VATIS Update Ozone Layer Protection . Sep-Oct 2006

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THE SCIENCE OF OZONE LAYER

Atmospheric ozone recovering in mid-latitudes

Concentrations of atmospheric ozone which protects the earth from the suns ultraviolet radiation are showing signs of recovery in the most important regions of the stratosphere above the mid-latitudes in both the Northern and Southern hemispheres, a new study shows. Researchers attribute the improvement to both a reduction in the ozone-depleting chemicals phased out by the global Montreal Protocol treaty and its amendments and to the changes in atmospheric transport dynamics.

The study, funded by NASA, is the first to document a difference among stratospheric regions in ozone-level improvement and to establish a cause-and-effect relationship based on direct measurements by multiple satellite and ground-based, ozone-monitoring systems. We do think we are on the road to recovery of stratospheric ozone, but what we dont know is exactly how that recovery will happen, said Prof. Derek Cunnold, Georgia Institute of Technology. Many in the scientific community think it will be at least 50 years before ozone levels return to the pre-1980 levels when ozone began to decline, he added.

The studys data indicate that atmospheric ozone has stopped decreasing in one region and is increasing in the other of the two most important lower regions of the stratosphere. Scientists attribute the stabilization of ozone levels in the past decade in the 18 to 25 km altitude region to the Montreal Protocol and its amendments.

In the 11 to 18 km region, the researchers link a slight increase in ozone to changes in atmospheric transport perhaps caused by natural variability or human-induced climate warming rather than atmospheric chemistry. The changes in this altitude range below the region where ozone-depleting gases derived from human activity are thought to cause depletion of ozone contribute about half of the overall-measured improvement, researchers said.

There is now widespread agreement in the scientific community that ozone is levelling off in the 18 to 25 km region of the stratosphere because of the Montreal Protocol, Prof. Cunnold said. We believe there is some tendency towards an increase in ozone in this region, though further study is needed to be certain. In the 11 to 18 km region, ozone is definitely increasing because of changes in atmospheric dynamics and transport not related to the Montreal Protocol, he added.

Contact: Ms. Jane Sanders, Georgia Institute of Technology, 75 Fifth Street, Suite 100, Atlanta, Georgia 30308, United States of America. Tel: +1 (404) 894 2214; Fax: +1 (404) 894 4545

E-mail: jsanders@gatech.edu

Website: www.gatech.edu

Global response to ozone hole is unprecedented success

Scientists report that, after 17 years of work to phase out the production and use of chlorofluorocarbons (CFCs), ozone depletion has stopped but has not yet begun to reverse. Experts predict that the ozone layer could be completely restored by 2060-2065 if releases are halted of manmade substances containing the chemicals chlorine and bromine, and if the earths surface has not warmed by then a condition that could increase the damaging effect of CFCs on ozone.

If you look at the ozone records from all over the world the data indicate that the reduction in ozone has stopped, said Dr. David Hofmann, a scientist from the United States National Oceanic and Atmospheric Administration (NOAA). We have not seen what you might call the second stage of ozone recovery, where ozone begins increasing again in Antarctica, he added.

Ozone depletion and global warming are not directly related; increasing concentrations of carbon dioxide in the atmosphere are the main cause of climate change, and chlorine, bromine and other ozone-depleting chemicals in the upper atmosphere deplete ozone. What the two problems have in common, it is fair to say, is that both are linked to the question of the long lifetimes of gases in the atmosphere, said NOAA senior scientist Dr. Susan Solomon. A fraction of the carbon dioxide that we have put into the atmosphere today due to human activity would still be there in 1,000 years, Dr. Solomon added.

To monitor ozone-depleting gases in the atmosphere, NOAA has developed an Ozone Depleting Gas Index (ODGI) a number based on NOAAs measurements of all the ozone-depleting gases that indicates the atmospheres recovery towards pre-ozone-hole conditions. Dr. Hofmann said the ODGI indicates that the ozone-depleting potential of the gases already has declined, in agreement with the early signs of levelling off of ozone loss and the success of the Montreal Protocol.

Website: www.usinfo.state.gov

Ozone hole kills sea life

The ozone hole over Antarctica is having a bigger impact on life than realized, scientists believe. The layer acts as a shield against ultraviolet (UV) radiation. An annual thinning of the ozone layer over Antarctica allows significantly more UV light to reach the ocean and damage DNA.

New Scientist magazine has reported that an analysis of east antarctic waters had shown that high levels of UV light could significantly reduce phytoplankton blooms. These microscopic plant cells at the bottom of the food chain provide food for zooplankton, tiny marine animals that are eaten by several species of seabirds, and by fish and sea mammals ranging from sardines to whales.

If you have a substantial reduction in the amount of plant material, that is going to have all sorts of knock-on effects for the rest of the food web, said Mr. Andrew Davidson, of the Australian Antarctic Division in Kingston, Tasmania. His team studied the marginal ice zone around Antarctica.

The team used satellite data to study levels of chlorophyll, an indicator of phytoplankton levels, and ozone concentration in five regions during November and December, from 1997 to 2000. They considered only data for periods when there were at least six cloudless days out of ten. Total chlorophyll increased, as expected. When ozone levels thinned, however, chlorophyll accumulation fell. Dr Davidson said it had been difficult to pinpoint the effect of UV, because the amount of plant material in antarctic waters varied by up to 25 per cent from year to year.

The findings have been challenged by a scientist in the United States, who said average chlorophyll concentrations in antarctic waters under the ozone hole had not changed since the late 1970s. Mr. Kevin Arrigo, associate professor of geophysics at Stanford University in California, said: This suggests to me that

the ozone hole is having very little impact on overall chlorophyll concentrations in the Antarctic.

Website: www.nzherald.co.nz

Ozone layer moves towards recovery from 2020

The volume of carbon tetrachloride (CTC) used as feedstock is not considered in the Montreal Protocol, since CTC is transformed entirely in the process. Montreal Protocol stipulates 85 per cent reduction of consumption in non-feedstock applications by 2005 compared with baseline levels, considering the average production and consumption levels as of 1998-2000 as the baseline level.

