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TABLE RONDE NATIONALE SUR L'ENVIRONNEMENT ET L'ÉCONOMIE

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USE AND DISPOSAL OF PLASTICS ON-FARM: A SUMMARY

Prepared For:

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96176
April, 1996

approved by: RST
Date: 04/12/96

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1. INTRODUCTION

Ecological Services for Planning Ltd., was retained by the National Round Table on the Environment and the Economy to:

- Identify, as quantitatively as possible, trends in packaging and by-product quantities, types, re-use, recycling, and cost with respect to inflation, total cost of operations, and product prices. Contrast trends in Canada to those in other jurisdictions — the United States and the European Union in particular;
- Identify key players across Canada (i.e., associations, materials suppliers, significant single actors);
- Report on the status and effectiveness of programs which influence the use of farm packaging and by-products; and
- Suggest possible roles for the NRTEE in order to meet program objectives.

Data collection was undertaken by:

- networking by telephone with key industry contacts;
- literature review of information available on the internet; and
- literature review of published information available at the University of Guelph.

The telephone networking proved to be the most valuable source of current information (a summary of contacts is provided in Appendix A). There was a paucity of useful information identified through published sources or through the internet.

2. AGRICULTURAL PLASTICS

Agricultural plastics are manufactured from various plastic resins to provide the most appropriate characteristics for their end use. The main waste plastics generate from on-farm activities are: Plastic Film, Liquid Agrochemical Containers, and Nursery Pots. Table 1 lists the plastic resins used to manufacture these products.

Table 1. Common agricultural plastics and estimates of usage in Nova Scotia (1990) and in the USA (1992). From the Nova Scotia Department of Agriculture and Pennstate College of Agricultural Sciences.

Product	Resin	Application	Amount used in Nova Scotia (1990)	Amounts used in USA (est, 1992)
Plastic Films	Low Density Polyethylene (LDPE)	Forage and grain storage (silage wraps and bags)	♦ 90,000 kg of haylage plastic ♦ 55,000 kg of silage tarp ♦ 69,000 kg of fertiliser bags	5,443,200 kg
		Greenhouse film	18,000 kg	7,257,600 - 13,608,000 kg
		Mulch film	4,500 kg	18,844,000 - 63,504,000 kg

Table 1. Continued

Liquid Agrochemical Containers	High Density Polyethylene (HDPE)	Pesticide containers	nd	18,844,000 kg
Nursery Pots	High Density Polyethylene (HDPE)	Nursery pots	nd	• Blow molded: 36,288,000 - 45,360,000 kg • Injection molded: 31,752,000 - 36,288,000 kg
	Polypropylene (PP)	Nursery pots	nd	31,752,000 - 36,288,000 kg
	Polystyrene (PS)	Nursery trays; packs; and flats	nd	22,680,000 - 27,216,000 kg

nd - no available data

3. PLASTIC FILMS

3.1 Silage Bags

Silage bags, also known as silage tubes, are Low Density Polyethylene (LDPE) tubes 2.4 to 3.7 metres (8 to 12 feet) in diameter, 30.5 to 76.2 metres (100 to 250 feet) long, and 45.4 to 90.7 kg (100 to 200 pounds) in weight. Silage bags provide a low cost method of storing and producing corn silage when compared to the traditional methods of vertical silos and concrete horizontal silos.

The annual volume of silage bags used in Canada in 1991 was 1,995,840 kg (4.4 million pounds). The volume used in the USA in 1994 was 3,175,200 to 4,082,400 kg (7 to 9 million pounds). The ease of use, low cost, and excellent performance suggest that use of silage bags will continue to increase in popularity. However, concern has been raised regarding the disposal of these plastics once their useful life is over.

3.2 Stretch Wrap Films

Plastic stretch wrap films made from LDPE are used to protect round bales of hay from the environment and to create conditions suitable for production of haylage. The haylage bales, generally consisting of moist, fresh cut alfalfa or clover-type hay, are completely covered with the wrap preventing oxygen from interacting with the haylage. This creates the anaerobic conditions needed for fermentation, resulting in a high protein haylage that is not possible to produce under normal (i.e., barn) storage conditions. Hay wrap is generally 1.3 to 1.4 metres (50 to 56 inches) wide while haylage wrap is typically 0.51 to 0.76 metres (20 to 30 inches) wide. About 9,072,000 to 13,608,000 kg (20 to 30 million pounds) have been used in the USA[1].

[1] Both of these wraps are made from LDPE.

3.2.1 Disposal

A number of traditional methods are currently used to dispose of these plastics including on-farm burning, landfilling, and burying. The relatively high embodied heat rate of plastics, compared to other common waste materials, makes them an attractive feedstock for energy-from-waste incinerators. Plastics are also amenable to recycling, although experience indicates there are some hurdles to overcome.

3.2.1.1 Burning

Historically, many types of on-farm wastes were burned. However, burning raises concerns about air quality and loss of the inherent energy and value of the plastic. Currently, regulations for burning wastes on-farm vary among provincial jurisdictions. For example, in New Brunswick there are no regulations restricting the on-farm burning of plastics whereas in Alberta a farmer was fined $10,000 for illegal on-farm burning of plastic.

3.2.1.2 On-farm Burial and Landfilling

Generally, plastics are relatively stable compounds that do not readily biodegrade. Thus, plastic does not contribute to leachate or foster disease organisms. However, once buried they do consume landfill space and their disposal is a loss of the inherent energy and material. In addition, disposal at a landfill will often require payment of a tipping fee (ranging from $35.00 to $105.00 per tonne).

There is a growing trend to stop the landfilling of these plastics. For example, the Provincial Government of Prince Edward Island has passed a law which will require mandatory recycling of plastics starting in 1998.

