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D-12232/ 2,4-D

R & D REPORT

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TITLE: A STUDY OF THE FORMATION AND REMOVAL OF IMPURITIES IN THE PROCESS FOR 2,4-D

57 PAGES IN FULL REPORT

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This report is: [X] INTERIM [ ] FINAL and mainly: [X] NEW [ ] REVIEW

CRI NUMBER

DESCRIPTIVE SUMMARY WITH CONCLUSIONS: (Include in this space references to data books, and to earlier related reports, patents and publications.)

Shortly after the startup of the 2,4-D process ~~in 948~~ Building, a new and unexpected class of nonacidic impurities were isolated in which two of the major components were tetrachloroxanthone and octachlorospirobixanthene. These impurities were causing problems in the subsequent formulation of 2,4-D as amine salts.

A project was started to learn the source of these impurities and methods for controlling them. It was found that the impurities are formed mainly in the 2,4-D reaction step by several different routes

A number of techniques were evaluated for removing the impurities

None of the treatments were totally successful.

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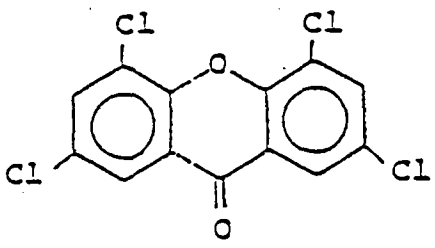
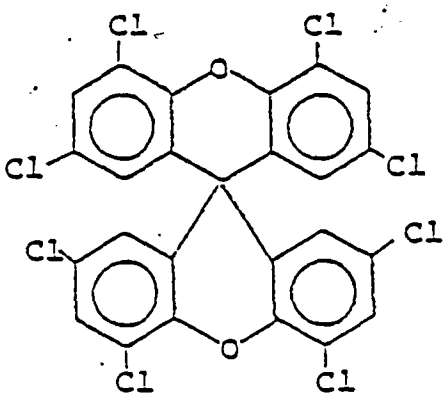
INTRODUCTION

A process for preparing high purity 2,4-D was started in May 1977 at 948 Building. The high purity molten acid is transferred by pipeline from 948 Building to 489 Building where it is formulated into esters and water soluble amine salts. Starting in late October 1977, precipitates were observed regularly in diluted amines formulations that were found to be made up of a number of impurities associated with the process but that were never detected during laboratory or pilot plant development work. In addition, these impurities were not found in the old 489 Building 2,4-D process. R. McLachlan[1] analyzed the precipitates and found 1,3,6,8-tetrachloroxanthone (I: TCX), 1,1'3,3'6,6'8,8'-octachloro-9,9'-spirobixanthene (II: OCSX), and marginally soluble salts of 2,4-D.



(I)



(II)

A screening program in the plant showed TCX at levels of 200-500 ppm in the crude reaction mass, the recycle solution, and in the final product. Levels of 1000-2000 ppm were found in the solvent and as much as 10% in the still tars.

McLachlan[1] analyzed a sample of still tars and his results are summarized in Table 1.

Table 1: An Analysis of One Tar Sample

Structure	Approximate Percentage	Comment
	60%	Main Component
	25%	From a heat exchanger leak (Dowtherm J)
DCP	0.5%	raw material
2,4-D	0.01%	Product
TCX (I)	1.5%	
OCSX (II)	1.1%	
Dichlorophenyl-dichlorovinyl ether	1.2%	Rxn product
Dichlorophenyl-trichlorovinyl ether	0.8%	

Plus:

at least eleven other minor components structurally similar to the above. See Ref. 1 for details.

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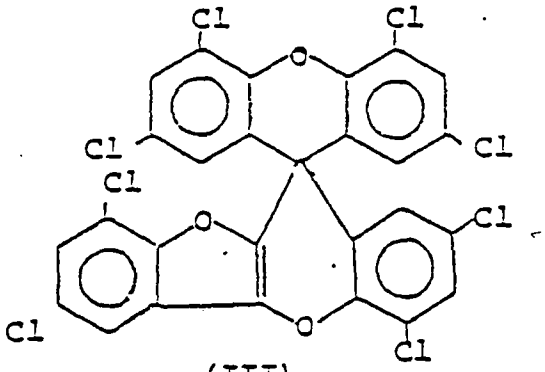
A project was started to study the formation of TCX and OCSX in some detail to learn more about their formation and fate in the process because it is not obvious how they are made. Several months after starting this study, another significant impurity was found in the product and, to a lesser extent, in the tars. It was identified as (III: "8-5") 2,2',4,4',5',7,7',9-octachlorospiro-(benzofuro(3,2-b)-benzopyran-11,9'-xanthene).

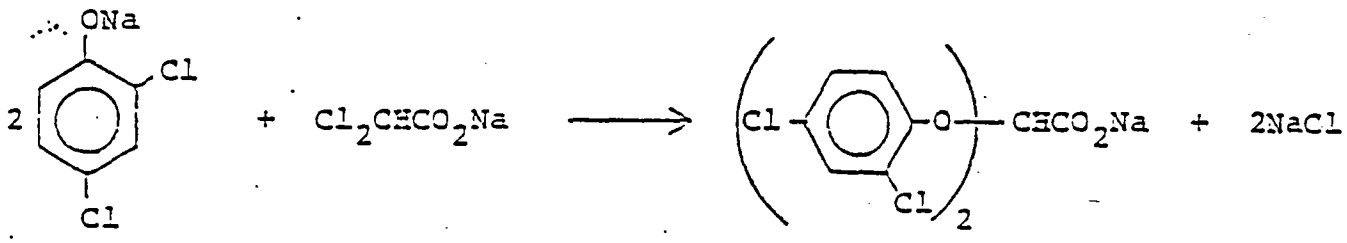


(III)

Important Side Reactions

$$ClCH_2CO_2Na + NaOH \longrightarrow HOCH_2CO_2Na + NaCl$$

Glycolic Acid



"Bis 2,4-D"

The reaction is performed in two stages by first reacting 2.2 moles of DCP with 1.2 moles of caustic (added as 50% NaOH) to form a solution of NaDCP in DCP.

High purity 2,4-dichlorophenol (2,4-DCP) made by the chlorination of phenol with sulfuryl chloride in the presence of $FeCl_3$/Diphenyl sulfide catalyst is used with chloroacetic acid (MCAA) made by the oxidation of vinylidine chloride to make 2,4-D as shown above. The typical raw materials analyses for each is shown in Table 2.

Table 2: Typical Raw Material Analyses for the 2,4-D Process

	DCP		MCAA
2,4-DCP	98.5%	MCAA	99.0%
2,6-DCP	~0.8%	Dichloroacetic acid	0.3%
Other Chloro-phenols	~0.5%	Chloromaleic acid	~0.05%
		H_2O	<1.0%

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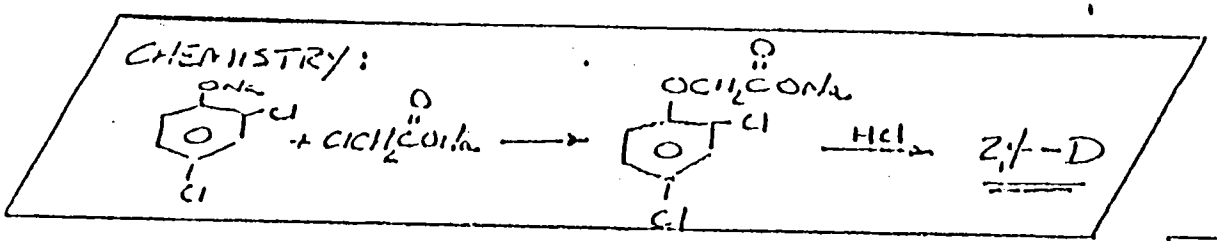
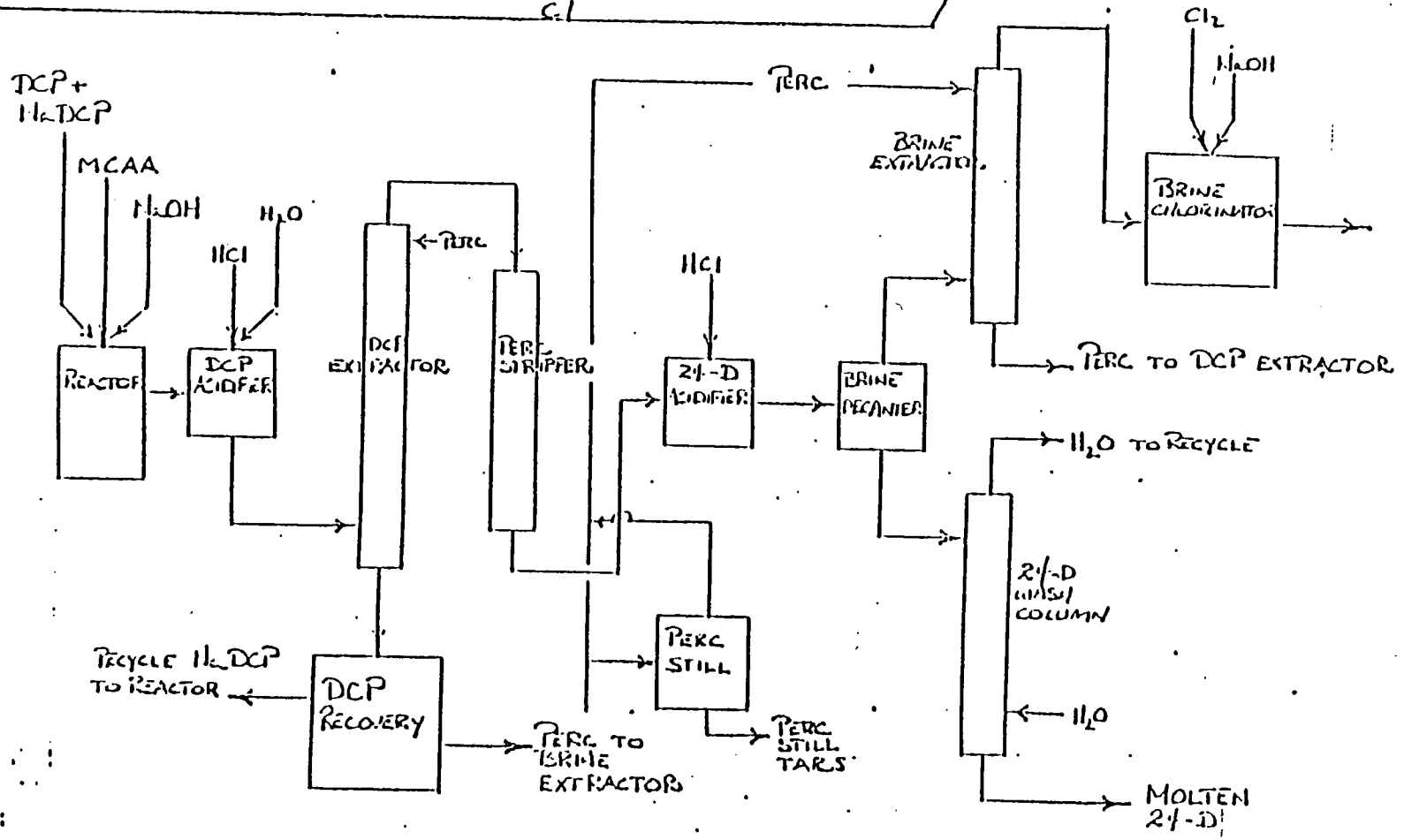
A rapid initial screening of the toxicity of purified TCX and tars gave the following results.

	Oral LD_{50} (single dose)	Skin/Eye
Tar (contains 3-5% TCX + OCSX)	>5g/Kg	slight transient initiation. Chloracne response after 10 applications of neat tars.
Purified TCX	>4g/Kg	not irritating. Chloracne response after 10 applications of 1% solution in $CHCl_3$.



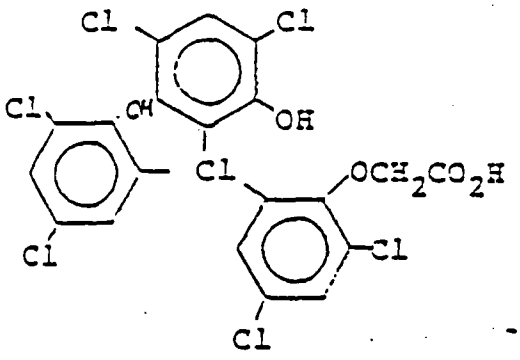


2,4-D PROCESS

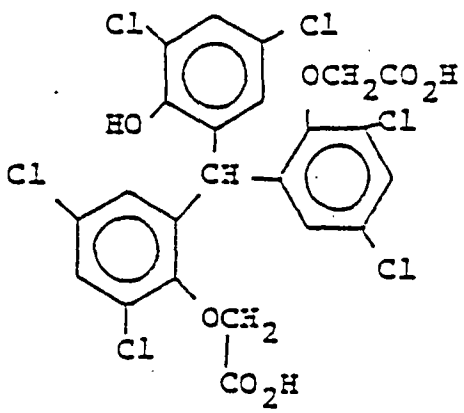
These results are encouraging from a plant hygiene standpoint, but more data is necessary regarding long term effects. When the impurities were first discovered in the plant, the still was used very occasionally.

The still was originally added to the process as a way of purging contaminants out of the stream to maintain high quality recycle solvent. At this point, tar impurities made up 60-75% of the precipitates formed in diluted amines formulations.

About February 1978, the capacity of the still was increased and the average levels of TCX levels dropped to ~50 ppm in the crude reaction mass and product and to 200-500 ppm in the recycled. From the period of March-May 1978, the ability to produce quality 2,4-D continued to improve and the amount of tar impurities found in the dilution test precipitates dropped. The balance were sparingly soluble metal salts of 2,4-D and some new impurities called Complex 1 and Complex 2, two of which are shown below (IV & V).



IV



V

I. July 1978, the still capacity was increased and efforts gained at understanding the parameters affecting formulation quality by S. Siegel (OCR), S. Schell (Production 489), and J. King (Formulation - 9001 Bldg) and their co-workers have greatly improved

the consistency with which 948 Bldg. 2,4-D can be formulated. Based upon partition coefficients and data on the rate of formation of TCX to be discussed later in this report, K. E. First[4] (Process Engineering) generated a computer program which predicted that by distilling of recycle the steady state level of TCX in the product would be ~10 ppm and in the recycled perc the TCX level would be ~40 ppm.

The purpose of this report is to present data on the formation and fate of the impurities in the 2,4-D process. In addition, the results of experiments aimed at reducing or eliminating the impurities by chemical and physical methods will be presented.

RESULTS AND DISCUSSION

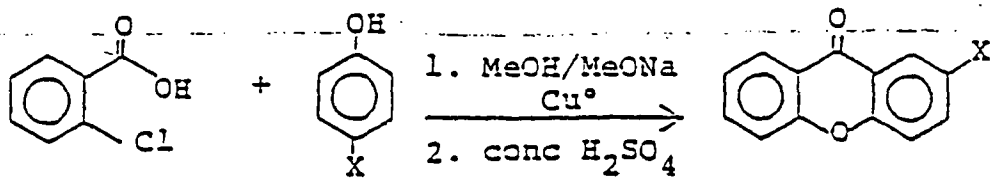
This study was divided into the following sections and the results of each are discussed separately.

(A) The mechanism of TCX formation.
(B) The distribution of TCX in the process.
(C) Reduction of TCX by chemical means.
(D) Reduction of TCX by physical means.

Although there are many impurities formed in this process, it was decided to focus the research on TCX for several reasons: (1) The rate and mode of formation of TCX was the most predicable of the major multicyclic impurities; (2) it was a major impurity; (3) a pure sample was readily obtained (by D. Humbert, Anal. Lab); (4) the analysis is not complicated; and; (5) structurally, it is the simplest of the multicyclic impurities.

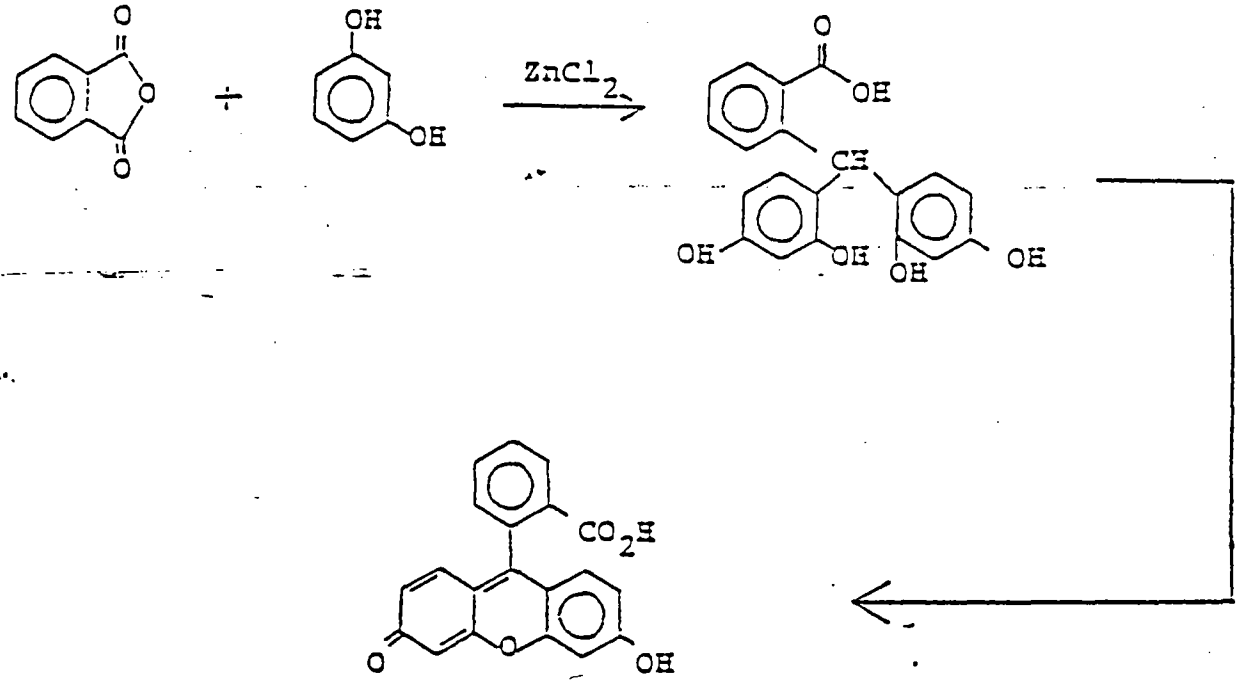
(A) The Mechanism of TCX Formation

A brief search of the literature including Chemical Abstracts showed that the xanthone ring system is formed from a number of reactions.[5] A common synthetic reaction is shown below in which the -X is included

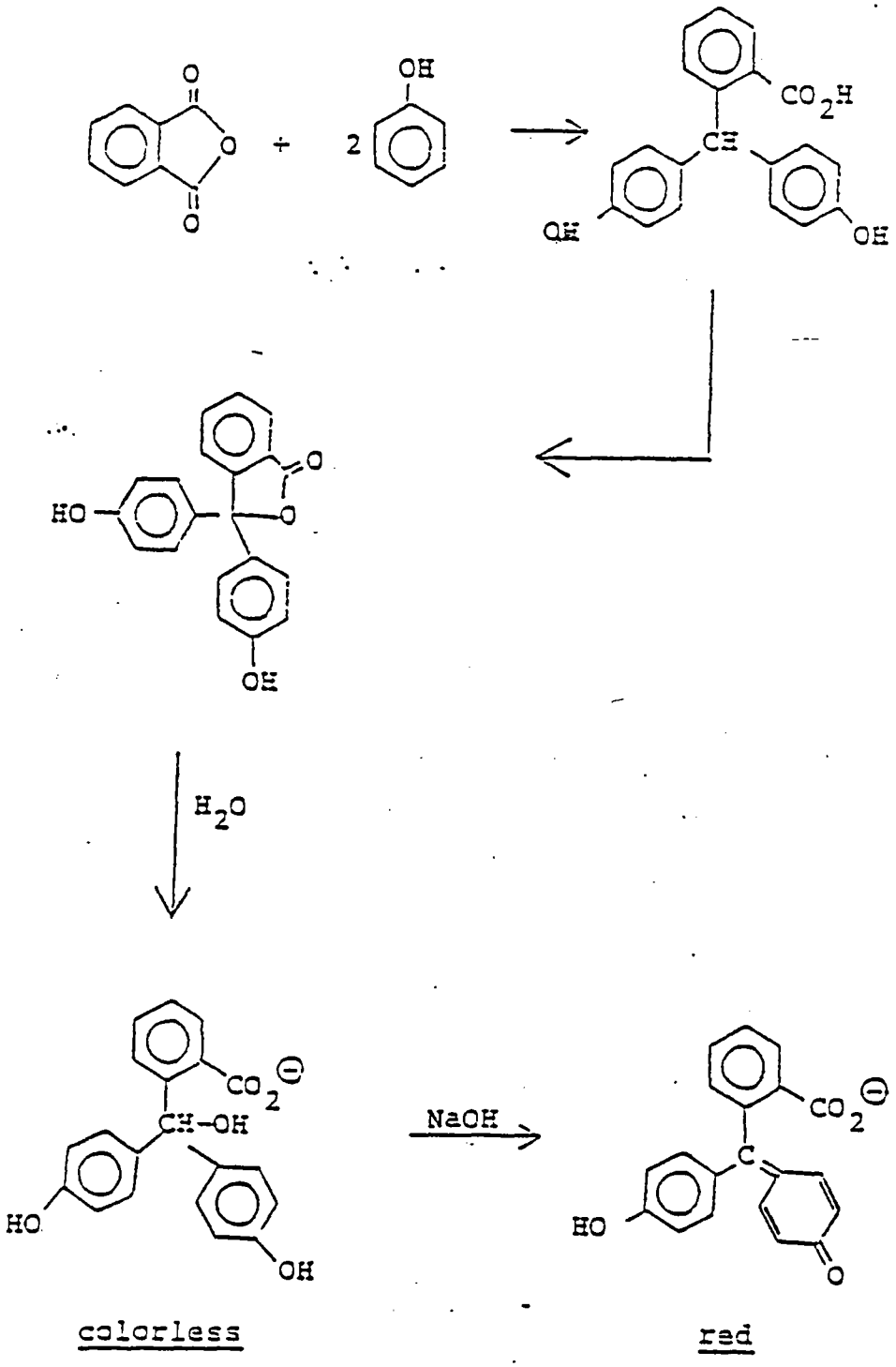


to show the orientation of reaction. Xanthone is formed along with other products from the pyrolysis of o-chlorobenzoic acid, salicylic acid, aspirin, o-phenoxybenzoic acid, and salts of the carboxylic acids. Most of these cyclizations take place in the presence of acidic catalysts such as P_2O_5, $AlCl_3$, Acetic anhydride, or sulfuric acid. Xanthone is prepared in reasonable yield[6] by the pyrolysis of phenol salicylate with or without a catalyst.

The ease of formation of ring systems that are structurally similar to xanthones is most clearly shown by the formation of fluorescein and fluorescein dyes. Fluorescein[7] is made by reaction of phthalic anhydride and resorcinol as shown on the following page.



Phenolphthalein[8] is also made by this process using phenol instead of resorcinol.



These background data give some important clues as to reaction mechanisms as will be whown later in the report.

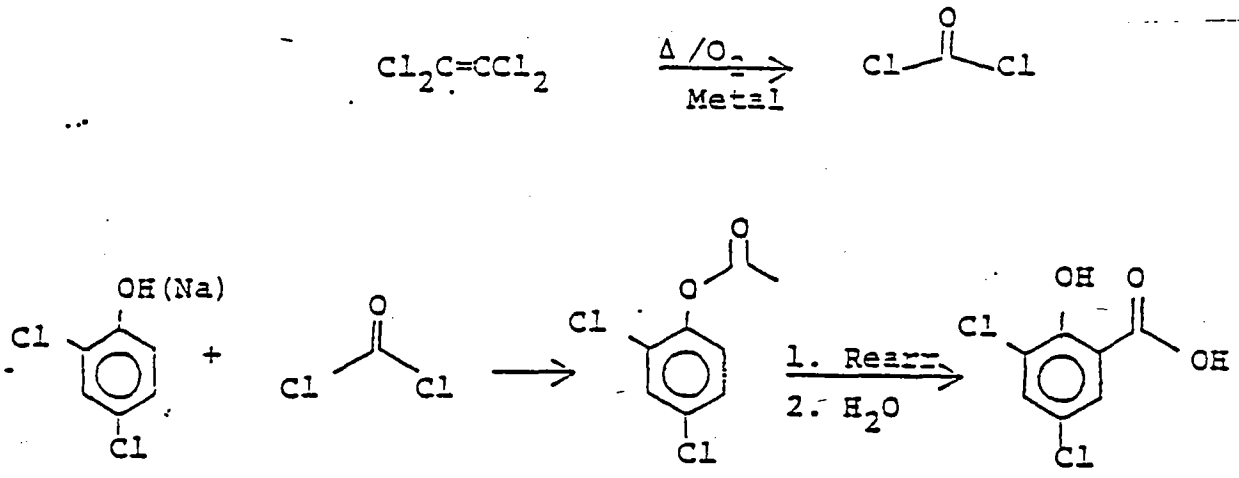
In order to understand the pathway of TCX formation, a series of ampoule tests were performed to determine which chemicals and/or combinations give rise to TCX. Table 3 summarizes the results of this study. A series of ampoules (25 ml capacity) were charged with 3-6 gms of mixtures in molar ratios as shown inTable 3 and were heated in an oil bath fo 72 hours at 160°C. The sources of the chemicals were as follows:

2,4-D: High Purity Rhone-Progil Acid
DCP : Doubly distilled 948 Bldg material
Perc :
NaOH :
Glyoxal :
Glyoxylic acid :
Tetrachloroethane :
(50:50 1,1,2,2- & 1,1,1,2-isomers)

} Reagent materials

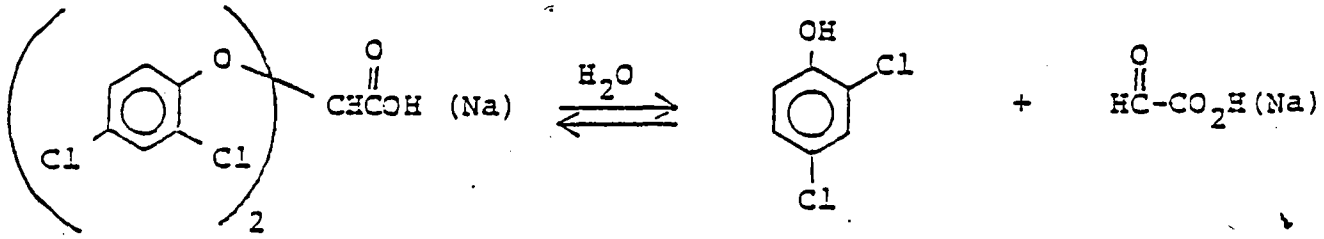
Table 3: The Formation of TCX from Synthetic Mixtures Heated at 160° for 72 hrs.

Several compounds other than those found in the process were tested. The tetrachloroethane mixture is a known contaminant in the 941 Bldg. chloroacetylchloride that is used to make MCAA. 2,5-Dichlorosalicylic acid is a proposed intermediate from the reactions suggested below:



The decomposition of perc to yield phosgene is known[9] but the second reaction is only speculated.

The glyoxylic acid is postulated to come from bis 2,4-D as shown below:



which is a well known acetal hydrolysis. The glyoxal was included to show the general nature of the reaction whose mechanism is suggested later in this report.

Several tentative conclusions can be made from the data in Table 3.

(a) TCX can be made by several routes
- NaOH and/or NaDCP is necessary for the formation of TCX.
- bis-2,4-D appears to be a key intermediate.
- Perc is a source of TCX.

(b) Significant amounts of TCX are probably made only in the reactor crude storage tank in the plant since strong base is required. Run 14 (Table 3) simulates the Na 2,4-D storage tank (V-501: 948 Bldg) and Run 1 (Table 3) simulates the product storage tank (V-602: 948 Bldg) in which no TCX was observed.

In order to study the formation of TCX as a function of reaction rameters, a series of 2,4-D reactions were performed in the laboratory. These reactions were run to evaluate the effect on the amount and rate of TCX formation. The data are summarized in Table 4. In these experiments, 1.1 mol of DCP was treated wth 0.6 mol of caustic and the mixture was heated to 130°C. The majority of the water that was formed was boiled off. To this mixture, 0.5 mol of NaOH and 0.5 mol of MCAA were con-added during 1 hr at 130° and the crude product was heated an additional 1 hr. Water was continuously distilled out during the con add step. At this point the desired number of ampoules were charged with 5-10 gms of crude reaction mixture and were heated in oil baths at 130°, 145°, and/or 160° for 24, 48, and 72 hours.

Table 4: The Parameters Affecting the Formation of TCX in the Semi-Hydrous Process for Preparing 2,4-D

Run/Reference	Source: DCP	Source: [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Test Temp (°C)	TCX at time: [illegible]	[illegible]	[illegible]	[illegible]	Comments
[illegible]	[illegible]	[illegible]	2.4	1.2	Air	—	—	130 145 160	ND ND 14	TR 22 125	23 49 234	32 110 323	
[illegible]	[illegible]	[illegible]	2.4	1.2	Air	1.1%	—	130 145 160	ND TR 6	13 22 76	29 73 132	49 127 232	
[illegible]	[illegible]	[illegible]	2.4	1.2	N_2	1.1%		130 145 160	ND ND TR	TR 20 56	17 57 111	19 104 162	
[illegible]	[illegible]	[illegible]	[illegible]	1.2	Air	—	—	130 145 160	ND ND ND	8 24 52	12 — 93	12 29 94	
[illegible]	[illegible]	[illegible]	[illegible]	1.2	Air	1.1%	—	130 145 160	— — —	14 24 49	22 57 96	53 96 144	
[illegible]	[illegible]	[illegible]	[illegible]	1.2	Air	—	—	160	N.D.	49	91	—	DCP from the old Dow process Direct chlorination; [illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1.0	Air	—	—	160	N.D.	TR	52	125*	*after 96 hrs heating
[illegible]	[illegible]	[illegible]		1.2	Air	—	—	160	ND	167	487	575	[illegible] with Dow
[illegible]	[illegible]	[illegible]	[illegible]	1.2	Air	—	—	160	—	12	41	56	
[illegible]	[illegible]	[illegible]	2.4	1.2	Air & CO_2	—	—	130 160	5 —	7 81	12 219	29* 444*	*after 120 hrs heating [illegible]
[illegible]	[illegible]	[illegible]	2.4	1.2	Air	—	[illegible]	130 160	6 —	16 241	30 706	75 1032	
[illegible]	[illegible]	[illegible]	2.4	1.2	Air	1.1%	500	130 160	ND —	9 177	23 525	42 [illegible]	
[illegible]	[illegible]	[illegible]	2.4	1.2	Air	—	200	130 160	9 —	14 293	37 365	125* 932*	*after 120 hrs heating
[illegible]	[illegible]	[illegible]	2.4	1.2	Air	—	25	160	5	61	223	394	

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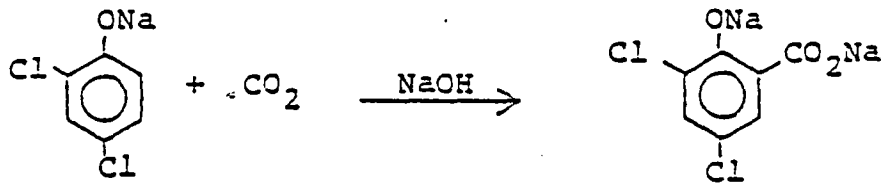
The data in Table 4 show a number of interesting points. It must be emphasized that in view of the fact that these data are based on parts-per-million chemistry, the precision must be subject to some error. The data are reproducible to about 20%.

more facile route to TCX from perc whose effect is masked at the higher temperatures by a primary route (compare Table 4, Runs 1 & 2 and Runs 3 & 4).

(C) Effect of Atmosphere in the Reactor

Nitrogen blanketing appears to lower the TCX level to ~2/3 that observed in air. It is not certain that this result is significant and since the magnitude of the drop was low, further work was not warranted. Since CO_2 is known to be present[10] in the vapor space throughout the 2,4-D process, a run was made to determine its effect on TCX formation. Carbon dioxide comes into the process from the caustic and from perc decomposition.

The reaction was run as described earlier with 20 mol% of $NaHCO_3$ added before the boil down step and then blanketing the reaction mass with CO_2 during the post reaction heating step. Since this is a high temperature, nearly anhydrous process, the following reaction was thought possible which could eventually lead to TCX (See Table 3, Runs 15 and 16).



Comparing Runs 1 and 10 (Table 4) show that $NaHCO_3$ and/or CO_2 do not measurably affect the formation of TCX.

(D) Changing NaDCP/NaMCAA Ratio

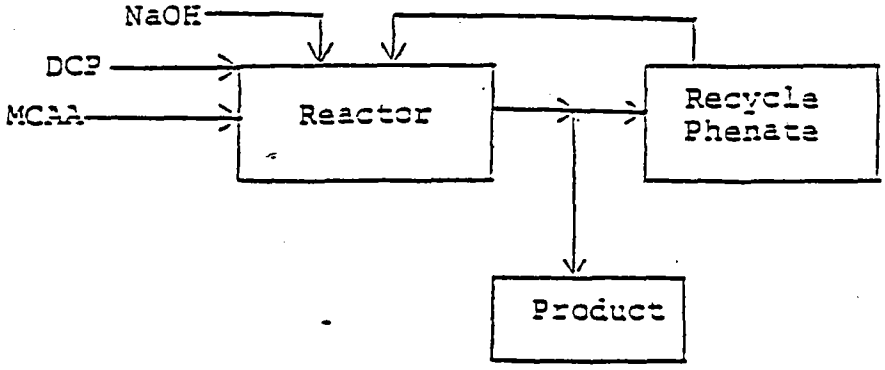
Comparing Runs 1 and 7 (Table 4) show that lowering the NaDCP/NaMCAA ratios significantly reduces the TCX levels as was also predicted from the data in Table 3. The effect was studied further and is discussed later in this report.

(E) Source of DCP

A run was made using the old lower purity DCP from the 349 Bldg process and assure that 948 Bldg, high purity, DCP was not a source of TCX. Run 6 shows that TCX formation is not associated with the source of DCP.

(F) Effect of Ferric Ion

Runs 11-14, Table 4, show that Fe^{+3} clearly increases the rate of TCX formation which suggest that alkylation step(s) are involved. D. Humbert and colleagues[7] performed a material balance of Fe in the following scheme.



They found that most of the iron is entering the process in the caustic and that the reactor normally contains 20 ppm of Fe^{+3}. A recurring problem for the past several months was how to explain the fact that the plant observed TCX formation rates that were 5 times greater than the lab. The iron results explain at least part of this discrepancy and suggest that efforts aimed at removing iron from the process are desirable.

Based upon the data presented up to this point, the mechanism shown in Figure 1 for TCX formation is suggested. This mechanism is consistant with the observations of the effect of caustic, the fact that TCX can be made from NaDCP and glyoxal or glyoxylic acid and the levels of bis-2,4-D. If this mechanism is correct, it is easy to see how perc can influence TCX formation when one considers the possible hydrolysis products using either NaOH or NaDCP. Some of these possibilities are shown in Figure 2 and many are known precursors to TCX.

In addition to TCX, OCSX and "8-5" are known to be formed in measurable quantities during the reaction to 2,4-D. It was initially assumed that TCX is the probable precursor to OCSX and "8-5". However, a series of ampoule experiments in which TCX was mixed with various ratios of DCP, 2,4-D, NaOH, and perc showed none formed in detectable amounts. In addition, a reaction was run in the presence of 500 ppm of added TCX and gave normal levels of the impurities when the 500 ppm of added TCX is subtracted out. It is apparent that OCSX, "8-5", and TCX are probably made by independant routes and proposed mechanisms are shown in Figures 3 and 4.

Figure 1: Proposed Mechanism of TCX Formation

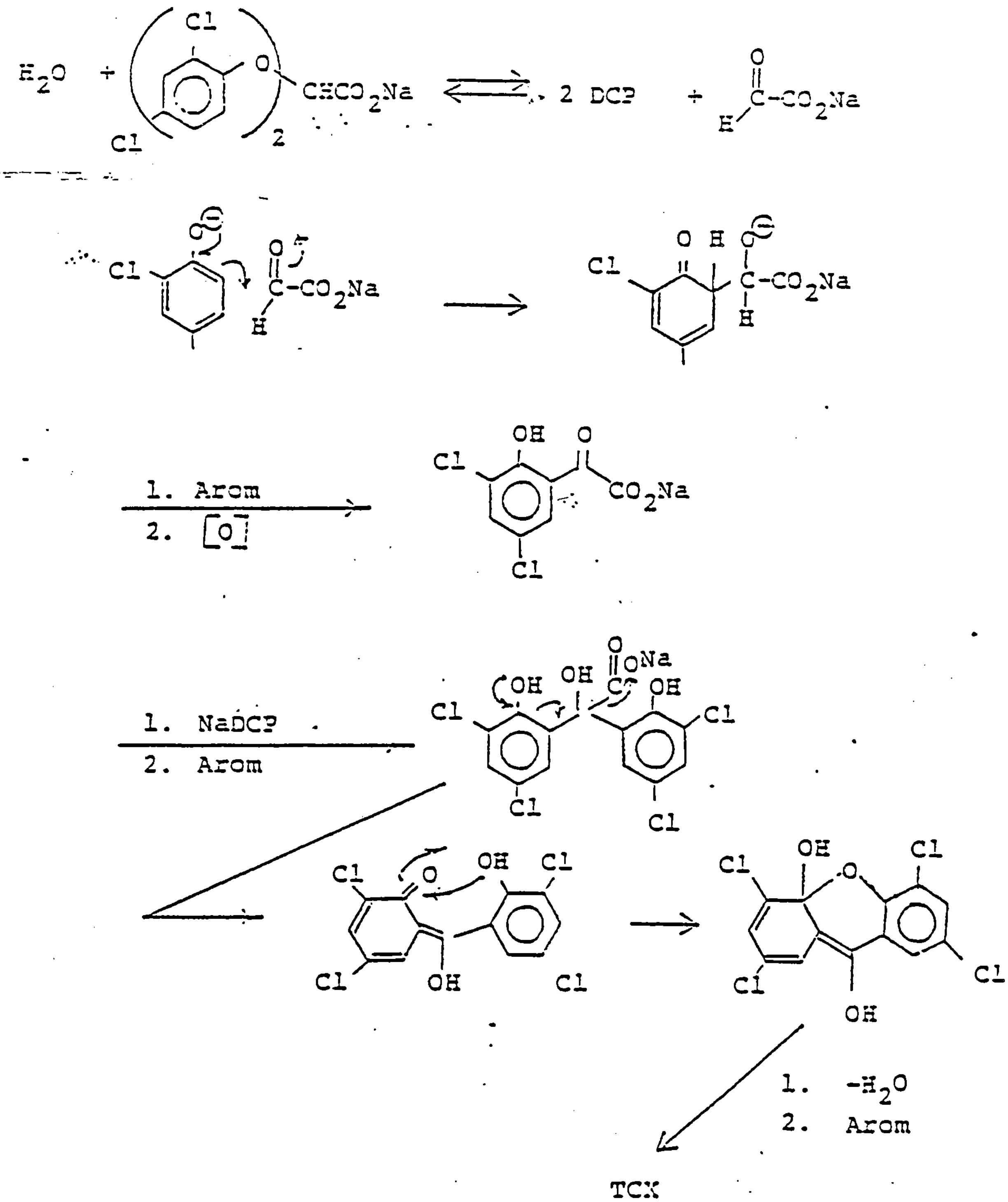


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Figure 2: Some of the Possible Products of the Hydrolysis of Perchloroethylene with NaOH or NaDCP

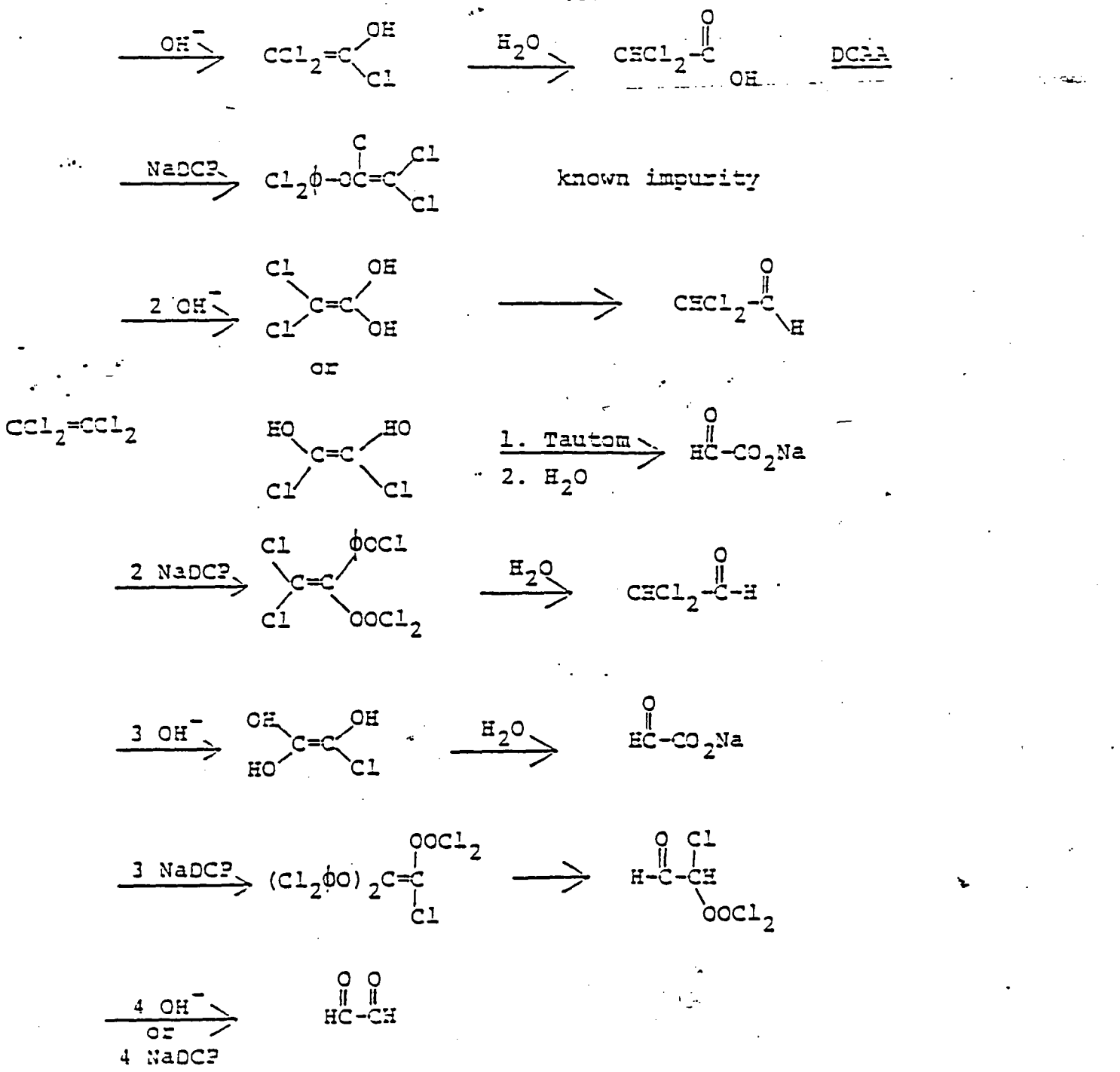

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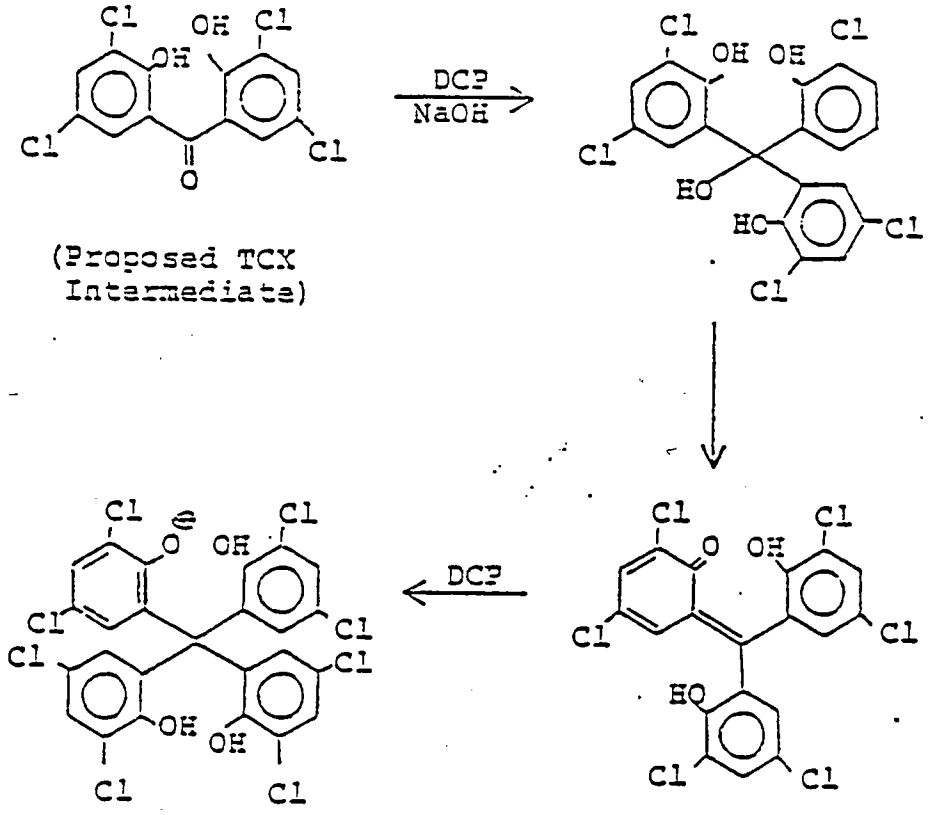
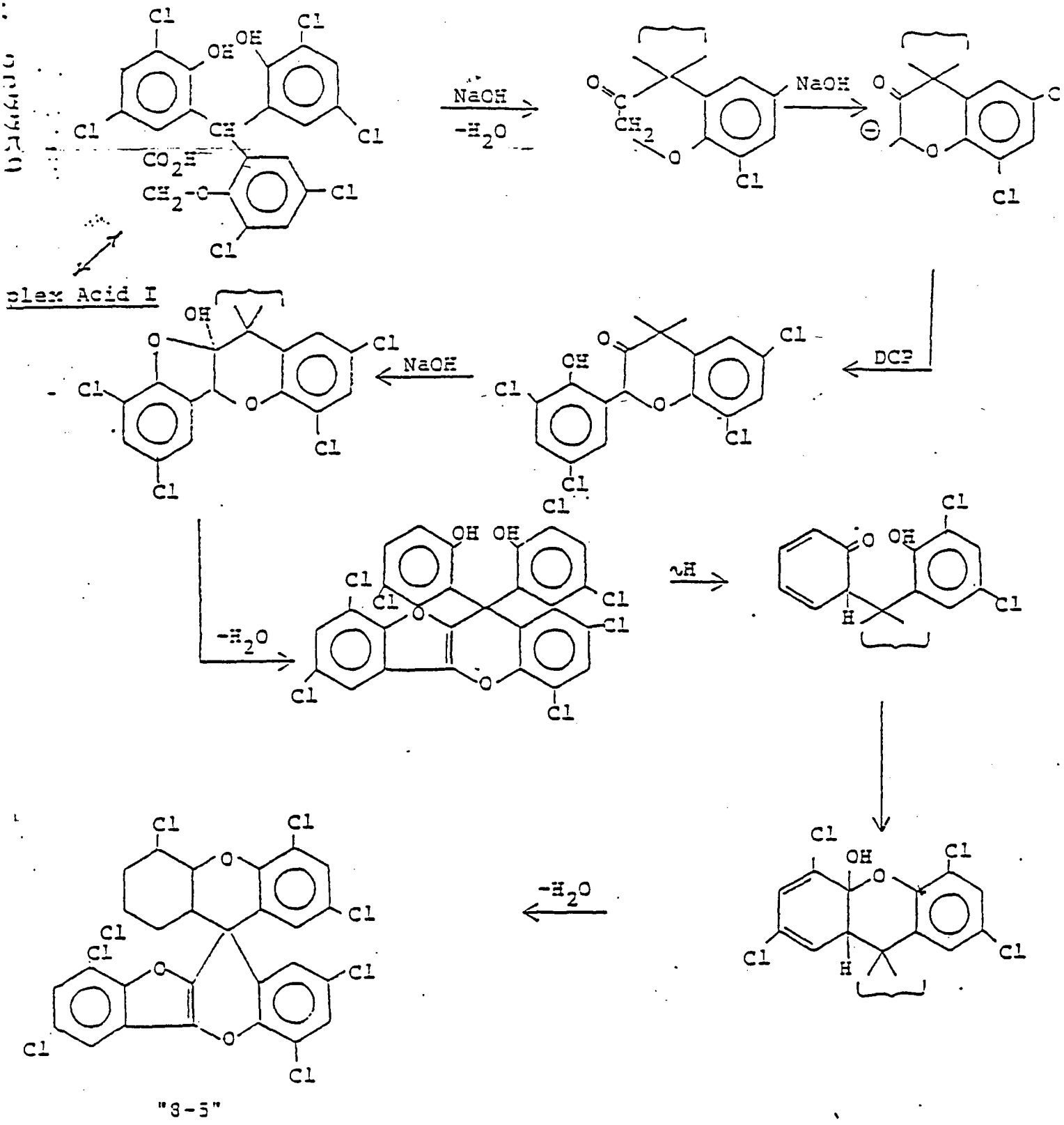
Figure 3: Proposed Mechanism for the Formation of OCSX By a Route That is Independent of TCX



OCSX

Figure 4: Proposed Mechanism for the Formation of "8-5" By a Route that is Independent of TCX



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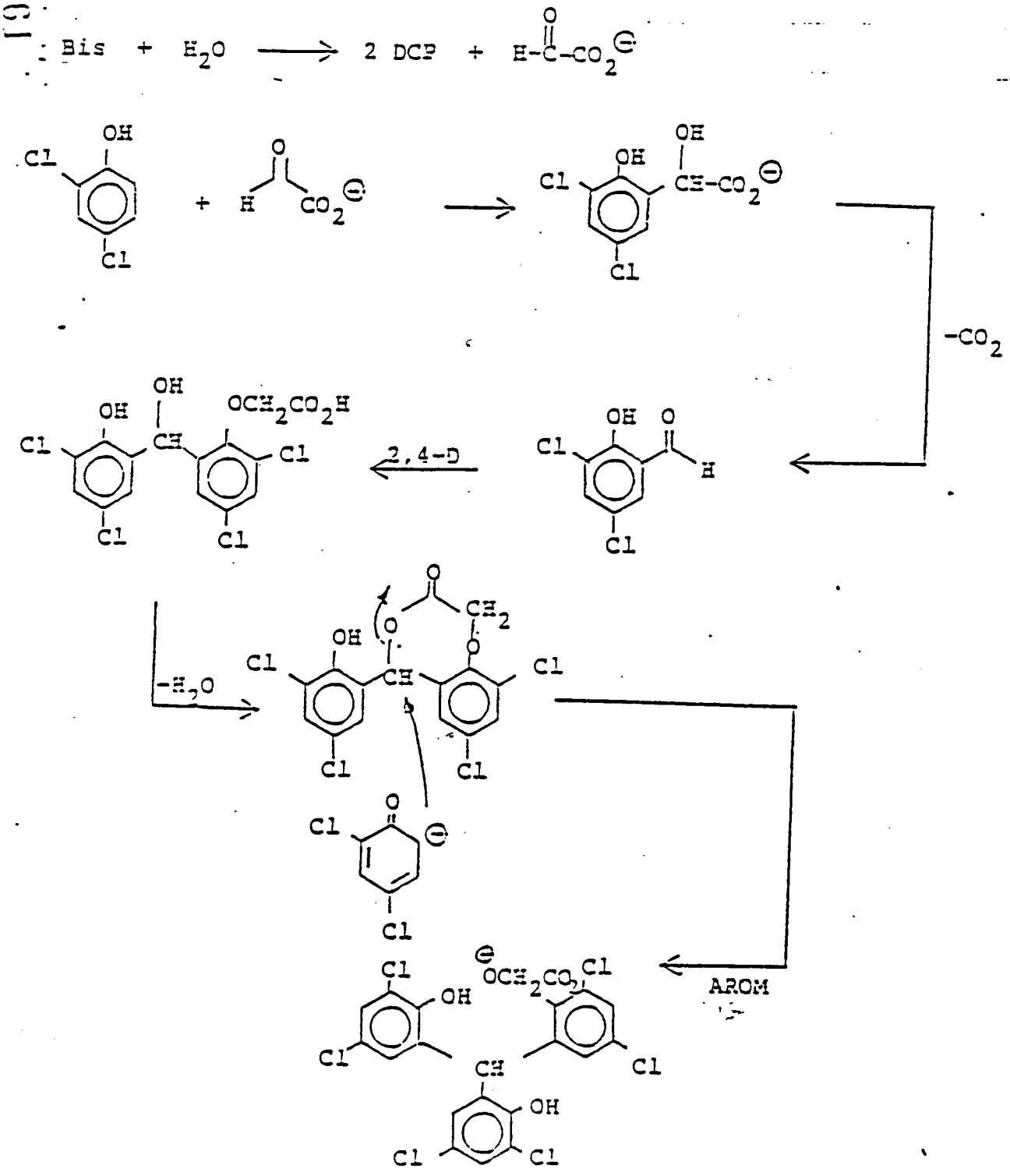
The formation of OCSX uses an intermediate in the TCX mechanism as its starting material. The apparent fact that TCX is not an intermediate suggests that the more activated dihydroxy ketone is necessary for alkylation. The mechanism for "3-5" formation involves a major component in the Complex I and II mixture as a starting material. Recent analytical results[10] have shown ~100-200 ppm of this mixture in the process. A proposed mechanism for the formation of Complex Acid I is shown in Figure 5. It must be emphasized that the mechanisms shown in Figures 3,4, and 5 are speculations and are only one of a number of possibilities. Much more work is necessary to prove their accuracy.

Figure 5: Proposed Mechanism for the Formation of the Major Impurity in Complex I mixture (Compound IV)



COMPLEX ACID I

V-602: Final Product Storage Tank: Tests run at 120-175° on wet and dry 2,4-D[11] showed that there is an initial slow build up of about 20 ppm of TCX during the first 48 hrs at >160° that stabilizes out. This suggests a small amount of an unstable unknown species that decomposes in acidic media. Molten 2,4-D can be treated for at least 100 hrs under the above conditions without affecting product performance.

Since TCX is formed in the reactor and was found throughout 948 Bldg process, a laboratory study of the distribution was requested. In this experiment a reaction was carried out and the crude reaction mass was spiked with TCX. The purification process was then simulated and the fate of the TCX was determined. Figure 6 summarizes the results of the extraction study performed at 90°/atm.

These data show an excellent TCX recovery in which, using clean perc, all the detectable TCX is removed from the Na 2,4-D solution. The fact that the plant observes some TCX in the product suggests that some entrained perc is carried overhead so that the impurities carried with it end in the product. The extraction of the perc/DCP mixture with caustic to recover the NaDCP also extracts about 5% of the TCX which is recycled to the reactor. This scheme was followed in a second experiment that was performed at 125°/ 35 psig which more closely follows the plant conditions. Under these conditions the aqueous solutions can be more concentrated in Na 2,4-D, NaCl, and DCP which could affect the distribution of TCX.

A high pressure, mechanically stirred glass reactor was constructed and was charged with partially neutralized material from V-301 (the DCP neutralizer). The molten material was extracted six times with perc at 125°C and the molten 2,4-D was isolated. The TCX and "8-5" levels were monitored throughout and the analytical results for the products are summarized in Table 5 for the two runs. The data show that TCX is effectively removed at the more drastic conditions.

Table 5: The Analysis of the Product from the High Temperature Extraction of Crude Na 2,4-D with Clean Perchloroethylene

	TCX (ppm)		"8-5" (ppm)		Metals (ppm)			
Run	init	final	init	final	Na	Fe	Ca	Mg
1	292	13	54	52	84	5	40	13
2	178	2	N.D.	25	91	3	50	16

It is interesting to note that "8-5" is not efficiently removed with perc extraction. Hence most of what is made goes out with the product. OCSX was not detected in these samples.

In summary, TCX is formed in the reactor and most of it remains in the recirculating perchloroethylene system. A certain amount of TCX spills into the product and the magnitude is directly related to the level in the perc. TCX is easily separated by distillation in the perc still so by increasing the rate of distillation one would achieve a lower steady state concentration of TCX in the perc.

Assuming a rate of TCX formation of 0.5-1.0 #/hr in the plant (based upon analyses of plant samples) K. E. First[4] has taken distribution coefficient data and has modeled the process in terms of TCX content in various streams as a function of % of perc distilled in the perc still. To date, there is not enough in-plant data to verify this model.

(C) Reduction of TCX by Chemical Means

Two approaches for chemical reduction of TCX were studied. These were methods for inhibiting its formation during the reaction step and methods for reducing it from process streams. The following approaches were studied and each will be discussed in detail.

1. Changing NaDCP/NaMCAA ratio.
2. Post reaction neutralization.
3. Effect of DCAA.
4. Bleaching Na 2,4-D solutions.

(1) Changing NaDCP/NaMCAA ratio

Excess caustic or NaDCP was shown earlier to have a significant qualitative effect on the increased production of TCX. The 2,4-D reaction as developed by H. Brust[12] used a ratio of NaDCP/NaMCAA = 1.2. As described earlier in the discussion, at this ratio the product contains theoretically ~6.3 mole % excess alkalinity as NaDCP as shown on the following page.

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Stg Mat'l		Product
0.5 mol DCP		0.5 mol DCP
0.6 mol NaDCP	⟶	0.1 ml NaDCP
0.5 ml NaMCAA		0.5 mol Na 2,4-D
		0.5 mol NaCl

Dhingra[13] and Fear[14] evaluated the effect of this ratio on the yield and kinetics of this reaction and concluded: (a) lower ratios (below 1.2 lead to lower yields based on MCAA and, (b) low H_2O in solution gives higher 2,4-D yields. The effect of changing the NaDCP/NaMCAA was restudied in order to determine if the lower yield from MCAA could be justified by reduced TCX formation due to less excess caustic.

The runs were carried out by using a constant amount of NaMCAA and varying the amounts of NaDCP which was done by adding differing amounts of caustic in the initial boil down step. Tables 6 and 7 and Figure 7 summarizes the results of this study. These data show that lowering the ratio from 1.2 to 1.1 results in a two fold reduction of TCX along with a 1% loss in MCAA yield. This is reasonable and was tested in the plant. After three weeks of operation, they did not note a measurable reduction for reasons that are not understood at this time. Any further reduction is not practical since the yield rapidly approaches that of the old plant thereby losing much of the advantage of the 948 Bldg process. It is interesting to note that at ratios below 1.0 there is still a measurable amount of NaDCP which explains why formation of TCX is still observed. All of the data to date indicate that formation of TCX cannot be limited to much less than 60 ppm (in the standard 72 hr/160°C ampoule test).

