Canada's Proposed Strategy to Accelerate the Phasing-Out of Uses of CFCs and Halons and to Dispose of the Surplus Stocks

Federal Provincial Working Group on Controls Harmonization-ODS

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1. Introduction

This proposed strategy is part of an ongoing process to fulfill Canada's commitment to protect the earth's ozone layer. It results from consultations on strengthening Canada's ozone layer protection program that recommended that:

- releases of chlorofluorocarbons (CFCs) and Halons be reduced to zero by appropriate target dates;
- a mechanism for the collection and safe disposal of ozone-depleting substances (ODS) be developed[1].

It is generally recognized that unless new initiatives are put in place to take CFCs and Halons out of use, most of the current Canadian inventory will ultimately be released to the environment. This document presents a proposed approach to accelerate the use phase-out of CFCs and Halons and thereby reduce releases. It also discusses options to safely dispose of the surplus stocks.

The *National Action Plan for the Environmental Control of Ozone-Depleting Substances (ODS) and their Halocarbon Alternatives (NAP)* published in 1998 by the Canadian Council of the Ministers of the Environment outlines a series of tasks aimed at reducing emissions of ODS. This strategy is a result of NAP Task 4 - Development of a Strategic Plan for Disposal of Surplus CFCs and Halons. Only CFCs and Halons are included in this exercise as these are the only substances for which surpluses are expected in the near future.

The preparation of this document and the consultations to develop a strategy are conducted under the auspices of the Federal-Provincial Working Group on Controls Harmonization-ODS (FPWG). The FPWG's objective of this strategy is:

> *To minimize and avoid the ultimate release to the environment of Canada's stock of CFCs and Halons by accelerating the use of alternatives and rendering the remaining stocks harmless.*

2. Background

Studies have shown that anthropogenic releases of certain halogenated compounds damage the ozone layer, thereby allowing for higher levels of ultraviolet radiation to reach the earth's surface. There is evidence that human exposure to increased ultraviolet radiation has lead to an increase in sunburn, the incidence of skin cancer, eye cataracts and the weakening of immune systems. There is also evidence that ecosystem health has been adversely affected by the increased ultraviolet radiation. Such evidence includes reduced plankton populations in the oceans and damaged vegetation and crops.

International concern spurred the establishment, in 1987, of the Montreal Protocol on Substances that Reduce the Ozone Layer. Canada was among the first signatories

[1] Federal-Provincial Working Group Controls Harmonization (ODS). Recommendations to Strengthen Canada's Ozone Layer Protection Program. May 1995.

and introduced measures to control the import, manufacture, use, sale and export of ODS. Subsequent revisions to the protocol have accelerated targets to reduce consumption. As of July 1999, there were 169 signatory nations to the Protocol.

The federal and provincial governments are responsible for regulating various aspects of ODS in Canada. In 1992, the Canadian Council of Ministers of Environment (CCME) published a *National Action Plan for Recovering, Recycling and Reclamation of Chlorofluorocarbons.* The CCME also announced that all jurisdictions would begin implementing CFC recovery and recycling initiatives by the end of 1992.

In 1994, a review of the Canadian ozone layer protection program was started. The primary objective of the review was to recommend activities that would improve the current program and address the entire life cycle of ozone-depleting substances. The resulting report *Strengthening Canada's Ozone Layer Protection Program*[1] made a series of recommendations to minimize emissions of CFCs and Halons. Specifically:

- zero-release target dates be set and met by a combination of total containment and elimination of uses;
- the destruction or transformation (to other chemicals) of unnecessary ODS be required as soon as feasible;
- the development of new disposal technology be supported.
- governments work in partnership with industry associations and other stakeholders to facilitate disposal; and
- market forces to promote removal from use and proper disposal be investigated.

In addition, the Office of the Auditor-General of Canada (OAG) in 1997, issued a report on Canada's national ozone layer protection program. One of the OAG recommendations was that the federal government should clearly articulate its position on the destruction of ODS and related equipment.

The recommendations from the "strengthening" exercise were incorporated into a revised National Action Plan (NAP). The NAP is the framework for the continued co-ordination of federal and provincial and territorial efforts in the control and management of ODS in Canada.

