

COPY

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

STANLEY MIKYSKA and
JOYCE MIKYSKA, his wife,

Plaintiffs,

Civil Action No. 870769

-vs-

UNION CARBIDE CORPORATION,
a foreign corporation,
DIAMOND SHAMROCK CORPORATION,
a foreign corporation,
STAUFFER CHEMICAL COMPANY,
a foreign corporation,
TENNECO CHEMICALS, INC.,
a foreign corporation,
UNIROYAL, INC.,
a foreign corporation,
ALLIED CHEMICAL CORPORATION,
a foreign corporation,
HOOKER CHEMICALS & PLASTIC CORP.,
a foreign corporation,
B. F. GOODRICH COMPANY,
a foreign corporation,
FIRESTONE TIRE & RUBBER COMPANY,
a foreign corporation,
GOODYEAR TIRE & RUBBER COMPANY,
a foreign corporation,

Hon. James Harvey

Defendants.

FILED
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EAST. DIST. MICH.

URL 08380

DEFENDANT UNIROYAL, INC.'S SUPPLEMENTARY ANSWERS TO
FIRST SET OF INTERROGATORIES TO DEFENDANTS

Defendant Uniroyal, Inc. ("Uniroyal") provides the following
supplementary answers to plaintiffs' First Set of Interrogatories to
Defendants.

SUPPLEMENTARY ANSWER TO 18

Yes, but the amount is more theoretical than practical. A
paper, "Small Molecule Migration in Products Derived from Glassy Poly-
mers," attached hereto as Exhibit A, discusses certain technical aspects
of this question. It should be kept in mind that 75°F is only 24°C.

The question as to what a "detectable amount" is can be answered only in terms of the test method used. For instance, the American Society for Testing Materials method, ASTM D-3749-78, claims to have a capability of measuring down to 50 parts per billion of VCM in PVC resin. This method, which was approved by ASTM in 1978, represents the current status of analysis methods. This is an area of rapidly developing technology. To Uniroyal's knowledge, no analytical method was available before 1974 which could reliably measure such minute amounts of VCM.

SUPPLEMENTARY ANSWER TO 19

While there is a "temperature dependent effect," there is no specific temperature at which VCM is released from PVC resin. Any VCM present will be released over a very long period of time at room temperature and over proportionally shorter periods at any higher temperature. See Exhibit A.

The question as to what a "detectable amount" is can be answered only in terms of the test method used. For instance, the American Society for Testing Materials method, ASTM D-3749-78, claims to have a capability of measuring down to 50 parts per billion of VCM in PVC resin. This method, which was approved by ASTM in 1978, represents the current status of analysis methods. This is an area of rapidly developing technology. To Uniroyal's knowledge, no analytical method was available before 1974 which could reliably measure such minute amounts of VCM.

SUPPLEMENTARY ANSWER TO 42

- a) To date, Uniroyal has no knowledge of such diagnosis at its Painesville, Ohio plant, except for cirrhosis of the liver. See report entitled "Mortality Study of Workers at the Painesville, Ohio Uniroyal Plant, July 1975," attached hereto as Exhibit B.

- b) There were press reports in 1974 and 1975, but these were not confirmed by qualified investigators.
- c) To date, no such report has been made, except as alleged in this case.
- d) To date, Uniroyal has no knowledge of such diagnosis.

SUPPLEMENTARY ANSWER TO 48

During the period 1965 through 1975, many rules were issued for the safety of employees and property in the PVC plant at Painesville, Ohio. Since the shutdown of this plant at the end of 1975, most files have been discarded. A thorough review of the retained files does not reveal a listing of these rules, nor to whom they were sent.

SUPPLEMENTARY ANSWER TO 49

Society of the Plastics Industry, Inc.
355 Lexington Avenue
New York, N.Y. 10017

Chemical Manufacturers Association
(formerly Manufacturing Chemists Association)
2501 M Street, N.W.
Washington, D.C. 20037

SUPPLEMENTARY ANSWER TO 50

No.

SUPPLEMENTARY ANSWER TO 51

The Company's first Medical Director, J. H. Wolfsie, M.D. was hired by Uniroyal in 1964. Dr. Wolfsie was assigned to Uniroyal's then New York, N.Y. headquarters to plan, establish, develop, direct, coordinate, and evaluate an occupational health program for the Company's employees. Dr. Wolfsie was hired by Mr. Was Graff, then

Uniroyal's Manager of Corporate Safety. Mr. Graff is deceased. After leaving Uniroyal, Dr. Wolfsie joined the Equitable Life Assurance Society, 1285 Avenue of the Americas, New York, N.Y.

SUPPLEMENTARY ANSWER TO 52

Uniroyal's first Industrial Hygienist, Mr. Fred Sands, was hired in the mid 1940's, exact date not presently known. Mr. Sands was assigned to Uniroyal's then New York, New York headquarters to provide environmental health control services to Company locations. It is believed that Mr. Sands was hired by Ernest Beck. Both Messrs. Beck and Sands are deceased.

