THE WALL STREET JOURNAL

SOUTHEAST JOURNAL

FAX

Date June 16 98

To Ken Cahill

From Carol Hallenbeck

This is the first of 54 page(s).
Please deliver to recipient as soon as possible.

One Peachtree Center, Suite 4200, Atlanta, GA 30308 tel: (404) 865-0170 fax: (404) 865-4379

DSW 138288

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June 16, 1998

Mr. Kevin Cahill
Director of Public Relations
Solutia Inc.
10300 Olive Boulevard
St. Louis, Missouri 63166

VIA FAX
314/674-3678

Dear Mr. Cahill:

Per our discussion, I am sending along certain documents that I would like to discuss at our scheduled meeting on Monday at 1 p.m. CST. The following is an indication of points in the documents I hope to discuss:

In document #:

#1: This 1950 document seems to indicate early concern about Aroclors for workers. What type of safeguards did the company have at this time for the disposal of the chemical?

#2: The fourth paragraph of this memo seems to indicate an acknowledgment of the health hazards and toxicity of the chemical.

#3: An explanation of the rabbits' death would be helpful.

#4: Please explain paragraph four and the reference to "it can be a potent carcinogen.''

#5: Please explain the reference to the author of the memo and the passage, re: "I was brutally frank and told him that this had to stop before he killed somebody with liver or kidney damage.''

#6: Please explain paragraph four, re: "I hope we have been falsely accused but maybe Aroclor is present.''

#7: It would be helpful for someone to discuss this entire document.

#8: Please explain paragraph three, specifically, why did the company expect "the regulatory agencies'' to be examining chlorinated biphenyl?

#9: Please explain paragraph three, re: "an extensive evaluation'' of the waterways. Was this extensive evaluation ever undertaken? When?

#10: A review of this memo would be helpful.

#11: Please see page 2 of this memo, item 2.

#12: Please explain paragraph four, re: "When are we going to tell our customers not to use any Aroclors in any paint formulation that contacts food, feed, or water for animals or humans?'' Why was this necessary?

#13: Please explain paragraph 3, re: Why was the company, and/or, the state agency concerned about the matter "hitting the Alabama press?''

#14: Please explain this memo.

#15: Please discuss this document.

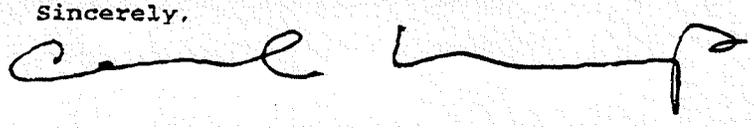
#16: The constant theme of this memo appears to be the effect on the fish. Please explain.

#17: In a 2/26/87 memo, it is noted, ``It should be made clear, however, that no monies have been reserved for a major site cleanup program. The basic assumption...is that any current contamination can best be contained in one place. A requirement for removal and disposal of contaminated soil or to deal with significant changes in current regulations on idle sites would require major, undefined expenditures.'' In this case, why was the company trying to avoid these costs? And, did the company take these steps discussed in this memo?

#18: In a 10/26/70 memo, it is noted in reference to an AWIC official, ``Crockett agreed that 'any written efficient effluent level reports would be held confidential by the technical staff and would not be available to the public.'' Per this memo, was this at the request of Monsanto?

Again, thank you for your help.

Sincerely,



Carrick Mollenkamp
404/865-4371

STLCOPCB4038248

FGR

#1

THE HANDLING OF AROCLORS (CHLORINATED DIPHENYL)

CAUTIONS

Do not heat Arocolors in open vessels above the temperatures at which fumes appear (approximately 300°F.) unless efficient ventilation is provided to remove the vapors.

The Arocolors are Chlorinated Diphenyl and, as is characteristic of chlorinated organic compounds, their vapors are irritating to the eyes, nose and throat. Prolonged and repeated exposure to such fumes may, in addition to causing irritation, interfere with the normal skin functions and result indirectly in physiological disturbances.

If ventilation is not possible, then as a temporary precaution, wear a gas mask and cover the skin with a liberal application of cold cream before exposure to the vapors. Cold Cream prevents fine particles of Arocolor from entering the skin pores and facilitates their removal with soap and water. Application of cold cream to exposed parts of the body is a precaution recommended to anyone working constantly with Arocolors. These precautions apply to dust from solid Arocolor as well as to vapors from heated materials.

As a treatment for irritation of the eyes, first wash the eyes well with a saturated solution of Boric Acid and then treat with a 10% solution of Argyrol.

Treat burns from hot Arocolor the same as any ordinary burn. Arocolor adhering to the burned area need not be removed immediately unless treatment of the burn demands it, in which case use soap and water or repeated washings with a vegetable oil (linseed oil).

Personal cleanliness is of utmost importance. Work clothes should be changed daily and must not be worn away from the plant. Before changing to street clothes at the end of the day the workmen should bathe with plenty of soap and warm water. Neglect of these simple precautions may result in skin infections, ill health, discomfort, inefficiency and loss of time.

MONS 057354

PLAINTIFF'S EXHIBIT 4A

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COPY

Dr. D.V.N. Hardy
Dr. E.R. Newman.

Monsanto Chemical Company

St. Louis, Missouri

September 20, 1955

Dr. J.W. Barrett

London

Your memo September 8 to Mr. Na

AROCLOR TOXICITY

#2

Howard Mason has given me your memo of September 8. I will be happy to discuss this with Dr. Newman during his visit here. I think, however, there are several points that I can answer you now.

You comment upon the difference in toxicity between Aroclor 1254 and 1242. This is not particularly surprising because in the earlier work it was found that toxicity increased with chlorination. Of course, from the standpoint of volatility in the case of inhalation or absorption from the gut from the point of view of ingestion are important. Frankly, there was not too great a difference between the two compounds, however. As you know, the maximum allowable concentrate is 0.1 ml/cubic meter in the case of 1254, and as high as 10.0 mgm in the case of 1268. I think the former is too low and the latter is too high. In this country they don't use the MACs very routinely, but certainly in England I think it would be alright to consider 0.2 mgm/cubic meter as perfectly safe.

I don't know how you would get any particular advantage in doing more work. What is it that you want to prove? I believe your work should be directed towards finding out what the concentrations are of Aroclor during different operations whether it is industrial or painting. The reports you have seen from Kettering Laboratory are the result of approximately $15,000 to $20,000 expenditure by MCC.

MCC's position can be summarized in this fashion. We know Aroclors are toxic but the actual limit has not been precisely defined. It does not make too much difference, it seems to me, because our main worry is what will happen if an individual developes any type of liver disease and gives a history of Aroclor exposure. I am sure the juries would not pay a great deal of attention to MACs.

PLAINTIFF'S EXHIBIT 342



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COPY

We, therefore, review every new Aroclor use from this point of view. If it is an industrial application where we can get air concentrations and have some reasonable expectation that the air concentrations will stay the same, we are much more liberal in the use of Aroclor. If, however, it is distributed to householders where it can be used in almost any shape and form and we are never able to know how much of the concentration they are exposed to, we are much more strict. No amount of toxicity testing will obviate this last dilemma and therefore I do not believe any more testing would be justified.

Let's see what our discussions with Dr. Kovats and yourself bring out.

H. Ernest Kelly, M.D.

HEK:k

FGL 0011308

58

DSW 138294

STLCOPCB4038251

This document has been retyped for clarity.

From **MONSANTO CHEMICAL COMPANY**
At: St. Louis, Mo.

Mr. H.K. Mason-H.O.
Mr. R.E. Soden-Nitro
Mr. L.C. Weger-Nitro

Date June 12, 1956

#3

To Dr. R. Emmet Kelly
At Medical Dept.

Reference
Subject CHLORACNE CASES AT BADISCHEN ANILIN DUE TO TRICHLORPHENOL

Person Present:
Dr. H. Oettel
Dr. H. T. Hofmann
A. Palm (Ph.D.)
W. Soenksen (Plant Supt., part-time)

On the 17th of November, 1953, Badische was producing a batch of trichlorphenol from tetrachlorbenzene when the process exceeded control pressure and temperatures similar to our incident at Nitro. No one was injured at the time. Within one week, as clean-up was being carried out, the first cases of chloracne developed. Fifteen or sixteen cases (6 serious) developed within the next 1-2 months and additional cases showed up during the next 10-12 months until there was a total of 50-60 cases.

I did not see our most severe Nitro cases nor have I seen photographs of these cases. The photographs of the worst Badische cases show horrible skin eruptions with nearly blister-like welts and some ulceration where infection ensued. Areas involved included the face, neck, arms, and upper half of the body. It is my impression that their severe cases were much worse than ours. In addition to the skin manifestations, their men reported all the additional symptoms as experiences in our workers, i.e., fatigue, vertigo, loss of libido, painful joints, etc.

