

MAERTIN / James Wright
W.F.

JAMES D. WRIGHT

MAERTIN v ARMSTRONG

JULY 30, 1998

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CONDENSED TRANSCRIPT
PREPARED BY:

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(1) UNITED STATES DISTRICT COURT
 (2) FOR THE DISTRICT OF NEW JERSEY
 (3) JOAN MAERTIN, Executrix of
 (4) the Estate of Lothar
 (5) Maertin; JOAN MAERTIN,
 (6) individually and in her own
 (7) right, et al, } Civil Action L-95-cv
 (8) vs. } 02849 (JBS)
 (9) ARMSTRONG WORLD INDUSTRIES,
 (10) INC., }
 (11) vs. }
 (12) MONSANTO COMPANY, AMERICAN
 (13) MINERAL SPIRITS COMPANY and
 (14) SOLUTIA, INC. }
 (15) DEPOSITION OF JAMES D. WRIGHT
 (16) JULY 30, 1998
 (17) OLYMPIA, WASHINGTON
 (18) <<<<< >>>>>

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 (20) For American Mineral Spirits Company;
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 (12) 1 1-page handwritten notes from 17
 (13) Mr. Wright
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 (15) and produce documents directed to
 (16) J.D. Wright
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 (18) containing products, American
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 (20) MAE 001073-75
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(1) APPEARANCES:
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(21) containing products, Union AMSCO
 (22) 1954-1977, MAE 000523-30
 (23) 5 2-page Sales Summary all PCB 89
 (24) containing products, Armstrong
 (25) Cork Company 1954-1977
 MAE 000001-2

(1) deposition would also be in response to a 30b6
 (2) notice with regard to the relationship between
 (3) Monsanto and AMSCO.
 (4) Having made that determination, on Monday we
 (5) faxed a letter to all counsel, informing them of
 (6) the 30b6 designation.
 (7) We produced documents by overnight mail. They
 (8) were delivered to counsel on Tuesday morning. I
 (9) personally gave a set of documents to Mr. Taylor at
 (10) his hotel on Tuesday evening, that relate to that
 (11) 30b6 notice.
 (12) Although I was not personally involved in
 (13) identifying and producing these documents, except
 (14) to have sent them out on Monday, it is my
 (15) understanding that some of these documents
 (16) previously were produced, and I'm not going to
 (17) comment any further on the documents at this time.
 (18) I will await whatever letter or formal
 (19) objections or comments that the parties want to
 (20) make, so that I can respond when I've had the
 (21) chance to gather all of the information
 (22) together with regard to the documents and that
 (23) production.
 (24) And that's all I have to say at this time.
 (25) MR. TAYLOR: Just to respond.

(1) This is Matt Taylor on behalf of Armstrong World
 (2) Industries.
 (3) Mr. Hopkins' statement is consistent with what
 (4) he put on the record yesterday at Jim Springate's
 (5) deposition, and my position is stated on that
 (6) record as well.
 (7) The only thing I do have to add, is that I did
 (8) not receive the documents until late Tuesday
 (9) evening in San Francisco. Did not-- I had a
 (10) deposition the next day. When I say "documents," I
 (11) mean the documents which Monsanto produced pursuant
 (12) to the 30b6, a 30b6 notice.
 (13) It did not describe which notice it was
 (14) being-- they were being produced for. They were
 (15) not specific to the AMSCO relationship 30b6 notice.
 (16) But in any event, I did receive them late
 (17) Tuesday evening, when I was preparing for
 (18) Springate's deposition yesterday.
 (19) Last night at 10:00, when I finally arrived in
 (20) my hotel in Seattle to review those documents, I
 (21) noticed, one, that they are in a heavily redacted
 (22) form. They do not have accompanied with it a
 (23) privilege lock. So I have no basis of knowing what
 (24) is redacted.
 (25) And my objection stands as far as the 30b6

(1) deposition stated in the Springate transcript, but
 (2) I'm going to expand that objection in relation to
 (3) my discovery deposition for today, because we are
 (4) out here on a discovery notice deposition, which we
 (5) have noticed months ago. And this has been
 (6) scheduled for weeks as a discovery deposition, not
 (7) a 30b6 designation.
 (8) And I reserve the right to redepose
 (9) Mr. Wright, based upon the documents which were
 (10) sent to us for the first time just late-- well,
 (11) they were sent Tuesday, which I did not receive.
 (12) I'm the one taking the deposition. I got those
 (13) late Tuesday night while I was on the road.
 (14) It may not be necessary, but I'm going to
 (15) reserve the right and, again, certainly I
 (16) appreciate Mr. Hopkins' statement on the record
 (17) that the 30b6 deposition will take place at a later
 (18) date mutually convenient to the parties.
 (19) MR. HOPKINS: Just for the
 (20) record, I'm noting my objection to Mr. Taylor's
 (21) reservation of rights, just to the extent it has to
 (22) do with the fact witness portion of this
 (23) deposition.
 (24) We are here. It's already 9:30. We are going
 (25) to proceed with that today. So just to preserve

(1) Monsanto's rights, I will note that objection for
 (2) the record.
 (3) Anybody else?
 (4) MR. O'CONNOR: I would just like
 (5) to know what Jim Orr has to think about all of
 (6) that?
 (7) MR. ORR: I have no comment.
 (8) MR. O'CONNOR: Neither do I, Jim.
 (9) MR. HOPKINS: We are going to
 (10) bring the witness in and get going.
 (11) * * *
 (12) * * *
 (13) JAMES D. WRIGHT, having been first duly sworn
 (14) by the Notary, deposed and
 (15) testified as follows:
 (16) * * *
 (17) * * *
 (18) EXAMINATION
 (19) BY MR. TAYLOR:
 (20) Q Mr. Wright, if you could state your full name and
 (21) address and Social Security Number for the record,
 (22) please.
 (23) A My name is James D. Wright, 3144 Lubbers Lane,
 (24) Olympia, Washington 98502. Social Security Number
 (25)

(1) 493-09-8026.
 (2) Q Good morning, sir. My name is Matt Taylor, and I
 (3) represent Armstrong World Industries in the matter
 (4) that you have been-- that you are here entitled
 (5) Maertin, et al. versus Armstrong World Industries,
 (6) which is pending in the United States District
 (7) Court in New Jersey.
 (8) Sir, have you had your deposition taken
 (9) before?
 (10) A Not for this case, no.
 (11) Q I understand that. Ever?
 (12) A Oh, yes.
 (13) Q Could you give me an idea of how many times you
 (14) have been deposed?
 (15) A At least once that I can recall. Lately as a port
 (16) commissioner, past port commissioner for the Port
 (17) of Olympia in relationship to a case with the Port
 (18) and the insurance companies relating to
 (19) contamination of soil on the port property.
 (20) Q In case you were not given the instructions in
 (21) those depositions, or at least that one deposition,
 (22) the court reporter is going to take down my
 (23) questions and then your answers.
 (24) A Okay.
 (25) Q Try to wait until I finish, if you can, my

(1) question, even though you may anticipate what my
 (2) question is going to be, so that the record is
 (3) clear, so we are not speaking over one another.
 (4) That is sometimes difficult when you are sure
 (5) you know how I'm going to finish my question and
 (6) you know the answer. So just try to let me finish
 (7) and then go on.
 (8) If you don't understand any of my questions, I
 (9) speak too quickly, or for any reason you don't
 (10) understand the question, just tell me that. I will
 (11) rephrase it and try to ask it in a way that you
 (12) will understand it.
 (13) If you need a break at any time, just ask.
 (14) You control that. The only limitation on that is
 (15) that if a question is pending, you must answer it,
 (16) and then you can take a break. So any time that
 (17) you need a break, just ask.
 (18) Sir, are you aware of the nature of the
 (19) lawsuit in which you are here today for?
 (20) A Generally, yes.
 (21) Q What is your general understanding?
 (22) A In relationship to what?
 (23) Q Do you know what the case is about?
 (24) A Well, I understand that the case is against
 (25) Armstrong, with Armstrong Cork in relationship to

- (1) A 1947.
 (2) Q What was your first position with Monsanto?
 (3) A Sales trainee.
 (4) Q Were you in any particular division or department
 (5) of the company as a sales trainee?
 (6) A Organic chemicals division. Can I get a glass of
 (7) water?
 (8) Q Sure.
 (9) (Pause in the proceeding.)
 (10)
 (11) Q (By Mr. Taylor) Mr. Wright, as sales trainee,
 (12) where were you located?
 (13) A St. Louis.
 (14) Q And how long were you a sales trainee?
 (15) A About a year, I guess.
 (16) Q Describe that for me. What is a sales trainee?
 (17) What was your function?
 (18) A We went through all of the various departments and
 (19) various plants, spent time with some the regional
 (20) managers and distract managers, was sort of a broad
 (21) exposure to the company.
 (22) You might recall back in those days there
 (23) weren't very many people in the company. It was
 (24) fairly small in comparison to what it is today.
 (25) Q And as a sales trainee in the Organic Chemical

- (1) Division, I take it you were trained in the various
 (2) products within the division, or were you limited
 (3) to a certain product group?
 (4) A Just a broad, broad familiarization.
 (5) Q Of the various products?
 (6) A Of the various products.
 (7) Q Was there a training course that you took then?
 (8) A Well, we had training courses by the various
 (9) product groups. It was fairly, fairly loose. It
 (10) was more a familiarization course.
 (11) Q You were in that position for about a year?
 (12) A Yeah.
 (13) Q 1948, did you change positions?
 (14) A No.
 (15) Q Tell me what you did? Tell me how long were you a
 (16) sales trainee?
 (17) A From there I went to New York as a sales
 (18) correspondent, which was the usual procedure for
 (19) most sales trainees, and then later moved to
 (20) Buffalo, New York, as a salesman in the Buffalo
 (21) area, still reporting to the New York office.
 (22) Q Let me stop you there. When did you move to New
 (23) York as a sales correspondent?
 (24) A 1948, I guess.
 (25) Q How did that- did your duties change from a sales

- (1) trainee to a sales correspondent?
 (2) A We answered letters, answered telephones, took
 (3) orders, the inside person for the sales people in
 (4) the field.
 (5) Q So you worked out of the New York-
 (6) A Office.
 (7) Q Was it the New York City office?
 (8) A Yes.
 (9) Q So you were not out in the field calling on
 (10) customers at that point?
 (11) A No, not at that time.
 (12) Q What position did you hold when you moved to
 (13) Buffalo, New York area?
 (14) A Salesman.
 (15) Q Salesman. That was how long? When was that? What
 (16) year was that?
 (17) A I think about a year and a half or so.
 (18) Q How long were you a salesman?
 (19) A From '49 to '52. 1949, May of '49 to January of
 (20) '52.
 (21) Q As a salesman?
 (22) A A sales rep in Buffalo.
 (23) Q This was still within the Organic Chemical
 (24) Division?
 (25) A Yes.

- (1) Q What were the products that you were selling?
 (2) A Everything the Organic Chemicals Division had at
 (3) the time, except petroleum chemicals.
 (4) Q Now, was the sales force split up into the
 (5) plasticizer group at that point, or were you
 (6) selling plasticizers and all of the products?
 (7) A All of the products. I was out in the hinterland.
 (8) A lost man in the field.
 (9) Q Who were the customers that you were- who were the
 (10) customers you remember calling on, the larger
 (11) customers?
 (12) A French Foods in Rochester, many of the chemical
 (13) companies in Niagara Falls, steel companies in
 (14) Buffalo.
 (15) Q Were you selling PCB-containing plasticizers at
 (16) that time?
 (17) A Very possibly.
 (18) Q Do you remember being, as part of your training,
 (19) trained in the application and uses that the
 (20) PCB-containing plasticizers could be sold for?
 (21) MR. HOPKINS: I will object to
 (22) the form. You can answer. Go ahead.
 (23) THE WITNESS: Say that again,
 (24) please.
 (25) Q (By Mr. Taylor) During your training, whether it

- (1) was either on-the-job training, or while you were a
 (2) sales trainee, were you trained in the applications
 (3) for PCB-containing plasticizers?
 (4) A I would say, generally, yes.
 (5) Q Okay. And at that time, in the early 1950s, do you
 (6) remember what your customers were using the PCB
 (7) plasticizers for?
 (8) A I don't recall at all.
 (9) Q I think I believe your testimony is in 1952 you
 (10) were in as a Buffalo sales rep until around 1952.
 (11) What was your next stop? What was your next
 (12) position within Monsanto?
 (13) A Well, then I moved as a sales representative to
 (14) Pittsburgh. Just a larger territory, moved from
 (15) Buffalo to Pittsburgh.
 (16) Q That was in 1952?
 (17) A '52.
 (18) Q How long were you- were you still a sales rep?
 (19) A Yes.
 (20) Q And how long were you in that position?
 (21) A For six years.
 (22) Q What did that- what was your geographical
 (23) territory when you were the sales rep for
 (24) Pittsburgh?
 (25) A Well, it just changed directions. I took on a

- (1) broader area of Pennsylvania and Western New York.
 (2) Q Was it the western part of Pennsylvania, or did you
 (3) get into the eastern part of Pennsylvania?
 (4) A Just about to Altoona.
 (5) Q Altoona and west-
 (6) A Yes.
 (7) Q - would you say?
 (8) Did your status, or did your job title change
 (9) between 1952 and 1958, or were you still- were you
 (10) still referred to as a sales rep?
 (11) A Yes.
 (12) Q During that time, did you have any occasion to call
 (13) on Armstrong?
 (14) A No.
 (15) Q What was your next position after 1952?
 (16) A District sales manager in Pittsburgh from '58 to
 (17) '61.
 (18) Q How did your duties change from a sales rep to a
 (19) district sales manager?
 (20) A I had more responsibility. I had another salesman
 (21) working with me, and they recognized me as a
 (22) district salesman, which was the sales manager.
 (23) Q Did that still include the same area that you
 (24) covered as the sales rep in the Pittsburgh area?
 (25) A Basically the same, yes.

- (1) A Well, it was a management decision from a marketing
 (2) standpoint to try to relieve our salesmen from
 (3) calling on small accounts, drums of product, as a
 (4) comparison of what our efforts were.
 (5) Q Well, tell me how that- you said there was
 (6) resistance. Who resisted that?
 (7) A Salesmen and district managers and many others.
 (8) You know, they didn't see the value from a credit
 (9) standpoint.
 (10) When you are a salesman, you always look at
 (11) credits, as we were not on commission, but they
 (12) were very closely graded or assessed by their
 (13) performance by credits of sales.
 (14) Q Well, did you have someone that- either one person
 (15) or a committee that you were reporting to in
 (16) connection with the negotiations or the process of
 (17) engaging a distributor or the distributors?
 (18) A Yes.
 (19) Q Who was that?
 (20) A It would be both of the regional managers or
 (21) district managers in New York, who was really
 (22) looking for ways to make his sales people more
 (23) efficient and also the product managers.
 (24) Q Who was that regional managers in New York that you
 (25) were dealing with in that issue, the

- (1) distributorship issue?
 (2) A Too long. I don't remember.
 (3) Q Okay. Do you remember any of product managers that
 (4) you were dealing with on that distributorship
 (5) topic?
 (6) A Howard Berglin was the- was the product manager as
 (7) I recall.
 (8) Q Were you given that assignment to work out the
 (9) details of bringing on the distributor?
 (10) A Yes.
 (11) Q When did that process start?
 (12) A Well, during the period I was there as industry
 (13) sales manager, which I was there for about three
 (14) years.
 (15) Q Did it start in 1961?
 (16) A I don't recall.
 (17) Q Well, did those efforts regarding bringing on
 (18) distributors begin prior to you becoming industry
 (19) sales manager in 1961, while you were a district
 (20) sales managers in the Pittsburgh area?
 (21) A Say that again? I don't think I followed you on
 (22) that.
 (23) Q Did the efforts to bring on a distributor begin
 (24) when you took the position of industry sales
 (25) manager in 1961 in New York, or did it begin while

- (1) you were a district sales manager in the Pittsburgh
 (2) area?
 (3) A When I was Industries sales manager in New York.
 (4) Q Did you research what distributors would be
 (5) appropriate for this role or this situation?
 (6) MR. HOPKINS: Object to the form.
 (7) You can answer. Go ahead.
 (8) THE WITNESS: Well, the main
 (9) reason that we took on distributors was because of
 (10) the competition of some of our major competitors,
 (11) such as, for example, Carbide, who had a
 (12) combination of products for solvents and
 (13) plasticizers and other chemicals, and that seemed
 (14) to thwart some of our sales people in the field for
 (15) combination of truckloads of plasticizers and
 (16) solvents were delivered to a customer, thereby,
 (17) they could- they could take advantage of a
 (18) truckload pricing as against a single LTL shipments
 (19) of which we could only offer.
 (20) Q (By Mr. Taylor) What is "LTL shipments"?
 (21) A Less than truckload.
 (22) Q I appreciate that. But my question is: Did you
 (23) approach- did you research what distributor would
 (24) be appropriate to fill Monsanto's needs for that?
 (25) MR. HOPKINS: Object to the form.

- (1) You can answer.
 (2) THE WITNESS: I would assume so,
 (3) and along with other people, input from other
 (4) regional managers and district managers and product
 (5) managers.
 (6) Q (By Mr. Taylor) Okay. What did you do in that
 (7) regard as far as researching what distributor
 (8) Monsanto would ultimately use?
 (9) A I talked to the distributors.
 (10) Q And had you had experience with distributors in
 (11) your career prior to 1961?
 (12) A No.
 (13) Q So how did you go about finding what distributors
 (14) would meet your needs?
 (15) A Who could offer the best services.
 (16) Q I understand that. How did you go about doing it?
 (17) How did you go about researching it?
 (18) MR. TAYLOR: Excuse me,
 (19) Mr. Davidson, do you have something to say on the
 (20) record?
 (21) MR. DAVIDSON: I will, if you
 (22) want me to.
 (23) MR. TAYLOR: You are not admitted
 (24) in this case.
 (25) MR. HOPKINS: Well, wait a

- (1) minute.
 (2) MR. TAYLOR: Counsel, is here,
 (3) and I would just appreciate-
 (4) MR. DAVIDSON: I was just
 (5) speaking to counsel.
 (6) MR. HOPKINS: Mr. Davidson is
 (7) not speaking on the record. He was speaking to me
 (8) in a quiet voice that was not interrupting you at
 (9) all.
 (10) MR. TAYLOR: Fine. Okay.
 (11) MR. HOPKINS: As to being
 (12) admitted in this case, Master Judge Rosen has
 (13) already indicated previously that Mr. Davidson can
 (14) make an appearance without being formally admitted.
 (15) MR. TAYLOR: Is that right?
 (16) MR. HOPKINS: That's right.
 (17) MR. TAYLOR: I was not aware of
 (18) that. I don't think that is accurate.
 (19) MR. HOPKINS: That is completely
 (20) accurate. If you want to take it up with the
 (21) Court, we can do that.
 (22) MR. TAYLOR: We may. But as long
 (23) as he doesn't speak on the record, I'm not going to
 (24) raise the objection.
 (25) MR. HOPKINS: He is not speaking

- (1) on the record.
 (2) MR. TAYLOR: If he does, I'm
 (3) going to object to it.
 (4) MR. HOPKINS: He is not speaking
 (5) on the record.
 (6) Q (By Mr. Taylor) What did you do to research, for
 (7) example, AMSCO to find them, seek them out?
 (8) A Well, they were well-known in the field for product
 (9) lines that they had, because they were already
 (10) distributing products, a combination of products.
 (11) They just needed a plasticizer line to augment
 (12) what they had. So they were known in the field, as
 (13) well as other distributors.
 (14) Q You were aware of AMSCO in your prior experience
 (15) before you took on this position as industry sales
 (16) manager?
 (17) A No.
 (18) Q Okay. How did you become aware of AMSCO?
 (19) A Through recommendations of our district manager and
 (20) salesmen in the field.
 (21) Q Okay. Did you then seek out a meeting with AMSCO?
 (22) A Sure.
 (23) Q As well as the other distributors?
 (24) A Sure.
 (25) Q Who did you first meet with from AMSCO?

(1) Q Well, did- I'm going to get back to the agreement
(2) with AMSCO. But after you left the position in New
(3) York as the industry sales representative, or
(4) industrial sales representative, did someone else
(5) take over as the point person, for lack of a better
(6) word, to deal with AMSCO or Central Solvents?
(7) A No. I don't think so. It was just, again, the
(8) reorganization of the structure of the field
(9) offices.
(10) Q Well, after you left, would AMSCO contact you if
(11) they had an issue regarding the distribution
(12) contract that they had with Monsanto?
(13) A No.
(14) Q Who would they contact?
(15) A Regional district managers and the product
(16) managers.
(17) Q Was there someone in the home office in St. Louis
(18) that had a responsibility to deal with the
(19) distributor?
(20) A The product managers.
(21) Q Who was that for plasticizers?
(22) A Whoever was in the product manager job at the time.
(23) We had a lot of changes, and so I can't quite-
(24) can't help you on that unless we look at some kind
(25) of records.

(1) Q And maybe we can when we go through that.
(2) A Okay.
(3) Q Your position as regional sales manager in the
(4) Atlanta office began that 1968?
(5) A Yes.
(6) Q How long were you in that position?
(7) A My records show that was April of '68.
(8) Q Okay. How long were you a regional sales manager?
(9) A It looks like about four months.
(10) Q I'm sorry. What was your next position?
(11) A Then I moved to St. Louis as field sales manager.
(12) Q In 1968?
(13) A Yes.
(14) Q What did that position- what was that about?
(15) A Well, I was responsible for working with all of the
(16) fields, the regional district managers, and
(17) salesmen, throughout the company for the organic
(18) chemicals division.
(19) Q Which would include the plasticizer line?
(20) A Which would include the plasticizer.
(21) Q How long were you a field sales manager out of the
(22) St. Louis office?
(23) A Until 1972, January.
(24) Q Now, as field sales manager, did you have any
(25) responsibility in dealing with the distributors and

(1) their contracts?
(2) A Sure.
(3) Q Okay. Tell me about what those responsibilities
(4) included, just in relationship to distributors?
(5) A Well, in an administrative job, so we worked with
(6) the district manager and the product manager in
(7) trying to maintain and maximize our sales of
(8) product. That's the job of the field sales
(9) manager.
(10) Q I'm want to zero in on dealings with your
(11) distributors. Did you have dealings with the
(12) distributors directly while you were a field sales
(13) manager in St. Louis between 1968 and 1972?
(14) A Well, I had dealings with distributors and
(15) customers at that time.
(16) Q Okay. I'm talking about distributors.
(17) A Okay.
(18) Q What were your responsibilities in relation to the
(19) distributors?
(20) A No direct responsibility at the time, just only as
(21) an overview and administrative order.
(22) Q Tell me what you would do in that regard, overview
(23) or administrative?
(24) A Analysis of sales, analysis of sales effort, the
(25) growth of product lines, the growth of the

(1) customer.
(2) Q Okay. Between 1968 and 1972, as a field sale
(3) manager, was part of your responsibility to
(4) research who the distributors were selling the
(5) products to?
(6) A We did not ask our distributors to, and they were
(7) reluctant to give us names of their customers.
(8) Q Why was that?
(9) A It's the general method of operation. They have
(10) their customers. We sell the product to the
(11) distributors, and then they buy it and resell it.
(12) Q And it was the policy of Monsanto not to ask the
(13) distributors to- not to ask the distributors who
(14) they were selling to?
(15) MR. HOPKINS: Object to the form.
(16) MR. TAYLOR: On what basis is
(17) that?
(18) MR. HOPKINS: Pardon me?
(19) MR. TAYLOR: What basis is the
(20) form? Tell me what the objection to the form is on
(21) that?
(22) MR. HOPKINS: Because I don't
(23) know that he has any knowledge as to what the
(24) policy of Monsanto is, and you have already
(25) indicated today that he is not being taken as a

(1) 30b6 witness.
(2) MR. TAYLOR: Sir, I'll rephrase
(3) the question.
(4) Q (By Mr. Taylor) You stated that Monsanto did not
(5) ask the distributors who they were selling the
(6) products to, correct?
(7) MR. TAYLOR: Why don't we read
(8) back that question and answer about three questions
(9) ago, and I will take it from there.
(10) (Questions and Answers on
(11) Page 47, Lines 2 through
(12) 11, read by the court
(13) reporter.)
(14)
(15) Q (By Mr. Taylor) I will take it from there.
(16) You testified that it was, as I understand
(17) your testimony, and correct me if I'm wrong, was it
(18) the general method of operation of Monsanto not to
(19) ask the distributors who they were selling the
(20) product line to?
(21) A The relationship of distributors with the Monsanto
(22) field people was a matter of developing strong
(23) joint efforts in many cases.
(24) Generally, the field regional managers and
(25) salesmen were aware from time to time as who the

(1) distributors were selling to, but we did not
(2) receive any formal notice from any distributor, as
(3) I recall, that these were their customer lists.
(4) Q Okay. As field sales manager, in St. Louis between
(5) 1968 and 1972, did you seek information as to who
(6) the distributors were selling your products to?
(7) A I don't recall.
(8) Q As a general method of operation, did Monsanto have
(9) a concern as to where its plasticizer products were
(10) being sold, and how they were being used?
(11) MR. HOPKINS: Object to the form.
(12) You can answer.
(13) THE WITNESS: Well, I think- say
(14) that again.
(15) MR. TAYLOR: Can you read the
(16) question back.
(17) (Question on Page 49, Lines
(18) 8 through 10, read by the
(19) court reporter.)
(20)
(21) THE WITNESS: I can't speculate
(22) on that, because my contacts with the distributors
(23) and our salesmen were only from an administrative
(24) basis.
(25) Any of the proprietary products I'm sure that

- (1) A So for 12 years.
 (2) Q 1992, roughly?
 (3) A Yeah.
 (4) Q Was that an elected position or an appointed position?
 (5) A Elected.
 (7) Q How long were your terms?
 (8) A Six years, two terms.
 (9) Q During that time between 1980 and 1992, did you do any consulting work for Monsanto?
 (11) A No.
 (12) Q Have you ever been an expert witness in any piece of litigation?
 (14) A No.
 (15) Q In 1992, what was your- what did you do after Port Commissioner? Were you employed?
 (17) A Not employed. I was on the board of several companies, but other than that, that's it.
 (19) Q Sir, we are going to go back to the time when you were in New York, roughly 1961, as an industrial sales manager, and when you were leading up to the time when Monsanto entered an agreement with AMSCO and also Central Solvents.
 (24) Were those distributors required to go through any training in Monsanto's products?

- (1) A That was the responsibility of the product manager, so there were general familiarization courses or training periods with all of the distributors to introduce them to our line of plasticizers.
 (5) Q You remember that taking place?
 (6) A Oh, yes.
 (7) Q Where were those training courses held?
 (8) A Generally, in the district offices of the distributor.
 (10) Q And who would conduct those courses for Monsanto?
 (11) A Well, we had product specialists for each of our product lines within the plasticizer group. And we might have had three or four product lines within the plasticizer group.
 (15) Q So the product specialists would come in and train the distributors' people?
 (17) A Yeah.
 (18) Q And were AMSCO and Central Solvents trained at the same time, or did they have separate training?
 (20) A Separate training. Different companies.
 (21) Q How did it work between AMSCO and Central Solvents, were they given exclusive territories or not?
 (23) A No.
 (24) Q Who was- which company, AMSCO or Central Solvents, had a larger volume business for Monsanto?

- (1) A What period?
 (2) Q Well, why don't we start from the beginning, from the early '60s.
 (4) A I think Central Solvents grew in their sales- in their sales probably faster in some cases than AMSCO.
 (7) Q And did that change? Did AMSCO catch up or become equal to Central Solvents?
 (9) A We always felt that AMSCO was a very important person in the group within our distributor function.
 (12) Q Did they catch up to Central Solvents?
 (13) A I don't recall. I don't think so.
 (14) Q Well, did it change over time, where AMSCO began to sell more of your products than Central Solvents?
 (17) A I don't recall.
 (18) Q Back to the training of the distributors. Anyone else besides the product specialists train the distributors' people?
 (21) A Some of our research people generally would participate on occasion, but I don't- I can't be specific.
 (24) Q Well, did you ever sit in on any of these training sessions of the distributors' people?

- (1) A Oh, yeah.
 (2) Q Tell me what- describe to me the training? Just if you can, generally, not specifically? Just generally, where was it, and tell me how it was conducted?
 (6) I believe you said it was done in your New York office?
 (8) A No.
 (9) Q I'm sorry.
 (10) A Done at the distributors' offices, the training.
 (11) Q For the training you would go to the distributors' offices?
 (13) A Yes. Because they would have their salesmen in.
 (14) Q And would the training be done in one location or would you go around the country to the various outlets of the distributors?
 (17) A What period are you talking about?
 (18) Q Well, I'm talking about in the beginning, when they first came on-board as a distributor, either of these companies?
 (21) A Well, our relationship in the New York area was primarily in the New York area. That's where it started.
 (24) Q Okay. Tell me how it progressed, the training, and where it progressed to?

- (1) MR. HOPKINS: Object to the form.
 (2) You can answer. Go ahead.
 (3) THE WITNESS: The training was arranged by the district manager, our district manager and his salesmen who serviced the AMSCO account, or district, wherever they were located.
 (7) And then they would call on the- they would call. I would help coordinate the people from St. Louis to show up, and we would put on a training session.
 (11) Q (By Mr. Taylor) Tell me about the training sessions. How long would they last?
 (13) A Oh, a number of hours, sometimes a half a day if not longer.
 (15) Q Would it ever last more than a day?
 (16) A No. I don't think so.
 (17) Q Was it a one-time training, or would you go back for follow-up?
 (19) A Depending upon the need.
 (20) Q Was there ever a situations where after the initial training, the distributor would call Monsanto and schedule additional training for those same people?
 (24) A Very possibly.
 (25) Q Do you ever remember that happening?

- (1) A I don't recall.
 (2) Q Now, what topics were covered in these training sessions?
 (4) A Generally, all of our plasticizer line. So each product is different in how it's used, where its applications might be and the markets that we see it.
 (8) Q Would the distributor- distributor trainee, would be their salesmen?
 (10) A Yes.
 (11) Q Did they have any of their own technical people that were being trained, for example, at AMSCO?
 (13) A I don't recall.
 (14) Q And were there demonstrations of applications on products conducted during these training sessions or was it all bookwork, went through the books?
 (17) A Bookwork.
 (18) Q And were Monsanto's technical bulletins and literature distributed during those-
 (20) A Yes.
 (21) Q - meetings?
 (22) A Generally, I would say, yes.
 (23) Q And were the distributors- were the distributors authorized- were the distributors given copies of- distributor salesmen, given copies of the

- (1) AMSCO?
 (2) A Yes.
 (3) Q Was AMSCO ever invited to Monsanto's sales
 (4) meetings?
 (5) A No.
 (6) Q Mr. Wright, did AMSCO have its own technical people
 (7) in-house?
 (8) A I don't know.
 (9) MR. ORR: You said you don't
 (10) know?
 (11) THE WITNESS: I don't know.
 (12) Q (By Mr. Taylor) In your career at Monsanto, did
 (13) you ever deal with Armstrong Cork Company?
 (14) A No.
 (15) Q When you were a-- between 1968 and 1972, when you
 (16) were the field sales manager, did you review the
 (17) sales of Monsanto to Armstrong?
 (18) A With our district manager.
 (19) Q That wasn't an articulate questions.
 (20) Did you deal with Armstrong, I meant, in any
 (21) way? Not face-to-face, but did you deal-- did any
 (22) of your job duties include sales to Armstrong?
 (23) A As the plasticizer division or product group, yes.
 (24) Q Tell me about that. Tell me about your involvement
 (25) in any way with Armstrong?

- (1) A Armstrong was a very important customer of
 (2) Monsanto, primarily in the floor tile field.
 (3) Q What other products do you remember-- besides
 (4) floor products-- do you remember Armstrong
 (5) Manufacturing?
 (6) A That's all.
 (7) Q At the time--
 (8) A That's it.
 (9) Q -- that you were at Monsanto, did you-- were you
 (10) aware that Armstrong manufactured ceiling tiles?
 (11) A No.
 (12) Q Was part of your function as the district sales
 (13) manager or field sales manager between 1968 and
 (14) 1972, did you get involved in any of the marketing
 (15) activities of the sales group.
 (16) A Well, explain that. That is the whole job of a
 (17) field sales manager.
 (18) Q Fair enough. Did you get involved in marketing
 (19) intelligence?
 (20) A Such as?
 (21) MR. HOPKINS: I will object to
 (22) form.
 (23) Q (By Mr. Taylor) Have you heard of the term
 (24) 'marketing intelligence'? Are you familiar with
 (25) that term?

- (1) A No.
 (2) Q Was part of your duties to obtain information as
 (3) to what products your customers were
 (4) manufacturing?
 (5) MR. HOPKINS: When he was a field
 (6) sales manager?
 (7) THE WITNESS: No.
 (8) MR. TAYLOR: That's right.
 (9) THE WITNESS: No.
 (10) Q (By Mr. Taylor) What I meant by that is, was part
 (11) of the sales group, was there efforts made to
 (12) determine for purposes of knowing what products
 (13) your customers may need, what products the
 (14) customers were manufacturing or planning to
 (15) manufacture in the future?
 (16) MR. HOPKINS: Object to the form.
 (17) You can answer.
 (18) THE WITNESS: Say that again.
 (19) MR. TAYLOR: If you can just read
 (20) that question back. If you don't understand it, I
 (21) can rephrase it.
 (22) (Question on Page 70, Lines
 (23) 10 through 15, read by the
 (24) court reporter.)
 (25) ///

- (1) THE WITNESS: It would be the
 (2) responsibility of the product manager and the
 (3) district manager and the salesmen, not necessarily
 (4) my job.
 (5) Q (By Mr. Taylor) Were you ever involved with the
 (6) plasticizer council within Monsanto?
 (7) MR. HOPKINS: Object to the form.
 (8) You can answer.
 (9) THE WITNESS: Only in writing up
 (10) our contracts.
 (11) Q (By Mr. Taylor) What was your understanding of
 (12) what the plasticizer council was?
 (13) A It was out of our legal department and the
 (14) particular lawyer that it was attached to or
 (15) department or division.
 (16) Q Did you ever travel to any of the Armstrong plants
 (17) or corporate offices?
 (18) A No.
 (19) Q Did you ever meet with any personnel from
 (20) Armstrong?
 (21) A I don't recall.
 (22) Q Were you involved in any of the committees studying
 (23) whether the PCB-containing plasticizers should be
 (24) withdrawn from the market?
 (25) A No.

- (1) Q Were you aware that there were committees formed to
 (2) study that topic?
 (3) A Yes.
 (4) Q What were you aware of? When did you become aware
 (5) of it?
 (6) MR. HOPKINS: Object to the form.
 (7) You can answer.
 (8) THE WITNESS: I don't recall.
 (9) Q (By Mr. Taylor) Well, what committees do you
 (10) remember that were studying that topic?
 (11) A I don't recall.
 (12) Q Were you advised, as the field sales manager, that
 (13) there was a-- prior to the Aroclors being pulled
 (14) from the market for the plasticizer group, were you
 (15) advised that that topic was being studied and that
 (16) that was a possibility?
 (17) MR. HOPKINS: Object to the form.
 (18) You can answer.
 (19) THE WITNESS: I don't recall.
 (20) Q (By Mr. Taylor) Do you recall that the
 (21) PCB-containing Aroclors were withdrawn from the
 (22) market?
 (23) A Yes.
 (24) Q Do you remember when that was?
 (25) A No.

- (1) Q Do you remember how long prior to that taking
 (2) place, that you were advised that that was the way
 (3) the company had decided to go?
 (4) A No.
 (5) Q Were you involved in any way in drafting the
 (6) communications to either the distributors or the
 (7) customers that the Aroclor plasticizers containing
 (8) PCBs were going to be withdrawn from the market?
 (9) A No.
 (10) Q Do you remember who was?
 (11) A The sales manager at the time, I think.
 (12) Q Who was that?
 (13) A Walter Schalk, or, yeah, I guess that's who it was.
 (14) MR. TAYLOR: If we could, we'll
 (15) mark this as Wright No. 3. This is the sales
 (16) summary, 'All PCB-containing products, American
 (17) Mineral Spirits, Conshohocken, PA, 1954 to 1997.'
 (18) It bears Bates MAE 001073 through 75.
 (19) (Exhibit No. 3 marked for
 (20) identification.)
 (21)
 (22) Q (By Mr. Taylor) If you could, Mr. Wright, just
 (23) review that and tell me if you recognize that type
 (24) of document?
 (25) A No.

- (1) Q What types of documents would you review?
 (2) MR. HOPKINS: Object to the form.
 (3) Q (By Mr. Taylor) If you look at the second and
 (4) third page of the document, there seems to be
 (5) another type of form. It's a product/customer
 (6) sales report.
 (7) A Yes.
 (8) Q Is the type of document you would review?
 (9) A Yes.
 (10) Q Obviously, this has been redacted, but it does have
 (11) certain information on it. For example, "Union
 (12) AMSCO, Philadelphia, PA."
 (13) Do you see that?
 (14) A Where are you looking?
 (15) Q I'm sorry. Turn to the next page.
 (16) A (Witness complies.) Okay.
 (17) Q Is that right?
 (18) A Yes.
 (19) Q Was Union AMSCO one of your distributors, or was
 (20) that a direct customer situation?
 (21) A That is the Union Oil, AMSCO. It is one and the
 (22) same.
 (23) Q Okay. Let's go back to the page you were looking
 (24) on, the second page of the document. You will see,
 (25) what I think is American Mineral Spirits,

- (1) Philadelphia, PA, 5715, Aroclor 1254.
 (2) Do you see that?
 (3) A Yes.
 (4) Q And can you tell what date that was shipped?
 (5) A No.
 (6) Q Is there any significance to the--
 (7) A It is a sales report for December 1970. It was a
 (8) monthly report--
 (9) Q Okay.
 (10) A -- of total sales to the distributors.
 (11) Q Is there any significance-- is this a year-end
 (12) report or is this a monthly report?
 (13) Up on top it says: "Organic Division,
 (14) Plasticizers, No. 4, customer/product sales report
 (15) for December 1970."
 (16) A That's right.
 (17) Q So does this indicate that in December of 1970,
 (18) 156,600 pounds of Aroclor 1254 was shipped to
 (19) American Mineral Spirits, Philadelphia, PA?
 (20) A That's right.
 (21) Q And is a plasticizer form?
 (22) MR. TAYLOR: Just for the
 (23) record-- Mr. Davidson. I don't know if it was--
 (24) did you take down what Mr. Davidson said?
 (25) THE COURT REPORTER: No.

