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Here's a draft of a presentation for AIChE
National Meeting in September.

I'd appreciate any comments.

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jh
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FROM _____

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MONS 216475

WHAT WE KNOW ABOUT HEALTH EFFECTS OF PCB'S

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MONS 216476

WHAT WE KNOW ABOUT HEALTH EFFECTS OF PCB'S

POLYCHLORINATED BIPHENYLS, PCB'S, HAVE RECEIVED CONSIDERABLE ATTENTION OVER THE PAST DECADE BECAUSE OF INCREASING CONCERNS ABOUT THEIR POSSIBLE EFFECTS ON HUMAN HEALTH AND THE ENVIRONMENT.

AS A CLASS OF CHEMICALS PCB'S ARE ONE OF THE MOST MISUNDERSTOOD, MOST FEARED AND MALIGNED GROUPS OF CHEMICALS KNOWN TO MAN. THEY HAVE BEEN SINGLED OUT IN THE CONGRESS, LEGISLATURES AND NEWS MEDIA OF THIS COUNTRY AS POSING A GENERAL THREAT TO HUMAN HEALTH. CERTAIN ENVIRONMENTALISTS, REGULATORY OFFICERS, LAWMAKERS AND THE MEDIA HAVE DUBBED PCB'S AS "DEADLY TOXINS", "HUMAN AND ANIMAL CANCER-CAUSING AGENTS" AND "LIFE THREATENING CHEMICALS." THIS HAS RESULTED IN AN UNWARRANTED PUBLIC PERCEPTION THAT EVEN THE SLIGHTEST PRESENCE OF PCB'S REPRESENT A SIGNIFICANT HAZARD TO HEALTH AND THE ENVIRONMENT.

PCB'S ARE THE ONLY CHEMICAL SUBSTANCE WHICH CONGRESS SPECIFICALLY TARGETED FOR IMMEDIATE REGULATORY ACTION BY THE EPA ADMINISTRATOR. THE PCB BAN REGULATIONS ARE PREMISED ON EPA'S BELIEF THAT ANY EXPOSURE OF HUMANS TO PCB'S IS SIGNIFICANT AND MAY PRESENT AN UNREASONABLE RISK.

TODAY MANY SCIENTISTS BELIEVE THAT SUBSTANTIAL EVIDENCE DOES EXIST TO SUPPORT THE CONCLUSION THAT LOW-LEVEL EXPOSURES TO PCB'S DO NOT PRESENT A RISK TO HUMAN HEALTH OR THE ENVIRONMENT.

MUCH NEW INFORMATION HAS BEEN PUBLISHED ON THE HEALTH EFFECTS OF PCB'S SINCE EPA PROMULGATED ITS BAN REGULATIONS IN 1976. A RECENT SEARCH OF THE PUBLISHED LITERATURE SHOWS THAT OVER 5,000 SCIENTIFIC AND TECHNICAL PAPERS ON PCB'S HAVE BEEN PUBLISHED FROM 1976 TO SEPTEMBER, 1981. AT MOST, CONGRESS AND EPA HAD AVAILABLE LESS THAN 2,800 SCIENTIFIC ARTICLES WHICH WERE PUBLISHED DURING THE 10-YEAR PERIOD PRIOR TO 1976, INCLUDING ONLY ONE HUMAN EXPOSURE INCIDENT, UPON WHICH TO BASE THEIR FINDINGS OF ADVERSE HEALTH EFFECTS OF PCB'S.

ON THIS BASIS ALONE, OF SHEER NUMBERS OF PUBLICATIONS, THE EPA SHOULD EVALUATE THE NEW SCIENTIFIC INFORMATION AND REASSESS THE POSITION THAT ANY EXPOSURE TO PCB'S IS SIGNIFICANT.

OF PARTICULAR SIGNIFICANCE IN THE NEWLY PUBLISHED SCIENTIFIC REPORTS ARE THOSE RELATING TO HUMAN EXPOSURE (EPIDEMIOLOGY) STUDIES. WITHIN THE LAST 12-24 MONTHS A LARGE NUMBER OF HUMAN PCB EXPOSURE STUDIES HAVE BEEN PUBLISHED WHICH SHED SIGNIFICANT NEW LIGHT ON THE PCB HEALTH EFFECTS PROBLEM.

