Hearing Clerk
Environmental Protection Agency
Room 1019 - East Tower
401 M Street, S.W.
Washington, D.C. 20460

Re: Environmental Protection Agency
(40 CFR Part 129)
Water Program
Proposed Toxic Pollutant Effluent Standards
Federal Register, Vol. 38, No. 247,
Pages 35388-35395
Thursday, December 27, 1973

Gentlemen:

On January 18, 1974, in accordance with Section 104.6, Part 104, Chapter I of Title 40, Code of Federal Regulations, we filed objections relating to the polychlorinated biphenyl effluent standards proposed in new Part 129, Subpart I, Chapter I of Title 40, Code of Federal Regulations.

As provided in "Order and Notice in the Matter of Proposed Toxic Pollutant Effluent Standards for Aldrin-Dieldrin et al. - FWPCA (307) Docket No. 1" dated February 8, 1974 by William J. Sweeney, Administrative Law Judge, we offer the following comments describing our objections in greater detail.

INTRODUCTION

Monsanto Company has been a major manufacturer of chemical products since 1901. These products are used in numerous American industries, and in fact,

PCB-ARCH0743375

through our research department, we have played a role in developing new products to meet the needs of industry and the consumer.

On some occasions a chemical compound with specific properties is developed to meet a need in a certain application. In other cases a chemical compound with unique properties is developed first -- possibly through innovative research, or even by happenstance -- and then an end-use is found.

The chemical structure of PCBs has been known for nearly 100 years. It was not until the late 1920s that a use for PCBs was found -- as a dielectric fluid in transformers and capacitors. The properties of PCBs -- inertness, fire resistance and a non-conductor of electricity -- ~~seemed to~~ are perfectly suited to those electrical applications where high-voltage arcing could occur; possibly resulting in serious fires or damage to the equipment.

~~Monsanto began~~ Commercial production of PCBs began in 1929. As the unique properties of the material became known, new uses were found. For example, their fire-resistant nature made them excellent choices for use in heat-transfer fluids. Their inertness gave long-lasting qualities to lubricants. Their use in surface coatings improved waterproofing characteristics.

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Handling of the product at the manufacturing level has not presented problems as long as the ~~proper~~ normal industrial hygiene practices were followed and PCB has always been considered less hazardous than many other chemicals in everyday use.

Therefore, it appeared that PCBs ~~were a very suitable~~ would be a unique product which met ~~the~~ important needs of ~~industry~~ industry.

Late in the 1960s, sophisticated analytical procedures were developed which could detect very minute quantities of PCB in nature. Following this analytical breakthrough, researchers discovered that PCB could possibly be affecting certain forms of aquatic, marine, terrestrial and avian wildlife.

The persistent nature and stability of PCBs, while so desirable from the standpoint of many industrial applications, appeared to be undesirable in terms of our environment.

~~CURRENT USES~~

When questions about the effect of PCBs on the environment first surfaced, Monsanto Company reviewed its product line and the applications for these products. As more data were developed concerning the effects of PCBs on ~~and~~ the environmental ~~controversy grew~~, Monsanto took steps ~~intended~~ to reduce the entry of PCB into the environment. The

PCB-ARCH0743377

Company stopped the sale of PCB for use in various applications, except where no acceptable alternatives were available.

Today, PCB manufactured by Monsanto Company is sold only to the electrical industry where it is used in closed systems as a dielectric fluid in transformers and capacitors -- applications for which we understand there ~~continues to be~~ exists no acceptable substitutes. Currently there are about forty electrical equipment manufacturers approved by Monsanto for PCB sales.

Our manufacturing and sales reduction program was a unilateral action taken by Monsanto and was based on our evaluation of developing environmental data.