- (1) MR. TAYLOR: Fine.
 (2) Q (By Mr. Taylor) What was your understanding of
 (3) that document, sir?
 (4) A That is a monthly report.
 (5) Q That this is a plasticizer product?
 (6) A Aroclor 1254, sure.
 (7) Q If you could go back to-- if you go back to the
 (8) fourth page of this document. Again, that is a
 (9) Monsanto company form. You said this is an
 (10) invoice, or is this--
 (11) A This is a shipping-- a shipping form. Monsanto's
 (12) shipping forms and invoices would be on a similar
 (13) facsimile of this, where the pricing and the total
 (14) value would be involved for invoicing. So this is
 (15) a shipping notice.
 (16) If you notice down here on July 13, 1970, they
 (17) expect to ship. This went to the customer as well
 (18) as to the product group.
 (19) Q Does that refresh your recollection, sir, of
 (20) whether Monsanto kept records-- kept records of who
 (21) American Mineral Spirits was selling your
 (22) plasticizer products to?
 (23) MR. HOPKINS: Object to the form.
 (24) You can answer.
 (25) THE WITNESS: No. That doesn't

- (1) refresh my memory at all.
 (2) Q (By Mr. Taylor) So this is-- you will agree with
 (3) me, that this is a Monsanto company document,
 (4) correct?
 (5) A Yes.
 (6) Q And that, at least on this document, Monsanto was
 (7) aware of who the distributor was selling their
 (8) product to, correct?
 (9) A Yes.
 (10) Q And in all of the cases, all of the shipments of
 (11) product, plasticizer products to AMSCO, was
 (12) Monsanto aware of who they were going-- who AMSCO
 (13) was going to sell that product to?
 (14) MR. HOPKINS: Object to the form.
 (15) You can answer.
 (16) THE WITNESS: In this case it
 (17) appears to be a drop shipment. In other words, we
 (18) shipped directly from the plant to this particular
 (19) location in Philadelphia. And what Pecora Chemical
 (20) Corporation is, I don't know. It could be a
 (21) warehouse.
 (22) Q (By Mr. Taylor) And was--
 (23) A And you notice that they were full truckloads.
 (24) Q I didn't notice that. Point to me where that
 (25) information is?

- (1) A 37,800 pounds is a full truckload of drums.
 (2) Q Of drums?
 (3) A Yes.
 (4) Q Not a tank car?
 (5) A That is right.
 (6) Q And when you-- I believe you said "drop shipment"?
 (7) A Yes.
 (8) Q Is there some other type of shipment that is
 (9) different than a drop shipment?
 (10) A Directly to-- directly to AMSCO's warehouses.
 (11) Q And a drop shipment would be?
 (12) A To the third party.
 (13) Q To a third party. Okay.
 (14) And if you turn to the last page of that
 (15) document, of that exhibit, that being No. 4, Wright
 (16) No. 4, bearing Bates MAE 000530.
 (17) A (Witness complies.)
 (18) Q Is this another example of a drop shipment?
 (19) A Yes.
 (20) Q You see there where it says: "Harleco Chemicals"?
 (21) Do you see that?
 (22) A Yes.
 (23) Q Is that a-- do you remember that company?
 (24) A No.
 (25) Q Do you know whether that is a customer of AMSCO?

- (1) A We billed AMSCO.
 (2) Q I understand that.
 (3) Do you know whether Harleco was a customer of
 (4) AMSCO's from this document, or was that a direct
 (5) customer of Monsanto?
 (6) A Oh, no. A customer of AMSCO.
 (7) Q Okay. And when was this-- this shipment in the box
 (8) in the right-hand corner was expected to be shipped
 (9) on October 6th, 1970?
 (10) A Yes.
 (11) Q And this was a plasticizer product?
 (12) A Yes.
 (13) Q And Aroclor 1254?
 (14) A Yes.
 (15) Q 6,000 pounds?
 (16) A Yes.
 (17) Q And do you see there where it says "steel" under
 (18) description?
 (19) A No. Oh, steel drums.
 (20) Q Steel drums. Okay. I didn't know.
 (21) Where it says here, I noticed this on the
 (22) other similar forms it says: "Less distributor"--
 (23) A -- "discount."
 (24) Q "Five percent." Tell me how that worked?
 (25) A Very simple.

(1) Number 6, Wright No. 6, with today's date, is a
 (2) document entitled: "Your Guide To Top-Quality
 (3) Plasticizers." It bears Bates stamp MAE 059457
 (4) through 059464.
 (5) And if you could, review that for a moment and
 (6) let me know when you are finished.
 (7) A (Witness complies.) Okay.
 (8) Q Is this a Monsanto publication?
 (9) A It appears to be since it has the Monsanto label on
 (10) it.
 (11) Q And do you remember this document?
 (12) A No.
 (13) Q How would you describe this document?
 (14) MR. HOPKINS: Object to the form.
 (15) You can answer.
 (16) THE WITNESS: A sales item.
 (17) Q (By Mr. Taylor) This is a sales-
 (18) A A sales.
 (19) Q - sales bulletin?
 (20) A Bulletin.
 (21) Q If you can turn to the back page.
 (22) A (Witness complies.)
 (23) Q You will see AMSCO's insignia on the bottom left,
 (24) towards- on the left. Do you see that?
 (25) A Uh-huh. (Witness answers affirmatively.)

(1) Q You'll see addresses across the country. Do you
 (2) see that?
 (3) A Uh-huh. (Witness answers affirmatively.)
 (4) Q Under American Mineral Spirits Company?
 (5) A Uh-huh. (Witness answers affirmatively.)
 (6) Q Can you explain why AMSCO's insignia and outlets or
 (7) locations are part of this document?
 (8) A I cannot.
 (9) Q Does that in your experience seem unusual?
 (10) MR. ORR: Object to the form of
 (11) the question.
 (12) MR. HOPKINS: Join.
 (13) THE WITNESS: I can't comment on
 (14) that.
 (15) Q (By Mr. Taylor) Well, if you look at the language
 (16) on the last page above the AMSCO's insignia,
 (17) saying: "We can ship you plasticizers and other
 (18) chemicals promptly out of nearby stocks."
 (19) Do you see that?
 (20) A Oh, yes.
 (21) Q Did Monsanto have "nearby stocks"?
 (22) MR. HOPKINS: Object to the form.
 (23) Q (By Mr. Taylor) Or is that AMSCO writing that
 (24) message?
 (25) MR. ORR: Object to the form.

(1) THE WITNESS: I can't comment.
 (2) Q (By Mr. Taylor) Well, can you comment whether
 (3) Monsanto had stockyards of- or stock- for lack of
 (4) a better word- centers of products around the
 (5) country?
 (6) MR. HOPKINS: Object to the form.
 (7) THE WITNESS: Oh, yes.
 (8) Q (By Mr. Taylor) They did?
 (9) A Yes.
 (10) Q And, sir, does this refresh your recollection when
 (11) I asked you earlier if Monsanto and AMSCO published
 (12) joint sales materials?
 (13) MR. HOPKINS: Object to the form.
 (14) MR. ORR: Join that.
 (15) THE WITNESS: I'm not aware of
 (16) jointly publishing sales materials.
 (17) Q (By Mr. Taylor) Were you aware of- did AMSCO have
 (18) its insignia and locations around the country at
 (19) the end of all of Monsanto's sales literature?
 (20) A No, No.
 (21) Q Do you remember that- do you remember it ever
 (22) appearing on Monsanto's sales literature; that
 (23) being AMSCO's insignia and locations?
 (24) A No.
 (25) Q If you can turn to the fourth page in, fifth page

(1) in, on the document bearing 059461.
 (2) A (Witness complies.) Okay.
 (3) Q Sir, were you, when you were at Monsanto, either as
 (4) a salesman or as a field sales manager, conversant
 (5) in the qualities of the Aroclor products?
 (6) MR. HOPKINS: Object to the form.
 (7) You may answer.
 (8) THE WITNESS: Was I conversant
 (9) with the Aroclor products? Yes.
 (10) Q (By Mr. Taylor) Their positive qualities which you
 (11) used to market to customers?
 (12) A Yes.
 (13) Q And do you remember the issue of whether a product
 (14) was flame resistant or flame retardant?
 (15) MR. HOPKINS: Object to the form.
 (16) THE WITNESS: Yes.
 (17) Q (By Mr. Taylor) And was there a distinction in
 (18) your mind between flame resistant and flame
 (19) retardancy?
 (20) A It's a matter of terminology.
 (21) Q Is there- I'm sorry.
 (22) A Probably used. Not probably. Okay. A matter of
 (23) terminology.
 (24) Q What do you mean by that, "a matter of
 (25) terminology"? I asked you if there was a

(1) distinction between the two?
 (2) A I think we use them interchangeably.
 (3) Q Okay. You are aware of no distinctions between the
 (4) two phrases?
 (5) A No.
 (6) MR. HOPKINS: Note my objection
 (7) to the form.
 (8) Q (By Mr. Taylor) I'm going to show you what was
 (9) marked yesterday as Springgate No. 4. It is a
 (10) "Minutes of Aroclor Ad Hoc Committee, first
 (11) meeting."
 (12) It bears Bates MAE 021976 through 021979. It
 (13) was marked in a deposition yesterday of James
 (14) Springgate, Springgate No. 4.
 (15) I ran out of copies of the thing. There is an
 (16) extra.
 (17) I had asked you earlier, Mr. Wright, if you
 (18) remember committees that were formed studying the
 (19) Aroclor PCB issue. Do you remember that?
 (20) A Yes.
 (21) Q When did you become aware that there were
 (22) allegations that the Aroclor PCB products were
 (23) harmful to the environment?
 (24) MR. HOPKINS: Object to the form.
 (25) THE WITNESS: I don't recall.

(1) Q (By Mr. Taylor) Do you remember how you became
 (2) aware of that?
 (3) A No.
 (4) Q Was it on your own, through your own observations
 (5) of the media, or was it through the company?
 (6) A Had to be through the company.
 (7) Q And am I correct in remembering your testimony that
 (8) you were aware that there were committees within
 (9) the company studying the issue and how the company
 (10) was going to respond to the allegations regarding
 (11) PCBs?
 (12) MR. HOPKINS: Object to the form.
 (13) THE WITNESS: I wasn't in the
 (14) loop.
 (15) Q (By Mr. Taylor) But were you aware? I understand
 (16) that you weren't in the loop, but were you aware
 (17) that those discussions were going on at some level
 (18) within the company?
 (19) MR. HOPKINS: Object to the form.
 (20) THE WITNESS: I don't recall.
 (21) Q (By Mr. Taylor) Well, between 1968 and 1972, when
 (22) you were the field sales manager, was there any
 (23) scuttlebutt or rumors going around among the sales
 (24) troops regarding the allegations being made in the
 (25) press about PCBs?

- (1) THE WITNESS: Okay.
 (2) Q (By Mr. Taylor) Okay. Were you involved at all in
 (3) assisting the salesmen on how to respond to
 (4) customers' questions relating to the PCB issue?
 (5) A No.
 (6) MR. HOPKINS: Object to the form.
 (7) Q (By Mr. Taylor) Do you remember this document?
 (8) A No.
 (9) Q Springgate No. 12? No?
 (10) A No.
 (11) Q From looking at the document, can you-- do you know
 (12) who would have prepared this document?
 (13) MR. HOPKINS: Object to the form.
 (14) Go ahead.
 (15) THE WITNESS: It would have come
 (16) out of product group, obviously.
 (17) Q (By Mr. Taylor) Why do you say "obviously"?
 (18) A That is their responsibility.
 (19) Q That would have been Cumming Paton, the group he
 (20) was in?
 (21) A Yes.
 (22) Q Was Walter Waychoff the product manager during the
 (23) time that you were field sales manager in St. Louis
 (24) for the plasticizer product?
 (25) A I don't recall, because he had different jobs, so

- (1) did Cumming Paton, so did I.
 (2) Q I understand.
 (3) A We turned around quite a bit.
 (4) Q You remember Cumming Paton was the product guy,
 (5) correct?
 (6) A Or in the technical aspects of the product group.
 (7) Q From you looking at this, why are you so sure that
 (8) it came out of a product group?
 (9) MR. HOPKINS: Object to the form.
 (10) THE WITNESS: The product groups
 (11) were responsible for all of their products that
 (12) they handled in that particular assignment, and
 (13) therefore, that was the responsibility to handle
 (14) the communications and the product.
 (15) They saw that the product was, you know,
 (16) communicated with, and that is their
 (17) responsibility.
 (18) Q (By Mr. Taylor) So this would not be questions
 (19) posed to the salesmen?
 (20) A What do you mean?
 (21) Q Well, it would be the product groups'
 (22) responsibility to field questions from customers,
 (23) as opposed to the salesmen?
 (24) A This appears to be a communication to the sales
 (25) people on how to answer the questions concerning

- (1) Aroclors.
 (2) Q So it would be--
 (3) A During this period of time.
 (4) Q It would be the product groups' advise to the sales
 (5) force?
 (6) A Yes.
 (7) Q And as field sales manager, you would not have--
 (8) would you have gotten, likely to get a copy of
 (9) this?
 (10) A I would imagine so.
 (11) Q You just don't remember this document--
 (12) A No.
 (13) Q -- sitting here today?
 (14) A No.
 (15) Q If you can turn to Page 11 of the document, the
 (16) last two pages of the document.
 (17) A (Witness complies.)
 (18) Q You will see under "Applications." Question No. 1,
 (19) the sample question is: "Could Aroclor 1254/1260
 (20) escape from my sealant/adhesive/coating whatever
 (21) into the environment?"
 (22) Do you remember that being an issue that you
 (23) dealt with?
 (24) A No.
 (25) MR. HOPKINS: Object to the form.

- (1) Q (By Mr. Taylor) If you go down to Question 3 it
 (2) says: "Does Monsanto intend to continue
 (3) manufacture of Aroclor 1254/1260, et cetera?"
 (4) And the answer, suggested answer that is given
 (5) under answer, under three, on the last page, is:
 (6) "I have been given no indication otherwise."
 (7) Do you see that?
 (8) A Yes.
 (9) Q Was that accurate? Is that an accurate statement
 (10) that the salesmen were not given any indication
 (11) that the Aroclor containing PCBs may be pulled from
 (12) the market?
 (13) MR. HOPKINS: Object to the form.
 (14) THE WITNESS: I can't answer
 (15) that, because I don't know what the indications
 (16) are.
 (17) Q (By Mr. Taylor) What indications?
 (18) A But, you know, read it. Read it yourself, because
 (19) it simply says-- that's the answer. That is the
 (20) given answer at the time.
 (21) Q What is the given answer? That "I have been given
 (22) no indication otherwise."
 (23) A Yeah. That's the answer.
 (24) Q I'm going to show you what was previously marked in
 (25) the deposition of Edward John, as John No. 16. And

- (1) for the record, it's entitled "Presentation to
 (2) Field Sales, Personal and Confidential." It bears
 (3) Bates MAE 033475 through 033484.
 (4) And if you could just take a moment, sir, and
 (5) review that.
 (6) A (Witness complies.)
 (7) MR. ORR: Are you going to mark
 (8) that?
 (9) MR. TAYLOR: I am not going to
 (10) mark this. It was marked as John No. 16.
 (11) MR. HOPKINS: Off the record.
 (12) (Discussion off the record.)
 (13)
 (14) THE WITNESS: Okay.
 (15) Q (By Mr. Taylor) Do you remember this document,
 (16) sir?
 (17) A No.
 (18) Q Is this document also something that would likely
 (19) to have been prepared by the product group?
 (20) MR. HOPKINS: Object to the form.
 (21) THE WITNESS: Yes.
 (22) Q (By Mr. Taylor) Yes?
 (23) A Yes.
 (24) Q Turn to the second page.
 (25) A (Witness complies.)

- (1) Q I'm sorry. Go to the third page of the document.
 (2) A (Witness complies.)
 (3) Q It says-- referring to a letter, the second page,
 (4) last paragraph. It says: "This letter goes to
 (5) plasticizer customers only."
 (6) Do you remember letters sent to the customers
 (7) advising them of the PCB situation?
 (8) MR. HOPKINS: Object to the form.
 (9) THE WITNESS: I don't remember.
 (10) Q (By Mr. Taylor) Do you remember that happening,
 (11) generally, that the customers were advised that
 (12) there was issues or allegations concerning PCB
 (13) products?
 (14) A Generally, yes.
 (15) Q Well, on Page 3 of this document, it says: "A copy
 (16) of this letter, together with a cover letter, will
 (17) be mailed to the head office of each of our Aroclor
 (18) distributors."
 (19) Do you see that?
 (20) A Yes.
 (21) Q Do you remember that happening?
 (22) A It was done. It was done by the product group.
 (23) Q Were you involved at all in that letter sent to the
 (24) distributors?
 (25) MR. HOPKINS: Object to the form.

- (1) ensure better control of end uses."
 (2) A Uh-huh. (Witness answers affirmatively.)
 (3) Q Do you see that?
 (4) A Uh-huh. (Witness answers affirmatively.)
 (5) Q Do you remember that taking place, that all sales
 (6) ceased through distributors?
 (7) MR. HOPKINS: Object to the form.
 (8) Q (By Mr. Taylor) Do you remember that? That is all
 (9) the question is.
 (10) A I don't recall.
 (11) Q You don't recall that sales of the Aroclor
 (12) containing PCBs were terminated through
 (13) distributors?
 (14) MR. HOPKINS: Object to the form.
 (15) You can answer.
 (16) THE WITNESS: I don't recall the
 (17) time or date or when or if.
 (18) Q (By Mr. Taylor) Well, it says: "We are
 (19) terminating all sales to distributors to ensure
 (20) better control of end uses."
 (21) Do you remember there being a concern that
 (22) there was a lack of control of end uses through
 (23) sales through distributors?
 (24) MR. HOPKINS: Object to the form.
 (25) THE WITNESS: I don't recall.

- (1) Q (By Mr. Taylor) You don't recall that issue coming
 (2) up?
 (3) A No.
 (4) Q No?
 (5) A No.
 (6) MR. HOPKINS: Can I just ask
 (7) Mr. Wright if he wants to take a break?
 (8) MR. TAYLOR: Sure.
 (9) MR. HOPKINS: We don't have to.
 (10) It is up to you.
 (11) THE WITNESS: Let's continue for
 (12) another half hour.
 (13) MR. TAYLOR: Okay. Fine I want
 (14) to mark this as No. 8.
 (15) (Exhibit No. 8 marked for
 (16) identification.)
 (17)
 (18) Q (By Mr. Taylor) I ask you, sir, to review this
 (19) document, which is a May 14, 1970, memorandum from
 (20) Willis Clark, to a host of individuals, on which
 (21) you were copied.
 (22) It's entitled "Confidential." It bears Bates
 (23) MAE 060748 through 750. Just let me know when you
 (24) have finished reviewing it, and you are ready to
 (25) proceed.

- (1) A (Witness complies.) Okay.
 (2) Q Do you remember John Mason of Monsanto?
 (3) A No, I don't.
 (4) Q Do you remember the name?
 (5) A No.
 (6) Q It says, in the second paragraph, he is referring
 (7) to a presentation to the corporate management
 (8) committee.
 (9) Do you see that?
 (10) A Yes.
 (11) Q And it's referring to two basic recommendations.
 (12) It says: "And second, that we phase out all of the
 (13) nonbiodegradable PCB products where control is not
 (14) possible and replace these with materials with
 (15) biodegradable PCBs or other suitable products."
 (16) A Uh-huh. (Witness answers affirmatively.)
 (17) Q And it says: "The Corporate Management Committee
 (18) approved these recommendations."
 (19) Do you see that?
 (20) A Uh-huh. (Witness answers affirmatively.)
 (21) Q The second paragraph, third paragraph: "In the
 (22) plasticizer area, none of our applications are
 (23) considered to be of a controllable nature."
 (24) Do you see that?
 (25) A Uh-huh. (Witness answers affirmatively.)

- (1) Q Do you remember that as an issue?
 (2) MR. HOPKINS: Object to the form.
 (3) THE WITNESS: This is a product
 (4) management responsibility to determine how they are
 (5) going to market their product.
 (6) Q (By Mr. Taylor) I'm asking you, at the time as a
 (7) field sales manager in the plasticizer- involved
 (8) with plasticizer products, at this time of this
 (9) memorandum, whether you remember the issue that
 (10) none of the applications of the plasticizers were
 (11) considered controllable?
 (12) MR. HOPKINS: Object to the form.
 (13) THE WITNESS: I don't recall.
 (14) Q (By Mr. Taylor) Do you remember the control at
 (15) all?
 (16) MR. HOPKINS: Object to the form.
 (17) Q (By Mr. Taylor) In relation to plasticizers?
 (18) A No.
 (19) Q Turn to the second page, under the "Plan of
 (20) Action." It says: "1. Contact AMSCO and Central
 (21) Solvents central offices to inform them of our
 (22) plans."
 (23) It says: "This was completed in early May on
 (24) a confidential basis." Do you remember that being
 (25) done in early May of 1970?

- (1) A I don't remember any specifics.
 (2) Q Do you remember that it was done on a "confidential
 (3) basis"?
 (4) MR. HOPKINS: Object to the form.
 (5) THE WITNESS: The direction of
 (6) this memo is to the district managers who were
 (7) responsible for calling on the distributors and all
 (8) of their customers.
 (9) Q (By Mr. Taylor) I understand. If you look on the
 (10) right-hand side it shows that you were copied.
 (11) A That's right. I was copied, along with others.
 (12) Q And I believe your testimony was that it was
 (13) likely that you would have been involved in
 (14) contacting the distributors regarding the
 (15) withdrawal of the PCB plasticizers from the
 (16) market?
 (17) A Yes.
 (18) Q And I'm asking if this reference here refreshes
 (19) your recollection regarding your contacting AMSCO
 (20) or Central Solvents?
 (21) A We had- the regional managers had direct contact
 (22) with Central Solvents and AMSCO at their
 (23) headquarters, as well as I, from an overview
 (24) standpoint. So I'm sure that this was done.
 (25) Q That you would have been involved?

- (1) A I would have been involved at some point.
 (2) Q The last sentence of point one says: "The regional
 (3) offices should not have been contacted by the
 (4) central offices."
 (5) Do you know what that means?
 (6) MR. HOPKINS: Object to the form.
 (7) THE WITNESS: I don't know what
 (8) that means.
 (9) Q (By Mr. Taylor) It says, No. 5: "Contact all
 (10) distributors and inform them in writing of our
 (11) decision to remove these products from the market
 (12) and to stop all shipments on 8/30/70."
 (13) Do you see that?
 (14) A Uh-huh. (Witness answers affirmatively.)
 (15) Q Did all shipments stop on 8/30/70?
 (16) MR. HOPKINS: Object to the form.
 (17) THE WITNESS: I don't know.
 (18) Q (By Mr. Taylor) Were you aware of AMSCO requesting
 (19) shipments of Aroclor 1254 after August 30, of 1970?
 (20) A No.
 (21) Q If they had, would product be shipped to them?
 (22) MR. HOPKINS: Object to the form.
 (23) THE WITNESS: I don't know. I
 (24) doubt it.
 (25) Q (By Mr. Taylor) Why do you doubt it?

- (1) again.
 (2) Q (By Mr. Taylor) Was there any restriction of
 (3) AMSCO- AMSCO's ability to call on customers that
 (4) were already direct customers of Monsanto?
 (5) A No. They could call on any customer they wanted,
 (6) and it's a matter of who could service them the
 (7) best.
 (8) They were primarily interested in handling our
 (9) drum accounts and to service the drum industry,
 (10) which is distinctly different from the bulk
 (11) industry.
 (12) Q It says here under No. 4 that: "Monsanto does not
 (13) expect to solicit small order business for the
 (14) product line in the area."
 (15) Is that what you mean, drum quantities?
 (16) A Drum accounts.
 (17) MR. HOPKINS: Note my objection
 (18) to the question.
 (19) Q (By Mr. Taylor) It goes on: "but expects to refer
 (20) some inquiries to distributor."
 (21) When it says "refer to distributor," was it
 (22) the practice of Monsanto, if it got an order for
 (23) say a drum quantities of Aroclor, not to fill that
 (24) order, but to give it to AMSCO or another
 (25) distributor?

- (1) A If the customer would agree to that, then we would
 (2) refer it to AMSCO.
 (3) Q Do you remember- I'm sorry. Are you finished?
 (4) A Go ahead.
 (5) Q Do you remember if Monsanto referred to AMSCO
 (6) Armstrong Cork's business?
 (7) A I don't have any knowledge of that.
 (8) Q On the term, you will see where it says: "One
 (9) year, commencing January 1, 1962." And then it
 (10) says in asterisks "Term of contract: See Exhibit
 (11) A. Paragraph 24."
 (12) If you could turn to Exhibit A, Paragraph 24,
 (13) and just read that for a moment to yourself.
 (14) A (Witness complies.) Go ahead.
 (15) Q Do you remember any amendment to this provision,
 (16) the term provision, between the contract between
 (17) AMSCO and Monsanto?
 (18) MR. HOPKINS: Object. You can
 (19) answer.
 (20) THE WITNESS: I don't remember
 (21) any amendment. It was a very good contract, and we
 (22) found AMSCO to be an outstanding distributor.
 (23) Q (By Mr. Taylor) Exhibit B, contained the price
 (24) list, correct?
 (25) A Yes.

- (1) Q Was that modified or amended from time to time as
 (2) the years went on?
 (3) A Yes.
 (4) Q And were you involved in those, the changing of the
 (5) price list?
 (6) A No.
 (7) Q Who was that?
 (8) A Product group.
 (9) Q On Exhibit A, which is the third page in, in the
 (10) document, underneath- well, in the center of the
 (11) page beginning with "In C/L or T/L of drums."
 (12) What does that refer to?
 (13) A Carload of truckload of drums.
 (14) Q It says: "Hereinafter referred to as 'proprietary
 (15) products.'" That is in quotations "proprietary
 (16) products."
 (17) A Right.
 (18) Q Were there other- and maybe Counsel can answer
 (19) this, but is this the whole list that is shown in
 (20) this exhibit, or were certain products deleted from
 (21) this document?
 (22) MR. HOPKINS: I'll volunteer, if
 (23) I might, because I think Mr. Wright had no
 (24) involvement in the production of this document.
 (25) MR. TAYLOR: Okay.

- (1) MR. HOPKINS: It's my
 (2) understanding the redaction log and the privilege
 (3) log are going to be produced.
 (4) It is my understanding there were other
 (5) products that are listed- that are listed there
 (6) that were redacted.
 (7) MR. TAYLOR: Do you know the
 (8) reason why they were redacted?
 (9) MR. HOPKINS: I think the basis
 (10) for the redaction- and this is going to be
 (11) reflected in the redaction log- is that those
 (12) products are not at issue in this case.
 (13) And that is by no means an admission that
 (14) Santicizer 160 or 141 are at issue in this case,
 (15) but they have been asked about previously, and the
 (16) Court has instructed us to produce information
 (17) about that, therefore, they were identified.
 (18) MR. TAYLOR: I object to,
 (19) obviously, the deletion. We will call and ask for
 (20) a totally unredacted version of this document, but
 (21) we can talk about that later.
 (22) Q (By Mr. Taylor) Did Monsanto have the right to
 (23) reject any requested for product made by AMSCO.
 (24) A Products made by AMSCO?
 (25) Q No. Products requested by AMSCO; could they reject

- (1) an order for any reason?
 (2) A No. We had our product line available to them, and
 (3) it was a matter of what their market had an
 (4) interest in, in plasticizers. We are talking about
 (5) plasticizers.
 (6) Q That's right.
 (7) MR. HOPKINS: Off the record.
 (8) (Discussion off the record.)
 (9)
 (10) Q (By Mr. Taylor) Paragraph 22 of the attachment, I
 (11) believe it's called Exhibit A of this document.
 (12) A Right.
 (13) Q Can you describe to me what- you can read it to
 (14) yourself- what is involved here in connection with
 (15) bulk terminals and warehouses?
 (16) A Very simple. Shipping bulk plasticizer was very
 (17) expensive. Santicizer 160 was made on the west
 (18) coast and in St. Louis, and it's a matter of
 (19) utilizing the most efficient bulk facility.
 (20) And from time to time if it was necessary, we
 (21) could pull on AMSCO's inventory to make bulk
 (22) shipments to customers.
 (23) I don't think that was a normal norm at all,
 (24) but at least it was there and where they maintained
 (25) bulk plasticizers, that was available.

- (1) Q Okay. Paragraph 23 talks about meetings
 (2) approximately twice a year between Monsanto and
 (3) AMSCO.
 (4) Can you discuss what those meetings were
 (5) about?
 (6) MR. HOPKINS: Object to the form.
 (7) You can go ahead.
 (8) THE WITNESS: Generally, to my
 (9) recollection, generally, the meeting was a result
 (10) of the progress of where their sales were going;
 (11) how they were doing; how we were servicing their
 (12) account; how the regional managers and salesmen
 (13) were working with their salesmen, you know,
 (14) whatever.
 (15) Q (By Mr. Taylor) Are these the meetings that you
 (16) referred to earlier in your deposition that you
 (17) would go to their meetings and sometimes either
 (18) talk to the group or meet with them, with your
 (19) technical people?
 (20) A Generally, this was with their executive group, and
 (21) also with their district managers.
 (22) Q The Paragraph 23 goes on and says: "To insure that
 (23) Monsanto is kept abreast of market conditions"-
 (24) A Yeah.
 (25) Q - "of new uses." Do you see that?

- (1) **is giving AMSCO names of accounts of which we were**
 (2) **servicing so that they could service them more**
 (3) **efficiently than we.**
 (4) Q Okay.
 (5) A Okay.
 (6) Q Well, if you read-- and I'm obviously reading this
 (7) wrong, but you tell me where I'm not clear here.
 (8) Under witness in the first page of Wright No. 10.
 (9) A Yeah.
 (10) Q The agency agreement.
 (11) A Yeah.
 (12) Q It says: "Principal hereby appoints agent." The
 (13) "principal" is Monsanto, correct?
 (14) A Right.
 (15) Q And the "agent" is AMSCO, correct?
 (16) A Right. Right.
 (17) Q "It's nonexclusive sales agent for the sale of its
 (18) proprietary plasticizers, namely:" and there is
 (19) some named here.
 (20) A Yes.
 (21) Q It includes the Aroclors. Do you see that?
 (22) A Yes.
 (23) Q "In bulk to those of the accounts listed in Table 1
 (24) attached hereto." Do you see that?
 (25) A Yes.

- (1) Q Am I missing something, as far as whether they were
 (2) selling drum accounts or larger quantities as in
 (3) tank cars or tank trucks? Do you see that?
 (4) A I see that. What are you saying?
 (5) Q I'm saying that pursuant to this agency agreement,
 (6) Monsanto was turning over certain accounts where
 (7) sales were going to be made in bulk?
 (8) A Yes. That's right.
 (9) Q Does that refresh your recollection?
 (10) A Yes, it does.
 (11) Q Your previous testimony was inaccurate?
 (12) A Yes.
 (13) Q Okay. Why would Monsanto turn over bulk accounts
 (14) to AMSCO?
 (15) A They could service them better than we, in
 (16) relationship with mixed bulk shipments of solvents
 (17) and plasticizers, which was common in the industry
 (18) at that time.
 (19) Q "Mixed bulk?"
 (20) A Mixed bulk.
 (21) Q Explain that to me.
 (22) A They would have departmental tank trucks that could
 (23) carry as much as four different products, several
 (24) different solvents, maybe two plasticizers, and
 (25) things of this nature, to make up a full tank

- (1) truck, which then gives the customer the
 (2) opportunity to purchase at the lowest bulk price?
 (3) Q Okay.
 (4) A Something that we could not participate in because
 (5) we only had plasticizers; whereas, AMSCO then with
 (6) their big list of solvents, which are generally
 (7) used together with plasticizers in the industries,
 (8) then could service the account.
 (9) Q I'm not-- okay. That is the answer to my question
 (10) of why they did that, because AMSCO could do it
 (11) more efficiently?
 (12) A Yes.
 (13) Q And AMSCO was responsible for arranging for these
 (14) carloads which could segregate the product in say,
 (15) four?
 (16) A Yes. Yes. Sure.
 (17) Q But AMSCO, I'm sorry. Monsanto typically would
 (18) send truckloads all of one product in a big tanker
 (19) truck?
 (20) A That's right. One of the real advantages of having
 (21) a distributor that had a product line that
 (22) complimented ours.
 (23) Q And what was the-- how was Monsanto compensated on
 (24) these type of transactions, which are governed by
 (25) the agency agreement?

- (1) A By the simple sale of a product to AMSCO.
 (2) Q Would that 5 percent commission also correspond
 (3) with this agency agreement, as well?
 (4) A Yes. It is on the last page.
 (5) Q That's what I'm looking for.
 (6) MR. ORR: Top of Page 3.
 (7) MR. TAYLOR: I see it.
 (8) Q (By Mr. Taylor) It says: "Monsanto reserves the
 (9) right to solicit business in competition with
 (10) agent."
 (11) What does that mean?
 (12) A Simply that. That we couldn't restrict them from
 (13) their calls and who they call on and they don't
 (14) restrict us. That is against the law.
 (15) Q So that there may be a customer on the list which
 (16) you gave them--
 (17) A Yes.
 (18) Q -- that they were allowed to ship these bulk
 (19) shipments to--
 (20) A Yes.
 (21) Q -- but that you could also sell that same customer
 (22) a bulk shipment?
 (23) A Yeah. Sure. If he wanted to buy from us.
 (24) Q Now, who was on this exhibit list; do you remember?
 (25) A Who? What do you mean?

- (1) Q What types of companies?
 (2) A I don't have the slightest idea.
 (3) Q Well, I'm assuming that Exhibit A, Table 1, was not
 (4) blank at the time this contract was signed?
 (5) A Well, certainly.
 (6) Q Did you see an unredacted version of that?
 (7) A My signature is on this.
 (8) Q The contract, but the exhibit. Did you see an
 (9) unredacted version of this document prior to your
 (10) deposition?
 (11) A What is the date?
 (12) MR. HOPKINS: I don't know if he
 (13) understands what you are asking.
 (14) THE WITNESS: Yeah. 1961. How
 (15) is that.
 (16) Q (By Mr. Taylor) That is when you saw the
 (17) unredacted version?
 (18) A Yes.
 (19) MR. TAYLOR: They have been
 (20) redacted?
 (21) MR. HOPKINS: Yes.
 (22) MR. TAYLOR: On what basis?
 (23) MR. HOPKINS: The customer names.
 (24) It is proprietary. We have a continuing objection
 (25) to providing customer names, and it has been

- (1) ongoing and it is not relevant either.
 (2) MR. TAYLOR: Obviously, relevancy
 (3) is not a proper objection.
 (4) MR. HOPKINS: The Court has
 (5) allowed you to redact numerous lab notebooks for
 (6) relevancy purposes.
 (7) I don't see why we shouldn't be entitled to
 (8) the same right, especially with the proprietary
 (9) information.
 (10) That is a fight for another day, I suppose.
 (11) MR. TAYLOR: That is a fight for
 (12) another day.
 (13) But for the record, there are many documents
 (14) that have been produced that have the customers'
 (15) names on them, which were unredacted. So it has
 (16) been inconsistent. I'm just curious why in this
 (17) case?
 (18) MR. HOPKINS: I think it has been
 (19) consistent in this case. But there is no point in
 (20) getting into the definition of distinction as to
 (21) what has been consistent and not.
 (22) MR. TAYLOR: Again, this is an
 (23) example, just for the record-- and Mr. Hopkins is
 (24) right, it is a fight for another day-- of why we
 (25) are probably going to have to reconvene your

(1) have the same agency agreement as AMSCO had with
 (2) Monsanto?
 (3) MR. HOPKINS: Object.
 (4) THE WITNESS: I don't recall.
 (5) MR. O'CONNOR: Excuse me. We are
 (6) going to sign off now.
 (7) MR. TAYLOR: Do you want to ask
 (8) any questions?
 (9) MR. O'CONNOR: No questions.
 (10) (Mr. O'Connor hangs up.)
 (11)
 (12) MR. TAYLOR: Would you mark that
 (13) as the next exhibit.
 (14) (Exhibit No. 14 marked for
 (15) identification.)
 (16)
 (17) Q (By Mr. Taylor) Mr. Wright, you are looking at
 (18) what has been marked as Wright No. 14. It is an
 (19) August 14, 1970, letter from Walter Schalk. It
 (20) bears Bates MAE 060487, and it has attached to it
 (21) "General Policy Concerning Distributors' Return of
 (22) Aroclors."
 (23) And I just ask you just to take a look at this
 (24) document, and there is a third page-- is there a
 (25) third? That is a mistake.

(1) A (Witness complies.) Okay.
 (2) Q Do you remember this issue on the return goods
 (3) policy?
 (4) MR. HOPKINS: Object to the form.
 (5) Q (By Mr. Taylor) Return of product policy?
 (6) A The policy was established by Walter Schalk and the
 (7) product group.
 (8) Q Do you remember it?
 (9) A Yes.
 (10) Q And the second paragraph, the first page, it says:
 (11) "The same two-month extension will apply to our
 (12) distributors."
 (13) Can you explain to me why there was an
 (14) extension given to the customers and the
 (15) distributors on the return of product?
 (16) MR. HOPKINS: Object. You can go
 (17) ahead.
 (18) THE WITNESS: I can't tell you
 (19) why. I don't know.
 (20) Q (By Mr. Taylor) Do you remember that happening?
 (21) A Again, it is the policy of the plasticizer group.
 (22) Q Do you remember what the policy was?
 (23) A It says it right here.
 (24) Q Without just-- okay.
 (25) Well, do you remember whether the distributors

(1) asked for a continuance of the policy for two
 (2) months?
 (3) MR. HOPKINS: Object to the form.
 (4) You can answer.
 (5) THE WITNESS: I think it's clear
 (6) in the second paragraph as to what was the policy
 (7) and relating to direct customers as well as
 (8) distributors.
 (9) Q (By Mr. Taylor) The second paragraph of what?
 (10) A Of the first page. They involved a two-month
 (11) extension for the customers, and a two-month
 (12) extension for the distributors.
 (13) Q My question is: Do you know why there was a
 (14) two-month extension granted?
 (15) A No.
 (16) MR. TAYLOR: Would you mark this,
 (17) please.
 (18) (Exhibit No. 15 marked for
 (19) identification.)
 (20)
 (21) Q (By Mr. Taylor) Before you, marked as Wright No.
 (22) 15, is a four-page document. This is how it was
 (23) produced to us.
 (24) I don't know if there is-- if they naturally
 (25) all belong together, but I'm going to ask you

(1) questions on all four.
 (2) They bear Bates MAE 060614 through 617. Just
 (3) take a look for a minute at these documents.
 (4) A (Witness complies.) Okay.
 (5) MR. HOPKINS: Counsel, the
 (6) documents that we had, were all separate. They
 (7) weren't stapled together.
 (8) MR. TAYLOR: I could be mistaken,
 (9) but I thought they were stapled together.
 (10) MR. HOPKINS: They weren't
 (11) intended to be. If the copies we gave you were
 (12) stapled together, then that must have been a
 (13) copying error, because they are four individual
 (14) documents as they were reflected in our original
 (15) production form.
 (16) Q (By Mr. Taylor) Well, I'm not going to ask you
 (17) questions on the first page. Turn to the second
 (18) page where there is some handwritten notes. And is
 (19) that your handwriting?
 (20) A No.
 (21) Q It says at the top: Mr. Nell Gronon, AMSCO,
 (22) Plainfield, New Jersey. Do you recognize that
 (23) name? That may be an "A." It may be Aronon.
 (24) A No.
 (25) Q Do you recognize that name?