3.2.1.3 Energy-from-Waste Incineration

Energy-from-waste incineration is a disposal method that captures the inherent energy of the materials. In some jurisdictions concerns about long range transport of pollutants and disposal of ash has prompted strict controls or even outright bans on this option (e.g., Ontario). The following table outlines the energy values for various materials.

Table 2: Energy Values of Various Fuels

Material	Btu/pound
• Fuel Oil	20,500
• Agricultural plastics	19,900
• Polypropylene	18,500 - 19,500
• Newspaper	8,000
• Wood	7,000 - 7,500
• Textiles	6,900

Source: OMAFRA and Council for Solid Waste Solutions

3.2.2 3R's Initiatives

3.2.2.1 Reduce and Reuse

At present there are no acceptable alternatives to silage wraps and bags that generate the same high quality silage at comparable costs to the farmer. Thus, reducing the amount of plastic being used by applying alternative methods doesn't appear feasible.

At present most silage bags are used once. It is feasible that silage bags could possibly, under the right conditions and if handled carefully, be reused 2 or 3 times. The main problem is that the plastics photodegrade with time and eventually tear. Recently, a reusable tarp has been developed that is made from woven polyethylene. The tarp has a life expectancy of approximately four years. Although the initial cost is higher than the regular plastic bags or tubes the product is cheaper in the long run. Haylage wraps, because they are coated with a tackifier and rip easily, are not suitable for re-use as wraps.

Other minor opportunities for reuse include using the sheeting to cover wood piles and farm machinery, lining the inside of horizontal silos, and recreational uses such as waterslides and toboggans.

3.2.2.2 Recycling

Recycling of agricultural films involves using the waste plastic as feedstock for the manufacturing of new items, such as "plastic wood". At present, there are a number of problems working against widespread recycling. The most commonly quoted problem deals with the contamination of the waste plastic by residual silage (e.g., solid and liquid organics), dirt (e.g., from tractor tires, and use in the field), and moisture. The material can be cleaned but it is often an expensive process.

The feedstock for new products generated from plastic films is generally of low quality and is, therefore, suitable for a limited number of applications. One application is durable, low-maintenance lumber suitable for a variety of uses including decks, picnic tables, park benches, docks, curb stops, planking for animal pens, pallets, and so on. Plastic lumber may also be used for fence posts, highway guard-rails, and wharf supports. Another alternative use of farm plastics is the manufacture of plastic pellets used for the treatment of sewage and as bio-filters for aquafarm fish tanks.

Other factors that must be considered when recycling the bags include:

- at present the recycled plastic costs more than virgin plastic;
- clear and white film cannot be made from recycled plastics due to the dyes in the plastic;
- plastic from recycled feedstock is of lower quality than plastic from virgin resins (i.e., the integrity of recycled plastic is reduced); and
- in the case of haylage wraps, the tackifier added to help seal the haylage attracts contaminants and is itself a contaminant.

3.2.2.3 OMAFRA Plastic Film Recycling Feasibility Study

The Ontario Ministry of Agriculture, Food and Rural Affairs, Kemptville Office, in co-ordination with Mobil Chemical Canada Ltd. launched a pilot test day to collect silage and haylage bags for recycling. On the pilot collection day approximately 2268 kg (5,000 pounds) of these plastic were collected. To keep things in perspective, Mobil Chemical produced 1,814,400 kg (4 million pounds) of plastic film in 1995.

The plastic was accepted by Mobil Chemical who attempted to create plastic wood from it. Mobil utilised 50% sawdust, 30% plastic shopping bags (HDPE), and 20% agricultural plastic (LDPE). The end result of study was that the 2268 kg of plastic, when mixed with shopping bags and sawdust, produced approximately 4082 kg (9,000 pounds) of plastic lumber. The lumber is stronger than natural wood and virtually maintenance free. The cost of the plastic lumber is similar to cedar lumber (e.g., 4"x4"x6' is $15.00 a board and a 2"x4"x8' nominal board is $7.20).

4. LIQUID AGROCHEMICAL CONTAINERS

Plastic containers made from High Density Polyethylene (HDPE) are used to market liquid agrochemicals, especially herbicides and insecticides. These containers are durable and break resistant and, therefore, provide an economical and safe medium for the handling, transportation, and storage of these chemicals. However, residual chemicals in these containers may be, or may be perceived to be, a hazard and concern for the disposal, reuse, or recycling of these containers

4.1 Disposal Methods and Energy-From-Waste Incineration

The options for disposal of HDPE containers are similar to the options for disposal of plastic films as described in Section 3.2.1. Energy recovery, through incineration, may be an option that addresses the contamination process as the high temperature environment of the modern incinerator may be able to effectively destroy residual chemicals.

4.2 3R's Initiatives

4.2.1 Reduce and Reuse

The container manufacturing sector has made a commitment to reduce the amount of packaging waste by 50%. Most of the progress towards this goal have been made by private companies taking the initiative to develop low use rate formulations, concentrated dry formulations, and gels.

Refillable and multi-trip containers have been developed as an alternative to one-time use containers. Within the Canadian market there are over 25,000 refillable containers in use. This number is still small when compared to the several million one-way containers that enter the Canadian market every year. These multi-trip containers do, of course, have a limited life-span at which point they too must be dealt with.

4.2.2 Recycling

In 1989 the Crop Protection Institute, which represents the manufacturers, formulators, and distributors of crop protection products, launched a *Container Management Program*. The program was initiated based on the recycling of agricultural chemical containers that began in Alberta in the mid 1980's. The CMP (Container Management Program) began in the prairie provinces[2] mainly through multi-stakeholder organisations comprised of government, farmers, rural municipalities, dealers, and the crop protection industry. The mandate of the CMP was to administer the collection, washing, shredding, and recycling of used agrochemical containers.

Ontario, British Columbia, and Prince Edward Island joined the recycling program in 1992, followed a year later by Quebec, New Brunswick, and Nova Scotia. Today, the CMP exists in nine provinces; all of the provinces but Newfoundland and Labrador. Across Canada the program has 763 collection locations available for the public to drop off their used pesticide containers.

