

Page 1 1 In The Superior Court 2 Of The State Of Delaware 3 In And For New Castle County 4 -----X 5 Monsanto Company, : 6 Plaintiff, : 7 : Civil Action Number 8 v. : 88c-ja-118-1-cv 9 Aetna Casualty & Surety Company, : Non-arbitration 10 et al. , : Case 11 Defendants. : 12 -----X 13 Deposition Of James R. Savage 14 Wilmington, Delaware 15 Tuesday, May 18, 1993 16 Deposition of James R. Savage, called for examination 17 pursuant to notice of deposition, at the law offices of 18 Smith, Katzenstein and Furlow, 1220 Market Street, Fifth 19 Floor, at 10: 00 a. m. before Kristine A. O'connor, a Notary 20 Public within and for the District of Columbia, when were 21 present on behalf of the respective parties: 22 -- continued --	Page 3 1 C O N T E N T S 2 Witness Examination 3 James R. Savage 4 by Mr. Brock 4 5 4 6 E X H I B I T S 7 Savage Deposition Number Identified 8 Exhibit 1 - Aroclor document 49 9 Exhibit 2 - Standard manufacturing process 50 10 Exhibit 3 - Map 87 11 Exhibits 4 through 29 - Group of documents 117 12 Exhibits 30 through 33 - Correspondence 187 13 Exhibit 34 - Memorandum 194 14 Exhibit 35 - April 1971 memorandum 196 15 Exhibit 36 - June 1971 memorandum 197 16 Exhibits 37 and 38 - 9/1/71 and 9/9/71 memoranda 198
Page 2 1 Appearances: James F. Burnett, Esq. 2 Potter, Anderson & Corroon 3 350 Delaware Trust Building 4 902 Market Street 5 Wilmington, Delaware 19801 6 On behalf of Plaintiff Monsanto Company. 7 Stephen F. Brock, Esq. 8 Manta and Welge 9 One Commerce Square 10 Thirty-seventh Floor 11 2005 Market Street 12 Philadelphia, Pennsylvania 19103 13 On behalf of Liberty Mutual 14 Insurance Company.	Page 4 1 P R O C E E D I N G S 2 Whereupon, 3 James R. Savage 4 was called as a witness and, having first been duly sworn, 5 was examined and testified as follows: 6 Examination 7 By Mr. Brock: 8 Q Good morning, Mr. Savage. My name is Stephen 9 Brock. I represent Liberty Mutual Insurance Company in 10 this lawsuit between Monsanto and a number of its insurance 11 companies relating to the claim of pollution at some of 12 Monsanto's plants. 13 The deposition here today is going to relate to 14 primarily three of Monsanto's plants: Krummrich, the plant 15 in Illinois, the plant in Anniston, Alabama and the plant 16 in Nitro, West Virginia. 17 Have you ever testified in a deposition before? 18 A Yes. 19 Q How many times? 20 A I think three times. 21 Q How long ago was the first time? 22 A Probably four or five years, maybe longer.

Page 5 1 Q Can you tell me the context of that deposition? 2 A It was in connection with lawsuits related to Pcb 3 problems. 4 Q Was that a lawsuit or lawsuits? I'm sorry, the 5 first one -- 6 A I think the first one was a single lawsuit, but I 7 don't remember much about it. 8 Q Did that relate to the operations at a particular 9 Monsanto plant? 10 A No, it was connected to customers. 11 Q What was the nature of the complaint in that 12 case? 13 A If I remember correctly, the first one was a case 14 generally known as Johnson Motors which related to some 15 pollution problems at their plant. 16 Q Where was Johnson Motors located? 17 A Either in southern Wisconsin or northern 18 Illinois, someplace between Chicago and Milwaukee. 19 Q How were they claiming that Monsanto was 20 responsible for the pollution at their plant, to your 21 understanding? 22 A I don't remember that. We sold them products	Page 7 1 A I don't know. 2 Q You've never been called to testify in court, I 3 take it? 4 A That's right. 5 Q When was the next time that you were deposed? 6 A There was another one shortly after that, and I 7 don't remember anything about it at all. 8 Q Was that in connection with your employment with 9 Monsanto? 10 A Yes. 11 Q Did it relate to Pcb's? 12 A Yes. 13 Q Do you recall who the claimant was? 14 A No, but the subject matter was similar to the one 15 at Johnson Motors, so they kind of run together. I don't 16 remember. 17 Q Do you know what court that case was pending in? 18 A No. 19 Q When was the third time that you were deposed? 20 A The third time was within the last year or two 21 and that was another hydraulic fluid case. 22 Q Do you know who the claimant was in that case?
Page 6 1 which contained Pcb's. 2 Q Do you know what the products were? 3 A They were hydraulic fluids. 4 Q Do you know what plants, plant or plants those 5 products came from? 6 A Possibly any of three. These hydraulic fluids 7 were blended at Anniston, a small amount at Krummrich and 8 at the Queeny plant at St. Louis. 9 Q What was the nature of your involvement in that 10 lawsuit? 11 A I was involved in the manufacturing. 12 Q Did your deposition relate to -- when you say you 13 were involved in manufacturing, was that at a particular 14 plant? 15 A I was in manufacturing at each of those plants, 16 but I was also manufacturing manager at the general office 17 for the business group that sold those products. 18 Q Do you recall what that business group was? 19 A That was called the specialty products business 20 group. It had some other names, but most of the time it 21 was called specialty products business group. 22 Q Has that lawsuit been resolved to your knowledge?	Page 8 1 A The claimant was a pipeline company and that 2 case -- I don't remember the name of the pipeline company. 3 Q Do you know where they were located? 4 A Somewhere in the west. 5 Q Do you know what the nature of the claims were in 6 that case? 7 A Some fluid had entered the pipeline system and 8 when it was discovered, it was expensive to clean it out. 9 Q When you say that company was a pipeline company, 10 what did that company do? 11 A They were involved in the transportation of 12 natural gas. 13 Q What was your involvement in that lawsuit? 14 A Well, the questions were related to my time as 15 manufacturing manager when they were our customer. 16 Q When you say " a customer, " a customer of 17 hydraulic fluids? 18 A Yeah, the product was a part of our hydraulic 19 fluid family but was actually a lubricant. It was called 20 Turbinol. 21 Q Do you know how to spell that? 22 A T-u-r-b-i-n-o-l.

Page 9 1 Q And that was the part of what family, I'm sorry? 2 A Part of the hydraulic fluid family. 3 Q Was that pipeline company claiming some sort of 4 fault on the part of Monsanto by virtue of the fact that 5 the fluid had entered the pipeline system? 6 A The fact that it entered the pipeline system was 7 related to some mechanical failure that had nothing to do 8 with us. They simply claimed that the fluid was a bigger 9 problem than they had known. 10 Q Do you recall why they were claiming the fluid 11 was a bigger problem? 12 A Well, the fluid contained Pcb's which of course 13 turned out to be an environmental issue. 14 Q Do you know whether that case has been resolved? 15 A No, I don't. 16 Q Have you ever testified in court in that case? 17 A No. 18 Q Have you ever testified in court in any context? 19 A No. 20 Q Have you ever been a plaintiff or defendant in a 21 lawsuit? 22 A No.	Page 11 1 A No. 2 Q Have you ever taken any courses relating to 3 insurance matters? 4 A No. 5 Q Have you ever taken any courses relating to the 6 toxicity or harmful nature of any chemicals, a course that 7 addressed that in whole or in part? 8 A No. 9 Q For example, did any of the courses that you took 10 at Wisconsin address that? 11 A Some of the courses included content on process 12 safety considerations which might relate to toxicity, but 13 this specific information about toxicity was not covered. 14 Q For example, when you were at the University of 15 Wisconsin, did you have occasion to read the Sax book, the 16 handbook on dangerous chemicals? 17 A No. 18 Q Have you ever had a chance to -- strike that. 19 Are you familiar with that book? 20 A I know what it is, yes. 21 Q Have you ever had a chance to consult it or look 22 at it for any reason?
Page 10 1 Q Having been deposed that often before, I'm sure 2 you're familiar with the general guidelines, but just let 3 me for the sake of the record give them to you again. I'll 4 be asking you questions. The court reporter is going to be 5 taking down your answers. She needs a verbal response. If 6 at any time you don't understand one of my questions, just 7 let me know and I'll try to make it as clear as possible. 8 If at any time you need a break, we can accommodate you. 9 Can you give me your educational background 10 starting with high school, sir? 11 A Graduated from high school in Wauwatosa, 12 Wisconsin, W-a-u-w-a-t-o-s-a. Bachelor's degree in 13 chemical engineering from the University of Wisconsin, 14 graduated in January 1957. Since then I've taken some 15 graduate courses, but no further degrees. 16 Q What would have been the nature of the graduate 17 courses that you've taken? 18 A Just some higher math, business law, some 19 statistics, computer science. 20 Q After your undergraduate degree in chemical 21 engineering, have you taken any courses relating to 22 chemistry or engineering?	Page 12 1 A Not personally. 2 Q Did you have a copy of it during your time with 3 Monsanto? 4 A No. 5 Q Have you ever taken any courses that addressed 6 the migration of chemicals in soil or water or the fate of 7 chemicals in soil and water? 8 A Courses, no. 9 Q Have you ever received any instruction or 10 training or seminars or materials addressing that subject? 11 A Specifically what subject? 12 Q The migration of chemicals in soil or water. 13 A No. 14 Q Or the fate of chemicals in soil or water. 15 A No. 16 Q After you graduated in January of 1957 did you 17 become employed? 18 A Yes. 19 Q By whom? 20 A By Monsanto. 21 Q What was your position at that time? 22 A I was a -- the title was assistant chemical

Page 13 1 engineer at the John F. Queeny plant in St. Louis. 2 Q How long did you hold that position? 3 A I think for the duration of my stay at the Queeny 4 plant, which was only a year. 5 Q What was your next position? 6 A I was transferred to the Anniston plant sometime 7 in the first quarter of 1958. 8 Q How long were you at the Anniston plant? 9 A Five years. 10 Q What was your position there? 11 A I went to the Anniston plant with the same 12 title. Later on that was changed to chemical engineer, the 13 word " assistant " taken out, and later during my stay at 14 Anniston I was production supervisor. 15 Mr. Brock: Off the record. 16 (Discussion off the record.) 17 By Mr. Brock: 18 Q I'm going to come back to these in more detail 19 later. Right now I'm just going to run through to try to 20 get the entire chronology of your positions. 21 What was your next position after production 22 supervisor at the Anniston plant?	Page 15 1 Q How long did you hold that position? 2 A About three years, until 1970. 3 Q What position did you take on in 1970? 4 A I transferred to the general offices of 5 manufacturing manager. 6 Q Was that in Creve Couer? 7 A Right. 8 Q If I pronounced it correctly. And how long did 9 you hold that position? 10 A Five years. 11 Q So that would be up until about 1975? 12 A Right. 13 Q What position did you take on in 1975? 14 A In 1975 there was a reorganization and I was just 15 on some special assignments in personnel and so forth for a 16 period of a couple of years. 17 Q And that would take us up to about 1977 or so? 18 A ' 78 actually. 19 Q What position did you move to in 1978? 20 A In 1978 I moved out of manufacturing into an 21 altogether different line of work, became licensing 22 manager.
Page 14 1 A I was transferred to the Krummrich plant in 1963 2 as supervising engineer. 3 Q How long did you hold that position? 4 A I guess about a year and a half. 5 Q What was your next position? 6 A I was promoted to superintendent in technical 7 services at the Krummrich plant. 8 Q Was that the Tsd department? 9 A Right. 10 Q How long did you hold that position? 11 A Until sometime in 1967 when I transferred to the 12 Queeny plant. 13 Q What was your position when you moved to the 14 Queeny plant? 15 A I was the head of Tsd. The title was general 16 superintendent of technical services and laboratory. 17 Q Could you repeat that for me? 18 A General superintendent of technical services and 19 laboratory. 20 Q Was that for the whole Monsanto entity or was 21 that for the -- 22 A For the Queeny plant.	Page 16 1 Q Where was your office at that time? 2 A Same place, the general office in Creve Couer. 3 Q How long did you hold that position? 4 A Essentially until my retirement about six weeks 5 ago. I was promoted position director of licensing in 6 about 1982, but the content of the job was still the same. 7 Q I'm sorry. Sometimes I'm a slow writer. In 1982 8 you were transferred to what position? 9 A I was promoted to the position of director of 10 licensing, but the content of the job didn't change. 11 Q So you went from licensing manager to director of 12 licensing? 13 A Right. 14 Q And you retired six weeks ago? 15 A At the end of March. 16 Q I hope it didn't have anything to do with this 17 case. Are you receiving a pension from Monsanto? 18 A No. I had the option of rolling out a lump sum 19 equivalent, which I did. 20 Q Are you presently employed? 21 A I'm self-employed. I suppose, I'm developing a 22 business as a consultant in technology transfer.

Page 17 1 Q When you use the term " technology transfer, " what 2 does that mean? 3 A That refers to the business of licensing 4 technology from one company to another, transferring the 5 information. 6 Q Do you presently specialize in the transfer of a 7 particular type of technology? 8 A No. 9 Q Is Monsanto one of your clients? 10 A No. 11 Q As assistant chemical engineer at the Queeny 12 plant and I'm starting in the 1957 -- or the ' 58 time 13 frame, who did you report to? 14 A My first boss was Jim Knox. 15 Q What was his position? 16 A He was technical services superintendent. 17 Q Was that at the Queeny plant? 18 A Yes. 19 Q Did each plant have its own Tsd department? 20 A Yes. 21 Q And was there a coordination among those 22 departments at the corporate level?	Page 19 1 plant besides Jim Knox? 2 A At some point I was also reporting to Bill Kuhn, 3 K-u-h-n, while Jim Knox was on some other assignment. 4 Q Did any employees report to you? 5 A No. 6 Q What were the nature of your job duties as 7 assistant chemical engineer? 8 A I was given specific assignments in various 9 production departments to correct operating problems or 10 improve the process. 11 Q Were the problems, the operating problems in the 12 processes that you addressed at the Queeny plant? 13 A Yes. 14 Q During that time did you address any problems or 15 processes at any other Monsanto plants? 16 A No. 17 Q What were the nature of the operating problems 18 that you had occasion to address during that time? 19 A Well, perhaps better describe them as 20 opportunities than problems because in general they were 21 projects related to improving productivity or yield. 22 Q Do you recall what the processes were that were
Page 18 1 A To some degree. 2 Q How did that work? 3 A Well, the technical services department formally 4 reported to the plant managers, which was at that time a 5 functional manufacturing organization, plant managers 6 reported to a director of manufacturing. Under the 7 director of manufacturing, there were some kind of 8 technical managers. I don't remember what their titles 9 were but their job was to do whatever coordination was 10 needed between the plants and the general office and the 11 plants on a technical level. 12 Q How long did that structure exist for the 13 coordination of the Tsd departments at the various plants? 14 A It survived up until the formation of a strong 15 business group organization in the ' 70s. 16 Q Was that the name of that business group, the 17 Strong Business Group? 18 A Oh, no. Business groups were formed, business 19 directors were named sometime I think in the late ' 60s. 20 But the organization was formalized between around 1972 or 21 1973. 22 Q Did you have a subsequent boss at the Queeny	Page 20 1 involved? 2 A I worked on salicylic acid, s-a-l-i-c-y-l-i-c, 3 aspirin, parantrophenetole. 4 Q You said parantrophenetole? 5 A Phenetole, yes. 6 Q Does that have an abbreviation? 7 A Probably called Pnpt. I think a couple of 8 others, but I don't remember. 9 Q Did any of your projects relate to improving 10 productivity or yield by reducing the amount of residues or 11 wastes or by-products? 12 A Typically the improvement of yield and the 13 reduction of waste go together. 14 Q Did any of your projects specifically focus on 15 the reduction of waste as a means to improve the 16 productivity or yield? 17 A Well, as I said those were the same thing. But 18 in the parantrophenetole department, for instance, I 19 worked on the start-up of a project which significantly 20 improved the yield and on raw material and reduced the 21 waste stream by exactly the same amount. 22 Q Was Pnpt manufactured at the Krummrich plant to

Page 21 1 your knowledge at any time? 2 A No. It was a raw material for the Krummrich 3 plant. The Krummrich plant converted it to paraphenitidine 4 which might have been known by the same set of initials, I 5 don't know. 6 Q Did the Anniston or Nitro plants use that 7 chemical? 8 A No, not to my knowledge. 9 Q Do you recall any other processes that you worked 10 on or that you had projects related to during that time 11 besides the Pnpt and the salicylic acid? 12 A I did one small projects in the old caffeine 13 department, but it was not very directly related to 14 process. 15 Q What did your work consist of on a day-to-day 16 basis on these projects? 17 A Well, generally the problem was defined in some 18 general way, usually by a work order written by the 19 production supervisor. And then my job was to go and study 20 the problem, collect whatever data was necessary, propose 21 solutions. If my proposal was accepted, then the engineer, 22 changed what was needed to implement the proposal.	Page 23 1 What were the nature of your job duties as 2 assistant chemical engineer at the Anniston plant? 3 A It was a different process but again solving 4 various problems, improving the process. 5 Q Do you recall what processes you worked on during 6 that time? 7 A That was the Niran department, products were 8 ethyl parathion and methyl parathion. 9 Q Were you an employee in the Niran department 10 during that time? 11 A I was part of the small technical service 12 department, but my duties were entirely in the Niran 13 department. 14 Q When you say the " small technical service 15 department, " what does that refer to? 16 A The Anniston plant being a small plant had a 17 small Tsd group. There were just three or four of us in 18 those days. 19 Q You're not separating it from another Tsd group 20 at the plant, I take it? 21 A No, my duties were in the parathion department 22 and other Tsd engineers worked in other departments.
Page 22 1 Q Do you recall addressing any -- strike that. 2 Do you recall being involved in any projects 3 during the time you were assistant chemical engineer at 4 Queeny addressing the methods by which Monsanto would 5 dispose of wastes from that plant? 6 A No. 7 Q From the 1958 to the 1963 time frame -- strike 8 that. 9 When you moved to the Anniston plant, do you 10 recall how long you were assistant chemical engineer? 11 A No. The only distinction between being called an 12 assistant chemical engineer and a chemical engineer was a 13 matter of salary progression. 14 Q Do you recall how long a time of the five-year 15 total that you were at Anniston that you held the positions 16 of assistant chemical engineer and chemical engineer? 17 A Three years. 18 Q I take it the job duties were the same, 19 essentially the same? 20 A Similar, yes. 21 Q Did your job duties change -- let me strike 22 that.	Page 24 1 Q Did you learn the processes of the Niran 2 department at that time? 3 A Yes. 4 Q How did you go about doing that? 5 A Well, when I arrived in 1958 the operation was 6 still in start-up and we had research people on the site, 7 and I started out working a shift as a shift supervisor as 8 part of the start-up group. And it would be impossible to 9 be effective in that job without learning the process. 10 Q Do you recall the nature of the projects that you 11 worked on relating to the Niran department during that 12 time? 13 A In the course of three years I probably worked on 14 50 projects. 15 Q Do you recall their nature? 16 A Well, all kinds. Yield improvement projects, 17 production capacity improvement projects, air pollution 18 projects, water pollution projects, projects to improve the 19 reliability of the equipment. 20 Q What were the air pollution projects that you 21 worked on? 22 A Well, the biggest one related to an incinerator

Page 25 1 that we had at the site which was used to dispose of still 2 residue from a distillation. And as originally designed 3 there was a white plume of phosphorus pentoxide that was 4 quite unacceptable in the community and I worked with what 5 was then the organic engineering department in St. Louis to 6 run a pilot plant for a solution to that problem. And then 7 I worked again with organic engineering in the installation 8 and start-up of a full-sized system to correct that 9 problem. 10 Q When you use the term " still residue, " what did 11 that consist of? 12 A In a distillation there's very often a material 13 left behind that does not boil over as part of the 14 product. And that's usually called still residue. 15 Sometimes it has other names. 16 Q Right. Do you recall -- strike that. 17 And I take it this was from the Niran department, 18 the Niran operation? 19 A Yes. 20 Q Do you recall what the still residue consisted of 21 chemically? 22 A Part of it was intermediate that we had failed to	Page 27 1 incineration. The major component of the still residue 2 actually was sulfur, which was a by-product of the 3 reaction. But there was some phosphorus in the still 4 residue and when phosphorus is burned, the product is 5 phosphorus pentoxide, which is normally a very small 6 particle which creates a white plume even in very small 7 concentrations. 8 Q Do you recall what else was in the plume other 9 than the sulfur, and I take it that would be phosphorus? 10 A Sulfur dioxide would have been the other major 11 part. 12 Q How often would that take place? 13 A That was a continuous operation. 14 Q So that would be every day? 15 A Yes. 16 Q Why was that not acceptable? 17 A It was partly an aesthetic issue. The Anniston 18 plant is in a valley and this white cloud depending on 19 weather conditions might put a kind of layer over the whole 20 valley. 21 Q Do you recall any times or any time during which 22 that still residue was disposed of in some way other than
Page 26 1 recover from the still residue. This intermediate is a 2 fairly complicated molecule which I can name if you want me 3 to. 4 Q Sure. And if there's an abbreviation, I would 5 appreciate that. 6 A Okay, when we were making ethyl parathion, we 7 called it ethyl Pct. If we were making methyl parathion 8 then that intermediate was called methyl Pct. And the 9 still residue was what was left after we had distilled off 10 as much of the Pct as we could. 11 Q The Pct, that was the final product ; is that 12 right? 13 A No, it was an intermediate which was further 14 processed to make parathion. The plant people called it 15 just intermediate for obvious reasons. 16 Q You said this resulted in a white plume of a 17 chemical that I thought you called phosphorus pentoxide? 18 A Right. 19 Q Can you tell me how that came about? 20 A Well, the still residue had to be disposed of. 21 It was a material that had some toxic components in it, it 22 smelled bad and the best way to destroy it was by	Page 28 1 incineration? 2 A No. 3 Q So it was incinerated when you got there and it 4 was incinerated continuously until the time you left? 5 A Right. 6 Q Had there been any complaints by others in the 7 Anniston area about the plume? 8 A Not that I know of. I wasn't the direct 9 recipient of a complaint. I was simply informed that that 10 was a reason why we would resolve the problem. 11 Q Who informed you of that? 12 A I think the plant manager. 13 Q Do you recall who that was at the time? 14 A It was Dez Hosmer. 15 Q Were you informed what the impetus was for that 16 project, why that project was being undertaken at that 17 time? 18 A No, it was just a very obvious problem. 19 Q I thought you mentioned that you had worked on 20 air pollution projects. Do you recall any other projects 21 of that type that you worked on at the Anniston plant? 22 A I can think of only one other that -- there was a

