

ME 500 Pierle

STATE OF ALABAMA
IN THE CIRCUIT COURT OF CALHOUN COUNTY

MARS HILL MISSIONARY
BAPTIST CHURCH, et al.,

Plaintiffs,

CIVIL ACTION NUMBER
CV-96-243

VS.

MONSANTO COMPANY, et al.,

Defendant.

COPIES

PLAINTIFFS' EXHIBITS 1 - 23 and 26-34

to the
VIDEOTAPED DEPOSITION OF MICHAEL A. PIERLE

Taken on behalf of the Plaintiffs

June 2, 1998

KRIEGSHAUSER REPORTING & VIDEO
REGISTERED PROFESSIONAL REPORTER
314 NORTH BROADWAY, SUITE 810
ST. LOUIS, MISSOURI 63102
(314) 621-4408 FAX (314) 621-4533

FIR

THE HANDLING OF AROCLORS (CHLORINATED DIPHENYL)

CAUTION:

Do not heat Aroclors in open vessels above the temperatures at which fumes appear (approximately 800°F.) unless efficient ventilation is provided to remove the vapors.

The Aroclors 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.

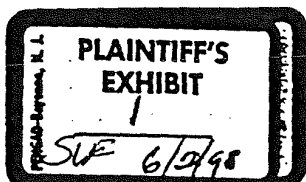
If ventilation is not possible, then as a temporary precaution, wear a gas mask and cover the skin with a liberal application of cold cream before exposure to the vapors. Cold Cream prevents fine particles of Aroclor from entering the skin pores and facilitates their removal with soap and water. Application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



From **MONSANTO CHEMICAL COMPANY**

At: St. Louis, Mo.

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

Date June 12, 1956

To Dr. R. Emmet Kelly

Reference

At Medical Dept.

Subject

CHLORACNE CASES AT BADISCHE 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 trichlorophenol from tetrachlorobenzene 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.

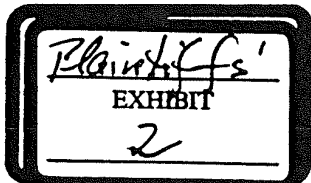
I did not see our most severe Nitro cases nor have I seen photographs of these cases. The photographs of the worst Badische cases show horrible skin eruptions with nearly blister-like welts and some ulceration where infection ensued. Areas involved included the face, neck, arms, and upper half of the 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 experienced 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.

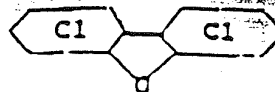
A thorough systematic investigation has isolated impurities in the trichlorophenol process (or residues) which will cause the same effects in rabbits. Liver necrosis will develop in rabbits at the following doses of the indicated materials:

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

This document has been retyped for clarity.



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 Don Irish at Dow who either reached the same conclusion independently or, in mentioning the potential of chlorinated diphenyl oxide, influenced Oettel's reasoning. Oettel believes, further, that this impurity can show up in the production of any chlorinated phenol allegedly to chlornapthalenes, pentachlorophenol, 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 trichlorophenol 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 trichlorophenol 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 trichlorophenol, 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 tetrachlorobenzene, trichlorophenol, or Na salt and any residues from the autoclave or material cleaned from the equipment and structural members.
- (2) Trichlorophenol (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.

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. Weger's excellent "History of Chloracne" 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 .

From **MONSANTO CHEMICAL COMPANY**

At Anniston, Alabama

Date Sept. 30, 1957

To Mr. R. S. Wobus
St. Louis
At Roberts Bldg.

Reference REK/JEC 2/25/57

cc
D. B. Hoerner
W. J. Dougherty
C. A. Sweets
W. B. Dunlap
Jack Clagorn
J.W. Graves-WCK
A.M. Ellenburg-Main Office
T.W. Dalton - WCK
Dr. R. E. Kelly-Main Office

Subject: TOXICITY OF MONTARS

In the reference memo, Dr. Kelly advised that he had no laboratory toxicological data on the Montars but felt certain they could cause chloracne similar to the chlorinated naphthalenes and diphenyls, and, secondly, they could cause liver trouble by inhalation of the fumes liberated at elevated temperatures. He recommended that the maximum allowable fume concentration be set at 0.5 milligrams per cubic meter of air for exposure data information to our customers.

At Anniston, we drain Montars at 380°C. from our stills an average of once per day when operating at maximum rate. The operation is performed under large hoods which I believe are effective in protecting our personnel. However, it is possible that some fumes may escape into the operating area due to wind currents or inadequacies in our blower system. At any rate, I would like to get a few readings in the department to make sure we are safe.

Can you furnish me a detailed procedure for determining the concentration of Montars in air? Also, has any further information relative to toxicity been developed?

C. M. Edelblut
C. M. Edelblut

CME/sb



MONS 095660

Brussels, Belgium

1st December, 1966

Aroclor Sweden

Dear

G. L. Beckman & St. Louis

A. Arpin - Brussels

Dr. Ernest Kelly - St. Louis

S.V.M. Birt - London

R.A. Stannard - St. Louis

THIS COPY FOR

Dear George,

I attach a copy of a letter received from Ole Palm in Stockholm. I have sent copies of this letter also to the appropriate departments within our own organisation. In consideration of the importance we are placing on development of the Swedish market for Aroclor over the next five years, we would be grateful if you could arrange for this information to be considered by the appropriate departments in St. Louis and their comments transmitted to us as soon as possible.

Based on the recommendations made by our medical departments we shall have to decide whether to arrange for publication of data in Sweden or not.

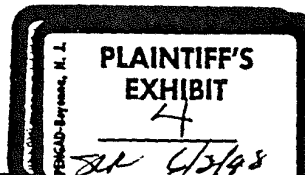
In relation to the specific problem mentioned of disposal of used materials, we would be interested to learn how this problem is handled in America. In the U.S. many companies have been burying material in drums, material in the drums having been absorbed into vermiculite or some similar porous material. Has any entirely safe method been developed for the disposal of waste Aroclor?

Best wishes,

GB.

per D. Wood

P.S. Thinking of the total quantities of Aroclor used in Sweden compared with the much larger volumes of Pentachlorophenol and Sodium Pentachlorophenolate, for water treatment in the paper industry and especially central in the timber industry. Is it likely that the chlorinated phenols show similar chromatographic traces to the chlorinated bi-phenols?



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STR 017390

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STOCKHOLM VA November 28, 1971
SVEAVÄGEN 17

Monsanto Europe
BRUSSELS 3
Belgium

For the attention of Mr. D. WOOD

Dear David,

Re: AROCLORES

As mentioned, there has been some publicity in Sweden concerning investigations made at the Institution of Analytical Chemistry at the Stockholm University. These have revealed that a group of products called Polychlorinated Bi-Phenols - PCB for short - accumulated in certain organs of animals. They are said to be related to DDT and equally poisonous.

Bi-phenols
lipids

The findings were discussed at a meeting of scientists at the Wenner-Gren Centre in Stockholm on November 23. Below please find a translation of an article in the Swedish daily paper "Dagens Nyheter":-

"It is found in salmon and in pike. It is found in sea eagle living on fish. It is found on the surface of the needles of the fir trees, that is in the air. It is found in the hair of a five months baby..."

The scientists working with biocides have for a long time seen this something as unknown "peaks" on their gas chromatographs and at a meeting at the Wenner-Gren Center, Research Assistant Sören Jensen of the Institution for Analytical Chemistry at the Stockholm University could reveal the identity of these peaks. It has been found that they consist of a group of poisons, Polychlorinated Biphenols (for short PCB) which are closely related to, and equally poisonous as, DDT.

PCB is broken down considerably slower than DDT and gives rise to damage of liver and skin. PCB is not

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STR 017391

used as a herbicide. It is not manufactured in Sweden but is supposed to be used by the industry to quite some extent. No special industry can be accused of being the source of contamination.

Research Assn. S. Jensen has tested 200 fishes and a number of birds. He has taken several samples of air and has reached the conclusion that PCB is equally common in nature as chlorinated hydrocarbons of the type of DDT, DDE, and Dieldrin. Even fish in Laddojourne in Lapland contain PCB. Mr. Jensen has also found that PCB does not appear in animals living on a vegetarian diet, such as the elk.

In the course of his work, Mr. Jensen has not found anything indicating that the source of contamination comes from agricultural activities. It is, however, obvious already now that PCB is most frequently found in organisms living in water or feeding from water animals. In all examined fishes PCB was found. In a sea eagle found dead outside Stockholm it was found that the liver contained 30 mg of substance per kilo. 76 mg DDT and considerably more PCB. The exact figure has not yet been determined.

PCB is found in water and in air, and not only in the Swedish air, but also in e.g. London air. Mr. Jensen has not yet been in London for sampling but could identify the poison by studying a gas chromatogram of air published in a British technical journal.

Mr. Jensen has also examined the hair of his family and himself and has found PCB on all samples. Most PCB was found in the hair of his wife but most sensational was that the girl aged 5 months had more PCB in her hair than her brothers and sisters of 3 and 6 years. Probably the girl had got the poison via the mother's milk.

In the State Museum Mr. Jensen has examined the whole collection of sea eagles dating back to 1880. By testing it could be established that PCB was present only in birds from 1944 and thereafter while birds collected before 1944 were quite free from PCB.

The use of PCB in Sweden is not established in detail. According to American sources these types of products are used in the manufacture of a variety of heat-resistant materials. They are used for electrical insulation, for fire-proof heat transport in hydraulic oils, in lubricating oils used at high

STR 01739Z

100

temperature and pressure, in paints and as pigments in various plastics. PCB is not imported only as such. It is also part of several finished products. Nothing is known as to the way in which it reaches the water and the air. According to Mr. Jensen, products containing PCB should have this openly declared.

PCB is equally harmful whether absorbed via the skin, through the food, or by inhalation. In contact with the skin it can cause edema. For DDT the highest permissible concentration in the air has been set at 0.5 - 1 mg/cu.metre. For PCB it has been mentioned to be 0.5 mg/cu.metre. Mr. Jensen will now try to get more complete analytical material. He hopes eventually to be able to disclose the source of the contamination and will also increase his cooperation with toxicologists and geneticists."

Another daily paper, Svenska Dagbladet, has a similar article. Here it is mentioned that Mr. Jensen, working under Laborator (Professor) Gunnar Widmark, has disclosed facts which will have far-reaching importance since the findings have proved a new source of pollution of the nature.

One of the participants at the meeting was Dr. A.V. Holden of Scotland, scientific contact man between the twelve O.E.C.D. countries, who has established coordinated analysis of chemicals used and found in nature.

I suppose there is no doubt that what has been termed Polychlorinated Biphenyls is equal to Aroclor. There is also no doubt that the published facts will cause considerable unrest in several quarters. We probably will have to have Aroclor registered with the Swedish Board of Poisonous Substances and the industry will have to be particularly careful in handling the material. The problem in some cases of course may be the disposal of used material. I understand that there hardly exists a convenient method of destroying Aroclor and that possibly burying unuseable material may be the only answer.

We shall be glad to hear from you soon.

Yours sincerely,

ROSE & STRAWL
HENRY STRAND

CS

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STR 017393

St. Louis - General Offices

December 5, 1958

Mr. R. B. Minter

General Offices

HYDRAUL LABELING

Dear Bob:

In order to comply with recent changes in labeling laws enacted by several state legislatures, the subject of correct labeling for the Pydrauls has been a great concern to us.

This situation was brought forcibly to our attention by a specific request from that a caution stamp be affixed to all Pydraul which they purchase from Monsanto for resale. We believe the wording which they use on this stamp is not in the best interest of Pydraul sales, and is such that our competition could use to great advantage. The language of the Society Mobil label is as follows:

C A U T I O N

Contains Chlorinated Hydrocarbons.
Avoid prolonged breathing of vapors or mists.
Avoid contact with eyes or prolonged contact with skin.

If skin contact is had, remove by washing with soap and water. For eyes, flush with water.

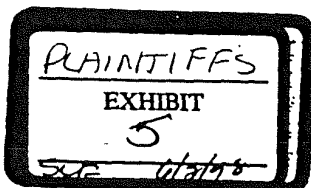
If clothing becomes soaked with fluid, remove promptly, and launder before wearing again.

This is in comparison to the caution label used for Aroclors, which is as follows:

C A U T I O N

Avoid prolonged and repeated contact with skin.
Avoid prolonged breathing of vapors and dust.

It is our desire to comply with the necessary regulations, but to comply with the minimum and not to give any unnecessary information which could very well damage our sales position in the synthetic hydraulic fluid field.



NPC0106279

FGL 0913770

Mr. R. D. Minter

- 2 -

December 5, 1958

By copy of this memo, I am requesting that you and Mr. Casper discuss what is necessary from the labeling viewpoint and the legal side, in order to comply, but yet maintain our excellent position in this field.

It would be appreciated if you could give us an answer by December 15, so we may take positive steps to comply with the Socony Mobil request.

D. F. Smith

DPS:bjt

FGL 0913771

NPC0106280

St. Louis - General Offices

Mack Nichols - Cleveland

September 3, 1965

AROCLOR 1242 -- Reliance Electric & Engineering Company, Cleveland

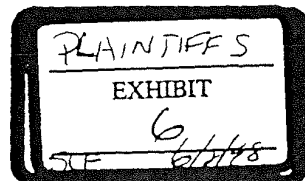
Richard Davis
RDAVI

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

MONS 097873



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. Haredos further that the Medical Department was skeptical about the use of Aroclors in mining operations because we had not seen data to show absence of toxic levels.

I emphasized and re-emphasized that the Aroclors 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. Haredos pointed out that in his application the Aroclor could be heated up to nearer 400°F than the 150°F figure which I had mentioned.

EPW

MONS 097874

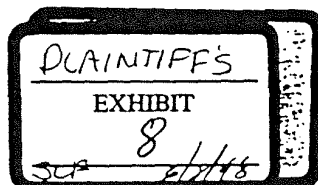
PROCESS FOR THE PRODUCTION OF
AROCLORES, PYRANOLS, ETC.
AT THE ANNISTON AND AT THE W. G. KROMBOLTZ PLANT

April 1955 ----- E. Kather

Distribution List (amended July 19, 1956)

1. Mr. J. S. Brough, London
2. Dr. H. B. Dyson, Newport + Newport T.I.E. file
3. Mr. G. V. Tylor, Newport
4. Mr. G. V. Tylor, Newport + Newport Process Superintendant
5. Mr. W. E. Hauer, Rubben
6. Mr. J. P. Stickley, St. Louis + Krombholz Plant
7. Mr. J. P. Stickley, St. Louis + St. Louis Library
8. MCI file at St. Louis
9. Mr. D. E. Hosmer, Anniston
10. Spats held in M.C.L. file at St. Louis FGL 0250036
11. Dr. W. A. Hayward's file Rubben

also Section IX, Specifications and Test Methods,
to Newport Analytical Department.



VI. PROCESS IN DETAIL, contd.

Packing

The finished Aroclors are run off into drums, a piece of diaper cloth being tied on the pipe outlet for the lighter Aroclors, and a piece of fine gauze for the heavier Aroclors, which have to be handled hot.

This, of course, is to arrest stray bits of pipe scale etc., but the precaution is now omitted at the Krumrich plant when materials are being filled directly from the delivery of the filter. Newport arrangements for filling and weighing drums are discussed in London Engineering Final Report, September 1951, page 108 and 1 F3-10, also in the start-up reports, July 24, and September 27, 1951.

The drums must be clean and dry, especial care being needed with electrical grades. Newport complaint NF/61, November 1951, of turbidity in 1248 was traced to the presence of water in the drums. Apparently, in presence of water, the Aroclor reacted on the galvanizing of the drum. Newport plant reports, December 1951, mentions the installation of equipment for drying the drums.

Care is taken not to do any packing if there is HCl fume in the air.

The gaskets for the bungs of the drums have to be correctly chosen. A sample of the gaskets supplied by the Meltram Supply & Gasket Co. to the Krumrich plant was sent to MCL, April 1947. See also the discussion of gaskets on page 2 of Section VII, below.

Mr. Penherton, December 1950, collected samples of the labels used at the Krumrich plant; one a patent list label, and the other a warning label on toxicity.