A CTC phase-out plan was prepared by the Government of India with support from the World Bank, UNEP, UNDP and UNIDO. This project of US$52 million for phasing out production and consumption of CTC was approved by the Executive Committee at its 40th Meeting. The World Bank is the designated lead implementation agency in this project, while the governments of France, Germany and Japan are cooperating agencies. The Ministry of Environment and Forests has also successfully concluded negotiations with the World Bank on the implementation modalities of the project. (The state-of-art report: Indias integrated approach to protect the Ozone Layer)

Website: www.ozonecell.com

ODS PHASE-OUT IN INDIA

Production sector

Production sector phase-out projects played a key role in the control of supply of ozone depleting substances (ODS). Indian producer industry co-operated closely with the Ozone Cell on project preparation and implementation activities. This ensured a transparent and effective mechanism for phasing out production of ODS. The specific initiatives undertaken for phasing out production of specific chemicals are presented below.

CFC production sector phase-out project

India is a producer and exporter of chlorofluorocarbons (CFCs). As of 1999, the country produced 22,588 MT of CFCs in four production facilities in the country. A project proposal for gradual phase-out of CFCs by 2010 was submitted to the 29th meeting of the Executive Committee of the Multilateral Fund. This proposal was developed through consultations with industry. The World Bank was designated as the implementing agency for monitoring and facilitating implementation of this project.

This project also included a technical assistance component provided by UNEP to facilitate a gradual reduction of production. This project was approved with a grant of US$82 million for India. This was a performance-based grant agreement that involved disbursement of funds on achievement of CFC phase-out. An innovative mechanism of transfer of production of quotas involving two major producers has been implemented through this project in July 2004. This shows Indias preparedness to adopt a country-driven flexible approach in meeting phase-out commitments. During 1999-2003, CFC production reduced by 7,574 MT.

One of the most important successes of Indias phase-out initiatives has been the pledge committed by the four

largest CFC producers in India to phase-out production by 2010. This was enabled through an India-UNEP Initiative in 2002. Cleaner technology alternatives are also proposed to be used by these producers so that their manufacturing operations can become more efficient and consistently aim at reducing emission of pollutants and effluents. Initiatives relating to this are under implementation by the producers.

Halons production phase-out project

India had two facilities producing halons. A proposal for closure of production of halons was submitted to the 34th meeting of the Executive Committee. US$2.6 million was approved for this project, which resulted in the elimination of baseline production of 95 MT of halons. The halon production facilities have now been rendered unusable for production.

CTC production phase-out project

The volume of carbon tetrachloride (CTC) used as feedstock is not considered in the Montreal Protocol, since CTC is transformed entirely in the process. Montreal Protocol stipulates 85 per cent reduction of consumption in non-feedstock applications by 2005 compared with baseline levels, considering the average production and consumption levels as of 1998-2000 as the baseline level.

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Website: www.ozonecell.com

Refrigeration/air-conditioning sector

The National CFC Consumption Phase-out Plan (NCCoPP) is Indias final CFC phase-out project for the refrigeration and air-conditioning (RAC) servicing sector funded by the Multilateral Fund (MLF) of the Montreal Protocol. CFCs are banned from use in manufacturing of refrigeration appliances such as car air-conditioners or refrigerators under the Ozone Rules 2000 since January 2003. The project aims to completely phase-out the CFC service consumption of 1,500 tonnes (1999 baseline) by 1 January 2010. In parallel, the production of CFCs in India (and elsewhere in the world) is phased out. By 2007, production and consumption of CFCs in India will be reduced down to 15 per cent of the 1999 volumes.

The project is being implemented as a collaborative effort of five implementing agencies. GTZ-Proklima (the lead implementing agency) on behalf of the Government of Germany, while INFRAS Consulting Group mandated by the Government of Switzerland, UNDP, UNEP and UNIDO are the cooperating implementing agencies.

While GTZ-Proklima is responsible for the overall coordination and ensures that the performance and verification of NCCoPP activities is in accordance with the agreement between India and the MLF, INFRAS is responsible for the training of service technicians all over India. This includes conduct of training, capacity building as well as other outreach functions.

UNDP is responsible for investment activities on the basis of pre-defined technical requirements and beneficiaries. This agency is also responsible for the phase-out activities in the foam sector and all sub-sectors of refrigeration manufacturing except transport refrigeration, which is implemented by UNIDO.

UNEP is responsible for the implementation of the necessary awareness activities under NCCoPP. It is also implementing the customs and policy training activities in collaboration with the Ministry of Environment and Forests and the National Academy of Customs, Excise and Narcotics.

Till date 3,743 technicians have been trained since inception of NCCoPP in 2004. Equipment support is given to Industrial Training Institutes for training the students from refrigeration faculty and refrigeration service enterprises (RSEs) to upgrade their tools and equipment. This will enable RSEs to adopt good servicing practices to service both CFC (R-12) and non-CFC appliances, and to retrofit CFC (R-12) based appliances with non-CFC refrigerants. The RSEs who have applied for the scheme and comply with the eligibility criteria would benefit (a nominal contribution is required).

Various media, both print and audio-visual, are being employed to create awareness. Posters have been circulated among dealers promoting best servicing practices. A regular newsletter for servicing technicians, Eco-Cool, is published regularly. The World in Our Hands, a video film, talks of the ill-effects of ozone depletion and urges technicians to undergo training and ensure a better world for our children. Additionally, the NCCoPP website (http://nccop.info) is a crucial link in the information chain, providing regularly updated information on the project.

The objective of the customs and policy training activities is to teach customs and enforcement officers on the harmful effects of ozone depleting substances (ODS), the regulations that determine internationally the use and trading of ODS as well as trends and types of illegal trading of such substances and the necessary actions to be taken. It also supports the role of customs officers and other government agencies in regulating ODS flow within the states and across the borders.

For more information, contact: GTZ-Proklima, A-33 Gulmohar Park, New Delhi 110 049, India. Tel: +91 (11) 2661 1021 Ext. 34; Fax: +91 (11) 2653 7673

E-mail: Markus.Wypior@gtz.de

Web: www.gtz.de/proklima

NCCoPP training

Training constitutes one of the main efforts under NCCoPP. Training is offered to refrigeration and air-conditioning (RAC) technicians all over India through training cells in all the major states. It focuses on mobile air-conditioning servicing; retrofitting for large commercial appliances using open-type compressors; retrofitting for domestic and small commercial appliances; and recovery & recycling of CFC refrigerants.