TABLE 6

EFFECT OF NaDCP/NaMCAA RATIO ON TCX FORMATION & YIELD ON MCAA

RUN	REF	Moles			Mol Ratio NaDCP / NaMCAA	ppm HOG	MCAA YIELD	CRUDE ANALYSIS			
		DCP	NaDCP	NaMCAA				Na 2,4-D	DCP	NaDCP	NaCl
1	OC 417-5-143	0.50	0.60	0.50	1.2	951	96.4%	45.4	31.2	8.9	10.
2	OC 417-5-144	0.55	0.55	0.50	1.1	1514	94.2	45.5	38.0	6.0	7.
3	OC 417-5-146	0.60	0.50	0.50	1.0	3808	86.8	41.3	40.3	2.2	7.
4	OC 640-1-1	0.61	0.49	0.50	0.98	3606	86.2	43.0	41.7	2.5	7.

TABLE 7

THE RATE OF TCX FORMATION AS A FUNCTION OF TIME, TEMPERATURE & $\frac{NaDCP}{NaHCAA}$ RATIO

RUN	REF	TEMP	TCX/OCSX 18 HRS	42 HRS	66 HRS	114 HRS
1	417-5-143	130	---	---	19	53
		145	37	34	70	210
		160	29	86	118/107	240
			18	42	66	114 Hrs
2	417-5-144	130	0	19	33	52
		145	27	39	64	93
		160	42	74	93	142
						90 Hrs
3	417-5-146	130	<10	<10	15	30
		145	15	20	41	59
		160	29	47	55	67
						90 Hrs
4	640-1	130	17	28	22	18
		145	23	31	34	52
		160	36	61	65	77

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FIGURE 7 : THE YIELD OF 2,4-D BASED UPON MCAA & THE FORMATION OF TCX AS A FUNCTION OF THE $\frac{NaDCP}{NaMCAA}$ RATIO

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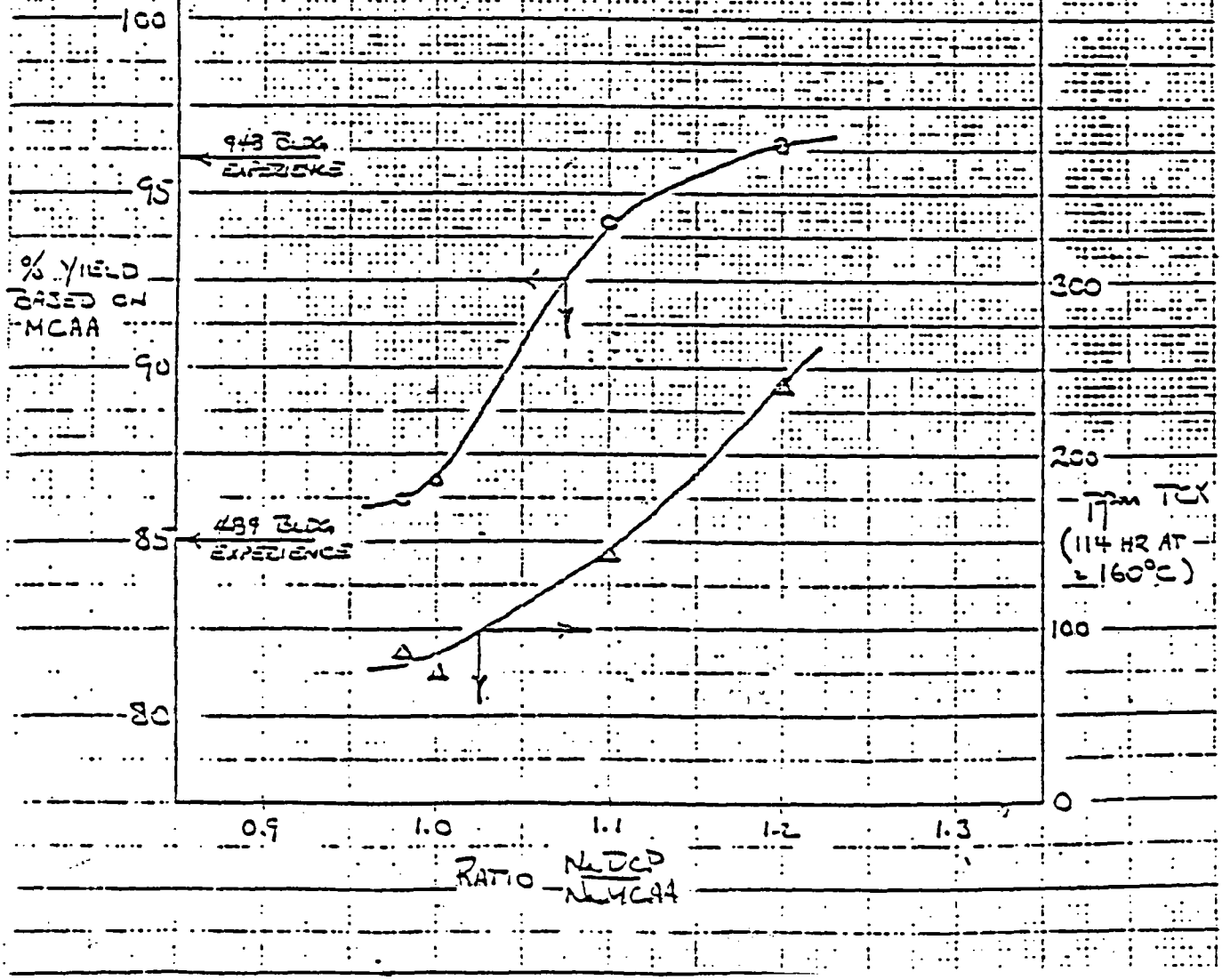

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(2) Post Reaction Neutralization

F. G. Aarstin[15] suggested that if the reactor crude were immediately treated with enough acid to neutralize the NaDCP after the post reaction before transfer to the reactor storage tank (V-202), TCX formation might be greatly reduced. This concept was tested using 32% HCl, and dry and wet 2,4-D as the neutralizing acid. The first experiment used enough dry 2,4-D to completely neutralize the residual NaDCP. The neutralized crude showed 1.4% NaDCP and a rate of TCX formation as shown below that is consistent with the data shown in Tables 6 & 7.

	ppm TCX		
Temp	24 hr	48 hr	72 hr
160°	24	51	62

The use of wet, molten 2,4-D (25% H_2O or 32% aqueous HCl has some serious physical handling problems.

As was discussed in an earlier report[16], water added to 2,4-D raises the freezing point of the mass creating a material similar to ~~cottage~~ cheese in consistency. In addition, the added salts (either Na 2,4-D or NaCl) also raised the freezing point of the reactor batch from a range of 115-120°C to 118-125°C.

In summary, whereas post reaction neutralization reduces TCX by a factor of four, it offers several disadvantages:

(a) it would add at least 30 min - 1 hr to the reaction cycle in a plant already reactor limited near capacity operation.

(b) Addition of acid could cause corrosion problems in the Incoloy 800 decanter .

(c) The possibility of precipitates forming in the reactor would put excessive stresses on the agitator. Their formation could not be avoided

in the laboratory even by very slowing adding the aqueous acid.

(d) Control of the acid addition would be difficult and, in addition, the plant would have to run a slightly smaller batch size in order to provide room for the acid. Further work on this concept is not warranted at this time.

(3) DCAA Content of MCAA

The effect of DCAA was discussed earlier.

(4) Bleaching Na 2,4-D Solutions

The major chemical difference between 948 Bldg and 489 Bldg techniques for processing crude 2,4-D is that 489 Bldg uses a bleach step in ich residual DCP is oxidized out of the Na 2,4-D solution with 8-12% NaOCl at pH 10.5/100°C. Several experiments were performed to determine if bleach would effect the impurity levels and/or improve the ability of the plant to consistently produce 2,4-D that passes the formulation dilution test. The results of these experiments are shown in Table 8.

The results of the first experiment appeared very encouraging since the dilution test solids, the TCK and the "8-5" were all significantly reduced. The second series of runs showed a consistent improvement in dilution test solids when near or out of spec, but not much effect on the impurities. A capital estimate performed by K. E. First[4] showed the cost of implementing a bleach step in 2,4-D to be $300 M which immediately eliminated any further interest in this project in view of the marginal benefits. It is assumed, posthumously, that the main effect of the bleach was to reduce residual DCP which is a known contributor to poor dilution test results.

Table 8: The Treatment of Na 2,4-D Solutions with Bleach

Na 2,4-D Solution Source	pH	Mol Ratio NaOCl / Na 2,4-D	ml solids		Impurities (ppm)		
			DMA-4	F-40	TCX	OCSX	"8-5
V-501 (4-7-78)	starting	material	---	0.18	58	N.D.	127
948 Bldg.	10.5	0.1	---	0.02	25	N.D.	N.D.
V-501 (6-5-78)	starting	material	0.01	TR	80	N.D.	31
943 Bldg	10.5	0.1	TR	TR	85	"	10
	10.5	0.2	TR	TR	85	"	26
	10.5	0.05	---	---	104	"	23
	10.5	0.1	---	---	94	"	16
	5	0.1	---	---	72	"	47

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(D) Removal of TCX by Physical Means

To date, a stage has been reached in 948 Bldg. where the 2,4-D plant can be run to consistently produce in-spec material and has demonstrated an ability to run at near capacity of 100-120 M#/day. With the perc still running at ∿15 GPM, the 2,4-D product contains ∿20 ppm of TCX and ∿20 ppm of "8-5".

A numberof attampts have been made to see if the levels of TCX can be reduced by physical means that include:

1. Carbon treatment of the recycling perc and the molten 2,4-D.
2. Removing perc from the reaction step.
3. Improved washing of the molten 2,4-D.
4. Recrystallization of Na 2,4-D and recrystallization of 2,4-D acid.

The details of each alternative are discussed below. In all cases, these experiments were short term, range finding efforts and not comprehensive. Further work is justified only if the levels of impurities presently found in the product prove unacceptable in the future from a toxicity, environmental, or performance standpoint.

(1) Removal of TCX with Activated Carbon

The removal of TCX with activated carbon from perchloroethylene from V-402 ("clean" perc storage tank) was evaluated by a standard isotherm method. A 100 ml portion of perc was treated with ground Pittsburg SGL carbon at 70°C/72 hrs. The data, summarized in Table 9, were evaluated by a known technique[18] that is summarized below. A plot was made of X/M vs. C on log-log paper as shown in Figure 5. By extrapoling C to incoming TCX concentration, the corresponding X/M value gives the amount of impurity absorbed per unit weight of carbon when that carbon is in equilibrium with the incoming concentration and represents the ultimate capacity of the carbon. The

theoretical volume of liquid to be completely freed by TCX/gram of carbon is calculated from the following equation:

$$V_{Co} = \frac{\left(\frac{X}{M}\right)_{Co}}{Co} \cdot V$$

V_{Co} = theoretical volumn to be treated

$\left(\frac{X}{M}\right)_{Co}$ = capacity/gm at incoming concentration

V = volume of liquid used in test

Co = incoming concentration

For this experiment:

$$V_{Co} = \frac{400}{241} \times 100 = 166 \text{ ml/g of Carbon}$$

or 19.9 gal of perc/# C

or 265 # perc/# C

Carbon loading at 241 ppm of TCX in feed = 166 ml/g C x 1.6 g ml x .00024 = 64 mg/gC

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Table 9: The Absorption Isotherm for TCX Removal from Perchloroethylene with Pittsburg SGL Activated Carbon

Sample	Impurity (ppm)			(M) WTC/100ml Perc	(C) Resid ppm TCX	(X) ppm TCX Removed	(X/M) ppm TCX removed / gm Carbon
	TCX	OCSX	"8-9"				
STG. Mat'l	241	N.D.	19	0	241	0	---
1	159	"		0.25	159	82	328
2	108	"		0.50	108	133	266
3	57	"	17	1.00	57	184	184
4	40	"		1.50	40	201	134
5	29	"	17	2.00	29	212	106

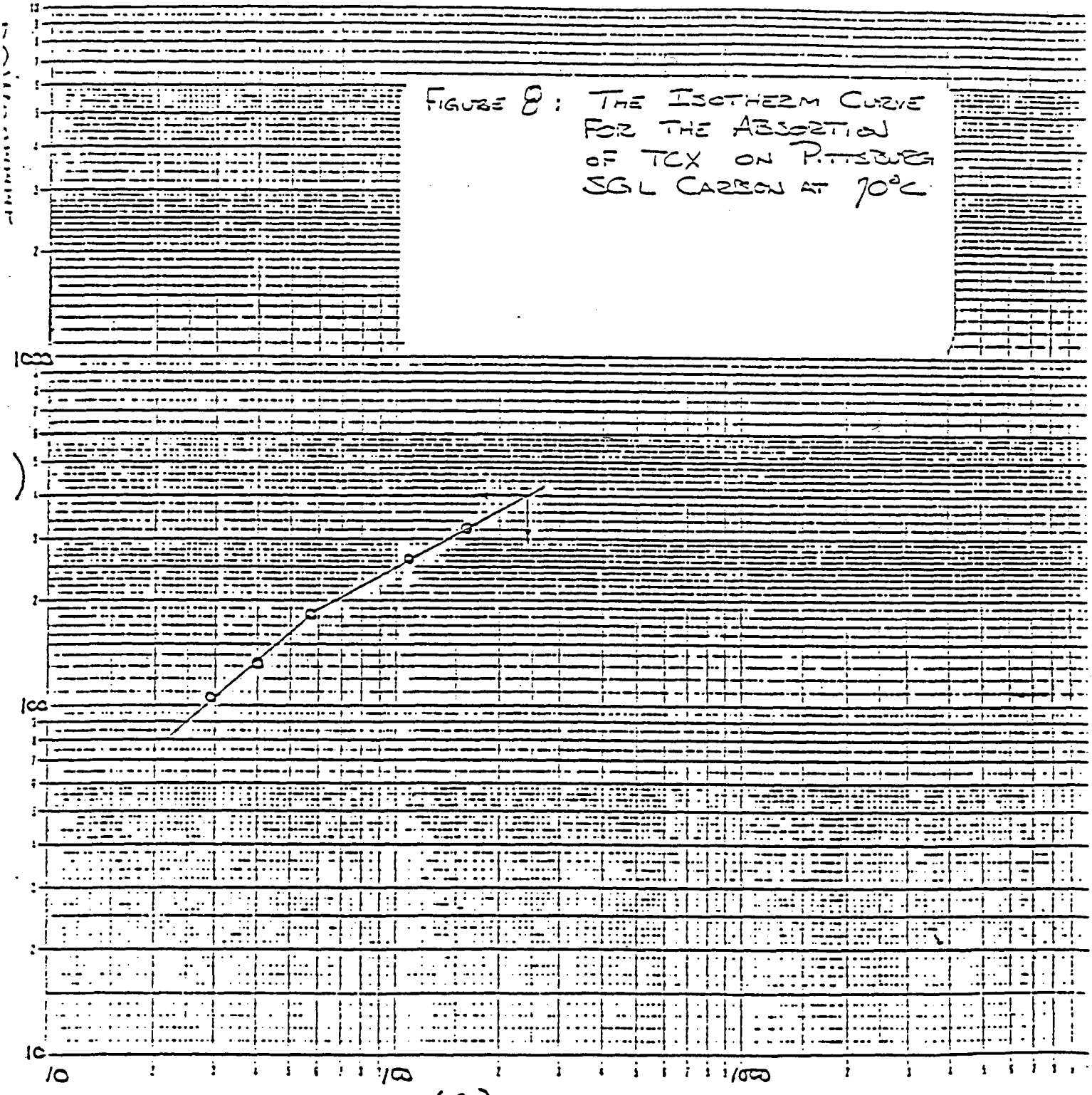

FIGURE 8: THE ISOTHERM CURVE FOR THE ABSORTION OF TCX ON PITTSBURG SGL CARBON AT 70°C

This is a low loading level and at the present rates of TCX production in the plant, about 15-20 # of carbon per hour would be required to remove the impurity. The data shown in Table 9 indicate that carbon does not remove "8-5" from perc. The shape of the isotherm curve indicates that more than one species is being absorbed onto the carbon. No effort was made to determine the identity of that compound although it was probably perc.

A run was made to remove impurities from wet molten 2,4-D. Since molten 2,-D is so difficult to handle at atmospheric pressure, pressurized system was built using a capillary feeder for controlling the continuous flow of molten 2,4-D at 100°/25 psig onto a vertical 2' x 0.5" column that was maintained liquid full. The flow rate was 10 ml/min down the column for a mass flux of ~1.0 gpm/ft.^{2} The results are summarized in Table 10.

Table 10: The Treatment of Molten 2,4-D with Activated Carbon

ple	Temp (°C)	Pressure psig	Approx feed rate ml/hr	Approx. Prod. cut volume (ml)	Product Analysis (ppm)			F-40* solids (ml)
					TCX	OCSX	"8-5"	
i	112				42	N.D.	32	.005
	110±2	33±2	300	100	--	--	--	
	110	33	600	375	14	N.D.	29	.04
	110	33	600	375	28	N.D.	38	.005
	110	33	600	376	32	N.D.	42	
	110	33	600	375	30	N.D.	36	

nulation contains 2% Versene & 0% PG 4000

se data are fairly crude in that the column was shorter than is desirable optimum column work (2' vs the recommended 5-6'[18]) and the flow through column was a little faster than the more desirable 0.5 gpm/ft^2 recommended.[13]

The data show that TCX loading is rather low. Breakthrough occurred after 900 ml molten D (~935g pure 2,4-D) was treated. From the analyses, the 59.8 gm of Pittsburg SGL 8 x 30 granular carbon charged to the column absorbed 291 mg of TCX for a loading of ~0.5 mg/g of carbon which is quite low. Again, "8-3" was not absorbed by the carbon. Based upon these preliminary experiments, carbon absorption of these impurities is not an attractive purification technique.

(2) Remove Perchloroethylene From the Reactor

Since perc is known to give rise to TCX, several methods were examined to eliminate its recycle to the reactor. At present, since perc is soluble to 1.2% in the recycle NaDCP solution, there are about 350# returning to the reactor in each batch. Since a continuous percphenate phase separation is performed in V-401 just before recycle to the reactor, a brief study was undertaken to evaluate the phase separation to determine the time required for complete layer separation and the solubility of perc in NaDCP solution.

A solution of 62% NaDCP and 2% NaOH in water was slurried with an excess of perc and vigorously stirred for 30 min at 75°. The stirring was stopped and the phenate layer was analyzed for % perc as a function of time. The results are summarized in Table II. These data show that the solubility of perc in NaDCP is 1.3±0.1% at 75°C and that layer separation is complete within 15 minutes. The residence time in V-401 is ~40 minutes so that with proper operation, no layer separation problems should result. The question was also asked if the perc was entrained in the NaDCP solution as an emulsion or was it in solution? A sample was centrifuged at 60° (minimum temperature) for 30 min at ~4000 rpm and 1.2% perc was found in the phenate. It is concluded that the present equipment gives optimum layer separation and the 1.2% of perc is soluble.

Table II: The Solubility and Separation Rate of Perchloroethylene and 62% NaDCP in Water at 75°C

TIME*	% Perc in Phenate Layer
5 min	1.9
15 "	1.3
30 "	1.4
1 hr	1.5
2 "	1.4
4 "	1.4
6 "	1.2
24 "	1.3

*Time zero is when the vigorous stirring of the two layers is stopped.

Several attempts were made to strip perc from the reaction mass and from the NaDCP solution. The plant tried to strip perc from the reaction mass during the normal boil down step. Whereas normal operation involves returning the distilled organic layer to the reactor, in this experiment the recovered organic layer was discarded. Whereas normal boil down returns 350# of DCP to the reactor, in this experiment even after 4000# of DCP was distilled off, there was still detectable perc in the distillate. As a result, this approach was judged impractical. Two attempts were made to distill the 1.3% of perc from the 60% NaDCP-2% NaOH solution.

The first involved a batch distillation from a standard solution from V-403. A total of 65.9 gms were distilled out and 73.8% of the perc was removed. The reaction was then carried out as usual and samples were heated for 24, 48, and 72 hrs and the results are summarized below. These data suggest that distillation of 75% of the perc does not reduce TCX formation (See Table 4, Runs 4&5).

	Temp	24 hrs	48 hr	72 hrs
ppm TCX	160°	21	75	145

The second approach taken for stripping out perc was using a falling film still. The results of two experiments are shown in Table 12. The results show that, as before, 70-80% of the perc is easily removed but that the last 20% is likely to be quite difficult. No more work is planned in this area until it can be better proven that removing perc offers any real advantage in reducing rates of TCX formation.

(3) Improved Washing of 2,4-D Acid

Several experiments were run to see if improved washing would affect impurity levels in the 2,4-D product. A sample of 2,4-D product was taken from V-602 (948 Bldg) and was treated in the following ways:

(a) A 250 gm sample of molten acid was washed 3 times with 200 ml of water per wash at 100°C.

TABLE 12

Preliminary Data for Falling Film Distillation of Perc From NaDCP Solution

Still: 1" x 12" Tube

	Run 1	Run 2
Pressure		ATM.
Temp (col'm)	120°	
" (feed)	75°	75°
Feed Rate (ave.)	10 ml/min	10 ml/min
Overhead Temp	85° → 90°	90° → 95°
Feed analysis		
% Perc	1.0	1.1
% DCP	51.5	50.1
Wt. Charged (Feed)	725 gms	738 gms
Product: Wt	652 gms	645 gms
% Perc	0.3%	0.2%
% DCP	53.9%	61.6%
Overhead: Wt	46.7 gms	75.0 gms
% Perc	1.5%	3.3%

(b) Another sample was reacidified to pH 0.5 with conc HCl and rewashed 2 times with water at 100°C.

(c) A synthetic V-501 mixture was made up using Rhone Progil 2,4-D to determine if any impurities are made in the washing step. The synthetic mixture was acidified and washed and the 2,4-D was recovered for analysis. This experiment was repeated in the presence of 2750 ppm of added TCX.

The results of these experiments are shown in Table 13. Based upon these experiments, it is shown that the impurities are not made or reduced by improved washing. If anything, they are slightly increased in the product due to the greater solubility of 2,4-D in the hot water or brine.

(d) Recrystallization of Na 2,4-D and 2,4-D Acid

An attempt was made to determine if the impurities could be removed by recrystallization of Na 2,4-D from water and 2,4-D acid from organic solvents. Na 2,4-D was recrystallized by taking 500 gms of material from V-501 and adding enough water (350 ml) to form a homogeneous solution at 100°C. The solution was cooled and the precipitated Na 2,4-D was filtered and washed with 5% brine. The Na 2,4-D was redissolved in hot water and the 2,4-D was isolated and analyzed. The results are shown in Table 14.

In two separate experiments, 2,4-D from V-602 was recrystallized from perchloroethylene and ethylbenzene. A weight ratio of 3 parts solvent to 1 part 2,4-D was heated to boiling, the water contained in the molten 2,4-D was boiled out as an azetrope (the organic distillate was returned) and the solution was cooled. The 2,4-D was recovered by filtration and the solvent removed by heating in a vacuum oven at ~60°C. The results are summarized in Table 14.

Table 13: The Effect of Improved Washing of Molten 2,4-D on Levels of Impurities

Material	Impurities		
	TCX	OCSX	"8-5"
V-602 Starting Mat'l	56	N.D.	58
Wash three times	73	N.D.	60
Reacidify, wash two times	96	34	68
Synthetic V-501 Na 2,4-D: 21.5% NaCl 7.0% DCP 0.2%			
After Acidif. & Wash	N.D.	N.D.	N.D.
Repeat the synthetic V-501 spiked with 2750 ppm TCX			
After Acidif & wash	3150	N.D.	10

Note: Rhone Progil 2,4-D shows no detectable TCX, OCSX & "8-5"

Table 14: The Effect of Recrystallization of Na 2,4-D and 2,4-D Acid on Impurity Levels

Treatment		Impurity Level (ppm) TCX	OCSX	"8-5"	F-40** Dilution Test	Comment
Recrystallize Na 2,4-D	Before*	58	---	127	0.18	Product Highly colored
	After	81	53	54	0.3+	
Recrystallize 2,4-D From Perc	Before	52	N.D.	46	***	91% Recovery of 2,4-D
	After	1	N.D.	N.D.		
Recrystallize 2,4-D From Ethylbenzene	Before	52	N.D.	46	***	87% Recovery of 2,4-D
	After	N.D.	N.D.	N.D.		

*The impurities analysis was performed on a sample of 2,4-D acid isolated from Na 2,4-D without any extra treatment.

*20:1 dilution in 1000 ppm hard water, formulation contained 2% Versene and no P-4000.

**The recrystallized product behaved like the high purity Rhone Progil 2,4-D which is difficult to formulate as was mentioned earlier in this report.

GENERAL CONCLUSIONS

TX and other non-acidic impurities are formed chiefly in the reaction step of the 2,4-D by several routes.

A number of attempts to chemically and physically remove these species have met with limited success.

SAFETY & ECOLOGY

2,4-Dichlorophenol, 50% NaOH, and chloroacetic acid are highly toxic and corrosive raw materials. When handling, the protective clothing included lab coat, rubber gloves and goggles, and when possible, all operations were performed in a fume hood. A number of operations were carried out at elevated pressure which required the use of a face shield and secondary shielding in the hood. All waste samples and solutions were sent to the burner for disposal.

EXPERIMENTAL

The Preparation and Workup of 2,4-D

The following is a general description of the procedure used to prepare and isolate 2,4-D when simulating 948 Bldg. A 1 liter round bottom flask equipped with a bottom drain, two dropping funnels, a mechanical stirrer, a thermometer, and a distillation head was charged with 179g (1.1 moles) of 2,4-DCP and 48 g (0.6 moles) of 50% NaOH. The flask was heated with a heating mantel attached to an I^2R Thermowatch controller.

The reactor contents were heated while stirring and a DCP-water azetrope was distilled out. The distillation was continued until enough water was removed so that a temperature of 130°C could be achieved. Normally 9-10 ml of H_2O and 2-3 ml of DCP were removed. The DCP was returned to the pot. Then 47.3g (0.5 moles) of melted MCAA and 40.0g (0.5 moles) of 50% caustic were con-added from the two dropping funnels during 50-60 minutes at 130°C. The rates of addition were carefully controlled so that neither added reactant was significantly in excess of the other. Water and DCP continuously distilled out during the con-add and the DCP was returned to the reactor. After the addition was complete, the reaction was heated an additional 60 minutes. About 43-47 gms of H_2O was recovered in the con-add step. At the end of the post reaction samples of the viscous crude reaction melt were taken into ampoules, if desired.

The work up procedure for isolating the 2,4-D is as follows: (The amounts used assumes no samples were taken after reaction). The reaction mass was diluted with about 500 ml of water, heated to boiling to ensure complete dissolution and the pH was adjusted to 5.2±0.2 with about 12 ml of conc HCl. The solution was then extracted with six 150 ml portions of perc at a temperature of >90°C to remove the DCP. Occasionally 50-100 ml of additional H_2O was necessary to keep all of the solids dissolved. The extracted Na 2,4-D solution

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to boiling and any traces of perc were distilled off. The pH of the solution was then lowered to 0.5-0.7 with about 55 ml of conc HCl added rapidly and the molten 2,4-D layer was separated and drained into a beaker. The resulting brine was discarded. The 2,4-D was reslurried in 250 ml of hot distilled H_2O in the pot and washed in this manner two times. The final pH of the aqueous layer was 2.7-2.9. The 2,4-D was recovered and dried overnight at ambient temperatures.

The analyses of product and intermediate streams were performed by personnel in the 948 Bldg quality control laboratory. The analyses for TCX, OCSX, and "8-5" were performed as described earlier[8].

The Carbon Clean up of Molten 2,4-D

A glass pressure apparatus was assembled in which molten 2,4-D was pumped onto a carbon column (downflow). The apparatus is shown schematically in Figure 10. The flow of 2,4-D was controlled by c trolling the pressure drop across a capillary tube. To handle

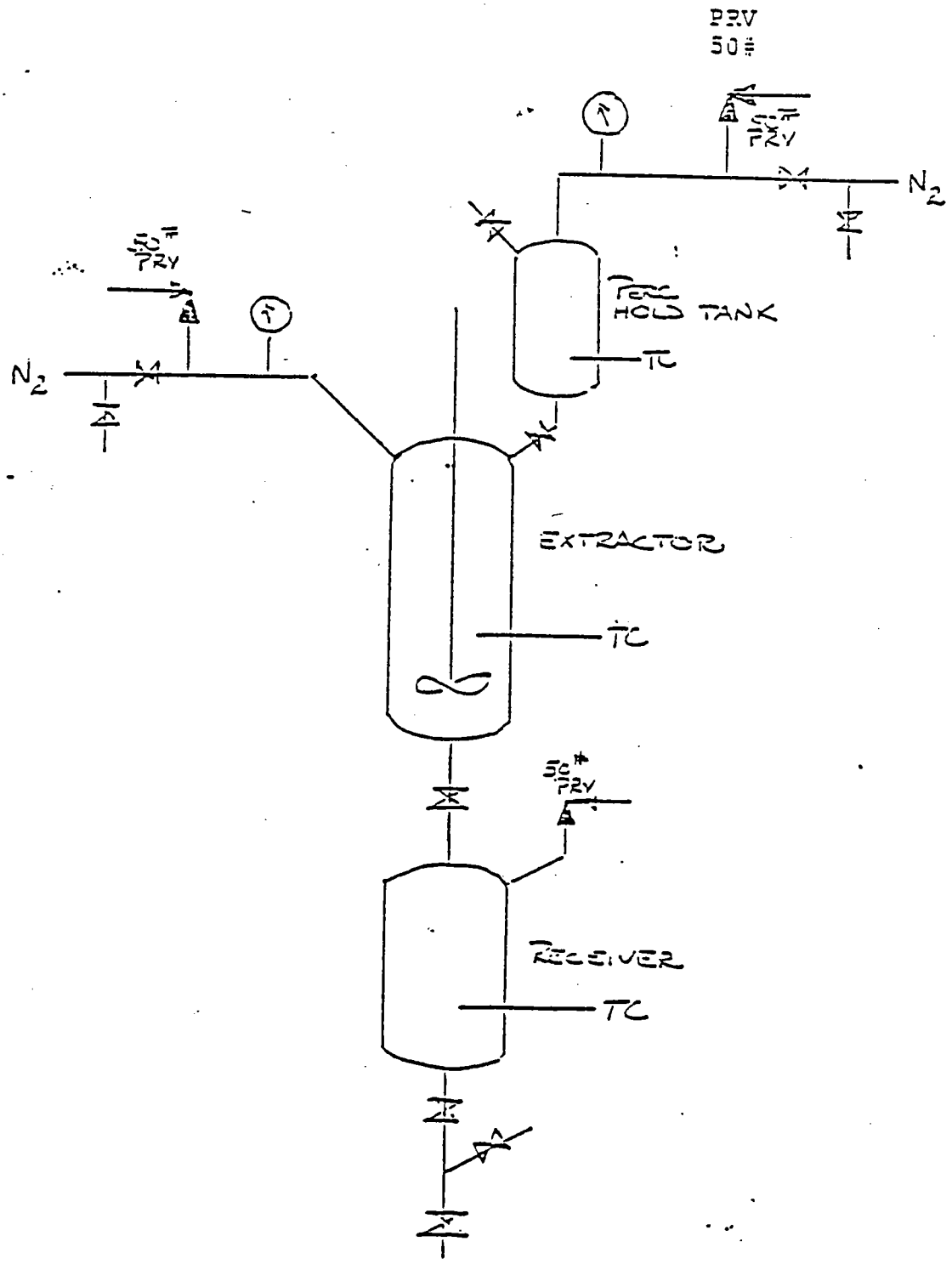
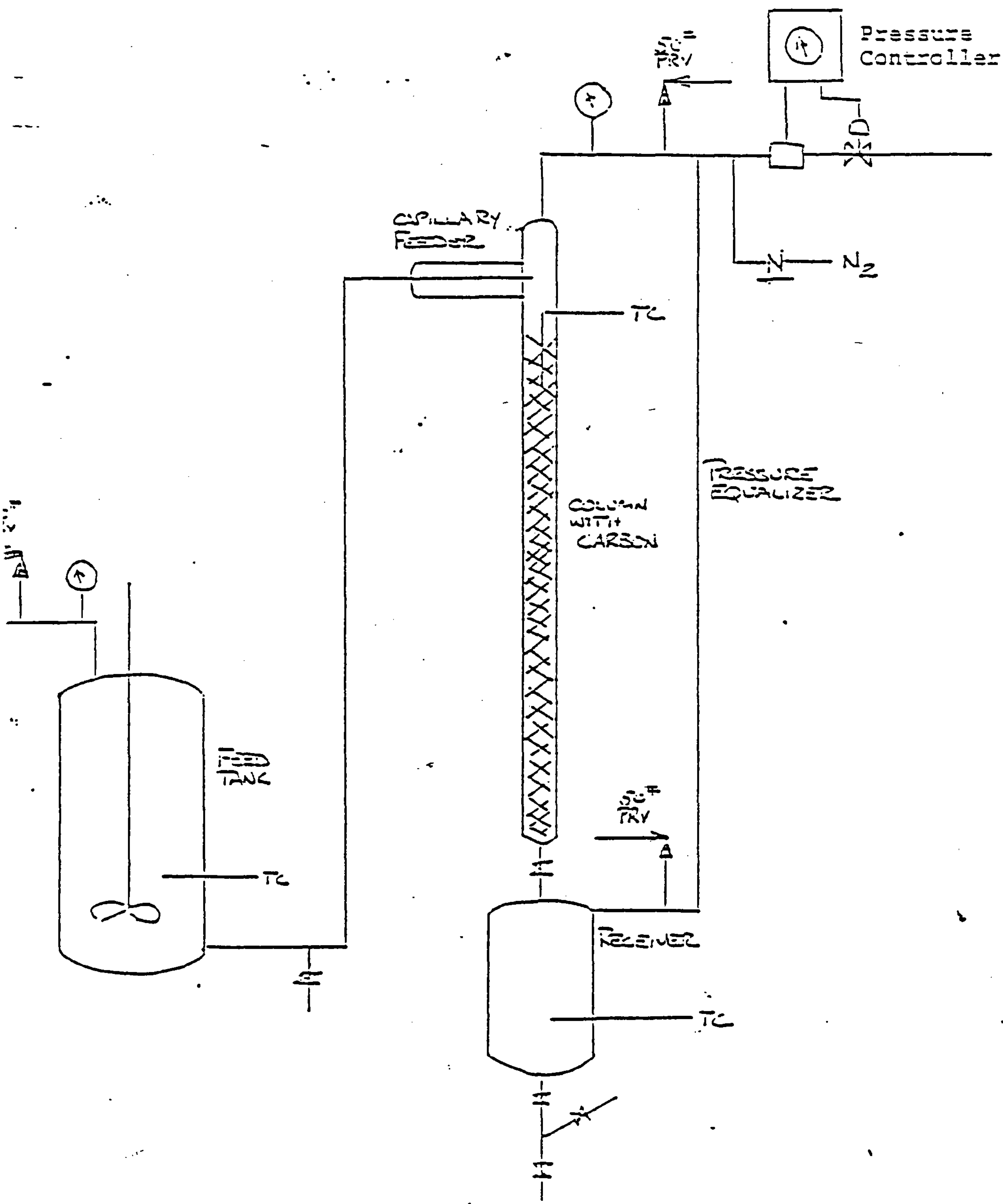


Figure 9: A Schematic Drawing of the apparatus used for Extracting DCP from Na 2,4-D with Perchloroethylene.

Figure 10: A Schematic Drawing of the apparatus used to treat Molten 2,4-D with activated carbon



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molten 2,4-D reliably and effectively, required at least 10 psig/ ~100-105°C to avoid flashing and freezing problems.

The 2,4-D and a slight excess of water were placed in the feed tank and heated to 110°C. When the entire contents were melted the valve on the bottom of the column was closed, the column was filled with molten acid to 1" above the top of the carbon, and the system stood for 60 min. The pressure drop across the capillary was adjusted to 7 psi (~10 ml/min flow) and the valve on the bottom of the column was adjusted so as to maintain the liquid level above the carbon bed. The results are shown in Table 10.

ACKNOWLEDGEMENTS

The authors wish to thank D. Humbert, R. MacLachlan, T. Evans, G. Jewett, P. Schloemann, and their colleagues for their analytical support. The assistance of K. First and his process modeling efforts are also acknowledged.

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K. L. Krumel OC 559, Pg. 95-131.

D-12330 2,4-D

DEC 1 1990

E.R. Zumwalt, Jr.
Admiral, U.S. Navy (Ret.)
1500 Wilson Boulevard
Arlington, Virginia 22209

Dear Admiral Zumwalt:

The Agency has recently received a full and unexpurgated copy of the Krumel Report, the Dow study which documents the formation of xanthones during a 2,4-D manufacturing process and the company's efforts to prevent the formation of those contaminants. In a June 8 letter, you provided this Office with an expurgated version of that report and asked the Agency to consider its implications for the regulation of 2,4-D compounds. At that time, I had informed you of the Agency's plans to locate and evaluate the full report.

The full report contains information that DowElanco (the successor of Dow Chemical Company) claims is Confidential Business Information because it relates information on manufacturing technology. The Agency is following a formally established procedure to verify that claim. The claim by DowElanco prevents the public release by EPA of the full report pending a determination of the validity of the claim. DowElanco has also provided a copy of the report from which all the material claimed to be confidential has been deleted. This expurgated report has been placed on the Public Docket, and I am enclosing a copy for your use. The new expurgated version differs somewhat from the version you transmitted in your letter of June 8; there are fewer deletions.

The Office of Pesticide Programs is researching toxicologic data on the compounds reported in the Dow document. I will keep you advised of the outcome of that review, and of the Agency's judgement on DowElanco's claim of confidentiality.

Sincerely yours,

Douglas D. Campt, Director
Office of Pesticide Programs

Enclosure

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D-12233 /2,4-D A

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BUSINESS INFORMATION

R & D REPORT

DOW CHEMICAL U.S.A.

RESTRICTED: for use within The Dow Chemical Company only.

LABORATORY REPORT CODE: OC/78-85

DATE ISSUED: October 27, 1978

DEPARTMENT: ORGANIC CHEMICALS RESEARCH

LAB. NO. | PROBLEM NO.: 0 5 0 9 0 0 0 0 0 0

TITLE: A STUDY OF THE FORMATION AND REMOVAL OF IMPURITIES IN THE SEMI-HYDROUS PROCESS FOR 2,4-D

PAG IN FI REPC 5

AUTHOR(S): K. L. Krumel & R. F. Arnold

AUTHOR(S) SIGNATURE(S): Karl L. Krumel R.F. Arnold (by KLK)

REVIEWER'S SIGNATURE: Peter W. Owen

This report is: [X] INTERIM [ ] FINAL and mainly: [X] NEW [ ] REVIE

CRI NUMBER → 790381

DESCRIPTIVE SUMMARY WITH CONCLUSIONS: (Include in this space references to data books, and to earlier relc reports, patents and publications.)

Shortly after the startup of the new 2,4-D process in 948 Building, a new and unexpected class of nonacidic impurities were isolated in which two of the major components were tetrachloroxanthone and octachlorospirobixanthene. These impurities were causing problems in the subsequent formulation of 2,4-D as amine salts.

A project was started to learn the source of these impurities and methods for controlling them. It was found that the impurities are formed mainly in the 2,4-D reaction step by several different routes and that the rate of formation is increased by increased caustic ratios, perchloroethylene, heat and iron.

A number of techniques were evaluated for removing the impurities including carbon treatment, recrystallization, bleaching, varying reaction conditions, and improved washing. None of the treatments were totally successful.

In the plant, the impurities tend to concentrate in the recirculati perchloroethylene system. It has been found that by increasing the capacity of the perchloroethylene distillation column from 0.7 to 15 gpm, the steady state concentration of impurities is reduced to where they do not adversely affect general product quality or the ability of the plant to operate at optimum rates.

pjd

Releasable per January 21, 1991, letter from Dow Elanco. 20261

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R & D ADMINISTRATION

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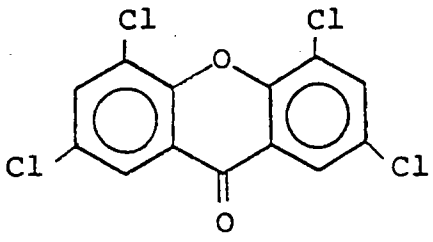
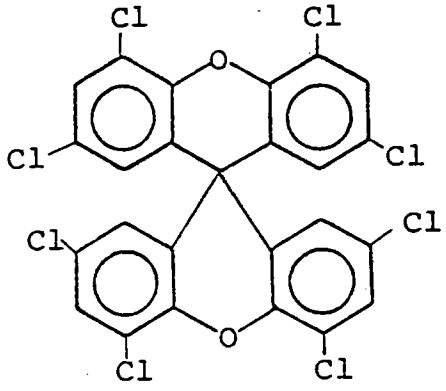
INTRODUCTION

A new process for preparing high purity 2,4-D was started in May 1977 at 948 Building. The high purity molten acid is transferred by pipeline from 948 Building to 489 Building where it is formulated into esters and water soluble amine salts. Starting in late October 1977, precipitates were observed regularly in diluted amines formulations that were found to be made up of a number of impurities associated with the process but that were never detected during laboratory or pilot plant development work. In addition, these impurities were not found in the old 489 Building aqueous 2,4-D process. R. McLachlan[1] analyzed the precipitates and found 1,3,6,8-tetrachloroxanthone (I: TCX), 1,1'3,3'6,6'8,8'-octachloro-9,9'-spirobixanthene (II: OCSX), and marginally soluble salts of 2,4-D.



(I)



(II)

A screening program in the plant showed TCX at levels of 200-500 ppm in the crude reaction mass, the recycle sodium dichlorophenate (NaDCP) solution, and in the final product. Levels of 1000-2000 ppm were found in the perchloroethylene (Perc) solvent and as much as 10% in the perc still tars.

McLachlan[1] analyzed a sample of perc still tars and his results are summarized in Table 1.

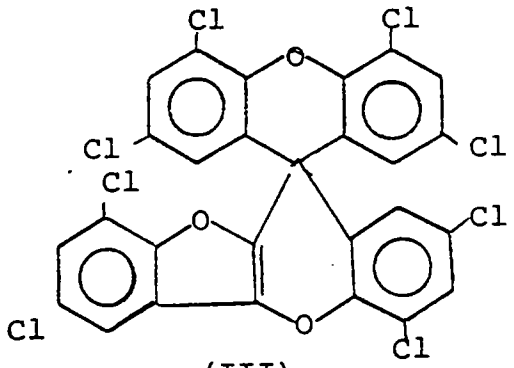
Table 1: An Analysis of One Perc Tar Sample

Structure	Approximate Percentage	Comment
Perc	60%	Main Component
Diethylbenzene	25%	From a heat exchanger leak (Dowtherm J)
DCP	0.5%	raw material
2,4-D	0.01%	Product
TCX (I)	1.5%	
OCSX (II)	1.1%	
Dichlorophenyl-dichlorovinyl ether	1.2%	Rxn product of NaDCP & perc & its impurities
Dichlorophenyl-trichlorovinyl ether	0.8%	

Plus:

at least eleven other minor components structurally similar to the above. See Ref. 1 for details.

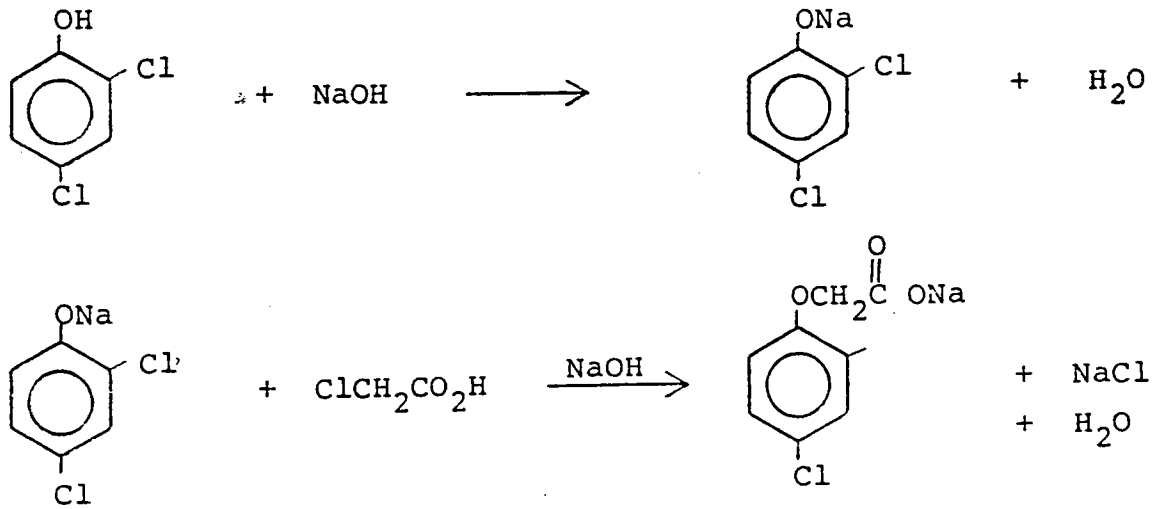
A project was started to study the formation of TCX and OCSX in some detail to learn more about their formation and fate in the process because it is not obvious how they are made. Several months after starting this study, another significant impurity was found in the product and, to a lesser extent, in the perc tars. It was identified as (III: "8-5") 2,2',4,4',5',7,7',9-octachlorospiro-(benzofuro(3,2-b)-benzopyran-11,9'-xanthene).



(III)

A description of the 2,4-D process in 948 Building is as follows:

Main Reactions

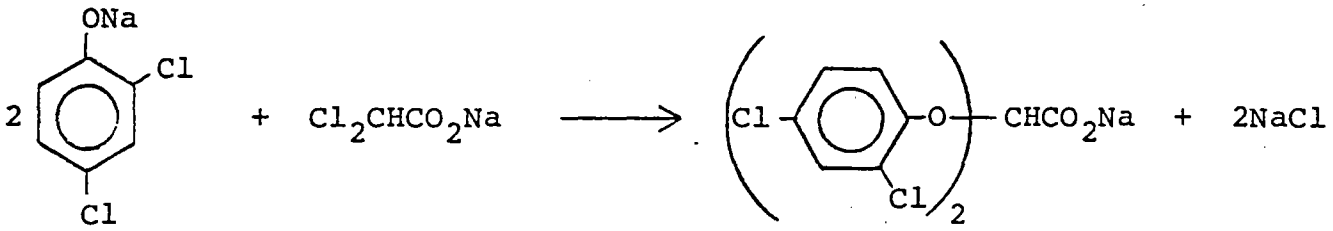


Na 2,4-D

Important Side Reactions

$$ClCH_2CO_2Na + NaOH \longrightarrow HOCH_2CO_2Na + NaCl$$

Glycolic Acid



"Bis 2,4-D"

The reaction is performed in two stages by first reacting 2.2 moles of DCP with 1.2 moles of caustic (added as 50% NaOH) to form a solution of NaDCP in DCP.

High purity 2,4-dichlorophenol (2,4-DCP) made by the chlorination of phenol with sulfuryl chloride in the presence of $FeCl_3$/Diphenyl sulfide catalyst is used with chloroacetic acid (MCAA) made by the oxidation of vinylidine chloride to make 2,4-D as shown above. The typical raw materials analyses for each is shown in Table 2.

Table 2: Typical Raw Material Analyses for the 2,4-D Process

	DCP		MCAA
2,4-DCP	98.5%	MCAA	99.0%
2,6-DCP	∿0.8%	Dichloroacetic acid	0.3%
Other Chloro-phenols	∿0.5%	Chloromaleic acid	∿0.05%
		H_2O	<1.0%

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The solution is then boiled down to remove most of the water. Then, 1.0 moles of NaOH (added as 50% NaOH) and 1.0 moles of MCAA are added to the solution at 130° and the water formed is continuously boiled off. The crude product, whose approximate analysis is shown below, is transferred to a storage tank that feeds the continuous purification equipment.

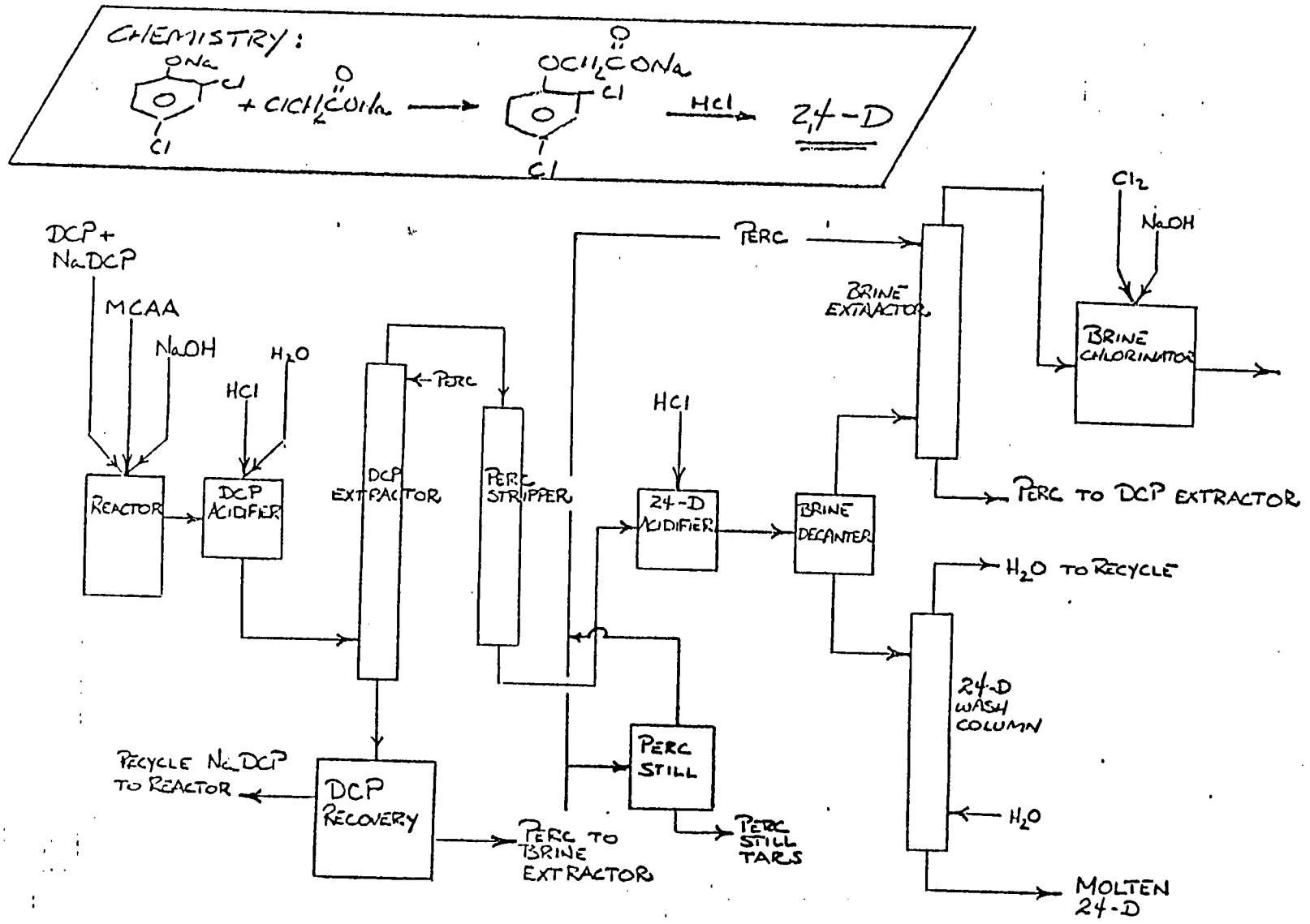
Approximate 2,4-D Crude Product Analysis

Na 2,4-D	45%
Na DCP	10%
DCP	30%
NaCl	12%
H_2O	3%

The 2,4-D is purified by partial acidification to selectively neutralize the DCP, extraction with Perc to remove the DCP, and then final acidification to liberate molten 2,4-D which is decanted from the brine and washed with water. A schematic flow sheet of the process is shown below.

A rapid initial screening of the toxicity of purified TCX and perc tars gave the following results.

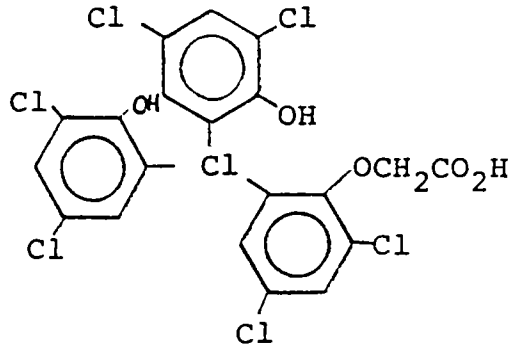
	Oral LD_{50} (single dose)	Skin/Eye
Perc Tar (contains 3-5% TCX + OCSX)	>5g/Kg	slight transient initiation. Chloracne response after 10 applications of neat tars.
Purified TCX	>4g/Kg	not irritating. Chloracne response after 10 applications of 1% solution in $CHCl_3$.


CHEMISTRY:
+ ClCH2CONa
HCl
2,4-D
DCP + NaDCP
MCAA
NaOH
H2O
HCl
REACTOR
DCP ACIDIFIER
DCP EXTRACTOR
PERC
PERC STRIPPER
PERC
HCl
24-D ACIDIFIER
BRINE EXTRACTOR
BRINE DECANTER
Cl2
NaOH
BRINE CHLORINATOR
PERC TO DCP EXTRACTOR
H2O TO RECYCLE
24-D WASH COLUMN
H2O
MOLTEN 24-D
RECYCLE NaDCP TO REACTOR
DCP RECOVERY
PERC TO BRINE EXTRACTOR
PERC STILL
PERC STILL TARS

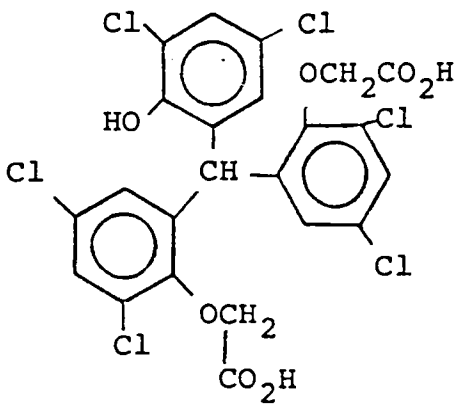
24-D PROCESS

These results are encouraging from a plant hygiene standpoint, but more data is necessary regarding long term effects. When the impurities were first discovered in the plant, the perchloroethylene still was used very occasionally and at a rate of <1 gpm vs a total perc flow of 40 gpm. The still was originally added to the process as a way of purging contaminants out of the stream to maintain high quality recycle solvent. At this point, perc tar impurities made up 60-75% of the precipitates formed in diluted amines formulations.

About February 1978, the capacity of the perc still was increased to 3 gpm and the average levels of TCX levels dropped to ∿50 ppm in the crude reaction mass and product and to 200-500 ppm in the recycled perc. From the period of March-May 1978, the ability to produce quality 2,4-D continued to improve and the amount of perc tar impurities found in the dilution test precipitates dropped to 10% of the total[3]. The balance were sparingly soluble metal salts of 2,4-D and some new impurities called Complex 1 and Complex 2, two of which are shown below (IV & V).



IV



V

In July 1978, the perc still capacity was increased to 15 gpm and efforts gained at understanding the parameters affecting formulation quality by S. Siegel (OCR), S. Schell (Production 489), and J. King (Formulation - 9001 Bldg) and their co-workers have greatly improved

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the consistency with which 948 Bldg. 2,4-D can be formulated. Based upon partition coefficients and data on the rate of formation of TCX to be discussed later in this report, K. E. First[4] (Process Engineering) generated a computer program which predicted that by distilling 15 gpm of recycle perc, the steady state level of TCX in the product would be ∿10 ppm and in the recycled perc the TCX level would be ∿40 ppm.

The purpose of this report is to present data on the formation and fate of the impurities in the 2,4-D process. In addition, the results of experiments aimed at reducing or eliminating the impurities by chemical and physical methods will be presented.

RESULTS AND DISCUSSION

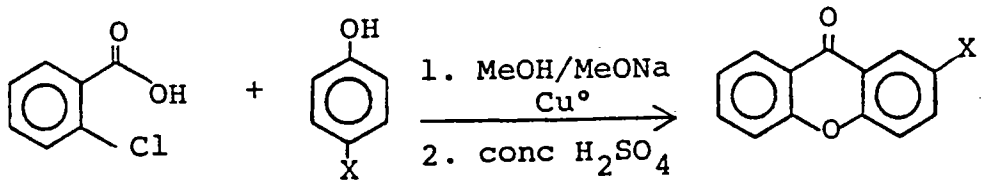
This study was divided into the following sections and the results of each are discussed separately.

(A) The mechanism of TCX formation.
(B) The distribution of TCX in the process.
(C) Reduction of TCX by chemical means.
(D) Reduction of TCX by physical means.

Although there are many impurities formed in this process, it was decided to focus the research on TCX for several reasons: (1) The rate and mode of formation of TCX was the most predicable of the major multicyclic impurities; (2) it was a major impurity; (3) a pure sample was readily obtained (by D. Humbert, Anal. Lab); (4) the analysis is not complicated; and; (5) structurally, it is the simplest of the multicyclic impurities.