About ten days following the incident, and after initial clean-up, Dr. Oettel was asked to expose animals to the workroom atmosphere. Rabbits (in open wire cages) were placed in the operating area for 24-48 hours. There were no obvious symptoms which developed in the animals until one week after exposure - when they died. Autopsy showed liver necrosis. Oettel thought there might be virus infection or some other cause for death until he exposed additional animals in the department, others in cages suspended inside the "decontaminated" autoclave, and some in the adjacent department. All died within 1-2 weeks following exposure. Subsequently, animals placed in the cages which had previously been in the department died of liver necrosis.

A thorough systematic investigation has isolated impurities in the trichlorphenol process (or residues) which will cause the same effects in rabbits. Liver necrosis will develop in rabbits at the following doses of the indicated materials:

15-20 mg.	of pentachlor naphthalene
1 mg.	of chlorinated diphenyl oxide
0.2 mg.	of residue from trichlorphenol distillation
0.01 mg.	of residue fraction from trichlorphenol (above 230°C)

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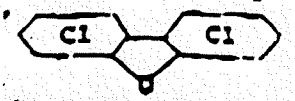
Dr. Oettel believes that the most potent chloracnogen is a compound somewhat similar to chlorinated diphenyl oxide, 

but, probably with additional oxygen atoms in the molecules. He has corresponded with Dan Irish at Dow who either reached the same conclusion independently or, in mentioning the potential of chlorinateddiphenyl oxide, influenced Oettel's reasoning. Oettel believes, further, that this impurity can show up in the production of any chlorinated phenol allegedly to chlornapthalenes, pentachlorphenol, chlorinated biphenyl, etc.

Dr. Oettel has no faith in any animal skin tests for isolating chloracnogens. He was very interested in Kettering's work and was not aware of the publication referred to in Dr. Suskind's first report and which describes the cyclic skin development in new-born rats. (Reference: Parnell, J.P.: Postnatal Development and Functional Histology of the Sebaceous Glands in the Rat, Am.J. Anat., 85:41, 1949). He is convinced that the Bromsulphalein test reported in the attached reprint is significant. In this regard, Badische routinely uses this test on each batch of trichlorphenol which they now purchase from Bayer, and refuses to accept material which fails to pass the animal tests, (I also learned at Bayer that they have experienced chloracne during the production of trichlorphenol but "have now licked the problem" according to Dr. Hansen (chemist - Research Director At Elberfeld).

Badische has been able to reproduce in the laboratory the conditions which lead to the incident such as theirs and ours at Nitro and was quite surprised that we had not been able to do so. I was not given the Nitro process information, i.e., temperatures and pressures, but if I had had this information I am sure that I could have obtained Badische's. One of their chemists, a Dr. Palm, sat in on our discussions and was prepared to go into details. He did mention that "with 3 mols of trichlorphenol, methyl alcohol, and alkali, and a temperature of 180°C" the process gets out of control. His remarks are in quotes because he does not speak English and I'm not certain of his remarks.

Dr. Oettel would be very happy to receive samples of any of our materials for investigation. He would like particularly:

(1) Samples of any of the materials involved in our 1949 incident including tetrachlorbenzene, trichlorphenol, or Na salt and any residues from the autoclave or material cleaned from the equipment and structural members.

(2) Trichlorphenol (or Na salt) from regular production.

(3) Any samples from raw materials, intermediates, and final product which may have been involved in our cases which developed during our normal 2, 4, 5-T production in the years following the initial incident.

This document has been retyped for clarity.

This document has been retyped for clarity.

He would be happy to exchange freely any and all information with us and Kettering. It was my suggestion that this be direct with Dr. Suskind to eliminate "third parties." He would routinely send carbons of any correspondence to us and we could request Dr. Suskind to do likewise. It is my opinion that this might save unnecessary duplication of effort and expense. In addition, Kettering might obtain valuable information to further their investigation involving human volunteers.

I left with Dr. Oettel copies of the following:

(1) The five (5) reports from the Industrial Hygiene Foundation which discuss their rabbit ear tests.

(2) Kettering's report - "Clinical and Environmental Survey at Nitro, 1953."

(3) Kettering's report - "Environmental Survey Carried Out In Building 30, Monsanto Chemical Company at Nitro, February 2, 1956."

We reviewed thoroughly Mr. Neger's excellent "History of Chlorsene" which he sent to me with covering memo dated May 15, 1956, and which included descriptions of Kettering's reports on their human and animal research. I did not give Dr. Oettel a copy of this account because I did not have permission to do so. As a result of my visit, it may be desirable to edit this report somewhat and add further process information before forwarding this to Badische.

Any specific recommendations are implied in the above narrative account of my visit to Badische and must be based on an agreement that full and complete exchange of information with Badische is desirable and possible.

EPW

Elmer P. Wheeler

EPW:dh

Attachment

This document has been retyped for clarity.

Mr. Paul Hoffman

I talked with the Hercules representative who attended the Dow meeting on the 2,4,5-T problem. He was Dr. Jack Frawley, a toxicologist.

It appears the presentation was the same as the one you and I were given. Representatives of Diamond and Hooker were there. Dr. Frawley stated that Dow told the various companies in private what the content of dioxane was in their 2,4,5-T acid. I gathered that Diamond and Hooker had some but Hercules stated they were told they had none.

It appeared to Frawley that Dow was having this meeting because they did not think they could, in conscience, not tell industry about their findings. Hercules also seems to believe that the Public Health Service would be very happy to get into the act, whether or not the chloracne exists in the ultimate user. I must agree with them about this and it would seem almost mandatory that we see if we can first firm up our analytical methods and then devise ways to minimize the presence of this known chloracne agent.

There is also another very good reason for us to do this. Regardless of what we think of the rabbit test, this dioxane compound must be a potent contaminant. Very conceivably, it can be a potent carcinogen. We, therefore, will never know how close we are to having another epidemic at Nitro, and we certainly don't want to go through that again.

I am going to be out of the country until about April 20, but Dr. Johnson and Mr. Wheeler are quite familiar with the various aspects of this problem and are available for discussions.

R. Knoot Kelly, M. D.

RKK/lo

#4

#10

PLAINTIFF'S EXHIBIT 433

6/24/65

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DSW 138298

STLCOPCB4038255

#8

St. Louis - General Offices Mack Nichols - Cleveland

September 3, 1965

AROCLOR 1242 -- Reliance Electric & Engineering Company, Cleveland

Richard Davis
RDAVI

As I told you on the telephone Mr. Haredos called me earlier this week quite disturbed as a result of my letter of August 27. This letter apparently alerted him somewhat to the potential toxic hazards of the use of Aroclor 1242 at elevated temperatures. He told me that the Monsanto literature furnished him had been more reassuring in terms of what problems might arise in their application. I guess what really shook him was when I mentioned that with temperatures greater than 150° mechanical exhaust ventilation should be provided to remove vapors.

For the record Mr. Haredos' application involves the use of Aroclor 1242 as a coolant in electric motors. Two motors are mounted on mining equipment used at the face of a drift. Total volume of Aroclor for the two motors is approximately two gallons. Haredos estimates that four quarts per day of this quantity would be lost in the mine -- presumably all of it by volatilization. I told him I doubted that the ventilation provided in mines would be sufficient to keep this amount of Aroclor at the threshold limit value of 1.0 mg/cu. meter of air. He told me there had been some complaints in mines where the motors were being used. He wasn't specific but I understood that the complaints were of odor and irritation. Whether or not the levels are actually irritating I don't know. It may be that the miners have just recognized that there is something in the air now that wasn't there before. Mr. Haredos went on to say that in his own plant hot Aroclor spills on the floor were common and that his own employees had complained of discomfort. I was brutally frank and told him that this had to stop before he killed somebody with liver or kidney damage -- not because of a single exposure necessarily but only to emphasize that 8-hour daily exposures of this type would be completely unsafe.

Haredos called a second time to inquire about the decomposition products with specific reference to decomposition products resulting from electric arcing. I told him that we had Underwriters' Laboratories reports on heat transfer fluids which were pertinent. He recognized that the chief decomposition

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PLAINTIFF'S EXHIBIT 4A6

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Richard Davis Page 2 9/3/65

product would likely be HCl. I emphasized that this in itself is a good "warning agent" which serves to limit voluntary exposure to high concentrations of decomposition materials.

I told Mr. Harvdos further that the Medical Department was skeptical about the use of Arochlors in mining operations because we had not seen data to show absence of toxic levels.

I emphasized and re-emphasized that the Arochlors are excellent products but must be used in closed systems if they are to be heated. He implied in his second conversation that his engineering group was looking at redesign to provide a "sealed" system.

Elmer P. Wheeler

EPW:mjb

P.S. Mr. Harvdos pointed out that in his application the Arochlor could be heated up to nearer 400°F than the 150°F figure which I had mentioned.

