SAVE THE OZONE LAYER - SAY NO TO OZONE DEPLETING SUBSTANCES

THE MONTREAL PROTOCOL
INDIA'S SUCCESS STORY

Transcending All Peaks

सत्यमेव जयते

OZONE CELL
MINISTRY OF ENVIRONMENT AND FORESTS
GOVERNMENT OF INDIA

NEW DELHI, INDIA

FOREWORD

Shri T. R. Baalu
Minister of
Environment and Forests
(Government of India)

Montreal Protocol on substances that deplete the Ozone Layer was signed on 16th September 1987 to protect the thin layer of ozone in the stratosphere. The Protocol has now been signed by over 180 countries and is recognised as a great success in the field of environmental protection.

India has been active in the implementation of the Montreal Protocol. After becoming a signatory to the Montreal Protocol in September, 1992, we prepared a Country Programme detailing the steps to be taken for phasing out Ozone Depleting Substances (ODS) without undue burden to industry and consumers.

We have in the last eight years concentrated on awareness creation on ODS phase out, disseminating information on ozone friendly technologies to the industry as well as assisting industry in accessing technology and funds for ODS phase out. The Ozone Cell, set-up under the Ministry of Environment and Forests, for managing implementation of Montreal Protocol activities, has been actively coordinating and managing these activities. We have also obtained funds aggregating to about USD 125 million for over 345 ODS phase-out projects till date from the Multilateral Fund.

The Government recognizes the need for supporting Small and Medium scale Enterprises (SMEs) in phasing out use of Ozone Depleting Substances. Major initiatives are being undertaken for small and medium scale enterprises especially in the refrigeration and air conditioning sector. The small scale industries network is being used to reach and identify small enterprises and group or umbrella projects are being formulated to effectively assist them.

Government of India has already taken a number of policy measures, both fiscal and legislative, to encourage early adoption of non-ODS technologies. In 1995, full exemption from payment of Customs and Excise duties was granted on capital goods required to implement ODS phase out projects funded by the Multilateral Fund. Further, in 1996 the Government also extended the benefit of Customs and Excise duty exemption for new projects based on non-ODS technologies. We have also notified detailed Rules to control and regulate ODS phase out under the Environment Protection Act, 1986 which have been put in place with effect from 19 July, 2000. The Rules give the necessary legal backing and time frame for the phase out of ODS.

Though the industry has been sufficiently sensitised on ODS phase out issues, there is still need to increase awareness among consumers for adoption of products/services using non-ODS technologies. We have to spread the message of reducing ODS usage and increasing adoption of non-ODS alternatives to every corner of the country. One of the steps in this regard was the Awareness Campaigns conducted by Ozone Cell, Ministry of Environment and Forests in over 25 States between May 2001 to August 2002. In addition a comprehensive public awareness campaign is proposed to be conducted beginning this month for increasing general awareness on Ozone Depletion and encouraging consumers to adopt and use products using non-ODS technologies.

We are at a stage where we not only have to encourage adoption of non-ODS technologies, but should also support the SMEs in achieving cost-effective ODS phase out. This will enable us in smooth transition to an ODS free environment. This will also help us in setting an example of how a large developing country like ours, which produces and consumes ODSs, achieves the ultimate objective of protecting the Ozone Layer with minimum cost to the economy and industry. On the occasion of the eighth International Day for the Preservation of the Ozone Layer, we reiterate India's commitment to the Montreal Protocol.

1. Ozone Layer

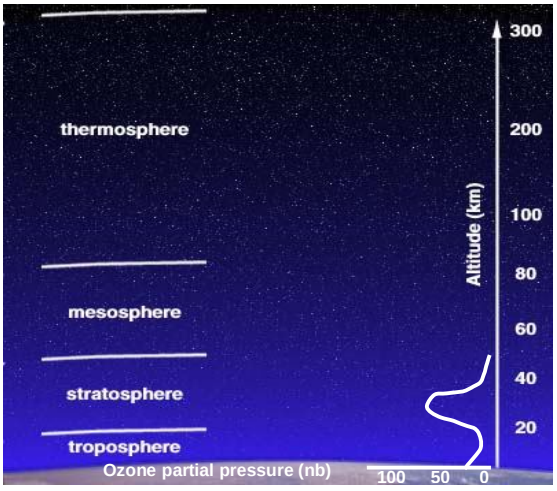
The small blue and green planet we call home is a very special and unique place. We live on the only planet in our solar system and possibly in the galaxy where life is known to exist. All life exists within thin film of air, water, and soil this spherical shell of life is known as the biosphere. The biosphere can be divided into three layers; the atmosphere (air), the hydrosphere (water), and the lithosphere (rock and soil). It is the unique attributes of the Earth's atmosphere that allow it to be a habitable place for humans, animals, microbes and plants as we know them.

The atmosphere is a mixture of gases and particles that surround our planet. When seen from space, the atmosphere appears as a thin seam of dark blue light on a curved horizon.

The Earth's atmosphere is divided into several layers. The lowest region, the troposphere, extends from the Earth's surface up to about 10 kilometers (km) in altitude. Virtually all human activities occur in the troposphere. Mt. Everest, the tallest mountain on the planet, is only about 9 km high. The next layer, the stratosphere, continues from 10 km to about 50 km. Most commercial airline traffic occurs in the lower part of the stratosphere.

Most atmospheric ozone is concentrated in a layer in the stratosphere, about 15-50 kilometres above the Earth's surface.

Concentration of Ozone in the atmosphere



Ozone is a molecule containing three oxygen atoms. It is blue in colour and has a strong odour. Normal oxygen, which we breathe, has two oxygen atoms and is colourless and odourless. Ozone is much less common than normal oxygen.

Ozone's unique physical properties allow the ozone layer to act as our planet's sunscreen, providing an invisible filter to help protect all life forms from the sun's damaging UV (ultraviolet) rays. Most incoming UV radiation is absorbed by ozone and prevented from reaching the Earth's surface. Without the protective effect of ozone, life on Earth would not have evolved the way it has. Most importantly, it absorbs the portion of ultraviolet light called UV-B. UV-B has been linked to many harmful effects, including various types of skin cancer, cataracts, and harm to some crops, certain materials, and some forms of marine life.

What is Ultraviolet Radiation?

The sun emits radiations of varying wavelengths known as the electromagnetic spectrum. Ultraviolet radiation is one form of radiant energy coming out from the sun. The various forms of energy, or radiation, are classified according to wavelength (measured in nanometres where one nm is a millionth of a millimetre). The shorter the wavelength, the more energetic the radiation. In order of decreasing energy, the principal forms of radiation are gamma rays, x-rays, ultraviolet radiation (UV) rays, visible light, infrared rays, microwaves, and radio waves. Ultraviolet, which is invisible, is so named because it occurs next to violet in the visible light spectrum. The three categories of UV radiation are:

- **UV-A between 320 and 400 nm**
- **UV-B between 280 and 320 nm**
- **UV-C between 200 and 280 nm**

Of these, UV-B and C being highly energetic are dangerous to life on earth. UV-A being less energetic is not dangerous. Fortunately, UV-C is absorbed strongly by oxygen and also by ozone in the upper atmosphere. UV-B is

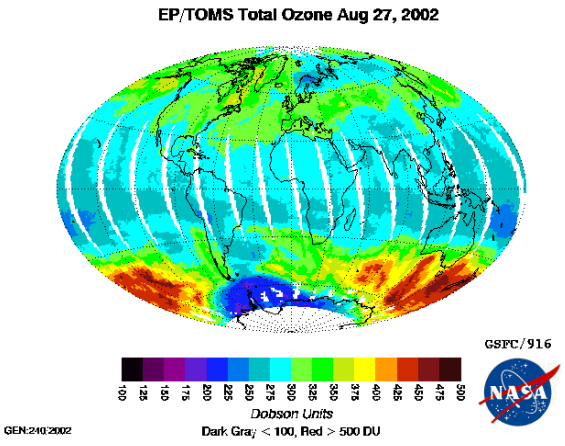
also absorbed by ozone layer in the Stratosphere and only 2-3% of it reaches the earth's surface. The ozone layer, therefore, is highly beneficial to plant and animal life on earth in filtering out the dangerous part of sun's radiation and allowing only the beneficial part to reach earth. Any disturbance or depletion of this layer would result in an increase of UV-B and UV-C radiation reaching the earth's surface leading to dangerous consequences.

Ozone Depletion

At any given time, ozone molecules are constantly formed and destroyed in the stratosphere. The total amount, however, remains relatively stable. The concentration of the ozone layer can be thought of as a stream's depth at a particular location. Although water is constantly flowing in and out, the depth remains constant.

