1413

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DAMMING THE SOLID WASTE STREAM: THE BEGINNING OF SOURCE REDUCTION IN MINNESOTA

MINNESOTA POLLUTION CONTROL AGENCY

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At the Agency meeting on January 21, 1975, MPCA Board Members unanimously passed a resolution that this staff report be approved and trnasmitted to members of the Legislature.

DAMMING THE SOLID WASTE STREAM:
THE BEGINNING OF SOURCE REDUCTION IN MINNESOTA

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STAFF REPORT

The public interest requires doing today those things that men of intelligence and good will wish five or ten years hence had been done.

Edmund Burke

TABLE OF CONTENTS

List of Tables

INTRODUCTION

This report, submitted pursuant to Minn. Stat. Chapter 116F.06, subd. 4 (Supp. 1973) deals with impacts of solid waste generation on our natural resource supply, environmental quality and the management of solid waste. It also discusses the historical trends in the generation of solid waste and the American standard of living in relationship to consumption patterns. Additionally, several source reduction measures are outlined, some of which can be implemented by the current session of the legislature, some of which will require additional study, and one of which -- the packaging review program -- is currently in the process of being implemented.

Although this report basically deals with source reduction, a brief section on energy and material recovery is included to partially explore questions which we believe must be answered before any state funds are expended for the construction of material or energy recovery facilities.

PROBLEMS OF SOLID WASTE GENERATION

I. DEFINITION OF THE PROBLEM

The U.S. Environmental Protection Agency estimates that about 125 million tons of municipal solid waste was generated in the United States in 1971 (3.32 lbs./person/day).[1]

The U.S. generates enough solid waste per year to fill garbage trucks stretched three abreast from New York to Los Angeles.[2]

Based on 1970 census figures and the EPA generation rate of 3.32 lbs./person/day, Minnesotans generated 4.6 billion pounds (2.3 million tons) of municipal solid waste in 1970. To collect, transport and dispose of this material, the tax-

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[1] Robert A. Lowe, Energy Conservation Through Improved Solid Waste Management, Office of Solid Waste Management Programs, U.S. Environmental Protection Agency, April 1974, p. 5. "This waste generation rate is lower than the widely quoted 190 million tons/year (5.3 lbs./capita/day) estimated in the 1968 National Survey of Community Solid Waste Practices. The National Survey was based on a sample of collected tonnage estimated (rather than systematic measurements) that were extrapolated to a national scale. These more recent estimates are primarily based on national material production and product marketing data. It is the judgement of EPA that these new figures are accurate to within approximately 25% and the 1968 survey over-estimated the national municipal solid waste stream."

[2] "U.S. Finds a Rich Resource: The Nation's Trash Pile," U.S. News and World Report, May 13, 1974.

payers spent $46 million.[3]

Municipal solid waste or "post consumer" solid waste is defined to include the material generated by households, commercial and government office buildings, wholesale and retail trade, and other general business and service sectors of the economy. Explicitly excluded are mining, agricultural, and industrial processing and converting wastes; sewage sludge; and demolition and construction wastes. Although the municipal solid waste stream comprises a relatively small percentage of the several billion tons of solid, liquid and gaseous wastes produced annually by all sectors of the economy, we have become increasingly aware of the significance of this segment of the "stream". This segment is important because of its impact on resource use, environmental quality and urban solid waste collection and disposal practices and costs.

The composition of the municipal solid waste stream is shown in Table 1.

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[3] This figure is less than the $62 million 1972 figure found in Jacquelyn Burke & Weston Fisher, The Realities of Recycling, MPCA, January 1973, p. 6 because that report relied upon erroneous per capita generation figures discussed previously in footnote 1.

Table 1.

MUNICIPAL SOLID WASTE GENERATION BY MATERIAL AND SOURCE, 1971

Type of material	10^6 tons of waste by product source category							Total	
	Newspapers, books, and magazines	Containers and packaging	Major household appliances	Furniture and furnishings	Clothing and footwear	Food products	Other	10^6 tons	Percent
Paper	10.3	20.4	-	Trace	Trace	-	8.4	39.1	31.3
Glass	-	11.1	Trace	Trace	-	-	1.0	12.1	9.7
Metal:	-	6.1	1.9	.1	Trace	-	3.8	11.9	9.5
Ferrous	-	5.4	1.7	Trace	-	-	3.5	10.6	8.5
Aluminum	-	.6	.1	Trace	-	-	.1	.8	.6
Other nonferrous	-	.1	.1	Trace	-	-	.2	.4	.3
Plastic	Trace	2.5	.1	.1	.2	-	1.3	4.2	3.4
Rubber and leather	-	Trace	.1	Trace	.5	-	2.7	3.3	2.6
Textiles	Trace	Trace	-	.6	.5	-	.7	1.8	1.4
Wood	-	1.8	-	2.3	Trace	-	.5	4.6	3.7
Food	-	-	-	-	-	22.0	-	22.0	17.6
Subtotal (in 10^6 tons)	10.3	41.9	2.1	3.2	1.2	22.0	18.4	99.1	79.3
Yard waste								24.1	19.3
Miscellaneous inorganics								1.8	1.4
Total								125.0	100.0
Percent product source composition	3.2%	33.5%	1.7%	2.6%	1.0%	17.6%	14.7%		79.3%

Source: EPA, Second Report to Congress, p. 3.

According to the EPA, the figures for product categories represent the first attempt to estimate physical weight quantities for the product sources of the solid waste stream. The newspapers, books and magazines and the containers and packaging figures are judged to be accurate to within 10%; while other categories are judged to be accurate to within 25%.

About 80% of the municipal solid waste stream is composed of market product sources (as opposed to yard and garden wastes). Excluding food wastes, market product sources account for about 60% of the waste flow. Container and packaging materials contribute about one-third of total post-consumer waste. This packaging fraction accounts for about 72% of the total mineral (combined glass and metal) content of the municipal solid waste stream.[4]

Little work has been done on providing accurate projections of solid waste generation, however EPA has commissioned a study to make projections on the major components of post-consumer waste over the next 15 to 20 years. To project boundaries of future solid waste generation rates, Table 2 summarizes projections for total waste, assuming low, medium and

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[4] Second Report to Congress: Resource Recovery and Source Reduction, U.S. Environmental Protection Agency, SW-122, 1974, p. 4.

high growth rates.

Table 2

Projected Total Solid Waste Quantities[5]

Assumed annual compound growth (percent)	Waste (10^6 tons) 1980	1985	1990
2.5 (low	155	175	200
3.5 (medium)	170	200	230
4.5 (high)	185	230	290

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[5] Ibid., p. 5.

II. HISTORICAL TRENDS AND THE U. S. STANDARD OF LIVING

The concept of the American frontier played an important role in American development. When land resources became depleted or scarce on the Eastern seaboard, there was a gradual extension of the frontiers westward, and a settlement of the country. When the geographical frontier closed in the 1890's, another frontier replaced it -- expectations of a higher standard of living. The historical development of the United States has consistently emphasized a higher standard of living based on the abundance of resources without thought of their depletion in the future.

The United States consumes resources at a rate that far exceeds that of the rest of the world. Table 3 points out that the U. S. is the leading world consumer of paper, for example. Sweden's quality of life is similar to that of the U.S. but we consume 36.5% more paper per year than that country.

Table 3

Pounds of Paper Consumed Per Capita Per Year[6]

Country	Pounds/Capita/Year
United States	639
Sweden	468
Canada	451
United Kingdom	301
Federal Republic of Germany	299
Soviet Union	67
People's Rep. of China	18
Kenya	13
Niger	.22
Mali	.44

It is only within the last decade that the problems associated with our rate of consumption of resources have been addressed. Even now, however, most Americans are unaware of the grave implications of both current and projected growth rates in resource use. When we exercise our choice as consumers very few of us consider how long the products we purchase will last,

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6 Pulp and Paper International Review, Miller Freeman Publishers, San Francisco, July 25, 1973.

or whether they can be easily repaired, or whether they can be reused or feasibly recycled.

Now the increasing burden on the environment and our domestic resource supplies makes it imperative for us to be more discriminating in the use of natural resources. As the National Commission on Materials Policy Final Report of 1973 states:

> Profligate materials use has been thoroughly built into the nation's economy, and remedial steps may cause painful readjustments. But inaction can result in serious economic dislocations resulting in loss of employment and investments, when emergency measures are taken in response to unforeseen shortages or environmental crises. The proper approach is to think ahead and bring about needed change in an orderly manner.[7]

Last winter's energy crisis indicated what the shortage of one resource can do to the United States. John Kyl, Assistant Secretary of the Interior, said in an interview with Associated Press recently, that the United States is headed for a materials shortage which will make the energy crisis look like a "Sunday school picnic" and predicts that it will occur in the next five years. The predicted materials shortage and the shortage of energy resources have grave implications for United States foreign policy as well as the world economy. Because our demand for

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[7] Materials Needs and the Environment Today and Tomorrow, Final Report of the National Commission on Materials Policy, Washington, D.C., June 1973, p. 18.

resources is so high and domestic production for many commodities has peaked, the United States is importing increasing amounts of minerals and crude oil.[8] According to Russell Train, Administrator of the U.S. Environmental Protection Agency, "...of the 13 basic raw materials required by our modern economy, we depended in 1970 on imports for more than half our supplies of six of these. By 1985, it has been projected that we will be primarily dependent on imports for supplies of nine of the 13 basic raw materials, including three major ones -- bauxite, iron ore and tin."[9] (emphasis added)

If current consumption trends continue, the formation of materials cartels similar to OPEC[10] could seriously jeopardize the United States economy. Importing large amounts of re-

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8 St. Paul Pioneer Press, September 30, 1974.

9 "Russell Train Says," Resource Recovery, Jan.-Feb.-Mar., 1974, p. 24.

10 The January 12, 1975, Minneapolis Tribune carried a story entitled "New Cartels To Copy Arabs Oil Action." In a discussion of a potential bauxite cartel it said in part "...so when Jamaica last June raised export taxes on bauxite, the price of a ton imported from the island shot up from $2.50 to $11.72. Since then the cost of many aluminum products in this country has gone up about 10%. The Dominican Republic and Gauyana [sic] announced plans to follow Jamaica's lead. Now these nations and other major bauxite producers--Guinea, Sierra Leone, Australia and Yugoslavia--are discussing formation of a bargaining cartel.

sources contributes to our balance of payments deficit, as Under-Secretary of State, John N. Irwin II testified in April, 1972. He stated before the House of Representatives Committee on Interior and Insular Affairs that even with the development of Alaskan and offshore oil reserves, oil imports were expected to climb from 25% in 1972 to 50% of total United States consumption by 1980, creating an estimated $17 billion impact on the United States balance of payments. And as the Upper Midwest Council's recent report states "[the] best estimates of energy waste in the United States range from 25% to 40%."[11] The Upper Midwest Council recommends "For the next 15-20 years conservation measures must be implemented to reduce overall demand and buy time to develop a plan for a more orderly transition to the use of other energy sources and to a more energy-aware society."[12]

Much is said today of our standard of living in the United States, and frequently opponents of any source reduction measures accuse proponents of trying to lower the American standard of living and force the nation's consumers to return to the "cracker barrel". One of the alleged indicators of a high stan-

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11 Managing Our Energy Future, Upper Midwest Council, August, 1974, p. 36.

12 Ibid., p. 135.

dard of living is the number of choices the consumer has at the supermarket. Oftentimes the argument in favor of increasing the amount of product choice to consumers is advanced in dramatic tones, as though profligate consumption was a God-given right, or at the very least, one supplied by the U.S. Constitution. Nonetheless it is doubtful that any rational person would argue that the standard of living in the U.S. had significantly increased in the last 9 years, but yet from the following table we see that the number of items carried by the average supermarket has increased by 25% since 1964 and by nearly 70% since 1950.

Table 4

Number of Items Carried by the Average Supermarket[13]

Year	Number of Items
1950	2,470
1960	5,100
1964	5,950
1968	6,925
1970	7,300
1972	7,775
1973	7,950

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13 "41st Annual Report of the Grocery Industry", Progressive Grocer, Vol. 53, No. 4, Western Edition, April 1974, p. 153.

While we agree consumers should have some amount of product choice, it is not clear that the wide array available today has either increased our standard of living or made us a more contented population.

Table 5 illustrates two points: the unbelievable number of choices in selected product groups and their growth in the last four years, as well as the proliferation of frivolous products which are foisted upon the American consumer.

Table 5

Assortment of Selected Products Available in Sizes/Brands At Warehouse

	1973*	1972**	1971***	1970****
Spray Deodorants & Anti Perspirants	81	65	56	48
Female Antiseptics/ Deodorants	36	23	15	10
Hair Coloring Products	149	85	47	39
Pain Relief	96	71	50	45
Stomach Relief	94	63	41	26
Cold Symtom Relief	102	63	44	38

*Source: Chain Store Age-Super Markets Headquarters Edition, Vol. 50, No. 7, July 1974, pp. 165, 170, 172.

**Source: Chain Store Age-Super Markets Headquarters Edition, Vol. 49, No. 7, July 1973, pp. 168, 177, 178.

***Source: Chain Store Age-Super Markets Headquarters Edition, Vol. 48, No. 7, July 1972, pp. 196, 202, 205.

****Source: Chain Store Age-Super Markets Sales Manual Issue For Stores, Vol. 47, No. 7, July 1971, pp. 190, 192, 199.

The most phenomenal growth occurred in hair coloring products which represents a 282% increase in size and brand selection in the last four years. However, stomach relief and female antiseptics/deodorants were a close second and third growing 261.5% and 260% respectively. The cold symptom relief

category expanded 168% in four years, while the pain relief groups increased 113%. Spray deodorants and anti perspirants only increased by 68.7%.

In a recent study published in the November 15, 1974 issue of Science, Allan Mazur and Eugene Rosa compared energy consumption in 55 countries in terms of health and health care indicators, education and culture indicators, general satisfaction indicators and economic indicators in order to determine whether there was a correlation between energy consumption and standard of living. They concluded that "...so long as America's per capita energy consumption does not go below that of other developed nations, we can sustain a reduction in energy use without long-term deterioration of our indicators of health and health care, of education and culture, and of general satisfaction." [14]

Table 6 details the countries utilized in the comparison and Table 7 illustrates the actual correlations between energy consumption and life-style indicators.

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[14] Allan Mazur and Eugene Rosa, "Energy and Life-Style," Science, Vol. 186, November 15, 1974, p. 609.

Table 6

NATIONS INCLUDED IN THE ANALYSIS FOR ENERGY CONSUMPTION AND LIFE STYLE CORRELATIONS

Developed market economies (N=19)

Australia
Austria
Belgium
Canada
Denmark
France
Greece
Israel
Italy
Japan
Netherlands
Portugal
South Africa
Spain
Sweden
Switzerland
United Kingdom
United States
West Germany

Centrally planned economies (N=7)

Bulgaria
Czechoslovakia
East Germany
Poland
Romania
Yugoslavia
U.S.S.R.

Developing market economies (N=29)

Algeria
Argentina
Brazil
Sri Lanka (Ceylon)
Chile
Colombia
Cuba
Egypt
Ghana
India
Indonesia
Iraq
Kenya
Malaysia
Mexico
Morocco
Mozambique
Nepal
Nigeria
Peru
Philippines
South Korea
Sudan
Tanzania
Thailand
Turkey
Uganda
Venezuela
Zaire

Source: Allan Mazur and Eugene Rosa, "Energy and Life-Style," Science, Vol. 186, November 15, 1974, p. 608.

