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UNITED STATES DISTRICT COURT,
FOR THE DISTRICT OF NEW JERSEY

EUGENE MALIKO, et al	)	
Plaintiffs,	)	Civil No. 76-1533
vs.	)	SUPPLEMENTAL INTERROGATORIES
MONSANTO COMPANY, etc.	)	
Defendants	)	

TO: PITNEY, HARDIN & KIPP, ESQS.,
Attorneys for deft. Union Carbide
163 Madison Ave.,
Morristown, N.J. 07960

SIRS:

The plaintiffs desire of the defendants answers to the following Supplemental Interrogatories under oath within the time prescribed by law:

1. Set forth the precise chemical formula of each vinyl resin which was shipped by this defendant to the OTD or ATC between 1960 and 1974.

During the period 1964-1976 Union Carbide produced 171 varieties of vinyl chloride resin. It is not possible to give the precise chemical formula of each such resin because vinyl resins are not precise chemical compounds in the normal sense; they are collections of molecules of varying sizes and compositions. Polyvinyl Chloride Homopolymer is generally represented as: (See Rider Attached).

RNW 0433

2. Set forth the amount in total tonage on a weekly or monthly basis that was shipped.

(See Rider Attached)

3. As to each vinyl resin shipped, state the actual measurements (GC-MS) indicating unconverted monomer concentrations in the resin particles on a weight parts per million weight parts of resin basis (for example, 1,2,100, or 1000 ppm.)

Reliable methods of determining ppm levels in resin were not developed until 1971 and were not used widely until 1974. However, no analytical data on each of the 171 resins which contained vinyl chloride and which were produced by Union Carbide during the period 1964-1976 was recorded. Also, samples of these products which are in the possession of Union Carbide do not reveal the actual measurements of unconverted monomer concentrations as those concentrations existed at the time of shipment. Therefore, it is not possible to answer this interrogatory.

4. In answer to Interrogatory 6 of the original interrogatories, defendant first set down under "I" that "these resins are essentially free of unconverted monomers, solvents and water soluble components." What does the defendant mean as to the word "essentially free" in terms of actual amounts of existing unconverted monomers.

Essentially free of unconverted vinyl chloride monomer means less than 1 ppm. Other monomers and solvents are less than 0.1% total as produced.

5. This defendant under Rider to Interrogatories II stated that "These resins are free of unconverted monomer and water soluble components. They differ from Item I in process and higher degree of polymerization." Set forth the precise amount, if any, of unconverted monomer as to the nonsolvent vinyl resins.

Non-solvent vinyl resins contain approximately 4ppm vinyl chloride monomer when produced. This drops very rapidly so that within a few days none is detectable.

RNW 0434

6. As to Rider to Interrogatories III, Dispersion PVC resins, the defendant has again states that these resins are "essentially free of unconverted monomer. Set forth the precise concentration of monomer in the resin particles.

Again, as is the case with solvent vinyl resins, residual vinyl chloride monomer is less than lppm by weight.

7. As to Rider to Interrogatories IV, the defendant in referring to suspension vinyl resins (polyvinyl chloride and polyvinyl chloride/vinyl acetate) has used the word "relatively high" in reference to monomer concentration. What is meant generally by "relatively" in terms of concentration mathematically stated.

Current levels of residual monomer (VCM) concentrations are lppm to 3207ppm in suspension vinyl resins.

8. As to Rider to Interrogatories V, the defendant again has used the word "relatively high" in connection with residual free monomer in resin. What is meant in mathematical terms by resin relatively high in terms of concentration.

Union Carbide has no measurements on these materials because it does not produce them. The use of the phrase "relatively high" in part of the answer to Interrogatory 6 was intended to convey that residual free monomer in these products exceeded 1000ppm.

9. Does this defendant maintain in its laboratory, ie, the laboratory working with these specific chemical products any fixed mathematical standards relating to concentration when they refer to words as "relatively, relatively high, essentially free," or any other nomenclature.