The effect of exposure of Aroclors to metal contact is discussed in Section VII, comments, page 17 below. Generally speaking, the distilled Aroclors are packed in galvanized drums, the undistilled ones in black steel drums. Flaked or milled solids were packed in barrels or Leverpac containers, bulk solid or resinous Aroclors go out in friction type lid drums, (galvanized for the distilled grades). Storage and blending of the distilled Aroclors is done in steel vessels sprayed with tin or zinc, or aluminum lined.

VI. PROCESS IN DETAIL, contd.

Packing, contd.

Since the Arcoclors are such effective solvents, they damage, and are damaged by, ordinary paints, lacquers, insulating varnishes. This feature is important in connection with hydraulic fluids containing Arcoclors. See, for example, MCI Research Progress Rep: 1151, DP 54/26/7 and DP 54/277/6 and 1152 DP 4/16/7 and 8 July 1953 etc., also the Section III, Physical & Chemical data, above. Drums for electrical grades of Arcoclors are not painted.

Newport Plant Technical Committee meeting, April 14, 1953, page 2, reported some promising tests with lacquered drums for electrical grades. It was decided not to use lacquered drums for resinous Arcoclors on a returnable basis, because the lacquer suffered at the high temperatures likely to be used in melting the material for the drums.

Arcoclors also are dispatched in rail cars. At the Krummrich plant the manhole of the car is protected by a tarpaulin tent during filling. Newport plant report for July 1954 mentions the installation of tank-filling facilities. The Krummrich plant operating instructions August 10, 1954 mention that rail cars for Pyranols and Arcoclors are insulated and have either a steam coil or a steam jacket. They are lined with Aluminium or else sprayed with tin and zinc. Only dry air is used for unloading. MCC have a "Christmas Tree" fitting, a one piece fitting carrying air valve, dip pipe, release valve and pressure gauge, ~~as well as on each tank~~. ~~It is important to~~ ~~the~~ the coil or jacket of the rail tank in cold weather. Galvanized or lacquered drums are used for Pyranols.

II. HAZARDS.

Toxicity

There are many literature references to harmful effects of the type of "chloric acne" resulting from exposure to chlorinated diphenyls, especially in cases where people working with small electrical components have been exposed to the fumes of hot, highly chlorinated, Aroclors. Chloric acne is sometimes accompanied by gastric troubles, and there are literature references to liver troubles.

There was some trouble of this kind among the production workers at Anniston in the early days of the development of the Aroclors. At that time highly chlorinated Aroclors were being made from diphenyl which had come from low grade benzene. Since good benzene has been used, the same Aroclors have been made without trouble. In March 1951 it was reported that the Anniston diphenyl and Aroclor plants had 12 years without lost time accident.

From the start of Aroclor manufacture at the Krombach plant the operators have been supplied a clean change of clothes every day, and time has been allowed at the end of the shift for bathing. Operators are advised to wash hands and face before eating. The Anniston operators do not have the same issue of clean clothes.

- * Percy May, "Chemistry of Synthetic Drugs", 3rd edition, page 19. The "Chemist Analyst", September 1947, Volume 36, No. 2 page 33, and a report by Dr. M. G. Jackson, Anniston plant, 1957, give data on the toxicity of diphenyl.

MCC Bulletin P-415 (new edition) mentions 0.5 to 1.0 mg. per cfm in air as the highest safe concentration of higher Aroclors, and 10 mg. for more highly chlorinated Aroclors.

H. B. Edkins "Chemistry of Industrial Toxicology", page 1-9 give 0.5 to 1.0 mg. as the allowable limit in working rooms.

The MCC Bulletin "Physical Properties of Aroclors" mentions systemic effects arising from the oral injection of Aroclors.

See the letters, E. Mather to P. J. C. Haywood, December 17, 1951, Mather to Newman, January 8, 1952, reviewing the literature on the toxicity of Aroclors.

See also correspondence relating to the article in Chem. & Eng. May 17, 1954, pages 2038 -, and the warning labels mentioned on page VI-34 above.

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Newport (L1-211)

Since writing to you on December 3rd I have come across a letter of mine to Mr. W. M. Cooper, London, June 24, 1946, (copies to W.D.S., W.H.G., and others), calling attention to an article in the J. T. Baker Company's "Chemist Analyst", Volume 26, No. 2, page 33, September 1947.

I attach a copy of this article, and I think you will agree that the warning relates only to really bad exposure, not such as should occur in ordinary analytical work.

On October 27, 1947 Mr. Barbra of the Krummhorn plant sent a copy of the Journal to Dr. Jenkins at Anniston for comment. Dr. Jenkins did not make any comments at the time, but the following extract from Mr. Barbra's letter is interesting:

"During the 11 years of production there only one man evidenced dermatitis. He had also shown similar symptoms in several other departments. When making Acrolier 51270 which is flaked, a noticeable amount of fine dust solidifies in the air. If men are exposed to it during hot humid weather, the skin is irritated, but we have not had any difficulty in curing cases of dermatitis from it".

161 0250010.

XI - HAZARDS, contd.

The Chemist Analyst, Vol. 36, No. 2, page 33,
J. T. Baker Chemical Co., Phillipsburg, N. J.
September 1947

ON THE TOXICITY OF THE "AROCHELORS" (sic)

Robert M. Brown, Chief
Industrial Hygiene Section, Division of Health
Dept. of Public Welfare, City of St. Louis, Mo.

A recently published article (Maglio, M. Martin, Chemist Analyst, 35 94 (1946)), has recommended the substitution of one of the "Arochlores" as the melting-point bath liquid in preference to the customary sulphuric acid. As stated in that article "Arochlores" are a group of chlorinated diphenyls produced by the Monsanto Chemical Company.

There is need therefore to give warning. For the toxicity of these compounds has been repeatedly demonstrated, both from the standpoints of their absorption from the inspired air, as well as from their effects in producing a serious and disfiguring dermatitis when allowed to remain in contact with the skin. Since these effects have been repeatedly observed, industrial hygienists have taken care to see that the proper controls have been established wherever these products are used. For example, the maximum allowable concentration of chlorinated diphenyl for an 8-hour working day is 1 milligram per cubic meter of air.

It is probable that nothing like an uncontrolled industrial exposure will occur in the laboratory. However, whether an individual is subjected to a possible acute exposure to chlorinated diphenyl, and its serious consequences, will depend upon the size of the melting-point bath, the caution with which it is used, and the temperature to which it may be heated. Likewise, with careless handling of the material and the resulting contamination of the skin, clothing, laboratory towels, work table surfaces, etc. the way is left open for the producing of dermatitis. Scrupulous cleanliness must be insisted upon wherever this material is handled.

The foregoing remarks have been prompted by the belief that in recommending the use of a material with which is associated a potential hazard from the health standpoint, it is very important that the possible consequences be presented together with recommendations for correct handling.

X. HAZARDS, contd.

Mr. A. C. W. Pennington of Newport, reporting on his American tour, December 29, 1950, page 5, writes:

"HEALTH AND SAFETY":

"At Anniston, no special protective clothing is provided the Diphenyl and Anoclor operators. A daily change of clothing was provided in the past but this practice ceased before the war. Gauntlet leather gloves and face shields are, of course, available as required on the plant.

"Tins of cold cream ointment, theatrical quality, are in the building, but the application of the cream is left to the operator's decision of the job in question. The men are expected take a bath, in their own time, at the end of the shift. A good quality soap, and alcohol for rubbing down purposes, are provided. The operators are sufficiently trained in the need for personal cleanliness that a record of bath taking is not warranted.

"Emergency showers are provided on each floor of the Diphenyl building and safety notices are widely used.

"At St. Louis, Plant B, the Anoclor building is rated a toxic department. Each operator is provided with a complete set of clothing comprising hat, coat, trousers, combination underclothes, socks and rubber shoes. A clean change of clothing, except shoes, is placed in the operator's locker in time for the following shift. Men working extra shifts are given a clean set of clothing. Canvas gloves and goggles are provided and 'Fly' hand barrier cream is available for use when necessary.

"Twenty minutes' paid time is allotted for bathing at the end of the shift but, again, no record is kept that baths are actually taken. Theoretically, food is not allowed to be eaten within the Anoclor building. Instructions are issued that hands and face should be washed well before eating.

"Employees in toxic departments are given an annual medical examination and a lung X-ray every three years."

XI. HAZARDS, contd.

Toxicity, contd.

A good deal of work has been done on determination of the vapour pressure of the Aroclors, and on the determination of concentrations of Aroclors in air. See pages 94, Section III, above, for a summary of this work.

In 1950 (letter April 20, N. F. Rapps to E. Mather) the Admiralty expressed interest in the determination of micro-quantities of Aroclors. MCC have a method for the determination of traces in air by means of the "Halidometer".

Mr. Ellenburg, March 15, 1954, mentions work done by H. B. Richard Jr., of MCC, June 17, 1953, on the determination of the concentration of Aroclors in air. Mr. Ellenburg also states:

"----- work on the safe limits of Aroclor vapour concentration in air is being carried on by the Medical Department at the Kettering Laboratories in Cincinnati. This work on animals is well under way, and will help us to know a little better just what is the safe limit of Aroclor Vapours that one might work in."

A question has been asked about the possible harm to plants if Aroclor containing paints are used in greenhouses. The reply is that most paints are somewhat harmful, and there is no evidence that Aroclor makes them worse. Aroclors have been used as rabbit repellents, without doing any harm to vegetation.

Care is needed in laboratories etc. where Aroclors are used in heating baths; there should be very positive ventilation.

The vapours of hot Aroclors are distinctly irritating to eyes and nose above a concentration of about 3 mg per ccm in air. Newport plant report for December 1951 records burns by hot Aroclor -- a case of a splash into a man's eye -- without serious damage.

Packages of Aroclors leaving the Krummich plant bear a label calling attention to possible toxic effects.

XI. HAZARDS, contd.

Fire Hazards

Diphenyl, of course, will burn, and reasonable care is needed in handling it. Precautions with toluene are mentioned also on pages VI-29, and under "Special Risks", below.

The Arcolers are handled as if non-inflammable. Drums of material are melted in the middle of the operating building, by open gas flames, and open gas flames are freely used to heat pipe lines.

An instruction, dated April 28, 1948, calls for a daily inspection of safety showers, fire extinguishers and gas masks, a check list being provided.

Flanged joints on Arcoler heating system can be a source of flame. See the notes on gaskets, page 2, Section XII, below.

Phosgene may be generated in electrical flashes and fires in transformers containing Arcolers, but this is not thought to be a major risk.

Safety Equipment

Each operator in the Krummrich Arcoler plant is supplied with goggles, rubber covered gloves, canvas gloves, rubber shoes and fume respirator. See also page XI-1. A spare suit of clothes is kept in a case in the department. ~~The department has the usual first aid equipment, gas mask (chlorine), fire extinguisher, (toluene, diphenyl), stretcher, safety showers, drinking fountain, eye bath.~~

Special Risks

The usual care is necessary in dealing with chlorine, in lighting the gas furnaces, and in handling hot materials, steam lines etc. Diphenyl might start to burn in chlorine gas if conditions in the chlorinator were badly out of line.

A Davis "Vaportester", model M-1, Type A, (Division of Davis Emergency Equipment Co., Inc., Newark, N.J.) is held in the department for use in testing the air of the working building after toluene has been used, and for testing vessels before men are permitted to enter, and before "flame certificates" are given. The instrument contains a

II. HAZARDS, contd.

Special Risks, contd.

catalytic cell electrically heated to a fixed temperature, and air to be tested is aspirated through it by means of a "squeezie ball". If combustible vapours are present, the temperature of the cell rises, and the indicating thermocouple registers on a calibrated scale.

The instrument has a zero adjustment, and it is checked twice a month by the instrument department. Flame certificates must give the number of the Vapotester used, also the date of its last calibration by the instrument department. The instrument has been useful in detecting gas escapes, and in tracing spills of gasoline, etc., from a neighbouring oil refinery into a public sewer which runs under Monsanto territory.

Mr. Benignus, of St. Louis, September 1953, discussed the dangers of using Aroclors in indoor paints. He discounted the possible dangers from phosgene formed by flash discharge in transformers charged with Aroclors.

See the references to safe handling of glycidyl phenyl ether on pages IX-161 etc.

BCC: P. O. BENNETT
D. A. OLSON

July 8, 1970

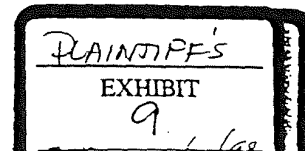
Mr. P. O. Jenkins
Vice President, Materials
Sprague Electric Company
North Adams, Massachusetts 01247

Dear Mr. Jenkins:

I was fortunately able to visit your Brown St. Plant on June 17 with Randall Graham. I personally found the discussion informative and interesting and I was most favorably impressed with the concern and interest expressed by your management personnel. We discussed briefly some of the points raised in your letter dated June 11. I will try in this letter to be more specific.

Biodegradability - Biodegradation studies conducted in our research laboratories in St. Louis, Missouri and in Rambo, Wales using media consisting of local river waters or activated sludges acclimated to biphenyl give direct evidence that the lower chlorinated biphenyls are affected. There is some evidence that chlorine position on the biphenyl configuration does influence the degree of destruction by the microorganisms. I have enclosed a tabulation from our Rambo laboratory which attempts to show this difference. We do not have formal information regarding the effect of sunlight or other natural influences on Aroclors. Experience gained over many years indicates Aroclors are highly stable under all known conditions present in the environment.

Toxicity - There is ample evidence from many laboratories that certain species of birds which are at the top of the marine food chain cannot reproduce properly when PCB's are present in their diets. The U. S. Fisheries Laboratory at Gulf Breeze, Florida conducted a study which indicated that juvenile brown shrimp did not survive in water containing 5 parts per billion of PCB. Attached are copies of reports on these studies.



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Monsanto has sponsored some studies on laboratory mice and dogs. A summary of the results to date is attached.

Disposal - The preferred method for disposal is high temperature incineration. I suspect there are several commercial burners on the market which will perform well. I personally witnessed burning tests at the John Link Company's unit in Tulsa, Oklahoma. Temperatures must exceed 1500° to assure that complete destruction is achieved. Lower temperatures would only vaporize the broclors and create atmospheric pollution or, worse yet, would form, by partial oxidation, materials which could be highly toxic (e.g. furans and dioxins). With incineration HCl is formed which must be scrubbed from the stack gas and neutralized before disposal. We are planning for an initial installation in one of our plants later this year. As a service to our customers who may not have access to other incinerators, we have offered to accept scrap broclor for immediate storage and eventual incineration. Tentatively, Monsanto will charge 1/4 per pound of returned material. This charge does not include freight or container costs and will be reviewed when final incineration costs are established. Material which is returned for disposal should be addressed to Monsanto Company, V. O. Krumrich Plant, Sangre, Illinois, Attention: Supervisor Department 246.

Solids contaminated with broclors present a bigger challenge. As yet, we have not tested an incinerator with these materials. Until we get more information the best we can advise is safe burial in an authorized, properly operated land fill located away from any waterway.

We have laboratory work underway on other forms of destruction. As yet no economically feasible approach has been found.

Analytical Methodology - I have attached copies of Monsanto's analytical procedures for the determination of PCB's in water, soil, air and biological samples. We are interested in comparing our methods with those devised by other laboratories. Any comments your laboratory may have would be welcome and appreciated.

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STR CC4C1

I hope that the above information is useful to you.
If I can be of further service, please let me know.

Sincerely,

W. H. Papageorge
Manager
Environmental Control

cc:

Mr. H. Davis
Sprague Electronics

G. L. Graham

073

The third step is to minimize exposure of Aracelor, to reduce air and water pollution, to restrict Aracelor to uses which can be controlled. This is the only way I see to survive.

I believe we should make sure that our plants have minimum air or stream pollution. I believe Anniston is vulnerable and that off-gas HCl and Aracelor should be 100% controlled. Environmental may also need help.

I believe we should demonstrate that Aracelor can be incinerated to harmless products for disposal.

I believe we should help our customers dispose of off-grade or non-reworkable Aracelor, either by incinerating or by toxic dump.

I believe plasticizer group marketing should know where their product is going and be able to minimize exposure risk if Aracelor has truly been identified as a pollutant.

We probably have 6 months to 1 year while they fight out the DDA case. I want to use this time to minimize our exposure. We will need your help in setting TSD targets.