Among the objectives of the 1998 NAP, is the following specific objective. "To improve the environmental management of all ODS and halocarbon alternatives and to reduce their emission from all industry sectors by:

- identifying, where feasible, appropriate dates for the phase-out of specific uses of CFCs and Halons or as an alternative, mandate total containment; and
- developing a strategy for the disposal of surplus CFCs and Halons."[2]

The NAP Task No.4 requires Environment Canada to prepare a Discussion Paper on disposal of surplus CFCs and Halons. The first step in the development of this paper was to commission a review (Options for the Management of Surplus Ozone Depleting Substances in Canada, Shapiro & Associates)[3] of the options available to manage

2 Canadian Council of Ministers of the Environment, National Action Plan for the Environmental Control of Ozone-Depleting Substances and their Halocarbon Alternatives, Jan. 1998. CCME PN 1291

3 Shapiro & Associates, Options for the Management of Surplus Ozone Depleting Substances in Canada, for Environment Canada, June 1998.

surplus CFCs and Halons. This 'Options Report' looked at the current status of ODS inventories in Canada and determined that in some sectors, notably mobile air conditioning, CFC stocks will be consumed in the short term, however, in other sectors, CFCs will continue to be used for many years. The NAP tasks No.11 and 14 also required that the feasibility of phasing out the use of CFCs and Halons be investigated. The 'Options Report' examined options to accelerate the phase-out of use of ODS in order to reduce the likelihood that ODS stocks will be released into the environment as well as the regulatory and non-regulatory tools available.

This strategy is based primarily on the information in the Options Report. The Federal Provincial Working Group has reviewed the 'Options Report' and is now proposing a strategy for consideration and input from stakeholders. Once this process is complete, the strategy will be considered by the CCME.

3. International Activity

Many countries are taking action to accelerate the phase-out of ODS use. The European Union (EU) is planning to eliminate the use of CFCs in refrigeration and air conditioning by the end of 2000. This new regulation will place an immediate ban of the sales of CFCs with an export licensing system to complement the existing import licensing system, for the remaining trade in ODS. The table below summarizes the key requirements regarding CFCs and Halons contained in the proposed European Commission regulations adopted by the European Council in 1998.The proposed regulations still need to be approved by the European Parliament, but substantive changes are not expected.

March 1999	Ban on sales of CFCs, and ban on sales and use of Halons and other fully halogenated substances
January 1, 2001	Ban on use of CFCs for refrigeration systems
January 1, 2003	Ban on use of non-critical Halon fire-fighting equipment
January 1, 2004	Mandatory decommissioning of non-critical Halon systems.

Nordic countries (Sweden, Denmark, Norway and Finland) have all prohibited the use of CFCs in new equipment in the early 90's. Sweden prohibited recharging of existing equipment with virgin or recovered CFCs in January 1998. Sweden has also set a target for prohibiting the use of CFC refrigerants in existing commercially used equipment by January 1, 2000. The Nordic countries are not attempting to restrict the use of CFCs in existing household appliances.

Australia has phased-out the import, export and manufacturing of Halons since 1992 and CFCs since 1995. Some state governments in Australia also ban the possession

of Halons without a license. Australia has also decommissioned all of its non-critical Halon fire extinguishing systems.

In Australia, all the states have passed regulations prohibiting the use of Halons in non-critical applications. The regulations also mandate that all non-critical systems be decommissioned. In addition, the Federal Government and industry have collaborated in programs to collect, recover and destroy surplus CFCs and Halons. An advance deposit levy is collected on sales of all CFC and HCFC refrigerants. The levy is used partly to refund returns of used CFCs and HCFCs, and partly to pay for the collection infrastructure and destruction of the surplus. Australian industry has developed a relatively low cost destruction process and plant to destroy ODS. High temperature incineration as a method for destroying ODS was not acceptable in Australia and a different process was required. The locally developed process allows for the safe destruction of CFCs and Halons with minimal environmental impact.

The United States EPA has reduced production and consumption levels and phasing-out the production and consumption of the major ozone-depleting chemicals. The phase-out schedule is in line with the dates agreed to by the Parties to the Montreal Protocol at the 1992 meeting in Copenhagen.

Parties to the Montreal Protocol have requested signatories to develop national and regional strategies for the management of Halons, including emissions reduction and ultimate elimination of their use. The strategies should include options for discouraging Halon use in new installations and equipment, encouraging the use of substitutes and replacements, complete removal of non-essential Halon installations and equipment and promoting appropriate measures to ensure recovery, storage, management and destruction of Halons.

At the 11th meeting of the parties, a decision was adopted on the development of strategies for the management of CFCs. The decision states that all non Article 5 parties (developed countries) prepare strategies for the management of CFCs, including options for recovery, recycling, disposal and eventual elimination of their use. The strategies are to be prepared by July 2001.

