Monsanto

FROM (NAME & LOCATION) Elmer P. Wheeler, Medical Department

DATE : September 11, 1969

SUBJECT : Invoice for WARF Institute Study

REFERENCE :

cc: H. S. Bergen, HBERG
M. W. Farrar, S. Second St.
~~R. E. Kelker, S. Second St.~~
W. R. Richard, WRICH
J. E. Springate, JSPRI

TO : Howard L. Minckler
HMINC

Enclosed is an invoice and a request for disbursement for Monsanto's support of the Wisconsin Alumni Research Foundation Study of Lake Michigan.

You will recall this study is an attempt to determine sources of contamination of the Lake by DDT, Dieldrin and other chlorinated hydrocarbons--and PCB's. Originally the study was to be sponsored by the DDT and dieldrin manufacturers including Shell, Stauffer and Montrose. We were asked to support the study since one-fourth of the samples to be taken were to be analyzed for PCB's. Recently Diamond Shamrock has also joined in support of the project.

The study is to examine the presence of the chlorinated hydrocarbons in Lake Michigan and streams tributary thereto. Samples for analysis will include water and sediment at the mouth of the tributaries, water and plankton at short distances in the Lake at the mouth of the tributaries, and water and fish in the general area of the tributaries about one mile from shore.

More than 500 samples were collected by the project study team in June. A very preliminary report of the analysis of 61 of the water samples is attached and shows in parts per trillion the levels of contaminants found. In eight of the samples, Aroclor 1254 was identified. In an additional nine samples there was such a spectrum of interfering substances that the original analyses were somewhat confused.

The locations of the samples in which Aroclor was found is shown on the rough map attached.

DSW 152600

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In a telephone conversation the WARF group has indicated some difficulties in their analytical techniques, particularly insofar as the Aroclor identification is concerned. We have been asked to have someone from Bob Keller's group visit WARF for a full discussion of analytical problems--or alternatively have the WARF analysts come to St. Louis. I am working with Bob Keller on an appropriate interchange of information.

The results of the WARF Study are being discussed with the federal and state agencies which are conducting their own sampling and analysis studies on Lake Michigan. I believe this makes it imperative for us to continue support of the WARF project.

Elmer P. Wheeler

EPW:ju

Enclosures

DSW 152601

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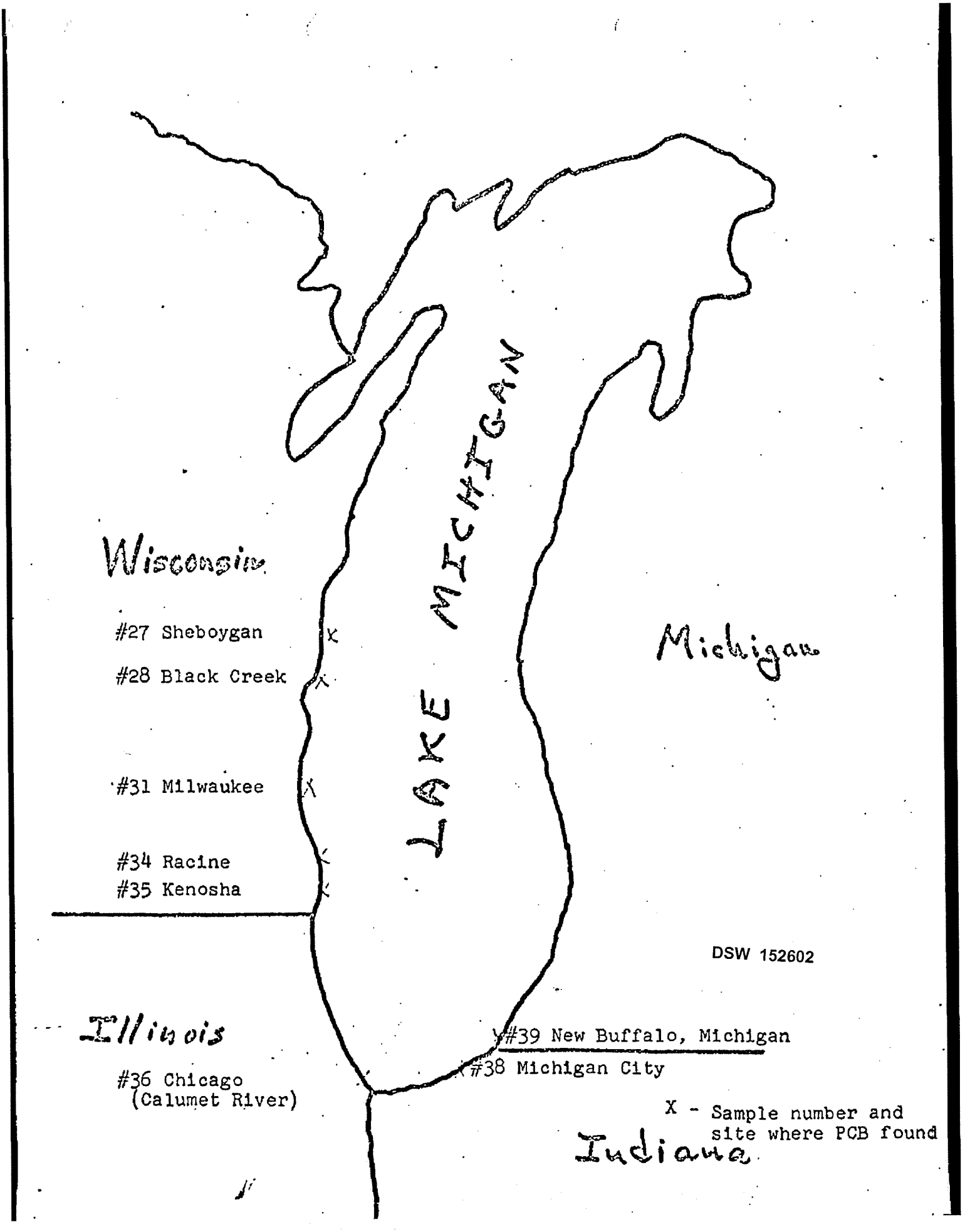

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TABLE 4

Tributary Streams Recommended
for Biological Monitoring

	Tributary	Location
	Michigan	
39	Galien River	LaPort Road, New Buffalo, Michigan
40	Drain	Sawyer, Michigan
41	St. Joseph River*	U.S. 31 Bridge, St. Joseph, Michigan
42	Paw Paw River	Above St. Joseph, Michigan
43	Black River	U.S. 31 Bridge, South Haven, Michigan
44	Kalamazoo River*	U.S. 31 Bridge, Saugatuck, Michigan
45	Black River	Ottawa Beach, Michigan
46	Pigeon River	Lake Shore Ave., Port Sheldon, Mich.
47	Grand River*	Corps of Engineers, Grand Haven, Mich.
48	Muskegon River*	Coast Guard, Muskegon, Michigan
49	White River	S. Channel wall, Whitehall, Michigan
50	Pentwater River	Coast Guard, Pentwater, Michigan
51	Pere Marquette River	Channel area, Ludington, Michigan
52	Manistee River*	Maple St. Bridge, Manistee, Michigan
53	Betsie River	Coast Guard, Frankfort, Michigan
54	Platte River	M-22, Benzie State Park, Michigan

* Water monitoring station for pesticide analysis.

