IN THE CIRCUIT COURT OF THE COUNTY OF HURON

STATE OF MICHIGAN

DALE L. SCHULZ, ET AL,	)	
	)	
VS.	)	FILE NO. 77-002552 NP
	)	
MICHIGAN SILO COMPANY, ET AL,	)	
ROGER A. HALEY, ET AL,	)	
	)	
VS.	)	FILE NO. 77-002593 NP
	)	
MICHIGAN SILO COMPANY, ET AL,	)	
RONALD L. SCHULZ, ET AL,	)	
	)	
VS.	)	FILE NO. 77-002671 NZ
	)	
MICHIGAN SILO COMPANY, ET AL,	)	
RONALD L. HYZER, ET AL,	)	
	)	
VS.	)	FILE NO. 77-002677 NZ
	)	
MICHIGAN SILO COMPANY, ET AL,	)	

DEPOSITION OF ROBERT G. KALEY, II
TAKEN ON BEHALF OF THE PLAINTIFF ROGER A. HALEY

GORE REPORTING COMPANY
408 OLIVE STREET
ST. LOUIS, MISSOURI 63102
241-6750

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STATE OF MICHIGAN)
) SS
COUNTY OF HURON)

IN THE CIRCUIT COURT OF THE COUNTY OF HURON

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DALE L. SCHULZ, ET AL,	)	
VS.	)	FILE NO. 77-002552 NP
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MICHIGAN SILO COMPANY, ET AL,	)	

DEPOSITION OF ROBERT G. KALEY, II, PRODUCED, SWORN AND EXAMINED ON THE 25TH DAY OF JANUARY, 1983, BETWEEN THE HOURS OF 8 A.M. AND 6 P.M. OF SAID DAY, AT THE MONSANTO COMPANY, 800 NO. LINDBERGH, ST. LOUIS, MISSOURI, BEFORE GERALYN L. WASHAUSEN, CERTIFIED COURT REPORTER, A NOTARY

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PUBLIC IN AND FOR THE STATE OF MISSOURI, IN A CERTAIN CAUSE NOW PENDING IN THE CIRCUIT COURT OF THE COUNTY OF HURON, STATE OF MICHIGAN, BETWEEN DALE L. SCHULZ, ET AL, VS. MICHIGAN SILO COMPANY, ET AL; ROGER A. HALEY, ET AL, VS. MICHIGAN SILO COMPANY, ET AL; RONALD L. SCHULZ, ET AL, VS. MICHIGAN SILO COMPANY, ET AL; AND RONALD L. HYZER, ET AL, VS. MICHIGAN SILO COMPANY, ET AL; TAKEN ON BEHALF OF THE PLAINTIFF, ROGER A. HALEY.

APPEARANCES:

FOR THE PLAINTIFFS - DALE L. SCHULZ, RONALD L. SCHULZ, AND RONALD L. HYZER:

MR. H. DALE CUBITT
186 EAST HURON AVE.
P. O. BOX 178
BAD AXE, MICHIGAN 48413

FOR THE PLAINTIFF - ROGER A. HALEY:

MR. JOHN W. MC GRAW
MR. PATRICK J. MC GRAW
MC GRAW & BORCHARD
1100 COURT STREET
SAGINAW, MICHIGAN 48602

MR. JAMES N. WOODWORTH
125 N. HEISTERMAN STREET
P.O. BOX 187
BAD AXE, MICHIGAN 48413

FOR THE DEFENDANT MONSANTO COMPANY:

MR. WILLIAM E. JUNGERHELD
CHAKLOS, JUNGERHELD & DELLA SANTINA
5525 COLONY DR. N.
SAGINAW, MICHIGAN 48603

MR. JOSEPH G. NASSIF
800 NO. LINDBERGH BLVD.
ST. LOUIS, MISSOURI 63167

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IT IS HEREBY STIPULATED AND AGREED BY AND BETWEEN COUNSEL FOR THE PLAINTIFFS AND COUNSEL FOR THE DEFENDANTS THAT THIS DEPOSITION MAY BE TAKEN IN SHORTHAND BY GERALYN L. WASHAUSEN, A CERTIFIED COURT REPORTER, AND AFTERWARDS TRANSCRIBED INTO TYPEWRITING, AND THEN SIGNED BY THE DEPONENT.

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ROBERT G. KALEY, II,

OF LAWFUL AGE, PRODUCED, SWORN AND EXAMINED ON BEHALF OF THE PLAINTIFF ROGER A. HALEY, ET AL, DEPOSES AND SAYS:

DIRECT EXAMINATION

QUESTIONS BY MR. MC GRAW:

MR. MC GRAW: FOR A DISCUSSION ON THE RECORD PRIOR TO OUR GETTING INTO QUESTIONING THE WITNESS, WE SEEM TO BE ALL HERE EXCEPT SOMEBODY FROM THE MICHIGAN SILO -- C&B SILO COMPANY AND/OR MICHIGAN SILO. C&B SILO IS REPRESENTED BY DAVIDSON, BREEN & DOWD'S OFFICE IN SAGINAW.

THE PRE-TRIAL ORDER ITSELF INDICATED THAT THE DATE FOR THESE DEPOSITIONS WERE TO BE -- WAS TO BE JANUARY 25, 1983 AT 10 A.M. AT THIS TIME AND IN ST. LOUIS, MISSOURI. WE HAD ALL DISCUSSED AT THE PREVIOUS DEPOSITION TAKEN IN SAGINAW ON THE 19TH AND 20TH WITH MR. DAVIDSON'S OFFICE PRESENT AND THEN I SPOKE PERSONALLY WITH MR. DAVIDSON ON FRIDAY, THAT WOULD BE JANUARY 22ND, AND ADVISED HIM AGAIN OF THE DEPOSITIONS AND TOLD HIM WHEN WE WOULD BE GOING AND STARTING AT 9:00 IN THE MORNING. I JUST REMEMBERED WHAT JOHN DAVIDSON TOLD ME, THAT HE HAD A TRIAL MAYBE STARTING BUT HE WOULD TRY TO MAKE IT HIMSELF, OR IF HE DIDN'T, HE WOULD SEND SOMEBODY ELSE, SOMETHING ABOUT A HEART CASE THAT HE HAD TO TRY.

WE TALKED AT MR. JUNGERHELD'S OFFICE ON THE 19TH AND/OR 20TH ABOUT THESE DEPOSITIONS, AND I THINK EVERYBODY

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KNEW THAT THEY WERE GOING, AND, IN FACT, IN CLOSING I THINK WE ALL SAID SOMETHING TO THE EFFECT THAT WE SAID, "WE'LL SEE YOU IN ST. LOUIS." NO NOTICES WERE FILED BECAUSE OF THE DISTRICT COURT ORDER AND ALSO PEOPLE DISCUSSED IT AND KNEW WHAT WAS GOING ON.

I THINK THAT'S ABOUT ALL I CAN ADD TO THE RECORD NOW BEFORE WE START, UNLESS ANYBODY ELSE WANTS TO PUT ANYTHING ON.

MR. CUBITT: I THINK YOU SHOULD INDICATE WE'RE STARTING AT NINE.

MR. MC GRAW: WE'RE STARTING NOW, IT'S ABOUT TEN OR TWELVE AFTER NINE INSTEAD OF THE TEN O'CLOCK THAT'S MARKED IN THE PRE-TRIAL ORDER. I DO BELIEVE THAT WE MAY HAVE TALKED ABOUT THAT ON THE 19TH OR 20TH, BUT I HAVE NO SPECIFIC RECOLLECTION OF IT. BUT I DO RECALL TALKING TO MR. DAVIDSON ON FRIDAY AND TELLING HIM ABOUT THAT AT THE SAGINAW COUNTRY CLUB. ANYBODY ELSE WANT TO MAKE A COMMENT?

MR. JUNGERHELD: FOR THE RECORD, LET ME SAY THAT I CONCUR WITH WHAT MR. MC GRAW HAS SAID. I DON'T KNOW, OF COURSE, ABOUT HIS DISCUSSIONS ON FRIDAY WITH DAVIDSON, BUT I DO RECALL THE DISCUSSIONS WITH THE COURT AT THE PRE-TRIAL CONFERENCE WHERE THE DATE WAS SPECIFICALLY SELECTED FOR THESE DEPOSITIONS, AND AFTER WE ALL ADJOURNED FOR A MOMENT TO GO OUT INTO THE HALL AND MAKE TELEPHONE CALLS TO BE SURE THESE DEPOSITIONS COULD BE TAKEN AS

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MR. MC GRAW HAS INDICATED, SO THERE WAS THAT AGREEMENT AT THE PRE-TRIAL CONFERENCE.

AND ADDITIONALLY, THESE DEPOSITION ARRANGEMENTS WERE DISCUSSED AT THE DEPOSITIONS IN MY OFFICE ON THE 19TH AND 20TH.

MR. MC GRAW: SO WE ALL AGREE, SHOULD WE START AND GO AHEAD, THEN?

MR. JUNGERHELD: I'M AGREED.

MR. CUBITT: AGREED.

MR. WOODWORTH: AGREED.

Q WILL YOU GIVE US YOUR FULL NAME FOR THE RECORD, MR. KALEY?

A YES, ROBERT GEORGE KALEY, K-A-L-E-Y, II.

Q AND WHERE DO YOU LIVE?

A MY HOME ADDRESS IS 8305 BUDDIE, B-U-D-D-I-E, HAZELWOOD, MISSOURI.

Q AND I JUST WANT TO MAKE A PREPARATORY STATEMENT TO YOU. WE'RE NOT THE ENEMY, AS HAS BEEN INTRODUCED TO YOU, BUT ALL I'M HERE FOR IS TO GATHER FACTS AND INFORMATION AND WHEN I ASK YOU QUESTIONS, IF YOU DON'T UNDERSTAND ME OR YOU WANT ME TO REPHRASE IT, JUST SAY SO.

A OKAY.

Q AND IF YOU WOULD SAY "I DON'T KNOW WHAT YOU'RE TALKING ABOUT," ANY PHRASE YOU WANT, AND I'LL TRY TO REPHRASE IT OR WE'LL GO OVER IT. IF YOU WANT TO HAVE THE QUESTION

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REPEATED, WE CAN, WE CAN ASK THE COURT REPORTER TO GO BACK AND READ IT TO YOU.

A FINE.

Q HAVE YOU EVER GIVEN A DEPOSITION BEFORE?

A NOT IN A PCB CASE.

Q BUT YOU HAVE GIVEN DEPOSITIONS BEFORE?

A YES.

Q IN WHAT KINDS OF CASES?

A IT WAS RELATED TO SOME RAILROAD WORKERS IN MISSOURI.

Q OKAY. SO YOU KNOW WHAT THIS PROCEDURE IS ABOUT?

A YES, SIR.

Q HOW OLD ARE YOU NOW?

A THIRTY-SEVEN.

Q AND WHERE DID YOU GO TO SCHOOL?

A I RECEIVED MY UNDERGRADUATE'S DEGREE, A B.S. IN CHEMISTRY, FROM PURDUE UNIVERSITY IN 1964, I RECEIVED AN M.S. DEGREE IN ANALYTICAL CHEMISTRY FROM THE UNIVERSITY OF ILLINOIS IN 1971, AND I RECEIVED A PH.D. IN ANALYTICAL CHEMISTRY FROM THE UNIVERSITY OF ILLINOIS AWARDED IN 1974.

Q AND WHAT ABOUT YOUR WORK BACKGROUND AFTER GETTING OUT OF YOUR INITIAL SCHOOLING?

A I HAVE BEEN EMPLOYED AT MONSANTO SINCE DECEMBER OF 1973.

Q AND WHAT HAVE BEEN YOUR JOB TITLES GOING UP THE

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LINE TO THE PRESENT?

A I STARTED AS A SENIOR RESEARCH CHEMIST, IN I THINK IT WAS JANUARY OF '78 I WAS NAMED A RESEARCH GROUP LEADER AND IN FEBRUARY OF 1981 I WAS NAMED A SENIOR RESEARCH SPECIALIST.

Q WHAT IS A RESEARCH SPECIALIST?

A RESEARCH SPECIALIST IS A PERSON WHO HAS DEMONSTRATED SOME EXPERTISE IN A PARTICULAR BRANCH OF CHEMISTRY OR AT MONSANTO ENGINEERING OR WHATEVER. IT'S ON A TECHNICAL LADDER OF PROMOTION.

Q IN WHAT AREA IS YOUR EXPERTISE?

A MY PRESENT EXPERTISE IS PRIMARILY IN THE AREA OF GAS CHROMATOGRAPHY AND MASS SPECTROMETRY.

Q AND WHEN DID YOU FIRST LEARN OF THOSE TWO PROCEDURES?

A I LEARNED OF THE PROCEDURES ON A THEORETICAL BASIS IN GRADUATE SCHOOL AND SOMEWHAT IN UNDERGRADUATE SCHOOL.

Q WHEN DID YOU START UTILIZING THOSE PROCEDURES IN YOUR WORK?

A THE GAS CHROMATOGRAPHY ASPECT I BEGAN AS SOON AS I JOINED MONSANTO IN '73, AND THROUGH A LATERAL TRANSFER IN THE SPRING OF 1976 I BEGAN WORK WITH MASS SPECTROMETRY.

Q CAN YOU TELL US WHAT GAS LIQUID CHROMATOGRAPHY IS?

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A YES.

Q GIVE US A LAYMAN'S OUTLOOK OF IT.

A GAS CHROMATOGRAPHY IS A PROCEDURE USED IN ANALYTICAL CHEMISTRY TO SEPARATE COMPONENTS OF A MIXTURE.

Q TO IDENTIFY THE COMPONENTS OF A CHEMICAL?

A THE GAS CHROMATOGRAPH ITSELF DOES NOT HAVE IDENTIFICATION CAPABILITIES.

Q WHAT DOES IT DO AS FAR AS SEPARATING THEM AND PERHAPS MAYBE AIDING IN IDENTIFICATION?

A OKAY. EACH CHEMICAL, OKAY, A GAS CHROMATOGRAPH IS ESSENTIALLY A COLUMN, A TUBULAR COLUMN CONTAINING A MATERIAL COATED EITHER ON THE WALLS OF THE COLUMN OR IN A -- OR ON VERY SMALL PARTICLES OF AN INERT SUBSTANCE. EACH CHEMICAL HAS A DIFFERENT DEGREE OF INTERACTION WITH THIS COATING MATERIAL SO THAT IT WILL TAKE DIFFERENT CHEMICALS DIFFERENT AMOUNTS OF TIME FROM THE TIME THEY ARE PUT ON THE HEAD OF THE COLUMN TO REACH THE END OF THE COLUMN.

AT THE END OF THE COLUMN IS SOME SORT OF DETECTOR WHICH WILL DETECT THESE CHEMICALS AS THEY PASS FROM THE END OF THE COLUMN INTO THE DETECTOR. IT WILL GENERATE AN ELECTRICAL SIGNAL WHICH IS MEASURED, AMPLIFIED AND GENERALLY OUTPUTTED TO A RECORDER WHICH GIVES A TRACE CONTAINING PEAKS AND VALLEYS.