Canadian Situation

The current situation in Canada is that the federal government has prohibited new uses of CFCs and Halons, and has restrictions on the import and export of bulk shipments and certain uses. The provinces restrict the emissions of CFCs and Halons and two provinces have banned the refilling of automotive air conditioning systems with CFCs. In all jurisdictions, it is prohibited to vent CFCs and Halons (except to extinguish a fire).

4. Options for Accelerating the Phase-Out of Use of ODS in Canada

The ‘Options Report’ indicated that surpluses are expected for specific CFCs and Halons and without implementation plans for safe recovery and disposal of surplus

ODS, it is only a matter of time before the entire inventory will be released to the environment. The 'Options Report' also indicated that there is potential to increase the volume of surplus CFC and Halon through accelerated schemes to phase-out the use of CFCs and Halons. Provided that safe disposal is available, increasing the surplus through accelerated means will reduce the likelihood that these products will be released to the environment.

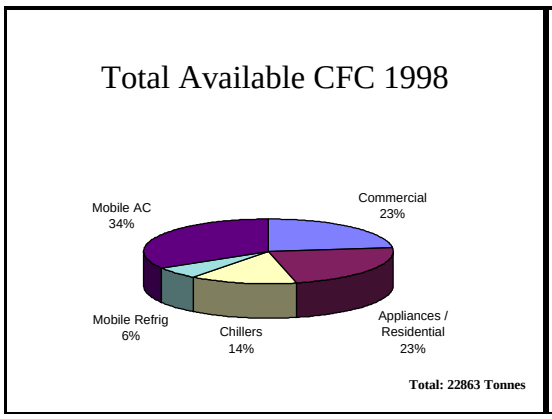

Fig. 1 Total Available CFC

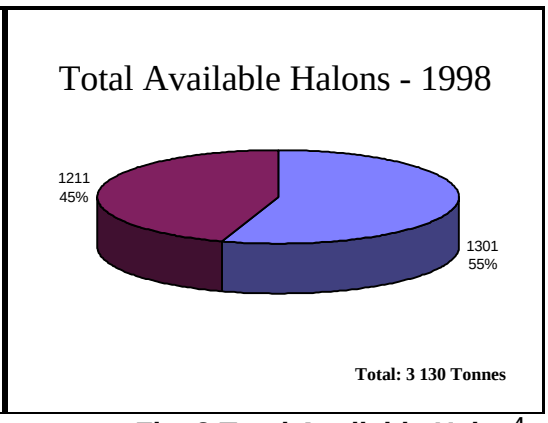

Fig. 2 Total Available Halon[4]

In preparing the 'Options Report', two meetings were held with interested stakeholders including manufacturers, service representatives, reclaimers and recyclers, as well as federal and provincial government officials. Other stakeholders unable to attend the meeting were kept informed by being on a correspondence list. Four management options were identified as a result of this process:

- Retain the *status quo*
- Restrict imports and exports
- Limit refilling of all or some categories of equipment
- Limit use in all or some categories of equipment

4.1 Retain the Status Quo

In general, the current regulations have been reasonably effective in reducing ongoing emissions of CFCs and capping the growth of the existing inventory. The status quo does little to reduce the amount of CFC in use or in stand-by for use, and will result in the inevitable release of the entire inventory of CFC in Canada to the environment.

4.2 Restrict imports and exports

In 1998, the federal government amended the ODS regulations. The amendment included restrictions on the import and export of CFCs and Halons. Federal regulations now prohibit importation of CFC and Halons (with specific exemptions) and set out strict controls on exports.

[4] This total does not include imports of Halons that were in finished products.

This paper will therefore discuss the remaining two options since the first two management options will have no effect on the strategy.

4.3 Limit refilling of all or some categories of equipment

Limiting refilling of all or some categories of equipment would result in a ban on the topping up or refilling existing equipment with CFCs or Halons. The refill ban could be applied selectively to certain sectors, which would allow efforts to be focused on sectors where the most environmental benefit could result while minimizing economic impacts. This approach has been recommended in the NAP and the Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems. This approach has already been incorporated into regulations for the mobile air conditioning sector in British Columbia, New Brunswick and by the Federal Government for Federal departments, agencies, boards and areas under federal jurisdiction.

The goal of limiting refilling is to encourage conversion to alternatives. These conversions would result in lowering the number of equipment containing CFCs and Halon and would, in turn, reduce the potential of ODS emissions to the environment.