While ozone concentrations vary naturally with sunspots, the seasons, and latitude, these processes are well understood and predictable. Scientists have established records spanning several decades that detail normal ozone levels during these natural cycles. Each natural reduction in ozone levels has been followed by a recovery. Recently, however, convincing scientific evidence has shown that the ozone shield is being depleted well beyond changes due to natural processes.

Ozone Concentration



Ozone depletion occurs when the natural balance between the production and destruction of stratospheric ozone is tipped in favour of destruction. An upset in this balance can have serious consequences for life on Earth, and scientists are finding evidence that the balance has changed. Concentration of Ozone within the protective ozone shield is decreasing, while levels in the air we breathe are increasing.

Environmental Effects of Ozone Depletion

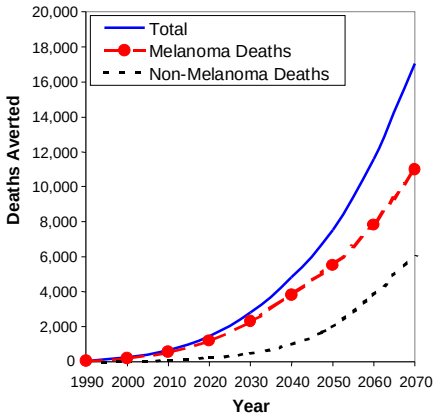
Ozone acts as a shield to protect Earth's surface by absorbing harmful ultraviolet radiation. Without this shield, we would be more susceptible to skin cancer, cataracts, and impaired immune systems. A 1% decrease in total column ozone causes the amount of transmitted UV radiation that damages deoxyribonucleic acid (DNA), to increase by about 2%.

If this ozone becomes depleted, then more UV rays will reach the earth. Exposure to higher amounts of UV radiation could have serious impacts on human beings, animals and plants, such as the following:

- **Harm to human health**:
  - More skin cancers, sunburns and premature aging of the skin.

Annual Deaths from Melanoma and Non-Melanoma Skin Cancer Averted Due to Montreal Protocols (Mean Estimate)

(Source: Global Benefits and Costs of the Montreal Protocol)



  - More cataracts, blindness and other eye diseases: UV radiation can damage several parts of the eye, including the lens, cornea, retina and conjunctiva.
  - Cataracts (a clouding of the lens) are the major cause of blindness in the world. A sustained 10% thinning of the

ozone layer is expected to result in almost two million new cases of cataracts per year, globally (Environment Canada, 1993).

- Weakening of the human immune system (immunosuppression) Early findings suggest that too much UV radiation can suppress the human immune system, which may play a role in the development of skin cancer.

- **Adverse impacts on agriculture, forestry and natural ecosystems**:
  - Several of the world's major crop species are particularly vulnerable to increased UV, resulting in reduced growth, photosynthesis and flowering. Many agricultural crops are sensitive to the burning rays of the sun, including the world's main food crops, rice, wheat, corn and soybean.
  - Many species of crops like sweet corn, soybean, barley, oats, cow peas, carrots, cauliflower, tomato, cucumber, peas and broccoli are highly sensitive to UV-B radiation. As a result, food production could be reduced by 1% for every 1% increase of UV-B radiation.
  - The effect of ozone depletion on the Indian agricultural sector could be significant.
  - Only a few commercially important trees have been tested for UV (UV-B) sensitivity, but early results suggest that plant growth, especially in seedlings, is harmed by more intense UV radiation.

- **Damage to marine life**:
  - In particular, plankton (tiny organisms in the surface layer of oceans) are threatened by increased UV radiation. Plankton are the first vital step in aquatic food chains.
  - Decreases in plankton could disrupt the fresh and saltwater food chains, and lead to a species shift.
  - Species of marine animals in their growing stage, including young fish, shrimp larvae and crab larvae, have been threatened in recent years by the growing UV-B radiation under the Antarctic ozone hole. Loss of biodiversity in our oceans, rivers and lakes could reduce fish yields for commercial and sport fisheries.

- **Animals**:
  - In domestic animals, UV overexposure may cause eye and skin cancers. Species of marine animals in their developmental stage (e.g. young fish, shrimp larvae and crab larvae) have been threatened in recent years by the increased UV radiation under the Antarctic ozone hole.

- **Materials**:
  - Wood, plastic, rubber, fabrics and many construction materials are degraded by UV radiation.
  - The economic impact of replacing and/or protecting materials could be significant.

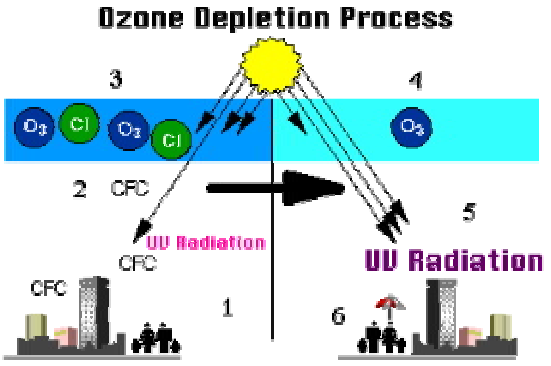
Beginning of Threat to Ozone Layer

For over fifty years, chlorofluorocarbons (CFCs) were thought of as miracle substances. They are stable, non-flammable, low in toxicity, and inexpensive to produce. Over time, CFCs found uses as refrigerants, solvents, foam blowing agents, aerosols and in other smaller applications. Other chlorine-containing compounds include methyl chloroform, a solvent, and carbon tetrachloride, an industrial chemical. Halons, extremely effective fire extinguishing agents, and methyl bromide, an effective produce and soil fumigant, contain bromine. All of these compounds have atmospheric lifetimes long enough to allow them to be transported by winds into the stratosphere. Because they release chlorine or bromine when they break down, they damage the protective ozone layer. The discussion of the ozone depletion process below focuses on CFCs, but the basic concepts apply to all of the ozone-depleting substances (ODS).

In the early 1970s, researchers began to investigate the effects of various chemicals on the ozone layer, particularly CFCs, which contain chlorine. They also examined the potential impacts of other chlorine sources. Chlorine from swimming pools, industrial plants, sea salt, and volcanoes does not reach the stratosphere. Chlorine compounds from these sources readily combine with water and repeated measurements show that they rain

out of the troposphere very quickly. In contrast, CFCs are very stable and do not dissolve in rain. Thus, there are no natural processes that remove the CFCs from the lower atmosphere. Over time, winds drive the CFCs into the stratosphere.

The CFCs are so stable that only exposure to strong UV radiation breaks them down. When that happens, the CFC molecule releases atomic chlorine. One chlorine atom can destroy over 100,000 ozone molecules. The net effect is to destroy ozone faster than it is naturally created. To return to the analogy comparing ozone levels to a stream's depth, CFCs act as a siphon, removing water faster than normal and reducing the depth of the stream.



1. CFCs released
2. CFCs rise into Ozone layer
3. UV releases Cl from CFC
4. Cl destroys Ozone
5. Depleted Ozone → More UV
6. More UV → More skin cancer

Large fires and certain types of marine life produce one stable form of chlorine that does reach the stratosphere. However, numerous experiments have shown that CFCs and other widely-used chemicals produce roughly 85% of the chlorine in the stratosphere, while natural sources contribute only 15%, as per United States Environmental Protection Agency.

Large volcanic eruptions can have an indirect effect on ozone levels. Although Mt. Pinatubo's 1991 eruption did not increase stratospheric chlorine concentrations, it did produce large amounts of tiny particles called aerosols (different from consumer products also known as aerosols). These aerosols increase chlorine's effectiveness at destroying ozone.

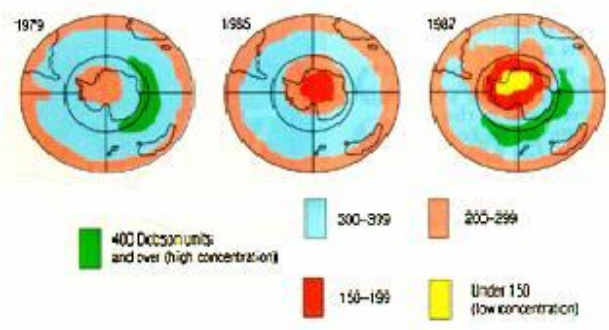
The aerosols only increased depletion because of the presence of CFC- based chlorine. In effect, the aerosols increased the efficiency of the CFC siphon, lowering ozone levels even more than would have otherwise occurred. Unlike long-term ozone depletion, however, this effect is short-lived. The aerosols from Mt. Pinatubo have already disappeared, but satellite, ground-based, and balloon data still show ozone depletion occurring closer to the historic trend.

