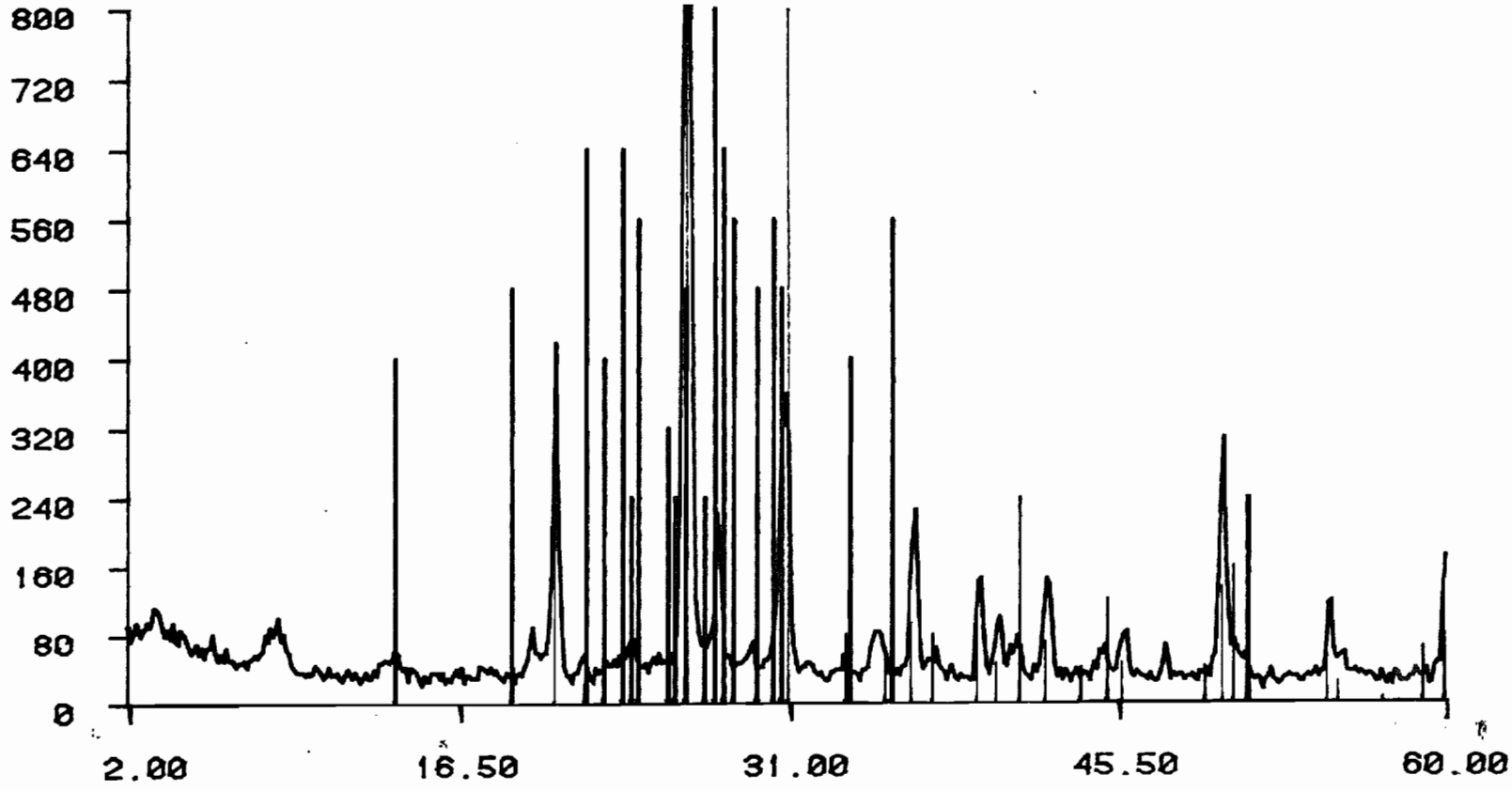

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0. 0. 0. 1787.