Primary emphasis is on good practice in handling CFCs. In addition, technicians are also trained in non-CFC technologies to ensure customer satisfaction, on which their survival depends. Safety aspects are also an issue,

especially with regard to use of hydrocarbons, and must be understood. NCCoPP operates through a network of training cells set up in 15 states. The training cells are managed through the four Regional Management Organizations (RMOs) that coordinate the training programmes in the East, West, North and South. Industry partners such as Godrej & Boyce Mfg. Ltd., Whirlpool and Kirloskar Copeland Ltd. also participate in the programme and provide their resources to train refrigeration servicing enterprise technicians in addition to training their own service networks and their franchisees.

These industries cater to the training needs of RSE technicians from all regions/states in India. The number of training cells may change over the projects lifetime as it will be uneconomical to operate all the individual training cells. For example, in the South, a very high coverage of the sector has already been achieved through the HIDECOR project, so the training cells in these areas and the number of training programmes in this region will gradually reduce.

All selected training institutions are given initial support through training of trainers workshops and equipment to reinforce their capacity and infrastructure.

Refrigeration service enterprise (RSE) training

RSE training has been designed as effective, practical two-day sessions. The training for RSE technicians illustrate:

Good practices in handling CFC;

Handling new technology for better servicing;

Proper servicing and retrofitting of refrigeration appliances using alternative HFC and HC refrigerants; and

Recovering and re-using CFC and HFC refrigerants.

The training programmes are held through training partners spread all over the country. These programmes are scheduled from 2005 to 2009.

MAC pilot training programme

The mobile air-conditioning (MAC) sector consists of around 6,000 enterprises, of which about every third enterprise is in the unorganized sector. Since 2003, most new units have been fitted with HFC-134a compressors. But a large population of vehicles, approximately 2 million, continues to depend on CFC-12. If no retrofit option is available, this sector will still require a significant amount of CFC-12 for servicing beyond 2010.

The technical options to address CFC phase-out in this sector are:

Use good servicing practices, including recovery and recycling and reuse of reclaimed refrigerant during maintenance of MAC units; and

Retrofit CFC-12-based systems to either HFC-134a or hydrocarbon blend HC-290/HC-600a.

NCCoPP addresses the issue by providing training programmes for MAC technicians. The first MAC Training Cell has been established in Bangalore and pilot training programmes have started in 2005. More training cells will be established in 2005-06. For the training, a Manual for Good Servicing Practices and Retrofitting of Mobile Air-conditioning System using HFC and HC Refrigerants has been developed by IIT Delhi with the support of other NCCoPP consultants. Research at Indian Institute of Technology, Delhi, and supplementary trials under NCCoPP have showed that retrofit with hydrocarbon blend refrigerants offers a low-cost solution, which compares in performance to the original CFC-based system. On a global scale, and especially in countries like Australia, Canada and the United States, more than 2 million cars operate safely with AC units retrofitted with hydrocarbon refrigerants. Retrofit with HFC-134a results in higher retrofit costs, depending on the approach chosen and may lead to reduced performance of the MAC unit.

A MAC training of trainers programme was conducted at Chennai under NCCoPP project on 10-12 December 2005, and a second programme was conducted at New Delhi from 17 to 18 March 2006. The key objective of the programme was to prepare trainers from the states of Tamil Nadu, Andhra Pradesh, Karnataka, Chandigarh and Rajasthan who are able to organize and facilitate MAC training programmes on a regular basis.

Dealers workshops

NCCoPP has important links with industry both the compressor and equipment manufacturing industry in India. The dealers, be they dealers of spare parts or refrigerants, are the prime point of contact for all RSEs to whom the dealers sell their companies products. Dealers support is requested to recruit and identify the firms who will send their technicians for training. The dealers can become an important agent for change pointing out to technicians the need to use new technologies and use them properly.

The dealer workshop is a good point of contact, enabling project partners to exchange ideas about recruiting plans with the dealers and to enlist the support of the dealers throughout the states in encouraging technicians to come forward for training. The programme offered at the meeting with dealers covers presentations on the impact of CFC on the environment, the important differences with the alternative refrigerants, the present status of phase-out in India and what NCCoPP offers. The format of training programmes offered to technicians is outlined as well as other important aspects of the programme.

ESS workshops

Equipment Support Scheme (ESS) workshops are held in stages in all states. Their purpose is to promote and advertise the equipment that is made available to RSEs at attractive prices. Technicians require appropriate equipment to retrofit CFC-12 based appliances with non-CFC refrigerants and efficiently service both CFC and non-CFC appliances. RSEs who participate in the workshop learn about the packages offered. If the offer is of interest to them, they can submit an Expression of Interest within a pre-determined timeframe.

Website: www.nccopp.info

Support schemes under NCCoPP Equipment Support Scheme (ESS)

Under the equipment support component, the project seeks to facilitate selected RSEs access to service equipment. The scheme is offered to eligible refrigeration servicing firms. The geographical scope of ESS will be extended in stages during the life of the project (2004-09). Local availability of scheme and the detailed

terms and conditions for ESS will be disseminated through press releases, articles in local newspapers, distribution of flyers and information leaflets, articles in newsletters and through the NCCoPP website.

Training institutes

The syllabus for the trade of refrigeration and air-conditioning (RAC) mechanic under Craftsman Training Scheme was revised under the HIDECOR project. To implement the revised syllabus the training institutes would require equipment, tools and appliances. NCCoPP project has decided to provide equipment support to few of the government Industrial Training Institutes (ITIs). Thus, 120 selected ITIs would receive equipment under ESS. RAC instructors from these selected ITIs have attended instructor training programmes at either ATI Howrah or ATI Hyderabad. The ITIs that benefit from equipment support will ensure the adoption of the updated curriculum for RAC training, which was put into effect from June 2003.