Q IN OTHER WORDS, IT FINALLY COMES OUT AND ENDS UP IN A GRAPH OF SOME KIND?

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A IN GENERAL, THAT IS TRUE.

Q AND FROM THAT GRAPH CAN YOU TAKE AND -- KNOWN SUBSTANCES AND THEIR PEAKS AND VALLEYS AND APPLY IT TO THAT AND SAY THIS IS WHAT THIS CHEMICAL IS, THIS IS WHAT THIS -- THAT THIS CHEMICAL IS?

A EACH CHEMICAL, AS I MENTIONED, HAS A SPECIFIC -- IN A SPECIFIC SYSTEM HAS A SPECIFIC TIME IT TAKES TO ELUTE FROM THE COLUMN. THESE RETENTION TIMES, AS THEY ARE CALLED, ARE INDICATORS OF THE IDENTITY BUT THEY DO NOT, IN AND OF THEMSELVES, CONSTITUTE A CERTAIN IDENTITY BECAUSE THERE ARE, AS WE KNOW, VERY MANY CHEMICALS AND THE CHANCES THAT TWO OR MORE CHEMICALS MAY ELUTE AT THE SAME TIME ARE VERY HIGH.

SO THEY CAN GIVE SOME INDICATION OF IDENTIFICATION BUT THEY CANNOT BE -- GAS CHROMATOGRAPHY BY ITSELF CANNOT BE USED AS A POSITIVE IDENTIFIER OF THE CHEMICAL.

Q IT CAN LEAD YOU TO THE UNDERSTANDING OF WHAT CONSTITUTES THAT CHEMICAL?

A IT CAN GIVE YOU A FIRST INDICATION OF WHAT THE CHEMICAL MIGHT BE, THAT'S CORRECT.

Q AND IS THERE SOMETHING AS FAR AS THE GAS CHROMATOGRAPHY IS CONCERNED THAT YOU MIGHT ALLUDE TO IN LAY LANGUAGE LIKE A FINGERPRINT OF DIFFERENT CHEMICALS?

A IT HAS BEEN REFERRED TO THAT WAY. I DON'T LIKE TO USE THAT TERM, BUT IT CAN -- THAT IS A COMMON USAGE, THAT IT DOES GIVE A FINGERPRINT.

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Q IT HAS SOME RELIABILITY, THEN, AS FAR AS IDENTIFICATION OF DIFFERENT CHEMICALS?

A YES. SOME.

Q IN YOUR SCHOOLING AND IN YOUR KNOWLEDGE AND BACKGROUND, WHEN DID THE SYSTEM OF GAS CHROMATOGRAPHY -- LIQUID CHROMATOGRAPHY COME INTO BEING, WHEN DID THEY START UTILIZING THAT?

A I THINK -- WELL, CHROMATOGRAPHY HAS BEEN KNOWN FOR MANY YEARS AS A COMMON ANALYTICAL TOOL. I THINK IT BEGAN TO BE USED SOMEWHERE IN THE MID FIFTIES, PROBABLY TOWARD THE MID SIXTIES IT CAME INTO COMMON USAGE WITH VERY NON-SPECIFIC DETECTORS.

Q AND WHO WERE USING THOSE TOOLS AT THAT TIME IN THE FIFTIES AND SIXTIES?

A WELL, I THINK -- I DON'T KNOW FOR SURE, I CAN GUESS, IF YOU WANT ME TO.

Q IF YOU CAN.

A OKAY. I WOULD SUSPECT THAT UNIVERSITY LABORATORIES AND SOME INDUSTRIAL LABORATORIES MAY HAVE HAD THOSE CAPABILITIES, BUT I HAVE NO IDEA FOR SURE.

Q COMPANIES WITH -- CHEMICAL COMPANIES, MONSANTO, ALLIED, ANY OF THE LARGE CHEMICAL COMPANIES?

A SOME OF THEM MAY HAVE. I CAN'T SPEAK FOR ANY OF THOSE INCLUDING MONSANTO. I DO NOT KNOW THE HISTORY OF GAS CHROMATOGRAPHY AT MONSANTO.

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Q WHAT ABOUT MASS SPECTROMETRY, WHAT IS THAT? COULD YOU GIVE US THAT IN LAY TERMS?

A I CAN TRY. MASS SPECTROMETRY IS A TECHNIQUE WHICH ALLOWS AN IDENTIFICATION OF A CHEMICAL BY A FRAGMENTATION PROCESS.

A CHEMICAL IS INTRODUCED INTO A MASS SPECTROMETER WHERE IN GENERAL IT IS BOMBARDED WITH A BEAN OF ELECTRONS AND THE ENERGY FROM THESE ELECTRONS CAUSE THE CHEMICAL TO FRAGMENT, TO BREAK APART INTO PIECES. THESE PIECES ARE THEN CAUSES TO TRAVEL DOWN EITHER A MAGNETIC FIELD OR AN ELECTRIC FIELD AND THE INTERACTION OF THESE PARTICLES BASED ON THEIR MASS AND THEIR CHARGE, THEY ARE IONS AND DO HAVE CHARGES ASSOCIATED WITH THEM, CAUSES THEM TO BE SEPARATED IN THESE FIELDS.

AGAIN, THESE IONS ARE THEN DETECTED AND OUTPUT AS A GRAPH OR A MASS SPECTROGRAM.

Q SOMETHING SIMILAR IN END RESULT, THEN, TO THE GAS LIQUID CHROMATOGRAPHY?

A NO, NOT REALLY. GAS LIQUID CHROMATOGRAPHY IS BASED STRICTLY ON THE TIME IT TAKES A CHEMICAL TO PASS THROUGH A COLUMN. ANY CHEMICAL PASSING THROUGH THAT COLUMN AT THE SAME TIME WILL GIVE A VERY SIMILAR SIGNAL.

IN THE CASE OF MASS SPECTROMETRY EACH COMPOUND HAS A SPECIFIC MASS SPECTROGRAM OR MASS SPECTRUM WHICH IS SPECIFIC FOR THAT COMPOUND. SO THAT MASS SPECTROMETRY CAN

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BE USED FOR A MUCH MORE POSITIVE IDENTIFICATION OF A MATERIAL WHEREAS GAS CHROMATOGRAPHY BY ITSELF, AS I MENTIONED BEFORE, CANNOT BE USED FOR POSITIVE IDENTIFICATION OF A MATERIAL.

Q BUT IT DOES, IN THE GAS CHROMATOGRAPHY, GIVE YOU AN IDENTITY, A FINGERPRINT OF THE CHEMICALS?

A WELL, IT MAY. YOU HAVE TO BE CAREFUL TALKING ABOUT FINGERPRINTS, THAT'S WHY I DON'T LIKE TO USE THE TERM FINGERPRINT. A SINGLE COMPOUND PASSING THROUGH A CHROMATOGRAPH WILL GIVE YOU A SINGLE PEAK AND WE HAVE TO BE CONCERNED ABOUT SINGLE COMPOUND AND ONE PEAK STICKING UP IS DIFFICULT TO CALL A FINGERPRINT, ALTHOUGH CHEMICALS DO HAVE CHARACTERISTIC RETENTION TIMES WHICH GIVES SOME FIRST INDICATION OF THEIR IDENTIFICATION.

IT CAN BE USED TO EXCLUDE THE POSSIBILITIES OF A CHEMICAL BEING PRESENT, BUT NOT TO DEFINITELY CONFIRM ITS PRESENCE.

Q BUT IT DOES HELP TO CONFIRM IN SOME?

A YES.

Q ARE THERE CERTAIN STANDARDS THAT A CHEMICAL IS KNOWN TO HAVE AND THAT THOSE STANDARDS CAN BE COMPARED WITH THE GAS LIQUID CHROMATOGRAPHY GRAPH AS AN IDENTIFYING -- IN AN IDENTIFYING DEGREE OF SOME DEGREE OF CERTAINTY?

A I DO NOT UNDERSTAND YOUR USE OF THE TERM STANDARDS IN THIS CONTEXT.

Q MY UNDERSTANDING IS THAT CERTAIN CHEMICALS

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HAVE CERTAIN STANDARDS LIKE IN GAS CHROMATOGRAPHY AND THAT YOU CAN MATCH UP THOSE STANDARDS WHEN YOU'RE TESTING A CHEMICAL TO SEE WHETHER OR NOT IT'S OF THE SAME TYPE OR KIND.

A A CHEMICAL DOES NOT HAVE A STANDARD.

Q MAYBE I'M NOT USING IT QUITE RIGHT, THEN. CAN YOU TAKE A CHEMICAL, A SAMPLE OF A CHEMICAL AND THEN RUN A GAS LIQUID CHROMATOGRAPHY GRAPHING ON IT AND THEN TAKE ANOTHER CHEMICAL AND RUN IT THROUGH THE GAS LIQUID CHROMATOGRAPHY TO SEE IF IT WILL MATCH WITH THAT SAMPLE TO MORE OR LESS BRING UP, IS WHAT I'M THINKING OF AS A STANDARDIZATION.

SAY WE KNOW WHAT THIS SAMPLE IS, WE CAN RUN IT THROUGH AND GET ITS PEAKS AND VALLEYS AND LENGTHS AND BREADTHS AND NOW WE'RE GOING TO TEST SOME OTHER CHEMICAL TO SEE IF THAT CHEMICAL IS WITHINTHAT MIXTURE.

A THAT IS A KNOWN PROCEDURE. IF YOU'RE USING A CHEMICAL AS A STANDARD FOR QUALITATIVE OR QUANTITATIVE MEASUREMENT, YES, THAT IS A COMMON PROCEDURE.

Q AND THAT'S A RELIABLE METHOD BY WHICH YOU CAN IDENTIFY VARIOUS CHEMICALS?

A IT IS RELIABLE, BUT IT IS NOT DEFINITE.

Q WHEN YOU BEGAN WORK HERE WITH MONSANTO, DID YOU GET INTO THE WORK INVOLVING PCB'S?

A I DID DO SOME PCB ANALYSES, YES.

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Q WHEN WAS THAT? WHEN DID YOU FIRST WORK ON THOSE?

A AS I THINK I STATED, I BEGAN WORKING WITH PCB ANALYSES, AMONG OTHER THINGS, AS SOON AS I JOINED THE COMPANY IN DECEMBER OF 1973.

Q WHEN WERE YOU TOLD THAT YOU WERE GOING TO GIVE A DEPOSITION IN THESE CASES?

A MY BEST RECOLLECTION IS PROBABLY BETWEEN TWO WEEKS AND A MONTH AGO.

Q IS THAT THE FIRST TIME YOU EVER HEARD OF THESE CASES?

A YES, SIR.

Q OKAY. WHAT, IF ANYTHING, DID YOU REVIEW IN PREPARING FOR TODAY?

A I WAS GIVEN -- I DID NOT REVIEW ANYTHING ON A TECHNICAL NATURE. I WAS GIVEN SOME INSTRUCTIONS ON WHAT A DEPOSITION WAS TO BE SURE I UNDERSTOOD THE PROCEDURE.

Q DID YOU REVIEW ANY DEPOSITIONS THAT OTHER PEOPLE HAD GIVEN?

A NO, SIR.

Q DID YOU REVIEW A BROCHURE SETTING OUT THE FACTS AND CIRCUMSTANCES AND THE CLAIMS OF SOME OF THE PARTIES SUCH AS THE HALEYS?

A NO, SIR.

Q DO YOU KNOW WHAT THIS MATTER IS ABOUT?

A IN THE VAGUEST DETAILS, YES.

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Q TELL ME.

A MY UNDERSTANDING IS THAT AT SOME POINT OR ANOTHER A COATING MAY HAVE BEEN OR WAS APPLIED TO SOME SILOS THAT THERE IS SOME CLAIM THAT THIS COATING AND/OR THE SILAGE CONTAINED PCB'S AT SOME POINT AND THAT THE PLAINTIFFS ARE CLAIMING DAMAGES FROM THE PRESENCE OF PCB'S THAT MAY HAVE BEEN THERE.

Q OKAY. DID YOU EVER WORK IN ANY WAY ON ANY TESTS OR SERIES OF TESTS, I SUPPOSE I SHOULD SAY, INVOLVING THE EFFECTS OF PCB'S ON THE ENVIRONMENT, LIVING THINGS, ANIMALS, HUMANS?

A NO. MY TRAINING IS ANALYTICAL CHEMISTRY AND I STRICTLY DO MEASUREMENT THINGS. I HAVE NO EXPERTISE AND HAVE NOT DONE ANY INTERPRETATION AS FAR AS EFFECTS.

Q WHAT IS ANALYTICAL CHEMISTRY?

A ANALYTICAL CHEMISTRY IS A BRANCH OF CHEMISTRY CONCERNED WITH THE PROPER MEASUREMENT OF CHEMICALS IN A VARIETY OF MATRICES AND IT HAS TWO ASPECTS, QUALITATIVE CHEMISTRY WHICH IS CONCERNED WITH THE IDENTIFICATION OR CONFIRMATION OF THOSE MATERIALS, QUANTITATIVE CHEMISTRY IS CONCERNED WITH THE MEASUREMENT OF THE LEVEL OF THOSE MATERIALS.

Q YOU CAME HERE IN 1973, SO YOU CAME IN AT A TIME WHEN, AS FAR AS WE KNOW HISTORICALLY, THE 1970 AREA, PCB'S WERE NO LONGER MANUFACTURED AND PRODUCED FOR SALE TO NON-ELECTRICAL USERS. DO YOU HAVE THAT HISTORICAL FACTOR IN MIND?

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A I KNEW THAT MONSANTO HAD CEASED SALES TO NON-ELECTRICAL USERS; TO CLOTHES, I HAVE NO KNOWLEDGE OF OTHER PRODUCERS OF PCB'S, WHAT THEIR PRACTICES WERE AT THAT TIME.

Q DO YOU KNOW OF ANY OTHER PRODUCERS OF PCB'S?

A YES.

Q WHO?

A OKAY. I DO NOT KNOW THE NAMES OF THE COMPANY, BUT I KNOW THERE ARE PRODUCTS MANUFACTURED WITH TRADE NAMES SUCH AS KANECHLOR AND CLOPHEN AND THERE MAY BE OTHERS.

Q THOSE OTHERS DIDN'T HAVE AROCLORS IN THEM, HOWEVER, DID THEY?

A WELL, WE'VE GOT TO BE VERY CAREFUL, AROCLOR IS A TRADENAME REGISTERED BY MONSANTO FOR THEIR PCB, POLYCHLORINATED BIPHENYL PRODUCTS. THE OTHER NAMES I MENTIONED, CLOPHEN AND KANECHLOR, WERE ESSENTIALLY THE SAME PRODUCTS WITH DIFFERENT NAMES; IT'S LIKE KLEENEX AND PUFFS, THEY'RE THE SAME THINGS BASICALLY, THEY HAVE DIFFERENT NAMES. SO THE QUESTION REALLY DOESN'T HAVE MEANING.

Q DID YOU EVER ANALYZE, BREAK DOWN IN ANY WAY, THE PCB'S MANUFACTURED BY ANY OTHER COMPANY?

A NOT TO MY KNOWLEDGE.