Table 7

PRODUCT-MOMENT CORRELATIONS BETWEEN ENERGY CONSUMPTION AND LIFE-STYLE INDICATORS**

Life-style indicators	All nations (N=25 to 55, median 47)				Nations with developed market economies (N=15 to 19)			
	Total energy consumption per capita	Electricity consumption per capita			Total energy consumption per capita	Electricity consumption per capita		
		Total	For domestic and commerical use	For industrial use		Total	For domestic and commercial use	For industrial use
Health and health care indicators								
Calories in diet per capita	.76	.69	.49	.58	.53		.40	
Life expectancy	.70	.66	.43	.54				
Hospitals per capita		.27						
Hospital beds per capita	.78	.81	.46	.66	.45*	.75*	.60*	.70*
Doctors per capita	.71	.65	.40	.55				
Pharmacists per capita	.70	.69	.50	.60				
Nurses per capita	.91	.87	.62	.75	.72	.66	.47	.49
Ulcer deaths per capita	.41	.44		.30				
Automobile deaths per capita	.57	.52	.36	.43	.43			
Education and culture indicators								
College students per capita	.77	.76	.79	.82	*	*	*	*
High school students per capita	.68	.73	.59	.63	*	*	*	*
Books published per capita	.56	.58	.37	.38	*	.45*	.66*	*
Newspaper circulation per capita	.78	.79	.50	.64	.75*	.81*	.74*	.72*
Cinemas per capita	.38	.33		.32				
Cinema attendance per capita								
Museum attendance per capita	.77	.73	.79	.79	*	*	.44*	*
General satisfaction indicators								
Divorces per capita	.57	.49	.58	.61	.80	.68	.92	.83
Marriages per capita	.33	.25		.28				
Manufacturing work hours per week	-.54	-.50	-.36	-.39				
Sex discrimination in college	-.41	-.34		-.33				
Sex discrimination in high school	-.54	-.47	-.38	-.50				
Male suicides per capita	.59	.55		.43	.54*	.62*	.58*	.49*
Population density	.24							
Economic indicators								
Telephones per capita	.82	.92	.81	.81	.77	.87	.76	.77
Radios per capita	.78	.71	.88	.86	*	*	*	*
Television sets per capita	.95	.93	.76	.85	.91	.84	.75	.79
Automobiles per capita	.84	.87	.80	.78	.83	.75	.73	.68
Gross national product per capita	.94	.93	.78	.83	.86	.84	.74	.74

* Canada and the United States excluded from the computation.

** Only correlations significant at the .05 level or better are given.

Source: Allan Mazur and Eugene Rosa, "Energy and Life-Style," Science, Vol. 186, November 15, 1974, p. 608.

In regard to energy consumption in the United States, Stewart Udall's article in a recent issue of The Progressive is quite informative. According to the 1970 census, 99.8 per cent of all American families owned a refrigerator, 95 per cent had at least one television set, and 80% operated at least one car. Between 1960 and 1970, Americans bought 47 million hair dryers. The U.S. owns one-half the television sets in the world and we generate and use 40% of the world's electricity. In the period from 1946 to 1968, the consumption of electricity per capita in the U.S. increased by 436%; our population increased during the same period by 43%; and the GNP increased by 59%. Consequently, our demand for energy doubled every six or seven years while our population doubled every seventy years.[15]

Just as we realized in the 1890's that the geographic frontier had closed, so are we now beginning to realize that the mineral and energy frontier is rapidly closing too.

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15 Stewart Udall, Charles N. Conconi, and David B. Osterhout, "The Great Energy Joyride", The Progressive, November 1974, p. 42.

SUGGESTED REMEDIES

I. SOURCE REDUCTION

Source reduction is defined as a reduction in the consumption of materials and products which result in a reduction in the generation of solid waste. Source reduction programs result in several benefits. These include benefits in the actual management of solid waste such as lower solid waste collection and disposal costs, less land used for disposal and less earth moving equipment needed for disposal, conservation of precious natural resources and a reduction in air, water and land pollution through less material mining and product fabrication. Finally, but probably most important, Americans would become more rational partners in the consumption of the world's resources. Currently, the U.S with 7% of the world's population consumes nearly half of the earth's yearly output of raw materials.[16]

There are two major source reduction strategies -- legislation and public education. Legislative measures include: packaging regulatory authority, deposits on beverage

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[16] Thomas F. Williams, "Environmental Protection -- The People's Choice," Speech presented at the 2nd Northeast Regional Conference of the National Audubon Society, June 8, 1974.

containers, taxing incentives and disincentives to favor recycled content in packaging, to encourage the reuse and repair of products, and to encourage the use of less mineral and energy per unit of product delivered. Public education measures include the production of printed materials, television and radio spots, slide shows and displays to encourage consumers to engage in mineral and energy conservation measures.

Source reduction goals include the following: 1) Reuse products rather than immediate disposal, 2) Reduce the consumption of energy and materials per product, 3) Extend product lifetime and 4) Decrease product econsumption.

A. SOURCE REDUCTION BENEFITS

Conservation of Natural Resources

Unfortunately, there have been no studies done to date showing possible savings of natural resources through successful source reduction programs due apparently in part to "...[the] complex product redesign considerations and technical feasibility issues."[17] It would appear, however that implementation of any type or a combination of several types of source reduction measures will result in significant conservation of natural resources. And as we have discussed previously, it is becoming increasingly necessary for the United States to think in terms of resource conservation.

What we are basically faced with in the resource supply controversy are two very divergent viewpoints. One, referred to as the neo-Malthusian specter of economic catastrophe, postulates that national and world resources are finite and the key issue is not whether they will last, but rather for how long. At the other extreme are those who believe that man and his friend, technology, will solve the problems

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17 Second Report to Congress, op. cit., p. 15.

of increasingly higher levels of resource consumption. The limits are those imposed by human knowledge, technology and economic organization; natural resources are not believed to be in short supply. At least four factors have a bearing on our future resource consumption. These are:

1) What is the extent of future mineral discoveries and what environmental and economic costs will be necessary to obtain them?
2) What is the future growth rate of world market demand? (We must not forget the underdeveloped countries here and, the implications resulting from increasing competition for the resources.)
3) What will the geopolitical events significantly affecting the U.S. position in international markets for particular commodities be? Will there be increased demands for U.S. exports?
4) Can private industry and human ingenuity really be effective in organizing raw material acquisition on a world-wide scale?[18]

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18 Ibid., p. 13

Environmental Quality Benefits

The environmental quality benefits which accrue from source reduction programs are significant. If the demand for goods is reduced, total system environmental benefits are realized. These benefits accrue initially at the mining stage since lower consumption results in mining less land to provide raw materials. Less consumption also results in decreased air, water and noise pollution at the manufacturing stage. Air and noise benefits are realized through a decrease in transportation of both raw materials and finished goods. Less land is needed for disposal of the products when they are discarded and significant air, water and noise benefits result from the decreased use of incinerators and sanitary landfills.

Solid Waste Management Savings

Successful source reduction programs result in savings in three areas: 1) collection and disposal costs, 2) land usage for disposal, and 3) equipment usage, both in collection and disposal. Additionally it is important to note that resource recovery operations are essentially limited to areas of high population density, while source reduction activities are not.

While it is expected that reducing the solid waste stream by as much as 10 to 20 per cent might not result in a decrease in collection costs in the short term, a reduction of any per cent over the long term would entail a reduction in costs. It is doubtful that collection organizations would reroute trucks to compensate for a small reduction in the generation of solid waste, however it is reasonable to assume that any reduction in the rate of growth would mean collection services would not expand through the purchase of additional trucks. Additionally, fewer pieces of earth moving equipment would be necessary at the landfill if the amount of solid waste received was significantly lowered. Disposal costs, on the other hand, would be significantly reduced immediately. For example, it has been estimated that an 8% reduction in solid waste generation nationwide would result in disposal savings of from $70 to $90 million in 1985.[19]

Land disposal costs per ton are likely to increase in the future due to higher land cost and stricter regulations concerning cover and leachate control at sanitary landfills. The greatest amount of waste is generated in highly populated areas where the value of land is high. It has been

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19 Ibid., p. 9.

increasingly difficult to obtain land for disposal that is within an economic hauling distance of the waste. A program of source reduction reduces the necessary land for waste disposal and increases the amount of land to be used for other purposes.

B. SOURCE REDUCTION STRATEGIES

There are basically two source reduction strategies: legislation and public education. The first of these constitutes a mandatory measure while the second relies on voluntary cooperation toward achievement of stated goals. What is needed is some combination of these two strategies. Here in Minnesota, the legislature has already provided one of the basic legislative approaches -- packaging regulatory authority. A discussion of the packaging program follows.

1. Packaging Regulatory Authority

a. Introduction

Packaging is the single largest component in the nation's municipal solid waste stream constituting approximately 34 per cent by weight. Additionally, packaging is one of the fastest growing components. Between 1958 and 1971 packaging materials consumption increased by 51 per cent per capita.[20] This phenomenal growth of packaging in the United States has led to increased consumption of raw materials and energy. In 1971 packaging accounted for approximately 47% of all paper production, 14% of aluminum production, 75% of glass production, 8% of steel production and 29% of plastic production. The packaging industry consumed an estimated 5% of United States industrial energy consumption in 1971.[21] It has been estimated by the U.S. Environmental Protection Agency that approximately 40-50 million tons of packaging wastes were disposed of in the

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20 Second Report to Congress, op. cit., p. xiii.

21 Ibid., p. 75.

United States in 1971.[22]

The Minnesota Pollution Control Agency has calculated that Minnesotans will throw away approximately 819 thousand tons of packaging wastes in 1975. Using the average total cost of $20 per ton for collection, transportation and disposal of solid waste, Minnesotans will spend approximately $16 million dollars to dispose of packaging wastes alone in 1975.[23]

While packaging's primary function has traditionally been one of product protection, in the last several decades we have seen a major shift in package functions. In addition to product protection, today's packages frequently function as the seller of the product.

There are two categories of products being sold by their packages. The first category consists of those items the consumer would not necessarily need so the product is pro-

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22 Ibid., p. 76.

23 This calculation was done based on the following: 1) The Minnesota population figure of 3,975,173 was taken from the middle estimate of Table 6A, "Population Projections by Region in Minnesota 1975-2000" of Minnesota Population, Minnesota Department of Health, March 1972, p. 111; 2) The EPA Solid Waste generation statistic of 3.32 lbs./capita/day; 3) The EPA statistic that packaging constitutes 34% of the municipal solid waste stream.

moted through the use of a gimmick package and/or advertising.

A recent industry report on packaging states that,

> "Less than half of the products sold by the typical supermarket receive significant media advertising. The remainder ... are promoted only by the package -- an approach that is generally less expensive than most media advertising. Thus the consumer receives the benefits of this lower - cost distribution system."[24]

We must be wary of claims by industry that this excess packaging saves the consumer money however. Someone is paying for the overpackaged product. More often than not it is the consumer who bears this cost. Gone are the days when consumers can intelligently make choices in a supermarket based on quality of product. Not only are we all victims of the Madison Avenue sales technique where talking packages scream through our television sets into our living rooms -- "buy me - buy me," but we also consistently fall prey to products which are unnecessarily packaged in several containers inside one another, containers of unusual shapes, and those in glittering foils. Both advertising and these gimmick packages sell consumers products they never dreamed were necessary for their well-

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24 Dr. Jack Milgrom and Dr. Aaron Brody, Packaging in Perspective, Report to the Ad Hoc Committee on Packaging, February 1974, C-75831, Arthur D. Little, Inc. p. S-4.

being.

The second category of product which is sold by its package consists of any product which can be packaged in such a way so as to lower the number of employees needed for a retail sales operation. This is called "self-service merchandising". Because the United States has always assumed it had unlimited material and energy resources at its command, industry decided to substitute the "cheap, bountiful" resources for the high-cost commodity -- labor. Self-service merchandising results in elaborate packaging of products which previously would have been handled by individual clerks and customers. Examples of this include precounted apples and oranges packaged in plastic bags and premeasured hardware items such as nails, screws, etc. encased in plastic and paperboard. Previously all of these items would have been weighed by a clerk and then either not packaged at all or simply placed in a paper bag.

In attempting to satisfy the convenience orientation of today's consumers there are now several different sizes of packages available in many different brands for any given product. In many cases single-serving packages are now being merchandised. These smaller packages utilize much more energy and material resources per ounce of product than packages of larger size.

When comparing the growth of product consumption to

the growth of packaging consumption for that particular product, we note an interesting trend. While food consumption increased in the United States by 2.3% by weight on a per capita basis between 1963 and 1971, the tonnage of food packaging for the same period increased by an estimated 33.3% per capita.[25] A specific example of this trend can be found in the consumption of fresh produce. Per capita consumption of fresh produce declined 11.3% between 1958 and 1970 but during that same period the packaging utilized to deliver the fresh produce to the consumer increased by 37.7%.[26]

Tables 8, 9, 10, 11 and 12 illustrate recent growth trends in consumer packaging by material type and end use.

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25 Second Report to Congress, op. cit., p. 76

26 Pat Taylor, "Source Reduction: Stemming The Tide of Trash," Environmental Action, August 17, 1974.

Table 8

PAPER PACKAGING FOR CONSUMER PRODUCTS

Type of Product	Total Consumption			Per Capita Consumption		
	Weight (10^3 tons)		Change, 1958-70 (Percent)	Weight (lb)		Change, 1958-70 (percent)
	1958	1970		1958	1970	
Food:						
Dairy	770.9	1,026.3	33.1	9.0	10.2	13.3
Fresh and cured meat	865.6	1,415.0	63.5	10.1	13.9	37.6
Prepared beverages	108.7	137.4	26.4	1.3	1.4	7.7
Frozen Foods	129.8	359.3	176.8	1.5	3.5	133.3
All other	2,022.0	2,994.8	48.1	23.6	29.3	24.2
Subtotal	3,897.0	5,932.8	52.2	45.5	58.3	28.1
Household supplies:						
Cleaning supplies	452.1	547.1	21.0	5.3	5.4	1.9
All other	168.4	148.9	11.6	2.0	1.5	-25.0
Subtotal	620.5	696.0	12.2	7.3	6.9	- 5.5
Health and beauty aids	375.2	399.7	6.5	4.4	3.9	-11.3
Other general merchandise	1,727.5	2,342.3	35.6	20.1	22.9	13.9
Total	6,620.2	9,370.8	41.5	77.3	92.0	19.0

Source: Second Report to Congress, op. cit., p. 77

Table 9

GLASS PACKAGING FOR CONSUMER PRODUCTS

Type of product	Total Consumption			Per Capita Consumption		
	Weight (10^3 tons)		Change, 1958-70 (percent)	Weight (lb)		Change, 1958-70 (percent)
	1958	1970		1958	1970	
Food:						
Beer	410.1	1,912.5	366.3	4.8	18.7	289.6
Soft drinks	359.3	2,511.3	598.9	4.2	24.6	485.7
Prepared beverages	678.6	841.9	24.1	7.9	8.3	5.1
All other	1,988.7	2,950.4	48.4	23.2	28.9	24.6
Subtotal	3,436.7	8,216.1	139.1	40.1	80.5	100.7
Household supplies	108.9	40.3	-63.0	1.3	.4	-69.2
Health and beauty aids	1,219.3	1,244.7	2.1	14.2	12.2	-14.1
Other general merchandise	304.8	105.2	-65.5	3.6	1.0	-72.2
Total	5,069.7	9,606.3	89.5	59.2	94.1	59.0

Source: Second Report to Congress, op. cit., p. 77

Table 10

STEEL PACKAGING FOR CONSUMER PRODUCTS

Type of product	Total consumption			Per capita consumption		
	Weight (10^3 tons)		Change, 1958-70 (percent)	Weight (lb)		Change, 1958-70 (percent)
	1958	1970		1958	1970	
Food:						
Beer	896.6	945.7	5.5	10.5	9.3	-11.4
Soft drinks	61.6	706.4	1,046.8	.7	6.9	885.7
Pet foods	159.8	245.9	47.6	1.9	2.4	26.3
All other	2,653.4	2,389.8	-9.9	30.9	23.4	-24.3
Subtotal	3,771.4	4,287.8	13.7	44.0	42.0	-.04
Household supplies:						
Cleaning supplies	3.8	32.0	742.1	.04	.3	650.0
Pesticides	4.7	10.9	131.9	.05	.1	100.0
All other	9.0	36.3	303.3	.10	.4	300.0
Subtotal	17.5	79.2	352.6	.19	.8	321.1
Health and beauty aids	43.0	172.1	300.2	.5	1.7	240.0
Other general merchandise	810.2	612.8	-24.4	9.5	6.0	-36.8
Total	4,642.1	5,151.9	11.0	54.2	50.5	-6.8

Source: Second Report to Congress, op. cit., p. 78.

Table 11

PLASTIC PACKAGING FOR CONSUMER PRODUCTS

Type of product	Total Consumption			Per Capita Consumption		
	Weight (10^3 tons)		Change, 1958-70 (percent)	Weight (lb)		Change, 1958-70 (percent)
	1958	1970		1958	1970	
Food:						
Baked goods	64.2	100.6	56.7	0.8	1.0	25.0
Produce	37.3	96.1	157.6	.4	.9	125.0
Candy and chewing gum	33.5	63.9	90.7	.4	.6	50.0
All other	110.0	387.0	251.8	1.3	3.8	192.3
Subtotal	245.0	647.6	164.3	2.9	6.3	117.2
Household supplies:						
Cleaning supplies	2.3	76.2	3,213.0	.020	.7	3,400.0
All other	.5	23.8	4,660.0	.006	.2	3,233.3
Subtotal	2.8	100.0	7,873.0	.026	.9	6,633.3
Health and beauty aids	6.4	78.7	1,129.7	.07	.7	900.0
Other general merchandise	83.3	633.3	660.3	1.0	6.2	520.0
Total	337.5	1,459.6	332.5	4.0	14.1	252.5

Source: Second Report to Congress, op. cit., p. 78.

