MCL. 143
959

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REPORT:-	No. 14.
DATE:-	11th May, 1970.

PROGRESS REPORT

TECHNICAL SERVICES DEPARTMENT
SQ 10077

Distribution:-

Newport
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F. MacDonald
A. F. Regan
A. C. Nethercott
Dr. H. R. Newman
H. Disley
J. D. Humphries
J. W. Pennington
P. J. Clelland
N. Bodger N.I.C. (2)

Ruabon
H. A. Vodden

Brussels
D. S. Cameron
N. H. Dahlström
E. V. Weekes

St. Louis
G.O.
W. Papageorge
E. Wheeler
R. Keller
D. Danna (3)
~~W. A. Kuhn~~
Jim Savage

File
Past
Arctic Pollution
- General

TITLE: Environmental Contamination by P.C.Bs.

PROBLEM: To report the minutes of a meeting held at Newport on 4th May, 1970.

AUTHOR: N. Bodger (A. C. Nethercott).

SUMMARY: This report is intended to summarise the discussion at the meeting held at Newport on 4th May to discuss environmental contamination by P.C.Bs. Its purpose being to supplement the summary of the presentation given at the meeting which is attached as an appendix to this report.

N. Bodger

N. Bodger
Technical Services Department

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DSW 347816

DETAILS

A meeting was held at Newport on 4th May,1970, to discuss environmental contamination by P.C.Bs. Present at the meeting were:-

W. Papageorge
E. Wheeler
R. Keller
D. S. Cameron
F. MacDonald
A. F. Regan
A. C. Nethercott
Dr. H. R. Newman
H. Disley
J. D. Humphries
P. J. Clelland
N. Bodger

Presentations were made by Messrs. MacDonald, Regan, Disley, Humphries and Clelland and a summary of these is appended to this report.

A general outline of the effluent situation into the Usk Estuary was presented in which it was pointed out that the rise and fall of the tide in this area was about 35 feet, among the highest in the world.

The plant history and present mode of operation was outlined, and the effluent streams indicated. The effluent streams include, spent Fullers earth, spent porocel, vapours from air blowing, effluent from still ejector, still bottoms, leaks and spills and the HC off gas line. At this point the question of the PCB content in the HC off gas line, and consequent PCB content of the muriatic acid, was raised. It was suggested that MCL check up on the uses of HCl Via Tankers and attempt to prevent its use in food processing industry, this to include any such hydrachloric acid used on site for Fumaric production which could eventually find its way into food applications. It was suggested that all HCL which could find its way into food processing was supplied from that produced via the Silicon Esters process on site. The PCB content of HCL at Annistan was 2-20 ppb and at WGK less than 5 ppb. There was some blending of HCL from other plant sources at WGK.

It was reported that MC plan to stop, in U.S.A., not only sales of muriatic acid to food processing industries, but also to withdraw from the market in Aroclors in all areas where food contamination is remotely possible, for example, the use of Aroclor as a heat transfer fluid for cooking food.

It was stated that all PCB containing waste from Newport is sent via Purle Waste Ltd., to a toxic dump at Pontypridd. Samples from streams in this area, taken by Monsanto Newport personnel, indicate a P.C.B. content of less than 4 p.p.b. This site is an approved dump for industrial waste only and it has been agreed that Monsanto sample the area for P.C.B. analysis at 6 month intervals.

Next discussed was PCB contamination in the liquid effluent from Newport. The site programme for controlling this via construction of interceptor pits, bund walls and waste bays was outlined (see appendix).

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Insufficient information, at present, precludes the possibility of setting a target level for PCB in the works effluent. It was suggested that, as an immediate aim, the target should be to have a PCB level no greater than that which matches the solubility of PCB in water i.e. 200 ppb. A tentative target of 10 ppb max. by end 1971 has been set for U.S.A. plants. Some analysis had been made at WGK for PCB content of the air surrounding the plant but actual lb/day discharges were not easy to determine. It was recommended that Newport try to determine vent losses, in particular these from ventilation systems.

It was stated that Monsanto have been approached for information on P.C.Bs. by Bristol University, who apparantly are to carry out a survey of P.C.Bs in fish in the Severn Estuary. They were refirred to Mr. A. Vodden for information.

The discussion then progressed to cover the disposal of waste Aroclor from customers, particularly the resale of paper off cuts by firms such as N.C.R. and Wiggins Tepe. No recommendations arose from this discussion.

Incineration of PCBs as a means of disposal, and details of trails performed on an existing Purle incinerator were discussed (see appendix). M.C. are considering incineration as a means of disposal of waste PCB and are performing trials in conjunction with the Zinc Corporation, and are at present taking back waste PCBs from customers for disposal at a charge of 3d. per ~~gallon~~ pound.

