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REAL ESTATE
AND CONSTRUCTION
OPERATION

November 21, 1973

Dr. C. Hugh Thompson, Chairman
Hazardous and Toxic Substance
Regulation Task Force
Office of Water Program Operations
Environmental Protection Agency
Washington, D.C. 20460

SUBJECT: COMMENTS ON TOXIC POLLUTANT EFFLUENT
STANDARDS (38 FR 21342, Sept. 7, 1973)

Dear Dr. Thompson:

In the above Federal Register announcement, the Environmental Protection Agency invited comments that might assist it in setting effluent standards for the pollutants on EPA's first list of toxic pollutants. On behalf of the General Electric Company, I am pleased to submit for your consideration the following comments that we believe are relevant to the establishment of effluent standards for polychlorinated biphenyls (PCBs). The General Electric Company is a major manufacturer of sealed capacitors and transformers that incorporate PCBs as insulating liquids.

COMMENTS

In promulgating its list of toxic pollutants, EPA stated that "Polychlorinated biphenyls are on the list because of their high order of toxicity to man and aquatic organisms, and because of their bio-accumulative potential. The data are adequate, and the point source discharges require prompt control." (underlinings added)

In an earlier section of this same promulgation (I, 3), which explains the criteria of toxicity, appears the statement that "substances which have an oral LD50 of 50 mg/kg of body weight or less ... are defined as highly toxic to mammals ...". This definition would seem to exclude PCBs, because the LD50's of all commercial preparations are many times greater, that of a typical material (Aroclor 1242) being 8650 mg/kg (1).

(1) PCBs and the Environment, Interdepartmental Task Force on PCBs, May 1972 p. 131.



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Dr. C. Hugh Thompson

-2-

November 21, 1973

The low order of toxicity to man is supported by several decades of experience in the U.S. electrical industry.

In addition, the foregoing statements about PCBs quoted from the promulgation receive little support from EPA's subsequent publication in October of its "Proposed Criteria for Water Quality - Vol. I."⁽²⁾ These criteria "are defined as the acceptable limits of constituents in receiving waters based upon an evaluation of the latest scientific information by the Environmental Protection Agency" (p. 12) and "are based upon current knowledge of the effects on health and welfare of the presence of various pollutants in receiving waters" (p. 18). Criteria for PCBs are discussed under four categories of water use (pages 121, 180, 224, and 320) along with the rationale for the recommended limits. None of these discussions suggests biological effects that could be described as a "high order of toxicity to man and aquatic organisms"; most of the rationales represent far from "adequate" data; and none of them leads to the conclusion that "point source discharges require prompt control."

The only numerical value suggested is a maximum acceptable concentration of PCBs in fresh water of 0.002 μ g/l (0.002 ppb) (p. 121). The rationale given for this level is based upon an exceedingly tenuous chain of reasoning beginning with a PCB residue level that has been suggested (not demonstrated) as the threshold for salmon egg mortality and continuing through several other vaguely defined multiplicative factors. Further, this number has no operational significance because no analytical techniques are available for the reliable determination of so low a concentration of PCBs in water.

Section 304 (a) (1) of The Federal Water Pollution Control Act Amendments of 1972 requires that criteria for water quality should accurately reflect the latest scientific knowledge "on the kind and extent of all identifiable effects on health and welfare ... which may be expected from the presence of pollutants in any body of water ...". We submit that none of the water quality criteria proposed for PCBs, which presumably reflect the latest scientific knowledge, provides an adequate basis for establishing effluent standards for PCBs. Other bases than water quality should be used and are discussed later on in this letter. In our opinion, however, the recommendation that "the body burdens of PCB's in birds and mammals should not be increased over present levels in order to maintain acceptable levels" does represent a reasonable goal for any PCB control program (Ref. 2, p. 180).

The Proposed Criteria for Water Quality acknowledge (Ref. 2, pp 17-18) that other considerations are important in "establishing particular standards and control measures" for pollutants that "may be listed as toxic pollutants under subsection 307 (a)."

(2) Proposed Criteria for Water Quality, Vol. I, U.S. Environmental Protection Agency, October 1973.