Q SO YOU HAVE NO WAY OF KNOWING HOW THEY MIGHT LOOK IN A GRAPH, WHETHER GAS CHROMATOGRAPHY OR MASS SPECTROMETRY?

A I HAVE SEEN IN THE LITERATURE THAT THE GAS CHROMATOGRAMS OF THOSE PRODUCTS ARE VERY SIMILAR TO PRODUCTS

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MANUFACTURED BY MONSANTO UNDER THE TRADE NAME AROCLOR.

Q DO YOU KNOW WHERE THESE CHEMICALS, KANECHLOR AND CLOPHEN, COME FROM?

A I DON'T -- I DON'T -- I GUESS I DON'T UNDERSTAND THE QUESTION. THEY ARE MANUFACTURED BY CHEMICAL COMPANIES.

Q OKAY. ARE THEY FROM THE U. S. OR FOREIGN COMPANIES, IMPORTED?

A MY UNDERSTANDING IS THEY ARE MANUFACTURED OUTSIDE THE UNITED STATES, BUT THAT DOESN'T PRECLUDE THEIR PRESENCE IN THE UNITED STATES.

Q AND DO YOU KNOW THAT THEIR SALES WAS LIMITED TO ELECTRICAL USES?

A I HAVE NO IDEA WHAT THEIR SALES PATTERNS WERE.

Q HOW DID YOU GATHER THIS INFORMATION, AND WHEN DID YOU KNOW THAT?

A JUST THROUGH READING IN THE LITERATURE, SCIENTIFIC LITERATURE.

Q HOW LONG HAVE YOU KNOWN THAT?

A I DON'T KNOW, SINCE SOMETIME IN THE LAST TEN YEARS. I REALLY DON'T KNOW. I COULDN'T PUT A DATE ON IT.

Q DID YOU KNOW THAT HISTORICALLY MONSANTO IS OR COULD BE THE SOLE PRODUCER OF PCB'S IN THE UNITED STATES IN THE YEARS THIRTIES, FORTIES, FIFTIES AND SIXTIES?

A I HAVE READ THAT.

Q WHERE?

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A THE SAME TYPE OF PCB LITERATURE, YOU KNOW --

Q AND THAT THEY ARE, IN THAT REGARD, THE SOLE PRODUCERS AND SELLERS OF PCB'S AS FAR AS NON-ELECTRICAL USERS ARE CONCERNED?

A THAT I HAVE NO IDEA OF.

Q DO YOU KNOW IF PCB'S WERE USED IN WHAT ARE TERMED RESINS AND PLASTICIZERS?

A I REALLY DON'T KNOW.

Q DO YOU KNOW ANY OF THE USES TO WHICH PCB'S HAVE BEEN APPLIED OVER THE YEARS, THIRTIES, FORTIES, FIFTIES, SIXTIES?

A CERTAINLY THE ELECTRICAL INDUSTRY AS DIELECTRIC FLUIDS. I DO KNOW THAT THEY WERE USED AS SOLVENTS FOR CARBONLESS CARBON PAPER AT ONE POINT. THAT IS THE ONLY USE OF WHICH I HAVE REALLY FIRSTHAND KNOWLEDGE.

Q DID YOU EVER HEAR OF A CHEMICAL CUMAR, C-U-M-A-R?

A NO.

Q NEVER READ IT IN THE LITERATURE AT ALL?

A NO.

Q NEVER SAW IT IN MONSANTO LITERATURE?

A NO, SIR.

Q AND YOU NEVER SAW IT IN ANY OF THE TRADE JOURNALS, HEALTH JOURNALS, CHEMICAL JOURNALS?

A NO, SIR.

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Q DID YOU EVER READ ANY OF THE AGRICULTURAL JOURNALS HAVING TO DO WITH CHEMISTRY?

A NOT THAT I CAN RECOLLECT.

Q CAN YOU GIVE US AN IDEA OF WHAT JOURNALS THAT YOU, YOURSELF, PERSONALLY SUBSCRIBE TO?

A AT THIS TIME I PRESENTLY DO NOT SUBSCRIBE TO ANY JOURNALS. I RELY ON THE MONSANTO LIBRARY.

Q OKAY. SINCE YOU HAVE BEEN IN SCHOOL AND OUT OF SCHOOL HAVE YOU -- AND IN MONSANTO, HAVE YOU EVER PERSONALLY SUBSCRIBED TO TRADE JOURNALS OR SCIENTIFIC JOURNALS?

A I HAVE SUBSCRIBED TO SCIENTIFIC JOURNALS, YES.

Q WHICH ONES WOULD THEY BE?

A ANALYTICAL CHEMISTRY.

Q ANY OTHERS?

A AT ONE TIME I DID SUBSCRIBE TO THE JOURNAL OF CHEMICAL EDUCATION, BUT THAT'S BEEN -- I'VE NOT DONE THAT SINCE I HAVE BEEN AT MONSANTO.

Q ANALYTICAL CHEMISTRY WAS A JOURNAL THAT YOU SUBSCRIBED TO?

A YES.

Q AND HOW LONG DID YOU SUBSCRIBE TO THAT, WHAT'S THE YEARS, THE PERIOD?

A I HAVE SUBSCRIBED TO ANALYTICAL CHEMISTRY OFF AND ON PROBABLY FOR THE LAST FIFTEEN YEARS, DURING MY YEARS IN GRADUATE SCHOOL AND OFF AND ON DURING MY YEARS AT MONSANTO.

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Q WHO PRODUCES THAT?

A IT IS PRODUCED BY THE AMERICAN CHEMICAL SOCIETY.

Q DID YOU EVER HEAR OF CUMAR IN THAT JOURNAL --

A NO, SIR.

Q -- OR READ ABOUT IT IN ANY WAY?

A NO.

Q DO YOU FAMILIARIZE YOURSELF WITH THE VARIOUS SCIENTIFIC JOURNALS AND HEALTH JOURNALS HERE AT MONSANTO?

A CHEMISTRY JOURNALS, YES; HEALTH JOURNALS, NO.

Q HAVE YOU WORKED AT ALL AT MONSANTO IN ANY WAY WHATSOEVER, DIRECT, INDIRECT, OR PERIPHERALLY, WITH REGARD TO THE ENVIRONMENT, ANIMALS, HUMANS, LIVING THINGS WITH REGARD TO THE PCB'S?

A THAT'S A LONG QUESTION. WOULD YOU GO THROUGH THOSE, EACH, ONE BY ONE SO I CAN ANSWER THEM?

Q FINE. HAVE YOU, DURING YOUR TOUR HERE AND WORK WITH MONSANTO, EVER BEEN CONNECTED WITH AND WORKED WITH PCB'S WITH THE ENVIRONMENT?

A YES, I HAVE ANALYZED SAMPLES WHICH HAVE BEEN TAKEN FROM THE ENVIRONMENT.

Q OKAY. WHEN WAS THAT?

A WELL, PROBABLY DURING THE PERIOD '73 TO '76, I REALLY DON'T RECALL. THAT WAS WHEN MY HEAVIEST INVOLVEMENT WITH PCB'S WAS. I DON'T HAVE ANY SPECIFIC RECOLLECTIONS.

Q DID YOU MAKE REPORTS AND FILE DOCUMENTS WITH

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REGARD TO YOUR WORK AND YOUR ANALYSIS?

A IN GENERAL, YES, BUT THEY VARIED FROM -- THEY MAY HAVE BEEN ORAL TELEPHONE CALLS OR THEY MAY HAVE BEEN FORMAL REPORTS.

Q DID YOU FOLLOW UP YOUR TELEPHONE CALLS WITH A MEMORANDUM TO A FILE OR A MEMORANDUM TO A SUPERVISOR OR TO A HEAD OF A DEPARTMENT?

A SOMETIMES YES, SOMETIMES NO.

Q WHAT WOULD THESE MEMORANDUMS AND REPORTS BE CALLED, WHAT WOULD YOU LABEL THEM?

A JUST REPORTS OF RESULTS, I GUESS.

Q AND WHAT DEPARTMENT WOULD THAT BE YOU WERE WORKING IN DURING '73 AND '76?

A THAT WAS MONSANTO INDUSTRIAL CHEMICALS COMPANY.

Q AND ANY PARTICULAR DEPARTMENT IN THAT COMPANY, LIKE THE ANALYTICAL LAB OR THE CHEMISTRY LAB OR --

A WELL, IT WOULD HAVE BEEN IN THE RESEARCH DIVISION OF MONSANTO INDUSTRIAL CHEMICALS.

Q AND HOW WOULD THESE ENVIRONMENTAL SAMPLES COME TO YOU, AND FOR WHAT PURPOSE?

A IN A VARIETY OF WAYS, THE ENVIRONMENTAL SAMPLES WERE NOT OUR -- WE WERE, AT THE TIME, AND STILL ARE INVOLVED IN RESEARCH SO THAT THAT ENVIRONMENTAL SAMPLES WERE USUALLY FEW AND FAR BETWEEN, AND I REALLY DON'T HAVE ANY SPECIFIC RECOLLECTIONS, ALTHOUGH I, YOU KNOW, I DO RECALL HAVING

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ANALYZED, FOR INSTANCE, RIVER WATER, BUT WITH REGARD TO WHAT, I REALLY COULDN'T ANSWER. I DON'T REALLY RECALL.

Q BUT YOU WOULD HAVE MADE REPORTS IN MOST INSTANCES ON THE ANALYSIS?

A THE RESULTS WOULD HAVE BEEN REPORTED BUT POSSIBLY NOT FORMALLY, ON PAPER.

Q OKAY. DO YOU KNOW IF THEY WERE KEPT?

A I HAVE NO IDEA.

Q DO YOU KNOW IF THEY WERE MADE A PART OF A REPORT TO ANY DEPARTMENT IN MONSANTO?

A I HAVE NO IDEA.

Q OR MADE A PART OF A REPORT TO A GOVERNMENTAL AGENCY, WHETHER IT BE STATE, LOCAL, CITY, FEDERAL AGENCY OR WHAT-HAVE-YOU?

A I HAVE NO IDEA.

Q DID YOU, YOURSELF, EVER GO OUT INTO THE FIELD AND GET ENVIRONMENTAL SAMPLES AND STUDIES?

A NOT THAT I RECALL, NOT RELATED TO PCB'S.

Q IT WOULD JUST BE THAT YOU WOULD RELY ON SOMEBODY BRINGING SOMETHING IN AND ASKING YOU PARENTHETICALLY WHAT IS THIS?

A IN GENERAL, THAT IS TRUE.

Q AND IF YOU MADE UP THESE REPORTS, DID YOU EVER GET THEM BACK TO SIGN OR DID YOU -- WHEN YOU MADE THE REPORT UP, DID YOU SIGN THEM AND PROCESS THEM?

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A I REALLY DON'T RECALL IT. OUR PROCEDURES FOR REPORTS HAVE MATURED OVER THE YEARS AND I DON'T RECALL WHETHER WE SIGNED THOSE EARLY REPORTS AT THAT TIME OR NOT. THERE IS DEFINITELY THAT POSSIBILITY.

Q CAN YOU TELL US WHAT KIND OF SAMPLES THAT YOU WERE ANALYZING FOR THE ENVIRONMENT?

A THEY WOULD HAVE BEEN PRIMARILY WATER SAMPLES.

Q DID YOU ANALYZE ANY SOIL SAMPLES?

A I MAY HAVE, BUT I HAVE NO SPECIFIC RECOLLECTION.

Q DID YOU ANALYZE ANY AIR SAMPLES THAT HAD BEEN GATHERED TO CHECKON PCB'S?

A NO. WE DID NOT HAVE THAT EXPERTISE.

Q DID YOU WORK ON SAMPLING OR TESTING OR ANALYZING ANY PRODUCT OR FORM OF WASTE THAT MIGHT BE ALLEGED TO HAVE CONTAINED PCB'S IN THOSE YEARS OF '73 TO '76?

A NOT TO MY RECOLLECTION, NO.

Q DO YOU RECALL EVER ANALYZING ANY FARM MATERIALS SUCH AS WASTE FROM ANIMALS?

A NO.

Q OR COATINGS OR PLASTICIZERS OR RESINS THAT MIGHT BE USED OR UTILIZED IN A FARM ATMOSPHERE?

A NO.

Q DO YOU HAVE ANY IDEA OF WHAT KIND OF CHEMICAL, WHAT FORM OF AROCLOR, PERHAPS, WAS USED AS PLASTICIZERS AND RESINS?

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A I HAVE NO SPECIFIC KNOWLEDGE THAT AROCLOR EVER WAS USED AS PLASTICIZERS AND RESINS.

Q DID YOU EVER READ ANY OF THE TECHNICAL BULLETINS OF MONSANTO SINCE YOU HAVE BEEN HERE IN '73 UNTIL NOW REGARDING THE USE OF AROCLORS IN OTHER AREAS THAN ELECTRICAL?

A NO, NOT IN ANY OTHER AREAS OTHER THAN ELECTRICAL, NO, SIR.

Q WAS YOUR JOB AS AN ANALYTICAL CHEMIST MORE OR LESS GEARED TOWARD THE ELECTRICAL INDUSTRY AND ITS USE OF PCB'S, OR WHAT?

A IT WAS NOT GEARED TOWARD THE ELECTRICAL INDUSTRY. MOST OF -- AS I SAID, WE WERE IN A RESEARCH DIVISION AND MOST OF THE WORK WAS GEARED TOWARD INTERNAL STUDIES INVOLVING THE BEHAVIOR OF PCB'S IN VARIOUS SYSTEMS. SO, YOU KNOW, AS FAR AS BEING DIRECTLY RELATED TO THE ELECTRICAL INDUSTRY, NO, IT WAS PRIMARILY TO STUDY THE PROPERTIES OF POLYCHLORINATED BIPHENYLS IN A VARIETY OF SYSTEMS.

Q DID ANY OF THOSE SYSTEMS, THE VARIETY OF WHICH YOU SPEAK, INCLUDE PLASTICIZERS OR RESINS?

A NO. I'M TALKING -- NO.

Q JUST SO THAT WE KNOW MAYBE WE'RE TALKING ABOUT THE SAME THING, WHAT IS A PLASTICIZER?

A MY UNDERSTANDING IS A PLASTICIZER IS A MATERIAL WHICH IS INTRODUCED IN THE MANUFACTURE OF A PLASTIC TO GIVE IT CERTAIN PROPERTIES, MY GUESS WOULD BE PLIABILITY, BUT I

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DON'T KNOW THAT FOR SURE.

Q WHAT ABOUT A RESIN?

A I REALLY DON'T KNOW ABOUT RESINS.

Q DO YOU EVER RECALL HAVING ANY -- LET ME BACK THAT UP. DO YOU RECALL THE SPECIFICS OF ANY OF THE ANALYSIS YOU DID WITH REGARD TO PCB'S IN THAT '73 TO '76 AREA?

A YES.

Q CAN YOU GIVE ME KIND OF FIRST AN OVERALL PICTURE OF WHAT YOU DID DURING THAT PERIOD OF TIME WITH REGARD TO PCB'S? MAYBE WE CAN WORK FROM THAT.

A OKAY. I'LL GO BACK TO MY ORIGINAL STATEMENT. I WAS INVOLVED IN A RESEARCH GROUP WHICH WAS STUDYING THE BEHAVIOR OF PCB'S IN A VARIETY OF SYSTEMS.