4.4 Limit use in all or some categories of equipment

Limiting use would result in banning the use of CFCs and Halons in new or existing equipment. This ban could be applied selectively to certain sectors, which would permit efforts to be focused on sectors where the environmental benefits would be optimized with the least economic cost. Some other countries (notably Sweden), have banned CFC use in all equipment with the exception of household appliances. Also, the European Union is proposing to ban uses of specific CFCs and Halons. In Canada, limits already exist for the use of CFCs in foams and, in some jurisdictions, for sterilants.

5. Approaches to Accelerating the Phase-out of CFCs and Halons by Sector

The sectors that use ODS fall into two general categories: refrigeration and fire protection. The refrigeration industry is concerned with CFCs and the fire protection industry is concerned with Halons. The uses of CFCs and Halons can be broken down into six sectors:

- mobile air conditioning (for passenger comfort);
- mobile refrigeration;
- stationary air conditioning and refrigeration (white goods);
- commercial refrigeration equipment;
- chiller air conditioning; and
- fire protection (Halons).

The following proposed actions are based on the 'Options Report' and ongoing discussions with a variety of stakeholders. They also take into consideration ongoing international activities that are likely to have an impact on the CFCs and Halons situation in Canada. In considering all of these proposed actions, it is worth noting that the cost of CFCs for refilling equipment is increasing steadily while the costs of replacements are decreasing.

5.1 Mobile Air Conditioning

Mobile air conditioning for passenger comfort is the largest CFC-using sector, using virtually all CFC-12. Since 1993 and1994 model years, new vehicles have been equipped with air conditioners that use an HFC refrigerant R-134a. In the Options Report, it was estimated that "old" mobile air conditioning units lose 10% of their CFCs per year or 160% over a vehicle's life. As no new CFC containing units are being produced and the losses from existing equipment are relatively high, the inventory of CFCs in this sector is declining rapidly. It is possible that the current estimated inventory (approximately 12,000 tonnes in 1998) would be consumed by late 2000. Given the rapidity with which CFC stocks are being consumed in this sector, banning refill or topping-up of existing CFC mobile air conditioning equipment, is considered the most practical and cost effective option to stop CFC releases.

Three jurisdictions (B.C., N. B., and the Federal Government) already have this approach incorporated in their regulations and the other provinces and territories have plans to have such regulations in effect by the end of 2000, excluding Alberta, who expect to have their regulations in place by early 2000. The refill ban is also a task in the NAP and all jurisdictions are committed to having the measure in place.

Approach: Prohibit Refill of Mobile Air Conditioning Equipment with CFCs by 2000

5.2 Mobile Refrigeration

The mobile refrigeration sector (sometimes referred to as reefers) includes refrigerated motor vehicles for transporting such product as frozen foods, dairy, meat and fresh soft fruit, as well as mobile canteens and snack wagon vehicles. It represents a major user of refrigerants, principally CFC-12 and R-502. Since 1994, all new equipment have been equipped with HFC-134a or HFC blends (HCFC-22 is also used to some extent). In 1998 the in-use inventory was estimated at 6,300 tonnes. It is estimated that stocks of CFC available for servicing could be used up by the end of 2000. The remaining CFC in use at that time will be approximately 6,000 tonnes and is expected to be released to the environment by 2010.

Releases to the environment due to leaks are high for this sector, approximately 10% per year. In addition, the design of most units does not easily accommodate CFC recovery resulting in increased releases.

Approach: Prohibit Refilling in the Mobile Refrigeration Sector with CFCs Effective 2003.

This option would ban the refilling with CFC products by 2003. This option would lead owners of mobile refrigeration equipment to convert to non-CFC technology. This would result in the greatest decrease in CFC releases to the environment. Given the high rate of accidental releases, this option would prevent the release of most of the inventory to the environment.

A recharge prohibition for this sector would present a challenge in regards to the amount of cross border activity in the trucking and rail industries. For example, in the MAC sector, there have been occasions in some jurisdictions, where US based buses have not been allowed to refill their AC systems with CFCs. In these cases the system has been retrofitted to an alternative.

5.3 Stationary Air Conditioning and Refrigeration - Appliances (White Goods)

The appliance sector includes all household plug-in refrigeration and air conditioning equipment. It is estimated that there are about 10,000,000 appliances that use CFC refrigerants. The volume of CFC in each unit is small (approx. 112gms). The total inventory was estimated at 4,700 tonnes at the beginning of 1998. Leakage from household appliances is minimal, therefore the demand for servicing this type of equipment is expected to be low and stock should be available for servicing until 2020.