The Interdepartmental Task Force on PCBs in its report (1), concurs that the safety benefits derived justify the continued use in this application. Recommendation 6 under Findings, Conclusions and Recommendations reads as follows:

"6. The use of PCBs should not be banned entirely. Their continued use for transformers and capacitors in the near future is considered necessary because of the significantly increased risk of fire and explosion and the disruption of electrical

PCB-ARCH0743378

service which would result from a ban on PCB use. Also, continued use of PCBs in transformers and capacitors presents a minimal risk of environmental contamination. The Monsanto Company, the sole domestic producer, has reported voluntarily eliminating its distribution of PCBs to all except manufacturers of electrical transformers and capacitors."

DEFINITION OF POLYCHLORINATED BIPHENYLS

Commercial chlorinated biphenyl products, of which Aroclor® are examples, are produced by direct chlorination of biphenyl; the degree of chlorination being chosen to provide desired properties. ~~These materials are relatively inert, chemically resistant, readily soluble in most common organic solvents, and have water solubilities on the order of 25-200 ppb.~~ These products are in all cases multi-component mixtures and not single entities as implied by the commonly employed acronym PCB. In fact, the commercial mixtures can theoretically have as many as 211 different components containing 0-10 chlorine atoms per biphenyl molecule.

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While it is well understood and accepted that ~~each~~ poly chlorinated biphenyl isomer has a unique set of physical and chemical properties, it is apparently not understood that ~~each isomer~~ this also bioaccumulates, and dissipates and biodegrades at different rates.

This lack of understanding is ~~amply~~ reflected in the definition proposed in the EPA Toxic Pollutant Effluent Standards (Federal Register, Vol. 38, No. 247, page 35393, Section 129.09a) and we quote:

> "As used in this Subpart, the term: Polychlorinated biphenyls (PCB's) means materials containing the biphenyl group which have been chlorinated to varying degrees. There are 210 possible different PCB compounds."

We object to this definition because it implies that all poly chlorinated biphenyl isomers are of equal environmental concern, i.e., that they all persist and bioaccumulate in the same manner in our environment. It has been well established by academic, government, and industrial researchers that this is simply not true. Environmental monitoring programs have clearly demonstrated that, with the exception of direct high-level controllable release near points of manufacture or use, the PCBs found in our environment are the more highly chlorinated ones, i.e., those

PCB-ARCH0743380

containing predominantly five or more chlorine atoms per biphenyl molecule (2-13).

This is true even though the lower chlorinated biphenyls have constituted >65% of all the PCBs manufactured over the years. This is strong evidence that the less chlorinated isomers degrade rapidly. It further suggests that even under conditions of unrestricted use, and without special precautions to prevent release into our environment (which is truly not the case now), that the less chlorinated materials degrade rapidly enough to prevent bioaccumulation.

More recently, it has also been demonstrated in laboratory experiments that chlorinated biphenyl isomers, readily undergo bacterial degradation at rates dependent upon the number of chlorines per biphenyl-molecule (17, 18, 19, 20 and 21). There are also good indications that ambient environmental PCB levels are decreasing at rates more rapidly than predicted (14, 15, 16).

The rapid metabolism of these chlorinated isomers and their lack of importance as contributors to the chlorinated biphenyl tissue burdens is evidence in the results of numerous studies. Risebrough (2) reported that the chlorine composition of the PCB detected in Atlantic Ocean zooplankton was approximately

PCB-ARCH0743381

54%. He concluded "It might be expected therefore that biphenyls with fewer chlorine atoms would predominate in planktonic samples unless these compounds were selectively degraded." Similar findings in fresh water and marine fishes were reported by Zitko (3) and Jensen, et al., (26). The disappearance of the lower chlorinated homologs in extracts of tissues from birds (5) and mammals (6) would ~~also~~ indicate ~~metabolic breakdown~~ of the lower chlorinated homologs. ~~The formation of 4-chloro-4'-hydroxybiphenyl from 4-chlorobiphenyl in rabbits has been reported (7). It has also been suggested that hydroxylation of the lower chlorine homologs is a general metabolic pathway, resulting in complete degradation, in birds and mammals.~~ As a result of the ~~relatively rapid and complete degradation of~~ the chlorinated biphenyls containing less than five chlorine atoms per molecule, their contribution to the effluent should not be used in measuring polychlorinated biphenyl effluent from a facility.