The problem of disposal of empty Aroclor drums (estimated use in Europe 5-6,000 per year) was discussed and it was suggested that a modified form of drum, with no lip around the outlet, be sought to permit more complete draining of Aroclor from drums. It was estimated that at present up to 1% of the Aroclor remains in the drum after emptying, although trials at Newport showed 0.5 lb when hot and 3 lb when cold.

Substitutes for Aroclor in the paint and paper industries were discussed. The possibility of construction of an HB40 plant in Europe, either at Newport or Antwerp were discussed, the HB40 produced to be supplied mainly to NCR for paper manufacture. It was pointed out that in USA MC. are developing a plant to produce M.I.P.B as a substitute for Aroclor and HB 40 in paper manufacture. It is possible that this product will be required by NCR in preference to HB 40 and may thus have some bearing in any HB40 project. Although this does not seem very likely in Europe.

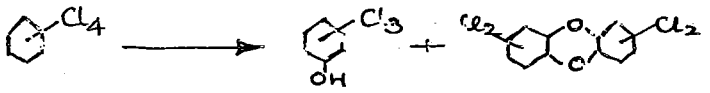
Other points covered were the uses of Aroclor in jet engine oils made by Castrol (about 30 tons/year) and the possibility of contamination from this source; and the use of Aroclor containing paints for painting the interior of silos and water tanks. The latter have led to the discovery of PCBs. mainly of the 1254 grade in cows milk.

The question of how to handle any fears which may arise among plant operators in the advent of any publicity on toxicity of PCB was raised. It was pointed out that there have been cases of chloro acne and slight liver damage among Aroclor workers who have inhaled large quantities of PCB fumes. However such cases are very rare, especially when viewed against the large numbers of people who have worked with Aroclors for many years without any adverse effects.

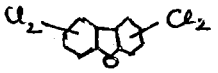
DSW 347818

Information on follow up with customers to control PCB emissions and on results of effluent sampling schemes at Newport are presented in the appended summary of the presentation.

Animal toxicity studies currently being carried out in USA with PCBs. indicate that the higher Aroclors 1254 to 1260 are more toxic than 1242 to dogs and rats. These results, however, are contradicted by tests on chickens in which 1242 would seem to be the more toxic. Nevertheless all these experiments indicate that PCB is far less toxic than D.D.T. Studies on hydrolysis of Chloro benzenes indicate the possibility of the formation of tetrachlorodibenzyldioxide which is highly toxic with a lethal dose of only 0.6 mg/kg.



It is possible that, under the right conditions, the hydrolysis of Aroclors could lead to the formation of a similar mono oxide compound which would also be quite highly toxic.



Toxicity studies on HB40 indicate a far more promising situation, the lethal dose for rats being in excess of 30,000 mg/kg.

NB/CL
11th May, 1970.