BENDIX

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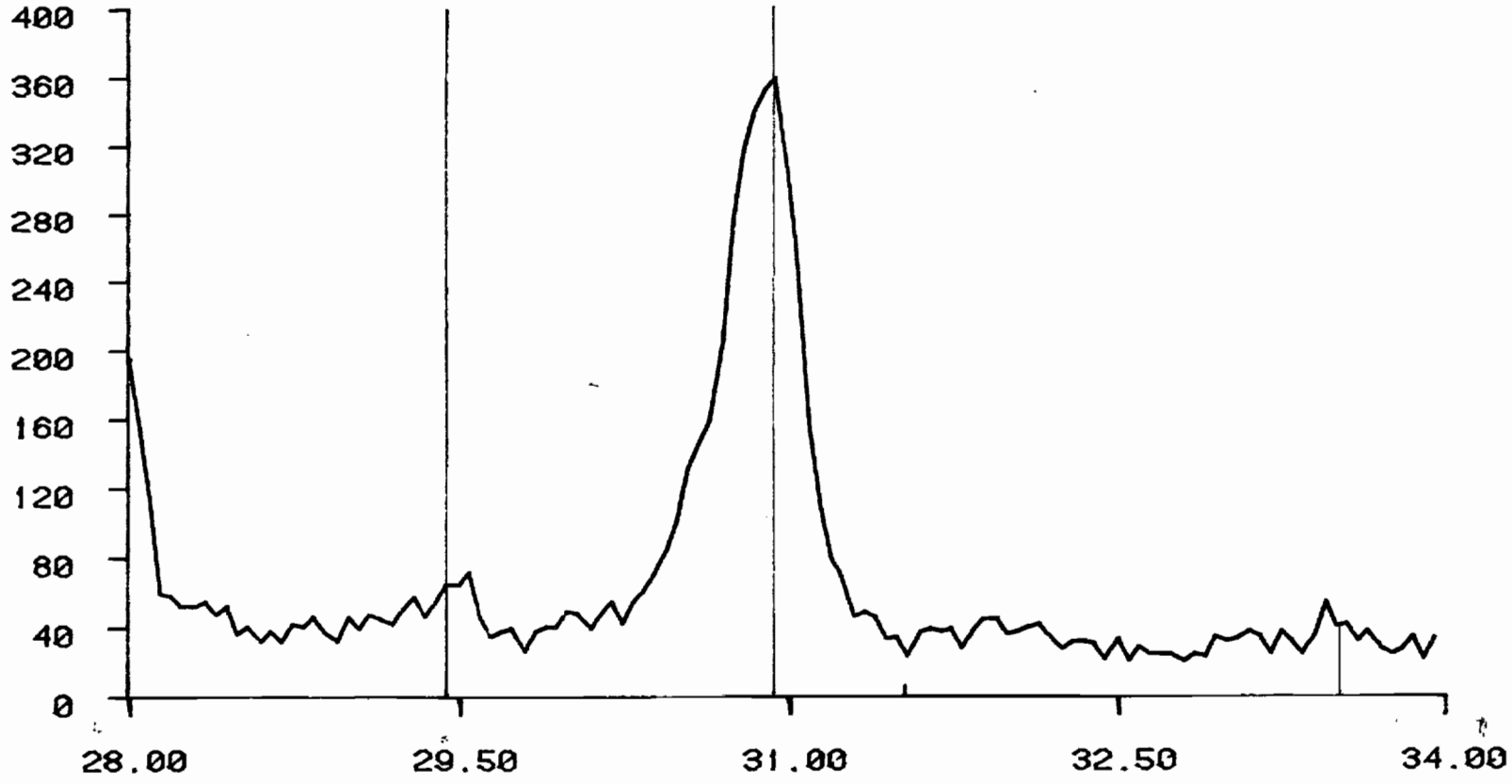
Sample Id: 3MWX 6507.9 BULK



PDF11- 78PDF24- 273MWX 6507.
1787. 1787. 1787.