W. R. Richard

W. R. Richard

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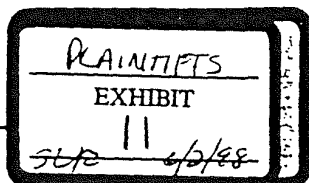
() April 2, 1969

REPORT AND COMMENTS ON MEETING ON CHLORINATED BIPHENYLS
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 80 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 10 million 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 Rissbrough 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 spectrometry strongly suggests that there is an important environmental quality problem involved in wastes of PCB.

Experimental Work Planned at Industrial Hygiene.

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 Biostat 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.

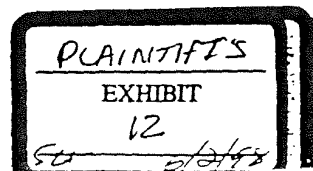
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PCB ENVIRONMENTAL POLLUTION ABATEMENT PLAN

Introduction

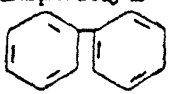
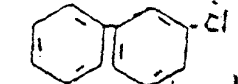
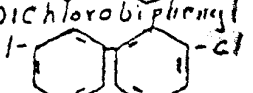
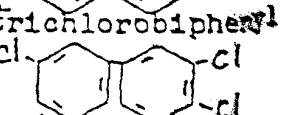
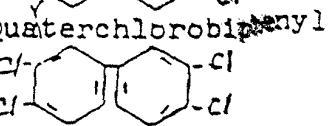
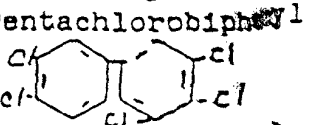
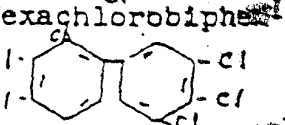
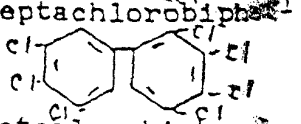
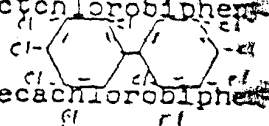
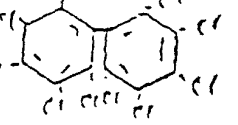
On 15 October the "AD HOC" Committee consisting of Messrs. M. Farrar, P. Hodges, E. John, W. Richard, and E. Wheeler issued a report summarizing the polychlorinated biphenyl (PCB) pollution problems from the known available information to date. Out of this report came considerable information, conclusions, 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.



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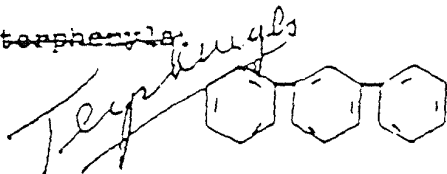
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Monsanto entered the Aroclor market in 1930 by acquiring Swain ~~Chemical~~ ^{Electrical} Company or known today as our Anniston, Alabama plant. The first load of Aroclor which incidentally was Aroclor 1254 -- went out of Anniston, Alabama to GE in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

<u>Chemical</u>	<u>Monsanto Product Line</u>	<u>Nature of Material at Ambient</u>
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 - transmission oil
Pentachlorobiphenyl 	Aroclor 1254	Heavy-Molasses
Hexachlorobiphenyl 	Aroclor 1260	Thick - tar
Heptachlorobiphenyl 	Aroclor 1262	Very thick - liquid
Octachlorobiphenyl 	Aroclor 1268	Solid
Decachlorobiphenyl 	Aroclor 12715	Solid

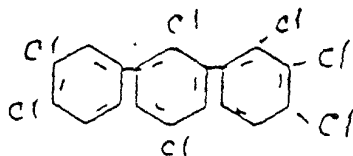
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Total possibility are 210 theoretically possible chlorinated biphenyls
terphenyls.



Santowax or terphenyl

Solid



Aroclor 5460

Solid

II. Problem

8/26 Summary
Damage to the ecological system by contamination from polychlorinated biphenyl (PCB).

III. Extensiveness

EW
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

EW
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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

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 part of it degrades biologically. Since the Aroclor 1242 contains 7 percent of the 5 chlorine biphenyl or higher we cannot rule out the possibility that the observations may be a concentration effect of 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~~ ⁱⁿ the effluent of our plants ~~where no Aroclor 1242 is present~~). ^{steamers and mud below our own plants at Anniston and Sargent}
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 in small quantities (down to 5 ppb) to sensitive marine life such as shrimp.
2. Birds - Predatory species feeding on the marine or aquatic life can further concentrate PCB to possible harmful effects. Specifically in birds PCB can affect the calcium metabolism leading to egg shell 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 after 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 with other permanent type chlorinated hydrocarbon pesticides. This becomes particularly serious since about every article of food in this country is being examined for a trace of these materials.

More than 50 samples sent to various labs
Have confirmed the random samples

V. Effect on Monsanto

Business potential at stake on a worldwide basis:

<u>Fluids</u>	<u>Plasticizers</u>	<u>Total/Year</u>
70M lbs.	34M lbs.	104M lbs.
\$16M	\$5M	\$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

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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 i.e., 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 basic decision whether to risk lives due to fire or risk extinction of some species of birds. In this case the PCB would probably be accepted 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 resistance 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. contamination 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

these manufacturers is dumping his waste into the Rhine River. Of any action taken by one producer will most assuredly affect the others. It is entirely possible that a joint plan of action could be developed but will most probably have to be spearheaded by Monsanto. It is 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 far the most critical problem at present is water contamination. To our knowledge to date the contamination can be broken down into two general categories, open and indirect pollution.

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

1. Fluids

Fluids are probably the most open source of pollution because of their mobility. They also may be the least serious because they 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 ^{juice} "pink" constituent dumped on dirt roads as a "dedusting agent" which inadvertently found its way back to the stream.

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5. Plastics

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

B. Indirect

Shipping containers and the cleaning thereof for subsequent use :
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
 - Painting inks and paper coatings
 - Certain adhesives

NEV 021443

IX. Recent Technical Changes Which Have Bearing on the Contamination

A. Fluids

The sources of pollution were pointed out as they have been in the
past because we are dealing with that quantity of material in the

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

1. Electrical - The large customers have established collection system where 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 - Systems 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 - ^{at} Settling ponds have been built by the large manufacturer to catch the material and decant off the PCB for reprocessing. The trend here as the other fluid areas has been towards the lower chlorinated materials.
4. Plants - The plant effluent has been passed through limestone which 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 chlorinated terphenyls could offer a possible solution.

NEV 021444

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 s. 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 business world. Project poor customer relations. The only advantage to this 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} due to raw material contracts, customer contracts and royalty -- secrecy contracts. Competition would take advantage on all fronts. We would be admitting guilt by our actions. Loss of capital investment in the plant, associated utilities, and associated 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 the problem.

This approach would enable us to phase out the higher chlorinated materials in many applications where they are no longer necessary or really desired. We could 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.

NEV 021440

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 action 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 notification of PCB problem.

B. Interim (Within 3 months)

- | <u>Fluids</u> | <u>Plasticizers</u> |
|--|--|
| 1. Confirm Aroclor 1254/Aroclor 1260 are found in the environment. | 1. Announce differential between fluids/plasticizer uses. |
| 2. Publicize the difficult analytical 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 Pydraul where control of the product is difficult. | 4. Initiate program to develop A 1254 & 1260 substitutes |

NEV 021447

5. Emphasize better control over other Aroclor 1254 & 1260 uses.
5. Investigate with manufacturer the feasibility of alternative 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.

NEV 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 action that will not unduly alarm the market but reduce the exposure in terms of liability. Coordinate recommendations with Marketing.

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

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

Realizing that the comprehensive program must be outlined the "Long Range Tentative Outline" is meant to serve as a guide: All aspects 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

- 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

NEV 021450

100505

XIV. Cost of Program

Neither the program nor the costs have been clearly defined at this time. However, a cost estimate of \$220,000 for toxicological work alone has been presented. Tentative figures indicated under the worst conditions the entire program could run as high as \$2.0-2.5M. At this stage it is very difficult if not impossible to develop a reasonable cost figure. One point is clear it will be larger than the normal research budget can handle. For this reason, assuming the approach is acceptable, we may 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 to better understand the problem.

Develop costs for the implementation 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 "precipitous pullout" or drastic legislative action although we do not feel this is a likely possibility.

NEV 021451

PROFIT AND LIABILITY VS. TIME

ACTION

DO NOTHING

DOLLARS

70

71

Time

72

73

DISCONTINUE
MANUFACTURE
OF PCB

DOLLARS

70

71

Time

72

73

RESPONSIBLE
APPROACH

DOLLARS

70

71

Time

72

NEV 021452

729507

PROBABILITY OF SUCCESS

PROFITS
\$

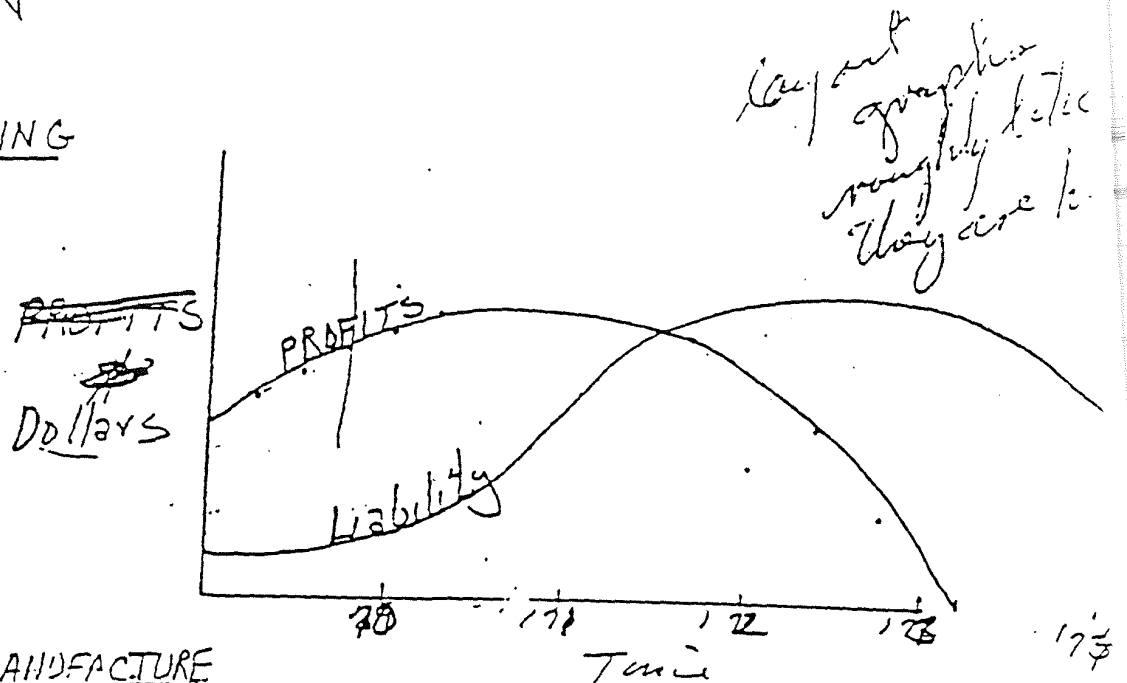
70 71 72 73 74
Time

NEV 021453

PROFIT AND LIABILITY VS TIME

ACTION

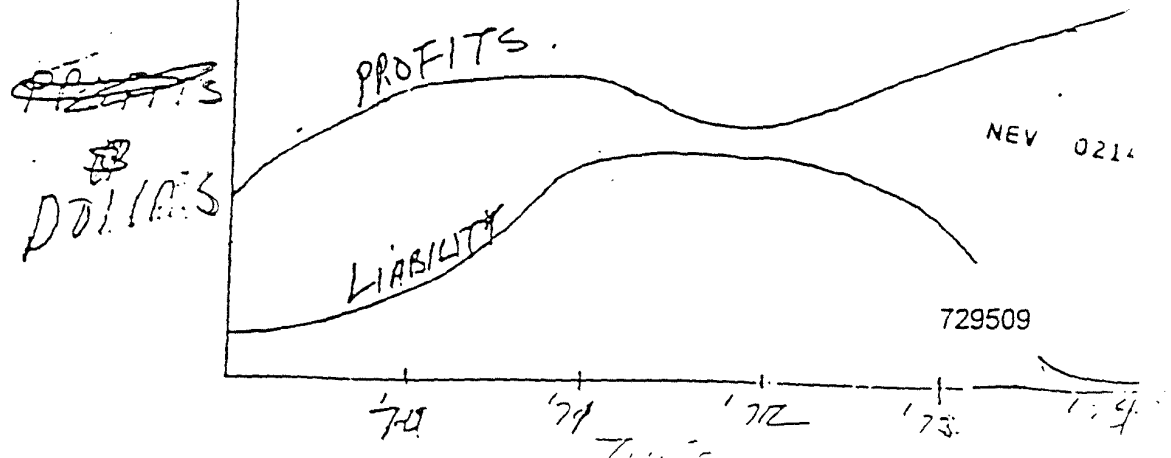
DO NOTHING



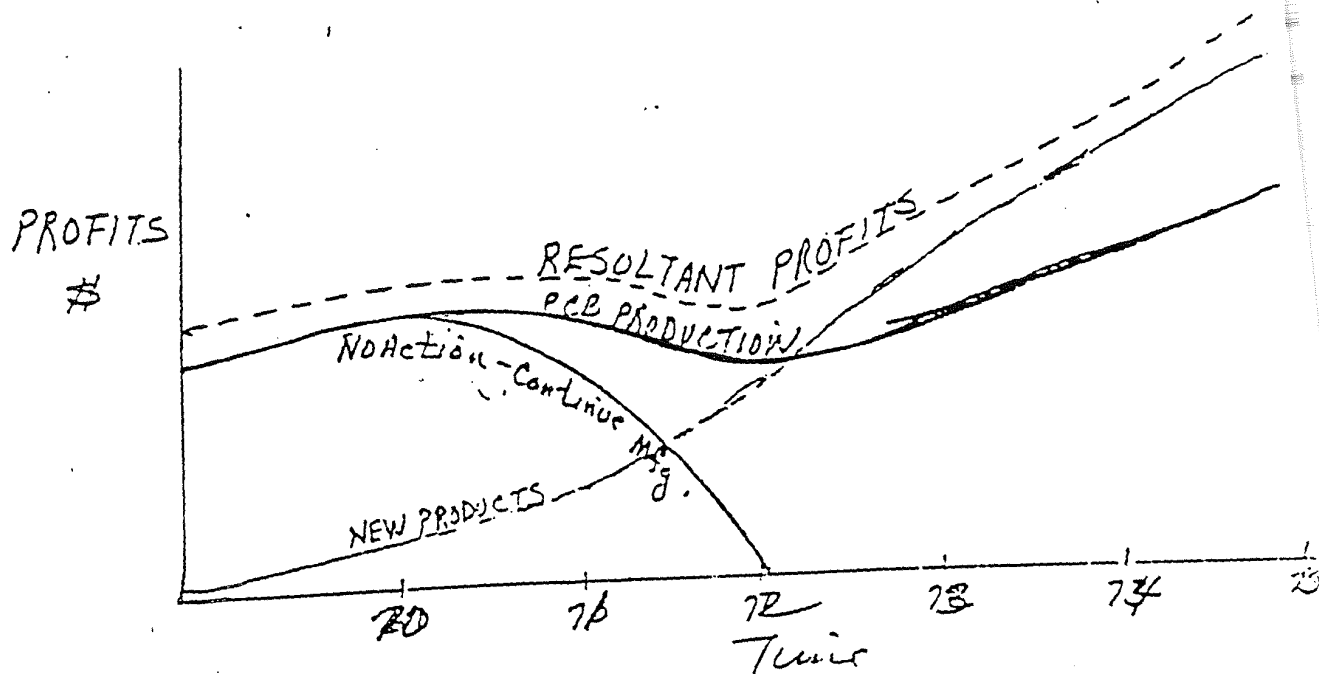
DISCONTINUE MANUFACTURE
OF PCB



RESPONSIBLE
APPROACH



PROBABILITY OF SUCCESS



NEV 021455

729510

XIII. . Probability of Success

XIV. Cost of Program

\$220,000 and bio with max. at \$20-25M

XV. Future

NEV 021456

729511



STATE OF ALABAMA
DEPARTMENT OF PUBLIC HEALTH

DONALD E. WILLIAMSON, M.D. • STATE HEALTH OFFICER

March 8, 1996

Dear Rev. Weatherly:

In-house dust samples collected in November 1995 have been analyzed by Weston, Inc. analyzed them under contract with the U.S. Environmental Protection Agency (EPA). The amounts of polychlorinated biphenyls (PCBs) in dust at your address are listed below in parts per million (ppm).