SUPPLEMENTARY ANSWER TO 53

No.

SUPPLEMENTARY ANSWER TO 54

Yes.

Uniroyal, through the Joint URW-Uniroyal Occupational Health Committee, has provided funds for several years to the Occupational Health Studies Group (OHSG), School of Public Health, University of North Carolina, Chapel Hill, N.C. The OHSG has made studies at many of Uniroyal's facilities, and has produced two reports related to the Painesville, Ohio plant where PVC was made. These are:

1. Mortality Study of Workers at the Painesville, Ohio Uniroyal Plant, July 1975.
2. Proportional Mortality Analysis of Death Among Workers at the Painesville Uniroyal Plant, May 1979.

Copies of these reports are attached as Exhibits B and C.

It is not possible to state the amount of money Uniroyal contributed to the Painesville research since a variable sum was contributed each year according to the hours worked by all United Rubber Workers at all Uniroyal plants.

Uniroyal also contributed to the following studies:

1. The University of Michigan acroosteolysis study in the late 1960's, funded by CMA (formerly MCA). Three reports are published in the Archives of Environmental Health, Volume 22, January, 1971.
2. The PVC fabricating plants epidemiology study conducted by the Organization Resources Counselors. A copy of a report dated May, 1977 will be made available to plaintiff when it has been obtained by counsel.
3. An epidemiological study of the vinyl chloride and polyvinyl chloride industries conducted by Equitable Environmental Health, funded by CNA (formerly MCA). Uniroyal cannot locate a copy of the final report.

It would be very difficult and time consuming for Uniroyal to determine the dollar amounts it contributed toward each study at this time.

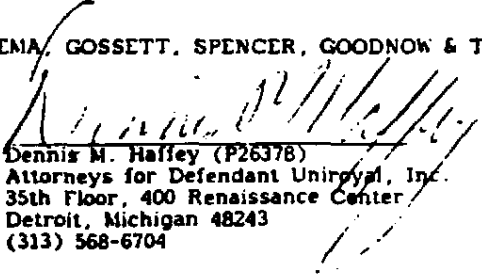
SUPPLEMENTARY ANSWER TO NO. 55

Uniroyal gave testimony during July 1974 at the OSHA hearings on the Proposed Permanent Standard for Occupational Exposure to Vinyl Chloride. Those testifying, and their positions at that time were:

1. Martin J. Kleinfeld
Commercial Planning Director
Uniroyal Chemical
Spencer Street
Naugatuck, Conn. 06770
2. Dr. Walter D. Harris
Corporate Toxicologist
Uniroyal, Inc.
Middlebury, Conn. 06749

3. Benton R. Leach
Factory Manager;
P.O. Box 460
Painesville, OH. 44077

DYKEMA, GOSSETT, SPENCER, GOODNOW & TRIGG

BY: 

Dennis M. Haffey (P26378)
Attorneys for Defendant Uniroyal, Inc.
35th Floor, 400 Renaissance Center
Detroit, Michigan 48243
(313) 568-6704

DATED: February 23, 1980

URL 08385

VERIFICATION

STATE OF NEW YORK)
 : SS.:
COUNTY OF NEW YORK)

VIRGINIA K. SMITH, being duly sworn that she is an Assistant Secretary of Uniroyal, Inc., a defendant in this action, that she has read the foregoing answers to interrogatories and knows same are therein stated upon information and belief, based upon information and documents compiled by defendant's attorneys and employees and that she believes them to be true.

Virginia K. Smith
VIRGINIA K. SMITH

Sworn to before me this
27th day of February, 1981

Notary Public

PAUL H. H. H. H.
Notary Public, State of New York
Qualified in New York
Cert. Filed in New York
Commission Expires March 22, 1982

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B. F. GOODRICH COMPANY,
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FIRESTONE TIRE & RUBBER COMPANY,
a foreign corporation,
GOODYEAR TIRE & RUBBER COMPANY,
a foreign corporation,

Defendants.

PROOF OF SERVICE

STATE OF MICHIGAN)
)SS
COUNTY OF WAYNE)

DEBRA C. LENZNER, being first duly sworn, deposes
and says that on the 4th day of March, 1981, she did serve a
copy of Defendant Uniroyal, Inc.'s Supplementary Answers to
First Set of Interrogatories to Defendants and a Proof of
Service upon:

Paul G. Bogos, Esquire
Bogos and Bogos
1315 Penobscot Building
Detroit, Michigan 48226

by placing a copy of said pleadings in an envelope addressed

UPL 08387

as above with proper postage affixed and depositing same in the United States Mail.

DEBRA C. LENZNER

Subscribed and sworn to before me this 4th day of March, 1981.