Table 12

ALUMINUM PACKAGING FOR CONSUMER PRODUCTS

Type of product	Total Consumption			Per Capita Consumption		
	Weight (10^3 tons)		Change, 1958-70 (percent)	Weight (lb)		Change, 1958-70 (percent)
	1958	1970		1958	1970	
Food:						
Frozen food	16.3	52.8	223.9	0.2	0.5	150.0
Soft Drinks	-	151.9	-	-	1.5	-
Beer	-	273.5	-	-	2.7	-
Baked goods	12.3	34.3	178.9	.1	.3	200.0
All other	24.2	300.3	1,140.9	.3	2.9	866.7
Subtotal	52.8	812.8	1,438.8	.6	7.9	1,216.7
Household supplies and health and beauty aids	10.1	20.2	100.0	1.	.2	100.0
Other General merchandise	12.4	31.8	156.5	.1	.3	200.0
Total	75.3	864.8	1,048.4	.8	8.4	950.0

Source: Second Report to Congress, op. cit., p. 79.

b. The Minnesota Bill

The 1973 legislature, recognizing that one of the most effective ways to reduce the solid waste burden in the State of Minnesota was to reduce the amount of solid waste generated at the source, passed Chapter 748, The Recycling of Solid Waste Act.

Section 6 of Chapter 748 directs the MPCA to review new or revised packages or containers sold at retail in Minnesota to determine whether the package or container will constitute a solid waste disposal problem or be inconsistent with the environmental policies of the State. The State policies are derived primarily from the Minnesota State Environmental Policy Act (Minn. Stat. 116D.02, subd. 2 (Supp. 1973)) which requires that state government:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- Assure for all people of the state safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
- Discourage ecologically unsound aspects of population, economic and technological growth, and develop and implement a policy such that growth occurs only in an environmentally acceptable manner;

-Practice thrift in the use of energy and maximize the use of energy efficient systems for the utilization of energy, and minimize the environmental impact from energy production and use;

-Reduce wasteful practices which generate solid waste;

-Minimize wasteful and unnecessary depletion of non-renewable resources;

-Conserve natural resouces and minimize environmental impact by encouraging extension of product lifetime by reducing the number of unnecessary and wasteful materials practices, and by recycling materials to conserve both materials and energy.

If the Agency determines that a particular package or container constitutes an environmental problem, it may, after a public hearing, issue an order prohibiting the sale of the package or container in the State. This prohibition would last until revoked by the Agency or until the last day of the next following legislative session, whichever occurs first, unless extended by law.

The Agency also was directed by Section 6 of Chapter 748 to adopt guidelines which would identify those types of new or revised packages which would be subject to its review. Additionally the law states that any person may submit a sample package to the Agency and the Agency may require additional information on the package in order to conduct an adequate

review. It also states that if packages and/or information are certified to be confidential, the Agency shall maintain that confidentiality. The review period is statutorily limited to 120 days and if the Agency fails to act during this period, it may not thereafter prohibit the package.

The Agency is required to submit an annual report to the legislature concerning problems relating to solid waste generation and suggested remedies. Also the Agency is required to advise and assist industry in developing packages consistent with State environmental policies. (A guide to industry on packaging is currently in preparation at the MPCA.)

c. Implementation of Bill - Regulation Writing

The MPCA staff faced several immediate problems in implementation of the new legislation. Preliminary estimates from industry representatives indicated that the MPCA might receive as many as 10,000 packages per year. Therefore, a mechanism was needed to reduce this number to a reasonable level. Most importatnly, the staff was faced with producing a workable set of regulations. These regulations had to: contain criteria which industry could utilize in making at least preliminary judgements as to whether its proposed package was environmentally sound, establish a review procedure, and

determine what type of information would be needed by the staff to adequately review packages and containers.

As Minnesota was the first (and to date the only) state to pass legislation granting a state agency the authority to review packages based on environmental impacts, there was no model to follow in writing regulations or setting up the packaging review program. Another problem facing the Agency was a lack of staff with expertise in the technical aspects of package design.

Realizing that the limited MPCA source reduction staff could not possibly handle the estimated 10,000 packages in the review process each year, it narrowed its authority by use of the Department of Commerce Numerical List of Manufactured Products (New (1972) SIC Basis) which was a publication familiar to most industries. This publication had the added advantage of providing an unbiased, undisputed delineation of products by code numbers. The staff selected industry numbers 20111 - 20999 (food and beverage), 28412 - 28424 (household cleaning supplies) and 28441 - 28445 (cosmetics and toiletries) as those product areas which the Agency would review. According to a study commissioned by the U.S. EPA, these three categories constitute approximately 85% of residential packaging solid waste.

The types of package or container materials utilized by these three product categories are summarized in the

supporting document entitled "Packaging Materials Data" (See Appendix E). The Regulations for Packaging Review are therefore applicable to approximately 75% of the paper, 99% of the glass, 85% of the steel, 96% of the aluminum and 57% of the plastic in residential packaging solid waste.

In order to develop a spirit of cooperation with industry, environmentalists, and the MPCA staff in achieving the goal of a workable set of regulations, a year and a half long series of meetings was begun with a two-day session in September, 1973. Individual meetings between representatives of packaging manufacturers and users from all across the country, environmental representatives and staff members of the MPCA have been held throughout the last year. In addition, a technical advisory group, including technical representatives of all materials industries, was formed at the request of industry, and met on February 26 and March 26 of 1974 to try to reach some agreement on certain areas of the packaging regulations. At these technical meetings and by way of follow-up letters, the advisory group was requested to supply the staff with certain information which would greatly have facilitated drafting certain sections of the regulations -- most notably the criteria and exemption sections. The response from industry was not encouraging and very little information was garnered pursuant to these requests.

In addition the staff has always met with any

industry or environmental group at its request. A partial chronology of these meetings, phone and mail contacts is included in this report as Appendix C.

While the staff has been disappointed at times with the lack of cooperation by some industries and groups, the approximately year and a half long series of meetings and contacts (both formal and informal) has been beneficial. The staff has achieved a degree of technical expertise in packaging and some industries are now more aware of the environmental implications of various package design choices.

In addition to the previously described meetings, the MPCA held an unprecedented three public hearings on the proposed Regulations for Packaging Review. (See Appendix C "Packaging Program Chronology" for hearing dates.) At these public hearings any interested party was allowed to testify in person; written statements were also accepted for the hearing record. After each public hearing, the staff studied all exhibits, met with industries and environmental groups and rewrote the draft regulations.

d. Summary of Regulations for Packaging Review

The Regulations for Packaging Review are comprised of 6 sections (SR-1 through SR-6) each further divided by

subsections.

SR-1 entitled "Applicability and Scope" contains three subsections entitled Scope, Definitions and Severability.

SR-1 (A) sets forth the scope and purpose of the regulations. It states that the regulations will identify those types of new or revised packages which may be subject to Agency review, sets forth the criteria to be considered by the Agency in its package review procedure, establishes the type of information the Agency may require to review packages, establishes the submission and review procedure to be utilized and sets forth certain exemptions for new or revised packages.

SR-1 (B) defines pertinent terms which are utilized throughout the regulations such as "Agency," "Closure," "New or Revised," "Package/Container," "Person," Review Period," "Sold at Retail," and User."

SR-1 (C) provides for severability of the various provisions of the packaging regulations.

SR-2 entitled "Criteria" contains three subsections dealing with the criteria to be utilized in the package review process.

SR-2 (A) states that the Agency shall place emphasis upon state responsibilities and policies established by the Minnesota Environmental Policies Act and by the Recycling of Solid Waste Act.

SR-2 (B) provides for a comparison between the new or revised package with packaging alternatives. The Agency shall assess the relative merits of each and encourage those packaging alternatives which:

1. Minimize the potential for environmental contamination, including but not limited to the release of metals or substances with the potential for biological harm;
2. Minimize the total system energy costs (these include: mining, manufacturing, fabrication, transportation and disposal);
3. Minimize the use of scarce or non-renewable resources;
4. Minimize the use of virgin materials;
5. Are most recyclable where recyclability is consistent with 1 and 2 above;
6. Minimize adverse economic effects on the consumer, the labor force, and industry, consistent with 1 and 2 above.

SR-2 (C) also provides for comparison among the new or revised package, any existing package and all feasible alternatives submitted to the Agency and states that the total positive impacts of the new or revised package in comparison to the alternatives submitted shall be weighed against the total negative impacts based upon criteria which are more

specific than found in SR-2 (B).

SR-3 entitled "Review Procedure" contains three subsections which describe how the review process may be initiated and how the Agency's review procedure will progress upon initiation.

SR-3 (A) provides for initiation of the review procedure by 1) the package user, 2) the Agency itself, or 3) any other person; however the package user is not required to submit the new or revised package before beginning retail sale in Minnesota.

SR-3 (B) states that if the Agency determines that the package is inconsistent with state environmental policies, it may by order made after notice and hearing, prohibit the sale of the package within the state. If the package is deemed acceptable, the Agency shall so notify the package user. If the package has been approved it may be used to convey products within the same five-digit product group of the Numerical List of Manufactured Products (New (1972) SIC Basis) without further review by the Agency.

SR-5 (C) sets out the procedure to be utilized by the Agency if the review process is initiated by either the Agency or any other person. A Notice of Intention to Review will be sent to the package user within 10 days. The user will then have 30 days to submit the required information to the Agency.

SR-4 entitled "Exemptions" contains 5 sections which describe a series of minor changes and other circumstances which could exempt a package from Agency review.

SR-4 (A) exempts a new or revised package from Agency review if it is marketed with a deposit of five cents or more, if it has a capacity of over 2 gallons by volume or twenty-five pounds by weight, if the change is required by federal laws or regulations relating to health or safety, if it conveys products subject to regulations under the Federal Meat Inspection Act or if it conveys products outside of the three categories the Agency is reviewing.

SR-4 (B) contains a series of exemptions for packages of each materials industry (glass, aluminum, steel, paper and plastic) involving routine, minimal changes in package design which would constitute insignificant solid waste and environmental impact.

SR-4 (C) states the Agency's interpretation of the grandfather clause -- if a package is identical in all ways to one sold at retail in Minnesota before May 25, 1973, and if the product to be conveyed in the package is within the same five-digit product groups of the Numerical List of Manufactured Products (New (1972) SIC Basis), it shall not be reviewed by the Agency.

SR-4 (D) provides for the package user to defer the review of a package for a prescribed number of days, in con-

sultation with the Agency, in the case of test marketing, seasonal or promotional purposes or in an emergency situation.

SR-4 (E) indicates that a package user who believes his new or revised package to be exempt from Agency review may, but is not required to, obtain a Certification of Exemption from the Agency.

SR-5 entitled "Information Required for Review" contains four subsections delineating the information required by the Agency on the new or revised package, existing packages (if any) and all feasible alternatives considered.

SR-5 (A) states that the user may or may not submit a sample of the new or revised package under Agency review.

SR-5 (B) describes that information required by the Agency on the new or revised package.

SR-5 (C) describes that information required by the Agency on any original package.

SR-5 (D) describes that information required by the Agency on all feasible alternatives the user considered.

SR-6 entitled "Confidentiality" contains one subsection which reiterates that the Agency shall maintain the confidentiality of a submitted sample and information if the user certifies them to be confidential at the time of submission.

e. Areas of Conflict Between MPCA and Industry

There are two major areas of conflict remaining between the Agency and industry in the matter of the Regulations for Packaging Review. These are the Agency's interpretation of the "grandfather clause" and the nature of the criteria which the Agency shall employ in reviewing packages.

The Grandfather Clause Issue

According to the enabling statute, the packaging review authority " ... shall not apply to any package or container sold at retail in this state prior to final enactment of sections 116F.01 to 116F.08." (Minn. Stat. Chapter 116F (Supp. 1973) Most industry spokespersons interpret the statute to mean that any grandfathered material may be used for any product. The Agency, as well as most environmentalists, maintains the position that the Agency must consider the package in light of the product contained therein otherwise the law becomes nearly meaningless since almost all known packaging materials have been grandfathered.

The Agency position that it is necessary to consider a package unit (package plus product) becomes clear from the following example. While a three material package may be environmentally acceptable as a tennis ball container, it should not be used as a snack food container without Agency

review. This review would be logical because tennis ball containers are produced in small quantities relative to snack food containers. Additionally since the tennis ball container is reused at least through the lifetime of the tennis balls, it needs to be more durable. The only prerequisite for the snack food container on the other hand, is that it adequately protect the product. Its container will be disposed of immediately upon opening and is not likely to ever be reused no matter what shape or material the container utilizes. For these reasons, the Agency believes the product contained by the package must be considered in the package review process.

It is interesting to note that two recent industry publications on packaging indicate an industry position that the product is inextricably linked to the package conveying it. In Packaging in Perspective the authors state, "But packaging does not operate in a vacuum -- it must function with the product ..."[27] Hanlon's Handbook of Package Engineering states"The product and the package are becoming so interdependent that we cannot consider one without the other."[28]

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27 Milgrom and Brody, op. cit., p. 171.

28 Joseph F. Hanlon, Handbook of Packaging Engineering, McGraw-Hill, 1971, p. 1-1.

Additionally, there is evidence to indicate that some Minnesota legislators hold the opinion that the Agency may not have interpreted the grandfather clause in a strict enough manner. At a legislative oversight hearing held before the House Committee on Environmental Preservation and Natural Resources - Subcommittee on Environment and Pollution Control and the Senate Committee on Natural Resources and Agriculture-Subcommittee on Environmental Protection on May 29, 1974, one legislator interpreted the grandfather clause to mean that any company using a particular grandfathered package or container could go on using it but if any other company began using the same package or container, it would be subject to Agency review. For example, if the Pepsi Cola Company was bottling Pepsi Cola in a particular bottle before May 25, 1973, the Coca Cola Company could not introduce their product in the same container after May 25, 1973, even though both companies' products would be classified within the same five-digit product group of the SIC code.

Subjective Criteria

The Development of a set of criteria which could provide assistance to industry in predetermining whether a specific package would be approved by the Agency or not, proved to be a difficult problem. Initially industry sought

some type of weighted numerical system which it could utilize to predetermine Agency acceptability. Because the technical data base was not yet complete, at the suggestion of industry spokespersons, the Agency adopted the comparison concept of reviewing packages. Consequently, the Regulations have been drafted to allow the new or revised package to be compared to any original package and to all feasible alternatives submitted by the package user to the Agency. As discussed previously, if the staff wishes to prohibit a package, there must be a public hearing at which time not only the affected package user, but also any other person may present whatever evidence he can to prove the staff in error in its determination. Therefore, the regulations do not unfairly subject an industry to a "subjective, arbitary" staff decision as has been alleged at times by some.

f. Current Status of Packaging Review Program

The Regulations for Packaging Review were adopted by the MPCA Board at its meeting on October 29, 1974. On November 27, 1974, the Regulations, accompanied by the hearing record, were sent to the Office of the Attorney General for review as to form and legality. The Rule Making Procedure of the Attorney General provides for an informal appeal during

the twenty days that office has to review a set of regulations. Consequently on December 6, 1974, a meeting was held between counsel representing the Office of the Attorney General, the MPCA and the Can Manufacturer's Institute (CMI). CMI requested that the Regulations be declared illegal. On December 16, 1974, a meeting was held between counsel representing the Office of the Attorney General and the MPCA, a representative of the Minnesota Association of Commerce and Industry (MACI) and counsel for the Society of Plastics Institute. Again the request was made to declare the Regulations illegal.

The Attorney General's Office found that the Agency had exceeded its authority by an extension of the statutorily prescribed review period and requested that the Agency rectify this error. The staff did so and by a telephone poll of the MPCA Board (which action will be confirmed at the January 21, 1975, Agency meeting) received approval for the change. The Regulations were resubmitted to the Office of the Attorney General and they were filed with the Secretary of State on December 31, 1974. Consequently, as of that date, the Regulations are legally enforceable.