Antarctic Hole

The terms “ozone hole” refers to a large and rapid decrease in the concentration of ozone molecules in the ozone layer, not the complete absence of them. The Antarctic “ozone hole” occurs during the southern spring between September and November. The British Antarctic survey team first reported it in May 1985. The team found that for the period between September and mid November, ozone concentration over Halley Bay, Antarctica, had declined 40% from levels during the 1960s. Severe depletion has been occurring since the late 1970s.

The problem is worst in this part of the globe due to extremely cold atmosphere and the presence of polar stratospheric clouds. The land under the ozone depleted atmosphere increased steadily to more than 20 million sq km in the early 1990s and in the Antarctic spring of 1998, the area of the Ozone hole exceeded 26 million sq kms and also covered some populated areas of the southern hemisphere. The total ozone dropped to about 97 Dobson units on 1 October 1998.

Evolution of the Antarctic Ozone hole (1979 – 1987 October)



In addition, research has shown that ozone depletion occurs over the latitudes that include North America, Europe, Asia, and much of Africa, Australia, and South America. Thus, ozone depletion is a global issue and not just a problem at the South Pole.

No one could imagine that these miracle chemicals could one day turn out to be harmful

substance to life on Earth. It all began when at the first United Nations Environment Conference at Stockholm in 1972, questions were asked about the effect of jet aircrafts on upper atmosphere. It was known that the high temperature jet exhausts contain an appreciable amount of nitrous oxide and it was also known that this substance can catalytically decompose ozone. The conference authorized United Nations Environment Programme (UNEP) to address this issue and focus on the possible damage to the ozone layer by hundreds of supersonic aircrafts that were expected to be in operation by the late 1980s. They were also entrusted with the task of finding out the effect of release of nitrous oxide from fertilizer manufacturing units on the ozone layer. These investigations did not make much headway and were dismissed as false alarms.

The Real Alarm

In 1974, two United States (US) scientists Mario Molina and F. Sherwood Rowland at the University of California were struck by the observation of Lovelock that CFCs were present in the atmosphere all over the world more or less evenly distributed by appreciable concentrations. They suggested that these stable CFC molecules could drift slowly upto the stratosphere where they may breakdown into chlorine atoms by energetic UV-B and UV-C rays of the sun. The chlorine radicals thus produced can undergo complex chemical reaction producing chlorine monoxide, which can attack an ozone molecule converting it into oxygen and in the process regenerating the chlorine atom again. Thus the Ozone-destroying effect is catalytic and a small amount of CFC would be destroying large number of ozone molecules. Their basic theory was then put to test by the National Aeronautic Space Authority (NASA) scientists and found to be valid, ringing alarm bells in many countries and laying the foundation for international action.

International Action

The first international action to focus attention on the dangers of ozone depletion in the stratosphere and its dangerous consequences in the long run on life on earth was initiated in 1977, when in a meeting of 32 countries in Washington D.C. a World Plan on action on Ozone layer was adopted with UNEP as the coordinator.

As experts began their investigation, data piled up and in 1985 in an article published in the prestigious science journal, “Nature” by Dr. Farman, pointed out that although there is overall depletion of the ozone layer all over the world, the most severe depletion had taken place over the Antarctica. This is what is famously called as "the Antarctica Ozone hole". His findings were confirmed by Satellite observations and offered the first proof of severe ozone depletion. These findings stirred the scientific community to take urgent remedial actions. A framework for such actions were designed and agreed in an international convention held in Vienna on March 22, 1985.

This, subsequently, resulted in an international agreement in 1987 on specific measures to be taken in the form of an international treaty known as the Montreal Protocol on Substances That Deplete the Ozone Layer. Under this Protocol the first concrete step to save the Ozone layer was taken by immediately agreeing to completely phase out chlorofluorocarbons (CFC), Halons, Carbon tetrachloride (CTC) and Methyl chloroform (MCF) as per a given schedule.

Evolution of the Montreal Protocol

The urgency of controlling the Ozone Depleting Substances (ODS) particularly CFCs was slow to pick up. CFCs were so useful that society and the industry were reluctant to give up consuming them. However, even as the nations adopted the Montreal Protocol in 1987, new scientific findings indicated that the Protocol’s control measures were inadequate to restore the ozone layer. In addition, the developing countries had a special situation as they needed the technology of substitutes as well as financial assistance to enable them to change over to non ODS substances.

Meanwhile, the report of the scientific panels entrusted with the task of finding the extent of ozone depletion showed that the actual harm to the ozone layer was much more than predicted by theoretical models and the control measures envisaged by the Protocol in 1987 would not stop the process. More urgent action was therefore necessary. Therefore, at the 2nd meeting of the Parties in London in 1990, 54 Parties as well as 42 non-Party countries agreed on a package of measures satisfactory to all. It was agreed in this meeting that the 5 important CFCs and Halons would

be phased out by the year 2000 and other minor CFCs and CTC would be controlled and eventually phased out. A special provision was made to fund the developing countries with an annual consumption of ODS of less than 0.3 kg per Capita (also called as Article 5 countries) in their efforts to phase out these harmful chemicals. These countries were also given a grace period of 10 years to phase out ODS.

In 1991, more alarming reports came up to show that the depletion of ozone is continuing in all altitudes except over the tropics. It was recognized that it is not enough to control emissions of CFCs and Halons. Other fluorocarbon chemicals like Hydro chlorofluorocarbons (HCFCs) and Methyl bromide, which are also ozone depleting need to be controlled. They have also been brought under the ambit of the Protocol in 1992.

Multilateral Fund

With a view to assist the developing countries in their phase out efforts, a Multilateral Fund has been created. This is known as the Montreal Protocol Multilateral Fund (MPMF). The Fund will finance incremental cost of ODS phase out. The incremental cost includes, cost of transfer of technology, purchase of capital equipment and operational costs for switching over to non ODS technologies enabling the developing countries to phase out controlled substances. Enterprises using ODS technology established before 25.7.95 are eligible for funding for conversion to non ODS technology from MPMF.

India being an Article 5 country is entitled to this assistance from Multilateral Fund in its efforts to phase out ODSs and switch over to non ODS technologies.

Alternatives to currently used Ozone Depleting Substances

During the last few years intense research has yielded a large number of substitute chemicals as replacements to currently used chlorofluorocarbons (CFCs), Halons, Carbon tetra chloride, and Methyl chloroform. These are summarised below on end-use basis:

Technology Options for Phaseout in Refrigeration and Air-conditioning Sector

Sub-sector	ODS used at present	Preferred alternatives / substitutes
Domestic refrigerators	Refrigerant CFC-12 Foam Blowing CFC-11	HFC-134a Isobutane Drop-ins (substitutes) Cyclopentane HCFC-141b
Refrigerated Cabinets (Deep Freezer, Ice-cream cabinets, Bottle coolers, Visi coolers)	Refrigerant CFC-12 Foam Blowing CFC-11	HFC-134a Blends of HC-290 and HC-600a HCFC-141b Cyclopentane
Water Coolers	CFC-12 HCFC-22 (for bigger capacity)	HFC-134a Blends of HC-290 and HC-600a HCFC-22
Mobile (car, bus, van, refrigerated trucks, train)	CFC-12 HCFC-22 (train)	HFC-134a HCFC-22 (trains only)
Central A/c plants	CFC-11, CFC-12 HCFC-22	HFC-134a HCFC-123 HCFC-124 HCFC-22 Ammonia
Process Chillers	CFC-12	HCFC-22, Ammonia

Technology Options for Phaseout in Refrigeration and Air-conditioning Sector contd.

