ENVIRONMENTAL PROTECTION AGENCY

BEFORE THE ADMINISTRATION

In re:
Proposed Toxic Pollutant
Effluent Standards for
Aldrin/Dieldrin, et al.

FWPCA (307) Docket No. 1

COMMENTS OF

WESTINGHOUSE ELECTRIC CORPORATION

Presented by

Dr. James H. Wright
Director
Environmental Systems Department

March 15, 1974

MONS 088619

County of Allegheny)
) S S
State of Pennsylvania)

AFFIDAVIT

My name is James H. Wright. I am Director of the Environmental Systems Department of the Westinghouse Electric Corporation, and am authorized to execute this affidavit on behalf of the Corporation. I have reviewed the foregoing Comments of Westinghouse Electric Corporation filed at FWPCA (307), Docket No. 1. The Comments were prepared under my supervision and direction. The material contained in the foregoing Comments is true and correct to the best of my information, knowledge and belief.

James H. Wright

James H. Wright, Director
Environmental Systems Department

Subscribed and sworn to before me
this 15th day of March, 1974.

Rebecca A. Lorince

Notary Public

My Commission expires

REBECCA A. LORINCE, NOTARY PUBLIC
MONROEVILLE BOROUGH
ALLEGHENY COUNTY
MY COMMISSION EXPIRES APRIL 15, 1977

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I. INTRODUCTION

These comments are filed on behalf of Westinghouse Electric Corporation in connection with the hearings being conducted by the Environmental Protection Agency on Proposed Toxic Pollutant Effluent Standards for Aldrin/Dieldrin, et al (FWPCA (307), Docket No. 1). The comments have been prepared under the direction of Dr. James H. Wright, Director of the Environmental Systems Department of Westinghouse and are limited to consideration of standards for polychlorinated biphenyls (PCB's). A copy of Dr. Wright's qualifications are attached to these comments.

The Westinghouse Transformer Divisions and the Westinghouse Distribution Apparatus Division are users of a substantial quantity of polychlorinated biphenyls in the production, for sale to their customers, of capacitors and transformers. The (W) R & D Center has done considerable precision work in the analyses of PCB's. The Environmental Systems Department is charged with the responsibility of assisting industry and government regulating agencies in quantifying environmental problems and assisting in devising solutions to these problems, and in this connection it has reviewed and analysed the environmental aspects of the proposed regulations for PCB's.

A review of the scientific information indicates the proposed regulations are unreasonable, unworkable and impractical. These comments detail the reasons for this conclusion. As set forth below, we believe that an environmentally acceptable regulation of PCB's can and should be adopted which will not have the costs associated with the proposed regulation.

These comments are divided into six sections as follows:

I. Introduction

II. Westinghouse Position on Proposed Standards

III. History of PCB Usage

IV. Requirements of the NEPA of 1969 and the FWPCA Ammendments of 1972

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V. Consequences of Proposed Standards

VI. Summary and Recommendations

II. WESTINGHOUSE POSITION ON PROPOSED STANDARDS

A. The numerical derivations of the discharge limits are highly questionable.

1. The concept of a single standard for PCB's does not seem valid. The PCB isomers used commercially, categorized according to the degree of chlorination, differ greatly in viscosity, water solubility, biodegradability, persistence and toxicity. Most of the environmental and toxicological data used in derivation of the proposed effluent standards refer to the higher chlorinated, more persistent PCB isomers while many and perhaps most of the effluents to be regulated contain primarily the lower chlorinated, less persistent isomers. The environmental impact of a PCB containing discharge depends upon factors such as the types of the PCB in the effluent; the sedimentation rate of the receiving water; the types of biological food chains present; and the existing loading of other toxic materials in the receiving water. The proposed standards ignore these factors and consider only stream flow and amount of PCB material discharged.

2. The selection of a "factor" to account for the biological reconcentration of the discharged material must be, by necessity, an educated guess, because the limited data available give a broad range of numbers due to the use of different test animals and different experimental conditions. Although the 30,000 factor selected for reconcentration of PCB's by fish in the marine environment falls within the range of available data, the 200,000 factor selected for freshwater fish appears to be indefensible with the available data. For example, the data presented in Table 7, pg. 100 of the Interdepartmental Task Force on PCB's report dated May 1972 shows a reconcentration factor range of 12,000 to 76,000.