The staff has developed administrative forms to be utilized by industry in submitting the information required under SR-5 of the Regulations. These forms are included in this report as Appendix C.

g. Summary of Proposed Amendments to Chapter 748

Relationship Between Product and Package

The Agency believes this point in the current legislation needs some clarification. We therefore recommend the inclusion of some additional definitions in the law. These definitions include:

> "Package or container" means any article, receptacle, device or contrivance made in whole or in part of paper, fiber, wood, ceramic, glass, metal, plastic or any combination of such materials, including but not limited to bags, baskets, bottles, boxes, cans, cartons, carrying cases, cups, cylinders, envelopes, glasses, jars, jugs, pails, tubs, sacks, trays, tubes, tumblers, and vessels intended for use in conveying any product for sale at retail.
>
> "User" means any industry which combines a package or container and product to create a unit intended for sale at retail.

These definitions are necessary to define terms used throughout the law in discussing the packaging review authority.

> "Package or container unit" means a package or container and the product it conveys. For the purpose of this Act, products shall be classified

according to the five-digit product codes of the Numerical List of Manufactured Products (New (1972) SIC Basis).

"New or revised" means either a new packaging concept not previously sold at retail in Minnesota or any change in a package or container sold at retail before May 25, 1973, or approved for sale at retail under this law. Such changes include, but are not limited to: change from one product to another product (different five-digit product codes of the Numerical List of Manufactured Products (New (1972) SIC Basis)) contained in the package or container; change in the chemical formulation of any constituent material; substitution of one or more constituent materials; substitution of closure; substitution of label; change in design; and all other changes, except any changes in color, printing, or shape. Changes from one product to another within the same five-digit product code of the Numerical List of Manufactured Products (New (1972) SIC Basis) shall not be considered a change of product for purposes of this definition.

By virtue of these two definitions, there should be no question remaining on this point. The packages will be

considered as a unit with the product in the package review process.

Review Period

The current Statute requires the Agency to conduct the package review process within 120 days after receipt of a sample. This review period may be extended by a period of 30 days "for good cause".

The Agency has two problems with this section of the law. First, it is essential to the package review process that the Agency have appropriate information on a package before an adequate package review can be accomplished. The current law states that the 120 days begins to run at receipt of the sample -- not receipt of the necessary information. This means that if the package review process is initiated by someone other than the package user, up to 40 days out of the 120 day review period may be lost because the Agency has 10 days to send the user a Notice of Intention to Review; the user then has 30 days to submit the information.

Even if the review process is initiated by the package user, he may not include all of the information required by the Agency at the time he submits the sample.

We therefore strongly recommend that this section of the law be changed so that the review period commences

at the submission of the required information.

The second problem with the review period involves the actual length of time for review granted to the Agency. On the surface it would seem that 120 days (4 months) is certainly a sufficient length of time for the MPCA to review a package. However, statutory requirements as well as the Agency's decision-making mechanisms (via monthly Agency meetings) mean that the Agency staff might have only from 1 - 5 weeks to actually review a package.

The following steps must be completed during the 120 day review period allowed by statute (subject to a 30 day extension, for "good cause" shown):

1. Agency staff reviews package and decides to seek authorization for a hearing to consider possible prohibition of a package.
2. Matter is put on Agency agenda for meeting (agenda is sent out, according to Minn. Reg. MPCA 3(b)(4)(iii), 10 days before meeting).
3. Agency meets and:
   a. authorizes hearing
   b. authorizes Executive Director to appoint a Hearing Officer.

   (At some later point the Agency would also have to approve the Hearing Officer's Contract.)
4. Notice of Hearing is sent out (at least 33 days before date of hearing, pursuant to statute and Minn. Reg. MPCA 9(1)).

5. Hearing is held.

6. Hearing Officer submits his recommendations to the Agency (according to Minn. Reg. MPCA 9(o)), within 30 days of close of Hearing).

7. Hearing Officer's recommedations and hearing record sent out to Agency members.

8. Matter is put on Agency agenda for next meeting. (See Step 2.)

9. Agency acts on the matter of possible prohibition.

Following these nine steps and making certain assumptions (described below) the following might be a typical scenario:

Assumptions: A. Package submitted by the user company with all accompanying information needed for review.

B. All Agency decisions made at regular monthly meetings, and not at special meetings or by telephone poll.

C. Hearing Office takes entire 30 day period to prepare his findings.

1. February 1 - Package and information submitted. It is determined that the 120 day period ends May 31. Counting backward then, the following timetable would result.

2. February 7 - Matter must be put on Agency agenda.

3. February 18 - Agency meets and authorizes the holding of hearing and appointing of a Hearing Officer.

4. February 19 - Notice of Hearing is mailed out.
5. March 24-25 - Hearing is held.
6. April 22 - Hearing Officer's recommendations received at Agency.
7. April 23 - Record of Hearing and Hearing Officer's recommendation sent to Agency members (Record must circulate among the nine members so that they can make reasonable decision.)
8. May 9 - Matter put on Agency agenda.
9. May 20 - Agency meets to act on the matter.

Although this gives the staff only 5 working days to review the package -- obviously inadequate for so complex a task -- this is not the "worst case" situation. Changes in the assumptions could provide either less or more time for staff review.

Assumption A: If the Agency initiates review, pursuant to SR-3(A)(2), or a consumer initiates review by submitting a package, pursuant to SR-3(A)(3), an additional period, up to 40 days, may be added before review can actually begin. This additional period is for notification to the package user and his submission of the information needed for review (as provided in SR-3(6)).

Assumption B: Agency rules (Minn. Reg. MPCA 3(5)(v)) provide for Agency decisions to be made by telephone poll, subject to confirmation at the next Agency meeting. Certain

of the preliminary Agency decisions (authorization for Hearing, authorization to appoint a Hearing Officer, and approval of Hearing Officer's contract) could be made in this manner. However, it would seem inappropriate for the Agency's final decision, regarding possible prohibition, to be made in this fashion, because of the inevitable controversial nature of such an action.

Assumption C: The Agency's rules provide for submission of the Hearing Officer's recommendations within 30 days of the hearing. However, the Agency could require in its contract with the Hearing Officer that they be submitted in a shorter period. A minimum of two weeks would probably be required in a matter of this complexity.

The Agency therefore recommends that the legislature change the 120 day review period to 180 days. This change would allow the staff to conduct an adequate review of the package.

Other Changes

Inasmuch as the size of a package or container is a significant environmental and consumer issue, it is recommended that the Agency be allowed to consider changes in size of package as a part of its package review. The current law excludes the Agency from reviewing size changes in packages.

Small packages not only utilize more energy and material resources than larger packages, but also cost the consumer more to purchase per unit of product.

The current law states that "The agency shall review the sample [which has been submitted] ..." Since this could place an unreasonable burden on the limited package review staff of the Agency in the review of environmentally insignificant package changes, it is recommended that the language be changed to read, "The agency may review ..." Additionally, the following language is recommended. "If the Agency decides not to review a sample package or container unit which has been submitted to it, it shall not thereafter review the previously submitted package or container unit."

The current statutory language implies that the required information must be obtained from the person submitting the sample package. Since in many cases, the person initiating the review process will not have access to the necessary information, it is recommended that the law identify the manufacturer or user as the person responsible for the submission of information to the Agency.

The recommended changes are contained in Appendix B of this report.

2. Beverage Container Legislation

a. Introduction

The proliferation of throwaway beverage containers is a fairly recent problem but was foreseen as early as 1939 as witnessed by the following from Business Week:

> Campaign for the throwaway bottle is temporarily stymied in Michigan, Vermont, and New Hampshire by a refusal of authorities to revoke regulations requiring deposits for beer bottles...Opponents to charge say... that convivialists will clutter the highways and create tire hazards with empties."[29]

With the advent of convenience products, beverage containers changed from an all-refillable system to a predominantly throw-away system in order to provide the consumer with the convenience of drinking his beverage in a "new" container and disposing of each container rather than returning it for reuse and refilling. The price of this "convenience" is $.065 per can.[30] When a consumer purchases a case of 24 cans of soft drink, he pays $1.56 for the packaging alone. Since beverage

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29 "The One Trip Beer Bottle," Business Week, September 23, 1939, p. 32.

30 EPA information based on industry contacts.

containers are often improperly disposed of on roadsides and in public areas, the consumer also pays indirectly through taxes for the collection and disposal of those beverage containers. If the consumer were made aware of the expense of this convenience, he would be more inclined to opt for returnable containers. However, consumers are not informed through advertising of the true costs of throwaway beverage containers. And the various shapes and sizes of throwaway beverage containers makes it difficult for consumers to do any comparison shopping when making their soft drink purchase. Instead they are subject to advertising which promotes the consumption of throwaway beverage containers that will later be recycled. In order to appease the environmental conscience of the audience, companies encourage the use of recyclable one-way containers. One aluminum company proclaims that "Today's waste can be tomorrow's resources." But why toss diamonds into the front end of the solid waste stream so that diamonds can be recovered at the end of the stream? And how many of those aluminum diamonds are currently being recycled? How many continue to be conveniently tossed away? The aluminum industry as a whole is currently recycling about 16% of the cans produced.[31]

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[31] Pat Taylor, "Debunking Madison Avenue," Environmental Action, December 18, 1974, p. 8.

Consumers do have a token economic incentive to return aluminum beverage containers to a recycling center since they receive 15¢ per pound. This means that each can is worth slightly less than 1¢. That few people are motivated to return their empty cans is evidenced by the above stated recycling rate. Frequently, returning cans to a recycling center requires a special trip in the car. The expenditure of precious fuel for their return will often be greater than the energy saved from recycling the cans. We do not encourage expending large amounts of fuel in order to recycle a small number of beverage containers.

One aluminum company has approached this problem by encouraging consumers to make a concerted effort to collect cans for recycling in those areas of the country "...where aluminum cans abound." They use a public relations brochure which includes descriptions of "How To Identify Aluminum Cans," "Where To Find Aluminum Cans," and "What To Do When You Find Aluminum Cans."

The section entitled "Where To Find Aluminum Cans" indicates that:

> Once you have determined that there are enough cans available in your area to make a nice profit, you will want to pin down those places where the cans are most likely to be found. Start your search in places where people congregate; parks, beaches, etc., then try the roadsides where some of your less tidy neighbors throw their trash. You might want to save yourself some steps by asking your neighbors or local tavern owners to save their empty aluminum cans for you. Weekends and Monday mornings are usually the best times to search

for cans.[32]

These kinds of advertising and public relations campaigns, involving hundreds of thousands of dollars and the most sophisticated mind manipulating techniques, are designed to create widespread public acceptance of wasteful throwaway containers on the grounds that they are recyclable and therefore "good" for the environment.

It is not our intention to single out the aluminun container for criticism; we do not approve of any throwaway beverage container. Since the aluminum beverage system is the most energy intensive of all beverage container systems, it has been in the forefront of criticism from environmental groups which in turn has necessitated a response from the industry. We cite the aluminum beverage container merely as an example of one industry's public relations response to possible container legislation.

Recycling is not the optimum solution to the environmental problems caused by beverage containers, however. A proposal encouraging source reduction, such as beverage container legislation, would represent a better solution. The following

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[32] "Aluminum Can Recycling - Desirable and Profitable," Alcoa Form A13-13414.

table compares the potential energy savings of recycling as compared to source reduction.

Table 13

Potential Energy Savings
Recycling Versus Source Reduction
An Example

	Potential Savings in Quadrillion Btu's in 1972
14 million tons of ferrous metals, aluminum, and glass could have been recovered using practical recovery rates	0.17*
all-refillable beverage container system nationwide (10 returns/bottle)	0.22**

*Source: Federal Energy Administration, Project Independence, Appendices, p. 171.

**Source: Federal Energy Administration, Project Independence, Appendices, p. 174.

The potential energy savings from an all-refillable system is 1.28 times greater than the total energy savings that might have been achieved through recycling ferrous metal, aluminum, and glass at practical recovery rates in 1972.

As witnessed by this example, recycling is not the best option and it would be more desirable to control the generation of beverage containers at the source.

b. Scope of the Problem

The increase in the production of non-returnable containers has made a rapid and distinct change over the last several decades.

According to computations by ecologist Barry Commoner, the highest postwar growth rate has been in the production of non-returnable soda bottles -- an increase of 53,000%.[33] The increase in the consumption of beverage containers has far exceeded the increase in the consumption of beverage. While the consumption of beer and soft drink containers rose 221% between 1959 and 1972, the consumption of beer and soft drinks rose only 33% for the same time period.[34]

The amount of natural resources used for packaging of beverage containers is staggering. The aluminum can accounts for 80% of all aluminum used for packaging, and beer and soft drink containers account for 80% of all aluminum cans produced. They are therefore directly responsible for the increase in the con-

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33 Stewart Udall, et. at., op. cit. p. 43.

34 Federal Energy Administration, Project Independence Report, U.S. Government Printing Office 4118-00029, Appendices p. 174.

sumption of aluminum for packaging. According to a report written by the Research Triangle Institute for the U.S. EPA,

> In 1967, the first year for which detailed data on aluminum cans were available, 177,000 tonnes of aluminum were converted into cans; by 1970, the amount of aluminum in can fabrication had increased 87% to 331,000 tonnes.[35]

The same report indicates that for the time period 1958-1970, the amount of steel used for the packaging of soft drinks increased twenty-fold.[36]

Minnesotans consume large numbers of throwaway containers and therefore contribute to the consumption and disposal problems inherent in the throwaway beverage container problem. Based on current national average growth rates, Minnesotans consume over 631 million throwaway beverage containers per year.[37]

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35 Taylor H. Bingham, et. at., An Evaluation of the Effectiveness and Costs of Regulatory and Fiscal Policy Instruments on Product Packaging, Research Triangle Institute, Contract No. 68-01-0791, RTI Project No. 41U-824, p. 52.

36 Ibid., p. 50.

37 Robert Dildine and Ron Rainey, Impacts of Beverage Container Regulation in Minnesota, January 1974, p. 7.

C. Solution to the Problem

The most frequently recommended solution to the problem of the throwaway beverage container is container deposit legislation. A refundable deposit on all beverage containers would encourage their return and reuse. Thus there would be a reduction in the wasteful use of both energy and material resources as well as a reduction in litter, solid waste and air and water pollution.

Since the use of nonrefillable containers requires more than twice the amount of energy necessary for packaging the refillable containers, about 0.22 quads (1 quadrillion Btu/year = 470,000 barrels of crude oil per day) could have been saved in 1972 alone if the country had had a totally refillable beverage container system and each container had been filled at least 10 times.[38] Assuming a 90% refillable bottle market, in which reduction in energy required to produce beverage containers would be approximately 0.194 quads., the conservation potential due to this measure is estimated to be 0.28 quads in 1980 and 0.310 quads in 1985.[39] Therefore, if the State of Minnesota were to

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38 FEA, Project Independence, op. cit., Appendices p. 174.

39 Ibid., Appendices pp. 179-180.

return to an all-refillable beverage container system, significant energy savings would also accrue. A report written by the State Planning Agency indicates that if Minnesota were to go to an all-refillable system 2.15 trillion BTU's/yr. would be saved on a nationwise basis.[40]

Significant resource savings would also accrue with an all-refillable system. According to EPA statistics in 1972 0.4 million tons of aluminum, 6.0 million tons of glass and 1.6 million tons of steel were utilized in the current beverage container system.[41] (These figures include both returnable and non-returnable systems.) If we as a nation were to return to a 100% refillable beverage container system, we would save 5-6 million tons of our material resources, split up in the following way: 0.4 million tons of aluminum, 1.5 million tons of steel and 3-4 million tons of glass (varying with the trippage rates of the refillable bottles). According to the State Planning Agency report, 62.88 million lbs. glass/yr., 42.54 million lbs. steel/yr. and 5.028 million lbs. aluminum/yr. would be saved if Minnesota were to return to an all-refillable beverage container system.[42]

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40 Dildine and Rainey, op. cit., p. 31.

41 Telephone conversation with Michael Loube of the U.S. EPA on January 7, 1975.

42 Ibid., p. 32.

The abundance of litter and solid waste resulting from beverage containers is another important problem. In 1969 from 20-32% of all roadside litter by item count (2.2 billion) were beverage containers. By type of container, it is estimated that 73.1% were cans and 17.0% were non-refillable bottles.[43] Beverage packaging is a significant part of the solid waste stream. In 1972 beverage packaging represented approximately 20% of all packaging waste and 7% of total municipal solid waste. This segment of the solid waste stream continues to grow at the phenomenal rate of 8% per year.[44]

The State Planning Agency report indicates a possible reduction in litter accumulation of 30% and possible monetary savings of up to $860,000/yr. in clean-up costs accruing mostly to local government if Minnesota were to pass beverage container legislation.[45] The report estimates a reduction of 47,800 tons in solid waste.[46]

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43 Second Report to Congress, op. cit., p. 83

44 "Baseline Forecast of Resource Recovery 1972-1990," Midwest Research Institute (unpublished report), EPA contract number 68-01-1828.

