MISSISSIPPI STATE UNIVERSITY

DEPARTMENT OF ZOOLOGY
P.O. DRAWER Z
STATE COLLEGE, MISSISSIPPI 39762
PHONE (601) 323-4321, EXT. 305

6 April 1967

cc: Papageorge
W C CARDER - G.C
G Gotsy
W P Dunlap - G.C
W W Miller
H Simpson
W C Robinson - G.C

Mr. L. C. Fuhrmeister
Technical Services Superintendent
Monsanto Chemical Company
Anniston, Alabama

Dear Mr. Fuhrmeister:

The following report includes a summary of some of our recent findings:

Table 1. Water-quality data collected March 22, 1967.

Location	Time	pH	Temp. (°C)	D. O. (ppm) Surface	D. O. (ppm) Elbow Depth
Choccolocco Creek - 4 mi. E. Boiling Spring	7:00 AM	7.4	13	8.9	8.9
Choccolocco Creek - Flat Bridge	8:15 AM	7.2	13.5	8.0	7.8
Choccolocco Creek - Hiway #93 Bridge	10:15 AM	7.7	14.0	8.5	8.4
Choccolocco Creek - Hiway #77 Bridge	11:00 AM	8.0	15.0	9.0	8.8
Anniston Sewage Treatment Plant	7:30 AM	7.3	19.0	None Detectable	---
Monsanto Treatment Facility	9:15 AM	6.2	17.0	6.5	---
Snow Creek at Front Fence	9:30 AM	11.2	22.0	8.0	---

DSW 162386

DEFENDANT'S EXHIBIT #10

Everything in Table 1 seems in order except the pH in the front ditch. Previous readings have always been very low or near 7.0.

You will recall my brief report of March 10 in which we found normal ACh levels in bluegills collected at Jackson Shoals. On March 23 we obtained other specimens from Choccolocco Creek for cholinesterase tests. All fish were kept alive until tested and each fish was tested separately (we usually pool two brains to make a sample). The samples in Table 2 were as follows:

Samples 1, 2 Distressed bluegills collected at Eureka Bridge.
Samples 3, 4, 5, 6 Healthy bluegills collected at Jackson Shoals.
Samples 7, 8, 9, 10 Healthy green sunfish collected at Jackson Shoals.

Table 2.

Sample No.	Brain Wt.	Optical Density	μM ACh Hydrolyzed 20'	60'	Specific Activity	Average
1	108.1 mg	.130	2.06	6.18	1.76	1.52
2	35.3 mg	.093	1.48	4.44	1.27	
3	100.7 mg	.133	2.20	6.60	1.88	
4	41.2 mg	.094	1.62	4.86	1.39	1.69
5	38.2 mg	.111	1.76	5.28	1.51	
6	26.5 mg	.145	2.30	6.90	1.97	
7	35.4 mg	.145	2.29	6.87	1.96	
8	28.2 mg	.107	1.66	4.98	1.42	1.75
9	36.0 mg	.142	2.28	6.88	1.96	
10	26.7 mg	.114	1.89	5.57	1.65	

On March 25, Dr. L. L. Ellis and I collected 9 distressed bluegills and 3 distressed green sunfish at Eureka Bridge. These were quick frozen on dry ice and kept frozen until analyzed on April 1.

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These samples gave us peculiar results. Three of them failed to give a meaningful reading and the others showed great variation. We don't know whether this can be attributed to technique, equipment, or the samples. For what it is worth, the results are shown in Table 3.

Table 3.

Sample No.	Brain Wt.	Optical Density	% ACh Hydrolyzed 20'	60'	Specific Activity	Average
1	77.8 mg	no data				
2	90.1 mg	no data				
3	100.0 mg	no data				
4	92.1 mg	.059	0.76	2.28	.65	
5	82.3 mg	.074	0.98	2.94	.84	
6	72.8 mg	.118	1.44	4.32	1.23	1.06
7	75.9 mg	.098	1.21	3.63	1.04	
8	85.8 mg	.141	1.79	5.37	1.53	
9	88.7 mg	.074	0.61	1.83	.52	
10	80.4 mg	.107	1.38	4.14	1.18	1.00
11	80.0 mg	.120	1.54	4.62	1.32	

This weekend we plan to collect additional specimens and freeze them. We will bring some of our control fish over and freeze them at the same time. This may indicate the source of our problems.

The following data refer to GLC analyses of samples collected March 5, 1967.

Location	Sample	Results
Dry Creek at Hiway 202 Bridge	700 ml water	2 small peaks - not pesticides or TCE.
Monsanto Treatment Facility	700 ml water	5 large peaks - unidentified

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Location	Sample	Results
Choccolocco Creek - 4 mi. E. Boiling Spring	700 ml water	2 peaks - one represents a trace of DDE.
Anniston Sewage Treatment Plant	700 ml water	3 peaks but * no pesticides
Choccolocco Creek - Hiway #93 Bridge	700 ml water	DDT - trace DDE - trace

(Note this water sample did not have the usual high interference that we have often attributed to Snow Creek.)

Choccolocco Creek - 4 mi. E. Boiling Spring	Golden Redhorse**	DDE - trace DDT - 0.05 ppm
Choccolocco Creek - Flat Bridge	Bluegill (Caged)** (12.14 g)	14 major peaks

(The sample produced high background that interfered with detection of DDE, DDT, DDD, heptachlor epoxide and methyl parathion. One peak corresponds to parathion, however, the compound causing the peak is less polar than parathion when tested in a partition-coefficient test.

Choccolocco Creek - Jackson Shoals	Spotted Bass ** (5.80 g)	17 major peaks Same background as mentioned above.

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* Two peaks resembled parathion and DDE but their partition coefficients (hexane - acetronitrile) proved otherwise.

** The GLC tracings for these 3 fish are included as a part of this report. Note the clean sample from the fish taken upstream. Many of the peaks in the downstream fish are those we have found in Snow Creek. Could this be the reason that the SE Lab did not do GLC analyses of fish tissues as a part of their report? Note that we indicate retention times for several pesticides on one tracing. The peaks do not match these times perfectly, indicating that they are not pesticides.

