May 25, 1934

REPORT OF DR. FREDERICK B. FLINN OF PATCH TESTS
MADE ON MATERIAL RECEIVED FROM SWANN RESEARCH, INC.

The object of this investigation was to determine whether or not the various chlorinated diphenyl compounds submitted or some impurities contained therein might be the causative agent producing the dermatitis which had developed among some of the workmen in the plant.

Large white rabbits were used in making the patch tests to determine the action of the various materials submitted on the skin. The procedure was to shave the animal 36 hours before the patch was applied so that there would be no broken skin to interfere with or to aggravate the test. The material being tested was mixed with ethyl alcohol, either getting a solution or a suspension for the purpose of diluting the material. The patch was left on for various periods during the tests -- some for 24 hours, others for 48 hours. The patch was then removed and the exposed area watched for two weeks to be sure that the test was negative. This was done to avoid the chance of not observing any latent or delayed action such as do sometimes take place in making patch tests. For our own information the materials which were negative were applied in a concentrated form in duplicate tests to see if a dermatitis might not develop under these circumstances.

Eight independent tests were made with each material and were made on different days with freshly prepared solutions to be sure that no error had crept in. Controlled tests were made each time with the alcohol and gauzes used to determine whether they might not be the causative agent causing the observed lesions.

Given below is Dr. Flinn's report, showing designations given the various materials by Swann Research followed by Dr. Flinn's designation and report of each specific material:

Aroclor 1262 (Lot 3, made before 3/1/33).

Aroclor 1262, Lot 3:-- All eight tests were negative. The two tests with concentrated material were also negative. An intradermal test was negative.

Aroclor 1262 (Lot Notebook No. 176, page 121; prepared by Harris of 94.5% diphenyl and 4.5% styrene and styrene high boiler:

Aroclor 1262, Lot Notebook 176, page 121, was negative to all tests including the concentrated and intradermal.

MONS 062172

Aroclor Special (Lot Notebook No. 192, page 9; prepared by Hubbard, of 75% diphenyl and 25% styrene and styrene high boiler). (Liquid Aroclor, specific gravity = 1.53).

Aroclor Special Notebook No. 192, page 9:- This chemical gave a positive test with each of the eight applications. It also gave a positive reaction with the intradermal test. The type of dermatitis was mild.

Aroclor 1248 (Lot 9, made 3/30/34):

Aroclor 1248, Lot 9: All eight tests gave a positive reaction. The intradermal test was also positive. The reaction was mild.

Aroclor 1248 (Lot 5, made 5/2/33):

Aroclor 1248, Lot 5 All eight tests gave a positive reaction with this compound. The intradermal test was also positive. I feel that the dermatitis produced by this material was milder than the two previous compounds which were also found to be positive. In several tests it did not make its appearance for 24 hours after the patch had been removed.

Aroclor 1269 (Lot 3, Dry Ground; made 6/22/32):

Aroclor 1269, Lot 3, ground dry: All eight tests were negative. The same is true of the two tests made with the concentrated material. The intradermal test gave negative reaction.

Aroclor 1269 (Lot Notebook No. 176, page 121; prepared by Harris, of 95.5% diphenyl and 4.5% styrene and styrene high boilor - dry ground):

Aroclor 1269. Lot Notebook 176, page 121, dry ground: All eight tests were negative. The concentrated tests were also negative. The intradermal test gave negative reaction.

Aroclor 1269 (Lote Notebook No. 176, page 121; same as immediately above but wet ground)

Aroclor 1269, Lot Notebook 176, page 121, wet ground: All eight tests were negative. The two tests made with concentrated material were also negative. The intradermal test gave a negative reaction.

Aroclor 1269, Lot 3, Notebook No. 192, page 10 (dry ground in pebble mill):

Aroclor 1269, Lot 3, Notebook No. 192, page 10: The eight patch tests were negative. The tests made with concentrated material were also negative. The intradermal tests gave a negative reaction.

Halowax #1000:

Halowax 1000: This compound gave a positive test in all of the eight tests in which it was applied. The reaction was different from that of the three Aroclors giving a positive reaction. They were mild, but this material gave an ulcerative area.

Halowax #1001:

Halowax 1001: All tests with this compound, both concentrated and dilute, were negative.

Halowax #1004:

Halowax 1004: All tests with this material, both concentrated and dilute, were negative.

Styrene Dichloride (Notebook No. 192, page 16):

Styrene Dichloride: Notebook 192, page 16: Every test made with this material was positive. It was noticed that the rabbit pulled away when this chemical was applied even in the dilute form. This also gave an ulcerative lesion.

Aroclor 1248 Special (Batch 8, Sample 04 - made 10/4/30):

Aroclor 1248 Special Batch 8-0-4. Made 10/4/30: This Aroclor gave a very slight reaction with the skin but one must say that it is positive.

Aroclor 1260 (Lot 32, made 6/23/31):

Aroclor 1260. Lot 32. Made 6/23/31): All eight tests were negative. No intradermal or concentrated tests were made.

Aroclor 1262 (Batch 8A, Sample J.L-6, Made 7/8/30):

Aroclor 1262. Batch 8A. Made 7/8/30: All tests were negative.

Chlor Ethyl Benzene (Notebook No. 192, page 21):

Chlor ethyl benzene. Notebook 192, page 21: Every test made with this material gave a positive test. The lesion was of an ulcerative type.

Chlorinated Styrene (Notebook No. 192, page 19 - 5/16/34):

Chlorinated Styrene. Notebook 192, page 19. 5/16/34: Every test made with this compound gave an ulcerative lesion.

MONS 062174

Dr. Flinn's comments are copied verbatim, as follows:

"Comments:

One is impressed with the fact that each of the Aroclors giving a positive reaction were of a fluid nature. Attempts were made to expose the animals to vapors but observations made us conclude that the only difference was that the animal would be exposed to the hot material and it was well known that the reaction where such an exposure is given is more severe.

One cannot but feel that any styrene compound which may be found to be present as an impurity is the cause of your trouble. I was rather surprised that more of the compounds submitted did not show or give reactions with the skin. It has been shown in some investigations that chlorine did not produce a dermatitis when metallic electrodes were used but did if the metallic electrodes were replaced by carbon electrodes. The theory was advanced that some organic chlorine compounds were produced in the latter case.

I would suggest that you study your ventilation system in places where fumes are given off. That means be provided for the men to take a bath with soap and water if they come in contact with the type of material found to be positive. By this I mean if a leak or spillage occurs. The immediate bathing under these circumstances should be insisted on. I found that where I had gotten the material on my hands if I washed them thoroughly no trouble arose.

(Signed) Frederick B. Flinn