<u>Location</u>	<u>PCB Level ppm</u>
Floor at main entrance	1.80 ppm
Floor at entrance by office	3.84 ppm
Floor at entrance at fellowship hall	4.42 ppm

EPA lists the level of concern for PCBs in dust as 1.0 ppm. Your dust PCB level is above the level of concern.

We know that you may be exposed to PCBs by accidentally swallowing contaminated soil and dust. Contaminated in-door dust can add to your total exposure. Exposure levels depend on amount and time of contact with contamination. That is, contact with more of the PCBs for a longer time causes higher levels of PCBs in blood.

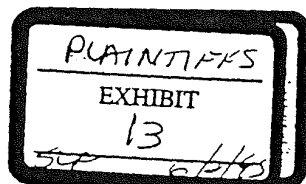
Since the meeting on January 23, 1996, we have been working with other agencies to solve the problem of PCB contamination in Anniston. Decisions about clean up and testing other neighborhoods are being made this week. We will provide a report of the exposure investigation to everyone on the mailing list. If you have questions, call us at 1-800-338-8374.

Sincerely,

Cheryl Burrows

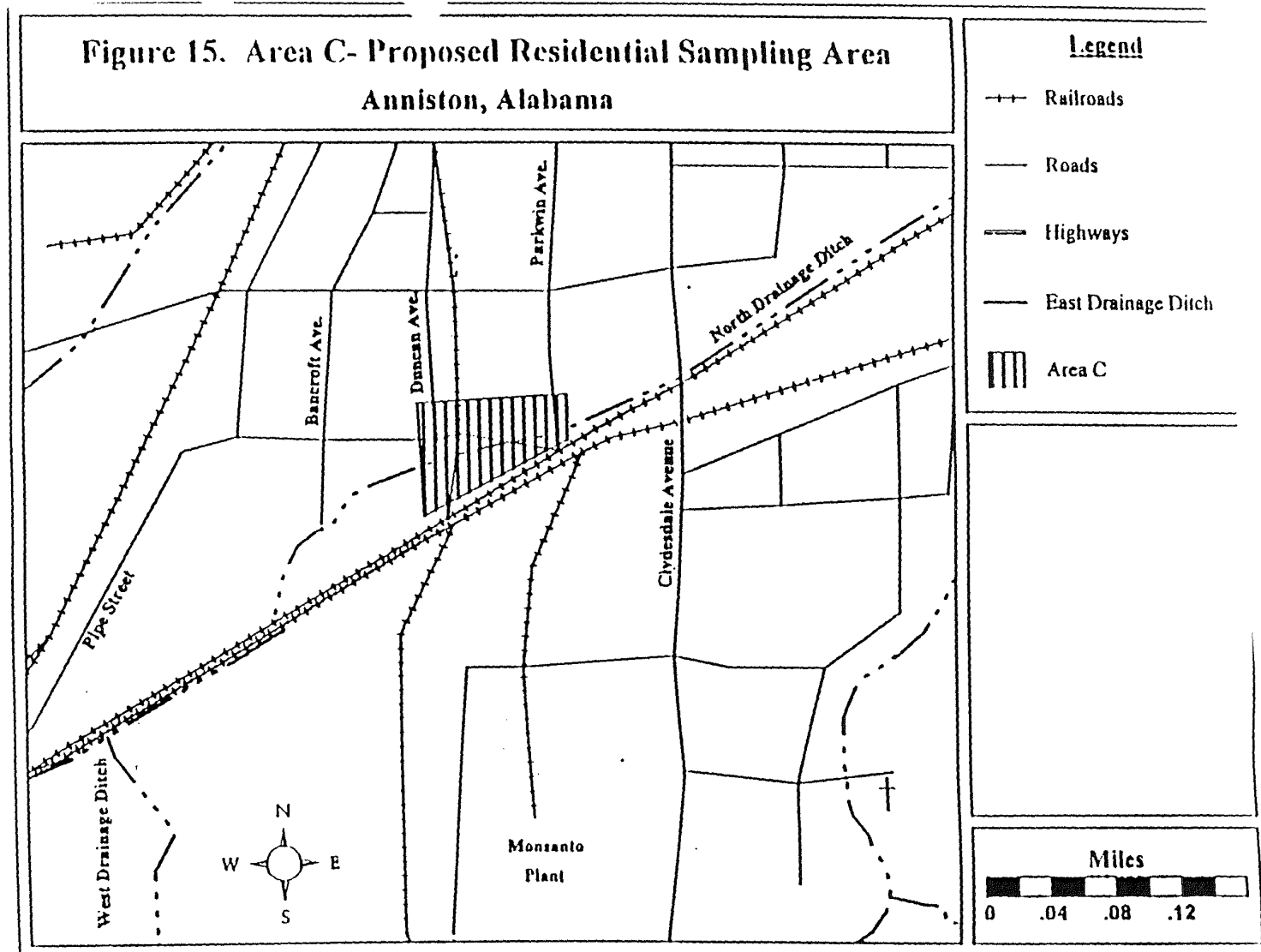
for

Neil Daniell
Geologist
Division of Epidemiology



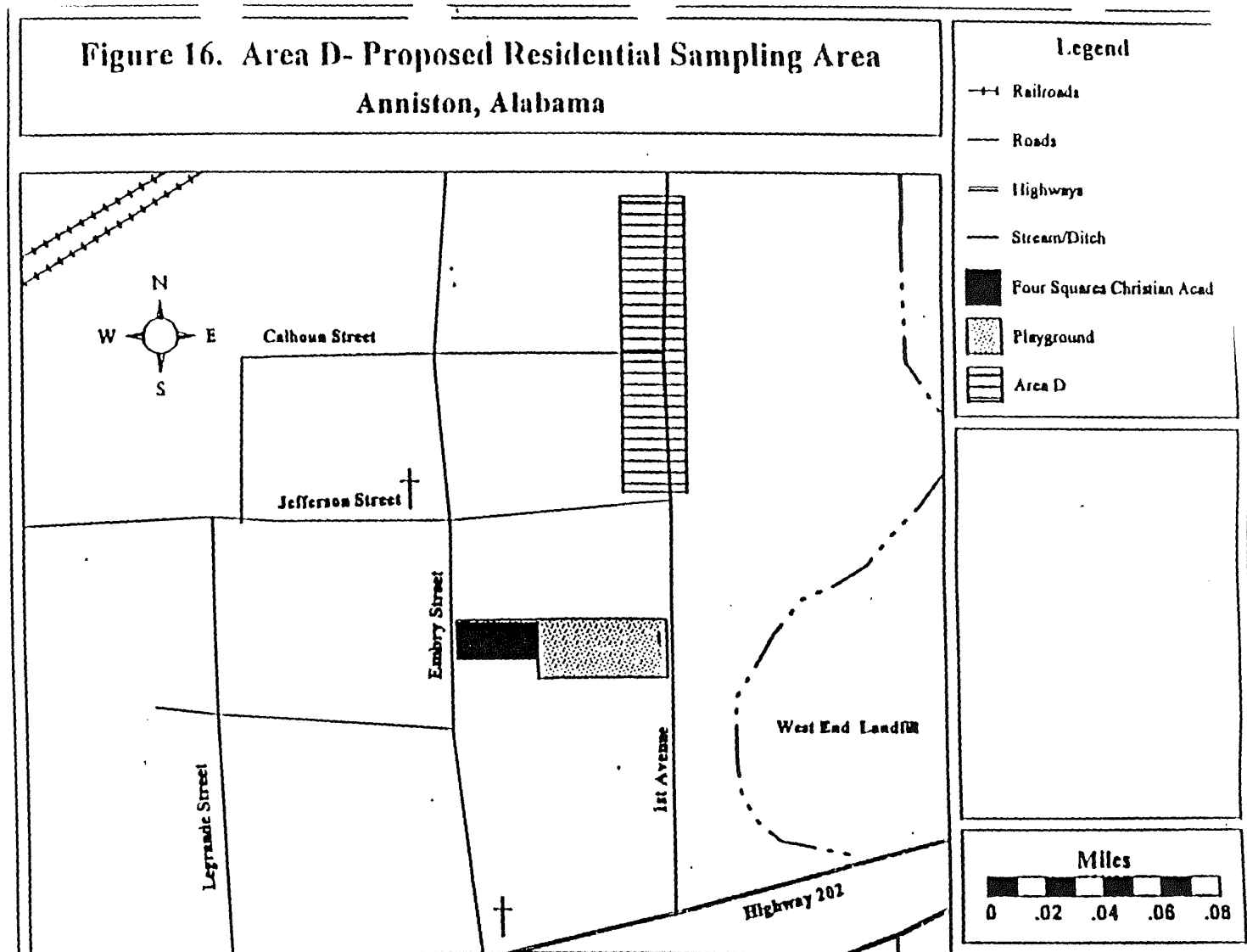
104

ATTACHMENT II



2027

ATTACHMENT II



MONSANTO

Arroclor Wilkerson
~~CONFIDENTIAL~~

FROM ANNISTON, ALABAMA

DATE May 12, 1969

SUBJECT

REFERENCE Memo PRB to WPT/CYB 4/28/69

TO Paul B. Hodges
General Offices

cc: V. A. Haupt
D. B. Roemer - G.O.
W. A. Kuhn - G.O.
J. C. Bandwehr
C. W. Miller
W. B. Pagegeorge
W. K. Richards - G.O.
K. G. Wright

corrected

B/U 7/1/69
7/1/69
State

The following information is a summary of our telephone conversation of May 9, 1969, complying with your request in reference memo.

The Anniston Plant plans for poly-chlorinated biphenyl (PCB) determinations in liquid waste streams including sources, quantities and recommended actions are included. We do not plan to look for atmospheric losses based on our present mutual feeling that losses to the atmosphere are negligible.

The target dates are based on 1) one man full time (K.G.Wright) sampling, correlating and reporting these and other studies; 2) one chemist for one to two months and sufficient analyst time thereafter; 3) that adequate methods are developed and reduced to plant practice in time; 4) that adequate instruments and instrument time are available. Items two through four require re-shuffling of the Anniston Laboratory plans and will be discussed with W. A. Kuhn and J. E. Smith (since low color Arroclor 5460 sample preparation is affected). Also, although electron capture equipment exists at Anniston it is not presently set up and operating. This will make meeting your proposed schedule of being ready to run PCB analyses by the Tucker method by June 2 unlikely.

Proposed Plan

1. Obtain gross samples of Snow Creek for visual checks to determine presence of discrete, non-aqueous liquid phase in pools or other stream bottom areas.

Start 5/1/69
Complete By 7/1/69

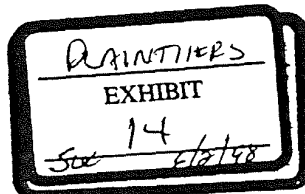
Completion determined when downstream limit of discrete, non-aqueous liquid phase has been established.

2. Obtain and analyze for PCB, samples of mud and water from Snow Creek at two points downstream of limit established in (1).

One of the sampling points will be at the mouth of Snow Creek. Two sets of samples taken two weeks apart will be used. (Total of 8 samples)

Target Completion 8/1/69

MONS 097294



Proposed Plan (Cont'd)

3. Obtain two samples of mud and water from Choctawhatchee Creek - one near Snow Creek confluence and second 8-10 miles down stream near Jackson Shoals. Same frequency as (2) above (Total of 8 samples). Target Completion
4. Further action on mud and water samples will be decided after results of 1 thru 3 are in. Decision Target
5. Complete the in-plant survey now underway to identify and quantify sources of PCB to the sewer.
 - a) Identify all departments utilizing or processing Aroclors. Completed 4/15
 - b) Audit Aroclor and HCl departments (previously identified as major sources) to determine source and amount of PCB loss to sewer. Target Completion
 - c) Recommend means of recovering, eliminating, or reducing losses from sources identified in (b). Target Completion
 - d) Define requirements and rough cost to assure ourselves that loss of Aroclor to Snow Creek (Solid and Liquid Aroclors) is limited to solubility losses. Target Completion
6. Establish continuing monitoring systems:
 - a) For loss of Liquid (or Solid) Aroclor to Snow Creek (hopefully zero). Target 6/1/70
 - b) For weekly or monthly PCB on our effluent to Snow Creek (solubility losses). Define Needs 9/1/
 - c) Establish water sampling station on Choctawhatchee Creek to monitor PCB and Parathion. In Operation 6/1/
7. Investigate means of disposal of Aroclor scrap.

This would need to be a cooperative venture between Research, Marketing, WCK, Anniston and CID since the problem is not unique to a single Monsanto location and is facing our customers too.

Schedule for 1970.

MONS 097295

That completes the proposed plan. There are a few other points I'd like to mention though.

1. The Anniston Plant is proceeding with projects to reduce the Aroclor in recovered HCl - some of which is severed.
 - a) The "catch-tank" in the HCl off-gas line has been successfully started up and is collecting some material.
 - b) A membrane type coalescer is to be installed in May to remove organics from the absorbed HCl.

Aroclor from these two sources will be buried in the toxic dump.

2. Cross sampling of Snow Creek started the week of 4/28/69. Snow Creek outfall has been monitored for pH and % HCl for several years. (Potassium and mercury analyses are no longer run)
3. Preparations are well underway to start the Aroclor/HCl departmental audits. Actual sampling should start within a week, if the analyses can be run.
4. The only departments using or processing Aroclors at Anniston are:
 - a) P_2S_5 - a Therminol system. This is drained to drums when replacement of Therminol is required. This has been done in this manner since startup.
 - b) Aroclor

Processing
Two Therminol systems
Floor cleanings
Spills
HCl off-gas

No significant amount is lost from tank car cleaning since any material (including heels) is drained into drums, cleaning cloths are put in trash containers. Both drums of liquid and rags are sent to the dump.

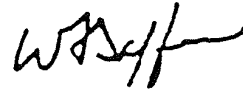
5. Present estimate of PCB analysis time indicates 2 to 3 man-hours are required per sample. This may well limit us to two to three samples per day.
6. Present guess on future monitoring is that we would need to add one man to the laboratory staff and buy an instrument (at about \$10,000) to support an adequate program.
7. An audit of the Parathion and PNP Departments will be carried out this summer in addition to the proposed program. This work is urgently needed to establish how close we are now approaching the ultimate capacity of the biological treatment plant and whether or not reduction through an in-plant control program is feasible. Answers are required

MOHS 097296

Points (Cont'd)

urgently because they determine the course of action of the sulfur recovery system proposed for Parathion as well as the ultimate production capacity of the Parathion Plant. While Parathion belongs to the Ag Division the biological treatment plant belongs to the Organic Division.

I hope this summary will serve your present needs. Many thanks for the suggestions in your 4/28 memo. As you can see many found their way into our program proposal.



W. F. Taffee

jw

MONS 097297

Monsanto

DATE, TIME & LOCATION: M. R. Foresman - Krummrich

DATE September 23, 1970
SUBJECT SAMPLING PROGRAM FOR AROCLOR
LOSSES
REFERENCE Memo-M. Pierle to W. Engman
8/5/70
TO : W. C. Engman

cc M. J. Beaudine
G. L. Bratsch
C. F. Buckley
B. W. Corlew
P. B. Hodges
H. J. Horner
W. Papageorge
J. R. Savage
J. Garrett

CONFIDENTIAL

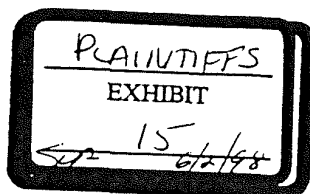
The following air sampling program is an addition to the total Aroclor sampling program as established in a memo from M. Pierle to W. Engman dated August 5, 1970.

<u>TYPE</u>	<u>SOURCE</u>	<u>FREQUENCY</u>
Air	Different locations within Department 246	2 samples/week

The air sampling program will be conducted for approximately two months with the results being distributed on a weekly basis.