EPW

MONS 09787

DSW 138300

STLCOPCB4038257

December 30, 1998

ARCOLOR - WILDLIFE

P. Hodges PHOUD
E. Wheeler EWHEE
E. Tucker JFO
D. Olson DOLSO
R. Kountz RKOUN
R. Davis RDAVI
W. Johnson WJOHN

W. A. Kuhn - WKUHN

#6

Bill, you wanted to become more familiar with the legal-political problems facing Arcolor with regard to pollution and the accusations in the literature that chlorinated biphenyls are poisoning and killing wildlife.

These wildlife people have to be taken seriously. They have taken the DDT industry to court in Wisconsin to prevent the use and sale of DDT in Wisconsin and if they win in that state, DDT will be banned in many others. This case was on National Television last week. The wildlife people are dedicated to the demise of DDT.

Our problem is that Arcolor has been "identified" along with DDT residues and hence we are almost certain of being drawn into the court records and may also be one of the scapegoats of the DDT defense. The wildlife people have accused Arcolor of doing all the bad things of DDT.

We are taking 3 steps to protect ourselves. Scott Tucker and R. Keller are to repeat some of the analytical identification work feeding Arcolor to chickens and seeing if Arcolor is really present as "shown" by the literature. I hope we have been falsely accused but maybe Arcolor is present.

Ed Wheeler is having feeding tests done on animals to establish a "safe" level for Arcolor feeding. If we can find a "safe" level Calandra's Lab will do 2 year experiments on animals including effects on succeeding generations. This will help a bit but the wildlife people won't be stopped by this kind of evidence.



PLAINTIFF'S EXHIBIT 2A2

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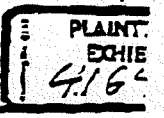

PLAINT. EXHIB 416

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#7

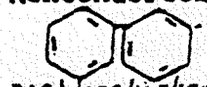
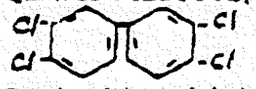
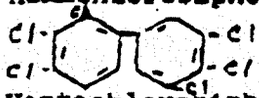
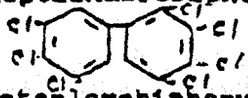
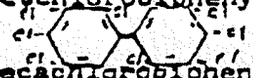
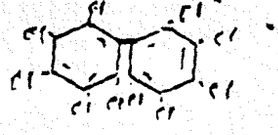
PCB ENVIRONMENTAL POLLUTION ABATEMENT PLAN

Introduction

On 15 October the "AD HOC" Committee consisting of Messrs. M. Farrar, P. Hodges, E. John, W. Richard, and E. Wheeler issued a report summarizing the polychlorinated biphenyl (PCB) pollution problems from the known available information to date. Out of this report came considerable information, conclusions, and recommendations which we have attempted to tie together into a plan of action in this document. Our objective has been to take a reasonable and responsible approach to the entire problem. Before we get into the problem, we should clarify the meaning of PCB, the nature of the entire line, and how these tie into our product line of Aroclors.

PLAINTIFFS EXHIBIT 305

Monsanto entered the Aroclor market in 1930 by acquiring Swann ~~Electrical~~ Chemical Company or known today as our Anniston, Alabama plant. The first load of Aroclor which incidentally was Aroclor 1254 -- went out of Anniston, Alabama to GE in 1931: Since that time the market has grown to 170 to 200M, worldwide.

Chemical	Monsanto Product Line	Nature of Material at Ambient
Biphenyl  ~~Solid at~~ ~~Sublimes at~~		Solid
Monochlorobiphenyl 	Aroclor 1221	thin liquid (oil)
Dichlorobiphenyl 	Aroclor 1232	thin flush water
Trichlorobiphenyl 	Aroclor 1242	oily type fluid material
Quaterchlorobiphenyl 	Aroclor 1248	Thicker - transmissio: oil
Pentachlorobiphenyl 	Aroclor 1254	Heavy-Molasses
Hexachlorobiphenyl 	Aroclor 1260	Thick - tar
Heptachlorobiphenyl 	Aroclor 1262	Very thick - liquid
Octchlorobiphenyl 	Aroclor 1268	Solid
Decachlorobiphenyl 	Aroclor 12715	Solid

NEV 021437

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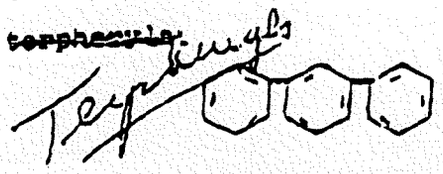
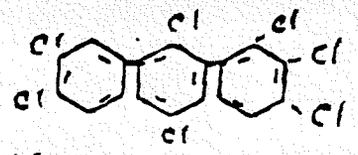
Total possibility are 210 theoretically possible chlorinated biphenyls

~~terphenyls~~



Santowax or terphenyl

Solid



Aroclor 5460

Solid

II. Problem

Damage to the ecological system by contamination from polychlorinated biphenyl (PCB).

III. Extensiveness

The problem involves the entire United States, Canada, and sections of Europe especially the United Kingdom and Sweden. As the investigation broadens other areas of Europe, Asia and Latin America will surely become involved. Evidence of contamination have been shown in some of the very remote parts of the world. The involvement could and most likely will follow the DDT investigations.

IV. Nature of the Problem

Professors Widmark and Jensen of the Institute of Analytical Chemistry at Stockholm, Sweden, in November 1966, announced and confirmed finding PCB in fish, birds, and eggs. Subsequent findings were made in 1967 in Great Britain. In February 1969, Professor Risebrough of the University of California published an article in the San Francisco Chronicle relaying his findings of PCB in the environment of the United States. Monsanto confirmed the presence of PCB's in mid-1969 and confirmed the adequacy of work by Widmark and Jensen and others; truly, the PCB's are a worldwide ecological problem.

NEV 021438

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Analysis indicates the environmental presence of the 5 and higher chlorinated biphenyls which take the appearance of Aroclor 1254 and Aroclor 1260. We have strong indications that Aroclor 1242 or at le part of it degrades biologically. Since the Aroclor 1242 contains a 7 percent of the 5 chlorine biphenyl or higher we cannot rule out the possibility that the observations may be a concentration affect of th higher chlorinated biphenyls of Aroclor 1242.

4

To date ~~there~~ we have ~~been~~ confirmed no reports of finding Aroclor 1242 present in the environment (except ~~outside~~ the effluent of our plants ~~where the Aroclor 1242 is present~~. of in the stream and mud below our own plants at Anniston and Sauget

The seriousness of the problem can best be spelled out as follows:

1. Fish - Marine or aquatic species concentrate PCB in the fatty tissue. Toxic is small quantities (down to 5 ppb) to sensitive ma life such as shrimp.

2. Birds - Predatory species feeding on the marine or aquatic life ca further concentrate PCB to possible harmful effects. Specifically in birds PCB can affect the calcium metabolism leading to egg shel imperfections which prevents proper hatch of the young. In fact, Monsanto has confirmed the eggshell by feeding chickens, a high order of the species, PCB's in controlled tests.

3. Man - There is no harmful effect known to man or other mammals aft 40 years of production. Investigations are underway by various sources.

4. Political and Public Emotion - PCB's are falsely linked with DDT because PCB's show up in the analysis for DDT. PCB's are linked w other permanent type chlorinated hydrocarbon pesticides. This becomes particularly serious since about every article of food in country is being examined for a trace of these materials.

5

NEV 021439

DSW 138305

STLCOPCB4038262

V. Effect on Monsanto

Business potential at stake on a worldwide basis:

Fluids	Plasticizers	Total/Year
70M lbs.	34M lbs.	104M lbs.
$16M	$6M	$22M
$6-8M G.P.	$2-3M G.P.	$8-11M G.P.

Already competition is using certain data against us in competitive situations.

A. Legal Liability

Direct lawsuits are possible. The materials are already present in nature having done their "alleged damage". All customers using the products have not been officially notified about known effects nor our labels carry this information. These are only a few of the possible legal implications which would best be covered by the legal department.

B. Public Image

The corporate image of Monsanto as a responsible member of the business world genuinely concerned with the welfare of our environment will be adversely affected with increased publicity.

The evidence proving the persistence of these compounds and their universal presence as residues in the environment is beyond questioning. This combined with certain scare publications is certain to give an adverse image. Guilty by association (with DDT) will prevail as the background while actual facts may be sparse.

C. Customer Relations NEV 021440

Some customers who presently use these materials will be "scared off" to other competitive products. Products associated with the same name or "trademark" will be adversely affected ie., Therminol, Pydraul and Aroclor. Competitors will use the information for an

influence on Monsanto products.

Customers will seek other "outs" rather than become involved.