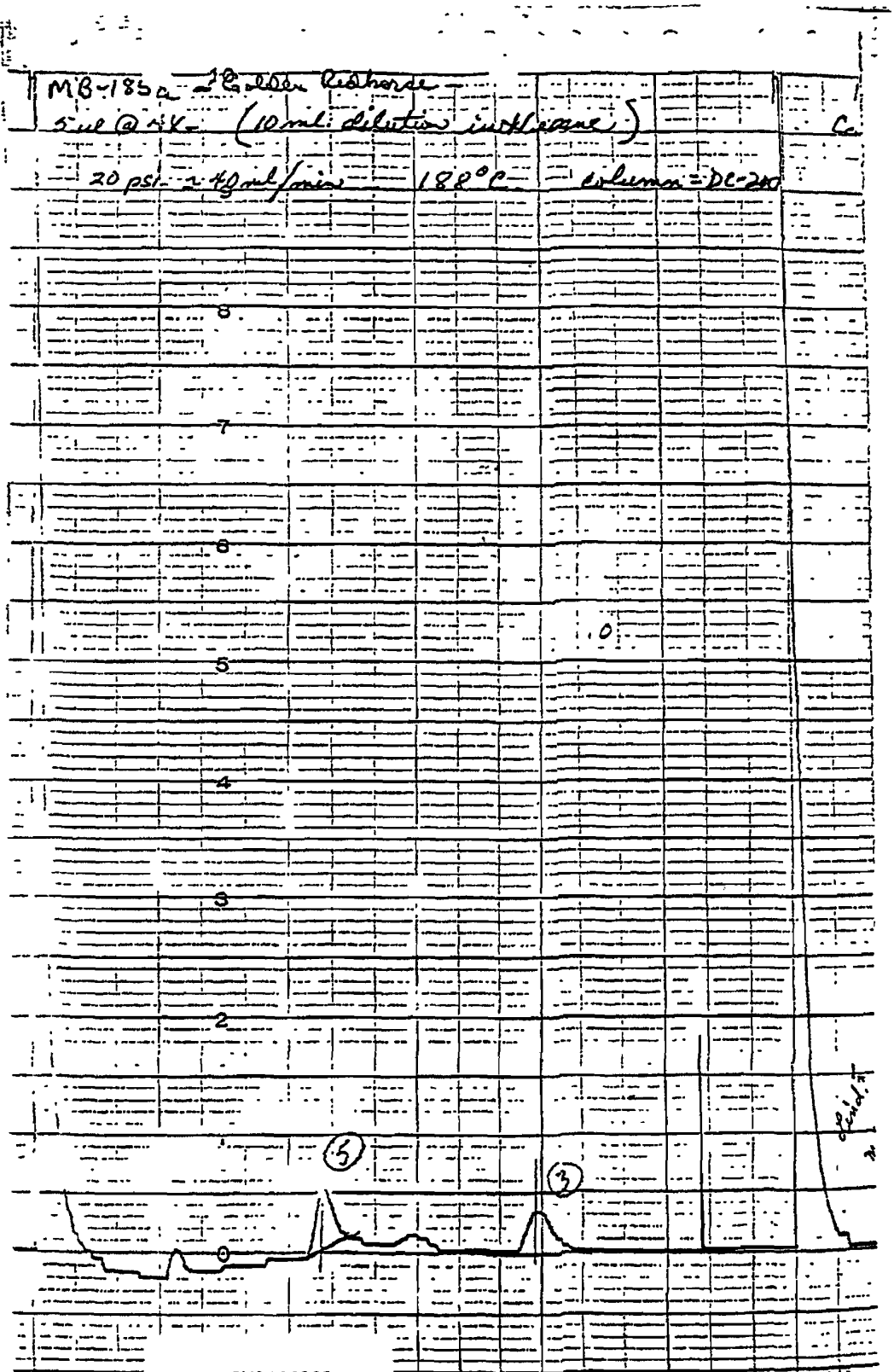
Sincerely yours,

Denzel E. Ferguson
Professor of Zoology

DEF:wb

DSW 162389

WATER_PCB-SD0000054877



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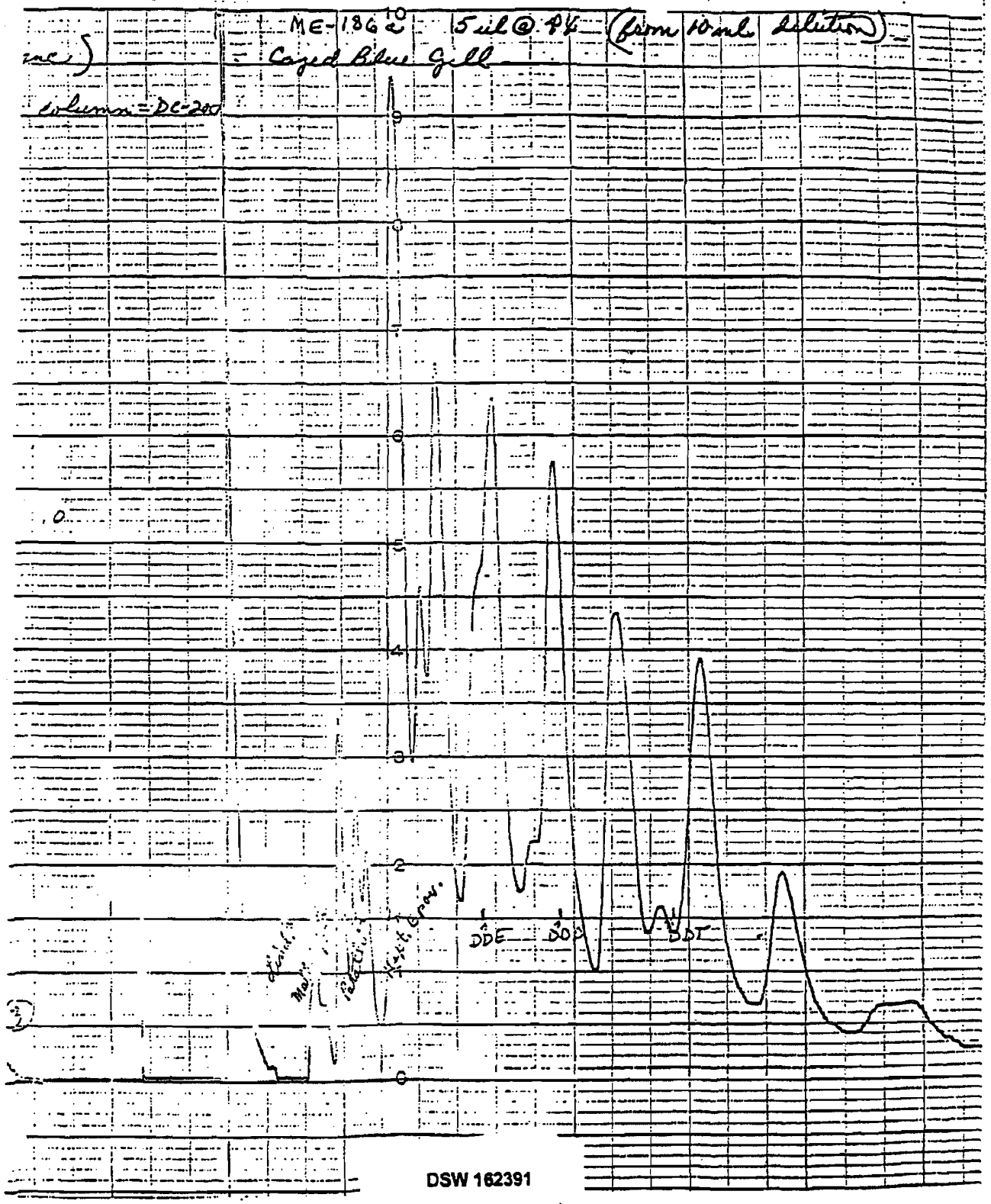