(1) A No.
 (2) Q It looks to me, unless Counsel has another
 (3) interpretation to be A--
 (4) MR. HOPKINS: It could be o-n-a-n
 (5) or o-n-o-n.
 (6) MR. TAYLOR: Right.
 (7) MR. HOPKINS: That is how I see
 (8) it.
 (9) Q (By Mr. Taylor) Do you remember an AMSCO outlet in
 (10) Plainfield, New Jersey?
 (11) A Plainfield is south, in the southern part of New
 (12) Jersey?
 (13) Q That's right.
 (14) A I don't recall.
 (15) Q It says a little bit lower, "Stop off American
 (16) Mineral Spirits Co. 350 Roosevelt," and is that--
 (17) MR. HOPKINS: Carteret.
 (18) Q (By Mr. Taylor) -- "Carteret, New Jersey."
 (19) Do you remember that outlet, or that AMSCO
 (20) location?
 (21) A I think that was their warehouse or bulk station.
 (22) I don't know what this pertains to.
 (23) Q Okay. If you turn to the last page, Mr. Wright, it
 (24) looks like a memorandum type form, bears Bates MAE
 (25) 060617. And it looks like a message to you from

(1) J.J. McNamara, Everett.
 (2) Do you see that?
 (3) A Yes.
 (4) Q That is Everett, Massachusetts?
 (5) A Yes.
 (6) Q And McNamara was a regional manager?
 (7) A Yes.
 (8) Q And it says: "Each salesman will personally
 (9) contact their accounts during the week of 5/25" and
 (10) I can't read-- oh-- "to explain situation."
 (11) And this memo refers to AMSCO. Do you see
 (12) that?
 (13) A Yes.
 (14) Q Do you remember that happening, that every salesman
 (15) contacted their AMSCO office in their area?
 (16) A It was the responsibility of each district manager
 (17) or regional manager, to see that the requirements
 (18) for notification were carried out by their
 (19) salesmen.
 (20) This was simply a confirmation to me that
 (21) AMSCO had been notified in the Everett area.
 (22) Q Do you remember that each, that, in fact, happened,
 (23) that each salesman-- because this says: "Each
 (24) salesman will personally contact."
 (25) Do you remember that that happened, that each

(1) **MR. TAYLOR:** Would you mark this
 (2) as the next exhibit.
 (3) (Exhibit No. 17 marked for
 (4) identification.)
 (5)
 (6) **Q** (By Mr. Taylor) Mr. Wright, you are looking at
 (7) Wright No. 17. It is a Monsanto call report, dated
 (8) 6/23/70, to Willis Clark from J.R. Beightel.
 (9) **A Yes.**
 (10) **Q** If you could take a moment and review this
 (11) document.
 (12) **A** (Witness complies.)
 (13) **Q** Do you remember-- I'm sorry. Are you finished?
 (14) **A Go ahead.**
 (15) **Q** Do you remember Fred Schroeder, regional manager of
 (16) AMSCO. Do you remember Fred Schroeder?
 (17) **A It's been so long. I really I can't place him.**
 (18) **Q** How about Jim Cally, C-a-l-l-y-
 (19) **A No.**
 (20) **Q** -- of AMSCO?
 (21) **A No.**
 (22) **Q** Do you see this was dated 6/20-
 (23) **MR. TAYLOR:** I'm sorry. I'm
 (24) going to mark this.
 (25) ///

(1) **Q** The gist of this was that this customer was looking
 (2) for a replacement for the Aroclor 1262?
 (3) **A That's right.**
 (4) **Q** And that they, you see that they purchased
 (5) approximately 60,000 pound of Aroclor 1262 per year
 (6) through AMSCO?
 (7) **A Yes.**
 (8) **Q** Was that a large customer for AMSCO?
 (9) **A I think that would be a good-sized customer for**
 (10) **AMSCO.**
 (11) **Q** And it says: "Samples are being rushed and this
 (12) customer will make a decision whether to stock up
 (13) additional inventory to cover their needs following
 (14) determination date of August 30."
 (15) Do you see that?
 (16) **A Yeah.**
 (17) **Q** Was it Monsanto's practice to allow the customer to
 (18) make the decision whether they wanted to stock up
 (19) on inventory to cover their needs following the
 (20) termination date of August 30?
 (21) **MR. HOPKINS:** I'll object. You
 (22) can answer.
 (23) **THE WITNESS:** I don't understand
 (24) that statement.
 (25) **Q** (By Mr. Taylor) What don't you understand about

(1) (Exhibit No. 18 marked for
 (2) identification.)
 (3)
 (4) **Q** (By Mr. Taylor) Wright No. 18, sir, is a Monsanto
 (5) call report, dated 6-- well, there is a question
 (6) mark for the date of call.
 (7) But on the date received it says, 6/26/70, to
 (8) Willis Clark from Beightel. And it says: "Joint
 (9) call with Jim Cally, AMSCO."
 (10) And my question is: Do you remember the name
 (11) Jim Cally from AMSCO?
 (12) **A No.**
 (13) **Q** Do you see under "Objective" where it says
 (14) "discussed PCB discontinuation"?
 (15) **A Yes.**
 (16) **Q** Was that a usual-- was it the practice that a
 (17) member of the sales force of Monsanto would
 (18) accompany an AMSCO salesman to advise the AMSCO
 (19) customer of the discontinuation?
 (20) **A No question about it, wherever there was a need,**
 (21) **that was the support we were trying to give to our**
 (22) **distributor.**
 (23) **This was a highly emotional thing in the**
 (24) **industry. There were few replacement products for**
 (25) **the Aroclors.**

(1) that?
 (2) **A I don't understand the "cover their needs following**
 (3) **the determination date of August the 30th."**
 (4) **Q** Do you think that is a typo? Would you agree with
 (5) me that that is probably a typo, and it means
 (6) termination date, not determination date?
 (7) **MR. HOPKINS:** I'll object, but
 (8) you can answer.
 (9) **THE WITNESS:** I can't comment on
 (10) this. It's out of my-- you know, I just don't
 (11) understand what he is trying to say.
 (12) **Q** (By Mr. Taylor) Do you remember a salesman from
 (13) AMSCO by the name of Nelson Bock, B-o-c-k?
 (14) **A No.**
 (15) **Q** And do you remember a salesman for Monsanto named
 (16) E.G. McCabe?
 (17) **A Yes.**
 (18) **Q** Out of the Wilmington Service Center?
 (19) **A Yes.**
 (20) **MR. TAYLOR:** I'm not going to
 (21) repeat it, Mr. Orr, but I'm going to request that
 (22) all of these gentlemen that I'm naming from AMSCO,
 (23) if they are identifiable, and for purposes of
 (24) taking their depositions. These are documents
 (25) which we have not seen before.

(1) **MR. TAYLOR:** I'm going to mark
 (2) the next document.
 (3) (Exhibit No. 19 marked for
 (4) identification.)
 (5)
 (6) **Q** (By Mr. Taylor) Wright No. 19, sir, that is being
 (7) shown, is a Monsanto call report, dated 7/1/70.
 (8) And do you remember a salesman, J.H. Gannon?
 (9) **A Yes.**
 (10) **Q** In the northeast region?
 (11) **A Right.**
 (12) **Q** You see the purpose of the call, it says: "Joint
 (13) call with AMSCO salesman to discuss replacement of
 (14) Aroclor?"
 (15) **A Yes.**
 (16) **Q** Was Aroclor 1262 a PCB-containing Aroclor?
 (17) **A Yes.**
 (18) **Q** Who received these call reports?
 (19) **A The district manager and product group.**
 (20) **Q** Would you ever receive copies of these?
 (21) **A Not necessary.**
 (22) **Q** Unless it was specifically-- as a matter of course?
 (23) **A No.**
 (24) **Q** Unless it was copied to you, shown on the document?
 (25) **A Yes.**

(1) Just for the record, Mr. Bock is referred to
 (2) on a call report, dated 7/27, 1970, bearing Bates
 (3) MAE 060630.
 (4) **MR. ORR:** I suppose I should say
 (5) for the record, my silence is not acquisition--
 (6) **MR. HOPKINS:** Acquiescent?
 (7) **MR. ORR:** Acquiescent rather, to
 (8) this request. I'm not sure-- I understand you
 (9) just saw the documents, but I'm not sure of the
 (10) status of requests for previous witnesses. So you
 (11) will send me a letter anyway, and we will take it
 (12) from there.
 (13) **MR. TAYLOR:** Correct. I
 (14) appreciate that.
 (15) Would you mark the next document, which is a
 (16) document I just identified, the 7/27 call report.
 (17) **MR. HOPKINS:** 21?
 (18) **MR. TAYLOR:** 7/27/70.
 (19) **MR. HOPKINS:** I mean, the exhibit
 (20) number.
 (21) (Exhibit No. 20 marked for
 (22) identification.)
 (23)
 (24) **Q** (By Mr. Taylor) Sir, have you reviewed that?
 (25) **A Yes.**

- (1) court reporter to note the date. I think you might
 (2) have misspoken. It is December 15, '67.
 (3) MR. TAYLOR: What did I say?
 (4) MR. HOPKINS: I think you might
 (5) have said '64.
 (6) MR. TAYLOR: I'm sorry. 1967.
 (7) Q (By Mr. Taylor) Do you recognize that name from
 (8) American Mineral Spirits Company?
 (9) A No.
 (10) Q How about Elmer Wheeler?
 (11) A Yes.
 (12) Q Who is he?
 (13) A Manager Environmental Health Medical Department.
 (14) Q Did you, as part of your duties at any time at
 (15) Monsanto, did you have dealings with Mr. Wheeler?
 (16) A Very possibly.
 (17) Q Do you remember any offhand?
 (18) A No.
 (19) Q Why do you say "very possibly"?
 (20) A After all, he was on the staff and always available
 (21) for any comments or questions.
 (22) (Exhibit No. 25 marked for
 (23) identification.)
 (24)
 (25) Q (By Mr. Taylor) Sir, before you is Wright No. 25,

- (1) is a document, "Product Classification Chart." It
 (2) bears Bates MAE 060727.
 (3) Can you identify this document?
 (4) A No.
 (5) Q Have you ever seen this type of document before?
 (6) A No.
 (7) Q Can you tell from what-- well, is this a Monsanto
 (8) document?
 (9) MR. HOPKINS: Object. You can
 (10) answer.
 (11) THE WITNESS: I don't know.
 (12) Q (By Mr. Taylor) It says "American Mineral Spirits
 (13) Company" in the top left-hand corner; does it not?
 (14) Do you see that?
 (15) A Yes.
 (16) Q And there are some columns on the document:
 (17) "Irritant." Do you see that? "Carcinogen." Do
 (18) you see there on the left?
 (19) A Yes.
 (20) Q Do you know if AMSCO had its own in-house research
 (21) staff?
 (22) A I'm not aware of their organization at that level.
 (23) Q How about its own medical staff?
 (24) A I'm not aware of that.
 (25) Q It says down at the bottom towards the left MCA and

- (1) LAB 1 Guide label states. Do you know what that
 (2) refers to?
 (3) A No.
 (4) MR. HOPKINS: It could also be
 (5) LAPI; couldn't it?
 (6) MR. TAYLOR: It could be LAPI.
 (7) It could be that. I thought it was LAB, but I may
 (8) be wrong. There is a line going right through the
 (9) end of that letter, which is either a B or a P, I
 (10) think.
 (11) MR. ORR: I don't want to get
 (12) into this, but it could be an F, in any event.
 (13) MR. TAYLOR: It could be. That's
 (14) right.
 (15) THE WITNESS: Can we get a break?
 (16) MR. TAYLOR: Sure. Let's take
 (17) five, and I am going to be finished in about 20
 (18) minutes.
 (19) (Recess.)
 (20)
 (21) MR. TAYLOR: We'll mark this.
 (22) (Exhibit No. 26 marked for
 (23) identification.)
 (24) ///
 (25) ///

- (1) EXAMINATION (Continuing)
 (2) BY MR. TAYLOR:
 (3) Q Before you is Wright No. 26, which is a February
 (4) 10, 1971, letter to Mr. George Nietzel, American
 (5) Mineral Spirits Company, Cranford, New Jersey, from
 (6) James Beightel, Sales Representative, Organic
 (7) Chemicals Division.
 (8) Do you remember a George Nietzel--
 (9) A No.
 (10) Q -- From AMSCO?
 (11) A No.
 (12) Q From the Cranford, New Jersey office?
 (13) A No.
 (14) Q Do you remember the Cranford, New Jersey office?
 (15) A This is the one down in the southern part of
 (16) Jersey, or not, or the central part?
 (17) MR. ORR: Central.
 (18) MR. TAYLOR: I'm not sure.
 (19) MR. HOPKINS: It is central.
 (20) THE WITNESS: Central.
 (21) Q (By Mr. Taylor) That name doesn't ring a bell?
 (22) A No. Are we through with that?
 (23) Q Yes, we are.
 (24) MR. TAYLOR: Sir, I think that is
 (25) all I have. I'm going to turn it over to Mr. Orr.

- (1) I'm going to check my notes. I may have a couple
 (2) of follow-up, but I'll let you know.
 (3) MR. ORR: I don't have a whole
 (4) lot of questions, but usually, when lawyers say
 (5) that that means they will be awhile, but I'll try
 (6) to be faithful here.
 (7)
 (8) EXAMINATION
 (9) BY MR. ORR:
 (10) Q I notice on your card Mr. Wright, Mar--
 (11) A Mar Rep.
 (12) Q What is that?
 (13) A Mar Rep.
 (14) Q Mar Rep Associates. What is the nature of that
 (15) business?
 (16) A Marketing representative, but that's not-- it is an
 (17) old card.
 (18) Q Old card. Okay. You are out of that business?
 (19) A Yeah.
 (20) Q In your various positions over the years with
 (21) Monsanto, did you become familiar with a way in
 (22) which smaller quantities; that is, in barrels, were
 (23) shipped from Monsanto to their various
 (24) distributors?
 (25)

- (1) A Yes.
 (2) Q Were the barrels labeled in any way?
 (3) A Oh, yes. Certainly.
 (4) Q Had Monsanto's name on the barrel, as well as on
 (5) some kind of paper--
 (6) A Yes.
 (7) Q -- labeling on it?
 (8) A Yes.
 (9) Q Okay. Did you understand the manner in which AMSCO
 (10) would then resell the Monsanto product? In other
 (11) words, did they repackage it? Did they sell it the
 (12) way they got it, or did they do something else with
 (13) it?
 (14) A They would sell it the way they got it. Generally,
 (15) if we ship it in our barrels, they would simply
 (16) resell it as such.
 (17) Q Is that what you understood would take place when
 (18) you participated in negotiating the distributorship
 (19) agreement?
 (20) A Yes.
 (21) Q To your knowledge, over the years did AMSCO honor
 (22) that agreement, in that it would ship Monsanto
 (23) product identifying it as a Monsanto product?
 (24) A Yes.
 (25) MR. ORR: I don't know if Counsel

- (1) through a distributor?
 (2) A I don't know.
 (3) Q Matter of fact, do you know whether that other-
 (4) what was that other company?
 (5) MR. HOPKINS: Central Solvents.
 (6) Q (By Mr. Orr) Do you know whether that distributor
 (7) may have sold to Armstrong?
 (8) A I don't know. I don't have any records of it.
 (9) Q Do you have any fact or basis to believe that AMSCO
 (10) sold Aroclor 1254 after the notice of cancellation
 (11) to Armstrong?
 (12) A I have no reason- I have no understanding of that.
 (13) Q Wright 6, which is the guide.
 (14) A Oh, yes.
 (15) Q You were asked some questions about the fact that-
 (16) well, first of all, this document, does it appear
 (17) to you to be a Monsanto sales brochure? You know,
 (18) what I mean?
 (19) A Yes. This appears to me to be a Monsanto sales
 (20) brochure.
 (21) Q Do you know whether there was any arrangement
 (22) made with Monsanto to print American Mineral
 (23) Spirits on a Monsanto document, as it is on the
 (24) last page?
 (25) A I see this on the last page, and that- well, they

- (1) represented us, and we backed them up, so that that
 (2) was a decision by their marketing department and
 (3) American Mineral Spirits to put that on. I have no
 (4) other comment concerning it.
 (5) Q Well, that sheet on the top has, would you agree
 (6) with me, appears to be a Monsanto sales sheet?
 (7) A Yes.
 (8) Q It has got the little Monsanto logo on the top?
 (9) A Sure.
 (10) Q What-
 (11) A I think it was a particularly good brochure that
 (12) could be used as a sales tool by all of our
 (13) salesmen, including American Mineral Spirits.
 (14) Q Do you have any recollection of seeing a document
 (15) like this printed with the name of the other
 (16) distributor on it?
 (17) A I don't have any recollection.
 (18) Q Okay. Is this a document that you would have seen
 (19) in the ordinary course of one of your many
 (20) positions?
 (21) A I would assume so.
 (22) Q Do you ever recall any discussions with management
 (23) as to whether or not Monsanto would print up a
 (24) quantity of these documents naming its distributor,
 (25) as opposed to giving authority to the distributor

- (1) to print their name on a Monsanto document?
 (2) MR. TAYLOR: Objection to the
 (3) form.
 (4) THE WITNESS: I can't comment on
 (5) that, primarily because I'm not- I'm not aware.
 (6) Q (By Mr. Orr) You just don't know?
 (7) A I think we were pretty- pretty- our objective was
 (8) to cooperate and assist our distributors in any
 (9) fashion that we could.
 (10) Q As it assisted sales and it was cost-effective?
 (11) A Sure.
 (12) Q Do you ever remember working with a fellow named
 (13) Roy Sullivan?
 (14) A Yes.
 (15) Q He was at AMSCO?
 (16) A No. Monsanto.
 (17) Q I'm sorry. I'm sorry. Okay.
 (18) A Wilmington.
 (19) Q He was- that's right. You are right. You know,
 (20) did you work with a fellow named- I may have this
 (21) pronounced wrong, Greacan at AMSCO?
 (22) A I don't recall the name.
 (23) MR. ORR: Okay. Thanks. I have
 (24) nothing further.
 (25) MR. TAYLOR: I have nothing.

- (1) MR. HOPKINS: I just have two
 (2) questions.
 (3)
 (4)
 (5) EXAMINATION
 (6) BY MR. HOPKINS:
 (7) Q Mr. Wright, there were a number of Monsanto
 (8) products that were sold through distributors, such
 (9) as, AMSCO?
 (10) A Uh-huh. (Witness answers affirmatively.)
 (11) Q That included the Santicizer products; is that
 (12) right?
 (13) MR. TAYLOR: Objection.
 (14) THE WITNESS: Santicizer.
 (15) MR. TAYLOR: Objection to the
 (16) form.
 (17) Q (By Mr. Hopkins) The Santicizer products?
 (18) A Yes.
 (19) Q It also included PCB-containing Aroclor products?
 (20) A Yes.
 (21) MR. TAYLOR: Objection to the
 (22) form.
 (23) Q (By Mr. Hopkins) In your experience at Monsanto
 (24) between '61, when the distributorship agreement
 (25) went into affect with AMSCO, and 1970 when

- (1) PCB-containing Aroclor products were withdrawn from
 (2) the market, do you have any recollection as to what
 (3) percentage of sales of all of the plasticizer
 (4) products, the PCB-containing Aroclor products
 (5) represented?
 (6) MR. TAYLOR: Object to the form.
 (7) THE WITNESS: No. I have no
 (8) recollection of the percentage of sales.
 (9) Q (By Mr. Hopkins) Was it a significant-
 (10) A Of the Aroclor products.
 (11) Q Was it a significant percentage of all of the
 (12) plasticizer products or a smaller percentage?
 (13) MR. TAYLOR: Objection to the
 (14) form.
 (15) THE WITNESS: I think relatively
 (16) probably small, but I can't- I would have to take
 (17) a look at the record here for 1970 for AMSCO as
 (18) indicative of that. We made millions of pounds of
 (19) plasticizer.
 (20) Q (By Mr. Hopkins) You are referring to the record
 (21) that showed that for the year of 1970 there was
 (22) approximately 156,000 pounds of Aroclor 1254 sold
 (23) to AMSCO?
 (24) A That's right.
 (25) Q Was AMSCO a distributor and also a customer with

- (1) regard to Aroclor 1254; if you know?
 (2) A Only as a distributor for our product. If they
 (3) were buying it for their own use in some other
 (4) process, I wouldn't have any idea.
 (5) Q Do you know if they were a customer of other
 (6) Monsanto products?
 (7) A I don't believe so.
 (8) Q Okay.
 (9) MR. HOPKINS: I have no further
 (10) questions.
 (11) MR. TAYLOR: Thank you,
 (12) Mr. Wright. I appreciate your time.
 (13) MR. HOPKINS: Thank You very much
 (14) for your time.
 (15) (Signature reserved.)
 (16) (Deposition concluded at
 (17) 4:00 p.m.)
 (18)
 (19)
 (20)
 (21)
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 (25)

Look-See Concordance
Report

UNIQUE WORDS: 2,149
TOTAL OCCURRENCES: 10,620
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SINGLE FILE CONCORDANCE

CASE SENSITIVE

COVER PAGES = 5

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Exhibits to
Wright's 7/30/98
Deposition

Monsanto Employment History

Sales Rep. New York 7/47 - 5/49

Sales Rep. Buffalo 5/49 - 1/52

Dr. Sales Rep. Pgh. 1/52 - 1/58

Nat'l. Sales Mgr. Pgh. 1/58 - 7/61

Industrial Sls. Mgr. Mgr 7/61 - 10/64

Nat'l. Mgr. Atlanta 11/64 - 12/68

Regional Sls. Mgr. Atlanta 1/68 - 4/68

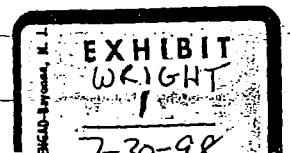
Field Sales Mgr. Dallas 5/68 - 1/72

Sls. Mgr. ~~Dist.~~ Atlanta

Plasticizer Mgr 1/72 - 5/74

Mgr. Atlanta Sales

Monsanto Ind. Chemicals 5/74 - 2/78



DUANE MORRIS & HECKSCHER, a Pennsylvania Limited Liability Partnership
By: Nolan N. Atkinson, Jr. (NNA 9315)
Craig F. Turet (CFT 1718)
51 Haddonfield Road, Suite 340
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(609) 488-7300

Attorneys for Defendant/Third-Party Plaintiff, Armstrong World Industries, Inc.

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

JOAN MAERTIN, Executrix of the
Estate of Lothar Maertin,
JOAN MAERTIN, individually and
in her own right, et al.

v.

ARMSTRONG WORLD INDUSTRIES, INC.

v.

MONSANTO COMPANY, AMERICAN
MINERAL SPIRITS COMPANY and
SOLUTIA, INC.

Civil Action L-95-cv
02849 (JBS)

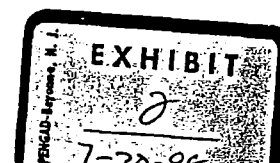
Simandle, U.S.D.J.

Rosen, U.S.M.J.

NOTICE TO TAKE DEPOSITION
AND PRODUCE DOCUMENTS
DIRECTED TO
J. D. WRIGHT

TO: Christopher M. DiMuro, Esquire
Latham & Watkins
One Newark Center
Newark, NJ 07101-3174

PLEASE TAKE NOTICE that the pursuant to Rule 30 of the Federal Rules of Civil
Procedure, Defendant and Third-Party Plaintiff, Armstrong World Industries, Inc. ("Armstrong")
will take the testimony by deposition upon oral examination before a person authorized to
administer oaths, on Thursday, July 30, 1998 at 9:00 A.M. (Pacific Time) in the Law Offices of



Parr & Younglove, 924 E. 7th Avenue, Suite A, Olympia, Washington and to continue from day to day thereafter until completed, with respect to the subject matter of this action, at which time and place the deposition of Monsanto will be taken by and through J. D. Wright. As counsel for Monsanto, you are requested to arrange for the attendance of J. D. Wright, and are invited to attend and cross-examine.

PLEASE TAKE FURTHER NOTICE that, at the time and place specified above, J. D. Wright is directed to produce all of the following documents, in accordance with the Definitions and Instructions attached hereto as Exhibit "A":

1. Any and all documents authored, generated, received or reviewed by J. D. Wright that refer or relate in any way to PCBs or PCB-containing products, sold for use as plasticizers.
2. Any and all documents authored, generated, received or reviewed by J. D. Wright that refer or relate in any way to the withdrawal by Monsanto (or decision to withdraw) PCBs or PCB-containing products from the market for open applications.
3. Any and all documents authored, generated, received or reviewed by J. D. Wright that refer or relate in any way to sales of PCBs or PCB-containing products by Monsanto to Armstrong World Industries, Inc.
4. Any and all documents authored, generated, received or reviewed by J. D. Wright that refer or relate in any way to sales of PCBs or PCB-containing products by Monsanto to American Mineral Spirits Company (AMSCO).
5. Any and all documents authored, generated, received or reviewed by J. D. Wright that refer or relate in any way to sales of PCBs or PCB-containing products by Monsanto to customers through American Mineral Spirits Company (AMSCO).

6. Any and all documents authored, generated, received or reviewed by J. D. Wright that refer to, relate to or reflect the terms of any distributorship or other agreement between Monsanto and American Mineral Spirits Company (AMSCO) at any time between 1960 and 1975.

7. Any and all documents (including, but not limited to, calendars, diaries or date books) that refer to, relate to or reflect the activities of J.D. Wright while employed by Monsanto at any time between 1960 and 1975.

8. Any and all documents authored, generated, received or reviewed by J. D. Wright that refer or relate in any way to meetings or communications between representative(s) of Monsanto and representative(s) of Armstrong between 1960 and 1975.

9. Any and all documents authored, generated, received or reviewed by J.D. Wright that refer or relate in any way to meetings or communications between representative(s) of Monsanto and representative(s) of American Mineral Spirits Company (AMSCO) between 1960 and 1975.

DUANE, MORRIS & HECKSCHER LLP

DATED: July 27, 1998

By: Nolan N. Atkinson, Jr.
Craig F. Turet
51 Haddonfield Road, Suite 340
Cherry Hill, NJ 08002-4810
(609)-488-7300
Attorneys for Armstrong World
Industries, Inc.

EXHIBIT "A" -- DEFINITIONS AND INSTRUCTIONS

As used herein, "document" or "documents" means, by way of illustration and not by way of limitation, the following items, whether printed or recorded or reproduced by any other mechanical process, written, produced by hand or produced by or stored in a computer, regardless of origin or location: books, records, communications, reports, correspondence, letters, telegrams, memoranda, summaries or records of telephone conversations, summaries or records of personal conversations or interviews, applications, booklets, brochures, catalogues, circulars, magazines, pamphlets, periodicals, bulletins, instructions, minutes, other communications (including, but not limited to, inter- and intra-office communications), purchase orders, bills of lading, bid tabulations, questionnaires, surveys, contracts, agreements, options to purchase, memoranda of agreements, assignments, licenses, books of account, orders, invoices, statements, bills, checks, vouchers, ledger sheets, accounts, journals, canceled checks, bank statements, bank passbooks, confirmations, statements of accounts, analyses, diaries, graphs, notebooks, charts, tables, working papers, plans, indices, summaries or records of meetings or conferences, summaries or reports of investigations or negotiations, opinions or reports of accountants or consultants, data sheets, data processing cards, photographs, photographic negatives, phono-records, tape recordings, discs, wire recordings, transcripts of recordings, drawings, motion picture film, advertisements, press releases, drafts, and marginal comments appearing on any such documents, all other written or printed matter of any kind, or any other and all other data compilations from which information can be obtained and translated if necessary.

Each request for a document or documents shall be deemed to call for the production of the original document or documents to the extent that they are in or subject to, directly or indirectly, the control of Monsanto. In addition, each request should be considered as including all copies and to the extent applicable, preliminary drafts of documents which, as to content, differ in any respect from the original or final draft or from each other (e.g., by reason of handwritten notes or comments having been added to one copy of a document but not on the original or other copies thereto).

As used herein, the term "PCBs" shall mean Polychlorinated Biphenyls, and the term "PCB-containing" shall mean consisting of, including, or containing PCBs.

CERTIFICATE OF SERVICE

I, Craig F. Turet, certify that a true and correct copy of the foregoing Notice To Take Deposition And Produce Documents Directed To James Beightol was served on all counsel of record on this 25th day of March, 1998 via facsimile (to counsel for Monsanto only) and first-class mail to all counsel, addressed as follows:

Christopher M. DiMuro, Esquire
Latham & Watkins
One Newark Center
Newark, NJ 07101-3474

Brian O'Connor, Esquire
Atrium II, Suite 101
3000 Atrium Way
Mt. Laurel, NJ 08054

Carolyn O'Connor, Esquire
Wilson, Elser, Moskowitz,
Edelman & Dicker
Two Gateway Center
Newark, NJ 07102-5311

Craig F. Turet

SALES SUMMARY

ALL PCB CONTAINING PRODUCTS

AMERICAN MINERAL SPIRITS - CONSHOHOCKEN, PA

1954 - 1977

1954 - 1957 -

Sales books are incomplete for these years. 0 lbs.

1958 - 1963

No sales found for these years. 0 lbs.

1964

Aroclor Dist. 1221	1,000 lbs.	*
Aroclor Dist. 1232	80,000 lbs.	*
Aroclor Dist. 1242	25,000 lbs.	*
Aroclor Dist. 1248	27,000 lbs.	*
Aroclor Dist. 1254	209,000 lbs.	*
Aroclor Dist. 1262	29,000 lbs.	*
Aroclor Dist. 1268	16,000 lbs.	*

1965

Aroclor Dist. 1221	500 lbs.
Aroclor Dist. 1232	41,250 lbs.
Aroclor Dist. 1242	31,100 lbs.
Aroclor Dist. 1248	55,425 lbs.
Aroclor Dist. 1254	230,940 lbs.
Aroclor Dist. 1262	6,000 lbs.
Aroclor Dist. 1268	25,000 lbs.

1966

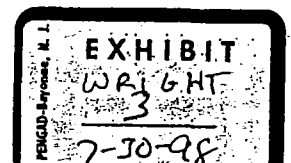
Aroclor Dist. 1221	2,600 lbs.	
Aroclor Dist. 1232	43,400 lbs.	
Aroclor Dist. 1242	34,373 lbs.	
Aroclor Dist. 1248	48,000 lbs.	†
Aroclor Dist. 1254	310,200 lbs.	†
Aroclor 1260 10% TOL	3,000 lbs.	
Aroclor Dist. 1262	0 lbs.	
Aroclor 1262 10% TOL	39,850 lbs.	
Aroclor Dist. 1268	28,000 lbs.	

MAE 001073

* Sales for these years are rounded to the nearest thousand pounds. Sales less than 500 pounds are recorded as 0 pounds sold.

† See Invoices.

M7 ar 5 4.11 #3



1967

Aroclor Dist. 1221	0 lbs.	
Aroclor Dist. 1232	28,000 lbs.	
Aroclor Dist. 1242	54,000 lbs.	
Aroclor-Dist. 1248	57,000 lbs.	
Aroclor Dist. 1254	316,000 lbs.	
Aroclor 1254 10% TOL	3,000 lbs.	†
Aroclor 1260 10% TOL	0 lbs.	
Aroclor Dist. 1262	116,400 lbs.	†
Aroclor 1262 10% TOL	15,000 lbs.	
Aroclor Dist. 1268	6,400 lbs.	†

1968

Aroclor Dist. 1232	19,250 lbs.	
Aroclor Dist. 1248	38,000 lbs.	
Aroclor Dist. 1254	309,000 lbs.	
Aroclor Dist. 1260	600 lbs.	
Aroclor Dist. 1262	120,000 lbs.	
Aroclor Dist. 1268	3,000 lbs.	

1969

Aroclor Dist. 1232	10,450 lbs.	†
Aroclor Dist. 1242	51,600 lbs.	*
Aroclor Dist. 1248	52,800 lbs.	*
Aroclor Dist. 1254	444,600 lbs.	*
Aroclor Dist. 1260	9,600 lbs.	*
Aroclor 1260 10% TOL	5,000 lbs.	†
Aroclor Dist. 1262	204,600 lbs.	*
Aroclor Dist. 1268	8,400 lbs.	*

1970

Aroclor 1221	7,280 lbs.	
Aroclor 1232	1,100 lbs.	
Aroclor 1242	117,600 lbs.	
Aroclor 1248	39,600 lbs.	†
Aroclor 1254	518,580 lbs.	
Aroclor 1260	1,200 lbs.	†
Aroclor 1260 10% TOL	29,400 lbs.	†
Aroclor 1262	229,800 lbs.	
Aroclor 1268	18,800 lbs.	

1971

Aroclor 1221	10,400 lbs.	†
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MAE 001074

* Sales for these years are rounded to the nearest thousand pounds. Sales less than 500 pounds are recorded as 0 pounds sold.

† See Invoices.

1972 - 1977

No Sales found for these years.

0 lbs.

MAE 001075

* Sales for these years are rounded to the nearest thousand pounds. Sales less than 500 pounds are recorded as 0 pounds sold.

† See Invoices.

SALES SUMMARY

ALL PCB CONTAINING PRODUCTS

UNION AMSCO - PHILADELPHIA, PA

1954 - 1977

1954 - 1957 -

Sales books are incomplete for these years. 0 lbs.

1958 - 1969

No sales found for these years. 0 lbs.

1970

Aroclor 1254 156,600 lbs.
SHIPPED TO: PECORA CHEMICAL CORPORATION

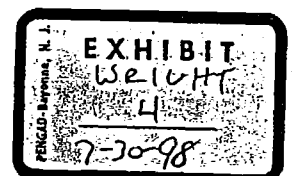
1971 - 1977

Harless Chemie

No Sales found for these years. 0 lbs.

Marshall #2

MAE 000523



REPORT 81476-A

ORGANIC DIV - PLASTICIZERS
NO. 4 CUSTOMER/PRODUCT SALES REPORT FOR DEC 1970
-IN ACTUAL POUNDS AND DOLLARS-

PAGE 1139

01/14/71

TOTAL MONTH SALES		Y-T-D SALES	
POUNDS	DOLLARS	POUNDS	DOLLARS

TOTAL LAST YEAR SALES		TOTAL YEAR	CUST ID
POUNDS	DOLLARS	GOAL LBS	MAJR-GRD-GP

AM MIN SPIRIT PHILADELPHIA PA
5715 AROCLOR 1254

156,600 27,266

AR 023266 10004276
1040-280-04

MAE 000524

U1131-A DIRECT #.
01/12/72

ORGANIC DIVISION SPECIALTY PRODUCTS
PRODUCT/CUSTOMER SALES REPORT

FOR DEC 1971

PAGE 290

		- IN THOUSANDS OF POUNDS AND DOLLARS -																	
MA G R	SLS REP	NAME OF PRODUCT/CUSTOMER	POTENTIAL	LAST YEAR SALES	SALES CUM. FOR CURR. YEAR	SALES CUM. YTD	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	CUST. NO. / MAR. GRD. GP.
		AROCLOX 1254																00351A	1040-280-17

15700	UNION ANSCO PHILADEL PA	157																	10004278
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MAE
000525

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

CO 220
1-66 Rev

MONSANTO COMPANY

ROS

Shipping +

//UW901/JN30/1413/1428/2/ZI204/FH/QZQ

ORG DSOS

SHIPPER'S NO. 564219	DISTRICT VL	DATE ENTERED 6/30/70	CUSTOMER'S ORDER NO. 206-423C	INVOICE DATE	INVOICE NUMBER
TERMS NET 30 DAYS				DATE SHIPPED 7-9-70	CAR INITIALS AND NO.

REPAID ON COLLECTY-ROUTING
200 Cell MALONE-CR
DELIVERY P.O. #

ANNISTON ALABAMA

SHIPPED FROM ANNISTON	WHEE. CODE 09	BOOKED THRU 53-07--57-15	COPIES CODE 2-1-2	CUST. FORM	S MANNS
--------------------------	------------------	-----------------------------	----------------------	------------	---------

OLD TO
AMERICAN MINERAL SPIRITS COMPANY 23268
A DIVISION OF UNION OIL COMPANY OF CALIFORNIA
3100 SOUTH MEACHAM ROAD
PALATINE ILLINOIS 60067

NEW TO
PECORA CHEMICAL CORPORATION
300-400 W SEDGLEY AVENUE
PHILADELPHIA PENNSYLVANIA

DESCRIPTION	QUANTITY
63 50 - 600 LB DRUMS-30 AROCLOR 1254 1040-280-04-09 LESS DISTRIBUTOR DISCOUNT 5 PCT PLUS FRT FROM ANNISTON ALABAMA AT MALONE RATE 	37 800 30000 LB LB

7/13/70

EXPECT TO SHIP
V

7/13/70

SPECIAL INSTRUCTIONS
SHIPPING DATE 7/13 ARRIVAL DATE
SEND COPY OF BILL OF LADING TO MR KEN DALEY-
AMECO COLVELLS PLANE-CONSHOHOCKEN PA 19428- ADVISE S MANNS-WILM OFFICE
IF WE CANNOT MEET SHIP DATE- CUSTOMER HAS ADVISED MALONE OF PICK UP

MAE 000526

TOWOLDMON0051529

CO 220
J-44 Rev

MONSANTO COMPANY

ROS

Shipping +

/UW902/JR30/1415/1432/2/Z1205/XR/QZE

ORG DSOS

SHIPPER'S NO. 564220	DISTRICT WL	DATE ENTERED 6/30/70	CUSTOMER'S ORDER NO. 206-424C	INVOICE DATE	INVOICE NUMBER
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TERMS

NET 30 DAYS

DATE SHIPPED
7-30-70

CAR INITIALS AND NO.

PREPAID OR COLLECT-ROUTING

P.D. Cell MALONE-CR
DELIVERY F.O.B.

ANNISTON ALABAMA

SHIPPED FROM ANNISTON	WHSE. CODE 09	BOOKED THRU 53-07--57-15	COPIES CODE 2-1-2	CUST. FORM	S MANNS
--------------------------	------------------	-----------------------------	----------------------	------------	---------

AMERICAN MINERAL SPIRITS COMPANY 23268
A DIVISION OF UNION OIL COMPANY OF CALIFORNIA
3100 SOUTH MEACHAM ROAD
PALATINE ILLINOIS 60067

TR# Malone 7576

PECORA CHEMICAL CORPORATION
300-400 W SEDGLEY AVENUE
PHILADELPHIA PENNSYLVANIA

(4) 7-30-70

30
-33

DESCRIPTION	QUANTITY
63 600 LB DRUMS-30 ROCLOR 1254 1040-280-04-09 LESS DISTRIBUTOR DISCOUNT 5 PCT PLUS FRT FROM ANNISTON ALABAMA AT MALONE RATE	37800 38880 189 R

.B

7/17/70

EXPECT TO SHIP

7/17/70

SHIP JULY 17 ARRIVAL DATE
SEND COPY OF BILL OF LADING TO MR KEN DALEY-
AMSCO COLWELLSPANE-CONSHOHOCKEN PA 19428- ADVISE S MANNS-WILM OFFICE
IF WE CANNOT MEET SHIP DATE- CUSTOMER HAS ADVISED MALONE OF PICK UP

MAE 000527

TOWOLDMON0051530

CO 220
1-44 Rev

MONSANTO COMPANY

ROS

Shipping +

/UW903/JW30/1416/1433/2/ZI206/FH/QZQ

ORG D503

SHIPPER'S NO. 564221	DISTRICT VL	DATE ENTERED 6/30/70	CUSTOMER'S ORDER NO. 206-425C	INVOICE DATE	INVOICE NUMBER
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NET 30 DAYS

1-30-70

TERMS

REPAID OR COLLECT-ROUTING

DELIVERY F.O.B.