On the basis of these data ~~we believe it to be~~ unrealistic to consider all chlorinated biphenyls equivalent in terms of persistence and bioaccumulation as does the proposed regulation. ~~We,~~ therefore, ~~suggest that,~~ for environmental purposes, the definition of

PCB-ARCH0743382

PCBs should focus upon those which are ~~truly~~ of concern and we recommend that ~~a more suitable definition would be:~~ the following definition be substituted for that proposed in ——

"Polychlorinated biphenyls (PCBs) means materials containing the biphenyl group which is chlorinated and which have been shown to persist and rapidly bioaccumulate in the aquatic environment. These chlorinated biphenyls are identified as those components having gas chromatographic retention times greater than 60, relative to p,p-DDE = 100, under the standard conditions recommended in the EPA PCB test method."

In suggesting this definition, we want it understood that we are not proposing the unrestricted release of the lower chlorinated biphenyls. We only suggest that the data indicates that our environment has shown the capability of handling these materials when large amounts were unknowingly released and that this, coupled with the industrial restriction of sales to critical non-dispersive uses, with emphasis on recycle and proper disposal, has already brought this aspect under control.

PCB-ARCH0743383

ANALYTICAL METHODOLOGY including Sampling

We have no reason to doubt that the recommended EPA PCB test method is capable of detecting ppt levels (parts per trillion) of PCBs in waste waters. However, our experience with analyzing industrial waste waters for PCBs at the ppt level prompts us to be concerned about the following areas, some of which are not covered adequately in the test procedure.

1. Sampling Procedures
2. Correction for Laboratory and Reagent Background
3. Correction for Non-PCB Sample Interferences
4. Absolute Verification
5. Quantitation
6. Precision and Accuracy

Our concern lies in the fact that any method, especially one as complex as a PCB analytical method, which is to be used for effluent control purposes must be thoroughly evaluated and its accuracy, precision, reproducibility and ~~hence~~ effectiveness of any effluent limit, no matter what the level, will prove to be difficult, if not impossible.

For example, we have found that if waste water streams are not sampled properly, the PCB levels found depend

PCB-ARCH0743384

on the sampling procedure employed and bear no relationship to the amount of PCBs discharged. For this reason, sampling procedures used must be designed for the discharge in question and clearly stated. To our knowledge, this has not been done.

We also note that no provisions are recommended for correcting the apparent PCB level found in a sample for laboratory and reagent background. It is our experience that as one approaches the ppt level, this background can significantly affect the observed PCB level.

With regard to correction for non-PCB sample interferences, we feel that, while the procedure notes many of the possible interferences, it does not really adress itself to those which are more likely to be in industrial waste water streams. For this reason, if the electron capture chromatogram does not match the PCB being manufactured or used, complete absolute identification of all components counted as PCB must be validated via ~~GC/mass.~~ (spell out) → an alt. technology such as gas chromatography/mass spect. cophotom

While the scheme proposed for estimation (quantitation) of PCBs is logical, it suffers from the same shortcoming as do the multitude of other procedures which have been proposed. It is an empirical estimate and

only a reflection of the real PCB level. Therefore, it should be determined via an alternate, more-elaborate procedure how closely the calculated PCB levels (for each of the cases) are to the real PCB levels so that they may be corrected.

Last, but not least, the precision and accuracy of any procedure proposed as a standard method should undergo a thorough inter-laboratory evaluation. If this has not already been done, it must be carried out prior to the use of the procedure for enforcement purposes. The accuracy and precision of the Monsanto PCB procedure has been subjected to a preliminary evaluation. Prior to this evaluation, we probably would have overestimated the precision and accuracy of our procedure. The exact details of the evaluation are available. Briefly, samples were prepared by spiking distilled water with 500 ppb PCBs. Individual preparations include blanks (no PCBs), Aroclor® 1242 only, Aroclor® 1254 only, Aroclor® 1260 only, all 50-50 two-component mixtures, and a 1/3, 1/3, 1/3 preparation containing all three components. Six samples of each mixture were prepared and analyzed by two analytical laboratories. Each result, expressed in ppb of the individual Aroclor®, was converted to percent of the total added. Analysis of variance was run on all data taken together and on each laboratory independently.