Sub-sector	ODS used at present	Preferred alternatives / substitutes
Ice Candy Machines	CFC-12	HCFC-22, HFC-134a
Walk-in Coolers	HFCF-22, CFC-12	HCFC-22 HFC-134a
Room A/C	HFCF-22, CFC-12	HCFC-22
Packaged A/C	HCFC-22	HCFC-22
Shipping	HFCF-22, CFC-12	HCFC-22 HFC-134a

Technology Options for Phaseout in Aerosol Sector

Sub-sector	ODS used at present	Preferred alternatives / substitutes
Perfumes, shaving foams, insecticides, pharmaceuticals, paints, etc.	CFC-11/12	HAP. DME (Di-methyl Ether) Small, Tiny & Cottage sectors use contract fillers, establish common filling facility for a cluster of units and switch to not-in-kind substitutes. (destenched LPG)
Metered Dose Inhalers	CFC-12	HFC -134a

Technology Options for Phaseout in Foams Sector

Sub-sector	ODS used at present	Preferred alternatives / substitutes
Flexible PUF Slabtstock	CFC-11	Methylene Chloride
Flexible Moulded PUF	CFC-11	Water blown technology
Rigid PUF General Insulation (other than refrigeration)	CFC-11	HCFC-141b
Thermoware	CFC-11	Current- HCFC-141b Long term - CFC-free systems (water blown)
Integral Skin PUF	CFC-11	HCFC-141b
Thermoplastic Foams - EPE/EPPN Foams - EPS Foams	CFC-11 CFC-12	Hydrocarbons CO_2
Phenolic Foams	CFC-11	Hydrocarbons

Technology Options For Phaseout in Fire Extinguishing Sector

Sub-sector	ODS used at present	Preferred alternatives / substitutes
Fire Extinguishers	H-1211, H-1301	Portable type - ABC powder, CO_2. Fixed type - FM200, HCFC blend, NAF-SI/SIII

Technology Options for Phaseout in Solvent Sector

Sub-sector	ODS used at present	Preferred alternatives / substitutes
Electronic and precision cleaning	CFC-113 CTC Methyl chloroform	DI Water Aqueous cleaning process Semi-aqueous cleaning process, organic non-halogenated and halogenated, solvents, perfluorocarbons
Coatings	CFC-113 Methyl chloroform	Aqueous solvents Tri chloro ethylene
Manufacture of pesticides and pharmaceuticals	CTC	Ethylene-dichloride Monochloro-benzene
Metal cleaning	CTC	Tri chloro ethylene
Chlorinated rubber	CTC	Aqueous system
Textile cleaning	CTC	Aqueous system, chlorinated solvents

2. India's Commitment to the Montreal Protocol

India signed the Montreal Protocol on 17.9.92. India's per capita consumption of Ozone Depleting Substances is at present less than 3 grams and did not cross 20 gms between 1995-97 as against 300 gms permitted under the Protocol. India is self sufficient in production of chlorofluorocarbons (CFCs). India mainly produced and used seven of the 20 substances controlled under the Montreal Protocol. These are CFC-11, CFC-12, CFC-113, Halon-1211, Halon-1301, Carbon tetrachloride, Methyl Chloroform and Methyl Bromide.

India prepared a detailed Country Programme (CP) to phaseout ODS in accordance with its national industrial development strategy in 1993. The objectives of the CP were to phaseout ODS without undue economic burden to both consumers and industry manufacturing equipment using ODSs and provided India with an opportunity to access the Protocol's Financial Mechanism. The other objectives of the Country Programme also include minimisation of economic dislocation as a result of conversion to non-ODS technology, maximisation of indigenous production, preference to one time replacement, emphasis on decentralised management and minimisation of obsolescence.

The Government of India has entrusted the work relating to ozone layer protection and implementation of the Montreal Protocol to the Ministry of Environment and Forests (MOEF). The MOEF has set up an Ozone Cell as a national unit to look after and to render necessary services to implement the Protocol and its ODS phaseout programme in India.

The MOEF has also established an Empowered Steering Committee, which is supported by four Standing Committees, namely the Technology and Finance Standing Committee, Standing Committee for Small Scale, Tiny and Unorganised industries, Standing Committee on Implementation of ODS phaseout projects and Monitoring and Evaluation Committee. The Empowered Steering Committee is responsible for the implementation of the Montreal Protocol provisions, review of various policy and implementation options, project approvals and project monitoring.

Current Situation

Although these miracle chemicals have been used in large scale in the developed countries since 1930s, India was slow to derive benefits from their use. The early use of these chemicals, in India, was in refrigerators and CFC-12 needed for servicing was imported. The use of CFC in refrigeration industry can be traced back to the 1960s. Other industries using CFCs such as foam blowing industry, aerosol industry etc., have developed only during the last 15 to 20 years in India. With the availability of CFC-11 and 12 from indigenous production, the growth of these industries consuming CFCs increased very rapidly.

Use of ODS as solvents is estimated to account for the maximum consumption, both in ODS as well as Ozone Depleting Potential (ODP) terms. Refrigeration & Air-conditioning and Foam are next large user sectors, followed by Aerosol. The consumption of ODS in fire extinguisher sector has considerably decreased over the years because of switch over to non-ODS technology by enterprises consuming large quantities of halons.

Progress of ODS Phaseout in India

India is in the process of phasing out ODSs both in the end-use consumption sector and production sector. A total of 347 projects in the consumption sector have been approved and funded by the Multilateral Fund. Of these, 270 are ODS phaseout investment projects while 77 are non-investment and support activities. A total amount of about USD 127 million has been approved by the Executive Committee of

the Multilateral Fund Secretariat for the phasing out 12,243 ODP tons.

The Executive Committee of the Multilateral Fund approved a total of US $ 82 million for the phased reduction and cessation of the entire CFC production in India. In this project, it has been agreed to reduce total CFC production in accordance with an agreed upon schedule. A Project Management Unit (PMU) is operational in the Ozone Cell for monitoring CFC production phaseout and implementing other support activities to aid CFC production phaseout. So far, the CFC producers have achieved a reduction of 3718 MT of ODS production since calendar year 2000 and have complied with their respective Production Quotas.

The Executive Committee of the Multilateral Fund also approved US $ 2.6 million for phasing out halon production and remaining consumption of halons. The enterprises producing halons are in the process of dismantling their plants to render them unusable for halon production.

There are three producers of carbontetrachloride (CTC) in India and their total production level in the year 2000 is 17,510 MT. In addition to the above, there is one methylbromide producer, who produces about 100 MT of the substance per annum.

Sector wise breakup of the funds approved by the Multilateral Fund for ODS phase-out projects in India is given in the table below:

Sector-wise Approved Projects as on 31.8.2002

Sl. No	Sector	No. of Projects	Grant Amount (US $)	OPD Tonnes Phased out
1.	Aerosol	22	2,517,452	740.5
2.	Foam	155	35,223,262	5327.5
3.	Halon	15	4,707,881	2,324.0
4.	RAC	50	25,915,964	2,616.0
5.	Solvent	27	9,411,198	1397.4
6.	Production	1	40,000,000	-
7.	Support Activities	77	9,221,588	-
	Total	**347**	**126,997,345**	**12,405**

Pledge to phase out Ozone Depleting Substances

Four producers of CFCs, SRF Limited, Gujarat Fluorochemicals Limited, Navin Fluorine and Chemplast Sanmar Limited, came together and signed a pledge reiterating their commitment to Montreal Protocol on phasingout Ozone Depleting Substances. This pledge was signed in the presence of Dr. Klaus Topfer, Executive Director, UNEP and Ms. Sushma Choudhary, Additional Secretary, Ministry of Environment and Forests, Government of India. Representatives from UNEP in Paris and Regional Office at Bangkok also participated in this event. In this pledge, the producers reiterated their commitment to go beyond Montreal Protocol mandate and take steps to reduce harmful emissions that will harm the environment.

ECOFRIG Project

This year also marked the end of ECOFRIG Project's initial phase where ODS free ecofriendly technologies were successfully transferred to refrigeration equipment manufacturers. This project was initiated in 1992 and was implemented with assistance from Government of Germany and Government of Switzerland. Indian Technical Institutions and industry also actively participated with supportive role from the Government of India. A conference was conducted on 5-6 March, 2002 to mark this event. The conference was presided by Thiru T.R.Baalu, Minister of Environment and Forests and was attended by the Ambassador of Germany and the Ambassador of Switzerland. Experts from industry, international organisations and technical institutions participated in this conference and shared their experiences under this project and related issues in the refrigeration sector. The next phase of this project, HIDECOR, would be implemented for supporting SMEs through training and equipment support, to the extent feasible.

Refrigeration and Air Conditioning Service Sector Strategy

Refrigeration and Air Conditioning Service Sector Strategy was also prepared during this year. A large survey covering about 20,000 respondents was carried out in a sample of 411 large cities and towns in the country. Based on this survey, a project for facilitating phaseout of ODS in this sector was prepared with assistance from GTZ, Germany, INFRAS, Switzerland, United Nations Environment Programme and United Nations Development Programme. Technical inputs were obtained from research institutions such as I.I.T., Delhi,

National Chemical Laboratory, Pune and industry experts for this study. This project is proposed to be implemented over a period of five years beginning 2003.