ANNISTON ALABAMA

SHIPPED FROM ANNISTON	WHSE. CODE 09	BOOKED THRU 53-07--57-15	COPIES CODE 2-1-2	CUST. FORM	S. MANNS
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AMERICAN MINERAL SPIRITS COMPANY 23238
A DIVISION OF UNION OIL COMPANY OF CALIFORNIA
3100 SOUTH MEACHAM ROAD
PALATINE ILLINOIS 60067

PECORA CHEMICAL CORPORATION
300-400 W SEDGLEY AVENUE
PHILADELPHIA PENNSYLVANIA

DESCRIPTION	QUANTITY
63 <i>Steel</i> 60 - 600 LB DRUMS-30 WROCLOR 1254 1040-280-04-09 LESS DISTRIBUTOR DISCOUNT 5 PCT PLUS FRT FROM ANNISTON ALABAMA AT MALONE RATE	37 800 30000 LBS

R.I.M.

7/22/70

EXPECT TO SHIP

7/22/70

SHIPPING DATE JUL 7 22 ARRIVAL DATE
SEND COPY OF BILL OF LADING TO MR KEN DALEY-
AMSCO COLWELLSPLANE-COMSHOCKEN PA 19428- ADVISE S MANNS-WILM OFFICE
IF WE CANNOT MEET SHIP DATE- CUSTOMER HAS ADVISED MALONE OF PICK UP

MAE 000528

TOWOLDMON0051531

CO 220
3-44 Rev

MONSANTO COMPANY

ROS

Shipping +

/UW904/JN30/1423/1441/2/Z1209/XR/QZQ ORG DSOS

SHIPPER'S NO. 564222	DISTRICT WL	DATE ENTERED 6/30/70	CUSTOMER'S ORDER NO. 206-426C	INVOICE DATE	INVOICE NUMBER
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TERMS NET 30 DAYS	DATE SHIPPED 8-3-70	CAR INITIALS AND NO.
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PREPAID OR COLLECT-ROUTING

DELIVERY F.O.B.

MALONE-CR

Customers pick up

ANNISTON ALABAMA

SHIPPED FROM ANNISTON	WHEE CODE 09	BOOKED THRU 53-07--57-13	COPIES CODE 2-1-2	CUST. FORM	S MANNS
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AMERICAN MINERAL SPIRITS COMPANY 23268
A DIVISION OF UNION OIL COMPANY OF CALIFORNIA
3100 SOUTH MEACHAM ROAD
PALATINE ILLINOIS 60067

PECORA CHEMICAL CORPORATION
300-400 W SEDGLEY AVENUE
PHILADELPHIA PENNSYLVANIA

DESCRIPTION	QUANTITY
62 ✓ <i>Steel</i> 50 - 600 LB DRUMS-30 180CLOR 1254 1040-280-04-09 LESS DISTRIBUTOR DISCOUNT 5 PCT PLUS FRT FROM ANNISTON ALABAMA AT MALONE RATE	37200 30000 LBS

PRM

7/27/70

EXPECT TO SHIP

7/27/70

SHIP JULY 27 ARRIVAL DATE
SEND COPY OF BILL OF LADING TO MR KEN DALEY-
AMSCO COLVELLSPLANE-CONSHOHOCKEN PA 19428- ADVISE S MANNS-WILM OFFICE
IF WE CANNOT MEET SHIP DATE- CUSTOMER HAS ADVISED MALONE OF PICK UP

MAE 000529

INSTRUCTIONS

TOWOLDMON0051532

CO 220
Rev. 1-70

Monsanto

ROS

Shipping 1

0/1W433/0C06/0740/0741/2/7I300/XR/0Z0 ORG DSOS

SHIPPER'S NO. 564811	DISTRICT WL	DATE ENTERED 10/6/70	CUSTOMER'S ORDER NO. 022-501	INVOICE DATE	INVOICE NUMBER
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TERMS NET 30 DAYS	DATE SHIPPED 10/6/70	CAR INITIALS AND NO.
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PREPAID OR COLLECT - ROUTING
COLLECT Anniston Mtr c/o Admiral Merchants

ANNISTON ALABAMA	SHIPPED FROM ANNISTON	WHEE. CODE 09	BOOKED THRU 53-07--57-15	COPIES CODE 2-1-2	CUST. FORM	S MANNS
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AMERICAN MINERAL SPIRITS COMPANY 23268
A DIVISION OF UNION OIL COMPANY OF CALIFORNIA
3100 SOUTH MEACHAM ROAD
PALATINE ILLINOIS 60067

HARLECO CHEMICALS
60TH AND WOODLAND AVENUE
PHILADELPHIA PENNSYLVANIA

DESCRIPTION	QUANTITY	PRICE & UNIT	AMOUNT
10 - 600 LB DRUMS-30 STEEL AROCLOR 1254 1040-280-04-09 LESS DISTRIBUTOR DISC 5 PCT 6500- 500- 6000	6000 LBS		

CONTAINERS			EXPECT TO SHIP 10/6/70
NON-RETURNABLE			
RETURNABLE	10/6/70		
PRICE			

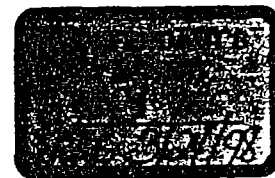
SHIPPING DATE	ARRIVAL DATE
	OCT 8--CR

THIS SHIPMENT APPROVED BY W S CLARK. IF NECESSARY RELABEL
ELECTRICAL GRADE AROCLOR 1254

re 1/1/70

MAE 000530

SALES SUMMARY
ALL PCB CONTAINING PRODUCTS
ARMSTRONG CORK COMPANY - LANCASTER, PA
1954 - 1977



1954 - 1957

Sales books are incomplete for these years. 0 lbs.

1958

Aroclor Distilled 1260 150 lbs.

1959

No sales found for this year. 0 lbs.

1960

Aroclor Crude No. 2565 0 lbs. *
Pydraul F-9 0 lbs. *

1961

Aroclor Distilled 1242 0 lbs. *
Aroclor Distilled 1254 0 lbs. *

1962

Aroclor Distilled 1242 400 lbs.
Aroclor Distilled 1254 50 lbs.

1963

No sales found for this year. 0 lbs.

1964

Aroclor Distilled 1254 1,000 lbs. *

1965

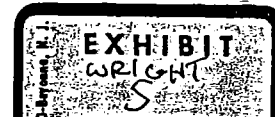
Aroclor Distilled 1254 2,160 lbs.
Therminol FR-2 9,000 lbs.

1966

Aroclor Distilled 1248 165 lbs.
Aroclor Distilled 1254 2,460 lbs.
Therminol FR-2 1,200 lbs.

MAE 000001

* Sales for these years are rounded to the nearest thousand pounds. Sales less than 500 pounds are recorded as 0 pounds sold.



1966 cont.

Therminol FR-2 600 lbs.

1967

Aroclor Distilled 1254 5,220 lbs.
Aroclor Distilled 1262 60 lbs.
Aroclor Distilled 4465 150 lbs.
Montar 1 500 lbs.
Pydraul F-9 54 lbs.

1968

Aroclor Distilled 1254 11,400 lbs.

1969

Therminol FR-2 1,200 lbs.
Aroclor Distilled 1254 60 lbs.

1970

Therminol FR-2 4,200 lbs.
Aroclor Distilled 1254 60 lbs.

1971

Therminol FR-1 3,000 lbs.

1972 - 1977

No Sales found for these years. 0 lbs.

MAE 000002

* Sales for these years are rounded to the nearest thousand pounds. Sales less than 500 pounds are recorded as 0 pounds sold.

11/66

Your guide to...



TOP-QUALITY PLASTICIZERS

Here are plasticizers and resin modifiers for any and every resin system!

No matter what the application or performance specification, one or a combination of the plasticizers offered here will do the job. As shown here, you can select from the widest choice of plasticizers available from any single source. They are recommended for use in compounding:

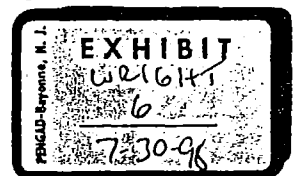
Flexible Film and Sheeting
Adhesives
Lacquers
Sealing Compounds
Paints

Casting Compounds
Extrusions
Plastisols
Fabric & Paper Coatings

YOU CAN DEPEND UPON THESE PRODUCTS' QUALITY AND PERFORMANCE

open once for "Compatibility" guide • open fully for a listing of products and properties

MAE 059457



Plasticizer-Resin

PHTHALATES

		Dibutyl	Dicyclohexyl	Diethyl	Diisodecyl	Disooctyl	Dimethyl	Di(n-octyl, n-decyl)	Dioctyl	Diphenyl	Ditridecyl	Sanicizer® 160	Sanicizer 165	Sanicizer 213	Sanicizer 214	Sanicizer 215	Sanicizer 262	Sanicizer 602	Sanicizer 603
VINYL TYPE	Polyvinyl Chloride	100	30	1	100	100	1	100	100	80	100	100	100	100	100	100	100	100	100
	Polyvinyl Acetate	100	50	100	1	1	100	1	1	70	1	100	1	10	1	1	40	1	1
	Polyvinyl Butyral	100	50	50	25	15	50	15	15	50	25	100	10	50	20	30	20	25	25
	Polyvinylidene Chloride	75	20	75	10	25	50	25	25	20	10	75	50	25	10	15	25	15	20
	Polystyrene	100	20	100	100	100	100	100	50	70	100	100	100	75	75	100	50	100	100
CELLULOSIC	Nitrocellulose	100	50	100	100	100	60	100	100	80	100	100	100	40	40	40	100	100	100
	Ethyl Cellulose	100	50	100	100	100	100	100	100	30	100	100	100	75	75	100	100	100	100
	Cellulose Acetate	25	1	85	1	1	80	1	1	1	1	10	1	1	1	1	1	1	1
	Cellulose Acetate Butyrate	100	20	100	50	50	100	50	50	20	50	100	50	40	20	40	50	50	40
	Cellulose Acetate Propionate	35	10	100	15	20	100	20	20	10	15	80	50	20	5	1	25	20	40
MISCELLANEOUS THERMOPLASTIC	Chlorinated Rubber	100	20	25	100	100	25	50	35	20	100	80	100	25	25	100	30	100	50
	High Styrene-Butadiene	50	20	25	50	50	20	50	50	20	50	50	50	40	40	40	50	50	40
	Protein Compounds	20	1	20	1	1	20	1	1	1	1	10	1	1	1	1	1	1	1
	Shellac	1	1	5	1	1	5	1	1	1	1	1	1	1	1	1	1	1	1
	Acrylic Type Resins	70	25	100	25	25	100	25	25	25	25	70	25	15	1	20	70	25	25
	Polyamides	25	10	1	20	25	1	25	25	10	20	25	25	1	1	5	20	20	20
THERMOSETTING	Polyester	20	20	10	15	20	5	20	20	20	15	20	20	5	5	5	15	10	15
	Epoxy	25	10	10	1	1	1	1	1	10	1	25	10	1	1	1	15	1	10
	Phenolic	50	25	25	25	25	25	25	25	30	25	50	50	25	25	25	25	25	25
	Alkyd	70	25	25	25	25	25	25	25	25	25	50	50	25	25	20	25	25	25
	Melamine	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Polyurethane	25	10	15	25	25	15	25	25	10	25	25	25	20	20	20	25	25	20
	Nitrile & Neoprene Rubbers	100	50	100	35	100	100	100	50	50	35	100	50	50	50	40	70	50	50

1 - Incompatible Figures - Compatibility, PHR

MAE 059458

MAE 059459

Specifications and Typical Properties

Product	Boiling Point (at 760 mm. Hg) (°C)	Vapor Pressure (mm Hg)			Viscosity (centistokes)			Surface Tension at 20°C (dynes/cm.)	Thermal Expansion Coefficient (at 10° to 40°C) (cc/cc/°C)	* Specification		Assay (Ester Content) (%)	Sulfur (Copper- strip test)	Solubility in water (at 25°C) (%)
		at 150°C	at 200°C	at 300°C	at 0°C	at 25°C	at 98.9°C			Flash Point (C.O.C.) (°F)	Fire Point (C.O.C.) (°F)			
340 B	—	1	9	300	55.0	15.6	2.4	35	0.00078	340	395	99 min.	—	0.001 (30°C)
270 to 278 (4 mm. Hg)	—	0.09	3.1	—	—	—	—	36.4 (75°C ± 1°)	—	405	465	99 min.	—	< 0.01
298	—	8	30	—	31.0	9.8	1.8	35.3 (20.5°C)	—	305	335	99 min.	Negative	0.1 (32°C)
250 to 257 (4 mm. Hg)	—	0.015	0.25	—	642.0	31.0	5.6	29	0.00074	450	520	—	—	< 0.005
278 to 237 (4 mm. Hg)	—	< 0.05	1.0	—	327.0	55.0	4.3	—	0.00073	430	480	99 min. to 101	Negative	< 0.01
282	—	13	76	—	54	11.4	1.6	32	0.00072 (9° to 30°C)	308	315	99.0 min	Negative	0.4 (32°C)
232 to 267 (4 mm. Hg)	—	0.01	0.25	—	—	130	34	31	0.00071	435	—	—	—	—
306	—	0.05	1.2	—	348.0	56.0	4.3	33 (25°C)	0.00074	425	480	99 to 101	Negative	< 0.005
405	—	0.15	1.7	55	—	—	—	—	—	435	—	—	—	< 0.01
283 (35 mm. Hg)	—	—	—	—	1500	160	8	—	—	450	—	—	—	—
370	—	0.16	2	90	—	41.5	—	39.9 (25°C)	0.00066	390	—	—	—	0.0003 (30°C)
—	—	0.14	1.8	—	250.0	45.0	3.9	—	—	390	—	—	Negative	< 0.005
—	—	19.6	70.4	—	—	17.0	—	33.6 (24°C)	—	315	335	—	—	Practically insoluble
—	—	15.0	53.1	—	—	29.6 (37.8°C)	4.5	31.0 (24°C)	0.00051	325	355	—	—	Practically insoluble
—	—	—	—	—	—	75	4.5	—	—	495	—	—	—	Practically insoluble
—	—	—	0.33	34	308	32	5.2	34.3 (25°C)	0.00051	420	515	—	—	—
—	—	—	—	—	—	34.5 (37.8°C)	5.0	—	—	412	—	—	—	—
—	—	—	—	—	400.0	80.0	4.6	—	0.00076	395	—	—	—	—
—	—	—	—	—	450.0	61.0	4.3	—	0.00074	370	—	—	—	—
—	—	—	—	—	250.0	50.0	4.8	—	0.00074	385	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
700 (4 mm. Hg)	—	0.02	0.50	—	—	14.5 (37.8°C)	3.0	30	0.00077	—	—	—	—	< 0.01
—	—	0.04	0.80	—	—	9.5 (37.8°C)	2.0	29	0.00076	400	480	—	Negative	< 0.01
214 (5 mm. Hg)	—	< 0.15	2.5	—	—	0.2 (37.8°C)	2.4	29	0.00078	377	450	—	—	< 0.01
420	—	—	0.5	29	1254.0	89.0	4.0	44.5	0.00057	470	695	—	—	< 0.002 gm. 100 ml
370	—	0.15	1.0	—	—	7.0 (36°C)	2.9	—	—	437	—	—	—	0.001 (34°C)
380	—	0.06	1	700 (390°C)	200.0	33.0	2.8	42	0.00067	450	none at 625	—	—	< 0.005
375	—	0.095	1.3	—	61.0	16.4	2.3	34.7 (25°C)	—	435	460	—	—	0.003
215-228	—	< 0.10	1.0	—	—	12.0 (20°C)	—	30	0.00081	435	465	—	—	0.11
137-145	—	7.3	> 500	—	—	3.8 (20°C)	—	29	0.00086	380	460	—	—	0.1
370	—	0.47	7	400	616.0	50.0	2.9	—	—	380	—	—	Negative	0.0175 (30°C)
345	—	0.1	1.0	150	279.0	46.0	3.0	—	—	390	—	—	Negative	0.0012 (30°C)
340	—	0.5	0	800	1476.0	82.0	2.8	43.6 (25°C)	—	380	—	—	Negative	0.09 (30°C)
350	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00045 (30°C)

MAE 059460

	—	—	—	—	—	—	—	—	—	—	—	—	—	Practically insoluble
	—	—	—	—	—	—	—	—	—	—	—	—	—	Nil
	—	—	—	—	—	18,500 to 13,500	—	—	—	595	—	—	—	Practically insoluble
	—	—	—	—	—	2,900 to 3,500	—	—	0.0071	530	578	—	—	Practically insoluble
	—	—	—	—	—	9,000 to 9,800	—	—	—	540	—	—	—	Practically insoluble
	—	—	—	—	—	556	—	—	—	475	535	—	—	Practically insoluble
	—	—	—	—	—	3,878	—	—	—	425	535	—	—	Practically insoluble
	—	—	—	—	—	6,422	—	—	—	525	540	—	—	Practically insoluble
	—	—	—	—	—	156	—	—	—	445	525	—	—	Practically insoluble
	345 to 396	2	15	238	79.8	29.8 (37.8°C)	3.8	40.1 (25°C)	—	345	345	—	—	—
	368	—	11 (22°C)	—	—	—	—	—	—	375	525	—	—	Hygroscopic
	360	—	11 (22°C)	—	—	17.5	—	—	—	375	525	—	—	Hygroscopic

FLAME-RETARDANT PLASTICIZERS

If you want products that resist burning, build your formulations with one or a combination of flame-retardant plasticizers. Monsanto's liquid and solid flame-retardant plasticizers offer a wide range of compatibilities. Other beneficial properties include permanence, chemical resistance, extraction resistance, flexibility and weatherability.

Santlicizer® 140
Santlicizer 141
Tricresyl Phosphate
Triphenyl Phosphate
11 Arbclor® Plasticizers
6 Montar® Compounds

FDA REGULATED PLASTICIZERS

Monsanto offers more FDA regulated plasticizers than any supplier for use in compositions related to food packaging and handling, and for articles that come into close contact with the human body. The following list of plasticizers offer you high specification standards of purity, low odor, minimum taste, flexibility, clearness and water resistance for applications such as: food-wrapping paper coatings, packaging films, label adhesives and inks, beverage and blood tubing:

Diethyl Phthalate
(high-water-content foods only)
Dilsooctyl Phthalate
(high-water-content foods only)
Diethyl Phthalate
Diethyl (2-ethylhexyl) Adipate
Santlicizer® 141
Santlicizer E-15
Santlicizer B-16
Santlicizer 160

SOLID PLASTICIZERS

Choose from a variety of plasticizers for use in adhesives, coatings and lacquers, foams, rigid compositions and films. Solid plasticizers decrease your hot processing time at reduced cost. During solvent processing, they require fewer surface-building coats and at less cost. For use such as delayed-tack and heat-seal adhesives and coatings for non-blocking films, easier processing of rigid plastics products, toughness of rigid foams, for even flow and uniform filling of resinous impregnants, choose from the following:

	Melting Point (°C)	Softening Range (°C)
Arbclor® 5442.....	—	46-52
Triphenyl Phosphate.....	48.5	—
Montar® 1.....	—	54-160
Santlicizer® 3.....	58	—
Arbclor 4465.....	—	60-66
Santolite® MHP.....	62	—
Dicyclohexyl Phthalate.....	63	—
Diphenyl Phthalate.....	69	—
Montar 2.....	—	70-170
Santlicizer 1-H.....	82.5	—
Montar 3.....	—	86-168
Montar 4.....	—	92-206
Arbclor 5460.....	—	98-105
Santlicizer 9.....	105	—
Montar 9.....	—	130-175
Arbclor 1268.....	—	150-170
Montar 5.....	—	155-195

MAE 059461

MONOMER PLASTICIZERS

Plasticizer	Molecular Weight	Acidity (meq./100 gm max)	Appearance	Color (APHA) (maximum)	Moisture (K.F. in methanol) (% maximum)	Odor	Refractive Index (at 25°C)	Specific Gravity (25°/25°C)	Density (at 25°C) (lb./gal.)	Crystallizing Point (°C)
PHTHALATES										
Dibutyl	278.34	* 0.12	* Clear, oily liquid	* 20	* 0.15	* Slight, characteristic	1.4825 to 1.4915	* 0.944 to 0.948	8.72	< -35
Dicyclohexyl	330.41	* 0.12	* White lumps or granules	* 100 (melted)	* 0.1	* Moderate, aromatic; slight phthalic, characteristic	—	1.29	—	—
Diethyl	222.11	* 0.12	* Clear, oily liquid	* 10	* 0.15	* Slight, aromatic, max.	1.4990 to 1.5010	* 0.915 to 1.118	8.25	< -8.3
Dioctadecyl	444.65	* 0.12	* Clear, oily liquid	* 50	* 0.10	* Slight, characteristic	1.4794 to 1.4864	* 0.963 to 0.969	8.95	-53 (white, clear gel)
Dioctadecyl	390.53	* 0.12	* Clear, oily liquid	* 25	* 0.10	* Slight, characteristic, max.	1.4230 to 1.4280	* 0.900 to 0.905	8.21	-45
Dioctyl	194.18	* 0.12	* Clear, oily liquid	* 10	* 0.25	* Slight, aromatic, max.	1.5123 to 1.5143	* 1.188 to 1.192	9.92	0.9 (in -7°C bath)
Di(n-octyl-n-decyl)	418 (average)	* 0.04	* Clear, oily liquid	* 50	* 0.10	* Slight, characteristic	* 1.4210 to 1.4340	* 0.9630 to 0.9770	8.1	-30
Diethyl	390.53	* 0.12	* Clear, oily liquid	* 25	* 0.10	* Slight, characteristic, max.	1.4453 to 1.4558	* 0.980 to 0.985	8.21	-55 (very shd gel)
Diphenyl	318.31	* 1.20	* Essentially white, fused solid with a slightly yellow or brown cast	* 100 (20ml; 30ml acetone)	* 0.25	—	1.572 (@ 74°C)	1.28	—	—
Dodecyl	326	* 0.12	* Clear liquid	* 100	* 0.1	* Clear, characteristic	* 1.4813 to 1.4850	* 0.948 to 0.955	7.93	—
Santolizer® 100	312.25	* 0.37	* Clear, oily liquid	* 40	* 0.15	* Slight, characteristic, max.	* 1.535 to 1.540	* 1.115 to 1.123	9.3	< -35
Santolizer 165	—	* 0.12	* Clear, oily liquid	* 40	* 0.12	* Slight (similar to DOP)	* 1.434 to 1.437	* 0.990 to 0.996	8.78	—
Santolizer 213	—	* 0.25	* Clear, oily liquid	* 75	* 0.15	Characteristic, very low	* 1.521 to 1.524	* 1.000 to 1.015	8.62	—
Santolizer 214	—	* 0.15	* Clear, oily liquid	* 100	* 0.15	Characteristic, very low	* 1.481 to 1.486	* 0.948 to 0.954	7.9	—
Santolizer 215	—	* 0.12	* Clear, oily liquid	* 100	* 0.10	Characteristic	* 1.508 to 1.516	* 0.974 to 0.980	8.14	—
Santolizer 262	396.5	* 0.37	* Clear, oily liquid	* 100	* 0.15	—	* 1.515 to 1.523	* 1.048 to 1.057	8.7	-27.8
Santolizer 302	—	* 0.18	* Clear, oily liquid	* 50	* 0.10	* Characteristic, mild	* 1.482 to 1.486	* 0.971 to 0.977	8.1	—
Santolizer 303	—	* 0.12	* Clear, oily liquid	* 100	* 0.10	Characteristic	* 1.4825 to 1.4895	* 0.977 to 0.987	8.18	—
Santolizer 330	—	* 0.12	* Clear, oily liquid	* 70	* 0.10	—	* 1.5095 to 1.5160	* 0.987 to 0.994	8.25	—
Santolizer 331	—	* 0.12	* Clear, oily liquid	* 40	* 0.10	—	* 1.4990 to 1.5045	* 0.964 to 0.990	8.72	—
Santolizer 332	—	* 0.12	* Clear, oily liquid	* 100	* 0.15	—	* 1.484 to 1.487	* 0.976 to 0.982	8.15	—
Santolizer 336	—	* 0.12	* Clear, oily liquid	* 75	* 0.10	—	* 1.478 to 1.488	* 0.969 to 0.977	8.11	—
Santolizer 331	—	* 0.20	* Clear, oily liquid	* 40	* 0.10	—	* 1.472 to 1.479	* 0.963 to 0.970	8.05	—
Santolizer 343	—	* 0.12	* Clear, oily liquid	* 40	* 0.10	—	* 1.488 to 1.489	* 0.975 to 0.981	8.01	—
ADIPATES										
Dioctadecyl	444.6	* 0.30	* Clear, oily liquid	* 50	* 0.10	* Mild	1.4485 to 1.4525	* 0.962 to 0.973	7.65	< -30
Di(n-octyl-n-decyl)	396 (average)	* 0.35	* Clear, oily liquid	* 50	* 0.10	Characteristic	* 1.444 to 1.458	* 0.914 to 0.922	7.83	-5
Diethyl	378.36	* 0.25	* Clear, oily liquid	* 25	* 0.10	* Mild	1.444 to 1.448	* 0.921 to 0.927	7.71	< -70
PHOSPHATES										
Tricresyl	362.18	* 0.20	* Clear, oily liquid	* 75	* 0.15	* No foreign odor	1.556	* 1.157 to 1.173	9.7	< -35
Triphenyl	326.31	* 0.06	* White flakes	20 (melted)	—	* Very faint, aromatic, max.	1.556 (@ 90°C)	1.268 (90°/20°C)	10.5	49
Santolizer 140	348.2	* 0.20	* Clear, oily liquid	* 40	* 0.15	* Essentially odorless	1.558 to 1.570	* 1.203 to 1.213	10	< -35
Santolizer 141	362.00	* 0.20	* Clear, oily liquid	* 80	* 0.10	* Slight, sweet	1.547 to 1.518	* 1.069 to 1.075	9.1	—
Triphenylmethyl	—	* 1.0	* Clear, oily liquid	* 75	* 0.20	* Characteristic, mild	* 1.434 to 1.438	* 1.017 to 1.023	8.56	< -70
Triethyl	264.32	* 0.11	* Clear, oily liquid	* 25	* 0.20	* Characteristic	* 1.422 to 1.424	* 0.973 to 0.978	8.14	< 80
GLYCOLATES										
Santolizer E-15	288.27	* 0.17	* Clear, oily liquid	* 20	* 0.15	* Slight, max.	1.496 to 1.500	* 1.100 to 1.105	9.85	(in acetone) 20 (viscosity)
Santolizer E-16	336.37	* 0.13	* Clear, oily liquid	* 45	* 0.15	* Slight, characteristic	1.488 to 1.492	* 1.095 to 1.105	9.15	< -35
Santolizer M-17	264.34	* 0.33	* Clear, oily liquid	* 20	* 0.15	* Slight, characteristic, max.	1.504	* 1.217 to 1.227	10.20	< -35
SULFONAMIDES										
Santolizer 1-8	252.30	—	* Yellow-brown fused mass	* 300 (melted)	* 0.15	—	—	1.129	—	(in acetone) 100 (viscosity)
Santolizer 3	190.25	* 1.00	* Powdery white solid	—	—	—	—	—	—	* 52.5 min.

MAE 059462

Sanicizer 809	—	* 0.08 (mg KOH/g)	* Hard, practically colorless resin	* 50 (25g: 75g butyl acetate)	—	Faint formaldehyde	(25g: 75g butyl acetate)	1.33	—	62
Sanicizer 811	—	* 0.18 (mg KOH/g)	* Light-colored, viscous liquid. Free flowing above 20°C	* 80 (25g: 35g butyl acetate)	—	—	—	1.254	10.5	—
PERMANENT										
Sanicizer 819	—	* 1.0	* Clear, viscous liquid	* 250 (50ml: 50ml 95% ethanol)	* 0.15	* Characteristic	1.476	* 1.128 to 1.132	9.41	—
Sanicizer 809	—	* 1.5	* Clear, liquid	* 150 (50ml: 50ml 95% ethanol)	* 0.15	* Very light ester	1.454	* 1.080 to 1.084	9.01	—
Sanicizer 811	—	* 1.8	* Slightly yellow, viscous liquid; some solids on standing	* 175 (50ml: 50ml 95% ethanol)	* 0.15	* Slight, characteristic	1.472	* 1.104 to 1.118	9.70	—
Sanicizer 849	—	* 0.60	* Clear, oily liquid	* 200	* 0.15	* Slight, characteristic	1.4943	* 1.039 to 1.046	8.72	—
Sanicizer 481	—	* 0.85	* Clear, oily liquid	* 300	* 0.15	* Slight, characteristic	1.4795	* 1.072 to 1.078	8.96	—
Sanicizer 482	—	* 1.1	* Clear, liquid	* 325	* 0.15	* Slight, characteristic	1.4751	* 1.097 to 1.103	9.16	—
Sanicizer 483	—	* 0.24	* Clear, oily liquid	* 125	* 0.15	* Slight, characteristic	* 1.5015 to 1.5050	* 1.045 to 1.052	8.74	—
OTHER										
HB-40 ²	—	—	* Practically colorless, oily liquid	* 150	* 125 ppm	* Faint, characteristic	1.5600 to 1.5750	* 1.001 to 1.007 (25°/15.5° C)	8.31	—
Mod-Epoxy ²	—	* 0.08 (mg KOH/g)	* Oily liquid or light-yellow solid	* 50	—	—	* 1.547 to 1.550	* 1.176 to 1.182 (30°/15.5° C)	9.83	25
Triphenyl Phosphite	318.28	* 0.18 (mg KOH/g)	* Oily liquid or light-yellow solid	* 50	—	—	* 1.567 to 1.590	* 1.176 to 1.182 (30°/15.5° C)	9.83	25

GENERAL PROPERTIES OF REPRESENTATIVE AROCLOR® PLASTICIZERS AND RESINS (*MONSANTO SPECIFICATIONS)

PROPERTY	AROCLOR 121	AROCLOR 122	AROCLOR 1242	AROCLOR 1243	AROCLOR 1254	AROCLOR 1264	AROCLOR 1262	AROCLOR 5442	AROCLOR 4463	AROCLOR 5490	AROCLOR 1274
Appearance	Clear, mobil oil	Clear, mobil oil	*Clear, mobil oil	*Clear, mobil oil	Light-yellow viscous oil	*Light-yellow, soft sticky resin	*Light-yellow sticky viscous resin	*Yellow, clear, sticky resin	*Light-yellow, clear, brittle resin	*Clear, yellow-brown, brittle resin or flakes	*White to off-white powder
Color, maximum	*58 APHA	*108 APHA	*100 APHA	*100 APHA	*108 APHA	*150 APHA	*150 APHA	*2 NPA (molten)	*2 NPA (molten)	*2 NPA (molten)	1.5 NPA (molten)
Chlorine, per cent	20.5-21.5	31.5-32.5	42	48	54	80	61.5-62.5	42	65	58.5-60.5	68
Acidity, mg KOH/g, maximum	*0.014	*0.014	*0.015	*0.010	*0.18	*0.014	*0.014	0.05	0.5	0.5	0.05
Moisture, ppm, maximum	—	—	*50	*58	*50	*50	—	—	—	—	—
Avg. Coefficient of Expansion, cc/cc/°C	0.00071 (15°-40°C)	0.00073 (25°-100°C)	0.00068 (25°-45°C)	0.00070 (25°-45°C)	0.00064 (25°-45°C)	0.00067 (20°-100°C)	0.00064 (25°-45°C)	0.00123 (25°-99°C)	0.00061 (25°-45°C)	0.00178 (25°-124°C)	0.00067 (20°-100°C)
Specific Gravity	*1.182-1.182 (25°/25°C)	*1.276-1.280 (25°/15.5°C)	*1.301-1.306 (25°/15.5°C)	*1.405-1.415 (85°/15.5°C)	*1.495-1.505 (85°/15.5°C)	*1.556-1.568 (90°/15.5°C)	*1.572-1.583 (90°/15.5°C)	1.478 (25°/25°C)	1.678 (25°/25°C)	1.670 (25°/25°C)	1.804-1.807 (25°/25°C)
Density, pounds per gallon, 25°C	9.85	10.55	11.50	12.04	12.82	13.50	13.72	12.24	13.91	13.91	15.91
Distillation Range, °C, corrected (ASTM D-29, modified)	275-320	290-325	325-366	348-375	366-398	385-428	398-425	215-300 (4 mm. Hg)	238-320 (4 mm. Hg)	290-325 (5 mm. Hg)	435-150
Evaporation Loss, % 100°C, 6 hours (ASTM D-6, mod.) 153°C, 5 hours	1.0-1.5	1.0-1.5	0-0.4 3.0-3.8	0-0.3 3.0-4.0	0-0.2 1.1-1.3	0-0.1 0.5-0.8	0-0.1 0.5-0.8	0.01 0.2	0-0.02 0.2-0.3	0.03	0-0.06 0.1-0.2
Flash Point (Cleveland Open Cup), °C	141-150 294-302	152-154 305-310	175-180 348-356	183-196 378-384	NONE	NONE	NONE	247 477	NONE	NONE	NONE
Fire Point (Cleveland Open Cup), °C	178 349	238 460	NONE**	NONE	NONE	NONE	NONE	350 662	NONE	NONE	NONE
Pour Point (ASTM D-97), °C	1 (crystals) 34 (crystals)	-35.5 -32	-19 2	-7 19.4	18 50	31 86	35-38 99	46 115	—	—	—
Softening Point (ASTM D-28), °C	—	—	—	—	—	—	—	*96-52 115-126	*98-66 140-151	*98-195.5 208-222	*150-110 302-328 (heat point)
Refractive Index, n_D^{25} @ 20°C	1.417-1.418	1.626-1.622	1.677-1.679	1.636-1.631	1.679-1.641	1.647-1.649	1.678-1.6517	—	1.664-1.667	1.660-1.665	—
Viscosity, Seconds Saybolt Universal (ASTM D-88)	*38-41 100°F (37.8°C) *35-37 130°F (54.4°C) *30-31 210°F (98.9°C)	*44-51 39-41 31-32	*82-82 49-56 34-35	185-240 73-80 36-37	1808-2500 290-340 44-48	— 3200-4508 72-78	800-250 1164°F; 71°C 96-108	— 380-480	96-138 2164°F; 120°C	—	—

*Monsanto Company specifications.

**NONE indicates no flash or fire up to boiling point.

PLASTICIZERS

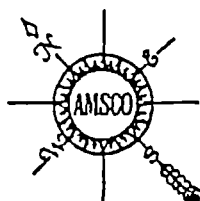
For the Widest Choice in the World



We can ship you plasticizers and other chemicals promptly out of nearby stocks. You may find it economical and convenient to place combination orders for plasticizers and other chemicals for delivery at the same time.

Let us help you on all your needs for plasticizers and other chemicals for processing, formulation maintenance.

MAE 059464



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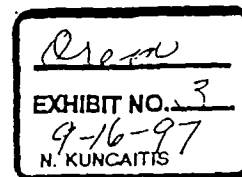
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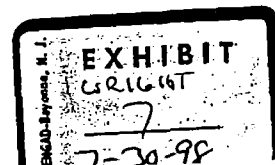
AROCLOR® PLASTICIZERS

A series of inert, chemically-resistant, fire-retarding
plasticizers compatible with wide variety of resins.

TECHNICAL BULLETIN O/PL-308



MAE 040881



AROCLO[®] PLASTICIZERS

A series of inert, chemically-resistant, fire-retarding
plasticizers compatible with wide variety of resins.

TECHNICAL BULLETIN O/PL-306

PLASTICIZERS



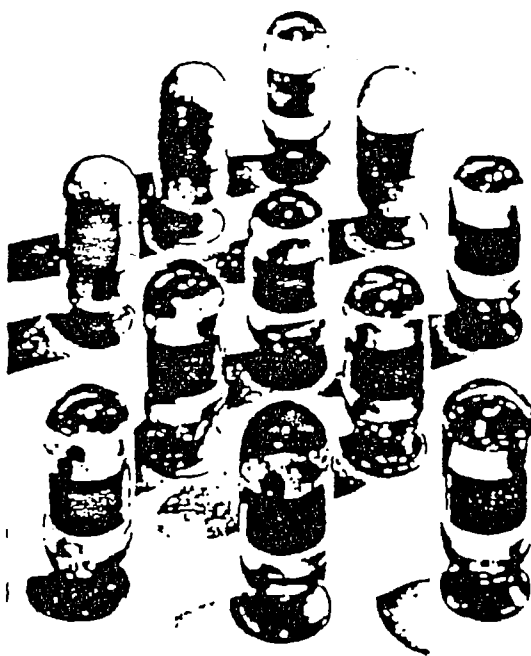
"Nothing contained herein is to be construed as a representation or warranty with respect to the fitness or dependability of any products referred to, or as a guarantee of satisfactory results from treatment with any product. The user assumes all responsibility for any failure or loss of product."

Organic Chemicals Division / 800 N. Lindbergh Blvd. / St. Louis, Missouri 63186

MAE 040882

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MAE 040884

Introduction

The unique Aroclor® plasticizers are among the most versatile chemically produced materials available. One outstanding characteristic — *inertness* — makes Aroclor useful in many ways for many different applications. The major benefits offered by Aroclor include:

- Chemical Resistance
- Fire Retardance
- Compatibility with most resins
- Nonoxidation
- Adhesivity
- Low Cost

This bulletin describes some of their many important plasticizing and related applications, including numerous suggested starting formulations. Examination of their physical properties, also given in considerable detail, may suggest scores of new uses that could not be performed by any other known material.

Additional information about the Aroclor compounds is available from your nearest Monsanto district sales office in the following technical bulletins:

- PL-307.....Monsanto's Plasticizers in Synthetic-Resin Adhesives
PL-311.....Aroclor Plasticizers for Chlorinated Rubber
PL-321.....Aroclor 1221, 1232, 1242 for Polyvinyl Acetate Emulsion Adhesives
PL-327.....Monsanto's Plasticizers in Protective Coatings
PL-331.....Monsanto Modifiers for Polysulfides
CS-14.....Aroclor Fire-Retarding Plasticizers and Modifiers in Epoxy Resins
CS-18.....Aroclor Compounds (performance with waxes)

Description

Monsanto's Aroclor plasticizers comprise a series of chlorinated biphenyls and chlorinated polyphenyls. They vary from mobile, oily liquids to white crystals and hard, transparent resins.

Twelve of the Aroclor plasticizers, each of which represents a series, are discussed in this bulletin. An understanding of the system for designation of each Aroclor should prove useful in the evaluation of the property gradations among them. The last two digits indicate the approximate weight percentage of chlorine in the product, and the first two digits indicate the type of material, as follows:

- 12 — chlorinated biphenyls
- 25 — blend of chlorinated biphenyls and chlorinated triphenyls (75:25)
- 44 — blend of chlorinated biphenyls and chlorinated triphenyls (60:40)
- 54 — chlorinated triphenyls

For nearly every Aroclor mentioned, a darker, less-pure grade exists, with about the same physical and chemical characteristics, but lower in price.