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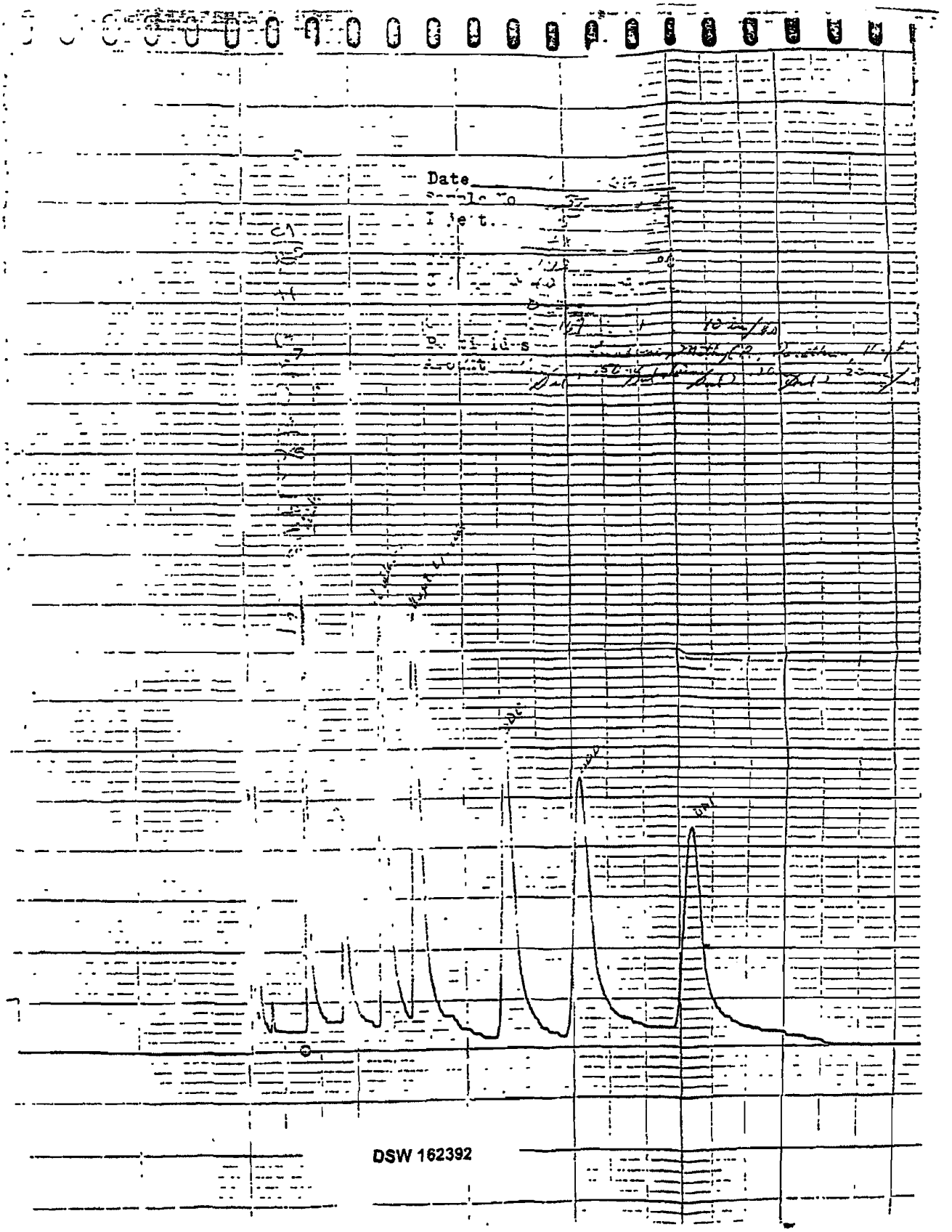
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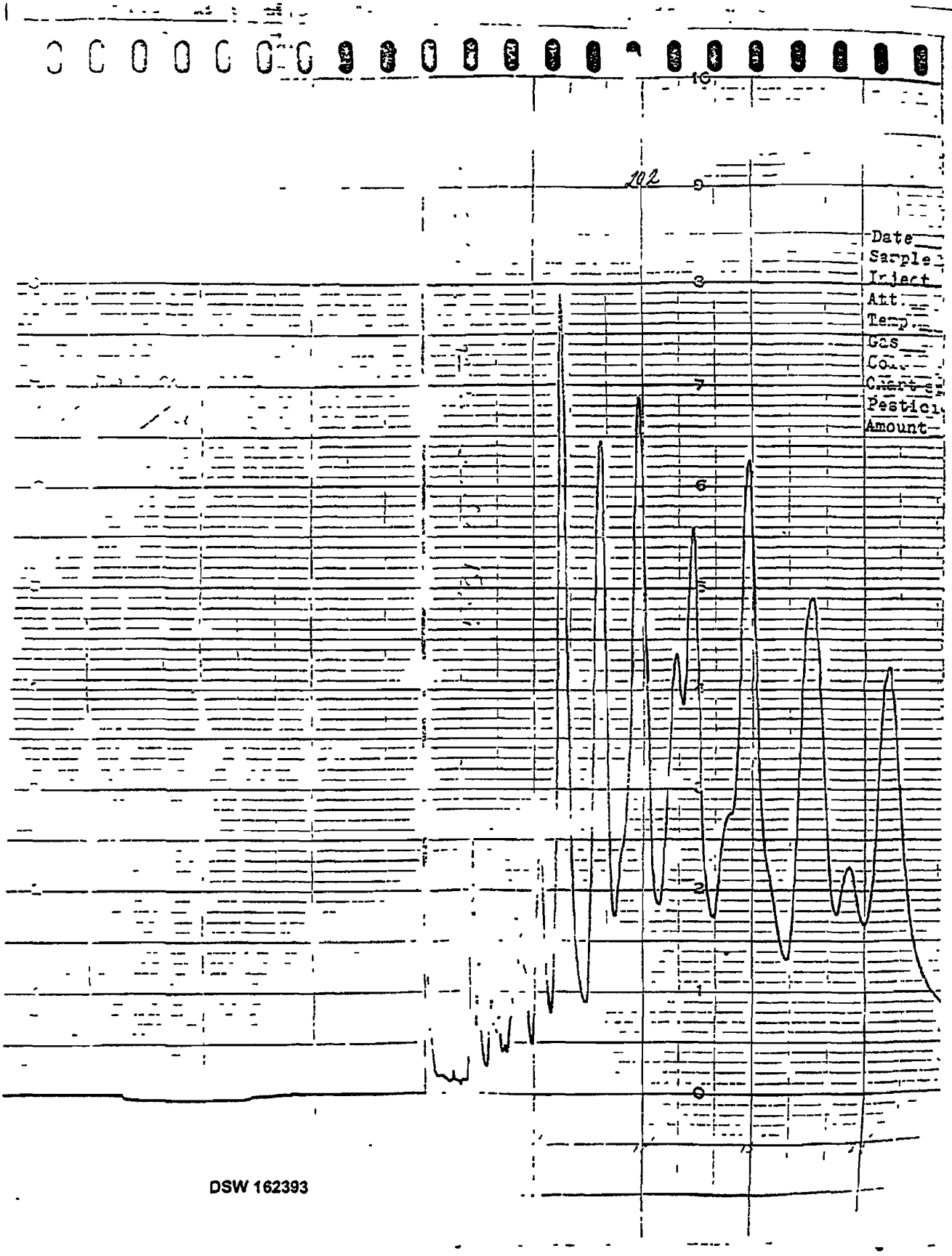
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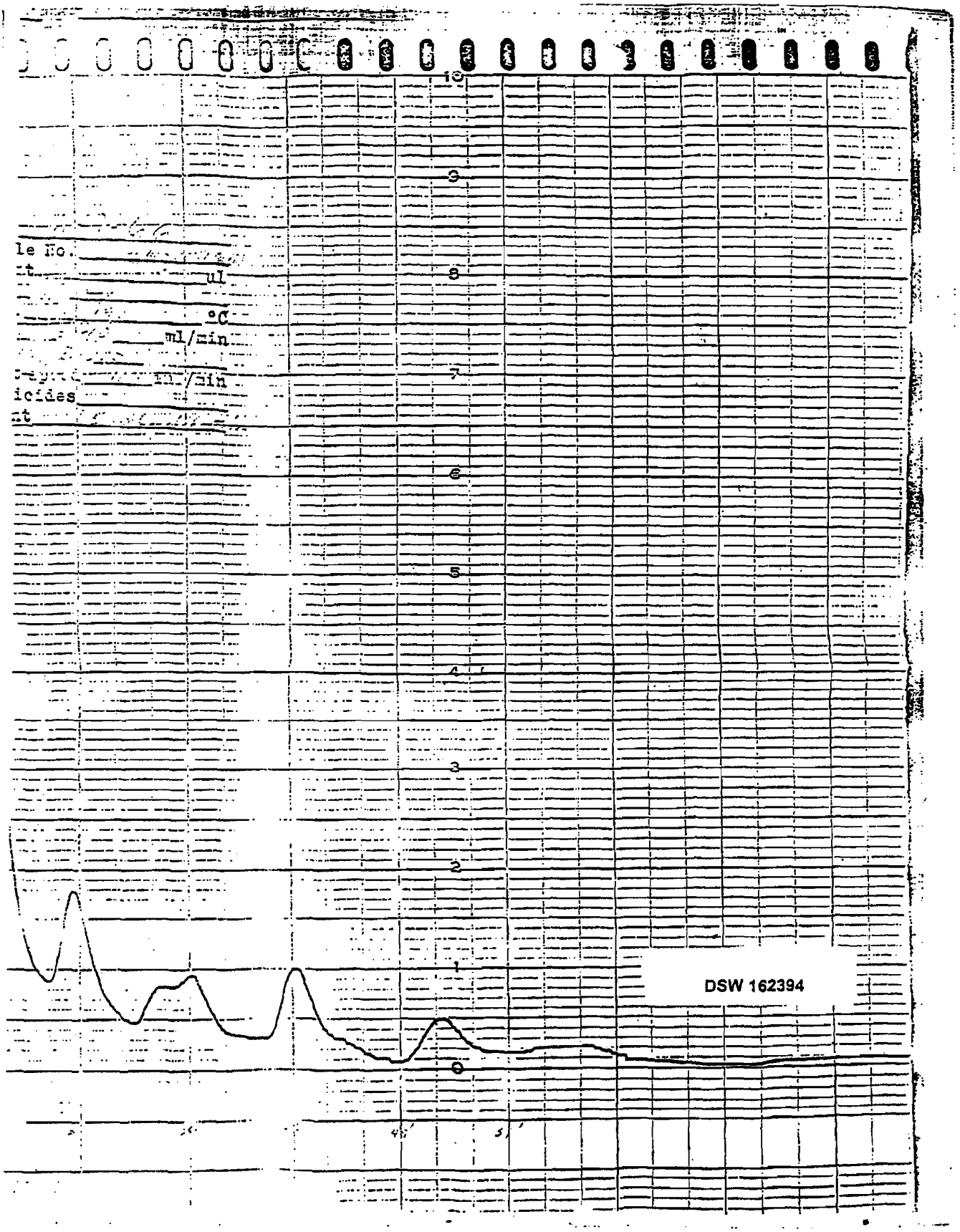
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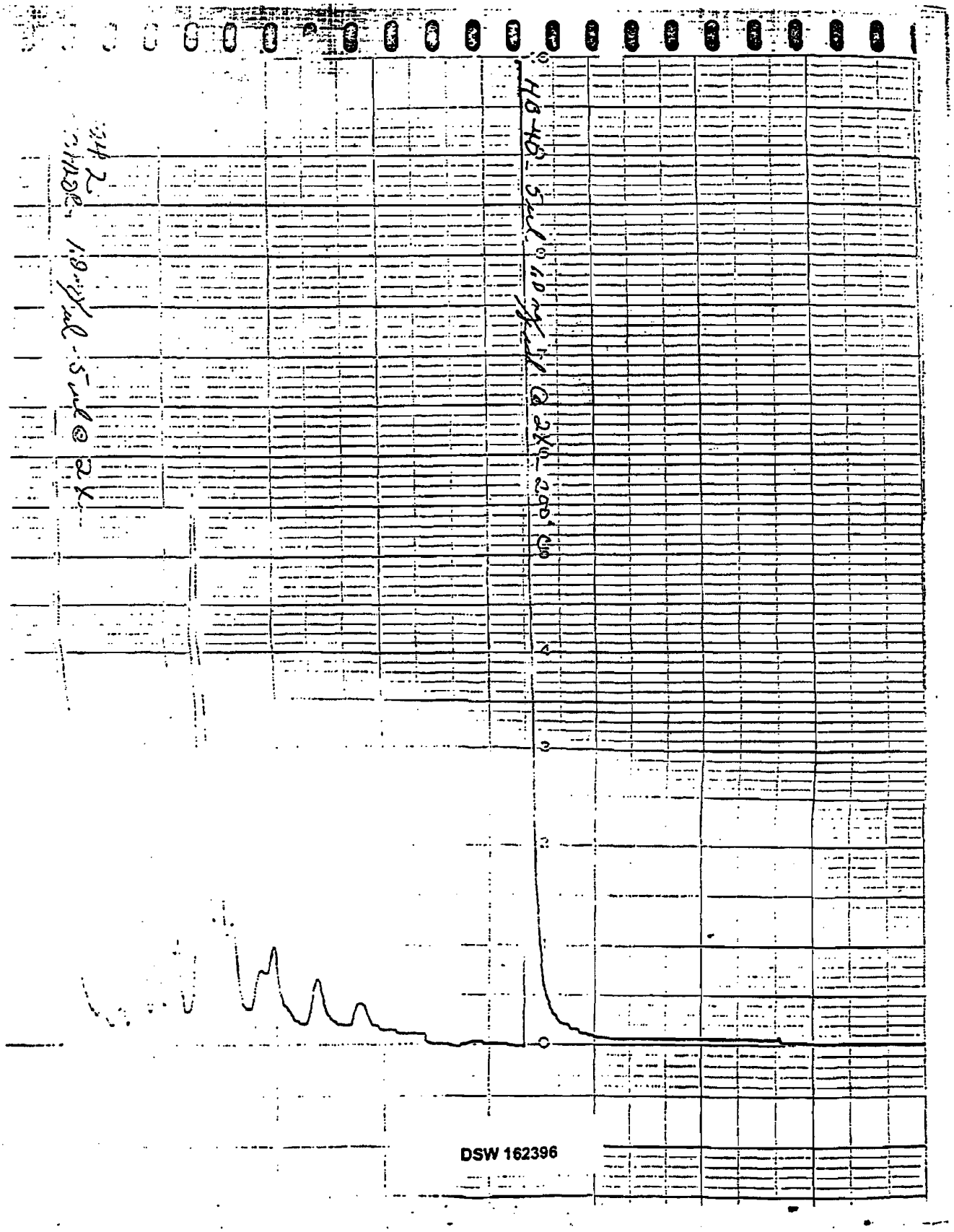
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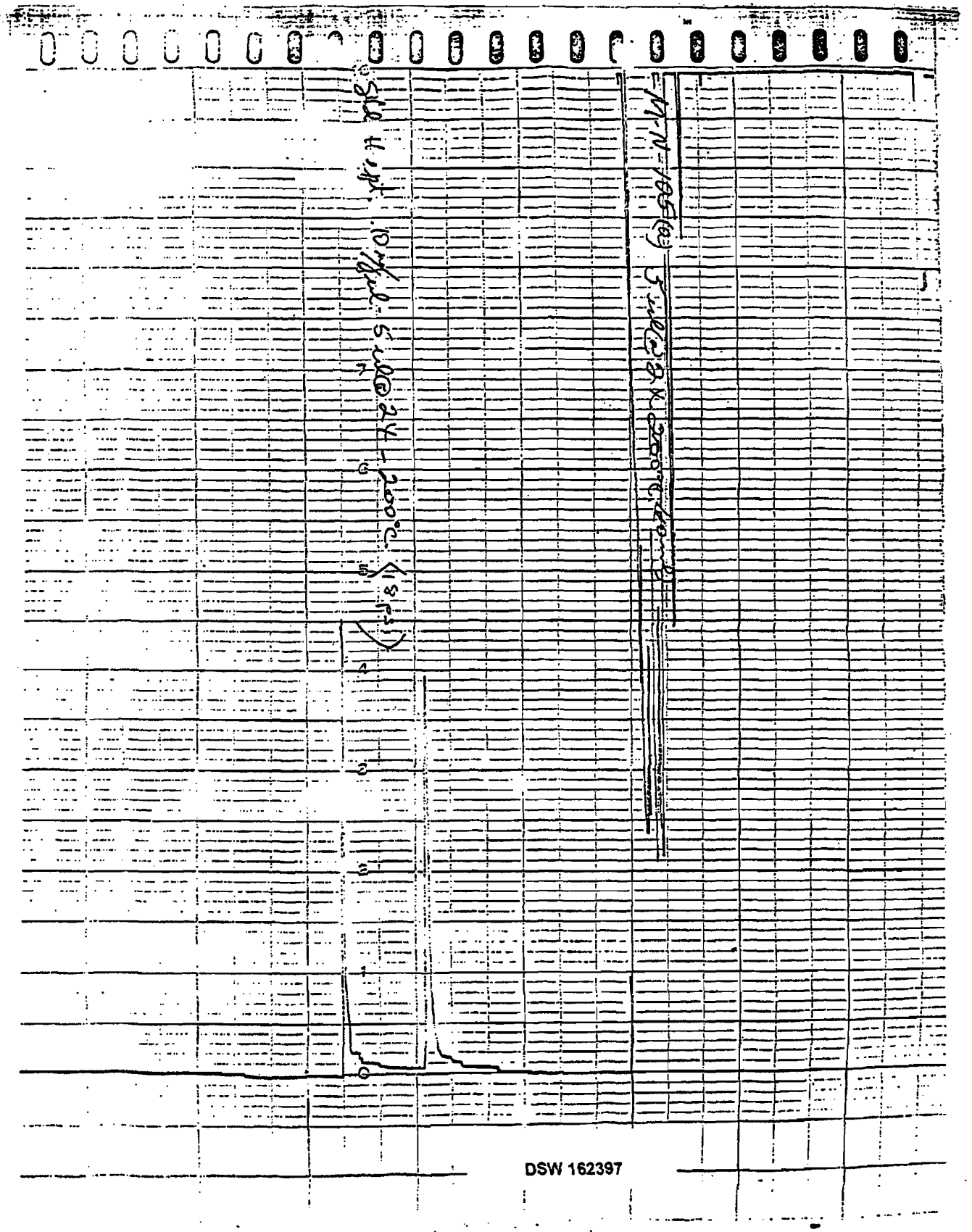