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3. Use of the 0.5 ppm level as the limit in fish is unduly conservative because this limit proposed by FDA applied to feed stock levels only. Navigable waters are seldom used as controlled feed stock sources for any husbandry activity. Such action would normally be prohibited by state laws protecting aquatic species. The PCB standard should be concerned with the 5.0 ppm level allowed for human consumption except in such cases and water systems which are used as a source of feedstock. Other federal agencies routinely incorporate a consideration of the actual food chain consideration on a case-by-case basis in establishing and enforcing regulations.

B. A review of techniques for removal of materials such as PCB's from the water has revealed that no commercial operation is now in effect. Furthermore, there is no proven technology on which such a technique might be based.

Two techniques for removal of PCB's from water have been suggested which after considerable research effort over an extended period of time may be shown to be effective. The first of these is carbon adsorption. While we have no data nor have performed any experiments along this line, a practical system might be developed sometime in the future.

The other technique which could find some usage here would be reverse osmosis. While no experimentation has been performed to date that we are aware of, the reverse osmosis contacts have advised us that there is a possibility of using this technique. However, again capital costs are expected to be extremely high and operating costs probably would exceed that of the activated carbon system.

In addition, in using the R.O. system and the adsorption system, disposal of the concentrate would be a problem.

The EPA explicitly states that "the attached standards are not based upon....the availability of treatment technology". (see page 35389 of F.R., Vol. 38,

No. 247 dated December 27, 1973) from which we derived that the EPA also acknowledges that no suitable treatment method exists.

C. The proposed standards are unworkable from an analytical point of view because the known methods for monitoring effluents are not sensitive enough to determine PCB's at the required compliance levels. To show compliance with the minimum allowable daily discharges at the Westinghouse facilities would require detection of PCB's at effluent concentrations less than 0.1 microgram per liter, while standard methods, under the best conditions, allow estimation of PCB's only at levels greater than 1.0 micrograms per liter. Even at these higher levels, the data obtained are at best semi-quantitative and subject to uncertainties on the order of plus/minus 100 percent.

D. In the definition of PCB's as 210 possible different PCB compounds, Section 129.09a does not recognize the differences in the individual PCB's which have been found by the government research summaries. Because the environmental contamination and toxic effects attributed to PCB's appear to be related to the homologs containing more than 4 chlorine atoms per molecule, and because available evidence indicates that the PCB homologs with 4 chlorine atoms or less per molecule are biodegradable, the lesser chlorinated PCB's should be considered separately under less restrictive standards than the greater chlorinated PCB's. A definition providing for these differences could substantially reduce the adverse economic and social impacts of the proposed standards without lessening the effective protection of the environment.

III. HISTORY OF PCB USAGE

Polychlorinated biphenyls consisting of many different chemical compounds have been manufactured by Monsanto Company since 1929 and sold under the trade name Aroclor. Since that time the various isomers have been distributed throughout industry for all types of applications including plasticizers for plastics, paints and paper coatings as well as for heat transfer liquids and liquid dielectrics used in capacitors and transformers. The Aroclor PCB's were compounded by the consumers into various compositions and, in the electrical industry, were resold as liquid dielectrics under various trade names. The Westinghouse trade name is Inerteen. After a number of years, an industry name Askarel came into use as the generic term for polychlorinated biphenyls used in capacitors and transformers.

The growth in the use of Aroclors continued and reached a peak in 1970 of approximately 80 x 10^6 lbs. It was determined in the few years prior to 1970 that PCB's had a deleterious effect on the environment so that effective August 30, 1970 Monsanto voluntarily discontinued the sale of Aroclors for all modifier and plasticizer applications. (Exhibit I). Later, effective December 15, 1971 Monsanto discontinued the sale of PCB's for heat transfer applications, thereafter, offering the sale of PCB Aroclors only for use by the electrical industry. (Exhibit II). In 1970, about 50% of the usage of Aroclors was by the electrical industry -- 40 x 10^6 lbs. This usage divided approximately two-thirds in capacitors -- 26.67 x 10^6 lbs. -- and one-third in transformers -- 13.33 x 10^6 lbs. At the same time Monsanto discontinued the sale of Aroclors for non-electrical applications, the electrical industry was cautioned by Monsanto about the PCB environmental problem. Westinghouse took strong measures to further limit the amount of PCB's entering the environment as the result of manufacturing operations (Exhibit III). Drains in manufacturing areas where PCB's were used were sealed. All waste matter was collected in specially marked containers

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in the factory. This material was subsequently sent to incinerating plants we understood were designed to consume the PCB's at temperatures that would destroy them. When accidental spills occurred in a manufacturing location, the material was absorbed with industrial absorbents and this material was sent to incineration plants. All possible precautions were taken to minimize the flow of PCB's from Westinghouse plants into nearby streams or sewage systems. Despite all of the precautions, there is an irreducible effluent limit below which manufacturing operations cannot be continued.