In 1996, manufacturers started using alternative refrigerants for new equipment, however, there remains a large number of CFC containing units available in the market. It is expected that the inventory of new appliances that contain CFC will be gone by the end of 1999. As these appliances have a long service life (appropriately 13-15 years), CFC containing units could be in use for many years.

Approach: Status Quo with a Ban on Converting Equipment to Use R-12 .

All current regulations and restrictions apply. Provincial regulations require recovery of CFC refrigerants before the appliance is scrapped. This option places the lowest costs on most stakeholders and users. Leakage rates and volumes used in household appliances are small and present a low risk for releases. Continued education on the importance of recovering CFCs from old appliances should substantially reduce releases to the environment.

5.4 Commercial Refrigeration and Air Conditioning

The commercial refrigeration and air conditioning sector covers a broad range of equipment including: plug-in case coolers, freezers, walk-in freezers and coolers, split air conditioning and air cooling systems for commercial buildings and restaurants. CFC-12 is mainly used for refrigerated coolers and R-502 is used for medium and low

temperature applications, such as frozen food display cases and storage freezers. There are several million units in Canada using such types of systems. The inventory of CFCs in 1998 was estimated at 5,350 tonnes.

Losses during servicing can be high for this sector as some types of equipment operate with high usage rates. In 1998, releases to the environment due to leaks and other releases were estimated to be about 7% of the total refrigerant in use.

Substitution with alternative refrigerants began in 1993. By 2020 the amount of CFC available is estimated to be 2,971 tonnes.

Approach: Prohibit Refilling with CFCs, Effective 2003.

The feasibility of a prohibition on refilling or topping up existing equipment with CFC products by 2003, has already been demonstrated by regulations in the mobile air conditioning sector. The limit on refill for CFCs would encourage and accelerate conversion to newer technologies and would result in the greatest decrease in CFC releases to the environment by reducing the number of equipment containing CFCs.

Using a “ban use” approach would place a greater burden on users of commercial refrigeration equipment because the number of units are high and widely distributed. The number of CFC containing units used is decreasing as old equipment is replaced and the cost of refilling with CFC rises.

This sector is a major repository of CFCs and will remain so for many years. This proposed approach to improve reclamation and encourage the use of alternative refrigerants is expected to yield the best environmental benefits while reducing direct economic costs to users of commercial refrigeration equipment.

5.5 Chillers

Chillers are large air conditioning units that provide cooling to buildings by cooling a medium, such as water, which is circulated in the area to be cooled. Chillers usually contain large charges of refrigerant (from 300-1000kg.). There are estimated to be 6,000 chillers in Canada. In 1998, it was estimated that there was approximately 3,148 tonnes of CFC in use or on standby. In 1998 an estimated 66 tonnes of CFC was released to the environment. Recovery efforts have improved, as has conversion to alternative refrigerants: by the beginning of 1998 approximately 30% of units had been converted. New units are now using alternative refrigerants. There is a trend to convert existing equipment to non-CFC refrigeration because of the increasing cost of CFCs and their reduced availability.

Chillers are long lasting and expensive to convert. By 2020 there will still be an estimated 2,580 tonnes of CFCs available. Leakage and release rates are predicted to be between 2.8% and 5%.

There are two types of chillers used: high pressure and low pressure. The vast majority of chillers in Canada are low-pressure chillers, which operate at lower than atmospheric pressure. High-pressure systems operate at higher than atmospheric pressure, so that in the event of a leak, the equipment will lose all of its refrigerant charge. Nevertheless, the release rates from high-pressure equipment are lower because the equipment has more built–in safety features.

Approach: Limit releases of CFC from low pressure chiller purges at less than 0.1kg/kg air; effective 2003. Ban the refill of chillers with CFCs; effective 2008.

This sector is a major repository of CFCs and will remain so for many years. Actions to improve reclamation and encourage the use of alternative refrigerants could yield high environmental benefits. The type of equipment used in chillers permits complete recovery and collection of CFCs. Purge limits are already in effect in eight jurisdictions. Purge releases are also controlled by the Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems[5]. In 2008 the refilling of CFC in all chillers, new and existing, will not be permitted. This approach will encourage and accelerate conversion to alternatives. The long-term limits on refilling permit responsible owners to continue to use CFCs while planning for eventual replacement of the equipment. The ban on refilling would not take effect for over 8 years, which should give the sector enough time to develop cost effective replacement strategies. It is expected that all chillers, high and low pressure, will be converted or replaced with non-ODS systems by 2008.