Principal distributor

UNDP has appointed IT Power India Pvt. Ltd. (ITPI) as the principal distributor (PD) under the ESS. To facilitate the tasks of distribution at the local level, PD has appointed a local distributor (LD) for each state. The ESS packages consist of:

Package A - Indigenous E&C unit with weighing scale, set of hoses and two piercing valves would be available to RSEs for a payment of Rs 5,000

Package B - Package A and an indigenous recovery unit would be available to RSEs for Rs 8, 000

Package C - Indigenous recovery unit would be available to RSEs for a payment of Rs 5,000

The distribution of equipment is being done in phases in the country. Distribution commenced in Andhra Pradesh, Karnataka, Tamil Nadu and Pondicherry during 2004-05. In the second phase (2005-06), distribution of equipment has begun in more states: Kerala, Himachal Pradesh, Gujarat, Maharashtra, Rajasthan, Uttar Pradesh, Delhi, Chandigarh, Uttranchal, Haryana, Jammu & Kashmir and Punjab. ITPI will continue as PD for these states as well.

The role of PD begins on receipt of the final consolidated list from the ESS Facilitator. The PD then informs the LD who in turn informs the RSEs. The LD plays a crucial role as a link between the PD and RSEs. It collects the payments, demonstrates the working of equipment and hands over the equipment to RSEs. In addition, for a period of one year after the delivery of equipment, the LD takes care of any repair and maintenance issues concerning the supplied equipment.

Customs and Policy Support (CPS)

The objective of CPS training is to teach customs and enforcement officers about the harmful effects of ODS, the Montreal Protocol that determines internationally the use and trading of ODS, the trends and types of illegal trading of such substances and the actions to be taken. CPS training also looks at the role of customs officers and other government agencies in regulating ODS flow within the states and across the borders. A two-day training of trainers programme was held at the National Academy of Customs, Excise and Narcotics for customs officers from the Directorate General of Foreign Trade, Coast Guards and Customs, and officers from Bhutan.

Website: www.nccopp.info

Retrofitting of under-slung AC units

Indian Railways is making proactive efforts to phase-out CFCs by converting the under-slung CFC-12 based units to HFC-134a. Several units have already been successfully converted from CFC-12 to HFC-134a by different railways such as Northern, Western, South-eastern and Southern Railways. The activity is closely co-ordinated and monitored by Research Designs and Standards Organization (RDSO), Lucknow. On 17 November 2005, a technical meeting was held at RDSO, where representatives from nominated railways and refrigeration compressor manufacturers participated.

Website: www.nccopp.info

Stain removers for testing

GTZ has assigned the task of testing to the laboratory of the Textiles Committee at Tirupur. This laboratory has emerged as Indias major stain removal expert centre. In 2004, in order to identify suitable substitutes for carbon tetrachloride (CTC), GTZ and the Textiles Committee tested several fabric stain removers for the presence of ozone depleting substances (ODS). The stain removers were not only screened for ODS, such as CTC, but were evaluated for cost-effectiveness and efficacy on commonly occurring stains on a broad variety of fabrics. This exercise established 29 stain removers as free from ODS.

The next phase of stain remover testing will commence soon, and products samples are invited from manufacturers. The materails required for the test are: (1) a sample of the fabric stain remover in a well labelled container; and (2) documentation including scope of application, instructions for use and safety data sheet on the material.

Those interested to participate may send the product sample and documentation to: Mr. K. Selvaraj, Assistant Director (Laboratories), Textiles Committee, 384, B. S. Sundaram Road, Tirupur 641 601, Tamil Nadu, India. Tel: +91 (421) 220 1402.

Website: www.ctc-phaseout.org

CTC phase-out in India

The project proposals on CTC substitutes in various industrial sectors where is currently used as process agent or solvent include: (1) Aqueous media; (2) Trichloroethylene; and (3) Perchloroethylene.

The substitutes proposed to be used for CTC phase-out will no doubt result in ODP reduction and associated benefits. However, these substitutes are not free from environmental problems from the view point of pollution and safety, particularly when trichlroethylene is used.

Use of aqueous media in chlorinated rubber and chlorinated paraffin production has been proposed primarily on account of the cost advantage as compared with other non-ODS technologies. While the use of aqueous media as a solvent in place of CTC offers a viable alternative, it will involve expenditure for handling large volumes of wastewater and treatment facilities for wastewater that contains high amounts of adsorbable halogenated compounds, which can cause adverse environmental impacts if discharged untreated into the waterways.

For metal cleaning operations, the most likely substitutes for CTC in solvent and process agent application are

chlorinated solvents (such as trichloroethylene, perchloroethyene and methylene chloride), aqueous and semi-aqueous technologies, as well as cleaning with petroleum solvent, ketones and alcohols. The final decision will have be made on a case-by case basis by participating enterprises and reviewed by the Ozone Cell through their experts.

Aqueous alkaline cleaning is preferred for cleaning requirements with less complicated shapes, a minimum of different metal substrates and where inorganic residues are to be removed. Since cleaning efficiency is less than for solvent cleaning, an ultrasonic system is normally incorporated in the wash stage. (ESR Report of CTC).

Website: www.ozonecell.com

Substitutes for CTC for stain removal in the textile industry

In the textile industry where carbon tetrachloride (CTC) is used as a fabric stain remover, GTZ has identified and tested about 30 alternative stain removers. Results confirm a wide range of suitable alternatives, many costing less than CTC.

The table on page 14 provides data on the results of testing various stain removing agents. The Textiles Committees Tirupur laboratory carried out the tests on behalf of GTZ.

Contact: Dr. Kshem Prasad, Consultant Team Leader, GTZ-Proklima Project Office, New No. 42, Canteen Street, Pondicherry 605 001, India. Tel: +91 (413) 2420 1241

E-mail: ctc-phaseout@airtelbroadband.in

Website: www.ctc-phaseout.org

Halon sector DRDO develops eco-friendly fire extinguishers

Scientists at the Defence Research and Development Organization have developed technologies to make gas and powder-based fire extinguishers, which wil put an end to the use of hazardous halons in fire fighting exercises. The fire extinguishers, developed by a research team from the Centre for Fire, Explosives and Environment Safety (CFEES), can put out all kinds of blazes. The technology that uses mono ammonium phosphate-based, multipurpose, dry chemical powder fire extinguishant is environment-friendly as it does not release toxic gases or residue, said Mr. Sivathanu Pillai, Chief Controller (R&D) of DRDO. Transfer of technology documents for the six technologies developed were handed over to industry representatives by the DRDO chief Mr. M. Natarajan.