MAE 040885

Aroclor compounds are nonoxidizing, inert, permanently thermoplastic, of low volatility, non-corrosive to metals, and low cost. Aroclor compounds are not hydrolyzed by water and resist alkalies, acids, and corrosive chemicals. The viscous, more-highly-chlorinated liquids and resins do not support combustion, and they impart fire retardance to other materials.

The crystalline Aroclor compounds are relatively insoluble, but the liquid and resinous compounds are soluble in most of the common organic solvents, thinners, and oils. All Aroclor compounds are insoluble in water and glycerine. Aroclor 5460 is insoluble in lower-molecular-weight alcohols; Aroclor 4465 is only partly soluble in the lower alcohols.

Aroclor compounds plasticize a great many resins without softening them unduly. The Aroclor compounds are unsurpassed for the plasticizing of protective coatings, particularly for use in chemical plants and other facilities that require a tough, chemically resistant surface. Aroclor plasticizers can also be used to flexibilize sealing compounds, adhesives, lacquers, inks, varnishes, free films, fabric coatings, and pigment dispersions. They are also used as components or extenders in elastomers and waxes. The properties of many end products can be improved — yet at reduced overall cost — by the use of an Aroclor as either a primary or a secondary plasticizer.

The properties imparted by Aroclor compounds (and their usefulness in particular applications) vary in regular gradient over the series. Selection of the right Aroclor for a particular use can generally be made by comparison of the properties, by "blending" two or more, and by adjusting the percentages used in the particular mixture in which the Aroclor compounds are formulated.

Monsanto's Plasticizer Council can provide specific formulation guidance that may help you improve your product or lower your processing cost. Processors are invited to ask the nearest Monsanto office for help on special problems.

Compatibility

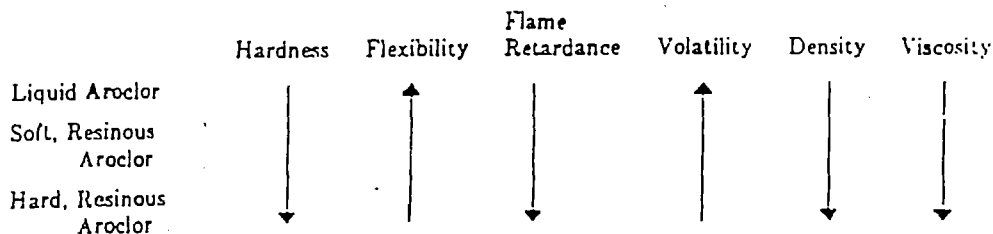
The Aroclor plasticizers are compatible with most common plastic materials; they are compatible to the extent of practical use with the following:

Asphalt	Polyethylene
Benzyl Cellulose	Polyester Resins
Carbauba Wax	Polystyrene Resins
Cellulose Acetate-Butyrate	Polyisobutylene
Chlorinated Rubber	Polysulfides
Coumarone-Indene Resins	Polyurethanes
Damar Resin	Polyvinyl Acetate
Ester Gum	Polyvinyl Butyral
Ethyl Cellulose	Polyvinyl Chloride
Ethylene/Vinyl Acetate	Polyvinylidene Chloride
Epoxy Resins	Rosin
Nitrocellulose	Rubber
Paraffin	Styrene-Butadiene Copolymers
Phenolic Resins	

MAE 040886

Aroclor plasticizers are not compatible with phenolic resins in the final stage of condensation or with cellulose acetate.

Aroclor plasticizers generally impart progressively increasing properties in the direction of the arrows in the following diagram:



Usually the desired balance between flexibility and hardness can be obtained either by selection of an Aroclor with the appropriate physical characteristics or by use of a blend of two or more Aroclor plasticizers.

In evaluation of formulations that contain Aroclor plasticizers, the compounder should thoroughly test an experimental product for compatibility, heat and light stability, and other properties according to normal industry practices.

Aroclor Plasticizers In Synthetic Resins

Low-cost Aroclor plasticizers are valuable for a variety of applications. They improve chemical resistance, flame retardance, and oxidation resistance. Depending upon the use, the various Aroclor plasticizer offers a number of benefits to the user. In almost all formulations, the use of an Aroclor reduces the over-all cost per pound.

In Polyvinyl Chloride

Aroclor is valuable in polyvinyl chloride and copolymers as a secondary plasticizer or as a plasticizer extender. The Aroclor plasticizers impart flame retardance and chemical resistance.

Selection of the proper Aroclor enables compounders to impart such special properties to their formulations as:

Resistance to migration to nitrocellulose lacquers (Aroclor 1260 and 1262).

Fine, uniform cell structure in vinyl foam (Aroclor 1262 and 1268).

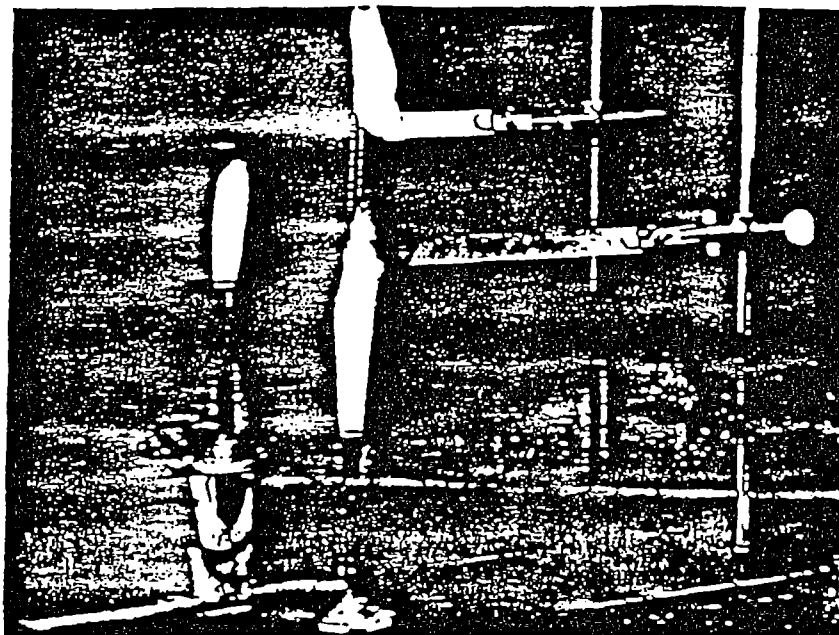
Adhesion in vinyl coatings (Aroclor 1260 and 5460).

Viscosity stability in plastisols (Aroclor 1248 and 1254).

Compatibility

Aroclor plasticizers (except Aroclor 1268) are compatible to about 25 per cent of the total plasticizer content in polyvinyl chloride and usually somewhat greater in copolymer resins. At these levels, no exudation occurs in the loop-compatibility test, one of the most severe used by the industry.

MAE 040887



The control specimen burns rapidly; the one containing Aroclor® does not even ignite.

Performance

As an illustration of the performance of Aroclor plasticizers, Table 1 shows evaluation of the five most commonly used in polyvinyl chloride.

TABLE 1

PERFORMANCE EVALUATION OF FIVE AROCLOR® PLASTICIZERS IN POLYVINYL CHLORIDE

Aroclor	Concen- tration (parts)	Hard- ness (Shore "A")	Volat- ility (Plasti- cizer lost, %)	Kerosene- Extraction (Plasticizer lost, %)	Low-Temp Flexibility (Glass & Berg) (T _g , °C)	Tensile Strength (psi)	Modulus (psi)	Elonga- tion (%)
1248	15	87	19	23	-26	2330	1320	342
1254	15	88	14	24	-24	2310	1360	334
1260	15	89	11	32	-22	2200	1330	315
4465	17.5	89	6	19	-19	—	—	—
5442	17.5	87	8	16	-20	—	—	—

Ingredients

Parts by Weight

a) Opalon® 860 PVC resin
Dioctyl Phthalate
Calcium Carbonate
Stabilizer
Aroclor

100

45

40

3

indicated

b) 24 hours at 87°C over activated carbon

c) 96 hours at 25°C

MAE 040888

Heat and Light Stability

Aroclor compounds impart good heat stability but somewhat reduce the light stability of vinyl formulations, but no more so than do many other secondary plasticizers commonly used in the industry. Light stability of the system may be improved by incorporation of a small amount of light-screening agent, such as 0.1 per cent Tinurin P.*

Chemical Resistance

For imparting resistivity to chemical attack, the Aroclor plasticizers are unsurpassed. Independent evaluations of the chemical resistance of vinyl chloride-vinyl acetate copolymer paint, modified by eight types of materials (alkyd resin, phenolic-chinawood oil varnish, ester gum-linseed oil varnish, Aroclor 1254, dioctyl phthalate, tricresyl phosphate, polymeric plasticizer, and acrylic polymer), showed that Aroclor 1254 has the "best all-around chemical resistance, failing badly only in the gasoline test."

Paints were sprayed onto solvent-cleaned, unprimed, cold-rolled-steel panels, which were then immersed in seven types of solutions until failure. The data in Table 2, excerpted from the November 1955 issue of *Official Digest* of the Federation of Paint and Varnish Production Clubs, compare the chemical resistance imparted by Aroclor 1254 and by dioctyl phthalate.

TABLE 2

COMPARATIVE CHEMICAL RESISTANCE OF PLASTICIZERS IN VINYL CHLORIDE-VINYL ACETATE COPOLYMER PAINT

Plasticizers		Time to Failure in Corrosive Media						
Dioctyl Phtha- late (%)	Aroclor® 1254 (%)	10% Sodium Hydrox- ide (days)	10% Hydro- chloric Acid (hours)	Gasoline (days)	5% Sodium Hypo- chlorite (days)	10% Acetic Acid (hours)	Linseed Oil Fatty Acids (days)	1% Tide at 160°F (days)
10	—	120*	82	0.4	4	84	80	21
—	10	120*	168*	5	13	168*	90*	22
25	—	80	24	0.4	4	84	27	25
—	25	120*	120	0.4	14.5	120	90*	22
40	—	80	24	0.4	4	48	22	25
—	60	120*	88	0.4	11	100	80	22

a/ End of test

In other corrosion-resistance tests of polyvinyl chloride plastisols, containing 70 parts plasticizer per 100 parts resin a formulation that contained 1 part Aroclor 1254 to 3 parts dioctyl phthalate was much more resistant to 15 percent nitric acid at either 23° or 50°C for six months than a compound plasticized with dioctyl phthalate alone.

The plastisol modified with both Aroclor 1254 and dioctyl phthalate was also more resistant to 25 percent chromic oxide at 50°C for four weeks and was equivalent at 23°C for six months in comparison with the dioctyl phthalate-modified vinyl plastisol.

*Transmittance of 50% solution.

MAE 040889

Migration Resistance

The use of Aroclor 1262 as a coplasticizer with dioctyl phthalate greatly enhances the resistance of plasticizer migration to nitrocellulose lacquers and films. Table 3 compares this property for four formulations.

TABLE 3

PLASTICIZER MIGRATION TO NITROCELLULOSE LACQUERS AND FILMS				
Plasticizer ^a	Aroclor [®] and DOP (parts)	Control DOP (parts)	Aroclor, DOP, and Polymeric (parts)	Polymeric and DOP (parts)
Dioctyl Phthalate	66	71	36	38
Polymeric Plasticizer	—	—	33	35
Aroclor 1262	20	—	20	—
Hardness, Shore "A"	72	72	72	73
<i>Time (weeks)</i>				
Room Temperature				
1	No Change	No Change	No Change	Slight Marking
2	No Change	No Change	No Change	Slight Marking
3	No Change	No Change	Very Slight Marking	Slight Marking
4	No Change	No Change	Very Slight Marking	Slight Marking
5	No Change	No Change	Very Slight Marking	Slight Marking
10	No Change	No Change	Very Slight Marking	Slight Marking
50° C				
1	No Change	Slight Marking	Moderate Marking	Very Slight Softening
2	No Change	Slight Marking	Severe Marking	Very Slight Softening
3	No Change	Slight Marking	Very Slight Softening	Slight Softening
4	No Change	Moderate Marking	Slight Softening	Slight Softening
5	No Change	Moderate Marking	Slight Softening	Slight Softening
10	No Change	Moderate Marking	Slight Softening	Moderate Softening
General Motors Lacquer Test (158°F; 72 hr.; ½-psi load)	Indentation. Very Slight Softening	Extreme Softening	Lifting	Extreme Softening
<i>a) Formulation</i>				
<i>Ingredients</i>		<i>Parts by Weight</i>		
Opalon [®] 660 PVC Resin		100		
Epoxy Soybean Oil		3		
Barium-Cadmium Laurate		3		
Calcium Carbonate		25		
Plasticizer		as indicated		

MAE 040890

Plastisols

The use of an Aroclor as a coplasticizer with dioctyl phthalate in polyvinyl chloride plastisols or organosols contributes greatly to the viscosity stability of these materials, especially at elevated temperatures. This benefit is especially important whenever shelf stability is required. Although the initial viscosity of the plastisol or organosol is increased by the use of an Aroclor in the formulation, the viscosity reduction upon temperature elevation (before the fusion temperature is reached) is much greater than when most other plasticizers are used.

A comparison of the viscosity stability of plastisol formulations with and without Aroclor is given in Table 4.

TABLE 4

VISCOSITY STABILITY OF PLASTISOLS			
	Dioctyl Phthalate (80 phr) Viscosity ^a (poises)	Aroclor® 1254 (20 phr) Dioctyl Phthalate (60 phr) Viscosity ^a (poises)	Aroclor 5460 (20 phr) Dioctyl Phthalate (60 phr) Viscosity ^a (poises)
25°C			
Initial	36	49	92
1 Day	85	83	154
1 Week	87	78	181
2 Weeks	116	75	178
4 Weeks	132	148	252
40°C			
Initial	37	48	68
1 Day	84	98	138
1 Week	215	108	139
2 Weeks	305	110	164
4 Weeks	428	209	274
60°C			
Initial	86	94	100
1 Day	gel	680	470
1 Week		880	900
2 Weeks		gel	gel
4 Weeks			

a) Brookfield LYF viscometer, No. 4 spindle, 12 rpm

Dipping Plastisols. The chemical resistance of Aroclor compounds is used to good advantage in chrome-plating-bath coatings and in glove coatings, as illustrated by the following formulation for a clear glove-dipping plastisol:

Ingredients	Parts by Weight
Opalon® 440 PVC resin	100
Aroclor® 1254	20
Diisodecyl Phthalate	50
Santicizer® 160	25
HB-40® Secondary Plasticizer	20
Liquid Barium-Cadmium Stabilizer	2
Liquid Chelator-Stabilizer	0.5
Santocal® 54 Silica Aerogel	3

Sealers. The adhesion-imparting characteristics of Aroclor compounds, their oxidation stability, and their chemical resistance are utilized in the manufacture of automotive sealers, such as the following suggested starting formulations:

<i>Ingredients</i>	<i>Parts by Weight</i>
Opalon® 440 PVC resin	96
Vynlite® VMCH resin	4
Aroclor® 1260	50
Diisododecyl Phthalate	100
Santicizer® 160	28
Calcium Carbonate	125
Epoxy Soybean Oil	5
Dibasic Lead Phosphite	3

Fabric-Coating Vinyl Dispersions. The use of Aroclor plasticizers in organosol or plastisol formulations enables the manufacture of fire-retardant free films and coated fabrics with a high degree of hardness, yet flexibility. The following typical starting formulation for a vinyl organosol to be used for free film or coated fabric illustrates this effect:

<i>Ingredients</i>	<i>Parts by Weight</i>
Opalon® 440 PVC resin	100
Diocetyl Phthalate	33
Aroclor® 1254	10
Liquid Barium-Cadmium Stabilizer	2.5
Epoxy Soybean Oil	3
Thinner	20-35
Xylene	15-25

Rigid Plastisols. The viscosity characteristics of the Aroclor plasticizers are utilized in the following formulation for rigid, rotationally-cast objects. The formulation is very viscous when first made up, but when heat is applied, the viscosity decreases so that a smoothly-flowing plastisol is obtained. The finished object has a Shore "D" hardness of 63.

<i>Ingredients</i>	<i>Parts by Weight</i>
Opalon® 440 PVC resin	55
Geon® 202 PVC resin	45
Aroclor® 1254	36
Santicizer® 141	10
Epoxy Octyl Tallate	5
Liquid Barium-Cadmium Stabilizer	2
Liquid Zinc Stabilizer	0.5
Polyethylene Glycol 400 Monolaurate	1

®Trademark of Union Carbide Corp.

***Trademark of S. I. Esterline Chemical Co.

MAE 040892

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Vinyl Foam

Aroclor 1262 and 1268 impart fine, uniform cell structure and flame resistance to chemically-blown vinyl foam, as shown by the following formulations:

Ingredients	Parts by Weight		
Opelon® 440 PVC resin	100	100	100
Aroclor® 1262	—	20	—
Aroclor 1268	20	—	10
Dioctyl Phthalate	40	—	—
Diisodacyl Phthalate	—	50	30
Di-(n-Octyl, n-Dacyl) Adipate	—	10	30
Santicizer® 214	—	15	—
Santicizer 409	50	—	—
Buryl Oleate	5	—	—
Liquid Barium-Cadmium Stabilizer	2	3	3
Epoxy Resin	—	2	2
Neutral Calcium Patronate	3.6	3.6	3.6
Calcium Oxide	—	1	1
Sodium Lauryl Sulfate	—	1.6	1.6
Nitrosan ¹ Chemical blowing agent	10	10	5

Flame-Retardant Floor Tile

The nonflammability of the Aroclor compounds suggests their use in the manufacture of flame-retardant vinyl-asbestos floor tile for military applications. In Table 5 is presented an evaluation of three Aroclor plasticizers in typical vinyl-asbestos-tile formulations. Substitution of antimony oxide for part of the limestone is suggested for still greater fire retardance.

TABLE 5

EVALUATION OF AROCLOR® IN FLAME-RETARDANT, VINYL-ASBESTOS FLOOR TILE

	Control ^a (parts)	Aroclor 1264 (parts)	Aroclor 1260 (parts)	Aroclor 5460 (parts)
Santicizer® 180	37	30	36	40
Aroclor® 1254	—	15	—	—
Aroclor 1260	—	—	17	—
Aroclor 5460	—	—	—	20
McBurney Indentation Hardness	7.8	8.6	10.4	11.2
Bambury Time (to reach 280°F, sec.)	99	96	102	115
Time to band on roll mill (sec.)	15	10	10	5
Plasticity	Excellent	Excellent	Excellent	Excellent
Tack	Excellent	Excellent	Excellent	Excellent
Surface	Excellent	Fair	Excellent	Excellent

^a/ Formulation

¹Trademark of E. I. du Pont de Nemours & Co., Inc.

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<i>Ingredients</i>	<i>Parts by Weight</i>
Opalon® 506 PVC Resin	100
Senticizer® 160	As Indicated
Aroclor®	As Indicated
Asbestos	160
Limestone	290
Titanium Dioxide	15
Stabilizer	5

In Polyvinyl Acetate

Aroclor compounds are excellent plasticizers for polyvinyl acetate-emulsion adhesives and hot-melt adhesives. The excellent tack and strong bonding power they impart and their low cost contribute greatly to the performance and profitability of these adhesives.

Emulsion Adhesives

The liquid Aroclors — such as Aroclor 1221, 1232, and 1242 — blend readily by simple stirring with polyvinyl acetate emulsion at up to 11 parts per 100 parts of emulsion. They greatly improve the quick-tack and fiber-tear properties of the adhesive. The performance of Aroclor plasticizers in polyvinyl acetate-emulsion adhesives is compared with that imparted by dibutyl phthalate in Table 6. The following is suggested as a typical starting formulation for a low-cost, quick-tack adhesive:

<i>Ingredients</i>	<i>Parts by Weight</i>
Gelva® S-55 PVAc Emulsion	100
Aroclor® 1232	11

TABLE 6

PERFORMANCE OF PLASTICIZERS IN POLYVINYL ACETATE-EMULSION ADHESIVES

	<i>Dibutyl Phthalate (11 phr)</i>	<i>Aroclor® 1221 (11 phr)</i>	<i>Aroclor 1232 (11 phr)</i>	<i>Aroclor 1242 (11 phr)</i>
<i>Hardness (Shore "A")</i>	69	66	86	97
<i>Low-Temperature Flexibility (Clash & Berg. T., °C)</i>	-10.2	-5.9	4.0	5.3
<i>Volatility (24 hr., 88°C over activated charcoal) (Plasticizer lost, %)</i>	4.0	4.8	4.3	4.0
<i>Kerosene Extraction (24 hr., 25°C) (Plasticizer lost, %)</i>	4.1	4.5	3.8	4.2
<i>Formulation Viscosity (cp.)</i>				
Initial ^a	2420	2240	2160	—
1 Day	2460	—	—	—
3 Days	—	2200	2060	—
4 Days	2520	—	—	—
5 Days	—	2200	2040	—
7 Days	—	2180	2020	—
10 Days	—	2260	2060	—

^a/ Initial viscosity of unolasticized emulsion: 1500 centipoises

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When the slight odor of Aroclor is objectionable in an adhesive for certain applications, it can be easily masked, at negligible cost, by the addition of a small amount of Santomask® 11.

Hot-Melt Adhesives

Aroclor compounds are widely used as plasticizers in polyvinyl acetate hot-melt adhesives for bookbinding and other applications. Four suggested started formulations for evaluation are as follows:

Ingredient	Parts by Weight			
	Application Temperature 165° - 175°C		Low-Melting	Alkali-Dispersible
Polyvinyl Acetate	95 ^a	100 ^a	50 ^a	38 ^c
Oxalon® 505 PVC Resin	5	—	—	—
Modified Resin	—	—	25	—
Coumarone-Indene Resin (soft)	—	—	—	28.3
Aroclor® 1254	—	55	12	27
Aroclor 1280	50-75	—	—	—
Dibutyl Phthalate	—	—	13	7
Santicizer® 160 (or dibutyl phthalate)	50-75	30	—	—
Clay	—	25	—	—
Fluxing Resin (Filtros® Resin WW)	—	75	—	—
Acrowax C ^b	—	—	—	1
Sodium Benzoate	—	—	—	0.78
Viscosity (centipoises)			2000 (120°C) Non-blocking	3500 (175°C) Non-blocking

a) Gelva® V-7

b) Gelva C-3 V-10

c) Gelva C-5 V-18

In Ethylene Vinyl Acetate

The Aroclor products are among the most compatible, effective, and versatile plasticizer/modifiers available for ethylene vinyl acetate. Both the liquid and solid Aroclor plasticizers are highly compatible with ethylene vinyl acetate and other ingredients commonly used in ethylene vinyl acetate, such as paraffin and microcrystalline waxes and other resin modifiers. Aroclor offers special functional properties and reduces formulation costs when used with ethylene vinyl acetate.

Hot-Melt Adhesives

Aroclor in ethylene vinyl acetate hot melts imparts excellent initial tack and high final bond strength. Aroclor is particularly useful in providing versatility of adhesive bond to various substrates such as aluminum foil, cellophane, polyethylene, Mylar® polyester film and paper. Liquid Aroclor, such as Aroclor 1254, provide greater flexibility and lower application viscosities. Solid Aroclor 5460 provides adhesive strength, permanence, and lowers the melt viscosity. Both liquid and solid Aroclor products are exceptionally heat stable, resistant to oxidation, moisture, and chemical attack and are, in general, very inert. Flexibility, specific adhesion, and melt viscosity may be adjusted by varying Aroclor concentration and by selection of solid and or liquid Aroclor plasticizers.

^aTrademark of Union Carbide Corp.

^bTrademark of Shell Chemical Co.

MAE 040895

Pressure-Sensitive Adhesives

Aroclor in ethylene vinyl acetate pressure-sensitive adhesives imparts excellent specific adhesion and tack. Liquid Aroclor, such as Aroclor 1248 or 1254, improve flexibility and adhesion while solid Aroclor 5460 or 5442 impart a high degree of tack and bond strength.

Suggested starting point formulations for evaluation using Aroclor in ethylene vinyl acetate hot-melt and pressure-sensitive adhesives are shown below:

Hot-Melt Adhesive		Pressure-Sensitive Adhesive	
	Parts by Weight		Parts by Weight
"Elvax"	40	"Elvax" 150	30
Aroclor® 5460	40	Aroclor 5460	40
Microcrystalline Wax	20	Aroclor 1254	50

In Epoxy Resins

The Aroclor plasticizers probably have greater compatibility with epoxy resins than any other available nonreactive plasticizer-modifiers. The excellent chemical resistance, oxidation resistance, and adhesive qualities imparted by the Aroclor compounds reinforce these important beneficial properties of epoxies and thereby help the compounder reduce his formulation costs materially without significant adverse effect on performance.

The lower-molecular-weight, liquid Aroclor plasticizers (such as 1221 and 1232) have maximum plasticizing efficiency and impart the most flexibility to epoxy compounds. The more viscous, resinous Aroclor products have progressively less effect on epoxy flexibility; the high-molecular-weight, solid Aroclor plasticizers (1268, 2565, 4465, 5460, etc.), in fact, tend to reinforce the compound.

The effects of Aroclor 1221 and 1248 on the properties and performance of an epoxy resin are indicated by the data in Table 7.

TABLE 7

EFFECT OF AROCLOR® 1221 AND 1248 ON PROPERTIES OF EPOXY RESINS

Formulation ^a		Viscosity ^a		Physical Properties			Physical Property ^a After Heat Aging	
Aroclor 1221	Aroclor 1248	Before Curing Agent	After Curing Agent	Impact Resist- ance	Clarity (Light Reflect- ed) (%)	Hardness Shore "D" (10 sec.)	Hardness Shore "D" (10 sec.)	Weight Loss (%)
—	—	12,800 (30 rpm)	7900	0.2	3.0	76	86	0.012
25	—	1650	1200	—	3.0	8	81	2.118
—	25	7700	4300	0.6	3.0	40	88	0.682

^aTested in accordance with the following methods:

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<i>Ingredients</i>	<i>Parts by Weight</i>
a/ Liquid Epoxy Resin	100
Tetraethylenepentamine	8
Aroclor 1221 or 1248	As Indicated
Cure: 30 minutes at 100°C	
b/ Brookfield LVF No. 4 spindle: 60 rpm unless otherwise specified	
c/ 24 hours at 85°C in activated charcoal	

Development of flame-retardant epoxy resins is of wide-spread interest. Aliphatic amine-cured epoxy-resin formulations are made *self-extinguishing* by the use of 20 parts of liquid Aroclor per hundred parts of resin. The incorporation of antimony oxide at 5 phr, with 15 parts of Aroclor per hundred parts of resin, yields *nonburning* formulations (Table 8).

The use of liquid Aroclor in aliphatic amine-cured epoxies also improves flexural strength and compressive-yield strength, has little effect on tensile strength, and slightly lowers heat-distortion temperature and compressive ultimate strength.

The use of solid Aroclor in phthalic anhydride-cured epoxy systems also reduces flammability and, in combination with antimony oxide, produces nonburning formulations. The solid Aroclor products also greatly improve such important properties as compressive strength, flexural strength, compressive-yield strength, and tensile strength, although they slightly lower the heat-distortion temperature (Table 9.)

Extension of epoxy-resin adhesives with Aroclor greatly reduces the formulation cost, with minimum effect on the bonding characteristic of the adhesive or surface coating.

In epoxy-resin protective surface coatings, the use of Aroclor 1254, 1260, or 1262 economically imparts excellent chemical resistance, particularly to acids and alkalis. When resistance to solvents is desired, however, Aroclors should not be used, since they are true plasticizers and do not combine chemically with the epoxy resin. Frequently, about 10 to 15 per cent Aroclor 1260 or 1262 is added to increase the flexibility of the epoxy composition, with minimum effect on the corrosion resistance and adhesion of the film.

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TABLE 8

EFFECT OF AROCLOR® 1242 AND 1260 ON FLAMMABILITY AND PHYSICAL PROPERTIES OF EPOXY RESINS

Formulation ^a			Flammability (ASTM 635-56T)			Heat- Distortion Temp. (°C)	Flexural Strength (psi)	Tensile Strength (psi)	Compres- sive Yield Strength (psi)	Compres- sive Strength (psi)
Aroclor 1242 (phr)	Aroclor 1260 (phr)	Antimony Oxide (phr)	Hardness (Rockwell "M")	inches burned	Rate (in./min.)					
—	—	—	104	4	0.82	117.5	20,100	11,400	15,700	43,000
20	—	—	108	2.125	b	79.5	21,800	10,700	17,900	32,500
—	20	—	103	1.125	b	87	23,800	13,000	17,250	32,900
15	—	5	107	0	c	81	22,200	12,800	16,700	32,400
—	15	5	108	0	c	92	22,100	9,800	16,950	38,150
Ingredients						Parts by Weight				
a) Liquid Epoxy Resin						100				
Diethylenetriamine						13				
Aroclor 1242 or 1260						as indicated				
Antimony oxide						as indicated				
Cure: 16 hours at room temperature, plus 2 hours at 100°C										
b) Self extinguishing										
c) Nonburning										

TABLE 9

EFFECT OF SOLID AROCLOR® ON FLAMMABILITY AND PHYSICAL PROPERTIES OF EPOXY RESINS

Formulation ^a			Hardness (Rockwell "M")	Flammability (in./min.)	Heat- Distortion Temp. (°C)	Flexural Strength (psi)	Tensile Strength (psi)	Compressive Yield Strength (psi)	Compressive Strength (psi)
Aroclor 1260 (phr)	Aroclor 5460 (phr)	Antimony Oxide (phr)							
—	—	—	113	0.8	143	16,900	11,000	20,900	23,400
20	—	—	112	0.38	128	25,900	13,500	22,300	38,500
—	20	—	113	0.38	135.5	26,300	11,500	21,000	41,700
15	—	5	112	b	134	20,000	11,100	20,500	36,700
—	15	5	111	b	135	19,000	10,200	21,200	40,700
Ingredients					Parts by Weight				
a) Liquid Epoxy Resin					100				
Phthalic Anhydride					75				
DMP 30 [®] catalyst					0.1				
Aroclor 1260 or 5460					as indicated				
Antimony Oxide					as indicated				
Cure: 20 hours at 150°C									
b) Nonburning									

^a Excerpted from Report 6, Union Carbide

MAE 040898

The highly chlorinated, less-volatile Aroclor compounds such as Aroclor 1260, 4465, and 5460, are very effective and economical fire retardants for polyester resins, and they do not significantly affect the physical properties of the resin.

The Aroclor plasticizers are effectively used in combination with equal amounts of antimony oxide, since the two materials are synergistic. Aroclor imparts self-extinguishing properties to the resin, and antimony oxide reduces afterglow.

Table 10 indicates the degree of flame resistance imparted to a general-purpose polyester resin (with a 35 percent styrene content) by various equal concentrations of antimony oxide and one of these three Aroclor plasticizers.

TABLE 10

FIRE RETARDANCE IMPARTED TO POLYESTER RESINS BY AROCLOR AND ANTIMONY OXIDE					
<i>Antimony Oxide and Aroclor^a</i>	2.5%	5%	7.5%	10%	15%
1260	—	semiflammable	semiflammable	self- extinguishing 30 seconds	self- extinguishing immediate
4465	—	flammable	self- extinguishing 5 seconds	self- extinguishing 5 seconds	self- extinguishing immediate
5460	flammable	self- extinguishing 80 seconds	—	self- extinguishing 5 seconds	self- extinguishing immediate

^a/ Formulation

<i>Ingredients</i>	<i>Weight Percent</i>
Polyester Resin (general purpose)	62
Styrene	35
Methyl Ethyl Ketone Peroxide (80% in dibutyl phthalate)	2
Cobalt Naphthenate (1% solution)	1
Aroclor and Antimony Oxide	as indicated

Inclusion of an Aroclor increases the flexural strength of the naturally brittle polyester and makes addition of a more expensive plasticizing polyester unnecessary. At a concentration of 10 percent (enough for fire retardancy), none of the Aroclor plasticizers reduced the flexural strength of the cure resin significantly (Table 11), and their effect was comparable to that of a plasticizing polyester. At 20 percent addition, they improved the impact strength, whereas the plasticizing polyester reduced it. The solid Aroclor plasticizers are preferred for fire-resistant surface coatings.

MAE 040899

TABLE 11

EFFECT OF AROCLOR® ON STRENGTH
OF FIBER-GLASS-REINFORCED POLYESTER RESINS

Plasticizer	(%)	Flexural Strength (psi)	Flexural Modulus (psi)	Impact Strength (ft.-lb/in.)
None	0	47,210	2,190,000	1.73
Plasticizing Polyester	10	43,310	2,000,000	1.64
	20	39,930	1,560,000	1.24
Aroclor® 1260	10	45,600	2,090,000	1.33
	20	33,880	1,690,000	2.04
Aroclor 4465	10	40,740	2,190,000	1.41
	20	33,390	1,290,000	2.48
Aroclor 5460	10	37,400	1,700,000	1.85
	20	35,890	1,550,000	3.06

In Polyethylene

The need to make polyethylene and other polyolefins flame retardant is well recognized. The well-known flame retardancy of the Aroclor products suggests their evaluation for polyolefin applications such as molded products, coatings, and hot-melt adhesives.

Preliminary evaluation of Aroclor 5460 (20 percent) and antimony oxide (10 percent) showed good results in imparting flame retardancy to low-density, noncrystalline polyethylene. Compared to the use of chlorinated aliphatic hydrocarbons, the use of Aroclor greatly improved the heat stability and had considerably less effect on tensile strength, yield, and elongation of the formulation.

In Polystyrene

The Aroclor products are good plasticizers for polystyrene. The lower-molecular-weight Aroclor plasticizers have greater solvating power than the higher-molecular-weight Aroclor products. The gelling rate of various plasticizers in polystyrene resin is shown in Table 12. Each plasticizer was added to the polystyrene resin at a concentration of 2 parts plasticizer per part of resin, and the time required for the material to gel was noted.

TABLE 12

GELLING RATE OF PLASTICIZERS IN POLYSTYRENE

Plasticizer (200 phr)	Time to Gel (min.)
Aroclor® 1221	immediate
Diethyl Phthalate	0.6
Dimethyl Phthalate	0.75
Aroclor 1242	2
Santizer® 141	3
Santizer 160	6
Santizer 8-18	18
HB-40®	30

Aroclor products are useful as plasticizers and flame retardants in polyurethane rubbers, foams, adhesives and coatings. Having extremely low moisture content (50 ppm or less), the Aroclor plasticizers are useful in applications where low moisture is required. Other advantages exhibited by Aroclor in polyurethanes include resistance to oxidation, resistance to alkali and acids, improved adhesion, and low cost. The following formulation illustrates the use of Aroclor 1254 in a polyurethane flocking adhesive:

	Ingredients	Parts by Weight
Part A	Multranil* FLD Urethane Resin	100
	Mondur* C Isocyanate	5
	Aroclor 1254	20
Part B	Multranil FLD	100
	Mondur C	5-10

Part A is applied to the fabric by knife coating and allowed to dry thoroughly. The fabric is then coated with Part B, and the material is flocked immediately.

Protective urethane coatings are unusually well suited for application to concrete and metal. Aroclor 1254 is incorporated to improve adhesion and sealing. The first of the following formulations is the preferred prime coat for concrete storage tanks for gasoline and fuel oils. The second formulation is the base coat for a concrete wood-kiln coating, which remained in perfect condition after two-and-one-half-years' continuous exposure to heat, moisture, and wood distillates. The other two formulations, for primer and intermediate light-metal coating, contain Aroclor 1254 for better adhesion to metal.

Ingredients	Unsealed- Concrete Prime Coat (parts)	High- Temperature Concrete Primer (parts)	Light-Metal Coating	
			Primer (parts)	Intermediate (parts)
Mondur C	18.0	12.0	21.0	25.1
Multrae R-4 Polyester Resin	—	—	2.8	7.2
Multrae R-10	10.0	12.0	10.5	7.2
Aroclor® 1254	5.0	2.8	2.7	1.8
Polyvinyl Acetate	0.2	—	0.3	0.3
Polyvinyl Butyral	—	0.4	—	—
Methyl Glycol Acetate	8.7	9.0	—	—
Butyl Acetate	8.7	5.4	8.0	7.5
Ethyl Acetate	8.7	4.0	8.0	7.5
Toluene	8.7	6.9	15.1	14.2
Pigment (colored)	12.6	—	6.7	21.0
Zinc Chromate	—	—	7.8	—
Titanium Dioxide (rutile)	—	15.0	—	—
Talc (micronized)	12.5	13.8	13.2	6.5

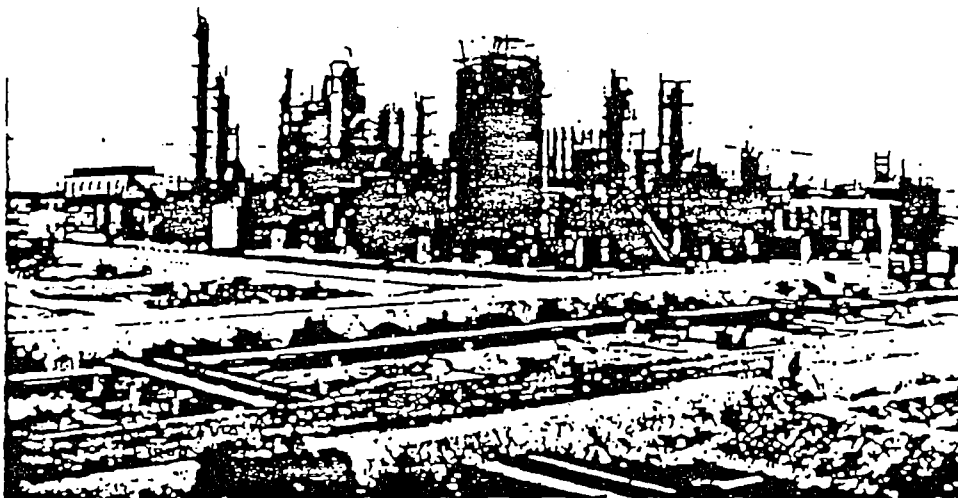
*Brenntag and Mondur: Bishay Chemical Company trademarks.

MAE 040901

In Phenolic Resins

Considerable interest has been shown in the use of Aroclor plasticizers to make phenolic laminating resins flame retardant. The higher-molecular-weight Aroclor products (1262 and 5460) are usually evaluated for this purpose.

Aroclor 1268 and 2565 are useful in the manufacture of brake linings.



Chlorinated rubber primer and topcoat, plasticized with Aroclor, offer excellent resistance to outdoor weathering, high humidity, steam and condensed acid vapors.

Aroclor In Rubbers

In Chlorinated Rubber And Chlorinated Polypropylene

Protective coatings based on chlorinated rubber generally contain Aroclor plasticizers to enhance their chemical resistance (to water, alkali, and acid), corrosion resistance, and electrical insulating properties and to impart flame retardance. When properly pigmented, they are unusually weather resistant. Aroclor compounds strengthen the adhesive grip of chlorinated-rubber lacquers, varnishes, and paints to structural materials and improve the flexibility and life of the coating.