PCB-ARCH0743386

- The 95% confidence limits observed for individual results were:

Either Lab	87.5 ± 55.2%
Lab A	81.3 ± 46.4%
Lab B	93.7 ± 19.2%

- The repeatability for the individual labs, based on repeat tests of samples having identical prepared compositions was:

Lab A	± 42.0%
Lab B	± 11.6%

We feel that these results demonstrate the importance of evaluating the precision of any PCB procedure. Note that the test did not include sampling problems, used distilled water free of interferences, and was carried out at a relatively high PCB level (500,000 ppt) by two experienced laboratories. It is expected that, if sampling problems were involved, and the level of PCB present was extremely low, the accuracy and precision of any PCB method would degrade considerably.

Background for PROPOSED EFFLUENT STANDARD

In the establishment of the proposed effluent standard the primary basis for toxicological consideration came from the Water Quality Criteria, October, 1973, (Federal Register, Vol. 38, pages 29646 et seq., Friday, October 26, 1973). These criteria were, in turn, based on Water

PCB-ARCH0743387

Quality Criteria, 1972 by the National Academy of Sciences and the National Academy of Engineering.

The Water Quality Criteria, October 1973 have not undergone the normal review, criticism, comment and revision before final adoption. We object to the use of challengeable portions of a proposed publication in the development of critical effluent standards.

We note in Water Quality Criteria, 1972 in those sections pertaining to polychlorinated biphenyls, the frequent use of unpublished data and the disturbing use of qualifying phrases such as "...may adversely affect...", "...apparently related...", or "...the work...suggest..." In our opinion, none of the discussions present adequate data to support establishment of responsible effluent standards for PCBs.

On page 5 of Water Quality Criteria, 1972, the Committee emphasized the importance in understanding that there is a distinction between criteria and standards and that the words were not interchangeable nor or they synonyms for words such as objectives or goals. The report further states that it is necessary to establish scientifically-based recommendations for each assignable water use, implying availability of practical methods of detecting and measuring which can be applied to monitoring. Once these fundamentals are available; political, social and economical factors enter into

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the decision-making process to establish standards. In our opinion, these procedural steps were not followed in arriving at the proposed effluent standards for PCBs.

The maximum acceptable concentration in fresh water that would be permitted by the proposed standard is 0.002 μg/l. The rationale described in the Statement of Basis and Purpose, Toxic Pollutant Effluent Standards is based on results of a preliminary study which have suggested (not yet proven) a threshold PCB level for salmon egg mortaility. We cannot accept the selection of salmon as representing organisms which are usual or may potentially be present in water systems near facilities described in Section 129.09, Subpart I, Title 40 CFR.

Although many reports have been published on the subject of polychlorinated biphenyls and living organisms, the majority of these describe the presence of PCBs in the environment. Presence should not be assumed to imply adverse effect. To our knowledge, no published report exists which conclusively relates the mortality of any wildlife species, aquatic, marine, mammalian or avian, to the presence of PCBs. The only reported mortalities are those achieved in laboratory studies. Not enough is known about the fate and effect of PCBs in the natural and diverse aquatic and marine

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environments to properly design laboratory studies. Results from such studies are not extrapolatable to the natural situations and any conclusions derived from such studies must still be considered speculative. In our considered opinion, fundamental scientifically-based data is lacking and the establishment of effluent standards for polychlorinated biphenyls cannot be made intelligently and responsibly.