FOR INSTANCE, WE MEASURED -- I WAS INVOLVED IN ANALYTICAL MEASUREMENTS FOR PEOPLE DOING STUDIES OF BIODEGRADATION OF PCB'S, AS AN EXAMPLE.

WE WOULD PUT THE PCB'S IN A LABORATORY EXPERIMENTAL SYSTEM AND MEASURE THEIR BEHAVIOR IN A BIODEGRADATION STUDY, THAT WOULD BE AN EXAMPLE OF WHAT I'M TALKING ABOUT.

Q WE'LL GO BACK AND ASK YOU FOR MORE EXAMPLES, BUT LET'S STOP ON THIS ONE. WHAT DO YOU MEAN BY A BIODEGRADATION?

A OKAY. BIODEGRADATION -- THERE ARE TWO TYPES OF BIODEGRADATION: OVERALL BIODEGRADATION IS A MEASUREMENT OR A CONCEPT INVOLVING THE DISAPPEARANCE OF A CHEMICAL FROM

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A SYSTEM WHICH CONTAINS LIVING ORGANISMS, OKAY, HENCE THE BIO. OKAY. WE WERE INVOLVED IN TWO TYPES OF STUDIES: THE FIRST WAS A LABORATORY SYSTEM SIMULATING SECONDARY SEWAGE TREATMENT, SO WE USED ORGANISMS WHICH WOULD -- MICRO ORGANISMS, BACTERIA, THINGS LIKE THAT WHICH WOULD BE FOUND TYPICALLY IN A SECONDARY SEWAGE TREATMENT, WE WOULD EXPOSE THOSE MATERIALS TO POLYCHLORINATED BIPHENYLS AND MEASURE THE DISAPPEARANCE OF THE PCB'S WITH RESPECT TO TIME.

THE OTHER SYSTEM MEASURES THE ULTIMATE DEGRADATION. ORGANIC CHEMICALS, WHEN THEY ARE DEGRADED, IF THEY ARE COMPLETELY DEGRADED, END UP AS CARBON DIOXIDE AND WATER AND WE HAD A LABORATORY EXPERIMENTAL SYSTEM TO MEASURE WHAT CONTAINED ANY NUMBER OF CHEMICALS, INCLUDING PCB'S, UNDERWENT COMPLETE DEGRADATION TO CARBON DIOXIDE, SPECIFICALLY WAS THE PARAMETER WE MEASURED.

Q IS IT CORRECT THAT PCB'S ARE NOT BIODEGRADABLE?

A NO, THAT IS NOT CORRECT.

Q IN OTHER WORDS, YOU SAY PCB'S CAN BE ABSORBED AND DESTROYED?

A I WOULD NOT SAY THEY CAN BE ABSORBED. PCB'S CAN BE DESTROYED BY, FOR EXAMPLE, BACTERIAL ACTION.

Q IS THERE ANY ONGOING METHODS IN THE UNITED STATES WHEREBY THE PCB'S ARE DELIVERED TO ANY PARTICULAR SOURCE AND DESTROYED FOREVER BY ANY MEANS WHATSOEVER?

A MY UNDERSTANDING IS THAT PCB'S, THERE ARE --

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THERE IS AT LEAST ONE INCINERATOR WHICH IS BEING USED FOR THE ULTIMATE DESTRUCTION OF PCB'S. I THINK THERE ARE OTHER SYSTEMS AVAILABLE, ALSO.

Q AND THAT'S IN THE LIQUID FORM?

A I HAVE NO IDEA WHAT FORM IT MUST BE DELIVERED.

Q CAN YOU BURN SOLIDS IN THAT INCINERATOR?

A I HAVE NO IDEA.

Q CAN YOU BURN ASPHALT AND CONCRETE AND MATERIALS LIKE THAT?

A I DON'T KNOW. I DO NOT KNOW.

Q SO IF PCB'S WERE IMPREGNATED IN THOSE SOLID SUBSTANCES, YOU HAVE NO IDEA WHETHER THEY CAN BE REMOVED?

A I HAVE NO IDEA WHETHER SOLIDS CAN BE BURNED, SO, YOU KNOW, I DON'T HAVE ANY IDEA ABOUT THE PCB PART OF IT.

Q BASICALLY WHAT YOU WERE DOING IN THOSE LABORATORY TESTS WERE UNDER LABORATORY CONDITIONS TAKING SOME PCB'S AND LITERALLY THROWING THEM INTO THE MIXTURE LIKE THE SLUDGE OR WASTE AND TAKING THE PROCEDURE AND THEN TRYING TO ELIMINATE THEM BY SOME PROCEDURE?

A I WOULDN'T CALL IT THROWING THEM IN. THEY WERE INJECTED UNDER CAREFULLY CONTROLLED CIRCUMSTANCES SO THAT WE COULD MEASURE THE CONCENTRATIONS BEFORE AND AFTER.

Q OKAY. SO WHAT YOU DO IS PUT THEM IN THE WASTE MATERIAL, AND THEN, BY SOME MEANS, YOU WOULD TEST TO SEE HOW YOU COULD GET IT OUT?

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A IT'S NOT WASTE MATERIAL, IT'S A BACTERIAL SYSTEM, AND THEN, RIGHT, WE WOULD INSPECT THEM AND WE WOULD DO AN ANALYTICAL PROCEDURE TO MEASURE HOW MUCH WAS LEFT.

Q DID YOU EVER TEST TO SEE HOW YOU COULD GET PCB'S OUT OF THE GROUND, OF THE EARTH?

A NO.

Q IF PCB'S WERE IN THE ENVIRONMENT, IN THE EARTH, FOR EXAMPLE, DO YOU HAVE ANY KNOWLEDGE AS TO HOW IT CAN BE TAKEN OUT OF THERE?

A ARE YOU REFERRING TO -- FOR MEASUREMENT PURPOSES?

Q IF YOU HAVE A SPILLAGE, FOR EXAMPLE, OF PCB'S IN THE GROUND, IS THERE ANY METHOD BY WHICH THAT CAN BE ELIMINATED FROM THAT GROUND?

A NOT TO MY SPECIFIC KNOWLEDGE; THAT ISN'T TO SAY THAT THEY CAN'T BE, I JUST DON'T HAVE SPECIFIC KNOWLEDGE WHAT PROCEDURES ARE AVAILABLE OR EFFECTIVE.

Q ALL RIGHT. DO YOU KNOW HOW PCB'S WOULD GET INTO ANIMAL LIFE?

A I SUPPOSE THERE ARE SEVERAL METHODS OF INTRODUCTION; INGESTION.

Q INGESTION, YOU MEAN BY BREATHING?

A NO, BY EATING.

Q EATING, DRINKING?

A POSSIBLY.

Q IF THE PCB'S GOT INTO THE BODY OF AN ANIMAL, DO

WATER_PCB-00046611

YOU KNOW WHAT PART OF THE ANATOMY IT GOES INTO AND HOW IT IS METABOLIZED?

A I HAVE SOME VERY RUDIMENTARY KNOWLEDGE OF THAT FROM MY READING, YES.

Q FROM THE SCIENTIFIC JOURNALS AND LITERATURE?

A YES.

Q WHAT IS THAT?

A MY UNDERSTANDING IS THAT BECAUSE POLYCHLORINATED BIPHENYLS ARE WHAT WE CALL HYDROPHOBIC, IN OTHER WORDS, THEY DO NOT LIKE TO BE IN WATER-TYPE ENVIRONMENTS, THAT THEY TEND TO BE DISTRIBUTED AMONG WHAT IS CALLED FATTY TISSUE, AND IN SOME CASES THEN THEY ARE METABOLIZED AND REMOVED FROM THAT TISSUE AND BY-PRODUCTS ARE EXCRETED.

Q HOW DOES A PCB GET OUT OF THE FATTY TISSUE?

A IT GETS OUT BY METABOLISM OF THAT FATTY TISSUE, IS MY UNDERSTANDING.

Q DO YOU KNOW HOW IT METABOLIZES FROM THE FATTY TISSUE?

A NOT SPECIFICALLY, NO.

Q DO YOU KNOW IF IT CAN COME OUT IN THE WASTE OF THE ANIMAL OR A HUMAN, IF IT'S IN A HUMAN?

A I DON'T KNOW FOR SURE, NO.

Q HAVE YOU READ IN THE LITERATURE THAT GENERALLY PCB'S IN THE FATTY TISSUE ARE BIOACCUMULATIVE?

A SOME PCB'S ARE BIO -- WE'VE GOT TO BE VERY CAREFUL,

WATER_PCB-00046612

PCB'S, AS I'M SURE YOU KNOW, IS A MIX OF TWO HUNDRED NINE CHEMICALS AND EACH ONE OF THOSE CHEMICALS HAS A DIFFERENT BEHAVIOR IN ANY SYSTEM; YES, IT'S MY UNDERSTANDING THAT CERTAIN ISOMERS WILL TEND TO ACCUMULATE MORE THAN OTHER ISOMERS.

Q AND HAS THERE BEEN ANY RESEARCH BY YOURSELF OR MONSANTO, TO YOUR KNOWLEDGE, AS TO WHICH OF THESE BIO ACCUMULATE MORE THAN OTHERS?

A WE HAVE LOOKED NOT AT SPECIFIC ISOMERS, WE HAVE LOOKED AT GENERAL PATTERNS, FOR INSTANCE, IN RATS.

Q HAVE YOU MADE ANY STUDIES YOURSELF IN THAT?

A I HAVE ANALYZED SAMPLES, BUT I HAVE NOT INTERPRETED OTHER THAN REPORTING NUMBERS, I HAVE NOT INTERPRETED THE NUMBERS.

Q TELL US ABOUT YOUR ANALYSIS OF THE ANIMALS, THE RATS.

A OKAY. IN GENERAL, WE WOULD RECEIVE TISSUES FROM THE RATS WHICH WE WOULD ANALYZE BY OUR STANDARD ANALYTICAL PROCEDURES AND REPORT THE LEVELS OF PCB'S DETECTED IN THOSE TISSUES.

Q WHAT STANDARDS WERE YOU USING?

A OKAY. I WANT TO BE SURE, WE'RE TALKING ABOUT STANDARDS AGAIN, WHAT DO YOU MEAN BY STANDARDS?

Q YOU SAID YOU WERE USING YOUR STANDARD ANALYTICAL PRACTICE.

WATER_PCB-00046613

A STANDARD ANALYTICAL TECHNIQUE WE TYPICALLY USED FOR ANIMAL TISSUES WOULD BE TO HOMOGENIZE OR VERY THOROUGHLY MIX THE FATTY TISSUES WITH AN ORGANIC SOLVENT AND THEN TO REMOVE THE ORGANIC SOLVENT FROM THE FAT, FATTY TISSUE, WHICH WOULD CARRY THE PCB'S WITH IT, AND THEN INJECT THE MIXTURE CONTAINING THE PCB'S ON A GAS CHROMATOGRAPH AND MEASURE THE CONCENTRATIONS OF PCB'S.

Q AND WHAT DID YOU COME UP WITH?

A I DON'T RECALL THE EXACT NUMBERS, I MEAN, THERE WERE MEASURABLE PCB'S BECAUSE THE ANIMALS HAD BEEN FED MEASURABLE LEVELS OF PCB'S, BUT I DON'T RECALL.

Q WHAT EFFECT DID THAT HAVE ON THE ANIMALS?

A I HAVE NO IDEA. WE GOT ANIMAL TISSUES IN GLASS JARS, I NEVER SAW THE ANIMALS. I HAVE NO IDEA OF EFFECTS.

Q DID YOU EVER INQUIRE AS TO THE DOSAGE, THE TIME, THE SPREAD AND THEN THE EFFECT, WHETHER THE ANIMALS' TISSUES THAT YOU RECEIVED DIED BEFORE OR DIED NATURALLY OR UNNATURALLY OR --

A OKAY. LET ME ADDRESS EACH OF THOSE -- LET'S SEE IF -- COULD YOU REPEAT THAT? I'D LIKE TO ADDRESS EACH ASPECT.

Q MAYBE SHE CAN REPEAT THAT.

(PREVIOUS QUESTION WAS READ BY THE REPORTER)

A I WAS UNAWARE OF THE FEEDING SCHEDULE, IN OTHER WORDS, THE DOSAGE LEVELS AND THE LENGTH OF DOSAGE OF THE

WATER_PCB-00046614

ANIMALS. THE ANIMALS WERE SACRIFICED AT GIVEN PERIODS OF TIME IN ORDER TO OBTAIN THE TISSUES FOR ANALYSIS, SO I GUESS THAT'S AN UNNATURAL DEATH. I HAD NOTHING TO DO WITH IT AND IT WAS NOT -- THE PURPOSE OF THE STUDIES, AS I'M AWARE OF, WERE NOT TO DETERMINE THE EFFECT, BUT TO DETERMINE TISSUE RESIDUE LEVELS.

Q CAN YOU GIVE US AN IDEA OF HOW MUCH OF THE TISSUE RESIDUE THERE WAS THAT YOU DISCOVERED?

A I HAVE NO SPECIFIC RECOLLECTION. THAT WAS EIGHT YEARS AGO.

Q WAS YOUR MEASUREMENT TO SEE HOW MANY PARTS PER MILLION WERE LEFT IN THE FAT TISSUE?

A THAT WAS THE PURPOSE OF MY MEASUREMENT, THAT WAS NOT THE PURPOSE OF THE STUDY. THE PURPOSE OF THE STUDY WAS TO MEASURE THE LEVELS OF THE TISSUES WHILE THE RATS WERE BEING FED AND TO MEASURE THE LEVELS OF THE TISSUES AFTER FEEDING OF PCB'S HAD STOPPED AND THE ANIMALS WERE ALLOWED TO CLEAR THE PCB'S FROM THEIR SYSTEMS.

Q DO YOU KNOW IF ANY OF THE ANIMALS EVER CLEARED THE PCB'S FROM THEIR SYSTEM?

A AS I RECALL, THE DATA DID SHOW DEFINITE CLEARANCE PROPERTIES, YES.

Q AND DO YOU KNOW WHETHER THOSE WERE MALE OR FEMALE RATS AND WHETHER THEY WERE LACTATING OR NOT?

A I HAVE NO IDEA.

WATER_PCB-00046615

Q DO YOU KNOW THE ROUTE BY WHICH THE PCB'S WERE ELIMINATED OR EXCRETED?

A NO, I DO NOT.

Q HOW DID THOSE TISSUES COME TO YOU, THROUGH WHAT CHANNELS AND HOW AND WHAT SOURCE?

A THEY WERE DELIVERED BY THE PEOPLE DOING THE ACTUAL FEEDING IN SPECIALLY CLEANED GLASS BOTTLES.

Q WHAT ABOUT THE SAMPLES YOU TALKED ABOUT FROM THE ENVIRONMENT BEFORE, HOW DID THEY COME TO YOU?

A AGAIN, THEY WERE DELIVERED IN SPECIFICALLY CLEANED GLASS BOTTLES.

Q DID ANY OF THE SAMPLES AND TISSUES YOU GOT COME DELIVERED IN ANY PLASTIC BAGS OR PLASTIC BOTTLES?