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Table 4 cont'd.

	(Michigan)	
55	Crystal River	Bay Lane, Glen Arbor, Michigan
56	Leelanau Lake outlet	Leland, Michigan
57	Boardman River	Traverse City, Michigan
58	Elk River	Elk Rapids, Michigan
59	Lake Charlevoix outlet	Charlevoix, Michigan
60	Bear River	Petoskey, Michigan
61	Millecoquins Creek	Naubinway, Michigan
62	Manistique River	Manistique, Michigan
63	Sturgeon River	Nahma, Michigan
64	Whitefish River	U.S. Bridge, Rapid River, Michigan
65	Escanaba River	Wells, Michigan
66	Ford River	M-35 Bridge, Ford River, Michigan
7	Menominee River*	Breakwater, Menominee, Michigan
	Indiana	
36	Grand Calumet River*	East Chicago, Indiana
37	Burns Ditch	Midwest Steel Catwalk, Burn Harbor, Indiana
38	Trail Creek	Franklin St. Bridge, Michigan City, Indiana

* Water monitoring station for pesticide analysis.

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Table 4 cont'd.

Wisconsin

6	Peshtigo River	Marinette County
5	Oconto River	Oconto County
4	Pensaukee River	Oconto County
3	Little Suamico River	Oconto County
1	East River	Brown County
2	Big Suamico River	Brown County
8-12	Mink River	Door County
	Unnamed Streams (7)	Door County
13	Ahnapee Creek	
14	Ahnapee River	Kewaunee County
15	Kewaunee River	Kewaunee County
16	East Twin River	Manitowoc County
17	West Twin River	Manitowoc County
18	Manitowoc River	Manitowoc County
19	Silver Creek	Manitowoc County
20	Calvin Creek	Manitowoc County
21	Pine Creek	Manitowoc County
22	Point Creek	Manitowoc County
23	Fisher Creek	Manitowoc County
24	Centerville Creek	Manitowoc County
25	Seven Mile Creek	Sheboygan County
26	Pigeon River	Sheboygan County

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Table 4 cont'd.

(Wisconsin)

27	Sheboygan River	Sheboygan County
28	Black Creek	Sheboygan County
29	Sauk Creek	Ozaukee County
30	Menomonie River	Milwaukee County
31	Kinnickinnic River	Milwaukee County
32	Oak Creek	Milwaukee County
33	Root Creek	Racine County
34	Pike River	Kenosha County
35	Barnes Creek	Kenosha County

DSW 152606

STLCOPCB4039950

F.W.

Sample #	Location	P.P.t. DDE	P.P.t. DDD	P.P.t. DDT	P.P.t. Dieldrin	P.P.t. BHC Lindane	
1	East River - Green Bay	2.7	4.4	3.9 (L)	1.4	??	
2	Big Suamico River	2.0	2.0	3.0 (L)	—	??	
3	Little Suamico River	1.8	3.1	4.2 (L)	—	??	
4	Pensaukee River	2.0	2.0	2.0 (L)	0.6	??	
5	Oconto River	2.0	2.0	2.0 (L)	0.6	??	
6	Peshtigo River	1.0	3.0	3.0 (L)	0.8	73.5	
7	Menominee River	2.8	2.6	4.9 (L)	—	128	
8	Creek off Mud Lake (Door County 4-A)	2.9	3.0	5.6 (L)	—	16.0	
9	Creek off Clark Lake	300 (E)	300 (E)	8.1	1.4	17.8	off
10	Creek - just north of Jacksonport	4.5	3.3	7.1 (L)	—	43.3	
11	Creek off Kangaroo Lake	3.1	8.3	14.4 (L)	0.6	52.2	
12	Moonlight Bay	—	—	—	2.8	27.2	
13	Stoney Creek	3.3	—	—	0.9	35.5	
14	Ahnapee River	150 (E)	180 (E)	5.0	4.2	72.2	off
15	Kewaunee River	1.1	2.0	—	—	13.3	
16	East Twin River	1.3	2.6	—	0.3	50.0	
17	West Twin River	(off)	(off)	5.0	—	26.7	off
18	Manitowoc River	2.2	4.1	5.0 (L)	—	66.7	
19	Silver Creek	8.0	4.3	10.8	—	34.4	DDT Look on
20	Calvin Creek (corp sponing)	1.6	2.2	4.9 (L)	—	4.7	
21	Pine Creek (Dead Fawn Ave) (water off-shore)	280 (E)	250 (E)	14.0 (L)	—	—	off
22	Point Creek (Corp sponing)	2.8	2.2	3.1	1.0	—	

DSW 152607

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T.W.

Sample #	Location	PPt DDE	P.P.t DDD	P.P.t DDT	P.P.t Dieldrin	P.P.t Blk Lindane	
23	Fisher Creek	1.9	2.6	3.6 (L)	1.0	4.4	
24	Centerville Creek	4.0	4.7	9.4 (L)	—	174.0	
25	Seven Mile Creek	300 E	300 E	14.4	—	27.7	71
26	Pigeon River	1.9	3.4	3.5	—	7.5	
27	Sheboygan River (Dredging in progress)	44.4	96.6 (E)	38.0 (L)	1.3	20	Arochlor
28	Black Creek	15.5	43.2 (E)	38.7 (L)	—	18.4	Arochlor
29	Sauk Creek	6.3	10.2	19.6 (L)	—	19.5	
30	Kinnickinnic River	57.8 (E)	62.2 (E)	25.6 (L)	—	39.2	77
31	Menominee River	17.6 (L)	22.0	14.2 (L)	14.0	84.0	Arochlor
52	Boardman River ~~[illegible]~~ Traverse City Mich.	2.7	4.5	7.8 (L)	—	Interferr	
33	Root Creek	9.5	10.0	9.5 (L)	2.0	64.0	
34	Pike River	10.0 (E)	19.1 (E)	20.0 (L)	2.4	10.4	Arochlor
35	Barnes Creek	16.2 (E)	28.2 (E)	31.1 (E)	0.8	3.8	Arochlor
36	Grand Calumet River	145.0 (E)	286.0 (E)	256.0 (L)	5.8	30	Arochlor
37	Burns Ditch	2.8	5.6 (E)	8.3 (L)	1.3	17.9	
38	Trail Creek	24.4 (E)	37.4 (E)	41.8 L	5.0	470	Arochlor
39	Galien River	15.1 (E)	19.6 E	22.2 (L)	—	14.0	Arochlor
40	Drain, Sawyer	528 (E)	555 (E)	26.1 (L)	5.0	3.0	(77) on DDE, DDD
42	Paw Paw River	119.0 (E)	75.0 (E)	13.3 (L)	10.0	10.0	71
43	Black River	40.0 E	30.5 E ~~[illegible]~~	11.7 (L)	2.0	—	76
60	Bear River, Petoskey	1.8	2.2	3.0 (L)	—	Not Inj. ~~[illegible]~~	