BENDIX

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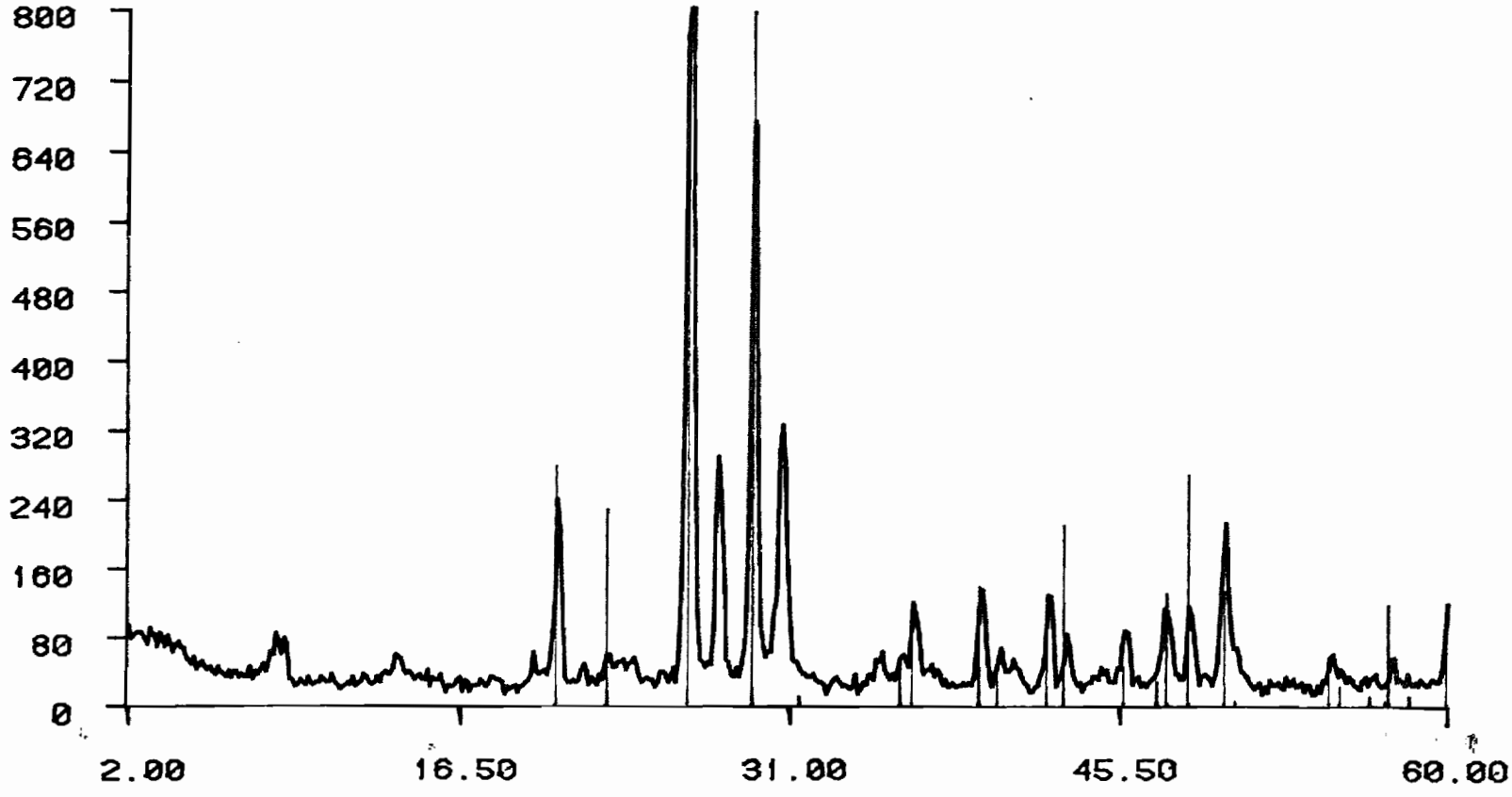
Sample Id: 3MWX 7542.3 BULK



PDF 5- 490PDF24- 273MWX 7542.
1787. 1787. 1024.