Westinghouse also conducted extensive evaluation programs leading to the use of Inerteens (PCB's) having relatively low persistence and high biodegradability in the environment. For many years, Westinghouse used Aroclor 1260 diluted with trichlorobenzene and thereafter used Aroclor 1254 diluted with trichlorobenzene. After thorough testing, including field tests, it was determined that Aroclor 1242 would be suitable as an Inerteen, and in February 1968, the use of this material was initiated in all Westinghouse transformers. According to Monsanto, Aroclor 1242 contains about 91% of the lower isomers (containing four chlorines or less) that more readily biodegrade in the environment. This material has been used by Westinghouse since that time with the understanding that over 90% of any small amounts that did enter the environment would have relatively low persistence.

At a later date Monsanto refined Aroclor 1242 to remove more of the higher chlorine containing isomers to produce a material designated as Aroclor 1016. By the first quarter of 1972, this material was introduced by Westinghouse into the manufacture of all capacitors which up to that time had always been filled with Aroclor 1242. The new material, Aroclor 1016, according to Monsanto contains 99% of the more biodegradable isomers (four chlorines or less) so that

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less than 1% of this material escaping into the environment would be highly resistant to biodegradation.

Dating from the time of first manufacture of PCB's, it is estimated that the non-electrical uses accounted for 95 to 99% of the entrance of these materials into the environment. Since the non-electrical usage of PCB has been discontinued, there are perhaps only about 50 locations in the United States where PCB's are still used in the manufacture of electrical apparatus.

IV. REQUIREMENTS OF THE NEPA OF 1969 AND THE FWPCA AMENDMENTS OF 1972

A. Requirements

We urge you to establish guidance in your regulations for toxic substances on the basis of the principles of the National Environmental Policy Act of 1969. Your proposed standards should incorporate the added dimensions of economic and social as well as environmental impact.

Section 101(a) of NEPA commits the federal government to "... to use all practicable means and measures ..... in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony and fulfill the social, economic and other requirements of present and future generations of Americans."

Section 102 authorizes and directs to the fullest extent possible that the policies, regulations and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this Act.

Specifically, it calls for an impact statement relative to each decision, regulation, or recommendation for legislation having a significant effect on the environment. This impact statement must contain the following:

(i) the environmental impact of the proposed action,

(ii) any adverse environmental effects which cannot be avoided .....,

(iii) alternatives to the proposed action,

(iv) the relationship between local short-term uses of man's

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environment and the maintenance and enhancement of long-term productivity, and

(v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

The interpretation of this law in the courts has added the requirement that a benefit-cost analysis of proposed actions be evaluated.

But the basic principle of the law is to guide these important decision processes so that both man and nature can live in productive harmony. The specific provisions require that the short and long-term effects of proposed and alternate actions be analyzed so that a balancing of benefits and costs can be made. Thus, this innovative statute for protecting social values recognizes the essential aspects of trade-offs.

EPA, in promulgating effluent standards pursuant to the Federal Water Pollution Control Act Amendment of 1972 may not be required by NEPA to file an environmental impact statement. However, can the EPA afford to be less thorough, in its considerations when establishing standards, especially when the law P.L. 92-500, administered by the EPA further requires consideration of the relationship of economic and social costs in establishing and enforcing effluent limitations, including economic or social dislocations in the affected community, to the social and economic benefits to be obtained (including attainment of the objectives of the Act).

B. Application to Proposed Toxic Pollutant Standards

Have the principles set forth above been met in the Proposed Toxic Pollutant Standards of December 27, 1973? The answer compelled by the contents of the proposed standard in the Federal Register is NO!

On page 35389 of the Federal Register, it is explicitly stated that "the attached standards are not based upon economic considerations or upon availability of treatment technology. However, the impact of the standards upon the

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V. CONSEQUENCES OF PROPOSED REGULATIONS

A. Economic Impact of Proposed Regulations

Introduction

A study of the economic impact of the proposed environmental water effluent standard is a study of the many alternatives that possibly meet the standard directly or indirectly. For each alternative, the economic impact has two parts: the impact on the manufacturer using PCB's in his product who is directly affected by the effluent standard and the impact on the consumer. Most assuredly, the laws of our economic environment imply that whatever the impact on the manufacturer the impact on the consumer will be at least equal, if not greater.