There are two primary methods of collection involved with this program: a) farmers take the plastic containers to the local landfill were they are collected and stored at no charge to the farmer; or b) the containers are returned to the retailers were they are inspected for contamination and temporarily stored by the retailer until they are collected by the Institute. It is important to note that the inspection and storage of these containers is done on a voluntary basis. Independent waste contractors (five across Canada) pick-up the containers once a year from the Institute's storage facilities, shred them, and haul them to the recycling plants.

The Crop Protection Institute has set targets for the amount of plastic containers to be recycled by the year 2000. For example, the objective for 1995 was a 65% recycled rate, for 1997 it is 70%, and for the year 2000 a 90% rate of recycling is targeted. It is too early to tell if the target was met in 1995, but the following tables identifies the past success of the program.

Table 3: CPI Rate of Recovery of Pesticide Containers

Year	Containers Shipped	Containers Collected	% Recovered
1993	4,388,000	2,300,500	52%
1994	4,942,000	2,922,900	59%
1995	not available yet	3,523,100	65% (est.)

The success of this recycling program is largely based on the participation of the farmers themselves. That is, they are the ones who must clean and drop-off the containers for recycling; without them this process would not work.

[2] The provinces of Alberta, Saskatchewan, and Manitoba account for over 70% of the agrochemical containers used in Canada.

Grower education is a critical component of the CMP. Extensive marketing and advertising campaigns have been successfully carried out the CPI. Radio, newspaper, and information packages have been distributed to the public as well as dealers contributing to the success of the program.

The CPI has had toxicology tests done on the recycling process and the results have indicated that the margin for safety is quite wide. That is, there are minimal/no residues created during the recycling process since polyethylene consists primarily of carbon monoxide and carbon dioxide; which are common by-products of any material during decomposition.

Another study conducted by the Centre for Fire Research in Maryland, USA, is more specific, but its conclusions are same (i.e., when this type of plastic is burned it is not considered highly or unusually toxic). Other compounds that are emitted during the recycling/burning process include: volatile carboxylic acids and oxygen containing organic compounds such as acrolein and formaldehyde; all of which are not of any toxicological importance.

A significant problem that was reported for recycling HDPE into plastic lumber is the residual odour that remains in the plastic of the containers. It is thought that the odour would render the final product unacceptable for retail use although commercial uses, such as guard rail posts for roads might be feasible.

5. NURSERY POTS AND PLANTING CELLS

Nursery pots are commonly made from High Density Polyethylene (HDPE) and polypropylene (PP). The pots and planting cells come in various sizes depending on the task that is required of the cells. Plastic cells have become the dominant germination housing for market gardeners as they are inexpensive and convenient to use. For example, a package of twelve planting cells of six costs approximately 99 cents at nursuries in Ontario.

5.1 Disposal Methods

Disposal options are similar to those described for plastic films in Section 3.2.1 (e.g., landfilling and incineration).

5.2 3R's Initiatives

5.2.1 Reduce and Reuse

When planting cells are treated carefully it is possible to get several uses out of them before they become damaged (e.g., bent and torn). Because most operators are likely already reusing as a cost savings practice further gains are unlikely. Available alternatives to plastic cells are available including bio-degradable cardboard planting cells and planting cell presses.

1. Planting Cell Press

Using a soil press, the soil is compacted into a planting cell and a seed planted within it. In the initial planting stages the cell can be small saving valuable space within the greenhouse. As the seed germinates and grows, the small cell can be placed within a bigger cell allowing additional root development.

An advantage of the cell press is that various sizes of cells can be pressed depending on the requirements for proper seed germination and the type of plant being grown. The press, unlike the plastic planting cells, is a one-time purchase that should last the buyer many years.

Currently planting presses are not widely available within Canada. A readily available model that makes 4 cells, with accessories, costs approximately $60.00 (Lee Valley Garden Tools Catalogue, Spring 1996). Larger presses are available in Europe, up to forty-eight cells, cost unknown, although one of our contacts reported a *used* twenty-four cell press cost approximately $200.00.

2. Bio-Degradable Containers

Various types of bio-degradable planting cells are available for the germination of seeds. Over time the material breaks down in the soil, although the amount of material added is not likely to affect soil texture or fertility significantly. Our contacts considered this type of growing method to be expensive compared to plastic cells. A check at a local nursery indicated plastic cells cost about $0.014 per cell whereas peat cells cost about $0.100 per cell. In addition, plastic can be reused, further reducing costs.

An additional factor that should be considered is the source of the material for the biodegradable container. For example, concern has been raised in recent years regarding the environmental impacts of peat mining, a common source of material for biodegradable pots.

5.2.2 Recycle

The recycling of these plastics is possible. However, some areas of Canada have facilities that will recycle these plastics (e.g., Ontario), while other areas of Canada do not have the recycling capabilities (e.g., Nova Scotia). In areas where no recycling facilities exist, the plastics are disposed of in landfills and in some cases burned.

6. INTERNATIONAL EXPERIENCE

In the US plastics in total contribute 7% of the total weight entering a landfill and of this only 0.15% can be attributed to agricultural film. In Canada plastics constitute approximately 8.1% of the total waste entering landfills. In 1990 there was 100 million kg of LDPE recycled in Canada and the US compared to the 1980 figure of 19 million kg. Approximately 8% of all non-packaging LDPE film was consumed by agriculture in the US in 1990 (this equals 120 million kg of plastic film), compared to Germany where agriculture consumes 4% of the annual production of plastic (this equals 320 million kg of LDPE film).

Packaging reduction percentages, in which agricultural packaging is included, have been set by various countries around the world. For example, in Germany by July 1, 1995, 80% of all packaging material was to be recycled, in the US a 25% reduction in packaging waste was targeted for 1992, and in Canada a 50% reduction in the waste from packaging is legislated by the year 2000; including agrochemical and agricultural plastics packaging.