DSW 152608

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Wet Bas

P.P.M

Sediment

		DDE	DDD	DDT (L)	Dieldrin
#1 East River - Green Bay	Sed.	0.018	0.048 (E)	0.041 (L)	<0.001
	I.P.	0.010	0.057 (E)	0.023 (L)	—
#2 Big Suamico River	Sed.	<0.001	<0.001	<0.001	<0.001
	I.P.	0.042	0.069 (E)	0.061 (L)	0.012

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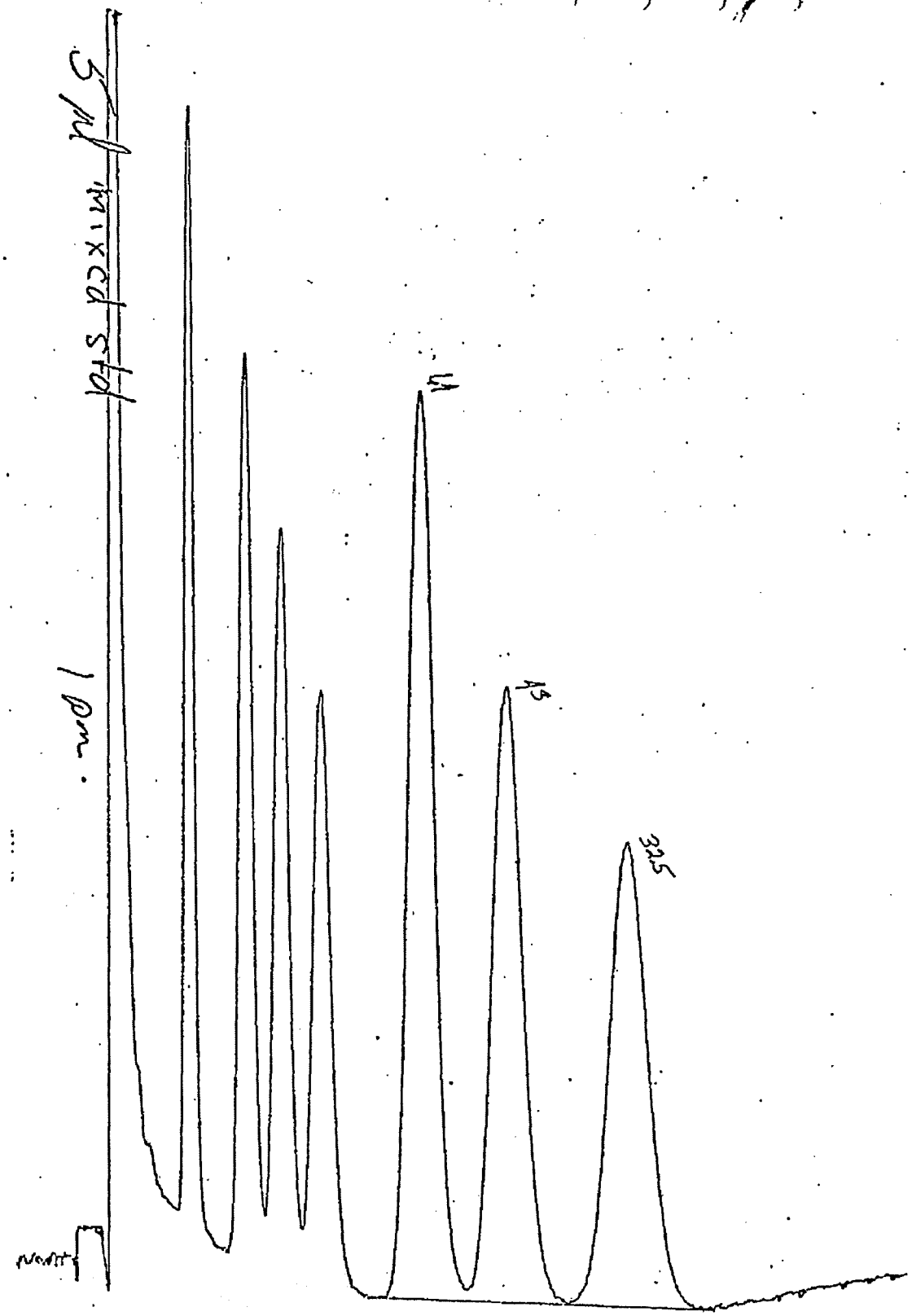

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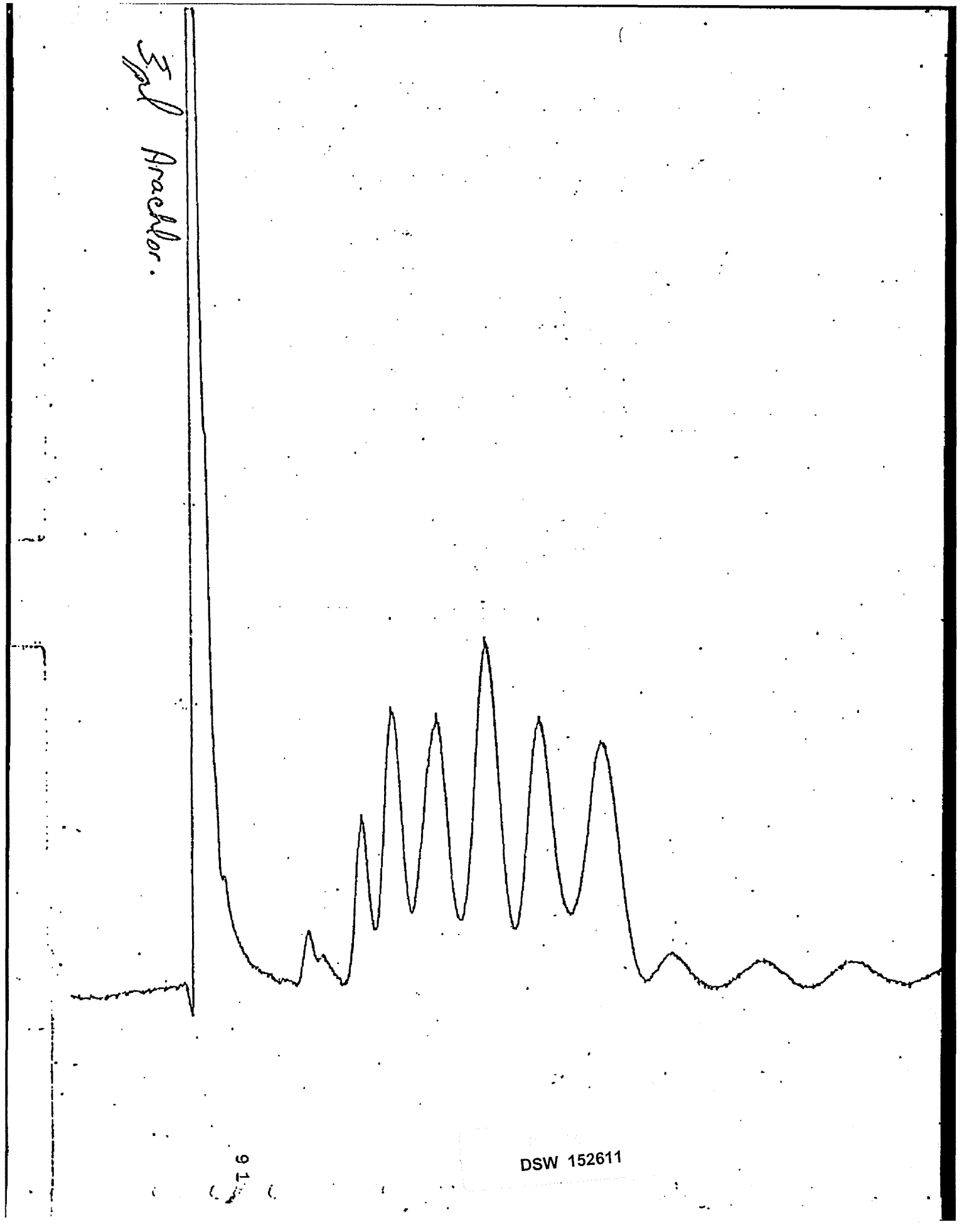
70