5.6 Fire Protection (Halons)

Halons are used in fire protection applications. Halon1211 is used in portable extinguishers while Halon1301 is used in fixed total flooding systems. Halons do not leave liquid or solid residues when discharged, therefore they are preferred for sensitive areas, such as computer rooms and data storage areas. They also can be used in the presence of humans, which is important in closed areas such as aircraft and armoured fighting vehicles.

The Halon sector stakeholders include: owners and users of Halon containing equipment, the fire protection service industry, manufacturers and distributors of fire protection equipment, and manufacturers and distributors of chemicals used in fire protection equipment. Halon has an extremely high ozone depleting potential (three to ten times more than CFCs) and its intended use results in its release into the environment.

Halon containing equipment is easy to identify and alternative fire extinguishing materials and technologies are available for many applications. Some large users (i.e. Department of National Defense, Manitoba Hydro) are taking steps to remove Halon containing equipment from all but the most critical areas. Most Halon 1211 in

[5] Environmental Code of Practice for Elimination of Flouorocarbon Emissions from Refrigeration and Air Conditioning Systems. Environment Canada, 1998.

commercial and industrial applications is being replaced, therefore, a need is emerging for disposal facilities. Halon 1301 is being retained in designated critical areas and recovered Halon 1301 is being banked for future use.

Current Federal regulations prohibit production of Halons and import and export of recovered Halons except by permit. There are Federal and Provincial controls on uses and releases and mandatory removal of Halon prior to decommissioning of equipment. Most provinces require reporting of releases (accidental or not). There is also an Environmental Code of Practice on Halons[6] which provides directions to owners of Halon containing equipment on reducing and eliminating Halon releases to the environment.

Fire protection equipment differs from refrigeration equipment in that owners must always be prepared to recharge their systems in the event of a release. This means that owners will generally have to act in advance of regulations coming into effect.

Approach: Prohibit Refilling of Portable Equipment by 2003 and fixed equipment by 2005, except under permits for critical uses.

This option would ban refilling or topping up existing equipment with Halon products either new or recycled starting in 2003. In addition, owners would be required to obtain a permit to refill equipment with Halon if it is for critical use applications. Permits would limit the number of refills permitted to 1 or 2, after which the owner must convert to non-Halon technology. There would also be blanket exemptions for applications where there are currently no alternatives (i.e. aircraft). This approach for portable Halon systems is already in place in four jurisdictions: Manitoba, New Brunswick, British Columbia (without the use of permits) and the federal house. In New Brunswick, this approach also applies to fixed systems.

A nation-wide program would encourage owners to convert to non-Halon technology in advance of the ban on refilling. The ban would encourage and accelerate conversion of Halon systems to newer technologies. The accelerated decommissioning of Halon equipment will stimulate the fire protection service sector and the Halon recovery and reclamation sector.

Since fire protection must always be ready for use, owners must be prepared to recharge their systems. If refilling with Halon is banned, owners will need to switch to an alternative before the ban on refilling comes into effect. Therefore, in some cases a ban on refilling has essentially the same effect as a ban on use.

6. Options for Disposal of Surplus ODS

Surplus ODS is defined as ODS that is surplus to Canada's requirements. The objective of the ozone layer protection program is to ensure that surplus waste ODS are destroyed or transformed into other useful chemicals in a manner that does not result in their release into the environment.

[6] Environmental Code of Practice for Halons. Environment Canada, 1998.

6.1 Destruction in Canada

At this time there is one permanent approved disposal facility for CFCs and Halons which is located in Swan Hills, Alberta.

6.2 Export of recovered ODS for reuse in Other Countries

It is now agreed in most countries that protection of the ozone layer requires that stocks of ODS be destroyed. Therefore, exporting of recovered ODS for reuse abroad is not a suitable option.

6.3 Export for Destruction

Destruction of ODS is already being carried out in several countries. A possible option for the disposal of ODS is to allow export of surplus ODS for destruction at a suitable facility. Facilities capable of destroying ODS are currently operating in Australia, Sweden, Germany, Japan, the United Kingdom, Russia and the United States. In these countries, several different technologies are in use.[7]

6.4 Establishment of Further Destruction Capability in Canada

A workshop will be held in February 2000 to review and discuss available ODS destruction technologies with the perspective of developing guidelines for the disposal of surplus ODS in Canada.