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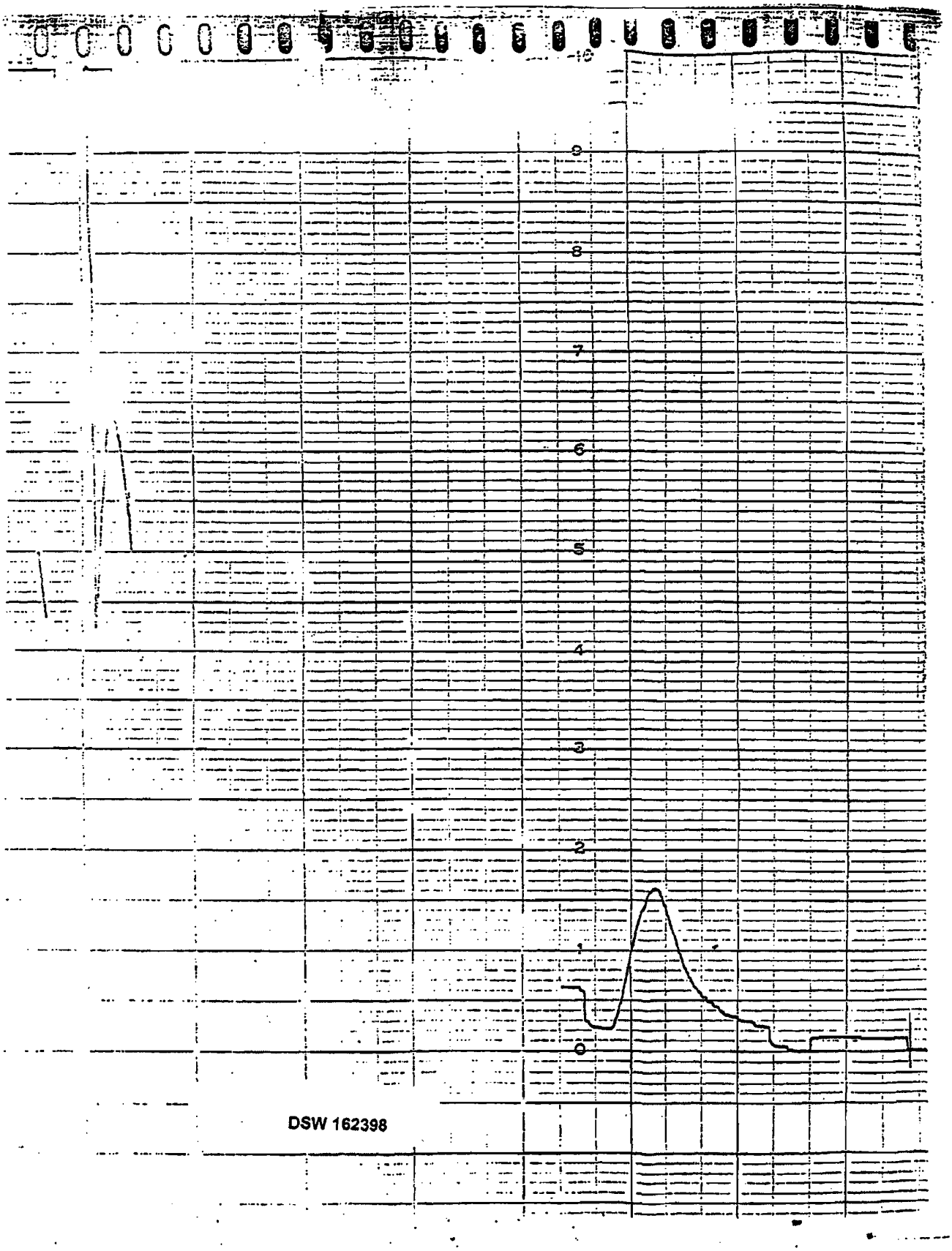