Earl Arachlor.
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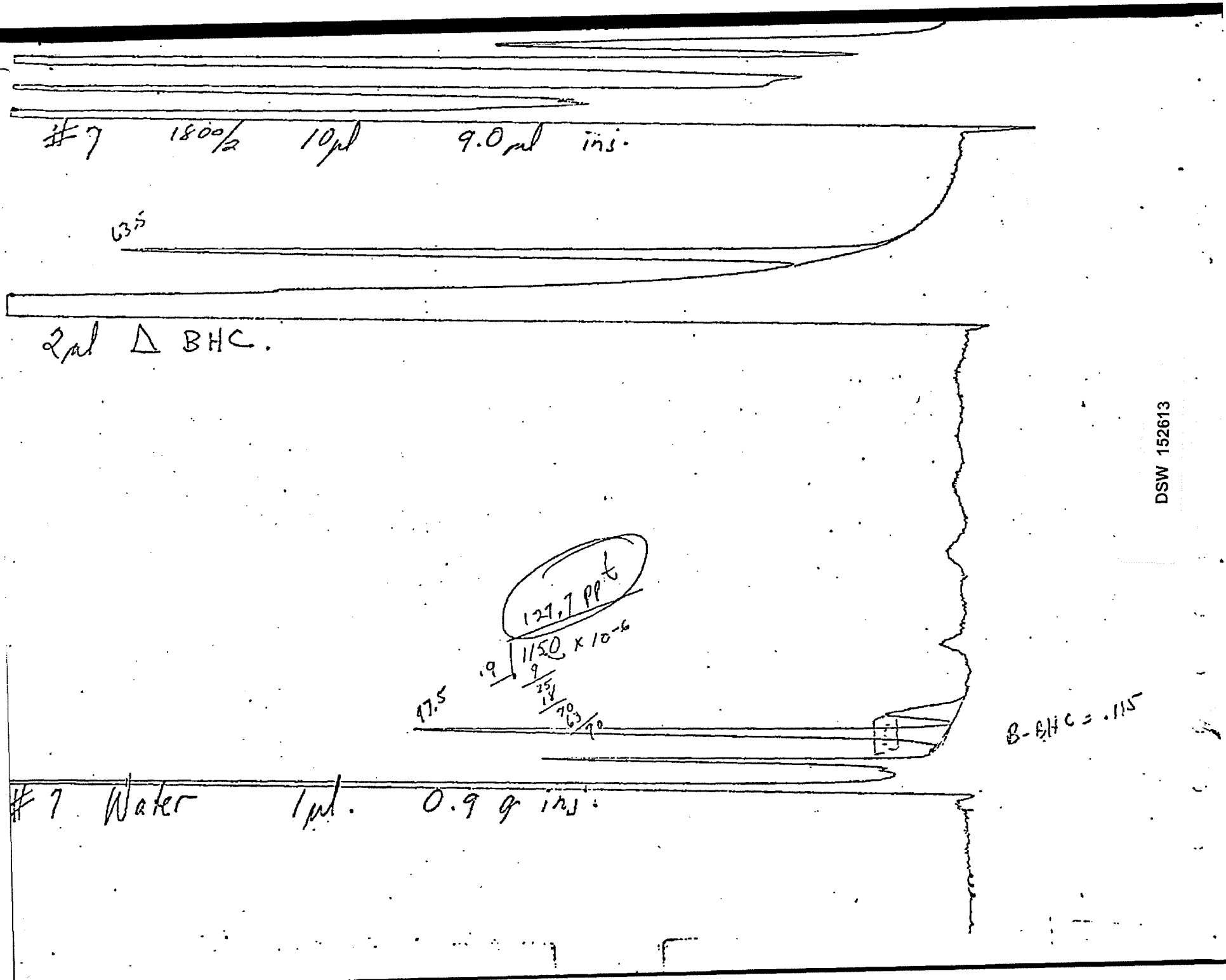

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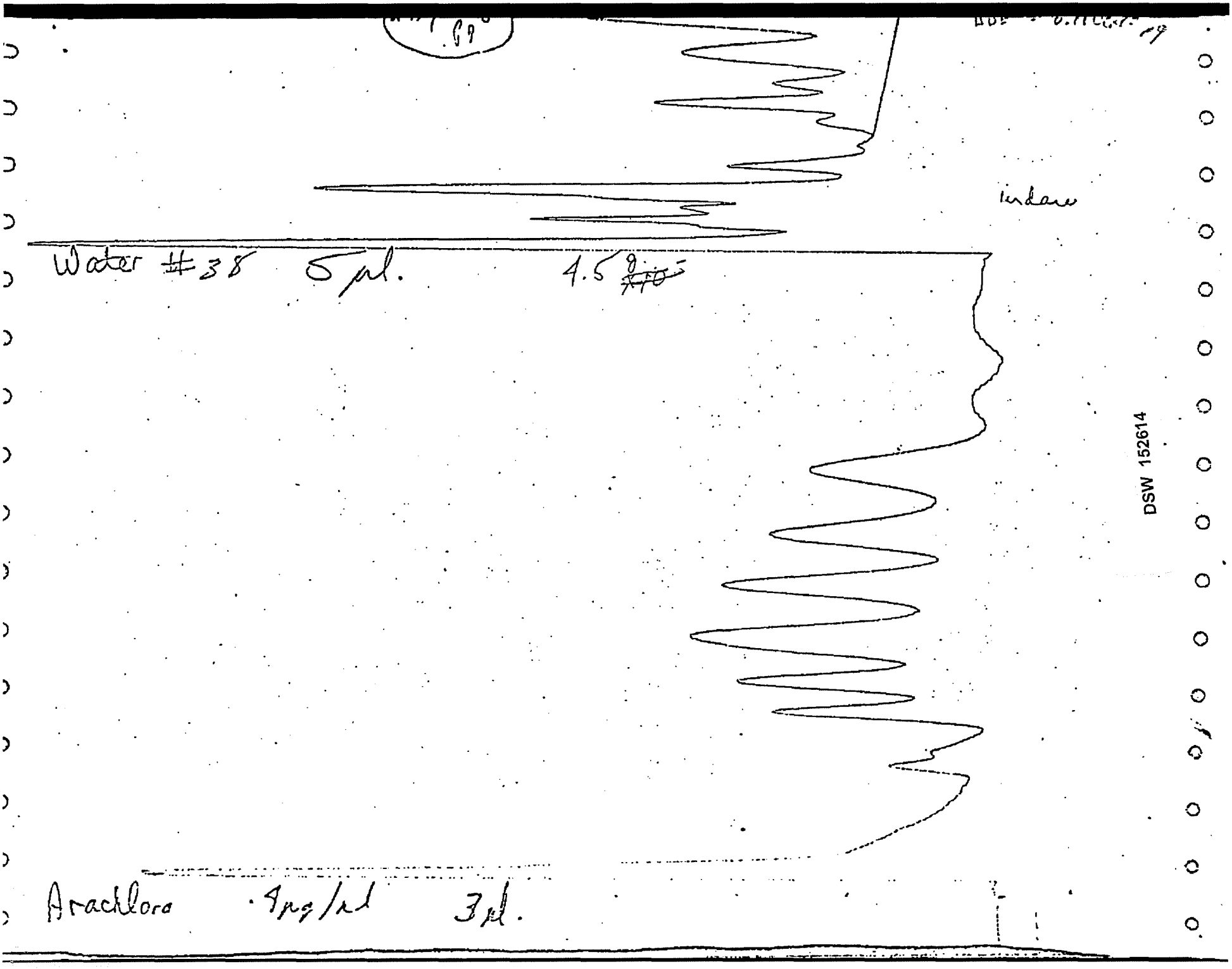