VI. Effect on Customers and Ultimate Consumers

One of the unique features of PCB's is their fire resistance. Here t basic decision whether to risk lives due to fire or risk extinction o some species of birds. In this case the PCB would probably be accepte as a necessary pollutant and tolerated under controlled conditions.

A. Electrical Industry - Capacitors and Transformers use Aroclor because it is the best inexpensive dielectric fluid available.

B. Food Processing - Bulk "deep frying" units for potato chips, fish, and doughnuts use the fire resistance fluid as an indirect heating medium.

C. Die Caster -- and other hot metal working industries fire resistanc fluids to protect the workers

Affects a wide range of plastics and adhesives because the PCB serves as the plasticizer.

A wide range of paints and coatings are affected. The "Carbonless" carbon paper used so widely would disappear.

VII. Involvement With Other Producers

Although Monsanto is most probably responsible for the U.S. contaminat and jointly responsible with MCL for the United Kingdom problem, we cannot accept responsibility for the world. There are five known producers in the free world, several possible producers behind the iron curtain and couple of additional companies making overtures about entering the business. Monsanto representatives have on one occasion discussed this problem with a couple of these producers but they expressed no great concern. In fact, it is highly possible that one of

NEV 021441

DSW 138307

these manufacturers is dumping his waste into the Rhine River. Cer: any action taken by one producer will most assuredly affect the othe It is entirely possible that a joint plan of action could be develop but will most probably have to be spearheaded by Monsanto. It is al likely that producers of other chlorinated products used with PCB's will be dragged into the investigation.

VIII. Sources of Contamination

Although there may be some soil and air contamination involved, by fa the most critical problem at present is water contamination. To our knowledge to date the contamination can be broken down into two genera categories, open and indirect pollution.

A. Open Pollution - Our manufacturing facilities sewered a sizeable quantity of PCB's in a years time.

1. Fluids

Fluids are probably the most open source of pollution because their mobility. They also may be the least serious because th are generally the lower chlorinated materials.

2. Electrical

Electrical customers have in the past sewered their wastes.

3. Heat Transfer

Heat transfer customers have sewered their objectionable and their spilled material.

4. Industrial

These fluids have generally been sprayed into drains, washed down sewers and generally regarded as very harmless.

All of the fluids have had the "pink" constituent dumped on dirt roads a "dedusting agent" which inadvertently found its way back to the stream.

5. Plastics

The plastics are not as mobile as the fluids so therefore the have not found and cannot find their way back to streams in c pollution.

B. Indirect

Shipping containers and the cleaning thereof for subsequent use a source of contamination.

1. Fluids

a. Electrical - Disposal of "burned out" transformer and capacitors may find its way back to streams. Scrap units (new) are generally disposed of in land fills but could possibly get back to the stream.

b. Heat Transfer - Leaks could contaminate.

c. Industrial - Cross product contamination carried out of an air compressor. Residual material carried on parts.

2. Plasticizers

a. Process Contamination from Washing

(1.) Environment Contamination

Swimming pool paints

Incineration of wax coatings

Traffic paints

(2.) Product Contamination

Coating for tank lining

Printing inks and paper coatings NEV 021443

Certain adhesives

Recent Technical Changes Which Have Bearing on the Contamination

A. Fluids

The sources of pollution were pointed out as they have been past because we are dealing

environment today which was deposited over the past forty years. We must state that responsible people throughout the industry have take corrective action to reduce contamination in the last two years. The: have also been technical advances which have brought about the use o: lower chlorinated biphenyls which may be an advantage because to date low chlorinated ones have not been identified present in nature.

1. Electrical - The large customers have established collect systems the waste is recovered. Incinerators are being investigated and built for the disposal of the materials. There has been a shift away from the higher chlorinated types products and could probably shift almost entirely away from those products.
2. Heat Transfer - System have been tightened up and redesigned to confine the contents Here, too the trend has been to shift away from the higher chlorinated materials.
3. Industrial - Settling ponds have been built by the large manufactur: to catch the material and decant off the PCB for reprocessing. Th: trend here as the other fluid areas has been towards the lower chlorinated materials.
4. Plants - The plants effluent has been passed through limestone whi: provides surface to catch some of the material. But high concentrations can be found in our effluent (that is relative to those findings in nature causing the problem).

B. Plasticizer

Quite opposite to fluids the trend in plasticizer Aroclor has been to : higher chlorinated biphenyls. In plasticizers the lower chlorinated biphenyl will not be an acceptable solution however, the lower chlorin: terphenyls could offer a possible solution.

NEV 021444

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X. Courses of Action

A. Do Nothing

We cannot deny the findings and the acquisitions by the various agencies. If we took no action we would likely face numerous su: We would let government tolerances be based on public and political pressure along with any experimental or developed data which they may generate. We would most likely be forced out of this business. Other product areas would be adversely affected. We would project an image as an irresponsible member of the busine world. Project poor customer relations. The only advantage to th technique offers is it reduces the cost but this too must be weighed against potential loss of business.

B. Discontinue Manufacture of All Polychlorinated Biphenyls (PCB) Although we all realize this could be an eventually unfortunately the solution is not this simple. Assuming we did stop manufacture immediately, the pollutants are present in the environment, the liability is present and possibly by the shifting to the lower chlorinated materials and the recovery techniques the contamination may already be reduced to an acceptable level. Obviously the entire business would be lost without any or very few substitutes to be offered. Other product areas would be affected. Financial loss could be considered due to raw material contracts, customer contrac and royalty -- secrecy contracts. Competition would take advantage on all fronts. We would be admitting guilt by our actions. Loss of capitol investment in the plant, associated utilities, and asse- ciated processes. We would possibly gain a little public image on this action.

NEV 021445

C. Respond responsibly, admitting that there is growing evidence of environmental contamination by the higher chlorinated biphenyls and take action as new data is generated to correct ...

This approach would enable us to phase out the higher chlorinated materials in many applications where they are no longer necessary or really desired. Wecould maximize the corporate image by publicizing this act. We would reduce a known pollutant. Additionally we could gain precious time needed to develop new products and investigate further the lower chlorinated materials. As new research data is generated our course may be altered considerably. Certain limited actions may reduce or limit the problem.

XI. Recommended Course of Action

Based on the information available today the only recommendation we honestly make is respond responsibly admitting that there is growing evidence of environmental contamination by the higher chlorinated biphenyls and take action as new data is generated to correct the problem.

XII. Implementation of the Recommended Course of Action

A. Immediate (By 12-1-69)

1. Set up a task force under a project manager or the equivalent responsible for initiating, directing and implementing all acti that Monsanto decides to take. This includes sufficient budget necessary to cope with the immediate problems. This task force should include representatives from Medical, Legal, Research and the two involved Marketing Groups and Public Relations and must conduct liaison with MCL and other locations involved in the problem.

2. Decide on timing and content of any public and/or customer noti cation of PCB problem.

B. Interim (Within 3 months)

Fluids	Plasticizers
1. Confirm Aroclor 1254/Aroclor 1260 are found in the environment.	1. Announce differential betwee fluids/plasticizer uses.
2. Publicize the difficult anal. tasks.	2. Announce safety of other PCB' chlorinated terphenyl.
3. Protect other PCB/chl. terph.	3. Educate customers on control effluent for all products.
4. Announce plans to reformulate certain Therminols and Pydrau where control of the product is difficult.	4. Initiate program to develop A 1254 & 1260 substitutes

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5. Emphasize better control over other Aroclor 1254 & 1260 uses.

5. Investigate with manufac the feasibility of alter products.

6. Initiate customer education or need for effluent control of all products.

~~6. Analyze 1242~~

7. Determine composition of all PCB's.

Develop a comprehensive Program

C. Short Term (within the next 12 months)

1. Research - Expand program for more meaningful biodegradation Medical studies and confirming analytical results. Expand toxicity studies. Follow developments concerning publicity and those developments covering political implications of PCB contamination.

2. Marketing - Discontinue or substitute replacement products for those applications of Aroclors 1254 and 1260 where the Aroclor remains mobile.

Work with customers to clean up plants on other Aroclors. Report the habitual violators or "do nothings" to the product group.

NEW 021448

Reclaim or safely dispose of fluids.

Consider renaming products that do not contain PCB. Follow and report market developments such as customer disposal systems. Follow and report any political or public feedback which may affect the contamination problems and must be coordinated with Medical, Research and Legal.

3. Production - Clean up plants and stop gross contamination.

4. Legal - Define our present position, recommend reasonable actio that will not unduely alarm the market but reduce the exposure in terms of liability. Coordinate recommendations with Marketi

DSW 138314

5. Public Relations - Publicize actions where believed advantage Certainly discussions should be held with other producers wit same period to determine their planned course of action, if a:

D. Long Range Tentative Outline (From 1 year to 3 years)

Realizing that the comprehensive program must be outlined the "Lor Range Tentative Outline" is meant to serve as a guide: All aspect of this program should be reviewed quarterly by Organic Management.