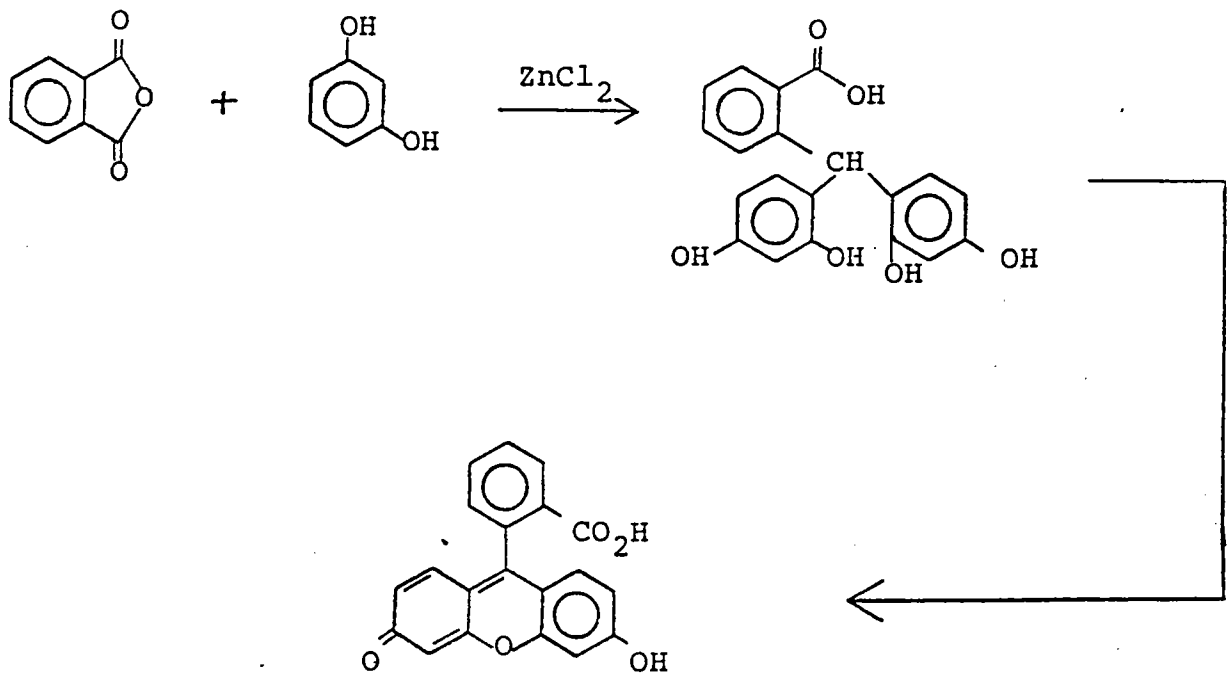
(A) The Mechanism of TCX Formation

A brief search of the literature including Chemical Abstracts showed that the xanthone ring system is formed from a number of reactions.[5] A common synthetic reaction is shown below in which the -X is included

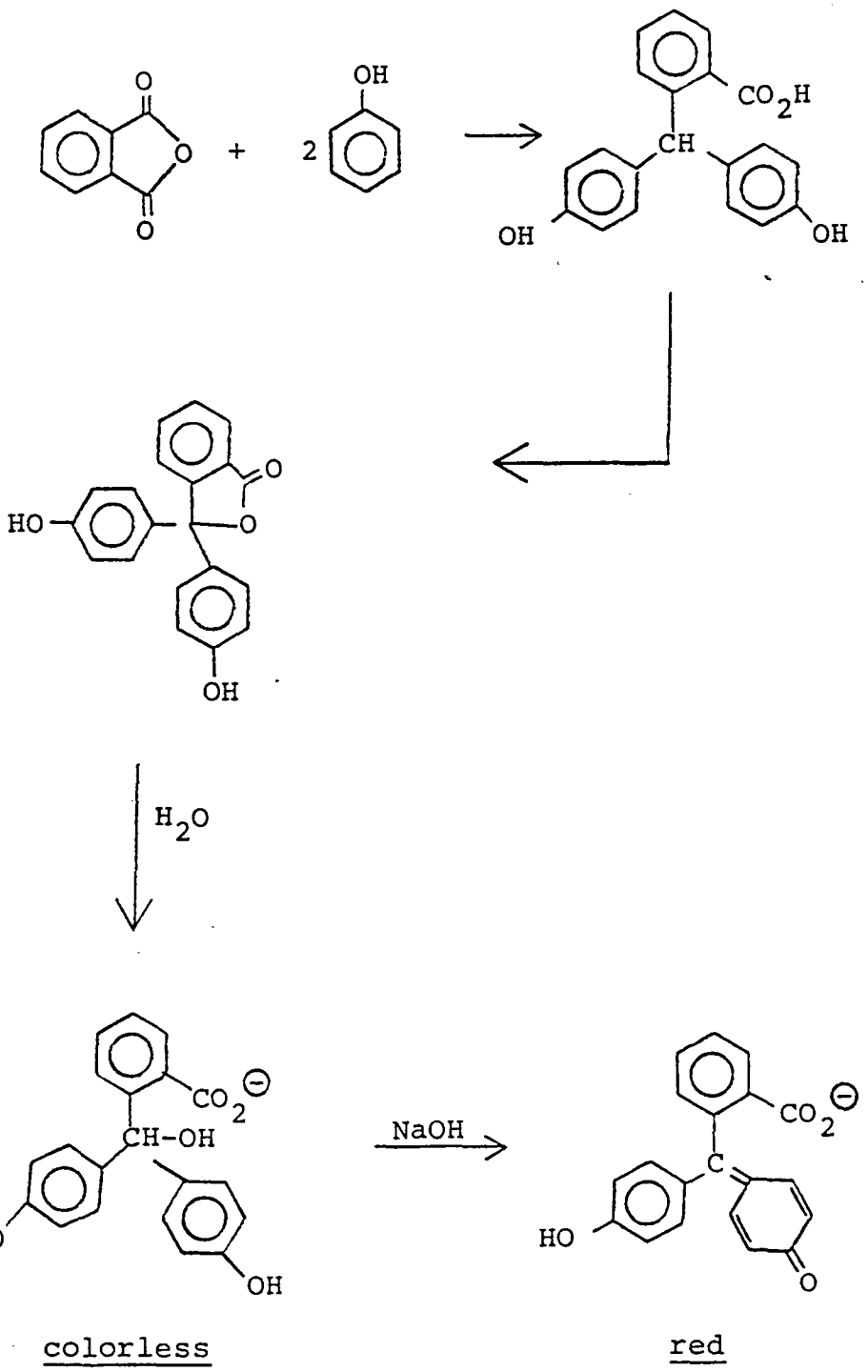


to show the orientation of reaction. Xanthone is formed along with other products from the pyrolysis of o-chlorobenzoic acid, salicylic acid, aspirin, o-phenoxybenzoic acid, and salts of the carboxylic acids. Most of these cyclizations take place in the presence of acidic catalysts such as P_2O_5, $AlCl_3$, Acetic anhydride, or sulfuric acid. Xanthone is prepared in reasonable yield[6] by the pyrolysis of phenol salicylate with or without a catalyst.

The ease of formation of ring systems that are structurally similar to xanthones is most clearly shown by the formation of fluorescein and fluorescein dyes. Fluorescein[7] is made by reaction of phthalic anhydride and resorcinol as shown on the following page.



Phenolphthalein[8] is also made by this process using phenol instead of resorcinol.



colorless red

These background data give some important clues as to reaction mechanisms as will be whown later in the report.

In order to understand the pathway of TCX formation, a series of ampoule tests were performed to determine which chemicals and/or combinations give rise to TCX. Table 3 summarizes the results of this study. A series of ampoules (25 ml capacity) were charged with 3-6 gms of mixtures in molar ratios as shown inTable 3 and were heated in an oil bath fo 72 hours at 160°C. The sources of the chemicals were as follows:

2,4-D: High Purity Rhone-Progil Acid
DCP : Doubly distilled 948 Bldg material
Perc :
NaOH :
Glyoxal :
Glyoxylic acid :
Tetrachloroethane :
(50:50 1,1,2,2- & 1,1,1,2-isomers)

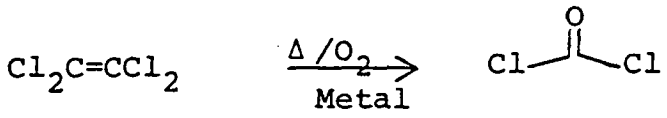
} Reagent materials

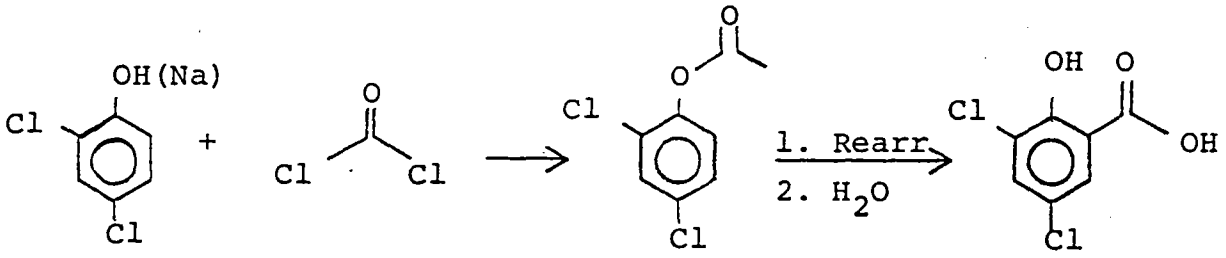
Run #	Molar Ratio						rpm TCX
	2,4-D	DCP	NaOH	Perc	Bis 2,4-D	Other	
1	1.0						N.D
2	1.0	1.0					N.D
3	1.0		1.0				N.D
4	1.0		2.0				N.D
5		1.0	1.0				N.D
6					1.0		N.D
7	1.0	1.2	1.16				8
8	1.0	1.4	1.16				28
9	1.0	1.2	1.16	0.06			24
10		1.0	0.26	0.25			24
11	1.0	1.2	1.16			TCE mixture*: 0.11	21
12			1.15		1.0		12
13		4.7	1.5		1.0		189
14	1.0		1.0			NaCl:1.5, H_2O: 26.0	-ND
15		1.0	0.16			3,5-dichlorosalicylic acid: 0.16	10
16		1.0				" "	N.D
17		1.0	0.26			Glyoxal: 0.26	10
18		1.0	0.26			Glyoxylic Acid: 0.55	21

*TCE Mixture: 50:50 Mixture of 1,1,1,2- & 1,1,2,2-Tetrachloroethane

Table 3: The Formation of TCX from Synthetic Mixtures Heated at 160° for 72 hrs.

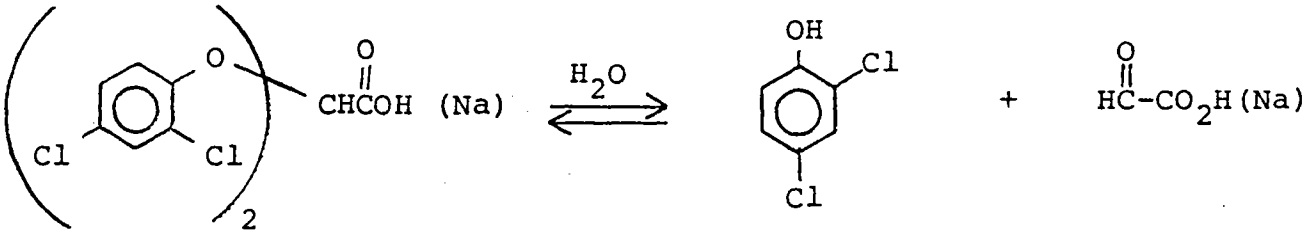
Several compounds other than those found in the process were tested. The tetrachloroethane mixture is a known contaminant in tne 941 Bldg. chloroacetylchloride that is used to make MCAA. 2,5-Dichlorosalicylic acid is a proposed intermediate from the reactions suggested below:





The decomposition of perc to yield phosgene is known[9] but the second reaction is only speculated.

The glyoxylic acid is postulated to come from bis 2,4-D as shown below:



which is a well known acetal hydrolysis. The glyoxal was included to show the general nature of the reaction whose mechanism is suggested later in this report.

Several tentative conclusions can be made from the data in Table 3.

(a) TCX can be made by several routes
- NaOH and/or NaDCP is necessary for the formation of TCX.
- bis-2,4-D appears to be a key intermediate.
- Perc is a source of TCX.

(b) Significant amounts of TCX are probably made only in the reactor crude storage tank in the plant since strong base is required. Run 14 (Table 3) simulates the Na 2,4-D storage tank (V-501: 948 Bldg) and Run 1 (Table 3) simulates the product storage tank (V-602: 948 Bldg) in which no TCX was observed.

In order to study the formation of TCX as a function of reaction parameters, a series of 2,4-D reactions were performed in the laboratory. These reactions were run to evaluate the effect of different raw materials, perc, air/N_2, and iron on the amount and rate of TCX formation. The data are summarized in Table 4. In these experiments, 1.1 mol of DCP was treated wth 0.6 mol of caustic and the mixture was heated to 130°C. The majority of the water that was formed was boiled off. To this mixture, 0.5 mol of NaOH and 0.5 mol of MCAA were con-added during 1 hr at 130° and the crude product was heated an additional 1 hr. Water was continuously distilled out during the con add step. At this point the desired number of ampoules were charged with 5-10 gms of crude reaction mixture and were heated in oil baths at 130°, 145°, and/or 160° for 24, 48, and 72 hours.

Table 4: The Parameters Affecting the Formation of TCX in the Semi-Hydrous Process for Preparing 2,4-D

2,4-D Reference	Dow Material Source DCP	Dow Material Source MCAA	% DCAA on MCAB	NaDCP / NaMCAB Ratio	Air or N_2 Purge	% Water Added	ppm Fe^{+3} Added	Heat-Age Tests in Ampoules — ppm of TCX — Temp (°C)	Initial	24 hrs	48 hrs	72 hrs	Comments
OC 417-5-130	Dow 948 Bldg	Dow	0.4	1.2	Air	—	—	130	N.D.	TR	23	32	
								145	N.D.	22	48	110	
								160	14	125	234	280	
OC 417-5-118	Dow 948 Bldg	Dow	0.4	1.2	Air	1.1%	—	130	ND	13	29	49	
								145	TR	92	83	127	
								160	6	86	132	230	
OC 417-5-120	Dow 948 Bldg	Dow	0.4	1.2	N_2	1.1%		130	ND	TR	17	18	
								145	ND	20	59	104	
								160	TR	55	111	160	
OC 417-5-125	Dow 948 Bldg	Hoescht	0.2	1.2	Air	—	—	130	ND	8	12	13	
								145	ND	24	—	39	
								160	ND	52	93	94	
OC 417-5-128	Dow 948 Bldg	Hoescht	0.2	1.2	Air	1.1%	—	130	—	14	22	53	
								145	—	24	58	96	
								160	—	49	96	144	
OC 417-5-127	Dow 949 Bldg	Hoescht	0.2	1.2	Air	—	—	160	N.D.	49	91	—	DCP from the old Dow process Direct Chlorination; lower Acid
OC 417-5-135	Dow 948 Bldg	Hoescht	0.2	1.0	Air	—	—	160	N.D.	TR	52	125*	*After 96 hrs heating
OC 415-5-131	Dow 948 Bldg	Dow Chlorinated DCAA	10%	1.2	Air	—	—	160	ND	167	487	575	Spiked MCAA with DCAA
OC 640-16	Dow 948 Bldg	High Purity	N.D.	1.2	Air	—	—	160	—	12	41	56	
OC 640-68	Dow 948 Bldg	Dow	0.4	1.2	Air & CO_2	—	—	130	5	7	12	29*	*After 120 hrs heating Initial reactor was spiked with 20 mol% $NaHCO_3$ & purged with CO_2 during post reaction
								160	—	81	219	444*	
OC 640-64	Dow 948 Bldg	Dow	0.4	1.2	Air	—	500	130	6	14	30	75	
								160	—	241	766	1002	
OC 640-66	Dow 948 Bldg	Dow	0.4	1.2	Air	1.1%	500	130	ND	9	28	42	
								160	—	177	555	908	
OC 640-67	Dow 948 Bldg	Dow	0.4	1.2	Air	—	200	130	9	14	37	126±	*After 120 hrs heating
								160	—	273	366	932±	
OC 640-73	Dow 948 Bldg	Dow	0.4	1.2	Air	—	25	160	5	61	273	394	

The data in Table 4 show a number of interesting points. It must be emphasized that in view of the fact that these data are based on parts-per-million chemistry, the precision must be subject to some error. The data are reproducible to about 20%.

(A) Effect of Dichloroacetic Acid in MCAA

Runs 1,4,8, and 9 show that DCAA affects TCX formation presumably through the formation and decomposition of bis-2,4-D. Run 9 was especially interesting because not only was TCX made but bis 2,4-D was observed as shown below:

	Hrs at 160°C		
	24	48	72
ppm TCX	12	41	56
% Bis	0.4	0.3	0.2

These data indicate there is another route to bis-2,4-D besides reaction of NaDCP with dichloroacetic acid since the monochloroacetic acid used in this experiment showed no detectable DCAA (< 100 ppm) by liquid chromatography.

(B) Effect of Perchloroethylene

Whereas Perc showed a significant increase in TCX levels in the ampoule experiments, its effect in the reactions is uncertain. In most of the runs, the reactions contaminated with perc showed more TCX at 130°C and similar amounts at 160°C.

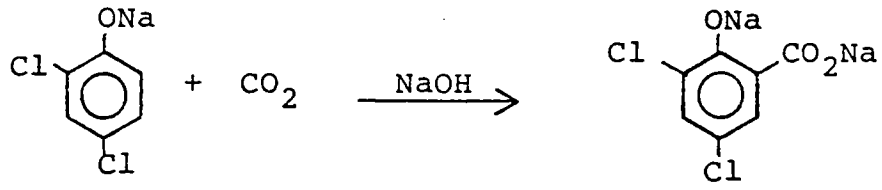
K. E. First, Process Engineering,[4] ran a computer analysis of the data which gave the best fit when calculated as two consecutive first order reactions with an Ea = ∿30 Kcal/mol. In the presence of perc the Ea dropped to ∿15 Kcal/mol. These data suggest that there is another

more facile route to TCX from perc whose effect is masked at the higher temperatures by a primary route (compare Table 4, Runs 1 & 2 and Runs 3 & 4).

(C) Effect of Atmosphere in the Reactor

Nitrogen blanketing appears to lower the TCX level to ∿2/3 that observed in air. It is not certain that this result is significant and since the magnitude of the drop was low, further work was not warranted. Since CO_2 is known to be present[10] in the vapor space throughout the 2,4-D process, a run was made to determine its effect on TCX formation. Carbon dioxide comes into the process from the caustic and from perc decomposition.

The reaction was run as described earlier with 20 mol% of $NaHCO_3$ added before the boil down step and then blanketing the reaction mass with CO_2 during the post reaction heating step. Since this is a high temperature, nearly anhydrous process, the following reaction was thought possible which could eventually lead to TCX (See Table 3, Runs 15 and 16).



Comparing Runs 1 and 10 (Table 4) show that $NaHCO_3$ and/or CO_2 do not measurably affect the formation of TCX.

(D) Changing NaDCP/NaMCAA Ratio

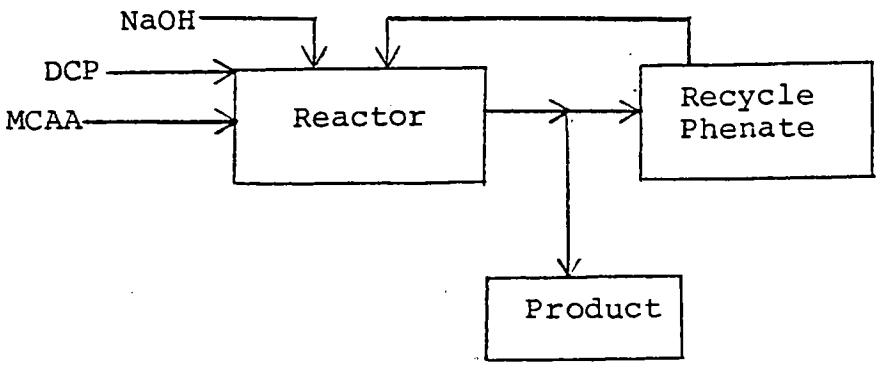
Comparing Runs 1 and 7 (Table 4) show that lowering the NaDCP/NaMCAA ratios significantly reduces the TCX levels as was also predicted from the data in Table 3. The effect was studied further and is discussed later in this report.

(E) Source of DCP

A run was made using the old lower purity DCP from the 349 Bldg process and assure that 948 Bldg, high purity, DCP was not a source of TCX. Run 6 shows that TCX formation is not associated with the source of DCP.

(F) Effect of Ferric Ion

Runs 11-14, Table 4, show that Fe^{+3} clearly increases the rate of TCX formation which suggest that alkylation step(s) are involved. D. Humbert and colleagues[7] performed a material balance of Fe in the following scheme.



They found that most of the iron is entering the process in the caustic and that the reactor normally contains 20 ppm of Fe^{+3}. A recurring problem for the past several months was how to explain the fact that the plant observed TCX formation rates that were 5 times greater than the lab. The iron results explain at least part of this discrepancy and suggest that efforts aimed at removing iron from the process are desirable.

Based upon the data presented up to this point, the mechanism shown in Figure 1 for TCX formation is suggested. This mechanism is consistent with the observations of the effect of caustic, the fact that TCX can be made from NaDCP and glyoxal or glyoxylic acid and the levels of bis-2,4-D. If this mechanism is correct, it is easy to see how perc can influence TCX formation when one considers the possible hydrolysis products using either NaOH or NaDCP. Some of these possibilities are shown in Figure 2 and many are known precursors to TCX.

In addition to TCX, OCSX and "8-5" are known to be formed in measurable quantities during the reaction to 2,4-D. It was initially assumed that TCX is the probable precursor to OCSX and "8-5". However, a series of ampoule experiments in which TCX was mixed with various ratios of DCP, 2,4-D, NaOH, and perc showed none formed in detectable amounts. In addition, a reaction was run in the presence of 500 ppm of added TCX and gave normal levels of the impurities when the 500 ppm of added TCX is subtracted out. It is apparent that OCSX, "8-5", and TCX are probably made by independent routes and proposed mechanisms are shown in Figures 3 and 4.

Figure 1: Proposed Mechanism of TCX Formation

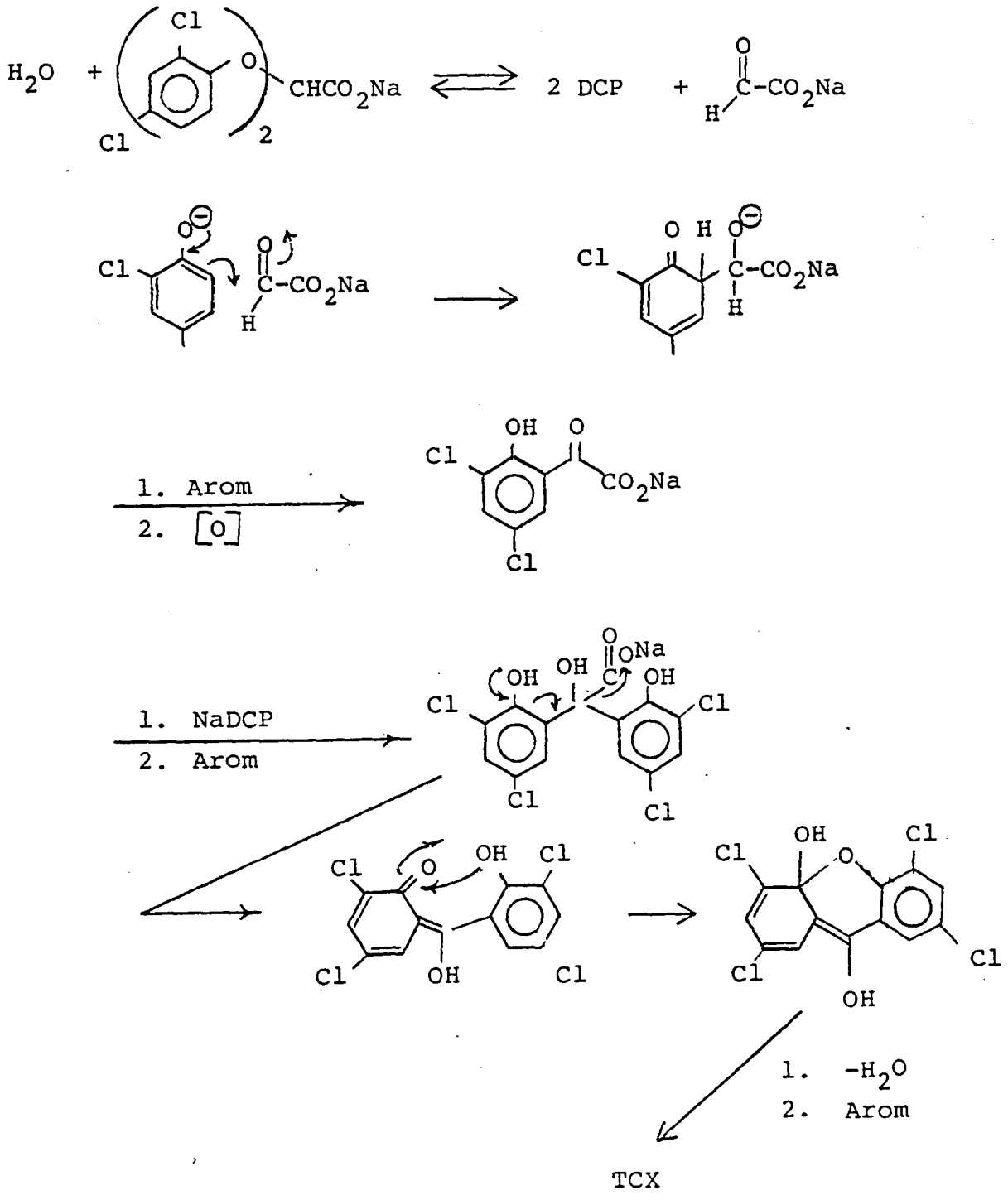


Figure 2: Some of the Possible Products of the Hydrolysis of Perchloroethylene with NaOH or NaDCP

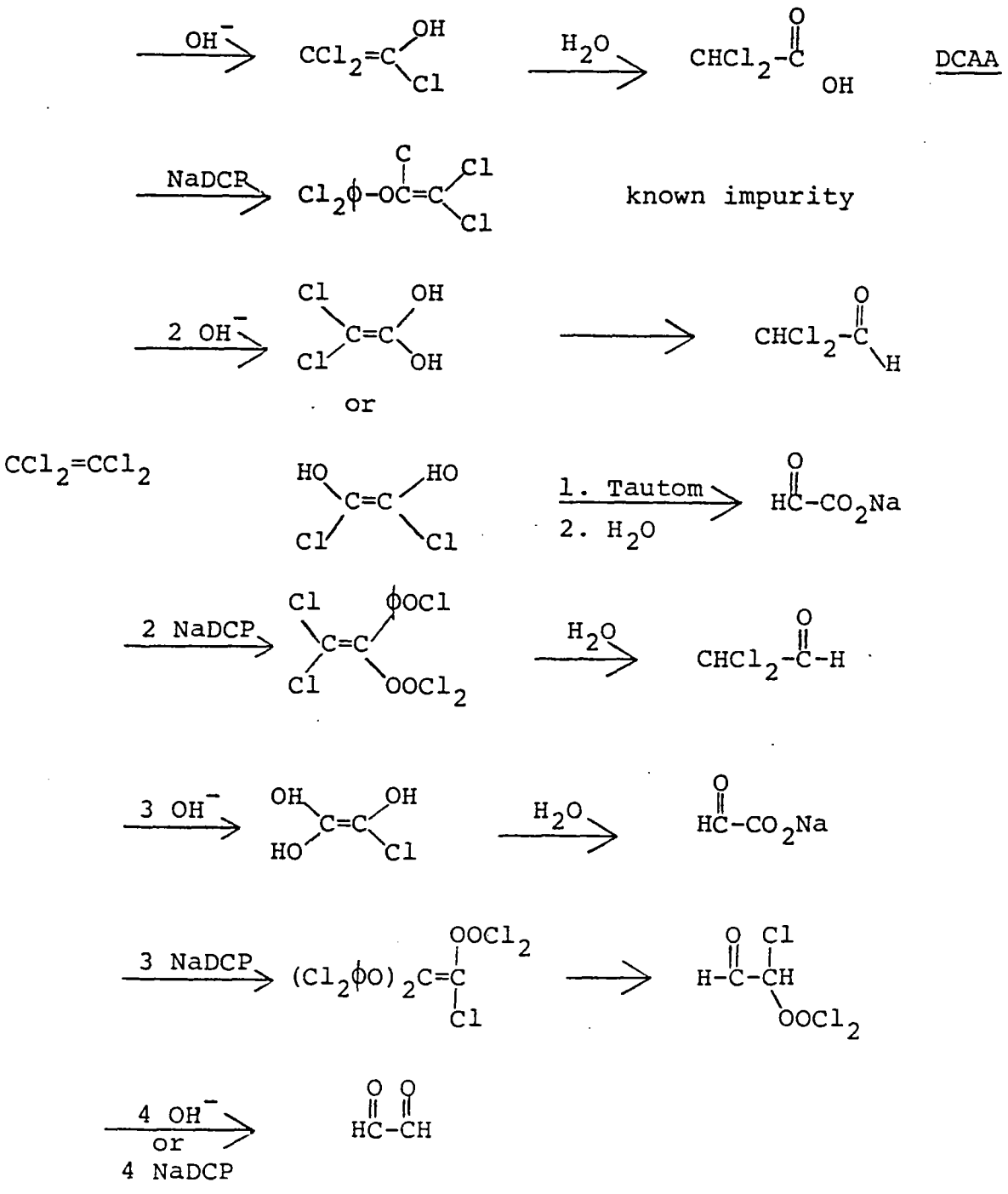


Figure 3: Proposed Mechanism for the Formation of OCSX By a Route That is Independent of TCX

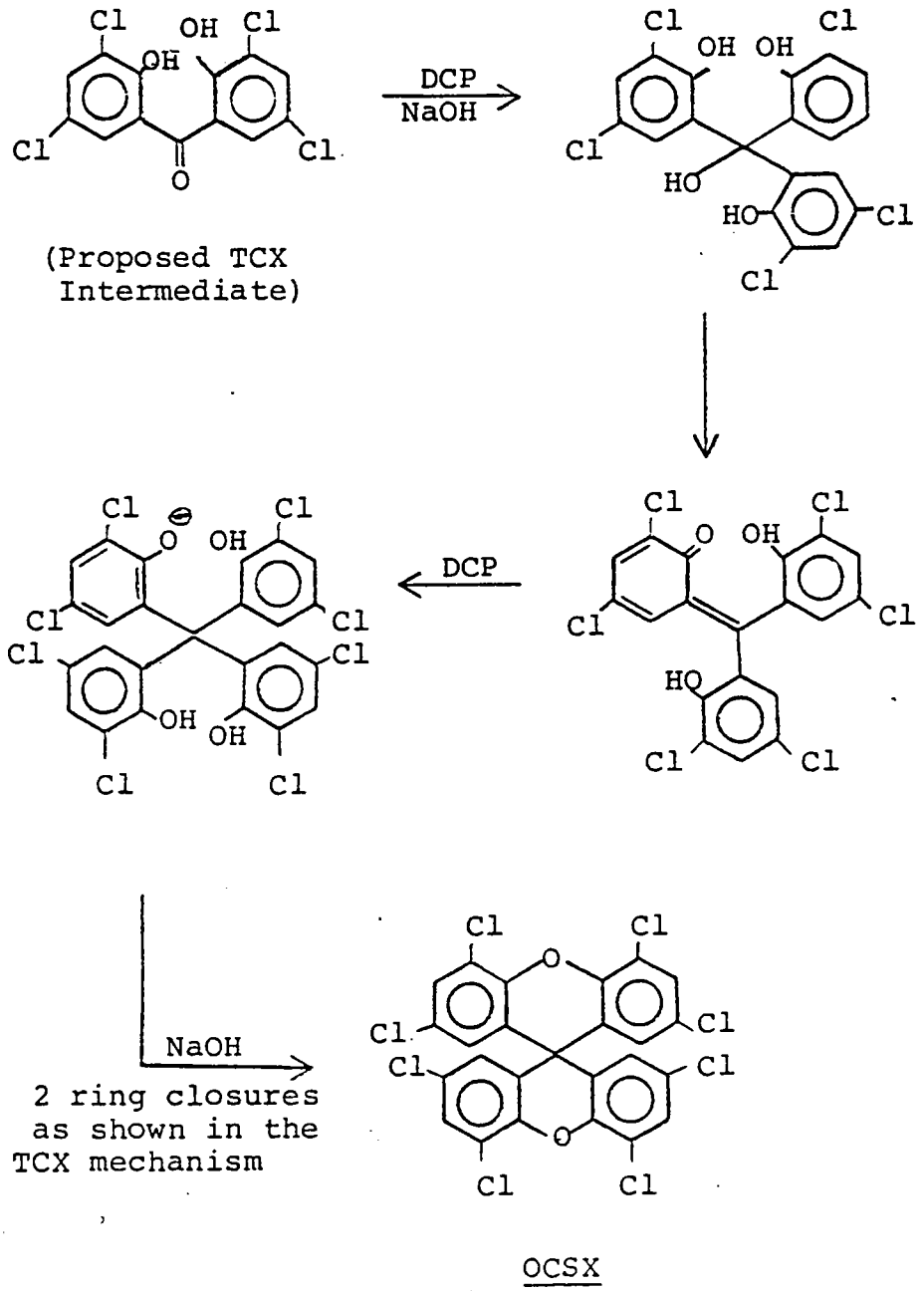
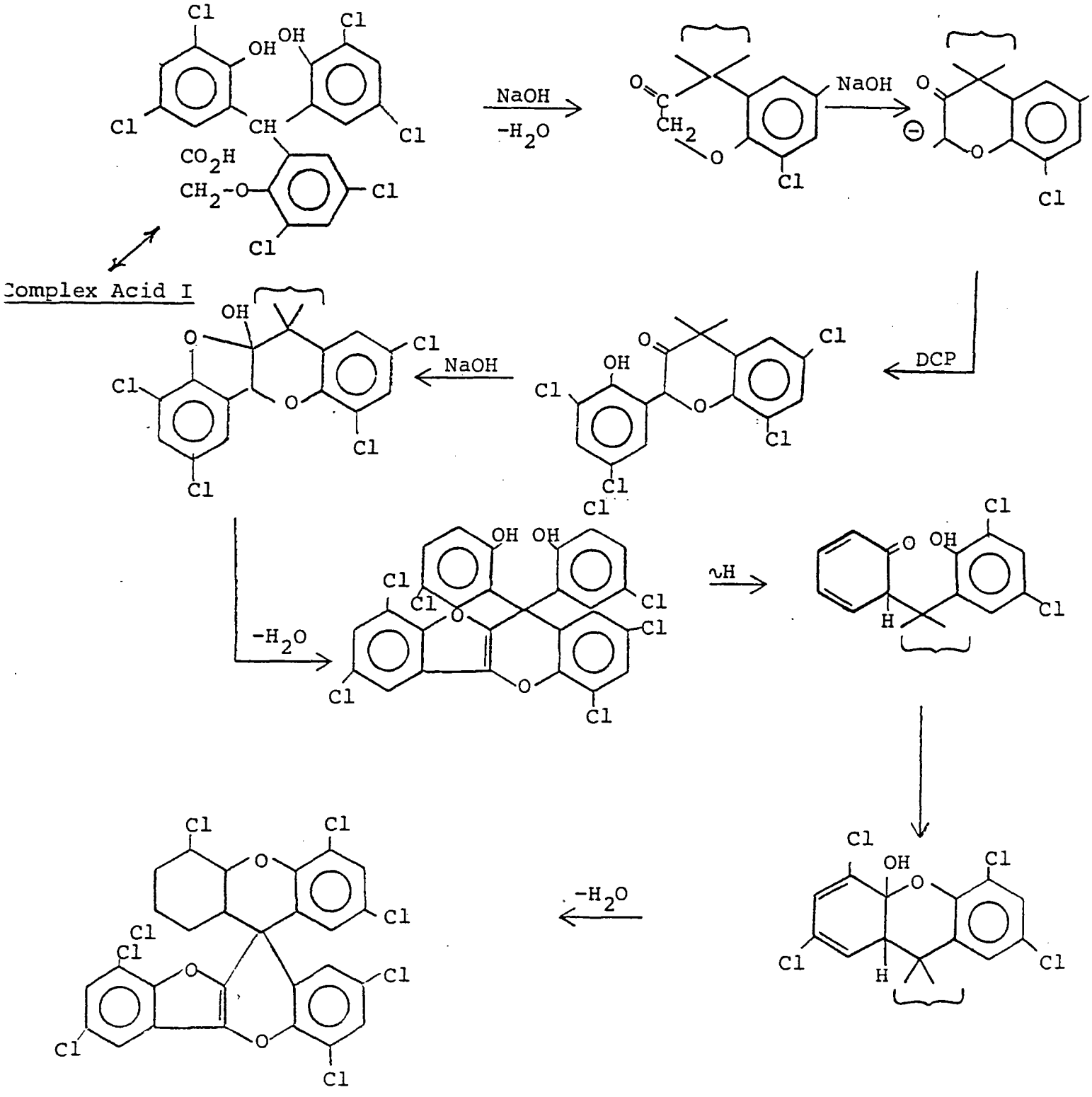


Figure 4: Proposed Mechanism for the Formation of "8-5" By a Route that is Independent of TCX



The formation of OCSX uses an intermediate in the TCX mechanism as its starting material. The apparent fact that TCX is not an intermediate suggests that the more activated dihydroxy ketone is necessary for alkylation. The mechanism for "8-5" formation involves a major component in the Complex I and II mixture as a starting material. Recent analytical results[10] have shown ∿100-200 ppm of this mixture in the process. A proposed mechanism for the formation of Complex Acid I is shown in Figure 5. It must be emphasized that the mechanisms shown in Figures 3,4, and 5 are speculations and are only one of a number of possibilities. Much more work is necessary to prove their accuracy.

(B) The Distribution of TCX in the Process

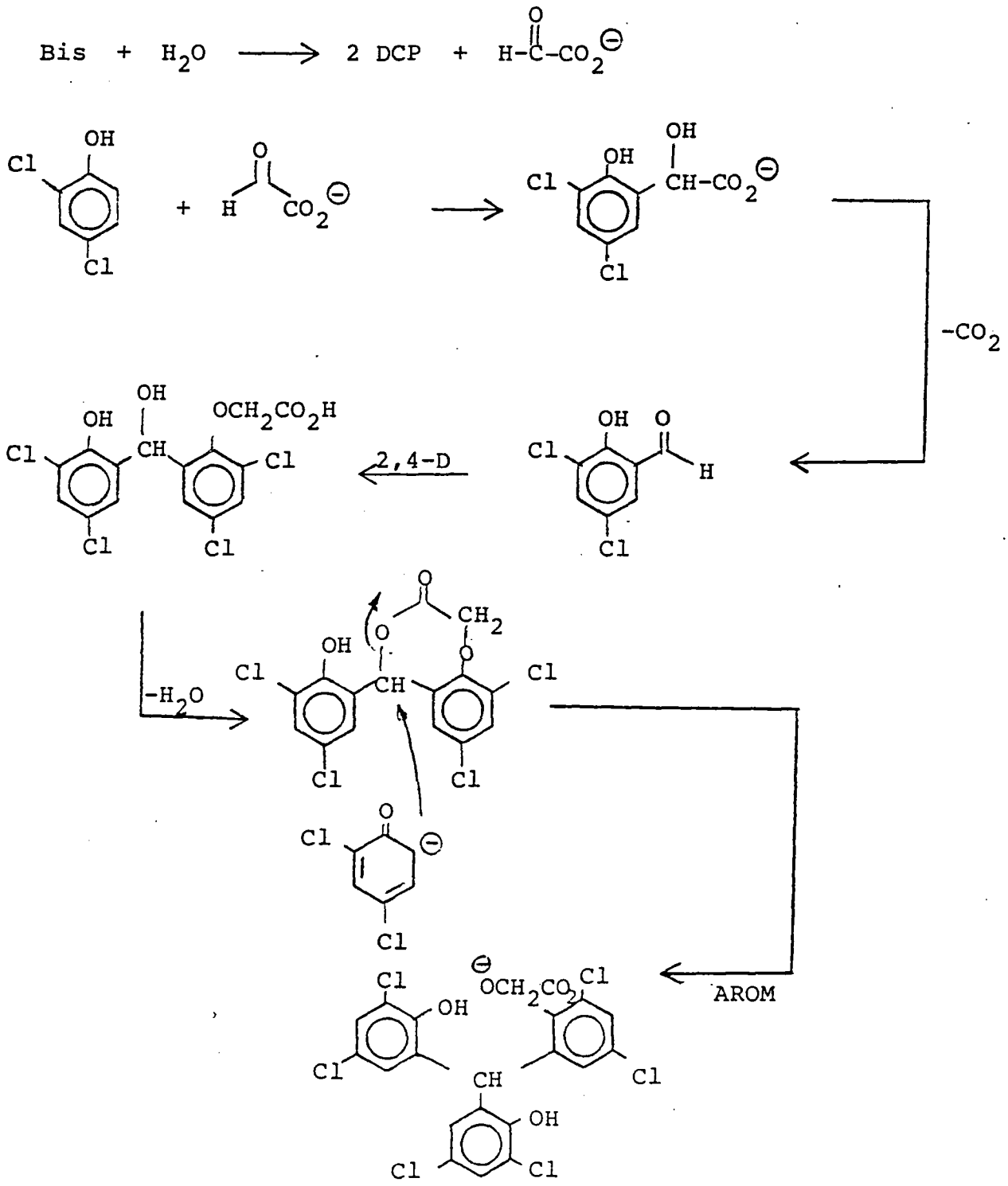
As mentioned earlier, TCX appears to be formed only in the reactor section of the process. Each of the process hold tanks were tested using either synthetic mixtures and/or actual plant material under normal operating conditions and the results are shown below:

V-201 and V-202: Reactor & crude reactor hold tank. Tables 3&4 summarize these results.

V-403: Phenate Recycle Storage Tank. 60% NaDCP was heated for up to 7 days in presence and absence of air in presence and absence of steel at 90°c and showed no detectable TCX.

V-501: Na 2,4-D Storage Tank
Mixtures of Na 2,4-D, NaCl & H_2O were heated at 145-160° for 3 days in presence and absence of traces of perc and DCP: no detectable TCX was formed.

Figure 5: Proposed Mechanism for the Formation of the Major Impurity in Complex I mixture (Compound IV)

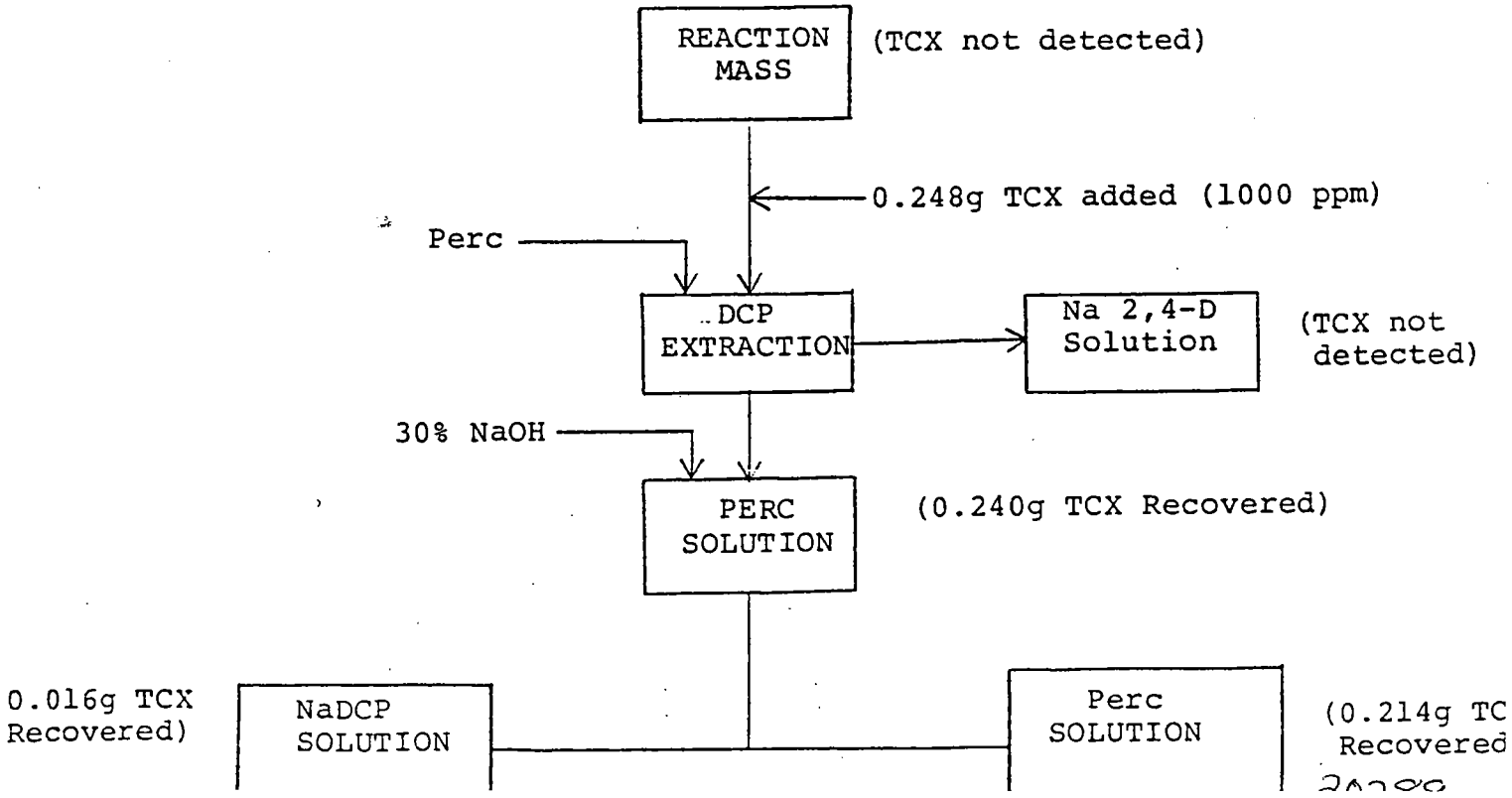


COMPLEX ACID I

V-602: Final Product Storage Tank: Tests run at 120-175° on wet and dry 2,4-D[11] showed that there is an initial slow build up of about 20 ppm of TCX during the first 48 hrs at >160° that stabilizes out. This suggests a small amount of an unstable unknown species that decomposes in acidic media. Molten 2,4-D can be treated for at least 100 hrs under the above conditions without affecting product performance.

Since TCX is formed in the reactor and was found throughout 948 Bldg process, a laboratory study of the distribution was requested. In this experiment a reaction was carried out and the crude reaction mass was spiked with TCX. The purification process was then simulated and the fate of the TCX was determined. Figure 6 summarizes the results of the extraction study performed at 90°/atm.

Figure 6: The Distribution of TCX in a Laboratory Simulation of the 948 Bldg 2,4-D Process



These data show an excellent TCX recovery in which, using clean perc, all the detectable TCX is removed from the Na 2,4-D solution. The fact that the plant observes some TCX in the product suggests that some entrained perc is carried overhead so that the impurities carried with it end in the product. The extraction of the perc/DCP mixture with caustic to recover the NaDCP also extracts about 5% of the TCX which is recycled to the reactor. This scheme was followed in a second experiment that was performed at 125°/ 35 psig which more closely follows the plant conditions. Under these conditions the aqueous solutions can be more concentrated in Na 2,4-D, NaCl, and DCP which could affect the distribution of TCX.

A high pressure, mechanically stirred glass reactor was constructed and was charged with partially neutralized material from V-301 (the DCP neutralizer). The molten material was extracted six times with perc at 125°C and the molten 2,4-D was isolated. The TCX and "8-5" levels were monitored throughout and the analytical results for the products are summarized in Table 5 for the two runs. The data show that TCX is effectively removed at the more drastic conditions.

Table 5: The Analysis of the Product from the High Temperature Extraction of Crude Na 2,4-D with Clean Perchloroethylene

	TCX (ppm)		"8-5" (ppm)		Metals (ppm)			
Run	init	final	init	final	Na	Fe	Ca	Mg
1	292	13	54	52	84	5	40	13
2	178	2	N.D.	25	91	3	50	16

It is interesting to note that "8-5" is not efficiently removed with perc extraction. Hence most of what is made goes out with the product. OCSX was not detected in these samples.

In summary, TCX is formed in the reactor and most of it remains in the recirculating perchloroethylene system. A certain amount of TCX spills into the product and the magnitude is directly related to the level in the perc. TCX is easily separated by distillation in the perc still so by increasing the rate of distillation one would achieve a lower steady state concentration of TCX in the perc.

Assuming a rate of TCX formation of 0.5-1.0 #/hr in the plant (based upon analyses of plant samples) K. E. First[4] has taken distribution coefficient data and has modeled the process in terms of TCX content in various streams as a function of % of perc distilled in the perc still. To date, there is not enough in-plant data to verify this model.

(C) Reduction of TCX by Chemical Means

Two approaches for chemical reduction of TCX were studied. These were methods for inhibiting its formation during the reaction step and methods for reducing it from process streams. The following approaches were studied and each will be discussed in detail.

1. Changing NaDCP/NaMCAA ratio.
2. Post reaction neutralization.
3. Effect of DCAA.
4. Bleaching Na 2,4-D solutions.

(1) Changing NaDCP/NaMCAA ratio

Excess caustic or NaDCP was shown earlier to have a significant qualitative effect on the increased production of TCX. The 2,4-D reaction as developed by H. Brust[12] used a ratio of NaDCP/NaMCAA = 1.2. As described earlier in the discussion, at this ratio the product contains theoretically ∿6.3 mole % excess alkalinity as NaDCP as shown on the following page.

Stg Mat'l		Product
0.5 mol DCP		0.5 mol DCP
0.6 mol NaDCP	⟶	0.1 ml NaDCP
0.5 ml NaMCAA		0.5 mol Na 2,4-D
		0.5 mol NaCl

Dhingra[13] and Fear[14] evaluated the effect of this ratio on the yield and kinetics of this reaction and concluded: (a) lower ratios (below 1.2 lead to lower yields based on MCAA and, (b) low H_2O in solution gives higher 2,4-D yields. The effect of changing the NaDCP/NaMCAA was restudied in order to determine if the lower yield from MCAA could be justified by reduced TCX formation due to less excess caustic.

The runs were carried out by using a constant amount of NaMCAA and varying the amounts of NaDCP which was done by adding differing amounts of caustic in the initial boil down step. Tables 6 and 7 and Figure 7 summarizes the results of this study. These data show that lowering the ratio from 1.2 to 1.1 results in a two fold reduction of TCX along with a 1% loss in MCAA yield. This is reasonable and was tested in the plant. After three weeks of operation, they did not note a measurable reduction for reasons that are not understood at this time. Any further reduction is not practical since the yield rapidly approaches that of the old plant thereby losing much of the advantage of the 948 Bldg process. It is interesting to note that at ratios below 1.0 there is still a measurable amount of NaDCP which explains why formation of TCX is still observed. All of the data to date indicate that formation of TCX cannot be limited to much less than 60 ppm (in the standard 72 hr/160°C ampoule test).

TABLE 6

EFFECT OF NaDCP/NaMCAA RATIO ON TCX FORMATION & YIELD ON MCAA

RUN	REF	Moles			Mol Ratio NaDCP/NaMCAA	ppm HOG	MCAA YIELD	CRUDE ANALYSIS			
		DCP	NaDCP	NaMCAA				Na 2,4-D	DCP	NaDCP	NaCl
1	OC 417-5-143	0.50	0.60	0.50	1.2	951	96.4%	45.4	31.2	8.9	10.0
2	OC 417-5-144	0.55	0.55	0.50	1.1	1514	94.2	45.5	38.0	6.0	7.4
3	OC 417-5-146	0.60	0.50	0.50	1.0	3808	86.8	41.3	40.3	2.2	7.4
4	OC 640-1-1	0.61	0.49	0.50	0.98	3606	86.2	43.0	41.7	2.5	7.9

TABLE 7

THE RATE OF TCX FORMATION AS A FUNCTION OF TIME, TEMPERATURE & $\frac{\text{NaDCP}}{\text{NaMCAA}}$ RATIO

RUN	REF	TEMP	TCX/OCSX			
			18 HRS	42 HRS	66 HRS	114 HRS
1	417-5-143	130	---	---	19	53
		145	37	34	70	218
		160	29	86	118/107	240
			18	42	66	114 Hrs
2	417-5-144	130	0	19	33	52
		145	27	39	64	93
		160	42	74	93	142
						90 Hrs
3	417-5-146	130	<10	<10	15	30
		145	15	20	41	59
		160	29	47	55	67
						90 Hrs
4	640-1	130	17	28	22	18
		145	23	31	34	52
		160	36	61	65	77

FIGURE 7 : THE YIELD OF 2,4-D BASED UPON MCAA & THE FORMATION OF TCX AS A FUNCTION OF THE $\frac{NaDCP}{NaMCAA}$ RATIO

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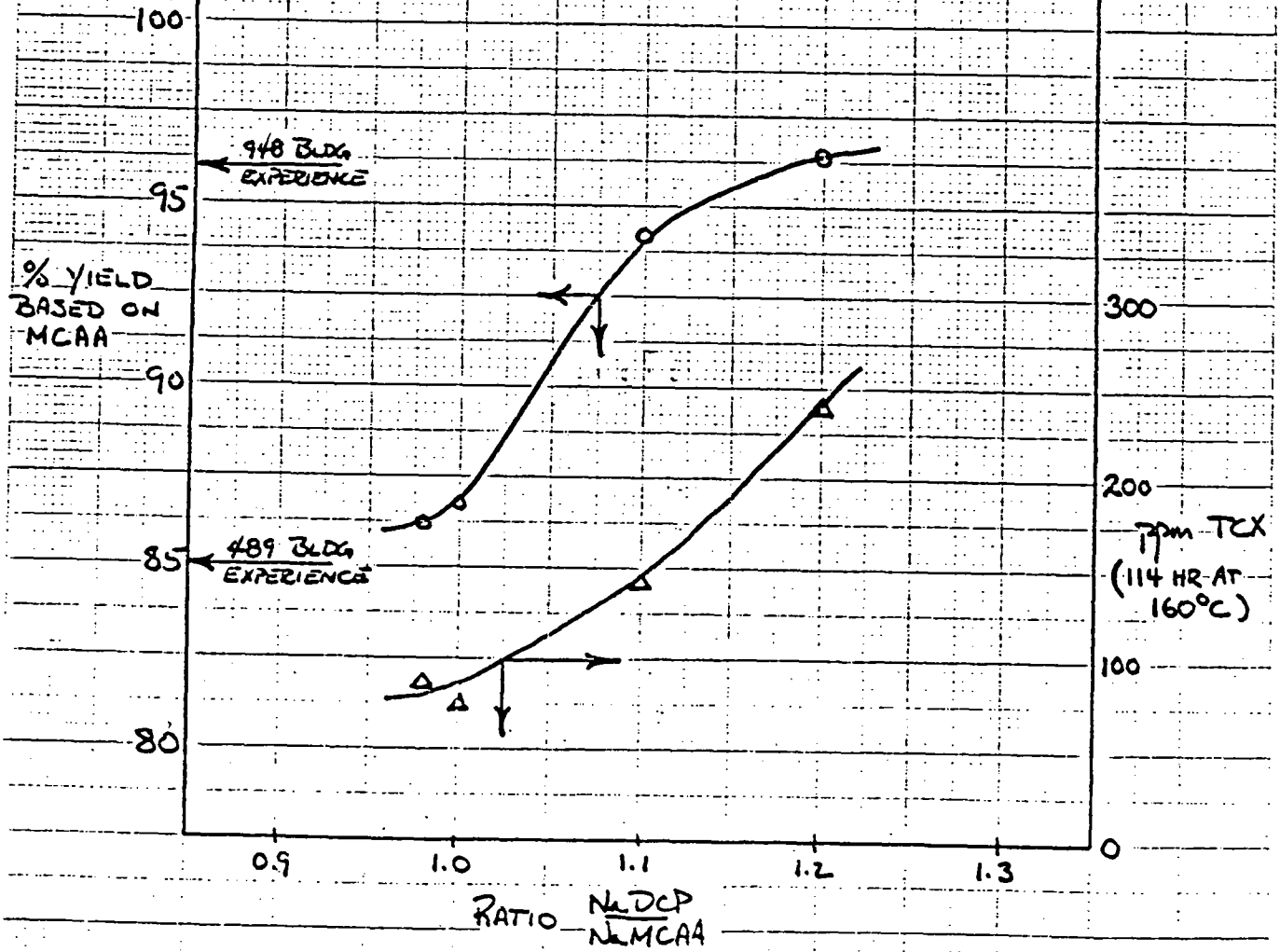


(2) Post Reaction Neutralization

F. G. Aerstin[15] suggested that if the reactor crude were immediately treated with enough acid to neutralize the NaDCP after the post reaction before transfer to the reactor storage tank (V-202), TCX formation might be greatly reduced. This concept was tested using 32% HCl, and dry and wet 2,4-D as the neutralizing acid. The first experiment used enough dry 2,4-D to completely neutralize the residual NaDCP. The neutralized crude showed 1.4% NaDCP and a rate of TCX formation as shown below that is consistent with the data shown in Tables 6 & 7.

	ppm TCX		
Temp	24 hr	48 hr	72 hr
160°	24	51	62

The use of wet, molten 2,4-D (25% H_2O or 32% aqueous HCl has some serious physical handling problems.

As was discussed in an earlier report[16], water added to 2,4-D raises the freezing point of the mass creating a material similar to cottage cheese in consistency. In addition, the added salts (either Na 2,4-D or NaCl) also raised the freezing point of the reactor batch from a range of 115-120°C to 118-125°C.

In summary, whereas post reaction neutralization reduces TCX by a factor of four, it offers several disadvantages:

(a) it would add at least 30 min - 1 hr to the reaction cycle in a plant already reactor limited near capacity operation.

(b) Addition of acid could cause corrosion problems in the Incoloy 800 decanter .

(c) The possibility of precipitates forming in the reactor would put excessive stresses on the agitator. Their formation could not be avoided

in the laboratory even by very slowing adding the aqueous acid.

(d) Control of the acid addition would be difficult and, in addition, the plant would have to run a slightly smaller batch size in order to provide room for the acid. Further work on this concept is not warranted at this time.

(3) DCAA Content of MCAA

The effect of DCAA was discussed earlier.

(4) Bleaching Na 2,4-D Solutions

The major chemical difference between 948 Bldg and 489 Bldg techniques for processing crude 2,4-D is that 489 Bldg uses a bleach step in which residual DCP is oxidized out of the Na 2,4-D solution with 8-12% NaOCl at pH 10.5/100°C. Several experiments were performed to determine if bleach would effect the impurity levels and/or improve the ability of the plant to consistently produce 2,4-D that passes the formulation dilution test. The results of these experiments are shown in Table 8.

The results of the first experiment appeared very encouraging since the dilution test solids, the TCX and the "8-5" were all significantly reduced. The second series of runs showed a consistent improvement in dilution test solids when near or out of spec, but not much effect on the impurities. A capital estimate performed by K. E. First[4] showed the cost of implementing a bleach step in 2,4-D to be $500 M which immediately eliminated any further interest in this project in view of the marginal benefits. It is assumed, posthumously, that the main effect of the bleach was to reduce residual DCP which is a known contributor to poor dilution test results.

Table 8: The Treatment of Na 2,4-D Solutions with Bleach

Na 2,4-D Solution Source	pH	Mol Ratio $\frac{NaOCl}{Na\ 2,4\text{-}D}$	ml solids		Impurities (ppm		
			DMA-4	F-40	TCX	OCSX	"8
V-501 (4-7-78) 948 Bldg.	starting material		---	0.18	58	N.D.	12
	10.5	0.1	---	0.02	25	N.D.	N.
V-501 (6-5-78) 948 Bldg	starting material		0.01	TR	80	N.D.	3
	10.5	0.1	TR	TR	85	"	1
	10.5	0.2	TR	TR	85	"	2
	10.5	0.05	---	---	104	"	2
	10.5	0.1	---	---	94	"	1
	5	0.1	---	---	72	"	4

(D) Removal of TCX by Physical Means

To date, a stage has been reached in 948 Bldg. where the 2,4-D plant can be run to consistently produce in-spec material and has demonstrated an ability to run at near capacity of 100-120 M#/day. With the perc still running at ∿15 GPM, the 2,4-D product contains ∿20 ppm of TCX and ∿20 ppm of "8-5".