Current recycling strategies vary, and include: no definite system of collection (Canada and US); regional recycling systems within countries (France, Holland, and Germany); and national recycling systems in which plastics are collected from a farmer and sold back to plastic manufacturers (UK and China).

Finally, if a ban were placed on plastic altogether this would not solve the plastic disposal problem. A study in Germany showed that if plastic packaging was replaced entirely the energy needed to produce alternative packaging would double, the weight of packaging would increase 4-fold, the cost of packaging would more than double, and the volume of waste collected would increase roughly 2.5 times.

7. SUMMARY AND DISCUSSION

Plastic has become a popular and common place material on farms for the same reasons it has become common place in other industries: low cost, durability, strength, ease of manufacture, and so on. For example, plastic silage wrap produces a high quality silage at a fraction of the cost of constructing a traditional vertical or horizontal silos. Likewise, plastic sheeting provides a low cost alternative to the traditional glass glazing of greenhouses. For containers, plastic provides a lightweight, durable, shatterproof, and reusable material for the safe transport and storage of liquid agrochemicals. Finally, low-cost and durable germination planting cells for starting seedlings are easily manufactured from plastic.

A number of initiative aimed at diverting waste plastic from conventional disposal routes were identified; some more advanced than others. The recycling of plastic containers for agrochemicals has become a proven method to recover waste material. Recycling programs for plastic films has lagged behind due to the problems associated with the contamination of the film.

Issues that need to be addressed regarding the recycling of agricultural plastics include: feedstock sources (amounts required to efficiently operate recycling plants, quality of the feedstock), economics (is the necessary technology affordable - how do you make it affordable), pollution (e.g., left over residuals from recycling process must be disposed of properly), and public involvement (e.g., how do you get people involved and keep them participating in the project).

Specific research needs to be completed regarding the proper cleaning of agricultural plastics to ensure a clean feedstock is possible. The cleaning mechanism must be efficient and cost-effective.

Additional research into reusable plastics (e.g., reusable silage and haylage bags), needs to be expanded to address technological and economic concerns. For example, how can the price of the reusable bags be decreased to increase their attractiveness over the one-time use bags. Once the reusable bag is at the end of its usefulness, it then needs to be recycled and not disposed of in landfills or burned on-farm.

Incineration, with advantages and disadvantages, is another area where research may be required. Agricultural plastics used as fuel have a low burning rate. This, coupled with a high BTU rate and minimal leftover residuals, make them an attractive fuel. Effective pollution control technologies and the proper disposal of remaining/leftover material are issues that need to be addressed.

Possible roles that organisations, like the National Round Table on the Environment and the Economy, could play is co-ordinating the various stakeholders (in a bottom-up approach) into an effective recycling program (similar to the role that the Crop Protection Institute has taken in regards to agrochemical containers). Many individuals and organisations have good ideas and concepts, regarding agricultural plastics recycling; these ideas need to be harnessed and co-ordinated country wide and used to generate feasible and practical recycling programs.

NRTEE could also assist in the research necessary to make the national recycling and/or incineration of agricultural plastics a national reality/goal. NRTEE could serve as a medium to exchange ideas, technological concepts, and concerns about the issues addressed in this report.

APPENDIX A

Note Report - All Notes

Karen Brown
Representative - Environment Canada
Environment Canada
EX NAEC member
Ecosystem Conservation Directorate
351 St-Joseph Blvd.
Place Vincent Massey, 7th Floor
Hull, QUE, Canada K1A 0H3

819 953 8056 (office) tele
819 994 2724 (office) fax

March 14, 1996 12:22 PM
GC left message for KB to return call (March 13, 1996).

KB returned call (March 14, 1996), and explained that Environment Canada is concerned with scientific programs and has not done any work in the field of recycling farm plastics.

Mr. David Coburn
Representative - NBFA
New Brunswick Federation of Agriculture
NAEC member
109 Keswick Ridge Rd., Fredericton, NB
Suite 201, 1115 Regent Street
Fredrickton, NB, Canada E3B 3Z2

506 452 8101 (office) tele
506 452 1085 (office) fax
506 363 3005 (home) tele
506 363 4388 (home) fax

March 14, 1996 2:54 PM
DC returned GC call from the previous day.

DC noted he has been involved with a sub-committee that was formulated three years ago to study the issue of on-farm plastic wastes and the recycling of them. He noted that agriculutral plastics are a big problem that is getting worse and feasible solutions to this problem need to be developed. The committee in which DC is involved has looked at issues such as recycling and incineration of these plastic wastes and he will have some of the committee members phone GC regarding their research (i.e., Reg King and Les Oulette).

DC suggested that the cost of disposal/recycling be incorporated into the retail price of the plastic products to make the manufactures more responsible for their products. These plastics are easy to use but they seldom break down under normal environmental conditions. Over time it may cheaper, and at the very least environmentally friendly, to build a barn to house the same products that the plastic wraps are housing.

Note Report - All Notes

March 13, 1996 9:21 AM
GC left message for DC to return call.

MR. Paul Cook **416 662 9771 (office) tele**
Representative - CPI **416 622 6764 (office) fax**
Crop Protection Institute - Toronto Office
Toronto, ONT, Canada

March 13, 1996 11:20 AM
PC noted that the success of their plastic container recycling program comes from the involvment of various stakeholder groups (e.g., manufacturers, retailers, farmers, and various government agencies - MOEE and OMFRA). The program began in the Prarie provinces in 1989 and by 1995 had spread to nine provinces; all the provinces but Newfoundland. Across Canada there are 763 collection locations. PC identified two primary methods of collection: a) farmers take the plastic containers to the local landfill were they are collected and stored at no charge to the farmer; or b) containers are sent back to the retailers were they are inspected and temporarily stored (all volunteer work).