DSW 347819

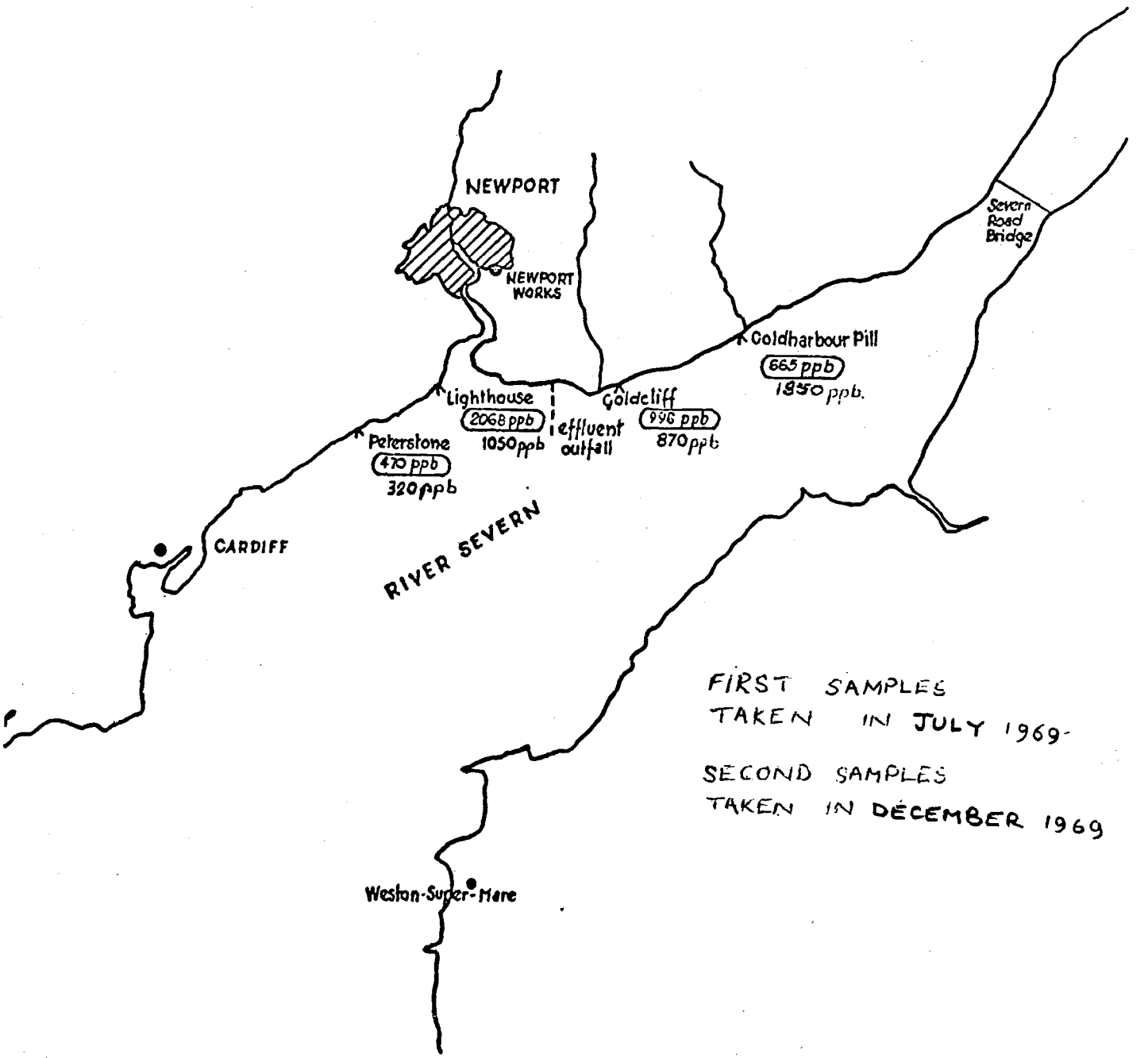
A P P E N D I X

SUMMARY OF PRESENTATION GIVEN AT MEETING.

DSW 347820

SEVERN ESTUARY SHOWING P.C.B

CONCENTRATIONS AT FOUR LOCATIONS



FIRST SAMPLES TAKEN IN JULY 1969.