IN ADDITION, IN CONJUNCTION WITH THE NEW PCB RULEMAKINGS BEING CONDUCTED BY EPA UNDER MANDATE OF THE FEDERAL DC CIRCUIT COURT, SEVERAL INDEPENDENT GROUPS OF SCIENTISTS (ABOUT SIX AT LAST COUNT) HAVE RECENTLY RE-REVIEWED THE TOTAL BODY OF PCB HEALTH AND TOXICITY LITERATURE WITH PARTICULAR EMPHASIS ON THE HUMAN EXPOSURE STUDIES. THEIR INDEPENDENT CONCLUSIONS, WHICH ARE SUPPORTIVE AND CONSISTENT WITH EACH OTHER, ARE SUMMARIZED AS FOLLOWS:

MONS 216478

1. PCB'S GENERALLY DO NOT POSE ANY SERIOUS RISK OF INJURY TO HUMAN HEALTH.
2. PCB'S ARE NOT HUMAN CARCINOGENS.
3. PCB'S HAVE NOT BEEN SHOWN TO ADVERSELY AFFECT HUMAN REPRODUCTION OR CAUSE BIRTH DEFECTS. PCB'S ARE NOT MUTAGENS OR TERATOGENS.
4. THE ONLY PROVEN ADVERSE HUMAN HEALTH EFFECTS RESULTING FROM PCB'S ARE TWO SKIN CONDITIONS: DERMATITIS AND CHLORACNE, WHICH ARE REVERSIBLE AFTER DISCONTINUANCE OF EXPOSURE.

I SHOULD EMPHASIZE THAT THESE CONCLUSIONS ARE NOT NEW OR STARTLING TO SCIENTISTS WHO HAVE BEEN INVOLVED IN PCB STUDIES OVER THE PAST DECADE. HOWEVER, THE WEIGHT OF THE NEW EVIDENCE UPON WHICH THEY'RE BASED SHOULD REINFORCE THE BELIEVABILITY AND, HOPEFULLY, RESOLVE THE ISSUE OF PCB HEALTH CONCERNS.

AS RECENTLY AS 1979, THE NATIONAL RESEARCH COUNCIL OF THE NATIONAL ACADEMY OF SCIENCES REVIEWED THE SUBJECT OF PCB'S. IN THE REPORT PREPARED BY THE COMMITTEE ON THE ASSESSMENT OF POLYCHLORINATED BIPHENYLS IN THE ENVIRONMENT, THE NAS GROUP CONCLUDED WITH RESPECT TO ASSESSMENT OF PCB HAZARD:

"AN ANALYSIS OF PCB DATA COMPILED FOLLOWING THE CRITERIA OF FIFRA AND TSCA PROPOSED GUIDELINES, LEADS TO THE CONCLUSION THAT PCB'S ARE PERSISTENT, AND ARE LIKELY TO ACCUMULATE. PCB'S DO NOT APPEAR PARTICULARLY TOXIC FOR SHORT-TERM EXPOSURE, BUT RESULTS ARE SUBJECT TO INTERPRETATION."

THE MOST RECENT 1981-1982 REVIEWS WERE CONDUCTED INDEPENDENTLY BY SEVERAL GROUPS OF SCIENTIFIC EXPERTS WHICH INCLUDED THE FIELDS OF CHEMISTRY, TOXICOLOGY, PATHOLOGY, EPIDEMIOLOGY, INDUSTRIAL HYGIENE AND

MEDICINE, INCLUDING OCCUPATIONAL MEDICINE, TO NAME A FEW. THE DATA AND CONCLUSIONS FROM THESE STUDIES WERE RECENTLY SUBMITTED TO THE U.S. EPA FOR THEIR USE IN DEVELOPING NEW PCB REGULATIONS. IN ADDITION, EPA IN MAY OF 1982 SPONSORED A TWO-DAY SYMPOSIUM OF LEADING WORLD SCIENTISTS AT BETHESDA, MARYLAND, TO REVIEW AND DISCUSS "THE RECENT ADVANCES IN EXPOSURE, HEALTH AND ENVIRONMENTAL EFFECTS STUDIES OF PCB'S." HOWEVER, THERE IS LITTLE PUBLIC AWARENESS OF THESE SIGNIFICANT STUDIES, THEIR REVIEWS AND THEIR IMPLICATIONS. IN ESSENCE, THESE CONCLUSIONS FROM ALL OF THE REVIEWS TO-DATE DEMONSTRATE AND STATE IN "LEGALESE" TERMS THAT:

1. PCB'S PER SE DO NOT REPRESENT AN UNREASONABLE RISK TO HUMAN HEALTH AND THE ENVIRONMENT.
2. THAT ANY EXPOSURE TO PCB'S IS NOT SIGNIFICANT.