Sharon C. Smale
Notary Public
SHARON C. SMALE
Notary Public, Wayne County, WI
My Commission Expires Dec. 19, 1983

JRL 08388

Exhibit
deleted

GENERAL ARTICLES

Small Molecule Migration in Products Derived from Glassy Polymers

William J. Koros* and Harold B. Hopfenberg

Department of Chemical Engineering, North Carolina State University, Raleigh, North Carolina 27660

The implications of the combined dual mode sorption and partial immobilization transport models on the migration of small molecules from glassy polymers have been considered. Neither dual-mode sorption nor "immobilization", in the sense used here, contributes to irreversible retention of sorbed species if the assumption of local equilibrium between the two sorption modes is satisfied. An apparent trapping of otherwise diffusible species results from the equilibrium partitioning of migrant between polymer and extractant phases rather than from an inherent kinetic limitation to transport. The interrelationship between the transport predictions of the partial immobilization model and the more general concentration-dependent diffusion coefficient phenomenology is emphasized throughout the analysis. A case study which presents calculated predictions of extraction kinetics of vinyl chloride monomer from 40-mil poly(vinyl chloride) sheet is discussed. The analyses pertain to idealized migration of small molecules into foods or more directly to actual extraction protocols for detection of trace components in polymeric materials.

The migration of trace amounts of solvents, reaction and degradation byproducts, additives, oligomers, and monomers from polymeric barriers used in food and beverage packaging can affect consumer acceptance, product quality, and regulatory approval of candidate packaging materials. The serious economic impact related to accurate prediction of long-term migration effects has motivated this presentation of the thermodynamic and kinetic realities governing transport in and from glassy polymeric barriers.

Much of the detailed experimental characterization of the migration of low molecular weight molecules in glassy polymers has focused on CO₂ transport in support of the massive research and development of polymeric containers for carbonated beverages (Michaels et al., 1963a,b; Vieth and Sladek, 1965; Toi, 1973; Fenelon, 1974; Kellen, 1975; Koros and Paul, 1978a-c). There is increasing recognition that dual-mode behavior is a rather general characteristic of nonswelling (low concentration) penetrant sorption in glassy polymers (Bereza, 1974a,b, 1979; Koros et al., 1977; Harris et al., 1978). The migration of trace amounts of solvents, monomers, oligomers, additives, and degradation byproducts should, therefore, be governed by the equilibrium and kinetic implications of the dual-mode model. An unfortunate and somewhat inconsistent designation has been assigned to the Langmuirian component of dual-mode sorption. These species were originally termed "immobile" although the useful transport analyses have also typically assumed local equilibrium between the Langmuirian and Henry's law species. The local equilibrium assumption implies that there can never be a significant difference in the chemical potential of penetrant sorbed in the two modes in any local region of the polymer. This suggests that interchange between species in the two modes is rapid compared to the time scale required for a significant change in the local value of the chemical potential. The validity of the local equilibrium assumption has been verified by pulsed NMR for ammonia in glassy polystyrene (Anisk, 1975) and by numerous transport studies for gases

in glassy polymers in concentration ranges corresponding to several thousand parts per million (Fenelon, 1973; Toi, 1973; Koros and Paul, 1978a-c).

The confusion regarding the implications of the term "immobilization" on ultimate release kinetics has prompted the analysis presented here regarding the effects of Langmuir sorption and "immobilization" on the migration kinetics of trace components from glassy polymers. Although the "equilibrium criterion" per se is sufficient to permit complete removal of all species into an infinite sink, the detailed kinetics of migration are, in fact, affected by the relative populations of Langmuir and Henry's law species and the degree of "immobilization" of the Langmuirian penetrant. The primary objective, therefore, of this paper is the presentation of a detailed and quantitative case study to aid in prediction of migration rates from glassy polymers complicated by multiple sorption modes and various kinetic and equilibrium possibilities.

Analysis and Discussion

Equilibrium Sorption Isotherms. A variety of equilibrium isotherms relating penetrant concentration in a polymer to penetrant concentration in a contiguous fluid phase are observed for polymeric substrates. Gas sorption in rubbery polymers follows Henry's law (Michaels and Bixler, 1961; Stern et al., 1969). Sorption of organic vapors in many rubbers is characterized by an exponential increase in the concentration plotted as a function of vapor activity (Rogers et al., 1960). Such isotherms are sometimes referred to as having a BET type III form. More complex behavior involving an inflection is frequently observed for vapor sorption in glassy polymers over extended concentration intervals. At low concentrations, the concave downward form of such isotherms suggests dual mode sorption effects, while at higher concentrations it is believed that swelling or penetrant clustering effects predominate (Bereza, 1975; Stannett et al., 1978). The dual-mode isotherm, typical of low concentration penetrant

Mortality Study of Workers at the
Painesville, Ohio Uniroyal Plant

by

Dale Herman, M.S.P.H.
Dragana Andjelkovic, M.D., M.P.H.

Occupational Health Studies Group
School of Public Health
University of North Carolina
Chapel Hill, North Carolina

Submitted to

The Joint UAW-Uniroyal Occupational Health Committee

July, 1975

U-6

EXHIBIT B

UPL 08391

**REPORT ON A CASE CONTROL STUDY
COVERING WHITE FEMALE EMPLOYEES
OF PVC FABRICATORS**

May 1977



**Organization Resources
Corporation, Inc.**

URL 08392

EXHIBIT C