1. Use & Significance of PCB's in Transformer Designs

a. Existing Transformer Designs

Although the basic materials of core and coil construction of all transformers are essentially the same, the environment within the transformer tank or enclosure can be different. Principally three environments are used:

1) Mineral Oil

2) PCB's

3) Dry (i.e. no liquid)

b. Why PCB's in Transformers?

Where failures resulting in fires and explosions may not represent serious threat to life, mineral oil transformers are used. These designs represent most of the power transformer applications. However, fire underwriters generally will not accept the use of flammable liquids for indoor transformers and electrical codes will not permit flammable liquid filled transformers in congested areas or buildings. As a result, non-flammable PCB filled transformers are used whenever fire protection is important and laws demand. Most are installed in and on buildings or at close proximity

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to buildings. Whenever fire and explosion are concerns, PCB filled transformers meet the requirements without additional containment. Based on availability of non-flammable transformers, considerable construction has already begun or has been designed. Delaying these projects to incorporate a substitute for the PCB transformers would result in significant financial hardship in a market of around 1 billion dollars.

2. Alternatives

a. Existing Plant, Existing Product, Refurbish Manufacturing Process

Economically this is the most attractive alternative for manufacturer, utility and consumer. However, the controls on the manufacturing process and/or new manufacturing techniques are not available to meet the proposed standard. There exists a serious question whether it is technically feasible to develop such controls. This alternative could be economically attractive but proves to be an alternative more technically limited than economically limited.

b. Existing Plant, Substitutive Product

There are two technically feasible alternatives to PCB filled transformers: (1) mineral oil filled and (2) dry. Each type has its own advantages and disadvantages.

In itself, a mineral oil filled transformer is more economical than a PCB filled transformer. Oil is substantially less expensive than PCB's. Overall, the PCB filled transformer is 25% - 35% more expensive than the oil-filled unit. As a result, in many applications, mineral oil transformers are preferred. However, a mineral oil transformer cannot directly substitute for a PCB transformer, where PCB transformers are presently being used. Flammability is the primary consideration. With mineral oil transformers, to meet the laws, electrical codes, and fire underwriters requirements, significant installation costs would be incurred by the user to make the mineral oil

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transformers safe. These costs may result from the use of fireproof vaults in buildings, or, where land availability permits, outdoor substations. The effective cost of the transformer that must be paid by the utility customer would approach twice the cost of the PCB transformer.

The dry type transformer offers comparable nonflammability of a PCB transformer. Lacking a flammable oil, it could satisfy the legal requirements. However, for the manufacturer it is a more expensive transformer to make, and for the utility, a more expensive transformer to buy. The dry type transformer is very likely to cost 30% to 60% more than a PCB transformer. They are somewhat larger and heavier. Also, dry type units are 5-10 db. noisier.

To achieve a sound level equivalent to a PCB unit of the same rating, utilities must pay a premium in price of approximately 10% for a typical unit. Furthermore, dry type transformers do not have the overload capacity of a liquid (PCB or oil) filled unit. Liquid filled units would easily survive overload conditions that would cause the failure of a dry type unit.

c. Existing Plant, New Technology

New technology would concentrate on the development of a new liquid to fill the transformer. Assuredly, adjustments (and strategic expense) would occur to modify present transformer designs. The significant expense would occur in the discovery and development of the new liquid. Ideally, it would approach the desirable characteristics of PCB, particularly nonflammability while improving biodegradability. In all likelihood, development of an acceptable substitute for PCB having good nonflammability characteristics will result in more expensive transformers, but it could easily be the best alternative technically.

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Development efforts indicate a silicone-based fluid may be an alternative to PCB. It has better non-flammability characteristics than mineral oil, but is not sufficient to meet all existing codes and decomposition products (gases) are highly combustible (explosive).

d. New Plant, Existing Product

If unable to meet proposed standards at the existing plant location, an alternative is the construction of a new plant. This constitutes an unusual investment decision for any manufacturer. Very careful examination of market and potential profit is required before investment is permitted.

Assuming that it is economically justified, the new plant also creates a social impact. Aside from the employees (and families) that undergo relocation, a much larger quantity of former employees will be out of work. The effect will multiply throughout the community. It represents lost purchasing power to the community and a social burden in supporting the unemployed.

3. Significance & Use of Power Capacitors with PCB

Capacitors are used in electric utility power systems to reduce the current carried by transmission and distribution circuits, thereby reducing the electrical losses, and to supply KVAC necessary to maintain system voltage.