I'D BRIEFLY LIKE TO DISCUSS IN MORE DETAIL WHAT WE DO KNOW ABOUT THE HEALTH ASPECTS OF PCB'S FROM THE (1) LABORATORY STUDIES ON ANIMALS, (2) THE NOW AVAILABLE AND MORE MEANINGFUL RETROSPECTIVE STUDIES ON HUMAN EXPOSURE, I.E., EPIDEMIOLOGY STUDIES, AND (3) SOME ENVIRONMENTAL CONSIDERATIONS.

LABORATORY STUDIES

THE PROBABILITY THAT A CHEMICAL WILL RESULT IN AN ADVERSE EFFECT IS A FUNCTION OF EXPOSURE TO THE COMPOUND AND ITS INHERENT TOXICITY. FORTUNATELY, ONE OF THE KEY PHYSICAL PROPERTIES OF PCB'S WHICH MADE IT A VALUABLE INDUSTRIAL CHEMICAL, THE LOW VAPOR PRESSURE, ACTUALLY MINIMIZES THE POTENTIAL FOR EXPOSURE EVEN AT CONCENTRATIONS OF SEVERAL

THOUSAND PPM. ANIMAL TOXICITY LITERATURE DOCUMENTS THAT PCB'S ARE NOT A HIGHLY TOXIC COMPOUND. UTILIZATION OF STANDARDIZED CRITERIA FOR ACUTE TOXICITY CLASSIFIES PCB'S AS ONLY SLIGHTLY TOXIC TO NON-TOXIC (TABLE 1). THIS RANKING IS BASED IN PART ON THE FACT THAT THE DOSES REQUIRED TO PRODUCE SHORT-TERM TOXIC EFFECTS IN SOME TEST SPECIES ARE SO HIGH THAT THE DOSE NECESSARY TO CAUSE SIMILAR EFFECTS IN HUMANS WOULD EXCEED ONE QUART. A COMPARISON OF THE ACUTE TOXICITY OF PCB'S WITH OTHER COMMONLY KNOWN CHEMICALS IS SHOWN IN TABLE 2.

PCB COMPOUNDS HAVE BEEN EVALUATED FOR MUTAGENIC POTENTIAL IN SEVERAL SYSTEMS, RANGING FROM BACTERIAL TEST SYSTEMS TO INTACT ANIMAL STUDIES. THEY HAVE BEEN FOUND TO BE NEGATIVE IN THE AMES TEST WITH THE EXCEPTION OF A POSITIVE MUTAGENIC RESPONSE FOR ONLY ONE COMPOUND, THE 4-CHLOROBIPHENYL CONGENER. THIS EARLY STUDY HAS NOT BEEN CONFIRMED, DESPITE REPEATED ATTEMPTS TO DUPLICATE THE RESULTS. THIS LACK OF REPRODUCIBILITY IN THE EARLY FINDINGS CAN ONLY LEAD TO THE CONCLUSION THAT THE POSITIVE RESULT IS UNFOUNDED.

CHLORINATED BIPHENYLS ARE FOUND TO EXHIBIT NEGATIVE RESPONSES IN THE DOMINANT LETHAL TEST (A TEST FOR HERITABLE DAMAGE LEADING TO EMBRYO-TOXICITY) AND ARE NOT CLASTOGENIC (CAPABLE OF CAUSING GROSS OR MORPHOLOGICAL DAMAGE TO CHROMOSOMES OF BLOOD, SPERM CELLS OR RATS OR CULTURED HUMAN BLOOD CELLS). COLLECTIVELY, THE RESULTS OF THESE STUDIES INDICATE THAT LOW-LEVEL EXPOSURE TO CHLORINATED BIPHENYLS DO NOT PRESENT A MUTAGENIC RISK.