Page 29 1 storage tank for an intermediate which had a vent, and 2 fumes from that vent were severe eye irritants which 3 bothered the workers, so I engineered a small device to 4 stop that. 5 Q I'm sorry. Let me go back to the previous air 6 pollution project that you worked on. Was that process 7 ceased during the time that you were at the Anniston plant? 8 A The process? 9 Q I thought you had talked about building a pilot 10 plant. Let me clarify my question. What was the nature, 11 if any, of the process change that was instituted to 12 address the phosphorus pentoxide plume situation during the 13 time that you were there? 14 A We installed a device which was called a Brink 15 demister which collected the P2o5 particles as phosphoric 16 acid and essentially eliminated the plume. 17 Q What was done with the P2o5 particles that were 18 collected in the demister? 19 A It was collected as phosphoric acid and we were 20 able to sell that. 21 Q What exactly is a Brink demister? 22 A That was a trade name we had adopted at the time	Page 31 1 A They were the designers. 2 Q When you say " they were the designers, " what 3 would they do as the designers? 4 A They literally designed the pilot plant unit that 5 was put in Anniston, and then after I had collected the 6 data from the pilot plant, they used that data to design 7 the full-sized system. 8 Q The second air pollution project that you 9 mentioned, the one with the storage tank that had a vent, 10 what chemicals -- I think you referred to it as 11 intermediate? 12 A Yes. 13 Q That was going through the vent? 14 A Yes. Ethyl Pct. 15 Q Can you describe for me the processes involved 16 that led up to the ethyl Pct being vented from the storage 17 tank? 18 A It was very simple. The storage tank was used to 19 accumulate batches from upstream and then batches for 20 further processing downstream would be drawn from it. So 21 it was essentially just buffer storage during the time it 22 was being filled, the vapor inside would breathe out and
Page 30 1 for a device that had been invented by Joe Brink, who was a 2 Monsanto scientist in which in another part of the company 3 was being developed for commercialization, consisted of a 4 packed bed of very fine glass fiber. 5 Q Do you recall who you worked on that project 6 with? 7 A The project engineer was Fritz Rosenberg, 8 F. E. Rosenberg, and Bill Garlette, G-a-r-l-e-t-t-e. They 9 were both in organic engineering in St. Louis. 10 Q During that time did you coordinate the projects 11 that you were working on with the people in Monsanto's 12 St. Louis offices? 13 A Yes. 14 Q Was there a system set up to provide for that 15 type of coordination between the people at the plant level 16 and the people at the corporate level in engineering 17 personnel? 18 A Yes, I was the contact at the plant and normally 19 Bill Garlette was the contact in St. Louis. Communication 20 generally by telex. 21 Q What was the nature of their involvement in that 22 project, if you recall?	Page 32 1 that vapor was an eye irritant. 2 Q How big was the tank? 3 A I don't remember. A couple thousand gallons, I 4 suppose. 5 Q How often would it be filled? 6 A Every time a batch was finished, which might be 7 five to 10 times a day. 8 Q Had there been complaints by Monsanto workers 9 that it was irritating their eyes? 10 A Yes. 11 Q Do you recall any particular Monsanto workers who 12 made such a complaint? 13 A No. 14 Q How did it come to your attention that there had 15 been such complaints? 16 A In the usual way. A work order from the 17 department supervisor asking for a solution to the problem. 18 Q Do you recall who the department supervisor was 19 from whom you received such work orders? 20 A It was probably John Mullendore. 21 Q Was he your boss at the time? 22 A No. He was the department production supervisor.

Page 33 1 Q Who was your boss at the time? 2 A Well, when I first arrived at the Anniston plant 3 under the start-up condition as part of the start-up team, 4 I was reporting to John Mullendore but then when the 5 start-up phase was completed, then I became a regular 6 member of Tsd, I reported to Bob Hedworth, who was the 7 supervisor of Tsd. 8 Q Did he report to the plant manager? 9 A Yes. 10 Q Did he also report to somebody in St. Louis? 11 A It was kind of a dotted-line relationship to 12 somebody in St. Louis, yes. 13 Q Who would that have been in St. Louis? 14 A I don't remember. 15 Q What was the nature of the device that you 16 engineered to address that venting situation? 17 A It turned out to be a very simple solution. It 18 was a cannister of activated carbon. 19 Q I've talked to other Monsanto employees who got 20 patents for some of their work. Was a patent issued for 21 that? 22 A No.	Page 35 1 I worked again operating a pilot plant that had been 2 designed by people in St. Louis to collect design data and 3 then worked with organic engineering on the installation of 4 the waste treatment plant. 5 Q Do you recall what the liquid wastes were from 6 the Niran department at that time? 7 A Mostly water, of course. 8 Q And what if anything in addition to water? 9 A Well, the visible component was sodium 10 paranitrophenate, which is soluble in water and has an 11 intense color at fairly low concentration. It was kind of 12 a marker for the rest of what was there. 13 Q Does that have a chemical abbreviation? 14 A Sodium Pnp or Napnp perhaps. 15 Q When you say that was a marker for other 16 chemicals that may have been there, what were those other 17 chemicals? 18 A I don't know. They would have been by-products 19 of the parathion reaction. 20 Q You don't know what those by-products were? 21 A Well, a chemist might speculate about it, but I 22 don't know.
Page 34 1 Q Do you recall working on any other air pollution 2 projects during the time you were at the Anniston plant? 3 A No. 4 Q You mentioned that you had worked on some water 5 pollution projects during the time that you were at the 6 Anniston plant. What were those? 7 A Again, this was connected with the Niran 8 department. The original design of the Niran department 9 for handling the liquid waste had been, I understood, based 10 on an agreement with the city, the city of Anniston had 11 just built a new municipal waste treatment plant. And the 12 original intention was that the waste from the Niran 13 department would simply go directly to the city waste 14 treatment plant and Monsanto would pay an appropriate 15 amount of money to cover the cost of treatment. 16 Early in the start-up phase, it appeared that the 17 Anniston municipal plant was not going to be able to handle 18 the combination of domestic waste from the city and the 19 waste from the parathion department. So at some high 20 level -- I don't know where -- it was decided that we 21 should pursue the possibility of our own waste treatment 22 plant and to pretreat before it was sent to the city. And	Page 36 1 Q When you came on board, had the Anniston waste 2 treatment plant been built? 3 A Yes. 4 Q Do you know what, if anything, was done with the 5 liquid wastes from the Niran department before the Anniston 6 waste treatment plant was built? 7 A The Anniston municipal waste treatment plant was 8 completed before the Niran department was started up so it 9 never went anywhere else. 10 Q How did the wastes from the Niran department 11 reach the Anniston waste treatment plant when you first 12 came on board at Anniston? 13 A Through city sewers. 14 Q So they would go through the Monsanto sewers at 15 the Anniston plant and into the city sewer system? 16 A That's right. 17 Q Do you recall ever hearing or learning of any 18 leaks or leakage from the Monsanto sewers leading from the 19 Niran department to the city sewers? 20 A No. 21 Q Do you recall hearing or learning of any leakage 22 from sewers leading from other departments at the Anniston

Page 37 1 plant to the city sewers? 2 A The Anniston plant has a ridge through the center 3 and the waste from the parathion department went to the 4 city sewers from one side of the ridge. The operations on 5 the other side did not go to the city sewers. 6 Q Where did those go? 7 A They went into what would otherwise be an 8 intermittent stream called Snow's Creek or Snow Creek 9 perhaps. 10 Q Was that the case even after the Anniston waste 11 treatment plant was constructed? 12 A Yes. 13 Q During the time that you were at the Anniston 14 plant, did you ever work on any projects relating to any 15 operations on the other side of the ridge? 16 A Well, when I became a production supervisor, I 17 was in charge of some operations on the other side. 18 Q The sewers on the other side of the ridge at the 19 Anniston plant, did those go directly to Snow Creek? 20 A There was a limestone bed in the front yard 21 through which the water flowed before it went to Snow 22 Creek.	Page 39 1 Q Do you recall what the nature of the treatment 2 was that the liquid waste from the Nirax department 3 received at the city of Anniston waste treatment plant? 4 A There was a conventional activated sludge waste 5 treatment plant, a primary settler, secondary settler and 6 an anaerobic digester for the sludge. 7 Q When you say a " settler, " is that something that 8 settles particles down to the bottom? 9 A Yeah, it's very conventional design for municipal 10 waste treatment plant. 11 Q What did the Monsanto waste treatment plant 12 consist of? 13 A Quite similar except that we didn't have a 14 primary settler because there was very little solid in the 15 waste to be settled and we had no anaerobic digester 16 because we had no sludge to get rid of. So essentially it 17 consisted of a limestone bed for neutralization of any acid 18 material present. Then aeration basins, which is where the 19 natural treatment took place, biological oxidation and then 20 after that a secondary settler, which was used to recycle a 21 small amount of sludge that was present. 22 Q And this is a separate limestone bed -- the waste
Page 38 1 Q Did you ever hear or learn of any leakage from 2 the pipes or sewers leading from those operations to the 3 limestone pit? 4 Mr. Burnett: Pit or bed? Did you say pit or 5 bed? 6 The Witness: I said bed. It might equally well 7 be called a pit. 8 By Mr. Brock: 9 Q From the past, I've referred to it as the 10 limestone pit but I don't have a problem using limestone 11 bed. 12 A I don't remember specifically problems with 13 faulty sewers, but that is not something that I would have 14 necessarily known about anyway. 15 Q That was going to be my next question. Did you 16 ever work on any projects relating to any pipes or sewers? 17 A No, the sewers were the responsibility of the 18 maintenance department. 19 Q Do you recall sewer repair projects or sewer 20 replacement projects going on during the time you were at 21 the Anniston plant? 22 A No.	Page 40 1 treatment limestone bed is a separate limestone bed than 2 the limestone bed that was on the other side of the plant? 3 A That's right. 4 Q Did you ever hear or learn of any leaching or 5 migration of chemicals from the waste treatment plant 6 limestone bed into the adjacent soil or water? 7 A I don't remember anything like that. 8 Q Was the limestone bed lined? 9 A Yes. 10 Q With what was it lined? 11 A I don't remember. The limestone bed was actually 12 in place when I arrived at Anniston because it was part of 13 the original design. 14 Q And now you're referring to the waste treatment 15 plant limestone bed? 16 A Yes, the original design was that the waste would 17 go through the limestone bed before it went to the city 18 sewer. 19 Q What did the aeration basins consist of? 20 A Quite large rectangular basins about 15 feet 21 deep. There were two of them side by side. Each one of 22 them about 30 feet wide, perhaps 80 feet long. There were

Page 41 1 pipes submerged in the waste and very large compressors 2 which blew air down into the pipes, went through 3 distribution nozzles to bubble air up through to the 4 basins. 5 Q Did that limestone bed and those aeration basins, 6 did they receive liquid wastes from departments other than 7 the Niran department? 8 A No. 9 Q Did you ever hear or learn of any claims that 10 chemicals had migrated or leaked from the aeration basins 11 into the adjacent soil or water? 12 A No, they were concrete. 13 Q So you're not aware of any time in which they 14 were cracked and materials leaked through? 15 A No. 16 Mr. Burnett: Whenever you reach a convenient 17 spot, why don't we take a short break. We've been going 18 about an hour. 19 Mr. Brock: Okay. 20 By Mr. Brock: 21 Q Did you work on any other water pollution 22 projects during the time you were at the Anniston plant?	Page 43 1 wastes from the Niran department? 2 A Again, I had a number of cost improvement 3 projects related to improving yield and we did improve the 4 yield on raw materials significantly during that time, and 5 that again resulted in a proportionate reduction in the 6 amount of waste. 7 Q Were there solid wastes that were produced in the 8 Niran department during that time? 9 A Very little. The main wastes were the aqueous 10 wastes that were handled in the waste treatment plant and 11 the heavy liquid that was incinerated. The only solid 12 waste that I can recall was a small amount of filter cake. 13 The final product was filtered before it was drummed and we 14 used some kind of clay as a filter aid. And when it was 15 time to clean the filter, there would be a small amount of 16 filter cake, which would consist of that clay plus whatever 17 had collected in the clay, and that was placed in some kind 18 of containers and hauled away. But I don't know where it 19 went. 20 Q Do you know who it was that hauled it away? 21 A It would have been the shipping department in the 22 plant.
Page 42 1 A You mean during my time as an engineer? 2 Q Right. 3 A I had a number of small projects related to 4 improving the operation of the waste treatment plant 5 itself. But since that was the entire liquid effluent from 6 the Niran department, there was no other waste treatment 7 problem to work on. 8 Mr. Brock: Now is probably a convenient time for 9 a break. 10 (Recess.) 11 By Mr. Brock: 12 Q Mr. Savage, before we broke, you had mentioned a 13 number of small projects that you had worked on relating to 14 improving the waste treatment plant itself. What were the 15 nature of those projects? 16 A Well, it's a long time ago. The only one that 17 comes to mind is we eventually expanded production in the 18 the parathion department and needed to expand our waste 19 treatment capacity proportionately, so I installed another 20 compressor to increase the air flow rate. 21 Q Did you work on any projects as an assistant 22 chemical engineer that related to reducing the amount of	Page 44 1 Q Do you know what that material, the material that 2 was collected, do you know what that consisted of? 3 A There was some kind of tar that formed as part of 4 the manufacturing process, I don't know what its chemical 5 composition was. 6 Q Do you recall there being any other solid wastes 7 produced in the Niran department during that time? 8 A No, I don't remember any. 9 Q You said you worked on a project that improved 10 the yield on raw materials and that resulted in a 11 proportionate reduction in the amount of waste. Can you 12 describe for me what that project was? 13 A There were quite a few such projects. In general 14 it related to changing operating conditions to try to 15 optimize the operation, small improvements in equipment 16 that would allow operation, more desirable conditions. 17 Q Do you recall what if any equipment changes were 18 instituted during that time? 19 A No. They were usually small things that allowed 20 process changes. The change in equipment was kind of 21 incidental to the process change. 22 Q Do you recall any specific process changes that

Page 45 1 were instituted during that time? 2 A The only one that comes to mind is that we 3 improved the vacuum system with several steps relating to 4 the distillation. And by improving the vacuum system we 5 were able to distill more effectively and therefore recover 6 more intermediate from the batch. 7 Q What happened to the intermediate that was not 8 distilled? 9 A That was part of the distill residue. It was 10 incinerated. 11 Q As production supervisor at the Anniston plant, 12 what were the nature of your job duties? 13 A My first assignment was the chlorine plant and as 14 a production supervisor I was responsible for the 15 day-to-day operation of the chlorine plant, which included 16 supervision of a foreman and a number of operators. 17 Q Who did you report to during that time? 18 A My first boss in production was Karl 19 E-d-e-l-b-l-u-t, and later on he was replaced by Bob Moody. 20 Q How long were you production supervisor of the 21 chlorine plant? 22 A Three years.	Page 47 1 A That was Tom Lackey, L-a-c-k-e-y. 2 Q Do you recall any of the operators who were there 3 during that time? I recognize it goes back aways. 4 A I can remember some of them as colorful 5 characters, but I don't think I can remember names right 6 now. 7 Q Who was the foreman in the Aroclor department who 8 reported to you? 9 A Mark Williams. 10 Q And I take it he was there during the entire 11 time? 12 A Yes. 13 Q Was he the foreman responsible for the muriatic 14 acid operations as well? 15 A I'm not sure. It was a large department, a large 16 work force. The other foreman was Barker Curry and he 17 reported to Burns Severson and so we shared management of 18 this large work force. And muriatic acid was operated by 19 that work force, but I don't remember which of the foremen 20 it was. 21 Q During the time you were production supervisor at 22 the Anniston plant, were there any departments, any
Page 46 1 Q Were you production supervisor of other 2 operations there as well? 3 A Yes. After one year, responsibility for the 4 Aroclor department was added, but I kept the chlorine 5 department. 6 Q Did you report to Mr. Edelblut and Mr. Moody 7 concerning the operations of the Aroclor department as 8 well? 9 A Yes. 10 Q As production supervisor at the Anniston plant 11 were there any other operations that were under your 12 purview? 13 A One of the by-products or the by-product of the 14 Aroclor department was muriatic acid, and during the time 15 that I supervised the Aroclor department, I also had 16 responsibility for that operation. That was the same work 17 force. 18 Q When you say it was " the same work force, " was 19 that in the same department? 20 A Yes, the Aroclor department. 21 Q Do you recall who the foremen were who reported 22 to you regarding the chlorine plant operation?	Page 48 1 additional departments that were ever under your purview? 2 A Oh, yes. A department we called Hb-40. 3 Q Was that a subset of the Aroclor department? 4 A No, it was another product made from the same raw 5 material. 6 Q Do you recall who the foreman was who reported to 7 you from that? 8 A That was also Mark Williams. Hb-40 was a small, 9 separate operation. 10 Q Was that manned by the same employees as the 11 Aroclor department? 12 A I don't remember. It may have been a separate 13 group. 14 Q When you say you were responsible for the 15 day-to-day operations of those departments, what did you do 16 on a day-to-day basis as production supervisor? 17 A Well, as the title implies, the first 18 responsibility is to get the production out. So this would 19 have to do with setting production schedules according to a 20 production plan received from St. Louis, setting up the 21 workers ' shift schedules, although that was usually 22 delegated to the foremen, checking on the condition of the

Page 49 1 department, writing maintenance work orders if they were 2 needed, and when there was time, studying the operation to 3 see where there were opportunities for improvement and 4 perhaps writing work orders to Tsd to implement any of 5 those. 6 Q How would you go about checking the condition of 7 the operations? 8 A The normal routine in the morning, since this was 9 a round-the-clock operation, our normal routine would be, 10 upon arrival, to take a look at the log sheets from the 11 previous evening's operations and see whether production 12 was proceeding according to schedule, taking whatever 13 action was indicated by that. 14 (Savage Exhibit 1 identified.) 15 Mr. Brock: I've marked as Savage Exhibit 1 a 16 multipage document with Bates numbers Mco 1792817 through 17 855. Mr. Savage, rather than have you read through the 18 document word for word, which could take a very long time, 19 could you just glance through the document to the extent 20 you feel comfortable and identify what it is for us. 21 (Witness reviewed the document.) 22 Mr. Brock: While you're doing that, I'll mark	Page 51 1 identify what that is for us. 2 (Witness reviewed the document.) 3 A Yes, this is just a couple of the many 4 amendments. 5 Q Do you recall -- strike that. 6 As production supervisor in the Aroclor 7 department, did you have any role in the amendments to the 8 standard manufacturing process in place in that department? 9 A Yes. 10 Q What was the nature of your role along those 11 lines? 12 A As you can see, I was the first approval line. 13 Q You're referring to Exhibit 2? 14 A Yes. Normally the production supervisor would be 15 the first to approve and then there was some other people 16 who approved. But I might have also been the initiator. 17 Q Do you recall any specific amendments that you 18 initiated? 19 A The only one I can recall without referring to 20 these documents is changing one of the batch operations to 21 continuous. 22 Q What was the impetus for that? Was that in the
Page 50 1 another exhibit for the record. This will be Exhibit 2, 2 which is a Tentative Amendment Number J to the standard 3 manufacturing process for Aroclor at the Anniston plant. 4 And the Bates numbers of this are Mco 1792839 through 855. 5 And I'll note that Exhibit 1 ends at Bates number 938. And 6 the reason I note that is because the Bates numbers are 7 sequential. 8 The Witness: This is a standard manufacturing 9 process for Aroclor, a standard document that Monsanto had 10 for all its operations. 11 By Mr. Brock: 12 Q This was the one that was in effect, or was this 13 the one that was in effect during the time that you were 14 production supervisor? 15 A It's dated October 1957, so I presume it was. 16 It also includes quite a long series of 17 amendments, various states. 18 (Savage Exhibit 2 identified.) 19 By Mr. Brock: 20 Q Let me ask you to take a look at Exhibit 2 and I 21 believe your name is in the top right-hand corner of that. 22 Once you've had a chance to look through that, could you	Page 52 1 Aroclor department? 2 A Yes, just to get more production. 3 Q Let me ask you to turn to the second page of 4 Exhibit 2. There are some names there. W. D. Robinson, who 5 was that? 6 A Dean Robinson, he was a research person at 7 St. Louis. 8 Q What, if any, was his role in the operations of 9 the Aroclor department at that time? 10 A Well, for each operation there was some research 11 person who was responsible for maintaining the process and 12 in this case it was Dean. 13 Q Who was H. L. Hubbard? 14 A That's Harold Hubbard. 15 Q What was the nature of his role in the Aroclor 16 process? 17 A He was a higher level person, research. I don't 18 know what his title was. 19 Q Let me ask you to turn to the table of contents 20 in Exhibit 1, which is on the Bates number that ends in 21 862. If you look on the side of the page, there's a 22 microfilm number there, which is 0048.