In the establishment of the PCB effluent standard for freshwater systems a bioaccumulation factor of 200,000 was selected. This factor has no extrapolatable relationship to either the residues of PCB in salmon eggs or to PCB residues of fresh water forage fish. The only published report of an accumulation factor of the magnitude selected was that for the hepatopancreas of the pink shrimp, Penaeus durarum, (27). Even though an accumulation of 204,000 in the hepatopancreas has occurred, a nearly complete elimination of PCB from that tissue was achieved when the shrimp were placed in water free of added PCB. The equilibrium whole body accumulation plateau indicated an approximate accumulation factor of 22,000. These results are in agreement with those reported by Stallings and Mayer (30), and with the studies of Ryther (28),

PCB-ARCH0743390

Greichus et al (24) and Crump-Weisner, et al (22) showing equilibrium biomagnification factors between water and fish ranging between 1000 and 75,000 and would support the selection of a factor considerably lower than the 200,000 which was applied. We suggest, from a review of the available literature, that a factor of 20,000-~~30,000 could be supported~~ would be possibly more appropriate.

Abritrary safety factors were applied to the tolerable chronic limit to establish the so-called "critical chronic limit" which was then used to compute the maximum allowable effluent. These safety factors were proposed to account for a multitude of variables, including non-point sources, multiple discharges and industrial growth. The safety factors proposed were identical for 7 of the 9 materials for which effluent standards were prepared. These safety factors, resulting in approximately two-fold reductions, are so small as to be of no beneficial toxicological consequence. (& we recommend it be deleted.)

In establishing the effluent standards, an attempt was made to distinguish between types of receiving waters by classifying them as streams, lakes and impoundments, estuaries and coastal waters. We do not believe this attempt to distinguish water bodies

PCB-ARCH0743391

is by any measure adequate. Water bodies are universally known to be complex systems with no two systems alike. With a complex material such as polychlorinated biphenyls, the determination of possible adverse effects in each water body becomes exceedingly difficult. The uniqueness of each water system must be considered.

A key parameter used to further describe the water body is the flow rate which was limited to the probable low rate of stream flow occurring during a seven-consecutive-day period once in ten years. We do not agree that is realistic or appropriate. In our opinion, adequate control can be achieved using average stream flow rates.

Further, the maximum flow rate that can be used in calculating the daily discharge permitted has been arbitrarily set at 10,000 cubic feet per second. This limit is based on a nondegradation philosophy which tolerates limited diffusion and on a desire to discourage industry from locating facilities on large main inland waters and coastlines. This limitation deprives our society from the judicious use of an important great natural resource. Discharge limitations should be based on the adverse effects a material will have on a water system, not on its size

PCB-ARCH0743392

or flow rate. For PCBs, proper control will not occur by imposing maximum flow rate conditions, but by applying results from scientific studies which properly define how each water system responds to the presence of PCBs.

RESIDUAL POLYCHLORINATED BIPHENYLS

Because of their chemical and physical properties, PCBs can be found in soils and waters long after a discharge has occurred. This source of PCBs to the environment will diminish with time. To maintain control of losses, emphasis should be directed toward discharges resulting from current and future uses of PCBs.

Since this problem of background levels occurs with all materials in varying degrees, we propose the following revisions:

From Section 129.01c(b), Subpart A, Part 129, 40 CFR, delete the words "in intake waters for a discharger".

Add an additional definition in Section 129.01a:

> "Background" means amounts of toxic pollutant (1) presently found in the waterways of the United States (including the intake waters of

PCB-ARCH0743393

a discharger, or (2) arising out of operations subject to this Part that occurred before the effective date of this Part, but were not discharged to the waterways of the United States before the effective date of this Part.

PCB DISCHARGE CONTROL - MANUFACTURING FACILITY

During the late 1960's, as more data were developed indicating PCBs could possibly be affecting certain forms of wildlife, Monsanto voluntarily undertook a two-phased program to keep the product out of the environment. One phase involved the limitation of sales of PCBs which was described ~~above~~ earlier. The second phase involved the control of discharges at our manufacturing location.

Since 1969, we have invested more than 22 man-years of work and millions of dollars in this program.

In our manufacturing area, we have taken a number of significant steps to contain PCBs. In essence, we have made the department a "concrete bathtub". Drainage is directed to trenches and piping, and then to one of two 3,000-gallon settling basins. This insures PCB containment in case of accidental spill or equipment failure.