BENDIX

File name: DF0:Z91176.RAW

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Today: 14-JAN-84 13:32:22

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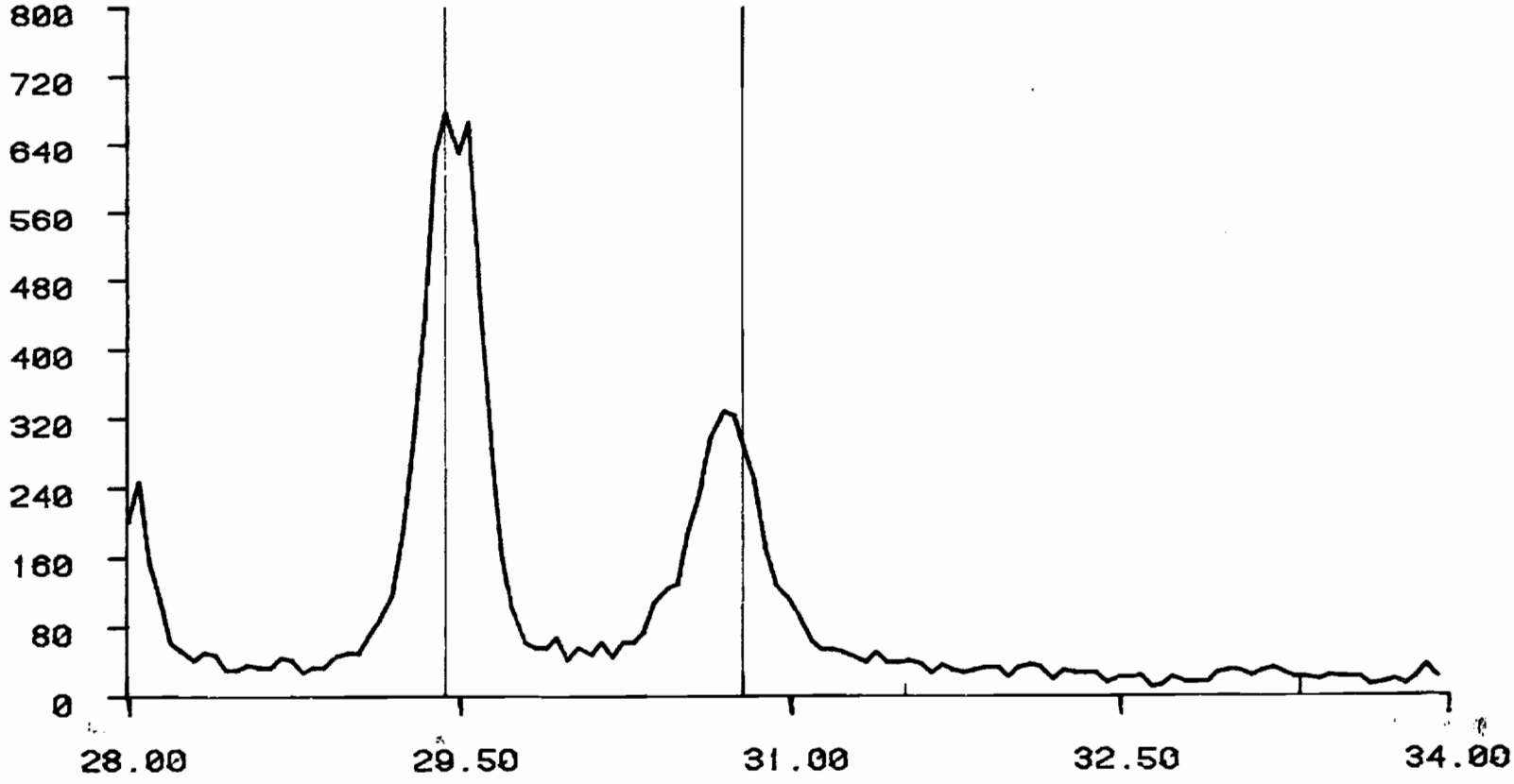

PDF24- 27PDF12- 883MWX 7542.
1024. 1024. 1024.

