UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE ADMINISTRATOR

In the Matter of:

PROPOSED TOXIC POLLUTANT EFFLUENT STANDARDS FOR POLYCHLORINATED BIPHENYLS (PCBs)	)	FWPCA (307) Docket No. 4

AFFIDAVIT OF NATHAN RAY CLARK

NATHAN RAY CLARK, being duly sworn, deposes and says:

1. I am the Vice President and General Manager of the Capacitor Division of Universal Manufacturing Corporation. I have held my present position since 1969, having previously worked as the Chief Engineer in Universal Manufacturing's Capacitor Division from 1965 to 1969. I have worked in the capacitor industry since 1940, except for my time in the United States Army during World War II. I attach as Exhibit A to this Affidavit a more detailed resume of my experience with capacitor manufacture and use.

2. Capacitors are a type of electrical instrument used for a wide variety of industrial and consumer purposes. Capacitors are used, among other things, by large electrical utility companies in the transmission and distribution of electricity, as well as in controls for fluorescent lamps and other high intensity discharge lamps, including mercury vapor out-door lighting. The capacitor

industry has used polychlorinated biphenyls (PCBs) for over 40 years as a vital ingredient in the manufacture of many types of capacitors which are in widespread use. PCBs are used in these capacitors as an impregnating liquid necessary to increase the electrical strength and to hold the charge within the capacitor.

3. There are three principal types of capacitors which use PCBs, all involving alternating current application, accounting for perhaps $150 million in annual sales.

(a) Large capacitors are used principally by electrical utility companies on their distribution lines to improve the efficiency of their system operations. These capacitors typically weigh more than 100 pounds each, and contain on the order of 30 pounds of impregnating liquid.

(b) Small to medium size capacitors are used in the lighting industry, both to control the current and voltage supplied to fluorescent lamps (used in devices called "ballasts"), and others used for out-door mercury vapor lighting and some in-door industrial lighting (called "high intensity discharge lamps"). A small capacitor

mounted in a fluorescent lamp ballast would contain approximately 1-1/4 ounces of PCB; a medium size capacitor used with a mercury vapor lamp ballast contains approximately 10 ounces of PCB.

(c) Small to medium size capacitors are used for "motor run" and a variety of other alternating current applications. A typical use of a capacitor of this sort would be in conjunction with the motor which drives the compressor in a room air conditioner. Here the purpose of the capacitor would be to improve the efficiency of the operation of the air conditioner. Typically, such a capacitor would contain approximately one pound of PCB.

There are perhaps hundreds of thousands of large utility-type capacitors in service; many hundreds of millions of the smaller capacitors are used in lighting, motor run, and many other miscellaneous applications. Capacitors have become an instrument of universal use, and have proved to be fundamental to the electrical and electronic components industry.

4. Almost all capacitors made for alternating current application in the United States which I have described above are impregnated with a particular variety of polychlorinated biphenyl (PCB) made only by Monsanto, and identified by the trade name Aroclor 1016. Capacitor manufacturers adapt this material to their particular processing procedures, with or without additives, and identify their dielectric liquids by such trade names as Pyranol, Dykanol, Hyvol, Eucarel, Clorphen, Chlorinol and the like. The generic term for this type of dielectric liquid is askarel. This particular variety of PCB has been used by the capacitor industry since about 1972. The principal difference from its predecessor (Aroclor 1242) is that most of the higher boiling homologues have been removed, leaving the lower chlorinated and therefore more biodegradable fractions.

5. The family of polychlorinated biphenyls have characteristics which make them suitable for a wide variety of uses, which in the past have resulted in widespread entry into the environment. At present, usage is limited almost entirely to transformers and capacitors where Aroclors have been used since the early 1930s. Aroclor 1016 has a unique combination of several different characteristics which make it especially well-suited for use in AC capacitors.

The most important of these, which are shared by no other known potential alternative, are:

(a) High (approximately 5) dielectric constant, which results in small size, and efficient utilization of other capacitor materials such as electrical grade kraft paper and aluminum foil.

(b) High stability to electrical, thermal and chemical stresses, which results in long life and reliability.

(c) Fire resistance. It has no fire point up to its boiling point in excess of 600°F, and has a UL classification of "non-flammable".

6. Capacitors impregnated with Aroclor 1016 are characterized by small size, long life in service, exceptional reliability, and safety. All of these factors are important from the economic standpoint, but the problem of safety has a special importance in many of the applications for the type of capacitors we call "small industrial". These capacitors are used in the home in devices such as TV receivers, air conditioners, microwave ovens and the larger dehumidifiers, and in whole host of commercial and industrial applications such as ballasts for fluorescent and high intensity discharge (e.g., mercury and sodium vapor) lamps and the industry has always been most concerned about the risk of fire caused by the use of a flammable dielectric liquid. Aroclor 1016 is particularly fire resistant, and this is an important reason for its present universal acceptance by the industry.

7. The capacitor industry has committed itself to terminate its use of PCBs in both transformers and capacitors as quickly as possible. At a meeting held on January 14, 1976 between representatives of the Environmental Protection Agency, the Electronic Industries Association, and representatives of other industries, many representatives of the industry stated their determination to cooperate in the elimination of the use of PCBs as soon as practicable. Obviously at this point a phase-out of PCBs is inevitable, in light of the passage of the 1976 Toxic Substances Control Act, recently signed by President Ford, which will ban the manufacture and use of products containing PCBs by the end of 1978.