1. Research-Medical

Continue biodegradation studies and analytical support

Isomer distribution

Toxicity and metabolism studies

Water soluble removal

Incineration analytical support

Confirmation analytical

Contract academic research for reference

Develop new and improved formulations

2. Manufacturing

a. Process Research and Development

(1.) Identification of typical Aroclor isomers

(2.) Develop control for effluent composition

(3.) Test substitute formulations, etc.

(4.) Develop new processes

b. Clean Up Plants

c. Modify processes to meet market needs

3. Engineering

a. Develop and set up on plant locations incineration systems

b. Design new processing equipment as necessary

4. Marketing

a. Specify alternates or changes NEV 021449

b. Customer liaison

DSW 138315

c. Set reclaim or disposal of fluids

d. Work on name association problems

5. Patent

Investigate trademarks registered

Cover with patents any work felt patentable

6. Environmental Control

Develop cheap disposal systems for customers

a. Incineration or pyrolysis

b. Biodegradation unit etc.

c. Consultants in pollution control

7. Legal

Investigate and define our position on Royalty secrecy agreements.

Contracts - Raw Material and Customer

8. Public Relations

Portray to public positive actions at correcting the contamination problem. Release periodical statements covering our position.

XIII. Probability of Success

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XIV. Cost of Program

Neither the program nor the costs have been clearly defined at this
However, a cost estimate of $220,000 for toxicological work alone ha
been presented. Tentative figures indicated under the worst conditi
the entire program could run as high as $2.0-2.5M. At this stage it
very difficult if not impossible to develop a reasonable cost figure
one point is clear it will be larger than the normal research budget
handle. For this reason, assuming the approach is acceptable, we sha
be forced to ask for additional appropriations to fund the program.

XV. Future

Follow developments on the problem as they unfold.

Develop an aggressive research program to confirm or deny findings and
better understand the problem.

Develop costs for the duplementation of the Recommended course of
action.

Develop specific actions with each department involved

Submit the actions with costs for approval

Develop a timetable to solve the overall problem.

Prepare for "precipitious pullout" or drastic legislative action altho
we do not feel this is a likely possibility.

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STLCOPCB4038274

February 14, 1969

J. R. Fallon
R. A. Garcia - AKRON
S. Shaw

INQUIRY FROM VAPOR CORPORATION ON TOXIC EFFECT OF CHLORINATED BIPHENYL

TO J. J. Roder - CHICAGO

#8

Stan forwarded to me the note you received from Ed Gustaf and the accompanying letter from T. Fujiwara, Managing Director, Nipon Vapor Generator Company, and to H. J. Schickedanz, General Manager, Vapor International. We have been advised by our Japanese representatives of the bran oil poisoning of quite a number of Japanese citizens that was attributed to Kanecler 400 (chlorinated biphenyl comparable to FR-2).

We assembled both medical and application data and sent it to our Japanese counter-parts as arguments for the safe use of chlorinated biphenyl heat transfer fluid. Essentially, we said that there are certain toxic and systemic effects that can be brought about by the vapors of chlorinated biphenyls. We did not rule specifically on the injestion limits of this chemical. We also directed attention to the large number of applications in food processing that utilize Therminol FR heat transfer fluid. We brought out very strongly the fact that these systems have been designed to minimize accidental contamination of food products with chlorinated biphenyls.

I think we have a good track record here in the States using Therminol FR in these applications. However, it only seems a matter of time until the regulatory agencies will be looking down our throats regarding the use of this material. Possibly, by the time this comes about, we will have completed feeding studies with chlorinated biphenyls that will allow us more exact data than has been available in the past. As a matter of fact, they're feeding this stuff to chickens now, but I have no specific results of these tests. I can only suggest that you attempt to put Gustaf's mind at ease regarding the "toxic" aspects of these chlorinated biphenyls by playing down the medical reports and playing up proper system design.

Look at the bright side for us in the heat transfer fluid end of our business -- if the government closes us down on the use of chlorinated biphenyls, we have two excellent fluids in Therminol 55 and Therminol 66, as well as, a proprietary fluid in Therminol 77 to exploit. Therminol 66 will certainly be available in Japan according to recent information from our Engineering Department.

RONS 096805

PLAINTIFF'S EXHIBIT 1A15

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A final caution Jim, please use the attached information with some discretion. I certainly would not pass completed sets of this data to those asking the questions, but rather extract the essential points from this data, namely, the ruling on vapor limits as handed down by the Industrial Hygienist Association, and a strong play on proper system design to prevent accidental contamination of food products and processing material by chlorinated biphenyls.

Don Roush

Don Roush

MCMS 096806

DSW 138319

STLCOPCB4038276

E. Scott Tucker - Env. Laboratories - 1700 So. Second

February 25, 1969

"→R. E. Keller - So. Second
J. T. Garrett - GO
P. E. Hodges - GO

SUBJECT: AROCLOR - WILDLIFE

#9

TO W. R. Richard/E. P. Wheeler
General Offices

On 9-6-68 four samples, two sediment and two water, from Snow Creek were received for Aroclor analysis. The water and sediment were sampled on 8-27-68 at the plant out fall and approximately one block below the plant out fall. The results of the analysis are as follows:

	Amount Aroclor Found	
Sample Designation	Sediment	Water
Plant Out fall	0.20±0.02%	58±2 ppb**
Plant Out fall (1 blk)	1.64±0.04%	- *

*Sample broken in transit.
**No less than this amount present.

The amount of Aroclor found was calculated as Aroclor 1242. The EC/GC traces of the sediment were unmistakably Aroclor 1242. The water extracts appeared to contain only the lighter chlorinated species along with a number of other electron capture active materials. For this reason a "no less than" value is stated, more quantitative results will have to await the development of more specific separation techniques.

Bill, on the basis of this information, I think that if the PCB accusation turns out to be true and the government people become more active, we should plan on an extensive evaluation of the extent of contamination in this area. For example, samples should be taken further down Snow Creek, down Choccolocco Creek and even from the Coosa River if necessary.

You might check, but I think the lab there has the necessary equipment and could carry out this study.

E. Scott Tucker

db

PLAINTIFF'S EXHIBIT 161

NEV 031193

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( ) April 2, 1...

#10

REMARKS AND COMMENTS ON PROBLEMS OF CHLORINATED HYDROCARBONS IN THE ENVIRONMENT AT INDUSTRIAL BIOTEST LABORATORIES, CHICAGO, MARCH 21, 1969

Robert L. Metcalf

From the background data presented it appears that something of the order of 60 million pounds of polychlor biphenyls (PCB) are produced annually. These products contain from 3 to 9 chlorine atoms per molecule and become increasingly inert and stable to environmental oxidation with higher degree of chlorination. However, about half the production is in the 3-chlorine atom variety (Aroclor 1242).

At first thought it seems unlikely because of the major uses of PCB in capacitors, transformer oils, heat transfer fluids in closed systems, that these materials could be the source of the substantial degree of environmental contamination reported. However, about 40 million pounds annually is stated to be used as plasticizers, hydraulic fluid, adhesives, and in carbon paper. From this amount a very substantial percentage must escape into the environment as waste. Because of the apparent high stability of PCB, amounts entering the environment would be degraded very slowly and it seems possible that at least 10million pounds annually may become environmental contaminants. Since the PCB's were introduced commercially in 1929 there have been 40 years of production. If this has averaged 50 million pounds per year, then about 2×10^9 pounds have been made and perhaps 2×10^8 pounds have entered the environment. Because of the apparent stability of these compounds most of this amount may still be circulating in the global ecosystem and this is suggested by the levels reported by Holmes et al. (1967) and Risebrough et al. (1968) in animal tissues which are quite comparable to those found for DDT. Both PCB

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and DDT are extremely stable and water insoluble and have been produced in roughly the same total amounts over the past 30 years.

Thus it seems quite reasonable to conclude that the environmental contamination described for PCB is due to waste amounts of these compounds. This, coupled with the thorough evidence from mass spectometry strongly suggests that there is an important environmental quality problem involved in wastes of PCB.

Experimental Work Planned at Industrial Biotest.—

This laboratory is highly experienced and seems quite competent to provide standard data required by FDA for evaluating the safety (or hazard) of agricultural or industrial chemicals. The long term feeding studies on rats and dogs will doubtless serve to indicate the chronic toxicity hazards of chronic ingestion of the PCB at ppm levels and this will almost certainly result in severe liver damage at some reasonable level. The chicken reproduction investigations at 0.01, 1, 10, and 100 ppm should be considerably more meaningful particularly in regard to studies of egg hatchability, shell thickness, etc.