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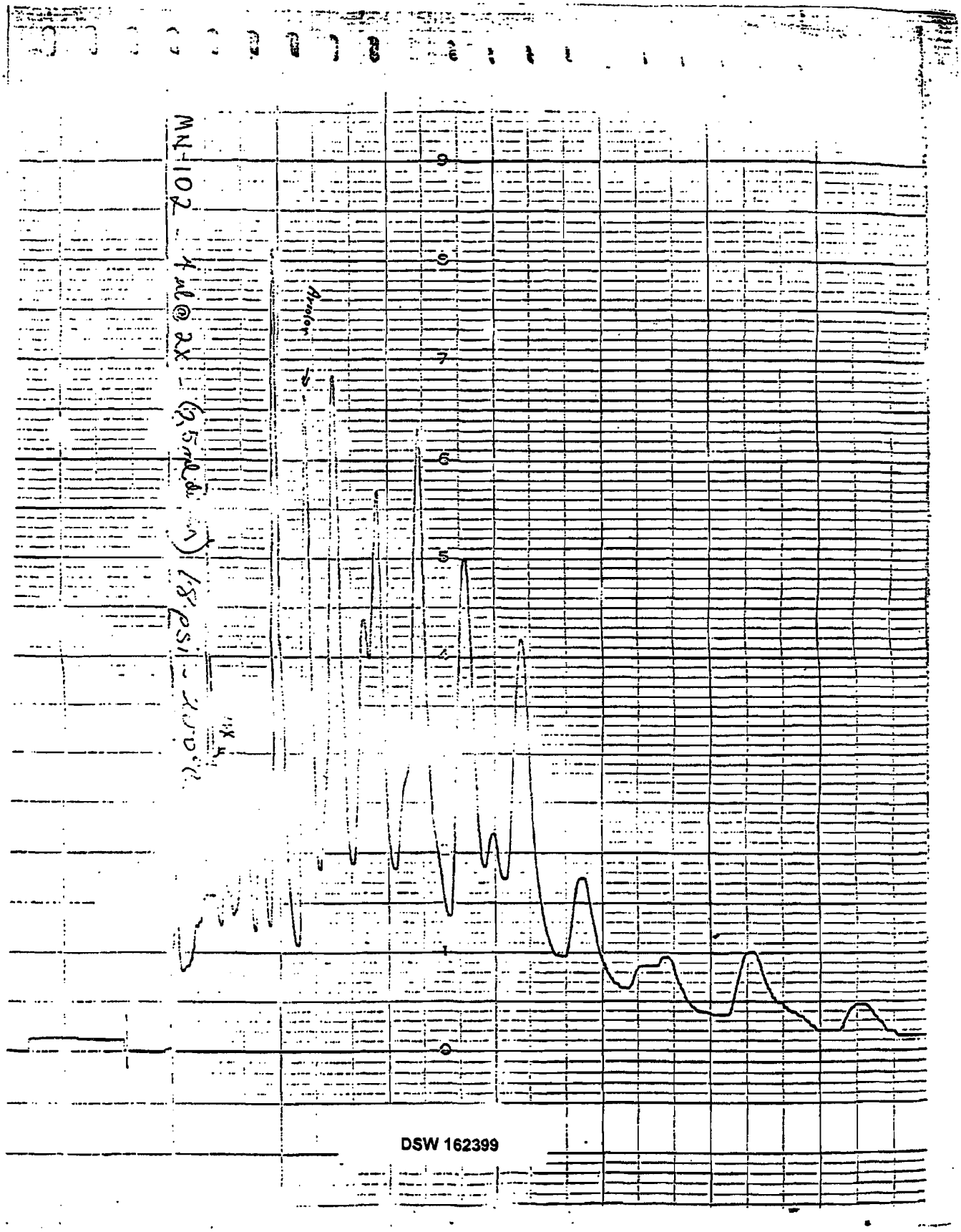