A CERTAINLY NOT IF WE HAD ANY CONTROL OVER IT. I DON'T RECALL IF WE EVER. WE WERE VERY CAREFUL NOT TO USE PLASTIC.

Q WHY?

A PLASTIC IS UNFORTUNATELY NOT A VERY INERT MATERIAL AND CONTAMINATION IN PCB ANALYSIS WAS AND STILL IS A VERY SERIOUS PROBLEM, AND SO WE WERE VERY CAREFUL TO USE SPECIFICALLY CLEANED GLASS BOTTLES TO AVOID CROSS CONTAMINATION IN ANY WAY.

Q DO YOU KNOW WHETHER OR NOT LIKE A PLASTIC BAG, ORDINARY PLASTIC BAG WOULD CONTAIN PCB'S?

A I DON'T KNOW WHAT AN ORDINARY PLASTIC BAG IS.

WATER_PCB-00046616

MY UNDERSTANDING IS THERE ARE SEVERAL KINDS OF PLASTIC AND I HAVE NO SPECIFIC KNOWLEDGE WHETHER IT MAY OR MAY NOT CONTAIN PCB'S, BUT JUST AS AN ANALYTICAL CHEMIST, USE OF PLASTIC IN ANY PART OF AN EXPERIMENTAL PROCEDURE IS EXTREMELY DANGEROUS.

Q WHY?

A BECAUSE OF THE POSSIBILITIES OF CONTAMINATION. PLASTIC ITSELF IS NOT INERT NOR IS IT IMPERMEABLE. THERE ARE ANY VARIETY OF WAYS WHICH WE TRY TO AVOID CONTAMINATION AND AVOIDANCE OF THE USE OF PLASTIC IS ONE OF THEM.

Q BUT YOU DON'T KNOW WHETHER IT CONTAINS ANY PCB'S IN A PLASTIC --

A NOT FOR SURE, NO.

Q DID YOU MAKE REPORTS ABOUT THESE ANALYTICAL TESTS THAT YOU MADE ON RATS?

A YES.

Q AND TO WHOM DID YOU REPORT?

A I DON'T RECALL THE SPECIFIC PERSON. IT WOULD HAVE BEEN TO THE MIC RESEARCH DEPARTMENT.

Q MIC?

A YES, MONSANTO INDUSTRIAL CHEMICALS, I'M SORRY.

Q WOULD THIS HAVE GONE TO THE MEDICAL DEPARTMENT IN ANY WAY?

A WELL, THEY CERTAINLY MIGHT HAVE GOTTEN COPIES BECAUSE THEY WERE THE ONES PRIMARILY INVOLVED IN DESIGNING

WATER_PCB-00046617

THE STUDY, SO I'M SURE THEY DO HAVE A COPY OF THAT REPORT.

Q DO YOU HAVE IN MIND WHAT THE PURPOSE OR THE DESIGN OF THOSE STUDIES WAS WHEN YOU BEGAN?

A I THINK I HAVE ALREADY ANSWERED THAT, THE PURPOSE OF THE STUDY WAS TO MEASURE THE LEVEL OF PCB'S IN RAT TISSUE DURING FEEDING AND TO MEASURE THE RATE OF DISAPPEARANCE AFTER FEEDING HAD CEASED.

Q WERE THERE ANY OTHER ANIMALS THAT WERE USED, TO YOUR KNOWLEDGE, ANY TISSUES FROM ANY OTHER TYPE OF ANIMALS OTHER THAN RATS?

A NOT IN THAT STUDY, NO.

Q DO YOU KNOW FROM YOUR ANALYTICAL STUDIES THAT RATS WERE FREQUENTLY USED AS KIND OF A SAMPLE TO SEE WHAT EFFECTS CHEMICALS MIGHT HAVE ON HUMAN BEINGS, TO EXTRAPOLATE FROM THE RAT STUDIES --

A I DO KNOW THAT THE RATS ARE USED PRIMARILY -- ARE USED EXTENSIVELY IN HEALTH TESTING LABORATORIES AND THAT THE RESULTS ARE SOMETIMES EXTRAPOLATED. I HESITATE TO AGREE WITH YOUR STATEMENT THAT THEY ARE USED AS SUBSTITUTES FOR HUMAN BEINGS. OBVIOUSLY, YOU CAN'T TEST ON HUMAN BEINGS, SO RATS ARE USED BECAUSE THEY ARE EASY TO MAINTAIN AND THEY ARE USED FOR EXTRAPOLATION, BUT --

Q CERTAINLY WE CAN AGREE YOU DON'T WANT TO USE HUMAN BEINGS TO TEST CHEMICALS.

A I WOULD AGREE WITH THAT, YES.

WATER_PCB-00046618

Q CAN YOU GIVE US THE NAMES OF PEOPLE TO WHOM YOU MADE REPORTS WITH REGARD TO THESE STUDIES?

A I REALLY CAN'T RECALL ALL THE SPECIFIC NAMES. I THINK -- I THINK BILL PAPAGEORGE HAD MUCH OF THE ULTIMATE RESPONSIBILITY FOR PCB'S AT THAT TIME AND CERTAINLY THEY WOULD HAVE BEEN DELIVERED TO HIM.

Q WOULD -- HAVE YOU SEEN THOSE RECORDS, LIKE YOU MIGHT HAVE BEEN INVOLVED WITH IN THOSE YEARS, '73 TO '76, RECENTLY --

A NO, I HAVE NOT.

Q -- IN THE LAST YEAR OR SO?

A OH, NO.

Q DO YOU KNOW WHERE THEY MIGHT BE KEPT OR WHAT OFFICE OR AGENCY AT MONSANTO MIGHT HAVE THEM AVAILABLE?

A I HAVE HAD SEVERAL JOB CHANGES SINCE THAT TIME AND I DON'T HAVE ANY SPECIFIC KNOWLEDGE. TO THE BEST OF MY KNOWLEDGE THEY'RE PROBABLY IN THE RECORDS SENT SOMEWHERE, SOME OF THEM MAY BE IN THE HANDS OF THE LEGAL DEPARTMENT. THAT WOULD BE THE TWO AREAS WHERE I WOULD EXPECT THEY WOULD BE. OTHER THAN THAT, I DO NOT KNOW.

Q IF YOU WANTED TO GET THEM FOR YOURSELF, MAYBE YOU WERE STARTING OFF ANOTHER STUDY AND SAID "I'D LIKE TO SEE WHAT I DID BEFORE," HOW AND TO WHOM AND WHERE WOULD YOU GO TO GET THESE STUDIES?

A I WOULD GO TO THE RECORD CENTER.

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Q AND THAT'S HERE IN ST. LOUIS?

A YES.

Q WHAT, IS THERE A BUILDING NUMBER OR DEPARTMENT NUMBER?

A WELL, IT'S IN THE RESEARCH CENTER.

Q JUST RECORD CENTER?

A YES.

Q AND THIS WOULD BE THE SAME WITH REGARD TO THE ENVIRONMENTAL RESEARCH THAT YOU HAVE DONE, SAME LOCATION, SAME PEOPLE?

A I DON'T RECALL ANY SPECIFIC FORMAL REPORTS BEING WRITTEN ON, YOU KNOW, ON ENVIRONMENTAL RESEARCH. AS I MENTIONED, THE VAST MAJORITY OF MY WORK WAS INVOLVED WITH IN-HOUSE STUDIES AND ANY ENVIRONMENTAL SAMPLES WOULD HAVE BEEN A HERE AND THERE THING, AND THOSE ARE THE ONES MOST LIKELY TO HAVE BEEN REPORTED BY TELEPHONE OR ORALLY.

Q AND THE RAT STUDIES WOULD BE WHAT YOU WOULD CALL IN-HOUSE STUDIES?

A YES. THAT'S CORRECT.

Q OTHER THAN THOSE TIMES OF THE ENVIRONMENTS THAT YOU MENTIONED AND THE TIME THAT YOU JUST NOW MENTIONED WITH THE RAT STUDIES, DID YOU GET INVOLVED IN ANY OTHER PROCEDURES OR TESTS WITH REGARD TO PCB'S AND THEIR USE?

A WELL, CERTAINLY NOT ANY TESTS INVOLVED WITH THEIR USE. AS I MENTIONED, I DID HAVE INVOLVEMENT WITH

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BIODEGRADATION STUDIES.

Q AND WHERE WOULD WE GET THOSE STUDIES OR REPORTS THAT YOU HAD IN THAT REGARD?

A MUCH OF THAT, THE BIODEGRADATION WORK HAS BEEN PUBLISHED IN THE OPEN LITERATURE.

Q BUT THERE HAS BEEN -- IT HAS BEEN WRITTEN UP IN INTERDEPARTMENT MEMOS AND ALSO REPORTS FROM YOU AND YOUR DEPARTMENT, RESEARCH DEPARTMENT, AND KEPT HERE?

A I ASSUME IT HAS BEEN WRITTEN UP. MUCH OF MY WORK IS FROM AN ANALYTICAL ASPECT, IN OTHER WORDS, OTHER PEOPLE MAY BE DESIGNING AND CARRYING OUT THE STUDIES, I DO THEIR ANALYSES FOR THEM AND REPORT THE NUMBERS BACK TO THEM. IN THOSE CASES MY NAME WOULD NOT APPEAR AS AN AUTHOR ON THE REPORT.

Q YOU WERE WORKING ALL THAT TIME AS AN EMPLOYEE OF MONSANTO?

A YES.

Q AND WHATEVER YOU WOULD REPORT WOULD GO TO DIFFERENT AGENCIES IN MONSANTO RATHER THAN TO OUTSIDE JOURNALS, DIRECTLY FROM YOU OR YOUR DEPARTMENT?

A OKAY, MY RESULTS, IF THEY WERE REPORTED FORMALLY, WOULD BE REPORTED FIRST WITHIN MONSANTO. IF IT WAS DEEMED SIGNIFICANT, THEN IT WOULD BE WRITTEN FOR OUTSIDE PUBLICATION.

Q AND WOULD YOU DO THAT OR WOULD SOMEBODY ELSE

WATER_PCB-00046621

TAKE YOUR RESULTS AND INCORPORATE THEM IN SOMETHING SOMEBODY ELSE DID TO FINALLY MAKE AN ARTICLE IN A PUBLICATION?

A BOTH WAYS.

Q HAVE YOU EVER MADE ANY ARTICLES OR WRITTEN ANY ARTICLES OR PUBLISHED ANY ARTICLES?

A YES.

Q WOULD YOU GIVE US THEIR NAMES AND THE JOURNALS AND THE DATES?

A I ASSUME YOU'RE RESTRICTING THIS TO BEING RELATED TO PCB'S?

Q WELL, LET'S START WITH THE PCB'S FIRST.

A I DON'T KNOW THAT I CAN RECALL ALL OF THEM. THE TWO THAT I AM CURRENTLY AWARE OF, THE RAT STUDY WE'VE MENTIONED HAS BEEN PUBLISHED IN THE BULLETIN OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY WITH MY NAME AS THE FIRST AUTHOR.

MR. JUNGERHELD: GIVE ME THE NAME OF THAT PUBLICATION.

THE WITNESS: BULLETIN OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY. THAT WOULD HAVE BEEN IN THE MID SEVENTIES, I DON'T RECALL THE SPECIFIC CITATION, I JUST REALLY DON'T REMEMBER, BUT IT WOULD HAVE BEEN SOMEWHERE IN THE MID SEVENTIES, '75, '76, SOMETHING LIKE THAT.

Q WERE THERE OTHER AUTHORS BESIDES YOURSELF?

A YES.

Q WHO?

WATER_PCB-00046622

A LET'S SEE, PROBABLY -- I DON'T RECALL, THERE WERE SEVERAL AUTHORS ON THAT PAPER, AS I MENTIONED, THERE WERE PEOPLE FROM THE MEDICAL DEPARTMENT, GEORGE LEVINSKAS WAS LISTED AS A CO-AUTHOR.

Q SPELL HIS LAST NAME, BECAUSE THE REPORTER AND I PROBABLY DON'T KNOW.

A I PROBABLY DON'T KNOW. PHONETICALLY, L-E-V-I-N-S-K-A-S-.

Q WAS HE AN EMPLOYEE AS WELL OF MONSANTO?

A YES.

Q WERE ALL THE AUTHORS EMPLOYEES OF MONSANTO?

A YES. OTHER THAN THOSE, I'M NOT SURE WHO ELSE MIGHT HAVE APPEARED ON THAT.

Q THAT WAS THE ONE ARTICLE, YOU MENTIONED A COUPLE OTHERS.

A OKAY. THE OTHER ONE WAS AN ARTICLE WRITTEN BY DR. MIEURE AND MYSELF ON CHARACTERIZATION OF PCB'S AS AN OUTGROWTH OF A PRESENTATION THAT DR. MIEURE MADE TO A CONFERENCE IN CHICAGO, AND IT'S -- I THINK IT'S BEEN PUBLISHED IN THE CONFERENCE PROCEEDINGS, AND I DON'T KNOW THE SPECIFIC CITATIONS. I KNOW THE CONFERENCE WAS HELD IN CHICAGO SOMETIME AND I DON'T REALLY --

Q DO YOU KNOW THE DATE?

A I REALLY DON'T, I'M SORRY, I REALLY DON'T.

Q ARE WE TALKING IN THE PERIOD OF '73 TO '76?

WATER_PCB-00046623

A THE WORK WAS CERTAINLY DONE IN THAT PERIOD, YES. THE SPECIFIC PUBLICATION MAY BE AFTER THAT BECAUSE THERE ARE DELAYS IN PUBLISHING CONFERENCE PROCEEDINGS, BUT IT WOULD HAVE BEEN IN THAT GENERAL EARLY TO MID SEVENTIES AREA.

Q DID YOU GO TO THE CONFERENCE AS WELL?

A NO, I DID NOT.

Q DID YOU EVER GIVE ANY TALKS AT ANY CONFERENCES OR WERE YOU A PARTICIPANT AT ANY CONFERENCES WITH REGARD TO PCB'S?

A YES.

Q WHEN WERE THEY AND WHERE?

A OKAY. THE -- I PREPARED A PAPER VERY SIMILAR TO THE PAPER THAT I SPOKE OF THAT DR. MIEURE AND I WROTE AT A UNITED STATES EPA-SPONSORED CONFERENCE AT WHAT THEY CALL THE LARGE LAKES REGIONAL LABORATORY AT GROSSE ISLE, MICHIGAN, THAT WOULD HAVE BEEN IN 1978, I BELIEVE, AND I WAS A RECENT PARTICIPANT IN A PCB CONFERENCE HELD IN -- SOMEWHERE IN MARYLAND THIS SPRING.

Q WHAT WAS THE TITLE OF THE ONE IN MARYLAND?

A PCB'S -- RECENT STUDIES ON THE EFFECTS OF PCB'S OR SOMETHING LIKE THAT.

Q ON THE HEALTH?

A THAT WAS PART OF IT. I HAD NOTHING TO DO WITH THAT PART OF IT. THERE WERE HEALTH RESULTS REPORTED THERE, AS I RECALL.