The fire extingishers currently available employ imported components and the DRDO technology, once implemented, would bring down costs significantly. K.V. Fire Chemicals, which received the technology to develop the powder-based fire extinguishers, plans to introduce the product soon. A vapour-based fire extinguisher, developed jointly by CFEES and Indian Institute of Chemical Technology, Hyderabad, uses

heptafluropropane as a replacement to halon-1301, which has been banned by Montreal protocol.

Website: www.hindu.com

Halons phase-out: India's success story By H.S. Kaprwan

Halons are a class of chemicals containing chlorine, bromine and/or fluorine atoms in hydrocarbons like methane and ethane, and are excellent fire and explosion suppressants. However, they are very potent stratospheric ozone depleting substances (ODS) when released to atmosphere. Ozone depleting potential (ODP) of one widely used Halon 1301 is eleven times more than CFC-11. This was the reason environmentalists identified this group of compounds to be phased out from production and use on priority under the Montreal Protocol for Ozone Layer Protection.

Among a few developed and developing countries, India produced and used halons for its fire protection industry. India signed Montreal Protocol treaty in 1993 and identified various areas where ODS phase-out strategies were prepared. Halons in fire protection sector was considered on priority similar to that in industrialized countries due to their high ODP and alternative availability under Art 10 of the Protocol.

Halon production & consumption in India

Indian production capacity was 1,000 MT of Halon 1301 and 1211 in two manufacturing Plants (SRF & NFI) and consumption was 3,650 ODP tonnes in 1993. India imported Halon 2402 from Russia mainly for its military weapon systems. There were about 50 fire equipment and system manufacturing companies using these halons in both portable fire extinguishers and fixed manual and automatic fire protection systems. These companies were spread across the country, but mostly concentrated in large cities and industrial towns. Though halons were used in industrialized countries for the last more than five decades, India started using them only from early 80s. Their use spread from small users like shop, home, car and kitchen to office building, aviation, shipping, military, power plants, refineries, rails, buses, electronics, telecommunication and computer installation in a very small span of time, as halons were excellent, cheap, and easy to get, use and install.

By 1990, halons started replacing even the conventional fire protection systems like carbon dioxide and water. This made the situation more challenging. The Ozone Cell, Ministry of Environment and Forests, during the preparation of country programme, identified fire protection sector also among others for preparation of halon phase-out strategy on priority.

Indian halon phase-out strategy

A sound, practical and effective strategy was necessary for phasing out the halons, as they were critical for some application in military, shipping, aviation, oil platforms, etc. Furthermore, just stopping production and control on import would be problem for some users in terms of safety of life and property, running of socially essential activities like communications, etc. For preparation of national halon phase-out strategy, an experts committee was created from industry, users, fire consultants, institutions, standardization, insurance and fire protection associations, legislative bodies and fire-fighting professionals.

Alternative technology

The project on evaluation of various halon alternative technologies and their adoption under Indian techno-

economic and climatic conditions, and related education and training was approved by Executive Commitee of MLF in 1995. It was implemented by UNDP, Ozone Cell and a Defence Laboratory covering the evaluation, training aspects and operation of various halon alternatives such as HFC-227, HCFC blends (HFC 22, 123, 124). Funds were allotted for their procurement, installation, evaluation, demonstration and training. Systems based on inert gas (Inergen) and water mist (Argonite) were evaluated for fixed fire protection, while HFC - 236, 123, Halotron and ABC powder were studied for portable extinguishers. These alternative technologies were demonstrated to the industry and users. More than 600 professionals visited the facility at CFEES laboratory, and the evaluation results were disseminated to all concerned through lectures, seminars, conferences, research paper, media and Internet.

Based on this work, in about two years time, the National Halon Phase-out Strategy was prepared and submitted to the Ozone Cell and Executive Committee of MLF for approval of other investment and institutional strengthening projects. In one of the project, about 25 fire equipment and system manufacturing companies were funded for conversion of their halon-based equipment to adopt identified alternatives such as water mist, inert gas, HFC, ABC powder and HFC-236 portable extinguishers. Within one year of these conversions, market demand of halon reduced to 10 per cent and halon production at two plants became uneconomical. Both these production facilities stopped halon production and MLF funded their closure in 1997-98. However, to meet some of the critical requirements of the critical users like military, aviation and power sectors, import is allowed at no extra cost to users.
Education, training and environment awareness programme continued under above project.

Indian standard specifications for halon alternative

Fire protection in India is regulated by regulations, acts, codes of practices and national/ international standards. Insurance companies also regulate by insuring life and property with the help of these national practices and require specifications and codes for fire protection. It was felt that Indian Standards will be key to success in adoption and use of alternative technologies.

Over the years, India has prepared more than 100 such standards, codes and handbooks. Many of these standards and codes specify use of halons for various applications. In the process of the halon phase-out programme, therefore, the Indian Halon Phase-out Option Committee felt it necessary to prepare its own national standard for alternatives and codes, including revision of about 30 standards where halons were specified.

New standards

A project for preparing Indian Halon Alternatives Standard and revising the existing standard was approved for funding by the Executive Commitee of MLF in 2002. The project was implemented by UNDP, Indian Standard Institution and Ozone cell. Based on the first project on the evaluation and adoption of halon alternatives technologies, about 13 new standards on HFCs, HCFC blends, inert gas systems, ABC dry powder, water mist and carbon dioxide, and their installation and maintenance procedures were prepared. Another 30 standards where halon was specified were revised. National building code was also revised and halon 1211 and halon 1301 standards withdrawn.

This project was unique in its kind and was funded and successfully implemented only in India among developing countries. This became an important tool for halon alternative technology adoption both by manufacturing industry and users for smooth transformation. About ten technical meetings and information dissemination conferences made it easy for the industry to adopt the new standards. As these standards are in line with ISO standards, Industry find in them new a business opportunity in and outside the country.