Chiller Sector Strategy

The World Bank is conducting a study on the chiller sector to formulate a ODS phaseout strategy for chillers. Chillers include refrigeration and air conditioning systems more than 2 TR using CFC-11 and CFC-12 not using a hermetically-sealed compressor. Tata Energy Research Institute (TERI) has compiled information on chillers that exist in the country in close consultation with the World Bank. After in-depth survey of a sample of chillers and collection of information on technical parameters, a draft report of the national strategy for phasing out of ODS in chiller sector, has been prepared.

State Workshops

The importance of State was recognised due to their geographic proximity to the industries consuming ODSs particularly SMEs and their ability to control and monitor activities relating to phasing out ODSs. To increase awareness of State authorities on Ozone related matters, the Project Management Unit, established under Technical Assistance component for CFC production sector phaseout project, conducted workshops in over 25 States between May 2001 to August 2002. This is proposed to be followed by periodic dialogue and meetings with the State authorities with primary focus on implementation of projects for SMEs and remaining ODS consuming industries and regulation implementation.

It is also proposed to create a Zonal Network within the country for implementation support on activities relating to international protocols. This is expected to help in greater information sharing and proactive steps by the States on implementation of environmental protection measures.

Capacity building of international trainers on controlling illegal ODS trade

Illegal trade was highlighted as an issue in the meeting of Parties that took place in Columbo in October 2001. A video was shown highlighting specific instances of illegal transport of ODS across porous borders. To address this issue, there is a need to train officers involved in implementation of regulations, especially customs officials and equipping goods entry points with identifiers of ODS.

National Academy of Customs Excise and Narcotics, India was identified as one of the international centres for training customs officers and officers associated with implementation of Ozone Regulations in the South Asian Region and as a first step, a one week intensive international training programme was organised in collaboration with UNEP and with funding from technical assistance for CFC production sector phaseout. Officers from five other such similar centres located across the globe participated in this training program. Further, it has been noted that with this training activity and increasing cooperation with neighbouring countries on addressing this issue, entry of illegal ODS or ODS containing products has significantly reduced.

Other activities

In addition to the above, process agent sector strategy, solvent sector strategy and Country Programme Update are under preparation. The focus of these studies is to facilitate regulations implementation and providing assistance to Small and Medium Scale Enterprises. A training project is also under preparation, with assistance from UNEP, for implementation of a training programme for officials from Customs Department and other officials implementing regulations.

Fiscal Measures

The Government of India has granted full exemption from payment of Customs and Excise duties on capital goods required for ODS phase out projects funded by the Multilateral Fund. The Government extend the benefit of Customs and Excise duty exemptions for ODS phaseout projects which were eligible for funding under the Multilateral Fund, whether or not such enterprises actually sought assistance from the fund. This will also cover projects submitted for retroactive financing. The benefit is available subject to the condition that enterprises give clear commitment to stop using ODS in all future manufacturing operations after the projects are implemented.

The benefit of duty exemption has been extended for new capacity with non-ODS technology. Indian financial institutions have decided not to finance/re-finance new ODS producing/consuming enterprises. The Tariff Advisory Committee (TAC) - a statutory body under the Insurance Act, 1938 - has decided to grant suitable discounts on fire insurance premiums if alternative agents are used to replace halons in fire extinguishing systems.

Regulatory Measures

Trade in ODS with non-Parties is banned. The import and export of ODS are subject to licensing requirement. The export of ODS to Non-Article-5 Parties is also banned. This regulatory measure is part of the Ozone Depleting Substances (Regulation and Control) Rules 2000 which have been notified in the Gazette of India on July 19, 2000.

Ozone Depleting Substances (Regulation and Control) Rules 2000

In accordance with the National Strategy for ODS phaseout the Ministry of Environment and Forests, Government of India, has notified Rules, covering various aspects of production, sale, consumption, export and import of ODS.

Important provisions of the Ozone Depleting Substances (Regulation and Control) Rules 2000

These Rules prohibit the use of CFCs in manufacturing various products beyond 1.1.2003 except in metered dose inhaler and for other medical purposes. Similarly, use of halons is prohibited after 1.1.2001 except for servicing and essential use. Other ODS such as carbon tetrachloride and methyl chloroform and CFC for metered dose inhalers can be used upto 1.1.2010. Further the use of methyl bromide has been allowed upto 1.1.2015. Since, HCFCs are used as interim substitute to replace CFC, these are allowed to be used upto 1.1.2040.

The Rules also provide for compulsory registration of ODS producers, manufacturers of ODS based products, importers, exporters, stockist and sellers and the same provision is applicable to manufacturers, importers and exporters of compressors. They are also required to maintain records and file periodic reports for monitoring production and use of ODS. Enterprises which have received financial assistance from Multilateral Fund for switchover to non-ODS technology have to register the date of completion of their project and declare that the equipment used for ODS has been destroyed. Creation of new capacity or expansion of capacity of manufacturing facilities of ODS and ODS based equipment has been prohibited. Purchasers of ODS for manufacturing products containing ODS, are required to declare the purpose for which ODS is purchased. Authority has been specified to issue license for all imports and exports of ODS and products containing ODS.

These rules also indicate specific phaseout dates for manufacturing products using ODSs.

Awareness Generation

The National Ozone Unit (NOU**)** has **undertaken** comprehensive public awareness campaign to ensure that both the public and the companies responsible for actually phasing out the ODS understand and support the policies to protect the ozone layer. Awareness campaigns on Montreal Protocol implementation were conducted between May 2001 to August 2002 at State level on implementation of Montreal Protocol in India and assistance that can be availed under the Protocol.

Further, the International Ozone Day for the year 2001 was celebrated at Hyderabad. This year was the first year where the International Ozone Day was celebrated at the State level. This was undertaken as a part of higher involvement of States in Ozone layer protection activities. During the celebrations, a pledge was taken by participants for protection of environment and following environmental friendly measures and practices.

A comprehensive public awareness campaign is proposed to be conducted beginning this month for increasing general awareness on Ozone Depletion and encouraging consumers to adopt and use products using non-ODS technologies.

Information dissemination package for school teachers and NGOs prepared by Centre for Environment Education was launched on 16th September, 1998 and distributed in four workshops organized in Calcutta, Delhi, Pune and Chennai in November - December 1998. This kit has been developed in consultation with the UNEP-DTIE office in Paris.

The reports of Meeting of Parties and of Meetings of the Executive Committee are sent to industry, Government departments and other stakeholders to inform them of deliberations of these meetings on a regular basis.

Painting Competitions have been organized by the Ozone Cell. An Indian entry won the prize in the International Competition organised by UNEP in 1999. A Painting Competition has been organised on the occasion of Eighth International Ozone Day.

A car sticker, a poster and a special day cover are being brought out for distribution every year on the International Ozone Day.

Ozone Friendly equipment and products are being exhibited during Ozone Day celebrations every year. A similar exhibition is held on the occasion of the International Ozone Day, 2002.

A quarterly newsletter Value Added Technical Information Service (VATIS) is published and distributed to about 2000 individuals and institutions in collaboration with United Nations Asia Pacific Centre for Technology Transfer.

Workshops and Seminars are being organised on a regular basis for interaction with industry, Government bodies etc.

Monitoring System in India

A detailed monitoring mechanism has been established by the Ozone Cell to ensure that the investments, which are made with financial assistance from the Multilateral Fund through implementing agencies, are being fruitfully utilized by the enterprises. The key aspects relating to monitoring mechanism are given below.

A Monitoring and Evaluation Sub Committee set up under the chairmanship of Special Secretary MOEF, including representatives from four implementing agencies, other line ministries and industry associations, regularly monitors the implementation of ODS phase out programme. The Sub-Committee is an advisory body to the Empowered Steering Committee on the Montreal Protocol, which is fully responsible for the implementation of the Protocol in India.

The Director (Ozone Cell) has been convening regular meetings with representatives of UNDP, IDBI and UNIDO with a view to note the progress of implementation and to sort out short term problems, which might occur during the implementation process. Further, Director, Ozone Cell is holding periodic meetings with industry to monitor their implementation progress for ODS phaseout.

Site inspections of the projects under implementation are carried out. Normally, during the course of the year, implementing agencies send three to four missions to visit sites where project implementation work is going on and where projects have been completed and handover protocols are to be signed. During such missions, ODS equipment is also destroyed. Now, an officer of MOEF is accompanying the mission of the implementing agency with a view to evaluate the work being done by the enterprises. It is also proposed to send a team of officers to the project sites to ensure that the enterprises have not reverted back to using ODS and that the new technologies in the respective enterprises have been put in place. These visits are being planned on a quarterly basis.