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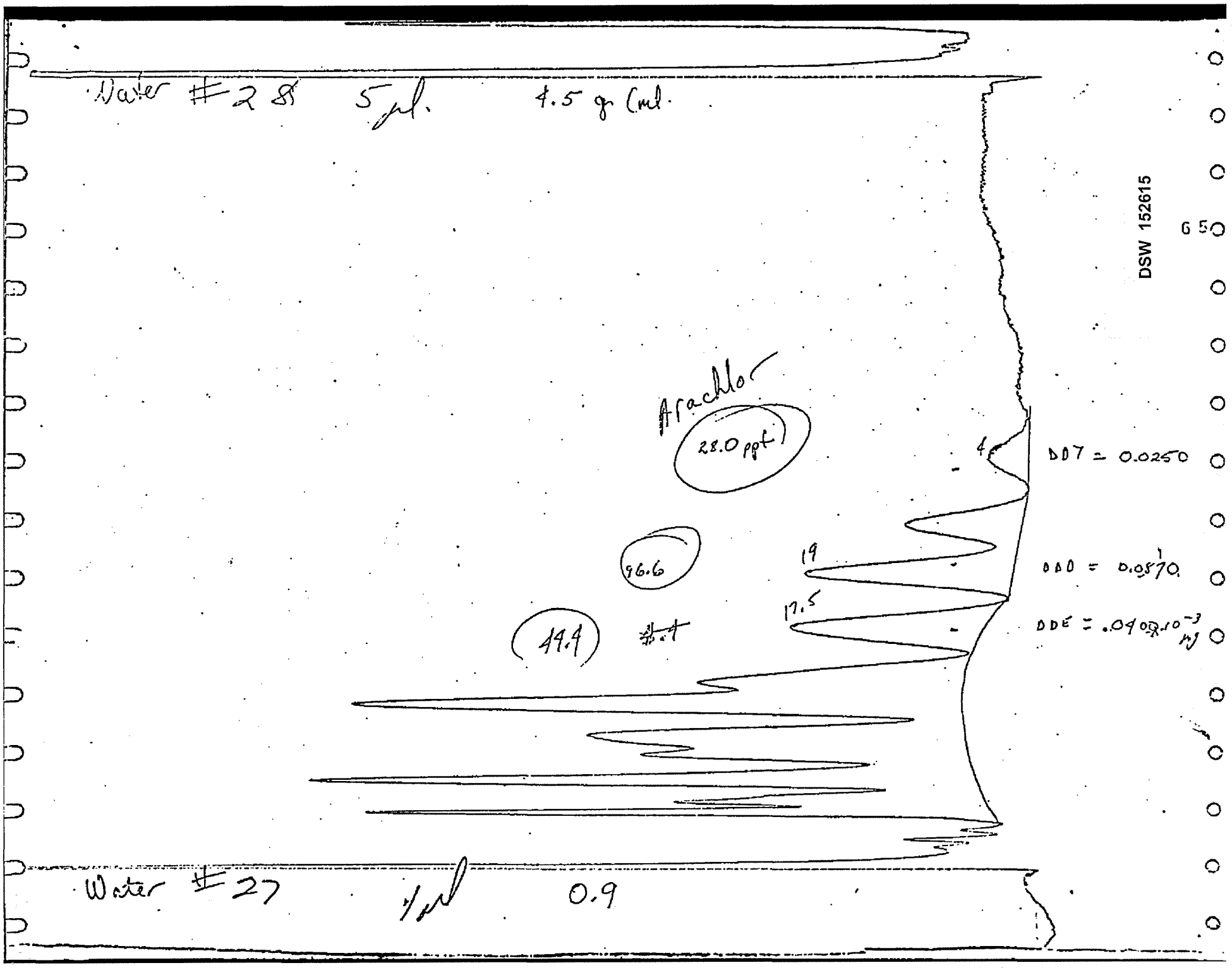