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We have also installed an incinerator to safely dispose of PCBs. This is accomplished through incineration at or above 2000°F.

When small quantities of PCBs are collected into the settling basins in the manufacturing area, they are later pumped into drums, and eventually incinerated. In the incinerator area itself, drainage is directed to trenches and piping which flows to a 10,000-gallon basin. Recovered PCBs are periodically pumped to storage, or incinerated.

In the manufacturing area, we have also rerouted rupture disc lines and atmospheric vents through catch tanks, or redirected them to settling basins. This insures that, if a rupture does occur, PCBs will not get into the environment, but will be contained in a controlled area.

We also provide nitrogen blanketing on storage tanks to eliminate any "breathing" of the tanks and resultant PCB escape.

We have installed mist eliminators in vapor lines -- once again to eliminate the possibility of PCBs leaving the manufacturing area through these lines.

Finally, we have replaced underground sewers with above-ground sewers, and repaired or combined others, so

PCB-ARCH0743395

that we can monitor the effluent from the department. In addition, this will prevent any unknown buildup of PCBs in our sewer systems or any contamination of PCBs into other sewers.

Much of the success of our efforts also depends on maintaining a high housekeeping level in the department itself. Among the housekeeping responsibilities our operators have assumed, are these:

All pumps are checked for leakage on every shift. Drip pans that collect leaks are emptied into scrap PCB drums.

All leaks are reported and documented so that corrections can be made and settling basins observed.

"FloorDry" is used to absorb any liquid PCBs that have spilled or leaked. If it becomes necessary to flush PCBs to the settling basin, a minimum amount of water is used.

Sampling drums and scrap PCB drums are quickly palletized, labeled, and transferred to the incineration area.

Through these kinds of programs, we feel we have literally built a "concrete bathtub" to catch and

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safely dispose of PCBs at our manufacturing location.

We have also developed sophisticated systems to monitor our effluent. Monitoring effluent streams for PCBs is not an easy effort. Measurement can be changed dramatically by taking the sample at different places along the sewer main, by changing the level at which the sample is taken, by changing the speed at which the sample is taken, or by varying the velocity of the effluent. But we have purchased the best available laboratory equipment, which enables us to determine PCB content in the parts-per-billion range. Here again, however, many factors affect our findings. The minimum detection level of PCBs on a routine basis contained in distilled water is one part per billion ($\pm$ 25%). If "dirty" water - i.e., that containing other materials which interfere with the determination of PCB -- is analyzed, the minimum detection level is 100 ppb $\pm$ 25%. Monitoring is difficult. But we feel with our experience and acquired "know'how", we're doing the <u>best</u> possible job. And we do this job 24 hours a day, 365 days a year.

We have also established loading and shipping safeguards to minimize accidental PCB loss during transportation. Specific written instructions are on every container we ship.

PCB-ARCH0743397

We have provided facilities for safely disposing of used PCBs returned from customers. As mentioned above, we installed a specially designed PCB incinerator, at a cost of $790,000. We have received an operating permit from the Illinois EPA for this incinerator, which meets all EPA requirements. This incinerator completely destroys PCBs received either from our manufacturing area or from customers.