A numberof attempts have been made to see if the levels of TCX can be reduced by physical means that include:

1. Carbon treatment of the recycling perc and the molten 2,4-D.
2. Removing perc from the reaction step.
3. Improved washing of the molten 2,4-D.
4. Recrystallization of Na 2,4-D and recrystallization of 2,4-D acid.

The details of each alternative are discussed below. In all cases, these experiments were short term, range finding efforts and not comprehensive. Further work is justified only if the levels of impurities presently found in the product prove unacceptable in the future from a toxicity, environmental, or performance standpoint.

(1) Removal of TCX with Activated Carbon

The removal of TCX with activated carbon from perchloroethylene from V-402 ("clean" perc storage tank) was evaluated by a standard isotherm method. A 100 ml portion of perc was treated with ground Pittsburg SGL carbon at 70°C/72 hrs. The data, summarized in Table 9, were evaluated by a known technique[18] that is summarized below. A plot was made of X/M vs. C on log-log paper as shown in Figure 5. By extrapoling C to incoming TCX concentration, the corresponding X/M value gives the amount of impurity absorbed per unit weight of carbon when that carbon is in equilibrium with the incoming concentration and represents the ultimate capacity of the carbon. The

theoretical volume of liquid to be completely freed by TCX/gram of carbon is calculated from the following equation:

$$V_{Co} = \frac{\left(\frac{X}{M}\right)_{Co}}{Co} \cdot V$$

V_{Co} = theoretical volumn to be treated

$\left(\frac{X}{M}\right)_{Co}$ = capacity/gm at incoming concentration

V = volume of liquid used in test

Co = incoming concentration

For this experiment:

$$V_{Co} = \frac{400}{241} \times 100 = 166 \text{ ml/g of Carbon}$$

or 19.9 gal of perc/# C

or 265 # perc/# C

Carbon loading at 241 ppm of TCX in feed = 166 ml/g C x 1.6 g ml x .00024-64 mg/gC

Table 9: The Absorption Isotherm for TCX Removal from Perchloroethylene with Pittsburg SGL Activated Carbon

Sample	Impurity (ppm)			(M) WTC/100ml Perc	(C) Resid ppm TCX	(X) ppm TCX Removed	(X/M) ppm TCX removed / gm Carbon
	TCX	OCSX	"8-9"				
STG. Mat'l	241	N.D.	19	0	241	0	---
1	159	"		0.25	159	82	328
2	108	"		0.50	108	133	266
3	57	"	17	1.00	57	184	184
4	40	"		1.50	40	201	134
5	29	"	17	2.00	29	212	106

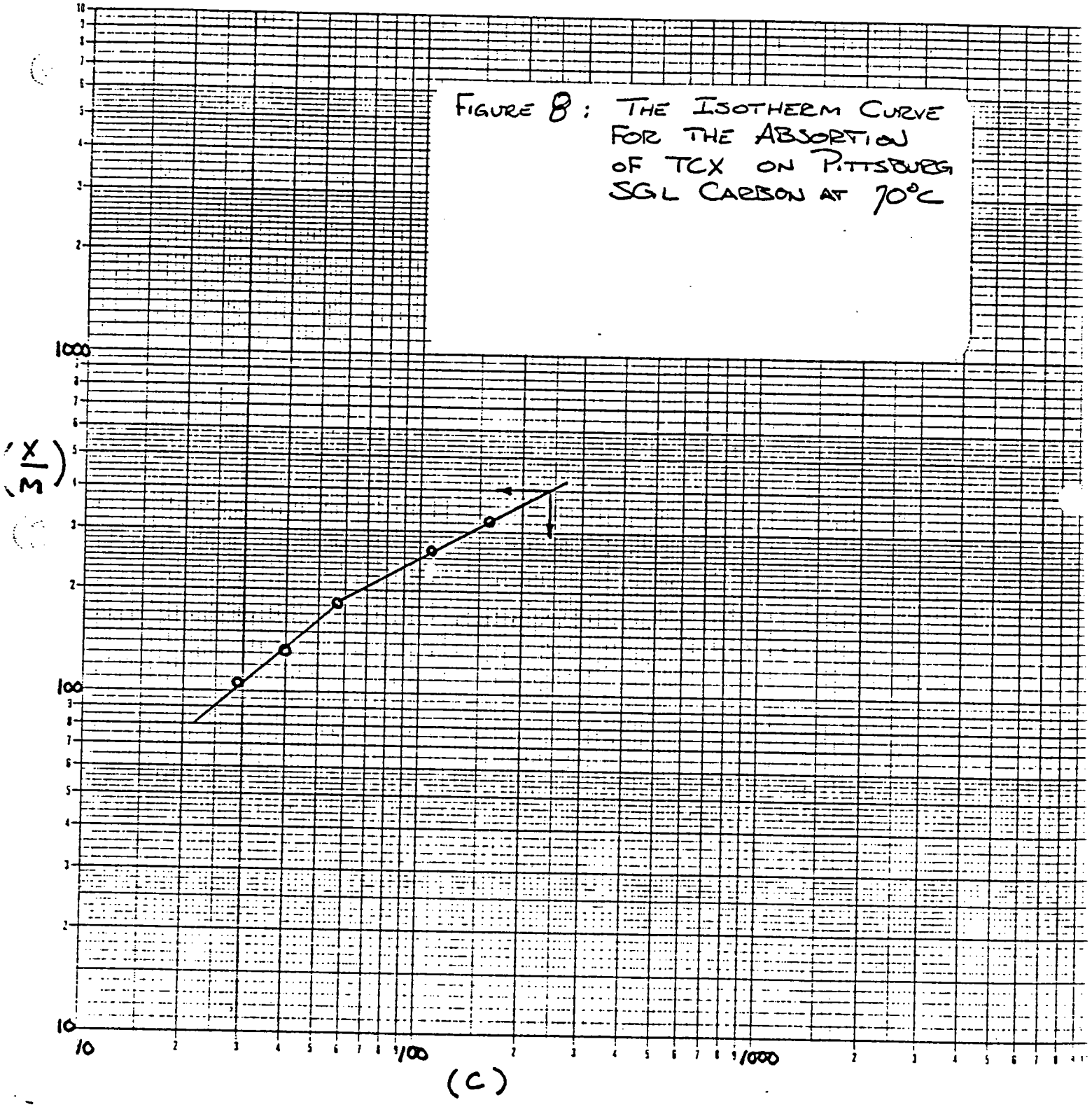


FIGURE 8: THE ISOTHERM CURVE FOR THE ABSORTION OF TCX ON PITTSBURG SGL CARBON AT 70°C

This is a low loading level and at the present rates of TCX production in the plant, about 15-20 # of carbon per hour would be required to remove the impurity. The data shown in Table 9 indicate that carbon does not remove "8-5" from perc. The shape of the isotherm curve indicates that more than one species is being absorbed onto the carbon. No effort was made to determine the identity of that compound although it was probably perc.

A run was made to remove impurities from wet molten 2,4-D. Since molten 2,-D is so difficult to handle at atmospheric pressure, pressurized system was built using a capillary feeder for controlling the continuous flow of molten 2,4-D at 100°/25 psig onto a vertical 2' x 0.5" column that was maintained liquid full. The flow rate was 10 ml/min down the column for a mass flux of ∿1.0 gpm/ft.^{2} The results are summarized in Table 10.

Table 10: The Treatment of Molten 2,4-D with Activated Carbon

Sample #	Temp (°C)	Pressure psig	Approx feed rate ml/hr	Approx. Prod. cut volume (ml)	Product Analysis (ppm)			F-40* solid (ml)
					TCX	OCSX	"8-5"	
Feed	112				42	N.D.	32	.005
1	110±2	33±2	300	100	--	--	--	
2	110	33	600	375	14	N.D.	29	.04
3	110	33	600	375	28	N.D.	38	.005
4	110	33	600	376	32	N.D.	42	
5	110	33	600	375	30	N.D.	36	

*Formulation contains 2% Versene & 0% PG 4000

These data are fairly crude in that the column was shorter than is desirable for optimum column work (2' vs the recommended 5-6'[18]) and the flow through the column was a little faster than the more desirable 0.5 gpm/ft^2 recommended

The data show that TCX loading is rather low. Breakthrough occurred after 900 ml molten D (∿935g pure 2,4-D) was treated. From the analyses, the 59.8 gm of Pittsburg SGL 8 x 30 granular carbon charged to the column absorbed 281 mg of TCX for a loading of ∿0.5 mg/g of carbon which is quite low. Again, "8-5" was not absorbed by the carbon. Based upon these preliminary experiments, carbon absorption of these impurities is not an attractive purification technique.

(2) Remove Perchloroethylene From the Reactor

Since perc is known to give rise to TCX, several methods were examined to eliminate its recycle to the reactor. At present, since perc is soluble to 1.2% in the recycle NaDCP solution, there are about 350# returning to the reactor in each batch. Since a continuous percphenate phase separation is performed in V-401 just before recycle to the reactor, a brief study was undertaken to evaluate the phase separation to determine the time required for complete layer separation and the solubility of perc in NaDCP solution.

A solution of 62% NaDCP and 2% NaOH in water was slurried with an excess of perc and vigorously stirred for 30 min at 75°. The stirring was stopped and the phenate layer was analyzed for % perc as a function of time. The results are summarized in Table 11. These data show that the solubility of perc in NaDCP is 1.3±0.1% at 75°C and that layer separation is complete within 15 minutes. The residence time in V-401 is ∿40 minutes so that with proper operation, no layer separation problems should result. The question was also asked if the perc was entrained in the NaDCP solution as an emulsion or was it in solution? A sample was centrifuged at 60° (minimum temperature) for 30 min at ∿4000 rpm and 1.2% perc was found in the phenate. It is concluded that the present equipment gives optimum layer separation and the 1.2% of perc is soluble.

Table 11: The Solubility and Separation Rate of Perchloroethylene and 62% NaDCP in Water at 75°C

TIME*	% Perc in Phenate Layer
5 min	1.9
15 "	1.3
30 "	1.4
1 hr	1.5
2 "	1.4
4 "	1.4
6 "	1.2
24 "	1.3

*Time zero is when the vigorous stirring of the two layers is stopped.

Several attempts were made to strip perc from the reaction mass and from the NaDCP solution. The plant tried to strip perc from the reaction mass during the normal boil down step. Whereas normal operation involves returning the distilled organic layer to the reactor, in this experiment the recovered organic layer was discarded. Whereas normal boil down returns 350# of DCP to the reactor, in this experiment even after 4000# of DCP was distilled off, there was still detectable perc in the distillate. As a result, this approach was judged impractical. Two attempts were made to distill the 1.3% of perc from the 60% NaDCP-2% NaOH solution.

The first involved a batch distillation from a standard solution from V-403. A total of 65.9 gms were distilled out and 73.8% of the perc was removed. The reaction was then carried out as usual and samples were heated for 24, 48, and 72 hrs and the results are summarized below. These data suggest that distillation of 75% of the perc does not reduce TCX formation (See Table 4, Runs 4&5).

	Temp	24 hrs	48 hr	72 hrs
ppm TCX	160°	21	75	145

The second approach taken for stripping out perc was using a falling film still. The results of two experiments are shown in Table 12. The results show that, as before, 70-80% of the perc is easily removed but that the last 20% is likely to be quite difficult. No more work is planned in this area until it can be better proven that removing perc offers any real advantage in reducing rates of TCX formation.

(3) Improved Washing of 2,4-D Acid

Several experiments were run to see if improved washing would affect impurity levels in the 2,4-D product. A sample of 2,4-D product was taken from V-602 (948 Bldg) and was treated in the following ways:

(a) A 250 gm sample of molten acid was washed 3 times with 200 ml of water per wash at 100°C.

TABLE 12

Preliminary Data for Falling Film Distillation of Perc From NaDCP Solution

Still: 1" x 12" Tube

	Run 1	Run 2
Pressure	ATM.	ATM.
Temp (col'm)	120°	120°
" (feed)	75°	75°
Feed Rate (ave.)	10 ml/min	10 ml/min
Overhead Temp	85° → 90°	90° → 95°
Feed analysis		
% Perc	1.0	1.1
% DCP	51.5	50.1
Wt. Charged (Feed)	725 gms	738 gms
Product: Wt	652 gms	645 gms
% Perc	0.3%	0.2%
% DCP	53.9%	61.6%
Overhead: Wt	46.7 gms	75.0 gms
% Perc	1.5%	3.3%

(b) Another sample was reacidified to pH 0.5 with conc HCl and rewashed 2 times with water at 100°C.

(c) A synthetic V-501 mixture was made up using Rhone Progil 2,4-D to determine if any impurities are made in the washing step. The synthetic mixture was acidified and washed and the 2,4-D was recovered for analysis. This experiment was repeated in the presence of 2750 ppm of added TCX.

The results of these experiments are shown in Table 13. Based upon these experiments, it is shown that the impurities are not made or reduced by improved washing. If anything, they are slightly increased in the product due to the greater solubility of 2,4-D in the hot water or brine.

(d) Recrystallization of Na 2,4-D and 2,4-D Acid

An attempt was made to determine if the impurities could be removed by recrystallization of Na 2,4-D from water and 2,4-D acid from organic solvents. Na 2,4-D was recrystallized by taking 500 gms of material from V-501 and adding enough water (350 ml) to form a homogeneous solution at 100°C. The solution was cooled and the precipitated Na 2,4-D was filtered and washed with 5% brine. The Na 2,4-D was redissolved in hot water and the 2,4-D was isolated and analyzed. The results are shown in Table 14.

In two separate experiments, 2,4-D from V-602 was recrystallized from perchloroethylene and ethylbenzene. A weight ratio of 3 parts solvent to 1 part 2,4-D was heated to boiling, the water contained in the molten 2,4-D was boiled out as an azetrope (the organic distillate was returned) and the solution was cooled. The 2,4-D was recovered by filtration and the solvent removed by heating in a vacuum oven at ∿60°C. The results are summarized in Table 14.

Table 13: The Effect of Improved Washing of Molten 2,4-D on Levels of Impurities

Material	Impurities		
	TCX	OCSX	"8-5"
V-602 Starting Mat'l	56	N.D.	58
Wash three times	73	N.D.	60
Reacidify, wash two times	96	34	68
Synthetic V-501 Na 2,4-D: 21.5% NaCl 7.0% DCP 0.2%			
After Acidif. & Wash	N.D.	N.D.	N.D.
Repeat the synthetic V-501 spiked with 2750 ppm TCX			
After Acidif & wash	3150	N.D.	10

Note: Rhone Progil 2,4-D shows no detectable TCX, OCSX & "8-5"

Table 14: The Effect of Recrystallization of Na 2,4-D and 2,4-D Acid on Impurity Levels

Treatment		Impurity Level (ppm) TCX	OCSX	"8-5"	F-40** Dilution Test	Commen
Recrystallize Na 2,4-D	Before*	58	---	127	0.18	Product Highly lored
	After	81	53	54	0.3+	
Recrystallize 2,4-D From Perc	Before	52	N.D.	46	***	91% Rec very of 2,4-D
	After	1	N.D.	N.D.		
Recrystallize 2,4-D From Ethylbenzene	Before	52	N.D.	46	***	87% Re very o 2,4-D
	After	N.D.	N.D.	N.D.		

*The impurities analysis was performed on a sample of 2,4-D acid isolated from Na 2,4-D without any extra treatment.

**20:1 dilution in 1000 ppm hard water, formulation contained 2% Versene and no P-4000.

***The recrystallized product behaved like the high purity Rhone Progil 2,4-D which is difficult to formulate as was mentioned earlier in this report.

Based upon these results, recrystallization of Na 2,4-D is not a good option since the TCX tends to concentrate in the product and the product was highly colored. It was also observed that the iron level in the product increased from 22 ppm to 91 ppm which could explain the off-color.

Recrystallization from an organic solvent clearly improves the product quality although it would be difficult and expensive to implement in the plant. No further work is planned in this area unless it is determined that extremely low levels of impurities are necessary from a toxicity or an environmental standpoint.

GENERAL CONCLUSIONS

TCX and other non-acidic impurities are formed chiefly in the reaction step of the 2,4-D by several routes. Additional caustic, perchloroethylene, elevated temperatures and iron all promote their formation. A number of attempts to chemically and physically remove these species have met with limited success. It was found that the impurities are concentrated the recirculating perchloroethylene system and that by increasing the capacity of the clean up distillation column from 0.75 to 15 gpm, the levels of impurities in the process do not cause serious operating or quality problems.

SAFETY & ECOLOGY

2,4-Dichlorophenol, 50% NaOH, and chloroacetic acid are highly toxic and corrosive raw materials. When handling, the protective clothing included lab coat, rubber gloves and goggles, and when possible, all operations were performed in a fume hood. A number of operations were carried out at elevated pressure which required the use of a face shield and secondary shielding in the hood. All waste samples and solutions were sent to the burner for disposal.

EXPERIMENTAL

The Preparation and Workup of 2,4-D

The following is a general description of the procedure used to prepare and isolate 2,4-D when simulating 948 Bldg. A 1 liter round bottom flask equipped with a bottom drain, two dropping funnels, a mechanical stirrer, a thermometer, and a distillation head was charged with 179g (1.1 moles) of 2,4-DCP and 48 g (0.6 moles) of 50% NaOH. The flask was heated with a heating mantel attached to an I^2R Thermowatch controller.

The reactor contents were heated while stirring and a DCP-water azetrope was distilled out. The distillation was continued until enough water was removed so that a temperature of 130°C could be achieved. Normally 9-10 ml of H_2O and 2-3 ml of DCP were removed. The DCP was returned to the pot. Then 47.3g (0.5 moles) of melted MCAA and 40.0g (0.5 moles) of 50% caustic were con-added from the two dropping funnels during 50-60 minutes at 130°C. The rates of addition were carefully controlled so that neither added reactant was significantly in excess of the other. Water and DCP continuously distilled out during the con-add and the DCP was returned to the reactor. After the addition was complete, the reaction was heated an additional 60 minutes. About 43-47 gms of H_2O was recovered in the con-add step. At the end of the post reaction samples of the viscous crude reaction melt were taken into ampoules, if desired.

The work up procedure for isolating the 2,4-D is as follows: (The amounts used assumes no samples were taken after reaction). The reaction mass was diluted with about 500 ml of water, heated to boiling to ensure complete dissolution and the pH was adjusted to 5.2±0.2 with about 12 ml of conc HCl. The solution was then extracted with six 150 ml portions of perc at a temperature of >90°C to remove the DCP. Occasionally 50-100 ml of additional H_2O was necessary to keep all of the solids dissolved. The extracted Na 2,4-D solution was heated

to boiling and any traces of perc were distilled off. The pH of the solution was then lowered to 0.5-0.7 with about 55 ml of conc HCl added rapidly and the molten 2,4-D layer was separated and drained into a beaker. The resulting brine was discarded. The 2,4-D was reslurried in 250 ml of hot distilled H_2O in the pot and washed in this manner two times. The final pH of the aqueous layer was 2.7-2.9. The 2,4-D was recovered and dried overnight at ambient temperatures.

The analyses of product and intermediate streams were performed by personnel in the 948 Bldg quality control laboratory. The analyses for TCX, OCSX, and "8-5" were performed as described earlier[8].

The Extraction of DCP and Impurities from Na 2,4-D Solution Under Pressure

A glass apparatus was designed and fabricated from heavy wall glass pipe as shown schematically in Figure 9 . The main pot was equipped with a mechanical stirrer and was loaded with 700g of material from V-301 (948 Bldg). The reactor was sealed and heated to 125°C. The perchloroethylene was added in 649 gm increments from the pressurized shot tank. The perc layer was drained into the bottom receiver where it was cooled before draining into a bottle. All analyses on the perc and Na 2,4-D layers were performed in the 948 Bldg Q. C. Laboratory.

The Carbon Clean up of Molten 2,4-D

A glass pressure apparatus was assembled in which molten 2,4-D was pumped onto a carbon column (downflow). The apparatus is shown schematically in Figure 10. The flow of 2,4-D was controlled by controlling the pressure drop across a capillary tube. To handle

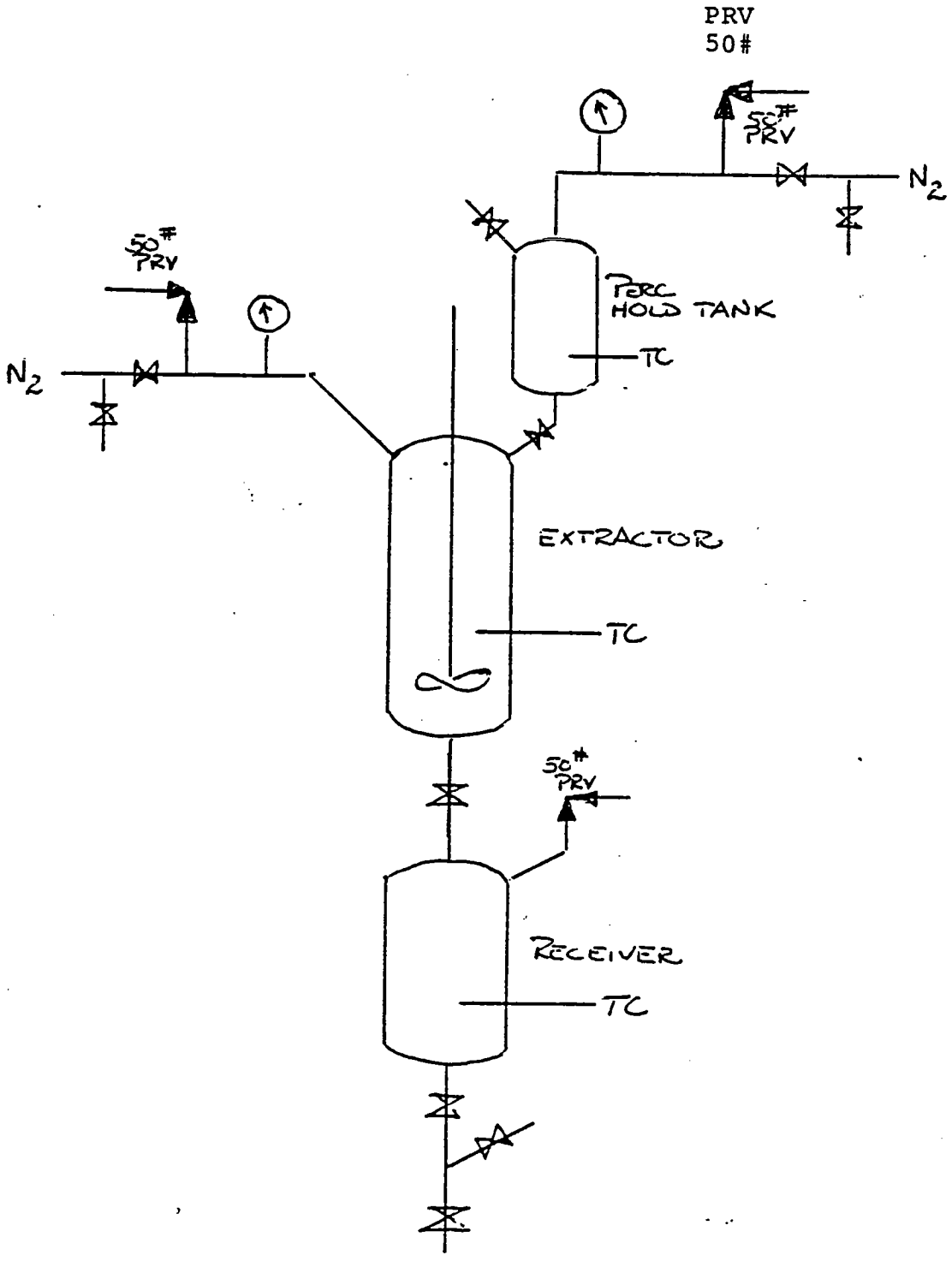
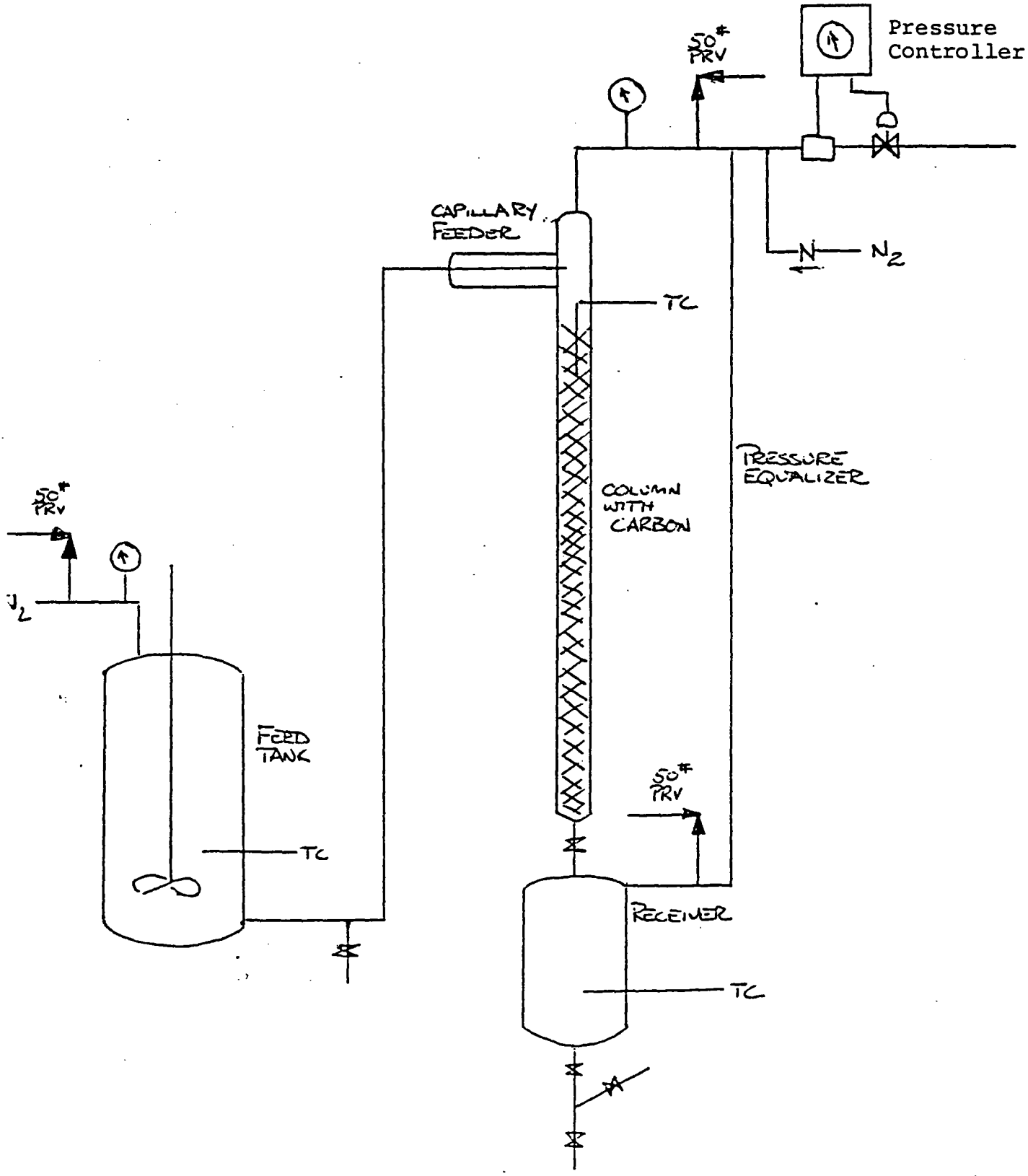


Figure 9: A Schematic Drawing of the apparatus used for Extracting DCP from Na 2,4-D with Perchloroethylene.

Figure 10: A Schematic Drawing of the apparatus used to treat Molten 2,4-D with activated carbon



molten 2,4-D reliably and effectively, required at least 10 psig/ ∿100-105°C to avoid flashing and freezing problems.

The 2,4-D and a slight excess of water were placed in the feed tank and heated to 110°C. When the entire contents were melted the valve on the bottom of the column was closed, the column was filled with molten acid to 1" above the top of the carbon, and the system stood for 60 min. The pressure drop across the capillary was adjusted to 7 psi (∿10 ml/min flow) and the valve on the bottom of the column was adjusted so as to maintain the liquid level above the carbon bed. The results are shown in Table 10.

ACKNOWLEDGEMENTS

The authors wish to thank D. Humbert, R. MacLachlan, T. Evans, G. Jewett, P. Schloemann, and their colleagues for their analytical support. The assistance of K. First and his process modeling efforts are also acknowledged.

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K. L. Krumel OC 559, Pg. 95-131.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

NOV 23 1990

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Garry Hamlin, Manager
Corporate Public Affairs
DowElanco
P.O. Box 681428
9002 Purdue Road
Indianapolis, IN 46268-1189

Subject: Krumel Report

Dear Mr. Hamlin:

The EPA Office of Pesticide Programs anticipates receiving requests under the Freedom of Information Act for copies of the documents listed on Enclosure 1, and in accordance with 40 CFR 2.204(a)(3), we are asking you to examine them for confidential information.

If you do not claim these records to be confidential, we will release them under FOIA to requesters who submit a signed Affirmation of Non-multinational Status. A blank affirmation and an explanation of its requirements are enclosed (Enclosure 2).

HOW TO RESPOND TO THIS LETTER

Please answer the questions on Enclosure 3 if you believe any of the records or portions of the records identified on Enclosure 1 contain confidential information.

Instructions to assist you with preparing your answers are attached to Enclosure 3. As stated in the instructions, you must respond to each question, and your reply should be as detailed as necessary to thoroughly and unambiguously answer the questions.

CONCURRENCES								
SYMBOL	H7506C	H7506C						
SURNAME	Fuelow	[signature]						
DATE	11-23-90	11-23-90						

EPA Form 1320-1 (12-70) *U.S.GPO:1989-624-485/10186 OFFICIAL FILE COPY

20319

FINAL OPPORTUNITY TO SEPARATE CONFIDENTIAL MATERIAL

Your response will constitute your final opportunity to separate material you believe is confidential from that which can be disclosed to qualified requesters. You are therefore asked to carefully prepare your reply to questions 1 and 2 on Enclosure 3.

WHERE TO SEND COMMENTS

Your reply can be mailed to me at the following address:

Susan Lawrence, Acting Chief
Public Information Branch
Field Operations Division (H7506C)
Office of Pesticide Programs
Environmental Protection Agency
Washington, D.C. 20460

Or your reply can be delivered to the following address:

Crystal Mall #2, Room 246
1921 Jefferson Davis Highway
Arlington, Virginia 22202

DEADLINE FOR RESPONSE

Your reply must be postmarked or hand-delivered within 15 business days of your receipt of this letter.

REQUESTS FOR EXTENSION OF DEADLINE

You may request an extension of the 15-day deadline by writing to me at the address given above or by calling me at (703) 557-4454. Your request for an extension must be made within the 15-day period.

FAILURE TO RESPOND TO THIS LETTER

Failure to respond by the established deadline will constitute a waiver of your claim of confidentiality. If we do not receive any reply from you within the specified time period, we will verify that no response has been sent and then declare the records not to be entitled to confidential treatment.

RELEASE OF NON-CONFIDENTIAL RECORDS TO REQUESTERS

Records named on Enclosure 1 which are not claimed as confidential will be released under FOIA to requesters who submit a signed Affirmation of Non-multinational Status.

This office maintains a public file of letters and signed affirmations from FOIA requesters who are provided with FIFRA health and safety data determined not to be confidential. The file is organized by company name and then subdivided by pesticide name. You can review the file of letters and affirmations in Room 242, Crystal Mall #2. Or you can request copies of the letters and affirmations by writing to me at the address given above. In your request, please specify the company and pesticide of interest.

This file will be your only notification of any release of the records or portions of the records named on Enclosure 1 determined not to be confidential. You will not receive written notification before the records are released to FOIA requesters who submit a signed Affirmation of Non-multinational Status.

CONTACT PERSON FOR QUESTIONS ABOUT THIS LETTER

If you have any questions or need additional information about this letter, please contact me at (703) 557-4454.

Cordially,

Susan M. Lawrence, Acting Chief
Public Information Branch
Field Operations Division
Office of Pesticide Programs

Enclosures

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

Date NOV 23

COMPANY DATA REVIEW REQUESTED UNDER 40 CFR 2.204(a)(3)

The following records, which were submitted by your organization to the EPA Office of Pesticide Programs, may be requested under the Freedom of Information Act. You are asked to review these records and substantiate any claims of confidentiality by answering the questions on Enclosure 3.

Company name DowElanco Pesticide 2,4-D

Volume number:

"A Study of the Formation and Removal of Impurities... for 2,4-D."
(Krumel Report)

__ Microfiche copies of the records are enclosed.

X Paper copies of the records are enclosed.

__ Sample pages which identify the records are enclosed.

__ No copies are enclosed. The reference numbers will direct you to the records in your files.

PRIN-_____ Docket Number-_____

Enclosure 1 (Letter C)

20322

D-13944 SK 2,4-D

TRANSMITTAL DOCUMENT

425510-00

1. Name and address of submitter:

   Hunt-Wesson, Inc.
   (La Choy Food Products Division)
   1645 W. Valencia Drive
   Fullerton, CA 92633-3899

2. Regulatory action in support of which this package is submitted:

   Reregistration of Para chlorophenoxy acetic acid
   Company No.: 008906-1
   Chemical No.: 019401
   Case No.: 2115

3. Transmittal Date:

   October 30, 1992

4. List of Submitted Data:

Rej.	Volume 1:	Possible Maximum Dioxin/Furan Contamination in Bean Sprouts
42551001	Volume 2:	Summary of Levels of Substituted Dioxins and Benzofurans in Samples of 2,4-D
42551002	Volume 3:	Determination of Dioxins and Benzofurans in 2,4-D, 2,4-DCP, MCPA, 2,4-DP, CMPP and 2,4-DPB by GC/MS
Admin ✓	Volume 4:	July 25, 1990 letter to EPA summarizing Hunt-Wesson's request to waive dioxin/furan data and documents supporting low volume/minor use. Includes EPA's response of March 31, 1991.
Rej.	Volume 5:	August 11, 1992 letter from Hunt-Wesson to R.J. Otten reporting result of analysis of 4-CPA.
42551003	Volume 6:	Report from Wright State University.
42551004	Volume 7:	4-CPA Magnitude of Residue Study.
42551005	Volume 8:	Hunt-Wesson Report.

R. J. Otten

COMPANY OFFICIAL: Richard J. Otten, Regulatory Consultant

COMPANY NAME: Hunt-Wesson, Inc.

COMPANY CONTACT: Richard J. Otten Phone: 919-846-7860

20323

ACTIVE INGREDIENTS FOR CASE

0073 2,4-D

PC CODE	CHEMICAL NAME
30001	2,4-Dichlorophenoxyacetic acid
30002	Lithium 2,4-dichlorophenoxyacetate
30004	Sodium 2,4-dichlorophenoxyacetate
30005	Ammonium 2,4-dichlorophenoxyacetate
30010	Alkanol* amine 2,4-dichlorophenoxyacetate *(salts of the ethanol and ispropanol series)
30011	Alkyl* amine 2,4-dichlorophenoxyacetate *(100% C12)
30013	Alkyl* amine 2,4-dichlorophenoxyacetate *(100% C14)
30014	Alkyl* amine 2,4-dichlorophenoxyacetate *(as in fatty acids of tall oil)
30016	Diethanolamine (2,4-dichlorophenoxy)acetate
30017	Diethylamine 2,4-dichlorophenoxyacetate
30019	Dimethylamine 2,4-dichlorophenoxyacetate
30020	N,N-Dimethyloleylamine 2,4-dichlorophenoxyacetate
30021	Ethanolamine 2,4-dichlorophenoxyacetate
30023	Heptylamine 2,4-dichlorophenoxyacetate
30024	Isopropanolamine 2,4-dichlorophenoxyacetate
30025	Isopropylamine 2,4-dichlorophenoxyacetate
30028	Morpholine 2,4-dichlorophenoxyacetate
30029	N-Oleyl-1,3-propylenediamine 2,4-dichlorophenoxyacetate
30030	Octylamine 2,4-dichlorophenoxyacetate
30033	Triethanolamine 2,4-dichlorophenoxyacetate
30034	Triethylamine 2,4-dichlorophenoxyacetate
30035	Triisopropanolamine 2,4-dichlorophenoxyacetate
30039	N,N-Dimethyl oleyl-linoleyl amine 2,4-dichlorophenoxyacetate
30052	Butoxyethoxypropyl 2,4-dichlorophenoxyacetate
30053	Butoxyethyl 2,4-dichlorophenoxyacetate
30055	3-Butoxypropyl 2,4-dichlorophenoxyacetate
30056	Butyl 2,4-dichlorophenoxyacetate
30062	Isobutyl 2,4-dichlorophenoxyacetate
30063	Acetic acid, (2,4-dichlorophenoxy)-, 2-ethylhexyl ester
30064	Isooctyl(2-ethyl-4-methylpentyl) 2,4-dichlorophenoxyacetate
30065	Isooctyl(2-octyl) 2,4-dichlorophenoxyacetate
30066	Isopropyl 2,4-dichlorophenoxyacetate
30072	Propylene glycol butyl ether 2,4-dichlorophenoxyacetate

ACTIVE INGREDIENTS FOR CASE

Ø196 2,4-DB

PC CODE	CHEMICAL NAME
3Ø8Ø1	4-(2,4-Dichlorophenoxy)butyric acid
3Ø8Ø4	Sodium 4-(2,4-dichlorophenoxy)butyrate
3Ø819	Dimethylamine 4-(2,4-dichlorophenoxy)butyrate
3Ø853	Butoxyethanol 4-(2,4-dichlorophenoxy)butyrate
3Ø856	Butyl 4-(2,4-dichlorophenoxy)butyrate
3Ø863	Isooctyl 4-(2,4-dichlorophenoxy)butyrate

11/26/93 REFERENCE FILES SYSTEM PAGE 1

ACTIVE INGREDIENTS FOR CASE

Ø294 2,4-DP

PC CODE	CHEMICAL NAME
31401	2-(2,4-Dichlorophenoxy)propionic acid
31419	Dimethylamine 2-(2,4-dichlorophenoxy)propionate
31453	Butoxyethyl 2-(2,4-dichlorophenoxy)propionate
31463	Isooctyl 2-(2,4-dichlorophenoxy)propionate

REPORT ID: PDR20B01 RUN DATE: 11/26/93

ENVIRONMENTAL PROTECTION AGENCY
PROGRAM MANAGEMENT AND SUPPORT DIVISION
PESTICIDE DOCUMENT MANAGEMENT SYSTEM (PDMS)

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24 D PART 1

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ENVIRONMENTAL PROTECTION AGENCY
PROGRAM MANAGEMENT AND SUPPORT DIVISION
PESTICIDE DOCUMENT MANAGEMENT SYSTEM (PDMS)

MRID SEQUENCE BIBLIOGRAPHY

24 D PART 1

MRID	CITATION
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00004725	Stanley, C.W. (1966) Derivatization of pesticide-related acids and phenols for gas chromatographic determination. Journal of Agricultural and Food Chemistry 14(3):321-323. (Also°In°unpublished submission received Sep 12, 1968 under 8F0676; submitted by Dow Chemical U.S.A., Midland, Mich.; CDL:092980-AQ)
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ENVIRONMENTAL PROTECTION AGENCY
PROGRAM MANAGEMENT AND SUPPORT DIVISION
PESTICIDE DOCUMENT MANAGEMENT SYSTEM (PDMS)

MRID SEQUENCE BIBLIOGRAPHY

24 D PART 1

MRID	CITATION
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SUBJECT: PRODUCT CHEMISTRY
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SUBMITTER: ALL
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PAGE	SUBJECT
86	MARCH 4, 1986 public meeting on dioxins/furans; attendees included American Petroleum Institute. Transcript of proceedings. Subject: Proposed testing and reporting requirements.
93	April 20, 1988, Protocol Review Panel Teleconference; documents list A. Dupuy, R. Harless & D. Firestone, minutes of meeting May 4, 1988, Midwest Research Institute.
95	July 27, 1988, August 17, 1988 meetings of Protocol Review Panel meetings; attendees include Dow, FDA, Mobil, Ethyl.
98	March 1, 1989 Protocol Review Panel meeting; attendees include GE Plastics Company; Dow, FDA, Ethyl, NIOSH. Subject: Exposure issues and protocol reviews.
102	September 8, 1989; Protocol Review Panel teleconference; attendees: EPA, Midwest Research Institute; Lockheed; FDA; subject includes analytical problems with Chloranil.
113	Dow: Direct testimony of David T. Buzzelli in 2,4,5-T proceedings; Exhibit 810 in re: The Dow Chemical Co. et al; Docket Nos. 415 et al, September 30, 1980.
116	February 11, 1985 Formation of the Dioxins;Furan Work Group.
118	List of Workgroup members March 1985; April 12, 1985 meeting notice and agenda
119	Work group: Appendix A -- Chemicals contaminated, potentially contaminated, and/or precursors to contamination with chlorinated and brominated dibenzodioxins (DBDs) and dibenzofurans (DBFs) April 12, 1985
122	January 13, 1986 letter from NIEHS to D. Barnes re: the revised draft of the CDD and CDF position document.
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166 Dow cohort mortality study of chemical workers

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Monsanto December 22, 1987, Dibenzofuran in diphenyl oxide and the relationshiop to brominated dibenzofurans

in brominated diphenyl oxide.

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Rhone-Poulenc, 2,4-Dichlorophenol test results

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247 February 4, 1985 Dow Analysis of 2,4-Dichlorophenol for the presence of 2,3,7,8-TCDD.

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Corp., Vertac Chemical Corp., and Rhone-Poulenc, Inc."

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#1.9 - Modification and Amendment Requests and Responses from January 1992 to January 1993; Docket #

Chemicals for the Dioxin/Furan Docket

CAS NO.	CHEMICAL NAME
----------	Alkylamine tetrachlorophenate
25327-89-3	Allyl ether of tetrabromobisphenol-A
37853-61-5	Bismethyl ether of tetrabromobisphenol-A
37853-59-1	1,2-Bis(tribromophenoxy)ethane
1940-42-7	4-Bromo-2,5-dichlorophenol
1163-19-5	Decabromodiphenyloxide
99-28-5	2,6-Dibromo-4-nitrophenol
615-58-7	2,4-Dibromophenol
2577-72-2	3,5-Dibromosalicylanilide
576-24-9	2,3-Dichlorophenol
120-83-2	2,4-Dichlorophenol
583-76-6	2,5-Dichlorophenol
87-65-0	2,6-Dichlorophenol
95-77-2	3,4-Dichlorophenol
120-36-5	2[2,4-(Dichlorophenoxy)]propionic acid
320-72-9	3,5-Dichlorosalicylic acid
32536-52-0	Octabromodiphenyloxide
32534-81-9	Pentabromodiphenyloxide
608-71-9	Pentabromophenol
3772-94-9	Pentachlorophenyl laurate
79-94-7	Tetrabromobisphenol A
21850-44-2	Tetrabromobisphenol-A-bis-2,3-dibromopropyl ether
4162-45-2	Tetrabromobisphenol-A-bisethoxylate
55205-38-4	Tetrabromobisphenol-A diacrylate
----------	Tetrabromobisphenol B
488-47-1	Tetrabromocatechol
79-95-8	Tetrachlorobisphenol A
87-10-5	3,4,5-Tribromosalicylanilide
118-75-2	2,3,5,6-Tetrachloro-2,5-cyclohexadiene-1,4-dione
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95-95-4	2,4,5-Trichlorophenol
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(1)	63-880000093	EPA (S. Hassur)	Review of Testing Exclusion Request from Ameribrom, Inc.	02/05/86
(2)	63-8600141	Monsanto Company	Analysis of Brominated Diphenyl Oxides for Brominated Dibenzofurans	04/03/86
(3)	63-880000097	Great Lakes Chemical Corporation	Response to EPA Questions	12/17/86
(4)	40-870000052	Ameribrom, Inc.	Response to EPA's Request for Additional Information	02/03/87
(5)	63-878000149	Ethyl Corporation	Request for Exclusion from Testing	09/01/87
(6)	63-878000146	Great Lakes Chemical Corporation	Request for Exclusion from Testing	09/03/87
(7)	63-878000147	Aldrich Chemical Company	Request for Exclusion and Waiver from Testing	09/03/87
(8)	63-870000104	Ameribrom, Inc.	Request for Exclusion from Testing	09/23/87
(9)	63-870000109	Pfister Chemical Company	_____	09/23/87
(10)	63-870000119	Aldrich Chemical Company	Exclusion/Waiver Support Information	09/28/87
(11)	63-870000117	Sigma Chemical Company	Request for Exclusion/Waiver From Testing	09/28/87

(12)	63-880000063	Midwest Research Institute	Ethyl Corporation	09/29/87
(13)	63-886000001	EPA (K. Wong)	Great Lakes Chemical Corp. and Ethyl Corp.	10/21/87
(14)	63-886000002	EPA (S. Hassur)	Great Lakes Chemical Corp. and Ethyl Corp.	10/21/87
(15)	------	EPA (S. Hassur)	Recommended Disposition of Testing Exclusion Request (Ameribrom and Great Lakes)	11/12/87
(16)	------	EPA (S. Hassur)	Recommended Disposition of Testing Exclusion Request (Pfister)	02/02/88
(17)	63-890000005			
(18)	63-900000009	Hoechst Celanese Corp.	8(a) Production Volume, Use, Import, Exposure, Environmental Release and Disposal Information	07/25/90
(19)	63-900000011	Chugai Boyeki (America) Corp.	8(a) Production Volume, Use, Import, Exposure, Environmental Release and Disposal Information	08/08/90

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			Fiche #
40-8593005	50 FR 51794, USEPA Polyhalogenated Dibenzo-p-Dioxins/Dibenzofurans; Testing and Reporting Requirements. Action: Proposed Rule. December 19, 1985 [83002]	(1)	513651
40-8693006	51 FR 37612, USEPA Testing and Reporting Requirements for Polyhalogenated Dibenzo-p-Dioxins/Dibenzofurans; Addition of Chlorinated and Brominated Benzenes to List of Precursor Chemicals. Action: Amendment to Proposed Rule. October 23, 1986 [83002B]	(2)	513652
40-8793161	52 FR 21412, USEPA Polyhalogenated Dibenzo-p-Dioxins/Dibenzofurans; Testing and Reporting Requirements. Action: Final Rule. June 5, 1987 [83002C] →	(3)	513653

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			Fiche #
40-8693007	U.S. Environmental Protection Agency Polyhalogenated Dibenzo-p-Dioxins/ Dibenzofurans; Testing and Reporting Requirements; Open Meeting. Action: Notice of Open Meeting. OPTS-83002A; 40 CFR Part 766. April 3, 1986	(1)	513654
40-8793203	U.S. Environmental Protection Agency Polyhalogenated Dibenzo-p-Dioxins/ Dibenzofurans; Testing and Reporting Requirements Action: Final Rule. OPTS-83002C. June 1987	(2)	513655
40-8793185	U.S. Environmental Protection Agency Receipt of Request for Exclusion From/ Waiver of Testing of Ethyl Corporation and Great Lakes Chemical Corporation. Action: Notice of Receipt of Requests for Exclusion/Waiver of Testing Requirements. OPTS-83002E. September 27, 1987	(3)	513656
40-8793221	U.S. Environmental Protection Agency Receipt of Request for Exclusion From/ Waiver of Testing of Certain Chemical Companies. Action: Notice of Receipt of Requests for Exclusion/Waiver of Testing Requirements. OPTS-83002G. October 23, 1987	(4)	513657

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			Fiche #
40-8893238	U.S. Environmental Protection Agency Notice of Decision on Exclusion/Waiver Applications of Seven Companies. Action: Notice of Decision on Exclusion/Waiver Requests. OPTS-83002H. February 2, 1988	(5)	513658
40-8893239	U.S. Environmental Protection Agency Receipt of Request for Waiver of Testing; Testing of Rohm and Haas Co. Action: Notice of Receipt of Request for Waiver of Testing Requirements. OPTS-83002I. April 21, 1988	(6)	513659
40-9093424	U.S. Environmental Protection Agency TSCA Chemical Testing; Receipt of Test Data. Action: Notice. OPTS-44546. January 25, 1990	(7)	524800
40-9093463	U.S. Environmental Protection Agency TSCA Chemical Testing; Receipt of Test Data. Action: Notice. OPTS-44552. May 17, 1990	(8)	533311
40-9093521	U.S. EPA Technical Amendments to Test Rules and Consent Orders. Action: Final Rule. OPTS-40020/83002J. May 14, 1991	(9)	533312

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(10) Fiche # 53335

40-919356 U.S. EPA

Receipt of Requests for Exclusion from Testing From Three Chemical Companies. Action: Notice of Receipt. OPTS-83002K. June 14, 1991

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			Fiche #
40-8393008	48 FR 48434, USEPA	(1)	513660

2,4,5-T and Silvex Products; Intent to Cancel Registrations of Pesticide Products Containing 2,4,5-T and Silvex; Revocation of Notices of Intent to Hold a Hearing to Determine Whether Certain Uses of 2,4,5-T or Silvex Should Be Cancelled.

Action: Notice of Intent to Cancel Registrations; Revocation of Notices of Intent to Hold a Hearing.

October 18, 1983 [OPP-66103]

40-8493009	49 FR 5831, USEPA	(2)	513661

Water Quality Criteria; Availability of Document.

Action: Notice of Final Ambient Water Quality Criteria Document.

February 15, 1984 [OW-FRL-2522-2]

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			Fiche #
40-8493010	49 FR 28666, USEPA	(3)	513662

Creosote, Pentachlorophenol, and Inorganic Arsenicals; Intent to Cancel Registrations of Pesticide Products Containing Creosote, Pentachlorophenol (Including Its Salts) and the Inorganic Arsenicals; Determination Concluding the Rebuttable Presumption Against Registration of the Wood Preservative Uses of Pesticide Products; Availability of Position Document.

Action: Notice of Intent to Cancel, Notice of Determination; Notice of Availability of Position Document.

July 13, 1984 [OPP-30000/28F; PH-FRL 2630-4]

40-8593011	50 FR 1978, USEPA	(4)	513663

Hazardous Waste Management System; Dioxin-Containing Wastes.

Action: Final Rule.

January 14, 1985 [SWN-FRL 2701-3]

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			Fiche #
40-8693012	51 FR 2736, USEPA Polyhalogenated Dibenzo-p-Dioxins/Dibenzofurans; ~~Testing~~ Testing and Reporting Requirements. Correction. January 21, 1986	(5) [83002]	513664
40-8693013	51 FR 12344, USEPA Toxic Substances; Polyhalogenated Dibenzo-p-~~Dioxins~~ Dioxins/ Dibenzofurans; Testing ~~and~~ Reporting Requirements; ~~Open~~ Meeting. Action: Notice of Open Meeting. April 10, 1986	(6) [83002A]	513665
40-8793205	52 FR 30430, USEPA Receipt of Request for Waiver of Testing of Supelco, Inc. Action: Notice of Receipt of Request for Waiver of Testing Requirements. August 14, 1987	(7) [83002D]	513666

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				Fiche #
40-8793230	52 FR 37009, USEPA Receipt of Request for ~~Exclu~~ sion From/Waiver of ~~Testing~~ of Ethyl Corp. and ~~Great~~ Lakes Chemical Corp. Action: Notice of Receipt of Requests for Exclusion/Waiver of Testing Requirements. October 2, 1987	[83002E]	(8)	513667
40-8793235	52 FR 39703, USEPA Decision on Waiver Application ~~Application~~ of Supelco, Inc. Action: Decision on Waiver Request. October 23, 1987	[83002F]	(9)	513668
40-8793222	52 FR 43250, USEPA Receipt of Request for Exclusion From/Waiver of Testing of Certain Chemical Companies. Action: Notice of Receipt of Requests for Exclusion/Waiver of Testing Requirements. November 10, 1987	[83002G]	(10)	513669

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			Fiche #
40-8893231	53 FR 3938, USEPA Toxic and Hazardous ~~Substances~~ Substances Control; Decision ~~on~~ on Exclusion/Waiver ~~Applications~~ Applications of Seven ~~Companies; Aldrich~~ Companies; Aldrich Chemical Co. et al. Action: Notice of Decision on Exclusion/Waiver Requests. February 10, 1988 [83002H]	(11)	513670
40-8893232	53 FR 15282, USEPA Receipt of Request for Waiver of Testing of Rohm and Haas Co. Action: Notice of Receipt of Request for Waiver of Testing Requirements. April 28, 1988 [83002I]	(12)	513671
40-9390420	54 FR 52449, USEPA TSCA Chemical Testing; Receipt of Test Data. Action: Notice. December 21, 1989 [44544]	(13)	524801

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			Fiche #
40-9390419	55 FR 3482, USEPA TSCA Chemical Testing; Receipt of Test Data. Action: Notice. February 1, 1990 [44546]	(14)	524802
40-9093464	55 FR 21934, USEPA TSCA Chemical Testing; Receipt of Test Data. Action: Notice. May 30, 1990 [44552]	(15)	533314
40-9193536	56 FR 32201, USEPA Receipt of Requests for Exclusion from Testing from Three Chemical Companies. Action: Notice of Receipt. July 15, 1991 [8300-K]	(17)	533316

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40-9193522 56FR 23228, USEPA 533315

Technical Amendments to Test Rules and Consent Orders.
Action: Final Rule.
May 21, 1991 [4020/F3002J]

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			Fiche #
40-8593014	U.S. Environmental Protection Agency Health Assessment Document for Polychlorinated Dibenzo-p-Dioxins. (Final) September 1985	(1)	513672
40-8593015	U.S. Environmental Protection Agency Economic Analysis for Requirement Under TSCA Section 8(d) for Submission of Unpublished Health and Safety Studies for Chemicals Potentially Contaminated with Polyhalogenated Dibenzo-p-Dioxins and Polyhalogenated Dibenzofurans. October 1985	(2)	513673
40-8593016	U.S. Environmental Protection Agency Economic Analysis of Proposed Call-In Under TSCA Section 8(c) of Allegations of Significant Adverse Reactions for Chemicals Potentially Contaminated with Polyhalogenated Dibenzo-p-Dioxins and Polyhalogenated Dibenzofurans. October 1985	(3)	513674
40-8593017	U.S. Environmental Protection Agency Economic Analysis of Proposed Section 8(a) Reporting Rule for Chemicals ~~Potentially~~ Potentially Contaminated with ~~Polyhalogenated~~ Polyhalogenated Dibenzo-p-Dioxins and ~~Polyhalogenated~~ Polyhalogenated Dibenzofurans. October 1985	(4)	513675

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			Fiche #
40-8593018	U.S. Environmental Protection Agency	(5)	513676

Economic Analysis of Proposed Section 4 Testing Rule for Chemicals Potentially Contaminated with Polyhalogenated Dibenzo-p-Dioxins and Polyhalogenated Dibenzofurans.
October 1985

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			Fiche #
40-8593014	U.S. Environmental Protection Agency Health Assessment Document for Polychlo-Polychlorinated Dibenzo-p-Dioxins. (Final) (Final) September 1985 [Crossreferenced to B_{1a}(1)]	(1)	513672
40-8693157	U.S. Environmental Protection Agency Economic Analysis of Final Section 8(a) Reporting Rule for Chemicals Potentially Potentially Contaminated With Polyhalogenated Dibenzo-p-Dioxins and Polyhalogenated Dibenzofurans. December 1986	(2)	513678
40-8693158	U.S. Environmental Protection Agency Economic Analysis for Requirement Under TSCA Section 8(d) for Submission of Unpublished Health and Safety Studies for Chemicals Potentially Contaminated with Poly-halogenated Dibenzo-p-Dioxins and Polyhalogenated Dibenzofurans. December 1986	(3)	513679
40-8693159	U.S. Environmental Protection Agency Economic Analysis of Final Call-In Under Under TSCA Section 8(c) of Allegations of Sig-of Significant Adverse Reactions for Chemicals Chemicals Potentially Contaminated With Polyhaloge-Polyhalogenated Dibenzo-p-Dioxins and Polyhaloge-Polyhalogenated Dibenzofurans. December 1986	(4)	513680

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			Fiche #
40-8793160	U.S. Environmental Protection Agency Economic Analysis of Final Section 4 Testing Rule for Chemicals Potentially Contaminated With Polyhalogenated Dibenzo-p-Dioxins and Polyhalogenated Dibenzofurans. (Third Draft) January 1987	(5)	513681
40-8793204	U.S. Environmental Protection Agency Economic Analysis of Final Section 4 Testing Rule for Chemicals Potentially Contaminated with Polyhalogenated Dibenzo-p-Dioxins and Polyhalogenated Dibenzofurans. (Final) (Sanitized) Mathtech, Inc. January 1987	(6)	513677

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			Fiche #
40-8593019	Agent Orange Work Group (Cabinet Council on Human Resources) Report given to the Domestic Council of the President's Cabinet. October 1985	(1)	513682
40-7993020	Albro, P.W., Luster, M.I., Chae, K., Chaudhary, S.K., Clark, G., Lawson, L.D., Corbett, J.T. and McKinney, J.D. (U.S. Department of Health and Human Services, National Institute of Environmental Health Safety, Research Triangle Park, NC) A Radioimmunoassay for Chlorinated Dibenzo-p-Dioxins. Toxicology and Applied Pharmacology; 50:137-146. 1979	(2)	513683
40-8493021	Bandiera, S., Sawyer, T., Romkes, M., Zmudzka, B., Safe, L., Mason, G., Keys, B. and Safe, S. (Texas A&M University, College of Veterinary Medicine) Polychlorinated Dibenzofurans (PCDFs): Effects of Structure on Binding to the 2,3,7,8-TCDD Cytosolic Receptor Protein, Protein AHH Induction and Toxicity. Toxicology; 32:131-144. 1984	(3)	513685
40-8493002	Bellin, J.S. and Barnes, D.G. Health Hazard Assessment for Chlorinated Dioxins and Dibenzofurans Other Than 2,3,7,8-TCDD. Presented at a Symposium in Cincinnati, Ohio. October 25, 1984 [Document Not Provided to Docket]	(3a)	

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			Fiche #
40-7993022	Bradlaw, J.A. and Casterline, J.L. (U.S. Department of Health, Education and Welfare, Food and Drug Administration) Induction of Enzyme Activity in Cell Culture: A Rapid Screen for Detection of Planner Polychlorinated Organic Compounds. J. Assoc. Off. Anal. Chem,; 62(4):904-916. 1979	(4)	513687
40-8593023	Canada Agriculture, Food Production and Inspection Branch Letter from Y.Y. Wigfield to S. Rudzinski, EPA July 15, 1985 Enclosure: (1) Answers to Questions/Issue on the Dioxin/Furan List and Methodology.	(5)	513688
40-8593024	Canada Agriculture, Food Production and ~~and~~ Inspection Branch Letter from Y.Y. Wigfield to S. Rudzinski, EPA, correcting an error in the July 15, 1985 comment letter. July 29, 1985	(6)	513689
40-8593025	Canada Environmental Protection Cover letter from M.J. Boddington to D. Barnes, EPA August 28, 1985 Enclosure: (1) Interim Risk Assessment PCDDs/PCPFs ~~PCDDs/PCRFs~~ Review Comments.	(7)	513690

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			Fiche #
40-8593026	Center for the Biology of Natural Systems	(8)	513691 513694

Cover letter from B. Commoner to D. Barnes, EPA
August 30, 1985

Enclosure:

(1) Comments on Chlorinated Dioxins Workshops Position Document (April 1985 - Updated: "Interim Risk Assessment Procedures for Mixtures of Chlorinated Dibenzodioxins and Dibenzofurans (CDDS and CDFs)."
August 30, 1985

40-8593027	Chemical Manufacturers Association	(9)	513692

Cover letter from G. Cox to S. Rudzinski, EPA
July 19, 1985

Enclosures:

(1) Attachment I: Response of the Chemical Manufacturers Association Dibenzofurans/Dibenzodioxins Program Panel to EPA's Questions Concerning Its Proposed Candidate List and Analytical Methodology.