Page 53 1 A Yes. 2 Q On some of these table of contents, for some of 3 these, I've seen categories for environmental or 4 atmospheric discharges and waste disposal, and I note that 5 there's not such a category here. Do you know when the 6 categories concerning environmental and waste disposal were 7 added to the standard manufacturing processes? 8 A No, I don't. The format for the standard 9 manufacturing process has evolved over the years, and I 10 don't know when that change was made. 11 Q Do you know whether such a change was made in the 12 Aroclor department during the time that you were there? 13 A In the standard manufacturing process? 14 Q Correct. At the Anniston plant. 15 A Not that I recall. 16 Q Let me ask you to turn to the page that has a 17 Bates number of -- that ends in 849. Again, those are the 18 numbers down at the bottom. 19 A Okay. 20 Q There's a reference up at the top to something 21 called an Aroclor still. Do you see that? 22 A Yes.	Page 55 1 Q Do you know whether that was taken to a landfill? 2 A I think it was but I don't know where. 3 Q When you say you think it was, why do you believe 4 that? 5 A Well, because I can't think of any other place 6 you'd go with it. 7 Q Do you know who from the shipping department -- 8 when you say the shipping department took that away, do you 9 have any names in mind of who actually handled that? 10 A The guy who ran the shipping department in those 11 days was called Pap Gray, H. L. Gray. I don't know what his 12 real name was. 13 Q Do you know whether he's still alive? 14 A No, I don't. He would be at least 80 by now, I 15 think. 16 Q Do you know how many Aroclor stills there were in 17 operation at the Anniston plant during that time frame? 18 A I think there probably were about five, but I 19 don't remember for sure. 20 Q But were those for the various grades of Aroclor? 21 A The stills were all about the same but typically 22 each one would be dedicated to a certain grade.
Page 54 1 Q What were the Aroclor stills? 2 A One of the steps of the Aroclor process was to 3 distill the finished product, and a piece of equipment for 4 doing that was called a still. 5 Q When the finished product was distilled, would 6 there be a residue? 7 A Yes. 8 Q What would that residue consist of? 9 A Materials that have been more highly chlorinated 10 than the desired product. 11 Q So they would be Pcb's, but that were chlorinated 12 too much or too high? 13 A That's right. 14 Q What was done with those materials? 15 A That material was drawn off from the bottom of 16 the stills into drums and taken away by the shipping 17 department. 18 Q Do you know where it was taken to? 19 A No, I don't. 20 Q Do you know how that process was decided upon? 21 A No. It had been going on for many years, I'm 22 sure.	Page 56 1 Q Right. For example, if you look at the page 2 we've been looking at that ends in Bates number 849, you 3 can see it references different grades of Aroclor 1221, 4 1242, 1248. Do you see that? 5 A That's right. 6 Q Would there be one still for 1221 and another for 7 1242 and another for 1248, that type of thing? 8 A Not really. There were only two or three grades 9 that were made in large volume and the others were made in 10 small. For instance, 1221 which was only made once in a 11 while borrow some from other stills. 12 Q What were the two that were made in large 13 volumes? 14 A 1242, 1254 and perhaps after that 1248 or 1260. 15 1221 was a small volume, 1262, very small volume. 16 Q When you say " after that, " you just mean the next 17 in order? 18 A Yes. 19 Q You don't mean sequentially in time? 20 A That's right. 21 Q How often would the distill operations take place 22 such that a residue was created that would need to be taken

Page 57 1 away? 2 A Well, the stills were running pretty much all the 3 time and usually operated chain-fed, meaning that 4 additional batches would be added to the still until the 5 amount of residue reached a certain point and then that 6 would be drawn off. 7 Q Do you recall how frequently it would be drawn 8 off? 9 A No, I don't remember. 10 Q When it was drawn off, what would the general 11 volume be? 12 A I don't remember. 13 Q Let me ask you to turn to the Bates number that 14 ends in 875 and again I'll refer just to the very bottom 15 sentence of that page where it talks about still residue 16 being removed from the still pot when changing from one 17 Aroclor to another ; do you see that? 18 A Yes. 19 Q Is the still residue that's referenced there the 20 same type of still residue that you and I have been talking 21 about? 22 A Yes.	Page 59 1 Q Do you know what that filter cake consisted of? 2 A It consisted primarily of the clay. There would 3 be Aroclor in it, of course, and perhaps small amounts of 4 tarry material, very, very little. 5 Q And that again was handled by the shipping 6 department? 7 A Right. 8 Q Do you recall there being any aqueous wastes from 9 the Aroclor department at that time? 10 A I think there was a water scrubber that handled 11 the discharge air from the blowing step and the water from 12 that scrubber went to the sewer. 13 Q Was that water scrubber there the entire time 14 that you were at the Anniston plant? 15 A I don't remember that. It was there for at least 16 part of that time, probably all of the time. 17 Q When you say that was from the blowing step, can 18 you just briefly run through the steps involved in the 19 Aroclor processes for me? 20 A Yes, that is fairly simple. The starting raw 21 material was either biphenyl or terphenyl, depending on 22 what kind of Aroclor was required. That material was first
Page 58 1 Q What was the still pot? 2 A That's just another word for the still. I 3 suppose when one would refer to the still, one would be 4 referring to the entire system with the furnace and so 5 forth whereas the still pot was the main piece, the tank. 6 Q Do you recall whether that distillation process 7 was changed at all during the time that you were production 8 supervisor at the Anniston plant? 9 A Not in any significant way that I can remember. 10 Q Do you recall anybody expressing the thought that 11 the still residue shouldn't be taken away for disposal 12 during that time? 13 A No. 14 Q Do you recall any other wastes or residues being 15 created in the Aroclor department during those years? 16 A There was a filter cake. The final step of the 17 process was to filter the Aroclor -- again, a clay was 18 added to the product as a filter aid -- and the product was 19 then filtered through platen frame filter presses with 20 filter paper. And at the end of the filtration cycle, the 21 press would be opened and the filter cake and the paper 22 dropped into drums to be hauled away.	Page 60 1 put in a feed tank where it was mixed with a small amount 2 of catalyst -- it was ferric chloride -- and then that 3 material went to a chlorinator. Some of the chlorinators 4 ran continuously and others were run batchwise. What came 5 from the chlorinator was called crude Aroclor. 6 The next step -- the next step that I remember 7 anyway was blowing and that consisted simply of blowing air 8 through the crude Aroclor to remove small amounts of Hcl, a 9 by-product from the reaction which was dissolved in the 10 crude Aroclor. Then after that the crude was put into the 11 still, distilled, then the distilled product was, again 12 what was called a clay treatment, which was the beginning 13 of the filtration step and after filtration the product was 14 finished. 15 Q From time to time, would there be leaks or spills 16 in those processes? 17 A Occasionally there would be failures of pump 18 packing or piping which would lead to leaks or spills. 19 Q And what would it be that spilled? 20 A Crude Aroclor or Aroclor. 21 Q What happened to the crude Aroclor in those 22 instances?

Page 61 1 A These materials are under ambient conditions 2 either very viscous liquids or solids, so any material that 3 leaked tended to pool on the floor and perhaps solidify and 4 with arduous effort would be scraped up and put into 5 dumpsters to be disposed of. Because it was so difficult 6 to clean it up, everybody was enthusiastic about preventing 7 leaks and spills. 8 Q Did the floor of the Aroclor department have a 9 sheen or a coat or a layer of the Aroclor on it typically? 10 A No. It was a concrete floor and there would be 11 places where the remains of previous spills might still be 12 evident and there were places where it was black and shiny. 13 Q Would there be -- aside from efforts to clean up 14 individual spills where Aroclor would be, were there larger 15 efforts to clean up residual Aroclor in the Aroclor 16 department, meaning, for example, a once-a-year cleanup or 17 that type of thing? 18 A Well, all departments went through an annual 19 housekeeping inspection. It was a tradition all over 20 Monsanto at that time. And there would always be a special 21 cleanup effort before that or before some big wheel came to 22 visit.	Page 63 1 A I don't know that there was a special amount of 2 Aroclor to be cleaned up at that time. Whatever there was 3 would be disposed of in the same way. There would be a 4 dumpster brought over by shipping. We would put in that 5 whatever we had, or typically what was cleaned up for 6 housekeeping inspection was just junk. 7 Q Do you recall there being any claims or 8 complaints during that time that Aroclor from the Aroclor 9 department had leaked into the soil or water? 10 A I don't remember anything like that. 11 Q You mentioned some aqueous wastes that were 12 handled through a water scrubber. What did those wastes 13 consist of other than water? 14 A Hcl, which when dissolved in water is known as 15 muriatic acid. As far as we knew at that time, that's all 16 it was. 17 Q And what was done with that? 18 A It went into the department sewers which led out 19 to the limestone bed in the front yard, from there to Snow 20 Creek. 21 Q Just to get a frequency of the times when that 22 would happen, would that happen every time that the blowing
Page 62 1 Q What did the annual housekeeping inspections 2 entail? 3 A It was usually a team of production people from 4 other plants who would come in and perhaps spend two or 5 three days going over the plant very carefully and making 6 recommendations for improving housekeeping or safety. And 7 by the same token Anniston people would go out on similar 8 teams to other plants. 9 Q Do you recall any housekeeping or safety 10 recommendations that were made with regard to the Aroclor 11 department in connection with those inspections? 12 A No, nothing specific. 13 Q Did you personally go visit other plants on 14 housekeeping inspections? 15 A I don't think -- no, I don't think I ever did. 16 Q You said there would be a big cleanup in 17 connection with the annual housekeeping inspections? 18 A Yes. Usually work overtime for a couple days and 19 try to make the place look particularly good. 20 Q When the residual Aroclor that was cleaned up in 21 the big housekeeping inspections, what would be done with 22 that?	Page 64 1 step took place? 2 A Yes. The scrubber ran all the time. 3 Q Do you know of any other aqueous wastes from that 4 department? 5 A No. 6 Q Were there air emissions from that department? 7 A Not that I remember. The vacuum jets had a steam 8 discharge but as far as we knew that was just steam. 9 Q I'm not sure that I have one of the big documents 10 for the chlorine department that would both guide us and I 11 guess delay us. Can you describe for me briefly the nature 12 of the operations of the chlorine department at that time? 13 A Chlorine is made from salt, sodium chloride. We 14 called it the chlorine department because that was the 15 product that we needed. In fact, in making chlorine from 16 salt, it was a coproduction of caustic soda, sodium 17 hydroxide. And in fact that particular plant was unusual 18 in that we used both sodium chloride and potassium chloride 19 as starting materials so that we could produce either 20 caustic soda or potassium hydroxide, caustic potash. 21 So we had two separate brine systems. In one 22 brine system salt was dissolved in water. In the other

Page 65 1 brine system, potassium chloride was dissolved. The main 2 part of the chlorine plant was a number of cells, 3 electrolytic cells. Ours were a proprietary system 4 licensed from Denora in Italy, mercury cells in which 5 there's a flowing mercury cathode and at that time carbon 6 anodes suspended in the brine above the mercury cathode. A 7 very large electric current passed through the cells and 8 the salt was electrolyzed into chlorine which came out of 9 the brine as a gas and metallic sodium or potassium which 10 became dissolved in the mercury. 11 The mercury would flow out of the cell into a 12 separate little tank called a decomposer in which the 13 sodium or potassium in the mercury amalgam would react with 14 the water to form either sodium or potassium hydroxide and 15 separate handling systems for sodium hydroxide and 16 potassium hydroxide, and mercury leaving the bottom. The 17 decomposer tank would be pumped back up into the cell. We 18 had 36 cells and a complicated system of changeover piping 19 so that it, more or less, any number of cells could be 20 placed on either sodium or potassium depending on what the 21 market required. 22 Q If I understood your answer correctly, the raw	Page 67 1 surface of the mercury primarily to prevent mercury vapor 2 from entering the atmosphere. And that wash water went to 3 the sewer. 4 Q Is that the sewer that went to the limestone bed 5 and then Snow Creek? 6 A Yes. 7 Q Would there be mercury in the wash water? 8 A Probably, a small amount. 9 Q Would there be anything else in the wash water 10 besides water? 11 A Yes. There would, be typically there was some 12 brine entrained out of the back end of the cell. So there 13 would be sodium chloride or potassium chloride in the 14 water. 15 Q Do you recall there being any complaints or 16 concerns expressed in connection with the fact that there 17 would be mercury in the wash water? 18 A No, I don't remember any complaints. Mercury is 19 very expensive and we did our best to minimize that. 20 Let me correct something I said before, there was 21 no solid waste, that's not quite true. Because we used 22 graphite anodes in the cells and they would be consumed
Page 66 1 materials were sodium chloride and potassium chloride? 2 A That's right. 3 Q Were there others? 4 A Trivial amounts of others that were used to treat 5 the brine. 6 Q Were there wastes or residues that were created 7 in that process? 8 A I don't remember any solid waste. There was a 9 by-product, hydrogen which came out of the decomposers. 10 And when I first became supervisor of that, hydrogen was 11 simply a waste product that was put up into the air ; of 12 course it just rises and disperses in the atmosphere. 13 Later on we began recovering that hydrogen and compressing 14 it to use in the Hb-40 department, so it became a valuable 15 by-product. 16 Q Do you recall any aqueous wastes from that 17 department? 18 A Yes, there was wash water that was used at the 19 cells. The cells were about three feet long -- or three 20 feet wide and about 40 feet long. Long, flat tanks. And 21 at the entrance and exit of the cell on each end where the 22 mercury went in and came out, wash water was run over the	Page 68 1 over the course of a year or so and what was left of the 2 anode was a waste that had to be discarded. 3 Q What did that consist of, graphite? 4 A Just a chunk of graphite. 5 Q How was that discarded? 6 A I don't know. 7 Q Do you know how frequently it would be discarded? 8 A Oh, yes, that was an important part of the 9 management of the cells. The anodes would last something 10 over a year and it was important to manage all the cells in 11 such a way that we could be rebuilding one or two cells 12 with new anodes while the rest of them ran. So it was 13 important to properly stagger that operation so that we 14 would normally have 32 to 34 cells available. 15 Q So I take it they would be replaced a little bit 16 less than once a year? 17 A That's about right. 18 Q Do you recall there being leaks or spills in 19 those, in the chlorine operations during that time? 20 A Sometimes we had brine leaks, brine is quite 21 corrosive. And even though we had special corrosion 22 resistant piping, we would get some brine leaks sometimes

Page 69 1 and brine would be spilled. As to chlorine, chlorine 2 itself, chlorine gas is dangerous enough that a leak 3 couldn't be tolerated. 4 Q Did you recall there being any emissions of 5 chlorine gas during that time? 6 A Yes. If we had a piping failure, but we would 7 immediately shut down. 8 Q Did that happen from time to time, a piping 9 failure? 10 A Not very often, but it did happen. 11 Q Approximately how frequently? 12 A Oh, I don't know. I only remember one incident 13 during my time. 14 Q When was that? 15 A I don't know. 16 Q What do you recall about the incident? Do you 17 recall what happened generally? 18 A A valve at the bottom of a tank had failed due to 19 corrosion and there was enough chlorine in the atmosphere 20 to be visible, so people had to put on emergency breathing 21 apparatus and of course shut down. It was -- because it 22 was an electrolytic operation, it was easy to shut down	Page 71 1 Q How long would it take for the brine to corrode 2 the pipes? 3 A There were a number of different corrosion 4 environments in various places in the system. In some 5 places the material would last many years. Some of the 6 piping was the original piping from when the plant was 7 built in the early ' 50s. But there were other environments 8 that were more corrosive and it was important to find just 9 the right material. 10 Q When you say " other environments that were more 11 corrosive, " what do you mean by that? 12 A The brine that was originally made up by 13 dissolving the salt or the potassium chloride was at a 14 neutral ph, it was neither acid nor alkaline and was not 15 particularly hard to handle. When the brine passed through 16 the cell, the concentration fell by 30 or 40 percent. That 17 is, only part of the salt or potassium chloride was 18 consumed on each pass. With the brine leaving, the cell 19 was saturated with the chlorine, had a very acidic ph, and 20 therefore it was very corrosive until it went back out into 21 the brine treatment area and had to be cleaned up. 22 Q What was the brine treatment area?
Page 70 1 very quickly. It was just a matter of interrupting the 2 current and the production was stopped. 3 Q Where would the brine leaks, where would they go? 4 A Onto the ground. The brine area had crushed rock 5 on top of the ground. 6 Q Do you know what was under the crushed rock? 7 A Just dirt. 8 Q How often would there be -- was that a frequent 9 thing, the brine leaks? 10 A It's something that would happen every couple of 11 months, I suppose. If it was considered an economic 12 problem and as production supervisor, I was responsible for 13 getting good raw materials. It was not something that I 14 wanted to tolerate. 15 Q Do you recall any steps being taken, during your 16 tenure as production supervisor, to reduce the frequency of 17 the brine leaks? 18 A Yes. The main thing that we did was I worked 19 with the maintenance supervisor on some preventive 20 maintenance to try to organize periodic shutdowns to 21 replace major parts of the piping that were kind of old 22 with new material.	Page 72 1 A Actually that was the largest part of the 2 operation because that was the area where salt was 3 dissolved. The brine system was an enclosed loop and spent 4 brine would be brought from the cells, ph adjusted and 5 treated and then passed back through tanks where more salt 6 or Kcl was dissolved, excuse me, potassium chloride. And 7 then that was fresh brine, it could be sent back to the 8 cells. They're two separate closed loops, one for 9 potassium chloride brine and the other for the sodium 10 chloride brine. 11 Q Let's see if we can do the same thing for the 12 Hb-40 operations at the Anniston plant during that time. 13 Can you describe those operations for me? 14 A The raw material for Hb-40 was terphenyl. The 15 product we called Santowax R which means refined 16 terphenyl. The terphenyl was brought into the department 17 into the feed tank, catalyst was added to it, in this case 18 the catalyst was something called Raney nickel, which is a 19 term for a special form of chemically active nickel. 20 Q Is that R-a-n-n-e-y? 21 A R-a-n-e-y, named after somebody, but it's not 22 really a trade name. A number of companies sell Raney

Page 73 1 nickel. The nickel would be disbursed in the terphenyl. 2 It didn't dissolve. It was just metallic granules mixed up 3 with the terphenyl. That material would be – and some 4 recycled catalyst was added because the catalyst was good 5 for several uses. That was placed in an autoclave, 6 hydrogen was introduced into the autoclave through a feed 7 pipe, the pressure was brought up to about 300 pounds in a 8 very short cycle. 9 It was brought to a hydrogenation level of 40 10 percent. That was the reason for the 40 in Hb-40, which we 11 would determine by a little measurement that the operators 12 could do in the department. And then that was the 13 product. It would be taken out of the autoclave and pumped 14 through a filter to recover the catalyst and that was the 15 product. The recovered catalyst would be sent back around 16 with the next batch. From time to time spent catalyst, 17 when it became inactive, would be drawn out of the system 18 and sent back to the supplier who would recover the metal 19 values for us. 20 Q Do you recall there being wastes or residues in 21 those processes? 22 A No.	Page 75 1 the product was very noncorrosive and it was a relatively 2 trouble-free operation. 3 Q When there were piping failures, what would come 4 out of the pipes? 5 A I don't even remember any specific piping 6 failures. 7 Q Let's see if we can do this for the muriatic acid 8 operations. Do you recall what those operations consisted 9 of? 10 A That was a package absorber. The trade name was 11 K-a-r-b-a-t-e, Karbate, and it was a package unit sold by 12 one of the equipment vendors. I don't remember who it was 13 anymore but the process was very simple. The by-product 14 Hcl gas from Aroclor chlorination came into the department, 15 went in at one point on the absorber. Water was introduced 16 in another place in the absorber. What came out was 17 muriatic acid. 18 The crude acid went to a carbon treatment step to 19 remove any organic material which may have come over in the 20 Hcl gas from the Aroclor department, and filtered, and that 21 was the finished product, shipped. 22 Q I take it the only raw material was the Hcl?
Page 74 1 Q There were no liquid, solid – 2 A What we made was sold. There was no by-product. 3 Mr. Burnett: Just as a caution, make sure you 4 give him a chance to finish his question before you answer 5 because she can't get it. 6 Mr. Brock: It's easier for the court reporter ; 7 that's right. 8 By Mr. Brock: 9 Q Were there sewers in that department? 10 A I suppose so, to collect rain runoff, but I don't 11 remember any waste. 12 Q Just so I'm clear, you don't recall any solid, 13 liquid or solid or liquid wastes or air emissions from that 14 department? 15 A No, I don't remember any. There would be sort of 16 an air emission. At the end of the batch cycle, the vessel 17 would contain hydrogen under pressure so a valve would be 18 opened and the hydrogen let off to the atmosphere. 19 Q Do you recall there being spills or leaks during 20 the Hb-40 operations? 21 A It would be perhaps the way I characterized the 22 Aroclor operation. Sometimes we'd have piping failures but	Page 76 1 A Yes, and water. 2 Q Were there any residues created during those 3 operations, for example, in the carbon treatment phase? 4 A Yes, the spent carbon was a waste. 5 Q What happened to that? 6 A I don't know. Within the department we put it in 7 some kind of container and it was carried off. 8 Q Do you recall there being spills or leaks during 9 those operations? 10 A Yes, that was a troublesome operation. Serious 11 corrosion problems because of the nature of muriatic acid. 12 When we had piping failures, muriatic acid would go to the 13 sewer. 14 Q Were there corrosion problems with things other 15 than pipes or was it just pipes? 16 A Storage tanks, pumps. It's a very difficult 17 material. 18 Q When you say difficult, you mean – you're 19 referring to the fact that it's corrosive? 20 A Yes. It's a very ordinary product of commerce 21 obviously. 22 Q And again that was a sewer that went to the

Page 77 1 limestone bed and then to Snow Creek ; is that right? 2 A That's right. 3 Q Do you recall there being any occasions on which 4 more Hcl was produced than there was a demand for? 5 A Yes. 6 Q And there was a demand for muriatic acid? 7 A Yes, muriatic acid in those days was typically in 8 oversupply and it was a challenge for the marketing 9 department to move it all. Most of the time they were 10 successful. 11 Q What would happen when the supply of the muriatic 12 acid outstripped the demand? 13 A I don't remember any incident like that. 14 Q Would it be gotten rid of somehow? 15 A As far as I can recall, we always were able to 16 get orders. Sometimes we'd have several tank cars backed 17 up in the yard waiting for orders, but as far as I recall 18 it was all moved sooner or later. 19 Q During the time that you were at the Anniston 20 plant, either in your chemical engineering positions or as 21 production supervisor, did you have contact with pollution 22 control personnel at the Anniston plant?	Page 79 1 A I'm sure there was somebody but I don't remember 2 who it was. The main person we worked with on pollution 3 was Cliff Studz from St. Louis. 4 Q Do you recall having contacts with him during the 5 time you were at the Anniston plant about the operations of 6 the Anniston plant? 7 A Well, I worked a lot with Cliff Studz at the time 8 I was working on the waste treatment plant for the Niran 9 department. I don't remember talking to Cliff during the 10 time I was production supervisor but I may have. 11 Q What was the nature of Cliff Studz's involvement 12 in the projects that you were doing concerning the waste 13 treatment plant? 14 A He was the process engineer. He was an expert on 15 waste treatment. 16 Q Do you recall there being any claims or 17 complaints about pollution in the area of the waste 18 treatment plant? 19 A Are you going back to Niran now? 20 Q Right, during the time that you were at 21 Anniston. 22 A Complaints from the community?
Page 78 1 A Do you mean from government agencies? 2 Q No. For example if I mentioned the name to you 3 Eugene Wright, is that a name you recognize? 4 A Yes. 5 Q Bunky Wright, he was referred to or Gene Coley, 6 do you recognize his name? 7 A Yes. 8 Q Did you have contacts with them during your 9 tenure? 10 A They were friends. It was a small plant. 11 Q Fair enough. Do you recall working with them on 12 any projects that related to the operations of the Anniston 13 plant? 14 A I remember both Coley and Wright at that time as 15 having been in the analytical laboratory. I know from 16 things that happened later that they took on pollution 17 responsibilities, but I don't remember that during the time 18 I was there as production supervisor they actually had 19 those responsibilities. 20 Q Do you know whether anybody at the plant had that 21 type of responsibility during the time you were production 22 supervisor?	Page 80 1 Q Right, or other Monsanto employees? 2 A Sometimes people said the waste treatment plant 3 smelled bad and when they said so, they were usually right. 4 Q Do you recall there being any claims or 5 complaints that there had been emissions of chemicals into 6 the soil or water in the area of the waste treatment plant? 7 A No. 8 Q Do you recall – 9 A I would not be the interface with the public so I 10 wouldn't have direct knowledge of such things anyway. 11 Q Do you recall there being any lawsuits making 12 allegations of pollution from the Niran operations at the 13 Anniston plant? 14 A Yes. Related to some people in the community who 15 complained of damage to the paint on their houses. 16 Q Do you know who the people were? 17 A No. People who lived near the plant. 18 Q Was that lawsuit ongoing during the time that you 19 were at the Anniston plant? 20 A Yes. 21 Q Are you familiar with one lawsuit or is it more 22 than one?