Transmission losses are significant to a utility. Even with the large quantity of capacitive compensation presently installed, transmission losses are approximately 10% of the energy transport. The lost energy could conceivably double if capacitors were not available for transmission. As an illustrative example of the present transmission losses, the entire output of presently installed generation at Grand Coulee Dam is required to supply the losses of the Bonneville System.

Unlike transformers where only a fraction of the units use PCB's, almost all capacitors use PCB's. Since its introduction into capacitors, more than

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30 years ago, it has resulted in significant improvements to capacitor reliability, reduction in size to make capacitors compatible with installation requirements, and enabled the manufacturing to lower the $/KVAC price of capacitors. The advantages of PCB's in capacitors clearly extends beyond its inflammability; it represents a significant economic and technical improvement over other designs.

4. Alternatives

a. Existing Plant, Existing Product, Refurbish Manufacturing Process

The same comments apply here as were stated under "Transformers", Section V,2,(a).

b. Existing Plant, Substitutive Product

It is technically feasible to go back to old, less efficient technology: mineral oil capacitors. However, designs of this type will be considerably more expensive. For technical reasons, alone, the expected cost to manufacture would be 3.5 to 4 times a PCB capacitor. In large part, this is due to the difference in dielectric constant of mineral oil (2.25) and PCB (5.85). The mineral oil capacitor precludes use of film/paper designs, forcing the manufacturer to physically large units for a given rating to maintain equivalent reliability. The net result is an approximate doubling of capacitor size or, in the present capacity limited situation, a 50% reduction in quantity of capacitance (KVAC) available to utilities. Investment by capacitor manufacturers to increase supply capabilities would not have an immediate significant effect on the supply of capacitors. In addition is the fact that it takes at least 1 to 2 years to build a new plant. The supply of special capacitor grade paper is expected to continue at its present rate. To meet the demand of capacitor manufacturers (and utilities), the paper supply would

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have to double. A similar situation exists for mineral oil. The net result would be an additional price increase.

With the yearly market for power capacitors presently estimated at $\$35 \times 10^6$ and an industrial capacitor market about double that figure, the additional cost to utilities would be over $100 million dollars per year, if the same output could be maintained. Over the short term at least, the total cost to utilities would be even more. With only 50% of the capacitors available, 50% of the planned transmission compensation could not occur. Additional fuel would be spent to provide for the extra transmission losses.

Mineral oil capacitors are flammable. Utilities would have to assume protective measures such as locations in "safe areas" away from congested areas or buildings, or locations in protective fireproof vaults. Fire insurance would be more expensive. As a result, the installation cost of capacitors would increase, increasing the cost to the customer even more.

c. Existing Plant, New Technology

New technology for capacitors concentrates on development of a new fluid. Aside from the common problem of flammability for alternatives suggested in technical literature, possible replacement liquids (representing untried new technology) generally lack either a sufficiently high dielectric constant to keep capacitor size down or a sufficiently high dielectric strength to maintain reliability of a PCB capacitor. In any case the state of the art indicates that the solution to the problem of an insulating fluid would fall between the limits of flammability, biodegradability, and cost defined by PCB and mineral oil. Unless it approaches PCB in electrical characteristics, the economic penalty would be high.

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d. Substitutes for Capacitors

Without capacitors, I^2R losses on transmission and distribution systems rise. Fuel must be expended to supply the losses. As an illustrative example, assume that presently installed transmission and distribution (and associated capacitors) remain in service. Furthermore, assume that engineering plans for future transmission and distribution additions do not change, but, after actual construction, capacitive compensation is not included. Conservatively, this would result in additional losses equivalent to at least 5% of the load. By 1983, the electric generation equivalent of 1/2 million barrels of oil/day would be required to supply system losses capacitors would otherwise compensate. In addition, the available power from transmission and distribution systems would be reduced, requiring more transmission and distribution lines. Extra generation capacity would of necessity be added to cover losses. Devices to regulate voltage would be added, too. The net effect would be considerable capital expense -- many multiples of the capital investment for power capacitors. This would be in addition to the direct expense of fuel and very significant maintenance costs associated with sophisticated equipment required to replace capacitors.

e. New Plant, Existing Product

The same comments apply that are given in Section V,2,d.

B. Environmental Consequences of Proposed Regulations

The environmental impacts of PCB's would remain essentially unchanged since as described previously in discussing the history of PCB usage, PCB's are no longer available for uncontained uses. At the levels found by the Interdepartmental Task Force: (1972)

1) not to appear to present an imminent hazard (to humans)

2) be viewed as potential problems at present environmental levels

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C. Social Consequences of Proposed Regulations

The social costs impairing the national electrical distribution system would impact essential manufacturing, farming, food processing, lighting, heating and shelter of all Americans are truly incalculable. In addition, life and death related systems such as medical care, safety and communications could also be affected by the lack of adequate power.