No. During the period 1960-1974 very few measurements were available for actual data; thus, Union Carbide tried to indicate general levels in its answers to Interrogatories.

RNW 0435

10. Set forth all the nomenclature used by its laboratories to correlate or equate descriptive words with actual concentration to describe the contents mathematically.

Union Carbide objects to this interrogatory as being too vague and unclear to be capable of a response. Notwithstanding that objection, but without waiving same, Union Carbide answers as follows. The only meaningful description in general use by the Union Carbide laboratories is "essentially free", which means little visible or measureable by methods then in use.

11. Defendant has stated in its answers to original Interrogatories that it shipped PVC to ATC in powdered form, in bulk and bags. Was this powdered form referred to commonly by the defendant as suspension PVC.

No. Suspension vinyl resin was one of a group of white powders shipped to ATC during the period 1960-1974; it was not the only powder.

12. Did the suspension form PVC contain free monomer and if so, set forth the amount of free monomer and actual concentration in the products in mathematical form.

Union Carbide did not begin measuring the suspension polyvinyl chloride which was shipped to ATC until 1975. Therefore, it cannot answer the interrogatory.

13. Answer #28 to the original Interrogatories reflect that the resin shipped in bulk by the defendant corporation to the plaintiff employer was largely suspension PVC. Describe the precise manner in which this product was shipped, ie in open railroad cars, in open or closed containers and set forth in detail the size of the containers, dimensions, weight and closure of the containers.

(See Rider Attached)

RNW 0436

14. Set forth the label on these containers.

The labels consisted of paper board tags attached to the discharge opening, showing the resin variety (example: Solvent Vinyl Resin), the resin type (example: VYHA) and the blend number (example: B-1428). Shipping papers and correspondence between the defendant and ATC showed this data and the van box number.

15. Did these containers have any other labels between the years 1960 and 1974 indicating "For Industry Use Only" and if so, set forth precisely either by attaching hereto or totally describing the color, size, lettering, etc. on the label used.

Union Carbide assumes that the "containers" referred to in the interrogatory are the aluminum van boxes discussed in its answer to Interrogatory 13. No other labels were attached to those containers during the years 1960 and 1974. With the implementation of the OSHA Vinyl Chloride Standard in April, 1975, the warning labels required by the Standard (and as described in the Standard) were attached to the aluminum van boxes which contained non-solvent and suspension resins.

16. The defendant has attached a form of Material Safety Data sheet by way of answers to interrogatories 33 and 48 specifying in detail that material safety data sheet to each form of PVC which was shipped by this defendant to the plaintiffs' employer correlating the name of each product with the Material Safety Data Sheet. Set forth as to the information required on the Material Safety Data sheet which would accompany each formula and describe in detail the formula to which this Material Safety Data sheet applies.

Union Carbide objects to this interrogatory as being too vague and unclear to be capable of a response. Notwithstanding that objection, but without waiving same, Union Carbide answers as follows. The Material Safety Data sheets & Product Standards provided in previous interrogatories were intended to represent the general data provided to customers. As stated in previous answers, during the period 1964-1976 Union Carbide produced 171 varieties of vinyl chloride resin. Material Safety Data sheets were initiated in 1970 and do not exist for all these products. Additional copies of Safety Data sheets will be provided if available.

17. Did the PVC suspension to which this defendant referred as being shipped by the defendant corporation to the plaintiffs' employer have any toxic effect on human tissue.

The polyvinyl chloride suspension resin as well as all other vinyl resins shipped to ATC showed no known toxic effect on human tissue.

18. Was this product inflammable.

No, with the assumption that "this product" means polyvinyl chloride suspension resin.

19. Does this product give off any airborne dust.

Vinyl resin powders yield airborne dust if aerated or moved through air. None give off airborne dust spontaneously.