Indian halon management/banking

Halon Inventory in India was assessed at about 1,000 MT of halon-1301, 2,000 MT of halon-1211 and 100 MT of halon-2402 (world halon inventory 50 KMT of H-1301 and 90 KMT of H-1211 HTOC data). These quantities are critical and essential to some of the users who will still need to maintain their fire protection for 20-25 years. As mentioned earlier, some users still have no identified alternative and therefore will need halon. Ozone cell and Halon Alternative Option Committee felt that phase-out of halons cannot be accomplished without implementing the National Halon Management Programme to manage existing inventory with critical users. It was also felt that this programme of recovery, reclamation and redistribution from those who have spare halon and others who still need it is an essential part of successful phase-out programme and also a tool for effective ODS emission reduction.

The National Halon Management Programme, funded under bilateral programme, is implemented in the Centre for Environment and Explosive Safety (CEES) Laboratory supported by Ozone Cell, India. It consists of the following components: introduction for supporting policies; development and adjustments of national standards related to halons uses; setting up a demonstration/testing centre for halon alternatives and substitutes; training and awareness creating activities; converting the fire protection industry from halons to substitutes; and setting up a national recycling and reclamation centre. The programme also provides support for repair, refill and maintenance of old halon equipment with recycled halons.

As per the policies, all new fire equipment sold in the Indian market are now substitutes and alternatives to halons. Existing halon fire equipment can remain in place and be serviced as long as the users want so and can find halons for it. As per condition associated with the MLF funding for the Halon Management Programme, import of newly produced halons was stopped by the government through administrative order issued by the Ozone Cell in December 2004.

A Halon Bank facility comprising recovery, recycling and reclamation machines for all three halons (1211, 1301 and 2402) has been set up at the CEES Laboratory in New Delhi. The facility also provides quality control on halons and has the necessary test and laboratory equipment. CEES has been operational since August 2004 and has been in regular use. The recycling is provided as a free service to the critical users (of which many are government departments). The National Halon Bank, which is a bilateral project with Canada and Australia and funded by them, only carries a small stock for its own uses.

In addition to this national recycling and reclamation facility, and because of the their specific needs and functions, the private sector has set up recycling centres in different part of the country at its own cost and operate them on a commercial basis. Halon recycling equipment has been funded by the MLF as part of their halon conversion projects for a small number of the larger fire equipment companies allowing them to provide services in general. (Three of the companies are New Age Fire Protection Industry, Mumbai, Nitin Fire Protection Industry, Mumbai, and Minimax Chennai).

Important critical and other users have been educated and trained in the use of this recycling and reclamation facility for their inventory. The physical inventories are with the owners of the halons, such as the military, civil aviation, oil and power/energy sectors, merchant shipping companies, fire services, etc. The halons are, for the most part, installed in existing fire protection equipment and smaller amount stocked for replenishment and servicing.

It is also understood that the Indian Navy is planning to establish their own halon recycling and reclamation facility in one of their naval bases for their own use and specialized applications different from the civil sector.

The national recycling facility is up and running and halon is recycled and reclaimed for the critical users on a regular basis (free of charge for the users). No technical problems have been found in running the national recycling facility so far. There have been no reported cases so far by Indian users having problems finding

halons for their critical applications. The private sector seems to use the halon recycling centres operating on a commercial basis by the private fire equipment companies.

Aerosols sector

Aerosols are widely used in several applications involving propellants including perfumes, shaving foams, insecticides, pharmaceuticals, paints and inhalers. To phase out CFC-11 and CFC-12 in this sector, 23 projects have been supported covering 44 enterprises. India is preparing the transition strategy for metered dose inhalers, with assistance from UNDP. One of the best examples of successful change-over to alternatives is the case of a pharmaceutical firm that has entered into an agreement to supply CFC-free inhalers overseas. The non-ODS alternatives proposed for aerosol sector include destenched liquid petroleum gas, particularly for the industrial aerosols sector. Hydrocarbon aerosol propellants (HAPs) are proposed for other applications. Consistent availability of the alternatives and associated costs are key issues.

Industry structure

The total production of aerosol containers in 1991 was about 45 million, of which over 90 per cent used CFC propellants. About 200 aerosol manufacturers were identified, mostly in the western and northern parts of India. All enterprises were in the private sector. A large majority of these enterprises (about 70 per cent) were SMEs, many of them in the informal sector, principally manufacturing personal care products such as perfume and deodorant sprays.

ODS consumption

In 1991, the aerosol sector consumed 1,100 MT of CFCs (about 40 per cent CFC-11 and 60 per cent CFC-12), which amounted to about 22 per cent of Indias total CFC consumption at that time. It was estimated that the demand for aerosol products would grow annually at 20 per cent until 2000, 18 per cent until 2005 and 15 per cent until 2010. These estimates were based on aspects such as emerging customer base for personal care products, entry of multinational corporations into India leading to expansion of the manufacturing base in this sector, reduction in taxes on cosmetics, etc.

Website: www.ozonecell.com

Fumigants sector Methyl bromide use

Methyl bromide is not used in India in agriculture or for fumigation of stored grains. For agriculture, conventional pesticides are used coupled with integrated pest management techniques. For grain preservation, the alternative fumigant, phosphine, has been in use from the beginning. Methyl bromide is used in India only for quarantine (very small amount) and pre-shipment purpose. The latter use has increased very much in recent years. India is now exporting perishables (vegetables) and durables (wheat, rice) in large quantities and all are fumigated in containers just before export. This use has gone up very much recently though accurate data are not available. It may be noted that this use is exempt from Montreal Protocol measures. One result of ratifying the Copenhagen Amendment will be that the government will now have to collect these data and report annually to the Ozone Secretariat. India will not otherwise be affected much for ratifying the amendments to the Montreal Protocol. (Indias Success Story).

Website: www.ozonecell.com

India reviews plant quarantine regulations

The Government of India has reviewed Indian plant quarantine regulations pertaining to the import of almonds. The measure is expected to benefit almond growers in the United States. Exports of almonds from the United States to India accounted for US$127 million in 2005, an increase of 28.7 per cent over the previous

year.

Plant quarantine regulations in India required fumigation by methyl bromide of all almond imports into India. The Government of the United States, on behalf of the exporters of almonds there, had taken up this matter with the Government of India for allowing fumigation to be done by phosphine rather than methyl bromide. (During the last two years, export consignments of almonds from the United States had been allowed entry into India and fumigation was done by methyl bromide at the port of arrival.) Following examination of data submitted by the United States pertaining to trials carried out with phosphine, the Indian plant quarantine regulations have been reviewed.