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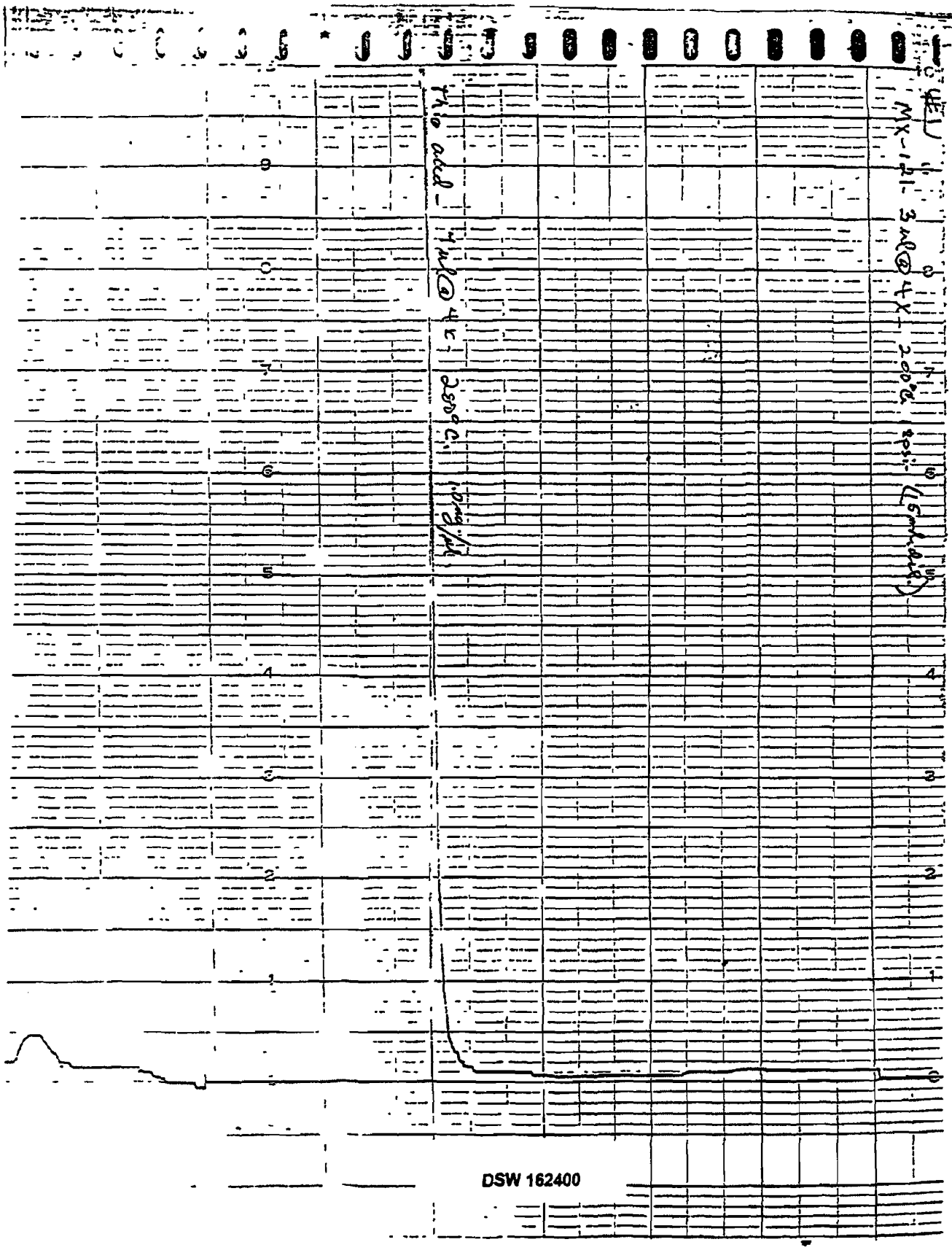

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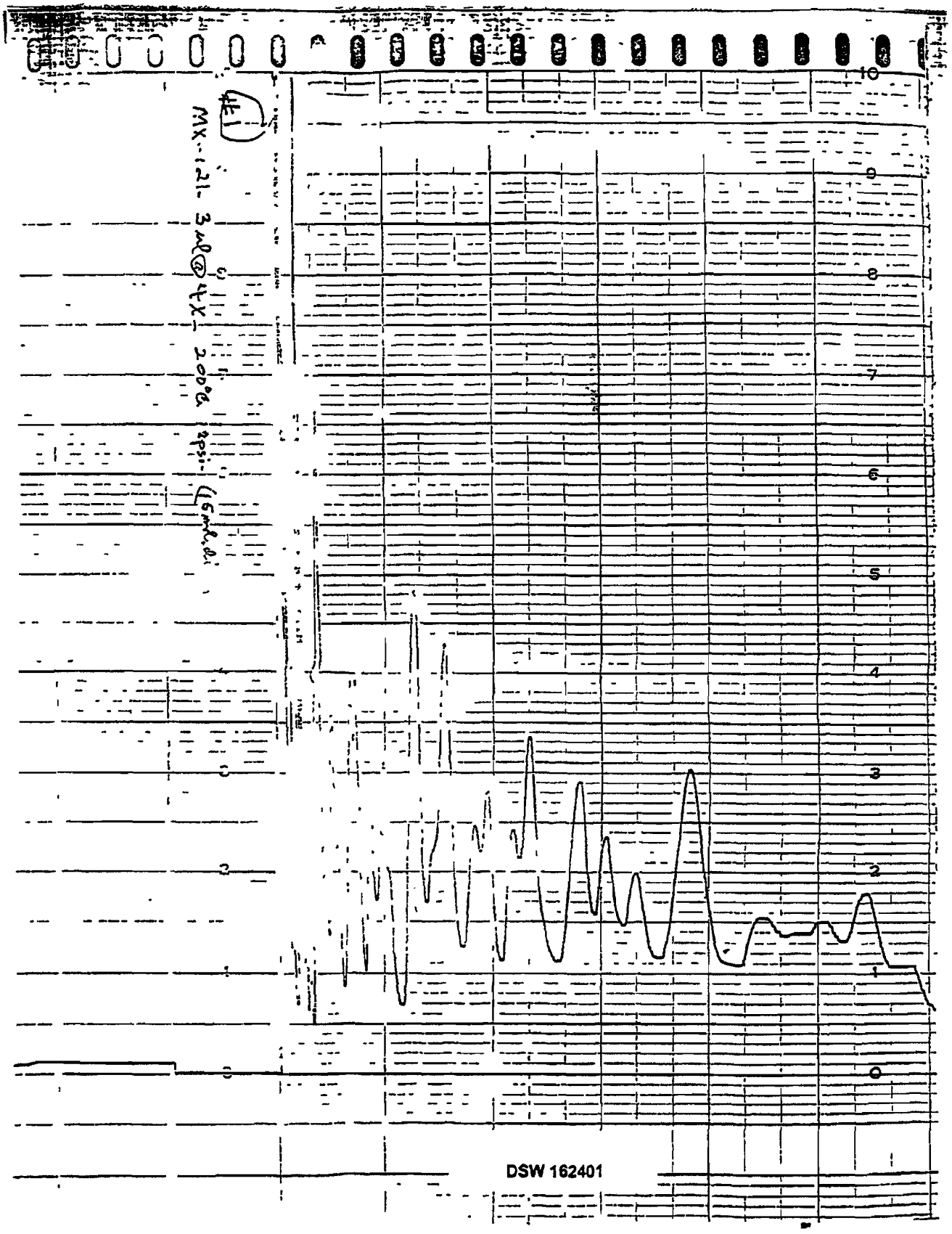