As indicated elsewhere due to the high PCB backgrounds relative to current controlled discharges, the standards might be met most easily by moving the plants to uncontaminated areas.

However, this would not accomplish a reduction in the PCB background and could result in a movement of 2000-5000 workers. This in turn would affect totals of 8000-20,000 workers and their families. Since for every 100 jobs directly affected by an industry about 70 secondary jobs are affected, the totals of workers and people affected would be projected as:

Workers - 3400 - 8500

People - 13,600 - 34,000

Alternatively, the manufacturers of capacitors and transformers could be moved out of the United States. This would be possible based on off-shore manufacturers of PCB's in Europe. The capacitors and transformers could then be imported with an unfavorable impact on balance of payments to the extent of $20,000 annually per employee or 68 to 170 million dollars annually and the loss of the number of jobs shown above.

All of the social impacts of this move would occur without measurably changing the PCB's in the environment, or in turn, reducing the environmental impacts.

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VI. SUMMARY AND RECOMMENDATIONS

We fully recognize EPA's legislative requirement to propose effluent standards for toxic substances. While the toxicity of PCB's to humans has not been fully substantiated, we would agree with the judgment that PCB's should be treated as a toxic substance.

We have opposed the effluent limit proposed on December 27, 1973 by EPA on the following basis:

(1) There is no presently available technology or process for removing PCB's from plant effluents; therefore, the proposed limits violate the statement and intent of the Federal Water Pollution Control Act (1972).

(2) The proposed effluent concentration limits are below detectable limits for routine analytical procedures and, therefore, cannot be properly dealt with.

(3) The technical basis for the proposed limitation incorporated two factors which are not technically justified:

a) The 200,000 to 1 reconcentration factor for fresh water is well outside of the vast majority of results in the technical literature and is, therefore, unduly conservative.

b) The use of 0.5 mg/kg as the maximum allowable tissue level for the derivation of the tolerable chronic limits appears to be more a case of back-fitting to a previously established limit of the FDA proposed tolerance for PCB residues in complete animal feeds rather than an evaluation of existing toxicity data. Better justification exists for selecting instead of the FDA proposed tolerance limit of 5.0 mg/kg for PCB residues in fish for human consumption. A general description of many of the factors which have already been

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considered is given in the April 1972 issue of Environmental Health Perspectives. Differences in concentrations between Aroclor types in the same media present a wide variation as shown in Table 1, pg. 160 of this document.

(4) The aribitrary limitation of dilution effect to 10,000 cfs is unreasonable -- placing undue hardship on operations far in excess of any environmental benefits.

(5) The broad classification of all PCB's under a single effluent limit is unreasonable and does not reflect credit to operations which have moved to lower chlorine content, biodegradable compounds.

(6) The proposed effluent standards would require a total retention of PCB's from the entire industry of 99.9999% of all PCB's produced. Operations with such constraints are clearly impracticable. A cursory analysis of the environmental inventory of PCB's resulting from the last 30 years of operations using a 10-year environmental half life of PCB's clearly indicates that environmental contamination from prior operations throughout the nation will far exceed the contamination from present operations until far into the next century. For the next 10 years, for example, prior contamination from all uses of PCB's will exceed that from current operations by a factor of more than 100 if current operation is held to a 1% leak rate.

In the absence of an analysis by EPA detailing the social, economic and environmental effects of the proposed and alternate control strategies for PCB's and without the accompanying cost benefit statement supporting the proposed effluent limit, EPA's proposal is unjustified and should not be promulgated.

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Recommendations:

Consistent with paragraphs (1) and (2) of Section 302 of the Federal Water Pollution Control Act Amendments of 1972, we propose an interim effluent limit requiring producers and users to limit their releases to 1% of the quantity processed and to examine, on a case-by-case basis, the resultant environmental effect which would be limited for any situation to the 5.0 ppm content for human consumption and further restricted to 0.5 ppm in those cases where the top of the aquatic food chain species were used as the principal feed stock in a husbandry program.

Such a standard could probably be implemented by improved processing and handling techniques without requiring special treatment facilities for which no process is presently available. It would also assure that the total environmental burden of PCB's would be continually and rapidly reduced by holding ongoing operational effluents to a small fraction of prior contamination.