Page 81 1 A There were several houses, but I don't know 2 whether it was one lawsuit or more than one. 3 Q Do you know how the people claim that their -- 4 strike that. 5 They were claiming that paint on their houses had 6 been damaged? 7 A Yes. 8 Q And they were attributing that to Monsanto, I 9 take it? 10 A Yes. 11 Q Do you recall how it was that they claimed 12 Monsanto was responsible for that paint damage? 13 A Well, they claimed that there were episodes when 14 there was a smell of rotten eggs at night and that there 15 were black patches on the paint the following day. 16 Q Was that lawsuit resolved to your knowledge? 17 A I think so but that's long ago. 18 Q Were you ever asked to give any information about 19 that or in connection with that lawsuit? 20 A Yes. The Monsanto attorneys wanted pictures of 21 the houses and since I was at the time an amateur 22 photographer, the plant manager asked me to get those	Page 83 1 anybody else besides Mr. Hosmer? 2 A I don't remember. 3 Q And you don't recall any of the names of any of 4 the claimants? 5 A Oh, no. I may have not ever known them. 6 Q Are you familiar with any other lawsuits claiming 7 pollution or environmental emissions from the operations at 8 the Anniston plant? 9 A I don't recall any. 10 Q When you were at the Anniston plant, did you have 11 any contacts with any governmental agencies concerning the 12 operations at the plant? 13 A No. 14 Q For example, Osha inspectors or that type of 15 thing? 16 A There wasn't any Osha. 17 Q Or safety inspectors, that type of thing from the 18 state? 19 A Not that I recall. 20 Mr. Burnett: Off the record. 21 (Whereupon, at 12: 30 p. m. , the deposition was 22 recessed, to be reconvened at 1: 30 p. m. this same day.)
Page 82 1 pictures. 2 Q Do you recall where the houses were located? 3 A They were in a residential area I think to the 4 west or north of the plant but I couldn't pinpoint it more 5 than that. 6 Q Does that refresh your recollection of -- strike 7 that. 8 Do you recall approximately how many houses you 9 took pictures of? 10 A I think six or eight, but that's very fuzzy. 11 Q Do you recall whether any individual Monsanto 12 employees were made defendants in that lawsuit? 13 A I have no idea. 14 Q Who was the plant manager who asked you to take 15 the pictures? 16 A Dez Hosmer. 17 Q Did you provide any other information in 18 connection with that lawsuit? 19 A No. That was my only role. 20 Q How did you learn of that lawsuit? 21 A Because Dez told me he needed those pictures. 22 Q Do you recall discussing that lawsuit with	Page 84 1 Afternoon Session (1: 40 p. m.) 2 Whereupon, 3 James R. Savage 4 resumed the stand and, having been previously duly sworn, 5 was examined and testified further as follows: 6 Examination (Continued) 7 By Mr. Brock: 8 Q Mr. Savage, let's go to the time when you were 9 supervising engineer at the Krummrich plant starting in 10 1963. What were your job duties in that position? 11 A This again was part of the technical service 12 department, Tsd. I had a group of five or six engineers 13 reporting to me and we were doing processing improvement 14 work in a number of different operating departments at the 15 Krummrich plant. 16 Q Who did you report to? 17 A At first to Bill Tafey, who was a process 18 superintendent in Tsd. 19 Q Where was he located? 20 A That was at Krummrich at that time. 21 Q Was he at the Anniston plant before that? 22 A No, he was at Anniston after that.

Page 85 1 Q And as a supervising engineer in the Tsd 2 department, did you report to someone subsequently to Bill 3 Tafey? 4 A Bill Tafey, when Bill Tafey transferred to 5 Anniston, I was promoted to replace him as the Tsd 6 superintendent and then I was reporting to the general 7 superintendent at the Tsd who was at that time John 8 Mullendore. 9 Q Was Mr. Mullendore at the Krummrich plant? 10 A Yes. 11 Q Do you recall the five or six engineers who 12 reported to you? 13 A Roadway Scott, Herb Mccown. 14 Q How do I spell that? 15 A M-c-c-o-w-n, Dan Middleton, John Rodel, 16 R-o-d-e-l, Harry Yapp, Y-a-p-p. 17 Q What were the -- 18 A Bill Cramper was one other. These were not all 19 at the same time necessarily but over the course of a year 20 or so. 21 Q What were the departments that were under your -- 22 for which you had job duties?	Page 87 1 Q Was that because the Krummrich plant was a second 2 plant? 3 A Sure. All that was long before my time. 4 Q Of the engineers who reported to you -- well, 5 first of all, did people who you said reported to you, were 6 those all engineers during the time you were supervising 7 engineer? 8 A Yes. 9 Q Were their responsibilities divided by 10 department? 11 A Well, as I recall it all involved the chlorine 12 departments but there were two separate chlorine cell 13 houses and some ancillary facilities, chlorine 14 liquification and so forth. 15 Q What is chlorine liquification? 16 A Chlorine as it's produced is a gas and to be able 17 to ship it or be able to store any large quantity requires 18 liquifying it, which involves compressing and cooling. 19 (Savage Exhibit 3 identified.) 20 By Mr. Brock: 21 Q Mr. Savage, I've marked as Exhibit 3 a map of the 22 Krummrich plant that was previously marked in another
Page 86 1 A As a supervising engineer it was primarily for 2 the two chlorine plants and the two chlorine departments we 3 had at Krummrich, but then when I was promoted to 4 superintendent, I kept those but also had several others. 5 Q Do you recall the numbers of the chlorine 6 departments offhand? 7 A No, I knew them once but I don't remember. They 8 were versions of 232, I think, but they had prefixes or 9 something. 10 Q Letter prefixes? 11 A I think so, I don't remember. 12 Q Do you have an understanding as to the 13 significance of the letter prefixes? 14 A Those that started with -- that were in the 200 15 series originally were the Krummrich department. It was an 16 old, old numbering system that described Queeny plant 17 departments and Krummrich plant departments from many, many 18 years ago. 19 Q Did the 200 system, did that -- what did that 20 mean? 21 A Just that that was a different plant than those 22 that were 100.	Page 88 1 deposition. Do you recognize this as a general layout of 2 the Krummrich plant during your tenure there? 3 A Yes. 4 Q If you look at this, does this refresh your 5 recollection as to the numbers of the departments that were 6 under your purview during that time? The chlorine 7 departments during the time that you were supervising 8 engineer? 9 A Well, in fact by the time -- this map is dated 10 1973 -- apparently, I think the chlorine plants were gone 11 by then so this is a lot of other things. I mentioned that 12 when I became the superintendent I also had some other 13 operations and some of those are visible here. 14 Q Were the -- 15 A Well, let me correct that. I see a box marked 16 Denora, that was one of the chlorine cell houses. 17 Q Were the departments under your purview as 18 supervising engineer, were they called the chlorine 19 department? 20 A Well, the older chlorine cell house was Hooker 21 diaphragm cells. And a lot of the general plant 22 terminology -- if someone just said the chlorine plant,

Page 89 1 they would be referring to that one. The Denora cell house 2 would either have been called Denora or the mercury cells, 3 which was a separate operation. 4 Q So the Denora cell house was under your purview 5 -- 6 A Oh, yes. 7 Q -- as supervising engineer? 8 Was the chloro-alkali department under your 9 purview? 10 A That's another term for the same thing. 11 Q So if I mentioned Department 231, does that 12 refresh your recollection or does that ring a bell at all? 13 A No. 14 Q Do you recall what type of process improvement 15 projects you worked on with regard to the chlorine 16 operations as a supervising engineer? 17 A The time that I arrived there was a project 18 underway to improve gas cooling and handling from the 19 diaphragm cells. That was completed a few months after I 20 arrived there. We did some projects in the brine area at 21 Denora. It was a relatively new operation but we were able 22 to devise a significant improvement in the brine area that	Page 91 1 Usually if the wet chlorine piping developed a leak, the 2 normal operation was to run that entire system at a slight 3 vacuum, partly because that was convenient for gas handling 4 but also as a safety measure since chlorine is dangerous. 5 So if there were leaks in the wet chlorine piping, the 6 problem would be manifested by air getting into the system 7 and the gas steam diluted, which was undesirable. So there 8 was always a substantial annual maintenance expense to keep 9 repairing piping because we couldn't tolerate a lot of 10 inert air in the chlorine. 11 Q Were the Denora operations, those were part of 12 the chlorine operation ; is that correct? 13 A Yes. But the Denora cell house was much newer. 14 It was built sometime in the early ' 60s. It was completed 15 and started up at the time that I arrived at the Krummrich 16 plant but it had only been in operation for a year or two, 17 whereas the Hooker diaphragm cells were much older. 18 Q As a supervising engineer, did you work on any 19 projects addressing possible changes in any waste disposal 20 methods at the Krummrich plant? 21 A Yes. I mentioned a project in the brine area at 22 Denora. There was some problem in some dissolved chlorine
Page 90 1 improved the chlorine yield, eliminated some difficult 2 pieces of equipment. 3 Q What was the effect of improving the gas cooling 4 and handling in the chlorine operations? 5 A That was largely a matter of improving the 6 reliability, wet chlorine -- chlorine as it's produced from 7 the cells is wet and as a wet gas it's extremely 8 corrosive. And the older technology for cooling the warm 9 wet chlorine gas was to use coolers using Pyrex tubes with 10 cooling water in them. They were subject to breakage and 11 had very poor capacity. And by that time, metal titanium 12 had become readily available as an economic material for 13 construction and permitted significant improvements in 14 reliability and economics of all of the wet chlorine 15 handling. So that was just a general trend going on at 16 that time was to replace older equipment with titanium 17 equipment. 18 Q Had corrosion of the equipment in the chlorine 19 department, did that lead to leaks and spills from time to 20 time at the Krummrich plant? 21 A Well, spills is kind of an imprecise word when 22 you're speaking of a gas. It was a matter of reliability.	Page 92 1 in wastewater from the brine area. And the replacement 2 system that we put in essentially eliminated that problem 3 by recovering the chlorine gas from the water stream and 4 recycling it into the main chlorine stream. 5 Q Where did the wastewater with the dissolved 6 chlorine go? 7 A Into the general plant sewers. 8 Q These were sewers from the process areas? 9 A Yes. 10 Q Do you recall what those sewers were called? 11 A I have no idea. 12 Q Were those the sanitary sewers? 13 A I don't know. That term normally implies human 14 waste, but I don't know whether that term was used at 15 Krummrich at that time or not. 16 Q Do you know where the sewers went? 17 A Well, eventually to the Mississippi River, I 18 suppose, but by what route, through what kind of treatment, 19 I don't know. 20 Q Did you work -- as a supervising engineer, did 21 you work on any projects relating to the sewers? 22 A No.

Page 93 1 Q As superintendent of Tsd, were you involved in 2 any projects that related to the sewers? 3 A Let me clarify. I was not superintendent of all 4 of Tsd. John Mullendore was superintendent for all of Tsd, 5 but I was what was informally called the group leader. 6 John Mullendore was called the superintendent, but I was 7 not responsible for the entire plant. I had about a 8 quarter of it for technical work, not for production. 9 Q During the time that you were a group leader of 10 Tsd at the Krummrich plant, were you involved in any 11 projects that related to sewers at the plant? 12 A No, I don't think so. Ordinarily projects 13 related to the sewers per se would be managed by the 14 maintenance department. 15 Q As supervising engineer did you become familiar 16 with the operations of the chlorine department? 17 A Certainly. 18 Q Can you just briefly describe what those 19 operations consisted of in the same way that you did for 20 the various -- 21 A I mentioned that one of the cell houses was 22 Denora. Again that's a proprietary design of Denora in	Page 95 1 wet as a gas and it was processed in a similar way. The 2 brine area per se was simpler because the brine was used in 3 a kind of once-through way. That is, each time the brine 4 went in, it was converted to cell liquor. There was no 5 recycled brine stream per se. 6 Q Can you mark for me where the brine area is on 7 Exhibit 3. You can just mark an X by the brine area. 8 A I'm sorry, I can't. I don't know where. It's a 9 long time ago and most of those things have been torn down. 10 Q Were there wastes or residues that were created 11 in the operations of the Denora cell houses? 12 A That was no different than Anniston. Spent 13 anodes that would be thrown away. 14 Q Anything else that you recall? 15 A The brine area for Hooker was different and I 16 recall that there was a sludge that was called gyp, g-y-p, 17 by the people in the plant because it was, a substantial 18 part of it was sodium sulfate, which is called gypsum or 19 calcium sulfate, maybe. This was just impurities from the 20 rock salt and this material would be drawn off from time to 21 time. I don't remember what was done with it and I don't 22 remember whether there was a similar material from the
Page 94 1 Italy. The cells and so forth were made in Italy, imported 2 and that operation, other than being four or five times as 3 large, was technically pretty much the same as the mercury 4 cell operation at Anniston. The other cell -- including 5 the fact that they were both sodium chloride and potassium 6 chloride loops. The other cell house, the Hooker diaphragm 7 plant, might superficially seem similar but in detail was 8 considerably different. The cells were much smaller and 9 there were a large number of them and brine was fed to one 10 compartment of the cell. 11 There was a diaphragm which made a deposit of 12 asbestos which separated the brine compartment from another 13 compartment. And in passing through the diaphragm under 14 the influence of the electronic current, the brine was 15 converted to something called cell liquor which was a 16 solution of both salt and caustic soda mixed together. And 17 then there was a large area where the cell liquor was 18 concentrated and the salt crystallized out to form the 19 product, caustic soda. 20 So the caustic soda side of that department was 21 much more complicated, used a large amount of energy. The 22 chlorine came off the cells in the same way. It was hot,	Page 96 1 Denora plant or not. 2 Q Let's go to the time that you were group leader 3 in Tsd at the Krummrich plant. What departments were under 4 your purview during those years? 5 A Still the chlorine plants. In addition, the 6 Aroclor department, the nitroanilines department, 7 chlorobenzenes, nitrochlorobenzenes and some small 8 nitration products. Nitrated dodecylbenzene, some other 9 small products made by nitration. 10 Q Can you just read that back. 11 A At one time the phenol department which was a big 12 monstrous thing. 13 (The reporter read the record as requested.) 14 By Mr. Brock: 15 Q Did the nature of your job duties change when you 16 switched from being supervising engineer to group leader of 17 Tsd at the Krummrich plant? 18 A Not really, just a few more engineers and more 19 departments to be responsible for. 20 Q So you still worked on process improvement? 21 A That's right. 22 Q Let me go back to the time when you were

Page 97 1 supervising engineer. Do you recall working on any other 2 projects relating to the method of waste disposal or wastes 3 other than the one that you talked about earlier involving 4 chlorine and the wastewater? 5 A No, I don't remember. 6 Q Do you recall any of the process improvement 7 projects that you worked on regarding the Aroclor 8 operations at the plant? 9 A I think there were quite a few but of course at 10 that time being responsible for a number of engineers, it's 11 more difficult to remember individual projects. Dan 12 Middleton was working for me in the Aroclor department at 13 that time and I remember one project of his related to 14 improving the drumming out of the still residue. 15 Q Can you describe that project for me? 16 A Well, it came to me as a work order from the 17 production supervisor. He was dissatisfied with the method 18 of handling still residue because he thought it might be 19 hazardous to the workers because they were working directly 20 with drums, very hot material. And Dan designed a system 21 that isolated the workers from the material and to a modest 22 degree automated the way it was done.	Page 99 1 from the Aroclor operations? 2 A Yes. It's the same material we talked about 3 earlier. 4 Q Do you know how that was disposed of at the 5 Krummrich plant during that time? 6 A No, I don't. 7 Q You described a project that Dan Middleton worked 8 on as somehow isolating the system. Can you describe for 9 me what the change was? 10 A I don't remember it in detail. It involved a 11 roller conveyor and some hoods, but I don't remember any 12 more detail than that. 13 Q What was Dan Middleton's position, was he an 14 engineer? 15 A Yes, chemical engineer. 16 Q Do you recall who the other engineers were who 17 reported to you when you were group leader in Tsd? 18 A Bob Fields, Roger Spiller, Tony Angoli, 19 A-n-g-o-l-i. I think there were a couple of others, but I 20 don't remember their names. 21 Q Were those engineers in separate departments? 22 A They were part of the technical service
Page 98 1 Q Do you recall who the production supervisor was 2 at that time? 3 A Woody Martin, E. E. Martin. He was Elwood, I 4 think. 5 Q Is he the person who came to you with the work 6 order regarding the still residues? 7 A I presume so because he was the production 8 supervisor at the time but I don't know specifically that 9 he was. 10 Q Do you recall what the production supervisor said 11 to you regarding whether the still bottoms -- strike 12 that -- whether the Aroclor could be hazardous to the 13 workers? 14 A I have no idea what he said. 15 Q When that type of thing came to you, what did you 16 do with it, what was the process? 17 A Sometimes it would come as a verbal request and I 18 would write up the work order myself or more commonly the 19 production supervisor would write up the work order. If I 20 agreed that it was a sensible project, I would sign off on 21 it and assign it to one of the engineers. 22 Q The still residues, that was a waste material	Page 100 1 department but -- 2 Q Were they assigned -- 3 A I would have each of them assigned to some 4 specific department. 5 Q Do you recall what department Bob Fields was 6 assigned to? 7 A Yes, he was in the nitroanilines department. 8 Q Do you recall offhand what that department was? 9 A Pardon me? 10 Q Do you recall offhand what that department was? 11 A That's 222. There were two of them. There was 12 an O and P. Orthonitroaniline and paranitroaniline. 13 Q Ona and Pna? 14 A Correct. 15 Q What about Roger Spiller, what department was he 16 assigned to? 17 A The nitrochlorobenzenes. 18 Q It's easier for me to pronounce the 19 abbreviation -- 20 A Ncb, Pncb. 21 Q Do you recall what numbers those were? 22 A 221.