M. R. Foresman

pd



MONS 098220

Monsanto

NAME & LOCATION

F. D. Ramsey - Anniston Plant

DATE September 4, 1970

J. T. Bell
V. R. Haupt
J. C. Landwehr

SUBJECT AROCLOR LOSSES TO THE ATMOSPHERE
AT THE HCl SCRUBBER JET

REFERENCE

TO E. G. Wright

Operations show that HCl gas not converted to Muriatic Acid is by-passed to the scrubbing jets and sewer. Based on acid produced, sold, and by-passed for the months of April, May, and June, an average day resulted in 4500 lb./hr. of HCl off-gas. Calculations based on vapor pressures, the temperatures that the HCl comes in contact with, and the ppm of Aroclor in acid - yields the following results:

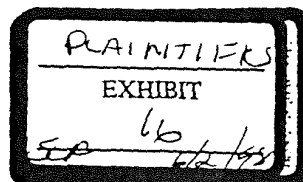
0.6 lb./hr. or 14.4 lb./day of PCB in vapor form reaches the jets
2.1 lb./hr. or 50.5 lb./day of PCB in acid produced

Total = 64.9 lb./day of PCB passes the HCl knockout tank

Assuming 100% contact at the jets, 0.47 lb./hr. or 11.84/day of PCB is sewer with the remaining 0.11 lb./hr. or 2.6 lb./day being lost to the atmosphere. Poor efficiency at the jets increases the loss of PCB to the atmosphere considerably.

Picky
F. D. Ramsey

:kd
Attachment



DSW 014031

HOW MUCH PCB is NOT condensed

HCL off-GAS (Avg. used)

HCL gas (saved)

April } Avg. = 1.98 M # HCL
MAY }

1.24 M # HCL

off GAS over from Chlorination
based on Cl₂ usage

(3.24 M # GAS)

HCL enters catch-tank approx. 45°C (113°F)

Vap. pressure = 0.023 mm Hg

1. Assume All liquid phase is removed at catch tank
2. " HCL off-gas passes HCL catch tank

$$\frac{3,240,000 \text{ lb HCL gas}}{\text{month}} \div \frac{365 \text{ lb (30 x 24) hr}}{\text{month}} = \frac{3,240,000}{26,300} = 123 \frac{\text{mole}}{\text{hr}}$$

DSW 014032

$$\frac{0.023 \text{ mm}}{915 \text{ mm}} = \frac{x}{123} \quad x = \frac{(0.023)(123)}{915} = \frac{2.83}{915} = 0.0031 \frac{\text{mole}}{\text{hr}}$$

$$0.0031 \frac{\text{mole}}{\text{hr}} \times \frac{193.8 \text{ lb}}{\text{mole of 122}} = 0.6 \text{ lb/hr} \xrightarrow{\text{in vapor form}} \text{passes the catch tank} = 14.4 \text{ lb/d.}$$

[0.6 lb/hr passes the catch tank]

14,000 #/hr of air
4500 #/hr

$$150 \text{ ppm} = \frac{2.10}{150} \# \text{ org. / hr (Filter, coalescer etc.)}$$

4500 #/hr (x)
14,000 #/hr

$$10 \text{ ppm} = \frac{0.14}{10} \# \text{ org. / hr (Carbon towers)}$$

$$\frac{\text{Vap. Press. @ } 20^\circ\text{C}}{\text{" " @ } 45^\circ\text{C}} = \frac{0.0042}{0.023} = 0.183$$

$$0.183 \times 0.6 \#/\text{hr} = 0.11 \#/\text{hr} \times 24 = 2.62 \#/\text{day}$$

DSW 014033

300 M lb of HCl gas + H₂O = ~~1~~ 1 billion lb. of Acid

$$\frac{300 \text{ M}}{36.5} = 8.22 \times 10^6 \text{ moles of gas (HCl)}$$

Cool Gas Stream to -10°C ; Pure Pt. of Catch-Tank Sample is -19°C

$$P_A = K_A P_T$$

$$P_B = K_B P_T$$

$$\frac{P_B}{P_{\text{HCl}}} = \frac{K_B}{K_A}$$

$$\frac{P_B}{P_{\text{HCl}}} = \frac{X_B}{X_A}$$

@ -10°C vapor Pressure P_{PCB} (mm Hg) = 0.00015 mm Hg

$$\frac{0.00015 \text{ mm Hg}}{915} = \frac{X \text{ mole of PCB}}{8.22 \times 10^6 \text{ moles of HCl gas}}$$

$$(1.64 \times 10^{-7}) (8.22 \times 10^6) = X$$

$$X = 1.35 \text{ moles of PCB}$$

$$1.35 \text{ moles} \times \frac{193.8 \text{ lb}}{\text{mole of 1221}} = 262 \text{ lb of PCB}$$

per 300 M lb HCl gas

262 ppb in acid

after dilution

to make acid

872 ppb in HCl coming over

→ Based on hq. Chlor. yield of 3500 % of act. GA
Solid. " " = 1250 % of "

$$\frac{900}{10^9} = \frac{X}{3500 \times 24} = \frac{X}{192,000}$$

DSW 014034

$$X = \frac{(900 \times 192,000)}{10^9} = \frac{172,800,000}{1,000,000,000} = \frac{1728}{10000} = \frac{1.7}{10} = 0.17 \text{ #/day}$$

Key d
Monsanto

St. Louis - General Offices

August 7, 1970

ANNISTON - PCB - CLEANUP PROGRAM

TO Mr. H. S. Bergen, Jr. - HBERG

John Mason	- JMASO
E. P. Wheeler	- EWHEE
W. B. Papageorge	- WPAPA
F. J. Holzupfel	- FHOLZ
D. B. Hosmer	- DHOSM
J. R. Savage	- JSAVA
G. L. Jessee	- Anniston
J. C. Landwehr	- Anniston

CONFIDENTIAL - F. Y. I. AND DESTROY

Following are the moves underway resulting from the FDA findings of high levels of PCB in fish taken from Choccolocco Creek downstream from it's confluence with Snow Creek.

STATUS

(1) We are presently discharging to Snow Creek about 16#^{16 lb/day}/day of PCB (down from 250#/day in '69). Measurements of departmental waste streams show a total loss of only 2#/day. The discrepancy is believed due to; (a) sampling problems in departmental waste streams where two-phase systems of water and free aroclors may be present, and (b) possible pickup of PCB by leaching previously deposited PCB from the limestone neutralization pit which also acts as a settling basin.

(2) Work to further reduce losses presently underway:

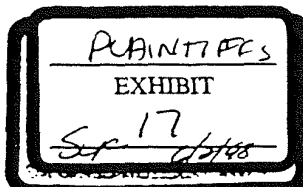
a) Sump is being installed at the aroclor department to capture free aroclors from the 275 gpm flow. This is believed to be the largest departmental source of sewer loss because of the liquid aroclors frequently observed. However, sampling work did not confirm the belief because, no doubt, of inherent sampling problems. The project was due for completion on 9/1, and had been delayed because of an underground spring.

b) Curbing is being installed at drum loading area with dry pick up of spilled aroclors planned.

c) Investigation of treatment methods - adsorption by activated carbon showing most promise to date.

(3) Joe Crockett, Secretary of the Alabama Water Improvement Commission, will try to handle the problem quietly without release of the information to the public at this time. He believes that FDA will not precipitately in this matter (he did not advise how FWQA might react). Dr. Myers, Director of Public Health of Alabama, wants toxicity information on PCB's and this will be conveyed personally to him by Jack Garrett next week.

MONS 033851



H. S. Bergen, Jr.
August 7, 1970
Page 2

PROGRAM

(A) Public Relations - E. V. John developed a proposed statement to be used in event of public disclosure but, after consultation with Legal, felt it should not be used because of the recent lawsuit instituted against the plant by BASS. Therefore, an innocuous, essentially "no comment" type statement is being drafted.

(B) Operator Education - All Anniston personnel have been re-advised of the necessity to avoid sewerage of any areolator.

(C) Mechanical Program

(1) Departmental Sump - at extra cost of \$2,000, work is proceeding on an overtime basis with completion expected 8/12/70. This will eliminate the possibility of large losses from the operating area.

(2) Loading Area - Washup of spilled areolator has been stopped and dry pick via sand instituted. Curbing project is being expedited.

(3) Neutralization Pit Clean out

(a) Immediately, the settled material downstream of the limestone will be removed as well as possible by pumping, with minimum stirring of the water. The solids (and areolators) will be landfilled.

(b) By-Pass of Neutralization Pt. - On crash basis, trenches will be dug to allow diversion of all water from the limestone pit. This will take 1 - 2 weeks and will cost about \$10,000.

In addition, it will be necessary to provide caustic neutralization of the acid wastes. This will be handled in the areolator department via installation of a pH controller and valve with temporary piping and trucking facilities. Cost will be about \$5,000 plus about \$500 per day for caustic during the period when the alternate neutralization is required. During this period, PCB losses should be no more than 5 - 10 lbs./day.

MONS 033852

H. S. Bergen, Jr.
August 7, 1970
Page 3

(c) Cleanout - The pit will be thoroughly cleaned out with probable removal of the present deteriorated asphalt membrane and replacement (possibly) by a plastic membrane which can resist aroclors. The plant will consider possible structural changes to permit more affective operation and ability to make future cleanouts without the present by-pass steps. Recommendations relative to this will follow.

(4) Water Flow Reduction - Present total flow through pit is 700 gpm. For at least several of the streams, reduction of flow will result in immediate reduction of PCB to Snow Creek. More important, reduction of flow will minimize future treatment costs.

In conjunction with the pit by-pass work in 3(a) above, approximately 200 gpm of aroclor free water will be permanently diverted. Included in the first reduction are the chlorinator cooling streams and most of the water coming from the Niran flare tower. Details of how this will be accomplished will be available by 8/14/70.

Over the next 3 - 4 months, further water conservation projects will be installed with objective of reducing the stream to the lowest practical amount, now estimated to be about 300 - 400 gpm. The projects will involve multiple use of water and further diversions of aroclor - free water.

(5) Final Treatment - Based on some indications (and much hope), by September, the actions above may approach the present plant objective of 10 ppb of PCB's in 700 gpm (or 0.1 #/day). The hope is raised because dissolved aroclor has shown a pronounced affinity for surface adsorption (as on walls of sample bottles). The solids generated by the limestone neutralization are believed to retain aroclor passing by them. Therefore, adequate settling and/or filtration following neutralization with periodic removal of the solids may accomplish the necessary treatment (along with water flow reduction). The plant will proceed on preliminary design of filtration facilities with and without carbon treatment between neutralization and filtration. The design will be available for action in case the reduction is not as great as hoped-for or in case the control agencies demand more complete removal (control agency requirements are a completely unknown factor at present). By the time a decision must be made relative to final treatment, we should have better information on requirements and methods.

MCNS 033853

H. S. Bergen, Jr.
August 7, 1970
Page 4

(D) Fish, Mud and Water Sampling - Since our fish samples from nearby Choocolocco Creek also showed high levels of PCB's, we are instituting more sampling to determine extent of the problem. Early during the week of 8/10, legal size fish will be caught in Choocolocco Creek near to confluence with the Coosa River (Logan Martin Lake). Fish will also be taken from the lake. If these samples show high (≈ 5.0 ppm) levels of PCB, sampling will be extended to points down the Coosa River. A high priority will be given these samples by Scott Tucker.

Progress reports will follow at suitable intervals.

Paul B. Hodges, Jr.
Paul B. Hodges

/np

MONS 033854

Monsanto

FROM: LOCATION: G. W. Miller - Anniston, Alabama

CONFIDENTIAL

DATE: May 7, 1970

SUBJECT: AROCLOR POLLUTION
AWIC CONTACT

REFERENCE:

TO: G. L. Jessee

cc: J. C. Landwehr
H. L. Williams
P. B. Hodges - G.O.
W. B. Papageorge - G.O.
F. J. Holzapfel - G.O.
J. R. Savage - G.O.
E. V. John - G.O.
J. H. Crowe - Decatur
E. G. Wright

On May 6, Messrs. J. C. Landwehr, E. G. Wright and I visited Mr. J. L. Crockett, Technical Director of the Alabama Water Improvement Commission, in Montgomery. The purpose of the contact was twofold; first, to familiarize Mr. Crockett with the situation regarding Aroclor wastes and their reported pollution potential and, secondly, to build confidence that Monsanto intends to cooperate with governmental agencies to define the effects of Aroclor on the environment.

Mr. Crockett and the AWIC staff were totally unaware of the published information concerning Aroclors. Copies of the most pertinent articles describing the situation along with Mr. Minckler's statements were provided for his use. Additional information supplied covered the following facts: 1) Monsanto is currently investigating independently and in cooperation with governmental agencies the potential ecological effects of Aroclors. 2) Investigation and research programs are underway at Anniston to identify, quantify and develop techniques which would control product losses to the environment. 3) Any Aroclors reaching the watershed from the Anniston plant were entering Snow Creek. 4) The production process was described in general detail to point out that water was not essential to production of Aroclors, and waste water was produced only by auxiliary equipment such as steam jets, etc.

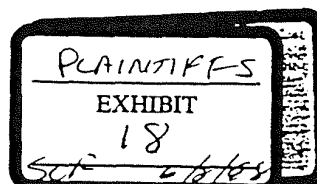
Mr. Crockett was most appreciative of Monsanto's approach to the problem and the fact that Monsanto came to him. He alluded that our action would produce a situation that was beneficial to the protection of both the Monsanto and AWIC positions. His recommendations were as follows:

1. Supply the AWIC with a general process description detailing potential loss sources.
2. Continue to develop information and as major items develop inform the AWIC.
3. Give no statements or publications which would bring the situation to the public's attention.
4. If approached by news media, either the AWIC or Monsanto is free to state that the situation is under study by the staff of AWIC at the direction of the Technical Director, Mr. Crockett.
5. If in the future, information is developed indicating that Aroclors are detrimental to watersheds, Monsanto will be required to secure a permit from AWIC to allow certain maximum quantities of chlorinated biphenyl to enter Snow Creek.

PLAINTIFFS
EXHIBIT

5

OSW 014098



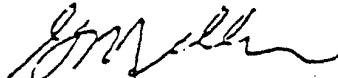
G. L. Jesse

- 2 -

May 7, 1970

In summary, Mr. Crockett was noticeably unexcited at our disclosure and all his remarks were directed toward a careful evaluation followed by actions as required by data. The full cooperation of the AWIC to reach the above objective on a confidential basis can be anticipated.

It must be remembered, however, that all AWIC actions are subject to state political pressure and federal control.


G. W. Miller

/bs

MQNS 099534

Monsanto

FROM: NAME & LOCATION: Medical Department

DATE

August 17, 1970

" P. B. Hodges, PHD
E. S. Tucker, Queeny

SUBJECT

REFERENCE

TO

J. C. Landwehr
Anniston Plant

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.