WATER_PCB-00046624

Q WHAT PART DID YOU PLAY IN THE ONE IN MARYLAND?

A WE WERE INVOLVED IN A -- ONE OF THE SESSIONS INVOLVING ANALYTICAL DIFFICULTIES IN THE MEASUREMENT OF PCB'S IN GENERAL.

Q AND DID YOU WRITE A PAPER ON THAT?

A NO. I WAS A DISCUSSION LEADER.

Q DID YOU MAKE A REPORT ON THAT IN THAT DISCUSSION TO YOUR SUPERIORS OR TO MONSANTO TO BE PUT INTO ANY KIND OF A PUBLICATION?

A NOT TO MONSANTO, NO.

Q DID YOU MAKE IT TO ANYBODY ELSE?

A YES.

Q TO WHOM?

A I REPORTED IT TO THE ORGANIZERS OF THE CONFERENCE.

Q AND DID THEY HAVE A PAPER PRINTED UP WITH THE OUTLINE --

A MY UNDERSTANDING IS THAT THOSE PROCEEDINGS WILL BE PUBLISHED, BUT TO THE BEST OF MY KNOWLEDGE VERY LITTLE HAS BEEN DONE ALONG THAT LINE.

Q WHO WOULD YOU GET IN CONTACT WITH IF YOU WANTED TO GET BACK WITH THEM AND ADD TO OR SUBTRACT WHAT YOU HAD GIVEN TO THEM?

A I CERTAINLY WOULDN'T ADD OR SUBTRACT ANYTHING, BUT I GUESS IT WAS ORGANIZED BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, SO THAT WOULD BE MY FIRST

WATER_PCB-00046625

CONTACT.

Q WOULD THERE BE ANYBODY THAT YOU HAD CONTACT WITH FOR THAT CONFERENCE IN MARYLAND TO ARRANGE TO GET YOU TO AND FROM THAT, IN OTHER WORDS, YOU JUST DIDN'T WALK THERE?

A YES. IT WAS ORGANIZED BY A COMPANY CALLED LIFE SCIENCES OR SOMETHING SIMILAR TO THAT IN CLEVELAND, OHIO, THEY ORGANIZED IT FOR THE EPA.

Q AND WAS THERE ANY PARTICULAR PERSON THAT YOU DEALT WITH?

A THERE CERTAINLY WAS, BUT I CAN'T RECALL HIS NAME RIGHT OFFHAND.

Q WHAT'S THIS LIFE SCIENCES IN CLEVELAND?

A AS FAR AS I KNOW IT'S A CONTRACT LABORATORY. THAT'S REALLY ALL I KNOW ABOUT IT. THEY PRIMARILY WORK ON THE BASIS OF RECEIVING CONTRACTS FROM THE EPA OR OTHER PEOPLE TO DO SPECIFIC TASKS AND THIS IS ONE TASK THEY CONTRACTED TO DO.

Q GET TOGETHER DIFFERENT PEOPLE FROM DIFFERENT ORGANIZATIONS, PRIVATE AND GOVERNMENT --

A YES.

Q -- AND TALK ABOUT THE EFFECTS OF PCB'S?

A YES. THAT'S CORRECT.

Q IN A LITTLE NUTSHELL CAN YOU GIVE US WHAT YOUR INPUT WAS TO THAT?

A MY INPUT WAS THAT IT IS EXTREMELY DIFFICULT TO

WATER_PCB-00046626

ANALYZE PCB'S IN A VARIETY OF MATRICES. THERE ARE NUMEROUS PROBLEMS INVOLVED BOTH FROM THE ASPECT OF QUANTIFICATION AND FROM THE ASPECT OF QUALITATIVE IDENTIFICATION OF THE PCB'S FROM THOSE MATRICES.

Q WHY IS THAT?

A WELL, AS I MENTIONED, PCB'S ARE A COMPLEX MIXTURE OF TWO HUNDRED NINE DIFFERENT ISOMERS EACH OF WHICH HAS DIFFERENT CHARACTERISTICS AND EACH OF WHICH HAS DIFFERENT BEHAVIORS IN ANALYTICAL SYSTEMS, AND AS AN ANALYTICAL CHEMIST, WE MUST BE VERY CAREFUL TO BE SURE THAT WE ARE MEASURING AND REPORTING WHAT WE THINK WE ARE MEASURING AND REPORTING AND WE MUST BE VERY CAREFUL TO AVOID CONTAMINATIONS AND, YOU KNOW, ERRONEOUS INTERPRETATION.

Q IF YOU UTILIZED GAS LIQUID CHROMATOGRAPHY TO DETERMINE WHETHER OR NOT A PRODUCT OR MIXTURE HAS PCB'S IN IT AND COME UP WITH PCB'S, CAN YOU AT LEAST RELY ON THE FACT THAT YOU'VE GOT PCB'S BUT MAYBE NOT THE EXACT NUMERICAL BREAKDOWN OF WEIGHT? IN OTHER WORDS, YOU COULD -- LET ME PUT IT AS AN ADDITIVE TO THAT QUESTION, YOU WOULD COME OUT WITH YES, WE HAVE PCB'S, BUT IT COULD BE EITHER 1242 OR 1248 OR 1254 OR 1260, WE'RE NOT SURE OF THE WEIGHT, THE PERCENTAGE OF CHLORINE, BUT WE KNOW THAT IT'S A PCB?

A FIRST OF ALL LET ME SAY BY WHAT YOU'RE CALLING 1242 OR 1254 YOU'RE REFERRING TO MONSANTO AROCLOR PRODUCTS?

Q YES.

WATER_PCB-00046627

A IN THE FIRST PLACE, THERE IS NO WAY, LOOKING AT A GAS CHROMATOGRAPH, EVEN IF YOU KNOW THAT THEY ARE PCB'S, TOIDENTIFY THAT THEY ARE AROCLOR. ALL PCB'S ON A GAS CHROMATOGRAPH LOOK IDENTICAL. THERE IS NO MARKER IN MONSANTO'S PRODUCTS TO SAY THIS IS AN AROCLOR. SO FIRST OF ALL YOU CANNOT SAY THIS IS AN AROCLOR PRODUCT.

SECONDLY, THERE IS SOME RELIABILITY ASSOCIATED WITH, IF YOU HAVE INDEPENDENTLY IDENTIFIED THE PRESENCE OF PCB'S THROUGH MASS SPECTROMETRY, TO USE THE GAS CHROMATOGRAPHIC PROCEDURE TO QUANTIFY THE LEVELS OF THOSE MATERIALS.

Q SO THAT YOU CAN GET THE LEVELS OF THE MATERIALS FROM THE GAS LIQUID CHROMATOGRAPHY?

A YES. THAT IS CORRECT.

Q SO THAT YOU COULD SAY THERE IS 54 PERCENT CHLORINE?

A NO. WE TYPICALLY -- THE CHROMATOGRAPHIC PROCEDURES MEASURE THE PRESENCE OF CHLORINATED BIPHENYL MOLECULES AND AS FAR AS THE LEVEL OF CHLORINATION, WE, WITHOUT DOING TESTS THAT WE VERY SELDOM DO, WE DON'T HAVE ANY INFORMATION TO THAT EFFECT. WE KNOW -- WE HAVE SOME VAGUE IDEA OF THE DEGREE OF CHLORINATION IN A GIVEN REGION OF THE CHROMATOGRAM, BUT WE CERTAINLY CANNOT GIVE A NUMBER LIKE 54 PERCENT, THERE IS NO WAY.

Q IF THERE IS A SAMPLE THAT YOU HAVE THAT SHOWS A GRAPHING AND YOU CAN MATCH THAT SAMPLING WITH A GRAPHING --

WATER_PCB-00046628

THE TEST PRODUCT WITH THAT SAMPLING, THEN YOU CAN AT LEAST BE REASONABLY SURE OF THE QUANTITY OF CHLORINE, CAN'T YOU?

A NO, BECAUSE WE DO NOT MEASURE THE QUANTITY OF CHLORINE.

Q YOU MEAN MONSANTO DOESN'T?

A MONSANTO DOESN'T AND MOST LABORATORIES INVOLVED, FROM MY UNDERSTANDING OF THE LITERATURE -- THE TEST FOR CHLORINE CANNOT BE DONE BY A GAS CHROMATOGRAPH. IT REQUIRES DESTRUCTION OF THE MATERIAL AND AN INDEPENDENT MEASURE OF THE PRESENCE -- OF THE QUANTITY OF CHLORINE.

Q IF YOU HAD A -- IF YOU HAD A PRODUCT WHICH WAS KNOWN TO CONTAIN, PREVIOUS TO ITS ANALYSIS BY GAS LIQUID CHROMATOGRAPHY, AN AROCLOR, AND YOU UTILIZED THAT TEST, COULD YOU REASONABLY COME UP WITH A SOLUTION THAT, YES, THERE ARE, ONE, PCB'S IN THAT SAMPLE, NUMBER ONE, CAN YOU DO THAT?

A YES. IF YOU HAD A PRODUCT THAT YOU KNEW CONTAINED PCB'S AND YOU DID A GAS CHROMATOGRAPHIC ANALYSIS AND GOT CERTAIN INFORMATION, YES, YOU COULD, TO A -- NOT COMPLETELY, BUT TO A REASONABLE DEGREE OF SAFETY, AGREE THAT THERE WERE PCB'S PRESENT.

Q AND THEN ALSO THAT YOU COULD TAKE AND MEASURE THAT WITH A SAMPLING OF WHAT 1248 WOULD BE, 1254, 1260 WOULD BE, AND SHOW THAT THE GAS CHROMATOGRAPHY HAD THAT SIMILAR FINGERPRINT SO THAT IT WAS AN AROCLOR, THOSE NUMBERS?

WATER_PCB-00046629

A OKAY. YOU CAN USE ANY PCB PRODUCT AS, AND I'M GOING TO USE THE TERM STANDARD THE WAY I USE THE TERM STANDARD, AS A STANDARD, IN OTHER WORDS, A KNOWN AMOUNT OF MATERIAL, REASONABLY WELL CHARACTERIZED, WHICH IS USED TO ESTABLISH THE RESPONSE OF THE ANALYTICAL SYSTEM FOR THAT MATERIAL.

AND HAVING DONE THAT, A SAMPLE MAY OR MAY NOT GIVE A SIMILAR PATTERN. BUT HAVING USED AN AROCLOR MATERIAL AS A STANDARD, WHICH WAS COMMON PRACTICE BECAUSE AROCLORS WERE MORE READILY AVAILABLE THAN OTHER PCB PRODUCTS FOR USE AS STANDARDS, YOU COULD USE THAT STANDARD TO ESTABLISH A RESPONSE FACTOR AND USE THAT RESPONSE FACTOR TO QUANTITATE PCB'S IN ANOTHER PRODUCT, BUT THAT HAS NO -- THERE IS NO ONE STEP FURTHER SAYING THAT THAT OTHER MATERIAL IS AROCLOR. YOU CAN USE THE AROCLOR AS A STANDARD, BUT THERE IS NO POSITIVE WAY TO IDENTIFY THE PCB'S IN THE SAMPLE ITSELF AS AROCLOR. AS I SAID BEFORE THERE IS NO MARKER IN AROCLOR WHICH DISTINGUISHES IT FROM OTHER PCB PRODUCTS.

Q BUT IF YOU STARTED OUT WITH THE KNOWLEDGE THAT THAT PRODUCT ORIGINALLY HAD AN AROCLOR IN IT AND YOU FOUND PCB'S AND QUANTITATED IT INTO THAT WEIGHT, YOU COULD REASONABLY PRESUME THAT THAT WOULD BE AROCLOR 1254, 1260, ET CETERA, COULDN'T YOU?

A IF YOU HAD POSITIVE KNOWLEDGE THAT IT WAS IN THERE ANDYOU ANALYZED IT AND FOUND PCB'S IN THERE, IT WOULD

WATER_PCB-00046630

BE A REASONABLY SAFE ASSUMPTION, YES.

Q DO YOU HAVE, LIKE FOR THESE LAST TWO MEETINGS YOU HAD, DO YOU HAVE ANY WHAT YOU MIGHT CALL OUTLINES OF YOUR TALKS THAT YOU WERE GOING TO GIVE AT THE CONFERENCES THAT YOU RETAINED YOURSELF?

A OKAY. THE PCB CONFERENCE --

Q THE ONE IN MARYLAND?

A NO. NO. THE EARLY ONE AT LARGE LAKES RESEARCH STATION, THE ONLY NOTES OR ANYTHING I WOULD HAVE WOULD BE THE PUBLISHED PROCEEDINGS FROM -- FROM THE PAPER ON CHARACTERIZATION OF PCB'S. I SAID NOTHING IN THAT TALK WHICH WOULD DIFFER FROM THE MATERIAL THAT'S ALREADY BEEN PUBLISHED.

FOR THE SECOND TALK I DID NOT -- FOR THE SECOND MEETING IN MARYLAND IN THE SPRING OF 1982 I DID NOT GIVE A TALK, I HAVE NO NOTES OF ANYTHING I SAID BECAUSE I DID NOT -- I DID NOT SPEAK. I WAS A DISCUSSION LEADER.

Q GOING BACK TO THAT, THE LARGE LAKES, WAS THAT THE ONE AT GROSSE ISLE THAT YOU HAD MENTIONED EARLIER?

A YES.

Q THIS PUBLICATION, I'M NOT CERTAIN WHAT PUBLICATION YOU'RE TALKING ABOUT.

A OKAY. IT WAS THE ONE I'M NOT CERTAIN OF, EITHER. IT WAS A PAPER ENTITLED "CHARACTERIZATION OF PCB'S", PRIMARY AUTHOR WAS JAMES MIEURE. MY UNDERSTANDING IS THAT

WATER_PCB-00046631

THE PROCEEDINGS OF THAT CONFERENCE HAVE BEEN PUBLISHED, BUT I DO NOT HAVE A SPECIFIC CITATION ON THE TIP OF MY TONGUE.

Q WHEN YOU SAY PUBLISHED, YOU'RE TALKING ABOUT SOME SCIENTIFIC JOURNAL?

A EITHER A SCIENTIFIC JOURNAL OR OFTENTIMES CONFERENCE PROCEEDINGS ARE PUBLISHED IN A SEPARATE VOLUME.

Q AND THIS WOULD BE WITH THE EPA, THAT CONFERENCE AT GROSSE ISLE?

A I DON'T KNOW WHO ORGANIZED THAT. I DON'T KNOW THAT THAT WAS THE EPA, I DON'T KNOW.

Q SUPPOSING YOU WANTED TO GET A COPY OF THOSE PROCEEDINGS, TO WHOM WOULD YOU GO AND WHERE?

A I WOULD ASK JIM MIEURE.

Q ALL RIGHT. DO YOU KNOW -- DID YOU EVER SEE A COPY OF SUCH A REPORT?

A I'VE SEEN A COPY OF JIM AND MY PAPER, YES.

Q WHERE?

A WELL, HE HAS A COPY, I HAVE A COPY.

Q DO YOU HAVE IT NOW?

A I HAVE IT IN MY FILE, IN MY PUBLICATION FILE, YES.

Q OKAY. AND YOUR PUBLICATION FILE IS HERE AT ST. LOUIS?