(2) Attachment II: Principles of Environmental Analysis. The ~~American~~ American Chemical Society. 1983

(3) Attachment III: Soil Screening Survey at Four Midwestern Sites Quality Control Summary. EPA. May 1985

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			Fiche #
40-8293028	Coggan, D. and Acheson, E.D. (University of Southhampton, England) Occupational Health: Do Phenoxy Herbicides Cause Cancer in Man? The Lancet; 1(8280):1057-1059. May 8, 1982	(10)	513693
40-8493029	Czuczwa, J.M. and Hites, R.A. (Indiana University) Environmental Fate of Combustion-Generated Polychlorinated Dioxins and Furans. Environ. Sci. Technol.; 18(6): 444-450. June 1984	(11)	513695
40-8593030	Dow Chemical USA Letter from W. Crummett to S. Rudzinski, EPA, commenting on the list of chemicals proposed for testing. July 15, 1985 Enclosures: (1) Table I: Parts per Trillion Concentration in Unspiked Human Adipose Tissue. (2) Table II: Unacceptable Data Points Taken in Human Adipose Tissue Study.	(12)	513696
40-8593031	Dow Chemical USA Letter from R.J. Kociba to D. Barnes, EPA, commenting on the "Interim Risk Assessment Procedures for Mixtures of Chlorinated Dibenzodioxins and Dibenzofurans." August 27, 1985	(13)	513697

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			Fiche #
40-8493033	Environmental Defense Fund	(14)	513700

Letter from E. Silbergeld to D. Barnes and J. Bellin, EPA, reviewing the draft report "Health Hazard Assessment for CDDs and CDFs Other Than 2,3,7,8-TCDD." September 20, 1984

40-8593035	Environmental Defense Fund	(15)	513701

Letter from E. Silbergeld to S. Rudzinski, EPA, commenting on the list of chemicals and the methods for analyzing chemicals.
July 26, 1985

Enclosures:

(1) Letter from D. Sundin, NIOSH, to L. Loy, EDF
July 17, 1985

(a) List of trade name products containing one or more ~~Dibenzofurans~~ Silvex/Dibenzodioxins. National Occupational Hazard Survey.

(2) Sachstande Dioxine (Report on Dioxins). (German)
May 1985

[See B_4(12) for Translation]

40-8593036	Environmental Defense Fund	(16)	513702

Letter commenting on the latest ~~"Interim~~ Interim Risk Assessment Procedures for ~~Mixtures~~ Mixtures of CDDs and CDFs" (dated July ~~24, 1985)~~ 24, 1985) from E. Silbergeld to D. Barnes, EPA.
October 17, 1985

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			Fiche #
40-8393038	Fingerhut, M.A., Halperin, W.E., Honchar, P.A., Smith, A.B., Groth, D.H. (U.S. Department of Health and Human ~~Services~~ Services, National Institute for ~~Occupational~~ Occupational Safety and Health) and ~~Russell, W.O.~~ Russell, W.O., (North Ridge General Hospital and Cancer Foundation, Fort Lauderdale, Florida) Review of Exposure and Pathology Data for Seven Cases Reported as Soft Tissue Sarcoma Among Persons Occupationally Exposed to Dioxin-Contaminated ~~Herbicides~~ Herbicides. From "Public Health Risks ~~of the~~ of the Dioxins," proceedings of a ~~symposium~~ symposium held October 19-20, 1983, in ~~N.Y. City;~~ N.Y. City; pages 187-203. October 1983	(17)	513704
40-8393039	Fingerhut, M.A., Marlow, D.A., Honchar, P.A. and Halperin, W.E. (U.S. Department ~~ment~~ of Health and Human Services, ~~National~~ National Institute for Occupational ~~Safety and~~ Safety and Health) The NIOSH Occupational Dioxin Registry. From "Public Health Risks of the Dioxins," proceedings from the ~~symposium~~ symposium held October 19-20, 1983 in ~~N.Y. City;~~ N.Y. City; pages 362-366. October 1983	(17a)	513705
40-8493040	Gierthy, J.F., Crane, D. and Frenkel, G.D. (N.Y. State Department of Health, Wadsworth Center for Laboratories and Research) Application of an In Vitro Keratinization Assay to Extracts of Soot From a Fire in a Polychlorinated Biphenyl-Containing Transformer. Fundamental and Applied Toxicology; 4:1036-1041. 1984	(18)	513706

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			Fiche #
40-8393041	Hajdu, S.I. (Memorial Sloan-Kettering Cancer Center) Classification and Pathological Diagnosis of Soft Tissue Sarcomas. From "Public Health Risks of the Dioxins," proceedings from the symposium held October 19-20, 1983 in N.Y. City; pages 173-186. October 1983	(19)	513708
40-8593042	Helder, T.H. and Seinen, W. (State University of Utrecht, The Netherlands) Standardization and Application of an E.L.S.-Bioassay for PCDDs and PCDFs. Chemosphere; 14(2):183-193. 1985	(20)	513710
40-8193043	Honchar, P.A. and Halperin, W.E. (U.S. Department of Health and Human Services, National Institute for ~~Occupational~~ Occupational Safety and Health) 2,4,5-T, Trichlorophenol, and Soft Tissue Sarcoma. The Lancet; 1(8214): 268-269. January 31, 1981	(21)	513712
40-8193044	Hutzinger, O., Olie, K., Lustenhouwer, J.W.A. (University of Amsterdam, The Netherlands) Okey, A.B. (Hospital for Sick Children, Ontario, Canada), Bardiera, S. and Safe, S. (University of Guelph, Canada) Polychlorinated Dibenzo-p-Dioxins and Dibenzofurans: A Bioanalytical Approach. Chemosphere; 10:19-25. 1981	(22)	513713

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			Fiche #
40-8593045	Indiana University, School of Public and Environmental Affairs (R.A. Hites) Letter from R. Hites to S. Rudzinski, EPA, in response to EPA's letter of June 20, 1985 requesting a review of the preliminary list of chemicals to be tested and the rationale and analytical standards involved. July 1, 1985	(22a)	513711
40-8593037	JRC, ISPRA, Italy (S. Facchetti) Response to EPA's request to review the preliminary list of chemicals to be tested for Dioxin/Furan contamination from S. Facchetti to S. Rudinski, EPA. (Telegram) July 24, 1985	(23)	513703
40-7493047	Kimbrough, R.D. (U.S. Department of Health and Human Services, Center for Disease Control) The Toxicity of Polychlorinated Polycyclic Compounds and Related Chemicals. CRC Critical Reviews in Toxicology, pages 445-498. January 1974	(24)	513714
40-8093048	Knutson, J.C. and Poland, A. (University of Wisconsin) Keratinization of Mouse Teratoma Cell Line XB Produced by 2,3,7,8-Tetrachlorodibenzo-p-dioxin: An In Vitro Model of Toxicity. Cell; 22:27-36. November 1980	(25)	513716

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			Fiche #
40-8293051	McKinney, J., Albro, P., Luster, M. Corbett, B., Schroeder, J. and Lawson, L. (U.S. Department of Health and Human Services, National Institute of Environmental Health Sciences, Research Triangle Park, NC) Development and Reliability of a Radio-immunoassay for 2,3,7,8-Tetrachloro-dibenzo-p-dioxin. From "Chlorinated Dioxins and Related Compounds; Impact on the Environment," proceedings held in Rome, Italy, October 22-24, 1980. 1982	(26)	513718
40-8593053	Monsanto Company Cover letter from F. Hileman to S. Rudzinski, EPA, in response to EPA's request for comments on the preliminary risk of chemicals to be tested and the methodology and analytical standards used. July 18, 1985 Enclosure: (1) Specific Comments on the Documents Sent for Review.	(27)	513720
40-8593054	Natural Resources Defense Council, Inc. Letter from R. Michaels to S. Rudzinski, EPA, responding to EPA's ~~request for~~ comments on the preliminary ~~list of~~ chemicals chosen to be tested ~~and the~~ methodology and analytical ~~standards~~ used. July 11, 1985	(28)	513721

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			Fiche #
40-8593055	New York State Office of Public Health (J.F. Gierthy) Letter from J. Gierthy, to D. Barnes, EPA, reviewing the document "Interim Risk Assessment Procedures for Mixtures of Chlorinated Dibenzodioxins and Dibenzofurans." August 28, 1985	(28a)	513707
40-8593056	New York State Department of Health (J.K. Hawley) Comment letter on the revised Position Document of the CDWG concerning the ~~risk~~ assessment procedures from J.K. ~~Hawley~~ to EPA. August 30, 1985	(28b)	513709

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			Fiche #
40-8593057	Ontario Environment	(29)	513723

Letter from B. Birmingham to D. Barnes reviewing the "Interim Risk Assessment Procedures . . ."
September 3, 1985

Enclosures:

(1) Report on Combustion Testing ~~Program~~ Pro- gram at the SWARU Plant, ~~Hamilton-Wentworth~~ Hamilton for the Ontario ~~Ministry~~ Ministry of the Environment Air ~~Resources~~ Resources Branch. Envirocon Ltd. January 1984

(2) Determination of Chlorinated Dibenzo-p-Dioxins, Chlorinated Dibenzofurans, Chlorinated Biphenyls, Chlorobenzenes and Chlorophenols in Air Emissions and Other Process Streams at SWARU in Hamilton. V. Ozvacic, G. Wong, ~~H.~~ H. Tosine, R.E. Clement, ~~J. Osborne~~ J. Osborne and S. Thorndyke. 1984

(3) Emissions of Chlorinated Organics From Two Municipal Incinerators in Ontario. Presented at the 77th Annual Air Pollution Control ~~Assoc.~~ Assoc. Meeting, June 24-29, 1984 ~~in San Francisco~~ in San Francisco. June 1984

(4) Interim Risk Assessment Procedures for Mixtures of Chlorinated Dibenzodioxins and Dibenzofurans (CDDs and CDFs). Chlorinated Dioxins Workgroup Position ~~Document~~ Docu- ment. (Updated) April 1985

[Enclosures (1), (2), and (3) Not ~~Provided~~ Provided to Docket]

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			Fiche #
40-8293058	Poland, A. and Knutson, J.C. (McArdle Laboratory for Cancer Research, University of Wisconsin) 2,3,7,8-Tetrachlorodibenzo-p-Dioxin and Related Halogenated Aromatic Hydrocarbons: Examination of the Mechanism of Toxicity. Ann. Rev. Pharmacol. Toxicol.; 22:517-554. 1982	(30)	513725
40-8493059	Safe, S., Sawyer, T., Bandiera, S., Safe, L., Zmudzka, B., Mason, G., (College of Veterinary Medicine, Texas A&M University), Romkes, M., Denomme, M.A. (University of Guelph, Ontario) and Fujita, T. (Kyoto University Japan) Binding to the 2,3,7,8-TCDD Receptor and AHH/EROD Induction: In Vitro QSAR. "Banbury Report 18: Biological Mechanisms of Dioxin Action"; 33:135-149. 1984	(31)	513728
40-8393289	Safety, Health and Environmental Affairs Survey for Health Effects of Potential Exposure to 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD). (Sanitized) October 14, 1983	(31a)	513729
40-8393060	Sawyer, T., Bandiera, S. and Safe, S. (Texas A&M, College of Veterinary Medicine), Hutzinger, O. and Olie, K. (University of Amsterdam, The Netherlands) Bioanalysis of Polychlorinated Dibenzofuran and Dibenzo-p-Dioxin Mixtures in Fly Ash. Chemosphere; 12(4/5):529-535. 1983	(31b)	513730

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			Fiche #
40-8293061	Sawyer, T. (University of Guelph, Ontario) and Safe, S. (Texas A&M, College of Veterinary Medicine) PCB Isomers and Congeners: Induction of Aryl Hydrocarbon Hydroxylase and Ethoxyresorufin o-Deethylase Enzyme Activities in Rat Hepatoma Cells. Toxicology Letters; 13:87-94. 1982	(32)	513731
40-8593062	Sawyer, T.W. and Safe, S. (College of Veterinary Medicine, Texas A&M University) In Vitro AHH Induction by Polychlorinated Biphenyl and Dibenzofuran Mixtures: Additive Effects. Chemosphere; 14(1):79-84. 1985	(33)	513732
40-8593065	Texas A&M University, College of Veterinary Medicine Letter from S. Safe to S. Rudzinski, EPA, responding to EPA's request for comments on the preliminary list of chemicals to be tested and the methodology and analytical standards used. July 12, 1985	(33a)	513726
40-8593066	Texas A&M University, College of Veterinary Medicine Comment letter on the Chlorinated Dioxin "Interim Risk Assessment Procedures . . ." from S. Safe to D.G. Barnes, EPA. August 5, 1985	(33b)	513727

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			Fiche #
40-8593067	U.S. Air Force, School of Aerospace Medicine (Brooks Air Force Base, Texas) Project Ranch Hand II: An Epidemiologic Investigation of Health Effects in Air Force Personnel Following Exposure to Herbicides; Mortality Update - 1985. November 29, 1985	(34)	513735
40-8593068	U.S. Department of Health and Human Services, National Institute of Environmental Health Sciences Letter from P. Albro to S. Rudzinski, EPA in response to EPA's request for comments on the preliminary list of chemicals to be tested and the methodology and analytical standards used. July 15, 1985	(34a)	513684
40-8593069	U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health Letter commenting on the Dioxin Workgroup's position document ~~"The Interim~~ Risk Assessment Procedures. . ." from L. Birnbaum to D. Barnes, EPA. August 12, 1985	(34b)	513686
40-8593070	U.S. Department of Health and Human Services, Center for Disease Control Letter from R. Kimbrough to D. Barnes, EPA, reviewing the document "Interim Risk Assessment Procedures. . ." August 15, 1985	(34c)	513715

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			Fiche #
40-0093071	U.S. Environmental Protection Agency Dioxin Emissions From Stacks of Poorly and Well Operated MWCs. (Chart) Undated	(35)	513736
40-0093072	U.S. Environmental Protection Agency Dioxin Data From Sweden. (Chart) Undated	(36)	513737
40-8093046	U.S. Environmental Protection Agency, Industrial Environmental Research Lab. (Cincinnati, Ohio) Dioxins. PEDCO Environmental, Inc., Contract No. 68-03-2577; Wright State Univ., Contract No. 68-03-2659; and Walk, Haydel and Assoc., Inc., Contract No. 68-03-2579. November 1980	(37)	513724
40-8393073	U.S. Environmental Protection Agency, Office of Water Regulations and Standards, Office of Solid Waste and Emergency Response and the Dioxin Task Force Dioxin Strategy. November 28, 1983	(38)	513738
40-8493074	U.S. Environmental Protection Agency, Office of Water Regulations and Standards Ambient Water Quality Criteria for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin. February 1984	(39)	513739

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			Fiche #
40-8493075	U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response Health and Environmental Effects Profile for Tetra-, Penta- and Hexachlorodibenzo-p-Dioxins. (Final Draft) EPA's Environmental Criteria and Assessment Office, Cincinnati, Ohio. August 1984	(40)	513740
40-8493063	U.S. Environmental Protection Agency Cover letter from K.E. McCaleb, Stanford Research Institute International to P. Tobin, EPA December 21, 1984 Enclosure: (1) Hexachlorobenzene: Chemistry of Formation and Identified Sources. (Draft) SRI Contract No. 68-02-3976; Tech. Directive #2. December 21, 1984	(40a)	513733
40-8593076	U.S. Environmental Protection Agency Interim Risk Assessment Procedures for Mixtures of Chlorinated Dibenzodioxins and Dibenzofurans. Position Document of the Chlorinated Dioxin Work Group (CDWG). 1985 [See Enclosure (4) to B_2(29)]	(41)	513723

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			Fiche #
40-8593077	U.S. Environmental Protection Agency, Office of Drinking Water Drinking Water Criteria Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin. (Final Draft) EPA's Environmental Criteria and Assessment Office, Cincinnati, Ohio. March 1985	(42)	513741
40-8593078	U.S. Environmental Protection Agency Memorandum to M. Cook, Dioxin Management Task Force, from D. Barnes, ~~Chlorinated~~ Chlorodioxins Dioxins Workgroup, regarding the health hazard assessment for mixtures of CDDs and CDFs. April 22, 1985	(43)	513742
40-8593079	U.S. Environmental Protection Agency Internal EPA memorandum from A. Mittelman to D. Barnes commenting on the Interim Risk Assessment Procedures document. May 10, 1985	(43a)	513722
40-8593080	U.S. Environmental Protection Agency Summary of Comments (and Responses) at TEF Work Group. May 14, 1985	(44)	513743

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			Fiche #
40-8593081	U.S. Environmental Protection Agency	(45)	513744

Internal EPA memorandum from J. Stara, Environmental Criteria and Assessment Office (Cincinnati, Ohio), to H. Spitzer ~~Spitzer~~ and D. Barnes, Dioxins Work Group ~~Group~~, reviewing the Chlorinated Dioxins Work ~~Dioxins Work~~ Groups' proposal on the risk assessment of Chlorinated Dioxins and Dibenzofurans ~~and Dibenzofurans.~~
May 17, 1985

40-8593082	U.S. Environmental Protection Agency	(46)	513745

Press Advisory: Production of Dacthal Containing Dioxin Traces.
June 10, 1985

40-8593083	U.S. Environmental Protection Agency	(47)	513746

Letter from S. Rudzinski to E. Silbergeld (and other addressees listed on attached list) requesting a review of documents attached.
June 20, 1985

Enclosures:

(1) List of addresses.

(2) Questions/Issues on the Dioxin/Furan List and Methodology (EPA).

(3) Guidance for a Sequential Approach to the Sampling of Dibenzodioxins and Dibenzofurans. (Draft)

(4) Guidance for Sampling Brominated and Chlorinated Dibenzofurans and Dibenzodioxins. (Draft)

Fiche #

40-8593083 (continued)

(5) Quality Assurance Plan for Measurement of Brominated and Chlorinated Dibenzofurans and Dibenzodioxins. (Draft)

(6) Development of the List of Chemicals to be Proposed for Testing.

(7) Summary of Current Commercial Status and Use.

40-8593084 U.S. Environmental Protection Agency (48) 513747

Letter from S. Lee to P.W. Albro, USDHHS, NIEHS (RTP, NC) and addresses listed on attachment, requesting a review of the preliminary list of chemicals to be tested, the rationale for selection of chemicals and the analytical guidelines for testing. June 20, 1985

Enclosures:

(1) Questions/Issues on the Dioxin/Furan List and Methodology. (EPA)

(2) List of addresses.

(3) List of chemicals to be tested.

(4) Rationale for selection of chemicals.

(5) Analytical guidelines for testing.

[See B_2(47) for Enclosures (3), (4) and (5)]

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			Fiche #
40-8593052	U.S. Environmental Protection Agency Guidelines for the Determination of Polyhalogenated Dibenzo-p-Dioxins and Dibenzofurans in Commercial Products. (Draft Final Report) Midwest Research Institute; Contract No. 68-02-3938. June 27, 1985	(48a)	513719
40-8593050	U.S. Environmental Protection Agency Survey of Dioxin Testing Laboratories. (Draft) Mathtech, Inc.; Contract No. 68-01-6630. July 3, 1985	(48b)	513717
40-8593085	U.S. Environmental Protection Agency Internal EPA memorandum from R. Harless to S. Rudzinski reviewing the five documents enclosed. July 11, 1985 Enclosures: (1) Development of the List of ~~Chemicals~~ Chemi-cals to be Proposed for ~~Testing~~ Testing. (2) Summary of Current Commercial Status and Use. (3) Guidance for Sequential Approach to the Sampling of Dibenzodioxins and Dibenzofurans. (4) Guidelines for the Determination in Commercial Products. Midwest Research Institute. June 3, 1985	(49)	513748

Fiche #

40-8593085 (continued)

(5) Questions/Issues on the Dioxin/ Furan List and Methodology.

[See B_2(47) for all Enclosures]

40-8593086 U.S. Environmental Protection Agency, Environmental Chemistry Laboratory, MS (49a) 513698

EPA letter from A. Dupuy to S. Rudzinski reviewing the list of chemicals to be tested for Dioxin/Furan ~~contamination~~ Contamination and the method to be ~~used.~~ used.
July 24, 1985

40-8593187 U.S. Environmental Protection Agency (50) 513749

Letter from J. Bellin and D. Barnes to E. Silbergeld, Environmental Defense Fund, in response to EDF's reaction to EPA's assessment of hazards for ~~Chlorinated~~ Chlori- Dioxins and Dibenzofurans.
July 24, 1985

40-8593087 U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response (51) 513750

Health and Environmental Effects ~~Profile~~ Profile for Brominated Dibenzo-p-~~Dioxins~~ Dioxins. (Draft) EPA's ~~Environmental~~ Environmental Criteria and Assessment ~~Office,~~ Office, Cincinnati, Ohio.
August 1985

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			Fiche #
40-8593064	U.S. Environmental Protection Agency Dioxin/Furan Screening: Production and Process Identification of Subject ~~Chemicals~~ Chemi-cals. (Revised Draft) Stanford ~~Research~~ Research Institute International; ~~Contract No.~~ Contract No. 68-02-3976, Tech. ~~Directive No. 17.~~ Directive No. 17. August 1985	(51a)	513734
40-8593032	U.S. Environmental Protection Agency Market Study of Selected Chemical Products Possibly Contaminated with Dioxins and Dibenzofurans. Dynamac Corp.; Contract No. 68-02-3952. August 19, 1985	(51b)	513699
40-8593088	U.S. Environmental Protection Agency, Chlorinated Dioxin Workgroup Interim Risk Assessment Procedures for Mixtures of Chlorinated Dibenzodioxins and Dibenzofurans. Revised Position Document. October 1985 [Document Not Provided to Docket]	(51c)	

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			Fiche #
40-8593089	U.S. Environmental Protection Agency	(52)	513751

Internal memorandum from I. Baumel to J. Bellin reviewing the CDWG's Position Document on the "Interim Risk ~~Assessment~~ Assessment Procedures for Mixtures of ~~Chlorinated~~ Chlorinated Dibenzodioxins and Dibenzofurans."
October 24, 1985

Enclosures:

(1) Comments.

(2) Genetically Mediated Induction of Aryl Hydrocarbon Hydroxylase Activity in Human Lymphoblastoid Cells by Polychlorinated Dibenzofuran Isomers and 2,3,7,8-Tetrachlorodibenzo-p-Dioxin. J. Nagayama, C. Kiyohara, Y. Masuda, M. Kuratsune. Arch. Toxicol.; 56: 230-235.
1985

40-8593092	U.S. Environmental Protection Agency	(53)	513754

List of Chemicals Contaminated or Precursors to Contamination with Incidentally Generated Polychlorinated and Polybrominated Dibenzodioxins and Dibenzofurans. Versar, Inc.; Contract No. 68-02-3968.
October 30, 1985

40-8593090	U.S. Environmental Protection Agency	(54)	513752

Internal memorandum from R. Morgan to D. Barnes regarding OWPE comments on the CDWG Position Document: "Interim Risk Assessment Procedures for Mixtures of Chlorinated Dibenzodioxins and Dibenzofurans (CDDs and CDFs)."
October 31, 1985

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			Fiche #
40-8593049	U.S. Environmental Protection Agency Cost Analysis for the Determination of Polyhalogenated Dioxins and Dibenzofurans in Commercial Products. Martin Marietta Data Systems, Mathtech Div. Contractor; Versar Inc. subcontractor. November 25, 1985	(55)	513755
40-8593091	Versar, Inc. Internal Versar memorandum on the In Vitro testing of Dioxins from B. Gregg and D. Dixon to B. Boethling. May 21, 1985	(56)	513753

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Fiche #

40-8693093 Chemical Industry Institute of Toxicology (1) 513756

Letter from R. Neal to V. Kim reviewing the revised procedures for estimating risk exposures.
January 24, 1986

Enclosure:

(1) Data from C. Boreiko's (CIIT) ~~Study~~ study with TCDD, 2,7-DCDD, 1,2,3,7,8,9-~~1,2,3,7,8,9~~HCDD and 1,2,3,6,7,8-~~HCDD.~~ HxCDD.

(2) 2,3,7,8-Tetrachlorodibenzo-p-~~Dioxin~~ dioxin (TCDD Promotes the Transformation of C3H/10T1/2 ~~Cells~~ cells. D.J. ~~Dot~~ Abernathy, W.F. Greenlee, J.C. Huband, and C.J. ~~Boreiko~~ Boreiko. Carcinogenesis; 6(4):651-653.
1985

40-8693094 Environmental Defense Fund (2) 513757

Cover letter from E. Silbergeld to S. Rudzinski, EPA
June 12, 1986

Enclosures:

(1) Automated Apparatus for the ~~Extraction~~ Extraction and Enrichment of 2,3,7,8-~~3,7,8~~-Tetrachlorodibenzo-p-Dioxin in ~~a~~ Human Adipose Tissue. C.R. ~~Lapeza~~ Lapeza, Jr., D.G. Patterson, Jr. and ~~J.A.~~ J. A. Liddle (U.S. Department ~~of HHS,~~ of HHS, Center for Disease ~~Control).~~ Control). Analytical Chemistry; ~~58(4):713-716.~~ 58(4): 713-716.
April 1986

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Fiche #

40-8693094 (continued)

(2) High-Resolution Gas Chromatographic/High-Resolution Mass Spectrometric Analysis of Human Adipose Tissue for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin. D.G. Patterson, J.S. Holler, C.R. Lapeza, Jr., L.R. Alexander, D.F. Groce, R.C. O'Connor, S.J. Smith, J.A. Liddle and L.L. Needham (USDHHS, Center for Disease Control). Analytical Chemistry; 58(4):705-713. April 1986

40-8693095 Great Lakes Chemical Corporation (3) 513758

Cover letter from C. O'Connor of McKenna, Conner and Cuneo to S. Rudzinski, EPA
June 9, 1986

Enclosure:

(1) Comments on Recent Publications Relating to the Determination of Halogenated Dibenzodioxins and Dibenzofurans in Commercial Products. Great Lakes Chemical Corporation.
June 2, 1986

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			Fiche #
40-8693097	U.S. Environmental Protection Agency Internal EPA memorandum from P. Tong to S. Lee and K. McCormack responding to a Manufacturer's comments on the health effects of Tetrabromobisphenol A. August 21, 1986	(4)	513761
40-8593096	U.S. State Department of Health Letter from J. Hawley to D. Barnes, EPA, commenting on the October 1985 version of the CDWG Position Document. December 27, 1985 Enclosure: (1) Reasoning for wording change from "root mean square" to "geometric mean" on page 8, Section 4 of the "CDWG Position Document on Risk Assessment Procedures for Mixtures of CDDs and CDFs."	(5)	513759
40-8693098	Wisconsin, University of, McArdle Laboratory for Cancer Research Letter from A. Poland to D. Barnes, EPA, ~~EPA,~~ commenting on the revised interim ~~risk~~ assessment procedures for Chlorinated ~~Chlorinated~~ Dibenzo-p-Dioxins. January 6, 1986	(6)	513760

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			Fiche #
40-7993020	Albro, P.W., Luster, M.I., Chae, K., Chaudhary, S.K., Clark, G., Lawson, L.D., Corbett, J.T. and McKinney, J.D. (U.S. Department of Health and Human Services, National Institute of Environmental Health Sciences, Research Triangle Park, NC) A Radioimmunoassay for Chlorinated Dibenzo-p-Dioxins. Toxicology and Applied Pharmacology; 50:137-146. 1979 [Crossreferenced to ~~B_2~~(2)] too small	(1)	513683
40-8393162	Bandiera, S. (University of Guelph, Ontario Canada), Sawyer, T.W. (Texas ~~A&M~~ University), Campbell, M.A. ~~(University~~ of Guelph, Ontario, ~~Canada)~~ ~~Fujita, T.~~ (Kyoto University, Japan) and Safe, S. (Texas A&M University) Competitive Binding to the Cytosolic 2,3,7,8-Tetrachlorodibenzo-p-Dioxin Receptor. Effects of Structure on the Affinities of Substituted Halogenated Biphenyls-A Qsar Analysis. Biochemical Pharmacology; 32(24):3803-3813. 1983	(2)	513762
40-8493021	Bandiera, S., Sawyer, T., Romkes, M., Zmudzka, B., Safe, L., Mason, G., Keys, B. and Safe, S. (Texas A&M University, College of Veterinary Medicine) Polychlorinated Dibenzofurans (PCDFs): Effects of Structure on Binding to the 2,3,7,8-TCDD Cytosolic Receptor ~~Protein~~, ~~Protein~~, AHH Induction and ~~Toxicology~~. Toxicology; 32:131-144. 1984 [Crossreferenced to B_2(3)]	(3)	513685

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Fiche #

40-8493002 Bellin, J.S. and Barnes, D.G. (4)

Health Hazard Assessment for Chlorinated Dioxins and Dibenzofurans Other Than 2,3,7,8-TCDD. Presented at ~~a~~ symposium in Cincinnati, Ohio. October 25, 1984

[Crossreferenced to B_2(3a) - Document Not Provided to Docket]

40-7993022 Bradlaw, J.A. and Casterline, J.L. (U.S. Department of Health, Education, and Welfare, Food and Drug Administration) (5) 513687

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			Fiche #
40-8693184	Cambridge Isotope Laboratories	(5a)	513763

Cover letter from J. Bradley to M. Dreyfus, EPA
July 8, 1986

Enclosures: ~~7/18/86~~ OK

(1) Summary of ~~6/18/86~~ Phone Conversation Between Mark Dreyfus, USEPA, and Dr. Joel Bradley, CIL.

(2) Quality Standards From Cambridge Isotope Labs. and Radian Corp.

(3) Proposed Rule Stock Status of Standards.

(4) Form letter from Dr. J. Bradley, CIL, to "Participating Labs" regarding the proposed interlaboratory testing program.

40-8593025	Canada Environmental Protection	(6)	513690

Letter from M. Boddington to D. Barnes, EPA
August 28, 1985

Enclosure:

(1) Interim Risk Assessment PCDDs/PCPFs Review Comments.

[Crossreferenced to $B_2(7)$]

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			Fiche #
40-8493163	Cull, M.R., Dobbs, A.J. (Princes Risborough Lab., Buckinghamshire United Kingdom), Goudot, M. (Rhone-Poulenc, Le Pont de Claix, France) and Schultz, N. (Dynamit Nobel AG, Federal Republic of Germany) Polychlorodibenzo-p-Dioxins and Dibenzofurans in Technical Pentachlorophenol - Results of a Collaborative Analytical Exercise. Chemosphere; 13(10):1157-1165. 1984	(7)	513764
40-8493164	Czuczwa, J.M. and Hites, R.A. (Indiana University) Environmental Fate of Combustion-Generated Polychlorinated Dioxins and Furans. Envir. Sci. Technol; 18(6):444-450. 1984	(8)	513765
40-8593165	Czuczwa, J.M., McVeety, B.D. and Hites, R.A. (Indiana University) Polychlorinated Dibenzodioxins and Dibenzofurans in Sediments from Siskiwit Lake, Isle Royale. Chemosphere; 14(6/7):623-626. 1985	(9)	513766
40-8593001	Dow Chemical USA Review and Trends in the Analysis for PCDD/PCDF. Dow Chemical USA. 1985 [See C_1(3) Enclosure (2a)]	(10)	513786

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Fiche #

40-8493034 Environmental Defense Fund (11) 513902

Cover Letter from R. Percival to W.D. Ruckelshaus, EPA
October 22, 1984

Enclosure:

(1) Petition of the Environmental Defense Fund and the National Wildlife Federation for Rulemakings to Prevent and to Reduce Environmental Contamination by Dioxins and Dibenzofurans. E. Silbergeld, R. Percival (EDF), M. Van Putten and L.K. Silbert (National Wildlife Federation).
October 22, 1984

[Crossreferenced to E_{3a}(1)]

40-8493167 Germany (Federal Republic of), Federal Health Office (12) 513768

Report on Dioxins (Sachstand Dioxine) - Update to November 1984. (German Translation)
1984

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			Fiche #
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40-8593042	Helder, Th. and Seinen, W. (State University of Utrecht, The Netherlands) Standardization and Application of an E.L.S.-Bioassay for PCDDs and PCDFs. Chemosphere; 14(2):183-193. 1985 [Crossreferenced to B_2(20)]	(14)	513710
40-8693168	Hoar, S.K., Blair, A. National Cancer Institute Holmes, F.F., Boysen, C.D. (University of Kansas Medical Center), Robel, R.J. (Kansas State University), Hoover, R. and Fraumeni, J.F. (National Cancer Institute) Agricultural Herbicide Use and Risk of Lymphoma and Soft-Tissue Sarcoma. JAMA; ~~JAMA~~, 256(9):1141-1147. September 5, 1986	(15)	513769

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			Fiche #
40-8193044	Hutzinger, O., Olie, K., Lustenhouwer, J.W.A. (University of Amsterdam, The Netherlands) Okey, A.B. (Hospital for Sick Children, Ontario, Canada), Bardiera, S. and Safe, S. (University of Guelph, Canada) Polychlorinated Dibenzo-p-Dioxins and Dibenzofurans: A Bioanalytical Approach. Chemosphere; 10:19-25. 1981 [Crossreferenced to B_2(22)]	(16)	513713
40-8093048	Knutson, J.C. and Poland, A. (University of Wisconsin) Keratinization of Mouse Teratoma Cell Line XB Produced by 2,3,7,8-Tetrachlorodibenzo-p-Dioxin: An In Vitro Model of Toxicity. Cell; 22:27-36. November 1980 [Crossreferenced to B_2(25)]	(17)	513716
40-8593169	Mason, G., Sawyer, T., Keys, B., Bandiera, S., Romkes, M., Piskorska-Pliszczynska, J., Zmudzka, B. and Safe, S. (Texas A&M University) Polychlorinated Dibenzofurans (PCDFs): Correlation Between In Vivo and In Vitro Structure-Activity Relationships. Toxicology; 37:1-12. 1985	(18)	513770

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			Fiche #
40-8293051	McKinney, J., Albro, P., Luster, M. Corbett, B., Schroeder, J. and Lawson, L. (U.S. Department of Health and Human Services, National Institute of Environmental Health Sciences, Research Triangle Park, NC) Development and Reliability of a Radioimmunoassay for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin. From "Chlorinated Dioxins and Related Compounds; Impact on the Environment". Proceedings held in Rome, Italy, October 22-24, 1980. 1982 [Crossreferenced to B_2(26)]	(19)	513718
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			Fiche #
40-8693171	Patterson, D.G., Jr., Hoffman, R.E., Needham, L.L. (Centers for Disease Control), Roberts, D.W., Bagby, J.R. (Missouri Department of Health), ~~Pirkle,~~ Pirkle, J.L., Falk, H., Sampson, E.J. ~~and Houk,~~ and Houk, V.N. (Centers for Disease ~~Control)~~ Control) 2,3,7,8-Tetrachlorodibenzo-p-Dioxin Levels in Adipose Tissue of Exposed and Control Persons in Missouri. JAMA; 256(19):2683-2686. November 21, 1986	(22)	513773
40-8693098	Wisconsin, University of, McArdle Laboratory for Cancer Research Letter from A. Poland to D. Barnes, EPA, commenting on the revised interim risk assessment of Dibenzo-p-Dioxins and Dibenzofurans. January 6, 1986 [Crossreferenced to B_3(6)]	(23)	513760
40-8293058	Poland, A. and Knutson, J.C. (McArdle Lab. for Cancer Research, University of Wisconsin) 2,3,7,8-Tetrachlorodibenzo-p-Dioxin and Related Halogenated Aromatic Hydrocarbons: Examination of the Mechanism of Toxicity. Ann. Rev. Pharmacol. Toxicol.; 22:517-554. 1982 [Crossreferenced to B_2(30)]	(24)	513725

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40-8493059	Safe, S., Sawyer, T., Bandiera, S., Safe, L., Zmudzka, B., Mason, G., (College of Veterinary Medicine, Texas A&M University), Romkes, M., Denomme, M.A. (University of Guelph, Ontario) and Fujita, T. (Kyoto University, Japan) Binding to the 2,3,7,8-TCDD Receptor and AHH/EROD Induction: In Vitro OSAR. "Banbury Report 18: Biological Mechanisms of Dioxin Action"; 33:135-149. 1984 [Crossreferenced to B_2(31)]	(25)	513728
40-7393172	Schwetz, B.A., Norris, J.M., Sparschu, G.L., Rowe, V.K., Gehring, P.J., Emerson, J.L. and Gerbig, C.G. (The Dow Chemical Company) Toxicology of Chlorinated Dibenzo-p-Dioxins. Environmental Health Perspectives; 5:87-89. September 1973	(26)	513774
40-8693173	Thoma, H., Rist, S., Hauschulz, G. and Hutzinger, O. (University of Bayreuth, Federal Republic of Germany) Polybrominated Dibenzodioxins and Furans from the Pyrolysis of Some Flame Retardants. Chemosphere; 15(5):649-652. 1986	(27)	513775

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			Fiche #
40-8793003	Thoma, H. et al. Polybrominated Dibenzofurans (PBDF) and Dibenzodioxins (PBDD) from the Pyrolysis of Neat Brominated Diphenylethers, Biphenyls and Plastic Mixtures of These Compounds Chemosphere. (In Press) 1987 [Document Not Provided to Docket]	(28)	
40-8093046	U.S. Environmental Protection Agency Dioxins. PEDCO Environmental, Inc., Contract No. 68-03-2577; Wright State Univ., Contract No. 68-03-2659; and Haydel and Associates Inc., Contract No. 68-03-2579. November 1980 [Crossreferenced to B_2(37)]	(29)	513724
40-8293166	U.S. Environmental Protection Agency Pre-Regulatory Analysis of Flame Retardants. Dynamac Corp.; Contract No. 68-01-6239. May 7, 1982	(29a)	513767
40-8393073	U.S. Environmental Protection Agency, Office of Water Regulations Standards, Office of Solid Waste and Emergency Response and the Dioxin Task Force Dioxin Strategy. November 28, 1983 [Crossreferenced to B_2(38)]	(30)	513738

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			Fiche #
40-8493074	U.S. Environmental Protection Agency, Office of Water Regulations and Standards Ambient Water Quality Criteria for 2,3,7,8-Tetrachlorodibenzo-Dioxin. February 1984 [Crossreferenced to B_2(39)]	(31)	513739
40-8493063	U.S. Environmental Protection Agency Cover letter from K.E. McCaleb, Stanford ~~Stanford~~ Research Institute to P. Tobin, EPA December 21, 1984 Enclosure: (1) Hexachlorobenzene: Chemistry of Formation and Identified Sources. (Draft) Stanford Research Institute; Contract No. 68-02-3976, Tech. Directive #2. December 21, 1984 [Crossreferenced to B_2(40a)]	(31a)	513733

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			Fiche #
40-8593052	U.S. Environmental Protection Agency Guidelines for the Determination of Polyhalogenated Dibenzo-p-Dioxins and Dibenzofurans in Commercial Products. (Draft Final Report) Midwest Research Institute; Contract No. 68-02-3938. June 27, 1985 [Crossreferenced to B_2(48a)]	(31b)	513719
40-8593187	U.S. Environmental Protection Agency Letter from J. Bellin and D. Barnes to E. Silbergeld, Environmental Defense Fund, in response to EDF's reaction to EPA's assessment of hazard for Chlorinated Dioxins and Dibenzofurans. July 24, 1985 [Crossreferenced to B_2(50)]	(31c)	513749
40-8593092	U.S. Environmental Protection Agency List of Chemicals Contaminated or Precursors to Contamination With Incidentally Generated Polychlorinated and Polybrominated Dibenzodioxins and Dibenzofurans. Versar, Inc.; Contract No. 68-02-3968. October 30, 1985 [Crossreferenced to B_2(53)]	(31d)	513754

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			Fiche #
40-8693174	U.S. Environmental Protection Agency, Science Advisory Board Report of the Science Advisory Board's Dioxin Toxic Equivalency Methodology Subcommittee Following its Evaluation of EPA's Toxic Equivalency Factor Methodology for CDDs and CDFs. 1986	(32)	513776
40-8693193	U.S. Environmental Protection Agency Internal memorandum from J. Smith to M. Dreyfus on the analytical standards for Polybrominated Dibenzofurans and Polybrominated Dibenzodioxins. August 4, 1986	(32a)	513777
40-8693176	U.S. Environmental Protection Agency Letter from L. Thomas to N. Nelson, Science Advisory Board December 19, 1986 Enclosure: (1) Response to SAB Comments on the "Interim Procedures for Estimating Risks Associated With Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and Dibenzofurans (CDDs/CDFs)."	(32b)	513778
40-8793194	U.S. Environmental Protection Agency Interim Procedures for Estimating Risks Associated With Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and Dibenzofurans (CDDs and CDFs). March 1987	(33)	513779

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			Fiche #
40-8793190	U.S. Environmental Protection Agency Internal EPA memorandum from D. Keehner to the Dioxin/Furan rulemaking record on the exposure assessment to support target limits of quantitation. May 6, 1987	(34)	513780
40-8793191	Versar, Inc. Internal Versar memorandum from C. Carpenter to B. Boethling on the documentation for the November 4, 1986 memo concerning the organic chemical dermal exposure estimates to DBDs/DBFs. April 10, 1987	(35)	513781
40-8793189	Versar, Inc. Internal Versar memorandum from D. Dixon ~~Dixon~~ to L. Bryan on the dermal exposure to inadvertently produced Dioxins in chemical plants. April 29, 1987 Enclosures: (1) Internal Versar memorandum from D. Dixon to B. Boethling on the revised estimates of worker dermal exposure to DBDs/DBFs during organic chemical synthesis. November 4, 1986 (a) Table 1. Worker Dermal Exposure to DBDs/DBFs During Organic Chemical Synthesis and ~~and~~ Use Estimated by Method 1.	(36)	513782

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40-8793189 (continued)

(b) Table 2. Worker Dermal Exposure to DBDs/DBFs During Organic Chemical Synthesis and Use Estimated by Method 2.

(c) Table 26. Worker Dermal Exposure to DBDs/DBFs During Organic Chemical Synthesis and Use.

40-8793192 Versar, Inc. (37) 513783

Internal Versar memorandum from D. Dixon to L. Bryon
April 30, 1987

Enclosure:

(1) Resumes for C. Carpenter, D. Dixon, E. Rissmann and K. Hergenrader.

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			Fiche #
40-8693099	Ameribrom, Inc. Comments of Ameribrom, Inc. on EPA's Proposed Testing and Reporting Rules for Polyhalogenated Dibenzodioxins and Dibenzofurans. A. Tillman. February 18, 1986	(1)	513784
40-8693100	Cambridge Isotope Laboratories Comment letter from J. Bradley to EPA. February 14, 1986	(2)	513785
40-8693101	Chemical Manufacturers Association Comment letter from G. Cox to M. Halper, EPA February 18, 1986 Enclosures: (1) Letter from R. Fensterheim, CMA, to J. Moore submitting the comments and requesting a meeting with EPA. February 18, 1986 (a) Comments on EPA's Proposed Testing and Reporting Rules for Polyhalogenated Dibenzo-dioxins and Dibenzofurans. 1. Appendix A - Letter from G. Cox, CMA, to S. Rudzinsky, EPA, commenting on the preliminary list of chemicals. July 19, 1985	(3)	513786

40-8693101 (continued)

a. Attachment I: Response of the Chemical Manufacturers Association Dibenzofurans/Dibenzodioxins Program Panel to EPA's Questions Concerning Its Proposed Candidate Data List and Analytical Methodology.

b. Attachment II: Principles of Environmental Analysis. American Chemical Society.

c. Attachment III: EPA's Soil Screening Survey at Four Midwestern Sites Quality Control Summary. USEPA Region V, Central Regional Laboratory. May 1985

2a. Appendix B: Review and Trends in the Analysis for PCDD/PCDF. Dow Chemical USA - W.B. Crummett, L.L. Lamparski and T.J. Nestrick. 1985

40-8693101 (continued)

2b. Polychlorinated Dibenzo-dioxins and Dibenzofurans in Sediments from Siskiwit Lake, Isle Royale. J.M. Cruczwa, B. McVeety and R.J. Hites (Indiana University). Chemosphere; 14(6/7): 623-626. 1985

2c. Environmental Fate of Combustion-Generated Polychlorinated Dioxins and Furans. J.M. Czuczwa and R. Hites (Indiana University). Environ. Sci. Tech.; 18(6):444-450. 1984

2d. An Evaluation of Reports of Dioxin Exposure and Soft Tissue Sarcoma Pathology in U.S. Chemical Workers. M.A. Fingerhut, W.E. Halperin, P.A. HonChar, A.B. Smith, D.H. Groth, (USDHHS, NIOSH) and W.O. Russell (North Ridge General Hospital and Cancer Foundation). Banbury Report; 18:461-470. 1984

40-8693101 (continued)

2e. Chlorocarbons in Adipose Tissue from a Missouri Population. M. Graham, F. Hileman, R.G. Orth, J.M. Wendling and J.D. Wilson (St. Louis Univ. School of Medicine and Monsanto Co.). Chemosphere (in press). 1986

2f. Health Implications of 2,3,7,8-Tetrachlorodibenzodioxin (TCDD) Contamination of Residential Soil. R. Kimbrough, H. Falk, P. Stehr (USDHHS, Center for Environmental Health Centers for Disease) and G. Fries (U.S. Dept. of Agriculture). J. Toxicol. and Environ. Health; 14(1): 47-93. 1984

2g. Scientific Criteria Document for Standard Development. No.4-84 Polychlorinated Dibenzo-p-Dioxins (PCDDS) and Polychlorinated Dibenzofurans (PCDFs). Ontario Ministry of the Environment. Pages 1-1 to 1-56, 3-130 to 3-147. September 1985

40-8693101 (continued)

2h. A Critical Examination of Assessments of the Health Risks Associated with 2,3,7,8-TCDD in Soil. D.J. Paustenbach and F.J. Murray (Syntex (USA) Inc.). Chemosphere (In Press). 1986

2i. Update on Soft Tissue Sarcoma and Phenoxyherbicides in New Zealand. A.H. Smith (Univ. of Calif.) and N.E. Pearce (Univ. of North Carolina). From "Dioxin 85"; the Fifth International Symposium on Chlorinated Dioxins and Related Compounds, September 21, 1985 in Mitwitz, FRG. Chemosphere (in Press). 1986

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40-8693109 2,4-D Task Force (3a) 513795

Cover letter from J.D. Conner of McKenna, Conner and Cuneo to Document Control Officer, EPA
February 14, 1986

Enclosures:

(1) Comments on Proposed Testing and Reporting Rules Under the Toxic Substances Control Act for Polyhalogenated Dibenzodioxins and Dibenzofurans.
February 14, 1986

(2) Letter from J. Conner, Jr., McKenna, Conner and Cuneo, to E. Johnson, EPA, concerning unregistered 2,4-D Acid being imported and sold into the United States.
June 16, 1983

(a) Weedone 138. Label for herbicide containing 2,4-D Acid. Union Carbide Corp. 1982

(3) Letter from E. Johnson, EPA, to J. Conner, Jr., McKenna, Conner and Cuneo, responding to his letter of June 16, 1983.
August 31, 1983

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Fiche #

40-8693102 (The) Dow Chemical Company (4) 513787

Cover letter from P. Brown to Document Control Officer, EPA
February 17, 1986

Enclosures:

(1) Comments of the Dow Chemical Company on EPA's Proposed Testing and Reporting Rules for Polyhalogenated Dibenzodioxins and Dibenzofurans.
February 17, 1986

(2) Cost Analysis for the Determination of Polyhalogenated Dioxins and Dibenzofurans in Commercial Products.
Martin Marietta Data Systems; Versar, Inc.
1985

(3) Summaries of Completed Toxicology Studies by the Industry Task Force on 2,4-D Research Data.

(4a) Pharmacokinetics of 2,4-Dichlorophenoxy Acetic Acid (2,4-D) in Fischer 344 Rats. F.A. Smith, K.J. Nolan, E.A. Herman and W.E. Braun (The Dow Chemical Co.) (Abstract) Abstracts of Papers No. 180 Society of Toxicology, Inc.; 19th Annual Meeting, Wash., D.C., March 9-13, 1980.
March 1980

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40-8693102 (continued)

(4b) 2,4-D ((2,4-Dichlorophenoxy) Acetic Acid): Results of a 13-Week Feeding Study in CDF Fischer 344 Rats. S.J. Gorzinski, R.J. Kociba, C.E. Wade, D.C. Morden, P.G. Keyes and B.A. Schwetz (Dow Chemical USA). (Abstract) The Toxicologist; 1(1):216. March 1981

(4c-1) Neurotoxicologic Assessment of Rats Dermally Exposed to 2,4-D Amine. J.L. Mattsson, R.R. Albee and K.A. Johnson (Dow Chemical USA). (Abstract) The Toxicologist; 4(1). March 1984

(4c-2) A Teratology Study in Fischer 344 Rats With 2, 4-Dichlorophenoxy-acetic Acid. D.E. Rodwell, R.D. Wilson, M.D. Nemec and E.J. Tasker (WIL Res. Labs., Inc.). (Abstract) The Toxicologist; 4(1). March 1984

(4c-3) A Teratology Study in Fischer 344 Rats with 2,4-Dichlorophenol. D.E. Rodwell, R.D. Wilson, M.D. Nemec and M.D. Merciera (WIL Res. Labs., Inc.). (Abstract) The Toxicolgist; 4(1). March 1984

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40-8693102 (continued)

(4c-4) Oral Administration of the 2-Ethyl-Ethylhexyl (Isooctyl) Ester of 2,4-D to Fischer 344 Rats. S.W. Frantz, Frantz, B.E. Kropscott, (Dow Chemical USA). (Abstract). The Toxicologist; 5(1). March 1985

(5) NTP Technical Report on the Toxicology and Carcinogenesis Studies of Decabromodiphenyl Oxide in F344/N Rats and B6C3F_1 Mice (Feed Studies). (Draft) USDHHS, NTP. August 1985

(6) Analysis for Brominated Dibenzodioxin and Dibenzofuran Impurities in Two Decabromodiphenyl Oxide Samples. USDHHS, NIEHS. June 20, 1985

(7) Results of a 2-Year Dietary Feeding Study with Decabromodiphenyl Oxide (DBDPO) in Rats. R.L. Kociba, L.O. Frauson, C.G. Humiston, J.M. Norris, C.E. Wade, R.W. Lisowe, J.F. Quast, G.C. Jersey and G.L. Jewett (Dow Chemical USA). J. Combustion Toxicology; 2:267-285. November 1975

40-8693102 (continued)

(8) Toxicological and Environmental Factors Involved in the Selection of Decabromodiphenyl Oxide as a Fire Retardant Chemical. J.M. Norris, J.W. Ehrmantraut, C.L. Gibbons, R.J. Kociba, B.A. Schwetz, J.Q. Rose, C.G. Humiston, G.L. Jewett, W.B. Crummett, P.J. Gehring, J.B. Tirsell and J.S. Brosier (Dow Chemical Co.). Applied Polymer Symposia No. 22: 195-219. 1973

(9) Toxicology of Octabromobiphenyl and Decabromodiphenyl Oxide. J.M. Norris, R.J. Kociba, B.A. Schwetz, J.Q. Rose, C.G. Humiston, G.L. Jewett, P.J. Gehring and J.B. Mailhes (Dow Chemical USA). Environmental Health Perspectives; 11: 153-161. June 1975

(10) Letter from R. Griesemer and N. Nelson, EPA's Science Advisory Board, to L.M. Thomas, EPA April 26, 1985

(a) Technical Report of the Environmental Health Committee of EPA's Science Advisory Board Regarding a Draft Health Assessment Document for Polychlorinated Dibenzo-p-Dioxins.

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C_1-FILE

			Fiche #
40-8693103	Eastman Kodak Company Comment letter from R. Brothers to Document Control Officer, EPA. February 12, 1986	(5)	513788
40-8693104	Environmental Defense Fund Comment letter from E. Silbergeld to E. Klein, EPA, requesting an opportunity for oral comment. February 3, 1986	(6)	513789
40-8693105	Environmental Defense Fund Cover letter from E. Silbergeld to Document Control Officer, EPA February 18, 1986 Enclosures: (1) Comments of the Environmental Defense Fund on EPA's Proposed Testing and Reporting Requirements for Polyhalogenated Dibenzo-p-Dioxins/Dibenzofurans. February 18, 1986 (a) Appendix A - Label for Lysol Disinfectant. (b) Appendix B - Memorandum of Points and Authorities in Support of Plaintiff's Motion for Partial Summary Judgment. R. Percival, EDF and M. Van Putten, NWF. Civil Action No. 85-0973; EDF and NWF vs. L.M. Thomas, EPA. December 16, 1985	(7)	513790

Fiche #

40-8693105 (continued)

(c) Appendix C - Memorandum of Points and Authorities in Opposition to Defendants' Motion to Dismiss and to Defendants' and Defendant-Intervenor's Motions for Partial Summary Judgment and in Reply to Defendants' and Defendant-Intervenor's Opposition to Plaintiffs' Motion for Partial Summary Judgment. Civil Action No. 85-973; EDF and NWF vs. L. Thomas, EPA. February 11, 1986

(d) Appendix D - Supplemental Declaration of Ellen K. Silbergeld. Civil Action No. 85-973; of EDF and NWF vs. L. Thomas, EPA. February 10, 1986

1. List of 98 chemicals likely to be contaminated by PHDDs and PHDFs that are not included in EPA's proposed testing and reporting rule.

40-8693106 Ethyl Corporation (8) 513791

Comment letter from G.L. Ter Haar to Document Control Officer, EPA. February 18, 1986

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C_1-FILE

			Fiche #
40-8693108	Great Lakes Chemical Corporation	(9)	513792

Comment letter from C. O'Connor of McKenna, Conner, and Cuneo to Document Control Officer, EPA.
February 3, 1986

40-8693110	Great Lakes Chemical Corporation	(10)	513793

Cover letter from C. O'Connor of McKenna, Conner and Cuneo to Document Control Officer, EPA
February 19, 1986

Enclosures:

(1) Comments on Proposed Testing and Reporting Rules Under the Toxic Substances Control Act for Polyhalogenated Dibenzodioxins and Dibenzofurans. (Sanitized) Great Lakes Chemical Corp.
February 19, 1986

(2) Technical Comments on Proposed Testing and Reporting Rules Under the Toxic Substances Control Act for Polyhalogenated Dibenzodioxins and Dibenzofurans. Great Lakes Chemical Corp. (Sanitized)
February 18, 1986

(3) Appendix A: Curriculum Vitae for three Great Lakes Chem. Corp. employees.

(4a) Appendix B: Review and Trends in the Analysis for PCDD/PCDF. W.B. Crummett, L.L. Lamparski and T.J. Nestrick (Dow Chemical USA).

40-8693110 (continued)

(4b) Letter from D. Rodwell, WIL Res. Labs., Inc., to D. McFadden, Great Lakes Chemical Corp. (Sanitized) June 7, 1985

(4c) Acute and Chronic Toxicity Testing of 1,3,6,8-Tetra-chlorodibenzo-p-Dioxin (1,3,6,8-TCDD). (Japanese Translation) K. Kawamura, R. Sato and M. Kashima. Oyo Yakuri; 25(5): 703-711. 1983

(5a) Summaries of Toxicity Data for Pentabromodiphenyl Oxide. (Sanitized) Great Lakes Chemical Corp. November 1984

(5b) Summaries of Toxicity Data for Octabromodiphenyl Oxide. Great Lakes Chemical Corp.

(5c) Summaries of Toxicity Data for Decabromodiphenyl Oxide. Great Lakes Chemical Corp. May 5, 1977

(5d) Summaries of Toxicity Data for Tetrabromobisphenol A. Great Lakes Chemical Corp. December 1979

(5e) Summaries of Toxicity Data for Tetrabromobisphenol A Bis(2-Hydroxyethyl Ether). Great Lakes Chemical Corp. March 21, 1979

Fiche #

40-8693110 (continued)

(5f) Summaries of Toxicity Data for Bis(Allyl Ether) of Tetrabromobisphenol A. Great Lakes Chemical Corp.
May 19, 1981

(5g) Summaries of Toxicity Data for Bis(2,3-Dibromopropyl Ether) of TBBPA.

(5h) Summaries of Toxicity Data for 2,4,6-Tribromophenol. Great Lakes Chemical Corp.
March 31, 1982

(5i) Summaries of Toxicity Data for 1,2-Bis(Tribromophenoxy) Ethane. Great Lakes Chemical Corp.
November 1981

40-8593107	Imperial, Inc.	(11)	513794

Comment letter from G. Currie to Document Control Officer, EPA.
December 31, 1985

40-8693111	Platte Chemical Company	(12)	513796

Comment letter from D. Burchett to Document Control Officer, EPA.
January 17, 1986

40-8693112	Vulcan Materials Company	(13)	513797

Comment letter from T.A. Robinson to Document Control Officer, EPA.
February 18, 1986

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			Fiche #
40-8693113	Workers' Institute for Safety and Health	(14)	513798

Comment letter from M. Gillen to Document Control Officer, EPA.
February 26, 1986

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C_2-FILE

			Fiche #
40-8693179	Eastman Kodak Company Comment letter from R. Brothers to Document Control Officer, EPA. November 21, 1986	(1)	513799
40-8693180	Environmental Defense Fund Cover letter from R. Percival to Document Control Officer, EPA November 21, 1986 Enclosure: (1) Comments of the Environmental Defense Fund on EPA's Proposed Addition of Certain Chlorinated and Brominated Benzenes to List of Precursor Chemicals in Proposed Testing and Reporting Rule for Polyhalogenated Dibenzo-p-Dioxins/ Dibenzofurans. November 21, 1986	(2)	513800
40-8693181	Great Lakes Chemical Corporation Comments on the Proposed Addition of 18 Chlorinated and Brominated Benzenes to the List of Precursor Chemicals. (Sanitized) November 24, 1986	(3)	513801

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C_2-FILE

Fiche #

40-8693182 Uniroyal Chemical Company, Inc. (4) 513802

Comment letter from R.A. Cardona to
Document Control Officer, EPA
November 21, 1986

Enclosures:

(1) Letter from R.A. Cardona, Uniroyal, ~~Uniroyal,~~ to J.W. Akerman, EPA, ~~regarding~~ regarding PCWB Data-Call-in Notice ~~of~~ of May 8, 1985.
May 5, 1986

(2) Letter from J.D.L. Salcedo, ~~Chemical~~ Chemi-Org. of Mexico, to R. ~~Cardona,~~ Cardona, Uniroyal, authorizing ~~Uniroyal to~~ Uniroyal to rely on data from ~~Chemical Org. of~~ Chemical Org. of Mexico.
April 28, 1986

(3) Letter from EPA to R. Cardona, Uniroyal, giving the status of submitted studies.
March 31, 1986

(a) Letter from G. Werdig, EPA, to Chemical Group, Uniroyal Inc., providing the EPA accession number for data submitted.
September 23, 1985

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D_{1a}-FILE

			Fiche #
40-8593116	EDF/NWF Meeting	(1)	513803

Attendees:

Environmental Protection Agency
Environmental Defense Fund
National Wildlife Federation

Date: January 31, 1985

Subject: EPA's response to Section 21 petition.