BENDIX

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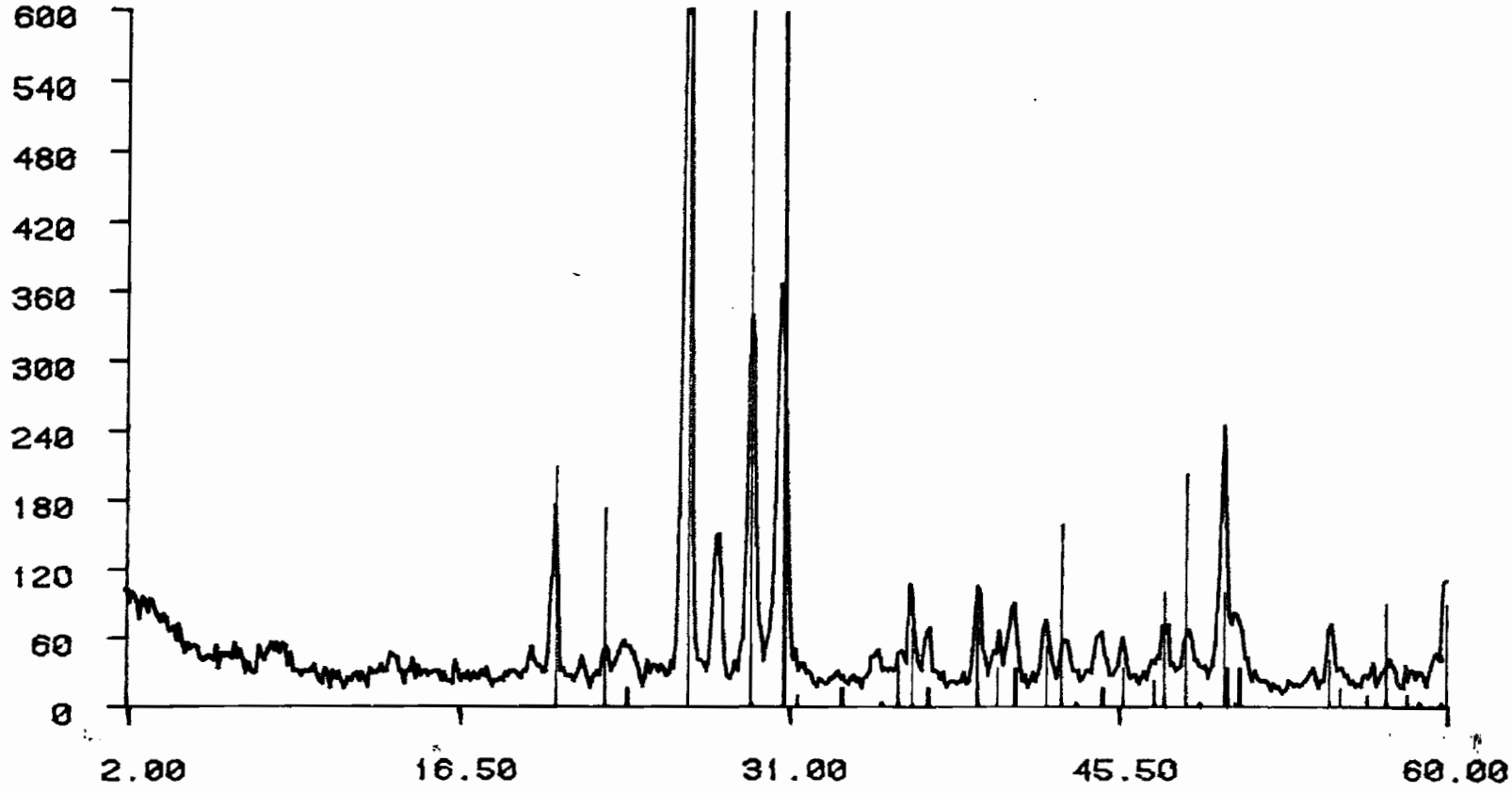

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1024. 1024. 1024. 1016.

