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MIKE REYNOLDS
Have this packet be prepared to N.Y.
State Center for Environmental Protection
VISTA POLYMERS INC. Klobner

APR 04 1989

Roy T. Gottesman
Executive Director

PVC BUSINESS AREA

March 31, 1989

FILE COPY
(HRF)

TO: The VI Executive Board
The Vinyl Packaging Council

RE: New York State Proposed PVC Ban: AB 5578

Attached are five copies each of three fact sheets I prepared to assist SPI's lobbyist Mary Kopley and others who are working to educate members of the New York State Assembly on the facts about PVC packaging and its impact on the solid waste stream.

They are:

- FACTS About.....PVC In Municipal Solid Waste
- FACTS About.....Incineration of PVC
- FACTS About.....Recycling of PVC

If you have any comments or suggestions, or would like additional copies, please call.

RTG/pmb

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FACTS about.....

PVC In Municipal Solid Waste (MSW)

What Is PVC?

Polyvinyl chloride, or PVC, is a non-hazardous white granular powder, made from vinyl chloride monomer (VCM) by a chemical process known as polymerization. Its manufacture, transportation and use is strictly regulated by the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the Food and Drug Administration (FDA), and the Department of Transportation (DOT).

Where is PVC Used?

PVC is fabricated by several processing methods into diverse products having a variety of applications. The major use is in building and construction. Of the 7.650 billion consumed domestically in 1987, 5.056 billion pounds (66.1%) was used in applications such as sewer and water distribution pipe, drain, waste and vent plumbing pipe, house siding, window and door frames, flooring and wall coverings. These are long-life uses and such products do not find their way into the municipal solid waste (MSW) stream for many years.

Other applications include electrical/electronic uses such as wire and cable (6.9%), packaging (8.0%), furniture and furnishings (3.8%), coatings (1.4%) and others (13.8%). (1)

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How Much PVC Is Used In Packaging?

The most recent figures available show that through December 1988:
(2)

	<u>Million/Lbs.</u>
Total pounds PVC consumed domestically	7770
Total pounds PVC bottles	215 (2.8%)
Total pounds PVC film and sheet, packaging	335 (4.3%)
Total pounds PVC in packaging	550 (7.1%)

How Much PVC and Other Plastic Packaging Containers Is There In MSW?

	<u>% By Weight</u>
All containers and packaging (includes paper, paperboard, aluminum, plastics)	30.3 (3)
Plastic containers and packaging	4.0 (4)
PVC containers and packaging	0.19 (5)

Less than 0.2% of MSW is PVC packaging.

How Can PVC Be Disposed?

PVC can be safely disposed of by any environmentally-suitable solid waste management method including recycling, incineration and landfilling. Because of its outstanding stability and resistance to attack under corrosive conditions, PVC is used in manufacturing liners for landfills and pipes for landfill leachate collection systems. (6)

(1) Facts and Figures of the U.S. Plastics Industry, 1988 Edition, The Society of the Plastics Industry, Inc., September 1988.

(2) Ernst & Whinney, Washington D.C. for SPI's Committee on Resin Statistics (CRS), December 1988 Report.

- (3) Characterization of Municipal Solid Waste in the United States, 1960 to 2000, Franklin Associates, Limited (1988).
- (4) The Council For Solid Waste Solutions Fact Sheet on "Containers & Packaging In The Waste Stream", Washington, D. C., (Sheet A-5, January 1989).
- (5) Calculation based on domestic consumption of 614 million pounds of PVC packaging used in 1987 and Franklin Associates estimate that 158 million tons (316,000 million pounds) of MSW are discarded each year.
- (6) Modern Plastics "Geosynthetics Prove To Be Vital Organs In Sanitary Landfill", p. 77-81, March 1989.

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FACTS about.....

INCINERATION OF PVC

What Materials Could Be Emitted to the Atmosphere When MSW Is Incinerated?

When municipal solid waste (MSW) is incinerated, without any pollution control equipment, the following materials have been detected in the flue gases. (1)

- **Criteria pollutants** (particulate matter, carbon monoxide (CO), oxides of sulfur (SOx), oxides of nitrogen (NOx), lead.
- **Acid gases** (hydrochloric acid (HCl), hydrogen fluoride (HF).
- **Metals** (chromium, cadmium, arsenic, mercury, nickel, beryllium, others).
- **Organic materials** (polychlorinated dibenzo-dioxins (PCDDs) and polychlorinated dibenzo-furans (PCDFs).

Almost all modern incinerators being installed have pollution control devices (filters, scrubbers) to minimize and/or eliminate such emissions.

Is PVC Alone Responsible For Hydrogen Chloride (HCl) Emitted When MSW Is Incinerated?

No. Numerous studies in Germany, England, France and Japan have shown that only 1/3 to 1/2 of the hydrochloric acid (HCl) in incinerator emissions is due to PVC. (2) Inorganic chlorides such as sodium chloride are abundant in refuse and are an important source of HCl. (3)

Would Banning PVC Be A Solution To The Problems Of HCl Emissions From Incinerator?

Absolutely not. . Other sources of HCl would still be present including paper, wood, textiles, food waste and salt. Air pollution control devices would be needed to remove HCl from these sources, in any case. It has been shown (4) that efficiency of HCl removal was 98.8% using a Teller/AAF spray drier utilizing lime to remove the acid gas.

Will The Presence of PVC Result in an Increase in Dioxin (PCDDs) or Furan Emissions in MSW Incineration?