Enclosure:

(1) Meeting summary.
February 8, 1985

40-8593117	EPA Dioxin/Furan Work Group Meeting	(2)	513804

Date: June 11, 1985

Subject: Review of the MRI Report.

Documents:

(1) Meeting summary.

TSCA SECTION 8(d) AND 4(a)
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MEETINGS FOR DOCKET #83002
D_{1a}-FILE

			Fiche #
40-8593118	EPA Dioxin/Furan Work Group Meeting	(3)	513805

Date: July 22, 1985

Subject: Levels of quantification and action levels.

Documents:

(1) Meeting summary.

(2) List of attendees.

(3) Options for Dioxin Work Group.

(4) Schedule for Dioxin/Furan Rule Development.

40-8593120	EPA Dioxin/Furan Work Group	(4)	513806

Date: August 5, 1985

Subject: Direction of the proposed rule.

Documents:

(1) Meeting summary. August 13, 1985

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MEETINGS FOR DOCKET #83002
D_{1a}-FILE

Fiche #

40-8593119 Chemical Manufacturers Association Meeting (5) 513807

Attendees:

Chemical Manufacturers Association
Environmental Protection Agency

Date: August 12, 1985

Subject: Technical aspects of the rule.

Documents:

(1) Meeting summary. August 14, 1985

(2) List of attendees.

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MEETINGS FOR DOCKET #83002B
D_{1b}-FILE

			Fiche #
40-8693114	Public Meeting on Dibenzo-p-Dioxins/ Dibenzofurans	(1)	513808

Attendees:

Environmental Protection Agency
McKenna, Conner and Cuneo
Kirkland and Ellis
Pesticide and Toxic Chemical News
Chemical Manufacturers Association
Ethyl Corporation
National Wildlife Federation
American Petroleum Institute
Monsanto Company
The Dow Chemical Company
Environmental Defense Fund
Ameribrom, Inc.
Great Lakes Chemical Corporation
~~H.S.~~ Bureau of National Affairs

Date: March 4, 1986

Subject: Proposed testing and reporting requirements.

Documents:

(1) List of attendees.

(2) Transcript of Proceedings.

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D_{1b}-FILE

			Fiche #
40-8693121	Great Lakes Chemical Corporation Meeting	(2)	513809

Attendees:

Environmental Protection Agency
McKenna, Connor and Cuneo
Great Lakes Chemical Corporation

Date: March 4, 1986

Subject: CBI and comments to the proposed rule from the Great Lakes Chemical Corp.

Documents:

(1) Transcript of private meeting. (Sanitized)

40-8693115	Public Meeting on Dioxins and Furans	(3)	513810

Attendees:

Environmental Protection Agency
NCAMP
Standard Chlorine of Delaware, Inc.
The Dow Chemical Company
Harvard School of Public Health
Pesticide and Toxic Chemical News
Kirkland and Ellis
Bureau of National Affairs
Great Lakes Chemical Corporation
Piper and Marbury
Vulcan Chemicals Company
Ethyl Corporation
Environmental Defense Fund
Chemical Manufacturers Association

Fiche #

40-8693115 (continued)

Date: April 22, 1986

Subject: Proposed testing and reporting requirements.

Documents:

(1) Attendees list.

(2) Transcript of Proceedings.

40-8693122 EPA Dioxin/Furan Work Group Meeting (4) 513811

Date: April 23, 1986

Subject: Summary of the public meeting and discussion of issues.

Documents:

(1) Meeting summary.

(2) List of attendees.

40-8693123 EPA Dioxin/Furan Work Group Meeting (5) 513812

Date: May 7, 1986

Subject: Testing recommendations.

Documents:

(1) Meeting summary. May 15, 1986

TSCA SECTION 8(d) AND 4(a)
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D_{1b}-FILE

			Fiche #
40-8693124	EPA Dioxin/Furan Work Group Meeting	(6)	513813

Date: May 21, 1986

Subject: Testing recommendations.

Documents:

(1) Meeting summary.
June 10, 1986

(2) Attendance sign-in sheet.

TSCA SECTION 8(d) AND 4(a)
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MEETINGS FOR DOCKET #83002C
D_{1C}-FILE

Fiche #

40-8693201 Dioxin Update Conference (1) 513814

Attendees:

(Not listed)

Date: July 1-2, 1986

Subject: Scientific issues associated with Dioxins.

Documents:

(1) Introduction to the Report.

(2) Conclusions of the Dioxin Update Committee.

(3) Review of the Epidemiologic Data Regarding Dioxin and Cancer. A. Blair; National Cancer Institute.

(4) Immunotoxicity of the Chlorinated Dibenzodioxins and Dibenzofurans. J. Dean and R. Kimbrough, CIIT and CDC.

(5) Bioavailability of Dioxins from Complex Mixture. M. Gallo.
June 19, 1986

(6) Mechanism of Action. A. Poland.

(7) Risk Assessment. D. Hoel.

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Fiche #

40-8693201 (continued)

(8) Teratology and Reproduction Studies with TCDD. R. Kimbrough.

(9) "Dioxin Update" Participants.

40-8793202 EPA Workgroup Closure Meeting (2) 513815

Date: February 18, 1987

Subject: Test rule and data submission requirements.

Documents:

(1) Meeting summary. February 20, 1987

(2) Attendees list.

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D_{1d}-FILE

			Fiche #
40-8793220	EPA Dioxin/Furan Workgroup Meeting	(1)	513816

Date: July 2, 1987

Subject: System for handling exclusion and waiver applications.

Documents:

(1) Meeting summary.

40-8893233	Dioxin Panel Meeting	(2)	513817

Attendees:

Midwest Research Institute
Environmental Protection Agency

Date: February 29, 1988

Subject: Protocol review.

Documents:

(1) Meeting summary from Midwest Research Institute. March 15, 1988

(2) List of attendees.

(3) Dioxin/Furan Rule Company Compliance Status.

(4) Protocol Review Process.

(5) Charter of the Dioxin/Furan Protocol Review Panel.

TSCA SECTION 8(d) AND 4(a)
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D_{1d}-FILE

			Fiche #
40-8893293	Protocol Review Panel Teleconference	(3)	524803

Attendees:

Midwest Research Institute
Environmental Protection Agency

Date: April 20, 1988

Subject: Protocol review.

Documents:

(1) Cover letter from D. Steele, Midwest Research Institute, to R. Mitchum, EPA (Also identical letters to W. Bontoyan, A. Dupuy, R. Harless and D. Firestone, EPA).
May 4, 1988

(a) Minutes of meeting from Midwest Research Institute.
May 4, 1988

(b) Participants at meeting.

TSCA SECTION 8(d) AND 4(a)
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D_{1d}-FILE

			Fiche #
40-8893294	Protocol Review Panel Teleconference	(4)	524804

Attendees:

Environmental Protection Agency
U.S. Food and Drug Administration
Midwest Research Institute

Date: May 18, 1988

Subject: Protocol review.

Documents:

(1) Cover letter from D. Steele, Midwest Research Institute to W. Bontoyan, EPA. May 24, 1988

(a) Minutes of the meeting from Midwest Research Institute. May 24, 1988

40-8893295	Protocol Review Panel Teleconference	(5)	524805

Attendees:

Environmental Protection Agency
U.S. Food and Drug Administration
Midwest Research Institute

Date: June 15, 1988

Subject: Protocol review.

Documents:

(1) Minutes of the teleconference from Midwest Research Institute. June 16, 1988

TSCA SECTION 8(d) AND 4(a)
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D_{1d}-FILE

			Fiche #
40-8893300	Protocol Review Panel Meeting	(6)	524806

Attendees:

Environmental Protection Agency
Lockheed Environmental Services
Midwest Research Institute
Great Lakes Chemical Corporation
Dead Sea Bromine Company
Hoechst-Celanese Corporation
U.S. Food and Drug Administration
Ethyl Corporation
Triangle Laboratories, Inc.
Latham and Watkins
The Dow Chemical Company
Borg-Warner Corporation
GE Plastics Corporation
Mobil Chemical Company

Date: July 27, 1988

Subject: Review of protocols.

Documents:

(1) Minutes of July TSCA Section 4 Dioxin/Furan Protocol Review Panel Meeting. Midwest Research Institute. August 17, 1988

(2) List of attendees.

TSCA SECTION 8(d) AND 4(a)
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D_{1d}-FILE

			Fiche #
40-8893301	Protocol Review Panel Teleconference	(7)	524807

Attendees:

Environmental Protection Agency
Midwest Research Institute

Date: August 16, 1988

Subject: Review of protocols.

Documents:

(1) Minutes of August EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Teleconference. Midwest Research Institute. August 18, 1988

40-8893317	Protocol Review Panel Meeting	(8)	524808

Attendees:

Environmental Protection Agency
U.S. Food and Drug Adminstration
Midwest Research Institute

Date: September 20, 1988

Subject: Review of protocols.

Documents:

(1) Minutes of September EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Meeting.

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D_{1d}-FILE

			Fiche #
40-8893328	Protocol Review Panel Teleconference	(9)	524809

Attendees:

Environmental Protection Agency
Midwest Research Institute

Date: December 14, 1988

Subject: Status of the protocol reviews.

Documents:

(1) Minutes of the December EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Teleconference.

40-8893329	Protocol Review Panel Teleconference	(10)	524810

Attendees:

Environmental Protection Agency
Midwest Research Institute

Date: January 25, 1989

Subject: Review of Revision 1 of the Dow Chemical Analytical Protocol.

Documents:

(1) Minutes of the January EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Teleconference.

TSCA SECTION 8(d) AND 4(a)
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D_{1d}-FILE

Fiche #

40-8993361 Dioxin/Furan Protocol Review Panel Meeting (11) 524811

Attendees:

Environmental Protection Agency
Great Lakes Chemical Corporation
GE Plastics Company
Lockheed Environmental Services
The Dow Chemical Company
Hoechst-Celanese Corporation
U.S. Food and Drug Administration
Ethyl Corporation
Triangle Laboratories, Inc.
National Institute for
Occupational Safety and Health,
USDHHS
Borg-Warner Corporation
Midwest Research Institute
Latham and Watkins
Ameribrom, Inc.

Date: March 1, 1989

Subject: Exposure issues and protocol reviews.

Documents:

(1) Minutes of March TSCA Section 4 Dioxin/Furan Protocol Review Panel Meeting.

(2) List of attendees.

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MEETINGS FOLLOWING DOCKET #83002C
D_{1d}-FILE

			Fiche #
40-8993362	Protocol Review Panel Teleconference	(12)	524812

Attendees:

Environmental Protection Agency
Midwest Research Institute

Date: March 23, 1989

Subject: Panel recommendations and comments on the protocols.

Documents:

(1) Letters from D. Steele of Midwest Research Institute to W. Sovocool, W. Bontoyan, R. Harless and A. Dupuy of EPA and D. Firestone of FDA. March 28, 1989

(a) Minutes of March 23 EPA TSCA Section 4 Dioxin/ Furan Protocol Review Panel Teleconference.

(b) Status of TSCA Section 4 Dioxin/Furan Protocols. March 2, 1989

TSCA SECTION 8(d) AND 4(a)
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D_{1d}-FILE

			Fiche #
40-8993363	Panel Review Teleconference	(13)	524813

Attendees:

Environmental Protection Agency
Midwest Research Institute

Date: May 17, 1989

Subject: Protocol reviews.

Documents:

(1) Minutes of May EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Teleconference.

40-8993364	Protocol Review Panel Teleconference	(14)	524814

Attendees:

U.S. Food and Drug Administration
Environmental Protection Agency
Midwest Research Institute

Date: June 14, 1989

Subject: Protocol review.

Documents:

(1) Minutes of June EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Teleconference.

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKETS #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
MEETINGS FOLLOWING DOCKET #83002C
D_{1d}-FILE

Fiche #

40-8993396 Protocol Review Panel Meeting (15) 524898

Attendees:

Environmental Protection Agency
U.S. Food and Drug Administration
Midwest Research Institute

Date: August 23-24, 1989

Subject: Triangle Labs. audit; Clarification of the protocols from A&D and Chugai for chloranil; Protocols pending and received; Review of sampling and analytical protocols 006 to 020 for the Brominated Compounds.

Documents:

(1) Minutes of EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Teleconference.

[See $H_{1.2}$(30a) for Summary)

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20571

Fiche #

40-8993397 Protocol Review Panel Teleconference (16) 524898

Attendees:

Environmental Protection Agency
Midwest Research Institute
Lockheed Engineering and Sciences Company
U.S. Food and Drug Administration

Date: September 8, 1989

Subject: Storage conditions for Brominated Compounds; Analytical problems with Chloranil; Approval of Protocols 002 to 005.

Documents:

(1) Minutes of EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Teleconference.

[See $H_{1.2}$(30a) for Document]

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKETS #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
MEETINGS FOLLOWING DOCKET #83002C
D_{1d}-FILE

			Fiche #
40-8993398	Protocol Review Panel Teleconference	(17)	524898

Attendees:

Environmental Protection Agency
Midwest Research Institute
Lockheed Engineering and Sciences Company
U.S. Food and Drug Administration

Date: September 29, 1989

Subject: Chloranil analysis; Review of protocol 006 to 020.

Documents:

(1) Minutes of EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Teleconference.

[See $H_{1.2}$(30a) for Document]

Fiche #

40-8993399 Protocol Review Panel Teleconference (18) 524898

Attendees:

Environmental Protection Agency
Midwest Research Institute
Lockheed Engineering and Sciences Company
U.S. Food and Drug Administration

Date: October 25, 1989

Subject: Chloranil analysis; BFRIR protocols; and Pfester protocol No. 021.

Documents:

(1) Minutes of EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Teleconference.

[See $H_{1.2}$(30a) for Document]

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TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKETS #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
MEETINGS FOLLOWING DOCKET #83002C
D_{1d}-FILE

			Fiche #
40-9093400	Protocol Review Panel Teleconference	(19)	524815

Attendees:

Environmental Protection Agency
Lockheed Engineering and Sciences Company
U.S. Food and Drug Administration
Midwest Research Institute

Date: January 10, 1990

Subject: BFRIP testing extension request; Data from Hoechst Celanese; Data from Chugai.

Documents:

(1) Minutes of January EPA TSCA Section 4 Dioxin/Furan ~~Protocol Review Panel Teleconference~~ Protocol Review Panel Teleconference.

40-9093450	Protocol Review Panel Teleconference	(20)	524816

Attendees:

Environmental Protection Agency
Midwest Research Institute
U.S. Food and Drug Administration
Lockheed Engineering and Sciences Company

Date: February 21, 1990

Subject: Update on protocol review.

Documents:

(1) Minutes of February EPA TSCA Section 4 Dioxin/Furan ~~Protocol Review Panel Teleconference~~ Protocol Review Panel Teleconference.

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKETS #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
MEETINGS FOLLOWING DOCKET #83002C
D_{1d}-FILE

			Fiche #
40-9093460	Review Panel Meeting	(21)	524817

Attendees:

Environmental Protection Agency
Lockheed Engineering and Sciences Company
U.S. Food and Drug Administration
Midwest Research Institute

Date: March 14, 1990

Subject: Protocol reviews.

Documents:

(1) TSCA Section 4 Dioxin/Furan Protocol Review Panel Meeting.
too much space here

(2) Exhibit I: EPA memo from D. McDaniel (Miss.) to A. Dupuy, Jr. Description of samples and ~~and~~ methods used in the analysis ~~analysis~~ of Tetrabromo bisphenol A. March 12, 1990

(3) Exhibit II: EPA memo from R. Harless (RTP, NC) to T. Murray ~~Murray~~ on the analysis for Dibenzo- ~~Dibenzo~~p-Dioxins and Dibenzofurans ~~Dibenzofurans~~ in Tetrabromobisphenol A. March 13, 1990

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
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MEETINGS FOLLOWING DOCKET #83002C
D_{1d}-FILE

Fiche #

40-9093461 Review Panel Meeting (22) 524818

Attendees:

Environmental Protection Agency
Lockheed Engineering and Sciences Company
U.S. Food and Drug Administration
Midwest Research Institute
Great Lakes Chemical Corporation
Arnold and Porter
Ethyl Corporation
Triangle Laboratories
Chemical Manufacturers Association
Ameribrom, Inc.
Brominated Flame Retardant Industry Panel

Date: March 14, 1990

Subject: Analytical methods development.

Documents:

(1) TSCA Section 4 Protocol Review Panel/BFRIP Meeting.

(1a) TSCA Section 4 Protocol Review Panel/BFRIP Meeting. (Revised)

(2) Exhibit I: Letter from D. Steele, Midwest Research Institute to C. Mazac of Great Lakes Chemical Corp. on the Panel questions of BFRIP protocols. March 8, 1990

Fiche #

40-9093461 (continued)

(3) Exhibit II: EPA memo from D. McDaniel (Miss.) to A. Dupuy on the description of samples and methods used in the analysis of Tetrabromobisphenol A.
March 12, 1990

(4) Exhibit III: EPA memo from R. Harless (RTP, NC) to T. Murray on the analysis for Dibenzo-p-Dioxins and Dibenzofurans in Tetrabromobisphenol A.
March 13, 1990

(5) Exhibit IV: Telefax from C. Mazac of Great Lakes Chemical Corporation to Chemsyn Science Labs. requesting the synthesis of additional brominated standards.
November 6, 1989

(6) Exhibit V: Letter from J. Kreuzberger of Chemsyn Science Labs. to C. Mazac of Great Lakes Chemical Corp. in response to their request of November 6, 1989.
December 13, 1989

(7) Exhibit VI: Internal Great Lakes Chemical Corp. memo from A.S. Klemene to D.W. Abbott on the structural determination of Heptabromodibenzofuran.
March 9, 1990

(8) Exhibit VII: Single Laboratory Method Evaluation for TBBPA.
March 7, 1990

Fiche #

40-9093461 (continued)

(9) Exhibit VIII: Single Laboratory Method Evaluation for PH-73.
March 7, 1990

(10) Addendum.
June 14, 1990

40-9093462 Review Panel Teleconference (23) 524819

Attendees:

Environmental Protection Agency
Midwest Research Institute
U.S. Food and Drug Administration

Date: May 9, 1990

Subject: Compliance complaints and protocol reviews.

Documents:

(1) TSCA Section 4 Dioxin/Furan Protocol Review Panel Teleconference.
May 9, 1990

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKETS #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
MEETINGS FOLLOWING DOCKET #83002C
D_{1d}-FILE

Fiche #

40-9093486 Review Panel Teleconference (24) 533311

Attendees:

Environmental Protection Agency
Midwest Research Institute
U.S. Food and Drug Administration

Date: June 27, 1990

Subject: Enforcement actions, protocol status and Chloranil analysis.

Documents:

(1) Minutes of ~~Meeting~~ June EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Teleconference.
July 24, 1990

40-9093487 BFRIP Teleconference (25) 533310

Attendees:

Environmental Protection Agency
Triangle Laboratories, Inc.
Midwest Research Institute
Great Lakes Chemical Corporation
President (Brominated Flame Retardant Industry Panel)

Date: July 12, 1990

Subject: Clarification of points raised as a result of analytical protocols prepared by Triangle Labs and submitted by BFRIP.

Documents:

(1) Minutes of Teleconference.
July 24, 1990

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TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKETS #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
MEETINGS FOLLOWING DOCKET #83002C
D_{1d}-FILE

Fiche # 53319

40-9093488 Review Panel Meeting (26)

Attendees:

Environmental Protection Agency
Lockheed Engineering and Sciences Company
U.S. Food and Drug Administration
Midwest Research Institute

Date: August 14, 1990

Subject: Chloranil testing.

Documents:

(1) Minutes of August EPA Section 4 Dioxin/Furan Protocol Review Panel Meeting. August 28, 1990

(2) Revised Minutes of August EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Meeting. September 5, 1990

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TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKETS #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
MEETINGS FOLLOWING DOCKET #83002C
D_{1d}-FILE

Fiche #

40-9093489 Review Panel Teleconference (27) 533320

Attendees:

Environmental Protection Agency
Lockheed Engineering and Sciences Company
U.S. Food and Drug Administration
Midwest Research Institute

Date: August 23, 1990

Subject: Review of the Panel's responses to the second revision of the analytical protocols.

Documents:

(1) Minutes of August 23rd, 1990 EPA TSCA Section 4 Dioxins/ Furan Protocol Review Panel Teleconference.
August 27, 1990

40-9093507 Review Panel Teleconference (28) 533321

Attendees:

Environmental Protection Agency
Lockheed Engineering and Sciences Company
U.S. Food and Drug Administration
Midwest Research Institute

Date: October 4, 1990

Subject: Status on the protocol reviews.

Documents:

(1) Minutes of the October EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Teleconference.
October 9, 1990

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKETS #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
LEGAL PROCEEDINGS FOR DOCKET #83002
D_{2a}-FILE

			Fiche #
40-8093125	The Dow Chemical Company et al.	(1)	513818

Direct testimony of David T. Buzzelli regarding 2,4,5-T and Silvex before the Environmental Protection Agency of the United States of America. Exhibit 810 in regards to The Dow Chemical Co. et al.; Docket Nos. 415 et al. September 30, 1980

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKET #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
LEGAL PROCEEDINGS FOR DOCKET #83002C
D_{2c}-FILE

			Fiche #
40-8093125	The Dow Chemical Company et al.	(1)	513818

Direct testimony of David T. Buzzelli regarding 2,4,5-T and Silvex before the Environmental Protection Agency of the United States of America. Exhibit 810 in regard to The Dow Chemical Co. et al.; Docket Nos. 415 et al. September 30, 1980

[Crossreferenced to $D_{2a}(1)$]

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKETS #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
HEARING FOLLOWING DOCKET #83002C
D_{3d}-FILE

			Fiche #
40-9093454	~~U.S.~~ EPA vs. Chugai Boyeki (America) Corporation	(1)	524820

Attendees:

Chugai Boyeki (America)
Corporation
Sandoz Chemicals Corporation
Hoechst-Celanese Corporation
Triangle Laboratories, Inc.

Date: June 1, 1990

Subject: Submission of study conducted in violation of Section 4 of TSCA.

Documents:

(1) Complaint and Notice of Opportunity for Hearing Under Section 16(a) of the Toxic Substances Control Act. Docket No. TSCA 90-H-11.

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TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
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WRITTEN COMMUNICATIONS FOR DOCKET #83002
E_{1a}-FILE

				Fiche #
40-8593126	From:	Environmental Protection Agency D. Keehner	(1)	513819
	To:	Environmental Protection Agency M. Callahan		
	Date:	February 11, 1985		
	Subject:	Formation of the Dioxins/Furan Work Group.		
40-8593127	From:	Environmental Protection Agency D. Keehner	(2)	513820
	To:	Environmental Protection Agency A. Carpien		
	Date:	February 11, 1985		
	Subject:	Formation of the Dioxins/Furan Work Group.		
40-8593128	From:	Environmental Protection Agency D. Keehner	(3)	513821
	To:	Environmental Protection Agency J. Carra		
	Date:	February 11, 1985		
	Subject:	Formation of the Dioxins/Furan Work Group.		

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKET #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
WRITTEN COMMUNICATIONS FOR DOCKET #83002
E_{1a}-FILE

				Fiche #
40-8593129	From:	Environmental Protection Agency D. Keehner	(4)	513822
	To:	Environmental Protection Agency F. Kover		
	Date:	February 11, 1985		
	Subject:	Formation of the Dioxins/Furan ~~Furan~~ Work Group.		
40-8593130	From:	Environmental Protection Agency D. Keehner	(5)	513823
	To:	Environmental Protection Agency G. Timm		
	Date:	February 11, 1985		
	Subject:	Formation of the Dioxins/Furan ~~Furan~~ Work Group.		
40-8593131	From:	Environmental Protection Agency A. Ralph	(6)	513824
	To:	Environmental Protection Agency R. Boethling		
	Date:	February 11, 1985		
	Subject:	Formation of the Dioxins/Furan ~~Furan~~ Work Group.		

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKET #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
WRITTEN COMMUNICATIONS FOR DOCKET #83002
E_{1a}-FILE

				Fiche #
40-8593132	From:	Environmental Protection Agency M. Halper	(7)	513825
	To:	Environmental Protection Agency I. Baumel and M. Shapiro		
	Date:	February 14, 1985		
	Subject:	Formation of the Dioxins/Furan ~~Furan~~ Work Group.		
40-8593133	From:	Environmental Protection Agency A. Ralph	(8)	513826
	To:	Environmental Protection Agency Dioxin/Furan Work Group		
	Date:	March 1985		
	Subject:	Meeting announcement.		
	Enclosures:			
		(1) List of Workgroup members.		
		(2) Draft Development Plan for the Rule.		
		[See E_{1a}(10) for Enclosures]		
40-8593134	From:	Environmental Protection Agency A. Ralph	(9)	513827
	To:	Environmental Protection Agency Dioxin/Furan Work Group		
	Date:	April 12, 1985		
	Subject:	Meeting notice and agenda.		

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKET #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
WRITTEN COMMUNICATIONS FOR DOCKET #83002
E_{1a}-FILE

Fiche #

40-8593135 From: Environmental Protection Agency (10) 513828
A. Ralph

To: Environmental Protection Agency
Dioxin/Furan Work Group

Date: April 26, 1985

Subject: Meeting announcement and agenda.

Enclosures:

(1) Briefing paper.

(2) Schedule.

(3) Environmental Protection Agency Start Action Request.

(4) Development Plan for a Section 4/8 Dioxin/Furan Rulemaking. (Draft)

(5) Appendix A - Chemicals Contaminated, Potentially Contaminated, and/or Precursors to Contamination with Chlorinated and Brominated Dibenzodioxins (DBDs) and Dibenzofurans (DBFs). April 19, 1985

(6) Appendix B - Isomers and availability of analytical standards (table).

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TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKET #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
WRITTEN COMMUNICATIONS FOR DOCKET #83002
E_{1a}-FILE

Fiche #

40-8593136

From: Environmental Protection Agency (11) 513829
S. Lee/K. McCormack

To: Environmental Protection Agency
Dioxin/Furan Work Group

Date: June 20, 1985

Subject: Meeting announcement and agenda.

Enclosures:

(1) List of addressees asked to review the methodology, list of chemicals and rationale for selection of chemicals.

(2) Minutes of June 11, 1985 meeting.

[See D_{1a}(2) for Enclosure (2)]

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TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
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WRITTEN COMMUNICATIONS FOR DOCKET #83002
E_{1a}-FILE

				Fiche #
40-8593137	From:	Environmental Protection Agency S. Lee and K. McCormack	(12)	513830
	To:	Environmental Protection Agency Dioxin/Furan Work Group		
	Date:	July 31, 1985		
	Subject:	Meeting announcement and agenda.		

Enclosures:

(1) Summary of comments from the workgroup on the rule.

(2) Minutes of July 22, 1985 meeting.

[See D_{1a}(3) for Enclosure (2)]

40-8593138	From:	Environmental Protection Agency K. McCormack and S. Lee	(13)	513831
	To:	Environmental Protection Agency Dioxin/Furan Work Group		
	Date:	August 13, 1985		
	Subject:	Meeting announcement and agenda.		

Enclosure:

(1) Minutes of August 5, 1985 meeting.

[See D_{1a}(4) for Enclosure]

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKET #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
WRITTEN COMMUNICATIONS FOR DOCKET #83002B
E_{1b}-FILE

				Fiche #
40-8693139	From:	National Institute of Environmental Health Sciences J. Goldstein	(1)	513832
	To:	Environmental Protection Agency D. Barnes		
	Date:	January 13, 1986		
	Subject:	The revised draft of the CDD and CDF position document.		
40-8693140	From:	Environmental Protection Agency S. Rudzinski	(2)	513833
	To:	McKenna, Conner and Cuneo C. O'Connor III		
	Date:	February 26, 1986		
	Subject:	Response to request for a private meeting with the Great Lakes Chemical Corp.		
40-8693141	From:	McKenna, Conner and Cuneo C. O'Conner III	(3)	513834
	To:	Environmental Protection Agency S. Rudzinski		
	Date:	February 28, 1986		
	Subject:	Confirmation of the upcoming private meeting.		

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKET #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
WRITTEN COMMUNICATIONS FOR DOCKET #83002B
E_{1b}-FILE

Fiche #

40-8693143 (4) 513835

From: Environmental Protection Agency
S. Lee and K. McCormack

To: Environmental Protection Agency
Dioxin/Furan Workgroup

Date: March 11, 1986

Subject: Comments to the proposed rule.

Enclosure:

(1) List of file headings for Dioxins/Furan comments.

(2) Comments received.

[See C_1 File for Enclosure (2)]

40-8693144 (5) 513836

From: Chemical Manufacturers Association
R. Fensterheim

To: Environmental Protection Agency
S. Lee

Date: April 3, 1986

Subject: Agenda for the April 22, 1986 meeting.

Enclosures:

(1) Letter from R. Fernsterheim, CMA, to M. Halper, EPA, commenting on the proposed rule.
February 18, 1986

Fiche #

40-8693144 (continued)

(a) Letter from CMA to Dr. Moore, EPA, requesting a meeting. February 18, 1986

(b) Comments on EPA's proposed rule.

[See $C_1(3)$ for Enclosures (a) and (b)]

40-8693145	From:	Cambridge Isotope Laboratories J.C. Bradley	(6)	513837
	To:	Environmental Protection Agency S. Rudzinski		
	Date:	April 7, 1986		
	Subject:	List of materials in catalog.		
40-8693142	From:	McKenna, Conner and Cuneo A. Kerester	(6a)	513838
	To:	Environmental Protection Agency S. Rudzinski		
	Date:	April 16, 1986		
	Subject:	Cover letter for enclosure.		

Enclosure:

(1) Transcript of private meeting.

[See $D_{1b}(1)$ for Enclosure]

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKET #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
WRITTEN COMMUNICATIONS FOR DOCKET #83002B
E_{1b}-FILE

				Fiche #
40-8693146	From:	Environmental Protection Agency S. Lee and K. McCormack	(7)	513839
	To:	Environmental Protection Agency Dioxin/Furan Workgroup		
	Date:	May 5, 1986		
	Subject:	Removal of chemicals from the list.		
	Enclosure:			
		(1) Minutes from the April 23, 1986 meeting.		
		[See D_{1b}(4) for Enclosure]		
40-8693147	From:	Environmental Protection Agency S. Lee and K. McCormack	(8)	513840
	To:	Environmental Protection Agency Dioxin/Furan Work Group		
	Date:	May 15, 1986		
	Subject:	Work Group meeting announcement and agenda.		
	Enclosure:			
		(1) Minutes from the May 7, 1986 meeting.		
		[See D_{1b}(5) for Enclosure]		

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKET #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
WRITTEN COMMUNICATIONS FOR DOCKET #83002B
E_{1b}-FILE

				Fiche #
40-8693148	From:	Environmental Protection Agency S. Lee and K. McCormack	(9)	513841
	To:	Environmental Protection Agency Dioxin/Furan Workgroup		
	Date:	June 10, 1986		
	Subject:	Meeting announcement and agenda.		

Enclosures:

(1) Minutes from the May 21, 1986 meeting.

(2) Decision paper used to brief R. Tinsworth (EPA). June 1986

[See D_{1b}(6) for Enclosure (1); Enclosure (2) Not Provided to Docket]

40-8693149	From:	Environmental Protection Agency M. Dreyfus	(10)	513842
	To:	Cambridge Isotope Laboratories J. Bradley		
	Date:	June 19, 1986		
	Subject:	Information submitted on the economic analysis.		

Enclosure:

(1) Summary of June 18, 1986, phone call.

[See E_{2b}(3) for Enclosure]

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKET #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
WRITTEN COMMUNICATIONS FOR DOCKET #83002B
E_{1b}-FILE

				Fiche #
40-8693150	From:	Environmental Protection Agency K. McCormack and S. Lee	(11)	513843
	To:	Environmental Protection Agency Dioxin/Furan Workgroup		
	Date:	July 14, 1986		
	Subject:	Meeting announcement and agenda.		

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKET #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
WRITTEN COMMUNICATIONS FOR DOCKET #83002C
E_{1c}-FILE

				Fiche #
40-8693196	From:	Mathtech, Inc. J. Orrell	(1)	513844
	To:	Environmental Protection Agency M. Dreyfus		
	Date:	September 26, 1986		
	Subject:	Production, producers and importers of the Chloranil market.		
40-8693175	From:	Environmental Protection Agency (Science Advisory Board) R. Griesemer and N. Nelson	(2)	513845
	To:	Environmental Protection Agency L. Thomas		
	Date:	November 4, 1986		
	Subject:	Science Advisory Board's review of "Interim Procedures for Estimating Risk Associated With Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and Dibenzofurans (CCDs and CDFs)".		
40-8693178	From:	McKenna, Conner and Cuneo A. Kerester (for C. O'Connor)	(3)	513846
	To:	Environmental Protection Agency Document Control Officer		
	Date:	November 7, 1986		
	Subject:	Participation in a public meeting.		

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKET #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
WRITTEN COMMUNICATIONS FOR DOCKET #83002C
E_{1c}-FILE

				Fiche #
40-8693197	From:	Environmental Protection Agency K. Wong	(4)	513847
	To:	Environmental Protection Agency M. Dreyfus		
	Date:	December 8, 1986		
	Subject:	Input on cost estimate for Dioxin/Dibenzofuran section 8(a) form.		
40-8693188	From:	Environmental Defense Fund E. Silbergeld and R. Percival	(5)	513848
	To:	Environmental Protection Agency J. Moore		
	Date:	January 15, 1987		
	Subject:	Settlement among Vulcan Materials, EPA, and Idacon, Inc., with respect to Dioxin contamination of PCP.		
40-8793195	From:	Environmental Protection Agency J. Moore	(6)	513849
	To:	Environmental Defense Fund E. Silbergeld		
	Date:	March 24, 1987		
	Subject:	Response to EDF's letter of January 15, 1987.		

TSCA SECTION 8(d) AND 4(a)
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				Fiche #
40-8793206	From:	General Electric Company S.F. Austin	(1)	513850
	To:	Environmental Protection Agency Document Control Officer		
	Date:	June 26, 1987		
	Subject:	Request for clarification of Final Rule.		
40-8793207	From:	Kirkland and Ellis T. Hardy	(2)	513851
	To:	Environmental Protection Agency D. Keehner		
	Date:	June 30, 1987		
	Subject:	Request for clarification of the Final Rule.		
40-8793208	From:	Supelco, Inc. L. Witting	(3)	513852
	To:	Environmental Protection Agency E. Klein		
	Date:	July 9, 1987		
	Subject:	Request for a waiver from testing.		

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				Fiche #
40-8793337	From:	Monsanto Chemical Company R. Olszewski	(3a)	524821
	To:	Great Lakes Chemical Corporation D. McAllister		
	Date:	July 21, 1987		
	Subject:	Confidentiality status of the April 3, 1986 submission from Monsanto ($F_1(2)$).		
40-8793209	From:	Kirkland and Ellis T. Hardy	(4)	513853
	To:	Environmental Protection Agency D. Keehner		
	Date:	July 29, 1987		
	Subject:	Request for additional clarification of final rule issues.		
40-8793210	From:	American Paper Institute and the National Forest Products Association J. Festa	(5)	513854
	To:	Environmental Protection Agency Document Control Office		
	Date:	August 3, 1987		
	Subject:	Request for clarification of Final Rule.		

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				Fiche #
40-8793211	From:	Ciba-Geigy Corporation A. DiBattista	(6)	513855
	To:	Environmental Protection Agency Document Control Officer		
	Date:	August 14, 1987		
	Subject:	Clarification of the Final Rule.		
40-8793223	From:	Rhone-Poulenc, Inc. N.I. Rouse	(7)	513856
	To:	Environmental Protection Agency Document Control Office		
	Date:	August 20, 1987		
	Subject:	Application for exemption from testing 2,4-Dichloro-phenol.		

Enclosure:

(1) Test results on imported 2,4-Dichlorophenol.

TSCA SECTION 8(d) AND 4(a)
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Fiche #

40-8793212 From: Ethyl Corporation (8) 513857
T. Pullin

To: Environmental Protection Agency
Document Control Officer

Date: September 1, 1987

Subject: Cover letter for enclosures.

Enclosures:

(1) Letter of intent to conduct tests on Pentabromodiphenyl-oxide and Octobromodiphenyl-oxide from T. Pullin, Ethyl Corp. to Document Control Officer, EPA. September 1, 1987

(2) Application letter from T. Pullin, Ethyl Corp. to Document Control Officer, EPA for an exclusion to conduct testing on Tetrabromobisphenol A and Decabromodiphenyloxide. (Sanitized) September 1, 1987

(a) Attachment I: Polybrominated Dibenzodioxins (PBrDD) and Dibenzofurans (PBrDF) in Some Flame Retardant Preparations. Chemosphere, 15(9-12):2111-2113. 1986

(b) Attachment II. (Deleted)

(c) Attachment III. (Deleted)

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				Fiche #
40-8793240	From:	BASF Corporation D. Briese	(9)	513858
	To:	Environmental Protection Agency Document Control Office		
	Date:	September 1, 1987		
	Subject:	Exemption request for 1,2-Bis(tribromophenoxy)ethane.		
40-8793213	From:	Ameribrom, Inc. A. Tillman	(10)	513859
	To:	Environmental Protection Agency Document Control Officer		
	Date:	September 2, 1987		
	Subject:	Request for a waiver.		
	Enclosure:			
	(1)	Letter request for a waiver from testing for Brominated Chemicals from M. Eldan, Ameribrom, Inc. to Document Control Officer, EPA. September 4, 1987		
40-8793214	From:	The Dow Chemical Company J. Gray	(11)	513860
	To:	Environmental Protection Agency Document Control Officer		
	Date:	September 2, 1987		
	Subject:	Intent to conduct testing on 2,4-Dichlorophenol.		

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				Fiche #
40-8793215	From:	The Dow Chemical Company J. Gray	(12)	513861
	To:	Environmental Protection Agency Document Control Officer		
	Date:	September 2, 1987		
	Subject:	Letter of intent to conduct testing on 2,4-Dichlorophenol.		
40-8793216	From:	The Dow Chemical Company W. Hancock	(13)	513862
	To:	Environmental Protection Agency Document Control Officer		
	Date:	September 2, 1987		
	Subject:	Request for waiver from testing all compounds except 2,4-Dichlorophenol.		
40-8793217	From:	Atochem, Inc. M. Hanley	(14)	513863
	To:	Environmental Protection Agency Document Control Officer		
	Date:	September 3, 1987		
	Subject:	Request for an exemption from testing Pentabromodiphenyl Oxide.		

TSCA SECTION 8(d) AND 4(a)
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				Fiche #
40-8793218	From:	McKenna, Conner and Cuneo C. O'Connor, III	(15)	513864
	To:	Environmental Protection Agency Document Control Officer		
	Date:	September 3, 1987		
	Subject:	Cover letter for enclosure.		
	Enclosure:			
	(1)	Request of Great Lakes Chemical Corporation for Exclusion and Waiver of Certain Chemicals From the Testing and Reporting Requirements of the Polyhalogenated Dibenzo-p-Dioxin/Dibenzofuran Test Rule, 40 CFR Parts 707 and 766 (52 FR 21412, June 5, 1987). (Sanitized) September 3, 1987		
40-8793219	From:	Smithkline Chemicals Company B. Sherry	(15a)	513865
	To:	Environmental Protection Agency Document Control Officer		
	Date:	September 3, 1987		
	Subject:	Cover letter for enclosure.		
	Enclosure:			
	(1)	Submitter Information - EPA form 7910-51 for the chemical Bromobenzene.		

TSCA SECTION 8(d) AND 4(a)
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				Fiche #
40-8793224	From:	Crescent Chemical Company, Inc. S. Bobrow	(16)	513866
	To:	Environmental Protection Agency L. Mack		
	Date:	September 21, 1987		
	Subject:	Waiver request for importation without special testing procedures.		
40-8793225	From:	Pfister Chemical, Inc. R.D. Huth	(17)	513867
	To:	Environmental Protection Agency Document Control Officer		
	Date:	September 23, 1987		
	Subject:	Application for testing waiver.		

Enclosures:

(1) Letter from R. Huth, Pfister Chemical to E. Mack, EPA requesting testing waiver for 3,4',5-Tribromosalicylanilide and 3,5-Dibromosalicylanilide.
September 3, 1987

(2) Followup to Pfister Chemical letter dated September 3, 1987.
September 9, 1987

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Fiche #

40-8793226 From: Rohm and Haas Company (18) 513868
R.L. Keener

To: Environmental Protection Agency
E.S. Klein

Date: September 23, 1987

Subject: Request for a waiver from testing requirements.

Enclosure:

(1) Internal Pfister Chemical memo ~~memo~~ from J.E. Plamondan to R.L. ~~R.L.~~ Keener on research notebook ~~notebook~~ searching. September 17, 1987

40-8793333 From: Diaz Chemical Corporation (18a) 524822
M. Bonn

To: Environmental Protection Agency
Document Control Officer

Date: September 29, 1987

Subject: Application of HDD/HDF rule to ~~to~~ the production of Dibromo-~~Bromo~~benzene.

Enclosure:

(1) Chemical reaction involving Bromobenzene during the processing at Diaz Chemical Corp.

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				Fiche #
40-8793227	From:	Great Lakes Chemical Corporation D.L. McFadden	(19)	513869
	To:	Environmental Protection Agency Document Processing Center		
	Date:	October 1, 1987		
	Subject:	Response to the request for any information on allegations of adverse effects.		
40-8793228	From:	Stauffer Chemical Company J.T. Elfstrum	(20)	513870
	To:	Environmental Protection Agency Document Control Office		
	Date:	October 13, 1987		
	Subject:	Letter of intent to test.		
40-8793241	From:	Stauffer Chemical Company J. Elfstrum	(21)	513871
	To:	Environmental Protection Agency Document Control Office		
	Date:	November 13, 1987		
	Subject:	Test data availability.		
40-8893242	From:	Pfister Chemical, Inc. R. Huth	(22)	513872
	To:	Environmental Protection Agency Document Control Office		
	Date:	January 29, 1988		
	Subject:	Letter of intent to test.		

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				Fiche #
40-8893243	From:	General Electric Company S. Austin	(23)	513873
	To:	Environmental Protection Agency Document Control Office		
	Date:	January 29, 1988		
	Subject:	Summary of ongoing or proposed ~~proposed~~ testing.		
40-8893244	From:	Great Lakes Chemical Corporation D. McFadden	(24)	513874
	To:	Environmental Protection Agency Document Control Office		
	Date:	March 10, 1988		
	Subject:	Intent to test.		
40-8893245	From:	Horsehead Industries, Inc. R. Marshall	(25)	513875
	To:	Environmental Protection Agency L. Marcus		
	Date:	March 17, 1988		
	Subject:	Production of chemicals falling under the rule.		
40-8893246	From:	Davos Chemical Corporation A. DelPrete	(26)	513876
	To:	Environmental Protection Agency Document Control Office		
	Date:	March 22, 1988		
	Subject:	Importation of Chloranil.		

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Fiche #

40-8893247 From: Sandoz Crop Protection Corporation (27) 513877
J. Licata

To: Environmental Protection Agency
Document Control Office

Date: March 28, 1988

Subject: Subject to TSCA rule.

Enclosure:

(1) Information on Banvel (Dicamba) - Pesticide).

[Enclosures are CBI]

40-8893248 From: Great Lakes Chemical Corporation (28) 513878
D. McAllister

To: Environmental Protection Agency
Document Control Officer

Date: March 28, 1988

Subject: Formation of Brominated
Dibenzofurans.

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				Fiche #
40-8893249	From:	Ameribrom, Inc. A. Tillman	(29)	513879
	To:	Environmental Protection Agency L. Marcus		
	Date:	March 30, 1988		
	Subject:	Intent to test.		
	Enclosure:			
		(1) Letter from M. Halper, EPA to A. Tillman, Ameribrom, Inc. denying request for waiver or exclusion from testing. March 8, 1988		
40-8893250	From:	Midwest Research Institute D. Steele	(30)	513880
	To:	Environmental Protection Agency R. Mitchum (Las Vegas, Nevada)		
	Date:	March 30, 1988		
	Subject:	Cover letter for enclosure.		
	Enclosure:			
		(1) Copy of the February 29, 1988 meeting summary.		
		[See D_{1d}(2) for Enclosure]		

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				Fiche #
40-8893251	From:	Midwest Research Institute D. Steele	(31)	513881
	To:	Environmental Protection Agency W. Bontoyan (Beltsville, MD)		
	Date:	March 30, 1988		
	Subject:	Cover letter for enclosure.		
	Enclosure:			
		(1) Copy of the February 29, 1988 meeting summary.		
		[See D_{1d}(2) for Enclosure]		
40-8893252	From:	Midwest Research Institute D. Steele	(32)	513882
	To:	Environmental Protection Agency R. Harless (RTP, NC)		
	Date:	March 30, 1988		
	Subject:	Cover letter for enclosure.		
	Enclosure:			
		(1) Copy of the February 29, 1988 meeting summary.		
		[See D_{1d}(2) for Enclosure]		

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Fiche #

40-8893253 From: Midwest Research Institute (33) 513883
D. Steele

To: Environmental Protection Agency
A. Dupuy (NSTL, MS)

Date: March 30, 1988

Subject: Cover letter for enclosure.

Enclosure:

(1) Copy of the February 29, 1988 meeting summary.

[See D_{1d}(2) for Enclosure]

40-8893254 From: Midwest Research Institute (34) 513884
D. Steele

To: Food and Drug Administration
D. Firestone

Date: March 30, 1988

Subject: Cover letter for enclosure.

Enclosure:

(1) Copy of the February 29, 1988 meeting summary.

[See D_{1d}(2) for Enclosure]

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				Fiche #
40-8893255	From:	Sartomer Company J. Cortese	(35)	513885
	To:	Environmental Protection Agency L. Marcus		
	Date:	March 31, 1988		
	Subject:	Manufacture of Tetrabromo-bisphenol A Diacrylate.		
40-8893256	From:	Pacific Anchor Chemical Corporation D. Johnson	(36)	513886
	To:	Environmental Protection Agency L. Marcus		
	Date:	March 31, 1988		
	Subject:	Manufacture of Dioxin chemicals.		
40-8893257	From:	Aceto Manufacturing Company R. Weaving, Jr.	(37)	513887
	To:	Environmental Protection Agency Document Control Officer		
	Date:	March 31, 1988		
	Subject:	Manufacture of any Dioxin product.		

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				Fiche #
40-8893258	From:	Biddle Sawyer Corporation H. Zeller	(38)	513888
	To:	Environmental Protection Agency L. Marcus		
	Date:	April 7, 1988		
	Subject:	Cover letter for enclosure.		
	Enclosures:			
	(1)	Letter from R.E. Chavkin, Biddle Sawyer to Document Control Officer, EPA on the production of Dioxin/Furans. March 17, 1988		
	(2)	Copy of return receipt.		
40-8893259	From:	Sartomer Company J. Cortese	(39)	513889
	To:	Environmental Protection Agency L. Marcus		
	Date:	April 8, 1988		
	Subject:	Manufacture of chemicals falling under the test rule.		
40-8893284	From:	Chugai International Corporation R. Tanaka	(40)	513890
	To:	Environmental Protection Agency L. Marcus		
	Date:	April 12, 1988		
	Subject:	Intent to test.		

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				Fiche #
40-8893260	From:	Inchema, Inc. H. Wessel	(41)	513891
	To:	Environmental Protection Agency Document Control Officer		
	Date:	April 18, 1988		
	Subject:	Manufacture of subject chemicals.		
40-8893261	From:	Ruhrkohle Tracking Corporation D. Fuhrmann	(42)	513892
	To:	Environmental Protection Agency L. Marcus		
	Date:	April 19, 1986		
	Subject:	Manufacture of subject chemicals.		
40-8893290	From:	Atochem, Inc. O. Shusko (M. Hanley's Secretary)	(43)	524823
	To:	Environmental Protection Agency L. Marcus		
	Date:	May 6, 1988		
	Subject:	Cover letter for enclosure.		

Enclosure:

(1) Letter from M. Hanley to L. Mack, EPA concerning their product "Rilsan BESNO P40 WS".
September 24, 1987

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				Fiche #
40-8893291	From:	Hoechst Celanese Corporation R. Jourdenais	(44)	524824
	To:	Environmental Protection Agency Document Control Officer		
	Date:	June 14, 1988		
	Subject:	Intent to test 2,3,5,6-Tetra-chloro-2,5-cyclohexadiene-1,4-dione.		
40-8893292	From:	Great Lakes Chemical Corporation C. Mazac	(45)	524825
	To:	Environmental Protection Agency L. Marcus		
	Date:	July 6, 1988		
	Subject:	Topics and questions for the upcoming protocol review meeting (Letter and Telefax).		
40-8893303	From:	A and D International, Inc. C. Gupta	(46)	524826
	To:	Environmental Protection Agency L. Marcus		
	Date:	July 22, 1988		
	Subject:	Exemption request from Testing ~~testing~~ Chloranil.		

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				Fiche #
40-8893304	From:	A and D International, Inc. C. Gupta	(47)	524827
	To:	Environmental Protection Agency L. Marcus		
	Date:	July 22, 1988		
	Subject:	Intent to test Chloranil.		
40-8893307	From:	Sandoz Chemicals Corporation B. Drum	(48)	524828
	To:	Environmental Protection Agency L. Marcus		
	Date:	August 17, 1988		
	Subject:	Intent to test 2,3,5,6-Tetra-chloro-2,5-cyclohexadiene-1,4-dione.		
40-8893316	From:	Ethyl Corporation P. Sistrunk	(49)	524829
	To:	Environmental Protection Agency Document Control Officer		
	Date:	September 26, 1988		
	Subject:	Notification of the start of the 2,3,7,8-Tetrabromodiben-zofuran test.		

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				Fiche #
40-8893330	From:	A and D International, Inc. C. Gupta	(50)	524830
	To:	Environmental Protection Agency C. Elkins		
	Date:	November 29, 1988		
	Subject:	Revision of protocol.		
40-8893331	From:	The Dow Chemical Company J. Gray	(51)	524831
	To:	Environmental Protection Agency Document Control Office		
	Date:	December 2, 1988		
	Subject:	Final protocol submission.		
40-8993332	From:	Midwest Research Institute D. Steele	(52)	524832
	To:	Food and Drug Administration, USDHHS D. Firestone		
	Date:	January 19, 1989		
	Subject:	Planning for Teleconference.		
40-8993359	From:	Ethyl Corporation L.L. Wen	(53)	524833
	To:	Environmental Protection Agency Document Control Office		
	Date:	May 22, 1989		
	Subject:	Production of Pentabromodi- phenyl Oxide.		

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				Fiche #
40-8993365	From:	Ethyl Corporation R.L. Smith	(54)	524834
	To:	Environmental Protection Agency Document Control Office		
	Date:	July 5, 1989		
	Subject:	Waiver request.		
	Enclosure:			
		(1) Letter from L. Wen of Ethyl Corp. to Document Control Office, EPA requesting a waiver on the required testing. May 22, 1989		
40-8993360	From:	White Chemical Corporation S.L. Shopsis	(55)	524835
	To:	Environmental Protection Agency L. Marcus		
	Date:	July 12, 1989		
	Subject:	Manufacture of Decabromodi-phenyl Oxide.		
40-9093395	From:	FMC Corporation R. Roseberry	(56)	524836
	To:	Environmental Protection Agency Document Control Officer		
	Date:	January 2, 1990		
	Subject:	Request for waiver from testing 2,4-Dibromophenol.		

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				Fiche #
40-9093445	From:	Akzo Chemicals, Inc. E. Bisinger, Jr.	(57)	524837
	To:	Environmental Protection Agency Document Control Office		
	Date:	March 16, 1990		
	Subject:	Letter of intent to test.		
40-9093446	From:	Akzo Chemicals, Inc. L. Rausch	(58)	524838
	To:	Environmental Protection Agency L. Marcus		
	Date:	March 27, 1990		
	Subject:	Cover letter for enclosure.		
	Enclosure:			
	(1)	Letter of intent to test from E. Bisinger, Jr. of Akzo Chemicals, Inc. to Document Control Office, EPA. March 16, 1990		

TSCA SECTION 8(d) AND 4(a)
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E_{1d}-FILE

				Fiche #
40-9093447	From:	Triangle Labs., Inc. R. Hass	(59)	524839
	To:	Environmental Protection Agency C. Elkins		
	Date:	May 4, 1990		
	Subject:	Freedom of Information request.		
	Enclosure:			
	(1)	Triangle Laboratories memo from R. Varcoe to R. Hass containing the EPA audit chronology. May 4, 1990		
40-9093448	From:	Environmental Protection Agency J. Merenda	(60)	524840
	To:	Environmental Protection Agency M. Wood		
	Date:	May 9, 1990		
	Subject:	Enforcement action recommended against Pfister Chemical, Inc.		
40-9093449	From:	Environmental Protection Agency C. Elkins	(61)	524841
	To:	Great Lakes Chemical Corporation C. Mazac		
	Date:	May 10, 1990		
	Subject:	Acceptance of their sampling protocol.		

TSCA SECTION 8(d) AND 4(a)
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E_{1d}-FILE

Fiche #

40-9093453 From: Environmental Protection Agency (62) 5-33322
J. Remmers

To: Great Lakes Chemical Corporation
C. Mazac

Date: June 11, 1990

Subject: Transmittal of three reports.

[Reports Not Provided to Docket]

40-9093482 From: Chemical Manufacturers Association (63) 5-33323
H. Shaw

To: Environmental Protection Agency
L. Marcus

Date: June 13, 1990

Subject: Changes in the Brominated Flame ~~Flame~~ Retardant Industry Panel ~~Panel~~ Organization.

40-9093483 From: Environmental Protection Agency (64) 5-33324
J. Remmers

To: Sandoz Chemicals Corporation
B. Drum

Date: July 9, 1990

Subject: EPA analysis of Chloranil sample.

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WRITTEN COMMUNICATIONS FOLLOWING DOCKET #83002C
E_{1d}-FILE

Fiche #

40-9093484 From: Chemical Manufacturers Association (65) 533325
H. Shaw

To: Environmental Protection Agency
J. Remmers

Date: July 9, 1990

Subject: Amendment of protocol.

40-9093485 From: Chemical Manufacturers Association (66) 533326
H. Shaw

To: Environmental Protection Agency
J. Remmers

Date: July 19, 1990

Subject: Conference call of July 25, 1990.

Enclosure:

(1) Tentative Agenda for Telecon-~~Teleconference Call of July 25, 1990.~~ July 25, 1990.

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TELEPHONE COMMUNICATIONS FOR DOCKET #83002
E_{2a}-FILE

				Fiche #
40-8593151	From:	University of Wisconsin, McArdle Lab. for Cancer Research A. Poland	(1)	513893
	To:	Environmental Protection Agency K. McCormack		
	Date:	July 31, 1985		
	Subject:	Comments on the Position Document. (Notes of Conversation)		
40-8593152	From:	Environmental Protection Agency S. Lee	(2)	513894
	To:	National Institute of Environmental Health Sciences D. Cantor (NTP)		
	Date:	July 31, 1985		
	Subject:	NTP work with Furans.		
40-8593153	From:	Center for the Biology of Natural Systems B. Commoner	(3)	513895
	To:	Environmental Protection Agency K. McCormack		
	Date:	August 30, 1985		
	Subject:	Delay in comment submission.		

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TELEPHONE COMMUNICATIONS FOR DOCKET #83002B
E_{2b}-FILE

				Fiche #
40-8693154	From:	Environmental Protection Agency S. Lee	(1)	513896
	To:	Environmental Defense Fund E. Silbergeld		
	Date:	June 3, 1986		
	Subject:	EDF's concerns on Dioxins/ Furans in Chlorinated Benzenes.		
40-8693177	From:	Environmental Protection Agency P. Tong and R. Gnaedinger	(2)	513897
	To:	Environmental Protection Agency S. Billet (Las Vegas, Nevada)		
	Date:	June 3, 1986		
	Subject:	Chemical screening methods for the detection of PHDDs and PHDFs.		
40-8693155	From:	Environmental Protection Agency M. Dreyfus	(3)	513898
	To:	Cambridge Isotope Laboratories J. Bradley		
	Date:	June 18, 1986		
	Subject:	Current availability of standards.		

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TELEPHONE COMMUNICATIONS FOR DOCKET #83002C
E_{2c}-FILE

				Fiche #
40-8693177	From:	Environmental Protection Agency P. Tong and R. Gnaedinger	(1)	513897
	To:	Environmental Protection Agency S. Billet		
	Date:	June 3, 1986		
	Subject:	Chemical screening methods for the detection of PHDDs and PHDFs.		
		[Crossreferenced to $E_{2b}(2)$]		
40-8793198	From:	Environmental Protection Agency D. Keehner	(2)	513899
	To:	Worker's Institute for Occupational Safety and ~~Health~~ Health M. Gillen		
	Date:	April 15, 1987		
	Subject:	Reasonable estimate of worker dermal exposure.		
40-8793199	From:	Chemical Manufacturers Association C. Stack	(3)	513900
	To:	Environmental Protection Agency D. Keehner		
	Date:	April 24, 1987		
	Subject:	Status of test rule.		

TSCA SECTION 8(d) AND 4(a)
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TELEPHONE COMMUNICATIONS FOR DOCKET #83002C
E_{2c}-FILE

Fiche #

40-8793200

From: Environmental Protection Agency (4) 513901
D. Keehner

To: The Dow Chemical Company
K. Burgess

Date: May 4, 1987

Subject: CMA's comments on the dermal exposure of chemical workers.