While the fish toxicity investigations will be interesting, I cannot see that they are particularly relevant or necessary at this time and I would think this data could be obtained from Fish and Wildlife investigations, etc., and will undoubtedly be forthcoming, unsolicited.

Conclusions and Suggestions.—

It seems to the writer that the evidence regarding PCB effects on environmental quality is sufficiently substantial, widespread, and alarming to require immediate corrective action on the part of Monsanto. The defensive measures presently underway will do little if anything to

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refute the evidence already presented. I would suggest the following:

1. A substantial analytical program to monitor air and water effluents from Monsanto plants producing PCB and also those of major customers.

2. Prompt correction of effluent conditions where PCB can be demonstrated.

3. Serious consideration of curtailing sales of PCB for uses such as plasticizers, adhesives, and carbon paper where waste is certain to enter environment.

4. Review of disposal and recovery methods for PCB in capacitors, transformers, heat transfer fluids, and hydraulic fluids. Emphasize to customers importance of preventing environmental contamination.

5. Thorough investigation of environmental fates of various PCB's including photochemical oxidations, chlorination in water systems, etc.

6. Biochemical and electron microscopic study of levels of PCB ingestion which cause proliferation of endoplasmic reticulum and induction of multifunction oxidases in chickens and rats (perhaps these are partially included in present Industrial Biotest experiments).

7. Begin investigations of possible biodegradable substitutes for PCB's as plasticizers, adhesives, fire resistant hydraulic fluids, etc., anticipating loss of these markets as a necessary corollary of environmental problems. Are, for example, chlorinated diphenyl oxides or diphenyl sulfides suitable for these uses. They should be considerably more biodegradable.

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Monsanto JUN 2 1969

FROM NAME & LOCATION: E. P. Wheeler

DATE: May 26, 1969

SUBJECT:

REFERENCE:

TO: W. R. Richard

R. E. Keller
E. S. Tucker
H. S. Bergen
J. E. Springgate
C. Paton
W. A. Kuhn
P. B. Hodges
Dave Nelson - MRC

Dave Nelson of MRC called me today to relay the following information:

1. A Mr. Bob Day in the Cincinnati Laboratories of the National Air Pollution Control Administration had called him and asked for any information Monsanto might have relating to what might happen to chlorinated biphenyls in products that might be incinerated. Day indicated that he needed the information for "his boss" John Ludwig, assistant commissioner of NAPCA in Washington by Monday, May 26.

   After trying to reach Day and finding busy circuits I called John Ludwig directly since I know him personally. Ludwig was surprised and said if the question of PCBs had come up he had forgotten it or at least didn't remember that he wanted an answer by next Monday. He offered to have Day call me directly but I told him that I would get through to Mr. Day.

   I did reach the latter and after much discussion it turned out that some member of Congress had sent a letter directly to the NAPCA offices in Washington asking what NAPCA knew about distribution of PCBs by incineration and Ludwig had passed the letter on to Cincinnati to get information for a reply.

   Mr. Day was under the same misconception as so many others concerning the widespread situation of PCBs in such things as automobile tires. I set this matter straight quoting from the company prepared statement. We then got into some detail because it became apparent that Day was not a "Knight on a White Horse" but was reasonable and objective. As we chatted further and expanded comments about mutual acquaintances, Day finally told me that he is a Monsanto employee from Pensacola fulfilling his millitary commitment as a member of the Commission Corps. in the Public Health Service.

   MONS 096344

   He indicated that the laboratory in Cincinnati may try to set up a program where waste materials containing PCBs will be incinerated (in one of the several experimental incinerators which they have there) and analyze the decomposition products. He asked if Monsanto would be in a position to provide wastes or

PLAINTIFF'S EXHIBIT 1616

DSW 138324

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plastic materials containing Aroclor which they could use in their experiments. I offered to cooperate in any way we could.

He will send word back to Washington which will then be related to the member of Congress that the PCBs are not used in some of the applications which have been indicated in the public press and in general try to present Monsanto's views to wit: "We can not conceive how the PCBs can be getting into the environment in a widespread fashion and that the company is actively involved in research programs to try to shed some light on the situation."

2. Dave Nelson attended a meeting at the Federal Water Pollution Control Administration Laboratory in Athens, Georgia recently to see if there were areas where MRC could bid on government grants for research in connection with pesticide residues.

Dave says that in the course of the meeting some of the FWPCA boys raised the question as to what Monsanto at Anniston, Alabama does to control the escape of polychlorinated biphenyls or waste products getting out of the plant. Obviously Dave would not have any of the details of our programs at Anniston but passed this word on to me with the thought that we can anticipate that the Feds will be looking at creek, river or lake water and mud samples below Anniston for PCBs.

Elmer P. Wheeler

es

MON5 096345

DSW 138325

Monsanto

FROM (LOCATION): St. Louis

DATE : March 30, 1970

SUBJECT :

REFERENCE :

TO : W. B. Papageorge
WPAPA

cc. H. S. Bergen - [illegible]
H. L. Minckler - [illegible]
P. S. Park - PPARK
J. E. Springgate - [illegible]

PLAINTIFF'S EXHIBIT

#12

We have been in communication with a Dr. Hill of the Ohio State Board of Health. He has found PCB, particularly Aroclor 1254, in samples of milk from at least three herds in Ohio. He has traced this contamination back to silage from three different silos. Dr. Hill reported concentrations of 0.2 ppm of PCB in the silage in the center of the silo and up to 20 ppm in the material next to the walls. He also stated that concentrations in the milk were between 0.1 ppm and 0.6 ppm and that some of the milk had been destroyed.

The silos are concrete silos whose interior surfaces were painted in 1967 using a formulation that contained 1254. I don't know if there was any other Aroclor in the formulation nor do we know the coating manufacturer; although, this could be found out if important. The presence of PCB in the silage came from flaking off of the material and possibly from leaching out during the silage storage. At present they will have to destroy about 150 tons of silage which is valued at about $20 per ton. As a rough guess, they consider there may be 50 other silos involved in Ohio that were painted with the same formulation. They are also looking into the fat contamination of the cows themselves.

All in all, this could be quite a serious problem, having legal and publicity overtones.

This brings us to a very serious point. When are we going to tell our customers not to use any Aroclor in any paint formulation that contacts food, feed, or water for animals or humans? I think it is very important that this be done. It may be that some of the customers will assure themselves on the basis of non-extractability that a particular formulation might be safe but I think we should make a blanket recommendation against these uses.

R. E. Kelly

R. Emmet Kelly, M. D.

REK/ln

PLAINTIFF'S EXHIBIT

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19

DSW 138326

STLCOPCB4038283

Medical Department

DATE August 17, 1970

SUBJECT

REFERENCE

TO J. C. Landwehr
Anniston Plant

cc P. B. Hodges, PhD
S. S. Tucker, Queeny

#13

I have enclosed a copy of the data given me by the State of Alabama water pollution authorities on the PCB analyses in Choccolocco Creek and the Martin-Logan Reservoir. These data are collected by the U. S. FDA and are the basis of FDA contact with the Alabama authorities. You will notice that this is the general trend that our own samples show in connection with PCB.

While I was in Alabama, J. L. Crockett, Jr., Chief Engineer of the Alabama Water Improvement Commission, recommended that when we sample fish for PCB analysis that we get samples above and below the Martin-Logan Reservoir. He further suggested that our control program should be written up and submitted to the state as a report covering our past efforts, present status and our future plans in connection with limiting PCB in the Snow Creek effluent. He also said that the state did require that we do daily analysis for PCB's in our effluent and submit weekly summaries to the Water Improvement Commission in Montgomery.

Crockett told me that if this PCB issue hits the Alabama press, the Alabama Water Improvement Commission would be forced to close Choccolocco Creek and the Martin-Logan Reservoir to commercial and sport fishing unless we can prove that the contamination level does not reach the reservoir. The State of Alabama has no choice but to follow the guide lines of the FDA which calls for no more than 5 ppm PCB in fish.

Jack T. Garrett

JTG:jz

Enclosure

DSW 010096

PLAINTIFF'S EXHIBIT

DSW 138327

DATE September 18, 1970

SUBJECT

REFERENCE

TO Toby Bell - Anniston

cc J. R. Savage - JSAVA
W. B. Papageorge - WPAPA
D. B. Rosmer - DROSM
G. L. Jesses - Anniston
G. Miller - Anniston
J. Landwehr - Anniston
J. L. Corder - Anniston

#14

CONFIDENTIAL

In reviewing your proposed letter to Joe Crockett with Legal, et al, we requested latest emissions data on the flow to Snow Creek. We had hoped that it might show an improvement over the 1st week in September and thus demonstrate a favorable trend to Crockett. Instead, the emissions are considerably increased with 9/13/70 at 6.25 ppm (or about 80 lbs. of PCB for the day). From the Legal standpoint, there is extreme reluctance to report even the relatively low emission figures because the information could be subpoenaed and used against us in legal actions. Obviously, having to report these gross losses multiplies, enormously, our problems because the figures would appear to indicate lack of control.