7. Proposed Management Approach

A combination of regulations and product stewardship is envisioned as the best approach for managing the phase-out and disposal of CFCs and Halons.

7.1 Extended Producer Responsibility (EPR)

Extended Producer Responsibility (EPR or sometimes referred to as Product Stewardship) is aimed at keeping material and products from being released or becoming waste by ensuring that manufacturers play a greater role in effective waste management beyond the point of sale or warranty. The essence of an EPR program is "the polluter pays" principle and its capacity to influence the design of new products and product systems that avoid waste and enable effective and efficient recovery, reuse or recycling of discarded product.

Many countries and several Canadian provinces are using forms of EPR for particular product categories. Several different tools can be used, including voluntary agreements or covenants with industry to achieve targets, deposit refund schemes, product disposal charges, and end-of-life product take-back requirements.

[7] Technology and Economic Assessment Panel ODS Disposal Subcommittee Workshop. 1995 ODS Disposal Technology Update, United Nations Environment Programme May 2-3, 1995, Montreal, Canada

In Canada, an EPR program is being proposed for the management of the collection and disposal of surplus CFCs. Under such a scheme, industry would be responsible for setting up, administering, and financing a stewardship organization or program that would operate a collection and disposal system for surplus CFCs. Government could participate by providing a regulatory back drop by requiring participation in the system and empowering the stewardship organization to collect fees or levies to pay for program management and disposal of the CFCs.

In the case of ODS in Canada, any EPR program must acknowledge that the product in question is no longer 'produced'. The application of a levy or fee imposed on the sale of new products, would ensure adequate management of the so-called 'orphan products' which were manufactured prior to the implementation of the EPR program. These funds would be used in a fashion similar to an advanced disposal fee to fund the end of life recovery and disposal. Australia's CFC recovery program is an example. The Australian program is financed through a surcharge on the sale of new refrigerants. These funds are used to finance the collection and the destruction of the returned material.

The Heating, Refrigeration and Air Conditioning Institute (HRAI) of Canada is in the process of developing a stewardship program for refrigerants in Canada. HRAI is in the preliminary stages of developing a memorandum of understanding (MOU) with Environment Canada and is planning to have their stewardship organization up and running by January 1, 2001. Participation by industry will help ensure the development of a successful program.

7.2 Economic Incentives

The private sector could provide incentives for equipment owners to switch to the alternatives. It could be in the form of providing a rebate for new equipment, covering the costs for removal and disposal of CFCs and Halons. This could encourage owners to convert to the alternatives in advance of the deadlines and give service providers the opportunity to creatively develop proposals for the removal of these substances.

Economic incentives, such as tax credits, grants and rebates are used widely in many aspects of the economy to encourage certain behaviour. Tax credits, in the form of permitting an accelerated capital cost allowance, have been used in other countries, notably the Netherlands, to help offset the costs of converting industrial equipment to improve environmental performance. Similar types of incentive could be considered in Canada to encourage owners of ODS using equipment to convert to non-ODS containing technology.

7.3 Regulations

If an EPR program is adopted for CFCs and Halons, regulations will be considered to set phase-out deadlines for refill and to provide provisions for seller take-back. The regulations would also require mandatory participation in a collection and disposal program.

Environment Canada would develop controls to only allow exports of the surplus for disposal or for critical use applications. These controls would need to be in place by 2003. The controls would also encourage owners to convert before the deadlines.