TSCA SECTION 8(d) AND 4(a)
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PETITIONS FOR DOCKET #83002
E_{3a}-FILE

			Fiche #
40-8493034	Environmental Defense Fund	(1)	513902

Cover letter from R. Percival to W.D. Ruckelshaus, EPA
October 22, 1984

Enclosure:

(1) Petition of the Environmental Defense Fund and the National Wildlife Federation for Rulemaking to Prevent and to Reduce Environmental Contamination by Dioxins and Dibenzofurans. E. Silbergeld, R. Percival (EDF) M. Van Putten, and L.K. Silbert (National Wildlife Federation). October 22, 1984

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E_{3b}-FILE

			Fiche #
40-8693156	Section 21 Petition: Environmental Defense Fund and National Wildlife Federation vs. EPA Plaintiffs' Opposition to Defendants' Motion to Dismiss and to Defendants' and Defendant - Intervenor's Motions for Partial Summary Judgment. Civil Action No. 85-973; U.S. District Court for the District of Columbia. EDF and NWF vs. Lei M. Thomas, USEPA et al. February 11, 1986	(1)	513903

(1) Order.

(2) Plaintiffs' Response to Statements of Material Facts as to Which There is No Genuine Issue by Defendants and Intervenor CMA.

(3) Plaintiff's Reply to Defendants' Response to Plaintiff's Statement of Material Facts as to Which There is No Genuine Issue.

(4) Memorandum of Points and Authorities in Opposition to Defendants' Motion to Dismiss and to Defendants' and Defendant -Intervenor's Motions for Partial Summary Judgment and in Reply to Defendants' and Defendant - Intervenor's Opposition to Plaintiffs' Motion for Partial Summary Judgment. February 11, 1986

Fiche #

40-8693156 (continued)

(5) Supplemental Declaration of Ellen K. Silbergeld.
February 10, 1986

(a) Chemicals Ignored in Federal Register Testing Notice Previously Acknowledged by EPA as Possibly Contaminated with Dioxin. (Exhibit A)

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(DOCKET #83002)
F_1-FILE

			Fiche #
40-8693183	Chemical Manufacturers Association	(1)	513904

Cover letter from C. Stack to S. Rudzinski, EPA
September 12, 1986

Enclosure:

(1) Letter from Visband Der Chemischen Industrie (Germany) to R. Roland, CMA (Press Release).
September 3, 1986

(a) Kunststoffe mit Flammschutz auf dem Prufstand. (German)
August 29, 1986

40-8693338	Monsanto Chemical Company	(2)	524842

Letter from C. Farley to Document Control Officer, EPA
April 3, 1986

Enclosure:

(1) Analysis of Brominated Diphenyl Oxides for Brominated Dibenzo-furans.

TSCA SECTION 8(d) and 4(a)
HEALTH AND SAFETY DATA REPORTING
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DOCUMENTS RECEIVED FOLLOWING DECISION OF OCTOBER 23, 1986
(DOCKET #83002B)
G_1-FILE

			Fiche #
40-8693283	Great Lakes Chemical Corporation	(1)	513905
	Response to EPA Questions Received from Steven Hassur, Ph.D. (Sanitized) December 17, 1986		

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			Fiche #
40-8793277	Atochem, Inc. Letter from M. Hanley to Document Control Officer, EPA concerning information requested on "Rilson Besno P40 W5". September 24, 1987	(1)	513909
40-8793278	Dead Sea Bromine Company Ltd. Teratology Study in the Rat (FR-1208). Life Science Research, Israel Ltd. February 10, 1987	(2)	513908
40-8793334	(The) Dow Chemical Company Letter from R.L. Hagerman to Document Control Office, EPA October 5, 1987 Enclosures: (1) PCDDs and PCDFs in Environmental Samples; Air, Particulates, Sediments and Soil. C. Rappe and L-O. (M) Kjeller, Univ. of Umea, Sweden. Presented at the U.S. Vinyl Institute Meeting. Document No. D002401. EOK ~~D002401~~. 8(d) Submission: 86-880000047. January 26, 1987 (2) Search for Industrial Sources of PCDD/PCDF. III. Short-Chain Chlorinated Hydrocarbons. A. Heindl and O. Huntzinger, Univ. of Bayreuth, FRG. Document No. DOO2402. 8(d) Submission: 86-880000048. Undated	(3)	524843

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40-8793334 (continued)

(3) Letter from R. Cook, The Dow Chemical Co. to T. Cresswell, P. Gehring, C. Goodman, R. Kagel and B. Weaver
August 7, 1986

(a) A Cohort Mortality Study of Chemical Workers with Potential Exposure to the Higher Chlorinated Dioxins. M.G. Ott, R.A. Olson, R. Cook and G. Bond. Document No. D002403. 8(d) Submission: 86-880000049.
July 8, 1986

(4) Dioxin and Resource Recovery Symposium ASCE - New York Hilton - 2/10/87 The Dioxin Situation in West Germany. K. Ballschmiter. Document No. D002404. 8(d) Submission:86-880000050.
Undated

(5) Summary of Experiments with PVC Combustion Products. L.C. Dickson and F.W. Karasek, Univ. of Waterloo, Ontario. Document No. D002405. 8(d) Submission: 86-880000051.
Undated

(6) Toxicity of Particulate Emissions From a Municipal Incinerator: Critique of the Concept of TCDD-Equivalents. M. Suter-Hofman and Ch. Schlatter, Univ. of Switzerland and Federal Institute of Technology, Switzerland. Document No. D002406. 8(d) Submission: 86-880000052.
Undated

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40-8793334 (continued)

(7) Dioxins and Incineration - Visit to Professor C. Rappe, UMEA, January 16, 1987. M. Ronnmark and H.M. Clayton. Document No. D00 2407. ~~D002407~~ 8(d) Submission: 86-880000053. Undated

(8) Analysis of the Animal Toxicity Studies of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) Used in Derivation of Lifetime Exposure Control Limit Recommendations for Humans. R.J. Kociba, The Dow Chemical Co. Document No. D 002408. ~~D002408~~ 8(d) Submission: 86-880000054. June 10, 1986

(9) The Toxicological Significance of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin and Related Compounds in Human Adipose Tissue. J.L. Byard. Document No. D002409. 8(d) Submission:86-880000055. Undated

(10) The Formation of Folliculitis in the Rabbit Ear Following a Single Subcutaneous Injection of Symmetrical Tetrachlorodibenzo-dioxin in Benzene. The Dow Chemical Co. Document No. D00 2381. 8(d) Sub - ~~Symmetrical Tetrachlorodibenzo-dioxin in Benzene. The Dow Chemical Co. Document No. D002381. 8(d) Submission:~~ 86-880000039. March 5, 1965

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40-8793334 (continued)

(11) The Effects of Repeated Applications of Symmetrical Tetrachlordibenzodioxin on Guinea Pig Ears. The Dow Chemical Co. Document No. D002380. 8(d) Submission: 86-880000040. Undated

(12) The Effects of Repeated Applications of Symmetrical Tetrachlordibenzodioxin on the Rat Ear. The Dow Chemical Co. Document No. D002382. 8(d) Submission: 86-880000041. Undated

(13) Chloracne Study Conducted on 1,2,3,4,7,8-Hexachlorodibenzo-p-Dioxin. The Dow Chemical Co. Document No. D002385. 8(d) Submission:86-880000042. March 22, 1971

(14) The Ineffectiveness of Washing as a Preventive Measure in the ~~Formation~~ Formation of Folliculitis in the Rabbit Ear Following Repeated Applications of Symmetrical Tetrachlorodibenzodioxin. The Dow Chemical Co. Document No. D002386. 8(d) Submission:86-880000043. March 5, 1965

(15) Bioconcentration Kinetics of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin in Rainbow Trout (A Revised Draft of Dow Report November 15, 1978). D.R. Branson, J.T. Tukahashi, W.M. Parker and G.E. Blass. Document No. D002394. 8(d) Submission:86-880000044. 1983

OK as is

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40-8793334 (continued)

(16) Analysis of Gall Bladders of Trout Exposed to 14C-TCDD in the Static Bioconcentration Experiment. Dow Chemical USA. Document No. D002398. ~~D002398.~~ 8(d) Submission: 86-880000045. September 29, 1978

(17) Notes by G. Stabenow on the German translation of study enclosed. Document No. D002400. 8(d) Submission:86-880000041. November 24, 1986

(a) Mass Burning - Unprepared Refuse Martin Stocker Water-~~Waterwall~~ Boiler-Power Generator and Steam Supply to District Heating Systems.

(b) Analyses of the Blood Serum of Employees of a Refuse Heat-~~Heat~~-and-Power Plant in Regard to Cadmium, Lead and Mercury. (German Translation) Translation) International Journal for Power Plant Technology. October 1984

(c) The New Bielefeld - Herford Refuse Incinerator Plant - An Unexpected Case of Corrosion. (German Translation) International Journal for Power Plant Technology. September 1989

(d) Mass Burning Unprepared Refuse Duesseldorf Stoker Waterwall Boiler Power Generation and In-plant Steam Use.

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40-8793334 (continued)

(e) Chance of Emissions of NOx and CO After Optimization of the Refuse Incineration Instillation Wuppertal-Remseheid. (German Translation) Mull and Abfall. January 1985

(f) Technical Installation Measures for the Emission. Reduction of Chlorinated Hydrocarbons at Municipal Refuse Incineration Plants. (German Translation) Mull and Abfall. February 1985

(g) Emissions of Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans from Solid Waste Incinerators. (German Translation) Hull and Abfall; page 313-327. November 1984

(h) List of Task Group for Dioxin control - German Federal Government.

(i) Establishment of a Project Group "Dioxin in Refuse Incineration Installations". (German Translation)

(j) Street European NOx Code Brings SCR Into the Limelight. Pollution Control; pages 53 and 56. August 1966

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40-8793334 (continued)

(18) Results of Chick Edema Bioassay Test Using Young Chickens Treated Orally for 21 Days with Hexachlorodibenzo-p-Dioxin. J.L. Emerson and C.G. Gerbig. Document No. D002365. 8(d) Submission: 86-880000024.
August 4, 1971

(19) Summary of Eye Irritation Study Conducted on Hexachlorodibenzo-p-Dioxin. Dow Chemical USA. Document No. D002366. 8(d) Submission:86-880000025.
October 25, 1971

(20) Summary of Chloracne Study Conducted on 1,2,3,7,8,9-Hexachlorodibenzo-p-Dioxin. Dow Chemical USA. Document No. D002367. 8(d) Submission: 86-880000026.
July 8, 1971

(21) Summary of Chloracne Study Conducted on Hexachlorodibenzo-p-Dioxin. Dow Chemical USA, Document No. D002368. 8(d) Submission: 86-880000027.
July 14, 1971

(22) Summary of Acute Oral and Chloracne Studies on Hexachlorodibenzo-p-Dioxin. Dow Chemical USA. Document No. D002369. 8(d) Submission:86-880000028.
April 10, 1971

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40-8793334 (continued)

(23) Summary of Chloracne Study Conducted on Hexachlorodibenzo-p-Dioxin. The Dow Chemical Co. Document No. D002370. 8(d) Submission:86-880000029. December 11, 1970

(24) Summary of Chloracne Studies Conducted on Hexachlorodibenzo-p-Dioxin Studies. The Dow Chemical Co. Document No. D002371. 8(d) Submission:86-880000030. November 3, 1970

(25) Summary of Chloracne Studies Conducted on Hexachlorodibenzo-p-Dioxin Studies. The Dow Chemical Co. Document No. D002372. 8(d) Submission:86-880000031. September 10, 1970

(26) Results of Chick Edema Bioassay Test Using Young Chickens Treated Orally for 21 Days with 2,3,7,8-Tetrachlorodibenzo-p-Dioxin. The Dow Chemical Co. Document No. D002373. 8(d) Submission: 86-880000032. August 6, 1971

(27) Urinary Excretion of Radioactivity Following Oral Admininstration of 14C-Labeled 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) to Female Guinea Pigs. Dow Chemical USA. Document No. D002374. 8(d) Submission:86-880000033. July 9, 1979

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40-8793334 (continued)

(28) 2,3,7,8-Tetrachlorodibenzo-p-Dioxin: Tissue Distribution and Excretion Following a Single Oral Dose in Female Guinea Pigs. Dow Chemical USA. Document No. D002375. 8(d) Submission: 86-880000034.
August 22, 1978

(29) Summary of Eye Irritation Study Conducted on 2,3,7,8-Tetrachlorodibenzo-p-Dioxin. Dow Chemical USA. Document No. D002376. 8(d) Submission:86-880000035.
October 25, 1971

(30) Summary of Chloracne Study Conducted on 2,3,7,8-Tetrachlorodibenzo-p-Dioxin. Dow Chemical USA. Document No. D002377. 8(d) Submission:86-880000036.
April 20, 1971

(31) The Effects of Various Doses of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin Administered with 2,4,5-Trichlorophenoxy Acetic Acid on Rat Fetal Development. G.L. Sparschu, F.L. Dunn, R.W. Lisowe and V.K. Rowe. Document No. D002378. 8(d) Submission: 86-880000037.

(32) The Ineffectiveness of Washing as a Preventive Measure in the Formation of Folliculitis in the Rabbit Ear Following Repeated Applications of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin in Corn Oil. Dow Chemical USA. Document No. D002379. 8(d) Submission:86-880000038.
March 26, 1965

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40-8793334 (continued)

(33) Acute Oral Toxicity of 2,3,7,8-Tetrabromodibenzo-p-Dioxin in the Rat. Brominated Flame Retardant Industry Panel; Inhausen Research Institute, Inc. Document No. D002364. 8(d) Submission: 86-880000023. Undated

(34) Rabbit Ear Bioassay for Comedogenicity, Multiple-Dose-Level Definitive Study with 2,3,7,8-Tetrabromodibenzofuran. Brominated Flame Retardant Industry Panel; Inhausen Research Institute, Inc. Document No. D002363. 8(d) Submission: 86-880000022. Undated

(35) Acute Oral Toxicity of 2,3,7,8-Tetrabromodibenzofuran in the Rat, Brominated Flame Retardant Industry Panel; Inhausen Research Institute, Inc. Document No. D002362. 8(d) Submission: 86-880000021. Undated

(36) Rabbit Ear Bioassay for Comedogenicity, Multiple-Dose-Level Definitive Study with 2,3,7,8-Tetrabromodibenzo-p-Dioxin. Brominated Flame Retardant Industry Panel; Inhausen Research Institute, Inc. Document No. D002361. 8(d) Submission: 86-880000020. Undated

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40-8793334 (continued)

(37) Toxicology of Chlorinated Dibenzo-p-Dioxins. B.A. Schwetz, J.M. Norris, G.L. Sparschu, V.K. Rowe and P.J. Gehring. Document No. D002358. 8(d) Submission: 86-880000019. Undated

(38) Mortality Among Employees Engaged in the Manufacture of Higher Chlorinated Phenols and Derivative Products. Dow Chemical USA. Document No. D002356. 8(d) Submission:86-880000018. 1982

(39) Evaluation of Mortality Patterns Among Chemical Workers with Chloracne. G.G. Bond, R. Cook, F.E. Brenner, D.J. Ducommun and E.A. McLaren. Document No. D002354. 8(d) Submission: 86-880000017. September 1986

(40) Update of the Mortality Experience of Workers Exposed to Chlorinated Dioxins. R. Cook, G. Bond, R. Olson and M.G. Ott. Document No. D002353. 8(d) Submission: 86-880000016. September 1986

(41) A Soft Tissue Sarcoma Case Control Study in a Large Multi-Chemical Manufacturing Facility. W. Sobel, G. Bond, B. Skowronski, P. ~~Brownson~~ Brownson and R. Cook. Document No. D002352. 8(d) Submission: 86-880000013. September 1986

(42) Analyses on 2,4-Dichlorophenol To Determine HDD/HDF Presence.

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[Enclosure (42) Not Provided to Docket — See H1.4 (13a)]

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			Fiche #
40-8793335	(The) Dow Chemical Company	(4)	524844

Letter from R.L. Hagerman to Document Control Office, EPA
October 6, 1987

Enclosures:

(1) Original letter from R.L. Hagerman, The Dow Chemical Company to Document Control Office, EPA submitting 8(d) studies. October 5, 1987

(2) List of Studies Known to Us But Copies of Which We Do Not Possess in Our Files.

40-8793336	(The) Dow Chemical Company	(5)	524845

Letter from R.L. Hagerman to Document Control Office, EPA
October 7, 1987

Enclosures:

(1) Studies in Progress. (Revised)

(2) Original cover letter from R.L. Hagerman, The Dow Chemical Co., to Document Control Office, EPA transmitting 8(d) studies. October 5, 1987

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			Fiche #
40-8793280	Eastman Kodak Company	(6)	513910
	Letter to Document Control Officer, EPA from R.D. Gerwe September 28, 1987		
	Enclosure:		
	(1) Report forms in compliance with TSCA Section 8(a) for 1,2-Dichlorobenzene, Chlorobenzene, imported products and (CBI) products. (Sanitized)		
40-8793279	E.I. Dupont de Nemours and Company, Inc.	(7)	513907
	Letter from R.R. Houston to Document Control Officer, EPA (Sanitized) September 22, 1987		
	Enclosure:		
	(1) EPA Form 7710-51, Part II containing process and reaction condition information. (Sanitized)		
40-8793281	Ethyl Corporation	(8)	513906
	Letter from Terry H. Pullin to Document Control Officer, EPA September 1, 1987		
	Enclosures:		
	(1) Letter of intent from T. Pullin, Ethyl Corp. to Document Control Officer, EPA to conduct tests on Pentabromodiphenyl Oxide and Octabromodiphenyl Oxide. September 1, 1987		

TSCA SECTION 8(d) AND 4(a)
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40-8793281 (continued)

(2) Application for an exclusion to conduct tests on Tetrabromobisphenol A and Decabromodiphenyl Oxide from T. Pullin, Ethyl Corp. to Document Control Officer, EPA. (Sanitized)
September 1, 1987

(a) Polybrominated Dibenzodioxins (PBrDD) and Dibenzofurans (PBrDF) in Some Flame Retardant Preparations. Chemosphere; 15(9-12):2111-2113.
1986

(b) CBI.

(c) CBI.

40-8793282 Ethyl Corporation (9) 513913

Cover letter from T.G. Pullin to Document Control Officer, EPA
September 29, 1987

Enclosures:

(1) Analysis of Brominated Diphenyl Oxides for Brominated Dibenzofurans.

(2) Rabbit Ear Bioassay for Comedogenicity, Dose-Range-Finding Study for Soot and Char Generated from the Combustion of High Impact Polystyrene. Inhausen Research Institute Inc.; Study #119.001.
August 1987

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40-8793282 (continued)

(3) Rabbit Ear Bioassay for Comedogenicity, Dose-Range-Finding Study for Soot and Char Generated from the Combustion of High Impact Polystyrene Flame Retarded with Decabromodiphenyl Oxide and Antimony Trioxide. Inhausen Research Institute, Inc.; Study #119.002.
August 1987

(4) Rabbit Ear Bioassay for Comedogenicity, Multiple-Dose-Level Definitive Study with 2,3,7,8-Tetrabromodibenzo-p-Dioxin.
Inhausen Research Institute, Inc.; Study #119.003.
August 1987

(5) Rabbit Ear Bioassay for Comedogenicity, Multiple-Dose-Level Definitive Study with 2,3,7,8-Tetrabromodibenzofuran. Inhausen Research Institute, Inc.; Study #119.004.
August 1987

(6) Rabbit Ear Bioassay for Comedogenicity Multiple-Dose-Level Definitive Study for Soot and Char Generated from the Combustion of High Impact Polystyrene. Inhausen Research Institute, Inc.; Study #119.005.
August 1987

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40-8793282 (continued)

(7) Rabbit Ear Bioassay for Comedogenicity, Multiple-Dose-Level Definitive Study for Soot and Char Generated from the Combustion of High Impact Polystyrene Flame Retarded with Decabromodiphenyl-oxide and Antimony Trioxide. Inhausen Research Institute, Inc.; Study #119.006. August 1987

(8) Acute Oral Toxicity of 2,3,7,8-Tetrabromodibenzo-p-Dioxin in the Rat. Inhausen Research Institute, Inc.; Study #119.007. August 1987

(9) Acute Oral Toxicity of 2,3,7,8-Tetrabromodibenzo-p-Dioxin in the Rat. Inhausen Research Institute, Inc.; Study #119.008. August 1987

(10) Acute Oral Toxicity in the Rat of Soot and Char Generated from the Combustion of High Impact Polystyrene (HIPs). Inhausen Research Institute, Inc.; Study #119.009. August 1987

(11) Acute Oral Toxicity in the Rat of Soot and Char Generated from the Combustion of High Impact Polystyrene Flame Retarded with Decabromodiphenyl Oxide and Antimony Trioxide (HIPs FR). Inhausen Research Institute, Inc.; Study #119.010. August 1987

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			Fiche #
40-8793236	General Electric Company	(10)	513918

Letter from S. Austin to Document Control Officer, EPA
December 23, 1987

Enclosure:

(1) Pyrolytic Formation of Polybrominated Dibenzodioxins and Polybrominated Dibenzofurans. (Table III)

40-8793237	Monsanto Company	(11)	513917

Letter from J. Downes to Document Control Officer, EPA
December 22, 1987

Enclosure:

(1) Dibenzofuran in Diphenyl Oxide and the Relationship to Brominated Dibenzofurans in Brominated Diphenyl Oxide. F. Hileman, J. Wehler, J. Wendling, R. Orth, C. Ritchie and D. McKenzie. Preprint to be published in Chemosphere. From the Proceedings of the 7th International Symposium on Chlorinated Dioxins and Related Compounds; October 4-9, 1987. 1988

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			Fiche #
40-8793286	Rohm and Haas Company	(12)	513911
	Cover letter from G.J. Powell to Document Control Officer, EPA September 28, 1987		
	Enclosure:		
	(1) Dioxin/Furan Report Form (in compliance with TSCA Section 8(a)) for Chlorobenzenes. (Sanitized)		
40-8793287	Rohm and Haas Company	(13)	513912
	Cover letter from R.L. Keener to Document Control Officer, EPA September 29, 1987		
	Enclosure:		
	(1) Dioxin/Furan Report Form for Chlorobenzene (TSCA Section 8(a) submission). (Sanitized)		

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			Fiche #
40-8793288	Rohm and Haas Company	(14)	513915

Letter from R.L. Keener to Document Control Officer, EPA (Sanitized)
October 5, 1987

Enclosures:

(1) Analysis of Dow and Rhodia 2,4-Dichlorophenol. (Sanitized)
October 17, 1977

(2) Analysis of [ ] and 2,4-DCP for 1,3,6,8-TCDD and 2,3,7,8-TCDD and of 2,4-DCP for 2,4,6-TCP and 2,4,5-TCP. (Sanitized)
May 18, 1987

(3) Results of Analyses for 2,7-Dichlorodibenzo-p-Dioxin.
(Sanitized)
October 2, 1970

40-8793285	Rhone-Poulenc, Inc.	(15)	513916

Letter from N.I. Rouse to Document Control Officer, EPA
October 5, 1987

Enclosures:

(1) 2,4 Dichlorophenol Test Results.

(2) Plan for the Determination of Polychlorinated Dibenzo-p-dioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs).

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			Fiche #
40-8793234	Standard Chlorine of Delaware, Inc.	(16)	513914

Letter from R. Touhey to Document Control Officer, EPA
September 30, 1987

Enclosure:

(1) Process Block Flow Diagram. Corrected copy of one submitted in the September 28, 1987 submission (CBI).

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TSCA SECTION 4
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
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~~SUPPORT REFERENCES FOR DOCKET #~~
~~B-1~~ FILE

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Fiche #

40-8793520 U.S. - EPA

Guidelines for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in Commercial Products. (17) 53332,

September 1987

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TSCA SECTION 8(d) AND 4(a)
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			Fiche #
40-8893310	A and D International, Inc. Letter to L. Marcus, EPA September 16, 1988 Enclosure: (1) Analytical Procedures for the Determination of Polychlorinated Dibenzodioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry (HRGC/HRMS). Triangle Laboratories, Inc. August 1988	(1)	524846
40-8893308	Brominated Flame Retardants Industry Panel Letter from P.H. Sistrunk, Ethyl Corp. to Document Processing Center, EPA September 6, 1988 Enclosure: (1) Acute Oral Toxicity of 2,3,7,8-Tetrabromodibenzofuran (TBDF) in the Rat. (Draft) Inhausen Research Institute, Inc.; Study No. 119.022.	(2)	524847

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			Fiche #
40-8893299	Chugai International Corporation	(3)	524848

Cover letter from R. Tanaka to P. Halper, EPA
July 21, 1988

Enclosure:

(1) Letter from N. Takahashi of Nippon Kayaku Co. Ltd.
July 18, 1988

(a) Analytical Determination of Dioxin in Tetrachloro-p-Benzoquinone (Chloranil). Japan Food Research Labs.

40-8893296	(The) Dow Chemical Company	(4)	524849

Cover letter from J. Gray to Document Control Office, EPA
July 1, 1988

Enclosures:

(1) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in 2,4-Dichlorophenol. Dow Chemical USA.
June 29, 1988

(2) Quality Assurance Project Plan for Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans. Environmental Protection Agency; Chemserv.

TSCA SECTION 8(d) AND 4(a)
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			Fiche #
40-8893319	(The) Dow Chemical Company	(4a)	524850

Letter from J. Gray to Document Control Office, EPA
December 16, 1988

Enclosure:

(1) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in 2,4-Dichlorophenol. Dow Chemical USA.

(2) Protocol and Quality Assurance Plan for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in 2,4-Dichlorophenol. Dow Chemical USA.

40-8893339	Great Lakes Chemical Corporation	(4b)	524851

Letter from D.L. McFadden to Document Processing Center, EPA
November 28, 1988

Enclosures:

(1) Listing of test studies.

(2) Studies on 1,2-Bis-(Tribromophenoxy)Ethane for Velsicol Chemical Corp.:

(a) Rate of Hydrolysis Studies. September 22, 1988

(b) Pharmacokinetic Study of FM-680 in Rats. August 11, 1978

(c) Photolysis of Firemaster 680. January 23, 1979

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40-8893339 (continued)

(d) Water Solubility of Several Flame Retardants and ~~Indus-~~ ~~Industrial~~ Chemicals.
April 12, 1978

(3) Studies on 1,2-Bis(Tribromo~~phenoxy~~ phenoxy) ~~Ethane~~ Ethane for Michigan Chemical Corp.

(a) 28-Day Rat Feeding Study.
WARF Institute, Inc.; Report No. 2071960.

(b) Acute Oral LD50; Acute Dermal LD50; Skin Irritation and Eye Irritation Studies. Warf Institute, Inc.; Report No. 2081295.
September 11, 1972

(c) Acute Oral Toxicity Study in the Albino Rat. Internat~~ional~~ ional Research and Development Corp.
November 27, 1974

(d) Acute Dermal LD50 on Fire~~Firemaster~~ master 680. (Corrected) ~~Warf~~ Warf Institute, Inc.; Report ~~No.~~ No. 3022861.
June 14, 1973

(e) Acute Inhalation Toxicity in the Albino Rat. Internat~~ional~~ ional ~~Research~~ Research and Development Corp.; Report No. 134-013.
November 27, 1974

(f) Acute Oral Toxicity Study in Beagle Dogs. International Research and Development Corp.; Report No. 134-012.
November 27, 1984

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40-8893339 (continued)

(g) Acute Toxicity (TL50) Study in the Bluegill. International Research and Development Corp.; Report No. 134-014.
December 13, 1974

(h) Acute Heated Vapor Inhalation Toxicity Study in Rats.
Industrial Bio-Test Labs., Inc.; Report No. 8562-09787.
December 6, 1976

(i) Modified Draize Multiple Insult Test in Male Humans.
International Research and Development Corp.; Report No. 134-017.
January 30, 1975

(j) Twenty-Eight Day Dermal Toxicity Study in Rabbits.
International Research and Development Corp.; Study No. 134-015.
February 11, 1975

(k) Twenty-One Day Inhalation Toxicity Study in Rats.
International Research and Development Corp.; Study No. 134-016.
February 11, 1975

(l) Acute Inhalation Toxicity in the Albino Rat After Pyrolysis.
International Research and Development Corp.; Study No. 134-039 and No. 134-038.
March 12, 1975

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40-8893339 (continued)

(m) Fourteen-Day Range Finding Study in Rats. International Research and Development Corp.; Study No. 134-053. April 10, 1975

(n) Twenty-Eight Day Toxicity Study in Rats. International Research and Development Corp.; Study No. 134-018. May 19, 1975

(o) Biodegradation Study with 14C-~~14C~~-Tagged MC-680. Industrial ~~Industrial~~ Bio-Test Labs., Inc.; ~~Inc.; Study~~ Study No. 632-07189. June 11, 1976

(p) Primary Skin Irritation Test with Mother Liquor 680 Process, Code No. 7-29-76-B in Albino Rabbits. Industrial ~~Industrial~~ Bio-Test Laboratories, Inc.; Study No. 8530-09618. October 25, 1976

(q) Skin Sensitization Test With Mother Liquor 680 Process in Albino Guinea Pigs. Industrial Bio-Test Laboratories, Inc.; Study No. 8530-09618. December 8, 1976

(r) (R) 90-Day Subacute Oral Toxicity Study with Firemaster 680 in Albino Rats. Industrial Bio-Test Laboratories, Inc.; Study ~~Study~~ No. 8532-08925 and Addendum. January 6, 1977 and March 10, 1977

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40-8893339 (continued)

(s) Mutagenicity Evaluation of 859-74-5. Litton Bionetics, Inc.; Project No. 2547. May 25, 1976

(t) Pilot Teratology Study in Rats. International Research and Development Corp.; Study No. 163-544. March 2, 1978

(u) Teratology Study in Rats. International Research and Development Corp.; Study No. 163-547. February 13, 1979

(v) Tissue Residue Accumulation/ Depletion Study with ~~Firemaster 680 in Albino Rats~~ Fire Rats, Industrial Bio-Test Laboratories, Inc.; Study No. 8532-85327-08950. January 9, 1979

(4) Studies on Pentabromodiphenyl ~~Oxide~~ Oxide for Great Lakes Chemical ~~Corporation~~ Corporation:

(a) Mutagenicity Evaluation of Pentabromodiphenyl Ether. Litton Bionetics, Inc.; Project No. 2547. May 25, 1976

(b) The Acute Oral Toxicity of Pentabromodiphenyl Ether to Rats. The British Industrial Biological Research Assoc.

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40-8893339 (continued)

(c) Acute Toxicity Studies in ~~Rats~~ Rats and Rabbits. ~~International~~ Research and ~~Development~~ Corp.; Study No. 274-025. October 31, 1975

(d) Twenty-eight Day Toxicity Study in Rats. International Research and Development Corp.; Study No. 274-023. January 24, 1976

(e) The Bioaccumulation of Compound S-512 by Carp. Chemicals Inspection and Testing Institute, Japan.

(f) 30-Day Dietary Study. WIL Research Laboratories, Inc.; Project No. 12042. Three volumes. December 4, 1985

(g) 90-Day Dietary Study. Three volumes. Wil Research Laboratories, Inc.; Project No. 12011. October 8, 1984

(5) Studies on Octabromodiphenyl Oxide for Great Lakes Chemical Corp.:

(a) The Bioaccumulation of Compound S-511 by Carp. Chemicals Inspection and Testing Institute, Japan. 1982

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40-8893339 (continued)

(b) Acute Toxicity Studies in ~~Rats~~ Rate and Rabbits. Interna~~tional~~tional Research and Develop~~ment~~ment Corp.; Study No. 274-~~024.~~ 029.
October 31, 1975

(c) Subacute Inhalation Toxicity Study in Rats. International Research and Development Corp.; Study No. 274-035.
July 27, 1978

(d) Mutagenicity Evaluation of Compound 345-79A. Litton Bionetics, Inc.
1976

(e) In Vitro Sister Chromatid Exchange in Chinese Hamster Ovary Cells with Octabromodiphenyl Ether. Hazleton Laboratories America, Inc.
November 18, 1982

(f) Unscheduled DNA Synthesis Assay Compound DE79. Hazleton ~~Hazleton~~ Laboratories America, Inc.
March 9, 1983

(g) Twenty-eight Day Toxicity Study in Rats. International Research and Development Corporation; Study No. 3274-023.
January 24, 1976

(h) Thirteen Week Feeding Study in ~~in~~ Rats. (Revised) International Research and Develop~~Development~~ment Corp.; Study No. 274-029.
April 18, 1978

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40-8893339 (continued)

(i) A Range-Finding Teratology Study in Rats with DE-79. WIL Research Labs., Inc.; Study No. 12051. August 25, 1986

40-8893297 Hoechst Celanese Corporation (5) 524852

Cover letter from R. Jourdenais to Document Control Officer, EPA July 8, 1988

Enclosures:

(1) Quality Assurance Plan for Polychlorinated Chemical Sample Analysis. Triangle Labs., Inc. July 3, 1988

(2) Analytical Procedures for the Determination of Polychlorinated Dibenzodioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry (HRGC/HRMS). ~~Triangle~~ Triangle Labs., Inc. July 1988

40-8893313 Hoechst Celanese Corporation (6) 524853

Letter from D. Woodhull to L. Moos, EPA October 24, 1988

Enclosure:

(1) Report of Air Sampling for the Presence of Polybrominated ~~Dibenzodioxins and Dibenzofurans During~~ Dibenzo- Furans During the Production of ~~Polybutylene Terephthalate Resin with Decabromodiphenyl Oxide~~ Polybutylene with Decabromo-.

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			Fiche #
40-8893186	Hoechst-Celanese Corporation	(7)	524854

Letter from D. Woodhull to L. Moos, EPA with corrections to the October 24, 1988 report "Air Sampling for the Presence of Polybrominated Dibenzodioxins and Dibenzofurans During the Production of Polybutylene Terephthalate Resin with Decabromodiphenyl Oxide".
November 8, 1988

40-8893298	Midwest Research Institute	(8)	524855

Letter from D. Steele to T. Murray, EPA
July 13, 1988

Enclosure:

(1) Review of "The Dow Chemical Co. Sampling and Analytical Protocols for 2,4-Dichlorophenol".

40-8893341	Midwest Research Institute	(9)	524856

Letter from D. Steele to T. Murray, EPA on the review of the report by BFRIP on the Hoechst Celanese Corp., Bishop, Texas plant air monitoring study.
November 18, 1988

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			Fiche #
40-8893302	Sandoz Chemicals Corporation	(10)	524857

Letter from B. Drum to L. Marcus, EPA
August 17, 1988

Enclosures:

(1) Determination of Polyhalogenated Dibenzo-p-Dioxins and Dibenzofurans in 2,3,5,6-Tetrachloro-2,5-cyclohexadiene-1,4-dione; Sample Selection and Sampling Plan.
August 17, 1988

40-8893305	Sandoz Chemicals Corporation	(11)	524858

Letter from B. Drum to L. Marcus, EPA
August 17, 1988

Enclosure:

(1) Dioxins/Furans Report form #7910-51 Part II for: 2,6-Dibromo-4-nitroaniline, Chlorobenzene and 2,6-Dichloro-4-nitroaniline.

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			Fiche #
40-8893306	Sandoz Chemicals Corporation	(12)	524859

Letter from B. Drum to L. Marcus, EPA
August 17, 1988

Enclosures:

(1) Existing test data from a study testing for presence of HDDs/HDFs in 2,3,5,6-Tetrachloro-2,5-cyclohexadiene-1,4-dione.

(2) Test method for determination of 2,3,7,8-Tetrachlorodibenzo-p-dioxin in environmental samples. Federal Register; 49(209):136-141.
October 26, 1984

40-8893309	U.S. Environmental Protection Agency	(13)	524860

Internal EPA Action Memorandum from M. Halper to C. Elkins on the recommendation concerning The Dow Chemical Co. protocol on 2,4-Dichlorophenol.
September 12, 1988

Enclosure:

(1) Letter from C. Elkins, EPA, to J. Gray, The Dow Chemical Co., on the review and recommendation of their test protocol on 2,4-Dichlorophenol.
September 14, 1988

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TSCA SECTION 8(d) AND 4(a)
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			Fiche #
40-8893311	U.S. Environmental Protection Agency	(14)	524861

Letter from C. Elkins to R. Jourdenais, Hoechst Celanese Corp. on their Chloranil testing protocol for the presence of Dioxins and Furans.
October 14, 1988

[Enclosure Not Provided to Docket]

40-8893312	U.S. Environmental Protection Agency	(15)	524862

Letter from C. Elkins to R. Tanaka, Chugai International Corp. on their protocol for testing Chloranil for the presence of Dioxins and Furans.
October 14, 1988

Enclosures:

(1) Polyhalogenated Dibenzo-p-Dioxins/ Dibenzofurans Testing and Reporting ~~ing~~ Requirements Final Rule. ~~Docket~~ #83002C. Federal Register; ~~52~~ 21412.
June 5, 1987

(2) Guidelines for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in Commercial Products.
September 1987

(3) ~~OTS~~ Guidance Document for the Preparation of Quality Assurance Project Plans.

[See A_1(3) for Enclosure (1)~~s~~ ~~Enclosures~~ (2) and (3) Not Provided to Docket]

(4) Guidelines for Reporting Test Results of HDD and HDF Determinations in Commercial Products - February 26, 19

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			Fiche #
40-8893314	U.S. Environmental Protection Agency Letter from C. Elkins to B. Drum, Sandoz Chemicals Corporation on the protocol for measuring Dioxins and Furans in Chloranil. November 7, 1988	(16)	524863
40-8893315	U.S. Environmental Protection Agency Letter from C. Elkins to A.P. Gupta, and D International, Inc. on their protocol for measuring Dioxins and Furans in Chloranil. November 7, 1988	(17)	524864
40-8893318	U.S. Environmental Protection Agency Charter of the Dioxin/Furan Protocol Review Panel. December 14, 1988	(18)	524865

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			Fiche #
40-8993340	A and D International, Inc.	(1)	524866

Letter from C.K. Gupta to T. Murray/C. Elkins, EPA
February 3, 1989

Enclosures:

(1) Letter from C. Elkins, EPA to A.P. Gupta of A and D International on the Chloranil protocol.
November 7, 1988

[See $H_{1.1}$(17) for Enclosure (1)]

(2) Sampling Plan for Testing HDD's and HDF's in Chloranil Imported by A and D International, Inc.

(3) Letter from Y. Tondeur of Triangle Labs., Inc. to A.P. Gupta of A and D International, Inc.
December 5, 1988

(a) Analytical Procedures for the Determination of Polychlorinated Dibenzodioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry (HRGC/HRMS). Triangle Labs., Inc.
December 1988

20677 201

TSCA SECTION 8(d) AND 4(a)
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Fiche #

40-8993368 A and D International, Inc. (2) 524867

Telefax from C.K. Gupta to L. Marcus,
EPA
August 8, 1989

Enclosures:

(1) Letter from C. Gupta of A and D International, Inc. to C. Elkins, EPA on their Analytical Protocol. August 1, 1989

(a) Sample Selection and Sampling Plan.

(b) Agreement for sharing test cost with Sandoz.

40-8993369 Akzo Chemicals, Inc. (3) 524868

Letter from E. Bisinger, Jr. to Document ~~Document~~ Control Office, EPA
August 16, 1989

Enclosure:

(1) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry in Pentabromodiphenyloxide. Brominated Flame Retardant Industry Panel; Triangle Laboratories, Inc.
July 4, 1989

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TSCA SECTION 8(d) AND 4(a)
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$H_{1.2}$-FILE

Fiche #

40-8993353 Ameribrom, Inc. (4) 524869

Letter from M. Eldan to Office of
Compliance Monitoring, EPA
July 3, 1989

Enclosures:

(1) Letter from M. Eldan, Ameribrom to
Document Control Office, EPA
July 3, 1989

(a) Sampling Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans in Decabromodiphenyloxide. Bromine Compounds Ltd. (Israel)
July 1989

(b) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry in Decabromodiphenyloxide.
Triangle Labs., Inc.
July 4, 1989

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TSCA SECTION 8(d) AND 4(a)
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Fiche #

40-8993358 Ameribrom, Inc. (5) 524870

Letter from A.S. Tillman to J. Johnson,
EPA, Office of Compliance Monitoring
July 13, 1989

Enclosures:

(1) Letter from M. Eldan, Ameribrom, Inc. to Office of Compliance Monitoring, EPA
July 3, 1989

(a) Letter from M. Eldan, Ameribrom, Inc. to Document Control Office, EPA
July 3, 1989

1. Sampling Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans in Pentabromodiphenyloxide.
Broomchemie-Terneuzen.
July 1989

(2) Letter from M. Eldan of Ameribrom, Inc. to Office of Compliance Monitoring, EPA
July 3, 1989

(a) Letter from M. Eldan of Ameribrom, Inc. to Document Control Office, EPA
July 3, 1989

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Fiche #

40-8993358 (continued)

1. Sampling Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans in Tetrabromobisphenol-A. Bromine Compounds Ltd. (Israel) July 1989

(3) Letter from M. Eldan, Ameribrom, Inc. to Office of Compliance Monitoring, EPA
July 3, 1989

(a) Letter from M. Eldan, Ameribrom, Inc. to Document Control Office, EPA
July 3, 1989

1. Sampling Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans in Octabromodiphenyloxide. Broom Chemie-Terneuzen.
July 1989

40-8993343 Brominated Flame Retardant Industry Panel (6) 524871

Letter from D. McAllister to T. Murray, EPA responding to EPA letter of November 18, 1988 reviewing the Bishop, Texas "Air Sampling Report".
February 22, 1989

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TSCA SECTION 8(d) AND 4(a)
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			Fiche #
40-8993370	Brominated Flame Retardant Industry Panel Letter from D. McAllister to Document Processing Center, EPA on the progress of the "90-Day Oral Subchronic Study on 2,3,7,8-Tetrabromodibenzodioxin. July 6, 1989	(7)	524872
40-8993322	Chugai Boyeki (America) Corporation Letter from R. Tanaka to C. Elkins, EPA January 13, 1989 Enclosures: (1) Sampling Procedures for Chloranil. Tokuyama Soda Co. Ltd. (2) Analytical Procedures for the Determination of Polychlorinated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry (HRGC/HRMS). ~~Triangle~~ Laboratories, Inc. December 1988	(8)	524873

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TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
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Fiche #

40-8993350 Chugai Boyeki (America) Corporation (9) 524874

Letter from R. Tanaka to C. Elkins, EPA
June 22, 1989

Enclosures:

(1) Sampling Plan. Tokuyama Soda Co., Ltd.
June 1, 1989

(2) Analytical Procedures for the Determination of Polychlorinated Dibenzodioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry (HRGC/HRMS). Spectro-Triangle ~~Triangle~~ Laboratories, Inc.
May 1989

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TSCA SECTION 8(d) AND 4(a)
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			Fiche #
40-8993371	Chugai Boyeki (America) Corporation	(10)	524875

Letter from M. Tanaka to L. Marcus, EPA
August 1, 1989

Enclosure:

(1) Letter from R. Tanaka of Chugai Bayeki Corp. to C. Elkins, EPA
July 24, 1989

(a) Analytical Procedures for the Determination of Polychlorinated Dibenzodioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry (HRGC/HRMS). Triangle Laboratories, Inc.
July 1989

(b) Sampling Plan. Tokuyama Soda Co. Ltd.
July 14, 1989

[Enclosure (b) Not Provided to Docket]

40-8993425	Chugai Boyeki (America) Corporation	(10a)	524876

Letter from R. Tanaka to C. Elkins, EPA listing the sample numbers selected for analytical testing.
September 22, 1989

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			Fiche #
40-8993388	Chugai Boyeki (America) Corporation	(10b)	524877

Letter from M. Tanaka to L. Marcus on the delay of the Chloranil samples.
November 9, 1989

Enclosure:

(1) Letter from D. Williford of Triangle Labs. to M. Tanaka of Chugai Boyeki Corp. on the reasons for the delay of the Chloranil samples.
November 6, 1989

40-8993342	(The) Dow Chemical Company	(11)	524879

Letter from J. Gray to Document Control Office, EPA
February 17, 1989

Enclosure: 3

(1) Protocol and Quality Assurance Plan for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in 2,4-Dichlorophenol. Dow Chemical USA.
February 10, 1989

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TSCA SECTION 8(d) AND 4(a)
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			Fiche #
40-8993349	(The) Dow Chemical Company	(12)	524880
	Letter from J. Gray to Document Control Office, EPA June 7, 1989		
	Enclosure:		
	(1) Final Report of the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in 2,4-Dichlorophenol. Dow Chemical USA. June 6, 1989		
40-8993389	E.I. Dupont de Nemours and Company, Inc.	(12a)	524881
	Letter from K.D. Dastur to H. Podall, EPA on their use of o-Dichlorobenzene. October 17, 1989		
40-8993347	Ethyl Corporation	(13)	524882
	Letter from P.H. Sistrunk to Document Control Officer, EPA March 22, 1989		
	Enclosure:		
	(1) 28-Day Range Finding Study 2,3,7,8-~~2,3,7,8~~ Tetrabromodibenzofuran (TBDF) in ~~(TBDF) in~~ the Rat. Inhausen ~~Research Institute~~ Research Institute, Inc.; Study No. 119-048.		

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TSCA SECTION 8(d) AND 4(a)
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$H_{1.2}$-FILE

			Fiche #
40-8993355	Ethyl Corporation	(14)	524883

Letter from R.L. Smith to Document Control Office, EPA
July 5, 1989

Enclosures:

(1) Sampling Protocol for the Determination of Brominated Dibenzo-p-Dioxins and Dibenzofurans in Decabromodiphenyloxide.
July 1989

(2) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry in Decabromodiphenyloxide.
Triangle Labs., Inc.
July 4, 1989

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Fiche #

40-8993356 Ethyl Corporation (15) 524906

Letter from R.L. Smith to Document Control Office, EPA
July 5, 1989

Enclosures:

(1) Sampling Protocol for the Determination of Brominated Dibenzo-p-Dioxins and Dibenzofurans in Octabromodiphenyloxide.
July 1989

(2) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry in Octabromodiphenyl Oxide. Triangle Labs., Inc.
July 4, 1989

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TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
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$H_{1.2}$-FILE

			Fiche #
40-8993354	Ethyl Corporation	(16)	524907

Letter from R.L. Smith to Document Control Office, EPA
July 5, 1989

Enclosures:

(1) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry in Tetrabromobisphenol A. Triangle Labs., Inc.
July 4, 1989

(2) Sampling Protocol for the Determination of Brominated Dibenzo-p-Dioxins and Dibenzofurans in Tetrabromobisphenol A.
June 26, 1989

40-8993372	Great Lakes Chemical Corporation	(17)	524884

Letter from C. Mazac to J. Glatz, EPA with the agenda for the upcoming March 1, 1989 meeting.
February 21, 1989

TSCA SECTION 8(d) AND 4(a)
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Fiche #

40-8993352 Great Lakes Chemical Corporation (18) 524885

Letter from C.J. Mazac to L. Marcus,
EPA
July 5, 1989

Enclosures:

(1) Letter from C.J. Mazac, Great Lakes Chemical Corp. to L. Marcus, EPA
July 1, 1989

(a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and ~~Dibenzofurans~~ Dibenzo-Tetrabromo Bisphenol ~~Tetrabromobisphenol~~ A.
June 26, 1989

(b) Analytical Protocol for the ~~Determination~~ of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry in Tetrabromobisphenol A.
Triangle Labs., Inc.
July 4, 1989

(2) Letter from C.J. Mazac, Great ~~Lakes~~ Lakes Chemical Corp. to L. Marcus, ~~EPA~~ EPA
July 1, 1989

(a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in Tetrabromobisphenol-A-Bisethoxylate (BA-50).
June 26, 1989

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Fiche #

40-8993352 (continued)

(b) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry in Tetrabromobisphenol-A-Bisethoxylate. Triangle Labs., Inc. July 4, 1989

(3) Letter from C.J. Mazac, Great ~~Lakes~~ Lakes Chemical Corp. to L. Marcus, ~~EPA~~ EPA July 1, 1989

(a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in Allyl Ether of Tetrabromobisphenol A (BE-51). June 26, 1989

(b) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry in Tetrabromobisphenol-A-Bis(Allyl Ether). Triangle Labs., Inc. July 4, 1989

(4) Letter from C.J. Mazac, Great ~~Lakes~~ Lakes Chemical Corp. to L. Marcus, ~~EPA~~ EPA July 1, 1989

40-8993352 (continued)

(a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in 2,4,6-Tribromophenol (PH-73).
June 26, 1989

(b) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry in 2,4,6-Tribromophenol. Triangle Labs., Inc.
July 4, 1989

(5) Letter from C.J. Mazac, Great Lakes Chemical Corp. to L. Marcus, EPA
July 1, 1989

(a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in 1,2-Bis(Tribromophenoxy)Ethane (FF-680).
June 26, 1989

(b) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry in 1,2-Bis(Tribromophenoxy) Ethane. Triangle Labs., Inc.
July 4, 1989

Fiche #

40-8993352 (continued)

(6) Letter from C.J. Mazac, Great Lakes Chemical Corp. to L. Marcus, EPA
July 1, 1989

(a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in Pentabromodiphenyl Diphenyl Oxide (DE-71).
June 26, 1989

(b) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/ High-Resolution Mass Spectrometry in Pentabromodiphenyl Oxide.
Triangle Labs., Inc.
July 4, 1989

(7) Letter from C.J. Mazac, Great Lakes Chemical Corp. to L. Marcus, EPA
July 1, 1989

(a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in Octabromodiphenyl Diphenyl Oxide.
June 26, 1989

Fiche #

40-8993352 (continued)

(b) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/ High-Resolution Mass Spectrometry in Octabromodiphenyloxide. Triangle Labs., Inc. July 4, 1989

(8) Letter from C.J. Mazac, Great Lakes Chemical Corp. to L. Marcus, EPA July 1, 1989

(a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in Decabromodiphenyloxide (DE-83). June 26, 1989

(b) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/ High-Resolution Mass Spectrometry in Decabromodiphenyloxide. Triangle Labs., Inc. July 4, 1989

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Fiche #

40-8993320 Hoechst-Celanese Corporation (19) 524886

Letter from R. Jourdenais to Document Control Officer, EPA
January 5, 1989

Enclosures:

(1) TCDD's in Chloranil (Tetrachloro-p-Benzochinone) Sample Collection Handling and Preservation. (Revised Protocol) Hoechst Aktiengesellschaft. December 19, 1988

(2) Analytical Procedures for the Determination of Polychlorinated Dibenzodioxins and Dibenzofurans By High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry (HRGC/HRMS). (Revised Protocol) Triangle Laboratories, Inc. December 1988

TSCA SECTION 8(d) AND 4(a)
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Fiche #

40-8993348 Hoechst Celanese Corporation (20) 524887

Letter from R.A. Jourdenais to Document Control Officer, EPA
May 25, 1989

Enclosures:

(1) TCDD's in Chloranil Sample Collection, Handling and Preservation. Hoechst AG. May 12, 1989

(2) Analytical Procedures for the Determination of Polychlorinated Dibenzodioxins and Dibenzofurans by High-Resolution Gas Chromotography/High-Resolution Mass Spectrometry (HRGC/HRMS). Triangle Laboratories, Inc. May 1989

(3) Brominated Flame Retardant Industry Panel (BFRIP) Hoechst-Celanese Air Samples from Bishop, Texas Test. (Revised) Triangle Labs., Inc. June 24, 1988

40-8993357 Hoechst-Celanese Corporation (21) 524888

Letter from R.A. Jourdenais to Document Control Officer, EPA
July 11, 1989

Enclosure:

(1) Revised pages 3, 5, 6 and 10 of the analytical portion of the protocol dated May 25, 1989.

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			Fiche #
40-8993323	Midwest Research Institute	(22)	524889

Letter from D. Steele to D. Firestone,
FDA
January 19, 1989

Enclosure:

(1) Summary report checklist for Revision #1 of the Hoechst-~~Celanese~~ Corp. analytical protocol ~~for~~ for Chloranil.

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TSCA SECTION 8(d) AND 4(a)
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Fiche #

40-8993324 Midwest Research Institute (23) 524890

Letter from D. Steele to W. Sovocool, EPA (Las Vegas, Nevada) and duplicate letters sent to R. Harless, EPA (EMSL, NC), D. Firestone, FDA, A. Dupuy, EPA (ECL, Miss.) and W. Bontoyan, EPA (Beltsville, Md.)
January 25, 1989

Enclosures:

(1) Summary Report Checklist for the Testing Protocol for HDD's and HDF's in Commercial Products Containing Chloranil Produced by Hoechst-Celanese Corp.
January 23, 1989

(2) Charter of the Dioxin/Furan Protocol Review Panel. (Revised)
January 19, 1989

(3) Status of TSCA Section 4 D/F Protocols.

40-8993325 Midwest Research Institute (24) 524891

Letter from D. Steele to D. Firestone, FDA and duplicates sent to R. Harless, EPA (EMSL, N.C.), W. Bontoyan, EPA (Beltsville, MD.) W. Sovocool, EPA (Las Vegas, Nevada) and A. Dupuy, EPA (ECL, Miss.)
February 3, 1989

Enclosures:

(1) Minutes of January EPA TSCA ~~Section 4 Dioxin/Furan Protocol Review Panel Teleconference~~ Section 4 Review.

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Fiche #

40-8993325 (continued)

(2) Status of TSCA Section D/F Protocols.
February 1, 1989

(3) Summary Report Checklist of the Testing Protocol for HDD's and HDF's in Commercial Products Containing Chloranil Produced by Chugai, International Corp.
February 3, 1989

[See D_{1d}(9) for Enclosure (1)]

40-8993366 Midwest Research Institute (25) 524892

Letter from D. Steele to D. Firestone, FDA and duplicates sent to R. Harless, EPA (EMSL, NC.), W. Bontoyan, EPA (Beltsville, Md.), A. Dupuy, EPA (ECL, Miss.) and W. Sovocool, EPA (Las Vegas, N.V.)
February 24, 1989

Enclosures:

(1) Status of TSCA Section 4 D/F Protocols.
February 24, 1989

(2) Testing Protocol for HDD's and HDF's in Commercial Products Containing Chloranil from A and D International. Protocol No. 005; Revision 1.

(3) Testing Protocol for HDD's and HDF's in Commercial Products Containing Chloranil from Sandoz Chemicals Corp. Protocol No. 004; Revision 1.

Fiche #

40-8993366 (continued)

(4) Protocol and Quality Assurance Plan for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in 2,4-Dichlorophenol. Dow Chemical USA. February 10, 1989

[See $H_{1.2}$(11) for Enclosure (4)]

(5) BFRIP questions for discussion at the March 1 panel meeting.

[Enclosure (5) Not Provided to Docket]

40-8993367 Midwest Research Institute (26) 524893

Letter from D. Steele to D. Firestone of FDA and duplicates sent to R. Harless, W. Bontoyan, W. Sovocool and A. Dupuy of EPA
March 3, 1989

Enclosure:

(1) Data Package on Hoechst-Celanese Air Samples from Bishop, Texas Test. Brominated Flame Retardant Industry Panel.

TSCA SECTION 8(d) AND 4(a)
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Fiche #

40-8993345 Midwest Research Institute (27) 524894

Letters from D. Steele to A. Dupuy, EPA (NSTL, Miss), D. Firestone, FDA, R. Harless, EPA (RTP, N.C.), W. Bontoyan, EPA (Beltsville, Md) and W. Sovocool, EPA (Las Vegas, N.V.)
March 20, 1989

Enclosures:

(1) TSCA Section 4 Dioxin/Furan Protocol Review Panel Draft Recommendations for Revision 1 of the Hoechst-Celanese Protocol (002) for 2,3,5,6-Tetrachloro-2,5-Cyclohexadiene-1,4-dione (Chloranil).
March 20, 1989

(2) TSCA Section 4 Dioxin/Furan Protocol Review Panel Draft Recommendations for Revision 1 of the Chugai International Corp. Protocol (003) for 2,3,5,6-Tetrachloro-2,5-Cyclohexadiene-1,4-dione (Chloranil).
March 20, 1989

(3) TSCA Section 4 Dioxin/Furan Protocol Review Panel Draft Recommendations for Revision 1 of the Sandoz Chemicals Corp. Protocol (004) for 2,3,5,6-Tetrachloro-2,5-Cyclohexadiene-1,4-dione (Chloranil).
March 20, 1989

Fiche #

40-8993345 (continued)

(4) TSCA Section 4 Dioxin/Furan Protocol Review Panel Draft Recommendations for Revision 1 of the A and D International, Inc. Protocol (005) for 2,3,5,6-Tetrachloro-2,5-Cyclohexadiene-1,4-dione (Chloranil).
March 20, 1989

(5) Example Sampling Plan.

40-8993346 Midwest Research Institute (28) 524895

Letters from D. Steel to R. Harless, W. Bontoyan, W. Sovocool, A. Dupuy of EPA and D. Firestone of FDA
March 9, 1989

Enclosures:

(1) Status of TSCA Section 4 D/F Protocols.

(2) Letter from D. Steel, Midwest Research Institute to D. McAllister of BFRIP responding to the BFRIP March 1 presentation to the panel.
March 9, 1989

(3) Minutes of the March TSCA Section 4 Dioxin/Furan Protocol Review Panel Meeting.

TSCA SECTION 8(d) AND 4(a)
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$H_{1.2}$-FILE

Fiche #

40-8993373 Midwest Research Institute (29) 524896

Letter from D. Steele to D. McDaniel, EPA, J. Donnelly of Lockheed ~~Engineering~~ Engineering and Sciences Co., R. Harless, EPA (RTP, NC), D. Firestone (USFDA), W. Bontoyan, EPA (Beltsville, Md.), A. Dupuy, EPA (NSTL, MS) and W. Sovocool, EPA (NERL, Las Vegas, Nevada) August 1, 1989

Enclosure:

(1) Review of protocols for Decabromodiphenyloxide from Ameribrom, Inc. (006), Ethyl Corp. (007) and Great Lakes Chemical Corp. (013); for Octabromodi-phenyloxide from Ethyl Corp. (008), Ameribrom, Inc. (011) and Great Lakes Chemical Corp. (014); for Pentabromodiphenyloxide from Ameribrom, Inc. (012), Great Lakes Chemical Corp. (015); for 1,2-Bis(Tribromophenoxy)Ethane from Great Lakes Chemical Corp. (017); and for Allyl Ether of Tetrabromobisphenol-A from Great Lakes Chemical Corp. (019). July 1989

20697 227

TSCA SECTION 8(d) AND 4(a)
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Fiche #

40-8993374 Midwest Research Institute (30) 524897

Letter from D. Steele to W. Bontoyan, EPA, (Beltsville, Md.), to J. Donnelly of Lockheed Engineering and Sciences Co., to R. Harless, EPA (RTP, NC), to D. Firestone (USFDA), to W. Bontoyan, EPA (Beltsville, Md.), to A. Dupuy and D. McDaniel, EPA (NSTL, MS) and W. Sovocool, EPA (NERL, Las Vegas, Nevada) August 15, 1989

Enclosures:

(1) Analytical and Sampling Protocols. Chugai Boyeki (America) Inc. July 1989

[See $H_{1.2}$(10) for Enclosure (1)]

(2) Analytical and Sampling Protocols. A and D International, Inc. December 1988

[See $H_{1.2}$(1) for Enclosure (2)]

(3) Summary Report Checklist for HDDs and HDFs in Commercial Products Containing Tetrabromobisphenol A from Ethyl Corp. (009).