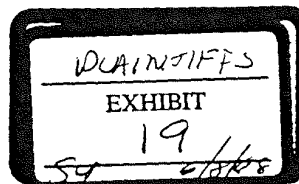
Crockett told me that if this PCB issue hits the Alabama press, the Alabama Water Improvement Commission would be forced to close Choccolocco Creek and the Martin-Logan Reservoir to commercial and sport fishing unless we can prove that the contamination level does not reach the reservoir. The State of 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
Jack T. Garrett

JTG:jm

Enclosure

DSW 014096



WATER_PCB-SD0000077202

ALABAMA									
ENV SAMPLE	DATE COLLECTED	TYPE OF FISH	RIVER / LAKE	SOURCE	MERCURY PPM	PESTICIDES		PCB	
01-0100	3-3-70	Crilia	Wetzel-Lagoon Lake/Cherokee Creek/Alabama	Commercial Fishermen	0.001	DDT 3.00, TOX 3.00, DDE 1.31		11.0	
"	3-3-70	Crilia	Cherokee Creek/	South of Cherokee Creek & Coosa River	0.11	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
"	3-3-70	Crilia	"	18 miles downstream from treatment plant	0.001	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
"	3-3-70	Crilia	Wetzel-Lagoon Lake/	Commercial Fishermen	0.001	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
01-0110	6-18-70	Bass	Cherokee Creek/	10 miles from plant and Oxford treatment	0.19	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
01-0120	6-18-70	Bass	Cherokee Creek/	"	0.19	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
01-0130	6-18-70	Crilia	Cherokee Creek/	"	0.19	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
01-0140	6-18-70	Bass	"	12 miles upstream in watershed project at	0.19	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
01-0150	6-18-70	Bass	"	(Fall Lake Forest)	0.19	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
01-0160	6-18-70	Bass	"	South of Cherokee Creek 20 miles from	0.19	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
01-0170	6-18-70	Bass	"	stream from Oxford treatment plant	0.19	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
01-0180	6-18-70	Crilia	"	"	0.19	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
01-0190	6-18-70	Crilia	Wetzel-Lagoon Lake/	Approx 6 miles from South of Cherokee	0.19	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
01-0200	6-18-70	Bass	"	Creek 16 miles from plant	0.19	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
01-0210	6-18-70	Crilia	"	"	0.19	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
01-0220	6-18-70	Crilia	"	Wetzel-Lagoon Lake/	0.19	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
01-0230	6-18-70	Bass	Coosa River	Wetzel's Creek below Coosa-Wetzel-Lagoon	0.19	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
01-0240	6-18-70	Bass	"	30-40 miles below plant	0.19	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
01-0250	6-18-70	Bass	"	"	0.19	DDT 1.70, TOX 1.70, DDE 1.31		31.4	
01-0260	6-18-70	Bass	"	"	0.19	DDT 1.70, TOX 1.70, DDE 1.31		31.4	

MSD 014097

Monsanto

FROM: J. C. Landwehr - Anniston

DATE: October 15, 1971

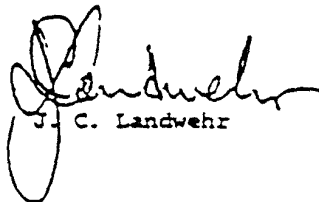
TO:

REFERENCE:

TO: D. B. Hosmer - G.O.

cc W. R. Roberts - G.O.
J. R. Savage - G.O.
W. B. Papageorge - G.O.
P. B. Hodges - G.O.

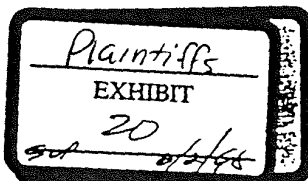
The attached letter is our proposed response to Joe Crockett's request for a status report. We have an appointment with Mr. Crockett on Wednesday, Oct. 20 to present our story to him so we need your comments by Tuesday. I discussed the change in concept away from any carbon treatment at this time with Bill Papageorge. I am also including a copy of the chart of weekly average flows and concentrations referred to in the memo. Other than these items our report will be limited to showing which Phase I and Phase II items in the original report have been completed, deferred or are underway.


J. C. Landwehr

/dp

Att.

OSW 013355



COMPANY CONFIDENTIAL

very private
CC Don Otto
Garni Buckle
Art Leary
Gil Hippe
Bill Fayman
Ed [unclear]

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

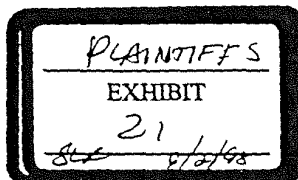
November 11, 1971

F/4/12

Copies to:

- H. S. Bergen
- J. T. Garrett
- J. W. Gillespie
- ~~H. P. Holsten~~
- P. B. Hodges
- P. J. Holzappel
- G. L. Jesse
- J. C. Landwehr
- J. Mason
- H. L. Minckler
- W. B. Papageorge
- P. S. Park
- W. R. Robins
- J. R. Savage

Meeting with Leary, Artger, Brown, Buckle, etc.
Signed that Brown will attempt to join the Congress
Stacy - PCBs - Brown/Buckle will try to convince
to advise Ching that EPA is in (new) reg.
problem - Try to be in the the way of 11/29



OSW 014379

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

Those Present:

Monsanto

J. T. Garratt
D. B. Hosmer
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 employees and Joe Crockett who emphasized that we had kept him fully advised concerning our program and our progress. Gene Jessee carefully pointed out

DSW 014380

Meeting at Southwest Regional
Office of EPA
November 11, 1971
Page 2

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 biphenyl from other polyphenyls. Mr. Jesse 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.

DSW 014381

Meeting at Southwest Regional
Office of EPA
November 11, 1971
Page 3

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. G. 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. Homer'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. Homer

bt
11-12-71

OSW 014382

MONSANTO

FROM: NAME & LOCATION: Paul E. Hodges - St. Louis

DATE: September 18, 1970

SUBJECT: _____

REFERENCE: _____

TO: Gov Bell - Anniston

J. R. Savage - JSAVA
W. B. Papageorge - WPAPA
D. B. Rosmer - DRDSM
G. L. Jesse - Anniston
G. Miller - Anniston
J. Landwehr - Anniston
J. L. Corder - Anniston

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.

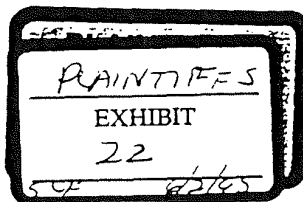
Realizing the extreme efforts the plant has gone to in order to curtail loss of PCB's, is there anything more that can be done to get the losses down? Is there a possibility that sampling practices are responsible for the wide variations shown (you might try duplicate effluent samplers)? Are there any practices 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

Paul E. Hodges

/mp

DSW 014095



FX 1

Monsanto

CONFIDENTIAL

J. C. Landwehr - Anniston Plant

10-6018342628

DATE October 26, 1970

MEMORANDUM

SUBJECT

TO : C. L. Jessee

J. L. Corder
W. B. Papageorge - J. C.
Z. B. Hodges - C. C.
J. R. Savage - C. C.
J. T. Bell
E. G. Wright
V. R. Hauge

E. G. Wright, J. T. Bell and J. C. Landwehr met with J. L. Crockett, Technical Staff Director of the Alabama Water Improvement Commission on Friday, October 21, 1970.

Mr. Crockett was "very well satisfied with progress at Anniston on the PCB problem" and could suggest no areas of further work which were not already receiving our attention.

Since he insisted again on knowing what effluent levels were, we verbally informed him that we were presently discharging total Aroclors in the range of 1-5 lbs./day with the latest trend being toward the 1 lb./day end of the range. To his question on past discharges, we informed him that current discharges were down from recent past ranges by 1/5 to 1/10, but qualified this answer that high recent past numbers were a result of higher water effluent flow and high solids content in the old limestone neutralization pit.

In conjunction with this information, a lengthy discussion of the technical complexity of Aroclor or PCB numbers resulted in Mr. Crockett's agreeing that any written effluent level reports would be held confidential by the Technical Staff and would not be available to the public until or unless Monsanto released it. Mr. Crockett also changed his past position from wanting a weekly report to accepting a monthly report of 24 hour cumulative effluent sample results. The initial report and transmittal letter is attached. The second report will cover October 21 through 31, and all reports thereafter will cover whole months.

The Progress Report on Abatement of Polychlorinated Biphenyl Discharge to Snow Creek was discussed in detail with Mr. Crockett with use of slides showing construction of sumps and new limestone pit, etc. Mr. Crockett requested that a section be added to the report briefly discussing the process and the role of various discharge abatement devices. Otherwise, he was quite satisfied with our proposed report. The requested addition will be made and plans are to transmit the report to Mr. Crockett the week of October 26.

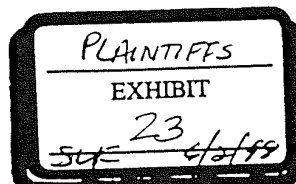
Numerous other related matters were discussed with Mr. Crockett during the six hour meeting with him.

J. C. Landwehr
J. C. Landwehr

skd
Attachment

OSW 013988

CONFIDENTIAL



J.R. Savage - General Office

October 7, 1970

Mr. H.S. Bergen
Mr. P.B. Hodges

SEPTEMBER PCB REPORT

Manufacturing

Mr. W. B. Papageorge
General Office

ANNISTON PLANT

PCB Levels In Snow Creek

Average PCB loss for the month was high at 2600 ppb or 32 lbs/day, largely as a result of one very bad day (400 lbs). Contributing causes were:

1. The old limestone pit was overloaded and solid sludges were carried through,
2. Detergent cleaning of the department,
3. Sewering of excessive amounts of muriatic acid.

Since the new limestone bed was placed in service on September 23, pit effluent has been at 0-3 ppb PCB's. However, leaching of PCB's from the creek bed results in a plant effluent level of 90 - 240ppb or 1.1 - 2.8 lbs/day, gradually declining. The plant believes that the new pit can handle ordinary upsets and peak loads.

Regulatory Action

Telephone contact continued with the Alabama Water Improvement Commission. However, a planned meeting did not take place due to illness of AWIC members. Pressure for routine submission of analytical data is not intense at this time.

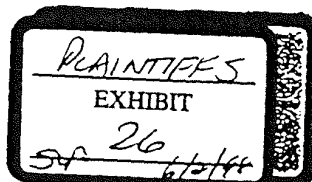
Department Suspended Aroclor Control

An experimental skimmer operated very well removing the PCB laden solids which accumulates in the new sump.

Solid Wastes

Solid waste data for evaluation of disposal methods has been accumulated. A report will be issued in October.

MONS 099026



Anniston

J. T. Bell
J. L. Corder
G. L. Jaxsee
J. C. Landwehr
H. E. Schulte



Anniston Plant

TECHNICAL SERVICES DEPARTMENT

MONTHLY REPORT

General Offices

D. Danna (1)
P. B. Hodges
W. B. Papageorge
J. R. Savage

Summary

NOV 70

CONFIDENTIAL

Read and Destroy

ANNISTON PLANT
I PCB Levels in Sum:
Current Level

AROCLOR 1248

Aroclor losses during November averaged 25 #/day (4620 ppb). One high value accounted for 18 #/day, neglecting this the November average would be 7 #/day (1410 ppb). Based on knowledge of plant operations and performance of abatement devices in November, much of the high level data is due to sample contamination.

Soils

Minor leaks were contained by use of sand and disposal in drums. No spills occurred.

Projects and Evaluations

1. Laboratory work to date indicates the presence of minimal amounts of PCB in the residue from Solid Aroclor distillation (Montar 5). This eliminates 10 M pounds per year of solid wastes from our PCB disposal plan.
2. Design work to collect spent carbon from HCl carbon towers has been deferred to early 1971 to accomplish the No. 1 HCl Limestone Pit rebuild.
3. Solids removal from plant effluent (part of program to reduce PCB in plant effluent to 10 ppb) is moving forward with preliminary screening tests at Denver Equipment Company and Betz Laboratories indicating good to moderate success with flocculation and settling. Further laboratory testing is scheduled for early December. A project has been written, design is underway and equipment modifications under study working with Monsanto Biodize to set up one of their clarifiers at Anniston for pilot scale

South Second St.

Other Locations

F. MacDonald -
Newport

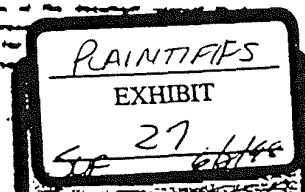
B. W. Corlew -
W.G.K.

DSW 013917

AM-104

CONFIDENTIAL INFORMATION

"This document contains confidential information which is the property of Monsanto Company. Only those portions of the document which are authorized individuals' need to have any be destroyed for loss. The report must not be used outside the Company and the authorized recipient is accountable for its safe handling, safeguarding or otherwise disclosure of its contents and for must return the property of Monsanto Company and shall be returned within two months to its author, except for a longer period."



AROCOR WASTESProjects and Evaluations - continued

Testing of the apparent best techniques recommended by Denver and/or Betr.

4. A successful test was made of removal of limestone lumps from the #2 HCl neutralization pit while in operation. A total weight of 127,000 pounds was removed of which 36% by weight was solids. Lab analysis of the total material revealed more than 100,000 ppb Aroclor or 12 to 15 pounds of Aroclor. Present indications are that this method of removal of solids while the pit is in operation will increase the efficient life of the pit by 25 per cent.
5. A mechanical expense project for repair of the No. 1 HCl neutralization pit was written and approved. This project will be coordinated with the Miran pit project to apply on asphalt lining at the same time, to save money on materials.


V. R. Haupt

:kd

OSW 013918

10:0018342528 PAGE 11/12

Monsanto

Monsanto Company
Anniston, Alabama 36201
Phone: (205) 235-6331

October 15, 1971

Mr. J. L. Crockett, Jr.
Technical Staff Director
Water Improvement Commission
State Office Building
Montgomery, Alabama 36101

Dear Mr. Crockett:

We respectfully submit the following status report on progress toward reduction of polychlorinated biphenyl discharges to a minimum.

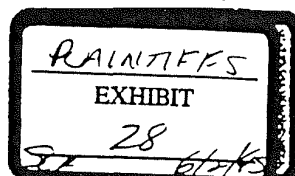
The attached graph of weekly average PCB concentrations (ppb) and effluent flow shows progress since our first report to you in November 1970. As shown at the beginning of the graph, effluent was in a range of 1 - 5 lbs./day PCB (100 - 500 ppb @ 1000 gpm). In contrast recent weekly averages have been 0.2 - 0.9 lbs./day with a good, downward trend still evident.

These current values represent a five-fold reduction in discharge levels resulting from numerous improvements in facilities and operating techniques made in accordance with the Phase I and Phase II program originally outlined. Revised Phase I and Phase II plans are attached with status of each item shown.

Research and plant test work in removal of PCB from water has shown that both an activated carbon column and a limestone bed of a particular configuration are effective in a combination filtration-adsorption process for removing PCB. The essential difference between the two is that surface loading (gpm/ft²) for carbon is much higher than for limestone and total loading capacity (# organic/# adsorbent) is also much higher for carbon. However, to take advantage of the higher performance of carbon an elaborate prefiltering and backwashing procedure is required to prevent blinding of the carbon and breakthrough. A large, properly designed limestone bed overcomes these disadvantages of carbon and is a much more economical means than carbon for providing sufficient surface and loading capacity to reduce PCB in water to low ppb levels.

Based on the above experience we are continuing to concentrate on improvement of our limestone bed design and reduction of flow to them. At this time it is our opinion that this approach will result

DSW 013356



Mr. J. L. Crockett, Jr.

- 2 -

October 13, 1971

in a continuation of the downward trend in PCB levels in plant effluent.

Yours very truly,

J. C. Landwehr
Technical Services Superintendent

/s/

Att.

DSW 013357

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

UNITED STATES OF AMERICA

vs.

JOSEPH C. CALANDRA,
MORENO L. KEPLINGER,
PAUL L. WRIGHT, and
JAMES B. FLANK,

No.

81 CR 335

Violation: Title 18, United States
Code, Sections 1001, 1341 and 13:

The SPECIAL OCTOBER 1980 GRAND JURY charges:

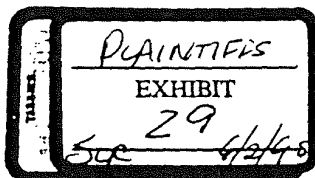
1. At all times material herein, Industrial Bio-Test Laboratories, Inc. (hereinafter referred to as IBT) did business in Northbrook, Illinois in the Northern District of Illinois and was a contract research laboratory which conducted animal studies on various drugs, pesticides, chemicals, and other substances, for the sponsors of said substances, in order to determine the safety and effectiveness of the substances.

2. At all times material herein, JOSEPH C. CALANDRA was President of IBT.

3. At all times material herein, MORENO L. KEPLINGER was Manager of Toxicology at IBT.

4. PAUL L. WRIGHT was Section Head for Rat Toxicology at IBT from approximately March, 1971 until September, 1972, at which time he became Manager of Toxicology for the Department of Medicine and Environmental Health at Monsanto Corporation in St. Louis, Missouri, from approximately October, 1972 until the present.

5. JAMES B. FLANK was the Senior Group Leader for Rat Toxicology at IBT until October of 1972, at which time he became the Assistant to the



APP. 4

100303

Manager of Toxicology at IBT from approximately October, 1972 until April, 1977.

6. IBT conducted a two-year chronic oral toxicity study on Trichlorocarbanilide (TCC) in albino rats, IBT Study Number B9575, for Monsanto Company (Monsanto). TCC is an antibacterial agent used in soaps. On or about May 10, 1976, IBT mailed its final version of the report of the study to Monsanto who submitted the IBT study report to the United States Food and Drug Administration (FDA) with a cover letter dated May 11, 1976, for that agency's use in its evaluation of the safety of TCC.