In the longer term, I would urge EPA to undertake such studies, investigations and development as necessary to provide a substantial technological basis for effluent limits of the various classes of PCB compounds and methods for treatment and removal, all as provided for under P.L. 92-500. After development of adequate technical information, alternate control strategies could be considered along with the economic, environmental and social impacts associated with these various control strategies with final decision made on a cost benefit basis.

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QUALIFICATIONS OF JAMES H. WRIGHT

I am James H. Wright. I am Director of the Environmental Systems Department of the Westinghouse Electric Corporation. I hold a bachelors' degree, a masters' degree, and a doctor of philosophy degree in chemical engineering. I have been working in the fields of pollution abatement and energy use for more than 20 years and have published more than 70 papers in the technical literature, and hold numerous patents for pollution abatement processes. My scope of work has included design, research and development, construction, and operation of energy use processes including the abatement of pollution and environmental effects.

I am a member of several professional societies including the American Institute of Chemical Engineers, the American Society of Engineering Education, the American Nuclear Society, and I am a registered engineer in the State of Pennsylvania. I am a consultant to various government agencies -- including President Nixon's National Water Commission. I am serving on the Committee on Power Plant Siting for the National Academy of Engineers.

I am a dedicated conservationist, an ardent fisherman, an amateur mountaineer, and maintain active membership in the Sierra Club, Trout Unlimited and other environmental organizations.

The Environmental Systems Department is charged with the responsibility of assisting industry and government regulatory agencies in quantifying environmental problems and assisting in devising solutions to these problems.

My staff consists of over 70 full-time professionals in the areas of marine biology, aquatic ecology, meteorology, radioecology, terrestrial ecology, landsacpe architecture, oceanography, public health and systems engineering. Our staff is supplemented by more than sixty part-time consultants. Our Department has conducted environmental studies for industry or government agencies in over half of the fifty states in the United States, the Commonwealth of Puerto Rico, Italy, France, Romania and Japan and are internationally recognized experts in the environmental impact of power systems operations. We conduct the Westinghouse International School for Environmental Management each year.

Monsanto

Monsanto Company
800 N. Lindbergh Boulevard
St. Louis, Missouri 63166
Phone: (314) 694-1000

June 1, 1970

Dear Customer:

You have received our letter mailed February 27, 1970 notifying you of the allegations that certain polychlorinated biphenyls (PCBs) had been found in the environment and were contaminants. Since that time other reports concerning PCBs have been published. An examination of the PCB matter has indicated that their use in synthetic resin compositions may be a source of the alleged environmental contamination.

Monsanto has sold PCB-containing materials under the trade name of Aroclor®. These Aroclors® included:

Aroclor® 1232
Aroclor® 1242
Aroclor® 1248
Aroclor® 1254
Aroclor® 1260
Aroclor® 1262
Aroclor® 1268
Aroclor® 4465
Aroclor® 1100 Series
Montar® 1

Toluene or xylene blends of the above products also contained PCB.

In review of the allegations which have been made concerning PCBs, and being a concerned and responsible member of the world community, we have come to a decision to discontinue the sale of PCB-containing products for modifier and plasticizer applications effective August 30, 1970.

Recognizing that this action will result in research effort on your part to find adequate replacements, we have prepared a series of data sheets outlining suggested alternatives for most applications. Copies of the report for your application may be obtained by calling the regional office closest to you as shown on the attached sheet.

We urge that you consider initiating now any necessary work on your part to effect the change to a new material. We stand ready to assist you in any way possible.

Very truly yours,

W. E. Schalk
Director of Sales
Plasticizers

ek

Attachment

Monsanto

MONSANTO INDUSTRIAL CHEMICALS CO.
800 N. Lindbergh Boulevard
St. Louis, Missouri 63166
Phone: (314) 694-1000

December 15, 1971

Dear Sir:

We are writing to advise you that, effective this date, Monsanto will no longer sell the Therminol® FR series of heat transfer fluids. This important decision by Monsanto's management has been carefully considered.

The Therminol® FR series of fluids contain polychlorinated biphenyls (PCBs). As we have previously advised you, studies indicate PCBs may be accumulating in the environment. In some instances, PCBs have been found in food or in the food chain. An article by Carl G. Gustafson of the Federal Water Quality Administration appearing in "Environmental Science & Technology" and dealing with this subject is attached for your information.

Because of Monsanto's concern over this problem, we have discontinued sales of PCBs where the usage was in so-called "open systems." We have discontinued sales of Therminol® FR materials where the usage would be in food processing applications. In addition, we have encouraged Therminol® FR fluid customers to switch to other materials.