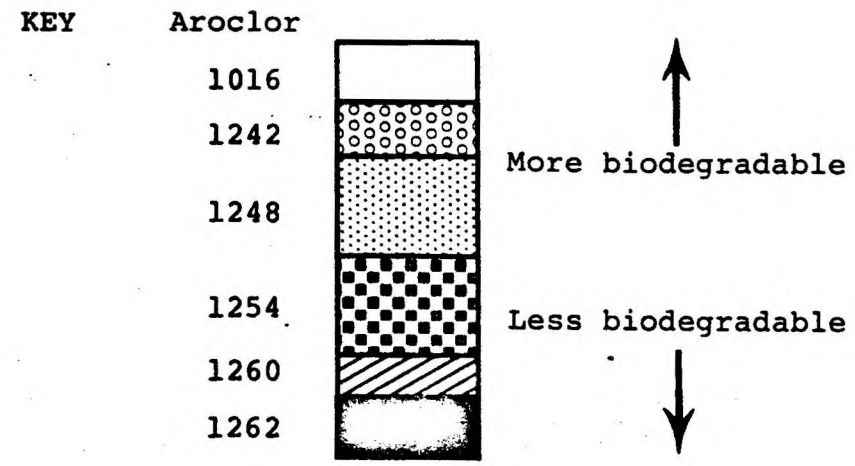
Finally, we have moved toward the manufacture of a more biodegradable polychlorinated biphenyl. In 1971, we installed a new distillation column in our manufacturing department at a cost of $970,000. This allowed us to separate the higher chlorinated, less biodegradable compounds from the lower chlorinated, more biodegradable ones. Our PCBs are known by the trade name Aroclor®. We manufacture different grades of Aroclor® (1016, 1242, 1254, for example). The lower the grade number, the less chlorinated and more biodegradable is the product.

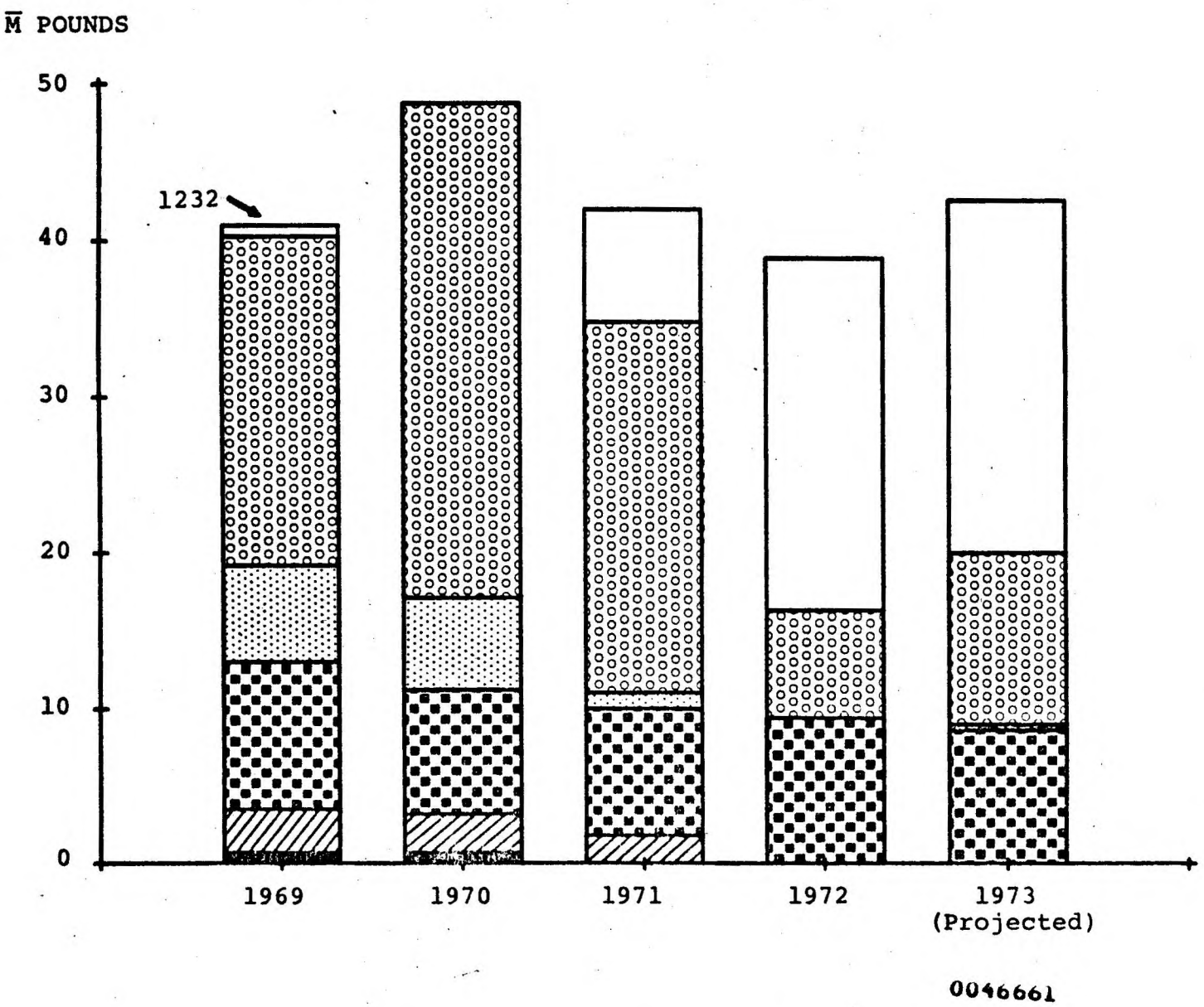
The attached table reflects how our production mix has changed to more biodegradable products while the production of higher chlorinated less biodegradable products has declined. 0046660