Realizing the extreme efforts the plant has gone to in order to curtail loss of PCB's, is there anything more that can be done to get the losses down? Is there a possibility that sampling practises are responsible for the wide variations shown (you might try duplicate effluent samplers)? Are there any practises in the manufacturing area which might result in the peak losses? Obviously, we cannot solve the problems from St. Louis but we do want to emphasize the concern from here.

Paul B. Hodges

/mp

DSW 014095

PLAINTIFF'S EXHIBIT 184

[redacted]

DSW 138328

MEETING AT SOUTHWEST REGIONAL OFFICE OF EPA
1421 Peachtree St. N.E.
Atlanta, Georgia
November 11, 1971

Those Present:

Monsanto

J. T. Garrett
D. B. Hommer
G. L. Jessee
J. P. Landwehr

State of Alabama

Joseph Crockett

Southwest Regional EPA

John White, Director of Enforcement
Dave Hill
Dennis Cafaro
George Harlow

Subject: PCB Effluents from Anniston Plant to Snow Creek, Choccolocco Creek, Etc.

This meeting was arranged by Mr. Joe Crockett at the request of Mr. John White.

Mr. White had two primary areas for concern:

1. The Federal Department of Justice has apparently recommended that suit be initiated against the Anniston plant for PCB emission under the Federal Refuse Act.

2. He will be required to approve or recommend a Refuse Act disposal permit for Anniston which limits pollution levels.

The PCB production history of the Anniston plant was reviewed briefly from its beginning in 1929 to the present. Our program to control and reduce PCB emissions to Snow Creek was reviewed by both Monsanto employes and Joe Crockett who emphasized that we had kept him fully advised concerning our program and our progress. Gene Jessee carefully pointed out

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that our production of PCB's had been greatly reduced in January, 1971 and discontinued in August, 1971. It was explained that current PCB emissions in the liquid effluents primarily resulted from our inability to make a complete separation of diphenyl from other polyphenyls. Mr. Jessee stated that equipment would be installed to vastly improve this separation by July 1, 1972, and that by this time a further reduction in PCB in effluents would be effected.

There was considerable discussion concerning the limiting level of PCB that should be permitted in the discharge. Mr. White suggested "no detectable amount." Mr. Crockett and the Monsanto personnel pointed out that this was an undesirable approach. The preferred concept was explained as a reduction in aqueous volume accompanied by a concentration reduction (reduced pounds per day). This appeared to be accepted.

As a result of the meeting, the following agreements were reached:

1. Mr. Crockett and Mr. White will agree upon an interim permissible level for PCB emissions to be provided in the Refuse Act permit. Obviously, Mr. Crockett will press for a number in excess of our 0.3 lbs./day current level.

2. The permissible PCB will be reviewed again when our new separation equipment is in operation as of July 1, 1972 to arrive at a new permit level.

3. A summary report outlining our past work and future plans will be written and sent to the EPA office via Mr. Crockett's office.

4. A second copy of our existing monthly reports on PCB effluents to Mr. Crockett will be forwarded to Mr. White via Mr. Crockett.

5. Monsanto is ready and willing to meet with the Federal EPA personnel concerning the PCB problems whenever requested and will feel it a privilege to describe our program.

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6. EPA can come and sample our effluents in a mutual program at any time they want to do this. (I believe they will use our data.)

We explained to Mr. John White that Mr. O. L. Jessee, the Anniston Plant Manager, was the man who spoke for Monsanto at Anniston. We further explained that Mr. Jack Garrett's presence was to indicate the support of the Company's Medical Department and that Mr. D. B. Hommer's presence was to demonstrate support of the Monsanto Industrial Chemicals Company, who is responsible for the manufacture of PCB's.

It was suggested by Mr. White that it might be desirable to dredge Snow Creek. I believe we convinced him that this is undesirable.

We received strong indications that the Southeastern Regional EPA Office will recommend strongly against a Refuse Act suit by the Federal Department of Justice on PCB pollution.

The entire atmosphere of the meeting was favorable, including the lunch following it.

D. B. Hommer

bt
11-12-71

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BIOLOGICAL CONSULTANTS

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June 9, 1972

#16

Mr. J. T. Ball, Plant Chief Chemist
Monsanto Company
Anniston, Alabama 36201

See #791

Dear Mister Ball:

On August 15, 1971, we submitted to Mr. Eugene Wright an interim report on the fish residue data for our survey. An additional copy of this report is transmitted for your own files. In the interim report we formulated a number of broad comparisons using the residue data for the December, 1970 and March, 1971 survey trips.

Using the additional residue data you sent to us May 30, 1972, we ar now in a position to report on the entire first year of the survey, spec ically the December, 1970, March, 1971, June, 1971, and September, 1971 t For this purpose we will discuss residue data for a number of the princip species that are considered to be most appropriate for our purposes. Aft a general review of the entire body of data we have decided to use the Ar 1254 data for this purpose. Wet-weight values for Aroclor 1254 lack pare theses; lipid values for Aroclor 1254 are in parentheses.

1) Flusgill, Lepomis macrochirus

	Choccolocco Cr., Sta. 3 Highway 9	Choccolocco Cr., Sta. 7 Martha Williams, Hwy.95	Chocco. Cr., Sta. Highway 77
Dec-1970	0.71 (14.22)	13.16 (208.33)	4.17 (125.00)
Mar-1971	0.11 (2.47)	23.81 (1,500.00)	5.44 (312.50)
Jun-1971	0.02 (0.75)	8.16 (155.00)	5.65 (160.00)
Sep-1971	2.48 (24.75)	No data	12.32 (215.63)

The object here is to compare the residue levels of control fishes not exp to Aroclor 1254 (see values for Sta. 3 which is in the headwaters well abo the Monsanto plant at Anniston) with residue levels of fishes below the pl and hence exposed to Aroclor 1254 due to location (Sta. 7 & Sta. 10). It obvious that the fishes below the source of P.C.B. s in Choccolocco Creek have concentrated the residue to a greater degree than those fishes resid upstream from the source.

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	Aker Creek	Cane Creek	Stanley Bridge	Coosa River, Clear Creek
Dec-1970	0.42 (3.33)	0.24 (10.00)	1.04 (28.57)	0.45 (6.00)
Mar-1971	0.19 (6.17)	0.24 (3.20)	No data	0.70 (31.07)
Jun-1971	0.01 (0.33)	0.14 (4.67)	2.50 (54.17)	0.73 (15.00)
Sep-1971	0.05 (0.89)	0.64 (19.00)	1.74 (29.38)	0.83 (19.23)

In the first comparison for bluegill we examined residue data for fishes restricted to Choccolocco Creek, with controls above the Monsanto outfall and exposed fishes located below the outfall. In the second comparison we are comparing residue levels in fishes located geographically above the confluence of Choccolocco Creek and the Coosa River with residue levels in fishes located geographically below the confluence of Choccolocco Creek and the Coosa River. Aker and Cane Creeks are located above the confluence and Stanley Bridge and Clear Creek are located below the confluence of Choccolocco Creek and the Coosa River.

This comparison indicates generally higher residue levels for Stanley Bridge and Clear Creek as compared with Aker and Cane Creeks upstream. Secondly, one notes that the values for Stanley Bridge are slightly higher that those at Clear Creek. In general then one can conclude that P.C.B. residues are indeed carried as far downstream as the Stanley Bridge and Clear Creek stations, however it is apparent that these residue levels are far below the levels found in Choccolocco Creek at Stations 7 and 10 (see page 1), as indicated by the residues concentrated in the fish tissues.

2) Blacktail shiner, Notropis venustus

	Choccolocco Cr., Sta. 3 Highway 9	Choccolocco Cr., Sta. 7 Martha Williams, Hwy.95	Choccc. Cr.,Sta. 10 Highway 77
Dec-1970	1.18 (17.75)	No data	65.00 (478.10)
Mar-1971	0.52 (17.60)	117.18 (1,250.00)	32.50 (406.25)
Jun-1971	0.14 (3.30)	7.76 (102.20)	2.50 (35.00)
Sep-1971	0.46 (6.83)	53.90 (1,133.33)	No data

Again we are comparing residue levels in fishes above the Monsanto outfall with fishes in Choccolocco Creek below the outfall. Station 3 is above and Stations 7 and 10 are below. It is obvious that the fishes below the outfall are concentrating the P.C.B. residue to a greater degree than those above.

3) Stoneroller, Campostoma anomalum (Same comparison; dates as for blacktail shiner, this page; only exception is that we have no data for Stations 7 and 10 and have used other stations for the comparison.)