BENDIX

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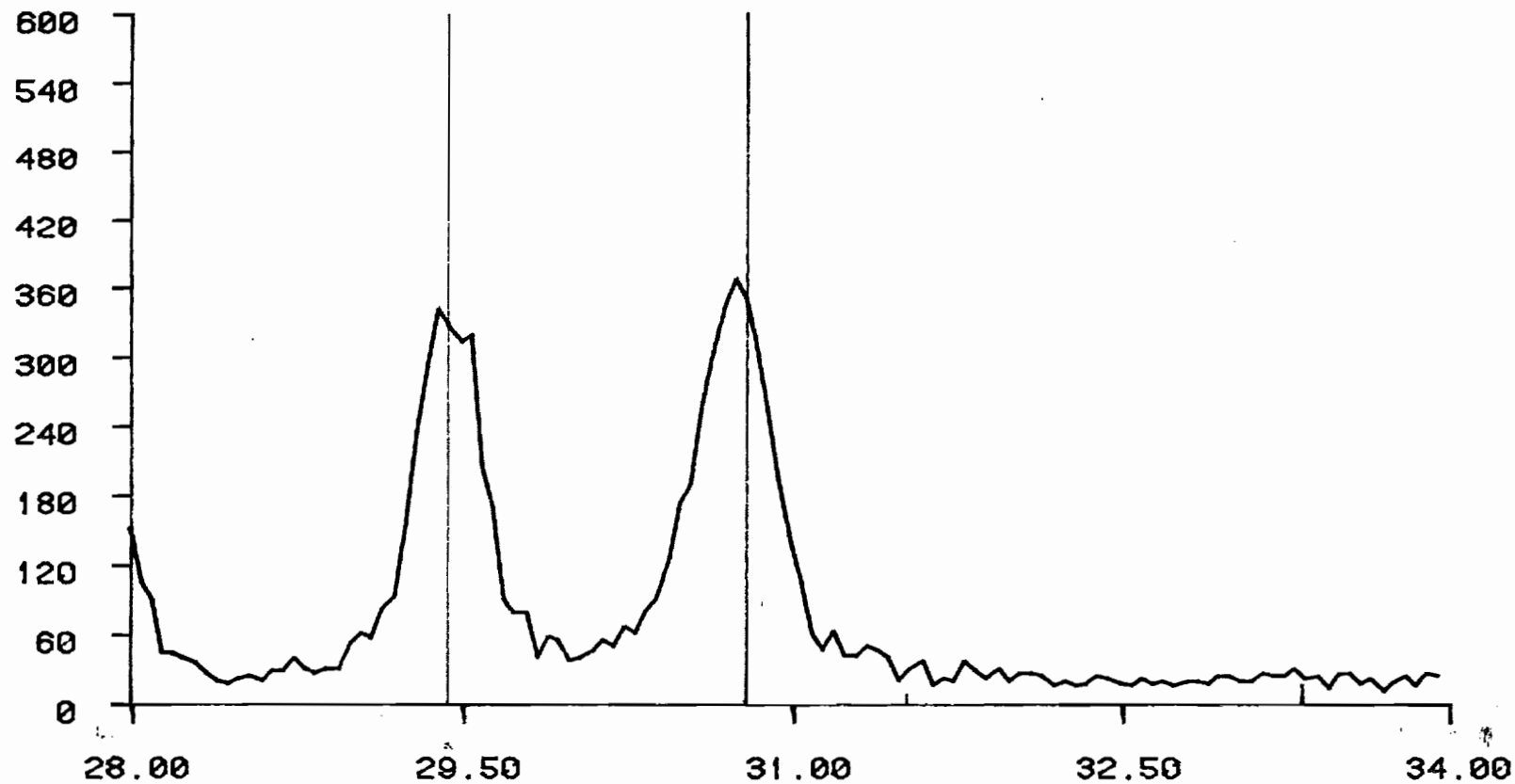
Sample Id: 3MWX 7546.2 BULK