Page 101 1 Q What about Tony Angoli, what department was he 2 assigned to? 3 A He worked in the phenol department for a while. 4 He only worked for me for a short while. He wasn't 5 successful with the company. 6 Q Why was that? 7 A He wasn't a very good engineer. 8 Q Do you recall any other process improvement-type 9 projects that you worked on with regard to the Aroclor 10 department at that time? 11 A No. I'm sure there were a number of them, but I 12 don't remember any specific one. 13 Q What about the nitroaniline department, do you 14 recall any specific process improvement projects that you 15 were involved in with regard to that department? 16 A There was a major project which Bob Fields 17 handled and which was not completed during my time there in 18 which we set out to develop a new, continuous process to 19 replace the old batch process. But during my time there, 20 it only got as far as pilot plant. 21 Q Were there any changes to the waste disposal 22 methods that you recall in that department during the time	Page 103 1 Pncb or Oncb department, Department 221? 2 A Again, there were a number of small projects but 3 we did have one fairly big project, which started out as 4 what was called a debottlenecking project, that's a common 5 term in the chemical business for relatively small projects 6 that can have a significant leverage on capacity. And the 7 original concept was that essentially the work order that 8 we were given was to add a fourth nitrator. There were 9 three nitrators at the time and we were to add a fourth one 10 to increase the capacity. 11 We were able to come up with a different solution 12 of adding another step, a stripping still to remove 13 unreacted monochlorobenzene, which was one of the raw 14 materials. The project was actually installed by organic 15 engineering, division engineering group because it was 16 larger than the normal scope of a plant project but it was 17 a way of getting the desired capacity and improving the 18 yield at the same time. 19 Q You mentioned the unreacted -- and I thought you 20 said monochlorobenzene? 21 A Monochlorobenzene is one of the raw materials to 22 make nitrochlorobenzene.
Page 102 1 you were there? 2 A There was a waste stream from that department 3 that contained ammonia -- ammonia is one of the raw 4 materials to make nitroanilines -- and we had some kind of 5 a program to improve the ammonia recovery from the 6 wastewater since that was a raw material that was 7 undesirable to lose it to wastewater. I don't remember the 8 nature of the project though. 9 Q Where did that wastewater stream go? 10 A It went into the general plant sewers. 11 Q Do you recall there being any complaints about 12 ammonium going into the wastewater or the plant sewers? 13 A I think there were some local complaints within 14 the plant just due to the odor of ammonia coming out of the 15 sewers. But that as far as I know didn't leave the plant 16 boundary, the problem didn't. 17 Q Were there other waste streams from the Ona or 18 Pna operations? 19 A I think there were but I don't remember what they 20 were. 21 Q Do you recall what type of project or process 22 improvement project you worked with with regard to the Ncb,	Page 104 1 Q Was that a residue, the unreacted Ncb? 2 A No, it's more complicated than that. To make 3 nitrochlorobenzene it requires a reaction between nitric 4 acid and monochlorobenzene, and it's rather difficult to 5 drive that reaction to completion. And therefore, there's 6 a small amount of unreacted monochlorobenzene left in the 7 crude nitrochlorobenzene. And that monochlorobenzene would 8 stay with the product through the refining stage and 9 eventually wound up in a fraction that was discarded but 10 which consisted of metanitrochlorobenzene and a lot of 11 other strange and undesired molecules. 12 Q How was that discarded? 13 A I don't know. That was part of -- it was handled 14 like a still residue, but I don't know where it went. 15 Q And the still residues were taken off the plant 16 by shipping, to your knowledge? 17 A As far as I know. 18 Q Do you recall working on any projects relating to 19 waste streams or waste disposal from Department 221 during 20 that time? 21 A No. 22 Q Do you recall working on any or being involved in

Page 105 1 any projects regarding waste streams or waste disposal from 2 the phenol department at that time? 3 A I was only briefly involved with the phenol 4 department. I only worked in a small part of it. 5 Q What small part was that? 6 A I don't even remember. I left out another name. 7 Ed Stewart worked for me during that time. Ed was a 8 supervising engineer and he had working for him some people 9 who worked in the phenol department, Tony Angoli was one of 10 those. And at some point as part of some reorganization Ed 11 reported to me but I didn't get very closely involved in 12 what was going on in the phenol department. 13 Q Did you become familiar with what the wastes 14 were, if any, from the phenol department? 15 A (Nonverbal response.) 16 Q She needs a verbal response just for the record. 17 A No. I just broadly understood the function, 18 that's about it. 19 Q What about from the Ncb, Pncb -- the 20 chlorobenzene department, did you come to an understanding 21 of what the wastes were from that department? 22 A Just roughly. It made by-product Hcl, which was	Page 107 1 during -- 2 A Not a specific project. I knew them very well of 3 course but I don't remember any particular project. 4 Q Were any claims or allegations of pollution or 5 contamination from the departments under your purview 6 brought to your attention at any time? 7 A I don't remember anything specifically. 8 Q What were your job duties as head of -- strike 9 that. 10 I believe you told me from 1967 to 1970 you were 11 head of Tsd at the Queeny plant? 12 A That's right. 13 Q What were your job duties in that position? 14 A We had three process groups, each headed by a 15 superintendent, which was like the job that I left at 16 Krummrich plant. One group I think we called plantwide 17 engineering or something like that. It's mechanical 18 engineers, and a small pollution group and the analytical 19 laboratory, chief chemist and group technicians reported to 20 me and we had a small process research group of chemists in 21 the laboratory. A total of about 150 people. 22 Q What were the process groups involved?
Page 106 1 used to make muriatic acid, much like the Hcl from 2 Aroclor. There was a still bottom from the final step, the 3 distillation of dichlorobenzene, but I've just said most of 4 what I know about it. 5 Q Do you know what was done with the still bottoms? 6 A No, I don't. 7 Q Do you know what they consisted of chemically? 8 A Higher chlorinated materials in general. 9 Trichlorobenzene, tetrachlorobenzene. 10 Q Do you recall working with the pollution control 11 group at the Krummrich plant during the time, the ' 63 12 to ' 67 time frame that you were there? 13 A Well, I knew the people, Paul Hodges and -- 14 Q Clarrie Buckley, was he there around that time? 15 A Clarrie Buckley succeeded Paul. Clarrie had been 16 production supervisor of nitrochlorobenzenes at the time 17 that I arrived at the plant. But at some point Paul Hodges 18 moved on to the general office and I don't know whether 19 Clarrie Buckley overlapped with him or succeeded him but 20 Clarrie went from production into pollution control work. 21 Q Do you recall working with any of the pollution 22 control personnel at the Krummrich plant on any projects	Page 108 1 A These were mainly chemical engineers, again, 2 assigned to various production departments to do process 3 improvements. 4 Q Do you recall what the operations were? 5 A Well, that was the whole Queeny plant, everything 6 was made at the Queeny plant. 7 Q So the whole Queeny plant was under your -- 8 A Technical work, the whole Queeny plant was mine. 9 That's not completely true because we had some guest 10 operations from other divisions. The only one I remember 11 for sure is the agricultural division had an operation in 12 there. I believe at that time they had a separate 13 organization. I'm not very clear about that. 14 Q During that time frame did you have any 15 responsibilities with respect to the Krummrich, Anniston or 16 Nitro plants? 17 A No. 18 Q Are you familiar as a general matter with wastes 19 being taken from the Queeny plant to something called the 20 Krummrich landfill? 21 A I was aware that that was done. 22 Q When you say you were aware, you mean during the

Page 109 1 time that you were head of Tsd at the Queeny plant? 2 A Yes, yes. I was aware that things like still 3 residue from Queeny went to Krummrich. 4 Q And still residue from what? 5 A A lot of different things. Distillation is a 6 very common purification step in chemical operations and 7 there usually is a still residue. 8 Q You're referring to residues that were left at 9 distillation processes? 10 A Yes. 11 Q Do you have any recollection as to what the still 12 residues were that were taken to the Krummrich plant? 13 A The only one I remember, just because I had a 14 little familiarity with it, was still residue from 15 nitrochlorobenzene operations. There was a small 16 nitrochlorobenzene operation at Queeny that handled one 17 by-product stream from Krummrich. 18 Q When you say the Queeny plant handled one 19 by-product stream from Krummrich, by by-product stream 20 you're not referring -- are you referring to the still 21 residue? 22 A No. This was a stream that at the Queeny plant	Page 111 1 then can be crystallized. So this complicated separation 2 step was a specialty operation at the Queeny plant which 3 separated the 221 oil to recover some more useful ortho and 4 para streams and to reject what was called the metafraction 5 which was the stream that was beyond further separation by 6 an economical method. A very small fraction of the 7 original amount of material made and everything that we did 8 in that department at Queeny was shipped back to Krummrich, 9 including the metafraction, which was waste. 10 Q You're right, it is complicated. 11 A I could give you a whole semester. 12 Q The still residues that went back to the 13 Krummrich plant from the Ncb operations at the Queeny 14 plant, was that the metafraction that you talked about or 15 was that something else? 16 A No, metafraction was not a still residue. I 17 don't remember how exactly it arose. It was a complex of 18 crystallization and distillations done batchwise. The 19 whole sequence of operations took about a month. 20 Q What did the still residues from the Ncb 21 operations that were taken back to the Krummrich plant 22 consist of?
Page 110 1 was called 221 oil because it came from Department 221 at 2 Krummrich, nitrochlorobenzene department. The -- this is a 3 fairly complicated subject. 4 The manufacture of nitrochlorobenzenes results in 5 making a mixture of three isomers, which are superficially 6 the same molecule but with slightly different structure. 7 They're called ortho, meta and para. 8 Paranitrochlorobenzene, Pncb, is generally the desired 9 material because it's needed for some downstream products. 10 Orthonitrochlorobenzene has some uses. 11 Metanitrochlorobenzene might have some uses but the amount 12 that's made is uneconomically small, and so we never 13 isolated it for sale. In the separation of these isomers 14 at the Krummrich plant by a combination of distillations 15 and crystallization, material was left which would normally 16 be called a eutectic, e-u-t-e-c-t-i-c, and this is what the 17 Queeny plant called 221 oil. 18 What that term "eutectic oil" refers to is it's a 19 material that has reached a stable composition with respect 20 to crystallization and it's impossible to separate it 21 further by crystallization. 22 So it has to be distilled into fractions which	Page 112 1 A In general materials that had been nitrated to a 2 higher level than nitrochlorobenzene so it could be things 3 like dinitrochlorobenzene and so forth. 4 Q Did you have any responsibilities during those 5 years for the Anniston or Nitro plants? 6 A No. 7 Q What were your job duties as a manufacturing 8 manager in the 1970 to 1975 time frame? 9 A 1970 I became part of a new matrix organization. 10 At that time I reported to the director of manufacturing, 11 Fred Holzapfel, H-o-l-z-a-p-f-e-l. Each of the 12 manufacturing managers was assigned to a specific business 13 group and was responsible for being sure that manufacturing 14 satisfied the needs of that business group from whatever 15 plants made the products of that business group. I was 16 assigned the specialty products group which was led by 17 Howard Bergen, he was business group director. Then about 18 two years later the organization was changed somewhat so it 19 was no longer a matrix and I from then on reported directly 20 to Howard Bergen and had a dotted-line relationship to Fred 21 Holzapfel. 22 Q What plants were in the specialty products group

Page 113 1 at that time during the first period of time when you said 2 that was under your purview? 3 A Well, specialty products group never had all of 4 any one plant, but we had products in a number of different 5 plants. We had Aroclor at Anniston and Nitro and at 6 Newport in Wales. 7 Q Did you have Aroclor at the Krummrich plant? 8 A Yes. And we had phosphate esters and hydraulic 9 fluids at the Queeny plant and heat transfer fluids at 10 several plants. We had a specialty latex product at 11 Texas City and after a year or two, there was a further 12 reorganization and we picked up the paper chemicals. So 13 then we had mersize at Nitro and at Lasalle in Quebec. And 14 we were involved with a small Aroclor unit that ran for a 15 short time in a joint venture in Japan with Mitsubishi and 16 pentachlorophenol at Krummrich and at Newport, sodium 17 pentachlorophenate which we call Santobrite at both of 18 those places. 19 Q And those were again at Krummrich and Queeny? 20 A Krummrich and Newport in Wales. 21 Q And the pentachlorophenol was at what plants 22 again?	Page 115 1 Q How did you first learn about the issue of water 2 pollution with respect to Pcb's? 3 A Through outside reading at a time when I had 4 nothing to do with it. Sometime in the late '60s some 5 papers were published by Professor Riseborough at one of 6 the California universities in which he described his 7 discovery that chlorinated biphenyls were affecting the 8 raptors, carnivorous birds, specifically the peregrine 9 falcon. And I remember being astonished by that since 10 those were products I had previous experience with. 11 Q Do you recall what university Professor 12 Riseborough was at? 13 A I don't know, but it's very famous. 14 Q Do you recall when you read those -- when you 15 read his papers? 16 A Not exactly, but it would have been 1968 or 1969, 17 I should think. 18 Q Was it during a time that you were at the Queeny 19 plant? 20 A I think so. 21 Q What did you do after you had read the papers? 22 What did you do with the information?
Page 114 1 A Krummrich and Newport. 2 Q Did people at the plant level at the various 3 plants report to you? 4 A Not directly. I had a dotted-line relationship 5 to one of the plant operating superintendents at each 6 plant, but formally each of them reported to the plant 7 manager at the site. 8 Q Do you recall who the plant superintendent was, 9 with whom you had a dotted-line relationship at the 10 Krummrich plant? 11 A No, I don't remember. I'm surprised that I don't 12 remember. 13 Q What about the Anniston and Nitro plants, do you 14 recall who -- 15 A At Anniston at first was Jesse Corder and later 16 on Hill Williams. At Nitro it was Dave Tippee. I remember 17 at Krummrich. It was Bill Corlew. 18 Q Did you get involved in waste disposal matters at 19 the various plants during the 1970 to '75 time frame? 20 A Well, yes. By that time the Pcb issue had arisen 21 in full force and the questions of particularly water 22 pollution had become quite urgent.	Page 116 1 A Well, I asked some of my scientist friends who 2 had something to do with Aroclors what they knew about it 3 and whether they thought that the work was valid. And they 4 were quite familiar with it and said yes, as far as they 5 could tell, it was valid. 6 Q Do you recall who it was, which scientists it was 7 you asked? 8 A I have no idea. 9 Q Were they scientists within Monsanto? 10 A Yes, oh, yes. 11 Q Were they at the Queeny plant, do you know? 12 A No. 13 Q Were they in Creve Couer in St. Louis? 14 A I should think so but I don't remember for sure. 15 I only remember that I did that just because I had been so 16 surprised by the article. 17 Q Do you know whether anybody else within Monsanto 18 had read those articles? 19 A Oh, they were way ahead of me. They had 20 apparently been in contact with Dr. Riseborough. 21 Q When you say they -- 22 A Whoever it was I talked to. It was somebody in

Page 117 1 research. 2 Q Do you recall the position of the person who you 3 talked to in research? 4 A No. 5 Q Did anybody you talked to question the validity 6 of Dr. Riseborough's works with respect to Pcb's at that 7 time? 8 A Not really. They said that it looked like his 9 work was valid. 10 (Recess.) 11 (Savage Exhibits 4 through 29 12 identified.) 13 By Mr. Brock: 14 Q For the record I've just had marked as Exhibits 4 15 through 29 some documents. To a certain extent, 16 Mr. Savage, I'm going to be asking you questions about 17 individual documents. But some of the documents are of the 18 same subject matter. So I'm going to be asking you about 19 them also as a group. I'd like to first ask you to turn to 20 what I marked as Exhibit 4 and after you've had a chance to 21 glance through it, tell me what it is. 22 (Witness reviewed the document.)	Page 119 1 how much Pcb was being lost to the sewers, if any, at the 2 various sites, and where we did find that there were Pcb's 3 going to the sewers, figure out where they came from and 4 what we might do about it. So each of the plants that 5 might have been involved was writing something like this. 6 I don't know when each of them started but this was a very 7 important part of what all of us were doing at that time. 8 Q When you say that was given urgent priority, why 9 was that? 10 A Well, this did in fact come out of 11 Dr. Riseborough's work. As the scientific community looked 12 at his work within Monsanto and elsewhere, it appeared that 13 the Pcb's were found in the environment, that they did not 14 biodegrade or at least certain components of Pcb's did not 15 biodegrade. They biomagnified in the food chain and 16 therefore were having a adverse effect on those animals 17 that were at the end of the food chain, primarily the 18 raptors. Dr. Riseborough's work was on the peregrine 19 falcon. 20 Q If you look at the subject line of this it reads 21 " Status of Aroclor pollution control. " Do you see that? 22 A Yes.
Page 118 1 A It's a monthly report by Bob Mccutchan addressed 2 to Bill Papageorge reporting on Aroclor pollution control 3 for the month of May 1970. 4 Q You see that you're a copy recipient on that ; do 5 you see that? 6 A That's right. 7 Q When did monthly reports like this first -- 8 regarding Aroclor pollution control -- first start being 9 reported to your knowledge? 10 A Well, before I became manufacturing manager 11 obviously. This is dated May 1970 and it's no more than a 12 month after I began those duties. It's a little strange as 13 a matter of fact because it's dated May 8 and it purports 14 to be a May report. So there's something a little wrong 15 there. It's probably an April report. 16 Q I see what you're saying. What was -- do you 17 recall what the impetus was for the initiation of these 18 monthly reports? 19 A Well, at the time that I joined the business 20 group, I found that Pcb questions had already developed a 21 fairly urgent priority. And at the time we were simply 22 trying to find out where we stood at the various plants,	Page 120 1 Q And some of the other exhibits also have that 2 same heading, for example, Exhibit 5 and Exhibit 8. Do you 3 see that? 4 Mr. Burnett: At the bottom of 5? Maybe my 5 numbers are wrong. 6 The Witness: Number 5 is Bill Corlew's memo to 7 me. 8 Mr. Brock: My numbering must be wrong. What is 9 Number 6? Is Number 6 dated June 10? 10 The Witness: 6 is titled " June report by 11 Mccutchan. " 12 By Mr. Brock: 13 Q It's Number 6 then. So Number 6 and Number 8 14 also have that heading. Do you see that? 15 A Yes. Mr. Mccutchan was a little fouled up again 16 because the memo dated June 10 is titled June report and 17 then the memo dated July 3 is also entitled June report. 18 So -- 19 Q He corrected himself maybe? 20 A I think he was a month out of phase on the 21 earlier one. 22 Q Was this a particular program to keep track of

Page 121 1 Pcb discharges from the plants? 2 A Oh, yes. 3 Q What was your -- what was the nature of your 4 involvement in that program? 5 A Well, since I had manufacturing responsibility 6 for the business group, it was my job to be sure that the 7 plants did this, developed reliable information on Pcb 8 losses and developed programs to eliminate them to the 9 degree that we could. I think I should mention that this 10 is written within the capabilities of 1970 and that the 11 numbers that we were reporting at that time probably are 12 unreliable, perhaps incorrect, because over the course of 13 succeeding months, we discovered that sampling methods and 14 analytical methods were not as reliable or as accurate as 15 we had thought and we refined these numbers to a 16 substantial degree over the course of the next year or 17 two. So while the programs described here are valid, the 18 numbers are not necessarily valid. 19 Q Do you recall a change in testing methodology 20 leading to more reliable measures? 21 A It was more -- well, there may have been changes 22 in testing. I would not have been directly involved in	Page 123 1 Q What led to the unreliability? 2 A Just the way that the sample was taken. When the 3 issue first arose, naturally the first thing that anyone 4 would do is simply dip a sample bottle in a stream and take 5 it to the laboratory and we found that the results were 6 very erratic, that samples that were taken under similar 7 conditions and therefore should have resulted in similar 8 numbers instead gave us numbers all over the map and we 9 eventually refined sampling methods to where we could get 10 more consistent and believable results. 11 Q How were the sampling methods refined? 12 A Typically by putting a probe in the stream 13 pointed upstream where the sampling velocity was controlled 14 so it would be the same as the velocity in the stream so 15 that the sample point from top to bottom in the stream was 16 at the right place to be a representative sample and what 17 else, there's a lot of careful things like that that have 18 to be done but continuous sampling is always more reliable 19 than simply grabbing a sample with a bottle. 20 Q Who gave you the assignment of developing 21 reliable information about Pcb discharges and developing 22 programs to eliminate them?
Page 122 1 that but I was reasonably conversant with sampling 2 problems. Since Pcb's are pretty insoluble in water, the 3 Pcb content of a water sample is highly affected by the way 4 that the sample is taken and that's because, particularly 5 in wastewater there's usually some small amount of final 6 divided solids. Since the Pcb is insoluble in water, it 7 tends to attach to the solid particles and therefore unless 8 the sample is carefully taken to capture a representative 9 number of the solid particles that are present, then the 10 sample becomes fairly meaningless. Then there is a 11 substantial science to take a sample correctly. 12 Q Do you know what was done in the earlier phases 13 of the project that led to -- or that may have led to 14 unreliability and what specifically was done to alleviate 15 that situation? 16 A I don't know what might have gone before this 17 time in 1970. 18 Q I thought you said that some of these numbers 19 might be unreliable? 20 A Oh, yes. They certainly were unreliable at this 21 time, but it was then later on we learned better ways of 22 taking samples.	Page 124 1 A Well, controlling Pcb's as part of the 2 manufacturing responsibility was part of my initial lineup 3 on what I was there for when I joined the business group, 4 because just in terms of understanding what's important 5 today in this business, that was a big part of it. As to 6 the business of getting more reliable numbers, I suppose I 7 assigned that to myself because I discovered I couldn't 8 believe what I was seeing. But we got some good work done 9 at all the plants to get better numbers. 10 Q How did it come about that you switched or you 11 moved from being head of the Tsd department at the Queeny 12 plant to manufacturing manager in the general offices? 13 A Right. And that was about April 1970. 14 Q How did that come about? 15 A Fred Holzapfel was brought in as director of 16 manufacturing, I think to replace Ray Strafmeyer who left 17 the company. I'm not sure he left just then, but Fred came 18 in to take over manufacturing sometime perhaps six months 19 or so earlier than that and he spent a period of several 20 months studying the organization and figuring out how he 21 wanted to organize it and who he wanted and when he set up 22 his new organization, he invited me to be one of the new

Page 125 1 manufacturing managers. 2 Q Did the subject of Pcb releases come up? Let me 3 go back a second. Did you interview for the position in 4 the general offices, is that how it worked? 5 A Well, yes, but I didn't know it at the time. 6 Fred came around to all the plants and talked to all the 7 general superintendents. Afterwards I compared notes with 8 my friend who was the general superintendent of maintenance 9 and he said he felt he was being interviewed for his 10 present job, but at any rate after Fred got through with 11 that long process, he simply said this is the way it's 12 going to be. 13 Q When he came around and talked to you, did the 14 subject of Pcb releases from the plants come up? 15 A I have no idea what came up. He was an old 16 friend. He was the one that had hired me in 1957. 17 Q As manufacturing manager, did you report to 18 someone on the status of Aroclor pollution control steps by 19 Monsanto? 20 A By that time Bill Papageorge was -- I don't 21 remember what his title was but he was the focal point of 22 all the Pcb work and so when I first became manufacturing	Page 127 1 doing with regard to the process? 2 A Yes. 3 Q Did you talk to him about the project or the 4 Aroclor pollution control and I'm going to use the word 5 program at this point for want of a better word? 6 A He was an old friend and his office was right 7 around the corner so we discussed it. That was part of my 8 indoctrination in a new job. 9 Q Did people at the plants report to you concerning 10 Aroclor releases from their plants? 11 A Yes. It was a dotted-line kind of thing, but 12 they did report to me. 13 Q Do you recall who it was from the Krummrich 14 plant? 15 A It was Corlew -- I think at one time it was also 16 Art Leisy, but I'm a little fuzzy about who came before or 17 after who. Mccutchan worked for Corlew. 18 Q What plants were being examined with regard to 19 Pcb? 20 A The three that manufactured Pcb's were Anniston, 21 Krummrich and Newport and any place that we used Pcb's was 22 also under some scrutiny.
Page 126 1 manager, my formal reporting relationship was to Fred 2 Holzapfel, later on to Howard Bergen and matters relating 3 to Pcb problems we all worked with Bill Papageorge and 4 reported to him what was going on. 5 Q Did you report on the subject of Aroclor 6 pollution control to anybody other than Mr. Papageorge 7 during your tenure as manufacturing manager? 8 A Well, of course Howard Bergen was always very 9 interested in what was going on, it was his business. And 10 so from a formal standpoint, I would report to Howard but 11 it was understood that Bill was the coordinator on 12 everything having to do with Pcb's. 13 Q Do you know how that happened or how he came to 14 be the coordinator of those matters? 15 A No. I think he was in place in that job before I 16 became a manufacturing manager. I had known him before 17 when he was a plant manager but I don't know how he got 18 that job. 19 Q Was there a manufacturing manager before you who 20 was handling the issue? 21 A Yes, that was Bill Kuhn, K-u-h-n. 22 Q So to some extent you took over what he had been	Page 128 1 Q Did you undertake to familiarize yourself with 2 the locations of the Pcb releases at the various plants? 3 A Yes, I had regular reviews with the plant people 4 to talk about how the program was going, encourage them to 5 keep tracking down all the sources and if a capital project 6 was required above a certain size, they would need to come 7 to me for approval of the project. 8 Q What size was that? 9 A I don't remember exactly but the plants could 10 only approve projects up to a certain size, probably 3 - or 11 \$5000 or something like that and I had an approval level 12 that was higher than that. If it was above my approval 13 level, I'd go to Howard Bergen. 14 Q Did you receive three separate reports, one from 15 Anniston, one from Newport, one from Krummrich? 16 A Yes. 17 Q And what did you do with those three reports? 18 A Well, I would put together a monthly report which 19 usually just amounted to marking up the reports from the 20 plants and my secretary would put that together in a single 21 report that would go on up the line. 22 Q Would you send that to Papageorge?