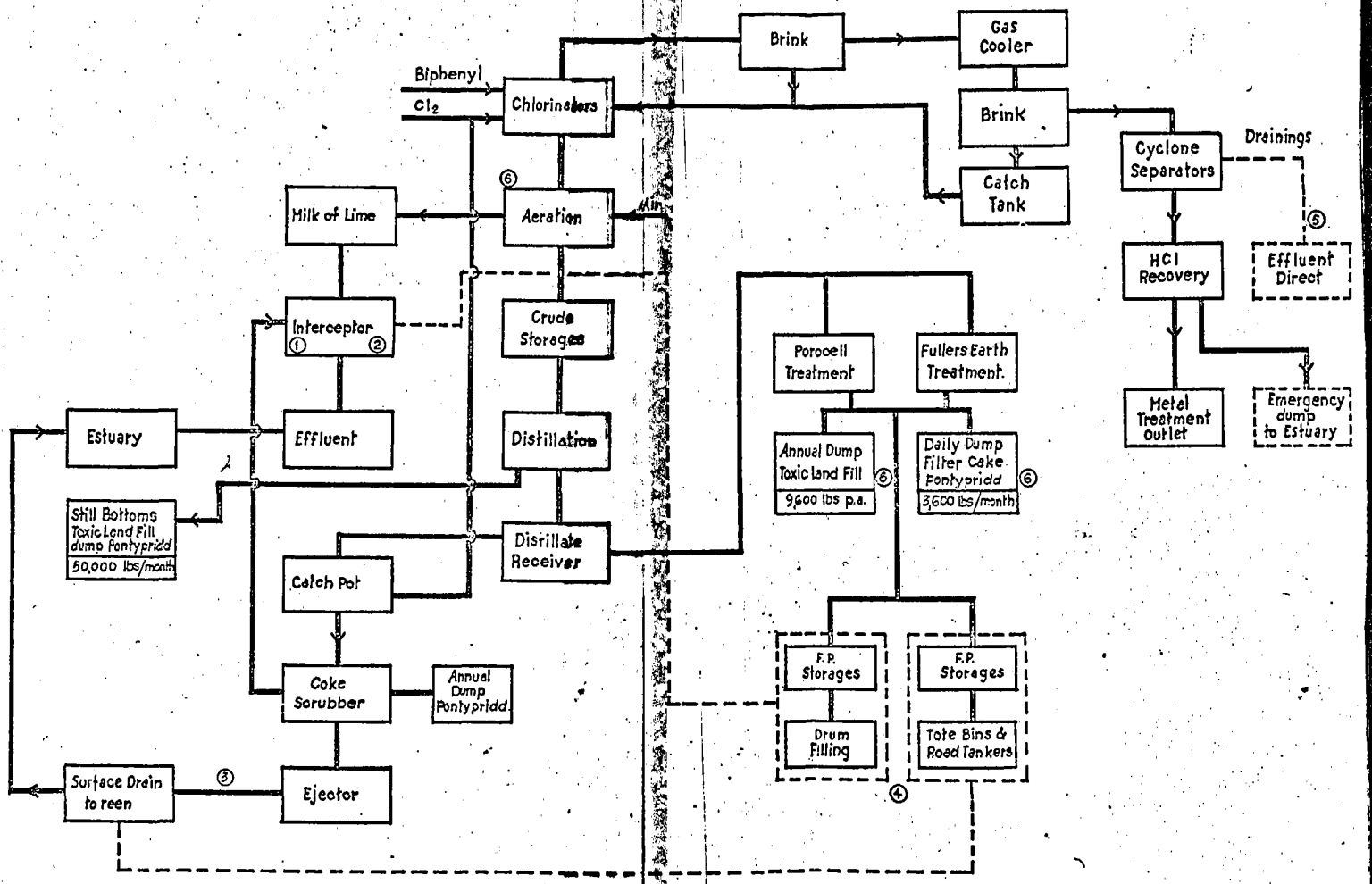
SECOND SAMPLES TAKEN IN DECEMBER 1969

DSW 347821

STLCOPCB4085133

FIG 1

AROCLORS OPERATIONS NEWPORT



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DSW 347822

STLCOPCB4085134

P.C.B. Samples ex. Plant - Newport

Date	Interceptor Pit p.p.b.	Milk of Lime Tank p.p.b.	Ejector Stream p.p.b.	Hydrochloric Acid p.p.b.
Dec. 10	3,250	750	22	None
17	13,250	1,720	53	Detected
23	Paraffinic	1,185	56	
30	13,100	785	150	
Jan. 5	- -	Hi Boilers	32	
13	7,170	33,520	3,790	
20	203,200	15,750	6,600	
27	20,720	11,750	260	
Feb. 3	7,730	55,830	22,240	
10	2,850	8,550	90	
17				
24				
Mar. 3				
10				
17				
24				
Apr. 1	190,000	57,000	1,500	
7	48,000	37,500	6,200	
14	9,000	7,000	375	
21	4,600		250	

DSW 347823

STLCOPCB4085135

P.C.B. IN NEWPORT EFFLUENT

ATE	P.C.B. CONTENT P.P.B.
Dec. 10	20
11	4
12	17
15	36
16	320
17	27
18	68
19	4
22	130
23	37
24	238
29	14
30	28
31	55
Jan. 1	510
2	600
5	1,500
6	1,400
7	1,400
8	3,250
9	1,430
12	5,560
13	7,030
14	2,950
15	1,940
16	3,200

DATE	P.P.B.	COMPOSITE SAMPLE
Jan. 19	3,330	
20	1,770	
21	4,030	
22	930	
23	2,000	23) 580
26	520	25)
27	070	25) 180
28	525	28)
29	830	28) 270
30	360	30)
Feb. 2	750	30) 310
3	800	4)
4	1,270	4)
5	820	5) 6,610
6	225	6)
9	520	8) 520
10	490	9)
11	835	10)
12		11)
13	120	12)
16		13)
17		16)
18		15)
19		17)
20		18)
23	1,550	22)
		22)
		24)

DATE	P.P.B.
Feb. 25 TO Mar. 25	28 samples to be analysed
Mar. 26	580
Apr. 1	6,250
2	12,500
3	8,500
5	120
8	310
10	450
12	155
14	125
17	1,860
19	
22	

Total Newport effluent is approximately 1 million imp. gallons per day.

∴ 100 ppb = 360 lbs. p.a. of P.C.B.

The break in the figures after January 2nd is caused by the rerouting of surface water drainings into the works effluent. Previously this surface water had been draining into a reen and samples taken around the reen had P.C.B. contents of 9,750 p.p.b. 10,000 p.p.b., and 6,000 p.p.b.