PC explained that intitially the program collected all the money and then redistributed to the various provinces. This was an expensive approach because research was being duplicated and each province was more or less doing its own thing. Now the program (as of June '94) is run from Toronto where all the contracting decisions are made and the provinces now act in an advisory capacity (e.g., public relations, how many collection facilities are necessary to run the program effectively - if a farmer has to drive to far to a collection station he/she may not and then the container does not get recycled - and answer any questions.

There are five independent contractors across Canada who pick-up and shread the plastic containers for CPI's recycling program.

Because of the multi-stakeholders that are involved in this recycling project effective communication and education are extremely important. For example, since the MOEE is involved in this project constant contact is maintained with the minister. Due to the amount of involvement MOEE has attempted to work with CPI to solve problems rather than critise. Also, there is a new environmental awarness among farmers today - they must be seen doing environmental work now that neighbours (urban areas) are a lot closer to them.

To aid in the communication and education process, CPI distributes a yearly information package to the stakeholders involved in the recycling program. This kits explain the need for recycling, outline the benefits of recycling, and provides hand-outs, posters, and stickers to retailers.

PC acknowledged that the manufacturers industry has put $24 million into the existing recycling

Note Report - All Notes

program.

Targets set by CPI for the amount of plastic containers recycled for the year 1997 is 70% and for the year 2000 90% of all containers produced are to be recycled. Targets reached thus far include:

YEAR	Containers Shipped	Containers Collected	% Recovered
- 1993	4,388,000	2,300,500	52%
- 1994	4,942,000	2,922,900	59%
- 1995	not available yet	3,523,100	65% est.

These stats are Canada wide and were presented at a global conference held in the US last year. The conference pertained to farm plastics recycling and the closet country to Canada was the US at a 20% recovery rate. Most countries are at the pilot stage for such recycling programs.

PC noted that CPI has had toxicology tests done on the recycling process and the results indicated that the margin for safety is quit wide. That is, there are no/minimal residues created during the recycling process (recall that polyethylene contains hydrogen, carbon, and oxygen - all naturally occurring compounds). The studies were done in Guelph, Edmonton, and Saskatoon.

Mr. Terry Daynard **519 837 1660 (office) tele**
Representative - OFEC **519 837 1674 (office) fax**
Ontario Farm Environmental Coalition
NAEC - member
90 Woodlawn Road West
Guelph, ONT, Canada N1H 1B2

March 13, 1996 12:07 PM
TD informed GC that he had not done any work in the area of recycling on-farm plastic wastes. He did note, however, that pesticide containers were currently being recycled, mainly into fence posts. The program (the CPI recycling program) is sucessful because it utilises a bottom-up approach (i.e., started with the farmers) and is private industry driven.

TD suggested that GC contact Mary Wiley of AGCare (Guelph office) to obtain information on the plastics recycling program. GC sent fax to MW requesting relevant recycling data.

TD noted that the original "bio-degradable" plastics consisted of 5% starch and 95% petroleum products. The starch would degrade but the petroleum products portion would not. New plastics now utilise 100% polymer compounds to aid in the bio-degradation of the plastics. TD thought that the

Note Report - All Notes

USDA had done work on these plastics and that information would be available on the internet.

MR. Ken Edie
Representative - PPI
Prarie Pools Inc. - Manitoba Pools
NAEC - member
Box 9800, 220 Portage Ave.
Winnipeg, MAN, Canada R3C 3K7

204 934 0433 (office) tele
204 942 0570 (office) fax

March 14, 1996 10:26 AM
GC left message for KE to return call (March 13, 1996).

KE returned call on March 14, 1996. KE noted that PPI has not done any work in the area of recycling farm plastics. KE suggested that GC talk with Sheila Forsyth (NAEC) for additional data. KE thought there may be data on this issue available from ICAR (Independent Canadian Agriculture Research Council) either on CD Rom or on the Internet.

MR. Hubert Esquirol
Representative - WCWGA
Western Canadian Wheat Growers Association
NAEC - member
Box 171 (home address)
Meota, SASK, Canada S0M 1X0

306 892 2169 (home) tele
306 892 2192 (home) fax

March 13, 1996 10:33 AM
GC left message for HE to return call.

Mary-Lou Garr
Representative - OFA
Ontario Federation of Agriculture
NAEC member
R.R. #2 Beamsville, Ont L0R 1B0 (home)
40 Eglinton Ave. E. 5th Floor
Toronto, ONT, Canada M4P 3B1

905 563 4478 (home) tele
905 957 1886 (home) fax
1 800 ONT FARM bus

March 13, 1996 9:25 AM

Note Report - All Notes

GC talked briefly with MLG regarding the recycling of on-farm plastic wastes in Ontario. MLG suggested that GC contact either David Armitage or Cecil Bradley at the Toronto office of OFA.

GC then placed a call to CB. CB returned the call on March 14, 1996 and the information request has now been forwarded to DA who will be in the office on March 15, 1996.

MR. Hart Haidn **604 785 3300 (home) tele**
Representative - NFU
National Farmers Union
NAEC - member
250C 2nd Ave. South
Saskatoon, SASK, Canada S7K 2M1

March 13, 1996 10:42 AM
HH did not have any information of the subject of recycling farm plastics. HH provided GC with Allen Watson's name and number and suggested that GC call him regarding this subject.

Marta Haley **613 233 9375 (office) tele**
Representative - CCA **613 233 2860 (office) fax**
Canadian Cattlemen's Association
Nat. Agriculture Environment Committee
602, 150 Metcalfe Street
Ottawa, ON, Canada K1P 1P1

March 13, 1996 11:02 AM
GC left message for MH to return call.

MH returned call:
She will check into possible recylcing programs with their Alberta office and get back to GC later in the week.

Peggy Strankman (Alberta office) called Friday March 15, 1996 - see notes under Peggy Strankman.