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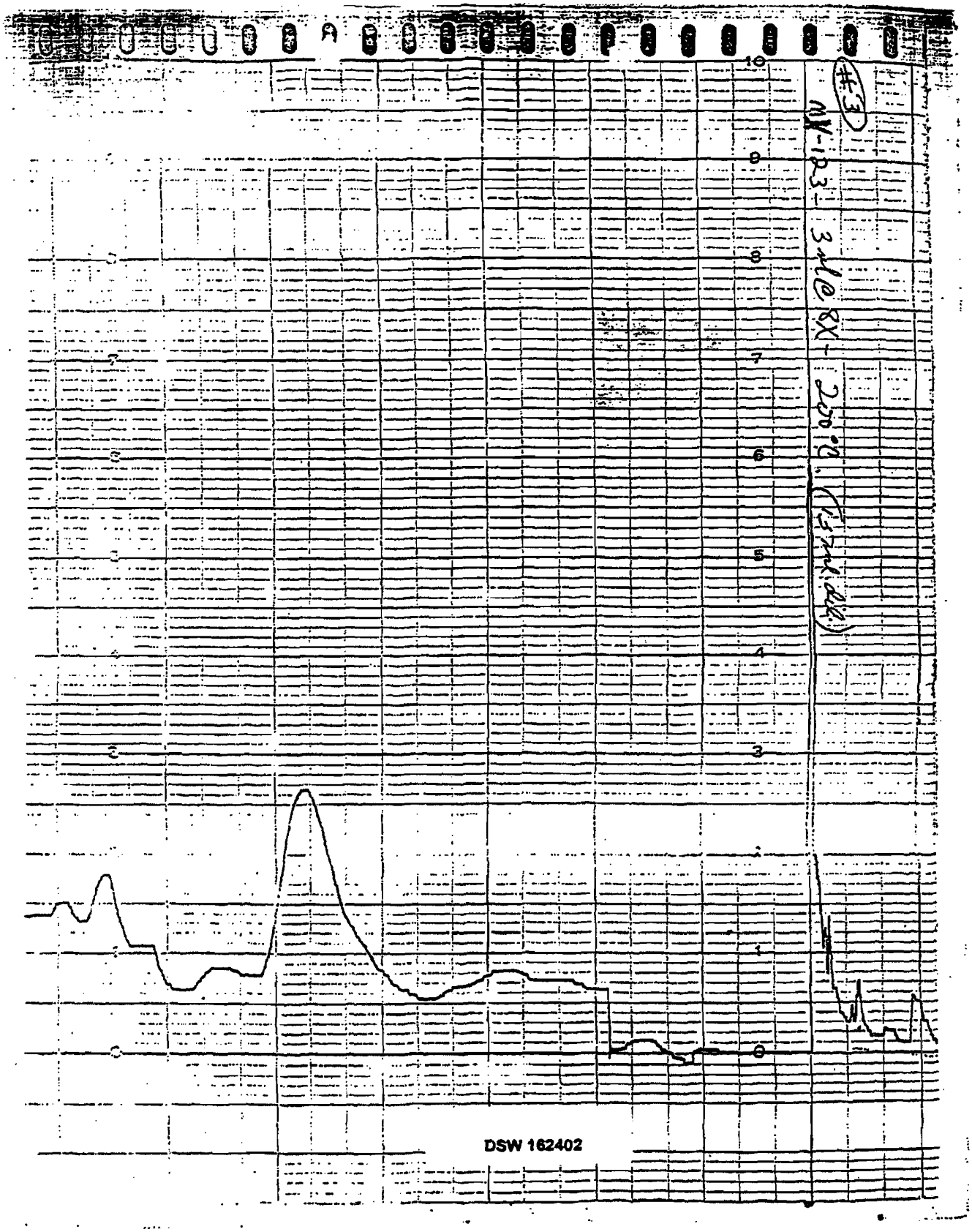
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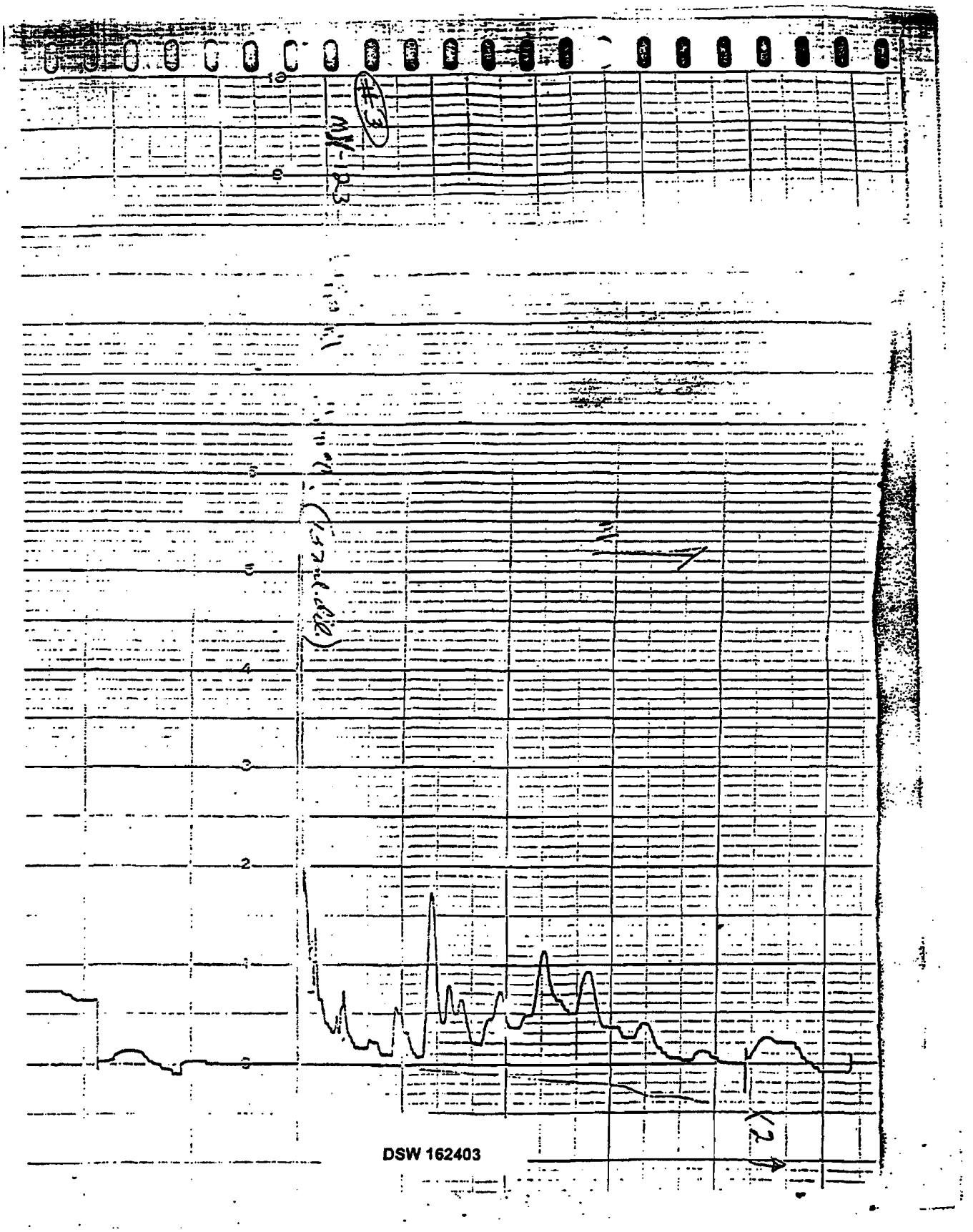
DSW 162402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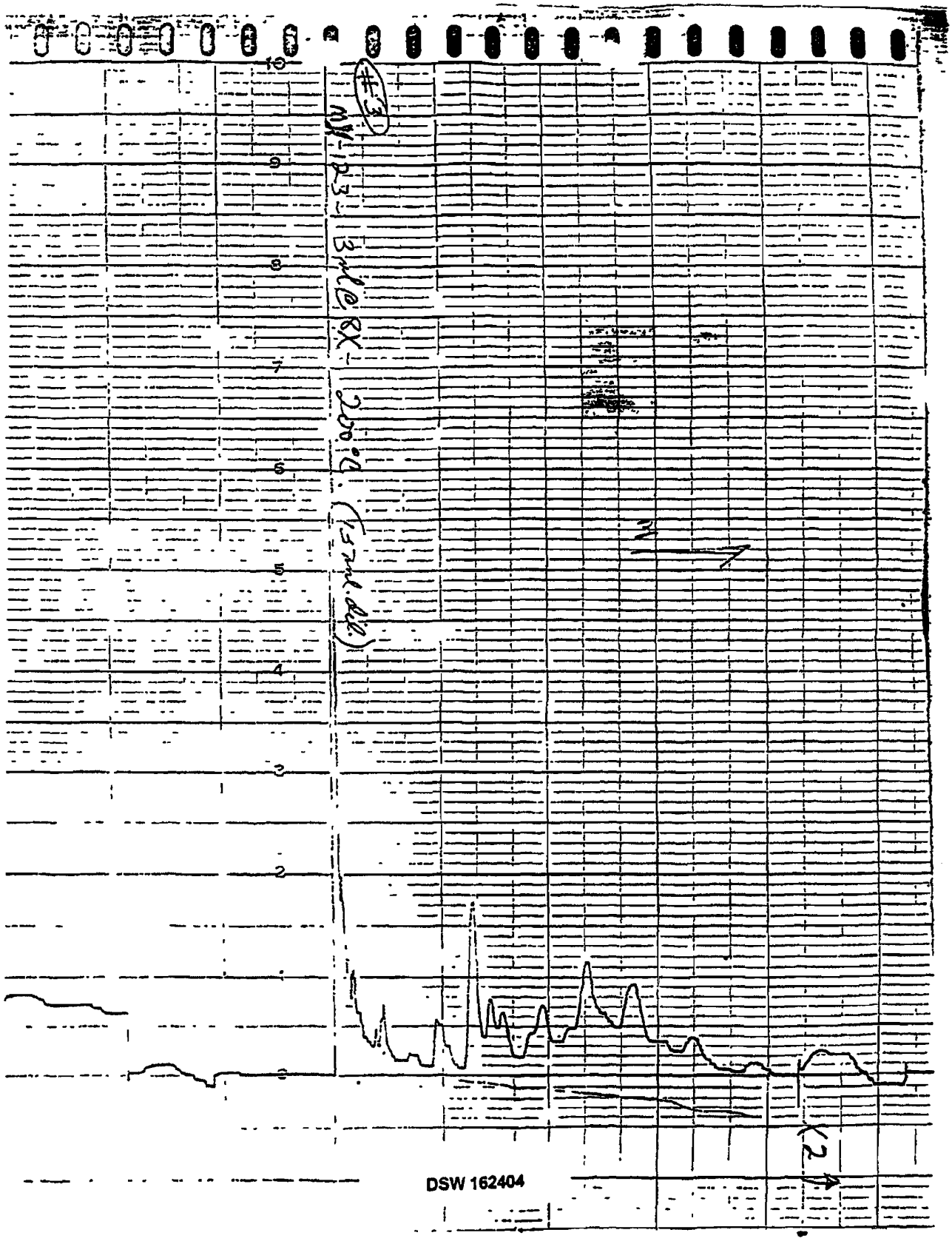
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(2)
DSW 162404