Dr. C. Hugh Thompson

-3-

November 21, 1973

"Some of the more important considerations are:

- (1) The nature of the environmental effect of the presence of pollutants in water (e.g., long or short term, temporary or permanent, localized or widespread, etc.).
- (2) The economic and social impact of the standards and control measures and the impact of the environmental damage to be alleviated.
- (3) The practicality and enforceability of the standards and control measures, including the availability of techniques and instrumentation for determining whether particular standards are being met."

Regarding the third consideration, we have already indicated that there is no practical method of enforcing a standard based upon the recommended maximum concentration of 0.002 ppb of PCBs for fresh water.

The following additional points, which we believe should be considered in establishing effluent standards for PCBs, are germane to the other two considerations.

(1) In 1971 the Monsanto Company (the sole U.S. producer of PCBs) began a program that has led to a total ban on sales of PCBs for all uses except the manufacture of sealed electrical equipment (capacitors and transformers). As a result there has been a large decrease in the number of point source discharges of PCBs. Since there are probably not more than 25 major users of PCBs throughout the country, current production-type discharges of PCBs are no longer as ubiquitous as when PCBs were a component of paints, inks, plastics, adhesives, textile coatings, hydraulic and heat transfer fluids, etc. Indeed, "production and sales figures for PCBs in 1971 were roughly half of those for 1970, when these volumes were at their peak ... (and) projections for 1972 indicate an even lower volume " (Ref. 1, pp. 5-10).

Thus, even apart from the introduction of improved control measures by present PCB-users, there has been a major decrease in the amount of PCBs to which the environment can possibly be exposed. Although current PCB discharges can and should be more carefully controlled, the situation is one whose magnitude is decreasing. There is, therefore, no need for emergency-type controls, which might be reflected in technically infeasible standards and compliance schedules.

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Dr. C. Hugh Thompson

-4-

November 21, 1973

(2) PCBs are not a unique chemical species. More than 100 isomers are possible, and major commercial products may contain as many as 18 distinct compounds. As pointed out by the Interdepartmental Task Force on PCBs:

"Full evaluation of actual or potential effects in the environment is hampered by the complex nature of the mixtures that compose PCBs, and by the inclusion of contaminants in these mixtures. As experimental studies have been conducted with the unaltered products, as sold, the results may not properly reflect the effects of the components as they exist in the environment." (Ref. 1, p. 19).

Furthermore, it was reported to the Interdepartmental Task Force

"... that all PCB products cannot be lumped together in terms of either their environmental impact or persistence." (3)

Other points made in this report to the Task Force are:

(1) As the degree of chlorination (of PCBs) decreases, the bacterial degradation rate increases. (Ref. 3, p. 4).

(2) The residue storage levels (in albino rats) decrease exponentially as the weight percent chlorine decreases. (Ref. 3, p. 6)

(3) PCB residues found in wild life are dominantly penta-, hexa-, hepta-, and octa- chloro biphenyls. (Ref. 3, Chart 4).

In recent years the Monsanto Company has developed a special product, Aroclor 1016, which is the only grade of Aroclor now used in capacitor manufacture. Although its gross chlorine content is almost the same as that of Aroclor 1242 (i.e. about 42% of Cl), Aroclor 1016 has been specially distilled to remove most of the higher boiling homologs, which are found in wild life residues. Indeed, more than 99% of Aroclor 1016 comprises homologs with 4 or less chlorine atoms per biphenyl (Ref. 3, Chart 1); and these homologs have not been found in wild life residues.

In light of the foregoing we recommend that the specific commercial preparation, Aroclor 1016, not be considered as a toxic pollutant. We are encouraged to see that in promulgating its list of toxic pollutants, EPA has recognized that not all compounds of cadmium and cyanide are toxic and has stated that distinctions will be made when the final

(3) Tucker, E.S., "Assessment of the Biological Persistence of Polychlorinated Biphenyls," from Presentation to the Interdepartmental Task Force on PCBs by Monsanto Company, May 15, 1972, p. 2.

November 21, 1973

effluent standards are published. We recommend that similar distinctions be made in writing effluent standards for PCBs.