Figures quoted prior to March the 26th are based on analysis results from Ruabon. All subsequent figures are based on analysis at Newport using new equipment which has just been installed for this purpose.

DSW 347824

Control of P.C.B. Emissions at Newport

Completed

1. Building of bund walls around Aroclor F.P. storages.

2. New interceptor pit in effluent from storage and loading area.

3. New interceptor in surface water drain.

4. Concreted area for storage/cleaning of Aroclor totebins and tankers.

5. Divert water from Aroclor ejector to effluent from surface water collection.

6. Modify existing Aroclor building interceptor to retain heavy materials.

7. New rubbish bay to segregate all P.C.B. containing wastes, this bay being connected to the interceptor in 2, above.

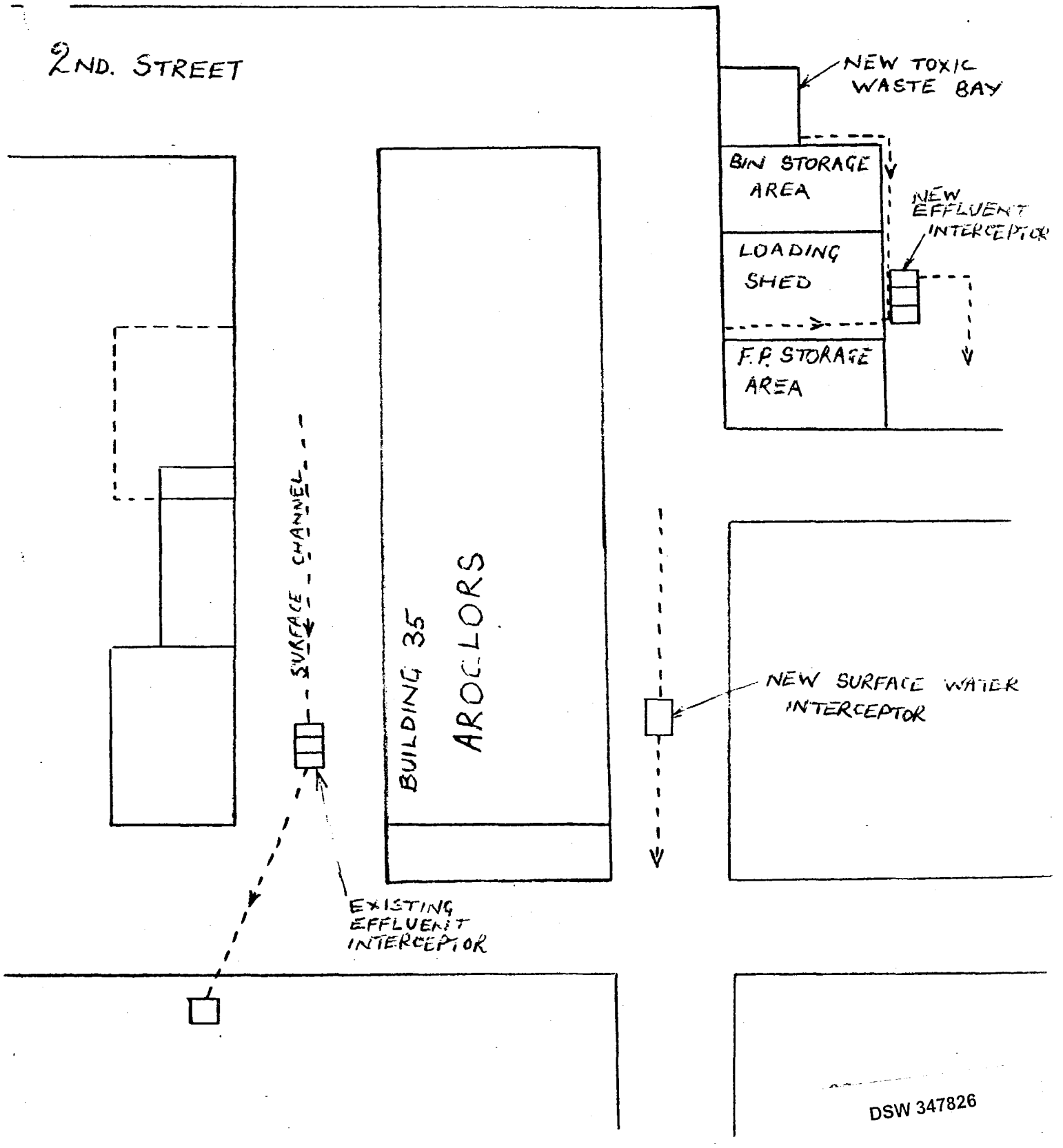
Planned

1. Install capacitance type level alarms in all three interceptors.

NOTE: The interceptor pits are to be sucked out into a Purle waste tanker and the material taken to the Pontypridd toxic dump for disposal.