45 Dildine and Rainey, op. cit., table 4.2, p. 53.

46 Ibid., p. 63.

Additionally, a system of all-returnable beverage containers would result in less air and water pollution. Assuming a return rate of each bottle of ten times, there would be a reduction of air effluents of 30-71% and a 34-87% reduction in waterborne waste.[47]

The following table provides a comparison of five different beverage container systems and the value of several environmental impacts of each system.

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47 Second Report to Congress, p. 83.

Table 14

SUMMARY OF COMPOSITE DATA FOR CONTAINER SYSTEMS
FOR 1,000 LITERS (AND 1,000 GALLONS) OF BEER

	10 trips returnable glass	All Steel	Bimetallic	One-way Glass	Aluminum
Raw materials (lb.)	1,560	2,722	2,746	7,541	1,986
Energy (10^6 BTU)	21.61	38.63	53.73	64.38	75.03
Water (1000 gal.)	15.42	39.02	34.10	36.94	15.11
Industrial Solid Waste (cu. ft.)	8.91	108.0	93.00	33.46	36.13
Atmospheric Emissions (lb.)	94.15	145.8	221.9	261.1	323.2
Waterborne Wastes (lb.)	34.76	18.14	34.35	56.46	59.08
Post-consumer Solid Waste (cu. ft.)	11.96	3.49	3.22	40.97	2.75

Source: Resource and Environmental Profile Analysis of Nine Beverage Container Alternatives. U.S. Environmental Protection Agency. SW-91c, p. 21

It is apparent from the table that the ten-trip returnable glass system represents the least environmental impact in all but three areas: water, waterborne wastes and post-consumer solid waste. The ranking in these three areas is not only very close but the adverse environmental impacts associated with these three parameters is slight in comparison to other parameters utilized in the table. For example, the use of virgin raw materials and energy is the most important consideration in the selection of a beverage container system. As discussed previously, the U.S. is dependent on other countries for many raw materials it uses; we are currently importing 90% of the bauxite needed to make aluminum.[48] The ten-trip returnable glass system is clearly less energy and material intensive in comparison to all other systems. Additionally, this system results in significantly less air pollution than the others.

As a refillable beverage container system would create desirable environmental effects without jeopardizing the employment of Minnesota citizens,[49] we recommend a return to an all-refillable system through beverage container legislation.

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48 The Mining and Minerals Policy, Second Annual Report of the Secretary of the Interior Under the Mining and Minerals Policy Act of 1970, Library of Congress number 72-622941, U.S. Government Printing Office, June 1973, p. 22.

49 Dildine and Rainey, op. cit., pp. 76-83a predict a net gain of 435 jobs in Minnesota with a refillable beverage container system.

3. Public Education

As discussed previously, we do not believe consumers are afforded the opportunity to make rational choices -- not only at the supermarket -- but in their every day lives. What has caused the consumer to believe he needs "convenience items? What has caused him to change to a throwaway mentality? What has changed this society from one that used to believe in repairing an item rather than buying a new one?

The answer to these questions is not readily apparent, however we suspect that industry advertising has made a significant impact on consumer habits. With the growing popularity of television in the 1950's, industry had its most successful media vehicle to further stimulate demand for its products. Advertising has the potential for creating a demand for a product the consumer never realized he "needed." As an example of this thesis, consider the case of the "fruit ripening bowl." Ludicrous as an electric bowl to ripen fruit sounds, a considerable consumer demand could be generated through an advertising campaign. However, before the advent of such a product and advertising campaign, the very consumers who ultimately would purchase this particular product would have given no thought to an electric fruit ripener. We believe the approach of creating an unnecessary product followed by an intensive advertising campaign to create consumer demand for it, happens all too frequently in the real world.

We have already discussed, in other sections of this report, the implications for the environment of further proliferation of non-essential products. To reiterate, these include air, water and land pollution associated with the mining, manufacturing, fabrication, transportation, and disposal of the product. Also the expanded popularity of such products contributes to the approaching shortages of material and energy resources.

We believe that public education in the area of source reduction is an effective measure to take toward achieving the goal of retarding the growth in the municipal solid waste stream. Industry has proven that consumers will respond to advertising, therefore it is our belief that consumers will also respond to environmental public education programs. All types of education should be utilized: radio and television, printed materials and displays in areas of heavy pedestrian traffic (e.g. shopping centers). It should also be pointed out that source reduction programs frequently coincide with consumer savings.

Since it is imperative that an attempt be made to adequately educate consumers, it is therefore recommended that the MPCA be granted the authority, staff, and budget to bring the facts to Minnesota consumers regarding the environmental consequences of their purchases.

C. SOURCE REDUCTION GOALS

Source reduction goals include the following: 1) Reuse containers rather than immediately disposing of them, 2) Reduce the consumption of energy and materials per product, 3) Extend product lifetime and 4) Decrease product consumption.

One of the most effective measures in achieving the goal of container reuse is to curtail the proliferation of one-way beverage containers through deposit legislation. Also uniform size and shape of containers, where possible, would enhance the reuseability of many other containers. For example, if pickle jars, mayonnaise jars, milk bottles, peanut butter jars, and ketchup jars, to mention only a few products, were manufactured in standard sizes and shapes, they could be returned to the store and then washed and filled either with the same product or a different one. This would be possible with many products packaged in glass and some packaged in plastic.

According to Michael Loube of the U.S. Environmental Protection Agency,[50] returnable plastic milk bottles in the Kansas City area are making 180 trips, a very impressive

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[50] Telephone conversation with Michael Loube of U.S. EPA on January 10, 1975.

return rate. Opponents of the system there claim this to be an inflated figure and argue that the trippage rate is only 100. Therefore it is recommended that Minnesota develop both economic and regulatory mechanisms to encourage a return to the use of refillable containers.

The second goal of source reduction programs is to reduce the consumption of energy and materials per product. This can be done by encouraging more efficient design and engineering of such diverse items as buildings, automobiles, and computers.

In the area of packaging, larger packages should be encouraged as they use fewer materials and energy to produce per unit of product. Current law prohibits the MPCA from reviewing changes in package size; we recommed that this restriction on the packaging review program of the Agency be rescinded. (See Appendix B for suggested change.)

The recent resurgence of successfully managed food and other consumer cooperatives deserves special attention, since they tend to be far less dependent on product packaging, and they also provide substantial savings to the budget-conscious shopper. It should be noted that the purchase of unprocessed and unpackaged produce tends to reduce the total energy cost for food. It apparently takes three times as much energy on the average to deliver a physical unit of processed food (e.g., frozen green beans) than farm produce,

(e.g., fresh green beans).[51] We recommend that the state carefully research possible ways of further promoting the establishment and operation of food and other consumer cooperatives.

The third goal of source reduction programs is to extend the lifetime of products. Because industry profitability is tied to the number of units of product sold, it is unlikely that manufacturers will voluntarily build products to last longer without some type of economic incentive.

This incentive could be of a positive or negative nature. A subsidy might be provided for manufacturers of certain classes of products to promote longer product lifetimes, including large items such as automobiles, refrigerators, stoves, television sets, furniture, etc. and/or smaller items such as radios, flashlights, hair dryers, cigarette lighters to name a few. Alternatively, product lifetime standards might be mandated by law. However, the implementation of such measures to improve product lifetime appears difficult. It would not be an easy matter to determine whether a given product would ultimately meet a set lifetime standard, nor would it be easy to determine whether the product manufacturer was eligible for a subsidy on each particular product sold.

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51 Eric Hirst, Energy Use for Food in the United States, Oakridge National Laboratory, ORNL-NSF-EP-57, October 1973, p. 29.

It would probably be equally difficult to employ tax disincentives on short-lived products.

Another method of encouraging the extension of product lifetime is an improved, expanded product warranty system. Warranties could be expanded to guarantee all product repairs -- of breakage during normal use -- for the total lifetime of the product. If manufacturers were required to bear the financial burden for repair of their products, they would have an incentive to produce products of higher quality and longer life. Alternatively, economic incentives might be offered to encourage those manufacturers willing to shift in this direction and disincentives to those with either short term or nonexistent warranties. Also consumers should be able to more easily take advantage of the warranty system. Oftentimes products must be mailed back to the manufacturer (at consumer expense) for repairs that take weeks and sometimes longer. Warranties should be designed so that the consumer is able to choose from a number of local repair shops. It is therefore recommended that the warranty system be expanded and improved to encourage the extension of product lifetime.

Additionally, consideration should be given to subsidizing the repair industry so that the consumer would be charged less for the repair of certain appliances thereby providing an incentive for the consumer to get his products

repaired instad of disposing of them as soon as they break down. This subsidy conceivably could take the form of a tax credit. The credit might be based on a percentage of the repair business income or on the number of items repaired in a year. There are problems with both of these however. If the credit was figured on the firm's income, there would be no incentive to pass the savings on to the consumer, since the firm would want to keep its income up to receive a higher subsidy the next year. To base a tax credit on number of items repaired would probably result in unreasonable administrative burdens both on the Department of Revenue and the firm involved. Additionally, there would probably have to be some system for assigning "credit weights" to various items. For example, a shoe repair shop would repair many more items in a year than a television repair shop.

Even though we recognize several problems potentially inherent in a subsidy system for the repair business, we recommend a study be done on possible tax incentives for Minnesota's repair industry.

Another approach to extension of product lifetime is through public education programs aimed at consumers. It is assumed that if consumers were made aware of the environmental degredation, the exhaustion of energy and material resources and the economic consequences for themselves occurring as a result of a proliferation of short-lived products, a

shift in consumer expenditures would occur. It has frequently been said, "Only the rich can afford to buy cheap products." This is true because only someone to whom money is unimportant can afford to be continually replacing the same product over and over. If consumers, aware at last, were to demand higher quality, longer lasting products, they would be produced. Consumers should be encouraged, through public education programs to purchase only high quality products of a class they really need.

-- If you don't need it, don't buy it.

-- If you do need it, select a brand that is of high quality and durable.

-- If it breaks, get it repaired rather than disposing of it.

-- If you no longer need the item, give it to a friend or charitable organization rather than disposing of it.

The fourth goal of source reduction programs is to decrease product consumption. This goal can be achieved primarily through public education. Consumers should be encouraged to avoid the purchase of non-essential products whenever possible.

We have listed the goals of source reduction programs and have suggested some possible methods of achieving those goals. Some of these suggested methods represent first thoughts on the subject and deserve study on either the state or federal level.

II. MATERIAL AND ENERGY RECOVERY

A. QUESTIONS TO CONSIDER

Before the State commits funds to material and energy recovery systems there are several qustions which should be answered.

Many of the basic questions concern the demand aspect of energy and material recovery systems. These are:

- What is the present demand for recycled materials?
- How do these markets operate?
- Have the markets reached full capacity to handle the present volume of recovered materials?
- What room do these markets have for growth?
- What are the markets within an economically feasible transportation distance from Minnesota?
- Are there financial incentives that could be used to encourage the demand for recycled materials?
- Where in the economic structure might these incentives be applied?
- How would the incentives operate?
- Could they be enacted into law?

In addition, there are several other resource recovery questions that should be answered:

- What items in the solid waste stream are truly worth recovery from an energy or materials standpoint?

- Should recovery of the items be encouraged?
- How will a limited supply of solid waste affect competing recovery systems in a given geographic area?
- Is it better to burn the combustibles or recycle them?
- In energy recovery, does existing technology allow for a back-up fuel system to the solid waste in the event it should be needed?

There are also two questions of a political nature which must be answered before any commitments should be made in this area. These are:

- Who owns the solid waste?
- Should the recovery systems be privately or publicly owned?

We cannot stress strongly enough the importance of adequate answers to the foregoing questions before the State takes any position in the areas of energy and/or materials recovery. We seriously question the economic viability of many of the recovery systems being developed in other states. Therefore it is recommended that no material or energy recovery activities be undertaken with State funds until the questions raised have been adequately answered.

B. THE VALUE OF NEWSPRINT TO NEWSPRINT RECYCLING

Preliminary information on the potential energy savings in shifting from virgin pulp to deinked newsprint for newspaper indicates about a 30% reduction in gross energy requirements.[52] This amounts to roughly 6.58 (10^6) Btu/ton of newsprint.[53]

On the other hand, incinerating newsprint to generate energy releases 15.1 - 15.9 (10^6) Btu/ton.[54] If the steam generating process is operating at 50% efficiency, 7.95 (10^6) Btu/ton performs useful work.[55] Thus the energy savings from steam generation of incinerated newsprint compares favorably with newsprint to newsprint recycling. However, incineration of newsprint to generate electricity compares less favorably since the efficiencies of conversion are generally on the order

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[52] FEA, Project Independence Report, op. cit., Appendices p. 160.

[53] Derived from Appendices p. 155 of FEA, Project Independence Report. For a more detailed look at recent figures on the amount of energy needed to produce selected materials, see Appendix E.

[54] Realities of Recycling, op. cit., p. 56, table 5.

[55] 15.9 (10^6) Btu/ton at 50% = 7.95 (10^6) Btu/ton.

of 30% rather than 50%. At 30% efficiency only 4.77 (10^6) Btu/ton performs useful work.[56]

Thus both newsprint to newsprint recycling and incineration of newsprint to generate steam are to be preferred over incineration to generate electricity whenever these options are available. Newsprint to newsprint recycling is most desirable because in addition to the energy savings, the strain on U.S. forest resources is reduced.

C. THE POTENTIAL IMPACT OF ENERGY RECOVERY FROM SOLID WASTE ON SOURCE REDUCTION AND PAPER RECYCLING

If per capita consumption of paper or plastic declines, or if recycling of these components increases, energy recovery systems may lose much of the combustible component that has made their operation in the mid-1970's appear economically attractive. For this reason use of combustible solid waste for energy recovery purposes, whether through incineration or pyrolysis, should be approached with caution. In all cases, such systems should have the capability of switching to alternative fuels rather than creating systems

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[56] 15.9 (10^6) Btu/ton at 30% = 4.77 (10^6 Btu/ton.

that will have to rely on a continued flow of combustible material even where source reduction or recycling might yield higher energy savings.

The potential conflict between energy recovery and recycling was explored in the May 13, 1974, issue of U.S. News and World Report:

> Energy-recovery systems depend on paper to keep heat output as high as possible. If more and more cities burn old newspaper and cardboard, instead of selling it to a secondary materials dealer, then recycling of paper may continue to decline as it has been doing since World War II.
>
> The Environmental Protection Agency says that in pulling newspapers and cardboard from an average load of refuse, 10 per cent of the heat potential will be lost. But even this small reduction could make waste fuel - a marginal economic proposition to begin with - a less appealing option for many cities.
>
> Officials at the American Paper Institute say their members firms can save energy and virgin materials, as well as cut down on pollution of air and water by recycling as much paper as they can get. They fear the surge in these new waste-disposal systems will only hurt efforts to step up recycling and ease the paper shortage.
>
> Today more than 100 U.S. cities require their citizens to separate and bundle newspapers and cardboard for special pickup, but these are not cities that depend on trash to generate electricity.[57]

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57 U.S. News and World Report, May 13, 1974, p. 64.

CONCLUSION AND RECOMMENDATIONS

Because the municipal solid waste stream continues to grow at a phenomenal rate, measures must be undertaken immediately to retard that growth in order to prevent further environmental degredation, further resource depletion and further economic disruption.

The reduction of solid waste at its source is only one facet of the broader area of resource conservation. Other facets include for example: improving automobile efficiency, improving the efficiency of transportation systems generally, insulation of homes, etc.

We can now introduce one facet of resource conservation -- source reduction. While source reduction programs may result in a small shift in the economy due to reduced consumption of mineral and energy resources, the shift is gradual. If there is a considerable delay in the implementation of source reduction programs and the predicted resource crisis occurs, the shift will be much more dramatic and rapid and will be accompanied by parallel dislocations in other areas of the economy so that the impacts will be unnecessarily severe.

Here in Minnesota we have the unique opportunity to take planned action now rather than rapid and possibly inappropriate action when we are in the throes of a potential resource crisis.

IT IS THEREFORE RECOMMENDED:

1. That the MPCA Packaging Review Program be strengthened in accordance with the recommended changes in Chapter 748 section 6 contained in pp. 53-60 and Appendix B of this report.

2. That some measures be taken in this session of the legislature to control the proliferation of one-way beverage containers.

3. That additional public education authority, staff and budget be granted to the MPCA for the purpose of consumer education in the source reduction area.