Key To Success

India attributes it's success in achieving rapid progress in ODS phase out to the following:

- Identifying the priority sectors for early phase-out.
- Choosing wisely a project portfolio with the right mix of investment and non-investment projects.
- Involving key stakeholders early in the phaseout process at both the planning and implementation level.
- Sending clear messages from the government to various stakeholders by notifying appropriate regulations and policies.
- Conducting awareness raising programs for key target audiences.
- Recognizing early the importance of building local capacity through training.
- Increasing the capacity of the Ozone Cell by its active involvement in the Regional Network of ODS officers and other international fora.

The Road Ahead

India is aware of the challenges ahead - maintaining momentum and exceeding the present achievements will require a sustained effort from all stakeholders. A shift in the nature of the activities will also be needed to reflect the country's evolving needs. Some challenges that are yet to be addressed include:

- Phaseout in the small and medium sector, both identification and providing assistance, especially in the refrigeration and air-conditioning servicing sector.
- Phaseout in the solvent sector especially use of CTC as solvent and as process agent.
- Illegal trade of CFCs.
- Inclusion of Ozone depletion issues and its relation to refrigeration practices in the curricula of all technical training institutes in the country.
- Mechanism for higher involvement of State level organisations on ODS phaseout.

3. How Can You Help The Ozone Layer ?

"Being ozone friendly" means taking individual action to reduce and eliminate impacts on the stratospheric ozone layer caused by the products that you buy, the appliances and equipment that your household or business uses, or the manufacturing process used by your company. Products made with, or containing ozone depleting substances (ODS) such as CFCs, HCFCs, halons, methyl chloroform and methyl bromide can contribute to ozone layer depletion.

The following list describes some actions individuals can take to help protect the ozone layer:

Be an Ozone-friendly consumer

Buy products (aerosol spray cans, refrigerators, fire extinguishers, etc.) that are labelled "ozone friendly" or "CFC free". The product labels should indicate that they do not contain ozone depleting substances such as CFCs or halons. Ask for more information from the seller to ensure that the product is ozone friendly. Tell you neighbour that you are the proud owner of "ozone friendly" products.

Be an ozone-friendly homeowner

Dispose of old refrigerators and appliances responsibly. CFC and HCFC refrigerants should be removed from an appliance before its is discarded. Portable halon fire extinguishers that are no longer needed should be returned to your fire protection authority for recycling. Consider purchasing new fire extinguishers that do not contain halon (e.g. dry powder) as recommended by your fire protection authority.

Be an ozone-friendly farmer

If you use methyl bromide for soil fumigation, consider switching to effective and safe alternatives that are currently being used in many countries to replace this ozone damaging pesticide. Consider options such as integrated pest management that do not rely on costly chemical inputs. If you don't currently use methyl bromide, don't begin to use it now (you will have to get rid of it in the future).

Be an ozone-friendly refrigeration servicing technician

Ensure that the refrigerant you recover from air conditioners, refrigerators or freezer during servicing is not "vented" or released to the atmosphere. Regularly check and fix leaks before they become a problem. Help start a refrigerant recovery and recycling programme in your area.

Be an ozone-friendly office worker

Help your company identify which existing equipment (e.g. water coolers, air conditioners, cleaning solvents, fire extinguishers), and what products it buys (aerosol sprays, foam cushions/mattresses) use ozone depleting substances, and develop a plan for replacing them with cost-effective alternatives. Become an environmental leader within your office.

Be an ozone-friendly company

Replace ozone depleting substances used on your premises and in your manufacturing processes (contact your National Ozone Unit to see if you are eligible for financial and technical assistance from the Multilateral Fund). If your products contain ozone-depleting substances, change your product formulation to use alternative substances that do not destroy the ozone layer.

Be an ozone-friendly teacher

Inform your students about the importance of protecting the environment and in particular, the ozone layer. Teach students about the

damaging impact of ozone depleting substances on the atmosphere, health impacts and what steps are being taken internationally and nationally to solve this problem. Encourage your students to spread the message to their families.

Be an ozone-friendly community organizer

Inform your family, neighbors and friends about the need to protect the ozone layer and help them get involved. Work with non-governmental organizations to help start information campaigns and technical assistance projects to phase out ozone depleting substances in your city, town or village.

Be an ozone-friendly citizen

Read and learn more about the effects of ozone depletion on people, animals and the environment, your national strategy and policies to implement the Montreal Protocol, and what the phase out of ozone depleting substances means to your country. Get in touch with your country's National Ozone Unit and learn how you can get involved on an individual level.

List of enterprises (sector wise) that have received assistance from the Multilateral Find.

Aerosols

S No	Project Activity
1	Aero Pharma Aerosol Conversion, Maharashtra
2	My Fair Lady Aerosol Conversion, New Delhi
3	Aerol Formulations Aerosol Conversion, New Delhi
4	Texas Enterprises Aerosol Conversion, New Delhi
5	Ultra Tech Specialty Chemicals Pvt Ltd. Aerosol Conversion, Maharashtra
6	Accra Pack India Pvt. Ltd. Aerosol Conversion, Gujarat
7	Stella Industries Ltd. Aerosol Conversion, New Delhi
8	Aeropress Aerosol Conversion, Gujarat
9	Aero pack Products Aerosol Conversion, Maharashtra
10	Asian Aerosols Pvt. Ltd. Aerosol Conversion, Gujarat
11	Aerosols D'Asia Pvt. Ltd. Aerosol Conversion, Gujarat
12	A.A. Attarwala and Co. Pvt. Ltd. Aerosol Conversion, Maharashtra
13	Aero Industries Aerosol Conversion, Gujarat
14	Chem Versa Consultants Ltd. , Maharashtra
15	SaraChem Pvt. Ltd. Aerosol Conversion, Maharashtra
16	Spray Products Ltd. Aerosol Conversion, Maharashtra
17	Sunder Chemical Ltd. Aerosol , Delhi
18	Maja Cosmetics Pvt. Ltd., Delhi
19	Midas Care Pharmaceuticals Ltd. Maharashtra
20	Syncaps Aerosols, Maharashtra
21	Ruby Aerosol, Delhi
22	Vimsons Aerosol, Gujarat

Foam

S No	Project Activity
1	Camphor & Allied Products Ltd., Gujarat
2	Sunpra Ltd., Pune, Maharashtra
3	Eagle Flasks Industries Ltd., Maharashtra
4	U-Foam Pvt. Ltd., (A.P)
5	Bakelite Hylam Ltd., Secunderabad
6	Alfa Foams , Maharashtra
7	Blue Star Ltd., Maharashtra
8	Duroflex Coir Industries P. Ltd., Karnataka
9	Industrial Foam P. Ltd. , New Delhi
10	Ishwar Arts, Gujarat
11	Ishwar Ashish Plastics P. Ltd., Gujarat
12	Karnataka Consumer Product Ltd.(Kurlon), Karnataka
13	Madras Polymounds, T.N.
14	Milton Plastics Ltd., Maharashtra
15	Milton Polyplast, Maharashtra
16	Tranquil Rubbers Sales P. Ltd., T.N
17	Vikram Plastics, Gujarat
18	Panorama Plastics, Gujarat
19	Polynate Foams P. Ltd., Karnataka
20	Polyflex (India) P. Ltd., Karnataka
21	Real Polymers, New Delhi
22	Vijyajyot Seats Ltd., Gujarat
23	Bharat Seats Ltd., Haryana

Foam cont.