DSW 347825

AROCLORS EFFLUENT COLLECTION SYSTEM



DSW 347826

Purle Incinerator

Incineration temperature 1300°C.

Residence time 3 secs (approx).

Capacity 500 lbs/hr (on test run).

Will accept only liquids or suspended solids.

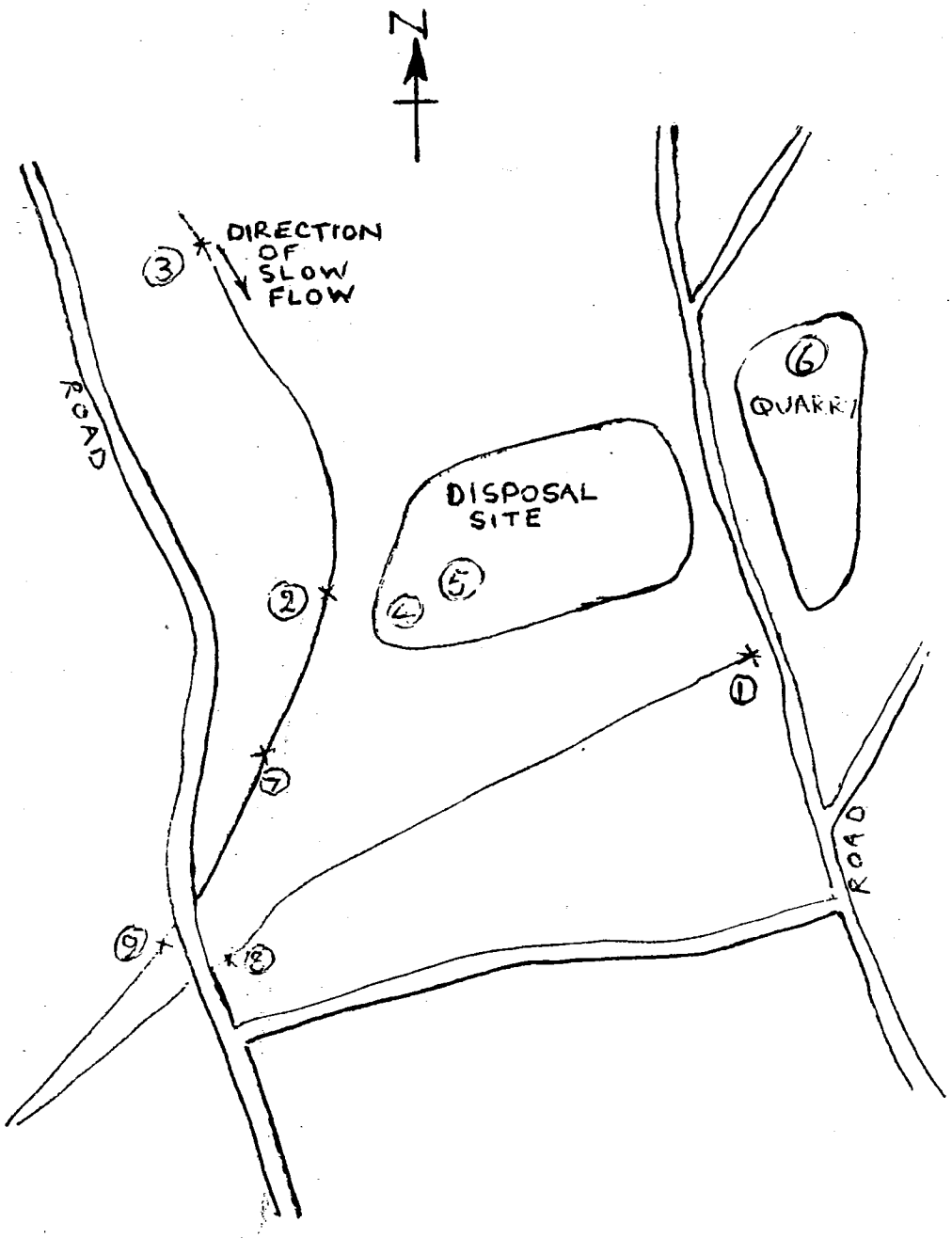
Effluents from Incinerator

Aqueous scrubber liquor.

Stack gas.

DSW 347827

PONTYPRIDD DUMP SITE



SAMPLES TAKEN FROM ALL NINE POINTS SHOWN HAD P.C.B. CONTENTS IN THE RANGE 325 – 5 p.p.b.