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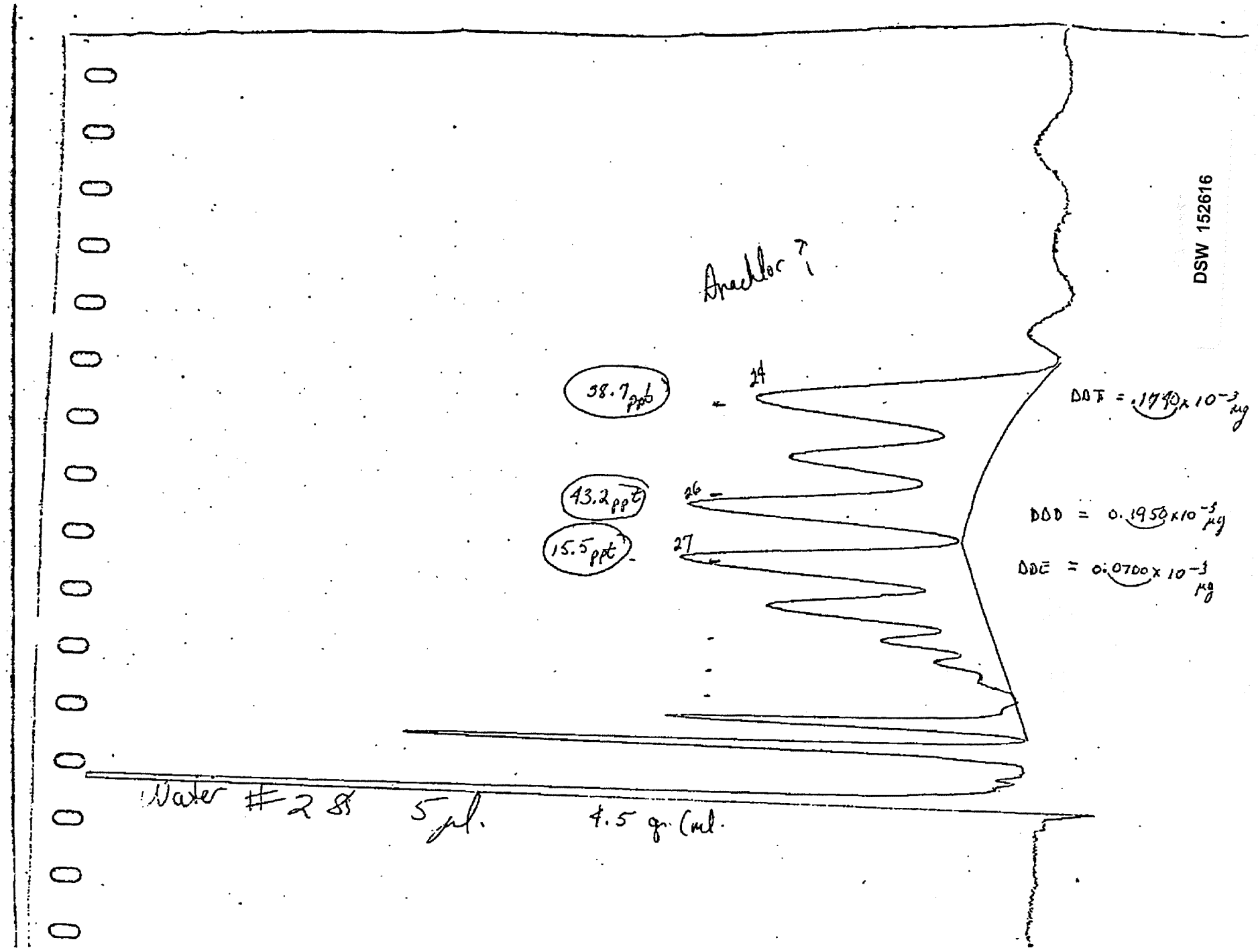
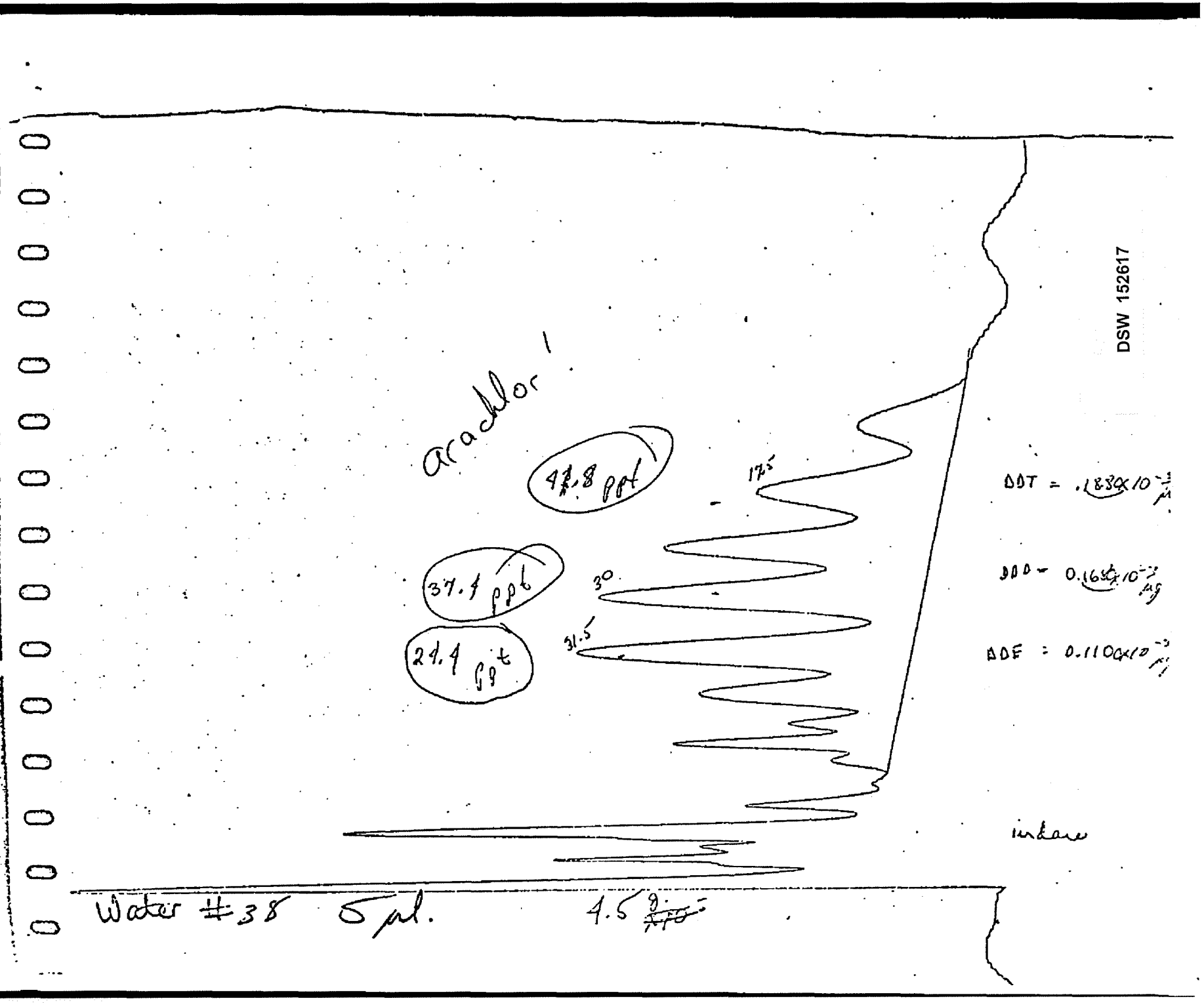

Aroclor ?
38.7 ppb
24
43.2 ppt
26
15.5 ppt
27
DDT = .1740 x 10^-3 µg
DDD = 0.1950 x 10^-3 µg
DDE = 0.0700 x 10^-3 µg
Water #28 5 µl. 4.5 g. (ml.