As a result of these efforts, many of our heat transfer fluid customers have switched from Therminol® FR series fluids to other materials or systems.

Our action in discontinuing sales for use in heat transfer systems has been taken because of the problems which may arise should there occur accidental leakage of PCBs from such systems. We believe this action is in the best interest of all our customers who have continued using these materials in heat transfer applications.

a unit of Monsanto Company

In order to help you accomplish a change-over from Therminol® FR to another heat transfer fluid with the least difficulty, Monsanto will offer you the following special services:

1) We have assembled a team of experienced engineers who will be available to visit your plant on request to consult with you on available alternatives. Of course, the decision is and will be yours as to how you elect to proceed. If you consider such a service would be of assistance to you, please telephone (314) 694-2514, or write directly to Dr. Cumming Paton, Monsanto Company, P. O. Box 14617, St. Louis, Missouri 63178.

2) We will pay freight costs incurred in returning the Therminol® FR to us and will properly dispose of the material (by high temperature incineration) at our cost. We will contact you concerning instructions about drainage, drumming and shipping of material to our facility in St. Louis.

3) We will accept return of any unopened drums of Therminol® FR series products which may be in your possession and credit you for this material at full purchase price if returned to us prior to March 1, 1972.

We sincerely regret any hardship that this decision may cause you, but feel you will agree Monsanto has made the correct decision.

Yours sincerely,

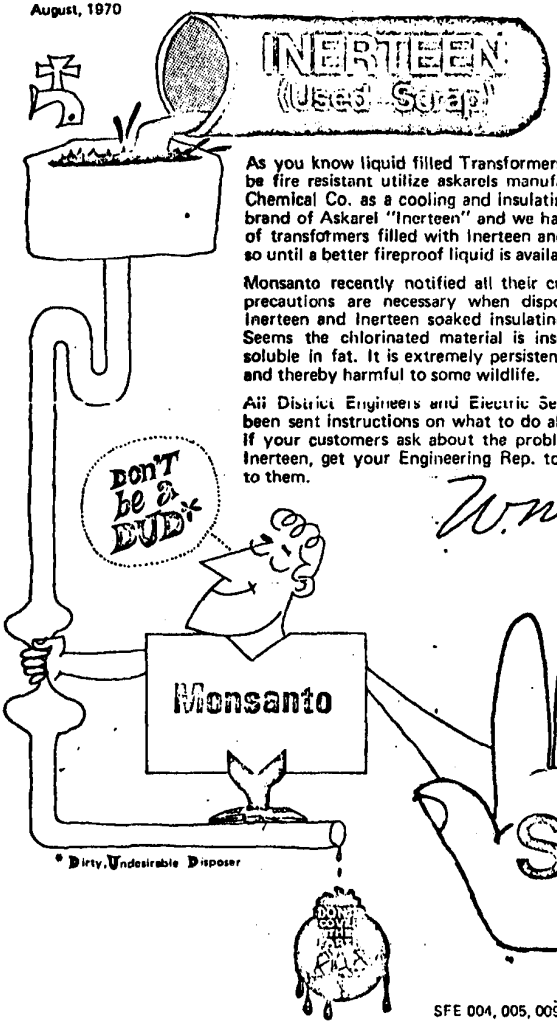
Howard Bergen

Howard Bergen, Director
Specialty Products Group
Monsanto Industrial Chemicals Company

Attachments

POWER TRANSFORMER DIVISION, SHARON, PA.

SALES LETTER 70-5
FILE 48-000
August, 1970



As you know liquid filled Transformers that are required to be fire resistant utilize askarels manufactured by Monsanto Chemical Co. as a cooling and insulating liquid. We call our brand of Askarel "Inerteen" and we have shipped thousands of transformers filled with Inerteen and will continue to do so until a better fireproof liquid is available.

Monsanto recently notified all their customers that special precautions are necessary when disposing of used, scrap Inerteen and Inerteen soaked insulating materials, rags, etc. Seems the chlorinated material is insoluble in water, but soluble in fat. It is extremely persistent in our environment and thereby harmful to some wildlife.

All District Engineers and Electric Service Engineers have been sent instructions on what to do about the problem, so if your customers ask about the problem of disposition of Inerteen, get your Engineering Rep. to explain the remedy to them.

W. M. Oliver
Marketing Manager
Power Transformer Division

MONS 088645

EXHIBIT III

SFE 004, 005, 009-014, 024-045, 051, 052

MH 184