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BENDIX

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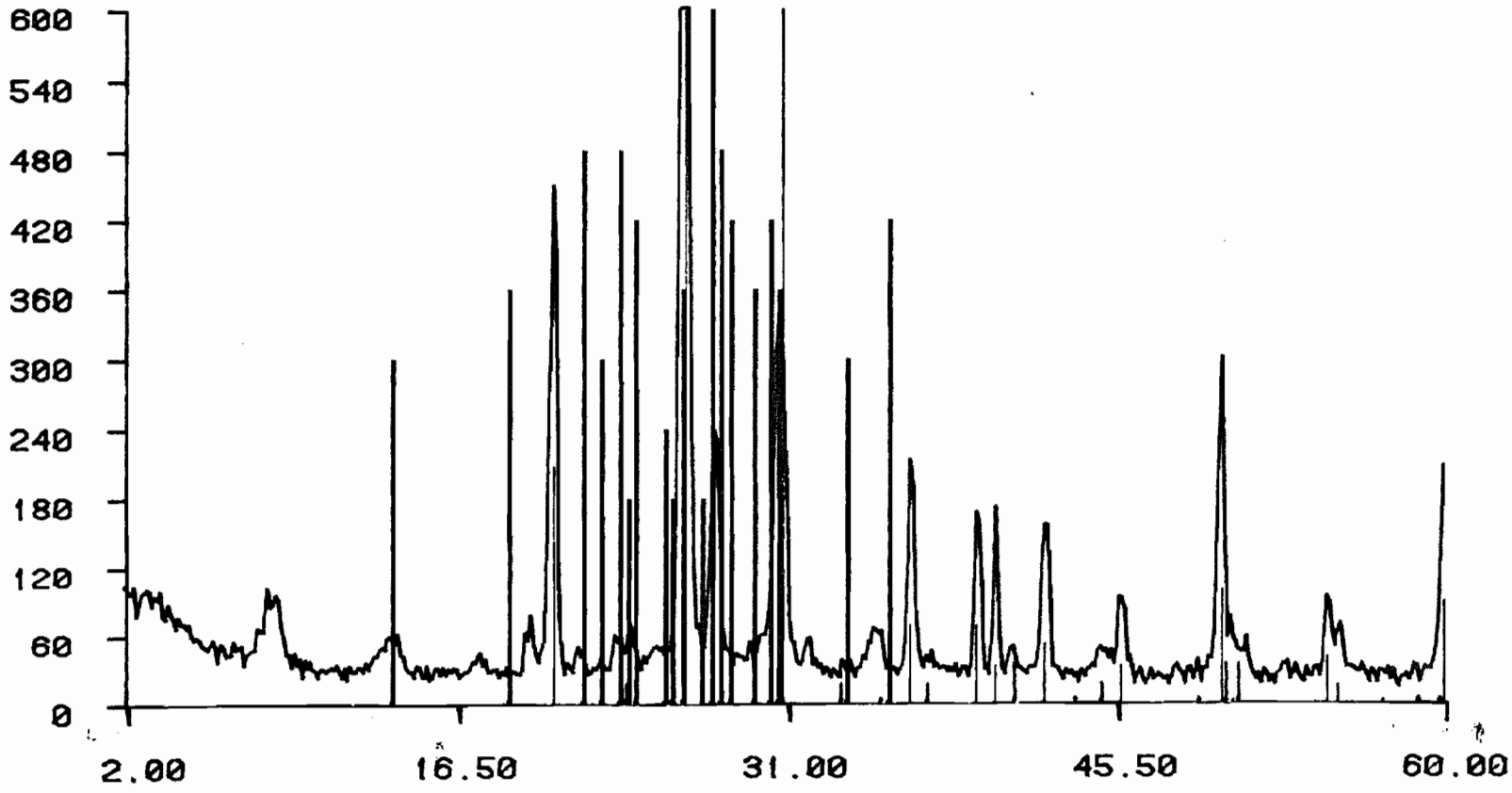
Sample Id: 3MWX 7556.5 BULK



PDF 5- 490PDF12- 88PDF 9- 4563MWX 7556.
1016. 1016. 1016. 1755.