We believe we can confidently assert that we have taken strong measures to contain PCBs and keep then out of the environment.

Yet, in spite of all our efforts, we cannot today meet the proposed EPA Std's. We have stated that we believe with still [illegible] effort we [illegible] to [illegible]

AROCLOR PRODUCTION
AT THE Wm. G. KRUMMRICH PLANT





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- We need to support economic impact as stated by EPA & others.

SUMMARY

1. Actions by Monsanto and its customers, which have resulted in limiting the use of PCBs only to electrical applications in hermatically sealed units, have dramatically reduced the quantities of the more persistent PCBs introduced directly into the environment.

2. There are over 200 chemical entities collectively known as PCBs. The chemical and physical characteristics of each of the isomers are not all alike. There is ample evidence that the higher chlorinated isomers are the type found in wildlife organisms and are, therefore, of environmental concern. We have proposed a definition describing the more persistent PCBs.

3. We are concerned with the accuracy and reproducibility of results attainable between laboratories using currently-available sampling and analytical techniques and further studies are proposed.

4. We are concerned with a PCB effluent standard based on inadequate toxicity information on a non-typical fish species and on an unusually high and unique bioaccumulation factor. We sincerely believe good scientific information is lacking and no responsible standard can be developed at this time.

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5. We object to a limitation of 10,000 cubic feet per second being arbitrarily assigned as a maximum stream flow without a sound technical basis demonstrating adverse effects.

6. We believe the presence of background levels of PCBs should be considered and propose a definition which would be helpful.

7. Control practices followed at our manufacturing unit have effectively contained PCBs.

Our purpose in commenting on the proposed standards is to aid the Agency in the development of realistic effluent standards which will achieve the intended objectives without serious technical, social and economic disruptions. We recognize the seriousness of this endeavor and find a statement made by Mr. John R. Quarles, Jr., Deputy Administrator, Environmental Protection Agency, of considerable interest. At a recent conference, Mr. Quarles (31) stated:

> "We have found it virtually impossible to devise intelligent standards which specify an appropriate degree of control over toxic pollutants irrespective of the sources of those pollutants and factors affecting the feasibility and timing of their abatement."

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We can appreciate Mr. Quarles' concern, particularily as it applies to PCBs. Lacking good scientific information on the fate and effects of PCBs in complex water systems each having unique characteristics, we urge extreme care be taken to avoid the promulgation of effluent standards which are unattainable and unwarranted.

Respectfully submitted,

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15. Statement obtained from Dr. George Harvey, Woods Hole Oceanographic Institute 1/9/74; permission to quote given.

    "In the summer and fall of 1972 the surface waters of the Eastern and Western North Atlantic ocean had an average PCB concentration of 30 parts per trillion. By the summer and fall of 1973, the average PCB concentration in the same areas had decreased to about 1 part per trillion.

    "Since the suspended solids fall out and mixing rates of the ocean are constant, the observed reduction in surface layer concentrations indicate a reduced PCB input."

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PCB-ARCH0743403

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PCB-ARCH0743404