DSW 347828

STLCOPCB4085140

Customer Visits Programme

Customer	Date Visited	Personnel
N.C.R.	8.1.1970	J.D.H./A.D.
Wiggins Teape Ltd. Nivelles, Treforest.	 3.2.1970. 2.2.1970.	 T.B./D.S.C. J.D.H./T.B.
Hunts	6.3.1970.	J.D.H./D.S.C.
Dubilier	6.3.1970.	J.D.H./D.S.C.
Erie	6.4.1970.	P.J.C./D.S.C./J.M.T.
B.I.C.C.C.	6.4.1970.	P.J.C./D.S.C./J.M.T.
T.M.C.	8.4.1970.	P.J.C./D.S.C./J.M.T.
R.I.C.	10.4.1970.	P.J.C./D.S.C./J.M.T.

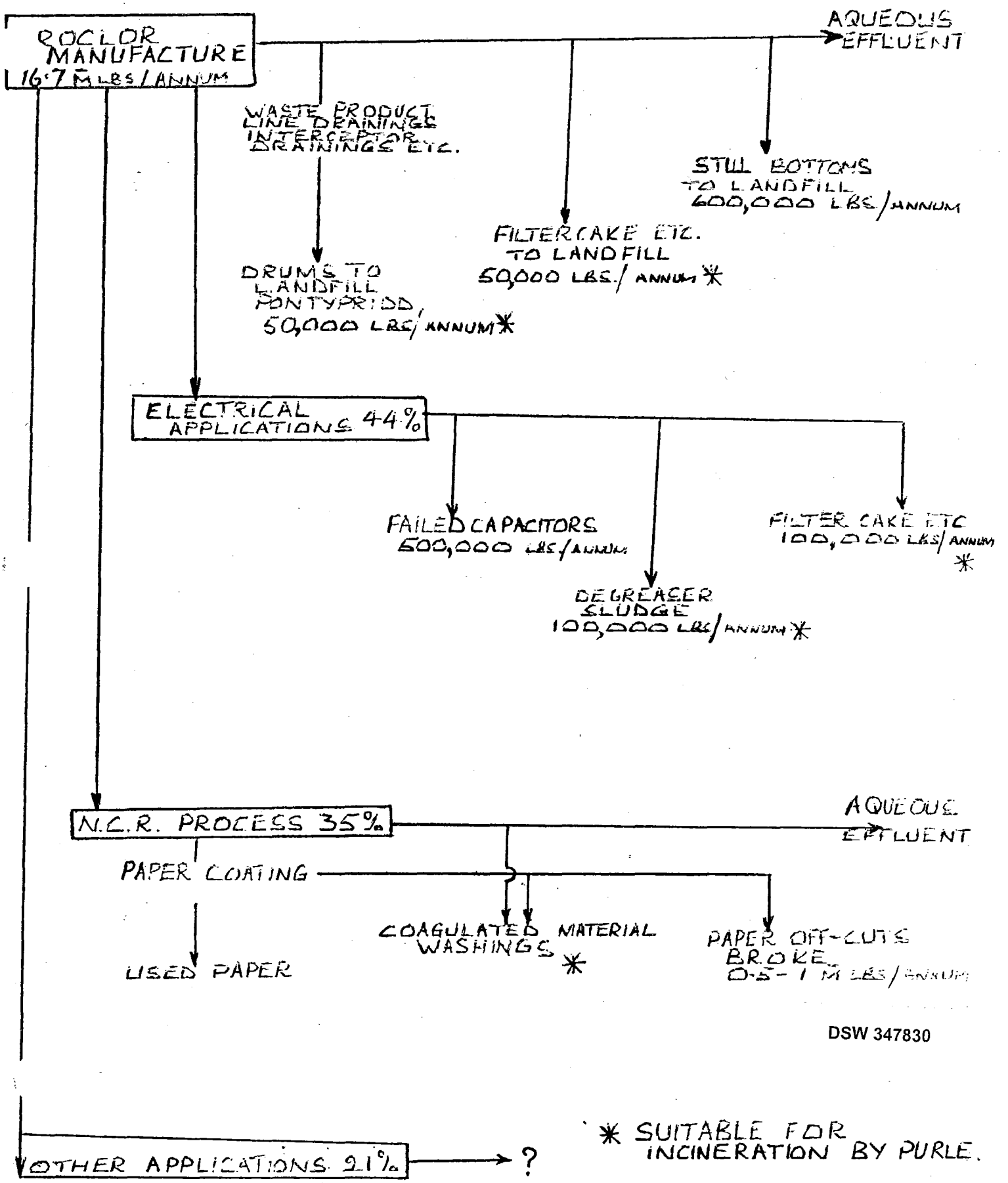
Customers to be Visited

Walkers)
Plymouth Capacitors) - Visits to be arranged by Marketing.