4. That Minnesota develop both economic and regulatory mechanisms to encourage a return to the use of refillable containers.

5. That the state study possible ways of further promoting the establishment and operation of food and other consumer cooperatives in order to reduce product packaging and to produce consumer savings.

6. That the product warranty system be expanded and improved to encourage the extension of product lifetime.

7. That the state study the feasibility of tax incentives to Minnesota's repair industry in order to promote the repair of products rather than immediate disposal of them.

8. That studies be done on the feasibility of incentives and disincentives to achieve the goals of extension of product lifetime and a reduction in the amount of materials and energy used per product.

9. That no material or energy recovery activities be undertaken on a statewide basis or funded by the state until the questions raised in pp. 83 and 84 of this report have been adequately answered.

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APPENDIX A

MINNESOTA POLLUTION CONTROL AGENCY
DIVISION OF SPECIAL SERVICES
REGULATIONS FOR PACKAGING REVIEW
DECEMBER 20, 1974

SR-1 APPLICABILITY AND DEFINITION

(A) Scope

These regulations and criteria govern the review of new or revised packages/containers sold at retail within the State of Minnesota after May 25, 1973, in accordance with Minn. Stat. Chapter 116F (Supp. 1973).

The purpose of these regulations is to:

(1) Identify the types of new or revised packages/containers which may be subject to Agency review;

(2) Set forth the criteria which the Agency will use in evaluating the new or revised packages/containers;

(3) Establish the types of samples and information that shall be requested or required by the Agency for evaluation of new or revised packages/containers;

(4) Establish a procedure for the manner in which samples and information shall be submitted and reviewed;

(5) Establish exemptions for some new or revised packages/containers.

(B) Definitions

(1) Agency. "Agency" means the Minnesota Pollution Control Agency, its agent or representative;

(2) Closure. "Closure" means any article, device, or contrivance made in whole or in part of paper, paperboard, fiber, wood, ceramic, glass, metal, plastic or any combination of such materials, including, but not limited to caps, clips, covers, lids, tabs or seals for the purpose of closing or fastening a package/container, but not including staples, metal tacks, nails, glues and adhesives;

(3) New or Revised. "New or Revised" means either a new packaging concept not previously sold at retail in Minnesota or any change in a package/container sold at retail before May 25, 1973, or approved for sale at retail under these regulations. Such changes include: change from one product to another product (different five-digit product codes of the Numerical List of Manufactured Products (New (1972) SIC Basis)) contained in the package/container; change in the chemical formulation of any constituent material; substitution of one or more constituent materials; substitution of closure; substitution of label; changes in design; and all other changes, except any changes in size, color, printing, or shape. Changes from one product to another within the same five-digit product code of the

Numerical List of Manufactured Products (New (1972) SIC Basis) shall not be considered a change of product for purposes of this definition.

(4) Package/Container. "Package/Container" means any article, receptacle, device or contrivance made in whole or in part of paper, fiber, wood, ceramic, glass, metal, plastic or any combination of such materials, including but not limited to bags, baskets, bottles, boxes, cans, cartons, carrying cases, cups, cylinders, envelopes, glasses, jars, jugs, pails, tubs, sacks, trays, tubes, tumblers, and vessels intended for use in conveying any product for sale at retail. Such term does not include any shipping carton not intended to be sold at retail;

(5) Person. "Person" means any human being, any municipality or other governmental or political subdivision, or any other public agency, any public or private corporation, any partnership, firm, association or other organization, any receiver, trustee, assignee, agent or other legal representative of any of the foregoing, or any other legal entity, but does not include the Minnesota Pollution Control Agency;

(6) Review Period. "Review Period" means the one hundred and twenty (120) day time period in which the Agency may review submitted samples and the accompanying information. The Agency may, for good cause shown, order the one hundred and twenty (120) day period to be extended for an additional period not to exceed thirty (30) days;

(7) Sold at Retail. "Sold at Retail" means sale or other transfer to the household of the ultimate consumer;

(8) User. "User" means an industry which combines packages/containers and products to create a unit intended for sale at retail.

(C) Severability

If any provision of any packaging regulation or the application thereof to any person or circumstances is held to be invalid, such invalidity shall not affect other provisions or application of any other part of such regulation or any other regulation which can be given effect without the invalid provision or application; and to this end all provisions of all packaging regulations and the various applications thereof are declared to be severable.

SR-2 CRITERIA

(A) In determining whether a package/container is consistent with state environmental policy, the Agency shall place emphasis upon state responsibilities and policies established by the Environmental Policy Act, Minn. Stat. 116D.02 subd. 2 (Supp. 1973), and by Minn. Stat. 116F.01 and 116.05 (Supp. 1973).

(B) The Agency staff will compare a new or revised package/container with packaging alternatives. The object of this comparison will be to encourage those alternatives which maximize material and energy conservation while minimizing adverse environmental impact and increased economic costs to the people of the state. The staff will assess the relative merits of alternatives and encourage those alternatives which:

(1) Minimize the potential for environmental contamination, including but not limited to the release of metals or substances with the potential for biological harm;

(2) Minimize the total system energy costs;

(3) Minimize the use of scarce or non-renewable resources;

(4) Minimize the use of virgin materials;

(5) Are most recyclable where recyclability is consistent with (1) and (2) above;

(6) Minimize adverse economic effects on the consumer, the labor force, and industry, consistent with (1) and (2) above.

(C) In reviewing a new or revised package/container the Agency shall compare it to the existing package/container and/or all feasible alternatives submitted pursuant to SR-5. The decision to approve a new or revised package/container shall be based on a finding that the total positive impacts of the new or revised package/container outweigh the total negative impacts in comparison to the existing package/container and/or all feasible alternatives submitted pursuant to SR-5. The agency shall assess whether the new or revised package/container:

(1) Contains greater or lesser quantities of metals, hydrocarbons, organic or inorganic chemicals, or other substances which upon release into the environment through incineration, leaching, or littering have or may have potential for biological harm when compared with the existing package/container and/or feasible alternatives submitted pursuant to SR-5;

(2) Has a potential for creating an environmental problem as litter, which is higher or lower than the existing package/container and/or feasible alternatives submitted pursuant to SR-5;

(3) Requires more or less Btu/kg of product than the existing package/container and/or feasible alternatives submitted pursuant to SR-5 for the same

package/container size;

(4) Requires more or less scarce or non-renewable resources than the existing package/container and/or feasible alternatives submitted pursuant to SR-5, for the same package/container size;

(5) Has a higher or lower virgin materials content than the existing package/container and/or feasible alternatives submitted pursuant to SR-5;

(6) Has more or less current potential for recycling than the existing package/container and/or feasible alternatives submitted pursuant to SR-5;

(7) Results in an increase or decrease in the volume of solid waste in comparison to the existing package/container and/or feasible alternatives submitted pursuant to SR-5;

(8) Has a beneficial or adverse economic effect on the consumer, in comparison to the existing package/container and/or feasible alternatives submitted pursuant to SR-5;

(9) Has a beneficial or adverse economic effect on the labor force, in comparison to the existing package/container and/or feasible alternatives submitted pursuant to SR-5; and

(10) Has a beneficial or adverse economic effect on industry in comparison to the existing package/container and/or feasible alternatives submitted pursuant to SR-5.

SR-3 REVIEW PROCEDURE

(A) Package/container review by the Agency may be initiated in any of the following ways:

(1) A package/container user may submit the information and samples described in SR-5. While such submission for review is not mandatory, any package/container user wishing to initiate the review process must submit all the information requested in SR-5;

(2) The Agency itself may identify a package/container which it believes is subject to its review and shall proceed according to SR-3(C);

(3) Any other person may submit to the Agency a package/container for review, and if the Agency determines that such package/container is subject to its

review, the Agency shall proceed according to SR-3(C).

(B) Once the review process is initiated, the Agency shall review the new or revised package/container during the review period. If the Agency determines that the package/container constitutes a solid waste disposal problem or is inconsistent with state environmental policies, as manifested in the criteria of SR-2, the Agency may by order made after notice and hearing as provided in Chapter 15, Minn. Stat. (1971), and following an additional period not to exceed thirty (30) days during which the Minnesota Environmental Quality Council may review the proposed action, prohibit the sale of the package/container within the state. Any such prohibition shall continue in effect until revoked by the Agency or until the last legislative day of the next following legislative session, whichever occurs first, unless extended by action of the legislature. If the Agency fails to issue an order prohibiting a package/container by the end of the review period or to provide written notice of its acceptability, the Agency may not thereafter prohibit it, pursuant to Minn. Stat. Chapter 116F (Supp. 1973). If it is determined that the package/container is acceptable, the Agency will so notify the submitting user. Any package/container approved by the Agency may subsequently be used to enclose or convey other products within the same five-digit product group of the Numerical List of Manufactured Products (New (1972) SIC Basis), as the product in the approved package/container without further review by the Agency, but use of a package/container to enclose or convey products within other product groups may subject package/container to review initiated pursuant to SR-3(A).

(C) Where the Agency or any other person initiates the review process by identification or submission of a package/container, a Notice of Intention to Review shall be sent to the user of the package/container within ten (10) days of identification or receipt of the package/container. Upon receipt of such Notice, the package/container user shall have thirty (30) days to submit the information required by SR-5. The review period shall begin upon the date of identification or submission of a package/container.

SR-4 EXEMPTIONS

(A) A new or revised package/container, will not be reviewed by the Agency if:

(1) It is marketed with a deposit of five (5) cents or more to encourage its return to the distribution system for reuse;

(2) It has a capacity of over two (2) gallons by volume or twenty-five (25) pounds by weight;

(3) It is required by federal laws and regulations

relating to health or safety. Any modification of a package ostensibly intended to achieve compliance with federal law, which involves changes of a kind different than those required for compliance with the law or regulation shall negate the exempt status of the package;

(4) It conveys products which are subject to the regulation of the U.S. Department of Agriculture pursuant to the Federal Meat Inspection Act, 21 U.S.C. 601-691;

(5) It conveys products other than those which come within Industry Numbers 20111 - 20999 inclusive, 28412 - 28424 inclusive, 28441 - 28445 inclusive of the Numerical List of Manufactured Products (New (1972) SIC Basis).

(B) A new or revised package/container, will not be reviewed by the Agency;

(1) When a package/container is made substantially of glass, and the change is of the following nature:

(a) Any change in the chemical formulation of the glass or its coloring agents; or

(b) Any change in enamels or coatings which are for color or identification; or

(c) Any change in coatings or surface treatments used to facilitate lubricity in manufacture or handling as long as such coating is not a structural portion of the package/container.

(2) When a package/container is made substantially of aluminum or steel, and the change is of the following nature:

(a) Any change in the alloy chemistry or temper thereof within the same metal type; or

(b) Any gauge change; or

(c) Any change in seam construction or solders or adhesives; or

(d) Any change in the inside coatings of metal packages/containers as long as such materials were in use for any steel or aluminum package/container coatings prior to May 25, 1973, or are approved by the United States Food and Drug Administration for contact with food surfaces and provided that such coatings do not exceed .0025 inch in gauge.

(3) When a package/container is made substantially of

paper or paper products and the change is of the following nature:

(a) Any change in board or paper coatings of clay, waxes, lacquers, or polyolefin compounds as long as such substitute materials were in use as board or paper coatings prior to May 25, 1973, or are approved for contact with food surfaces by the United States Food and Drug Administration; or

(b) Any change of foil laminates which do not exceed .0005 inch in gauge in those cases where scientific or engineering data substantiate the need for a functional barrier; or

(c) Any change in caliper or basis weight; or

(d) Any change in board or paper furnish where such change does not represent a specification change by the user with the effect of reducing recycled content.

(4) When a package/container is made substantially of plastic-type materials and the change is of the following nature:

(a) For rigid wall containers:

(1) Any change in density; or

(2) Any substitution of standard formulations within the same monomer group.

(b) For pouches, liners, chubs, and other film packaging including laminates with a wall thickness not exceeding .010 inch:

(1) Any substitution within or between the following groups:

a. Nylons
b. Polyester
c. PVDC
d. Polyethelene
e. Polypropylene
f. Ionomers
g. Polyethelene terephthalate; or

(2) Any change in density or caliper of any material constituents so long as the total gauge does not exceed .010 inches; or

(3) Any substitution individually or in combination of substrate materials of paper,

glass, nylon or cotton fabric.

(c) A new or revised package/container otherwise exempt from review pursuant to SR-4 (B) (4) may be reviewed by the Agency if the revision involves the use of any foamed resins.

(C) Notwithstanding any other provision of these regulations, no package/container shall be reviewed if:

(1) It is identical in all ways to a package/container sold at retail in Minnesota before May 25, 1973, or if any changes do not bring it within the definition of "new or revised" contained in SR-1, and

(2) The product to be packaged in the package/container is within the same product group as a product sold at retail before May 25, 1973, in such identical container. For products within the Numberical List of Manufactured Products (New (1972) SIC Basis) subject to review the five-digit product code shall be used to determine whether the products are within the same product group.

(D) If the user certifies that the package/container has been introduced into the Minnesota retail market for test marketing, seasonal, or promotional purposes, and further certifies the period of time necessary to complete such test marketing, seasonal or promotional purpose, the Agency may, upon request of the user defer review for that period of time equal to the test marketing, seasonal and promotional time period so certified by the user; provided, however, that in no event shall such deferral extend for longer than one hundred and eighty (180) days. In addition, the Agency may defer review for a fixed period of time (not to exceed one hundred and eighty (180) days where the user certifies that an emergency situation has arisen; the term "emergency situation" includes specifically, but is not limited to, any change made in a package which is temporary and caused by an inability to obtain supplies.

(E) Notwithstanding any other provisions of SR-4, the user or manufacturer of any package/container who believes the package/container to be exempt under SR-4 (A), (B) or (C) may, but is not required to:

(1) Submit to the Agency a request for Certification of Exemption which identifies the subdivision of SR-4 that the user, or manufacturer believes is applicable and which contains appropriate documentation. The Agency may request the submission of additional information necessary to determine whether such Certification of Exemption is appropriate.

(2) Initiate the review process, pursuant to SR-3 (A) (1), by submitting the information and samples

described in SR-5.

SR-5 INFORMATION REQUIRED FOR REVIEW

(A) Where the package/container review process has been initiated pursuant to SR-3, the package/container user may, but is not required to, submit a sample of the new or revised package/container. The sample may, but need not, contain the product retailed in it. Such samples and products will not be returned to the submitting party.

(B) The package/container user who intiates the review process pursuant to SR-3 (A) (1) or who receives a Notice of Intention to Review issued pursuant to SR-3 (C) shall submit to the Agency the following information on the new or revised package/container:

(1) A brief description of the package/container and closure including its appearance, weight (in grams of each sub-assembly), volume of package/container and weight of product to be contained therein;

(2) In the event a sample is not submitted, an engineering drawing of the package/container with closure must accompany the application for review;

(3) A brief description of the product to be retailed in the new or revised package/container and the five-digit product group of the Numerical List of Manufactured Products (New (1972) SIC Basis) thereof;

(4) The trade name and/or common names of all components present in quantities greater than 1% by weight in the package/container and closure;

(5) The chemical name (following the nomenclature of Chemical Abstracts) of all components present in quantities greater than 1% by weight in the package/container and closure including but not limited to resins, catalysts, plasticizers, stabilizers, coatings, coloring agents, metals and preservatives. The total mass of each such constituent shall be listed in grams. However other chemical constituents or contaminants constituting less than 1% by weight should be reported if known;

(6) The percent of recycled content from post-consumer waste of each component if known;

(7) A brief statement as to whether the user's specifications for the package/container specifically

discriminate against the use of recycled materials from post-consumer waste in cases where the United States Food and Drug Administration does not prohibit such reuse;

(8) The best estimate of energy requirements for fabrication or conversion of the package/container and closure;

(9) Any specifications for the package/container and closure which limit total heavy metals and which specifically limit any undesirable impurities such as unreacted monomer, catalysts or reaction-by-products to lowest levels consistent with good manufacturing practices;

(10) An estimate by the package/container user of effects on the labor force of acceptance or prohibition of the package/container. This estimate shall include both positive and negative effects;

(11) An estimate by the package/container user of effects on industry of acceptance or prohibition of the package/container. This estimate shall include both positive and negative effects;

(12) An estimate by the package/container user of unit price per ounce of product sold at retail for the same package/container size;

(13) The approximate date the package/container will be introduced into the Minnesota retail market;

(14) A listing of assumptions and methods of computation used to determine the calculated data required by SR-5 (B) (6), (8), (10), (11) and (12).