7. IBT conducted a 22 month chronic oral toxicity study on Naprosyn in albino rats, IBT Study Number B7922, for Syntex Corporation (Syntex). Naprosyn (also known as naproxen) is a drug used in the treatment of arthritis. On or about March 3, 1972, IBT mailed its report of the study to Syntex who submitted the IBT study report to FDA, with a cover letter dated March 22, 1972, as part of its application for approval to test naprosyn on humans and ultimately market the product.

8. IBT conducted two carcinogenic studies on mice (tests to determine whether a compound causes cancer) for Chemagro Corporation (Chemagro). One study was on Sencor, a herbicide, IBT Study Number 9069, one on Nemacur, a pesticide, IBT Study Number 9068. IBT submitted the results of the studies with a cover letter dated August 15, 1972 to Chemagro, submitted the IBT study reports to the United States Environmental Protection Agency (EPA), the Sencor study report by mail on March 8, 1973 and the Nemacur study report by mail on October 15, 1975. Both study reports were submitted as part of Chemagro's application for approval to use these products for use on food crops.

9. Beginning in or about 1970 and continuing until about July, 1977, in Northbrook, in the Northern District of Illinois, Eastern Division, and elsewhere,

JOSEPH C. CALANDRA,
MORENO K. KEPLINGER,
PAUL L. WRIGHT, and
JAMES B. PLANK,

defendants herein, together with co-schemers both known and unknown to the grand jury, devised and intended to devise a scheme to defraud clients and government agencies by writing and distributing false and fraudulent study reports and false and fraudulent explanations of studies and study reports, and by concealing the fraudulent nature of the study reports and explanations of studies and study reports, all by means of false and fraudulent representations and concealments, knowing and intending that the representations and concealments were false when made.

10. It was a part of the scheme to defraud that the defendants wrote and distributed false and fraudulent animal study reports to clients who commissioned the studies, which study reports were submitted by the clients to government agencies that evaluate such reports as part of their determination of the safety of those test materials.

11. It was further a part of the scheme to defraud that the defendants provided FDA with false and fraudulent written submissions which reaffirmed and made new false and fraudulent statements as to material facts, and concealments and omissions of material facts in, or pertaining to, the studies and study reports.

12. It was further a part of the scheme to defraud that the

original version of the TOC study report was written and distributed by IBT to Monsanto on or about March 21, 1974. IBT submitted this version of the TOC report to FDA on December 12, 1976, which study report the defendants knew to be false and fraudulent in that the study reports:

a. stated that the data reported were from animals that had been on the study for 24 months, when defendants then knew that the report included data from a substantial number of animals that had been on the study for significantly lesser periods of time;

b. stated that 480 animals were in the study when defendants then knew that a substantially greater number of animals were also part of the study; and

c. contained an Animal Mortality Table (Table IV) which defendants then knew to be false in that it substantially under-reported the number of animals that were in the study and the number of animals that died during the study.

13. It was further a part of the scheme to defraud that the final version of the TOC study report was written in April and May, 1976, was dated March 21, 1974, and was mailed to Monsanto by IBT on or about May 10, 1976, was submitted to FDA by Monsanto under a cover letter dated May 11, 1976, and was known by defendants to be false and fraudulent in that the study reports:

a. stated that the data reported were from animals that had been on the study for 24 months, when defendants then knew that the report included data from a substantial number of animals that had been on the study for significantly lesser periods of time;

b. stated that 480 animals were in the study when defendants

then knew that a substantially greater number of animals were also part of the study;

c. contained an Animal Mortality Table (Table IV) which defendants then knew to be false in that it substantially underrepresented the number of animals that were part of the study and the number of animals that died during the study;

d. stated that 250 extra animals were on the study for 24 months and were an independent IBT "research" group, separate from the animals reported in the TOC study, when defendants then knew (1) that the so-called "research" group animals were not an independent "research" group, but were used as a source of extra animals and animal tissues for the TOC study; (2) that the so-called "research" animals had been on study for significantly lesser periods of time than 24 months; and (3) that a substantial number of the extra animals were commingled into, and reported as part of, the TOC study group;

e. stated that no histopathological examination (study of tissue characteristic of animal disease) was performed on the so-called "research" group animals, when defendants then knew that tissues from many of the so-called "research" group animals had been so examined;

f. omitted and concealed the findings listed in a table of "Histopathological Changes in Testes — Postmortem Animals", when defendants then knew that the table existed;

g. stated that postmortem autolysis (chemical deterioration of tissue after animal death) of testicular tissue precluded meaningful histopathologic evaluation of the testicular tissues of the postmortem animals, when defendants then knew that many of those tissues had been so

examined and graded;

b. stated that the IBT pathologist, Dr. Donovan Gordon, examined the tissues of the study animals and concluded that the findings in the testes of the lowest dose level (T_1) animals were indistinguishable from the findings of the testes of the control group animals, when defendants then knew that Dr. Gordon's conclusion was that there were TCC related toxic effects in the testes of the animals in the lowest dose level; and

i. omitted and concealed, as defendants then knew, that Dr. William Ribelin, a pathologist hired by Monsanto, had examined some of the testicular tissues of the TCC study animals and had concluded that the lowest dose level showed TCC treatment-related toxic effects.

14. It was further a part of the scheme to defraud that in response to FDA questions concerning the TCC study, a written explanation of the TCC study and report, dated December 12, 1976 was prepared and submitted to FDA by IBT on December 14, 1976, which explanation defendants then knew to be false and fraudulent in that the submission:

a. stated that the data reported in the May, 1976 report (dated March 21, 1974) were from animals that had been on the study for 24 months, when defendants then knew that the report included data from a substantial number of animals that had been on the study for significantly lesser periods of time;

b. concealed, as defendants then knew, that the animal mortality in the TCC study was substantially greater than reported in any version of the study reports;

c. stated that 250 extra animals were on the study for 24 months and were an independent IBT "research" group, separate from the

animals reported in the TCC study, when defendants then knew (1) that the so-called "research" group animals were not an independent "research" group, but were used as a source of extra animals and animal tissues for the TCC study; (2) that the so-called "research" animals had been on study for significantly lesser periods of time than 24 months; and (3) that a substantial number of the extra animals were comingled into, and reported as part of, the TCC study group;

d. concealed that histopathologic examinations were performed on a substantial number of the so-called "research" animals, when defendants then knew that such examinations had been performed; and

e. omitted and concealed, as defendants then knew, that Dr. William Ribelin, a pathologist hired by Monsanto, had examined some of the testicular tissues of the TCC study animals and had concluded in a written report that the lowest dose level showed TCC treatment-related toxic effects.

15. It was further a part of the scheme to defraud that the final study report on Naprosyn, dated January 4, 1972, was written by IET and was received through the mail by Syntex from IET on or about March 3, 1972, and submitted to the FDA by Syntex under cover letter dated March 22, 1972, which report defendants then knew to be false and fraudulent in that the report:

a. contained individual animal and summary animal data allegedly based on blood and urine tests performed on or about the time of final sacrifice of the study, when defendants then knew that no such tests had been conducted and that the data was fabricated and false; and

b. was supplemented by an Appendix II which was submitted to FDA by Syntex on April 9, 1974 which purported to represent, among other things, all the findings from gross examination of the study animals, when

defendants then knew that for a substantial portion of the gross findings for postmortem animals, no such examinations were performed and the findings were fabricated and false.

16. It was further a part of the scheme to defraud that in response to FDA questions raised in September, 1976 concerning the Naprosyn study, a letter signed by Joseph C. Calandra and an explanation of the Naprosyn study dated November 11, 1976 was written and submitted to FDA, and a copy was mailed to Syntex under cover letter dated November 17, 1976. Defendants then knew that the November 11, 1976 submission to the FDA was false and fraudulent in that the submission:

a. stated that the data reported for individual animal and summary animal blood and urine values allegedly collected on or about the time of final sacrifice of the study were accurate, when defendants then knew that the data were fabricated and false; and

b. stated that gross examinations were performed on the postmortem animals and that the data from those examinations reported in Appendix II were obtained from animal cage cards and animal disposition sheets, when defendants then knew that for a substantial number of the reported postmortem animal findings no gross examinations were performed and the data were fabricated and false.

17. It was further a part of the scheme to defraud that IBT prepared and mailed to Chemagro final reports for the Sencor and Nenacur studies under cover letter dated August 15, 1972 to Chemagro. Chemagro submitted the IBT Sencor study report to EPA by mail on or about March 8, 1973, and submitted the IBT Nenacur study report to EPA by mail on or about October 15, 1975, which reports defendants then knew to be false and

fraudulent in that each report:

a. stated that all the mice on the study were fed the test material for 18 months, when defendants knew that (1) the study only ran for 14 months; and (2) the mice sacrificed and examined at the end of the study included a substantial number of mice which had been fed the test material 14 months or less;

b. contained a Mortality Table which defendants then knew substantially under-reported the number of animals that were on the study and the number of animals that died during the study;

c. concealed that a larger number of extra mice were added to and were a part of the study; and

d. stated that there was a third positive control group fed benzedrine, when the defendants then knew that no such control group had been conducted with these studies.

18. It was further a part of the scheme to defraud that IBT wrote an "Addendum Report to Chemagro" regarding the Sencor study report and mailed it to Chemagro on or about December 21, 1973, which addendum Chemagro mailed to EPA on or about October 8, 1974, and which defendants knew to be false and fraudulent in that the addendum:

1. listed the number of days that each mouse was on the study as if the study had run for 18 months, when defendants then knew that the mice had been on the study for significantly lesser periods of time;

2. omitted and concealed that a substantially greater number of mice were on the study than reported; and

3. listed for the individual animals designated as PCIII, their alleged number of days on the study and gross pathological findings which

information defendants knew was false because no such positive control group had been conducted with this study.

19. It was further a part of the scheme to defraud that an ~~an~~ audit was conducted on the Chemagro studies in April, 1976 which documented that the studies were false, as specified above in Paragraph 17a, and that the defendants concealed the results of this audit from Chemagro until July, 1977.

20. It was further a part of the scheme to defraud that the United States mails and interstate wire communications were used in furtherance of the scheme.

21. On or about May 10, 1976, in the Northern District of Illinois, Eastern Division,

JOSEPH C. CALANDRA,
MOFENO L. KEPLINGER,
PAUL L. WRIGHT, and
JAMES B. FLANK,

defendants herein, for the purposes of executing the aforesaid scheme to defraud, and attempting to do so, knowingly did cause to be placed in the United States mails the final version of the TCC study report, addressed to:

Daniel Roman
Monsanto Company
800 Lindbergh Blvd.
St. Louis, Missouri

to be sent and delivered by the United States Postal Service according to the ~~directions~~ directions thereon.

In violation of Title 18, United States Code, Section 1341.

The SPECIAL OCTOBER 1980 GRAND JURY further charges:

- 1.- Paragraphs One through Twenty of Count One of the indictment are realleged herein.
2. On or about August 11, 1976, in the Northern District of Illinois, Eastern Division,

JOSEPH C. CALANDRA,
MORENO L. KEPLINGER,
PAUL L. WRIGHT, and
JAMES B. PLANK,

defendants herein, for the purposes of executing the aforesaid scheme to defraud, and attempting to do so, knowingly did cause to be placed in the United States mails a letter from Joseph C. Calandra dated August 11, 1976, addressed to:

Dr. Carl M. Leventhal
Deputy Director, Bureau of Drugs
Department of Health, Education and Welfare
Public Health Service
Food and Drug Administration
Rockville, Maryland 20852

to be sent and delivered by the United States Postal Service according to the directions thereon.

In violation of Title 18, United States Code, Section 1341.

COUNT THREE

The SPECIAL OCTOBER 1980 GRAND JURY further charges:

1. Paragraphs One through Twenty of Count One of this indictment are realleged herein.

2. On or about November 17, 1976, in the Northern District of Illinois, Eastern Division,

JOSEPH C. CALANDRA,
MORENO L. KEPLINGER,
PAUL L. WRIGHT, and
JAMES B. PLANK,

defendants herein, for the purposes of executing the aforesaid scheme to defraud, and attempting to do so, knowingly did cause to be placed in the United States mails a copy of the written submission by IET to the FDA regarding Naprosyn dated November 11, 1976, addressed to:

Mr. Virgil Thompson
Syntex Corporation
3401 Hillview Avenue
Palo Alto, California 94304

to be sent and delivered by the United States Postal Service according to the directions thereon.

In violation of Title 18, United States Code, Section 1341.

COUNT FOUR

The SPECIAL OCTOBER 1980 GRAND JURY further charges:

1. Paragraphs One through Twenty of Count One of this indictment are realleged herein.
2. In or about October, 1976, in the Northern District of Illinois, Eastern Division,

JOSEPH C. CALANDRA,
MORENO L. KEPLINGER,
PAUL L. WRIGHT, and
JAMES B. PLANK,

defendants herein, for the purposes of executing the aforesaid scheme to defraud, and attempting to do so, knowingly did transmit and cause to be transmitted in interstate commerce, by means of wire communication, certain signs, signals and sounds, to wit: a long distance telephone call between DET and Dr. D.W. Lamb at Chanagro in Kansas City, Missouri.

In violation of Title 18, United States Code, Section 1343.

COUNT FIVE

The SPECIAL OCTOBER 1980 GRAND JURY further charges:

1. Paragraphs One through Six of Count One of this indictment are realleged herein.
2. At all times material herein, the Food and Drug Administration (FDA) was an agency of the United States Government.
3. On or about May 10, 1976, in Northbrook, in the Northern District of Illinois, Eastern Division, and elsewhere,

JOSEPH C. CALABRO,
MORENO L. KEPLINGER,
PAUL L. WRIGHT, and
JAMES B. PLANK,

defendants herein, wilfully and knowingly did make, and cause to be made, false, fictitious and fraudulent statements and representations as to material facts and concealed and covered up material facts, in a matter within the jurisdiction of FDA, to wit: "Report to Monsanto Company, Two-Year Chronic Oral Toxicity Study with TOC in Albino Rats, BTL 71-8, March 21, 1974, IRT No. 9575," which study report was submitted to FDA by Monsanto under cover letter dated May 11, 1976. The aforesaid false, fictitious and fraudulent statements and representations and omissions as to material facts are listed in Paragraph Thirteen of Count One of this indictment and are realleged herein.

In violation of Title 18, United States Code, Section 1001.

COUNT SIX

The SPECIAL OCTOBER 1980 GRAND JURY further charges:

1. Paragraphs One through Six of Count One and Paragraph Two of Count Five of this indictment are realleged herein.
2. On or about December 12, 1976, in Northbrook, in the Northern District of Illinois, Eastern Division, and elsewhere,

JOSEPH C. CALANDRA,
MORENO L. KEPLINGER,
PAUL L. WRIGHT, and
JAMES B. FLANK,

defendants herein, wilfully and knowingly did make, and cause to be made, false, fictitious and fraudulent statements and representations as to material facts and concealed and covered up material facts, in a matter within the jurisdiction of the FDA, to wit: a written explanation to the FDA by IBT regarding IBT's "Report to Monsanto Company, Two-Year Chronic Oral Toxicity Study with TOC in Albino Rats, BTL 71-8, March 21, 1974, IBT No. 9575." The aforesaid false, fictitious and fraudulent statements and representations and omissions as to material facts are listed in Paragraph Fourteen of Count One of this indictment and are realleged herein.

In violation of Title 18, United States Code, Section 1001.

COUNT SEVEN

The SPECIAL OCTOBER 1980 GRAND JURY further charges:

1. Paragraphs One through Six of Count One and Paragraph Two of Count Five of this indictment are realleged herein.
2. On or about December 12, 1976, in Northbrook, in the Northern District of Illinois, Eastern Division, and elsewhere,

JOSEPH C. CALANDRA,
MORENO L. KEPLINGER,
PAUL L. WRIGHT, and
JAMES B. PLANK,

defendants herein, wilfully and knowingly did make, and cause to be made, false, fictitious and fraudulent statements and representations as to material facts and concealed and covered up material facts, in a matter within the jurisdiction of the FDA, to wit: the original version of the study report called "Report to Monsanto Company, Two-Year Chronic Oral Toxicity Study with TOC in Albino Rats, BIL 71-8, March 21, 1974, IRT No. 9575", which was submitted along with the written explanation of the TOC study to the FDA under cover letter dated December 12, 1976 by IRT. The aforesaid false, fictitious and fraudulent statements and representations and omissions as to material facts are listed in Paragraph Twelve of Count One of this indictment and are realleged herein.