(4) Summary Report Checklist for HDDs and HDFs in Commercial Products Containing Tetrabromobisphenol A from Ameribrom, Inc. (010).

(5) Summary Report Checklist for HDDs and HDFs in Commercial Products Containing Tetrabromobisphenol A from Great Lakes Chemical Corp. (016).

Fiche #

40-8993374 (continued)

(6) Summary Report Checklist for HDDs and HDFs in Commercial Products Containing Tetrabromobisphenol A-Bisethoxylate from Great Lakes Chemical Corp. (020).

(7) Summary Report Checklist for HDDs and HDFs in Commercial Products Containing 2,4,6-Tribromophenol from Great Lakes Chemical Corp. (018).

(8) Status of TSCA Section 4 D/F Protocols.
August 14, 1989

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Fiche #

40-8993390 Midwest Research Institute (30a) 524898

Cover letter from D. Steele to W. Sovocool, EPA (Las Vegas, Nevada), R. Harless, EPA (Research Triangle Park, NC), D. Firestone, USFDA and A. Dupuy, EPA (NSTL, Miss.)
November 8, 1989

Enclosures:

(1) Bromodioxins and Bromofurans in Stock. Cambridge Isotope Laboratories.
July 21, 1989

(2) Production Schedule for Bromo-~~Bromo~~dioxins and Bromofurans. Cambridge ~~Cambridge~~ Isotope Laboratories.
July 21, 1989

(3) Minutes of EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Meeting.
August 23-24, 1989

(4) Minutes of EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Teleconference.
September 8, 1989

(5) Minutes of EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Teleconference.
September 29, 1989

(6) Minutes of EPA TSCA Section 4 Dioxin/Furan Protocol Review Panel Teleconference.
October 25, 1989

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~~F~~ FILE

4/.3

Fiche #

40-90 93 508

(209) 533337

Chemical Manufacturers Association

Letter from G. Cox to C. Elkins, EPA Re: in response to EPA's letter of October 26, 1990 concerning the development of the Analytical Methods for eight Chemical substances.

November 21, 1990

20701

TSCA SECTION 4
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~~N~~ FILE

H,3

Fiche #

40-9093572

Chemical Manufacturers Association (20b) 533338

Letter from H. Shah to
L. Mercer, EPA
December 6, 1990
Enclosures:
(1) Letter from K. Riggs,
Battelle to C. Mazac
2 Brominated Flame
Retardant Industry Panel
Containing a status
report on the development
of the Analytical Protocol
for determining Dioxins
in Decabromodiphenyl ~~Et~~
Ether Matrix
November 7, 1990
(a) Results of initial
analyses.

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20702

TSCA SECTION 4
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DOCUMENTS RECEIVED FOLLOWING DECISION OF
~~F~~ FILE

4/1.3

Fiche #

40-9093512 (Continued)

(2) Letter from R. Mitchum of Triangle Labs. to H. Shah, CMA containing a status report on the development of the Analytical Protocols for OBDPO.
November 7, 1990
(a) Initial analyses.

20703

TSCA SECTION 8(d) AND 4(a)
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			Fiche #
40-9093406	Chugai Boyeki (America) Corporation	(21)	524938

Letter from R. Tanaka to L. Marcus, EPA
January 9, 1990

Enclosure:

(1) Letter from R. Varcoe of Triangle Labs. to S. Ushiyama of Chugai Boyeki Corp. on the reason for the blank "Certificate of Analysis" sample enclosed in their December 26, 1989 letter.
November 17, 1989

40-9093474	Chugai Boyeki (America) Corporation	(22)	533339

Letter from D. Severn of Jellinek, Schwartz, Connolly and Freshman, Inc. to J. Canterbury, EPA on protocol modifications.
August 6, 1990

Enclosures:

(1) Certificate of Analysis for Two Samples of PCDD/PCDF.
March 11, 1990

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20704

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
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			Fiche #
40-9093410	Ethyl Corporation	(23)	524939

Letter from L. Wen to L. Marcus, EPA
January 16, 1990

Enclosures:

(1) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in Tetrabromobisphenol-A. Triangle Laboratories, Inc.
January 12, 1990

(2) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in Octabromodiphenyloxide. Triangle Laboratories, Inc.
January 12, 1990

(3) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzo-furans by High-Resolution Gas Chromatography/Medium-High-Resolution Mass Spectrometry in Decabromodiphenyloxide. Triangle Laboratories, Inc.
January 12, 1990

20705 235

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
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$H_{1.3}$-FILE

			Fiche #
40-9093411	Ethyl Corporation	(24)	524940

Letter from L. Wen to L. Marcus, EPA
January 16, 1990

Enclosures:

(1) Letter from L. Wen, Ethyl Corp. to L. Marcus, EPA
January 11, 1990

(a) Sampling Protocol for the Determination of Brominated Dibenzo-p-Dioxins and Dibenzofurans in Decabromodiphenyl-oxide. Triangle Laboratories, Inc.
January 4, 1990

(b) Sampling Protocol for the Determination of Brominated Dibenzo-p-Dioxins and Dibenzofurans in Tetrabromobisphenol-A. Triangle Laboratories, Inc.
January 4, 1990

(c) Sampling Protocol for the Determination of Brominated Dibenzo-p-Dioxins and Dibenzofurans in Octabromodiphenyl-oxide. Triangle Laboratories, Inc.
January 4, 1990

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
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DOCUMENTS RECEIVED FOLLOWING DECISION OF JUNE 5, 1987
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$H_{1.3}$-FILE

			Fiche #
40-9093412	Ethyl Corporation	(25)	524941

Letter from L. Wen to L. Marcus, EPA enclosing a copy of complete protocol (incomplete copy sent January 16, 1990).
January 18, 1990

Enclosure:

(1) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzo-furans by High-Resolution Gas Chromatography/ Medium High-Resolution Mass Spec-~~Spectrometry~~ in Octabromodiphenyl ~~oxide~~. Triangle Laboratories, Inc.
January 12, 1990

40-9093407	Great Lakes Chemical Corporation	(26)	524942

Cover letter from C. Mazac to L. ~~Marcus~~, EPA
January 16, 1990

Enclosures:

(1) Letter from C. Mazac to L. Marcus, EPA
January 16, 1990

(a) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/ Medium High-Resolution Mass Spectrometry in 1,2-Bis(Tribromophenoxy)Ethane. Triangle Laboratories, Inc.
January 12, 1990

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20707

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H1.4

(13)

Fiche #

~~(29)~~ ~~(40)~~ 533375

40-9193555

Chemical Manufacturers Association

Letter from H. Shalte

J. Cassa, EPA

October 2, 1991

Enclosures:

(1) Table I. BFRIP Protocol Corrections.

(2) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium High Resolution Mass Spectrometry in Decabromodiphenyloxide. Triangle Labs, Inc. for the BFRI Panel. ~~January 29 1991~~ Revised January 29, 1991 Protocol.

September 20, 1991

238

20708

TSCA SECTION 4
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
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~~8(a)~~-FILE

Fiche #

40-9193555 (Continued) 14.1

(3) same as (2)
in Octabromodiphenyloxide.

(4) same as (2)
in Pentabromodiphenyloxide.

(5) same as (2)
in Tetrabromobisphenol A.

(6) same as (2)
in Tribromophenol.

(7) same as (2)
in Tetrabromobisphenol-A-Bisethoxylate.

(8) same as (2)
in Tetrabromobisphenol A Bis (Allyl Ether).

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20709

TSCA SECTION 4
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~~E1~~-FILE

H1-4

Fiche #

40-9193556

Chemical Manufacturers Association

(14) 533376

Letter from H. Shatto
J. Harris, EPA on additional
data on Pentabromodiphenyl
Oxide.
October 2, 1991
Enclosure:
(1) Attachment 17: Analysis
of Pentabromodiphenyloxide
Plant samples:

240

20710

TSCA SECTION 4
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
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~~E~~-FILE
H, 1.4

Fiche #

40-9193557 Chemical Manufacturers Association (~~13~~) 15 (~~13~~) 533377

Letter from C. Strickland to J. Carra, EPA in response to his August 30, 1991 letter concerning the analytical protocol for 1,2-Bis(Tribromophenoxy)-Ethane.

October 4, 1991

20711 241

TSCA SECTION 4
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H1.4 (16)

Fiche #

40-9193560 Chemical Manufacturers Association . 533378

Letter from H. Shah to R. Marcus, EPA Concerning reports inadvertently omitted from the October 2, 1991 submission.
October 17, 1991

Enclosures:
(1) Evaluation of a Protocol for the Determination of PBDD/PBDF in Tetrabromobisphenol-A-Bisethoxylate. Great Lakes Chemical Corp.; Battelle.
March 11, 1991
(2) same as (1) in Tetrabromobisphenol-A-Bis(Allyl Ether).

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20712

TSCA SECTION 4
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
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H, 4

Fiche #

40-9193567 Chemical Manufacturers (17)
Association

Letter from H. Shah to
J. Gaza, EPA in response
to ~~the letter~~ of August 30, 1991
~~dated~~

EPA's letter:
December 2, 1991
Enclosure:
(1) Analytical Protocol for the
Determination of Polybrominated
Dibenzo-p-Dioxins and Dibenzofurans
by High-Resolution Gas Chromatography/
Medium Resolution Mass Spectrometry in
1,2-Bis(Tribromophenoxy) Ethane -
Battelle Labs. for Brominated
Flame Retardant Industry Panel.
November 25, 1991

20713

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TSCA SECTION 4
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DOCUMENTS RECEIVED FOLLOWING DECISION OF
[illegible]-FILE

H1.4 (18) **Fiche #**

40-9193568 Chemical Manufacturers Association

Letter from H. Shah to Document Control Office, EPA ~~[illegible]~~ on the voluntary study plan for Tetrabromobisphenol A, Pentabromodiphenyloxide and 2,4,6-Tribromophenol.

December 10, 1991

Enclosures:

(1) Curriculum Vitae for personnel from Triangle Labs., Inc.

(2) <u>Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in Tetrabromobisphenol A.</u> Triangle Labs. Inc. for Brominated Flame Retardant Industry Panel.

January 29, 1991

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30714

40-9193568 (Continued) #1.4

Fiche #

(3) same as (2)

in Pentabromodiphenyloxide.

Same -

January 29, 1991

(4) same as (2)

in Tribromophenol.

same

January 29, 1991

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~~E~~-FILE

H, 1, 4

Fiche

3569 ~~Letter~~ Chemical Manufacturers (19)
Association

Letter from H. Shahte
Document Control Office,
EPA on the voluntary study
plan for Decabromodiphenyloxide,
Octabromodiphenyloxide, Tetra-
bromobisphenol-A-Bisethoxylate
and Allyl Ether of Tetrabromo-
bisphenol A.
December 10, 1991
Enclosures:
(1) Curriculum Vitae for
personnel from
Battelle Memorial Institute
(2) Analytical Protocol for the
Determination of Polybrominated
Dibenzo-p-Dioxins and Dibenzofurans
by High-Resolution Gas Chromatography/
Medium High-Resolution Mass Spectrometry
in Decabromodiphenyloxide. Transmittal
ltr. for the Brominated Flame Retardant
on 29, 1991 Industry Panel.

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~~E.~~ -FILE

H 1.4

Fiche # 20

40-9193562 (The) Dow Chemical Company (~~The~~) 533379

Letter from R. L. Hagerman
to E. Green in response to an
omission in their October 5, 1987 letter (H.1.0 (3)).
November 8, 1991

Enclosure:
(1) Analysis of 2,4-Dichlorophenol
for the Presence of 2,3,7,8-
Tetrachlorodibenzo-p-Dioxin.

February 4, 1985

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TSCA SECTION 4
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
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~~41~~ -FILE

H1.4

Fiche #

40-9193570 Ethyl Corporation (21)

Letter from P. Rankert
M. Bauer, Battelle Labs. Inc.
informing them of the testing
of decabromodiphenyl oxide
and octabromodiphenyl
oxide.
November 26, 1991

40-9193571 Ethyl Corporation (22)

~~Letter~~ Like 21

~~&~~ Tetrabromodiphenyl A.

November 26, 1991

TSCA SECTION 4
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
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DOCUMENTS RECEIVED FOLLOWING DECISION OF
~~X~~-FILE

H1.4

Fiche #

40-9193572 Great Lakes Chemical Corporation (23)

Letter from C. Magee to F. Varnae, Triangle Labs. notifying them of the testing of Tetrabromo-bisphenol A, 2,4,6-Tribromo-phenol and ~~Penta~~ Pentabromo-diphenyl Oxide

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~~E~~-FILE

H1.4

Fiche #

40-9193573 ICI Americas, Inc. (24)

Letter from J.F. Jadlocki
+ Document Control Offic,
EPA ~~Re~~ concerning the
presence of Dioxins and
Furans in Chloranil.
February 4, 1991
Enclosures:
(1) Letter from J. Cassa, EPA
~~to~~ on the investigation
of Chloranil for Dioxin
Contamination.
December 31, 1990
(2) Detailed Process description
of the manufacture of Chloranil.
(CBI)

20720 250

TSCA SECTION 4
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H, 4

Fiche #

40-91/93523 Pfister Chemical, Inc. (25) 533380

Letter from R. Braunth
L. Marcus, EPA
January 15, 1991
Enclosures:
(1) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in 3,4',5-Tribromosalicylanilide.
January 15, 1991
(2) Curriculum Vitae for Triangle Labs. personnel.

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TSCA SECTION 8(d) AND 4(a)
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			Fiche #
40-8993391	Midwest Research Institute	(30b)	524899

Letter from D. Steele to W. Bontoyan, EPA (Beltsville, Md.), D. Firestone, USFDA, R. Harless, EPA (RTP, NC), W. Sovocool, EPA (Las Vegas, Nevada), A. Dupuy, EPA (NSTL, Miss.) and J. Donnelly, Lockheed Engineering and Sciences Co.
December 12, 1989

Enclosure:

(1) Letter from C. Elkins, EPA to A. Gusmano, Pfister Chemical, Inc. containing the review of their protocol for the analytical ~~testing~~ Testing of 3,4',5-Tribromo-salicylanilide.
November 27, 1989

40-8993392	Midwest Research Institute	(30c)	524900

Letter from D. Steele to W. Sovocool, EPA (Las Vegas, Nevada), R. Harless, EPA (RTP, NC), D. Firestone, USFDA, A. Dupuy, EPA (NSTL, Miss.), W. Bontoyan, EPA (Beltsville, Md.) and J. Donnelly of Lockheed Engineering and Sciences ~~Co.~~ Co.
December 18, 1989

Enclosure:

(1) Initial Review of Hoechst-Celanese (002) Data for Chloronil.
December 18, 1989

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TSCA SECTION 8(d) AND 4(a)
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			Fiche #
40-8993375	Pfister Chemical, Inc. Letter from A. Gusmano to L. Marcus, EPA on the manufacture of 3,4',5-Tribromosalicylanilide. August 8, 1989	(31)	524901
40-8993376	Pfister Chemical, Inc. Letter from A. Gusmano to Document Control Office, EPA September 15, 1989 Enclosure: (1) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry in 3,4',5-Tribromosalicylanilide. Triangle Laboratories, Inc. August 28, 1989	(32)	524902
40-8993327	Sandoz Chemicals Corporation Letter from B. Drum to L. Marcus, EPA February 8, 1989 Enclosure: (1) Protocol for the Determination of Polyhalogenated Dibenzo-p-dioxins and Dibenzofurans in 2,3,5,6-Tetrachloro-2,5-cyclohexadiene-1,4-dione. February 7, 1989	(33)	524903

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Fiche #

40-8993351 Sandoz Chemicals Corporation (34) 524904

Letter from B.W. Drum to L. Marcus, EPA
June 30, 1989

Enclosures:

(1) Agreement for Sharing Testing Cost (A&D International, Inc.)

(2) Sample Selection and Sampling Plan for the Determination of Polyhalogenated Dibenzo-p-Dioxins and Dibenzofurans in 2,3,5,6-Tetrachloro-2,5-Cyclohexadiene-1,4-dione. Triangle Labs., Inc.
June 30, 1989

40-8993451 Sandoz Chemicals Corporation (34a) 524905

Letter from B. Drum to L. Marcus, EPA revising their notice of intent to test (letter of August 17, 1988).
June 30, 1989

Enclosure:

(1) Analytical Testing Protocol for ~~the~~ the Determination of Polyhalo~~genated~~ genated Dibenzofurans in 2,3,5,6-Tetrachlorod-2,5-Cyclo-dione. ~~Triangle~~ Labs., Inc.
May 1989

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TSCA SECTION 8(d) AND 4(a)
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			Fiche #
40-8993377	Sandoz Chemicals Corporation	(35)	524908
	Letter from B. Drum to L. Marcus, EPA July 27, 1989		
	Enclosure:		
	(1) Agreement for Sharing Testing Cost (Between Sandoz Chemicals Corp. and A and D International, Inc.).		
40-8993378	Sandoz Chemicals Corporation	(36)	524909
	Letter from B. Drum to L. Marcus, EPA July 27, 1989		
	Enclosure:		
	(1) Four corrected pages and one missing page to the protocol submitted on 2,3,5,6-Tetrachloro-2,5-Cyclohexadiene-1,4-dione submitted June 30, 1989.		
	[See H_{1b}(34a) for Protocol]		
40-8993393	Standard Chlorine of Delaware, Inc.	(36a)	524910
	Letter from R. Touhey to H. Podall, EPA in response to his letter of October 4, 1989 regarding contents of ~~Paradichloro~~ Paradichlorobenzene used to produce ~~1,2,4 Trichloro~~ 1,2,4-Trichlorobenzene. November 7, 1989		

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			Fiche #
40-8993344	U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health	(37)	524911

Letter from R.W. Hartle from the Centers for Disease Control (CDC) to L. Moore, EPA containing a status report on NIOSH's involvement with the Brominated Flame Retardant Industry Panel's investigation of PBDD's and PBDF's.
February 22, 1989

Enclosures:

(1) Report of Air Sampling for the Presence of Polybrominated Dibenzodioxins and Dibenzofurans During the Production of Polybutylene Terephthalate Resin with Decabromodiphenyl Oxide. Hoeschst-Celanese Corp., Brominated Flame Retardant Industry Panel.

(2) USDHHS memorandum from A. Lunsford, to R. Hartle containing a review of the "analytical section" of the BFRIP report.

(a) Summary of PBDD/PBDF Analytical Results from Triangle Laboratories, Inc. (Table)

40-8993321	U.S. Environmental Protection Agency	(38)	524912

EPA memo from T. Murray to "The Record" on the Sampling Protocol from A&D International, Inc.
January 11, 1989

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			Fiche #
40-8993326	U.S. Environmental Protection Agency EPA memo from T. Murray to "The Record" on the review of The Dow Chemical Co. Sampling and Analytic Protocol. February 6, 1989 Enclosure: (1) Draft Panel Recommendations for Revision 1 of the Dow Protocol Submitted for 2,4-Dichlorophenol Under the EPA TSCA Section 4 Dioxin/Furan Rule. Midwest Research Institute.	(39)	524913
40-8993379	U.S. Environmental Protection Agency Letter from C. Elkins to R. Jourdenais of Hoechst-Celanese Corp. reviewing their revised test protocol sent January 5, 1989 on Chloranil. April 17, 1989	(40)	524914
40-8993380	U.S. Environmental Protection Agency Letter from C. Elkins to B. Drum of Sandoz Chemicals Corp. reviewing their revised test protocol for Chloranil sent February 8, 1989. April 17, 1989	(41)	524915
40-8993381	U.S. Environmental Protection Agency Letter from C. Elkins to C.K. Gupta of A and D International, Inc. reviewing their revised test protocol for ~~Chloranil~~ Chloranil sent February 3, 1989. April 17, 1989	(42)	524916

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			Fiche #
40-8993382	U.S. Environmental Protection Agency Letter from C. Elkins to R. Tanaka of Chugai Boyeki (America) Corp. reviewing their revised test protocol for Chloranil sent January 13, 1989. April 17, 1989	(43)	524917
40-8993383	U.S. Environmental Protection Agency Letter from C. Elkins to B. Drum of Sandoz Chemicals Corp. accepting their revised test protocol for Chloranil sent July 27, 1989. August 21, 1989	(44)	524918
40-8993384	U.S. Environmental Protection Agency Letter from C. Elkins to R. Tanaka of Chugai Boyeki (America) Corp. accepting their revised test protocol for Chloranil sent June 22, 1989. August 21, 1989	(45)	524919
40-8993385	U.S. Environmental Protection Agency Letter from C. Elkins to R. Jourdenais of Hoechst-Celanese Corp. accepting their revised test protocol for Chloranil sent May 25, 1989. August 21, 1989	(46)	524920
40-8993386	U.S. Environmental Protection Agency Letter from C. Elkins to C.K. Gupta of A and D International, Inc. accepting their revised test protocol for Chloranil sent August 1, 1989. August 21, 1989	(47)	524921

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			Fiche #
40-8993387	U.S. Environmental Protection Agency	(48)	524922

Internal EPA memo from J. Merenda to C. Auer on the analytical data for 2,4-Dichlorophenol submitted by The Dow Chemical Co. .
September 1, 1989

Enclosure:

(1) Letter from A. Dupuy, Jr., EPA (Environmental Chemistry Section, Stennis Space Center, Miss.) to E. Bryan, EPA (Hdqtrs.) on the review of data for 2,4-Dichlorophenol submitted by The Dow Chemical Co. August 23, 1989

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Fiche #

40-9093465 A and D International, Inc. (1) 533328

Letter from C. Gupta to J. Canterbury and J. Breen, EPA
July 6, 1990

Enclosures:

(1) EPA Form 7710-51 on Chloranil (Positive Dioxin Report from Product Analysis).
April 11, 1990

(2) Log Out for Chloranil from Phenol-Flow Diagram.

(3) Comments on Flow Diagram.

(4) Material Safety Data Sheet for Chloranil.

(5) Product Label for Chloranil.

40-9093402 Ameribrom, Inc. (2) 524924

Letter from M. Eldan to Document Control ~~Control~~ Office, EPA
January 12, 1990

Enclosure:

(1) Sampling Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins/Dibenzofurans in Penta-bromodiphenyloxide. ~~Broomchemie~~ Broomchemie B.V.
January 1990

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			Fiche #
40-9093403	Ameribrom, Inc.	(3)	524925

Letter from M. Eldan to Document ~~Control~~ Central Office, EPA
January 12, 1990

Enclosure:

(1) Sampling Protocol for the Determinaton of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans in Tetrabromobisphenol-A. Bromine Compounds, Ltd.
January 1990

40-9093404	Ameribrom, Inc.	(4)	524926

Letter from M. Eldan to Document
Control Office, EPA
January 12, 1990

Enclosure:

(1) Sampling Protocol for the Determination of Polybrominated ~~Dibenzo-p-Dioxins and Dibenzofurans in~~ Dibenzofurans in Octabromodiphenyloxide.
Broomchemie B.V.
January 1990

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Fiche #

40-9093405 Ameribrom, Inc. (5) 524927

Letter from M. Eldan to Document Control ~~Control~~ Office, EPA
January 12, 1990

Enclosure:

(1) Sampling Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans in Decabromodiphenyloxide. Bromine Compounds, Ltd.
January 1990

40-9093408 Ameribrom, Inc. (6) 524928

Letter from A. Tillman to L. Marcus, EPA
~~EPA~~
January 16, 1990

Enclosures:

(1) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in Pentabromodiphenyloxide. Triangle Laboratories, Inc.
January 12, 1990

(2) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in Octabromodiphenyloxide. Triangle Laboratories, Inc.
January 12, 1990

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40-9093408 (continued)

(3) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in Decabromodiphenyl Oxide. Triangle Laboratories, Inc. January 12, 1990

(4) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in Tetrabromobisphenol-A. Triangle Laboratories, Inc. January 12, 1990

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			Fiche #
40-9093414	Chemical Manufacturers Association	(7)	524929

Letter from H. Shah to L. Marcus, EPA containing status report on progress of analytical methods development.
February 1, 1990

Enclosures:

(1) Progress Report GLC No. 1 from Y. Tondeur, Triangle Laboratories, Inc. to C. Mazac of Great Lakes Chemical Corp. reporting on activities for PH-73 (Tribromophenol).
January 26, 1990

(2) Progress Report GLC No. 2 from Y. Tondeur, Triangle Laboratories, Inc. to C. Mazac of Great Lakes Chemical Corp. reporting on BFRIP protocols.
January 26, 1990

40-9093417	Chemical Manufacturers Association	(8)	524930

Letter from H. Shah to L. Marcus, EPA
February 23, 1990

Enclosures:

(1) Progress Report No. 4 on BFRIP protocols from R. Varcoe, Triangle Labs, Inc. to C. Mazac of Great Lakes Chemical Corp.
February 23, 1990

(a) Addendum to Progress Report No. 4.

(2) Progress Report GLC No. 3 on PH-73 from R. Varcoe of Triangle Labs, Inc. to C. Mazac of Great Lakes Chemical Corp.
February 23, 1990

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			Fiche #
40-9093430	Chemical Manufacturers Association	(9)	524931

Letter from H. Shah to L. Marcus, EPA
April 6, 1990

Enclosures:

(1) Report on the Results on Comparative Study EPA-TLI TBBPA Procedures. Triangle Labs., Inc.
April 4, 1990

(2) Progress Report on Darco/AX-21 (350-100 AX-21 Procedure).
April 4, 1990

40-9093431	Chemical Manufacturers Association	(10)	524932

Letter from H. Shah to L. Marcus, EPA
April 20, 1990

Enclosures:

(1) Progress Report No. 6 from Y. Tondeur of Triangle Labs. to C. Mazac of Great Lakes Chemical ~~Corp.~~ on the preparation of ~~samples for~~ "single lab evaluation".
April 18, 1990

(a) Letter from H. Cavalier of Cambridge Isotope Labs. to Y. Tondeur of Triangle Labs. confirming problems with impurities in ED-1460.
March 20, 1990

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			Fiche #
40-9093432	Chemical Manufacturers Association	(11)	524933

Letter from H. Shah to L. Marcus, EPA
May 10, 1990

Enclosure:

(1) Letter from Y. Tondeur of Triangle Labs. to C. Mazac of Great Lakes Chemical Corp. containing the status on the solid-phase separation procedure.
May 8, 1990

40-9093433	Chemical Manufacturers Association	(12)	524934

Letter from H. Shah to L. Marcus, EPA
May 17, 1990

Enclosures:

(1) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in 2,4,6-Tribromophenol. Triangle Labs., Inc.; Brominated Flame Retardant Industry Panel.
May 15, 1990

(2) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzo-furans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in Decabromodiphenyl Oxide. Triangle Labs., Inc.; Brominated Flame Retardant Industry Panel.
May 15, 1990

Fiche #

40-9093433 (continued)

(3) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzo-furans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in 1,2-Bis(Tribromophenoxy)Ethane. Triangle Labs., Inc.; Brominated Flame Retardant Industry Panel.
May 15, 1990

(4) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzo-furans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in Tetrabromobisphenol A. Triangle Labs., Inc.; Brominated Flame Retardant Industry Panel.
May 15, 1990

40-9093457 Chemical Manufacturers Association (12a) 524935

Letter from H. Shah to L. Marcus, EPA
May 31, 1990

Enclosure:

(1) Progress report on the Analytical Methods Development for Polyhalogenated Dibenzo-p-Dioxins/Dibenzofurans in Octabromodiphenyloxide and Allyl Ether of Tetrabromobisphenol-A. Triangle Labs., Inc.
May 30, 1990

TSCA SECTION 8(d) AND 4(a)
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			Fiche #
40-9093458	Chemical Manufacturers Association	(12b)	524936

Letter from H. Shah to L. Marcus, EPA
June 6, 1990

Enclosure:

(1) Corrected page 55 (Table 5) for all four protocols submitted May 17, 1990.

40-9093459	Chemical Manufacturers Association	(12c)	524937

Letter from H. Shah to L. Marcus, EPA
June 14, 1990

Enclosures:

(1) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in Tetrabromobisphenol A-Bis(Allyl Ether). Brominated Flame Retardant Industry Panel.
June 15, 1990

(2) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in Octabromodiphenyl oxide. Brominated Flame Retardant Industry Panel.
June 15, 1990

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Fiche #

40-9093466 Chemical Manufacturers Association (13) 533329

Letter from H. Shah to J. Remmers, EPA submitting an amendment to the Analytical Protocol for Decabromodiphenyl ~~phenyl~~ Oxide submitted by the Brominated ~~nated~~ Flame Retardant Industry Panels (BFRIP); requesting a deviation from ~~test rule~~ sample size in the Analytical ~~Protocol~~ for Pentabromodiphenyl Oxide and request ~~and request~~ for a meeting.
June 26, 1990

Enclosures:

(1) Progress Report on Decabromodiphenyloxide Analytical Protocol, on BA-50 and Method Development for PeBDPO. Triangle Labs., Inc. June 24, 1990

(2) Note on the Single-Laboratory Evaluation of PeBDPO. Triangle Labs., Inc.

40-9093467 Chemical Manufacturers Association (14) 533330

Letter from G. Cox to C. Elkins requesting the analysis of blood samples taken from employees working near the processing of Polybutylene Terephthalate (Containing Decabromodiphenyl Ether as a Flame Retardant) ~~be~~ performed at the Midwest Research Institute.
July 16, 1990

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Fiche #

40-9093468 Chemical Manufacturers Association (15) 53333/

Letter from H. Shah to L. Marcus, EPA
July 17, 1990

Enclosures:

(1) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in Pentabromodiphenyloxide. Triangle Labs., Inc.; Brominated Flame Retardant Industry Panel.
July 15, 1990

(2) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in Tetrabromobisphenol-A-Bisethoxylate. Triangle Labs., Inc.; Brominated Flame Retardant Industry Panel.
July 15, 1990

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Fiche #

40-9093469 Chemical Manufacturers Association (16) 533332

Letter from H. Shah to L. Marcus, EPA
July 17, 1990

Enclosure:

(1) DBDPO Analytical Protocol Amendment. Triangle Labs., Inc.; Brominated Flame Retardant Industry. July 5, 1990

(a) Table 1 - Analytical Results for Sample "Macro-SG-Micro-A".

(b) Table 2 - Analytical Results for Sample "Macro-SG-Micro-B".

40-9093470 Chemical Manufacturers Association (17) 533333

Letter from H. Shah to J. Remmers, EPA responding to EPA's questions on the Analytical Protocol submitted by the Brominated Flame Retardant Industry Panel.
July 19, 1990

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TSCA SECTION 8(d) AND 4(a)
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Fiche #

40-9093471 Chemical Manufacturers Association (18) 533334

Letter from H. Shah to J. Remmers, EPA containing the interpretation of ~~remarks~~ remarks from Y. Tondeur of Triangle ~~Labs., Inc.~~ Labs., Inc. on "limits of quantification" ~~(LOQs),~~ (LOQs), ~~precision/matrix spike studies and~~ precision/matrix spike studies and ~~recovery/consideration of the validity~~ recovery/consideration of the validity of data from samples presenting ~~low~~ low recovery.
August 10, 1990

Enclosure:

(1) Flow Charts on Low Recovery Sample Data.

40-9093472 Chemical Manufacturers Association (19) 533335

Letter from H. Shah to J. Remmers, EPA
August 21, 1990

Enclosure: to J. Remmers, EPA

(1) Letter from B. Biles of Arnold and Porter addressing modifications to test protocols and timetables for analytical testing.
August 21, 1990

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TSCA SECTION 8(d) AND 4(a)
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Fiche #

40-9093473 Chemical Manufacturers Association (20) 533331

Letter from H. Shah to L. Marcus, EPA
August 24, 1990

Enclosure:

(1) Progress Report: Evaluation of a Microcarbon Column (DBDPO Sample Fractionation Procedure).
Triangle Labs., Inc.
August 23, 1990

(a) Table 1. - Analytical Results for Sample "Macro-SG-Micro-A".

(b) Table 2. - Analytical Results for Sample "Macro-SG-Micro-B".

(c) Comparison of the Analytical Results for DBDPO Analyzed by the Two-and Three-Step Procedures.

(d) Comparison of Selected Ion Current Profiles for DBDPO After Undergoing "Two-Step" and "Three-Step" Chromatographic Cleanups; Recovery Standard and QC-SICP.

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Fiche #

40-9093407 (continued)

(2) Letter from C. Mazac to L. Marcus, EPA
January 16, 1990

(a) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/ Medium High-Resolution Mass Spectrometry in Tetrabromobisphenol-A-Bisethoxylate. Triangle Laboratories, Inc. January 12, 1990

(3) Letter from C. Mazac to L. Marcus, EPA
January 16, 1990

(a) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/ Medium High-Resolution Mass Spectrometry in Allyl Ether of Tetrabromobisphenol-A. Triangle Laboratories, Inc. January 12, 1990

(4) Letter from C. Mazac to L. Marcus, EPA
January 16, 1990

(a) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/ Medium High-Resolution Mass Spectrometry in 2,4,6-Tribromophenol. ~~Triangle~~ Triangle Laboratories, Inc. January 12, 1990

Fiche #

40-9093407 (continued)

(5) Letter from C. Mazac to L. Marcus, EPA
January 16, 1990

(a) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/ Medium High-Resolution Mass Spectrometry in Decabromodiphenyloxide. Triangle Laboratories, Inc.
January 12, 1990

(6) Letter from C. Mazac to L. Marcus, EPA
January 16, 1990

(a) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/ Medium High-Resolution Mass Spectrometry in Octabromodiphenyloxide. Triangle Laboratories, Inc.
January 12, 1990

(7) Letter from C. Mazac to L. Marcus, EPA
January 16, 1990

Fiche #

40-9093407 (continued)

(a) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/ Medium High-Resolution Mass Spectrometry in Tetrabromobisphenol-A. Triangle Laboratories, Inc. January 12, 1990

(8) Letter from C. Mazac to L. Marcus, EPA
January 16, 1990

(a) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/ Medium High-Resolution Mass Spectrometry in Pentabromodiphenyloxide. Triangle Laboratories, Inc. January 12, 1990

40-9093409 Great Lakes Chemical Corporation (27) 524943

Cover letter from C. Mazac to L. Marcus, ~~Marcus,~~ EPA
January 16, 1990

Enclosures:

(1) Letter from C. Mazac to L. Marcus, EPA
January 16, 1990

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Fiche #

40-9093409 (continued)

(a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in 1,2-Bis(Tribromophenoxy)Ethane. Triangle Laboratories, Inc. January 8, 1990

(2) Letter from C. Mazac to L. Marcus, EPA
January 16, 1990

(a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in Tetrabromobisphenol-A-Bisethoxylate. Triangle Laboratories, Inc. January 8, 1990

(3) Letter from C. Mazac to L. Marcus, EPA
January 16, 1990

(a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in Allyl Ether of Tetrabromobisphenol-A. Triangle Laboratories, Inc. January 8, 1990

(4) Letter from C. Mazac to L. Marcus, EPA
January 16, 1990

(a) Analytical Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in 2,4,6-Tribromophenol. Triangle Laboratories, Inc. January 8, 1990

Fiche #

40-9093409 (continued)

(5) Letter from C. Mazac to L. Marcus, EPA
January 16, 1990

(a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in Decabromodiphenyl oxide. Triangle Laboratories, Inc.
January 8, 1990

(6) Letter from C. Mazac to L. Marcus, EPA
January 16, 1990

(a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in Octabromodiphenyl oxide. Triangle Laboratories, Inc.
January 8, 1990

(7) Letter from C. Mazac to L. Marcus, EPA
January 16, 1990

(a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in Tetrabromobisphenol A. Triangle Laboratories, Inc.
January 8, 1990

Fiche #

40-9093409 (continued)

(8) Letter from C. Mazac to L. Marcus, EPA
January 16, 1990

(a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in Pentabromodiphenyloxide. Triangle Laboratories, Inc.
January 8, 1990

40-9093413 Great Lakes Chemical Corporation (28) 524944

Fax letter from C. Mazac to J. Johnson, EPA concerning the adequacy of the sampling protocols.
January 25, 1990

40-9093415 Great Lakes Chemical Corporation (29) 524945

Letter from C. Mazac to T. Murray, EPA requesting an early evaluation of the analytical protocol for Tetrabromo-bisphenol-A.
February 6, 1990

40-9093416 Great Lakes Chemical Corporation (30) 524946

Letter from C. Mazac to L. Marcus, EPA
February 8, 1990

Enclosures:

(1) Progress Report No. 3 from R. Varcoe, Triangle Laboratories, Inc. to C. Mazac of Great Lakes Chemical Corp. on the BFRIP protocols.
February 9, 1990

Fiche #

40-9093416 (continued)

(2) Progress Report GLC No. 2 from R. Varcoe, Triangle Laboratories, ~~Inc.~~ Inc. to C. Mazac of Great Lakes ~~Chemical~~ Chemical Corp. on protocol for PH-~~73 (2,4,6-~~ 73 (2,4,6-Tribromophenol).
February 9, 1990

40-9093434 Great Lakes Chemical Corporation (31) 524947

Letter from C. Mazac to L. Marcus, EPA enclosing the second revision of the sampling protocol.
April 16, 1990

Enclosure:

(1) Letter from C. Mazac of Great ~~Lakes~~ Lakes Chemical Corp. to L. Marcus, ~~EPA~~ EPA
April 16, 1990

(a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in Allyl Ether of Tetrabromobisphenol A (BE-51).
Triangle Labs., Inc.
April 1990

40-9093435 Pfister Chemical (32) 524948

Letter from R. Huth to L. Marcus, EPA
May 4, 1990

Enclosure:

(1) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzo Furans in 3,4',5-Tribromosalicylanilide.

TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
DOCKET #83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
DOCUMENTS RECEIVED FOLLOWING DECISION OF JUNE 5, 1987
(DOCKET #83002C) - FOR 1990 ONLY
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Fiche #

40-9093475 Pfister Chemical, Inc. (33) 533340

Letter from R. Huth to L. Marcus, EPA
September 10, 1990

Enclosure:

(1) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in 3,4',5-Tribromosalicylanilide.
September 5, 1990

(a) Curriculum Vitae for Pfister Chemical and Triangle Labs. personnel.

40-9093492 Pfister Chemical, Inc. (33a) 533341

Letter from R.C. Brady to Document Control Office, EPA
October 8, 1990

Enclosure:

(1) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in 3,4',5-Tribromosalicylanilide.
Triangle Laboratories, Inc.
October 5, 1990

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TSCA SECTION 8(d) AND 4(a)
HEALTH AND SAFETY DATA REPORTING
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
[#83002 - POLYHALOGENATED DIBENZO-p-DIOXINS/DIBENZOFURANS
DOCUMENTS RECEIVED FOLLOWING DECISION OF JUNE 5, 1987
(DOCKET #83002C) - FOR 1990 ONLY
$H_{1.3}$-FILE

			Fiche #
1	Ethyl Corporation	(24)	52494(

Letter from L. Wen to L. Marcus, EPA
January 16, 1990

Enclosures:

(1) Letter from L. Wen, Ethyl Corp. to L. Marcus, EPA
January 11, 1990

(a) Sampling Protocol for the Determination of Brominated Dibenzo-p-Dioxins and Dibenzofurans in Decabromodiphenyl-oxide. Triangle Laboratories, Inc.
January 4, 1990

(b) Sampling Protocol for the Determination of Brominated Dibenzo-p-Dioxins and Dibenzofurans in Tetrabromobisphenol-A. Triangle Laboratories, Inc.
January 4, 1990

(c) Sampling Protocol for the Determination of Brominated Dibenzo-p-Dioxins and Dibenzofurans in Octabromodiphenyl-oxide. Triangle Laboratories, Inc.
January 4, 1990

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Fiche #

40-9193555 [redacted] 533375

Chemical Manufacturers Association

Letter from H. Shah to J. Casas, EPA
October 2, 1991

Enclosures:
(1) Table I. BFRIP Protocol Corrections.

(2) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium High Resolution Mass Spectrometry in Decabromodiphenyloxide. Triangle Labs, Inc. for the BFRI Panel. ~~January 29, 1991~~ Revised January 29, 1991 Protocol.
September 20, 1991

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Fiche #

40-9193555 (Continued) 14.1

(3) same as (2)
in Octabromodiphenyloxide.

(4) same as (2)
in Pentabromodiphenyloxide.

(5) same as (2)
in Tetrabromobisphenol A.

(6) same as (2)
in Tribromophenol.

(7) same as (2)
in Tetrabromobisphenol -A-
Bisethylate.

(8) same as (2)
in Tetrabromobisphenol A Bis
Bis (Allyl Ether).

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40-9193556

Fiche #

(14) 533376

Chemical Manufacturers Association

Letter from H. Shah to J. Harris, EPA on additional data on Pentabromodiphenyl Oxide.

October 2, 1991

Enclosure:

(1) Attachment 17: Analysis of Pentabromodiphenyloxide Plant Samples:

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TSCA SECTION 4
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
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40-9193557 Chemical Manufacturers Association (15) 533377

Letter from G. Strickland to J. Cossa, EPA in response to his August 30, 1991 letter concerning the analytical protocol for 1,2-Bis(tribromophenoxy)-Ethane.

October 4, 1991

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Fiche #

40-9193560 Chemical Manufacturers Association 533378

Letter from H. Shah to R. Marcus, EPA Concerning reports inadvertently omitted from the October 7, 1991 submission.
October 17, 1991

Enclosures:

(1) Evaluation of a Protocol for the Determination of PBDD/PBDF in Tetrabromobisphenol-A-Bisethoxylate. Great Lakes Chemical Corp.; Battelle.
March 11, 1991

(2) same as (1) in Tetrabromobisphenol-A-Bis(Allyl Ether).

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TSCA SECTION 4
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40-9193567 Chemical Manufacturers (17)
Association

Letter from H. Shah & J. Garra, EPA in response to ~~the letter~~ of August 30, 1991

EPA's letter:

December 2, 1991

Enclosure:

(1) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium Resolution Mass Spectrometry in 1,2-Bis(Tribromophenoxy) Ethane.

Battelle Labs. for Brominated Flame Retardant Industry Panel.

November 25, 1991

20758 288

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TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
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H.1.4 (18) Fiche #

40-9193568 Chemical Manufacturers Association

Letter from H. Shah + Document Control Office, re PA ~~Deficiency~~ on the voluntary study plan for Tetrabromobisphenol A, Pentabromodiphenyloxide and 2,4,6-Tribromophenol.

December 10, 1991

Enclosures:

(1) Curriculum Vitae for personnel from Triangle Labs., Inc.

(2) Analytical Protocol for the Determination of Polybromonated Dibenzo-p-dioxins and Dibenzofurans by High-Resolution Gas Chromatography/Medium High-Resolution Mass Spectrometry in Tetrabromobisphenol A. Triangle Labs.

D.C. for Brominated Flame Retardant Industry Panel.
January 29, 1991

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40-9193568 (Continued) #1.4

(3) same as (2)

in Pentabromodiphenyloxide.

Same

January 29, 1991

(4) same as (2)

in Tribromophenol.

same

January 29, 1991

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TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
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(19)

3569 Chemical Manufacturers Association

Letter from H. Shahte
Document Control Office,
EPA on the voluntary study
plan for Decabromodiphenyloxide,
Octabromodiphenyloxide, Tetra-
bromobisphenol-A-Bisethoxylate
and Ether of Tetrabrome-
bisphenol A.

December 10, 1991

Enclosures:

(1) Curriculum Vitae for personnel from Battelle Memorial Institute

(2) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-dioxins and Dibenzofurans by High-Resolution Chromatography/ Medium High-Resolution Mass Spectrometry in Decabromodiphenyloxide. Triangle for the Brominated Flame Retardant Industry Panel.

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40-9193562 (The) Dow Chemical Company (~~The~~) 533379

Letter from R. L. Hagemann
to E. Crow in response to an
omission in their October 5, 1987 letter (H.1.0(3)).
November 8, 1991

Enclosed:
(1) Analysis of 2,4-Dichlorophenol
for the Presence of 2,3,7,8-
Tetrachlorodibenzo-p-Dioxin.

[signature]
February 4, 1985

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40-9193570 Ethyl Corporation (21)

Letter from P. Rankert to M. Bauer, Battelle Labs, Inc. informing them of the testing of decabromodiphenyl Oxide and Octabromodiphenyl Oxide.
November 26, 1991

40-9193571 Ethyl Corporation (22)

~~Fact~~ Like 21

~~&~~ Tetrabromodiphenyl O.

November 26, 1991

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40-9193572 Great Lakes Chemical Corporation (23)

Letter from C. Mazac to F. Varnac, Triangle Labs. notifying them of the testing of Tetrabromo-bisphenol A, 2,4,6-Tribromo-phenol and ~~Penta~~ Pentabromo-diphenyl Oxide

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TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
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Fiche #

40-91935?3 ICI Americas, Inc. (24)

Letter from J.F. Jadlocki
+ Document Control Office,
EPA ~~the~~ concerning the
presence of Dioxins and
Furans in Chloranil.
February 4, 1991
Enclosures:
(1) Letter from J. Cassa, EPA
~~to~~ on the investigation
of Chloranil for Dioxin
Contamination.
December 31, 1990
(2) Detailed ~~Process~~ description
of the manufacture of Chloranil.
(CBI)

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40-9193523 Pfister Chemical, Inc. (25) 533380

Letter from R. Braun to
L. Marcus, EPA
January 15, 1991
Enclosures:
(1) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in 3,4',5-Tribromosalicylanilide.
January 15, 1991
(2) Curriculum Vitae for Triangle Labs. personnel.

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40-9193527 Pfister Chemical Inc. (8) ~~8~~533381

Letter from R. Brown
to L. Marcus, EPA
~~Jn.~~ April 11, 1991
Enclosure:
(1) Letter from R. Brown,
Pfister Chemical, Inc.
to L. Marcus, EPA
January 15, 1991
~~E~~ (a) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in 3,4',5-Tribromosalicylanilide.

(b) Curriculum Vitae for Triangle Labs. personnel.

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Fiche #

40-9193529 Pfister Chemical, Inc. (27) (10) ~~#~~ 533382

Letter from R. Braun
to J. Harris, EPA
April 18, 1991

Enclosure:
(1) Letter from R. Varcoe of Triangle
Labs. to R. Braun of Pfister
Chemical Co. summarizing the
method of ~~the~~ testing ~~of~~ TBS.
April 18, 1991

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40-9193547 Pfister Chemical, Inc. (38) 533383

Letter from L. Braun
to L. Marcus, EPA
August 8, 1991
Enclosures:
(1) Sampling Protocol for the Determination of Halogenated Dibenzo-p-Dioxins and Dibenzofurans in 3,4',5-Tribromosalicylanilide: (Revised)

August 6, 1991
(a) Curriculum Vitae for Pfister Chemical personnel.

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40-9193528 Rhone-Poulenc, Inc. 533384

Letter to Document Control Office, EPA on the substantiation of confidentiality of the analytical method.

April 12, 1991

300

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TSCA SECTION 4
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(30) Fiche #

40-9193541 Rhone-Poulenc, Inc. [redacted] 53338

Letter from N. Rouse to Document Processing Center, EPA indicating intent to test Chlorsulfuron.

June 26, 1991

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40-9193558 Rhone-Poulenc, Inc. (31) J33386

Letter from N. Rouse
to Document Control
Office, OPP
October 14, 1991
Enclosure:
(1) Raw data on Chlorpyrifos
referenced in their April 12
and May 21, 1991 submissions. (Study
October 14, 1991

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TSCA SECTION 4
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40-9193559

Rhone-Poulenc, Inc.

533307

Letter from N. Lowe
to Document Control Office,
EPA
October 14, 1991
Enclosures:
(1) Chloroxuil - Process
Comparison. (Analytical
Methods, Data and Quality
Assurance Plan.
- Section 1:

(2) Section 2:

(a) Text of ~~studies~~ unpublished health and safety ~~data~~ studies submitted previously.

(b) Information provided to the Office of Pesticide Programs in support of product registration # 264-427, 264-491 and 264-227.

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40-9193559 (Continued)

(c) Skin Corrosion Study with 2,4-Dichlorophenol in Rabbits. Toxicology-Pathology Lab.; Rhodia, Inc. August 1, 1978

(3) Section 3: Civil Trial on allegations against Dow Chemical Company, Riverdale Chemical Co., Amvac Chemical Corp., Velsicol Chemical Corp. and Rhone-Poulenc, Inc. March 19, 1990

(4) Section 4: Substantiation of Confidentiality Claims.

TSCA SECTION 4
TESTING OF CHEMICAL SUBSTANCES AND MIXTURES
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(33)

40-9193574 Rhone-Poulenc, Inc.

Letter from N. Rouse to Document Control Office, EPA on the analytical methodology, results and data from the analysis of Chloranil.

December 5, 1991

Enclosures:

(1) Substantiation of Confidentiality Claims.

(2) Chloranil - Determination of Octachlorinated Dibenzo-P-Dioxin and Dibenzofuran. (Sanitized)

November 20, 1991

TSCA SECTION 4
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40-9193575 Rhone-Poulenc, Inc. (34)

Letter from

repeat (33)

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40-9193513

U.S. EPA

(35) 533385

Letter from J. Cavra to R. Huth, Pfister Chemical, Inc. Containing the review of the first revision of the sampling Plan for 3, 4', 5-Tribromosalicylanilide. January 2, 1991

TSCA SECTION 4
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(36) ~~(6)(23)~~
533389

40-9193525 U.S. EPA

Letter from M. Greenwood to R. Huth, Pfester Chemical, Inc. concerning the inadequacy of the analytical protocol for TBS -
March 15, 1991

Enclosure:
(1) Correlation of Structure with Retention Index for Bromo- and Bromochloro-Dibenzo-p-Dioxins and Bromodibenzofurans.
~~J.R. Donnelly~~ Lockheed Engineering and Science Co.

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TSCA SECTION 4
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~~(44)~~ Fiche # 533390

40-9193531 U.S. EPA

Letter from J. Cassa to
G. Cof. CMA on the
approval of changes
in the analytical
protocols for five chemicals.
May 6, 1991
Enclosure:
(1) Review Comments for
the Analytical Protocols.

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~~(33)~~ Fiche #
(~~5~~) 533391

40-91935 ~~33~~ U. S. EPA

Letter from J. Carratt
6. Cap on the approval
of changes in the analytical
protocols for two chemicals.
June 4, 1991
Enclosures:
(1) Review Comments for
the Analytical Protocols (Revision 3)
Submitted for two chemicals the Allyl Ether
of Tetrabromobisphenol-A Under the
Dioxin/Furan Rule.

(2) same as (1)
for Tetrabromobisphenol-A-Bisethoxyla

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~~(39)~~ 533392
(39)

40-9193545 U.S. EPA

Letter from J. Cassa
to R. Brauer, Pfizer
Chemical, Inc. on the
review of sampling
plan for TBS.
July 9, 1991

TSCA SECTION 4
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(40) Fiche # 533393

40-9193552

U. S. EPA

Letter from J. Cassa
to H. Shah, CMA
in response to their
August 13, 1991 letter
requesting protocol
Corrections.
August 30, 1991

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40-9193553

U.S. EPA

~~33~~ 533394

Letter from J. Carra to H. Shah, CMA on the revised analytical protocols submitted with their ltr of June 3, 1991.
August 30, 1991

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40-9193554

U. S. EPA

~~39~~ 533395

Letter from J. Carra to
H. Shah, CMA on the
reviewing the analytical
protocols submitted June 27, 1991.
August 30, 1991

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40-9193564 (1.)

Ameribrom, Inc.

Letter from M. Eldan to M. Bauer Battelle Labs, Inc. notifying them of the contract ~~testing~~ testing of Decabromodephenyl Oxide and Octabromodephenyl Oxide, to be conducted at their lab.
November 26, 1991

40-9193565 (2)

Ameribrom, Inc.

Letter from M. Eldan to F. Vasco, Triangle Laboratories, Inc.: notifying them of the contract testing of Tetrabromobisphenol A and Pentabromodephenyl Oxide to be conducted at their lab.
November 26, 1991

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(3)

40-9193566 Akzo Chemicals, Inc.

Letter from L. Rausch to J. Harris, EPA clarifying letter of December 4, 1991 regarding the method of manufacture of pentabromodiphenyl oxide. (Sanitized)
December 6, 1991

Enclosures:
(1) Letter from L. Rausch, Akzo Chemicals, Inc. to J. Harris, EPA containing information on the manufacture of Pentabromodiphenyl oxide. (sanitized)
December 4, 1991
(2) Letter from L. Rausch, Akzo Chemicals, Inc. to G.S. Dillman, EPA on the preparation of a sampling protocol for PBDPO. (Sanitized)
November 13, 1991

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40-9193566 (Continued)

(3) Letter from E. Besinger Jr. ~~to~~ Document Control Office, EPA ~~transf~~ transmitting a protocol as a result of Stauffer Chemical Corp.'s (acquired by Akzo Chemicals, Inc.) response to the Dioxin Rule.
August 16, 1989

(4) Letter of intent to test PBDPO from E. Besinger, Jr. ~~to~~, Akzo Chemicals, Inc. to Document Control Office, EPA concerning the completion of their company to the testing of PBDPO.
March 16, 1990

(5) Letter from L. Rausch, ~~H.L. Marcus~~ ~~AKZO~~ Akzo Chemicals, Inc. to L. Marcus, EPA concerning their letter of March 16, 1990.
March 27, 1990

(6) Letter from M. Wood, EPA to E. Besinger, Jr. Akzo Chemicals, Inc. in response to their August 16, 1989 letter
April 25, 1990

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40-9193566 (continued)

(7) Letter from M. Wood, EPA
to E. Bessinger, Jr. (Duplicate
of April 25, 1990 Letter).
May 15, 1990

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40-9193514 Chemical Manufacturers Association 533366

(4)

Letter from G Coyle
L. Warren, EPA
January 31, 1991
Enclosures:
(1) Background and
Issue Paper:
(2) Analytical Protocol for the
Determination of Polybrominated
Dibenzo-p-Dioxins and
Dibenzofurans by
High-Resolution Gas Chromatography/
Medium High-Resolution Mass
Spectrometry in
Tetrabromobisphenol A. Triangle
Labs., Inc.
January 29, 1991

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40-9193514 (continued)

(3) first 7 lines same
--- in Tribromophenol.
Triangle Labs., Inc.
January 29, 1991

(4) first 7 lines same
--- in Decabromodiphenylopide.
Triangle Labs., Inc.
January 29, 1991

(5) first 7 lines same
--- in Octabromodiphenylopide.
Triangle Labs., Inc.
January 29, 1991

(6) first 7 lines same
--- in Pentabromodephenylopide.
Triangle Labs., Inc.
January 29, 1991

(7) first 7 lines same
--- in Tetrabromobisphenol-A-Bisethoxylate.
Triangle Labs., Inc.
January 29, 1991

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40-4193514 (continued)

(8) first 7 lines same
... in Tetrabromobisphenol A
Bis (allyl Ether). Triangle
Labs., Inc.
January 29, 1991

(9) Protocol and Quality
Assurance Plan for the
determination of Polybrominated
dibenzo-p-dioxins and Polybrominated
dibenzofurans in 1,2-Bis(Tribromo-
phenoxy) Ethane, Battelle.
January 28, 1991

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40-9193515 Chemical Manufacturers Association (5) 533367

Letter from H. Shah to L. Marcus, EPA

February 5, 1991

Enclosures:

(1) Corrected page 44 for the Tetrabromobisphenol A-Bisethoxylate Analytical Protocol.

(2) Corrected page 44 for the Tetrabromobisphenol A Bis (Allyl Ether) Analytical Protocol.

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(6) Fiche # 533368

40-9193524 Chemical Manufacturers Association

Letter from G. Cof to R. Markus, EPA
March 13, 1991

Enclosures:

(1) Report on "Evaluation & a Protocol for the Determination of PBDD/PBDF in Tetrabromobisphenol-A-Bisethoxylate" Great Lakes Chemical Corp.; Battelle.
March 11, 1991

(2) ~~Report on~~ "Evaluation of a Protocol for the Determination of PBDD/PBDF in Tetrabromobisphenol-A-Bis (Allyl Ether). Great Lakes Chemical Corp.; Battelle.
March 11, 1991

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(7) ~~10~~ (1) Fiche #

40-9193530 Chemical Manufacturers Association (~~4~~) 533369

Letter from G. Cox to J. Corra, EPA
May 2, 1991
Enclosure:
(1) Analytical Testing of Certain Brominated Compounds.

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40-9193532 Chemical Manufacturers Association (15) (8) 533376

Letter from H. Shah
to J. Cassa, EPA
June 3, 1991
Enclosures:
(1) Revisions for five analytical protocols submitted to EPA
January 31, 1991
May 30, 1991

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40-9193542 Chemical Manufacturers Association. 53371

Letter from H. Shah to J. Carra, EPA on revisions to the analytical protocols.

June 27, 1991

Enclosures:

(1) Analytical Methods (Tetrabromobisphenol A Bis(ethyl) Triangle Laboratories, Inc.

(2) Analytical Methods (Tetrabromobisphenol A Bis (allyl Ether).

(3) Table 2: Initial Calibration Relative Response Factors.

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10-919354

Chemical Manufacturers Association

533372

Letter from H. Shah to L. Marcus, EPA on the analytical testing for Dioxins in blood samples of certain workers.

July 16, 1991

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~~8EHQ~~ 8 533373

40-9193546

Chemical Manufacturers Association

Letter from H. Shah
Cassa, EPA
to J. July 17, 1991

Enclosure:
(1) Analytical Protocol for the Determination of Polybrominated Dibenzo-p-Dioxins and Dibenzofurans by High Resolution Gas Chromatography/Medium Resolution Mass Spectrometry in 1,2-Bis(Tribromophenoxy) Ethane. BFRI Panel.
July 17, 1991

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Chemical Manufacturers Association

533374

Letter from H. Shalto
J. Cassa, EPA
August 13, 1991
Enclosures:
(1) List of chemicals
(2) Corrections to Protocols submitted.

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20799

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40-9193555

U.S. EPA

Letter from J. Carra to H. Shah, CMA

August 30, 1991

Enclosure:
(1) Review Comments for the Analytical Protocol (Revision 3) Submitted Under the Dioxin/Furan Test Rule.

May 1, 1991

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40-9193576 U.S. EPA

Letter from J. Cassa
& G. Strickland, CMA
approving the seven
Analytical Protocols, granting
a request for an extension
of time for submitting final
reports and outlining the modification
procedure.
November 22, 1991

Enclosure:
(1) Discrepancies in Changes Made
in Protocols and the Designation
of those Changes in CMA's
Transmittal Letter of October 2, 1991.

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40-9193577 U.S. EPA

Letter from G. Timm
& H. Shah concerning the
review of "Example
Final Report for the Analysis
of Polybrominated Dibenzo-p
Dioxins and Polybrominated
Dibenzofurans in Decabromo-
diphenyloxide" (submitted
September 4, 1991).
December 12, 1991