MR. Gordon Hamblin **306 699 2402 tele**
Representative - COAB **360 699 2402 fax**
Canadian Organic Advisory Board

Note Report - All Notes

NAEC - member
P.O. Box 135
Qu'Appelle, SASK, Canada S0G 4A0

March 13, 1996 9:43 AM
GC left message for GH to return call.

MR. Randy Howanyk **613 391 4675 (office) tele**
Purchasing Supervisor **613 966 3795 (office) fax**
Mobil Chemical Canada Ltd. **1 800 363 3456 ex4675 bus**
P.O. Box/C.P. 280
Belleville, ONT, Canada K8N 5A2

March 12, 1996 12:41 PM
Mobil's Chemical Division was sold last Novemeber ('95) to Tenaco Packaging (a US based firm) who make corogated plastics, automotive parts, natural gas components,and ship building materials. Prior to the sale, Mobil had pioneer plastic lumber created from agricultural wraps (LDPE) mixed with sawdust and grocery bags (HDPE). 4000 to 5000 pounds of plastic was required to output 9000 pounds of lumber.

RH was also involved in a pilot collection day in Eastern Ontario for plastic film. On that day approximately 5000 pounds of plastic was collected. To keep things in perspective Mobil in 1995 produced 4 million pounds of film. RH also noted that PEI has approximately 30,000 pounds of the film collected and it is sitting a warehouse until it can be recycled.

GC asked RH what other manufacturers were doing in terms of recycling these agricultural plastics. RH replied that other manufacturers are not currently recycling these products. To RH knowledge, no other manufacturers were running pilot recycling programs either.

RH pointed out that PEI, commencing in the summer of 1998, will introduce mandatory recycling laws in regards to plastics. RH identified a case in Alberta were a farmer was fined $10,000 for burning his plastic in an open field.

RH provided GC with a copy of an OMAFRA New Bulletin regarding the recycling of agricultural plastic wraps. RH to send a sample of Mobil's plastic lumber.

Mr. Reg King **506 452 8101 (office) tele**

Note Report - All Notes

Representative - NBFA 506 452 1085 (office) fax
New Brunswick Federation of Agriculture 506 432 9119 (home) tele
NAEC member
109 Keswick Ridge Rd., Fredericton, NB
Suite 201, 1115 Regent Street
Fredrickton, NB, Canada E3B 3Z2

March 15, 1996 10:27 AM
RK phoned to discuss current recycling issues. RK suggested that GC phone Pat McCue (a recycler in PEI) who is undertaking the recycling of agricultural plastic wraps to be used as filtration devices in fish ponds, in the treatment of sewage sludge, and posts.

RK noted that the Local Service District responsible for the Moncton Landfill Site is responsible for collecting recyclable materials and the cost for getting the material to the recycler is shared by the LSD and NBFA. However, RK did not know where the recyclable materials were going.

GC called PM and left a message to return the call.

Anne Lang-Harris 604 223 8402 (home) tele
Representative - DFC 604 223 8402 (home) fax
Dairy Farmers of Canada 613 236 9997 (office) tele
NAEC - member 613 236 5749 (office) fax
Box 5, Site 5 R.R.#1 Boswell,BC V0B 1A0
75 Albert Street, Suite 1101
Ottawa, ONT, Canada K1P 5E7

March 13, 1996 9:50 AM
ALH informed GC that she is not aware of any projects regarding the recycling of on-farm plastics and that is why she has not submitted any information to NAEC on this subject.

MR. Mike Langman 902 893 6642 (office) tele
Provincial Advisor Land-Use Planning
Nova Scotia Department of Agriculture and Marketing
P.O. Box 550
Truro, NS, Canada B2N 5E3

March 12, 1996 2:03 PM
GC left message for ML Tuesday March 12, 1996.

Note Report - All Notes

GC left another message for ML on Thursday March 14, 1996.

Mr. John MacDonald
Representative - PEIFA
P.E.I. Federation of Agriculture
NAEC member
R.R #2 Miscouche, PEI C0B 1T0 (home)
Farm Centre, 420 University Ave.
Charlottetown, PEI, Canada C1A 7Z5

902 854 2625 (office) tele
902 888 2179 (office) fax

March 13, 1996 10:07 AM
GC left message for JM to return call.

Mr. Pat Mc Hugh
Waterline
R.R. #10
Winsloe, PEI, Canada C1E 1Z4

902 368 3463 (bus) Tele
902 566 5419 (home) Tele

March 19, 1996 9:28 AM
INTRODUCTION
GC phoned PM to discuss what type of product "Waterline" is making and what types of markets they are servicing. Waterline is a fibreglass company that makes fish tanks and plastic filter pellets to remove bacteria and amonia from the water. These pellets can also be used in the treatment of municipal solid waste (i.e., sewage sludge). Waterline has pattened the plastic media (i.e., the plastic corrogated pellets) and most of their business, about 99%, is in the States (West Virgina and possibly Texas in the near future) and Mexico.

THE PELLETS
The plastic pellets that Waterline makes are corrogated. This means that the pellets are groved. It is within these groves that the bacteria can grow and filter the water, removing amonia and nitrates; common pollutants in fish tanks and municipal waste. This product is 8 to 9 years old and the technology is not new. The technology utilises methodologies that are common to septic tanks since the bacteria is the same.

THE PROCESS
Water is extracted from the bottom, middle portion of a fish tank; the place where solids gather (i.e., feed and fisie). It is here where amonina is present. This water is poured over the pellets which are

immersed in sludge. The bacteria of the sludge attaches itself to the pellets and eats the amonina turning it to nitrates (CO2) which is then released into the atmosphere as a naturally occurring substances.

AGRI PLASTIC WITHIN THE PROCESS

PM has attempted to utilise plastic agricultrual wraps in the formulation of the plastic pellets (last week). The biggest problem was that the wraps are contaiminated (i.e., dirt, moisture, and silage and hay still left in the bags). Because of this contamination, Waterline must clean and then shread the plastic before it can be recycled into the pellets. The moisture problem created about 10% gas that is not recoverable in the plastic pellets.