DSW 152616



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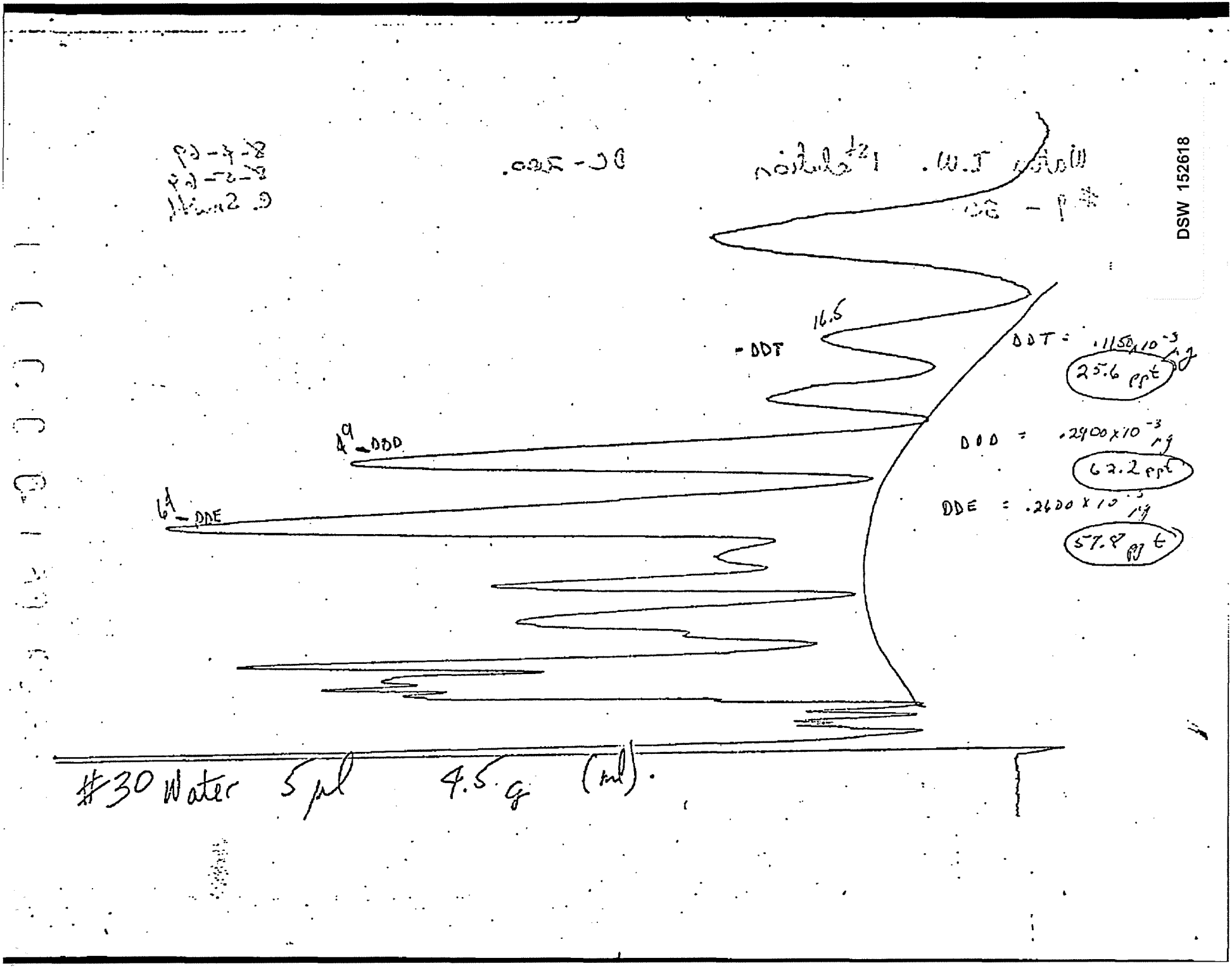

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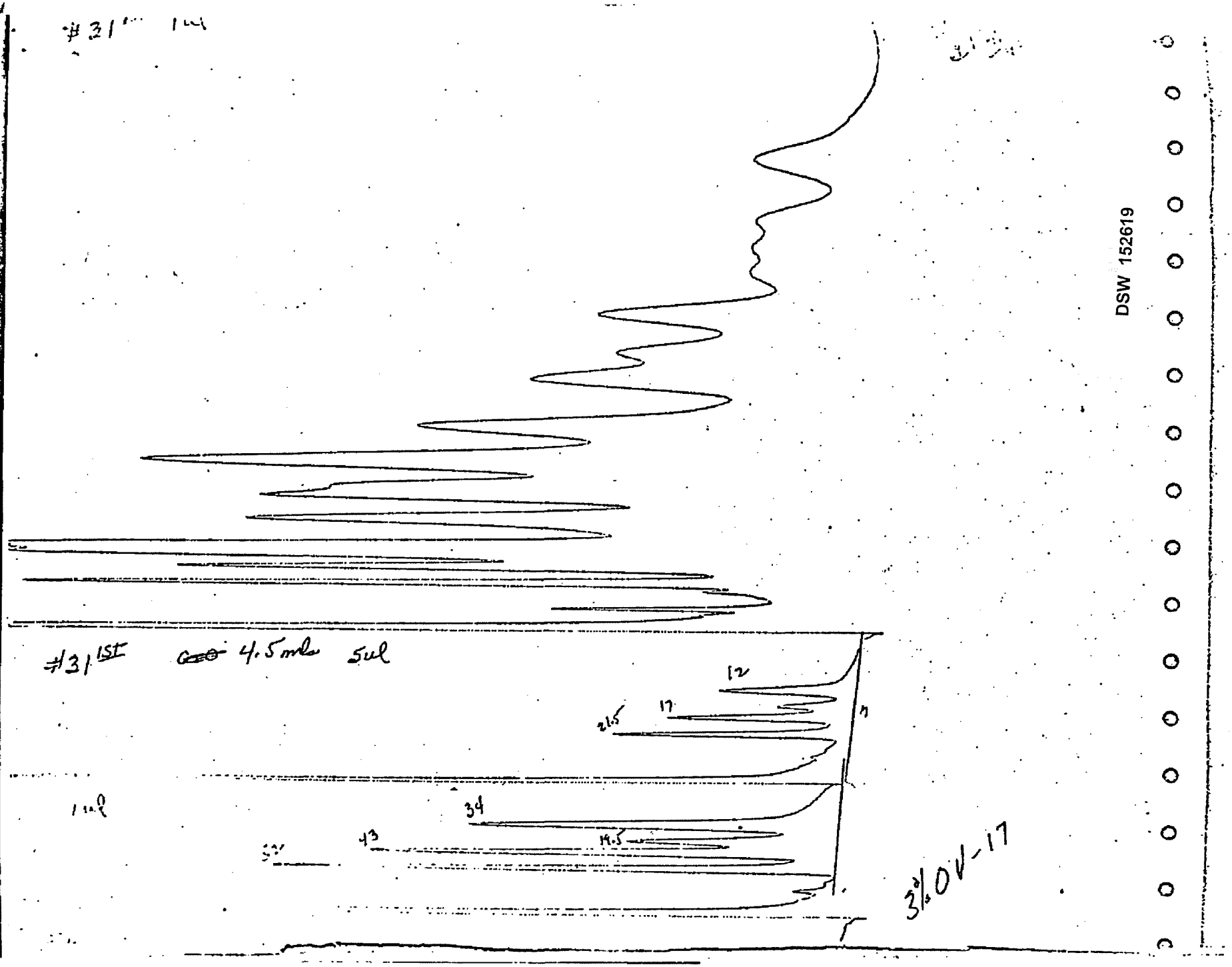