No. A study carried out in a full-scale commercial incinerator in Pittsfield, Massachusetts by the New York State Energy Research and Development Authority showed that no statistically-valid relationship existed between dioxin and furan emissions and PVC in the waste stream. (5) This confirms results found by others in full-scale studies in Belgium (6), France (7), and Germany (8) and is supported by extensive mathematical analysis. (9)

Are Chlorine, Phosgene or Vinyl Chloride (VCM) Produced in Incineration of PVC?

Neither chlorine or phosgene are combustion products of PVC. While thermal decomposition of PVC can, under certain conditions generate trace amounts of VCM (10), the flame environment will completely destroy it during incineration.

If PVC Packaging is Present in MSW, Does it Contribute to Heavy Metals and Toxic Ash Problems Associated With Incinerators?

Certain metal-based materials (calcium, zinc and organo-tins) are used in stabilization of PVC when it is fabricated into bottles, film and packaging materials. None of these are heavy metals nor are they toxic.

Thus, the presence of PVC packaging in MSW is not a contributor to heavy metals or toxic ash generation during incineration.

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- (1) Municipal Waste Combustion Study - Report to Congress, Environmental Protection Agency, Washington, D.C., EPA Report 501-SW87.021a, June 1987.
 - (2) "Plastics In Municipal Solid Waste Incineration: A Literature Study", Prof. Richard S. Magee, Hazardous Substance Management Research Center, New Jersey Institute of Technology, Newark, New Jersey, January 1989.
 - (3) S. Uchida, H. Kamo and H. Kubota, Ind. Eng. Chem. Res. 1988, 27, p. 2188-2190.
 - (4) Air Emissions Tests at Commerce Refuse-To-Energy Facility, May 26-June 5, 1987, Volume 1: Test Results ESA 20522-449, Energy Systems Associates, Pittsburgh, Pennsylvania, July 1987.
 - (5) Results of the Combustion and Emissions Research Project at the Vicon Incinerator Facility in Pittsfield, Massachusetts prepared by Midwest Research Institute for the New York State Energy Research and Development Authority, Final Report, June 1987.
 - (6) R. De Fre et. al., Dioxin Levels in the Emission of Belgian Municipal Incinerators (1985)
 - (7) F. Karasek et. al J. Chromatography 270: 227-234 (1983)
 - (8) K. Ballschmitter et.al Chemosphere, Volume 12, #4/5 585-594 (1983).
 - (9) W. Shaub, U.S. National Bureau of Standards Reports NBSIR 84-2872 and 84-2975.
 - (10) I.B. Wakeman and H.R. Johnson, Poly. Eng. Sci. 18, 404(1978)

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FACTS about.....

RECYCLING OF PVC

Can PVC Be Recycled?

Yes. Since PVC is a thermoplastic, it has been recycled industrially for years. For example, scrap produced in pipe manufacture or bottle blowing plants is ground and recycled directly into the process from which it resulted.

Can PVC Packaging Materials Be Recycled?

It has been demonstrated (1) that post-consumer PVC waste such as bottles and blister pack can be recovered for recycle. This requires clean-up of the separated PVC bottles by grinding, detergent washing, electrostatic metal removal and drying.

Recycling of PVC flexible film as used in meat wrap has not yet been demonstrated to be technically or economically feasible. Incineration or landfilling represent the best disposal methods currently available for such films.

Is PVC Packaging Being Reclaimed Commercially Today?

Yes. Although this is an infant industry in comparison to recycling of the PET soda bottle or HDPE milk bottle, PVC is being successfully recycled from a mixed post-consumer plastic container stream by several companies including Recoverable Resources (R2B2) Bronx, New York. (2) At present, this requires manual sortation of PVC away from other containers by visual inspection. Research to develop an automatic sorting device is underway at the Center For Plastics Recycling Research at Rutgers University, New Brunswick,

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New Jersey. An Italian company, Govoni, working cooperatively with Solvay and EniChem has demonstrated the feasibility of mechanically separating PET bottles away from PVC bottles.

Where Can Recycled PVC Bottles Be Used?

PVC from recycled bottles can be converted into profile extrusions, drainage and irrigation pipe or large diameter sewage pipe. The latter application, which uses a co-extrusion process to produce a foam between two rigid PVC layers ("foam core pipe") is being carried out commercially in the Netherlands by Draka Polva, a Solvay et Cie subsidiary.

Is it Necessary to Separate PVC From Other Plastics For Recycling?

No. Because of the new trend in packaging toward "composites", i.e., containers made of several different plastics, support is growing for recycling of "commingled" or mixed plastics. Based on research at the Center For Plastics Recycling Research at Rutgers University, PVC up to approximately 25% of the mixed plastics feed can be processed in an extruder, Et-1, developed by Advanced Recycling Technologies in Belgium to produce a "synthetic lumber". Potential applications include fencing, landscape architectural uses, traffic barriers, parking lot car stops, and picnic tables and benches for recreational facilities.

Is HCl Given Off in Recycling Processes?

No. As the bottles and containers are already stabilized to prevent thermal decomposition, HCl is not produced during recycle operations.

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- (1) D. Goodman and W.F. Carroll, Jr., Plastics Engineering, Volume XLV, No. 3 March 1989, p. 69. Abstract of paper on "Recycling PVC Bottles" to be presented May 4, 1989 at New York Annual Technical Conference (ANTEC '89) of the Society of the Plastics Engineers (SPE).
 - (2) R. D. Leaversuch, Modern Plastics 66, No. 3 69-73 (March 1989).
 - (3) J. Claerbout, Paper at Recycle 1988 Forum in Davos, Switzerland (May 31-June 2, 1988) on "Recycling PVC Bottles into Coextruded Pipe".

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