S No	Project Activity
24	PUR Polyurethane Products P. Ltd., New Delhi
25	Pfeda Synthetics (P) Ltd., New Delhi
26	SDC Polyurethane Products Ltd., Gujarat
27	Shroff Textiles Ltd., Maharashtra
28	Harita Grammer Ltd., Karnataka
29	Punjab Scooters Ltd., Punjab
30	Amit Polyseats Ltd., U.P
31	Meenakshi Polymers Pvt. Ltd., Delhi
32	Beardsell Ltd., T.N.
33	Asha Handicraft., Maharashtra
34	Wimco Pen Co., Maharashtra
35	Llyod Insulation (India) Ltd., Delhi
36	Cello Plast., Daman
37	Cello Thermoware Ltd., Daman
38	Polyproducts , Gujarat
39	Kaygee Foams P. Ltd., Maharashtra
40	Preto Foams, Hyderabad, A.P.
41	Bharat Plastic Products., Daman
42	Inalsa Ltd., New Delhi
43	Mahavir Enterprises, Maharashtra
44	Omkar PUF Insulation, Maharashtra
45	Krishna Fabrications Ltd., Karnataka
46	K.B. Poly Industries P. Ltd., Orrisa
47	Vora Cork Industries, Maharashtra
48	Best Plastronics Pvt. Ltd. , New Delhi
49	Bharat Plast, Daman
50	Amar Enterprises, Maharashtra
51	Deccan Engineering Enterprises, A.P.
52	Bharat Cottage Industries, Maharashtra
53	80 Small and medium sized enterprises - group project SMEs
54	Super Urethane Products P. Ltd., Daman
55	Blowkings KFTZ, Maharashtra
56	Delta Foams Engineering Co., Maharashtra
57	Panna International, Gujarat
58	Viral Corporation, Gujarat
59	Ras Polybuild Products P. Ltd., A.P.
60	Alaska Industries., Daman
61	Bluplast Corporation, Maharashtra
62	Reliable Rotomoulders Pvt. Ltd. , West Bengal
63	Malanpur Entech Pvt. Ltd., M.P.
64	Nissan Thermoware P. Ltd., Daman
65	K.J. Polymers P. Ltd., Delhi
66	Venus Auto P. Ltd. U.P
67	Shri Krishna polyurethane Industries (P) Ltd., Delhi
68	Sidhi Polymer P. Ltd., Karnataka
69	Legend Interiors , Delhi
70	National Flask Industries Ltd., Gujarat
71	Sintex Industries. Ltd., Gujarat
72	Jayson Industries, Delhi
73	Duab International, Haryana
74	Jaypee Tech-noplast P. Ltd., Jammu
75	Galaxy FRP Pvt. Ltd., Haryana
76	Ajay Corrugating & Plastics P. Ltd., Gujarat
77	Puff Insulators , Delhi
78	Joti Foam Products P. Ltd., Maharashtra
79	Bansal Plastic Industries, Delhi
80	Baba Insulators, Delhi
81	Shree Nath Plastics, Delhi
82	R.S. Insulators, Delhi
83	P.K. Construction Co., Delhi
84	Ganga Thermoware P. Ltd. U.P.
85	Shivathene Linopack, H.P.
86	Nav Texfeb Pvt. Ltd., U.P.
87	Ashok Metals, Delhi
88	O.K.Industries, Delhi

Foam cont.

S No	Project Activity
89	28 small and medium-sized enterprises-group project
90	Devisons P. Ltd. , Delhi
91	Varivar Plast Products Pvt. Ltd., U.P.
92	Supertek International, Delhi
93	Standard Electric Appliances, T.N.
94	N.D.Plastics , Delhi
95	Primrose Multiplast Pvt. Ltd., Delhi
96	Delite Foam and Polymers, Haryana
97	Reactive Polymers Ltd., Gujarat
98	National Plastics, Daman
99	Tokyo Plast International Ltd., Daman
100	Crystal Electronics and Plastics, U.P.
101	Mayur Jugs Pvt. Ltd., Delhi
102	Santech Industries, Punjab
103	Saddle Poly Products P. ltd., A.P.
104	24 Small and medium-sized Enterprises
105	Harjas Plastic and Metal Components P. Ltd. Maharashtra
106	Naorang Plast, Delhi
107	16 Spray Foam Enterprises
108	Crown Industries, Gujarat
109	Evershine Plastic Industries P. Ltd., U.P.
110	Ramakrishna Moulders, Delhi
111	Sanjay Industries, West Bengal
112	Enertech engineering P.Ltd., A.P.
113	M-Plast, Delhi
114	Raipur Agencies, Chattishgarh
115	Pyarelal Coir Products Ltd., U.P.
116	Alka International Ltd., U.P.
117	SR Poly Steel P. Ltd., Haryana
118	Nindra Foams, Delhi
119	R.H. Industries, Punjab
120	Pinnacle Inudstries Ltd., M.P.
121	Coolwels Automobile Engineers, Haryana
122	Jaiswal Industries, New Delhi
123	Premium Mouldings & Pressing P. Ltd., Haryana
124	Sawhney Seating Systems, Haryana
125	Sun Steering Wheels Ltd., Haryana
126	Netplast Ltd., U.P.
127	Group Project spray and Insitu insulation 14 Enterprises
128	SR Polymers and Printers, New Delhi
129	Roome Plastics P. Ltd., Rajasthan
130	Apollo Steelcrafts, Delhi
131	17 Small and Medium-sized enterprises
132	Solvay Moulding P. Ltd., Dadar & Nagar Havelli
133	Polyrub Industries, Gujarat
134	Prince Plastoware Ltd., Daman
135	Nandadeep Fibrotech P. Ltd. , Maharashtra
136	Lear Insulation Engineering P. Ltd., Maharashtra
137	Essa Aircons Ltd., Daman
138	UNC Plast Industries, Navi Mumbai
139	Poly Glass Fibre Industries P. Ltd., New Delhi
140	Caryaire Equipments India P. Ltd., U.P.
141	Bhatia Plastics, New Delhi
142	Flexo Foam P. Ltd., Haryana
143	Malvika Polymers, Haryana
144	Nu-Foam Rubber Industries P. Ltd., Haryana
145	Sutlej Coach Products P. Ltd., Punjab
146	Viking Engineers P. Ltd., U.P.
147	Oto Industries P. Ltd., Haryana
148	Precision Engineering Tools and Components
149	Pramukh Polymers

Foam cont.

S No	Project Activity
	Multiple - Subsectors
150	Enkay Foam P. Ltd., U.P
151	Manali Petro chemicals Ltd., Madras
152	UB Petrochemicals Ltd., Madras
153	Expanded Incorporation, Mumbai
154	Polyurethane (Asia) P. Ltd., Mumbai
155	Sectoral Phaseout plan for elimination of CFCs in the foam sector

Halon

S No	Project Activity
1	Real Value Appliances Ltd., Maharashtra
2	Vijay Fire Protection Systems Ltd., Gujarat
3	Nitin Fire Protection Industries Ltd., Maharashtra
4	New Age Industries, Maharashtra
5	Steelage Industries Limited, T.N.
6	Vimal Industrial Safety Equipment Corporation, Baroda
7	Atkins, New Delhi
8	Ashoka Engineering Co., New Delhi
9	Standard Casting Pvt. Ltd., Delhi
10	Bharat Engineering Works, Maharashtra
11	Zenith Fire Services, Maharashtra
12.	New Fire Engineers Pvt. Ltd., Maharashtra
13.	Cascade Counsel Ltd., New Delhi
14.	Kooverji Devshi & Co Pvt. Ltd., Maharashtra
15.	Umbrella project for the closure of Two Plants in India – SRF & NFI

RAC

S No	Project Activity
1	Blue Star Ltd., Maharashtra
2	Subros Ltd., New Delhi
3	Meghdoot Refrigeration Industries, Maharashtra
4	V. Krishna & Co., Maharashtra
5	Friz-Tech. P. Ltd., Maharashtra
6	V. Krishna P. Ltd., Maharashtra
7	Rockwell Devices P. Ltd., A.P.
8	Rabi Run Refrigeration Pvt. Ltd., Karnataka
9	Sethia Appliances P. Ltd., A.P.
10	Seepra Refrigeration P. Ltd., Maharashtra
11	Shakti Fabricators, Punjab
12	Chandra Frig. Co. P. Ltd., New Delhi
13	Supercold Refrigeration Systems., Kerala
14	Murali Refrigeration and Engineering Co., Kerala
15	Godrej-GE Appliances Ltd., Maharashtra
16	Standard Refrigeration Appliances, Maharashtra
17	Polar Enterprises , Maharashtra
18	Refrigerators and Home Appliances P. Ltd., New Delhi
19	Hindustan Refrigeration Industries, New Delhi
20	Refrigeration Components and Accessories, New Delhi
21	Sheetal Engineering Works P. Ltd., Gujarat
22	Videocon Appliances Ltd., Maharashtra
23	Voltas Ltd., A.P.
24	Electrolux – Kelvinator Ltd. (Maharaja International Ltd.), Rajasthan