BENDIX

File name: DF0:Z91179.RAW

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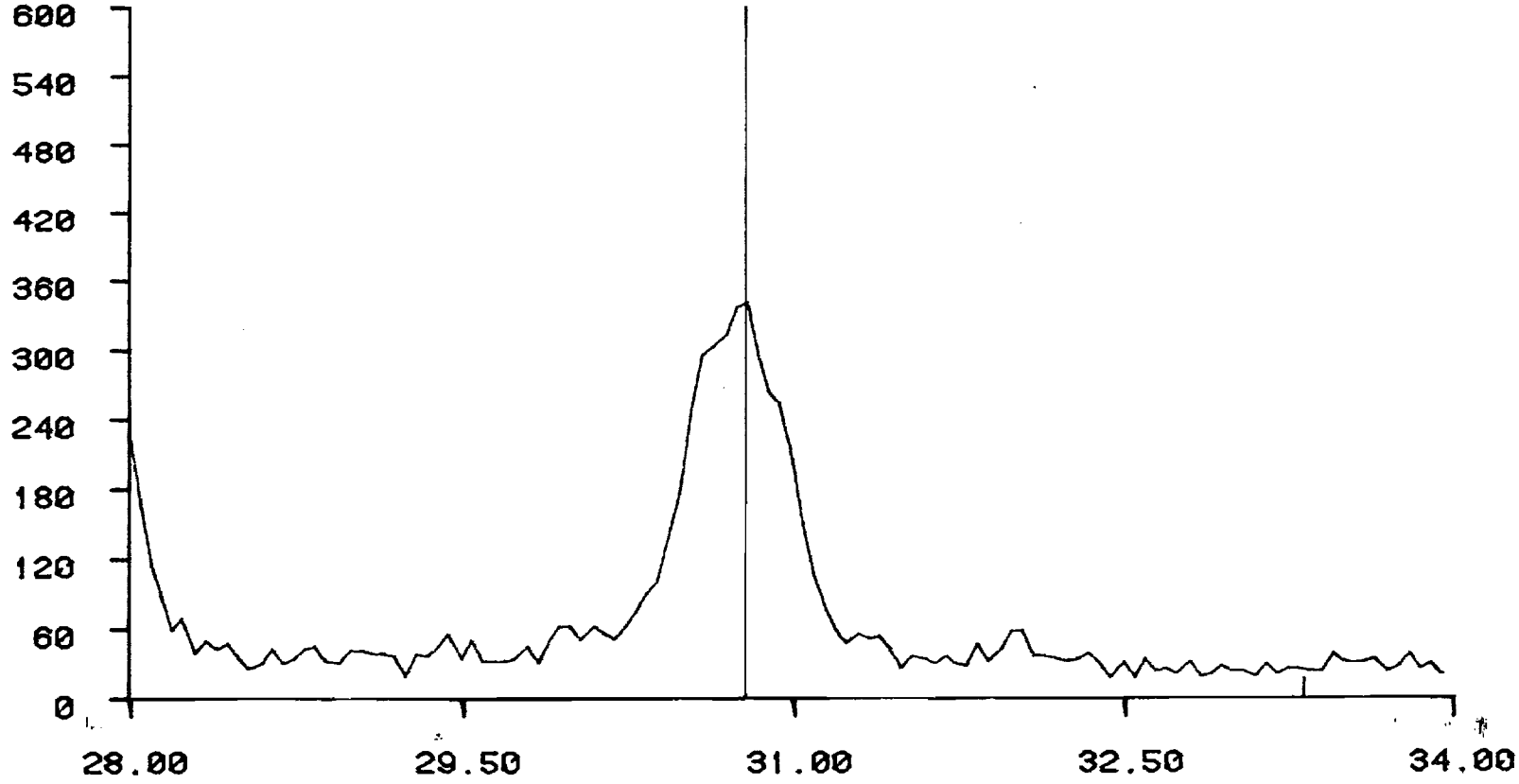
Sample Id: 3MWX 7556.5 BULK



PDF12- 883MWX 7556.
1755. 1755.

BENDIX