20. Did the airborne dust particles have any inherent danger to persons breathing same.

This interrogatory is improper in that it seeks expert opinion in a manner inconsistent with Rule 26(4)(A)(i) FRCP, which provides the sole means by which the opinions of experts may be obtained; i.e., through interrogatories requiring a party "to identify each person whom the * * * party expects to call as an expert witness at trial, to state the subject matter on which the expert is expected to testify, and to state the substance of the facts and *

21. When for the first time did this defendant corporation have reason to ascertain that there would be any danger to human health or life by being exposed to PVC chemical with free monomer.

(See Rider Attached)

* opinions to which the expert is expected to testify and a summary of the grounds for each opinion."

RNW 0438

22. How did the defendant obtain this information, ie by experience or by investigation or research.

See the Answer to Interrogatory 21.

23. Did this defendant have any knowledge of the hazards of PVC resin dust particles to animals any time subsequent to 1940 and if so, name the articles in which it first became familiar with such hazards either by ingestion of dust particles, acute toxicity or inhalation of monomers.

Union Carbide is aware that one study has concluded that PVC resin dust is harmful to animals, but Union Carbide's evaluation of that conclusion has not yet been finalized. That study is "Influence of PVC Dust on the Respiratory System in the Rat," by J. Popow (1969).

24. How did it become familiar with such hazards.

See the answer to Interrogatory 23.

25. The defendant has referred in its appendix to Interrogatories to a list of references and citations. Who in the defendant corporation was familiar with these cited references and set forth when and where read.

The list does not represent all published information, but it was chosen to provide a reference source. The Bibliography on Vinyl Chloride, dated May 22, 1974, and prepared by NIOSH, was included to aid the plaintiff. The papers on the list of References and Other Data Sources was studied by R. N. Wheeler in the course of his work for Union Carbide in vinyl chloride resin manufacture. They were also read by others in vinyl chloride resin research, engineering and manufacture.

26. Set forth what individual or collective conclusions were drawn and where recorded.

(See Rider Attached)

RNW 0439

27. Did these conclusions and recordations have any impact on the defendant corporation's attempt to either protect their workers from any health hazards in the processing or being exposed to PVC resins and or VCM chemicals.

(See Rider Attached)

28. Did this defendant require its own PVC resin workers and VCM employees in its plants to wear protective clothing and use self-contained breathing apparatus while on the job prior to 1974.

Union Carbide objects to this interrogatory on the same ground as it objects to Interrogatory 27. Notwithstanding this objection, but without waiving same, Union Carbide answers as follows. Protective clothing was provided from approximately 1968 onward but use was not mandatory. Employees entering unventilated spaces and tanks were required to use air supplied respirators if acute exposure was likely or if there was an absence of oxygen.

29. If the above is answered in the affirmative, set forth in detail the specific protective device used by the workers and the date of such use, and the name and address of the plant where it was put in use.

(See Rider Attached)

RNW 0440

30. What was the threshold limit value for VCM in ambient air that was in effect prior to 1974.

See the answer to Interrogatory 31.

31. Was this threshold limit value established by OSHA, FDA or EPA or any other and if so, set forth in detail that group or governmental body which established same as well as the date and number of regulations so established.

(See Rider Attached)

32. What relationship does the threshold limit value for VCM in air have with threshold limit value for VCM in the resin when the resin particle is exposed to ambient air.

This interrogatory is improper because it seeks expert opinion in a manner inconsistent with Rule 26(4)(A)(i), FRCP, as discussed in Union Carbide's objection to Interrogatory 20.

33. Explain fully the term ppm of VCM in a resin particle as shipped in bulk or bags.

The full term is ppm by weight of vinyl chloride. At a one ppm level there would be one pound of vinyl chloride contained in one million pounds of resin.

34. What do the units represent in the ppm term, physically and chemically.

Ppm does not have units. It is a dimensionless ratio similar to percentage.

RNW 0441

35. What does the ppm term mean when used for ambient air.

By convention gases are analyzed volumetrically; thus, 1 ppm in ambient air is 1 volume per million volumes. A volume in this case may be milliliters, cubic feet or other volumetric measurement.