	Choccolocco Cr., Sta. 3	Shoal Creek	Choccolocco Cr., Sta. 8, Hwy.
Dec-1970	0.37 (7.17)	0.018 (0.94)	16.85 (121.09)
Mar-1971	0.26 (4.33)	0.08 (6.00)	45.00 (675.00)
Jun-1971	0.01 (0.25)	0.04 (1.10)	No data
Sept-1971	0.90 (5.63)	None found	32.07 (812.50)

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Here we are comparing two stations above the Monsanto outfall (Choccolocco Creek Station 3 and Shoal Creek, which is upstream from Station 3), and Station 8 at the Highway 93 crossing. Again, it is obvious that the fishes below the outfall have concentrated the P.C.B. residue to a greater degree than those fishes above the outfall both in Choccolocco Creek (Station 3) and in Shoal Creek.

4) Longear sunfish, Lepomis megalotis

	Choccolocco Creek, Sta. 3 Highway 9	Choccolocco Creek, Sta. 10 Highway 77
Dec-1970	0.43 (0.93)	2.86 (150.00)
Mar-1971	0.17 (0.66)	18.75 (1,200.00)
Jun-1971	0.07 (2.06)	4.63 (105.00)
Sep-1971	0.09 (2.83)	25.86 (416.67)

This is a comparison of residue levels from fishes taken above the Monsanto outfall at Station 3 with fishes taken below the outfall at Station 10. Again one can see that the residue level is very high in this segment of Choccolocco Creek as indicated by the amount taken up in fish tissues.

	Aker Creek	Cane Creek	Stanley Bridge	Clear Cr., Coosa R.
Dec-1970	0.04 (0.57)	0.13 (4.55)	1.21 (36.25)	0.36 (12.75)
Mar-1971	0.05 (3.30)	0.13 (2.13)	1.14 (50.00)	0.14 (9.00)
Jun-1971	None found	0.04 (0.75)	0.62 (14.23)	0.43 (10.57)
Sep-1971	0.03 (0.73)	1.18 (27.50)	2.15 (48.86)	0.29 (7.27)

In this comparison we are looking at levels in fishes located geographically above the confluence of Choccolocco Creek and the Coosa River (Aker and Cane Creeks) and residue levels in fishes located geographically below the confluence (Stanley Bridge and Clear Creek); this same comparison was made for the bluegill on page 2 of this report.

This comparison shows higher residue levels for Stanley Bridge fish specimens than are to be found in Aker and Cane Creek specimens. We also see that the Clear Creek specimens do not have levels as high as the Stanley Bridge specimens, again due to the fact that Stanley Bridge is closer to the residue source in Choccolocco Creek. Although we know little or nothing as to how the residues from P.C.B.'s are transported in the aquatic environment, one could visualize that movement of materials into the Clear Creek area would be made difficult by its location with respect to the entirety of Logan Martin Reservoir, whereas Stanley Bridge area would be in the line of direct transport.

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5) Largemouth bass and spotted bass, Micropterus, all species combined.

	Aker Creek	Cane Creek	Stemley Bridge	Clear Creek, Coosa River
Dec-1970	No data	No data	1.95 (41.00)	0.68 (27.00)
Mar-1971	0.13 (5.60)	0.06 (1.50)	1.46 (59.25)	0.66 (15.39)
Jun-1971	0.01 (0.29)	0.03 (2.00)	0.50 (10.75)	0.66 (15.83)
Sep-1971	0.77 (16.04)	0.77 (16.04)	1.08 (33.50)	0.41 (8.75)

This comparison shows generally lower residue levels for Aker and Cane Creek specimens which were collected well above the confluence of the Coosa River and Choccolocco Creek, and generally higher residue levels for fish specimens collected at Stemley Bridge and Clear Creek below the confluence of Choccolocco Creek with the Coosa River. As in the other comparisons we have made, however, the residue levels of the Stemley Bridge and Clear Creek fish specimens are far lower than residue levels for the several stations in the lower part of Choccolocco Creek, namely Stations 7, 8, and 10.

Discussion:

1) The data for the first year of the survey indicate clearly that the fishes below the Monsanto outfall have concentrated the P.C.B. residues to a very high level. The highest values obtained for fishes were at Stations 7, 8 and 10 in Choccolocco Creek. Secondly, fishes below the confluence of Choccolocco Creek and the Coosa River concentrate the P.C.B. residues to a greater degree than do their counterparts upstream from the confluence. However, the relative amounts are much smaller in the Coosa River (Logan Martin Reservoir) than in Choccolocco Creek below the outfall.

2) We continue to find deformed, sick and lethargic fishes in our collections, particularly at Stations 7, 8 and 10. Since the residue levels are highest at these stations it is apparent to us that there is a cause and effect relationship.

3) As consultants we recommend that Monsanto Company continue to follow the residue levels of fishes in Choccolocco Creek, Shoal Creek, the Coosa River and tributaries for some years to come in order to discover the details of the breakdown process with respect to time. The residual nature of P.C.B.'s complicates the environmental problem, as well as the very large quantity of P.C.B.'s that have been added to Choccolocco Creek in past years.

[redacted]

Mr. Turner is to be commended for the fine job he did in running the many samples over the past year. The uniformity of the body of data clearly indicates that his analyses are sound and repetitive.

Thank you for your consideration. If there are any questions relevant to this report please let us know.

Very truly yours,

Royal D. Suttkus, Ph.D.
Gerald E. Gunning, Ph.D.
Biological Consultants

gcg
Enclosures-3

DSW 013311

DSW 138336

STLCOPCB4038293

Monsanto

#17

FROM (NAME-LOCATION-PHONE): M. A. Pierle - St. Louis, G4WT - 4-6882

DATE: February 26, 1987

SUBJECT: ANNISTON

REFERENCE:

TO: R. G. Potter G4NH

cc: H. J. Corbett D1D
R. L. Fields C2NJ
T. L. Gossage G4NH
T. H. Lafferre G4NJ
V. T. Matteucci G5NR
D. Mickelson C2NA
D. B. Madington C2SB
F. E. Reining G4NO
M. W. Winkel G5NG

You requested that we estimate the potential site environmental costs at the Anniston plant. MAC has provided current estimates of these costs and we have reviewed them.

Various restructuring, RCRA closure and ERAP reserves for the Anniston site were established at $5.8M exclusive of PNP and polyphenyls ($1M). Anticipated expenditures against these reserves will result in a $1.9M balance. This includes reasonable estimates for closure of various RCRA facilities and equipment, decontamination of parathion and P_2S_5 departments, clean up of the ditch to Snow Creek, and additional site investigations.

Ongoing monitoring and remedial actions associated with the old parathion plant and the landfill are estimated at $300-400k per year. MAC has budgeted funds for 1987 to cover these costs, and is committed to cover the same costs in future years.

It should be made clear, however, that no monies have been reserved for a major site cleanup program. The basic assumption, based on present knowledge of the site and regulations, is that any current contamination can best be contained in place. A requirement for removal and disposal of contaminated soil or to deal with significant changes in current regulations on idle sites, would require major, undefined expenditures. Should such a major need develop, the corporation would need to address proper allocation of costs.

In summary, planned environmental improvements can be accommodated within the current reserve with an expected balance of $1.9M environmental and $1.0M PNP and polyphenyls. The ongoing costs associated with planned closure ($300-400/yr.) will be borne by MAC. The expanded site study will be started in 1987 with results expected in about 12 months. While the $1.9M would cover reasonable further cleanup efforts, any significant issues would have to be dealt with based upon the facts at that time. As we have indicated before, discontinued MCC operations were a significant part of the Anniston history.

We are ready to discuss the details at your convenience.

M. A. Pierle

344.122/PAM.1

PLAINTIFF'S EXHIBIT 2 DX

DSW L20027

DSW 138337

STLCOPCB4038294

E. V. John - World Headquarters

November 30, 1970

NOVEMBER PR REPORT
Polychlorinated Biphenyl

Mr. W. B. Papageorge - WPAPA

The Anniston Star, Anniston, Ala., somehow obtained figures from the FDA which showed unusually high levels of PCB in fish samples taken from Choccolocco Creek. A Star reporter contacted the Anniston plant for comments on the data and information about our PCB production operations there. Public relations prepared replies to specific questions.

Plant management convinced the reporter to visit the plant for a firsthand view of what the plant was doing to eliminate PCB escape to the environment. A factual front-page feature appeared in the Star Sunday, November 22, edition reflecting the value of cooperation with news media planning PCB stories.

Quoting both plant management and the Alabama Water Improvement Commission, the feature emphasized the PCB problem was relatively new, was being solved by Monsanto and, at this point, was no cause for public alarm.

E. V. John

/ecw

MONS 099530



DSW 138338