DSW 347829

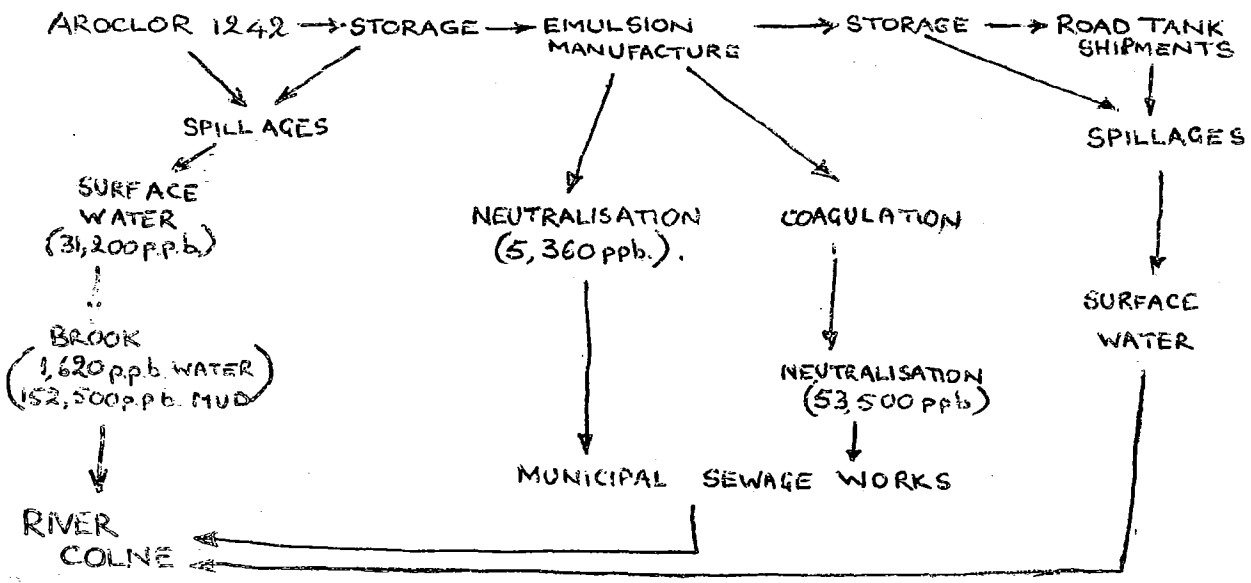
STLCOPCB4085141

P.C.B. CONTAINING WASTES



STLCOPCB4085142

N.C.R. BOREHAM WOOD



RECOMMENDATIONS

1. Provide full off-loading instructions for tanker driver and N.C.R.
2. Fit interceptor pit in surface water system.
3. Improve level indicator on storages.
4. Give all N.C.R. effluent coagulation treatment.

DSW 347831

STLCOPCB4085143

N.C.R. BOREHAM WOOD

1.	Centrifuge effluent Neutralisation tank	53,500 p.p.b.	P.C.B.
2.	Main neutralisation tank.	5,360 p.p.b.	P.C.B.
3.	Stream to which surface water discharges	1,620 p.p.b.	P.C.B.
4.	As 3, with mud from bed of stream	152,500 p.p.b.	P.C.B.
5.	Surface water drain	31,200 p.p.b.	P.C.B.

Wiggins - Teape

Treforest 2nd Feb.

Plant Effluent 150 p.p.b. PCB

Nivelles Belgium 3rd Feb.

River La Thines as it enters W-T property	34 p.p.b.	P.C.B.
Mill effluent before separator plant	98 p.p.b.	P.C.B.
Liquid entering settling lake after separator plant	219 p.p.b.	P.C.B.
Steam Drainage from solids dump	26 p.p.b.	P.C.B.
Mud from effluent settling lake	N I L	
Liquid from River La Thines as it leaves W-T property	N I L	

DSW 347832

WIGGINS - TEAPE LTD

Use NCR product at

1. Treforest
2. Nivelles.

Waste Aroclor contained in:-

(a) Plant effluent as a result of washing down machines, storage tanks etc., and surface drainage.

(b) Paper off-cuts.

Disposal Methods

1. Treforest:
   (a) Plant effluent - via Treforest industrial estate trunk sewer to Bristol channel.
   (b) Off-cuts - mainly to "Birmingham Waste Ltd."

2. Nivelles:
   (a) Plant effluent - River La Thines and eventually North Sea.
   (b) Off-cuts - via an agent for repulping in Germany.

DSW 347833