36. What are the units and what physical and chemical interpretation is associated with the units of ppm for ambient air that has been polluted with VCM gas.

This interrogatory is improper because it seeks expert opinion in a manner inconsistent with Rule 26(4)(A)(i), FRCP, as discussed in Union Carbide's objection to Interrogatory 20.

37. What is the conversion factor for ppm (air) in order to obtain the equivalent in mg/m³ (milligrams per meter cubed).

1 x 1000 / 22.400

$$\text{mg/m}^3 = \frac{62.5}{24.04} \times \text{ppm}$$

100 x 100 x 100
100,000

If temperature departs significantly from 20°C and pressure from 760 mm Hg, then corrections must be made if extreme accuracy is needed.

38. If you take a pound each of resin dust which the defendant has admitted shipping in bulk or bag to ATC and which the defendant further stated contained either relatively high unconverted monomer or relatively little and containerize them in individually, hermetically sealed glass bottles with an air head-space, describe fully what happens to the residual free monomer in each bottle over the course of time extending to several weeks or months.

This interrogatory is improper because it seeks expert opinion in a manner inconsistent with Rule 26(4)(A)(i), FRCP, as discussed in Union Carbide's objection to Interrogatory 20.

39. In relation to the defendant's response to question 38, specifically what role does each of the following items have on the destiny of VCM in the bottle.

(a) initial residual free monomer concentration in the resin.

(b) temperature effects including elevated temperatures and ignition temperature.

(c) volume of head-space to volume of resin.

(d) type of polymeric resin

(e) effective mass diffusion coefficient for VCM in the resin.

(f) resin particle size, shape and microvoid porosity.

RNW 0443

(g) state of agitation of the particles in the bottles.

(h) chemisorption, sorption, dissolution, Henry's Law, etc.

This interrogatory is improper because it seeks expert opinion in a manner inconsistent with Rule 26(4)(A)(i), FRCP, as discussed in Union Carbide's objection to Interrogatory 20.

40. Regarding the bottle process in question #38, set forth how VCI in the resin and VCM in the head-space of the bottle are measured experimentally.

This interrogatory is improper because it seeks expert opinion in a manner inconsistent with Rule 26(4)(A)(i), FRCP, as discussed in Union Carbide's objection to Interrogatory 20.

41. What instruments and/or wet chemistry analytical methods are used for the measurements, also indicate what controls are run.

This interrogatory is improper because it seeks expert opinion in a manner inconsistent with Rule 26(4)(A)(i), FRCP, as discussed in Union Carbide's objection to Interrogatory 20.

RNW 0444

42. Set forth what are the instruments' sensitivity, calibration factors.

This interrogatory is improper because it seeks expert opinion in a manner inconsistent with Rule 26(4)(A)(i), FRCP, as discussed in Union Carbide's objection to Interrogatory 20.

43. Did the defendant have knowledge of or access to a gas chromatography-Mass Spectrometer instrument prior to 1974.

Yes, Union Carbide had possession of a gas chromatography-Mass Spectrometer instrument prior to 1974.

RNW 0445

44. With respect to questions 30 through 43, inclusively, set for your response to each individual question as to the information sought for the individual chemicals associated with plasticizers, surfactants, solvents, water soluble components, etc. which were used in the manufacturing of the subject resins.

Union Carbide objects to this interrogatory as being improper on several grounds: (1) with regard to Interrogatories 32, 36 and 38 through 42, the plaintiffs are seeking expert opinion in a manner inconsistent with Rule 26(4)(A)(i), FRCP; (2) as stated in previous answers, Union Carbide produced 171 varieties of vinyl chloride resin during 1964-1976; this interrogatory now appears to seek extensive information for each of these resins and the various components thereof, which is extremely burdensome and constitutes harassment upon Union Carbide; and (3) the interrogatory is too vague and unclear to be capable of a response.