Page 129 1 A Yes, and to Bergen and some other people in the 2 business group. 3 Q Who else would you send it to? 4 A Well, certainly to Bill Richard, he was the 5 director of research. I'm not sure who else. 6 Q If I could ask you to look at the first page of 7 Exhibit 4, there's a category for " Known Losses to Sewer in 8 April. " Do you see that? 9 A Yes. 10 Q How was the sewer chosen as one area to sample at 11 the Krummrich plant? 12 A I'm not sure I understand the question. Where 13 are you in this? 14 Q On the first page of Exhibit 4. 15 A Okay. 16 Q It references " Known Losses to Sewer in April. " 17 A Well, what was known as the Pcb problem was 18 generally perceived to be a problem of Pcb's in water and in 19 rivers and lakes and so forth. The path to causing a 20 problem in wildlife was by way of aquatic organisms and 21 therefore controlling losses to the sewer was the most 22 immediate priority.	Page 131 1 and the situation as it stood at that time in the 2 department. What Bill is talking about is a program that's 3 more plantwide and involves quote, using departments, which 4 presumably refers to other departments where Aroclor is 5 used rather than manufactured. 6 Q Let me turn you back to Exhibit 4 for a second 7 then. Because that's the May 8, 1970 report from Mccutchan 8 and down below where it says " Known Losses to Sewer, " that 9 appears to me to refer to departments other than the 10 Aroclor department. Do you see that? 11 A Yes, you're right. 12 Q With that in mind, does this impact on whether or 13 not you believe Exhibits 7 and 8 refer to the same program 14 or project or a different program? 15 A It's an interesting point, but Bob Mccutchan was 16 production supervisor for Aroclor so perhaps as a matter of 17 information he was reporting on losses from other 18 departments, but as far as I know he had no direct 19 responsibility for those things. 20 Q Let's go back to Exhibit 7 for a moment. There's 21 a phrase in the first paragraph, item 3 " deals with 22 eliminating sewer'd Pcb's from using departments, " eliminate
Page 130 1 Q Do you know how the -- strike that. 2 Let's go for a second to Exhibit 7. If my 3 numbers are correct that's dated June 26, 1970. 4 A Okay. 5 Q Can you identify that for us? 6 A It's a memo from Bill Engman in Krummrich, Tsd to 7 a long list of people who appear to be all plant people and 8 even the carbonees seem to be all plant people. 9 Q What was Engman's role in the program for Aroclor 10 pollution control? 11 A At the time he was a Tsd superintendent so he 12 would have been in charge of technical work in a group of 13 departments of which the Aroclor department was one. 14 Q Let me ask you to compare Exhibit 7 to exhibits 4 15 and Exhibit 8. Exhibit 8 for the record is dated July 3, 16 1970. 17 A Okay. 18 Q My question is, for example, Exhibit 7 and 8, do 19 those relate to the same program or separate programs? 20 A Well, Bill Engman's memo, Exhibit 7 is a little 21 broader than Bob Mccutchan's report, Exhibit 8 because Bob 22 Mccutchan, Exhibit 8 is reporting on the Aroclor department	Page 132 1 is the key. Do you see that? 2 A Yes. 3 Q Was it your understanding at the time that 4 Monsanto was going to be required to completely eliminate 5 Pcb's, Pcb discharges to the sewers? 6 Mr. Burnett: Object to the form of the 7 question. It's ambiguous. 8 The Witness: Bill's memo says that item 3 " deals 9 with eliminating sewer'd Pcb's from using departments " is 10 quite different from the producing department, where Pcb's 11 were used in departments. I don't remember which 12 departments used Pcb's. But Pcb's were sold as heat transfer 13 fluid and also used for that purpose in various places in 14 Monsanto and " eliminate " really refers to finding some 15 other process solution rather than using Pcb's as a heat 16 transfer fluid or for whatever they were being used. 17 By Mr. Brock: 18 Q There's a statement that " latest word is that the 19 Feds ' plan a stepped up attack on Pcb's in July. " Do you 20 see that? 21 A Yes, I see that. 22 Q Around this time was it your understanding that

Page 133 1 the Feds were going to step up an attack concerning Pcbbs? 2 A I don't know what Bill was specifically referring 3 to here. We certainly anticipated increasing regulatory 4 pressure more severe regulatory requirements, but I can't 5 place in time any specific action that the federal 6 government might have taken. 7 Q Why was increased regulatory pressure 8 anticipated? 9 A I don't know. I don't remember this memo. These 10 addressees are mostly production people in other parts of 11 the plant so I think Bill is just trying to get their 12 attention. 13 Q Let's go through those. Who is D. C. Armstrong? 14 A Dallas Armstrong was in the laboratory. He was 15 head of a small process research group. 16 Q Who was R. M. Fabian? 17 A I don't know. 18 Q What about T. E. Greenman? 19 A Tom Greenman, I think, was a production 20 superintendent. 21 Q What about G. V. Vincent? 22 A George Vincent was in Tsd. I think he ran the	Page 135 1 the various plans and programs of the various plant groups 2 working on Pcb pollution control. " Do you see that? 3 A Yes. 4 Q Do you recall there being various plans and 5 programs of various plant groups working on that subject? 6 A Well, sure, there were various plant groups. I 7 certainly can't remember which ones at the present time. 8 Q The statement various plans and programs, how 9 many plans or programs working on that subject do you 10 remember in or about that time? 11 A He's still just talking about the Krummrich 12 plant. 13 Q Let's start with the Krummrich plant and then we 14 can go to the other plants. Were there multiple programs 15 concerning the Krummrich plant to your knowledge, dealing 16 with the subject of Pcb pollution control? 17 A Well, there were various parts to what we were 18 doing. Just broadly speaking there were programs relating 19 to the Aroclor department itself and then other parts of 20 the plant where Aroclors might be used or found for some 21 other reason. 22 Q What were the programs related to the Aroclor
Page 134 1 instrument department. 2 Q What about D. Venters? 3 A That's Dennis Venters. I don't remember what his 4 job was. 5 Q What about Kimball? I skipped Dalton, I know who 6 Dalton is. I've heard that name. 7 A Kimball was an operating superintendent. I think 8 he was guest superintendent for ag operations at the time. 9 Q And who was J. C. Hume? 10 A Jack Hume was another operating superintendent. 11 I think for most of his time at Krummrich he was in charge 12 of rubber chemicals, but I'm not sure he was at this 13 particular time. 14 Q And up at the top, who was D. W. Jackson? 15 A Darryl Jackson, I think, was general 16 superintendent of technical service and lab at Krummrich, 17 equivalent to the same job that I had left at Queeny. 18 Q If you look on the next page of that same exhibit 19 that's a June 25, 1970 memorandum from Engman to 20 Papageorge ; is that correct? 21 A Yes. 22 Q There's a statement, " This is to draw together	Page 136 1 department itself? 2 A Sampling. Since we were working on all the 3 plants at the same time and since the Aroclor processes 4 were very similar at all the plants, there were similar 5 programs in place where we would sample, we would work 6 upstream from our main sampling point and try to track down 7 the sources of Aroclor losses and then do engineering work 8 on each one of those sources. So there was a similar 9 package of projects at each one of the plants. They 10 weren't identical, but they were similar to solve similar 11 problems at each place, try to eliminate any loss we could 12 identify. 13 Q Do you recall an effort to pull the various, 14 various plans and programs together under one -- 15 A Well, there was a need to organize and track all 16 of these things, this 1970, ' 71, ' 72 was probably the 17 busiest time of my life because we had so many things that 18 we were trying to do at one time related to Pcbbs, not just 19 at the plants but with the products and so forth. Because 20 there were so many things going on at once, there were a 21 lot of people involved. Simply track everything and make 22 sure everything got the appropriate priority. We got a lot

Page 137 1 of people involved and no one person had it all in his head 2 at once. 3 Q How much of your time during those years did you 4 devote to the Pcb situation? 5 A It varied as other problems came along but I 6 would say on the average it was probably half my time, but 7 not just on these questions of losses from the plant, but 8 reformulation of products and a lot of other things having 9 to do with Pcb's. 10 Q What did you do along the lines of reformulation 11 of products? 12 A Within Aroclor itself the biggest application, 13 the original application for Pcb's was a fire resistant 14 fluid for capacitors. We changed the nature of the product 15 that we sold for that purpose. What had been called 1242 16 became 1016, which had been particularly refined to 17 eliminate some of the less biodegradable isomers. In the 18 case of the hydraulic fluids, speaking of the industrial 19 hydraulic fluids that contained Pcb's, we reformulated the 20 entire product line twice, which meant that each time a 21 dozen or more new products had to be created and put into 22 production. Some new products were non-pcb products, were	Page 139 1 applications and people were working hard on replacements 2 and it was clear that the electrical industry would adopt 3 those replacements as soon as they were satisfied that they 4 could make good products with them. 5 Q Mr. Engman's memo lists a number of categories. 6 I want to run through some of those briefly. One of the 7 goals was to -- or under the heading one, " Pcb levels in 8 sewer, summarized published data gathered to date. " Do you 9 see that? 10 A Yes. 11 Q Do you know what was done along those lines, I 12 mean, I see that it says who, it says Pierle? 13 A Yes. I'm sure we did that, but I don't know 14 whether we did it by the completion dates mentioned here or 15 not. 16 Q Who is A. Rasmussen? 17 A That's Tony Rasmussen. I don't remember what his 18 job was at that time. He was at various times a production 19 superintendent. That's the only job I remember for sure 20 that he had. But I don't remember what his job was at this 21 time. 22 Q Let's go to the category 2 or the Roman numeral
Page 138 1 used for carbon copy paper solvent. It was my 2 responsibility to get those products into production. 3 Q Monsanto eventually went out of the Aroclor 4 business ; is that correct? 5 A Yes, but that was after my time that the 6 operation was shut down completely. 7 Q You anticipated my next question, which was did 8 you have any input into that decision? 9 A No. 10 Q Do you know or do you have an understanding as to 11 how that decision was reached? 12 A No. I think at the time that I left in business 13 it was assumed it was only a matter of time before it was 14 discontinued but that decision was made well above my 15 level. 16 Q Why was it a belief that it was only a matter of 17 time? 18 A Well, a number of applications had been dropped 19 already. Very early in the game we stopped selling Aroclor 20 for use as a plasticizer. Then we stopped selling it for 21 use as heat transfer fluid. We took it out of the 22 hydraulic fluids so all that was left was the electrical	Page 140 1 li. A is " Absorbed rupture disk repiping "; do you see 2 that? 3 A Yes. 4 Q Do you know what that is? 5 A I know what a rupture disk is, but I don't know 6 why that repiping was called for. 7 Q Are you aware of what was done in connection with 8 that repiping? 9 A No, I don't remember what the problem was. 10 Q The next is " Basin for trenches. " Do you know 11 what that refers to? 12 A There were drainage trenches in the department 13 that were used to catch rain runoff and so forth and the 14 basin was a settling basin that was put in so if there were 15 any Aroclor in that water, it would be captured in the 16 basin. Aroclor is much heavier than water. 17 Q What was done with the Aroclor -- before 1970 18 what was done with the Aroclor that settled in the settling 19 basin? 20 A There wasn't any settling basin before that. I 21 suppose if there was any Aroclor, it would have gone to the 22 sewer.

Page 141 1 Q So this refers to the installation of a settling 2 basin to stop that? 3 A That's right. 4 Q What is a blow tank demister? I thought you used 5 that term before. 6 A Yes. Well, I used the term " blow tank " as well, 7 I think. Blowing was one step of the Aroclor process. It 8 was the step between chlorination and distillation. In 9 that step air was blown through crude Aroclor to remove 10 Hcl. One of the things we had discovered as part of the 11 sampling program was that there was a small amount of 12 Aroclor in the air leaving the blow tank and that by simply 13 scrubbing that to the sewer, that was one of the ways that 14 Aroclor was getting to the sewer. The demister was a 15 device, again, one of these Brink demisters, it was put 16 between the blow tank and the scrubber so that if there 17 were any Aroclor in that air stream, that it would be 18 collected rather than going to the sewer. 19 Q And under Roman numeral Iii, " Program to 20 eliminate sewered Pcb's from using departments. " B is 21 " Provide disposal improvements and control facilities as 22 needed. " Do you see that?	Page 143 1 because the effect of contamination was so critical. 2 So what we had decided to do was to take that 3 Aroclor back from our electrical customers and redistill it 4 and use it for the less demanding applications like heat 5 transfer where those minor amounts of contaminants didn't 6 make that much difference. That was our customer service. 7 It was not a very big deal. 8 Q If I understand your testimony correctly, that 9 didn't refer to Aroclor that had been disposed of, not by 10 Monsanto, but that was Aroclor that had been with 11 Monsanto's customers? 12 A That's the only way in which we used the term 13 " rework " that I recall. 14 Q Let's go to Exhibit 8 again for a second. And 15 again, that has a category of " Losses to sewer in June. " 16 Do you see that? 17 A Yes. 18 Q Was it your understanding that the losses to the 19 sewer – well, you can see that those – strike that. 20 Was it your understanding that losses to the 21 sewer of Aroclor was a routine thing at the Krummrich 22 plant?
Page 142 1 A Yes. 2 Q Do you know of any disposal improvements that 3 were provided for using departments? 4 A No. I don't remember what the using departments 5 were or what the use was. But Aroclor was a product that 6 was broadly used for heat transfer so it undoubtedly was 7 used for heat transfer somewhere. 8 Q But you don't recall what the disposal 9 improvements would have been? 10 A No. 11 Q Number 6, Vi, is " Pcb rework project. " Do you 12 know what that was? I mean, I see that it's got three 13 phases, but go ahead. 14 A The customers who bought Aroclor for electrical 15 applications didn't use it all, that is, in impregnator 16 capacitors or to some extent filling transformers, there 17 would be some left over because the electrical properties 18 of Aroclor were extremely sensitive to minute amounts of 19 impurities. They couldn't simply use that fluid to make 20 the next batch of capacitors and so they had Aroclor left 21 over that was contaminated in a very trivial way for most 22 uses but could not be used for electrical applications	Page 144 1 A Are you referring to this paragraph titled 2 " Losses to sewer in June "? Or are you referring to the 3 entire report. 4 Q I'm referring to the general situation. 5 A Well, we had by that time discovered that there 6 was a consistent loss of Aroclor at the sewer. 7 Q When you say " by that time discovered, " what do 8 you mean? 9 A Well, by " this time, " I mean the middle of 1970 10 we recognized that we had, that we were losing Aroclor to 11 the sewer essentially all the time. That's not something 12 we would have recognized before the Pcb problem became 13 known because we had not been doing the kind of sampling it 14 would have taken to find out. 15 Q Are you aware of any occasions on which Monsanto 16 sampled to measure Pcb discharges to sewers before 17 Professor Riseborough's work came out? 18 A I'm not aware of it. 19 Q Let me turn you briefly to Exhibit 14 which is 20 dated September 1, 1970. And the first category there is 21 " Pcb levels in sewer. " Do you see that? 22 A Yes.

Page 145 1 Q And it says " current losses to the river are 2 about 30 to 35 pounds per day. " Do you see that? 3 A Yes. 4 Q Was it your understanding that losses of Pcb's to 5 the sewer would take place on a daily basis from the 6 Krummrich plant? 7 A Yes. 8 Q Was it your understanding that Monsanto employees 9 knew about the losses to the sewers before the sampling 10 came on board even though they might not have known about 11 the quantities being released? 12 A I don't know. 13 Q For example, when you were -- when the Aroclor 14 department was under your purview at the Krummrich plant 15 when you were a Tsd group leader, was it your understanding 16 that Aroclors were being released to the sewer at the 17 plant? 18 A I don't recall the question arising. In most 19 departments, we would be quite aware of raw material 20 consumption and if based on raw material consumption it 21 appeared that we were not getting good yield on the 22 product, then we would begin an investigation which would	Page 147 1 production superintendent at Newport and Hill Williams was 2 the production superintendent at Anniston. 3 Q Let's go to Exhibit 10, that's dated August 4, 4 1970. Under the category with the li, " projects to reduce 5 sewer'd Pcb's from Aroclor department. " First of all, do 6 you see that category? 7 A Yes. 8 Q And D under that is " provide paving curbs and 9 catch basin in Aroclor department to prevent losses from 10 spills, especially in the tank car loading area. " Do you 11 see that? 12 A Yes. 13 Q Are you familiar with that project? 14 A I don't remember that project specifically but 15 it's consistent with the general approach we were taking, 16 which was that if there was any place for a potential spill 17 or loss to the sewer, we were going to try to seal it off. 18 Q Do you know what that area was like, what the 19 ground in that area was like before August of 1970? 20 A No, I don't remember. 21 Q Do you recall paving curbs and a catch basin 22 being installed?
Page 146 1 include sampling. But it was always believed that yields 2 in Aroclor were very high and therefore there was no reason 3 to suspect that losses, at least losses of any economic 4 significance, were going on. 5 Q But the yield in the Aroclor department was not 6 100 percent ; is that correct? 7 A No, not 100 percent but the difference could be 8 readily explained by the amount of still residue. 9 Q When was the first time that you became aware of 10 losses of Aroclor to the sewer at the Krummrich plant? 11 A When I joined the business group. 12 Q Staying on Exhibit 8 for a moment, one of the 13 copy recipients is H. Williams at the Anniston plant and 14 also F. McDonald at the Newport plant. Do you see that? 15 A Yes. 16 Q Was information about the Pcb control -- strike 17 that. 18 Was information about the Pcb situation generally 19 shared between the Krummrich, Anniston and Newport plants? 20 A Yes. The processes were nearly identical and so 21 it was valuable to profit at each site from whatever was 22 learned at the other ones. Fred McDonald was the	Page 148 1 A I think we did that but I don't know when it was 2 completed. 3 Q Let's go to the next page. Under B, it says " the 4 five organic Tsd groups have responded with programs for 5 their areas. " Do you see that? 6 A Yes. 7 Q And my copy doesn't have them attached so I was 8 wondering whether you recall what those were. 9 A No, I don't. As you'll see, that's under the 10 heading of " program to eliminate sewer'd Pcb's from using 11 departments. " So I'm sure this just refers to people who 12 have responsibility for an area where the Pcb's were used in 13 some way related to the process in that area, probably have 14 nothing to do with Aroclor manufacturing. 15 Q And lv refers to " removal of soluble Pcb's from 16 sewer'd stream. " Do you see that? 17 A Yes. 18 Q And it says " no work being done at Wgk. " Do you 19 know why that was? 20 A Well, the next sentence says that the research at 21 Anniston, " research at Anniston is working on a process. " 22 There was no point in duplicating that work.

Page 149 1 Q Did the question come up of whether Monsanto 2 would be required to clean up Pcb contamination in the area 3 of the Krummrich plant? And I'm making a distinction just 4 between reducing discharges from, for example, sewers. 5 A What would now be called site remediation? 6 Q Something of that ilk, yes. 7 A I don't remember that we anticipated any 8 particular requirement. 9 Q While you were manufacturing manager, do you 10 recall any other companies being ordered to engage in a 11 cleanup with respect to Pcb contamination? 12 A I wouldn't remember any government regulatory 13 action against another company. I would have no reason to 14 know that. 15 Q Have you ever heard of something called Findett 16 Corporation? 17 A Yes. 18 Q Did you have any dealings with Findett 19 Corporation? 20 A Yes. 21 Q What were your dealings with Findett Corporation? 22 A My biggest interface with Findett was to use them	Page 151 1 Q Let's go to Exhibit 11, which is dated August 5, 2 1970. Could you identify what this document is for us? 3 A Mike Pierle was in the pollution control 4 department at Krummrich at the time. Just on its face, 5 it's a program for sampling for Pcb losses in a number of 6 different places. 7 Q And how were those places chosen? The places are 8 wastewater, water sediment and fish, those are the type, do 9 you see that? 10 A Yes. 11 Q And you don't know how -- the places are under 12 the category source, is that correct, places where the 13 sampling took place? 14 A Yes. 15 Q And you're not familiar with how those places 16 were chosen? 17 A I'd have to speculate. I don't know for a fact. 18 Q The " Department 246 trench, " I think you 19 mentioned that earlier? 20 A Yes. 21 Q Where did that go? 22 A That went into the general plant sewers.
Page 150 1 as a tool manufacturer to make some special materials that 2 we needed in another part of the business. Findett is a 3 small specialty tool manufacturing company west of 4 St. Louis. 5 Q Did you ever speak with anybody at Findett about 6 whether Findett had been ordered to engage in a cleanup 7 with respect to Pcb contamination? 8 A No, but now you remind me, that was the other 9 deposition, the second one. 10 Q Okay, when you say I reminded you, what did it 11 remind you of? 12 A That that was the second time I gave a deposition 13 on Pcb's. It was somebody looking for information about 14 Findett. 15 Q Did you have any information about -- were you 16 familiar with Findett's use of Pcb's? 17 A I knew that they reclaimed spent hydraulic fluid 18 for our customers but I wasn't directly involved in that. 19 Q Do you recall ever speaking with anybody at 20 Findett concerning the subject of whether or not they would 21 be required to engage in a cleanup? 22 A No.	Page 152 1 Q And the treatment plant influent, what does that 2 refer to? 3 A There was a treatment plant down near the river 4 bank which I think was operated by Sauget village. I was 5 never familiar with any of that. I've never actually been 6 there, but there was a treatment plant. 7 Q What was a Monsanto dock? 8 A We had a dock on the Mississippi River that we 9 used for unloading. In fact, we may have had two because 10 we received both benzene and salt by barge and so we have 11 docks. I'm not sure whether they really belong to Monsanto 12 or were leased by somebody else but Monsanto dock could 13 refer to either one of those. 14 Q Did you ever have any responsibilities regarding 15 those locations? 16 A No. 17 Q What is East Carondolet, what does that refer to? 18 A East Carondolet is a village, I think it's south 19 of the plant. I don't know why that would have been 20 picked. 21 Q What is J. B. Bridge? 22 A Jefferson Barracks Bridge is a bridge across the