PCB'S HAVE PRODUCED EMBRYOTOXICITY AND SPONTANEOUS ABORTIONS IN LABORATORY ANIMALS, BUT ONLY AT DOSES WHICH ARE HIGH ENOUGH TO PRODUCE MATERNAL TOXICITY. PCB'S ARE NO MORE TOXIC TO THE FETUS THAN

Table 1
TOXICITY RATING CHART

Probable Oral Lethal Dose for Humans*

Rating	Animal LD ₅₀	Expected Human Dose
1. Nontoxic	15,000 mg/kg	
2. Weakly Toxic	5,000-15,000 mg/kg	1 Pint-1 Quart
3. Moderately Toxic	500-5,000 mg/kg	1 Ounce-1 Pint
4. Toxic	50-500 mg/kg	1 Teaspoon-1 Ounce
5. Extremely Toxic	5-50 mg/kg	7 Drops-1 Teaspoon
6. Super Toxic	5 mg/kg	Less Than 7 Drops

* Average Adult of 70 kg

Adapted from Casarett and Doull's, Toxicology: The Basic Science of Poisons (2nd edition) Macmillan Publishing Co., Inc., New York (1980)

MONS 216482

Table 2
ACTUAL TOXICITY AND THE TOXICITY RATING CHART
OF SOME SELECTED CHEMICALS

Agents	Animal LD ₅₀ (mg/kg)	Expected Human Dose*
PCBs	14,000	1 Quart
Alcohol	10,000	1 Pint-1 Quart
Table Salt	4,000	1 Pint
Iron	1,500	1 Ounce-1 Pint
DDT	100	1 Teaspoon-1 Ounce
Strychnine	2	4 Drops
Nicotine	1	1 Drop
TCDD	0.001	Less Than 1 Drop
Botulinus toxin	0.00001	Less Than 1 Drop

* Average Adult 70 kg

Adapted from Casarett and Doull's, Toxicology: The Basic Science of Poisons (2nd edition) Macmillan Publishing Co., Inc., New York (1980)

MONS 216483

MOST CHEMICALS WHEN GIVEN AT TOXIC DOSES TO THE MATERNAL ANIMALS.

THE CHEMICAL MANUFACTURERS ASSOCIATION (CMA) CONTRACTED WITH THE INDEPENDENT CONSULTING FIRM ECOLOGY AND ENVIRONMENT, INC. (E&E), TO PREPARE A REVIEW OF THE LATEST HEALTH EFFECTS INFORMATION ON PCB'S. IT IS E&E'S "INDEPENDENT PROFESSIONAL OPINION THAT 'ANY EXPOSURE TO PCB'S' DOES NOT POSE A SIGNIFICANT HEALTH RISK TO HUMANS." E&E CONCLUDED "THAT PCB'S DO NOT REPRESENT A CARCINOGENIC (GENOTOXIC/INITIATOR) RISK AND THAT, EVEN IF THEY POSSESS ONCOGENIC (EPIGENETIC/PROMOTING) ACTIVITY, THE RISK AT LOW EXPOSURES IS INSIGNIFICANT."

NUMEROUS STUDIES INVOLVING BOTH MICE AND RATS HAVE BEEN REPORTED, BUT TO-DATE, ONLY ONE STUDY EXISTS WHICH SUGGESTS THAT PCB'S MAY CAUSE AN INCREASE IN HEPATOCELLULAR CARCINOMA (LIVER CANCER). TWO OTHER CHRONIC TESTS IN RATS, AS WELL AS TESTS IN THE MOUSE, DID NOT REVEAL A STATISTICALLY SIGNIFICANT INCREASE IN LIVER CANCER OR ANY OTHER CANCER FROM EXPOSURE TO PCB'S. A RECENT BIOASSAY PERFORMED BY THE NATIONAL CANCER INSTITUTE DID NOT DEMONSTRATE THAT PCB'S PRODUCED CANCER IN THE RAT. COMPARING THE ONE POSITIVE STUDY WITH THE LARGE NUMBER OF NEGATIVE TESTS AND CONSIDERING OTHER IMPORTANT CONTRIBUTING FACTORS (SUCH AS THE SPONTANEOUS RATE OF LIVER INJURY AND LIVER REGENERATION WHICH CAN LEAD TO ABERRANT HEPATOCELLULAR GROWTH), SUPPORT THE CONCLUSION THAT PCB'S DO NOT REPRESENT A CANCER RISK TO HUMANS.