Typical applications include protective and decorative coatings for swimming pools, stucco homes, steel structures, tank cars, and both wood and metal maritime equipment. Their outstanding chemical resistance qualifies these coatings for use in manufacturing plants where chemical attack is prevalent. Aroclor 1254 and 1260 are used in chlorinated-rubber coatings as flexibilizing plasticizers, commonly in combination with Aroclor 5460, which serves as a resin fortifier. A variety of suggested starting formulations based on chlorinated rubber is given in the following table.

MAE 040902

Paints for Alkaline Surfaces

Ingredients	Fed. Spec. TT-P-91 (parts)	Concrete Swimming Pool (parts)	Maximum Acid and Alkali Resistance (parts)	White Marine Paint (parts)
Parlon* (20 cp.) Chlorinated Rubber	18	10.2	18	20
Aroclor® 1254	10	5.1	8	6
Aroclor 1260	—	—	6	—
Aroclor 5460	8	—	—	—
Long-oil, oxidizing, alkyd resin	—	—	—	8
Medium-oil, drying, alkyd resin	—	5.1	—	—
Carbon Black	0.5	—	—	—
Iron Oxide	—	—	18	—
Titanium Dioxide	18	11.4	—	25
Zinc Oxide	2	—	—	—
Asbestos** 3X (magnesium silicate)	—	11.7	—	—
Bentone*** 34 gelling agent	—	1.3	—	—
Epichlorohydrin	—	0.1	0.09	—
Stabilizer	—	—	0.9	—
Solvesso**** 150	42.75	—	—	—
Solvesso 100	—	9.1	45	—
Turpentine	4.75	—	5	—
Xylene	—	45.7	—	23
Hi-Flash Naphtha	—	—	—	20

Aroclor compounds are also incorporated in chlorinated-rubber formulations used for heat-sealing adhesives, electrical coatings, paper and textile coatings, and printing inks. The following starting formulation is for an acid- and flame-resistant adhesive:

Ingredients	Parts by Weight
Chlorinated Rubber (125-cp. type)	20
Aroclor® 1254	8
Aroclor 5460	8
Toluene	88

Chlorinated polypropylene, a new film-forming resin, produces clear, colorless films, appears equal to chlorinated natural rubber in chemical resistance, and is noticeably more heat and light stable. Aroclor is very compatible with the resin and is recommended in the following starting formulations:

Ingredients	Composition (wt. %)	
Chlorinated Polypropylene	50.0*	55.0*
Aroclor® 5460	15.0	15.0
Aroclor 1264	24.0	24.0
Diocetyl Sebacate	4.3	4.3
Epoxy stabilizer	1.7	1.7
Solids, wt. percent in toluene	50.0	50.0

*Trademark of Hercules Inc.

**Trademark of International Salt Co.

***Trademark of Wm. L. & Co.

****Trademark of Standard Oil Company (N. J.)

MAE 040903

Film Properties

300°F heat stability

1 hour	v. sl. yellow	v. sl. yellow
2 hours	v. sl. yellow	sl. yellow
3 hours	sl. yellow	mod. yellow
6 hours	mod. yellow	—
18 hours	black	—

Fede-Ometer^a stability

24 hours	sl. yellow	v. sl. yellow
48 hours	sl. yellow	sl. yellow
96 hours	mod. yellow	sl. yellow
144 hours	mod. yellow	brown

Two-week chemical resistance

water	excellent	excellent
10% hydrochloric acid	excellent	excellent
1% sodium hydroxide	excellent	excellent

a) Parlon P (10-cp, 20% in toluene) — Hercules Inc.

b) Parlon P (20-cp, 20% in toluene) — Hercules Inc.

c) Lacquers were sprayed on "bondarized" steel panels. Films were 2.5- to 3.0-mils thick after 72-hours' air drying.

In Styrene-Butadiene Copolymers

Aroclor plasticizers are very often incorporated in coatings based on styrene-butadiene copolymers to impart resistance to acids, alkalies, moisture, and corrosive chemicals. These coatings are suited for use on masonry, wood, and metal for such applications as concrete floors; architectural finishes; metal primers and finishes on maritime equipment, structures, and tank cars; baking primers; corrosion-resistant industrial films; and oil- and grease-resistant coatings.

The following suggested formulations for typical applications of styrene-butadiene-copolymer coatings offer excellent performance:

Ingredient	Clear Vehicle (wt. %)	Wall Sealer (lb./100 gal.)	Aluminum Enamel (wt. %)	Paint (lb.)	Traffic Paint (parts)
Styrene-Butadiene	16.60*	123.2*	7.40*	147*	250*
Aroclor® 1264	8.39	41.4	6.00	—	120*
Aroclor 1280	—	—	—	31	—
Aroclor 5480	8.11	41.4	13.40	—	130
Raw Tung Oil	1.855	—	—	—	—
Hydrogenated Methyl Abietate	—	—	—	8	—
Troykyd*** ABC	—	—	—	3	—
Lecithin	0.545	—	—	—	—
Soya Lecithin	—	6.9	—	—	—
Petroleum Naphtha	62.70	248.4	—	—	—
Hi-Flash Naphtha	—	—	—	395	—
Mineral Spirits No. 10	—	185.3	33.60	—	340
Toluene	—	—	—	—	340
Xylene	—	—	22.40	—	—

*Trademark of Alcoa (Metallic Division) Co.

***Trademark of Troy Chemical Co.

MAE 040904

Lithopone	—	339.3	—	—	—
Titanium Dioxide	—	59.2	—	179	—
Aluminum Stearate	—	5.9	—	—	—
Aluminum Paste	—	—	8.55	—	—
Zinc Oxide	—	—	—	60	—
Barium Sulfate	—	—	—	90	—
Asbestine 3X (magnesium silicate)	—	75.0	—	—	—
Calcium Carbonate, ground	—	—	—	236	—
Diatomaceous Earth	—	—	—	76	—
Mica	—	—	8.00	30	—

a) Marbon "8200" MV (Trademark of Marbon Chemical Div., Borg-Warner Corp.)

b) Pliolite S-5A (Trademark of Goodyear Tire and Rubber Company)

c) Marbon "8200" LV (Marbon Chemical Div., Borg-Warner Corp.)

d) Flaked Piccolflex 120 (Trademark of Pennsylvania Industrial Chemical Corp.)

e) Pliolite S-5B (Goodyear Tire and Rubber Company)

f) or Aroclor 1248

In Synthetic And Natural Rubbers

The liquid Aroclor plasticizers — 1221, 1232, 1242, and 1248 — have a strong plasticizing action on both natural and synthetic rubbers. Solid Aroclor — 1254 and 1260 — imparts permanent tackiness and adhesion to the rubber composition.

Neoprene

Compositions containing up to 40 parts of Aroclor 5460, 2565, 4465, or 1268 in 100 parts of neoprene rubber are extremely fire retardant. About 1.5 parts of Aroclor 1268 per hundred parts of neoprene imparts excellent working qualities at 225° to 325° F for injection moldings. Neoprene modified with Aroclor compounds has proved extremely useful as a wire and cable coating.

Aroclor 5460 imparts plasticization and adhesion to decorative and protective coatings that have been commercially used on rubber products for many years. Suggested starting formulations for a clear, dull coating and for three pigmented coatings are as follows:

Ingredients	Parts by Weight	
	clear, dull coating	base for pigmented coatings
Aroclor® 5460	3.70	16.00
Neoprene GRN-10	3.50	8.00
Chlorinated rubber (21 cps.)	1.30	—
High-styrene resin	1.00	4.38
Isobutyl methacrylate	0.40	1.75
Toluene	90.10	69.87

<i>Ingredients</i>	<i>green coating</i>	<i>white (high gloss)</i>	<i>white (luster modifier)*</i>
<i>Paste:</i>			
Base	20.0	43.0	29.0
Chromium Oxide	6.4	—	—
Zinc Oxide No. 3	3.6	10.5	—
Titanium Dioxide	—	15.0	—
Aluminum Hydrate	—	—	25.0
Toluene	10.0	31.5	52.0

Ready-to-Use Coating:

Base	80.0	70.0	*
Paste	40.0	30.0	*

*To modify the luster of the white, high-gloss coating, the selected amount of the modifier composition is incorporated into the high-gloss paste to achieve the desired degree of flatness.

Polybutene

Aroclor plasticizers and Indopol* polybutenes are blended in various proportions to make permanently tacky coatings for fabric or paper. Insecticides, for example, can be blended into such coatings to make insect traps or barriers on tree trunks for foliage or fruit protection. Such coatings can also be used for tape and sign backing.

Excellent sealing and caulking compounds are made with blends of Aroclor and polybutenes with inorganic fillers, such as:

<i>Ingredient</i>	<i>Percent</i>
Whiting	50
Talc	30
Lithopone	10
Asbestos	10

By various combinations of selected Aroclor compounds and polybutenes, a wide range of hardness, viscosity, flow, and bonding characteristics can be produced in durable sealing and caulking compounds.

Specialty mastics, too, are obtained by selective blends of Aroclor plasticizers with polybutenes. They have excellent adhesivity for such uses as automobile-body sealants.

*Trademark of American Cyanamid Co.

MAE 040906

Paper-transparentizing liquids (for making tracing paper, window envelopes, and special packaging) can be formulated with Aroclor 5460 and polybutenes. A typical economical formulation is as follows:

<i>Ingredient</i>	<i>Percent</i>
Aroclor® 5460	30
Polybutene (Indopol H-300)	25
Toluene	45

Butadiene-Acrylonitrile Rubber

The Aroclor plasticizers — particularly Aroclor 5460 — are useful as softeners for Buna N rubber.

Silicone Rubber

Aroclor is a very effective flame retardant for silicone rubbers.

Crepe Rubber (Natural)

Aroclor 1262 is used as a low-cost plasticizer for crepe rubber in paint compositions. In concentrations of from 6 to 50 per cent of the weight of the rubber, the Aroclor increases the films alkali resistance, and adhesivity to steel.

Polysulfide Rubber

Aroclor plasticizers are widely used to flexibilize, improve the bonding strength, increase the chemical resistance, and reduce the cost of Thiokol® polysulfide liquid rubbers. Among the many uses of polysulfide formulations are joint-sealant compounds used in construction, solvent-resistant gaskets, adhesives for concrete, potting and encapsulation, protective coatings, and binders.

Although the Aroclor plasticizers are highly compatible with polysulfide rubbers — up to 100 phr — the concentration to be used depends on the handling and performance properties required in the finished compounds. Suggested concentrations of Aroclor range from about 15 phr for sealant compounds to about 40 phr for casting formulations.

Liquid Aroclor (such as Aroclor 1248) is used to reduce the viscosity and permit the use of higher filler concentration, whereas the solid Aroclor (such as Aroclor 5460) is useful where low volatility is desired.

The following suggested starting formulations illustrate the use of Aroclor 1232 in a joint sealant compound and of Aroclor 1248 in a polysulfide casting formulation:

*Trademark of Thiokol Chemical Corp.

<i>Ingredient</i>	<i>Sealant (parts)</i>	<i>Casting Compound (parts)</i>
Thiokol LP-32 polysulfide	100	—
Thiokol LP-2 polysulfide	—	100
Aroclor® 1232	5-15	—
Aroclor 1248	—	20-40
Calcium Carbonate	20	—
Calcined Clay	20	—
Titanium Dioxide	10	—
Phenolic Resin	5	—
Stearic Acid	1	—
Zinc Sulfide	—	40
Sulfur	0.1	0.1
C-5 Paste ^a	15	15

Property

Cast sheets, after cure of 7 days at room temperature:

Tensile strength, psi	150-200	150-200
Elongation, percent	500-700	300-400
Hardness, Shore "A"	30-40	25-35

^a/ lead peroxide, 50%; dibutyl phthalate, 45%; stearic acid, 5%; passed three times through a tight paint mill.

Aroclor in Cellulosic Resins

In Ethyl Cellulose

Ethyl cellulose formulations plasticized with Aroclor are used as protective lacquers, adhesives, and strippable coatings. The solids, such as Aroclor 5460, are widely used with ethyl cellulose or cellulose acetate-butyrate resins in hot-melt applications for the protection of tools and metal parts.

The Aroclor plasticizers are highly compatible with ethyl cellulose: the liquid Aroclor imparts flexibility; the solids impart hardness. For example, 75 parts of Aroclor 1242 with 100 parts of ethyl cellulose produces a very flexible, slightly tacky material. Aroclor 5460 at the same concentration yields a very hard, somewhat brittle composition. Hard films that contain Aroclor 4465 are not brittle at ordinary temperatures.

For high-gloss coatings with exceptional weathering qualities to be applied to rigid surfaces, compositions containing equal parts by weight of Aroclor 5460 and ethyl cellulose are suggested. When a more flexible coating is required, a softer Aroclor should replace either all or part of the Aroclor 5460.

MAE 040908

The following five typical formulations indicate the versatility of various Aroclor plasticizers in compounding for widely different types of applications. They are intended as guides to the use of Aroclor compounds with ethyl cellulose.

Ingredients	Lacquer (parts)	White Alkali- Resistant Lacquer (parts)	Liquid Adhesive (parts)	Strippable Coating (parts)	Hot-Melt Adhesive (parts)
Ethyl Cellulose	60	25	50	49	24
Aroclor® 1254	—	16	—	49	—
Aroclor 1260	60	—	—	—	—
Aroclor 5460	—	78	40	—	7
Dow 276, V-8	—	—	8	—	—
Octylphenol	—	1	2	1	—
Stearic Acid	—	—	—	1	—
Rutile Titanium Oxide	—	50	—	—	—
Epoxy Resin	—	1	—	—	—
Santonox® Antioxidant	—	—	—	—	1
Mineral Oil	—	—	—	—	57
Castor Oil	—	—	—	—	5
Epoxidized Soya Oil	—	—	—	—	3
Paraffin Wax (m.p. 135°F)	—	—	—	—	3

The first four of these formulations may be dissolved in suitable solvents, such as mixtures of about four parts of toluene to one part of butanol, to obtain the desired viscosity.

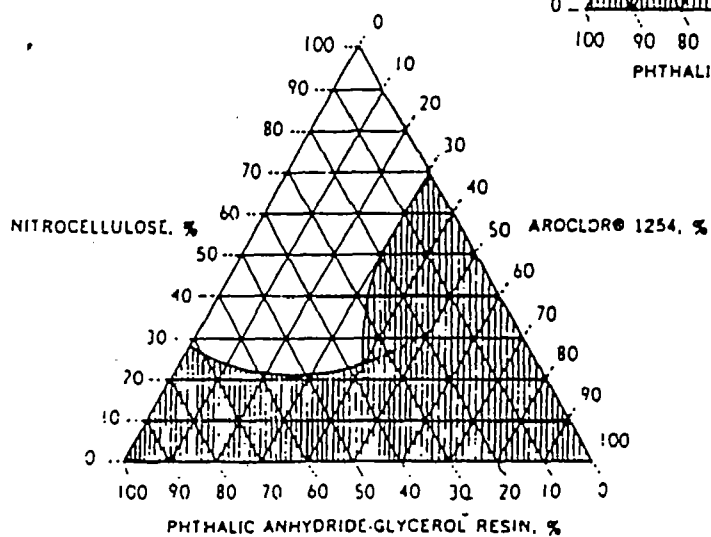
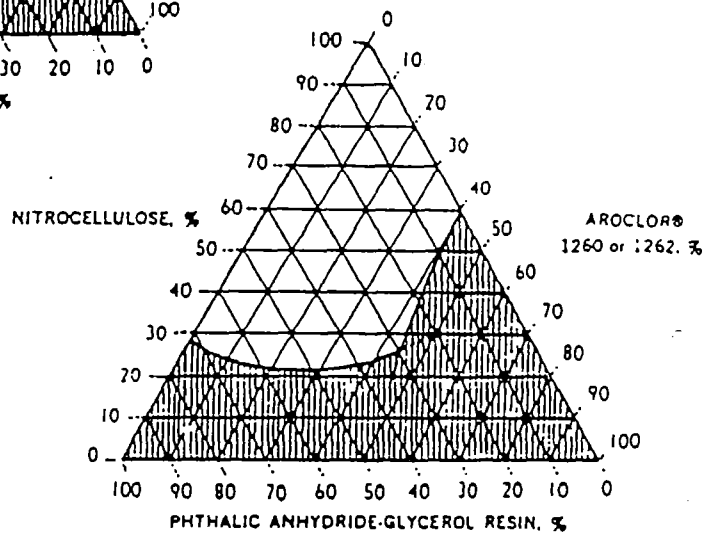
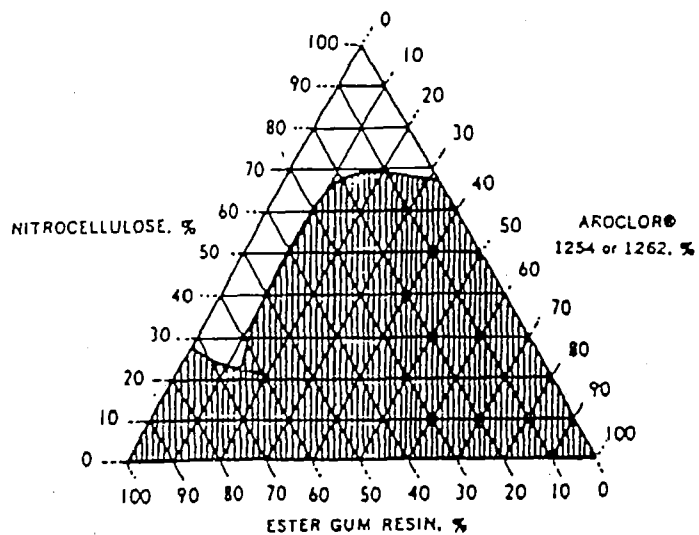
In Nitrocellulose

In nitrocellulose lacquers, the Aroclor compounds can function either as plasticizers to modify the properties of the film or as resin extenders to add film-forming body. They are highly compatible with nitrocellulose and with other resins and plasticizers commonly used in lacquer formulations. They impart weather resistance, luster, adhesion, and flame retardance. Their excellent electrical characteristics and their ability to retard the passage of moisture and gases through nitrocellulose films make the Aroclor compounds especially valuable in coatings for electric-insulating materials.

The following trilinear diagrams (Figure 1), show the limits of practical compatibility of Aroclor 1254, 1260, and 1262 when used in nitrocellulose lacquers in combination with some other resins or plasticizers. The less viscous Aroclor plasticizers (1242 and 1248) are more compatible than those shown; the more resinous Aroclor (1268, 2565, 4465, 5442, and 5460) is less compatible.

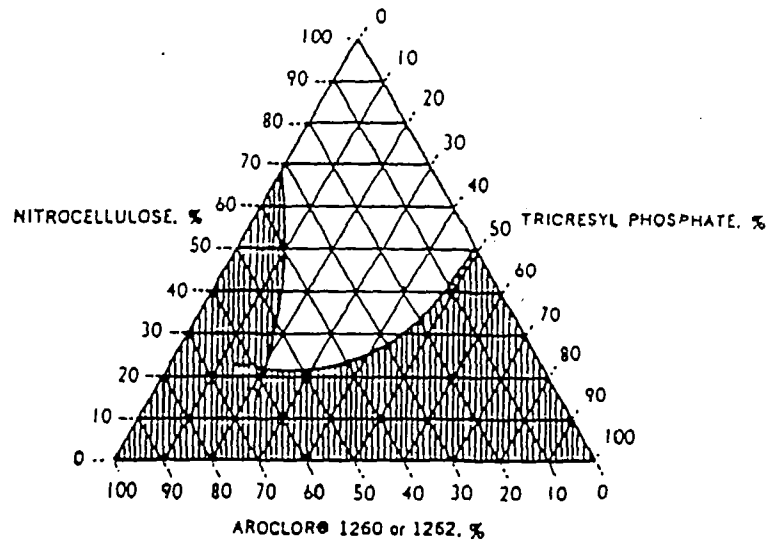
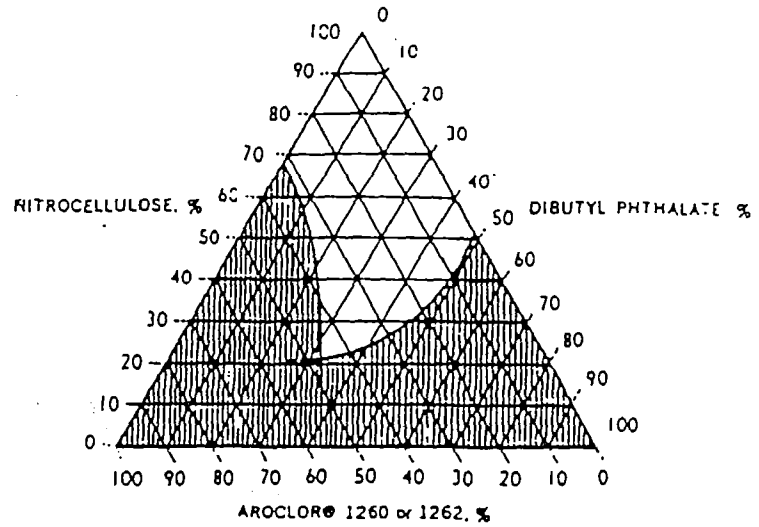
In these trilinear diagrams, compositions represented by any point in an unshaded area produce homogenous nitrocellulose-lacquer films. On the other hand, compositions represented by points in the shaded areas produce impractical (segregated, brittle, or soft) films.

Fig. 1 — Limits of Practical Compatibility of Aroclor® in Nitrocellulose Lacquers



MAE 040910

Fig. 1 (Continued)



The following formulations are given to illustrate modifications that can be obtained by variations in composition. They all have excellent durability, but the first two are much harder and less flexible than the third. The first two also have excellent sanding and polishing qualities, but No. 3 is too soft for sanding. The cable lacquer (No. 4) has extremely high flexibility, as required for high-tension automobile cables.

Ingredient	No. 1 (parts)	No. 2 (parts)	No. 3 (parts)	No. 4 Cable Lacquer (parts)	No. 5 Chrome Lacquer (parts)
Nitrocellulose (1/2 sec.) (wet)	—	—	—	—	100
Nitrocellulose (1/2 sec.) (dry)	100	100	100	—	—
Nitrocellulose (15-20 sec.)	—	—	—	100	—
Aroclor® 1242	—	—	—	80	—
Aroclor 1260	20-39	20	80-70	—	—
Aroclor 5460	—	—	—	—	47
Dibutyl Phthalate	20-0	20	—	—	32.5
Tricresyl Phosphate	—	—	39-70	120	—
Demer Resin	80	—	—	—	—
Ester Gum	—	80	—	—	—

In Cellulose Acetate-Butyrate

The high-chlorine-content Aroclor plasticizers are highly compatible with cellulose acetate-butyrate and are widely used in the manufacture of low-cost, flame-resistant lacquers. Typical uses for these products include paper coatings, lacquers for plastics, strippable coatings for paint booths, and hot-melt adhesives. Typical starting formulations, illustrative of these uses, are suggested as follows:

Ingredients	Paper Lacquers		Clear Wood Filler (wt. %)	Plastics* Lacquer (wt. %)	Paint-Booth Strippable Coating (wt. %)	Hot-Melt Adhesive (wt. %)
	Low-Cost Flame Resistant (wt. %)	Curly Resistant (wt. %)				
Half-Second Cellulose Acetate-Butyrate	20	20	7	8	20	35
Aroclor® 1260	—	20	—	1.5	—	—
Aroclor 1262	15	—	—	—	—	—
Aroclor 5460	—	—	15	—	9	30
Dioctyl Phthalate	—	—	—	—	9	15
Esoxy Soybean oil	—	—	—	—	9.5	—
Acrylic Resin	—	—	—	2.5	—	—
Dow 276, V3	—	—	—	1.5	—	—
Sacony Vacuum 200	—	—	—	—	2.5	—
"Newport V40" pine resin	—	—	—	—	—	19.89
Acetone	—	10	—	—	10	—
Methyl Ethyl Ketone	—	—	—	10	—	—
Methyl Isobutyl Ketone	—	—	—	5	—	—
Isobutyl Acetate	5	10	22	—	5	—
Ethanol	12	10	—	33.5	10	—
Butanol	—	—	5	—	—	—
Isobutanol	—	—	—	25	—	—
Toluene	48	30	6	15	25	—
Santonox® Antioxidant	—	—	—	—	—	0.1
Syn Flour No. 6 odorant	—	—	—	—	—	0.01
Asbestine X (magnesium silicate)	—	—	45	—	—	—

a) Coatings for callophane, cellulose acetate, and cellulose acetate-butyrate.

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Aroclor is soluble in paint and varnish oils and solvents and compatible with most film-forming coating resins. The Aroclor plasticizers improve adhesion to the substrate and impart to the film properties that correspond to the particular character of the Aroclor used: the hard, resinous Aroclor tends to give increased hardness; the viscous Aroclor imparts flexibility.

Aroclor 4465 and 5460 produce paints that are very quick drying and yet have excellent durability. The amount of Aroclor used may be from 30 to 50 percent of the weight of the oils.

Aroclor 1260 is best for short-oil varnishes that are required to be flexible. The Aroclor plasticizers impart water and alkali resistance and also enhance the value of the other resins used in the varnish. A suggested starting formulation is two parts of oil, one part of Aroclor 1260, and one part of other resin. These proportions can be varied as required. The Aroclor may be considered to play the same role in the varnish formulation as oil, except that it does not oxidize and lose its flexibility on exposure.

The Aroclor plasticizers do not react chemically with oils, hence there is no advantage in heating together in making a varnish. They are best added as a "chill back" or as a cold cut in the thinning operation. The only reason to heat the Aroclor is to fluidize it so that it can be more readily mixed with the oils. Alkyd, phenolic, or ester gum resins, with a harder Aroclor such as 5460, may be used in making varnish formulations. To illustrate the use of Aroclor plasticizers in alkyd resins the following suggested starting formulation is shown.

<i>Ingredients</i>	<i>Parts by Weight</i>
Alkyd (80% Nonvolatile)	81
Kettle Bodied Linseed Oil (Gardner-Holdt Visc. 2-2)	20
Raw Linseed Oil	35
Aroclor 5460	34
Titanium Dioxide (Rutile)	34
Titanium Dioxide (Anatase)	87
Magnesium Silicate	100
Mineral Spirits	38
Drier-Absorption Agent	1.3
Phenyl Mercury Naphthenate (10% Mercury)	2.7
Cobalt Naphthenate (8% cobalt)	1.5
Lead Naphthenate (24% lead)	3.2
Antiskinning Agent (Volatile type)	0.67

The following suggested starting formulation for a fire-retardant enamel illustrates use of the flame retardancy of an Aroclor in alkyds:

<i>Ingredients</i>	<i>Parts by Weight</i>
38% Phthalic Anhydride-Soya Alkyd	63
Aroclor® 5460 Solution (Aroclor 5460, 53; Hi-Flash Naphtha, 22)	75
Whiting	84
Colloidal Grinding and Dispersing Agent	2.7
Antimony Oxide	42
Titanium Dioxide (Rutile)	33
<i>Grind above ingredients, and thin with:</i>	
38% Phthalic Anhydride-Soya Alkyd	96
Xylene	38
Cobalt Naphthenate (8% cobalt)	1
Manganese Naphthenate (8% manganese)	1
Lead Naphthenate (24% lead)	2.3

Aroclor plasticizers are excellent grinding and dispersion media for pigments used in paints and varnishes. Aroclor 1254 is used to disperse aluminum powder in a paste form that can be incorporated easily into paints and varnishes. The Aroclor imparts excellent leafing qualities, brightness, or luster and does not tarnish the aluminum pigment on aging. Moreover, the composition does not support combustion.

Aroclor is an important ingredient of heat-resistant aluminum paints and enamels that contain silicone resins. For example, the following suggested formulation for a heat-resistant coating can withstand a maximum temperature of 800° F and continuous-service temperature of 400° F. The heat-resistant enamel can withstand temperatures of 900° to 1000° F in such applications as jet-engine components, exhaust manifolds, and incinerators. The heat-resistant paint has excellent resistance to a programmed heat test, including 8 hours at 1200° F, and to salt-water spray after programmed heating to 500°, 600°, and 900° F.

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	Heat-Resistant Coating (lb./100 gal.)	Heat-Resistant Enamel (lb./100 gal.)	Heat-Resistant Paint ^a (lb./100 gal.)
"Dow Corning 805" Resin (50% Nonvolatile)	220	—	—
G E Silicone Resin SR-82 (60% in xylene)	—	174.2	93.6
G E Silicone Resin SR-112 (50% in xylene)	—	313.3	—
Styrene-Butadiene (50% in xylene) (Pliolite S-5B)	—	—	207.9
Aroclor® 4465 (90% nonvolatile)	332	—	—
80% Aroclor Solution (Aroclor 4465, 36 wt. %) (Aroclor 1262, 24 wt. %) (Solvesso 100, 24 wt. %) (Xylene, 16 wt. %)	—	435.8	—
Aroclor 5460 (60% in xylene)	—	—	93.6
Aroclor 1254	—	—	47.8
Aluminum Paste (74% nonvolatile)	384	250.0	240.0
Cobalt Octoate (6% cobalt)	—	4.4	—
Xylene	114	—	140.8
Mineral Spirits	—	—	113.1

a/ Meets Spec. TT-P-0028

In Waxes

The Aroclor plasticizers, especially 5460, are compatible with various natural waxes, and are blended with waxes for many uses, including "lost-wax" casting, impregnating compounds, and inexpensive sealers. Waxes formulated with Aroclor are nontacky and stable.

Much of the highest quality precision-casting wax used in the "lost-wax" process is formulated with Aroclor, most frequently 5460, 4465, and 1254. Waxes containing Aroclor are widely used in making dental castings, costume jewelry, and precision-cast aircraft parts.

Usually from one-fourth to one-half the composition consists of Aroclor 5460, which contributes these desirable properties to the formulation: hardness without brittleness, shrinkage resistance, sharp definition, sharp melting point, fire resistance, low volatility, and volatilization without carbonization during final curing.

Excellent impregnating compounds to prevent sticking of furniture drawers, double-hung windows, etc. are made from selected Aroclor plasticizers, such as 5460, and various waxes. Combinations of resinous Aroclor with waxes make excellent and inexpensive sealers for masonry, wood, fiberboard, and paper.

Aroclor imparts moisture and gas resistance, adhesion, alkali and chemical resistance, flame resistance, lubricity, and insulation to impregnants for cloth, paper, wood, and asbestos. They are combined with such materials as waxes, asphalt, tars, sulfur, aluminum stearate, and inorganic pigments so as to provide exactly the physical characteristics required for the specific purpose. Aroclor 1254, 4465, and 5460 are suggested as most applicable.

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Wood is decidedly toughened, hardened, and made more moisture-resistant when impregnated by the vacuum-pressure method with the following mixture:

<i>Ingredients</i>	<i>Per Cent</i>
Aroclor® 4465	70
Microcrystalline Wax	20
Sulfur	10

The coating is very resistant to acids and alkalis but can be attacked by aliphatic, aromatic, or chlorinated hydrocarbons. The paintable surface is not appreciably discolored. Various degrees of hardness and adhesion are obtained by variations in the proportions of the ingredients.

Blends of Aroclor 1268 and 1242 have the unusual capability to extend carnauba wax satisfactorily and at an attractive saving in cost:

<i>Ingredients</i>	<i>Parts by Weight</i>				
Aroclor® 1268	10	19.6	30	35	35
Aroclor 1242	5	4.9	5	5	5
Carnauba Wax	5	6.8	10	30	50
Ceresin Wax	20	19.6	20	20	10
Paraffin Wax	60	49.0	35	10	—

<i>Characteristics</i>					
Color	Pale Yellow, White	Pale Yellow	Pale Yellow	Pale Cream	Cream
Texture	Smooth, hard, non-tacky	Smooth, hard, non-tacky	Smooth, hard, slightly brittle	Slight surface crystallinity	Smooth; carnauba ringed surface
Softening point, °C	60	77	78	79	80.5
Melting point, °C	74	79	78	86	88

In Asphalt

Self-extinguishing asphalt formulations for caulking, roof coatings, and sound-deadening coatings are obtained by incorporation of at least 30 percent Aroclor 5460 or other solid, resinous Aroclor.

In Allyl Starch

Substitution of the hydroxy hydrogen atoms of the starch molecule by allyl groups produces allyl starch, which upon polymerization forms stable, cross-linked molecules. A minimum of 20 weight-percent plasticizer is required to make the film flexible. The aroclor plasticizers are highly compatible and very efficient plasticizers for allyl starch.

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Miscellaneous Applications Of Aroclor

With their wide range of physical properties, their inertness, lubricity, and low vapor pressures — Aroclor plasticizers are valuable ingredients in an incredible variety of formulated products. They are compatible with many solvents and oils and most resins. They are virtually non-volatile and permanently thermoplastic; they do not react with other chemicals in the formulation. Finally, their low cost makes their use for special purposes eminently practical and economical.

Dust Prevention And Dust Catching

Aroclor 1254 is a low-cost dedusting agent that "holds down" the dusting of a variety of chemical materials. Since Aroclor 1254 resists both oxidation and combustion, it can even be used to control the dusting of highly reactive compounds. As a typical example, a few tenths of a percent controls the dusting of calcium hypochlorite.

Since Aroclor is non drying and tacky, it makes excellent coatings to capture dust, lint, and other fine, airborne particles. Glass fiber, metal mesh, and other materials used to filter air and gas streams are coated with Aroclor 1260 and 5460.

Vapor Suppression (For Longer Insecticide Kill-Life)

The effective kill-life of expensive chlorinated insecticides is extended as much as ten-fold by the incorporation of equal parts of Aroclor 5460, which acts both as a vapor suppressant and as a sticking agent. Hard surfaces (painted or metallic) sprayed with lindane or benzene hexachloride fortified with Aroclor 5460 remain toxic to flies, ants, roaches, and silverfish for as long as three months, compared with one week for unfortified sprays.

The Aroclor retards the rapid evaporation of the volatile insecticides without adding odor or objectionable residue. Formulation into an insecticide is simple: a solution of the Aroclor in a suitable solvent is merely added and mixed into the other ingredients.

Aroclor 5460 is also recommended for noncrop insect formulations containing chlordane, aldrin, and dieldrin. The other resinous Aroclor products (1254, 1260, 1262, 4466, and 5442), also nonvolatile and sticky or tacky, likewise merit evaluation as insecticide extenders.

Moisture Proofing

In moisture-proof coatings for wood, paper, concrete, or brick, Aroclor is best combined with waxes, especially paraffin or carnauba; oils such as mineral oil or drying oils; or synthetic resins, including modified alkyds, phenolics, chlorinated rubber, polystyrene, styrene-butadiene copolymers, ethyl cellulose, cellulose acetobutyrate, benzyl cellulose, or vinyl resins. The material to be used with the Aroclor should be selected according to the end-use requirements of the specific application.

Some very simple compositions contain only Aroclor and paraffin. One very efficient moisture-proofing compound, consisting of 96 weight percent Aroclor 5460 and 4 percent paraffin (melting point 54°C), has

an ASTM softening point of about 82°C. A similar compound, based on Aroclor 4465, has a softening point of about 58°C.

Softening point and viscosity when melted are further decreased by the use of mixtures of Aroclor. For example, a composition containing 40 percent Aroclor 1260, 56 percent Aroclor 5460, and 4 percent paraffin, is very soft at room temperature. A higher concentration of paraffin also produces softer compounds.

An excellent melt coating for paper and cloth, made according to the following suggested formulation, may be applied by knife or roller at 350°F, requires no solvent, and provides an extremely flexible coating.

<i>Ingredients</i>	<i>Percent</i>
Half-second Cellulose Acetate-Butyrate	50
Diethyl Phthalate	9.9
Aroclor® 1260	40
Santonox® antioxidant	0.1

Pigment Dispersion

Aroclor 4465 is a useful resin in rotogravure and other printing inks. It is an important ingredient in the following mimeograph ink suitable for use on bond paper:

<i>Ingredients</i>	<i>Percent</i>
Aroclor® 4465	40
Lubricating Oil (SUV 1200 @ 100°F)	35
Paraffin Oil (SUV 76 @ 100°F)	20
Carbon Black	4
Oil-Soluble Dye	1

Aroclor 4465 is also used in the preparation of imitation gold leaf. Bronze powder is spread upon a hot coating of Aroclor on one side of a sheet of paper. When the paper treated with Aroclor and bronze powder is placed on the object to be imprinted and a hot die is pressed against it, the Aroclor softens, sticks the bronze to the object, and coats the powder to prevent tarnishing.

Aroclor 1254 and 4465 serve as pigment vehicles for decoration of glass and ceramics. When the decorated object is fired, the Aroclor volatilizes without carbonization and thus avoids discoloration. Aroclor plasticizers are also valuable as grinding and dispersing mediums for pigments used in plastics.

Sealing And Impregnation

The liquid Aroclor plasticizers, 1221 and 1254, because of their low vapor pressures and fire resistance, are excellent sealants. These non-evaporating fluids have good flow at slightly elevated temperatures and are chemically stable at elevated temperatures. These liquid Aroclor products therefore are excellent fluid seals wherever the use of oil would create a fire hazard. In the trough of annealing furnaces, for example, Aroclor plasticizers are dependable, fire-safe roof sealants.

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Because of their nonflammability, high resistivity and dielectric strength, and low power factor, the liquid and resinous Aroclor plasticizers are extremely valuable impregnants for many electrical applications. One important use of Aroclor 1260, 4465, and 5460 is in wire and cable coatings and as impregnants for braided cotton-asbestos insulation. Their high purity and excellent electrical resistance make Aroclor 1254, 5460, and 1268 excellent dielectric sealants: to close the pores of carbon resistors, and to seal electrical bushings and terminals.

Aroclor plasticizers are essential components of coatings for flameproofing cotton drill for outer garments and for rendering olive-drab canvas fire-retardant, water-repellent, and rot-proof for tents, tarpaulins, etc., according to the following formulations:

Flameproofing Formula for Cotton Drill

<i>Ingredients</i>	<i>Parts by Weight</i>
(A) Urea-formaldehyde resin monomer	9.62
Catalyst for resin	0.40
Water	22.26
(B) Oil-modified alkyd resin	3.89
Aroclor 1254	12.00
Aroclor 5460	14.40
Stoddard solvent	25.15
(C) Antimony oxide, 300 mesh or finer	12.28

Dissolve the solids in the indicated solvents, add the aqueous solution (A) to the hydrocarbon solution (B) with stirring, and then disperse the antimony oxide in the emulsion.