ECONOMICS OF AGRI PLASTIC

This is a new use of agri plastic for Waterline; they generally use shopping bags etc. the higher quality polyethylenes. It costs approximately 25 cents/pound to make these pellets. The machine that they have produces 200 pounds of pellets per hour which translates to about $50.00/hour. With the high quality polyethylene one person is required to run the machine, however, with the contaimination and the process required to clean these plastics, three persons are needed to operate the system. If the machine only makes $50.00/hour and three people at $10 to $12/ hour, plus $7.00/hour in hydro, plus overhead and other expenses, there is no money to be made.

If this process could be reduced to one person, the economics of recycling the agri plastics is possible. However, currently it is not worth Waterline borrowing money from the bank to undertake such a project. That is, PM can not justify having the profitable portion of the company supporting the non-profitable agri plastic section.

If financial assisstence was available, and possibly improved cleaning methods, this could be profitable business. PM noted that Waterline could possibly be the biggest user of dirty plastic if it had external financial help (e.g., to purchase the necessary machines to clean and dry the plastic). Waterline is not concerned with colour or rips, and aside from the dirt and moisture problems, the only concern that they have is the end density of the plastic pellets.

PROBLEMS

A problem that PM is experiencing is not knowing how to access the proper federal agencies and departments who may be able to help further develop the uses of agri plastic. Currently, there is not much financial assistance available to him i.e., provincial budgets are small, $1,000 to $2,000 for such projects, and the government is trying to spread this money out over as many farmers as possible to promote the plastic recycling industry.

With this type of project, much research is needed. This research comes in the form of trial and error to end up with an appropriate end product. Waterline is co-ordinating research with the Charllotown Vet. College in New Brunswick.

Note Report - All Notes

THE FUTURE
Orders for the plastic pellets are in the neighbourhood of 400,000 pellets per order. A proposal has been sent to Waterline that involves a 300 foot diametre tank that will utilise a 6' plastic media (i.e., the pellets). If Waterline was to get this project, they would have to import plastic from provinces outside of the Maritimes to sustain the order.
PM noted that the farmers are quit enthusiastic about recycling the agri plastic and they are very co-operative. PM also pointed out that five local feedmills are looking into collecting the plastic (i.e., when they deliver the feed they might as well collect the plastic from the previous trip).

Mr. Louis Menard
Representative - UPA
L'Union des Producteurs Agricoles
NAEC member
555 Boul. Roland-Therrien
Longueuil, Que, Canada J4H 3Y9

514 679 0530 (office) tele
514 679 4943 (office) fax

March 13, 1996 12:45 PM
LM spoke with GC regarding the recycling of on-farm plastics. LM noted that not much work has been done at this point on recylcing, however, two pilot projects are schduled for this spring. LM pointed out that intitial talks were commencing among the recycling industry, manufacturing industry, government agencies, and the public (i.e., farmers).

A study has been completed in the Beauchamps area of Quebec and LM will forward the study. He also recommended that GC speak with Silvan Leger of Essay Quebec (?) (514) 352-5002 regarding the two pilot projects.

GC then placed a call to SL who was out of the office, but the receptionist took a message for Luc Beauqwin who was in the office to call back (no call received as of March 14, 1996).

LM would like a copy of the final report.

MR. Jim Smiley
General Manager
Canadian Plastic Lumber
164 Needham St., Unit 6
Lindsay, ONT, Canada K9V 5R7

705 878 5700 (office) tele
705 878 5702 (office) fax

March 12, 1996 1:10 PM

Note Report - All Notes

JS explained to GC the necessary requirements for the raw plastic before it can be turned into plastic lumber. CPL utilises an in-house process that is extremely labour intensive (i.e., all plastic must be sorted by hand). CPL process combines a variety of plastics to achieve the end product of lumber (e.g., marine boat wraps, hay wraps). They do not, however, use pesticide containers in their lumber product because of marketing problems relating to odour. All the plastics that they use must be dry and relatively clean - JS noted that a little dirt is not a problem.

JS identified approximately 30 plastic lumber manufacturing companies in existance in North America. CPL however, is the only one to use 100% recycled plastic products in the creation of its lumber (i.e., no virgin plastic involved). The plastic lumber has two to three times the compression strength of wood and requires little or no maintenance (i.e., build once and forget about it). Each plastic board can hold 2000 pounds per square inch and costs about the same as clear cedar. The plastic lumber comes in three colours: grey, brown, and green.

CPL in its manufacturing process uses almost every number of plastic (i.e., No. 1 to No. 7). The only plastic that is not used is No. 3 plastic (vinyl) for various reasons. CPL has not been able to utilise the "AG Bags" in their production of plastic lumber.

JS noted that organisation and education are the key to the future success of the industry. Organising the marketing of such products is key to altering existing perceptions about the plastic lumber. Education is important so people know were the materials come from, how they are being used, and practical uses of the end product.

JS sent through information on the plastic lumber that CPL makes.

MR. George South **705 645 4453 (office) tele**
Muskoka Containerised Services Ltd.
P.O. Box 1779
Bracebridge, ONT, Canada P1L 1V7

March 11, 1996 1:02 PM
GS noted that all agricultural plastics are recyclable. However, they are generally a low grad plastic (i.e., contaminated with dirt, water, resin etc). These plastics are generally sold in conjuction with high grad plastics to avoid tipping fees. When these plastics are sold (MCS primarily to the Canadian Plastic Lumber Co.) a fee of approximately $40 to 50 per tonne is received.

All the plastic must be brought into collection stations by the farmers and no fee is charged.

GS suggested that GC phone Canadina Plastic Lumber to find out more on the end product.