AT WORST, PCB'S AT HIGH OR ELEVATED DOSES IN LABORATORY ANIMALS MEET SOME OF THE CRITERIA FOR A CHEMICAL PROMOTER, I.E., THEY ENHANCE TUMOR GROWTH THROUGH EPIGENETIC MECHANISMS. PCB'S DO NOT INDUCE NEW TUMOR

GROWTHS. AT MOST, PCB'S HAVE BEEN SHOWN TO POSSESS ONLY A WEAK PROMOTING ACTIVITY. THEREFORE, THE THRESHOLDS BOTH PROPOSED IN THEORY AND OBSERVED IN ANIMAL STUDIES SUGGEST THAT THERE ARE SAFE EXPOSURE LEVELS FOR PCB'S.

IT SHOULD BE EMPHASIZED THAT TWO FACTORS CONFOUND ISSUES RELATING TO THE HEALTH EFFECTS OF PCB'S. FIRST OF ALL, THE EFFECTS OF PCB'S VARY GREATLY WITH THE DEGREE OF CHLORINATION OF THE BIPHENYL MOLECULE. SECONDLY, MOST OF THE TOXICITY STUDIES AVAILABLE HAVE UTILIZED COMMERCIAL PCB MIXTURES. THESE MIXTURES FREQUENTLY CONTAIN CONTAMINANTS WHICH MAY BE TOXIC THEMSELVES AT HIGH EXPOSURE LEVELS.

EPIDEMIOLOGY

THE MOST MEANINGFUL INFORMATION FOR ASSESSING A CHEMICAL'S CHRONIC HEALTH EFFECTS CAN BE DERIVED USING HUMAN DATA FROM PROPERLY DESIGNED EPIDEMIOLOGY STUDIES. EPIDEMIOLOGICAL STUDIES ARE OFTEN POSSIBLE IN SITUATIONS WHERE PEOPLE HAVE BEEN EXPOSED FOR MANY YEARS.

A RECENT REVIEW OF TWENTY-ONE EPIDEMIOLOGY STUDIES FOUND THAT DURING OCCUPATIONAL EXPOSURE, PCB'S CAN CAUSE TEMPORARY SKIN PROBLEMS. YET, THERE ARE NO CLINICALLY OBSERVABLE LONG-TERM HUMAN HEALTH EFFECTS, INCLUDING THE OCCURRENCE OF CANCER. STUDIES OF NON-OCCUPATIONALLY EXPOSED POPULATIONS FOUND NEITHER DERMATITIS NOR OTHER CLINICAL EVIDENCE OF EXPOSURE-RELATED EFFECTS.

MANY OF THE RECENT EPIDEMIOLOGY STUDIES INCLUDE DATA ON LARGE NUMBERS OF INDUSTRIAL WORKERS WHO, OVER MANY YEARS, WERE OCCUPATIONALLY

EXPOSED TO PCB'S. THESE OCCUPATIONAL EXPOSURES, IN MOST CASES, INVOLVED CHRONIC PCB EXPOSURE LEVELS WHICH WERE ORDERS OF MAGNITUDE GREATER THAN ANY WHICH CAN REASONABLY BE FORESEEN UNDER EXISTING REGULATIONS. A COMPARATIVE REVIEW OF THESE OCCUPATIONAL-EXPOSURE STUDIES REVEALS THAT, LIKE OTHER CHEMICALS, PCB'S CAN CAUSE ADVERSE HEALTH EFFECTS, BUT IN MOST RESPECTS THESE EFFECTS HAVE BEEN MINIMAL. WHILE DERMATITIS AND CHLORACNE HAVE BEEN NOTED, THESE SKIN DISORDERS WERE REVERSIBLE AFTER DISCONTINUING THE EXPOSURE. IN SPITE OF OVER 50 YEARS OF USE, NO CAUSAL RELATIONSHIP HAS BEEN ESTABLISHED FOR ANY SPECIFIC TYPE OF CANCER, NOR HAS IT BEEN PROVEN THAT THE INCIDENCE OF CANCER MORTALITY HAS INCREASED FROM PCB EXPOSURE.