Appendix
CFC Forecast by Sector

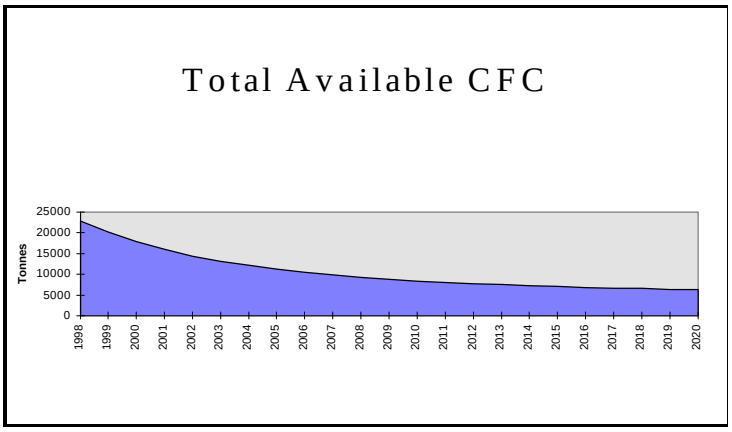

Figure 3

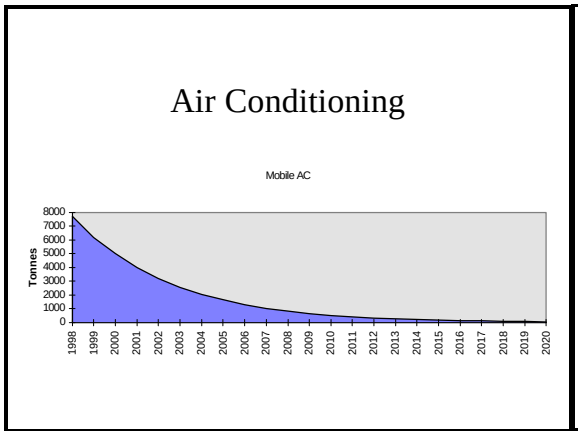

Figure 4

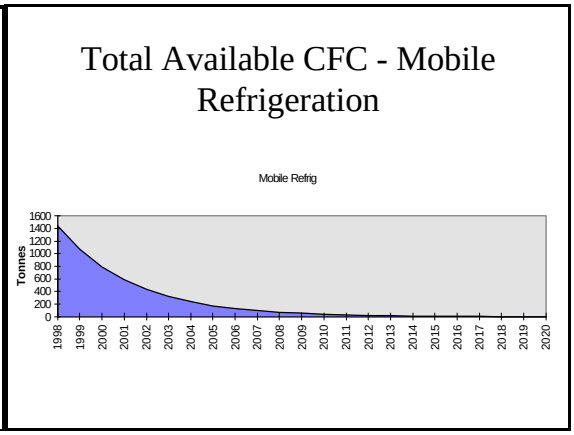

Figure 5

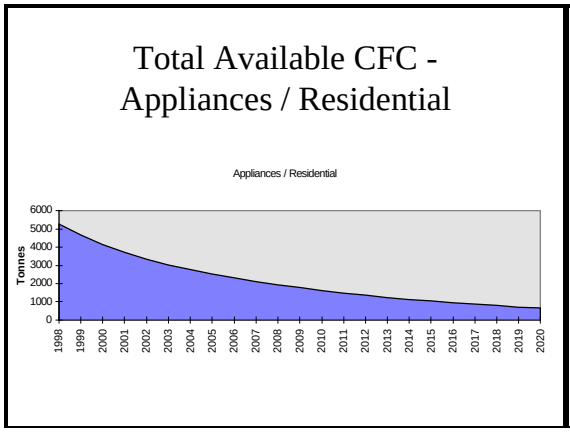

Figure 6

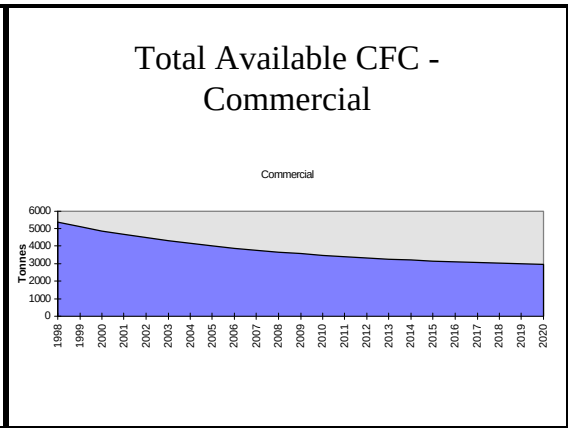

Figure 7

Total Available CFC -
High Pressure Chillers

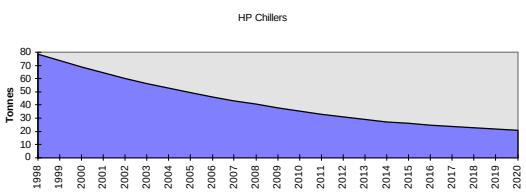

Figure 8

Total Available CFC -
Low Pressure Chillers

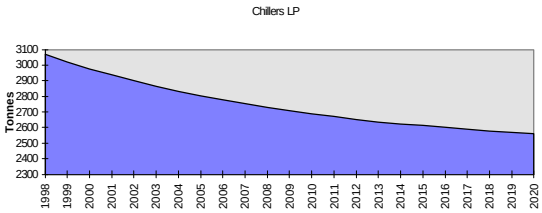

Figure 9