A YES.

Q WHAT OTHER PUBLICATIONS DO YOU HAVE IN YOUR OWN

WATER_PCB-00046632

FILE?

A OF MINE?

Q YES.

A THERE ARE ABOUT EIGHT DIFFERENT PUBLICATIONS. I THINK THE ONE ON THE TISSUE STUDY WHICH WE'VE MENTIONED AND THE ONE ON CHARACTERIZATION OF PCB'S ARE THE ONLY RELATED TO PCB'S. THE OTHER ARE RELATED TO OTHER MONSANTO PRODUCTS WE HAVE STUDIED IN VERY MUCH THE SAME WAY AS WE HAVE STUDIED THE PCB'S.

Q WOULD THOSE BE READILY AVAILABLE TO YOU THAT YOU COULD GET AND LET US SEE?

A SURE, THEY'RE IN MY FILES, OBVIOUSLY.

Q OKAY. AND HOW LONG WOULD IT TAKE FOR YOU TO GET THEM?

A RIGHT NOW?

Q WELL, I'M NOT ASKING YOU TO RUN --

A THEY ARE IN A FILE IN MY DESK.

Q I DON'T KNOW WHERE YOU'RE STATIONED.

A I'M ACROSS THE ROAD.

Q SO IT'S A MATTER OF A HALF HOUR OR SO --

A YES.

Q -- IF YOU NEEDED TO --

A YES.

Q ALL RIGHT. SO, REALLY, THE REPORT THAT YOU AND JIM MIEURE HAD IN RELATION TO THAT GROSSE ISLE MEETING,

WATER_PCB-00046633

WAS THE RESULT OF THE WHOLE MEETING THE BROCHURE THAT YOU HAVE IN YOUR FILE?

A NO. ALL I HAVE IS A COPY OF THAT SPECIFIC PAPER.

Q NOT THE WHOLE MEETING?

A NO, SIR. I DON'T KNOW THAT THAT'S EVER BEEN PUBLISHED ANYWHERE. I DON'T KNOW.

Q THAT'S WHAT I WAS GETTING AT.

A ALL I HAVE IS A COPY OF THE SINGLE PAPER CO-AUTHORED BY JIM AND MYSELF WHICH I PRESENTED AT THAT MEETING.

Q OKAY. BUT I UNDERSTAND THAT, PERHAPS MAYBE I'M WRONG, THAT AFTER YOU AND JIM PRESENTED THIS PAPER, YOUR PAPER AND ANYTHING ELSE VERBALLY THAT MIGHT HAVE GONE INTO IT BY YOU OR JIM OR BOTH TOGETHER WITH OTHER PARTICIPANTS, WENT INTO A REPORT?

A THAT'S TRUE. THAT'S MY UNDERSTANDING. I DO NOT HAVE THAT PROCEEDINGS OF THAT CONFERENCE. I'M NOT SURE I'VE EVER SEEN IT. I KNOW THAT IT EXISTS.

Q YOU'VE GOT YOUR INPUT?

A RIGHT.

Q BUT YOU DON'T HAVE THE CONFERENCE OUTPUT?

A THAT IS CORRECT.

Q AND IF YOU WANTED TO GET THE CONFERENCE OUTPUT, TO WHOM WOULD YOU GO?

A I WOULD GO TO JIM MIEURE AND SEE IF HE KNOWS

WATER_PCB-00046634

WHERE IT IS. FAILING THAT, I'M NOT SURE WHAT I'D DO; DEPENDING ON WHAT JIM KNEW, I WOULD MAKE A DECISION.

Q DO YOU HAVE ANY IDEA NOW IN YOUR HEAD MAYBE WHO WAS THE SPONSOR OF THAT?

A I REALLY DON'T. THAT WAS EIGHT YEARS AGO. I REALLY DON'T KNOW.

Q AND THAT YEAR AGAIN WAS WHAT, I'M SORRY?

A I'M GUESSING '76, '75, '76, MID 70'S IS REALLY THE BEST I CAN DO FOR THIS, HIS PRESENTATION. MY PRESENTATION WAS IN '78 AT GROSSE ISLE. HIS PRESENTATION I'M NOT EXACTLY SURE WHEN IT WAS.

Q IT WOULD HAVE BEEN DIFFERENT YEARS, THEN?

A PROBABLY, YES.

Q HIS BEFORE YOURS?

A YES.

Q DO YOU SUBSCRIBE TO THE OR DO YOU KNOW IF MONSANTO DOES TO THE JOURNAL OF INDUSTRIAL HYGIENE AND TOXICOLOGY?

A I HAVE NO DEFINITE KNOWLEDGE OF THAT.

Q DID YOU EVER READ IT YOURSELF?

A NO.

Q OR THE PUBLIC HEALTH REPORTS?

A NO.

Q I ASKED A LOT OF PEOPLE AND I MIGHT BE REPEATING SOME THINGS TO YOU THAT I'VE ALREADY ASKED YOU, SO FORGIVE

WATER_PCB-00046635

ME IF I FORGET, DID YOU EVER HAVE ANYTHING TO DO WITH CUMAR?

A NO, I DID NOT.

Q DID YOU EVER TEST IT IN ANY WAY?

A NO, SIR.

Q WERE YOU EVER ASKED TO TEST IT?

A NO, SIR.

Q DO YOU KNOW WHAT IT CONTAINS?

A NO, SIR.

Q DID YOU EVER HEAR WHERE IT CAME FROM?

A NO, SIR.

Q WHEN YOU SAY YOU DON'T KNOW ANYTHING, YOU DON'T KNOW ANYTHING ABOUT IT?

A THAT'S TRUE.

Q OKAY. DO YOU KNOW SPECIFICALLY WHAT AROCLOR 1254 WAS UTILIZED FOR IN THE FIELD?

A MY ONLY KNOWLEDGE OF THE USE OF AROCLOR 1254 WAS AS A DIELECTRIC FLUID PRIMARILY FOR USE IN TRANSFORMERS.

Q DO YOU HAVE ANY KNOWLEDGE THAT IT WAS USED IN PLASTICIZERS AND RESINS?

A NOT SPECIFIC, NO.

Q AND I THINK YOU TOLD ME BEFORE YOU REALLY HAD NOTHING TO DO WITH PLASTICIZERS OR RESINS?

A NO. THE DECISION FROM MONSANTO TO WITHDRAW FROM ANY OTHER APPLICATIONS OTHER THAN DIELECTRIC WAS MADE BEFORE I JOINED THE COMPANY.

WATER_PCB-00046636

Q DO YOU KNOW OF YOUR OWN KNOWLEDGE OR FROM READING LITERATURE THAT AROCLORS WERE USED IN SEALANTS?

A NO, I DO NOT.

Q DID YOU EVER HEAR OF AROCLORS BEING USED AS A SILO SEALANT?

A NOT PRIOR TO MY BRIEFING ON THE PARTICULARS OF THIS CASE, NO.

Q WERE YOU EVER GIVEN, IN YOUR BRIEFINGS, ANYTHING WITH REGARD TO THE USE OF AROCLORS IN SILO SEALANTS?

A NO, I WAS GIVEN NOTHING IN MY BRIEFINGS.

Q ARE YOU PERSONALLY AWARE OF ANY ARTICLES OR LITERATURE WITH REGARD TO THE TOXICITY OF PCB'S IN THE ENVIRONMENT, ANIMALS OR HUMANS?

A OKAY. I KNOW THAT THERE ARE ARTICLES IN THE LITERATURE, I HAVE NO SPECIFIC KNOWLEDGE OF THOSE, WITH REGARD TO THE ENVIRONMENT AND THE ANIMALS. I'M NOT AWARE OF ANY REPORTS IN THE LITERATURE REGARDING TOXICITY TO HUMANS.

Q OKAY. DO YOU THINK THAT YOU HAVE READ ALL THE ARTICLES THAT MAY HAVE BEEN PUBLISHED, SCIENTIFIC ARTICLES, WITH REGARD TO THE TOXICITY AND THE EFFECTS OF PCB'S?

A ABSOLUTELY NOT. I HAVE READ A VERY SMALL PERCENTAGE, PROBABLY.

Q AGAIN, WOULD IT, AS I THINK YOU PREVIOUSLY ANSWERED, NOT BE WITHIN YOUR AMBIT OF YOUR EMPLOYMENT TO LOOK INTO THE HEALTH EFFECTS OF THESE?

WATER_PCB-00046637

A THAT'S ABSOLUTELY CORRECT.

Q ARE YOU FAMILIAR WITH ANY STUDIES SUCH AS YOU DID WITH RATS BY OTHER PERSONS?

A I KNOW THEY'VE BEEN DONE JUST FROM READING IN THE LITERATURE.

Q DO YOU REMEMBER IF THEIR STUDIES DIFFERED FROM YOURS?

A I DON'T RECALL. I DON'T RECALL ANY THAT HAD THE SPECIFIC PURPOSE THAT OURS HAD SO THAT THEY COULD BE DIRECTLY COMPARED, FRANKLY.

Q DID YOU, IN YOUR STUDIES WITH THE RATS, TRY TO CHECK ON OR SEE WHAT THE RESULTS WERE WITH REGARD TO REPRODUCTION?

A NO. AS I MENTIONED, THE PURPOSE OF THE STUDY WAS TO MEASURE TISSUE LEVELS DURING AND AFTER FEEDING, AND IT WAS STRICTLY A TISSUE LEVEL STUDY, AND TO THE BEST OF MY KNOWLEDGE NO -- NO OTHER EFFECTS WERE MEASURED DURING THE STUDY.

Q OKAY. FORGIVE ME AGAIN, BUT WHAT YEAR WOULD THAT BE?

A I'M GUESSING '74, '75ISH.

Q DID YOU EVER WORK ON ANY PROJECT, WHETHER IT BE THE RATS OR OTHERS, WHERE YOU TRIED TO ESTABLISH WHAT MIGHT BE CALLED A SAFE DOSAGE OF PCB'S IN ANIMALS?

A I CAN'T SAY THAT I NEVER ANALYZED ANY TISSUES

WATER_PCB-00046638

FROM STUDIES WITH THAT PURPOSE, BUT IF I DID, I WAS NOT MADE AWARE OF THAT PURPOSE.

Q OKAY. WE TALKED ABOUT BIODEGRADABILITY BEFORE.

A YES.

Q ARE YOU FAMILIAR WITH STUDIES THAT SHOW THAT PCB'S ARE EXTREMELY NON-BIODEGRADABLE?

A I AM AWARE THAT THERE ARE REPORTS IN THE LITERATURE WHICH INDICATE THAT CERTAIN HIGHER CHLORINATED POLYCHLORINATED BIPHENYL ISOMERS ARE LESS DEGRADABLE THAN OTHERS. THE OTHER TERM YOU USE, "HIGH" IS STRICTLY RELATIVE AND I DON'T KNOW WHAT YOU MEAN BY THAT.

Q OKAY. WOULD THAT BE THE HIGHER WEIGHT SUCH AS THE 48'S, 54'S, 60'S?

A OKAY. AGAIN, YOU'RE CONFUSING AROCLOR TRADE NAMES WITH POLYCHLORINATED BIPHENYLS, AND CERTAIN OF THE AROCLORS DID PROBABLY CONTAIN SOME OF THE ISOMERS WHICH ARE LESS READILY DEGRADABLE THAN OTHERS. THOSE TYPICALLY TEND TO BE HIGHER CLORINATED MATERAILS.

Q IF WE'RE TALKING ABOUT PCB'S IN THE UNITED STATES, WOULD IT BE TRUE THAT SOME ARTICLES HAVE INDICATED, IN FACT, I THINK EVEN FROM MONSANTO, THAT ABOUT 98 PERCENT OF ALL PRODUCTS IN THE UNITED STATES IS FROM MONSANTO UNDER THE TRADE NAME AROCLOR?

A I DON'T KNOW THE NUMBERS. I KNOW THAT MONSANTO HAS BEEN LISTED AS THE SOLE U. S. PRODUCER. AS FAR AS THE

WATER_PCB-00046639

NUMBERS AND OTHER STUFF, I HAVE NO IDEA WHAT THE RELATIVE LEVELS ARE.

Q GOING TO A LITTLE DIFFERENT TERM THAN BIODEGRADABILITY, ARE PCB'S CONSIDERED TO BE BIOACCUMULATIVE, OR DO YOU KNOW?

A I -- OKAY, THERE ARE TWO TERMS, BIOACCUMULATION AND BIOMAGNIFICATION, AND I'M NOT SURE OF THE DISTINCTION BETWEEN THOSE TWO AT THE TIME.

Q DOES IT HAVE --

A I THINK BIOMAGNIFICATION INVOLVES PCB'S THAT ARE INGESTED THROUGH THE DIGESTIVE SYSTEM. BIOACCUMULATION INVOLVES PCB'S ENTERING THE BODY THROUGH OTHER FORMS OTHER THAN INGESTION. IN THAT CASE I THINK THERE ARE STUDIES WHICH SHOW THAT CERTAIN ISOMERS OF POLYCHLORINATED BIPHENYLS DO BIOACCUMULATE IN FISH TISSUES THROUGH GIL ABSORPTION.

Q WHAT ABOUT BIOMAGNIFICATION IN ANIMALS?

A I REALLY DON'T KNOW OF ANY STUDIES, I CAN'T RECALL SPECIFIC NUMBERS OR IF THERE ARE STUDIES THAT SAY THAT.

Q AND AS FAR AS YOU KNOW FROM YOUR KNOWLEDGE AND STUDIES, BACKGROUND, EDUCATION AND WORK WITH MONSANTO, YOU HAVE NO IDEA OF WHETHER OR NOT THERE IS A HEALTH HAZARD TO ANY PERSON OR ANIMAL THAT WOULD EAT OR DRINK MIXTURES OF PCB'S?

A I DON'T KNOW, NO, FROM MY KNOWLEDGE I HAVE NO IDEA

WATER_PCB-00046640

OF HAZARDS.

Q DID YOU HAVE ANYTHING TO DO WITH THE SAUGET PLANT IN ILLINOIS WITH REGARD TO ITS DISCHARGING EFFLUENCE AND THE GOVERNMENT'S WORK WITH MONSANTO TO LOWER ITS EFFLUENT INTO THE AIR?

A NOT TO MY SPECIFIC KNOWLEDGE. I MAY HAVE ANALYZED SAMPLES FROM THERE, BUT I DON'T REALLY RECALL SPECIFICALLY.

Q YOU MENTIONED THAT WHEN YOU WERE TALKING ABOUT GETTING DIFFERENT TYPES OF CONTAINERS AND THAT YOU WOULD USE A GLASS, CLEAN GLASS JAR FOR YOUR SAMPLES AND SO ON, YOU WERE MENTIONING CONTAMINATION AND SO ON, ARE PCB'S THEMSELVES A FORM OF A CONTAMINANT?

A WHAT DO YOU MEAN BY CONTAMINANT?

Q WHAT DO YOU MEAN BY CONTAMINANTS?

A A CONTAMINANT TO ME IS SOMETHING WHICH IS UNINTENTIONALLY PRESENT IN SOME OTHER MATERIAL.

Q IT'S A FOREIGN BODY IN A MATERIAL?