A RECENT STUDY BY THE NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH (NIOSH) FOCUSED ON 2,500 ELECTRICAL EQUIPMENT MANUFACTURING WORKERS. OVER HALF OF THE COHORT WAS OCCUPATIONALLY EXPOSED IN EXCESS OF 20 YEARS. SOME OF THE WORKERS WERE EXPOSED TO PCB'S FOR AS LONG AS 40 YEARS. THE STUDY FOUND NO EXCESS IN TOTAL MORTALITY, NOR IN MORTALITY DUE TO CANCER, CARDIOVASCULAR DISEASE OR NEUROLOGICAL DISORDERS. SINCE THIS STUDY FAILED TO DEMONSTRATE AN EXCESS CANCER RATE IN A HIGH-EXPOSURE POPULATION, IT PROVIDES SOME REASSURANCE THAT IT IS UNLIKELY THAT FUTURE STUDIES WILL SHOW ANY INCREASED RISK OF CANCER FROM PCB'S. AS ADDITIONAL DATA HAVE BEEN ACCUMULATED ON THE YUSHO INCIDENT, IT APPEARS THAT IT WAS NOT THE PCB'S WHICH WERE RESPONSIBLE FOR THE ADVERSE HEALTH EFFECTS OBSERVED BUT THE EXTRA-ORDINARILY HIGH LEVELS OF IMPURITIES IN THE JAPANESE COMMERCIALLY MANUFACTURED PCB MIXTURE.

THE CONCLUSIONS REACHED BY ALL OF THE EPIDEMIOLOGIC STUDIES ARE IN DISTINCT CONTRADICTION TO STATEMENTS APPEARING IN THE PRESENT COURT OF APPEALS DECISION THAT "PCB'S ARE EXTREMELY TOXIC TO HUMANS", AND THAT "EPIDEMIOLOGY DATA AND EXPERIMENTS ON LABORATORY ANIMALS INDICATED THAT PCB'S POSE CARCINOGENIC AND OTHER RISKS TO HUMANS."

ENVIRONMENTAL CONSIDERATIONS

ALTHOUGH MOST RECENT SCIENTIFIC LITERATURE REVIEWS HAVE FOCUSED ON HUMAN HEALTH EFFECTS STUDIES, RECENT PUBLICATIONS ON THE EFFECT OF ENVIRONMENTAL CONTAMINATION BY PCB'S DO NOT SUPPORT THE CONCLUSIONS THAT PCB'S HAVE EXHIBITED A SIGNIFICANT IRREVERSIBLE EFFECT ON THE ECOSYSTEM. EARLY REPORTS DOCUMENTED THAT PCB'S ARE BOTH PERSISTENT IN THE ENVIRONMENT AND THAT THEY BIOACCUMULATE IN SOME SPECIES. SCIENTISTS AGREE GENERALLY THAT THE HEAVILY CHLORINATED PCB HOMOLOGS ARE PERSISTENT AND BIOACCUMULATE TO SOME DEGREE. HOWEVER, CURRENT AVAILABLE SCIENTIFIC EVIDENCE DOES NOT SUPPORT THE ALLEGED HEALTH AND ENVIRONMENTAL EFFECTS.

FEAR OF DIRE ECOLOGICAL CONSEQUENCES CAUSED THE ADMINISTRATOR OF EPA TO FIND "THAT ANY RELEASE OF PCB'S INTO THE ENVIRONMENT WILL EVENTUALLY RESULT IN WIDESPREAD EXPOSURE OF WILDLIFE, INCLUDING SOME OF MAN'S FOOD SOURCES AND HUMANS, AND THAT SUCH EXPOSURE MAY HAVE ADVERSE EFFECTS." IN 1976, EPA PRESENTED DATA ON PCB CONTAMINATED FOOD FOR THE YEARS 1973-1975 (TABLE 3). THESE DATA CLEARLY INDICATE A SIGNIFICANT DOWNWARD TREND IN PCB LEVELS, INCLUDING A DECLINE IN THE HIGH CONCENTRATIONS FOUND IN FISH. THESE DOWNWARD TRENDS IN CONCENTRATION LEVELS ARE THE RESULTS OF VOLUNTARY INDUSTRY ACTIONS