Fire-Retardant, Water-Repellent, Rot-Proof Canvas Coating

<i>Ingredients</i>	<i>Per Cent</i>
Modified phenol-formaldehyde resin	4
Aroclor® 1254	16
Aroclor 5460	4
Antimony Oxide	8
Tricresyl Phosphate	1.5
Aluminum Stearate	0.5
Copper Naphthenate (8% copper)	8
Mica, ground	3
Limestone, ground	6
Iron Oxide, yellow	7
Chrome Orange	2
V M & P Naphtha	40

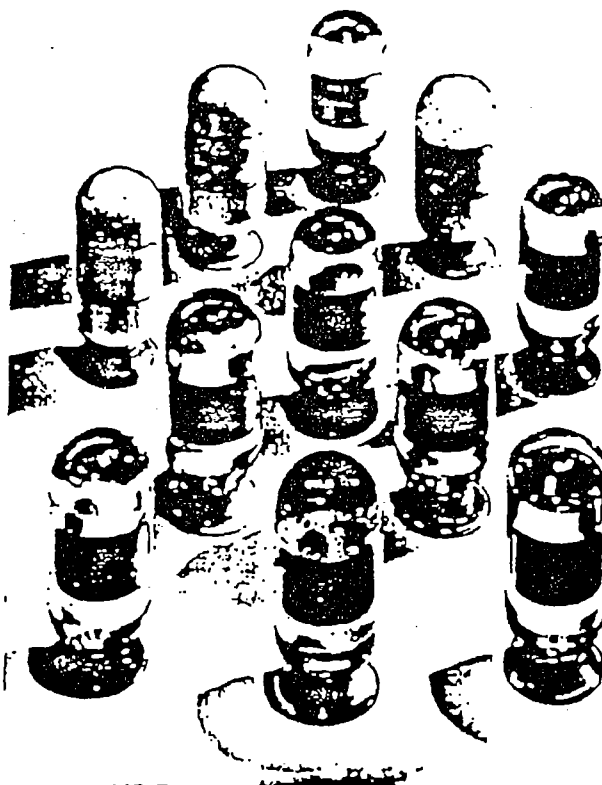
Properties Of The Aroclor Plasticizers

Mobile Liquids

Viscous Liquids

Soft Resins

Brittle Resins



Numerous applications for the Aroclor plasticizers have been suggested and described in the preceding sections of this bulletin. Their success depends on the general inertness of the compounds and on the range and gradation of their physical properties, including physical state, density, viscosity, melting and boiling points, volatility, and solubility. These and other properties, as well as handling and shipping information, are presented in detail in the remainder of the bulletin.

Solubility

The Aroclor liquids and resins are readily soluble in most common organic solvents and drying oils. Although all Aroclor plasticizers are insoluble in water, the hard, crystalline materials are generally less soluble than the liquids and softer resins. Solubilities of some Aroclor plasticizers are shown in Table 13.

TABLE 13

SOLUBILITIES OF AROCLOR® PLASTICIZERS IN VARIOUS SOLVENTS											
Solvent	Aroclor 1242		Aroclor 1248		Aroclor 1254		Aroclor 1268		Aroclor 4465		Aroclor 5480
	25°C	Hot	25°C	Hot	25°C	Hot	Cold	Hot	Cold	Hot	25°C
Acid											
Acetic Acid	S	S	—	—	S	S	—	—	SS	S	—
Oleic Acid	S	S	—	—	S	S	—	—	S	VS	—
Benzoic Acid	10.8 ^{100°C}	—	10.0 ^{100°C}	—	—	—	—	—	—	—	—
Aldehyde											
40% Formaldehyde	I	I	I	I	I	I	I	I	I	I	—
Furfural	VS	VS	VS	VS	VS	VS	SS	SS	VS	VS	—
Amine											
Aniline	S	S	—	—	S	S	—	—	VS	VS	—
Pyridine	132.5 ^{100°C}	440 ^{100°C}	—	—	114 ^{100°C}	425 ^{100°C}	—	—	VS	VS	—
Chloro derivatives											
Amyl chlorides — mixed	S	S	S	S	S	S	—	—	VS	VS	—
Carbon Tetrachloride	S	S	S	S	S	S	—	—	VS	VS	156
Chloroform	S	S	S	S	S	S	S	S	VS	VS	—
Dichloroethylene	—	—	—	—	—	—	—	—	VS	VS	—
Ethylene Dichloride	S	S	S	S	S	S	S	S	VS	VS	—
Monochlorobenzene	S	S	S	S	S	S	—	—	VS	VS	—
Orthodichlorobenzene	—	—	—	—	—	—	—	—	VS	VS	—
Tetrachloroethane	S	S	S	S	S	S	—	—	VS	VS	—
Trichloroethane	S	S	S	S	S	S	—	—	VS	VS	—
Trichloroethylene	S	S	S	S	S	S	—	—	VS	VS	—
Drying Oil											
Tung Oil	S	S	S	S	S	S	—	—	VS	VS	—
Linseed Oil	S	S	S	S	S	S	I	S	VS	VS	—
Ester											
Amyl Acetate	S	S	S	S	S	S	S	S	VS	VS	—
Butyl Acetate	S	S	S	S	S	S	S	S	VS	VS	—
"Cellasolve" Acetate	S	S	S	S	S	S	—	—	VS	VS	—
Cottonseed Oil	S	S	S	S	S	S	—	—	S	VS	—
Dibutyl Phthalate	S	S	S	S	S	S	S	S	S	VS	—

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Diethyl Phthalate	S	S	S	S	S	S	—	—	S	VS	—
Ethyl Acetate	S	S	S	S	S	S	SS	SS	S	VS	—
Ethyl Lactate	S	S	S	S	S	S	I	S	VS	VS	—
Ethylene Glycol Diacetate	S	S	S	S	S	S	—	—	VS	VS	—
Methyl Acetate	S	S	S	S	S	S	SS	SS	S	S	—
Tricresyl Phosphate	S	S	S	S	S	S	—	—	SS	S	—
Ether: Ethyl Ether	S	S	S	S	S	S	S	S	S	—	—
Ether Alcohol											
Carbitol ¹	224 ^{25°C}	347 ^{25°C}	VS	VS	173 ^{25°C}	259 ^{25°C}	I	S	SS	—	—
Cellosolve	S	S	S	S	S	S	I	S	S	—	—
Diethylene Glycol	—	—	—	—	—	—	—	—	S	—	—
p,p' Dihydroxy Ethyl Ether	18.5 ^{25°C}	18 ^{25°C}	SS	SS	8 ^{25°C}	10 ^{25°C}	—	—	SS	—	—
Hydrocarbon											
Benzene	VS	VS	VS	VS	VS	VS	S	S	VS	VS	143
Gasoline	VS	VS	VS	VS	VS	VS	—	—	VS	VS	—
Kerosene	VS	VS	VS	VS	VS	VS	SS	S	VS	VS	—
Mineral Spirits	VS	VS	VS	VS	VS	VS	S	S	VS	VS	—
Paraffin	2.0 ^{25°C}	S	2.0 ^{25°C}	S	—	S	—	—	5.0	S	—
Pine Oil	S	S	VS	VS	S	S	S	S	S	S	—
Toluene	VS	VS	VS	VS	VS	VS	S	S	VS	VS	142
Turpentine	VS	VS	VS	VS	VS	VS	S	S	VS	VS	—
Xylene	VS	VS	VS	VS	VS	VS	S	S	VS	VS	178
Hydroxy derivatives											
Amyl Alcohol	S	S	—	—	S	S	SS	S	S	S	—
n-Butyl Alcohol	S	S	—	—	S	S	I	SS	SS	S	—
Ethyl Alcohol (3-A)	23.3 ^{25°C}	80.8 ^{25°C}	—	—	10 ^{25°C}	28 ^{25°C}	I	I	SS	—	—
Glycerine	I	I	I	I	I	I	I	I	I	I	—
Methyl Alcohol	42.5 ^{25°C}	88.5 ^{25°C}	—	—	15 ^{25°C}	22.2 ^{25°C}	—	—	SS	—	—
Phenol — 90%	194 ^{25°C}	S	—	—	SS	S	SS	S	S	S	—
Ketone: Acetone	S	S	—	—	S	S	I	I	S	S	260
Miscellaneous											
Carbon Disulfide	S	S	—	—	S	S	S	S	VS	VS	—
Nitrobenzene	S	S	—	—	S	S	—	—	VS	—	—
Water	I	I	I	I	I	I	I	I	I	I	—

I — Insoluble SS — Slightly Soluble S — Soluble VS — Very Soluble.
 Figures show grams of Anacolor per 100 milliliters of solvent at 25°C unless otherwise indicated.

¹Trademark of Union Carbide Corp.

TABLE 14

CHEMICAL AND PHYSICAL PROPERTIES OF REPRESENTATIVE AROCLOR® PLASTICIZERS AND RESINS

Property	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254
Appearance	Clear, mobile oil	Clear, mobile oil	Clear, mobile oil	Clear, mobile oil	Light-yellow viscous liquid
Color, maximum	*100 APHA	*100 APHA	*100 APHA	*100 APHA	*100 APHA
Chlorine, percent	20.5-21.5	31.5-32.5	42	48	54
Acidity, mg KOH/g, maximum	*0.014	*0.014	*0.015	*0.010	*0.010
Moisture, ppm, maximum	—	—	*50	*50	*50
Ave. Coefficient of Expansion, cc/cc/°C	0.00071 (15°-40°C)	0.00073 (25°-100°C)	0.00068 (25°-85°C)	0.00070 (25°-85°C)	0.00066 (25°-85°C)
Specific Gravity	*1.182-1.182 (25°/15.5°C)	*1.270-1.280 (25°/15.5°C)	*1.381-1.392 (25°/15.5°C)	*1.405-1.415 (65°/15.5°C)	*1.495-1.505 (65°/15.5°C)
Density, pounds per gallon, 25°C	8.85	10.55	11.50	12.04	12.82
Distillation Range, °C, corrected (ASTM D-20, modified)	275-320	280-325	325-366	340-375	365-390
Evaporation Loss, %, 100°C, 6 hours (ASTM D-6, mod.) 183°C, 5 hours	1.0-1.5	1.0-1.5	0-0.4 3.0-3.8	0-0.3 3.0-4.0	0-0.2 1.1-1.3
Flash Point (Cleveland Open Cup), °C °F	141-150 286-302	152-154 305-310	176-180 348-356	193-196 379-384	None to boiling point
Fire Point (Cleveland Open Cup), °C °F	176 348	238 460	None to boiling point	None to boiling point	None to boiling point
Pour Point (ASTM E-87), °C °F	1 (crystals) 34 (crystals)	-35.5 -32	-19 2	-7 19.4	10 50
Softening Point (ASTM E-28), °C °F	—	—	—	—	—
Refractive Index, n D-20 20°C	1.617-1.618	1.620-1.622	1.627-1.629	1.630-1.631	1.639-1.641
Viscosity, Seconds Saybolt Universal (ASTM D-88)	100°F (37.8°C) 130°F (54.4°C) 210°F (98.9°C)	*38-41 35-37 30-31	*44-51 39-41 31-32	*82-92 49-56 34-35	185-240 *73-80 36-37
					1800-2500 260-340 *44-48

*Approximate values

Arcoior 1260	Light-yellow, soft, sticky resin	150 APHA	60	0.014	0.60	—	0.00067	(20°-100°C)	1.555-1.566	(80°/16.6°C)	13.50	385-420	0.0-0.1	None to boiling point	None to boiling point	31	88	—	1.647-1.649	1.6501-1.6517	800-850 (160°F: 71°C)	300-400	80-150 (266°F: 130°C)	—	—
Arcoior 1262	Light-yellow sticky, viscous resin	150 APHA	61.5-62.5	0.014	—	—	0.00064	(25°-85°C)	1.572-1.583	(80°/16.5°C)	13.72	390-425	0.0-0.1	None to boiling point	None to boiling point	36-38	88	—	—	—	800-850 (160°F: 71°C)	300-400	80-150 (266°F: 130°C)	—	—
Arcoior 5442	Clear yellow sticky resin	2 NPA (molten)	42	0.06	—	—	0.00123	(28°-89°C)	1.470	(25°/25°C)	12.24	215-300 (4 mm. Hg)	0.01	None to 247	None to boiling point	46	115	46-52	115-126	1.64-1.667	80-150 (266°F: 130°C)	300-400	80-150 (266°F: 130°C)	—	—
Arcoior 4465	Clear, light-yellow, resin	2 NPA (molten)	85	0.06	—	—	0.00061	(25°-85°C)	1.870	(25°/25°C)	13.81	230-320 (4 mm. Hg)	0.0-0.2	None to boiling point	None to boiling point	—	—	80-86	140-151	1.64-1.667	80-150 (266°F: 130°C)	300-400	80-150 (266°F: 130°C)	—	—
Arcoior 2565	Black, opaque, brittle resin	—	85	1.4	—	—	0.00066	(25°-86°C)	1.734	(26°/25°C)	14.44	—	0.2-0.3	—	—	—	—	88-72	148-162	—	—	—	—	—	—
Arcoior 5460	Clear, yellow- to-amber, or flakes	2 NPA (molten)	58.5-60.6	0.05	—	—	0.00178	(25°-124°C)	1.670	(25°/25°C)	13.81	280-335 (5 mm. Hg)	0.03	None to boiling point	None to boiling point	—	—	98-105	208-222	1.660-1.665	—	—	—	—	—
Arcoior 1268	White to off-white powder	1.5 NPA (molten)	68	0.05	—	—	0.00067	(20°-100°C)	1.804-1.811	(25°/25°C)	15.09	435-450	0.0-0.06	None to boiling point	None to boiling point	—	—	150-170 (hold 302-338 point)	—	—	—	—	—	—	—

MAE 040924

Density

All the Aroclor plasticizers are heavier than water, a valuable property for many applications. Densities are shown in Figure 2.

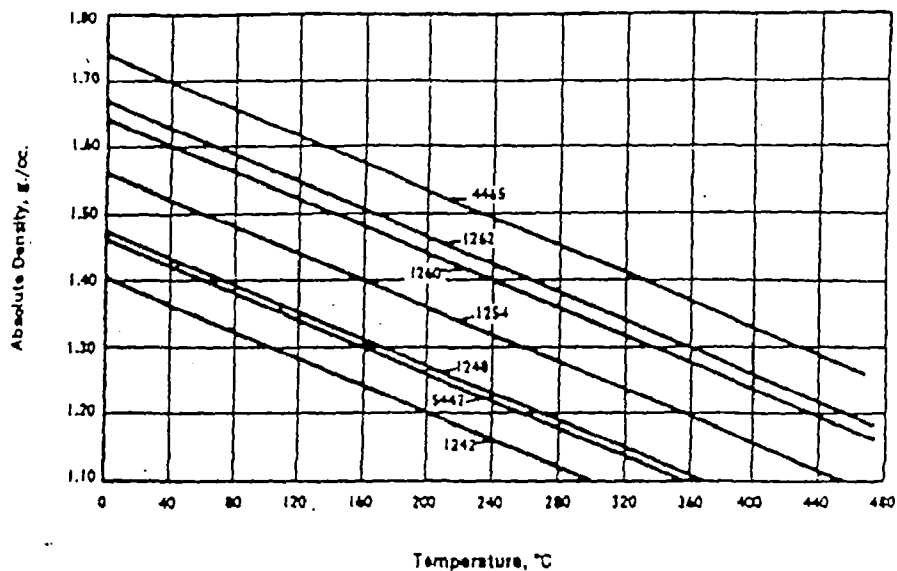


Fig. 2 — Densities of Aroclor® Plasticizers at Various Temperatures

Specific Volume

The specific volume of Aroclor 1248 at different temperatures is as follows:

Temperature (°F)	Aroclor 1248 Specific Volume (ml/g)
0	0.874
100	0.888
200	0.726
300	0.755
400	0.790
500	0.828
600	0.870

The low vaporization loss of Aroclor plasticizers is indicated in Table 15.

TABLE 15

VAPORIZATION RATES OF AROCLOR® PLASTICIZERS			
Plasticizer (Surface area: 12.28 sq. cm.)	Wt. Loss (g)	Exposure at 100°C (hr.)	Vaporization Rate (g/sq. cm./hr.)
Aroclor 1221	0.5125	24	0.00174
Aroclor 1232	0.2572	24	0.000874
Aroclor 1242	0.0395	24	0.000338
Aroclor 1248	0.0448	24	0.000152
Cherolac® 42-S	0.0745	48	0.000125
Diethyl phthalate	0.0635	48	0.000117
Detraz® 25	0.0256	24	0.000087
Aroclor 1254	0.0158	24	0.000053
Shell Detraz 20	0.0047	24	0.000016
Aroclor 1262	0.0039	24	0.000013
Aroclor 1260	0.0028	24	0.000009
Aroclor 4465	0.0064	72	0.000007
Aroclor 6442	0.0038	72	0.000004
Aroclor 6440	0.0032	72	0.000004
Tricresyl phosphate	0.0010	24	0.000003

It is concluded that the vaporization rates of Aroclor plasticizers — especially the most widely used 1254 and 1260 — compare most favorably with the similar constants of other plasticizers selected specifically for these tests because of their low vaporization rates.

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 ® Registered of Shell Oil Co.

MAE 040926

The vapor pressures of several Aroclor plasticizers are indicated in Figure 3 over the temperature range 160° to 300°C.

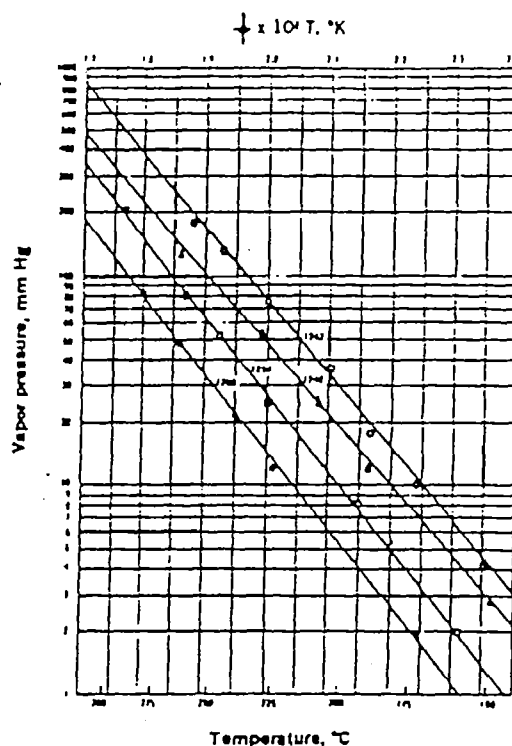


Fig. 3 — Vapor Pressures of Aroclor® Plasticizers

The estimated vapor pressures of several Aroclor plasticizers at 100°F shown in the following table were determined by extrapolation from the values shown in Figure 3.

Approximate Vapor Pressure of Aroclor® Plasticizers
Estimated at 100° F (37.8° C)

Aroclor 1232	0.005 mm. Hg
Aroclor 1242	0.001 mm. Hg
Aroclor 1248	- 0.00037 mm. Hg
Aroclor 1254	0.00006 mm. Hg

Viscosity

The viscosities of the Aroclor plasticizers vary according to whether the base material is a biphenyl or a polyphenyl and on the degree of chlorination. In general the low-chlorinated biphenyls have the lowest viscosities (Figure 4).

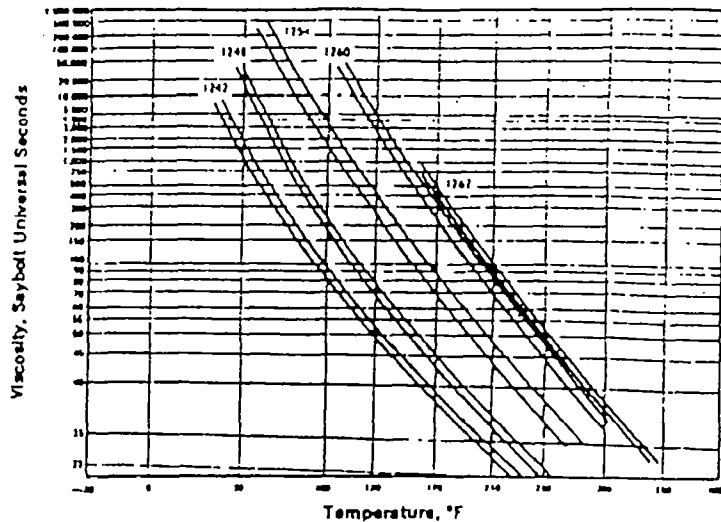


Fig. 4 — Viscosity Ranges of Some Aroclor® Plasticizers

Stability

Toward Alkalies

The Aroclor plasticizers are remarkably resistant to the action of either hydrolyzing agents or high temperature. They are not affected by boiling with sodium hydroxide solution.

Toward Acids

No hydrogen chloride was evolved when Aroclor 1254 was stirred with an equal volume of 10 percent sulfuric acid for 160 hours. Even after prolonged treatment (255 hours) with concentrated sulfuric acid only a slight trace (too small for quantitative measurement) of hydrogen chloride was evolved.

Toward Heat

Because of their stability to heat, the Aroclor plasticizers are useful heat-transfer media. Aroclor 1254 and particularly the less viscous Aroclor 1248 are recommended for this purpose, because they may be heated up to 315°C (600°F) in a closed system for long periods without appreciable decomposition, and because they are nonflammable.

Toward Light

The Aroclor plasticizers have good light stability in heavily pigmented compounds and fair light stability in clear formulations. The materials become discolored, but their physical properties are not degraded. For critical applications, incorporation of a small amount of a light-

screening agent greatly improves light stability at reasonable cost. The following data show that as little as 0.01 percent Tinuvin P in Aroclor 1254 nearly doubles the service life in the 50-to-100-hour range and that 0.1 percent Tinuvin P results in a 10-fold improvement.

Tinuvin P Concentration (%)	Fade-Ometer Exposure (hours)				
	0	50	100	150	500
	Color (Gardner Units)				
0	0	5	10	11	14
0.01	0	1	6	7	14
0.05	0	0	3	4	11
0.1	0	0	1	2	6

Toward Oxidation

When Aroclor plasticizers are heated to 140°C with oxygen in a bomb at 250 psi, no evidence of oxidation occurs, as judged by absence of sludge formation or increased acidity. Also, no increase in acidity occurred after 4 hours heating with air at 260°C and 210 psi.

Nonflammability

The viscous Aroclor liquids and the resins do not support combustion when heated alone, even at their boiling points — above 350°C. Most of the Aroclor plasticizers flux readily with resinous and pitch-like materials to give products with decreased fire hazard. Aroclor products incorporated in plastic products and rubber foams retard the rate of burning.

Nondrying Properties And Thermoplasticity

The Aroclor plasticizers are nondrying. When exposed to the air, even in thin films, no noticeable oxidation or hardening takes place. Despite this property, Aroclor plasticizers do not retard the drying rate of lacquer films. Quick-drying varnishes and paints may be made with Aroclor resins without affect on drying characteristics.

The Aroclor plasticizers are permanently thermoplastic. They apparently undergo no condensation or hardening upon repeated melting and cooling. Clear Aroclor resins are available with softening points up to 105°C. The opaque crystalline solids are available with melting points up to about 160°C.

Electrical Properties

The electrical properties of Aroclor plasticizers are extremely interesting: high resistivity and dielectric strength and low power factor, as listed in Table 16. The dielectric constants of the various Aroclor plasticizers range from 3.3 to 4.9 at 100°C and 1000 cycles.

TABLE 16

ELECTRICAL PROPERTIES OF AROCLOR®					
Aroclor	Dielectric Constant (ASTM D-150-47T) 1000 cycles		Volume Resistivity (ASTM D-257-46) 500 Volts D.C., 100°C (ohm-cm.)	Dielectric Strength (ASTM D-149-44) (KV)	Power Factor (ASTM D-150-47T) 1000 cycles, 100°C (%)
	25°C	100°C			
1232	5.7	4.8			
1242	5.8	4.9	Above 500×10^9	Above 35	Below 0.1
1248	5.8	4.8	Above 500×10^9	Above 35	Below 0.1
1254	5.0	4.3	Above 500×10^9	Above 35	Below 0.1
1260	4.3	3.7	Above 500×10^9	Above 35	Below 0.1
1268	2.5				
1442	3.0	4.8	Above 500×10^9		
1454	2.7	4.2			
1460	2.5	3.7			
1466	2.7	3.3			

How To Emulsify Aroclor

Emulsions of Aroclor plasticizers can be made simply in several ways; the method can be selected to suit the particular Aroclor and the type of formulation in which it will be used.

Emulsifiable Concentrated Stock Solutions of Aroclor

Stock solutions made according to the following formulation are readily emulsified with water. The amount of toluene may be increased as needed to dissolve the more resinous Aroclor plasticizers.

Ingredient	Parts by Weight
Aroclor	79
Toluene	18.70
Isopropanol	3.55
Sterox® CD (nonionic emulsifier)	1.00
Santomer® No. 3 (anionic wetting agent)	0.75

Emulsifying Liquid Aroclor

Ingredient	Parts by Weight
<i>Portion 1</i>	
Aroclor 1254	100
Oleic Acid	4
<i>Portion 2</i>	
Water	100
Ammonium Hydroxide (28%)	2

MAE 040930

Mix the polystyrene and ammonium hydroxide in warmed water with vigorous agitation. Mix the Aroclor 1254 and oleic acid, heat to 45°C, and agitate vigorously. Maintain the 45°C temperature and agitation, and slowly add in the aqueous portion (Portion 2). Continue agitation for one-half hour until phase inversion is complete.

Emulsifying Viscous Aroclor

<i>Ingredient</i>	<i>Parts by Weight</i>
<i>Portion 1</i>	
Aroclor 1254	64
Stearic Acid	4
<i>Portion 2</i>	
Water	32
Triethanolamine	1

Heat the Aroclor to a workable viscosity (180°F or higher) and stir in the stearic acid thoroughly. Heat the water almost to boiling (207°F) and stir in the triethanolamine thoroughly. Pour the Aroclor-stearic acid portion into the water-triethanolamine portion with vigorous agitation. Process the combined portions either with a high-speed emulsifying stirrer or through a colloid mill.

Toxicity And Safe Handling

Inhalation

At ordinary temperatures the Aroclor chlorinated polyphenyls have not presented industrial toxicological problems. The hazard of potential toxic exposure varies with their volatility; the lower-chlorinated, more-volatile ones present more of a potential problem from the standpoint of both inhalation and skin contact. When Aroclor plasticizers are used at elevated temperatures, engineering controls must be applied, either by the use of closed systems or by effective local-exhaust ventilation together with general workroom exhaust.

Vapor of the liquid Aroclor plasticizers at room temperature should not be breathed in a confined space, and no vapor of any Aroclor evolved at elevated temperatures should be allowed to be dispersed into the general workroom.

Inhalation tests on animals indicate that the maximum safe concentration of vapor is in the range of from 0.5 to 1.0 milligram of the lower-chlorinated Aroclor plasticizers per cubic meter of air. The threshold limits (maximum allowable concentration for an 8-hour working day) set by the American Conference of Government Hygienists are 1.0 milligram of the lower-chlorinated Aroclor compounds per cubic meter of air and 0.5 milligram of the more-highly-chlorinated compounds, such as Aroclor 1254, per cubic meter of air.

Skin Contact

Schwartz patch tests on 200 volunteers showed that Aroclor 1254 was neither a primary skin irritant or a sensitizer.

Continuous or repeated skin contact with the Aroclor plasticizers must be avoided by the use of gloves and protective garments, because of the possible occurrence of a condition called chloracne. Although reports of this condition caused by Aroclor are rare, it can be produced by excessive skin contact. If any Aroclor is spilled on the skin the skin should be washed in the usual manner with a soap solution.

A burn caused by contact with a hot Aroclor should be treated like any ordinary burn. Aroclor plasticizer adhering to the burned area need not be removed immediately, unless treatment of the burn demands it, in which case either soap and water or repeated washings with a vegetable oil are recommended.

Shipping

Freight Classification

Aroclor 1221, 1243, 1242, 1248, 1254, 1260, 1262	Synthetic Resin, Liquid, NOIBN
---	--------------------------------

Rail Classification

Aroclor 1268, 2565, 4465, 5442, 5460	Synthetic Resin, Other Than Liquid, NOIBN
---	--

Truck Classification

Aroclor 1268, 2565	Synthetic Resin, Powder, NOI
Aroclor 4465, 5442, 5460	Synthetic Resin, Lumps or Solid Mass, NOI

Shipping Regulations

None

Standard Containers

Aroclor 1221	Tank car, 520-lb. steel drum, 50-lb. can
Aroclor 1282	Tank car, 550-lb. steel drum, 50-lb. can
Aroclor 1242, 1248, 1254, 1260, 1262	Tank car, 600-lb. steel drum, 50-lb. can
Aroclor 1268	200-lb. fiber drum, 25-lb. fiber drum
Aroclor 2565, 4465	500-lb. steel drum, 50-lb. can
Aroclor 5442	450-lb. steel drum, 50-lb. can
Aroclor 5460 (flaked)	100-lb. bag

MAE 040932

DISTRICT SALES OFFICES ALL DIVISIONS

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Lenox Towers East
3400 Peachtree Rd. N. E. - Suite 1711
Tel. (404) 577-2260

BOSTON, MASSACHUSETTS 02149

Everett Station
Tel. (617) 387-5010

CHICAGO, ILLINOIS

3158 Des Plaines Ave.
Des Plaines, Illinois 60018
Tel. (312) 296-6638

CINCINNATI, OHIO 45206

1501 Madison Road
Tel. (513) 761-6707

CLEVELAND, OHIO 44122

3645 Warrensville Center Rd
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912 Northstar Center 110 S. Seventh St.
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277 Park Avenue
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800 N. Lindbergh Blvd.
Tel. (314) Oxford 4-1000

SAN FRANCISCO BAY AREA

2770 Lafayette, Santa Clara, Calif. 95052
Tel. (408) 343-0414

SEATTLE, WASHINGTON 98104

301 Western Avenue
Tel. (206) Main 2-0203

SPRINGFIELD, MASSACHUSETTS 01101

730 Worcester Ave.
Tel. (413) 786-6311

WILMINGTON, DELAWARE 19803

2005 Concord Pike, Feltex
Tel. (302) Olympe 8-6531

MONSANTO, 800 N. LINDBERGH BLVD., ST. LOUIS, MISSOURI 63166

Additional District Offices
are maintained by:

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P. O. Box 174
Tel. (504) 784-8263

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1023 Riverside Drive
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Tel. (901) Whithall 7-3161

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350 Fifth Ave.
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Lion Oil Building
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Woodland Station
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1616 West Seventh St.
Tel. (501) Franklin 8-2437

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1023 Riverside Drive
P. O. Box 13248
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820 Brown Street
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Tel. (216) Hamblet 4-1821

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2-2713-0948-6 LITHO IN U.S.A.

MAE 040934

MONSANTO, 800 N. LINDBERGH BLVD., ST. LOUIS, MISSOURI 63166



Monsanto

NAME & LOCATION: Willis S. Clark - General Offices

May 14, 1970

1200 SERIES AROCLORS;
Removal of Products from Market

G. W. Buhrmann - GBUHR
F. M. Lockett - Chicago
W. B. Papageorge - WPAPA
W. F. Waychoff
J. D. Wright - JWRIG

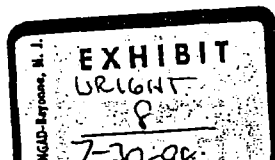
D. H. Bechtold - Chicago
R. N. Brell - Wilmington
E. H. Fording - New York
R. V. Johnson - RJOHN
J. J. McNamara - Everett
E. C. Wilde - Akron

CONFIDENTIAL

As all of you are aware, Monsanto has been in the process of evaluating our polychlorinated biphenyl (Aroclor) products since late last year. I would like to bring you up to date on the present status of these evaluations and to present our plans for these products for the next several months.

On May 11, John Mason presented our proposed course of action for polychlorinated biphenyls (PCBs) to the Corporate Management Committee. In that presentation, he made two basic recommendations; first, that we market non-biodegradable PCBs only for closed system applications where control over disposal is possible (e.g. transformer fluids). And second, that we phase out of all non-biodegradable PCB products where control is not possible and replace these materials with biodegradable PCBs or other suitable products. The Corporate Management Committee approved these recommendations.

In the plasticizer area, none of our applications are considered to be of a controllable nature. This means that we will be starting immediately on the job of removing non-biodegradable PCB Aroclors and Montars from the market. We will not be able to ship any of these materials after 8/30/70. This will include Montar 1, Aroclor 4465, Aroclors 1232, 1242, 1248, 1254, 1260, 1262, 1268, and the 1100 series Aroclors. Aroclor 1221 will not be withdrawn. The 5000 series Aroclors will not be removed from the market; indeed, they will figure in our replacement plans.



MAE 060748

May 14, 1970

The plan of action which we have established at this time to accomplish the removal and replacement of PCBs is as follows:

1. Contact AMSCO and Central Solvents central offices to inform them of our plans. This was completed in early May on a confidential basis. The regional offices should not have been contacted by the central offices.
2. Contact and to inform them of our plans. Once again, this was accomplished in early May on a confidential basis.
3. Contact other key accounts. This should be done by the field sales people during the week of 5/25/70.
4. Complete the lists of suggested replacement products for Parlon, styrene butadiene, PVAc and polysulfide sealant systems. These are being compiled now in St. Louis and will be sent out as soon as is possible, at any rate by 5/27/70.
5. Contact all distributors and inform them in writing of our decision to remove these products from the market and to stop all shipments on 8/30/70. The distributors will be notified by mail from the St. Louis office on 5/29/70.
6. Contact all direct customers and inform them in writing of our decision to remove these products from the market and to stop shipments on 8/30/70. The direct customers will be notified by mail from St. Louis on 6/1/70. Both the distributors and the direct customers will be requested to contact the field sales offices on all questions concerning timing and replacement products.
7. The time between 6/1/70 and 8/30/70 will be a frantic, frenzied period when the objective will be to achieve 100% conversion of the required products in a completely orderly fashion. In all seriousness, that should be our objective. Needless to say, it is bound to tax our capabilities, not to mention our frustrations, just a bit.

Regional Managers

-3-

May 14, 1970

8. On 8/30/70, we will discontinue the shipments of the non-biodegradable Aroclors listed above.

I think that I am aware of at least some of the problems that this removal of products from the market is going to cause you people. Also, the tight time schedule is probably not going to make life any easier. On the other hand, we feel that in the interest of equal treatment to all accounts, it is important to stick to the time-table shown above. Therefore, please do not contact any customers on this subject prior to 5/25/70. Also, would each of you send me the list (as short as feasible) of key accounts which you would like to contact the week of 5/25/70. This will be used to check to see whether we are all interpreting "key account" basically the same way. I will need that list by 5/22/70.

I am very interested in your response to this plan. I know that I haven't left you much time for reply, but please let me hear from you anyway.

Will Clark

Willis S. Clark

/dbw

MAE 060750

TOWOLDMON0051604

MONSANTO CHEMICAL COMPANY

DISTRIBUTOR CONTRACT

CONTRACT between Monsanto Chemical Company, St. Louis 88, Missouri ("Monsanto") and American Mineral Spirits Company of Murray Hill, New Jersey
DIVISION OF THE PURE OIL COMPANY ("Distributor").

1. Monsanto hereby appoints Distributor a non-exclusive distributor of the following products (the "Products") and sells the Products to Distributor subject to the terms and conditions stated below and on the reverse side hereof.

PRODUCTS	QUANTITY	PRICE & PACKING	F.O.B.	TERMS
*In C/L or T/L of drums (LCL will be shipped only in an emergency) and/or tankcar and/or tankertruck quantities-				

See Attached Exhibit A

*In C/L or T/L of drums (LCL will be shipped only in an emergency) hereinafter referred to as "Proprietary products".

See Attached Exhibit A

Less 5% Service Allowance

Price and packing & FOB point & terms on attached Monsanto price sheet Exhibit B attached hereto. QTY. estimated at 2,000,000 lbs. of all types.

2. While nothing in this Contract shall restrict the territory within which Distributor shall be free to distribute the Products, Distributor's area of primary responsibility for distribution of the Products (the "Area") shall be: East Coast from New England states to Florida and including Atlanta-Nashville areas.

3. Distributor shall exert its best efforts to exploit fully the potential markets for the Products in the Area. Monsanto plans to maintain an advertising and sales promotion program and to furnish Distributor with current literature and information concerning the Products; the scope and frequency of such advertising and sales promotion to be determined by Monsanto.

4. Monsanto reserves the right to make sales direct to customers located within the Area. Without limiting such right, Monsanto does not expect to solicit small order business for the Products in the Area, but expects to refer such inquiries to Distributor, except with respect to accounts whose established policy permits purchases only from manufacturers and trial shipments for experimental work.

5. Term: One (1) year commencing January 1, 1962
 *Term of Contract: See Exhibit A, Paragraph 24.
 THIS CONTRACT cancels and supersedes all existing Contracts by and between Monsanto and Distributor for the distribution and sale of the Products.

MAE 060388

AMERICAN MINERAL SPIRITS COMPANY
AMERICAN MINERAL SPIRITS COMPANY IS A DIVISION OF THE PURE OIL COMPANY

Distributor

By: [Signature]
 Vice President

Title: _____

Date: January 26, 1962

MONSANTO CHEMICAL COMPANY

By: [Signature]
 Industry Sales Manager
 Title: Plasticizers & Rubber Chemicals
 Organic Chemicals Division

Date: November 27, 1961

☐ 6-277

EXHIBIT
 W-1
 9

6. Deliveries may be suspended by either party in case of Act of God, war, riots, fire, explosion, flood, strike, lockout, injunction, inability to obtain fuel, power, raw materials, labor, containers, or transportation facilities, accident, breakage of machinery or apparatus, national defense requirements, or any cause beyond the control of either party, preventing the manufacture, shipment, acceptance, or consumption of a shipment of a Product or of a material upon which the manufacture of a Product is dependent. If, because of any such circumstance, Monsanto is unable to supply the total demand for the Product, Monsanto may allocate its available supply among all of its customers and itself in an equitable manner. Such deliveries so suspended shall be cancelled without liability, but the contract shall otherwise remain unaffected.

7. In the case of bulk carload, tank car, or tank truck shipments, Monsanto's shipping weights shall govern.

8. Where shipment requires use by Monsanto of carboys, drums, barrels or other returnable containers, title to such containers shall remain in Monsanto and a deposit in the amount required by Monsanto must be made at the time the Products are paid for to insure the return of the container to point of shipment. Such container must be kept in good condition and may not be used for any material other than that shipped therein and must be returned within sixty (60) days from date of shipment. I.C.C. regulations require that empty drums must have filling and vent holes properly closed and empty carboy must be thoroughly (completely) drained. On such containers being so returned in good condition, a refund of the deposit will be made.

9. Monsanto makes no warranty or representation of any kind, express or implied, with respect to any Product sold hereunder except as provided in Condition 13 hereof. Monsanto shall not be liable for, and Distributor assumes responsibility for, risk of loss or damage resulting from the handling, possession or use of the Products, whether alone or in combination with other substances. Claims on account of weight, quality, loss of or damage to a Product shall be made in writing as promptly as possible. Monsanto's liability for losses or damages from all causes shall in no event exceed the purchase price of the particular delivery with respect to which such losses or damages are claimed plus any transportation charges paid by Distributor. Unless otherwise specified, Monsanto's standard specifications for quality shall govern. Transportation charges for returned goods shall not be paid by Monsanto unless authorized by Monsanto.

10. Any increase in freight rates paid by Monsanto on shipments covered by this contract, may, at Monsanto's option, be added to the price of the Products shipped under this contract.

11. Any tax or governmental charge or increase in same hereafter becoming effective increasing the cost to Monsanto of producing, selling, or delivering the Products or of procuring materials used therein, and any tax now in effect or increase in same payable by Monsanto because of the sale of the Products such as Sales Tax, Use Tax, Retailer's Occupational Tax, Gross Receipts Tax, may, at Monsanto's option, be added to the price herein specified.