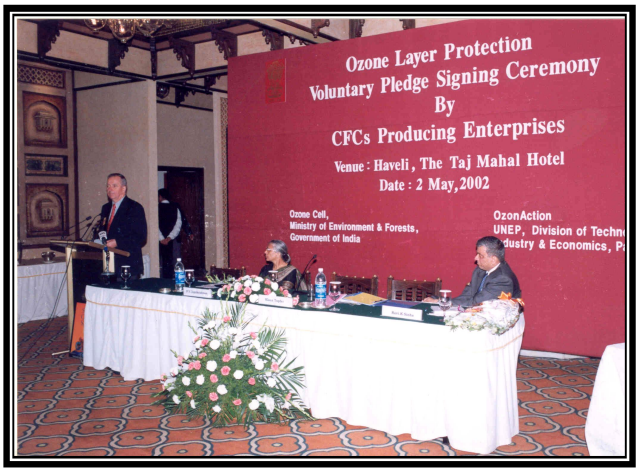
RAC

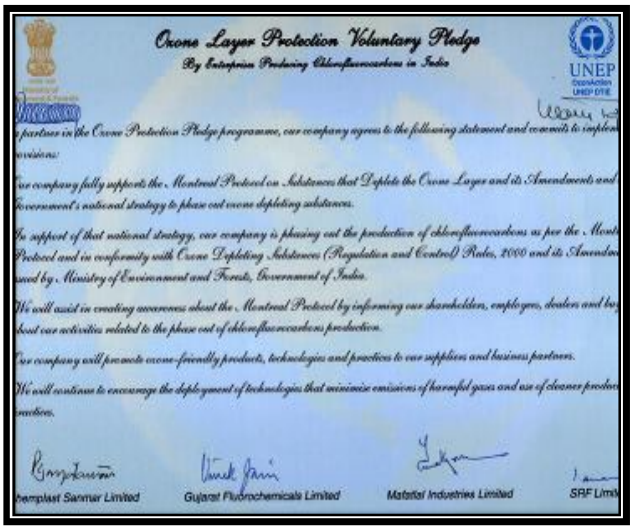
S No	Project Activity
25	Pranav Vikas India Ltd., Haryana

26	Sanden Vikas India Ltd., Haryana
27	Arkay Industries., Goa
28	Saikrupa Industries, Maharashtra
29	Sarkar Refrigeration Industries., Maharashtra
30	Sidwal Refrigeration., Delhi
31	BPL Refrigeration Ltd., Karnataka
32	Sandeep Refrigeration, Maharashtra
33	Whirlpool of India Ltd., Haryana
34	Fedders Lloyd Corporation Ltd. U.P.
35	Sandlas Air-Com Systems P. Ltd. Punjab
36	Umbrella Project of three commercial refrigeration enterprises , Delhi
37	Nine Enterprises for Commercial Refrigeration
38	Five Enterprises for Commercial Refrigeration
39	Nine Enterprises for Commercial Refrigeration
40	Fourteen Enterprises for Commercial Refrigeration
41	Ice-Make Refrigeration
42	Konark Refrigeration Appliances
	RAC (Compressor)
43	Shriram Industrial Enterprises Ltd. Hyderabad
44	Kirloskar Copeland Ltd., Karad, Maharashtra
45	Freezeking Industries, New Delhi
46	Godrej G.E. (Compressor), Maharashtra
47	IOC for Sidwal Refrigeration Industries, New Delhi
48	IOC for Sarkar Refrigeration, Maharashtra
49	IOC for Saikrupa Refrigeration, Maharashtra
50	IOC for Aarkay Industries, Goa

Solvent

S No	Project Activity
1	ITI Mankapur, U.P.
2	Hindustan syringes & Medical Devices P. Ltd., Haryana
3	Electronics Research Ltd., Bangalore, Karnataka
4	ITI, Palakkad, Kerala
5	ITI, Bangalore, Karnataka
6	Modi Xerox, U.P.
7	Malhotra Shaving Products Ltd., A.P.
8	Harbans Lal Malhotra & Sons Ltd., West Bengal
9.	Vidyut Metallics Ltd., Maharashtra
10.	Microraj Electronics Pvt. Ltd., A.P.
11	Videocon Group (VCD), Gujarat
12	Excel Industries Ltd., Gujarat
13	Blue Star Ltd., Maharashtra
14	Alpha Drugs India Ltd., Punjab
15	Doctors Organic Chemicals , A.P.
16	Svis Labs Ltd., Ranipet, T.N.
17	Satya Deeptha Pharmaceuticals P. Ltd., Karnataka
18	Sapna Coils Ltd., Maharashtra
19	Engineering Industries, Maharashtra
20	Sapna Engineering, Maharashtra
21	Pradeep Shetye Ltd., Maharashtra
22	Benzo Chemical Industries, Maharashtra
23	FDC Limited, Maharashtra
24	GRD Chemicals Ltd., M.P.
25	Rishiroop Organics P. Ltd. & Rishiroop Polymers P. Ltd., Gujarat
26	Chiplun Fine Chemicals Ltd., Maharashtra
27	Amoli Organics Limited





Workshop on Montreal Protocol in Aizawl

Aizawl, July 5: A workshop on Montreal Protocol regarding ozone layer concerns and issues, was successfully organised July 4 at the State Guest House conference hall in Aizawl yesterday. The workshop was conducted by Mr G P Shukla, PCCF.

Mr R K Chandolia, Coordinator, Ozone Cell, Ministry of Environment & Forest, New Delhi and Mr Mohammed Rasit Ayub MIS Coordinator, New Delhi gave an intensive discussions and interactions on threats posed by weakening ozone layer due to increasing environmental abuse worldwide. Also, Mr C Lalduhawma, Environment Engineer, Mizoram Pollution Control Board presented a paper.

The Montreal Protocol on ozone concerns and issues was adopted at a meeting in 1987 in Montreal by representatives of international communities. India too joined the Protocol in 1992 with the rest of 182 countries in the world.

Participants in the workshop include officers of the E&F Dept., officials from the Industry Dept, SCERT, CEP, dealers of Fridge and special invitees.

Mr C. Lalduhawma in his paper pointed out that air pollution in Mizoram has not been a major concern for the present as there was no big industrial units in the state

Industries urged to switch to non-ODS tech

By A Staff Reporter

MUMBAI: Time is running out for industries dealing with ozone depleting substances to register themselves with the authorities. The deadline for industries using ozone depleting substances (ODS) in their products as well as dealers and importers to register themselves is July 19 this year.

Speaking at a workshop held here on Thursday, the director of the ozone cell, Union ministry of environment and forests, C. Vishwanathan, emphasised the need for industries to comply with the new rules governing ODS.

The Ozone Depleting Substances (Regulation and Control) Rules came into effect on July 2000, to regulate and eventually eliminate the use of substances like chlorofluorocarbons, halons, methyl-bromide etc in industries. Such substances are known to contribute to the thinning of the ozone layer covering the earth and causing an increase in temperatures.

The rules are in line with the Montreal Protocol, an international envir onment treaty to protect the earth's ozone layer. The protocol stipulates that CFCs used for refrigeration and foam blowing, halons used for fire- fighting and other chemicals with zone depleting substances are to be phased out.

Substitute chemicals with no ozone depleting potential are to be used and the changeover will take place over the next 10 years in developing countries. Indian producers will gradually phase out production of CFCs by 2010 through yearly reduction in production. Failure to comply with the rules will now result in action under the Environment Protection Act.

At the workshop organised by the Maharashtra Pollution Control Board, the Union ministry of environment and the state environment department, Mr Vishwanathan urged industries to avail of funds and technological support for converting from ODS technology to non-ODS technology. To effect a changeover to substitutes, the parties to Montreal Protocol set up the Multilateral Fund in 1990. Contributions to the fund were made by developed countries and the funds were used to assist developing country users to changeover to substitutes.

All small-scale units (less than Rs 1 crore) should register with Small Scale Industries Service Institutes, Saki Naka, Andheri and others with the Ozone Cell, India Habitat Centre, New Delhi.

Be Ozone Smart

WHOM TO CONTACT TO LEARN MORE ABOUT OZONE

Ms. Usha Chandrasekhar
Director
Ozone Cell
Ministry of Environment and Forests
Government of India
India Habitat Centre
Core 4B, IInd Floor, Lodhi Road
New Delhi – 110003
Tel: 011- 4642176 Fax: 011-4642175
E mail: ozone@del3.vsnl.net.in
Website : www.ozonecell.com

Mr. Rajendra Shende
Chief Energy and Ozone Action Unit
UNEP Industry and Environment
Tour Mirabeau, 39-43 Quai Andre Citreon
75739 Paris Cedex 15, France
Tel: (331) 44371450 Fax: (331) 44371474
E mail: ozoneaction@unep.fr
Website : www.unepie.org/ozonaction.html

Mr. Michael Graber
Deputy Executive Secretary
Ozone Secretariat
United Nations Environment Programme
PO Box 30552, Nairobi, Kenya
Tel: (2542) 623850 Fax: (2542) 623913
E mail: ozoneinfo@unep.org
Website: www.unep.org/ozone