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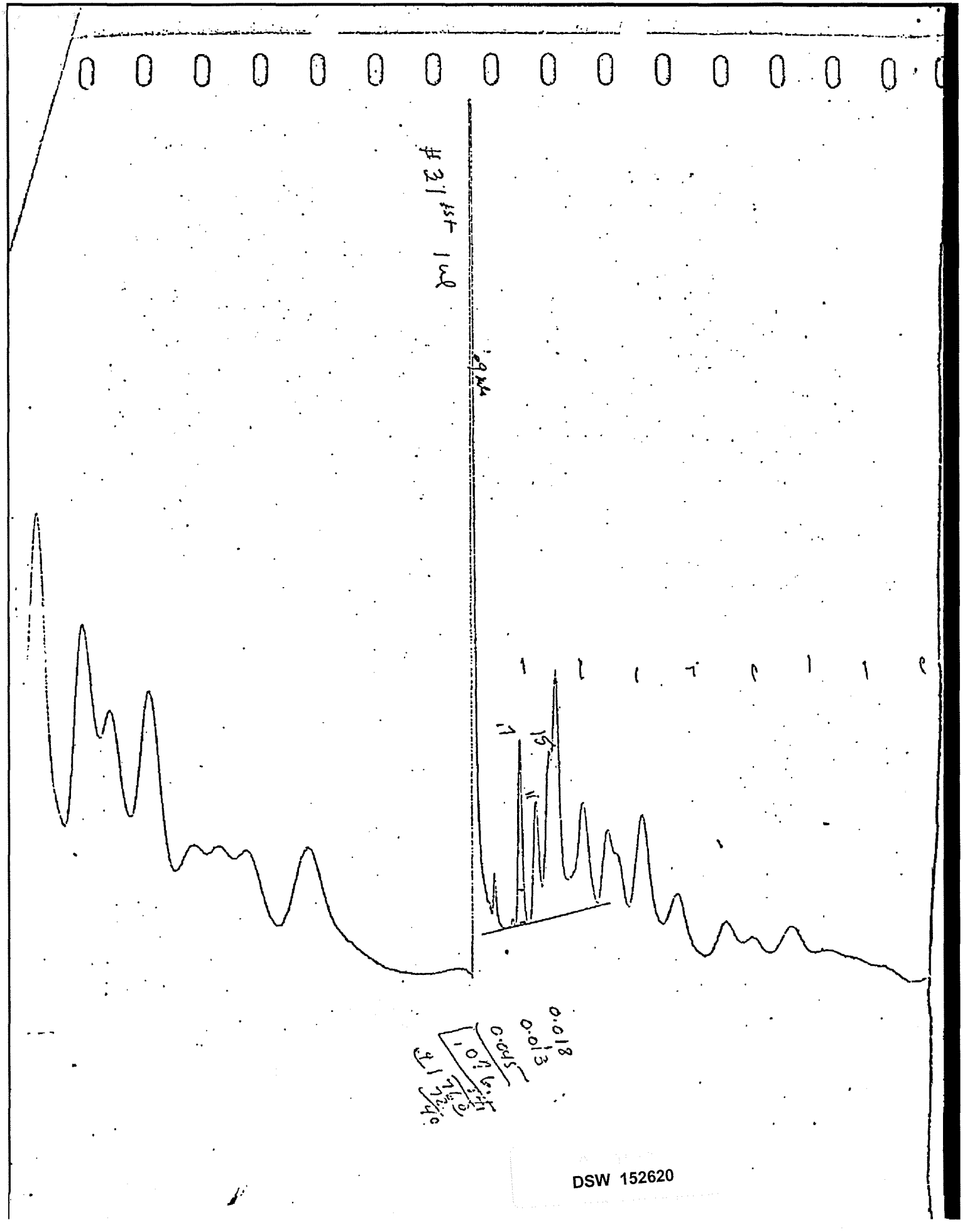
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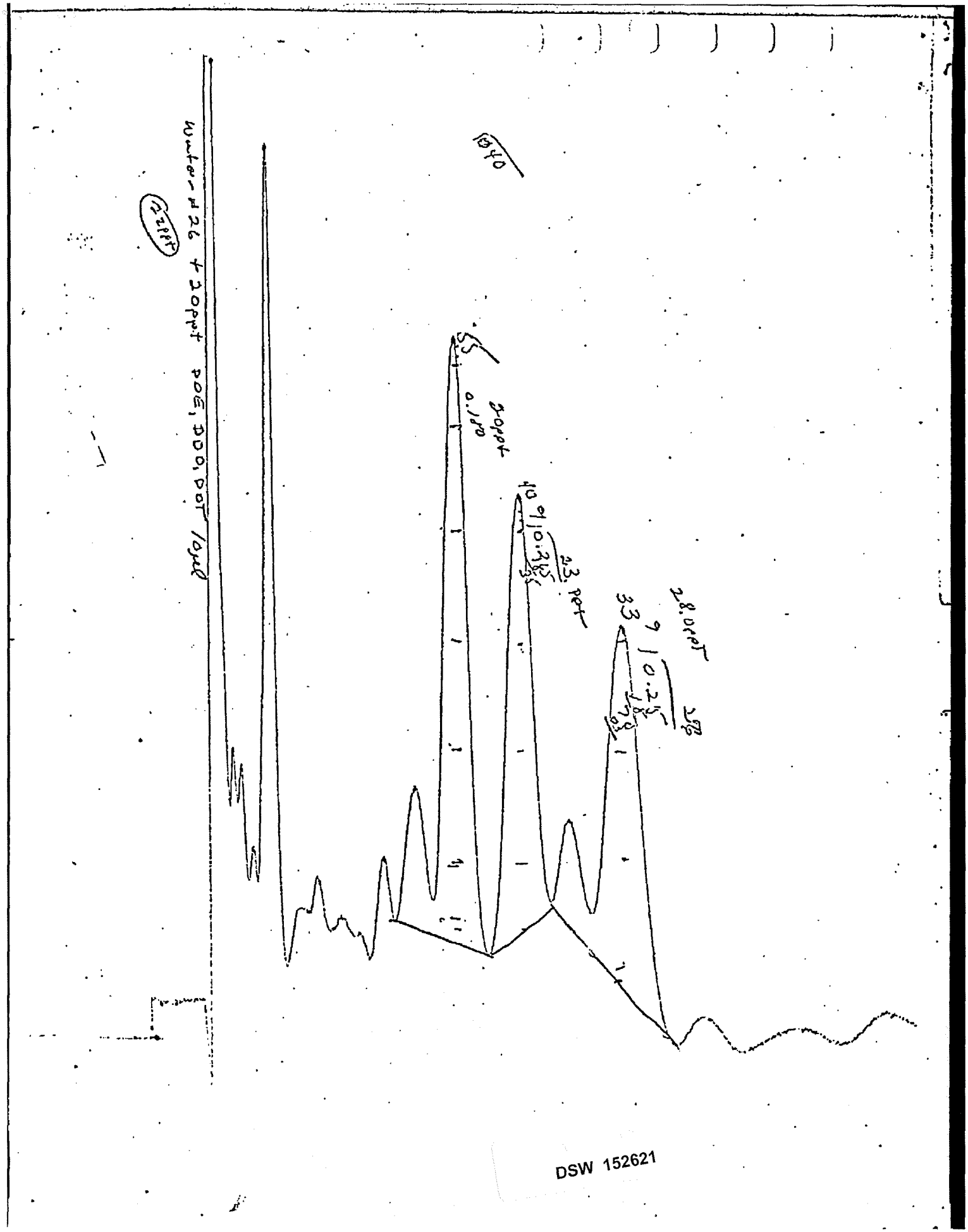
Water #26 + 20ppt DOE, DDD, DDT 10µl
22ppt
1040
20ppt
0.180
23 ppt
28.0ppt
33
9
10.215

DSW 152621