In violation of Title 18, United States Code, Section 1001.

COUNT EIGHT

The SPECIAL OCTOBER 1980 GRAND JURY further charges:

1. Paragraphs One through Five and Paragraph Seven of Count One and Paragraph Two of Count Five of this indictment are realleged herein.
2. On or about November 11, 1976, in Northbrook, in the Northern District of Illinois, Eastern Division, and elsewhere,

JOSEPH C. CALANDRA,
MORENO L. KEPLINGER,
PAUL L. WRIGHT, and
JAMES B. PLANK,

defendants herein, wilfully and knowingly did make, and cause to be made, false, fictitious and fraudulent statements and representations as to material facts and concealed and covered up material facts, in a matter within the jurisdiction of the FDA, to wit: a letter and written explanation to the FDA prepared and submitted by IBT dated November 11, 1976 regarding the IBT study report on Naprosyn called: "Report to Syntex Research, Division of Syntex Corporation, 22-Month Chronic Oral Toxicity Study with RS 3540 Albino Rats, January 4, 1972, IBT No. B7922". The aforesaid false, fictitious and fraudulent statements and representations and omissions as to material facts are listed in Paragraph Sixteen of Count One of this indictment and are realleged herein.

In violation of Title 18, United States Code, Section 1001.

A TRUE BILL:

FOREPERSON

UNITED STATES ATTORNEY

Monsanto

Monsanto Company
800 N. Lindbergh Boulevard
St. Louis, Missouri 63166
Phone: 314/ 684-1000

July 18, 1975

Dr. J.C. Calandra
Industrial BIO-TEST Laboratories
1810 Frontage Rd.
Northbrook, Ill. 60062

re: AROCLOR 2-year Rat Feeding Studies

Dear Joe:

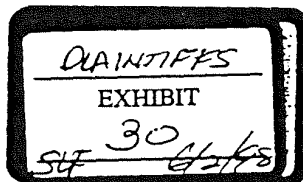
The attached table summarizes a comparison of the 3 revised AROCLOR reports (1242, 1254, 1250).

In 2 instances, the previous conclusion of "slightly tumorigenic" was changed to "does not appear to be carcinogenic". The latter phrase is preferable. May we request that the AROCLOR 1254 report be amended to say "does not appear to be carcinogenic".

The number of hepatomas reported for AROCLORS 1260 and 1242 have been interchanged. This appears to have arisen from confusion regarding the numbering of the animals. The original reports show tumors in animals with numbers in the 100-300 range for AROCLOR 1260 and in the 500 to 800 range for AROCLOR 1242. This leads me to conclude that the numbering scheme shown in the second set of reports is correct. With AROCLOR 1254 confusion is compounded. The original report showed tumors in animals with numbers in the units to teens, but the revised report shows animal numbers ranging from 40 to 1000. Can this be straightened out?

I was unable to reconcile the differences in the animal numbers between the first supplemental report and the original reports, I had inquired as to the changes in the numbers. As I recall, I was told that the sections had been renumbered when the new slides were made and that a key relating to the sets of numbers

100737



RECEIVED
JUL 21 1975 209
BIO TEST

<u>Product</u>	<u>Supplemental Report #1 (mailed)</u>	<u>Supplemental Report #2 (JCC delivered)</u>
<u>AROCLOR 1260</u>		
conclusion	slightly tumorigenic	does not appear carcinogenic
hepatomas	3	7
range of test animal nos:		
p. 9	600 to 800	100 to 300
p. 10	1000 series	800 to 900
p. 11	70 to 100	10 to 40
p. 12	500 to 600	80 to 200
p. 13	600 to 700	200 to 300
p. 14	700 series	200 to 300

<u>AROCLOR 1254</u>		
conclusion	slightly tumorigenic	slightly tumorigenic
hepatomas	6	6

<u>AROCLOR 1242</u>		
conclusion	slightly tumorigenic	does not appear carcinogenic
hepatomas	7	3
range of test animal nos.	as in report #2 for AROCLOR 1260	as in report #1 AROCLOR 1260

Dr. J.C. Calandra
July 18, 1975
Page - 2 -

would be supplied. This has not been done. It may not be necessary for AROCLORS 1260 and 1242, but AROCLOR 1254 remains unresolved.

Insofar as I can see, the remainder of the reports appear acceptable.

Kindest personal regards,

Sincerely,

George J. Levinskas, PhD
Mgr., Environmental Assessment
and Toxicology

/bcp

att.

cc: Dr. George Roush, Jr., M.D.

August 4, 1975

Dr. George J. Levinshas, Manager
Environmental Assessment and Toxicology
Monsanto Company
800 North Lindbergh Boulevard
St. Louis, Missouri 63166

Dear George:

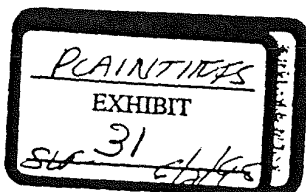
Re: Aroclor - 2 Year Rat Studies

In regard to the comments and questions covered in your letter dated July 18, 1975, pertaining to the above, please note the following:

1. We will amend our statement in the last paragraph on page 2 of the Aroclor 1254 report to read, "does not appear to be carcinogenic" in place of "slightly tumorigenic" as requested.
2. In regard to the animal numbers in the Aroclor 1242 and 1260 reports, they are correct in our final revised report. In the original reports, the Aroclor titles for these two materials were reversed.
3. The animal identification numbers appearing in the reports on evaluation of additional liver sections are the same as those in our original report. The animals were not renumbered.
4. We cannot find any discrepancy in animal identification numbers in the reports (original, re-evaluation, final revision) on Aroclor 1254. However, in the report on re-evaluation of additional liver sections dated March 24, 1975, there was a typographical error on page 1 which referred to Aroclor 1260 instead of 1254. Perhaps this is the basis of your confusion.

I hope that this will serve to further clarify the situation. Thank you for your assistance and cooperation.

Sincerely yours,



J. C. Calandra
President

212

100714

G 02138

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

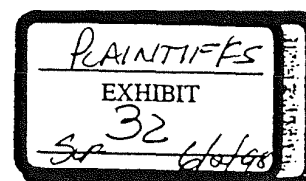
Stan forwarded to me the note you received from Ed Gustaf and the accompanying letter from T. Fujiwara, Managing Director, Nippon Vapor Generator Company, and to H. J. Schickedanz, General Manager, Vapor International. We have been advised by our Japanese representatives of the bran oil poisoning of quite a number of Japanese citizens that was attributed to Kaneclor 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 ingestion 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.

MONS 096865



February 14, 1969
Page 2

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

MONS 096866

January 23, 1969

AROCLORS IN PLANT EFFLUENT

Messrs.

E. G. Wright - ANNISTON
C. P. Buckley - KRUMMRICH

Messrs.

W. R. Richard - WRICOR
W. A. Kuhn - WRICOR
D. B. Hosmer - DHOSE
E. S. Tucker - S. 2W
E. P. Wheeler - EWHEE
G. L. Bratsch - KRUMMRICH
W. D. Papageorge - ANNISTON
D. W. Jackson - KRUMMRICH
B. R. Williams - ANNISTON
J. C. Landwehr - ANNISTON
W. Taffee

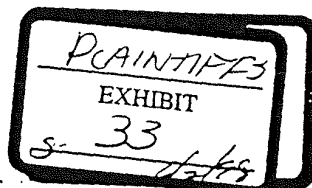
C-O-N-F-I-D-E-N-T-I-A-L

With the likelihood that the attention now being focused on presence of aroclors in natural waters will draw attention to any aroclor being sewered in our production plant outfalls, we should begin to protect ourselves. Since the problem, if any, has not yet been defined, I'm recommending at this time only action preparatory to actual clean up. Please arrange for the following:

1. Waste samples -- Before any clean up action of any kind is taken, we need to know, at least approximately, how much aroclor we are discharging into natural waters via our waste outfalls.

We do not presently have techniques for analyzing water for aroclors in low concentrations. It is expected that these techniques will be developed by late this coming fall. Therefore, please collect, freeze and hold indefinitely three 2-3 liter samples of your outfall as it is discharged to natural surface waters (entrance to Snow Creek at Anniston; outlet of Village waste treatment plant at W. G. Krummrich). Scott Tucker, who is developing the analytical procedures suggests use of polyethylene bottles. Samples should be taken several days apart and should represent normal conditions, including one sample taken at peak loading (e.g. after dropping spent aroclor from P2S5 heat exchanger at W. G. Krummrich).

2. In addition to collecting the samples, commence collecting data on points and amounts of aroclor discharges to sewers and means of disposal alternate to sewerage. This information will help permit us to move rapidly in case a crisis develops. Do not proceed with abatement projects at this time except as in (3) below. Publish report on information developed along with roughly estimated costs. June 1, 1969, appears to be a reasonable deadline at this time for the report, but this could change drastically.



NEV 031181

MAR 02

EQW
NAME - LOCAL IN - PHONE

D. S. Redington - C258 - 4-4958

DATE

February 26, 1987

SUBJECT

Environmental Status
-- Anniston Plant

REFERENCE

H. J. Corbett/D1D
R. L. Fields/C2NJ
R. L. Harness/C2NA
V. T. Mattauci/C5NR
D. D. Mickelson/C2NA

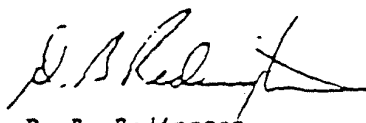
TO

R. G. Potter/G4NH
N. L. Reding/C2NA

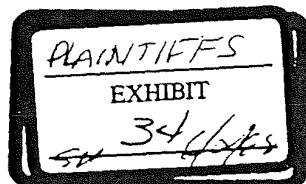
The status of environmental programs and issues at the Anniston Plant was reviewed with Mr. Hal Corbett on February 26, 1987. In view of the present indicated direction of transferring management responsibility for the plant from MAC to MCC, our objectives were to inform Hal of the present environmental setting and direction of the plant and to ascertain any corporate environmental reservations or concerns relative to that transfer.

Dennis Redington of MAC Environmental Affairs reviewed plant status vs. our internal guidelines, and discussed on-going activities to further advance environmental programs at the plant as part of the 1987-88 project for site consolidation -- given the demise of parathion manufacture at the site. Site consolidation is funded by the MAC restructuring reserve and is expected to leave an unexpended variance of about \$2 M in the environmental sector of the reserve. In addition to costs for consolidation, MAC expects to incur on-going costs in the range of \$400 k per year for environmental remedial requirements. Copies of Denny's presentation materials are attached.

A number of future potential environmental issues were identified, which will require continued monitoring and sensitivity. Hal agreed, however, that the plant's assessment, program and corrective action efforts are doing about what should be done given our understanding of site issues. It is further understood that costs for remedy of any future environmental issues that emerge will be borne by the operating companies in proportion to cause. We should continue to maintain a cooperative interaction with the regulators, and to be responsive to local community attitudes to stay ahead of and defuse these future concerns.


D. B. Redington
M. A. Pierle

DBR-MAP:jbb



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ANNISTON PLANT
WORLDWIDE
GUIDELINE STATUS

- #1
 - WATER ASSESSMENT
 - 6/84 PLAN
 - ESSENTIALLY CURRENT
 - NEEDS TO BE RE-DONE
 - AIR ASSESSMENT
 - 2/6/87 REVISION
 - NO NPDES VIOLATIONS
 - 2-7 TSS VIOLATIONS/YR - POTW
 - 1-4 AIR EXCEEDANCES/YR - FLARE BYPASS
 - NO CERCLA REPORTS

- #2
 - IN ESSENTIAL COMPLIANCE WITH ACUTELY HAZARDOUS/
INCINERABLE TIMETABLE
 - ACTIVE SUPPORT OF HAZARDOUS WASTE DATA BASE/REDUCTION

- #3
 - LAST ENVIRONMENTAL AUDIT - 4/85
 - LAST GROUNDWATER ANNUAL REVIEW - 10/84
 - LAST ASSESSMENT UPDATE - 1/83
 - I/M PLAN FOR UG STRUCTURES - 6/28/85

- #5
 - 6 OP'S USED AND LISTED
 - MINOR USE
 - 5/6 ASSIGNED TO OTHERS
 - AUDITS ESSENTIALLY CURRENT (10/86-5/88 NEXT)
 - 5/6 UNDER CONTRACT

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ANNISTON ENVIRONMENTAL REVIEW
ENVIRONMENTAL ELEMENTS
OF
SITE CONSOLIDATION

	<u>S</u>	<u>K</u>
1. DISMANTLEMENT - 12/87		
• 4 PCB TRANSFORMERS		60
• NUCLEAR INSTRUMENTS		6
• UPGRADE 1600 FT. SEWERS		383
• ASBESTOS, P4, MAT'LS DISPOSAL		111
• DECONTAMINATION FOR DISPOSAL/SALE		120
• CONSOLIDATE WTP CONTROL ROOM		92
• MODIFY RCRA DRUM STORAGE		15
2. RCRA CLOSURES		
• LIMESTONE BED - 1/88		104
• LANDFILL - 6/88		150

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	<u>S</u>	<u>K</u>
3. RCRA REMEDIAL ACTION		
• LIMESTONE BED - 6/88		100
• OLD LANDFILL CELLS - 12/87		90
4. ADDED MONITORING WELLS - 12/87		80
• 3 RCRA (DEEP)		
• 4 VOLUNTARY (2 DEEP, 2 SHALLOW)		
5. PCB REMOVAL -- SNOW CREEK		ERAP
6. EXCESS WTP OPERATION TO FACILITATE SHUTDOWN		1370
7. SHARE OF PROJECT ADMIN		<u>315</u>
BUDGET ESTIMATE		2996
RESERVE ALLOWANCE		<u>4900</u>
PLAN VARIANCE		1904

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ANNISTON ENVIRONMENTAL REVIEW

EXPECTED MAC COST BURDEN
FOR
ON-GOING OPERATIONS

	<u>\$ K/YR</u>
1. LANDFILL POST-CLOSURE MONITORING	17 ¹
2. LIMESTONE BEDS POST-CLOSURE MONITORING	9 ¹
3. LANDFILL AND LIMESTONE BEDS REMEDIAL ACTION	300
4. CONTINGENCY (FUTURE PART B NEEDS)	<u>74</u>
	\$400

¹COVERED BY RCRA ACCRUAL

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ANNISTON ENVIRONMENTAL REVIEW

FUTURE
POTENTIAL PROBLEMS

1. CHLORINATED HYDROCARBONS IN GROUND WATER
2. DEEP GROUNDWATER
3. OLD FERRO-MANGANESE LANDFILL
4. POTENTIAL FUTURE MOBILIZATION OF SOIL
CONTAMINANTS
 - PCB'S
 - MERCURY
 - ORGANOPHOSPHATES
 - PNP
 - OTHER

RESOLVED:

ANY FUTURE ENVIRONMENTAL COSTS TO BE BORNE BY
OPCO MOST CLOSELY RELATED TO CAUSE

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ANNISTON PLANT
CHLORINATED ORGANICS
IN
GROUNDWATER

<u>DATE</u>	<u>WELL</u>	<u>PPB</u>	<u>FOUND</u>
4/82	MW-7	11 48	1,2-DICHLOROETHENE TRICHLOROETHENE
	MW-8, 9	— CLEAN	
3/83	MW-7, 8, 9	— CLEAN	
4/84	MW-7	— CLEAN	
	MW-8	TR	1,1,2,2-TETRACHLOROETHANE
	MW-9	TR	METHYLENE CHLORIDE
5/85	MW-7	7 18 29	1,2-DICHLOROETHENE TRICHLOROETHENE 1,1,2,2-TETRACHLOROETHANE
6/85	PROD'N	5 4 10 31 TR	CARBON TETRACHLORIDE CHLOROFORM METHYLENE CHLORIDE TRICHLOROETHYLENE BENZENE
2/86 ¹	PROD'N	NO 3,4,4 282,41,13 9,16,16 8,6,6	CARBON TETRACHLORIDE CHLOROFORM METHYLENE CHLORIDE TRICHLOROETHYLENE BENZENE

¹THREE SUCCESSIVE SAMPLES

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