Page 153 1 Mississippi about 10 miles south of it. 2 Q Let's go to Exhibit 12. That's dated August 11, 3 1970. Can you identify what that is for us? 4 A Well, the original memo is from Bill Engman to 5 Bill Papageorge and refers to some specific losses from 6 using departments. They mention one, Department 251. If I 7 recall correctly that was the Acl department, the cyanuric 8 chloride, it was a swimming pool chemical. Someone has 9 written by hand on this, and I guess it's Mike Pierle 10 reflecting that this loss from a using department was 11 larger than, by far than the total that our whole target 12 for the plant was. 13 Q And the typewritten memo refers to " Aroclor 14 losses to the sewer other than from routine Aroclor 15 production. " Do you see that? 16 A That's right. 17 Q By this time were most losses from the plant 18 considered to be from the routine operations, production 19 operations at the plant? 20 A I don't know. The numbers and that speak for 21 themselves. I don't remember. 22 Q Who was A. Glosecki?	Page 155 1 report. 2 Q Were there subsequent meetings about his reports? 3 A Oh, we had a lot of meetings about Pcb's but I 4 don't know that we specifically reviewed this report. 5 Q What would you do as a matter of practice with 6 the information provided to you in Mr. Papageorge's monthly 7 reports? 8 A Well, his report was I think mostly intended for 9 the information of people a level up from me. I would do 10 several things with a report like this. I would make sure 11 that the information about manufacturing was properly 12 reflected and nothing had got mixed up in the translation. 13 I would be interested in what was going on in engineering. 14 It was a subject of great interest to all of us, and I'm 15 sure I read the whole thing but there were only a few parts 16 of it that would directly involve research and engineering 17 mainly. 18 Q There's a reference to " Aroclor incineration " on 19 the first page. 20 A Yes. 21 Q Were you involved in any Aroclor incineration 22 projects?
Page 154 1 A I don't know. I don't recognize the name. 2 Q Who was B. Young? That's the last copyee. 3 A I'm not sure. There was a Bob Young at the 4 Krummrich plant who was in the maintenance department, but 5 I don't know why he would receive this. 6 Q Who is W. A. Krull, K-r-u-l-l? 7 A Wayne Krull became the production supervisor of 8 the Aroclor department at some point, I believe. He may 9 have been working as a Tsd engineer at that time. 10 Mccutchan is still on this memo, so apparently he's still 11 the production supervisor at the time but eventually Wayne 12 Krull replaced him. 13 Q Let's go to Exhibit 13, which is dated August 18, 14 1970, for the record, has Bates numbers Mco 0407871 through 15 7788. Can you identify what this is for us? 16 A Just on its face, it's Bill Papageorge's monthly 17 report on Pcb's. 18 Q Earlier you had talked about sending information 19 to Papageorge. Did Mr. Papageorge send back to people 20 monthly reports on the Pcb situation? 21 A Well, yes. He would summarize what he got from 22 me as well as from other people and put it together in a	Page 156 1 A Yes. 2 Q What were those? 3 A Well, there was only one. Essentially I was the 4 sponsor of that project. We needed a way to dispose of 5 still residue without sending it to a landfill, and also we 6 were concerned about the possibility of having to 7 incinerate customer returns so we sent some samples of 8 typical Aroclor still residue to an incinerator 9 manufacturer who did a pilot plant run to determine the 10 proper operating conditions, and then based on that, we had 11 an incinerator designed and built and installed at the 12 Krummrich plant. 13 Q Who was the incinerator operator, do you recall? 14 A The operator? The production supervisor was -- 15 Q No, you said you sent it to -- 16 A -- an incinerator manufacturer. 17 Q Who was that? 18 A I don't remember. There's only a few people in 19 the country who do that sort of thing. It was a well-known 20 company but I don't remember. 21 Q You mentioned that you needed a way to dispose of 22 the still residue without sending it to a landfill. Had it

Page 157 1 come to your attention that the still residues had been 2 sent to a landfill before that? 3 A Well, that was just part of the general knowledge 4 that we all had, was that it was going to a landfill. I 5 wasn't directly involved with that. My piece of this was 6 to do something different, and getting an incinerator 7 installed at Krummrich was the best solution we could come 8 up with. 9 Q When you were at the Krummrich plant in the 1963 10 to 1967 time frame, did you understand at that time that 11 the still residues were sent to a landfill? 12 A I assume so but I didn't have any direct 13 involvement in that. 14 Q At this time frame in August of 1970, were 15 Aroclor still bottoms still being sent to a landfill? 16 A I think so. There was no other place to go with 17 them. I think at some point we started to accumulate 18 material in a storage tank in anticipation of startup of 19 the incinerator but I don't know when we did this. 20 Q Was Aroclor sent to landfills in connection with 21 all three of the plants, meaning Krummrich, Anniston and 22 the Newport plant, at this time?	Page 159 1 page, and the Bates numbers are 782 and 783. Just let me 2 know when you've had a chance to read that section to 3 yourself. 4 (Witness reviewed the document.) 5 A Okay. 6 Q That references " a lawsuit claiming that cows had 7 given milk contaminated by Aroclors. " Do you see that? 8 A Yes. 9 Q Were you familiar with that lawsuit? 10 A I had heard of it. 11 Q Do you know how that lawsuit was resolved? 12 A No. 13 Q Do you know what Monsanto's response was to the 14 claim that the plaintiff's cows had given milk contaminated 15 with Aroclors? 16 A No. There's no reason why I would have been 17 involved in something like this. 18 Q Were you familiar with any other claims or 19 lawsuits against Monsanto claiming that Aroclors from the 20 Krummrich plant had caused damage to property or damage to 21 wildlife or that type of thing? 22 A I had heard of things like that secondhand, but I
Page 158 1 A In general, yes. But Newport had actually 2 organized a relationship for the commercial incinerator 3 near the site at some point. And it could be that at this 4 point Newport had already done some incineration through 5 this commercial incinerator, but I don't know exactly when 6 that happened. 7 Q Was that a separate project from the dealings 8 with the -- strike that. 9 Was that a separate project from the Aroclor 10 incinerator project than the Krummrich plant? 11 A Certainly. It's on the other side of the 12 Atlantic. 13 Q Right, but was there consideration given to using 14 the process that was used at the Newport plant at the 15 Krummrich plant? 16 A No. That was a commercial incinerator. There 17 were -- we were not able to find a commercial incinerator 18 in the United States that could operate at the unusual high 19 temperature and long residence time that was required to 20 destroy Pcb's. 21 Q Let me ask you to turn to the second page of this 22 under the category " legal, " which continues on to the third	Page 160 1 have no firsthand knowledge of that. 2 Q What did you hear secondhand? 3 A It was about a lawsuit having to do with 4 contamination of some kind of animal feed from a heater 5 that used Aroclors, a heat transfer medium. I don't know 6 any more about it than that. Other people were working on 7 those problems. I had plenty of my own. 8 Q Do you recall the general time frame when you 9 heard about that lawsuit? 10 A No. 11 Q Was it during the time that you were a 12 manufacturing manager dealing with the Pcb's? 13 A Yes. 14 Q Do you know what the resolution of it was? 15 A No. 16 Q Can I ask you to read the section under the 17 public relations heading just to yourself and let me know 18 when you've had a chance to do that. 19 (Witness reviewed the document.) 20 A Okay. 21 Q Had you ever heard stories to the effect that 22 Pcb's caused birth defects?

Page 161 1 A I don't specifically remember reading stories 2 about that. 3 Q Did any claims of that nature, did you hear or 4 learn of any claims of that nature? 5 A I never heard of anything like that. 6 Q Let me ask you to turn to page 6 of the document 7 under the heading " biodegradation testing-st. Louis. " That 8 makes a reference to " semicontinuous activated sludge 9 units. " Do you see that? 10 A Yes. 11 Q What were those sludge units? 12 A That was -- that work was done somewhere in 13 research and I never had any connection with it other than 14 to read reports like this that said the work was going on. 15 Q Do you know what the term " sludge unit " refers 16 to? 17 A Activated sludge is a conventional type of 18 biological treatment that's used for waste. 19 Q Let me ask you to turn to page 7 of the exhibit 20 under the heading for " Sauget Pcb levels in sewer. " It 21 states that " current losses are about 45 pounds per day to 22 the river. " Do you see that?	Page 163 1 A We reviewed this regularly. I visited the 2 Krummrich plant at least once a month and probably visited 3 Anniston nearly as often, and talking about Pcb losses was 4 always a major item on the agenda, so we would always 5 review the latest figures and review the program, decide 6 whether the program was really addressing all of the losses 7 that we could identify, and if not, we would add whatever 8 was necessary. 9 Q Do you recall any specific occasions on which you 10 made a point to the plant people that the emissions were 11 too high and something needed to be done about them? 12 A I think we were a little more businesslike than 13 that. We would simply look at where we were and what we 14 had to do and get on with it. I don't recall preaching. 15 (Recess.) 16 By Mr. Brock: 17 Q Let me take you somewhat out of order, exhibit 18 wise, Mr. Savage. To Exhibits 28 and 29. Let's refer to 19 Exhibit 29 first. Is that your signature at the bottom of 20 Exhibit 29? 21 A Yes. 22 Q And is this a memo you wrote to the addressees
Page 162 1 A Yes. 2 Q Do you recall any discussions along the lines of 3 whether or not a figure of that type was too high? 4 A I can't answer that. I can just comment that, 5 considering that this is the middle of 1970, we felt our 6 losses were too high and that we had to get them down, so I 7 presume that's a higher number than we found acceptable, 8 but that's too long ago for me to remember whatever target 9 numbers we may have had. 10 Q Does it refresh your recollection to review 11 Exhibit 12 where it says " the plant goal for losses is 10 12 parts per billion "? Exhibit 12? 13 A That doesn't add anything to what I remember. 14 Q I thought you said you didn't recall what the -- 15 A Well, I can read -- 16 Q -- what the goal was. 17 A I can read that it says that but I still don't 18 remember it. 19 Q If levels came back that were significantly above 20 the plant goal for Pcb emissions, was there something that 21 you did as a matter of course when that came to your 22 attention?	Page 164 1 listed? 2 A I'm sure it was. I don't remember writing it but 3 I'm sure it was. 4 Q If you refer to Exhibit 28, does that appear to 5 you to be the attached memorandum from Bill Papageorge? 6 would just point out that the numbers, the Bates stamp 7 numbers are sequential. 8 A It appears to be, yes. 9 Q Mr. Papageorge's memo states " we should not 10 neglect to consider losses to the atmosphere through jet 11 exhausts, vents, stacks, et cetera. " Do you see that? 12 A Yes. 13 Q Had those type of losses to the atmosphere not 14 previously been emphasized? 15 A Not emphasized. I think we had thought about 16 some of those things before but had not emphasized them. I 17 think the reason is simply that that seemed unlikely to be 18 a serious problem because the vapor pressure of Aroclor is 19 very, very low so we would assume that that was not going 20 to be a severe problem. Papageorge's memo, I think, points 21 out that we shouldn't just assume that, and I passed the 22 message along to the clients.

Page 165 1 Q When you say the vapor pressure was low, why 2 would that lead you to believe that would not be a serious 3 problem? 4 A To say something has a low vapor pressure is 5 equivalent to saying it's not very volatile, so a tank full 6 of Aroclor out in the open would not give off any Aroclor. 7 A very high boiling point, that's another way of saying the 8 same thing. 9 Q In your memo in the second paragraph, it states 10 " one of the first questions from semiknowledgeable 11 legislators and control agency personnel is always how much 12 goes up your stacks. " Do you see that? 13 A Yes, that's a little sarcastic, I guess. 14 Q Had you dealt with legislatures? 15 A No, not really. 16 Q Had you dealt with control agency personnel? 17 A No, no. I was just repeating some conventional 18 knowledge. 19 Q Where did that conventional knowledge come from? 20 A I don't know. 21 Q Was it conveyed to you by people at Monsanto who 22 did deal with legislatures and control agency personnel?	Page 167 1 or Pcb material being sent to the Krummrich landfill at 2 around this time? 3 A Well, I believe what the memo says, but I don't 4 remember what this was about. 5 Q The next paragraph states " this should cease 6 about mid-september when the Protectoseal equipment 7 arrives. " Do you see that? 8 A Yes, I don't know what that is. 9 Q What, the Protecto-seal equipment? 10 A Right. 11 Q The reference to " this should cease, " do you know 12 what the " this " refers to? Does it refer to sending 13 something to the landfill? 14 A Presumably it refers to the previous paragraph. 15 On the face of this, that's what it says. 16 Q Do you recall whether sending Pcb materials to 17 the landfill ceased in or about that time? 18 A No, I don't know. 19 Q Somewhat out of order again, let me ask you to 20 turn back to Exhibit 14, which is dated September 1, 1970. 21 Is that your handwriting up at the top of that first page? 22 A Yes.
Page 166 1 A No, I think this was just my personal sarcasm. 2 Q I'm curious -- were you aware of anybody within 3 Monsanto who at that time was dealing with legislatures or 4 control agency personnel with respect to the Pcb situation? 5 A No, not at all. I think what I was doing in this 6 paragraph was simply telling the guys at the plant don't 7 bother me with a sophisticated explanation of why there 8 shouldn't be any there. Let's go look. 9 Q Let's go to Exhibit 15, which is dated September 10 14, 1970. Let me know when you've had a chance to see 11 that. 12 (Witness reviewed the document.) 13 A Okay. 14 Q First of all, is this a memorandum sent to you in 15 the ordinary course of your employment with Monsanto? 16 A Yes. 17 Q The second paragraph mentions " laboratory 18 continuing to send solvent-contaminated Pcb to the 19 landfill -- 20 A Yes. 21 Q -- through August. " Does this refresh your 22 recollection as to being aware of Pcb-contaminated material	Page 168 1 Q Is this a memorandum you would receive in the 2 ordinary course of your business with Monsanto? 3 A Yes. 4 Q What would it mean -- when you wrote 5 " W. B. Papageorge " at the beginning, what would that mean? 6 A Just that I bucked it up to Bill for some reason, 7 but I don't know why. 8 Q On the last page there's a reference to 9 " incineration liaison. " 10 A Right. 11 Q What was that? 12 A Well, Bill Engman was at the plant in the 13 technical service department, and what had happened was 14 that the incinerator project had reached the point where it 15 was a formal project, and the procedure in those days is 16 that when a large formal project was launched, that 17 somebody at the plant would be nominated to be the 18 manufacturing representative, which is referred to at the 19 end of this paragraph, and once that had happened, then it 20 was no longer within the interest of the technical service 21 department, it was being handled in another channel. So 22 this just reflects the fact that the incinerator project

Page 169 1 had become a formal project. 2 Q Let's go to Exhibit 16. My first question is 3 just whether or not this is a memorandum you received in 4 the ordinary course of your business or your employment 5 with Monsanto. 6 A Yes. 7 Q On the left-hand side, there's some writing, and 8 in between the first and second paragraphs I believe it 9 states " Krummrich. " Do you see that? 10 A Yes. 11 Q Is that your writing? 12 A Yes. 13 Q Was that to change the format of these for the 14 purpose of sending your report to Bill Papageorge? 15 A This is my markup of the report, which I would 16 give to my secretary along with similar reports from the 17 other plants so that she could put it together in a single 18 report that would be sent on to Bill Papageorge and others. 19 Q Let me ask you to turn to page 2, under 20 department 239. The next to last sentence reads " how to 21 sump the area around potential spills is still 22 unresolved. " Do you see that?	Page 171 1 Q What does that refer to? 2 A " Chat " is a term that's used to describe crushed 3 rock which is often used as ground cover. 4 Q Do you recall that area being soaked with 5 Aroclor? 6 A No, I don't even remember what Department 270 7 was. 8 Q Do you recall any areas at the plant, at the 9 Krummrich plant, being soaked with Aroclor? 10 A No, not really. 11 Q When you say not really, are you qualifying that 12 somehow? Were they soaked a little bit? 13 A Soaked is a word that could have all kinds of 14 interpretations. If " soaked " means it's so juicy that it's 15 liquid when you walk on it, no, I don't remember anything 16 like that. If it means that there's a coating on the 17 surface of the stone and therefore the stone ought to be 18 replaced, I can remember seeing things like that. I can't 19 tell you exactly where. 20 Q Did you see situations like that during the time 21 you were at the Krummrich plant? 22 A I don't remember.
Page 170 1 A Uh-huh. 2 Q First of all, do you recall what department 239 3 was? 4 A Well, from the rest of this paragraph, it speaks 5 of Santofin 1, and as I recall, that was the Santofin 6 department. Santofin was a completely unrelated product. 7 Q Do you recall this subject coming up of whether 8 or not or how to sump the area around potential spills in 9 that department? 10 A No. Must have been just a mechanical problem. 11 Q Do you recall there being a concern about spills 12 from that department reaching the ground or water? 13 A I don't think there was any specific concern 14 about that department. It was just that, by that time, we 15 had become sensitive enough to Pcb issues that we wanted to 16 be sure that any place that Pcb's were being used, that if 17 there were a spill, it wouldn't get away from us and get 18 into water. 19 Q Let's go down to the entry under Department 270. 20 There's a reference to " chat soaked with Aroclor around the 21 furnace. " Do you see that? 22 A Yes.	Page 172 1 Q Do you recall any places at the Krummrich plant 2 where the ground or soil would be discolored due to a layer 3 of Aroclor? 4 A No, I don't remember. 5 Q Do you recall the area — strike that. 6 Do you recall any areas at the Krummrich plant 7 being discolored with materials other than Aroclor? Was 8 that a frequent thing? 9 A That's a pretty broad question. The Krummrich 10 plant was a great big place. The only place that I can 11 remember that had a serious problem like that was actually 12 in rubber chemicals, which was an operation I only visited 13 a few times. I don't know anything about it. It had 14 nothing to do with this. 15 Q When you say rubber chemicals, what plant was 16 that or what plant are you talking about when you say 17 rubber chemicals? 18 A I'm trying to remember what that's called. It's 19 the antioxidant operations down at the south end of the 20 plant. They were at the south end of the plant at the 21 time, but I don't remember the name of the product anymore. 22 Q Is that at the Krummrich plant?

Page 173 1 A Yes. 2 Q What was the material on the ground? 3 A I don't know. 4 Q How did that situation come to your attention? 5 A Just by being involved in plant inspection teams 6 where we'd go around and look at housekeeping. 7 Q What did the plant inspection teams -- what were 8 those? 9 A I don't remember exactly how those things were 10 organized but housekeeping was an issue at every plant that 11 I was -- that I ever worked on, and we would have various 12 mechanisms for trying to set a high standard and to make 13 recommendations as to places that we thought needed 14 cleaning up. 15 Q Do you recall it being recommended that any 16 location at the Krummrich plant be cleaned up as a result 17 of discharges to the environment? 18 A Nothing specific. 19 Q Let's go to Exhibit 17. Is this an example of 20 the monthly Pcb reports that you sent to Papageorge? 21 A This appears to be -- just glancing through it, 22 it covers Anniston and Krummrich, and not Newport, which is	Page 175 1 A Yes. 2 Q Do you know whose handwriting that is? 3 A Not mine, but I don't know whose it is. 4 Q Are you aware of anybody who kept the file of Pcb 5 pollution-related matters? 6 A I would think that Papageorge did but -- each of 7 us who were working on pieces of this would have our own 8 personal files, but they would all be subject to the normal 9 records retention policy, so unless there was some specific 10 directive otherwise, they wouldn't be kept for very long. 11 Q Let's go back to Exhibit 17. It's dated October 12 7, 1970. Near the bottom of the first page there's a 13 reference to " regulatory action. " Do you see that? 14 A Yes. 15 Q Where it says " telephone contact continued with 16 the Alabama Water Improvement Commission. " 17 A Yes. 18 Q Were you aware of telephone contacts with that 19 agency about the Pcb situation at that time? 20 A I was aware of contacts, but in this report, all 21 I'm doing is picking up what the plant had reported to me. 22 So I wouldn't necessarily be familiar with that in any
Page 174 1 a little surprising, but otherwise, yes, it seems like the 2 routine thing I would send to Papageorge. 3 Q Why do you say that's surprising that Newport is 4 not -- 5 A My recollection is that we reported on all three 6 sites together, but I'm not sure whether I did that as part 7 of this report or maybe Fred Macdonald reported it directly 8 to Papageorge. I don't remember. 9 Q Would these be kept in the ordinary course of 10 your employment with Monsanto? 11 A Pardon? 12 Q Would you keep these in the ordinary course of 13 your employment? 14 A Keep them? 15 Q Right, keep them in a plant somewhere. 16 A I probably kept these for a year in the reading 17 file. 18 Q Along these lines, let me refer you to Exhibit 19 20, which is dated December 1, 1970. 20 A Yes. 21 Q Up near the top of the page, there's some 22 handwriting " Pollution -- Pcb. " Do you see that?	Page 176 1 detail. 2 Q Do you recall who it was at the Anniston plant 3 that reported to you? 4 A Well, I would get my reports generally from Hill 5 Williams, or later on, Jesse Corder, but it was probably 6 somebody like Bunky Wright who was doing this. I really 7 don't know. 8 Q Did you ever have any contacts with the Alabama 9 Water Improvement Commission about the Pcb situation? 10 A No. 11 Q Did you ever have any contacts with them at all 12 to your knowledge? 13 A No. 14 Q Let's go to the second page of the memo. Pcb 15 levels in sewer. 16 A At Krummrich? 17 Q Right. And again, that gives a range from 12 to 18 742 Ppbs, do you see that? 19 A Yes. 20 Q Do you recall there being any discussion or 21 concern about leakage of Pcb's from the sewers leading from 22 the Krummrich plant?