The Government of India has notified that with effect from 12 July 2006, imports of almonds into the country will be permitted provided they are fumigated with phosphine at a minimum basis of 40 g per thousand cubic feet for seven days so as to result in complete mortality of all live stages of quarantine pests, such as the Mediterranean flour moth and Apricot Chalcid, and the treatment shall be endorsed on the phytosanitary certification. Since this is required for all such changes, this decision is subject to any objection filed with the Department of Agriculture till 30 September 2006.

Website: www.indianembassy.org

IN THE NEWS

Developing countries receive funds to eliminate ODS

Additional US$21 million has been provided from the Multilateral Fund (MLF) to 36 developing countries to phase out over 1,143 tonnes of ozone depleting substances (ODS) such as CFCs, carbon tetrachloride, halons and methyl bromide. The MLF has a mandate to assist developing countries to comply with the timetable for the phase-out of ODS set by the Montreal Protocol.

Funds approved at the 49th Meeting of the Executive Committee ranged from between US$10.8 million to India to progress the gradual phase-out of production and consumption of carbon tetrachloride (a common ozone-depleting solvent that was formerly used in large quantities in many cleaning applications) down to US$44,000 to provide additional institutional support for five Pacific Island Countries that are facing challenges to phase out CFCs used in critical refrigeration servicing sector applications such as food preservation. The Executive Committee earmarked an additional US$2.7 million for performance-based national plans for phasing out ODS in the Democratic Republic of the Congo, the Syrian Arab Republic and Tunisia.

Website: www.multilateralfund.org

Tackling illegal trade in ODSs and dangerous waste

A project to curb illegal trade in ozone depleting substances (ODS) and dangerous waste in the Asia-Pacific region began operation on 1 September 2006. Project Sky Hole Patching is designed to monitor the movement of suspicious shipments of ODS and dangerous commodities across several customs territories in the region. It involves customs administrations and environment authorities, besides key organizations such as the World Customs Organizations Regional Intelligence Liaison Office for Asia and the Pacific (RILO A/P), UNEP

Regional Office for Asia and Pacific (UNEP-ROAP), the Compliance Assistance Programme (CAP) of UNEPs Division of Technology, Industry and Economics, Basel Convention Regional Centres.

The approaching deadlines to phase out ODS and dwindling legal supplies are leading to rise in ODS prices, creating lucrative business opportunities for illegal operators. While it is very difficult to give an accurate estimate of chlorofluorocarbons (CFCs) smuggled into developing countries, there are indications of high incidence of illegal trade. Illegal ODS has been seized in China, India, the Philippines, Indonesia, Thailand and other countries in the region. For example, 88,291 kg of ODS was seized in Thailand in 2005, up 6,997 kg from 2004.

During the 11th World Customs Organization Asia-Pacific Regional Conference of Heads of Customs Administrations held in Beijing on 3-6 April 2006, the meeting unanimously agreed to initiate the Project Sky-Hole-Patching. A proposed plan of action of the project was adopted during the 4th Joint Southeast Asia and Pacific/South Asia Customs-ODS Officers Cooperation Workshop held in Bangkok on 17-20 May 2006. The operation will be conducted in two phases with the first six-month phase focusing on ODS. The second phase will include hazardous waste. UNEP-ROAP/CAP and RILO A/P will facilitate the operation for the region in consultation with involved regional and international institutions dealing with ODS and dangerous waste.

Contact: Mr. Atul Bagai, Regional Co-ordinator (Networking), South Asia, Compliance Assistance Programme, Regional Office of Asia and the Pacific, UNEP, Bangkok, Thailand. Tel: +66 (2) 2881 662

E-mail: bagai@un.org

Website: www.unep.org

Viet Nam and Lao Peoples Democratic Republic to protect ozone

Tight customs procedures were recommended by authorities and experts of Viet Nam and Lao Peoples Democratic Republic at a recent symposium as an effective way to find ozone depleting substances (ODS) in imports and exports through border gates. The symposium, co-sponsored by the Vietnamese Ministry of Natural Resources and Environment (MNRE) and the Agency of Science, Technology and Environment of Lao Peoples Democratic Republic, was held in the central province of Quang Tri, which houses the busy Lao Bao international border gate leading to Lao Peoples Democratic Republic.

Customs offices in three other central Vietnamese provinces Quang Binh, Ha Tinh and Nghe An that share border with Lao Peoples Democratic Republic also sent representatives to the symposium where a MNRE representative presented a device to detect ODS. The two countries have worked closely together in their efforts to fully meet their commitments to ozone layer protection.

Web- site: www.vietnamnews.vnagency.com.vn

India celebrates International Ozone Day

The twelfth International Day for preservation of Ozone Layer was celebrated on 16 September to

commemorate the date of signing of Montreal Protocol on Substances that Deplete the Ozone Layer. Mr. Namo Narain Meena, Minister of State for Environment & Forests, in his address to the gathering revealed that India had received about Rs. 10 billion to phase out 23,000 MT production of CFC and CTC and about 22,000 MT consumption of CFC, CTC, halons and methyl chloroform. India achieved 50 per cent target by reducing CFC production from 22,558 MT to 11,294 MT and consumption from 6,681 MT to 1,940 MT. The most critical and important target of CTC production and consumption had also been achieved by adopting suitable alternative technology for non-feedstock applications of CTC.

Mr. Rajendra Shende, Chief of OzoneAction, United Nations Environment Programme, gave examples of action taken by children in China and the United States and appealed to the children to initiate movement in preserving the ozone layer. On this occasion, National Awards for Prevention of Pollution and Rajiv Gandhi Environment Awards for Clean Technology were presented, apreciating the efforts of industrial units towards prevention of environment pollution.