Note Report - All Notes

Mr. Norman Storch 403 854 2593 tele
Representative - CAESA 403 854 2593 fax
Canada/Alberta Environmetally Sustainable Agriculture Agree
Member - NAEC
P.O. Box 1358
Hanna, AL, Canada T0J 1P0

March 13, 1996 9:09 AM
GC left message for NS to return call.

MS. Peggy Strankman 403 275 8558 (office) tele
Representative - CCA
Canadian Cattlemen's Association
Nat. Agriculture Environment Committee
602, 150 Metcalfe Street
Ottawa, ON, Canada K1P 1P1

March 15, 1996 2:25 PM
PS returned GC call today.

PS is not aware of any current efforts to recycle the plastic wraps. PS did mention that Alberta Agriculture has central collection areas for pesticide containers that are picked up and then recycled. PS mentioned that contamination is a problem (e.g., dirt and moisture). PS wasn't sure who was doing work in the field of recycling on-farm plastics or wether it was private or public initiatives.

MRS, Judy Thompson 604 642 5148 (home) tele
Representative - BCFA 604 642 4929 (home) fax
British Columbia Federation of Agriculture 604 383 7171 (office) tele
Member - NAEC 604 383 5031 (office) fax
Box 757 Sooke, B.C. V0S 1N0 (home)
846 Broughton St.
Victoria, BC, Canada V8W 1E4

March 14, 1996 11:26 AM
GC left message for JT to call back (March 13, 1996).

Note Report - All Notes

JT returned call on Thursday March 14, 1996. JT mentioned that last year a pilot project was undertaken for plastics recycling. The program was good for recycling pesticide and fertiliser containers because the manufactures were participating. As far as the plastic wraps go, most of this waste is created because proper disposal/recycing is not in place (recycling is expensive).

JT pointed out that plastic wraps for greenhouses, while inexpensive to purchase, accumulate over time in both the amount disposed and the money spent replacing torn or damaged plastic. All this considered, it may be cheaper to return to the glass greenhouse and avoid the constant expense of replacing the plastic (initial cost is high for glass, but little money is spent over time replacing the glass compared to plastic), while reducing plastic waste disposal at the same time.

JT noted that manufactures of these plastic products may have to look at ways in which these products can reuse and/or recycled if they want to keep selling this product at a reasonable price. GC pointed out that many of the attitudes of the farming community are environmentally concsious (i.e., concernd about the proper disposal/recycling of these plastic wastes), and if manufactures want to maintain an interest in this market sector JT's suggestion may need to be discussed at greater length with all the relevant stakeholders.

JT mentioned that the local recycling industry is just beginning to recycle plastic (looking into the possibilities of it).

MR. Allen Watson **604 785 8084 (home) tele**
Representative - NFU
National Farmers Union
250C 2nd Ave South
Saskatoon, SASK, Canada S7K 2M1

March 13, 1996 10:46 AM
GC contacted AW regarding the recycling of on-farm plastics. AW noted that a sucessful recycling program is in place (in co-ordination with Crop Protection Institue). Last year they recycled over 10,000 plasitc containers mainly into fence posts. Alberta Transportation has a contract with the plastic wood manufacturer to purchase the plastic wood for use as guard rails. Some alternative uses pointed out by AW include using the plastic lumber as vinyl siding, landscaping logs and retaining walls (lumber can be made in an interlocking fashion similar to Lego).

AW noted that currently there is not enough plastic on the market to meet the demand for the plastic wood products. The plastics that are returned for recycling must be tripled washed, dry, and punctured (they must be punctured to ensure that additional uses of the plastic containers is not feasible e.g., you don't want people using pesticide containers to haul drinking water in).

Note Report - All Notes

Some farm equipment manufacturers are now equipping their pesticide sprays with a pressurised water hose so the farmer can rinse the container and its contents into the sprayer rather than down the drain at home. This way the farmer gets the most pesticide/herbicide out of the container prior to cleaning it.

AW explained the method for collecting the container prior to recycling. As noted above the farmers must triple clean, dry, and puncture the containers. Then the containers are taken back to the place where they were sold and inspected for cleanliness etc. The retailers then store all the plastic containers until they are picked up by the CPI. CPI then warehouses the containers collected from the dealers. Once a year Curtis Construction comes by the CPI warehouse to shread the plastic containers and haul them away to a recycling plant.

AW noted that the initial attempts to convince the retailers to collect and store these containers were quit difficult (no financial benefit to retailers i.e., they are not paid for providing these services). However, once one dealer was on-side the others quickly followed suit (i.e., it is a competitive market and environmental concerns are increasing within the farming community and no retailers wanted to let the other retailers get an advantage in the market place).

AW said that in 1993 4000 containers were recycled; in 1994 5000 containers were recycled; and in 1995 (with introduction of the CPI return the containers to the retailer) over 10,000 containers were recycled (stats for the Peace River Block in B.C. i.e., Dawson Creek to Fort St. John area).

Finally, AW suggested that GC call the Crop Protection Institute (Paul Cook at the Toronto Office) to obtain additional information on the subject of recycling farm plastics.

Mr. Jeff Wilson
Vice Chair CHC
Canadian Horticultural Council
Nat. Agriculture Environment Committee
R.R. #3 Orton, Ont L0N 1N0 (home)
310-1101 Prince of Wales Drive
Ottawa, On, Canada K2C 3W7

519 855 6519 (home) tele
519 855 6061 (home) fax

March 13, 1996 3:00 PM
GC left message for JW to call back

Marjorie Zingle
Representative - CFC
Canadian Forage Council

403 244 4487 (office) tele
403 244 2340 (office) fax
403 244 0986 (home)

Note Report - All Notes

NAEC - member
P.O. Box 4143, Station C, 1235 17th Ave
Room 205
Calgary, ALTA, Canada T2T 5N3

March 13, 1996 10:38 AM
GC left message for MZ to return call.