(3) The "economic and social impact" (consideration number 2) of a uniform effluent standard would be much more severe upon an existing plant than upon a new plant. Most of the existing plants that manufacture sealed electrical equipment containing PCBs were in operation for many years before there was any recognition of the possible environmental hazards of PCBs, and during these years no special precautions were taken concerning the handling and disposal of these liquids. Thus, accumulations of PCBs over the years in and around the drainage systems of these plants could result in continued discharge of PCBs even if the plants were to eliminate PCBs from their current operations. Elimination of such reservoirs of PCBs might well require a major and prohibitively expensive renovation of plant and site. However, with the institution of internal control measures such as described in proposed American National Standard Guidelines (4), older plants are preventing further build-up of such reservoirs.

WHAT EFFLUENT STANDARDS ARE FEASIBLE FOR THE ELECTRICAL MANUFACTURING INDUSTRY

We have already noted that the Monsanto Company now sells PCBs only to manufacturers of sealed electrical equipment, such as capacitors and transformers. The soundness of this decision is supported by the findings of the Interdepartmental Task Force on PCBs (Ref. 1, p. 4) and the regulation promulgated by the Food and Drug Administration (38 FR 18096, July 6, 1973). These documents recognize the unique combination of fire safety and design efficiency that the use of PCBs imparts to capacitors and transformers and the minimal risk of environmental contamination associated with such use.

We believe that the special conditions pertaining to the past and present use of PCBs in the electrical industry warrant recognition in the setting of effluent discharge standards. These should not necessarily be identical to those deemed appropriate for the chemical industry.

The manufacture of transformers and capacitors involves a multiplicity of operations including vacuum impregnation, heat treatment, filling, sealing, washing operations and the like. Provision must be made for the handling of large apparatus containing up to 1500 gallons/unit (in the case of transformers) and for the filling and sealing of millions of small units per year (in the case of capacitors).

Control of PCB discharges in such electrical manufacturing plants requires a combination of process design and good housekeeping. For example, waste lines and operating procedures may be designed to eliminate contact between PCBs and water not directly used in the PCB operations themselves (e.g. cooling water). No effective end-of-line treatment has been demonstrated on a plant scale.

(4) Official Standards Proposal. Proposed American National Standard Guidelines for Handling and Disposal of Capacitor- and Transformer-Grade Askarels Containing Polychlorinated Biphenyls, C107.1- (), National Electrical Manufacturers Association Pub. No. CP-P1-1973 and Pub. No. TR-PG-1973, January 25, 1973.

Segregation of operations and waste lines is feasible in the design and construction of a new plant but would be prohibitively expensive for an old plant. If such controls are incorporated into a new transformer or capacitor plant on a new site, it should be possible to limit the discharge of PCBs to less than 5 pounds per day depending upon the volume and complexity of the production processes. The attainable discharge from an existing plant that had already been in production before the mid-60's may be as much as 15 pounds higher as the background level, depending on the size of the plant, its age, and the nature of its earlier operations, all of which would have affected the location and extent of its reservoirs of PCBs. Such a plant could install the control measures mentioned above and still be unable to reach the discharge levels for a new plant at a new site.

We believe that the foregoing numbers can provide the basis for realistic effluent standards because they reflect the actual technology of the capacitor and transformer industry. As we have mentioned earlier, the recommended water quality standards provide no practical basis for effluent standards.

SUMMARY

In the foregoing comments we have raised the following points:

- 1) Available data do not support categorizing PCBs as a "highly toxic" material, nor setting standards on the basis of this arbitrarily assigned hazard rating.
- 2) The maximum recommended concentration of 0.002 ppb of PCBs in fresh water is an operationally meaningless number that is unsupported by convincing ecological data. Any effluent standards based upon such a water quality standard could not be attained in existing plants and could lead to shut-down of capacitor and transformer operations.
- 3) Actions already taken by Monsanto and PCB users in the electrical industry have substantially reduced the exposure of the environment to PCBs and should result in a decreasing impact of PCBs in the environment.
- 4) Existing data suggest that Aroclor 1016 should not be considered a toxic pollutant.
- 5) Older plant sites will continue to have significant background levels of PCBs in their discharges because of accumulated reservoirs from years of operation before anyone recognized the possible environmental hazards of PCBs. These background levels should be considered apart from those levels contributed by current operating procedures.

GENERAL ELECTRIC

Dr. C. Hugh Thompson

-7-

November 21, 1973

We appreciate the opportunity to submit these comments and hope that they will be of assistance to EPA in setting effluent standards for PCBs.

Very truly yours,



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