8. In my opinion, it would be economically irrational for a company to make the very substantial outlay of capital required to install and operate the type of carbon adsorption system recommended by the EPA for the very limited amount of time before PCB use will be banned by the 1976 Toxic Substances Control Act.

9. It is impossible to state specifically the total cost of compliance with the proposed toxic effluent standard proposed in the above-captioned proceeding. Versar, Inc., under a contract with the Environmental Protection

Agency, has prepared estimates of capital operating costs of pretreatment and for PCB removal by carbon treatment of effluent water at various flow rates,* a system which so far as I know has never been shown to be effective in removal of PCBs in actual industrial use. I have made the rough estimate that the costs of using the carbon adsorption treatment proposed by the EPA (according to the Versar cost curves) at my Company's Bridgeport plant would be in excess of $200,000.

10. Under no circumstances would my Company expend $200,000 for a carbon treatment system which will be in operation for no more than a year before we terminated PCB use.

11. I am not an analytical chemist, and I cannot comment on the specific technical issues concerning the reliability of different measurement techniques involved in determining the PCB levels in industrial effluent. Over the last few years I have had extensive contacts with independent testing laboratories, and I know from my first-hand experience that reputable independent testing laboratories, conducting analyses of identical industrial

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* Report of EPA 560/6-76-006, Task II, Assessment of Wastewater Management, Treatment Technology, and Associated Costs for Abatement of PCBs Concentrations in Industrial Effluents.

effluent samples, are unable to agree as to the PCB levels in these samples. I know that I have personally taken samples from effluent streams and mailed identical samples of effluent taken from the same stream at the same moment in time, and I received in return greatly varying analyses. I enclose as Exhibit B a brief outline of my experience with different testing facilities on duplicate samples. Exhibit B also contains copies of the test reports submitted by the commercial laboratories in question.

12. There is another very serious problem in this area which merits attention. Water samples have been taken by the EPA and others at every plant known to be a user of PCBs in the United States, as well as in municipal water supplies, rivers, lakes and sea water.*/ In a substantial portion of the results from these studies which have been made public, PCBs have been detected at levels in the range of 1/2 to 2 or 3 parts per billion. In some cases, the PCB content was reported at even higher levels. The validity and reproducibility of analyses in this low range is a matter of great concern to us, but if we assume for the moment that the analysis procedure does yield valid and reproducible results, it is obvious that capacitor

*/ Draft report "Review of PCB Levels in the Environment" by the EPA Office of Toxic Substances, January 1976.

manufacturers who use PCBs, as well as other manufacturers who do not use PCBs, unavoidably receive PCBs in their influent water. In some cases the PCB content of influent water is at levels higher than the effluent limits proposed by EPA. At a meeting on March 19, 1976 of representatives of the PCB Ad Hoc Committee of EIA with representatives of the Environmental Protection Agency, Dr. Glenn Schweitzer of the EPA expressly stated that in establishing effluent limits for PCB content in revised water discharge permits, background (i.e. PCB in influent water) would be deducted. Under the effluent standards now proposed by EPA, which are the subject of this proceeding, no provision is made for deduction of PCBs in influent water (unless the effluent flows into the same water body from which influent is derived, which I understand is the case for only one capacitor manufacturer who uses PCBs). This proposed aggregate standard is most unfair and should be revised; only a "net standard", measuring actual discharges by the capacitor plant, can be regarded as a reasonable approach to the problem. Put simply, under the regulation presently proposed by the EPA, a capacitor manufacturer who adds absolutely no PCB to the influent water may be required to pretreat this water in order to

comply with the proposed effluent standards, while a manufacturer of a different product next door would not be subject to the same requirement.

13. Monsanto has announced its intentions to terminate shipments of its Aroclor 1016 on October 31, 1977. Monsanto made this announcement only after consulting each of its industrial users of Aroclor 1016 to determine their needs until approximately the third quarter of 1978. These data obtained by Monsanto are proprietary, and I do not know the phase-out schedules of my competitors. After consultation with Monsanto, I have determined that my Company's needs for Aroclor 1016 will be satisfied by Monsanto through the third quarter of 1978. Accordingly, my Company will not be obliged to use any other PCB other than Aroclor 1016 as a capacitor impregnant.

14. Monsanto has agreed to make available for storage their fleet of tank cars, with a capacity of approximately three million pounds of material; I have been informed that if additional Aroclor 1016 is needed, additional storage can be maintained in 55-gallon drums guaranteeing an adequate supply of Aroclor 1016 by Monsanto through the time when PCB use must end according to the law. Based on these facts, it is my opinion that

Clark.

there is no necessity or incentive for the capacitor industry to use any PCB other than Aroclor 1016 for capacitor production between Monsanto's termination of shipments of material and the final phase out in 1978.

NATHAN RAY CLARK

Subscribed and sworn to before me this __ day of _____, 1976.

NOTARY PUBLIC

My Commission expires:

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