45. With response to the PVC resins and any VCM monomers if any, set forth all toxicological studies associated with the subject resins and (a) what tests were conducted if any (b) were only animals used for such tests (c) were the test animals (and/or humans) specifically subjected to the effects of ingested resin dust particles as inhaled or swallowed, (d) were the test animals subjected to varying levels of VCM in ambient air that is inhaled under controlled conditions (e) what were the levels of residual free VCM in the resins that were ingested by the test animals and (f) what were the specific findings from these kinds of tests.

Union Carbide assumes that this interrogatory seeks information contained within those papers listed in the list of References and Other Data Sources attached to Union Carbide's answers to the first set of Interrogatories. That information can be determined by a reading of the papers by the plaintiffs, their attorneys or their experts and it is improper, burdensome and harassing to request Union Carbide to provide this information.

46. Set forth all compounds and chemicals used in the formulation of PVC resins that were shipped to ATC and OTD giving the period of time during which such products were shipped.

The vinyl chloride resins shipped to ATC and OTD during the period 1960 to 1974 were unformulated. Plasticizers, stabilizers, colorants, lubricants and other materials were added by fabricators to whom OTD and ATC shipped the resins.

47. Set forth how it was prepared starting with the original chemical.

See the answer to Interrogatory 46.

48. What products or products resulted therefrom.

See the answer to Interrogatory 46.

49. What intermediate products resulted.

See the answer to Interrogatory 46.

50. What was the complete chemical breakdown qualitatively and quantitatively of PVC resins manufactured and shipped by this defendant to the plaintiffs' employer for the period of 1960-1974.

Vinyl chloride homopolymer usually contains 4.8% hydrogen, 38.4% carbon and 56.8% chlorine. A vinyl chloride vinyl acetate homopolymer containing 16% vinyl acetate homopolymer would contain 5.1% hydrogen, 40.8% carbon, 48.9% chlorine and 5.2% oxygen. Resins produced by Union Carbide fall between these ranges.

51. The plaintiffs' employer has indicated that the plaintiffs were exposed to the following chemicals:

Polyethylene resin, vinyl resin, isopropylidene bisphenol resin and polystyrene resins

Did this defendant ship each of these chemicals to the plaintiffs' employer at any time between 1960 and 1974 and if so, set forth what chemicals were shipped and when they were shipped.

Union Carbide objects to that portion of this interrogatory which conveys plaintiffs' understanding of deposition testimony in this matter. Notwithstanding that objection, but without waiving same, Union Carbide shall answer, but its answer shall in no way be perceived to be an acceptance of the plaintiffs' understanding of the deposition testimony.

Yes, except that isopropylidene bis-phenol resin was not shipped; bis-phenol-A was shipped. Attached hereto is a tabulation sheet showing the material shipped to ATC from 1963 to 1974 and the amounts thereof. This sheet was compiled from available documents.

52. In what manner were these chemicals transported, ie in solid form, pellet or liquid form or in any other manner.

All the products listed in the answer to Interrogatory 51 were shipped in bulk; polyethylene and polystyrene were in pellet form; polyvinyl chloride was in powder form; and bis-phenol-A was in flake form; polyethylene was also in powder form.

RNW 0448

53. Set forth and describe the manner in which these chemicals were packaged.

All the materials listed in the answer to Interrogatory 51 were received in van boxes.

54. Set forth the labels attached to each of these products.

A general format for the labels was to show the resin process (example: low density polyethylene); the resin grade (example: DYNH); and the resin lot number (example: 4320).

55. State in what manner the packages containing the PVC were sealed.

Van boxes have hatchways and openings closed by rubber gasketed bolted plates or blind flanges.

56. Describe the actual material enclosing the product, ie PVC.

Van boxes were made of aluminum.

LEVINSON, CONOVER, FINK & AXELROD,
BY: Alfred A. Levinson, Member of firm

RNW 0449