A WELL, I DON'T THINK IT HAS TO BE A BODY.

Q FOREIGN ELEMENT, FOREIGN CHEMICAL.

A I'LL GO ALONG WITH A FOREIGN SUBSTANCE UNINTENTIONALLY PRESENT IN A -- IN SOME OTHER SUBSTANCE.

Q DOES IT HAVE A DELETERIOUS EFFECT ON THAT SUBSTANCE IF THERE WAS A --

A ARE WE TALKING ABOUT CONTAMINANTS IN GENERAL?

WATER_PCB-00046641

Q YES.

A NOT NECESSARILY, NO. I THINK, YOU KNOW, DIRT IS A CONTAMINANT IN THE RUG AND I DON'T THINK IT'S PARTICULARLY HURTING IT.

Q IF PCB'S WERE FOUND IN THE ENVIRONMENT, IT HAS BEEN ALMOST CONSISTENTLY TALKED ABOUT IN THE JOURNALS IN SCIENTIFIC AREAS, IT IS A CONTAMINATION OF THE ENVIRONMENT?

A THAT WOULD GO ALONG WITH MY DEFINITION BECAUSE THEY WERE NOT PLACED THERE INTENTIONALLY.

Q IT'S A MANMADE OBJECT, PCB'S?

A IT HAS NOTHING TO DO WITH BEING MAN-MADE PARTICULARLY. IN THAT CASE PCB'S APPARENTLY ARE MOSTLY MAN-MADE, BUT THAT REALLY HAS NOTHING TO DO WITH THE FACT THAT THEY'RE A CONTAMINANT. THEY ARE JUST UNINTENTIONALLY PRESENT IN THE ENVIRONMENT.

Q DO YOU HAVE ANY KNOWLEDGE AS TO WHETHER OR NOT MONSANTO PERFORMED ANY TEST TO DETERMINE WHETHER THERE WAS ANY CARCINOGENIC EFFECTS ON LIFE, ANIMAL OR OTHERWISE, BY THE USE OF PCB'S OR THE INGESTION OF PCB'S?

A I HAVE NO KNOWLEDGE OF THAT.

Q HAVE YOU DONE ANY STUDIES TO MAKE AN ANALYSIS OF FOOD PRODUCTS OF ANY KIND, FIRST LEVELED AT ANIMAL FEED WITH REGARD TO PCB'S?

A I DON'T HAVE ANY SPECIFIC RECOLLECTION, ALTHOUGH I MAY VERY WELL HAVE ANALYZED ANIMAL FEED FROM FEEDING

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STUDIES, IN OTHER WORDS, WHERE WE INTENTIONALLY PLACED POLYCHLORINATED BIPHENYLS TO FEED TO RATS FOR INSTANCE IN THAT TISSUE RESIDUE STUDY. BUT AS FAR AS NON-INTENTIONALLY PLACED PCB'S, I DON'T HAVE ANY RECOLLECTION OF ANYTHING FROM A FOOD CHAIN.

Q WHAT ABOUT IN MILK THAT MIGHT FIND PCB'S IN IT WHERE THE ANIMALS ARE FEEDING THEIR OWN YOUNG SUCH AS COWS TO CALVES?

A I'VE NOT DONE ANY MILK ANALYSES.

Q HAVE YOU DONE ANY ANALYSIS OR STUDIES IN THE FOOD CHAIN WITH REGARD TO THE HUMAN BEING?

A NO.

Q A LITTLE WHILE AGO YOU MENTIONED SOMETHING ABOUT THE DEFINITION, WHEN YOU WERE TALKING ABOUT CONTAMINATION, AND YOU SAID IT'S AN UNINTENTIONAL INGESTION INTO THE ENVIRONMENT. WHAT DO YOU MEAN BY "UNINTENTIONAL"?

A IT'S NOT AN INGESTION.

Q WELL --

A BY UNINTENTIONAL I MEAN SOMETHING THAT WAS NOT PURPOSELY -- PURPOSEFULLY PLACED THERE.

Q YOU MEAN, FOR EXAMPLE, IF MONSANTO WENT OUT AND KNEW THAT THEY HAVE A 55-GALLON DRUM OF PCB'S, MONSANTO OR ANYONE KNOW THAT THEY HAVE GOT A 55-GALLON DRUM OF PCB'S, IF THEY WOULD DUMP IT, THAT WOULD BE INTENTIONAL, AND, THEREFORE, NOT UNINTENTIONAL, IS THAT WHAT YOU'RE TALKING

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ABOUT?

A WELL, HOPEFULLY NOBODY WOULD DO THAT. THE PLACEMENT OF THE DRUM WAS INTENTIONAL UNDER THE CIRCUMSTANCES YOU WERE DESCRIBING, BUT THE PLACEMENT OF A DRUM CONTAINING ANY CHEMICAL DOES NOT NECESSARILY INVOLVE CONTAMINATION OF THE ENVIRONMENT. IF, FOR INSTANCE, THAT DRUM LEAKED AND WHATEVER CHEMICAL WERE IN THERE WERE FILLED, THEN THAT WOULD BE WHAT I CONSIDER CONTAMINATION, IT WAS NOT INTENDED FOR THAT DRUM TO LEAK AND SPILL ONTO THE SOIL. IS THAT FAIR?

Q ALL RIGHT. SUPPOSING THAT, FIRST OF ALL, YOU KNOW THAT AROCLORS WERE USED IN PAINTS, EVEN THOUGH YOU DIDN'T WORK ON THEM --

A I DO NOT KNOW THAT, I HONESTLY DO NOT KNOW THAT THEY WERE USED IN PAINTS.

Q OKAY. IF YOU ASSUME THAT THEY WERE USED IN PLASTICIZERS, RESINS AND PAINTS, THAT THEY CONTAINED THOSE AND THEY WERE PUT OUT AND PAINTED OUTSIDE BUILDINGS AND INSIDE BUILDINGS AND SO ON, SO FORTH, THEORETICALLY IT WOULD BE PLACED INTENTIONALLY WITHIN THAT PRODUCT, BUT SOMEHOW IT LEAKED INTO OR LEACHED INTO THE GROUND, SOIL, FEED OR WHATEVER IT WAS AROUND, DO YOU CONSIDER THAT LEACHING INTO THE ATMOSPHERE AS A CONTAMINATION OF THE ATMOSPHERE OR OF THE FOOD AROUND WHICH IT WAS SITUATED?

A UNDER MY DEFINITION THAT I'M USING FOR CONTAMINATION RIGHT NOW, IF WE ASSUME EVERYTHING THAT YOU

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HAVE SAID, THAT THE PCB'S WERE INTENTIONALLY PLACED IN SOME OR OTHER PRODUCT AND SOME ASPECT OF THE ENVIRONMENT, YOU KNOW, POSSIBLY SOMEHOW HAD PCB'S IN IT AS A DIRECT RESULT OF THAT INTENTIONAL PLACEMENT, I WOULD CONSIDER THAT CONTAMINATION OF THAT SUBSTANCE WHICH THE PCB'S GOT INTO ACCIDENTALLY.

Q OKAY. DID YOU EVER WORK WITH ANY OUTSIDE LABORATORIES WITH REGARD TO PCB'S, THEIR TESTING ANALYSIS OR ANYTHING LIKE THAT?

A I'M NOT SURE WHAT YOU MEAN BY WORK WITH.

Q OKAY. SHARE WORK WITH, DO WORK WITH, OR SHARE INFORMATION AND MATERIALS WITH A LABORATORY TESTING PCB'S FOR WHATEVER PURPOSE AND USE OTHER THAN MONSANTO'S OWN RESEARCH AND DEVELOPMENT OR THEIR DEPARTMENTS?

A YES.

Q WHAT OTHER OUTSIDE LABS DID YOU WORK WITH?

A THE ONES I CAN RECALL MOST SPECIFICALLY WOULD BE CERTAIN OF OUR CUSTOMERS IN THE DIELECTRIC INDUSTRY.

Q AND THIS IS IN THE ELECTRICAL END OF THE BUSINESS?

A YES, SIR.

Q APPARENTLY NONE IN THE NON-ELECTRICAL END OF THE BUSINESS?

A NOT THAT I WORKED WITH DIRECTLY, NO, NOT THAT I CAN RECALL.

Q WHAT LABORATORIES DID YOU WORK WITH OUTSIDE OF

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MONSANTO?

A WE PROVIDED ADVICE FOR, AS I SAID, OUR CUSTOMERS, I GUESS PRIMARILY WESTINGHOUSE AND GENERAL ELECTRIC.

Q DID YOU WORK WITH THEM IN -- WHAT WAY WOULD YOU WORK WITH THEM?

A GIVING THEM ANALYTICAL TYPE ADVICE ON HOW TO ANALYZE FOR PCB'S.

Q WHY?

A WELL, MONSANTO WAS ONE OF THE BETTER LABORATORIES IN THE COUNTRY DOING PCB ANALYSES AND THESE OTHER LABORATORIES WERE TRYING TO GEAR UP TO BECOME CAPABLE ANALYTICAL CHEMISTS IN THE AREA OF PCB ANALYSES, SO WE WERE SHARING OUR EXPERTISE WITH THEM.

Q WHAT WOULD BE THE NECESSITY FOR SOMEBODY ELSE, OUTSIDE, LIKE G.E., WESTINGHOUSE OR ANY OTHER KIND OF A COMPANY, TO BE ABLE TO ANALYZE SUBSTANCES TO SEE IF PCB'S ARE IN THEM?

A I'M SORRY, COULD YOU REPEAT THAT OR REPHRASE IT OR SOMETHING?

Q SURE. AND I'LL START OUT IN A DIFFERENT WAY, MAYBE.

A FINE.

Q FIRST OF ALL, MONSANTO YOU KNEW HAD BEEN SELLING PCB'S TO GENERAL ELECTRIC AND THE OTHER ONE YOU MENTIONED, WESTINGHOUSE?

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A YES.

Q OKAY. SO THAT LET'S JUST TAKE GENERAL ELECTRIC, THEY KNEW THEY WERE BUYING PCB'S FROM MONSANTO?

A YES.

Q SO WHEN THEY BOUGHT THOSE PCB'S FROM MONSANTO, THEY KNEW THEY WERE PCB'S, THEREFORE, WHY WOULD YOU HELP THEM DEVELOP AN ANALYTICAL MEANS AND BASIS TO DETERMINE IF THEY WERE PCB'S?

A NO. I WAS NOT HELPING THEM DETERMINE IF THEY WERE PCB'S. I WAS HELPING THEM DETERMINE OR TO ESTABLISH THEIR SKILLS AT MEASURING THE PRESENCE AND/OR LEVELS OF PCB'S IN A VARIETY OF DIFFERENT MATRICES, FOR EXAMPLE, WATER.

Q HAD THAT WORK THAT YOU HAD BEEN DOING BASICALLY BEEN WITH REGARD TO POLLUTION OF WATER, CONTAMINATION OF FISH AND LEAKAGE OF THE PCB'S IN ONE FORM OR ANOTHER INTO THE ENVIRONMENT AND THAT YOU WERE HELPING OUT THEIR CHEMISTS OR SCIENTISTS TO DETERMINE WHERE AND THE QUANTITY OF THE PCB'S THAT THEY MIGHT BE INVOLVED WITH IN THE ENVIRONMENT?

A THAT WAS MY UNDERSTANDING, YES.

Q SO THAT REALLY THAT'S THE PURPOSE FOR THE OUTSIDE LABORATORIES ASKING MONSANTO TO HELP THEM, IS THAT THE STUFF YOU SOLD US IS SOMEHOW GETTING INTO THE ENVIRONMENT AND WE WANT YOU TOHELP US DETERMINE AND MAKE UP ANALYTICAL

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STUDIES SO WE CAN DO IT, PERFORM TESTS TO FIND IT, TO QUANTITATE IT AND DO SOMETHING WITH IT?

(AT THIS TIME A BREAK WAS TAKEN)

MR. MC GRAW: I HAVE NO MORE QUESTIONS.

MR. JUNGERHELD: I HAVE NO QUESTIONS.

BOB, YOU'RE FREE TO GO.

MR. CUBITT: OFF THE RECORD.

(DISCUSSION OFF THE RECORD)

Robert G. Kaley II

ROBERT G. KALEY, II

SUBSCRIBED AND SWORN TO BEFORE ME THIS 17 DAY OF February 1983.

MY COMMISSION EXPIRES: March 26 1986

Helen L. Daley

NOTARY PUBLIC

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I, GERALYN L. WASHAUSEN, A NOTARY PUBLIC IN AND FOR THE STATE OF MISSOURI, DO HEREBY CERTIFY THAT PURSUANT TO AGREEMENT OF COUNSEL CAME BEFORE ME AT THE MONSANTO COMPANY, 800 NO. LINDBERGH BLVD., IN THE CITY OF ST. LOUIS, STATE OF MISSOURI, ROBERT G. KALEY, II, WHO WAS BY ME FIRST DULY SWORN TO TELL THE WHOLE TRUTH OF HIS KNOWLEDGE TOUCHING THE MATTER IN CONTROVERSY AFORESAID; THAT HE WAS EXAMINED ON THE DAY, BETWEEN THE HOURS AND AT THE PLACE IN THAT BEHALF FIRST AFORESAID, AND HIS EXAMINATION WAS TAKEN IN SHORTHAND AND LATER REDUCED TO TYPEWRITING; THAT THE DEPOSITION WAS SIGNED BY THE DEPONENT ON THE _____DAY OF _____1983, AND HIS DEPOSITION IS NOW HEREWITH RETURNED.

IN WITNESS WHEREOF I HAVE HEREUNTO SET MY HAND AND AFFIXED MY NOTARIAL SEAL THIS ____DAY OF _____1983.

MY COMMISSION EXPIRES FEBRUARY 23, 1983.

_____
NOTARY PUBLIC IN AND FOR THE
STATE OF MISSOURI

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DEPOSITION CORRECTION SHEET

In Re:

Upon reading the deposition and before subscribing thereto, the deponent indicated the following changes should be made:

Page 7 Line 17 Should read:

... PURDUE UNIVERSITY IN 1968

Reason assigned for change:

ERROR IN FACT, I PROBABLY JUST SAID THE WRONG DATE.

Page 12 Line 7 Should read:

... WITH A BEAM OF ELECTRONS ...

Reason assigned for change:

MISSPELLING

Page 12 Line 10 Should read:

THEN CAUSED TO ...

Reason assigned for change:

TYPO ??

Page 13 Line 11 Should read:

UP BEING CALLED ~~A~~ A FINGERPRINT

Reason assigned for change:

MAKES MORE SENSE

Page 17 Line 2 Should read:

~~USERS~~ STRIKE "TO CLOTHES"

Reason assigned for change:

DOESN'T MAKE SENSE, AND I DON'T RECALL WHAT I MAY HAVE SAID

Page 32 Line 14 Should read:

A: I WAS AWARE OF ...

Reason assigned for change:

ERROR IN FACT.

Page 37 Line 17 Should read:

RECORDS CENTER SOMEWHERE

Reason assigned for change:

TRANSCRIPTION ERROR

Page Line Should read:

Reason assigned for change:

_____

Deponent