(15) The name and address of the user of the package/container, including the name of a person within the company who may be contacted for additional information.

(C) The package/container user who initiates the review process, pursuant to SR-3(A) (1) or who receives a Notice of Intention to Review issued pursuant to SR-3(C) shall submit to the Agency for purposes of comparison the following information on any original package/container:

(1) A brief description of the original package/container and closure including its appearance, weight (in grams of each sub-assembly), volume of package/container and volume of product to be contained therein;

(2) In the event a sample is not submitted, an engineer-

ing drawing of the package/container with closure shall accompany the other information;

(3) A brief description of the product retailed in the original package/container and the five-digit product group of the Numerical List of Manufactured Products (New (1972) SIC Basis) thereof;

(4) The trade name and/or common names of all components in the package/container and closure;

(5) The chemical name (following the nomenclature of Chemical Abstracts) of all components present in quantities greater than 1% by weight in the package/container and closure including but not limited to resins, catalysts, plasticizers, stabilizers, coatings, coloring agents, metals and preservatives. The total mass of each constituent shall be listed in grams. However other chemical constituents or contaminants constituting less than 1% by weight should be reported if known;

(6) The percent of recycled content from post-consumer waste of each component if known;

(7) The best estimate of energy requirements for fabrication or conversion of the package/container and closure;

(8) Any specifications for the package/container and closure which limit total heavy metals and which specifically limit any undesirable impurities such as unreacted monomer, catalysts or reaction-by-product to lowest levels consistent with good manufacturing practice;

(9) An estimate by the package/container user on unit price per ounce of product at retail for the same package/container size.

(D) In the case of a new or revised package/container the user shall evaluate the merits of feasible alternative packages/containers. The user shall submit to the Agency all information required pursuant to SR-5 (B) on all feasible alternatives so considered.

SR-6 CONFIDENTIALITY

(A) If the manufacturer and/or user of a new or revised package/container certifies at the time of submission of any sample and required information that disclosure of any of the information will affect the company's competitive position the Agency shall keep such sample and information confidential except as may be necessary for public hearings as requested by the user required under SR-3.

APPENDIX B

A bill for an act

relating to the environmental impact and reduction of solid waste, amending Minnesota Statutes 1973 Supplement, Sections 116F.02 by adding subdivisions; and amending 116F.06, Subdivisions 2 and 3; adding Subdivision 4 and renumbering remaining subdivisions.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MINNESOTA:

Section 1. Minnesota Statutes 1973 Supplement, Section 116F.02, is amended by adding subdivisions to read:

Subd. 8. "Package or container" means any article, receptacle, device or contrivance made in whole or in part of paper, fiber, wood, ceramic, glass, metal, plastic or any combination of such materials, including but not limited to bags, baskets, bottles, boxes, cans, cartons, carrying cases, cups, cylinder, envelopes, glasses, jars, jugs, pails, tubs, sacks, trays, tubes, tumblers, and vessels intended for use in conveying any product for sale at retail.

Subd. 9. "Package or container unit" means a package or container and the product it conveys. For the purpose of this Act, products shall be classified according to the five-digit product codes of the"Numerical List of Manufactured Products" (New (1972) SIC Basis).

Subd. 10. "New or revised" means either a new packaging concept not previously sold at retail in Minnesota or any change in a package or container sold at retail before May 25, 1973, or approved for sale at retail under this law. Such changes include, but are not limited to: change from one product to another product (different-five digit product codes

of the "Numerical List of Manufactured Products" (New (1972) SIC Basis)) contained in the package or container; change in the chemical formulation of any constituent material; substitution of one or more constituent materials; substitution of closure; substitution of label; changes in design; and all other changes, except any changes in color, printing, or shape. Changes from one product to another within the same five-digit product code of the "Numerical List of Manufactured Products" (New (1972) SIC Basis) shall not be considered a change of product for purposes of this definition.

Subd. 11. "User" means an industry which combines a package or container and product to create a unit intended for sale at retail.

Sec. 2. Minnesota Statutes 1973 Supplement, Section 116F.06, Subdivision 2, is amended to read:

Subd. 2. The Agency shall review a new or revised ~~packages or containers~~ package or container unit except when such changes involve only color, ~~size,~~ shape or printing. The agency shall review innovations including, but not limited to, changes in constituent materials or combinations thereof and changes in closures. When the agency determines that any new or revised package or container would constitute a solid waste disposal problem or be inconsistent with state environmental policies, the manufacturer or user of the ~~product~~ package or container may withdraw it from further consideration until such time as the manufacturer or user may resubmit ~~such~~

~~product~~ it to the agency, or, the agency may, by order made after notice and hearing as provided in Minnesota Statutes, Chapter 15, and following an additional period not to exceed 30 days during which the environmental quality council may review the proposed action, prohibit the sale of the package or container unit in the state. Any such prohibition shall continue in effect until revoked by the agency or until the last legislative day of the next following legislative session, whichever occurs first, unless extended by law. This subdivision shall not apply to any package or container unit sold at retail in this state prior to final enactment of this act.

Sec. 3. Minnesota Statutes 1973 Supplement, Section 116F.06, Subdivision 3, is amended to read:

Subd. 3. The agency shall adopt and may amend or rescind quidelines identifying the types of new or revised package or container units ~~containers-and-packaging~~ that are subject to its review after notice and hearing as provided in Minnesota Statutes, Section 15.0412, Subdivision 4. Any person may submit to the agency a sample of a package or container for agency review. The agency may ~~shall~~ review the sample, and may require the ~~person,~~ manufacturer and/or user to furnish such additional samples and information as may be necessary for it to determine the environmental or solid waste disposal problems that the ~~container-or-packaging~~ package or container

unit would cause. Except as may be necessary in connection with any public hearing, the agency shall keep the samples and information confidential if the person submitting them certifies that disclosure of said samples and information would affect the competitive position of the person. If the agency fails to issue an order prohibitng sale of a package or container within 180 ~~120~~ days after ~~the sample was~~ all information required for review is submitted, the agency shall not prohibit it thereafter. The agency may, however, for good cause, order the ~~120~~ 180 day period to be extended for an additional period not to exceed 30 days. If the Agency decides not to review a sample package or container unit which has been submitted to it, it shall not thereafter review the previously submitted package or container unit.

Subd. 4. No language in this Act shall be construed to give the agency the authority to prohibit the sale of any product conveyed by a subject package or container.

APPENDIX C

MPCA - PACKAGING CHRONOLOGY

7/24-25/73	Packaging Public Hearings.
8/20/73	Letter to industries requesting information on recycled content in various types of packaging for possible use in developing an exemption for recycled content in packaging.
9/13-14/73	Meeting with technical representatives of industry and environmental groups on criteria and exemptions. 9/13 Morning - paper Afternoon - plastic & glass 9/14 Morning - metals Afternoon - packaging users
10/12/73	Meeting with Green Giant.
10/17/73	Meeting in Washington of Sandra Gardebring with FDA, Richard Ronk and Peter Hutt - General Counsel, to discuss parallel between FDA food additive regulations and MPCA - SR regulations.
10/25/73	Meeting with Owens-Illinois, glass container manufacturer.
10/29-30/73	Meeting in Washington of Wes Fisher with EPA's Eileen Claussen to discuss criteria, meeting with Phil Lewis and Richard Ronk of FDA to discuss packaging regulations.
12/20-21/73	Packaging Public Hearings.
2/8/74	Letters of invitation to February 26 meeting on packaging criteria and a packet of information on packaging, including a packaging review go - no go flow chart for discussion. More than a dozen technical representatives of industry and environmental groups were invited to participate.
2/26/74	Meeting with industry and environmental representatives to discuss energy and environmental data, and a packaging review checklist. Staff demonstrated the use of energy data in reviewing the energy requirements of several selected packages and their alternatives.
2/27/74	Follow-up letters requesting lists of major and minor exemptions, environmental impact information, and comments on criteria and environmental and resource data.

3/7/74	Meeting with Hoerner-Waldorf to discuss Feb. 26 meeting and MPCA requests.
3/13/74	Hoerner-Waldorf plant visit.
3/14/74	Brockway Glass plant visit.
3/20/74	Invitations to March 26 meeting and second information packet with a renewed request for comments on packaging criteria, environmental impact, and resource data, and lists of "major" and "minor" changes.
3/25/74	Meeting with Harry Eden, Can Manufacturer's Institute to discuss criteria checklist, and energy data.
3/26/74	Meeting with representatives from the February 26 meeting to discuss environmental impact and energy data and the definition of new or revised, exemptions and minor changes, and a revised criteria checklist.
4/10/74	Follow-up letters to industry on lists of major and minor changes.
5/1/74	Meeting with the Society of Packaging and Handling Engineers at Hennepin County Vocational Technical School.
5/10/74	Meeting with LaMaur, Inc. to discuss possible exemptions for "minor" changes.
5/20/74	Meeting with Green Giant to discuss possible exemptions for "minor changes" and to update the company on the meetings of Feb. 26 and March 26.
5/29/74	Legislative Overview Hearing before the House Committee on Environmental Preservation and Natural Resources-Subcommittee on Environment and Pollution Control and the Senate Committee on Natural Resources and Agriculture-Subcommittee on Environmental Protection. Discussion between PCA staff and legislators on the status of the packaging program.
6/7/74	Letter from Green Giant regarding exemption section of the regulations.
6/10/74	Letter from Pillsbury regarding exemption section of regulations.
6/19/74	Meeting with Dr. Robert Testin of Reynolds Metals and Michael McGuire, an attorney to discuss regulations.
7/17/74	Packaging Public Hearings.

7/18/74	Letter from Distilled Spirits Council in regard to regulations.
7/26/74	Meeting with Dr. Robert Testin and Andy McCutcheon of Reynolds Metals and Michael McGuire to discuss regulations.
7/30/74	Letter to Vick Chemical Company in response to a question on the regulations.
9/23/74	Transcript of hearings and some exhibits from July 17, 1974 hearing mailed to PCA Board members.
9/26/74	More exhibits sent to PCA Board.
10/4/74	Final regulations and Findings of Fact and Notice of PCA meeting on Oct. 15, 1974 mailed to PCA Board and all who either attended the July 17, 1974 hearing or submitted statements.
10/8/74	Memorandum to all who either attended the July 17, 1974 hearing or submitted statements indicating the Agency Board would consider packaging regulations at its meeting on Oct. 15, 1974 in Duluth instead of Roseville.
10/8/74	Letter to Johnson & Johnson in response to a request for a copy of the regulations.
10/9/74	Letter from the Cosmetic, Toiletry and Fragrance Association regarding the proposed regulations.
10/10/74	All remaining exhibits mailed to PCA Board.
10/11/74	Letter from Owens-Illinois in regard to the proposed regulations.
10/11/74	Phone conversation with David Benforado of 3M in regard to regulations.
10/14/74	Letter from Michael McGuire submitting a statement on the proposed regulations on behalf of the aluminum industry.
10/18/74	Memorandum to all who either attended the July 17, 1974 hearing or submitted statements informing them that the PCA Board would consider the regulations on Oct. 29 in Roseville. Also included a couple of changes the staff wanted to make in the regulations.
10/21/74	Letter to PCA Board sending them statements of Aluminum Association, Owens-Illinois, and CTFA.

10/21/74	Memorandum to PCA Board from James T. Shields of MACI on proposed regulations.
10/24/74	Letter from LaMaur, Inc. on proposed regulations.
10/24/74	Letter from Don Skinner, a MECCA member, on proposed regulations.
10/24/74	Letter from Board Chairman of MECCA in regard to regulations.
10/25/74	Memorandum to PCA Board on additional staff changes in the regulations.
10/25/74	Letter and memorandum from CTFA in regard to regulations.
10/28/74	Statement from Minnesota Retail Federation in regard to regulations.
10/29/74	Letter from General Mills in regard to regulations.
10/29/74	PCA Board approved the packaging regulations.
10/30/74	Calls from WWTC, St. Paul Dispatch and Modern Medicine-World News regarding implementation of the regulations.
10/30/74	Tour of Pillsbury Co.
11/1/74	Meeting with Keith Amundson of EPA/California Solid Waste Board in regard to possible packaging legislation in California.
11/4/74	Plant visit to Hoerner-Waldorf.
11/4/74	Memorandum to all who either attended the July 17, 1974 hearing or submitted statements to inform them of the PCA Board approval of the regulations.
11/5/74	Phone conversation with graduate student who was writing a seminar paper on possible implementation on a federal level of packaging regulations.
11/6/74	Phone conversation with a student who was writing a paper on packaging.
11/19/74	Letter from G. Heileman Brewing Company seeking preliminary review of an aluminum malt beverage container. Our response indicated we did not have provision for a preliminary review and that we did not have sufficient information to comment and the Regulations had not yet been filed with the Secretary of State.

11/21/74	Letter sent to Gulf State Paper Corp. in response to a request for a copy of the packaging regulations.
11/21/74	Letter sent to L.B. Schmidt Co. in response to a request for a copy of the packaging regulations.
11/22/74	Letter to Consumer Union of U.S. Inc. in response to a question on the packaging program in Minnesota.
11/25/74	Meeting with Dennis Sullivan of Hurty-Peck and Company in regard to whether a proposed non-returnable beverage container would be acceptable in Minnesota under the packaging regulations. We informed Mr. Sullivan that the regulations had not yet been promulgated and we could not therefore comment.
11/27/74	Phone call from Pat Sharp of Mead Johnson (Baby food and pharmaceutical company) who had questions on the regulations.
11/27/74	Packaging record sent to Office of Attorney General.
11/27/74	Phone conversatinn with Fran Gendlin from New York regarding a source reduction report she's writing for the Governor.
12/3/74	Letter to Doris Cellarius, Environmental Education Chairman, Pacific Northwest Chapter - Sierra Club in response to a question on the regulations.
12/5/74	Phone conversation with Sally Gorski of the Massachusetts Forests and Parks Assn. in regard to packaging legislation she is drafting for the state modeled on Minnesota law.
12/5/74	E. C. Leonard, Humpko Sheffield, Memphis, Tenn. called with a question on the regulations. His company would not be affected since they do not engage in sale at retail.
12/5/74	Phone call from Eileen Claussen of EPA regarding status of packaging regulations.
12/6/74	Ken Murphy, Environmental Reporter - writing an article on packaging regulations. Will call back with any more questions.
12/6/74	Meeting with Mike Miller; Paul Hallman of CMI; Jack Mason, CMI local counsel; Lou Heib, American Can Co., they raised arguments re. packaging regulations and asked thay they be prohibited.

12/9/74 Letter to David S. Brown, Consultant to the Fourth Sink Management Group in response to questions on the regulations.

12/9/74 Letter to Terrance Hamilton of the Massachusetts Consumer Council in response to questions on the regulations.

12/9/74 Letter to Betty Ladner, Librarian for Illinois Institite for Environmental Quality to send her a copy of the regulations.

12/10/74 Letter to the Metal Box Company in London in ressponse to questions on the regulations.

12/10/74 Phone conversation with Frank Smith of EPA, 202-254-7844 re. Gordian Report. He will mail us a xerox copy of the final report in the next few weeks.

12/13/74 Letter sending regulations to Champale, Inc., N.Y.

12/13/74 Meeting with Ron Ross, editorial writer for Minneapolis Tribune re. packaging regulations.

12/16/74 Meeting with Mike Miller; Ted Shields; Mike Flanagan. They raised arguments re. packaging regulations and asked that they be prohibited.

12/17/74 Melinda Milone, Grocery Manufacturers of America, question on promulgation of regulations.

12/17/74 Ted Shields, MACI, question re. promulgating regulations.

12/18/74 Ann Anderson, Packaging & Labeling Newsletter, question re. promulgating regulations.

12/18/74 Ted Shields: to tell him revision of regulations would not go to Board until Janaury meeting but we'd do a telephone poll of the Board to get preliminary approval.

12/19/74 Jim Jenkins, Federal Package Corp. question re. packaging regulations.

12/19/74 Reply to citizen's letter concerning sale of aerosols in Minnesota.

12/20/74 Victor Denslow, Coordinator of Environmental Affairs, Amoco Chemical, Chicago, called to ask status of regulations and to clarify a couple points.