MONS 216487

Table 3
PCBs IN FOOD

Products	1973	1974	1975	Maximal Concentra- tion (50ppm)
Fish	60.4	44.0	17.8	123.0
Milk	2.2	2.6	0.7	2.3
Eggs	1.1	4.2	0.0	11.0
Cheese	0.9	2.6	0.0	2.8
Feed Components	12.7	0.0	0.3	9.0
Animal Feed	7.2	0.0	0.0	199.5
Processed Fruit	4.5	0.0	0.0	19.2
Baby Food	1.1	0.0	0.0	trace
Meats, Poultry	1.9	1.2	0.3	5 ppm

Adapted from Jelinek, C. F. and Corneliusen, P. E., Levels of PCBs in the U.S. Food Supply, National Conference on Polychlorinated Biphenyls (EPS-560/6-75-004) pp. 147, (1976)

MONS 216488

TAKEN IN 1971 TO REDUCE USAGE AND POSSIBLE EXPOSURE TO PCB'S. THESE RESPONSIBLE INDUSTRY ACTIONS WERE TAKEN PRIOR TO PROMULGATION OF TSCA IN 1976 AND CERTAINLY MUCH EARLIER THAN THE ACTUAL PCB REGULATIONS WHICH BECAME EFFECTIVE IN MID-1979.

VERY RECENT DATA ON CONTAMINATION OF FISH AND NATURAL BODIES OF WATER FROM COMMERCIAL PCB MIXTURES HAVE SHOWN THAT ENVIRONMENTAL LEVELS ARE STILL DECREASING AT A SIGNIFICANT RATE. LEVELS IN FISH IN THREE DIFFERENT AREAS OF THE UNITED STATES (GREAT LAKES, NEW YORK STATE AND ALABAMA-GEORGIA) WERE IN THE RANGE OF 1 TO 5 PPM IN 1980-81, AS CONTRASTED WITH THE DATA WHICH RANGE FROM 60 PPM IN 1973 TO 18 PPM IN 1975. IN ADDITION, AT LEAST TWO RECENT PUBLICATIONS DEMONSTRATE THAT THE EARLIER PREDICTION OF EXTREME PERSISTENCE OF THE HIGHER CHLORINATED PCB HOMOLOGS IN THE ENVIRONMENT IS NOT OF THE ORDER OF A HUNDRED YEARS BUT IS MEASURABLE AND IS, ON THE AVERAGE, IN THE RANGE OF 40-50 MONTHS. THESE DATA ARE BASED UPON HALF-LIFE VALUES OF PCB'S IN THE TISSUES OF FISH ENVIRONMENTALLY EXPOSED. IN ADDITION, RECENT DATA PUBLISHED BY THE NATIONAL RESEARCH COUNCIL (1979) HAVE SHOWN A SIGNIFICANT REDUCTION OF PCB CONCENTRATIONS IN AIR OVER THE NORTH ATLANTIC OCEAN. THESE DATA HAVE DEMONSTRATED AN ORDER OF MAGNITUDE DECREASE IN PCB CONCENTRATIONS IN AIR RANGING FROM $0.76 \pm 0.55 \text{ ng/m}^3$ IN 1973 TO $0.074 \pm 0.099 \text{ ng/m}^3$ IN 1977.

THUS, A THOROUGH EVALUATION OF THE TOXICOLOGICAL AND, TO A LESSER EXTENT, THE ENVIRONMENTAL LITERATURE SUBSTANTIATES THE CONCLUSION THAT UNDER MOST CONDITIONS OF EXPOSURE PCB'S HAVE NOT BEEN DEMONSTRATED TO BE HAZARDOUS TO THE PUBLIC AND THAT LOW EXPOSURES

PAGE 14

WILL NOT LEAD TO HARMFUL CONSEQUENCES. HOPEFULLY, THE EPA AND GOVERNMENT SCIENTISTS WILL TOTALLY REVIEW THE RECENT DATA AND PUBLISHED LITERATURE AND REACH SIMILAR CONCLUSIONS TO THOSE OF THEIR OTHER SCIENTIST COLLEAGUES.

MONS 216490