PESTICIDE ANALYSIS

PRESENCE OF POLYCHLORINATED BIPHENYLS AT RESIDUE ANALYSIS OF BIOLOGICAL SAMPLES.

Sören Jensen and Gunnar Widmark

Institute of Analytical Chemistry, University of Stockholm,
Stockholm 50, Sweden

(Synopsis)

At analysis of samples from the Swedish wild-life fauna by means of gas chromatography, using both electron capture detector and micro coulometric detector, a large number of unknown but chlorine containing compound have been detected together with the ordinary pesticides. Massspectra of some of these compounds obtained at a combined gas chromatograph mass spectrometer (LKB-9000) indicate that most of the unknown compounds are polychlorinated biphenyls, potentiated somewhat in nature towards those of higher degree of chlorination.

A large number of samples have been examined, and polychlorinated biphenyl are found especially in fish and in sea birds but also in needles of conifers and in some samples of human depot fat. Two hundred samples of soil and water did not contain detectable amounts of chlorinated biphenyls nor did twenty samples of terrestrial mammals.

By the use of a nitration method most of the ordinary pesticides can be removed from extracts, leaving the polychlorinated biphenyl unaffected. Using this method, it has been shown that two of the major peaks of the chlorinated biphenyls overlap the two peaks of p,p'DDT and o,p'DDT respectively. This is found true for SF-96 columns, most frequently used for the quantitative residue analyses reported in literature; not in case of QF-1 columns.

PLAINTIFF'S EXHIBIT
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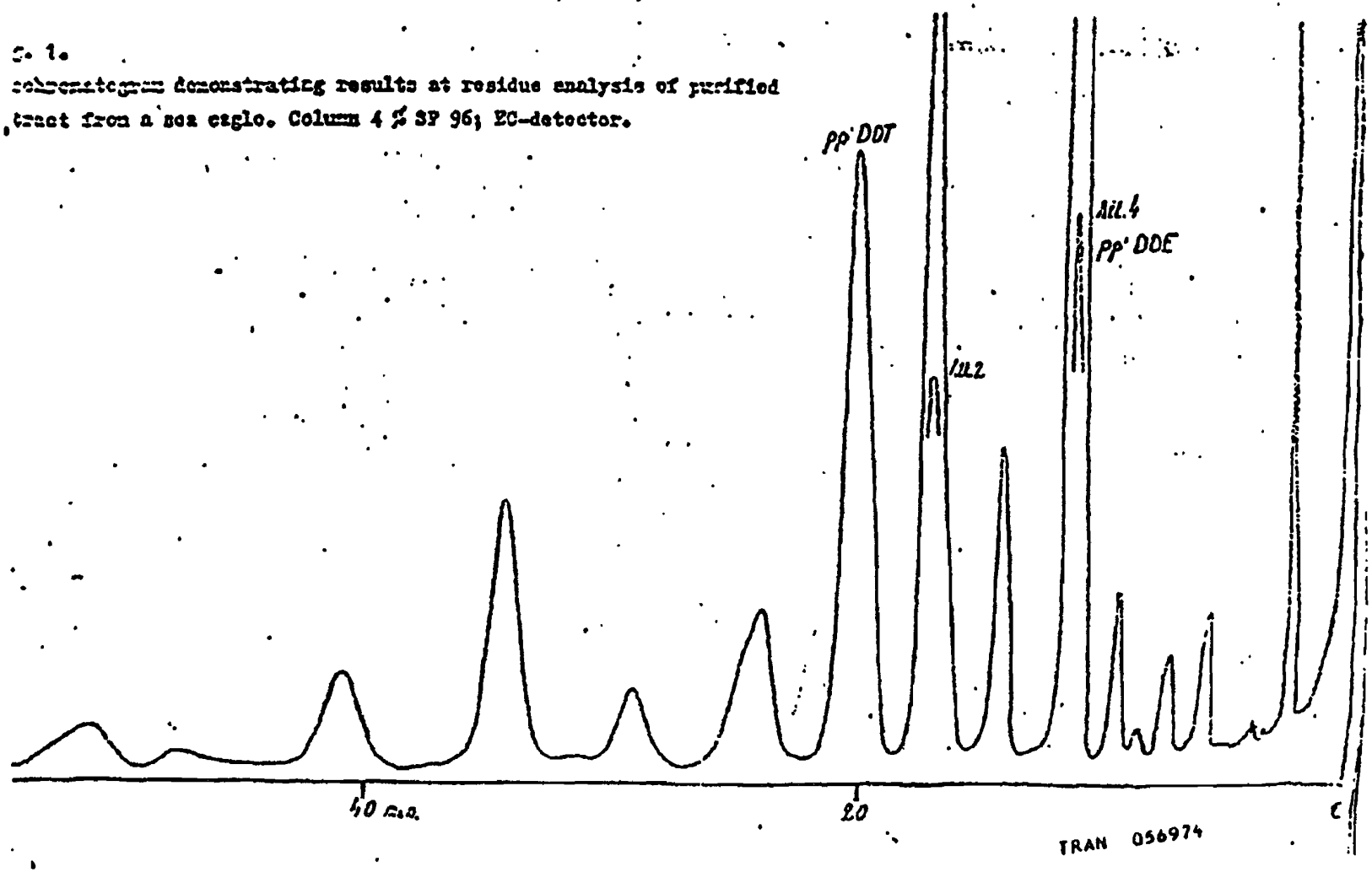

Fig. 1.
Chromatogram demonstrating results at residue analysis of purified extract from a sea eagle. Column 4 % SP 96; EC-detector.

WATER_PCB-SD0000054894

September 1966

Institute of Analytical Chemistry
University of Stockholm
Ronlagevägen 90
STOCKHOLM 50

Head: Gunnar Widmark, Ph.D.

Secretary: Mrs. Ingrid Droms

Research fellows: 15

Education: 24 students a year
12 graduates

Technical assistants: 4

Workshop: 2

Laboratory area: about 400 m^2

Instrumentation (examples): Gas Chromatographs (40 of different manufacture), IR (Perkin-Elmer 421), UV (Hitachi 139), atomic absorption (Jarrell-Ash), differential scanning calorimeter (Perkin-Elmer DSC-1) ion chamber (Cary), electrophoresis, zone-melting, mass spectrometer [illegible]

Research specialities: Analytical chemistry in the fields of organic chemistry, biochemistry and medicine ("life sciences")

Basic Research:

- Gas chromatography, general (Allan Linnarsen)
- Analysis of expired air (Bo Jannson)
- Head space analysis (Dagt Larsson)
- Quantitative gas chromatography (Kerstin Widmark)

Applied Research:

- x Analysis of chlorinated pesticides [illegible] (Sören Jensen)
- x Analysis of 3,4-Benzopyrene (Lars-Erik Strömberg)
- x Lipid analysis (Kerstin Widmark)
- Mercury analysis, atomic absorption (Jan Åsullman)
- Organic mercury, gas chromatography (Sören Jensen)
- Isotopic synthesis (Olof Borgå)

x = research combined with stations for routine analysis

TRAN 056975

WATER_PCB-SD0000054895