Page 177 1 A I remember problems with the sewers at Krummrich, 2 but whether that was expressed in terms of leakage of Pcb's 3 from the sewer, I don't remember. The Krummrich plant 4 sewer system at that time was a mixture of sewers that had 5 been built at various times through its long history, and 6 so there were problems. But exactly what they were, I 7 don't remember. 8 Q Do you recall how those problems came to your 9 attention? 10 A Just in the course of our sampling efforts to 11 track where the Pcb's were coming from. It was kind of 12 confusing to figure out what the flows in the sewers really 13 were for a while. Eventually that was worked out. 14 Q When you say it was confusing to figure out where 15 the flows really were, what do you mean by that? 16 A Well, the total losses from the plant were larger 17 than could be accounted for just from the Aroclor 18 production facilities, so one would suspect from that that 19 it was also coming from some using departments, and the 20 sampling program was to determine how much was coming from 21 where, and the conditions of the sewers was a confusing 22 factor. The way they were interconnected was such that it	Page 179 1 Q For Exhibit 18, I just have a simple question. 2 Is this a memo that you received in the ordinary course of 3 business of your employment with Monsanto? 4 A Yes. 5 Q And is Exhibit 19 a memorandum that you sent in 6 the ordinary course of your business with Monsanto? 7 A Yes. 8 Q Let me ask you to turn to Exhibit 22. Can you 9 identify what that is for us? 10 A Well, it's a memo from Bill Papageorge to me in 11 which he underlines how far we are from our goals at the 12 plant. 13 Q In the first paragraph, he sets forth a goal -- 14 or a maximum of 50 parts per billion in wastewater 15 effluent ; is that correct? 16 A That's what it says. 17 Q If we go back to Exhibit 12, again, that's the 18 handwritten addition to an August 11, 1970 memo that states 19 "the plant goal for losses is 10 Ppb. " 20 A Yes. 21 Q I'm trying to put together what the situation 22 was. How would you explain the reference to 10 Ppb in one
Page 178 1 was a bit ambiguous as to where the flows came from. 2 Q Do you recall an investigation or study being 3 done to determine where the sewers came from and went at 4 the Krummrich plant? 5 A Well, we must have done that, but I don't 6 remember anything about it. 7 Q Do you recall who may have been involved in that? 8 A No. 9 Q Was that in conjunction with the Pcb issue that 10 that was done? 11 A I think so because it did take us a while to 12 track down the sources and be confident that we knew what 13 they were. 14 Q Do you recall being involved in that project at 15 all? 16 A I don't think I was. 17 Q Would it have been the maintenance personnel? 18 I'm just trying to get -- who would be likely to know about 19 that? 20 A There was the utilities department and there was 21 a maintenance department, and it might have been either 22 one.	Page 180 1 and the 50 Ppb in the other? 2 Mr. Burnett: Object to the form of the 3 question. Mischaracterizes the documents. 4 Mr. Brock: Hang on. 5 By Mr. Brock: 6 Q How do you explain or what would be your 7 explanation for the 50 Ppb level appearing in the 8 December 7, 1970 memorandum and the 10 Ppb level being 9 referenced in the August 1970 memorandum? 10 A Just that Pierle is talking about the longer 11 range goal of 10. Papageorge is also pointing out that we 12 have an interim goal that was higher than that. 13 Q Were you involved in the setting of the interim 14 goals or the long-range goals? 15 A No. 16 Q Papageorge's memo states, there's a sentence that 17 states " We do not have the luxury of unlimited time to 18 combat this problem. " Do you see that? 19 A Yes. 20 Q Was it your understanding that the Pcb problem 21 was, at that time was a problem that Monsanto should 22 address with some dispatch?

Page 181 1 A Absolutely. 2 Q And what was the -- what was the reason that that 3 problem needed to be addressed quickly? 4 A There was a feeling that government regulation 5 was sure to come, and that if we voluntarily got our losses 6 down to the absolute minimum, that we could accomplish -- 7 that the regulation would be less punitive, perhaps it 8 would avoid adverse publicity for the company. It just 9 seemed good business to get ahead of the problem as quickly 10 as we could. 11 Q Do you know whether Monsanto people were 12 communicating to governmental people concerning Monsanto's 13 voluntary efforts to reduce the Pcb problem? 14 A I had heard of those things, but I wasn't 15 directly involved. 16 Q What did you hear? 17 A Papageorge had talked to regulatory people in 18 Washington, I think at some point he may have testified to 19 some Congressional committee. Again, I'm just hearing this 20 stuff secondhand. I wasn't directly involved in any of it. 21 Q Did you ever deal with any governmental people in 22 Washington on the Pcb situation?	Page 183 1 A Yes. 2 Q Do you know what projects the Anniston and 3 Krummrich expenditures, for example, capital expenditures 4 referred to? 5 A No, I don't remember. They're mentioned in some 6 of these earlier memos that we looked at, but I don't 7 remember the details. 8 Q Let's go to Exhibit 24, and to speed it along, my 9 first question is whether or not this is a January 5, 1971 10 memorandum from W. Engman to you that you received in the 11 ordinary course of your employment with Monsanto. 12 A Yes. 13 Q Let me take you first to the second page under 14 the category with lv. Number 3 states " clean all 15 contaminated sewers and sewer boxes. " Do you see that? 16 A Yes. 17 Q Does that refresh your recollection at all as to 18 Monsanto undertaking to clean up past contamination as 19 opposed to just -- or as opposed to reducing ongoing 20 emissions? 21 A I don't remember. This seems like a plausible 22 action to take but I don't remember exactly what we did.
Page 182 1 A No. 2 Q Did you ever testify in that situation? 3 A No. 4 Q Did you ever make any speeches or presentations 5 concerning that situation? 6 A No. 7 Q Let's go to Exhibit 23. Could you identify what 8 that is for us? 9 A This is a memo from me to Bill Papageorge just 10 outlining the financial requirements for the Pcb control 11 program. 12 Q What was your -- what were your responsibilities 13 with regard to the level of expenditures for Pcb control? 14 A I had a certain capital approval level, so I 15 could approve projects up to a certain size. Those were 16 larger than projects that could be approved at the plants. 17 And above the level that I could approve it, then I would 18 have to go to Howard Bergen or somebody else. Basically 19 I'm just telling Bill how much money we need. Presumably 20 he needed that information for some summary that he was 21 putting together. 22 Q The M, does that refer to thousands?	Page 184 1 Q Do you recall being involved in any projects 2 during that time to go back and clean up past contamination 3 as opposed to just -- to reducing ongoing emissions? 4 A No, I really don't remember. 5 Q What is Rogers Terminal? 6 A I don't know that either. 7 Q For Exhibit 25, a very simple question: Is this 8 a memorandum that you sent to Mr. Papageorge in the 9 ordinary course of your employment with Monsanto? 10 A Yes. 11 Q Let me ask you to turn to Exhibits 26 and 27 12 together. Is this an example of an occasion on which you 13 received information concerning the Pcb situation at the 14 Krummrich plant and transmitted that information in a 15 report to Mr. Papageorge? 16 A Yes. 17 Q When the reports would come to you of the -- for 18 example, the February -- Exhibit 26, the February 2, 1971 19 report to you from Engman, when you got those, did you 20 undertake to -- strike that. 21 What, if anything, did you do with those reports 22 before including them in your reports to Papageorge?

Page 185 1 A Well, I read them, obviously. Usually I was in 2 such close contact with the plant on these issues that it 3 would be unusual if I would be surprised by anything in 4 here. It was almost always something that I was already 5 familiar with. If I were surprised by anything I read 6 here, I would have called Bill and tried to learn a little 7 more about it. 8 Q You would call Mr. Papageorge? 9 A No, Bill Engman. 10 Q Oh, I'm sorry. 11 A Obviously, if it appeared that it was a bad 12 situation and something had to be done about it, we'd talk 13 about what should be done. The formal reporting was kind 14 of after the fact. Everybody was working pretty closely 15 together as a team, and the formal report was just kind of 16 for the record and to let the people on up the line know 17 about it. 18 Q Let me turn you to page 2 of Exhibit 26 and page 19 3 of Exhibit 27. It's your report to Papageorge. The 20 third paragraph from the bottom of exhibit -- the page on 21 Exhibit 26 talks about past sewer contamination, and that 22 same reference is made on the third page of Exhibit 27. Do	Page 187 1 A Well, the Aroclor department operations had 2 always been considered to be very stable. The yields were 3 always consistent. We had never suspected that there was 4 any remarkable loss of product. 5 Q Do you recall there being any attempt to discover 6 precisely how the past contamination had got there, for 7 example, during what years or what proportions, during what 8 time frames, that type of thing? 9 A I have no idea how you'd do that. 10 Mr. Brock: Off the record. 11 (Discussion off the record.) 12 (Savage Exhibit 30 through 33 13 identified.) 14 By Mr. Brock: 15 Q Mr. Savage, let's go to Exhibit 30. Is that a 16 March 1, 1971 memorandum you received in the ordinary 17 course of your employment with Monsanto? 18 A Yes. 19 Q There's a reference near the bottom to a " village 20 sewer. " Do you see that? 21 A Yes. 22 Q Does that refresh your recollection as to what
Page 186 1 you see those references, page 3 of Exhibit 27? 2 A Yes. It appears to be identical. 3 Q For clarity of the record, the statement reads 4 " losses at the treatment plant are expected to remain 5 above 10 Ppb by 9/1/71 due to past sewer contamination. " 6 Do you see that? 7 A Yes. 8 Q Do you recall any attempt to address the question 9 of how that past sewer contamination had gotten there? 10 A I don't recall this particular paragraph 11 obviously. It's more than 20 years ago. The past sewer 12 contamination presumably was simply the consequence of the 13 ordinary operation. I don't think there's -- there is no 14 reason that I can recall to suppose it reflects this 15 particular incident so much as the operating condition that 16 we discovered when we began sampling and studying the 17 problem. 18 Q Was that understanding shared by others within 19 Monsanto, to your knowledge? 20 A I guess so. 21 Q And what leads you to believe that that was the 22 case?	Page 188 1 Rogers Terminal was? 2 A Just on the face of this, it's a place where, in 3 the previous one, it's a place where trucks were washed, 4 but I didn't remember that. 5 Q Do you recall the reason for Monsanto instituting 6 a sampling program with respect to the village sewer or 7 Rogers Terminal location? 8 A I'd have to speculate. I don't remember. 9 Q The village sewer, does that refer to a separate 10 sewer system that plant sewers -- and if you look up above, 11 there's a reference to main plant sewers. 12 A What I recall is that the plant sewer eventually 13 went into the village sewer, so the village sewer would be 14 the plant plus something else, but I didn't get involved in 15 that area. Other people were working on that part of it 16 and I had plenty to do. 17 Q On the second page, the last page of that 18 exhibit, just under the heading of " Pcb levels in the 19 atmosphere, " there's a reference to a nitrogen purge. What 20 is that? It says " replacing the nitrogen purge with the 21 nitrogen blanket. " 22 A Well, I can tell you just as an engineer what the

Page 189 1 difference is between a purge and a blanket. I don't 2 remember this project. A purge implies that nitrogen flows 3 into the tank and out on a continuous basis as a way to 4 create an nitrogen atmosphere inside the tank, which might 5 be done to keep it dry or something like that. 6 A nitrogen blanket implies that some kind of 7 pressure device has been put on the tank so that a nitrogen 8 atmosphere exists inside the tank but there isn't any 9 continuous flow. 10 Q And up above in that page under li, it references 11 two projects to be completed, and the first is " paving and 12 trenching the loading and storage areas. " Do you see that? 13 A Yes. 14 Q And that references -- that's in connection with 15 the Aroclor department, is that your understanding? 16 A Yes. 17 Q Are you familiar with efforts to pave and -- pave 18 those areas? 19 A I don't remember that project in particular but 20 that's the kind of thing we were doing at the time. 21 Q Do you recall those areas, the trench loading and 22 storage areas?	Page 191 1 A Well, again, looking at the face of it, I presume 2 this is a change, that Rogers trailers are now coming to 3 that place instead of where they were before. I don't 4 remember that particular situation. It fits with the rest 5 of what we're doing. 6 Q Let's go to Exhibit 32. Is this a memorandum 7 that Engman sent jointly -- was sent from Engman joint to 8 you and Mr. Papageorge in April of 1971? 9 A Yes. 10 Q Do you have an understanding as to why this was 11 sent jointly, does this refer to a different project or 12 program? 13 A I don't think so. I don't know why he did that. 14 Maybe I was out of town or something. 15 Q Is that your -- some handwriting that says 16 " file, " do you know whose handwriting that is? 17 A It looks like mine but I can't be sure. The 18 arrow on this document indicates that this copy went to me, 19 so I suppose it is. 20 Q Under the entry for " Pcb levels in sewer, " the 21 last sentence talks about " removing the sludge from the 22 treatment plant settling basins. " Do you see that?
Page 190 1 A The pave and trench is a combined verb. Loading 2 and storage areas are the subject. 3 Q I see. 4 A I remember generally where the loading and 5 storage area was. It was just adjacent to the department, 6 but I don't remember much about it. 7 Q Do you know what the ground consisted of in that 8 area prior to this time? 9 A Well, the general practice in that plant, as most 10 plants, was to cover the ground with crushed rock, so I 11 presume before there was paving, that's what was there. 12 Q Under lii, category F states " all Aroclor 13 trailers including Rogers trailers are being washed at 14 Wgk rip track. " What was a rip track? 15 A That was an area in the plant run by the shipping 16 department where tank cars in general were serviced, which 17 included cleaning them or making minor repairs. 18 Q Do you recall there being a concern about 19 Aroclors getting into the environment from that location? 20 A No. 21 Q Do you know why that location appears in Engman's 22 report to you, or at least in this report?	Page 192 1 A Yes. 2 Q Do you know what that sludge was? 3 A No. This no doubt refers to the village 4 treatment plant because there was no treatment plant within 5 the Krummrich boundary, but it was outside any area that 6 I've been involved in. 7 Q There's reference below to the Therminol unit 8 changeouts. What were Therminol unit changeouts? 9 A Where are you? 10 Q Just down below, immediately under li. 11 A What was going on here is that it had been 12 decided that -- let me back up. Therminol was the trade 13 name given to Aroclor when it was used as a heat transfer 14 fluid. What this refers to was that at some point we 15 decided it was not sufficient to simply put down curbs and 16 so forth but that instead we should simply eliminate the 17 use of Aroclor as a heat transfer fluid in our plants, and 18 changeout means that that conversion was going on, that 19 some other heat transfer fluid was being put into the 20 systems. Usually that required something more than simply 21 taking out fluid and putting in fluid. Typically there 22 would have to be some mechanical changes, the replacement

Page 193 1 fluids would be combustible whereas Aroclor was not. 2 Q Let's go to Exhibit 33. Could you identify what 3 that is for us? 4 A This is a letter from me to the operating 5 superintendents at the two U. S. plants, and I was giving 6 them instructions about how to set up accounts for the 1972 7 budget. 8 Q There's a reference to toxicological accounts. 9 What does that refer to? 10 A That's a little fuzzy in my recollection, but it 11 seems to me that in the early days we collected those costs 12 in a separate category ; that is, costs at the plant related 13 to solving Pcb problems, and for I think probably some 14 historical reasons, that was accounted for -- that name was 15 given to it, toxicological expense, because when the 16 problem was first discovered in the later ' 60s, that's kind 17 of the way it was characterized. 18 Q As a toxicological problem? 19 A Yes. 20 Q Did you have responsibility relating to other 21 toxicological accounts? 22 A No. This just refers to plant accounts, and that	Page 195 1 about that time? 2 A It could be, but I don't remember. I don't think 3 so. 4 Q Let me ask you to turn to the second page of the 5 exhibit, and that references a number of different 6 projects ; is that correct? 7 A Yes. 8 Q And the Aroclor scrap rework, is that the matter 9 we talked about earlier about reworking the Aroclor 10 obtained back from other customers? 11 A Yes, I think so. 12 Q " Contaminant collection at rip track, " do you 13 know what that refers to, the contaminant collection? 14 A No. It sounds just like a routine part of our 15 program to do that everywhere. 16 Q What about " pave under Therminol unit "? Do you 17 know what that entailed? 18 A No, I don't remember that. That seems like kind 19 of an anomaly because it refers to Therminol unit, but it's 20 talking about 246, which is the Aroclor department. Maybe 21 there was a Therminol heater in the Aroclor department but 22 I don't remember that.
Page 194 1 would be the only place where I would have a concern. 2 Q Who is A. J. Koenig, K-o-e-n-i-g? 3 A Art Koenig was our business group accounting 4 manager. 5 (Savage Exhibit 34 identified.) 6 By Mr. Brock: 7 Q I've had Exhibit 34 marked, and the Bates numbers 8 are 0292923 through 926. 9 Mr. Savage, is this a memorandum you received 10 from Mr. Stewart in the ordinary course of your employment 11 with Monsanto? 12 A Yes. 13 Q Did Stewart replace Engman in some capacity at 14 the Krummrich plant? 15 A I think so. I think Ed Stewart was working for 16 Bill at that time. I don't know why the change in 17 reporting occurred here, but this is obviously the same 18 kind of report that Bill had been sending me. 19 Q Engman is listed as a copyee on the right-hand 20 column. Do you see that? 21 A Right. 22 Q Do you know whether he changed positions in or	Page 196 1 (Savage Exhibit 35 identified.) 2 By Mr. Brock: 3 Q For the record, I've marked Exhibit 35, and the 4 Bates numbers are 0248589 through 92. 5 My first question, Mr. Savage, is just whether or 6 not this is one of the memoranda that you sent to Bill 7 Papageorge in or about April of 1971. 8 A Yes. 9 Q Let me ask you to turn to the second page where 10 it's talking about project evaluations, and specifically 11 number 2 where it says " samples from 36 storm sewers 12 recently repaired to avoid infiltration show definite 13 decrease in Pcb. " Do you see that? 14 A Yes. 15 Q You can see that that's referring to the Anniston 16 plant ; correct? 17 A Yes. 18 Q Are you familiar with storm sewers at the 19 Anniston plant being repaired around this time frame? 20 A No, I didn't remember that at all. 21 Q Do you recall the sewers at the Anniston plant 22 being repaired or replaced at any time?

Page 197 1 A No, it's not remarkable. It's an old plant. I 2 don't remember it. 3 Q Do you recall it coming to your attention that -- 4 let me rephrase it. Do you recall ever hearing or learning 5 that Pcb's were thought to be, or that there was a 6 possibility that Pcb's were leaking from the sewers at the 7 Anniston plant? 8 A I don't remember that. 9 Q I take it you just don't recall what the impetus 10 was for that project or what it involved? 11 A No. 12 (Savage Exhibit 36 identified.) 13 By Mr. Brock: 14 Q In what may be a futile attempt to refresh your 15 recollection, I'll show you Exhibit 36, and my first 16 question is whether or not this is a memorandum that you 17 sent to Mr. Papageorge in or about June of 1971. 18 A Yes. 19 Q If you'd turn to page 3 under projects and 20 evaluations, up near the top, entry 2 reads " the 36-inch 21 sewer repairs have accomplished a goal of minimizing 22 Aroclor infiltration into storm sewer. " Do you see that?	Page 199 1 correct? 2 A That's right. 3 Q Let me ask you to turn to the second page of 4 Exhibit 37 under the project that's given a number of 5 2422. The last sentence in that reads " major sewer to be 6 installed to north Edc extended to 10/1/71. " Do you see 7 that? 8 A Yes. 9 Q And then in Exhibit 38, that information -- you 10 transmit that information to Mr. Papageorge on the second 11 page of Exhibit 38 ; is that correct? 12 A Yes. 13 Q Do you recall a project involving a major sewer 14 to be installed to the northern part of the Krummrich plant 15 in or about this time? 16 A No, I don't know what that means. 17 Q What is Edc? 18 A Estimated date of completion. 19 Q Do you recall any projects involving 20 installation, replacement or repair in the north area of 21 the Krummrich plant at or around this time? 22 A I'd be a little careful about characterizing that
Page 198 1 A Yes. 2 Q Does that refresh your recollection at all as to 3 that repair, storm sewer repair project? 4 A It seems like something maybe I ought to remember 5 but I don't. 6 (Savage Exhibits 37 and 38 identified.) 7 By Mr. Brock: 8 Q For the record, I've marked Exhibits 37 and 38. 9 37 is dated September 1, 1971 and has Bates numbers 0292977 10 through 980, and Exhibit 38 is dated September 9, 1971 with 11 the Bates numbers 0008722 through 8725. 12 Mr. Savage, is Exhibit 37 a September 1, 1971 13 memorandum that you received in the ordinary course of your 14 employment with Monsanto? 15 A Yes. 16 Q And Exhibit 38 is a memorandum that you sent to 17 Mr. Papageorge in the ordinary course of your employment 18 with Monsanto? 19 A Yes. 20 Q And in Exhibit 38, you transmitted the 21 information that had been transmitted to you in Exhibit 37 22 along with information concerning other plants ; is that	Page 200 1 as north area. North area referred specifically to a hunk 2 of the plant that was across the highway and which I 3 believe by that time had been sold to Edwin Cooper. I 4 hardly think that this went to what we call the north 5 area. I think he refers to it as the compass direction as 6 to where the sewer is going to be installed. 7 Q You're probably right. 8 A The north area would be a long way away. 9 Q Do you recall a major sewer that was to be 10 installed in connection with the Aroclor department at that 11 time? 12 A No. 13 Q On the third page of Exhibit 37 -- and it's 14 repeated on page 2 of Exhibit 38 -- there's a reference to 15 routine and special sewered samples. Do you see those 16 references? 17 A Yes. 18 Q What were special sewer samples? 19 A I can interpret the sentence as I read it, but I 20 don't remember anything in particular. We of course did 21 have routine samples. A special sample would be something 22 simply to answer some unusual question as part of the

1 investigation.

2 Q Do you recall what special question that was?

3 A No, no idea.

4 Q Let me take you to the Anniston section of

5 Exhibit 38, and under regulatory action it mentions a

6 visit, an August 19 visit to the plant by two Epa

7 representatives and a representative of the Awic, Alabama

8 Water Improvement Commission. Do you see that?

9 A Yes.

10 Q Do you recall Epa representatives or Awic

11 representatives visiting the Anniston plant to take Pcb

12 samples?

13 A No, I was not at the plant at the time, and I'm

14 simply repeating what the plant has reported.

15 Q Do you recall raising the question of why the Epa

16 or the Awic wanted to take samples at the Anniston plant?

17 A No, no.

18 Q Do you recall being concerned about that?

19 A No. This would not have been particularly

20 remarkable. It was well known that both the state and

21 federal government were concerned about Pcb's and no doubt

22 collecting some information. I don't think we felt we had

1 anything to hide. This would not have been a big surprise.

2 Q Do you recall there being any consideration given

3 to whether or not the Epa or the Awic might have served

4 some type of claim against Monsanto with respect to Pcb

5 effluents from the Anniston plant?

6 A I have no idea.

7 Q That was not something that you recall

8 discussing?

9 A No. I would not have been surprised that the

10 state or federal government were interested in this issue.

11 I wouldn't have bothered about what the specific reason was

12 for this visit.

13 Mr. Brock: I see we've come to 5:30.

14 (Whereupon, at 5:30 p. m. , the deposition was

15 adjourned, to reconvene at 9:30 a. m. , on Wednesday, May 19,

16 1993.)

17 -----

18 James R. Savage

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