12/27/74	Alice Ginsburgh of Swift & Co. in Chicago called to request a copy of regulations.
12/31/74	Phone conversation with Penny Hanson and Harold Samtor of U.S. EPA on questions concerning energy requirements, incineration and recycling of paper packaging.
12/31/74	Dick Moffa, Office of Policy Development, Ohio EPA, Box 1049, 450 E. Town St., Columbus, Ohio 43216. Wanted to discuss possible packaging regulations in Ohio. Politically not feasible in Ohio this year.
1/2/75	Call from Melinda Milone re. packaging regulations.
1/2/75	Conversation with Eda Stodenmeyer (2874) Chief of Documents re. printing of regulations.
1/2/75	Ken Hurst, Washington State legislative staff person: Some interest in writing a packaging law.
1/2/75	Talked to Jack Mason: he requested I send the regulations as originally to Miller, Miller's response to us, the regulations as we sent them back. I agreed to do so.
1/2/75	Talked to Paul Hallman -- query re. whether regulations had been filed with Secretary of State.
1/2/75	Talked to Flanagan: re. whether regulations had been filed with Secretary of State.
1/6/75	Talked to Dave Benforado, Environmental Group at 3M: re. status of regulations. Sent revised copy (Dec. 20, 1974).
1/6/75	Russell Susag, 3M -- questions re. packaging regulations.
1/8/75	Steve Kellner, Chem. Spec. Mfg. Assoc. -- questions re: regulations.
1/8/75	Steve Kellner and Joe Hollingsworth of CSMA -- questions re: interpretation of the regulations.
1/9/75	Melinda Milone, GMA question re: difference between regulations of Oct. 29 and Dec. 20.
1/9/75	Call from Ken Slater, Twin City Bottle Co. with general questions on regulations. Copy of regulations sent.
1/13/75	Talked to Priebe, General Mills, inquiry as to whether regulations have been filed.

1/13/75	Jack Mason: called to see if we were reviewing any packages.
1/14/75	Ted Shields, called to see if there was to be an amendment to Chapter 748 proposed by us re. package, product combination.

APPENDIX D

MINNESOTA POLLUTION CONTROL AGENCY
1935 W. County Road B2, / Roseville, Minnesota 55113

Information Required for Review

Pursuant to Section SR-5 of Regulations for Packaging Review (December 20, 1974) a package/container user who initiates the review process pursuant to SR-3 (A)(1) or who receives a "Notice of Intention to Review" (MPCA Form 20) pursuant to SR-3(C) shall submit to the Agency certain specified information.

To aid the user and to provide a uniform presentation of data, three different forms are available.

MPCA Pkg. Form 11	"Information Required on New or Revised Package/Container"
MPCA Pkg. Form 12	"Information Required on Any Original Package/Container"
MPCA Pkg. Form 13	"Information Required on Feasible Alternative Package/Container Considered"

A separate Form 12 must be completed for any original package/container and a separate Form 13 must be completed for each feasible alternative package/container considered.

Should you have any questions regarding the use of Forms 11, 12 or 13 or if you need additional copies of any of the above, please do not hesitate to contact Martin Little at 612-296-7295 or Karen Wendt at 612-296-7292.

MPCA Log # _____

Information Required on
a New or Revised Package/Container

Section Number* (15)

Company Name _____

Address _____

City _____ State _____ Zip _____

Person to Contact _____ Telephone _____

A. Sample submitted with this form? Yes ____ No ____ (2)

Engineering drawing submitted with this form? Yes ____ No ____

If "yes" to either, please label sample and/or drawing to correspond to this form i.e. "new" or "revised package/container."

B. Package/container is composed of ____ (number) different materials and ____ (number) components (or subassemblies) including closure. (1)

Component	Material	Weight (grams)

Liquid: Volume of product contained _____ fl. oz.

Volume of container (if filled to brim) _____ fl. oz.

Solid: Weight of product contained ____ lbs. _____ oz.

* Corresponding Section of SR-5(B) of Regulations for Packaging Review (Dec. 20, 1974)

C. Product to be retailed in subject package/container. Five-digit product group of the Numerical List of Manufactured Products (New (1972) SIC Basis). _____ (3)

Brief description of the product.

_____

_____

_____

_____

D. Package/container constituents (greater than 1%)[1] (4) (5) (6)

Component _____

	(a)	(b)	(c)	(d)
Constituent(s)[2]				
Chemical Name				
Trade Name				
Common Name				
% of Constituent				
Grams of Constituent				
% of Constituent recycled from post-consumer waste[3]				

List additional components in space provided on page 3 of this Form.

---

1 Including but not limited to resins, catalysts, plasticizers, stabilizers, coatings, coloring agents, metals, preservatives.

Chemical constituents or contaminants constituting less than 1% by weight should be listed if known.

2 In the case of plastics use appropriate designation from Modern Plastics Encyclopedia "Plastics Properties Chart".

3 If no percentage is listed, we shall assume no recycled post consumer waste utilized.

Component _____

	(a)	(b)	(c)	(d)
Constituent(s)				
Chemical Name				
Trade Name				
Common Name				
% of Constituent				
Grams of Constituent				
% of Constituent recycled from post-consumer waste				

Component _____

	(a)	(b)	(c)	(d)
Constituent(s)				
Chemical Name				
Trade Name				
Common Name				
% of Constituent				
Grams of Constituent				
% of Constituent recycled from post-consumer waste				

Component _____

	(a)	(b)	(c)	(d)
Constituent				
Chemical Name				
Trade Name				
Common Name				
% of Constituent				
Grams of Constituent				
% of constituent recycled from post-consumer waste				

E. Best estimate of energy requirements (by type (oil, natural gas, coal)) for conversion or fabrication of package/container and closure. (in Btu's/pkg.) (8)

_____

F. Estimated price per ounce of product sold at retail in the subject package/container _____. (12)

G. Do you have specifications for the package/container and closure which limit total heavy metals and any undesirable impurities such as unreacted monomer, catalysts or reaction by-products? (9)

Yes ____ No ____. If "yes" list specifications.

Material	Specifications
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

H. Do your specifications for the package/container specifically discriminate against the use of recycled materials from post-consumer waste in cases where the United States FDA does not prohibit such reuse? Yes ____ No ____. If "yes" explain. (7)

_____

_____

_____

I. What effects (positive and negative; estimate numbers where appropriate) will the acceptance or prohibition of this package/container have on the labor force? (10)

J. What effects (positive and negative; estimate numbers where appropriate) will the acceptance or prohibition of this package/container have on industry? (11)

K. This package/container will be (was) introduced into the Minnesota retail market on or about _____. (13)

L. In the space below (include additional sheets as necessary) list assumptions and methods of computation used to determine calculated data required in D (% of Constituent recycled from post consumer waste), E, F, I, and J.

MPCA Log # _____

Information Required on
Any Original Package/Container

Company Name _____ Section Number*

Address _____

City _____ State _____ Zip _____

Person to Contact _____ Telephone _____

A. Sample submitted with this form? Yes ____ No ____ (2)

Engineering drawing submitted with this form? Yes ____ No ____

If "yes" to either, please label sample and/or drawing to correspond to this form i.e. "Original package/container".

B. Package/container is composed of ____ (number) different materials (1)
and ____ (number) components (or subassemblies) including closure.

Component	Material	Weight (grams)

Liquid: Volume of product container _____ fl. oz.

Volume of container (if filled to brim) _____ fl. oz.

Solid: Weight of product contained _____ lbs. _____ oz.

* Corresponding Section of SR-5 (C) of Regulations for Packaging Review (Dec. 20, 1974)

C. Product to be retailed in subject package/container. (3)

Five-digit product group, of the Numerical List of Manufactured Products (New (1972) SIC Basis). _____

Brief description of the product.

_____

_____

_____

_____

D. Package/container constituents (greater than 1%)[1] (4) (5) (6)

Component _____

	(a)	(b)	(c)	(d)
Constituent(s)[2]				
Chemical Name				
Trade Name				
Common Name				
% of Constituent				
% of Constituent recycled from post-consumer waste[3]				

List additional components in space provided on page 3 of this form.

---

[1] Including but not limited to resins, catalysts, plasticizers, stabilizers, coatings, coloring agents, metals, preservatives.

Chemical consitutents or contaminants constituting less than 1% by weight should be listed if known.

[2] In the case of plastics use appropriate designation from Modern Plastics Encyclopedia "Plastics Properties Chart".

[3] If no percentage is listed, we shall assume no recycled post consumer waste utilized.

Component ______________________

	(a)	(b)	(c)	(d)
Constituent(s)				
Chemical Name				
Trade Name				
Common Name				
% of Constituent				
Grams of Constituent				
% of Constituent recycled from post-consumer waste				

Component ______________________

	(a)	(b)	(c)	(d)
Constituent(s)				
Chemical Name				
Trade Name				
Common Name				
% of Constituent				
Grams of Constituent				
% of Constituent recycled from post-consumer waste				

Component ______________________

	(a)	(b)	(c)	(d)
Constituent(s)				
Chemical Name				
Trade Name				
Common Name				
% of Constituent				
Grams of Constituent				
% of Constituent recycled from post-consumer waste				

E. Best estimate of energy requirements (by type (oil, natural gas, coal)) for conversion or fabrication of package/container and closure. (7)

_____ _____

F. Estimated price per ounce of product sold at retail in the subject package/container _____. (9)

G. Do you have specifications for the package/container and closure which limit total heavy metals and any undesirable impurities such as unreacted monomer, catalysts or reaction by-products? (8)

Yes ____ No ____. If "yes" list specifications.

Material	Specifications
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

L. In the space below (include additional sheets as necessary) list assumptions and methods of computation used to determine calculated data required in D (% of Constituent recycled from post consumer waste), E, and F.

MPCA Log # _____

Information Required on Feasible Alternative Packages/Containers Considered

Section Number*

Company Name _____ (15)

Address _____

City _____ State _____ Zip _____

Person to Contact _____ Telephone _____

A. Sample submitted with this form? Yes ____ No ____ (2)

Engineering drawing submitted with this form? Yes ____ No ____

If "yes" to either, please label sample and/or drawing to correspond to this form e.g. "Alternative No. 1".

B. Package/container is composed of ____ (number) different materials and ____ (number) components (or subassemblies) including closure. (1)

Component	Material	Weight (grams)

Liquid: Volume of product contained _____ fl. oz.

Volume of container (if filled to brim) _____ fl. oz.

Solid: Weight of product contained _____ lbs. _____ oz.

_____

* Corresponding Section of SR-5(D) of Regulations for Packaging Review (Dec. 20, 1974)

C. Product to be retailed in subject package/container. (3)

Five-digit product group of the Numerical List of Manufactured Products (New (1972) SIC Basis). _____

Brief description of the product.

_____

_____

_____

_____

D. Package/container constituents (greater than 1%)[1] (4)(5)(6)

Component _____

	(a)	(b)	(c)	(d)
Constituent(s)[2]				
Chemical Name				
Trade Name				
Common Name				
% of Constituent				
Grams of Constituent				
% of Constituent recycled from post-consumer waste[3]				

List additional components in space provided on page 3 of this form.

---

1 Included but not limited to resins, catalysts, plasticizers, stabilizers, coatings, coloring agents, metals, preservatives.

Chemical constituents or contaminants constituting less than 1% by weight should be listed if known.

2 In the case of plastics use appropriate designation from Modern Plastics Encyclopedia "Plastics Properties Chart".

3 If no percentage is listed, we shall assume no recycled post consumer waste utilized.

Component ____________________

	(a)	(b)	(c)	(d)
Constituent(s)				
Chemical Name				
Trade Name				
Common Name				
% of Constituent				
Grams of Constituent				
% of Constituent recycled from post-consumer waste				

Component ____________________

	(a)	(b)	(c)	(d)
Constituent(s)				
Chemical Name				
Trade Name				
Common Name				
% of Constituent				
Grams of Constituent				
% of Constituent recycled from post-consumer waste				

Component ____________________

	(a)	(b)	(c)	(d)
Constituent(s)				
Chemical Name				
Trade Name				
Common Name				
% of Constituent				
Grams of Constituent				
% of Constituent recycled from post-consumer waste				

E. Best estimate of energy requirements (by type (oil, natural gas, coal)) for conversion or fabrication of package/container and closure. (in Btu's/pkg.) (8)

_____

F. Estimated price per ounce of product sold at retail in the subject package/container_____. (12)

G. Do you have specifications for the package/container and closure which limit total heavy metals and any undesirable impurities such as unreacted monomer, catalysts or reaction by-products? (9)

Yes ____ No ____. If "yes" list specifications.

Material	Specifications
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

H. Do your specifications for the package/container specifically discriminate against the use of recycled materials from post-consumer waste in cases where the United States FDA does not prohibit such reuse? Yes ____ No ____. If "yes" explain. (7)

_____

_____

_____

L. In the space below (include additional sheets as necessary) list assumptions and methods of computation used to determine calculated data required in D (% of Constituent recycled from post consumer waste), E, and F.

APPENDIX E

PACKAGING MATERIALS DATA*

PAPER

Food and Beverages	5,933,000 Tons/yr.
Household Cleaning Supplies	696,000
Toiletries & Cosmetics	399,700
	7,028,700

Total of all paper packaging 9,371,000
- Food & Beverages - 63% of all paper packaging
- Household Cleaning Supplies - 7% of all paper packaging
- Toiletries & Cosmetics - 4% of all paper packaging

GLASS

Food and Beverages	8,216,000 Tons/yr.
Household Cleaning Supplies	40,000
Toiletries & Cosmetics	1,245,000
	9,501,000

Total of all glass packaging 9,605,000
- Food and Beverages - 85% of all glass packaging
- Household Cleaning - 0.4% of all glass packaging
- Toiletries & Cosmetics - 13% of all glass packaging

STEEL

Food and Beverages	4,288,000 Tons/yr.
Household Cleaning Supplies	79,000
Toiletries & Cosmetics	17,000
	4,384,000

Total of all steel packaging 5,152,000
- Food and Beverages - 83% of all steel packaging
- Household Cleaning Supplies - 1.5% of all steel packaging
- Toiletries & Cosmetics - 0.3% of all steel packaging

ALUMINUM

Food and Beverage	661,000 Tons/yr.
Household Cleaning Supplies & Toiletries and Cosmetics	20,000
	681,000

Total of all aluminum packaging 713,000
Food and Beverages - 93% of all aluminum packaging
Household Cleaning and Toiletries and Cosmetics - 3% of all aluminum packaging

PLASTICS

Food and Beverages	648,000 Tons/yr.
Household Cleaning Supplies	100,000
Toiletries & Cosmetics	79,000
	827,000

Total of all plastics packaging 1,460,000
Food and Beverages - 44% of all plastic packaging
Household Cleaning Supplies - 7% of all plastic packaging
Toiletries & Cosmetics - 5.4% of all plastic packaging

---

* Data received from Eileen Clausen of the U.S. Environmental Protection Agency.
Data received by EPA from contract awarded to Research Triangle Park.
All data is in tons per year and based on a 1970 study year.

The calculations were prepared by Connie Ennenga, Research Scientist, Minnesota Pollution Control Agency.

APPENDIX F

Table 15

Energy Used to Produce Selected Materials

	Primary Energy Consumption (MMBTU/ Ton Product)	Breakdown of Primary Energy Use by Type of Resource (Percentages)					Total Energy Used in 1970 in Making Product (10^{12}BTU)
		Coal	Oil	Gas	Purchased Electricity	Derivative Fuels	
Low Density Polyethylene Resin	93.49	0	23.6	67.3	18.2	(9.1)	201
High Density Polyethylene Resin	88.64	0	28.1	73.1	8.4	(9.6)	75
Polystyrene Resin	117.42	1.1	100.4	27.1	6.9	(35.5)	197
Polyvinyl Chloride Resin	82.92	9.1	19.4	55.6	23.4	(7.5)	131
Petroleum Refinery Products	(0.44)	--	--	--	--	--	1745 604
Portland Cement - Wet Process	8.04	30.4	13.7	39.9	16.0	--	378
Portland Cement - Dry Process	7.25	42.6	8.0	32.4	17.0	--	224
Primary Copper	111.84	10.1	13.5	38.4	38.0	--	170
Primary Aluminum	173.26	0.5	15.1	9.0	72.2	3.2	690
Raw Steel	19.22	81.1	6.6	13.5	8.4	(9.6)	2528
Glass Containers	18.16	35.8	7.3	48.8	14.5	(6.4)	205
Newsprint	21.95	6.6	12.8	13.5	67.1	--	73
Writing Paper	23.09	20.2	28.5	22.1	29.2	--	68
Corrugated Containers	21.40	26.2	26.2	42.1	6.9	(1.4)	308
Folding Boxboard	21.90	17.1	25.8	40.6	16.5	--	21
Virgin Styrene Butadiene Rubber	133.63	0.1	47.8	53.9	9.7	(11.5)	199

Total energy use represented by these products was 7.2 quads Btu in 1970.

Source: Federal Energy Administration, Project Independence Report, November 1974, Appendices, p. 155.