12. Monsanto reserves the right, among other remedies, either to terminate this contract or to suspend further deliveries under it in the event Distributor fails to pay for any one shipment when same becomes due. Should Distributor's financial responsibility become unsatisfactory to Monsanto, cash payments or satisfactory security may be required by Monsanto.

13. Monsanto warrants that any Product sold pursuant to this contract, except as is made specifically for Distributor according to Distributor's specifications, does not infringe any valid U.S. patent. This warranty is given upon condition that Distributor promptly notify Monsanto of any claim or suit involving Distributor in which such infringement is alleged, and, if Monsanto is affected, that Distributor permit Monsanto to control completely the defense or compromise of any such allegation of infringement. Monsanto does not warrant that the use of any Product sold hereunder, or articles made therefrom, either alone or in conjunction with other materials, will not infringe a patent.

14. The quantity shipped in any contract month may be limited by Monsanto to either: (a) the average of the monthly quantities ordered by Distributor hereunder for the preceding contract months, or (b) the maximum quantity covered by this contract divided by the number of months in the contract period.

15. Monsanto shall not be bound to tender delivery of any quantities for which Distributor has not given shipping instructions.

16. The price, point of delivery, service allowance, if any, and terms of payment herein specified for any Product may be revised as of the beginning of any quarterly period commencing on the first days of January, April, July and October after the date hereof (including the first such quarterly period), by written notice from Monsanto dispatched not less than fifteen (15) days prior to the date on which any such quarterly period is to commence. If Distributor does not serve Monsanto with written notice of objection thereto prior to the beginning of any quarterly period, the proposed revision will become effective at the start of such quarterly period. Distributor's written objection to such proposed revision served upon Monsanto prior to its effective date shall permit Distributor to purchase elsewhere the quantities due during the ensuing quarterly period if Distributor shall be able to purchase such quantities from responsible United States manufacturers of the Product, and shall have furnished Monsanto with satisfactory written evidence of bona fide offers by such manufacturers and Monsanto shall have elected not to meet such offers, in which event Monsanto shall be released from its obligation during such quarterly period. If Monsanto desires to revise the price, point of delivery, service allowance, or terms of payment pursuant to this paragraph, but is restricted to any extent against so doing by reason of any law, decree, order, or regulation of any government, or if the price, point of delivery service allowance, or terms of payment then in effect under this contract are altered by reason of any law, decree, order, or regulation of any government, Monsanto shall have the right to terminate this contract.

17. Should Distributor at any time any shipment is due under this contract be offered a lower delivered price on material of equal quality, in like quantity as the shipment involved, for the same use by a responsible United States manufacturer of the Product and furnish Monsanto satisfactory proof of same, Monsanto will either supply such shipment at the lower price or permit Distributor to purchase such quantity elsewhere, and the quantity so purchased elsewhere will be deducted from the total quantity of this contract.

18. Distributor may not assign its rights under this contract without the prior written consent of Monsanto and any attempted assignment shall be void.

Paragraphs 19, 20, 21, 22, 23, & 24
See Exhibit A

MAE 060389

MONSANTO CHEMICAL COMPANY
DISTRIBUTOR CONTRACT WITH
AMERICAN MINERAL SPIRITS COMPANY
DATED ^{DEVELOP OF THE PURE OIL COMPANY} November 27, 1961

EXHIBIT A

The following products are offered in Paragraph 1 of the distributor contract:

*In C/L or T/L of drums (LCL will be shipped only in an emergency) and/or tankcar and/or tanktruck quantities-

Dioctyl Phthalate

*In C/L or T/L of drums (LCL will be shipped only in an emergency) hereinafter referred to as "proprietary products"-

Santicizer 160✓

Montars*
Aroclors*

Santicizer 141✓

The following additional terms and conditions apply to subject distributor contract:

19. Monsanto will make third party shipments only if it agrees to do so prior to each sale contemplating such shipment. Such shipments if allowed by Monsanto will be made only by common carrier and only in tankcar, tanktruck, carload or truckload quantities. Shipments will be made prepaid; Monsanto will pay the freight on freight allowed products and charge the freight to destination for FOB products. Monsanto will make stop off shipments only if it agrees to do so prior to each sale contemplating such shipment. If Monsanto allows such shipment the distributor will pay stop off charges and any additional freight charge above that which would apply for shipment to the appropriate distributor terminal.
20. In the event the distributor wishes to use his own trucks to transport plasticizers from Monsanto's plant to his terminals or warehouses, Monsanto

MAE 060390

will allow freight at full tanktruck or truckload rate, regardless of quantity taken, for products sold on a freight allowed basis. A premium of 1/2¢/lb. will be charged for shipments of 1000 to 1999 gallons. Sufficient notice must have been given the Monsanto plant to permit scheduling and prompt loading.

21. The following will apply with respect to inventory price protection.

a. In the event of a price decrease, Monsanto will credit the distributor for the difference between the old price and the new price for all purchases made in the 30 days previous to the announcement of the price decrease, the date of shipment will govern.

b. In the event of a price increase, Monsanto will notify the distributor in accordance with Paragraph 16 of this contract.

22. It is understood that where convenient to Monsanto, Monsanto will utilize the distributor's bulk terminals and warehouses to service customers to whom it makes direct sales of the products inventoried by the distributor, with suitable through-put charges to be negotiated as regards each warehouse and/or bulk terminal.

23. Approximately twice a year the distributor and a Monsanto representative will review the distributor sales of "proprietary products" to insure that Monsanto is kept abreast of market conditions, of new uses, and of applications for its products in order to plan its research and application efforts properly and in order further to insure that the market is being serviced adequately.

~~24. This contract shall, on the expiration of this contract on December 31, 1962, continue in force from year to year until terminated by either party by written notice given at least six (6) months prior to the end of any calendar year.~~

24. This appointment shall be for a term of one (1) year from date hereof until December 31, 1962, and shall continue from year to year thereafter unless terminated at the end of the first year or at the end of any succeeding year by either party serving on the other six (6) months' written notice of its desire to terminate at least six (6) months prior to the end of any year.

MAE 060391

MONSANTO CHEMICAL COMPANY

AGENCY AGREEMENT

THIS AGREEMENT, made and entered into this First day of January, 1962, by and between MONSANTO CHEMICAL COMPANY, a Delaware Corporation (hereinafter referred to as "Principal") and AMERICAN MINERAL SPIRITS COMPANY (hereinafter referred to as "agent")

WITNESSETH:

Principal hereby appoints agent its nonexclusive sales agent for the sale of its proprietary plasticizers, namely:

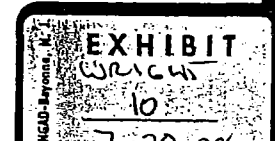
Santicizer 160

Santicizer 141

Montars
Aroclors, Distilled
Aroclors, Undistilled

MAE 060392

in bulk (tankcar or tanktruck) to those of the accounts listed in Table I attached hereto, made a part hereof and marked Exhibit A as same may be amended from time to time in the future by mutual agreement of principal and agent, hereinafter referred to as "listed accounts", which buys for the first time in either tankcar or tanktruck lots, hereinafter referred to as "bulk buyers", subsequent to the end of the year immediately following the year during which agent first made a sale to such account.



This appointment shall be for a term of one (1) year from date hereof until December 31, 1962, and shall continue from year to year ^{unless} ~~until~~ *see you* terminated at the end of the first year or at the end of any succeeding year by either party serving on the other six (6) months' written notice of its desire to terminate at least six (6) months prior to the end of any year.

Agent hereby accepts such appointment and agrees to use its best efforts to so sell said proprietary plasticizers.

All sales shall be subject to approval by principal and shall be at such prices, terms, and conditions as principal shall determine upon and advise agent from time to time.

Agent shall do the invoicing and may invoice under his own "bill head" provided that agent shows on each invoice that in so billing he is acting as agent of principal.

Agent will be responsible for all credit risks involved in connection with any sales made by agent and will either turn over funds collected by it for Monsanto's account on the 15th day of the month following the month in which the sale was made for Monsanto or itself give to Monsanto such sums due which it may not have collected.

Should agent enter into any written contracts as contrasted with spot sales they shall be written in principal's name and on principal's forms and the original copy of such contracts shall be retained by principal.

Principal will ship directly to the purchaser such material as agent sells under this agency agreement.

MAE 060393

Principal shall pay agent a commission of five per cent (5%) of the gross selling price of all such proprietary plasticizers delivered upon orders or contracts obtained by agent during the period of this agency and accepted by principal.

Monsanto reserves the right to solicit business in competition with agent.

Agent shall not be paid any commission on sales to any "listed account" who becomes a bulk buyer before the end of the year immediately following the year during which agent first made a sale to such account.

All expenses incurred by agent in soliciting orders or obtaining sales such as traveling expenses, telephone, telegrams, office expense and payroll shall be borne by agent.

Principal shall pay agent his commission promptly on receipt from agent of the funds collected by it for Monsanto or receipt of the funds given Monsanto by agent in the event he has been unable to collect the sums due Monsanto within the stated period.

Neither principal nor agent shall assign this agreement or assign any money to become due hereunder and any such assignment shall be void unless previously agreed to by the other party.

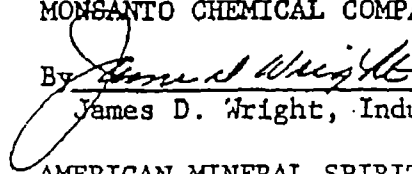
Signed at St. Louis, Missouri the day and year first above written.

ATTEST:

MAE 060394

MONSANTO CHEMICAL COMPANY

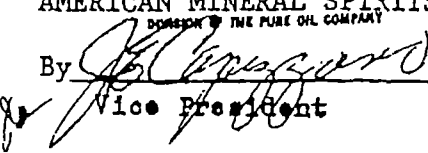
By


James D. Wright, Industry Sales Mgr.

ATTEST:

AMERICAN MINERAL SPIRITS COMPANY

By


Vice President

November 27, 1961

EXHIBIT A

TABLE I

Agency Agreement
with Monsanto Chemical

ATLANTA AREA

MAE 060395

MAE 060396

MAE 060397

EVERETT, MASS. AREA

MAE 060398

MAE 060399

MAE 060400

MAE 060401

NEW YORK AREA

MAE 060402

MAE 060403

MAE 060404

MAE 060405

MAE 060406

MAE 060407

MAE 060408

TOWOLDMON0051627

MAE 060409

MAE 060410

WILMINGTON, DELAWARE AREA

MAE 060411

WJ. 5. 11. 11.

MAE 060412

←

→

MAE 060413

MAE 060414

April 29, 1970 meeting - Schalk says
some address list on road for.

May 25, 1970 letter (for Schalk
to Home, 5-3-73), namely:

American Mineral Products Co., N.Y., N.Y.

Central Solvents - Chemical Co.
Chicago, Ill.

East Portland Chemical Co.
Portland, Ore.

Lab Chemical Co.
Chicago, Ill.

MAE 060445



MAY 26 1970

bcc: G. W. Buhrmann
E. H. Fording - New York
R. V. Johnson
F. M. Lockett - Chicago
W. B. Papageorge
→ P. S. Park
W. E. Schalk/J. E. Springgate

W. F. Waychoff
J. D. Wright
May 25, 1970

Mr. E. M. Toby, President
American Mineral Spirits Company
Division of Union Oil of California
1345 Avenue of the Americas
New York, New York 10019

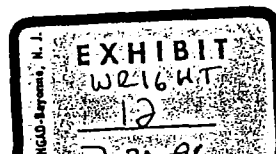
Dear Mr. Toby:

You have received previous communications from us regarding the allegations that certain polychlorinated biphenyls (PCBs) had been found in the environment and were contaminants. Since that time, other reports concerning PCBs have been published. An examination of the PCB matter now indicates that their use in modifier and plasticizer applications may be a source of the alleged environmental contamination.

Monsanto has sold PCB-containing materials under the trade name of Aroclor[®]. These Aroclors[®] included:

Aroclor[®] 1232
Aroclor[®] 1242
Aroclor[®] 1248
Aroclor[®] 1254
Aroclor[®] 1260
Aroclor[®] 1262
Aroclor[®] 1268
Aroclor[®] 4465
Aroclor[®] 1100 Series
Montar[®] 1

Toluene or xylene blends of the above products also contained PCB.



MAE 060453

TOWOLDMON0051637

Mr. E. M. Toby

-2-

May 25, 1970

In review of the allegations which have been made concerning PCBs, and being a concerned and responsible member of the world community, we have come to a decision to discontinue the sale of the above PCB-containing products for modifier and plasticizer applications effective August 30, 1970.

We will notify our direct customers using the above products of this decision by June 1, 1970. As a distributor of these products, it would seem appropriate that you follow the same course of action at as early a date as is feasible. A record should be kept of all customers notified, along with the dates on which the letters were transmitted.

Recognizing that this action will result in considerable effort to define replacement products on your part and on the part of your customers, we have prepared data sheets outlining suggested alternatives for most applications. Copies of these sheets for your use and for the use of your customers will be sent to you and to your regional offices prior to June 1. Additional copies may be obtained from the appropriate Monsanto regional office. A list of these sales offices is enclosed with this letter.

We regret the work that this action will create for you. However, as a responsible supplier, we feel that we have a duty to keep our customers informed on matters concerning the safe handling and use of our products. We appreciate your support in this matter. As in the past, we stand ready to assist you in any way possible.

Very truly yours,

W. E. Schalk
Director of Sales
Plasticizers

/dbw

MAE 060454

TOWOLDMON0051638

P. W. Gann - B2SF

May 9, 1973

PCB Warning Letter, August 14, 1970
By Schalk

Memo to File

This warning letter was sent to the following four distributors:

E. M. Toby, President
American Mineral Spirits Co.
Division of Union Oil of California
1345 Avenue of the Americas
New York, New York 10019

Mr. Carl Giloth
Central Solvents & Chemical Co.
2540 West Fluornoy Street
Chicago, Illinois 60612

Mr. W. C. McCall, President
Great Western Chemical Co.
3720 North West Yeon Ave.
Portland, Oregon 97210

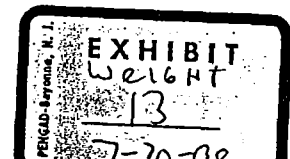
Mr. C. J. Turriff, President
Tab Chemical Co.
4801 South Austin
Chicago, Illinois 60638

This is the same list as used in May 25, 1970 letter.

P. W. Gann

/mc

MAE 060455



Monsanto

ORGANIC CHEMICALS DIVISION

Monsanto Company
800 N. Lindbergh Boulevard
St. Louis, Missouri 63166
Phone: (314) 694-1000

August 14, 1970

Dear Sir:

During the week of August 10, 1970, Monsanto is sending to all its direct customers for Aroclors in plasticizer/modifier application 1) a letter summarizing the latest information on PCBs, and 2) the most recent Aroclor technical bulletin. This bulletin replaces and supercedes O/PL-306 - Aroclor Plasticizers. In as much as some important information concerning recent FDA actions and changes to Monsanto's returned goods policy are discussed, we strongly urge you to forward copies of this bulletin and a letter to your Aroclor customers. Copies of both have been enclosed for your use.

The change in returned goods policy for our direct customers involves a two month extension of the deadlines for returning material to Monsanto. The same two month extension will apply to our distributors. A copy of our revised returned goods policy is attached.

We realize that this additional communication provides an added workload for your people. However, in view of the importance of this matter, we feel it is necessary for you as our distributor to assist in this matter.

Very respectfully,



Walter E. Schalk
Director of Sales
Plasticizers

/dbw



MAE 060487

TOWOLDMON0051642

GENERAL POLICY CONCERNING DISTRIBUTORS'
RETURN OF AROCLORS*

1. The following policy will be in effect covering returned goods:
 - a. If unopened containers purchased after September, 1969 are returned to the Sauget, Illinois plant or the Anniston, Alabama plant prior to 10/31/70, 100% of the net purchase price will be allowed for the returned goods. No additional handling charges will be assessed. Freight from distributor's warehouse will be paid by Monsanto at truckload rates.
 - b. If unopened containers purchased after September, 1969 are returned to the Sauget, Illinois plant or the Anniston, Alabama plant prior to 12/31/70, 90% credit will be allowed for the returned goods. No additional handling charges will be assessed. Freight will be paid by the distributor.
 - c. If unopened containers purchased after September, 1969 are returned to the Sauget, Illinois plant or the Anniston, Alabama plant prior to 2/28/71, 50% credit will be allowed for the returned goods. No additional handling charges will be assessed. Freight will be paid by the distributor.
2. Monsanto will accept orders through July 31, 1970 and will make every effort to meet these commitments and to complete shipment as of August 31, 1970. Monsanto reserves the right to limit shipments based on its production capabilities.

*Aroclors 1232, 1242, 1248, 1254, 1260, 1262, 1268, 4465, Montar 1, Toluene/Xylene blends.

Revised 8/14/70

MAE 060488

TOWOLDMON0051643

OUTGOING MESSAGE BLANK

Tele-Communications System

DATE

2-24-70

TIME

SENDER'S ACCOUNT NO.

2-00-721:33

INDICATE DESIRED SERVICE → ☐ FULL RATE ☐ DAY LETTER ☐ NIGHT LETTER

Names of addressee and sender must include initials. Show complete address for telegrams and cables.

BOOK MESSAGE

FEB 24 1970

R. N. Brell - Wilmington
E. H. Fording - New York
F. M. Luckett - Chicago
J. J. McNamara - Everett
E. C. Wilde - Akron

Yesterday we mailed the following to Presidents of Amsco and Central Solvents re PCBs:

1. Monsanto letter to distributor.
2. Suggested cover letter for distributor use in notifying customers.
3. Copy of letter to our direct customers.
4. Reprint of article from Chemical Week.

Due to similarity of letters 1 and 3, we addressed letter 3 to Presidents instead of 1. Bechtold contacting Amsco/ by phone. Corrected set being mailed today. You will receive corrected copy of letters 1 and 3 only. Apologies.
Cumming Paton - St. Louis

IN-IR
REV. 7-64

for BETTER service - Forward to transmitting operator IMMEDIATELY after preparation.

into

OUTGOING MESSAGE BLANK

Tele-Communications System

DATE

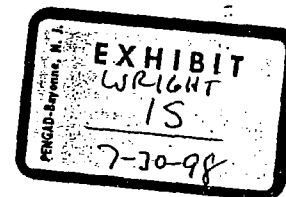
TIME

SENDER'S ACCOUNT NO.

INDICATE DESIRED SERVICE → ☐ FULL RATE ☐ DAY LETTER ☐ NIGHT LETTER

Names of addressee and sender must include initials. Show complete address for telegrams and cables.

cc: D. H. Bechtold - Chicago
R. V. Johnson
W. B. Papageorge
→ P. C. Park
W. F. Waychoff/W. E. Schalk
J. D. Wright



MAE 060614

IN-IR
REV. 7-64

for BETTER service - Forward to transmitting operator IMMEDIATELY after preparation.

S/N 493430

Phone 4-17-70
8:15 am

Mr. Neil Cronon

Ameco - Blumfield Hg

Phone 201-755-4868

Bill To. Birma Products Corp.
Ansil-Coustic Plaster
James Mill Road
Sayreville, N.J.

Stop-off - American Mineral Spirits Co.
350 Roosevelt
Eastert, N.J.

to local 3-500# lbs. Arden 4465
10-600# " " 1254

Final list
Sayreville, N.J.

240-	50#	Bay Arden	54.60
20-	600#	lbs Arden	1260 + 10% Tax
3-	375#	Monter	5

~~5000~~
~~102.0~~
~~Arden~~
~~Monter~~

MAE 060615

V
A/NB339/MY22/1052/1054/1/CH386/QZQ

WILLIS CLARK STLOUIS

RE UR MAY 14 MEMO WE PLAN TO NOTIFY THE FOLLOWING KEY ACCTS. THE WK OF
5-25.

AMSCO

THESE ARE ALL EITHER LARGE USERS OR SENSITIVES SITUATIONS

E H FORDING NY

MAE 060616

Monsanto

OUTGOING MESSAGE BLANK Telecommunications System	DATE 5/26/70	TIME 10:00 A.M.	SENDER'S ACCOUNT NO.
--	-----------------	--------------------	----------------------

INDICATE DESIRED SERVICE → ☐ FULL RATE ☐ DAY LETTER ☐ NIGHT LETTER

Names of addressee and sender must include initials. Show complete address for teletype and cable.

J. D. WRIGHT
ST. LOUIS

CC: ~~W. Clark~~ - St. Louis
C. V. Cook - Everett
J. H. Gannon - Everett

RE AROCLOR. OUR KEY ACCOUNT LIST FOR THOSE PCB'S BEING DISCONTINUED ARE:

AMSCO

MAE 060617

EACH SALESMAN WILL PERSONALLY CONTACT THEIR ACCOUNTS DURING WEEK OF 5/25 TO EXPLAIN SITUATION.

J. J. MC NAMARA - EVERETT

IN-IR
REV. 7-64

for BETTER service - Forward to transmitting operator IMMEDIATELY after preparation.

TOWOLDMON0051648

DICTATE IN SEQUENCE:

1. HEADING INFORMATION
2. NAMES OF ADDRESSEES
3. NAMES OF CARBONEES
- IMMEDIATE ACTION NEEDED
- REPORT ON CALL

REPORT CAPTIONS:

1. OBJECTIVE
2. PERSONS CONTACTED
3. RESULTS
4. ACTION REQUIRED

CUSTOMER NAME				DATE OF CALL	
CITY AND STATE				DATE RECEIVED	
, Penna.				6/8	
CUSTOMER MAILING LIST CHANGES - SERVICE CENTER USE ONLY					
NAME AND TITLE		PUT ON	TAKE OFF	MP	MAG
REGION		SERVICE CENTER		SALESMAN	
SE		Wilmington		E. G. McCabe/sm	

TO Willie Clark - St. Louis CC G. W. Buhrmann - SE

Contacted: Walter Stroebble - P. A.
Wayne Waters - Chief Chemist

Called with: Jim Bollinger - Amco Sales Rep.

Objective:

Discuss PCB containing Aroclors.

Results:

Reviewed our discontinuation of PCB containing Aroclors in complete detail and explained all related policy changes.

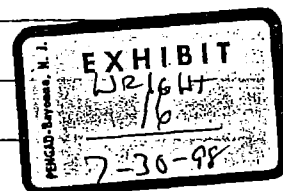
buys 100M lbs. per year or more of Aroclors. They buy primarily A-1254, 1260, 1262 for light construction industry.

I discussed our replacement recommendations in detail. However, they expressed concern regarding increased costs, and asked about the possibility of our supplying a blend. I explained the decision to do this would not be made for several months.

Bollinger, Amco, is arranging to give samples so they can begin reformulating. In the meantime, Stroebble indicated they will stock up as much as they can.

Future Action:

Coordinate with Amco to assure successful transition.



Monsanto

CALL REPORT - ORGANIC DIVISION

DICTATE IN SEQUENCE:

1. HEADING INFORMATION
2. NAMES OF ADDRESSEES
3. NAMES OF CARBONEES
4. IMMEDIATE ACTION NEEDED
- REPORT ON CALL

REPORT CAPTIONS:

1. OBJECTIVE
2. PERSONS CONTACTED
3. RESULTS
4. ACTION REQUIRED

CUSTOMER NAME		DATE OF CALL	
CITY AND STATE		DATE RECEIVED	DATE TYPED
N.Y.		6/24/70	7/6/70
CUSTOMER MAILING LIST CHANGES - SERVICE CENTER USE ONLY			
NAME AND TITLE	PUT ON	TAKE OFF	MP
REGION	SERVICE CENTER	SALESMAN	
	N.Y.	J.R. Bechtold/lr	

TO: Willis Clark ✓ CC: G. Berman J.A. Smoke
F.M. Lockett M.H. Fording
D.H. Bechtold J.R. Darby

CALLER: with Amsco Salesman

CONTACTED: Purchasing agent, Packaging Materials
Chemist, Product Manager for Packaging Materials, and
Group Staff Manager.

BACKGROUND:

Fred Schroeder, Regional Manager of Amsco specifically requested that I
call on this account to tell them of the discontinuation of TCP Aroclors.
used to be assistant buyer at and thus he and I
have been good friends for about a year. There was little doubt that
our relationship contributed to the call.

OBJECTIVE 1: DISCUSS ~~XXXX~~ DISCONTINUATION OF PCB AROCLORS

became somewhat emotional when I attempted to present the
facts behind our discontinuation of PCB's. As a matter of fact, I was
completely cut off and listened to an oration on how strong
their purchasing power is and that they buy quite a bit of
material from Monsanto and Amsco and that we should be prepared to suffer
the consequences unless we can store indefinitely for their
requirements of 10,000 pounds per year of Aroclor 1254. came
to bat with us and told us not to worry about the situation as it was a
purchasing problem and he could handle it ably.

I recommended a 2:1 blend of Aroclor 5460 to Aroclor 1221 as a replacement
for Aroclor 1254. Aroclor 1254 is used in combination with TCP and
Antimony Oxide in a plastisol application made for the U.S. government.

indicated that there was a government priority number involved but
with such a small amount of material in question there would be no
problem in replacing it to the best of his knowledge. pointed out
that Nevill Chemical had been in last week bad-mouthing Monsanto and their
discontinuation of PCB's. We are casually referred to as "the guys that
cut you off".

I brought up the subject of replacing TCP with S-140 and indicated
that they were already going in this direction. I asked him how they
arrived at this approach and they indicated that Stauffer had been in in
the last 2 weeks going over this approach with them. On my call yesterday



DICTATE IN SEQUENCE:

1. HEADING INFORMATION
2. NAMES OF ADDRESSEES
3. NAMES OF CARBONEES
4. IMMEDIATE ACTION NEEDED
- REPORT ON CALL

REPORT CAPTIONS:

1. OBJECTIVE
2. PERSONS CONTACTED
3. RESULTS
4. ACTION REQUIRED

CUSTOMER NAME					DATE OF CALL	
CITY AND STATE , N.Y.					DATE RECEIVED	DATE TYPED
CUSTOMER MAILING LIST CHANGES - SERVICE CENTER USE ONLY						
NAME AND TITLE				PUT ON	TAKE OFF	MP
REGION		SERVICE CENTER		SALESMAN		
				J.R. Baighol		

TO... CC...

Page 2

on Stauffer had also indicated that this was the approach to go in to .. ~~xxxxxx~~ Looks like they and I are encouraging customers to go in the exact direction that we want them to.

ATTENTION JAN SMOKE:

Jan, I guess that you should ~~xxx~~ call on directly. The only potential available, which I can see at this account, is DOP & TCP. Amco currently has the TCP business in drums and I am not quite sure who has the DOP.

701153110

CALL REPORT - CARBONIC BATTERIES

DICTATE IN SEQUENCE:

1. HEADING INFORMATION
2. NAMES OF ADDRESSEES
3. NAMES OF CARBONEES
4. IMMEDIATE ACTION NEEDED
REPORT ON CALL

REPORT CAPTIONS:

1. OBJECTIVE
2. PERSONS CONTACTED
3. RESULTS
4. ACTION REQUIRED

CUSTOMER NAME 		DATE OF CALL 7	
NEW YORK		DATE RECEIVED 6/26/70	DATE TYPED 6/28/70
CUSTOMER MAILING LIST CHANGES - SERVICE CENTER USE ONLY			
NAME AND TITLE	PUT ON	TAKE OFF	MP
REGION New York	SERVICE CENTER	SALESMAN J. K. Beightol/sb	

TO: Willis Clark

CC: G. W. Spears - St. Louis
D. H. Bechtold - Chicago
J. M. Luckett - Chicago
E. H. Fording - New York
J. R. Darby - Queeny

Joint call with Jim Cally, Amaco

CONTACTED:

Cecil Murphy - Owner
Bert Murphy - Owner

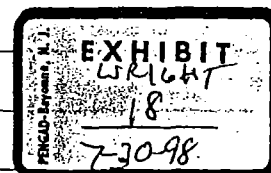
OBJECTIVE:

Discuss PCB discontinuation, emphasizing that 5460, 5442, and 5060 will not be involved whatsoever purchases about 50,000 lbs. per year of Aroclor 5460 and 1221 and the two phosgards were discussed as possible replacements for Aroclor 1254 and 1260. Current PCBs are used in polyvinyl acetate emulsions, SBR and acrylic adhesives. Plasticizer are currently purchased through Stony Mueller and Peerless. Somewhere between 100,000 and 200,000 lbs. per year of TCP are purchased by

RESULTS:

Results on this call were sensational as we got a 25 drum Aroclor 1254 and 25 drum ~~XXXX~~ Aroclor 1260 order. Accompanied with this, we got a plant trial via one drum of Aroclor 1221, two drums of Santicizer 140, and two drums of Santicizer 148. Both 140 and S-148 will receive undivided attention to replace TCP.

Jim Beightol



DICTATE IN SEQUENCE:

1. HEADING INFORMATION
2. NAMES OF ADDRESSEES
3. NAMES OF CARBONEES
4. IMMEDIATE ACTION NEEDED
5. REPORT ON CALL

REPORT CAPTIONS:

1. OBJECTIVE
2. PERSONS CONTACTED
3. RESULTS
4. ACTION REQUIRED

TO MR. W. S. CLARK
ST. LOUIS

CC

CONTACTED: Mr. , Chemist - Mr. , P.A.

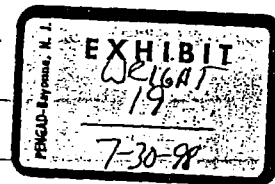
PURPOSE OF CALL:

Joint call with AMSCO salesman to discuss replacement of Aroclor 1262.

RESULTS :

manufactures " " lubricating oil for automobiles. They use the Aroclor 1262 as an additive to such lubricating oil to improve heat stability and chemical resistance. They have used this product for 30 years with tremendous success and feel there is no real equivalent on the market place, including Chlorinated Paraffins. They purchase approximately 60,000 lbs. of Aroclor 1262 per year through AMSCO. I recommended that they test Aroclor 5442 as a close substitute for the Aroclor 1262, and also test blends of Aroclor 5460 and 1221. Samples are being rushed and this customer will make a decision whether to stock up additional inventory to cover their needs following determination date of August 30.

CUSTOMER NAME <i>af</i> [REDACTED]		DATE OF CALL 7/1/70	
CITY AND STATE [REDACTED], MASSACHUSETTS		DATE RECEIVED 7/2/70	DATE TYPED 7/7/70
CUSTOMER MAILING LIST CHANGES - SERVICE CENTER USE ONLY			
NAME AND TITLE	PUT ON	TAKE OFF	MP MAG CATEGORY CODES
REGION NORTHEAST	SERVICE CENTER Everett	SALESMAN J.H. Gannon/lms	



Monsanto

CALL REPORT - ORGANIC DIVISION

DICTATE IN SEQUENCE:

1. HEADING INFORMATION
2. NAMES OF ADDRESSEES
3. NAMES OF CARBONEES
- IMMEDIATE ACTION NEEDED
- REPORT ON CALL

REPORT CAPTIONS:

1. OBJECTIVE
2. PERSONS CONTACTED
3. RESULTS
4. ACTION REQUIRED

CUSTOMER NAME		DATE OF CALL	
CITY AND STATE		DATE RECEIVED	DATE TYPED
Md.		7/28	7/29
CUSTOMER MAILING LIST CHANGES - SERVICE CENTER USE ONLY			
NAME AND TITLE	PUT ON	TAKE OFF	MP
REGION	SERVICE CENTER	SALESMAN	
SE	Wilmington	E. G. McCabe/sm	

TO W. S. Clark - St. Louis CC

Contacted: - Tech. Director
- Chemist

Called with: Nelson Bock - Amsco Salesman

Objective:

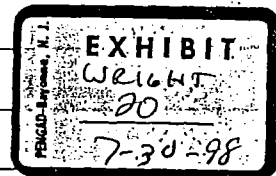
Discuss Aroclor discontinuation.

Results:

produces polysulfide sealants and caulks for light construction, using about 10,000 lbs. aroclor 1254 per year at most. They have purchased a year's supply of Aroclor to be used during reformulation.

Future Action:

- (1) Send samples of S-261, 679, 148 and 213.
- (2) Follow up thru Nelson Bock.



Pricing information for the two fluids is as follows:

<u>Quantity</u>	<u>T-55</u>	<u>T-66</u>
1 - 4	\$1.05/gal.	\$3.35/gal.
5 - 39	.975/gal.	3.20/gal.

Drum Size

Gallons	54	55
Pounds	400 # net	460 # net

FOB Point	Alvin, Texas	Anniston, Ala.
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Please call should you have additional questions.

Very truly yours,

J. J. Roder
Product Supervisor
Heat Transfer Fluids

os

MAE 060655

bcc C. Paton/D. E. Roush
B2SD ~~F. W. Gann~~
1800 D. R. Hansen
1800 C. Boutin

January 10, 1972

Amoco Division
Union Oil Company
P.O. Box 727
La Mirada, Calif. 90638

Attention Mr. W. Taipale

Dear Mr. Taipale:

As discussed by telephone we wish to confirm our suggestion of either Therminol 55 or 66 as a replacement for your Therminol FR-1 system.

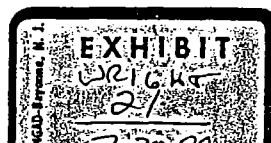
We suggest that the Therminol FR-1 system be drained completely. Residue FR-1 can cause decomposition of the new fluid. A solvent flush with acetone or xylol is one method to remove residual FR-1 or you could use Therminol 55 for the same purpose. The use of Therminol 55 would permit operation at normal operating temperature for a couple weeks prior to refilling with a new charge of either T-55 or T-66.

Both the used FR-1 and flush fluid should be drummed and tightly sealed for return to Monsanto for disposal. We will pay the return freight and disposal cost. We will give return instructions on request.

We suggest that this conversion from Therminol FR-1 be reviewed with your insurance company because neither T-55 nor T-66 is fire resistant. It may be necessary to install sprinklers, heater snuffers, or other protective devices.

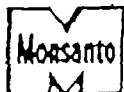
It is also important to protect both T-55 and T-66 from oxidation caused by air contact in the vapor space of the expansion tank. Either an inert gas blanket or cold seal tank as shown in the attached literature would be helpful.

REC'D JAN 10 1972



MAE 060654

TOWOLDMON0051662



Monsanto
C O M P A N Y

Anniston, Alabama 36202
Phone: (205) 236-6331

LABORATORY TEST REPORT

PRODUCT: Aroclor 1248

To: American Mineral Spirits
At: Carteret, N. J.
Customer's Order No. _____

Lot No: AI-15
Container: _____
Date Shipped: _____

PROPERTY

RESULT

Specific Gravity @ 65°C

1.414

Acid No.

0.001

Color

20

Moisture, ppm

29

Viscosity, SUS

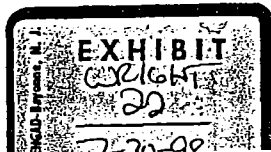
77.6

Condition

Clear

/dp
10/30/67

An 10



G. W. Miller
G. W. Miller - Plant Chief Chemist

MAE 060723

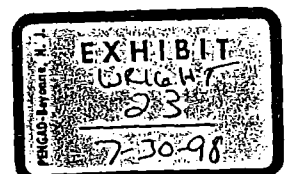
TOWOLDMON0051664

Arcola 1248 Tot AI-15
1254 AI-35

American Mineral Spirits
350 Roosevelt Drive.
CARTER. N.J.
Attn. Mr. Mike
MATICKIE.

Call received
by J. H. M.
10-30-67

MAE 060724



December 15, 1967

Mr. M. J. Matheke
American Mineral Spirits Company
3100 South Meacham Road
Palatine, Illinois 60067

Dear Mr. Matheke:

Mr. Brell of our New York office has asked me to
reply to your letter of December 6.

The product classification chart accompanying your
letter was filled out with the pencil notations when
I received it. I don't know who entered the check
marks and the notations. We in the Medical Department
did provide answers as shown on the lower half of
the sheet. The information on Aroclor 1242 is based
on published and unpublished data and our own experience
or history of use. The comments on n-butyl acetate
are based on literature references.

If I can be of any further assistance, please
let me know.

Very truly yours,

Elmer P. Wheeler
Manager, Environmental Health
Medical Department

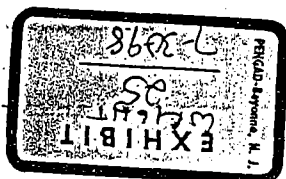
EPW:cjs

cc: R. N. Brell - New York



MAE 060726

PRODUCT	IRRITANT, SENSITIZER, CARCINOGEN						TOXIC POTENTIAL AND EFFECT ON EYES								FLAMMABILITY AND PRESSURE GENERATING POTENTIAL		
	SPI CLASSIFICATION						IF SWALLOWED		IF INHALED		IF ABSORBED THROUGH SKIN		EFFECT ON EYES		very flammable	flammable	pressure generating
	1	2	3	4	5	6	poison	harmful	poison	harmful	poison	harmful	causes severe burns	causes eye irrit.			
1. Aroclor 1242	✓							✓		✓							
2. n-Butyl Acetate	✓							✓		✓		✓					
Aroclor 1242		X						X		X		X		X	No	No	No
Aroclor 1242 is not irritating to the skin by usual definition or SPI rating. It is a good solvent for normal fats and oils of the skin and repeated or prolonged skin contact will lead to drying and chapping. More important, excessive skin contact can result in absorption and possible subsequent systemic effects. The Monsanto label states: "Caution! Contains chlorinated hydrocarbons. Avoid prolonged breathing of vapors or mists. Avoid contact with eyes or prolonged contact with skin. If skin contact occurs, remove by washing with soap and water. Following eye contact flush with water. If clothing becomes soaked with fluid, launder before wearing again."																	
n-Butyl Acetate		X						X		X		?		X	?		?
MCA - LAFL Guide label states: "Caution! Keep away from heat and open flame. Avoid prolonged breathing of vapor. Use with adequate ventilation. Avoid prolonged or repeated contact with skin."																	



FEB 13 1971

bcc: Jan Smoke - New York
Gil Buhmann - St. Louis
F. M. Lockett - Chicago
D. H. Bechtold - Chicago
E. H. Fording - New York

February 10, 1971

Mr. George Nietzel
American Mineral Spirits Company
14 Commerce Drive
Cranford, New Jersey 07016

Dear George:

It was like the good old days making a call with you at
in , New Jersey on Tuesday, February 2, 1971.
As we discussed, a communication problem did exist between
and Monsanto/Amsco in two areas:

- (1) Our discontinuation of PCB Aroclors.
- (2) Our new low color Aroclor 5460.

Hopefully, our joint call has resolved these problem areas and
we are back on first base with a good customer. Certainly with
your salesman's call frequency of twice per month what seemed to
be major problems today can be turned into opportunities.

George, opened the door very wide for us in terms
of Santicizer 140 replacing PCB with the current 4¢ per pound
differential in price. By picking up Santicizer 140 business
at you will also pick up solvent and alcohol business
for Amsco. I would like to review the Santicizer 140 potential
with you in about three months to see if we could make a contribution
at getting the business through Amsco.

Best regards,

James R. Beightel
Sales Representative
Organic Chemicals Division

JRB/lbh