Website: www.pib.nic.in

Efforts in the Philippines to stop ODS smuggling

In the Philippines, The Department of Environment and Natural Resources (DENR) has begun linking up with other government agencies to stop the smuggling of ozone-depleting substances (ODS), which are used in cars, refrigerators, cleaning sprays and other household items.
The DENRs Environmental Management Bureau (DENR-EMB), in enforcing the ban on ODS, specifically needs help from agencies conducting law enforcement or are in charge of ports of entry in the country, said Mr. Roy V. Kyamko,

DENRs Undersecretary and deputy head of the National Anti-Environmental Crime Task Force (NAECTAF). The most widely used ODS are the CFCs commonly called freons, which are used as cooling agent for refrigerators and air-conditioners, blowing agent for foam, and propellant for spray cans and solvent. Smugglers have begun using ingenious methods in concealing the ODS in cargo shipments, like hiding them in travellers backpacks. Others resort to fraudulent trans-shipment.

This environmental crime done by unscrupulous smugglers can be prevented by stringent checking of documents, matching import documents with consignment, inspecting the consignment, routine checking of imports of hydrochlorofluorocarbon (HCFCs) and hydrofluorocarbon (HFCs), using refrigerant identifiers, and checking the recycling capacity and vigilance of countries of origin at border crossings, Mr. Kyamko said. Raising the awareness of customs officers is also one of the preventive measures, he added.

Website: www.denr.gov.ph

Honeywells non-ODS blowing agent to be used in China

Honeywell International, the United States, has signed a deal with China-based manufacturer Linuo Paradigma to provide its patented blowing agent Enovate to improve performance of foam insulation used in Linuo Paradigmas solar-energy water heaters. It marks the first such use of this non-ODS hydrofluorocarbon that allows cells in foam insulation to expand. The technology aims to phase out the use of ODS such as CFCs.

Website: www.njbiz.com

REFRIGRATION/AIR-CONDITIONING

New CO2 refrigerant system

Visteon Corp., the United States, has launched a refrigerant system that provides safe and reliable climate control solutions for the automotive market. The prototype was demonstrated with two test vehicles at the 2006 SAE Automotive Alternate Refrigerant Systems Symposium, 27-29 June in Scottsdale, Arizona. One test vehicle used natural refrigerant R744 and the other featured Fluid H, the alternative refrigerant with low global warming potential. The Fluid H vehicle was developed by Visteon and its affiliate Halla Climate Control in close relationship with Hyundai. Visteons R744 system which uses carbon dioxide refrigerant instead of the R134a refrigerant demonstrated production-ready component hardware. It can run at higher pressures but is more efficient under most conditions. The system can achieve up to a 20 per cent reduction of incremental fuel consumption for air-conditioner operation.

Website: www.autoserviceworld.com

Novel low-energy chillers

Coolmation, the exclusive distributor of Rhoss chillers in the United Kingdom, has introduced the new air-cooled series of low-energy Powercool chillers (76.5 kW up to 182 kW cooling capacities) for industrial and process cooling applications.

Powercool series has been specifically developed by Rhoss to provide the best European Efficiency Ratio (EER) performance available in their range. Running on R407C refrigerant, these chillers can generate water within a temperature range of +20C to -5C as standard, or optionally down to -10C. They integrate the latest in energy efficient heat exchange and scroll compressor technology, combined with advanced control strategy techniques. Every Powercool chiller features two high-efficiency scroll compressors, as standard. Reliable in operation, these compressors are housed in a sound-insulated compartment, ensuring low noise levels and reduced vibration. Each chiller also incorporates plate type evaporators with two refrigerant circuits and one water circuit. Chiller operation is managed by a multi-functional microprocessor controller, which automatically regulates fan speed to optimize efficiency and maintain constant condensing temperatures.

Powercool chillers are compact in size and available with a choice of options to suit particular application requirements. They can be supplied with or without an integral circulating pump and high-capacity buffer tank, or with a pump only. Dual pump options are also provided, if needed.

Contact: Coolmation Limited, Unit 7, Millstream Industrial Estate, Ringwood, Hampshire BH24 3SD, United Kingdom. Tel: +44 (1425) 478971.

Website: www.processingtalk.com

Zero-ODP centrifugal chillers

Centrifugal chillers from the multinational company Hitachi use HFC134a refrigerant with zero ozone depletion potential. High-pressure HFC134a refrigerant enables downsizing and weight reduction of the rotating body components in comparison with other refrigerant types. Consequently, the energy loss caused by rotation is reduced for consistent downsizing and high efficiency. Hitachis unique capacity control mechanism allows energy-saving operation throughout the year by stable capacity control in a wide range.

Contact: Hitachi Asia Ltd., Air-conditioning & Refrigeration Division, 16 Collyer Quay, #20-00 Hitachi Tower, Singapore 049318. Tel: +65 6231 2119; Fax: +65 6538 53 05

E-mail: ar@has.hitachi.com.sg

Website: www.hitachi.com.sg

HFC 134a-based cooling water network

The novel cooling delivery station to the Louvre Museum in Paris has attracted the attention to the Paris cooling water network, one of the largest in the World and the first in Europe, with a total length of 52 km and a cold water storage of 12,000 m3. Cooling is based on HFC-134a, and the system has a total cooling capacity of 164 MW. Cold water is sent to five decentralized delivery stations at the temperature of 4C and returned at around 14C. District cooling provides the cooling and air-conditioning needs of hundreds of buildings.

Website: www.fluorocarbons.org

SOLVENTS

Biodegradable, non-corrosive, general purpose cleaner

CRC Industries from the United States has introduced HydroForce Zero VOC general purpose cleaner, an industrial strength aqueous non-aerosol cleaner best used for applications that will not allow butyl, but demand performance and versatility. It is strong enough to attack tough dirt, grease and grime deposits and keep these soils from returning to treated surfaces.

HydroForce Zero VOC can be used full strength on tools, parts, grills, tyres, engines, shop equipment and lawn and garden equipment or diluted with water in pressure washers for vehicle washing, wall and paint preparation and floor cleaning. It is non-corrosive (pH <11), biodegradable, safe on most plastics, non-inflammable and non-ozone depleting. It contains no phosphates, ammonia or bleach and is hence safe enough to use daily for all cleaning needs. The cleaner is available in 32-oz spray bottles, 1-gallon bottles, 5-gallon pails and 55- gallon drums.

Contact: CRC Industries, Industrial Products Division, 885 Louis Drive, Warminster, PA 18974, United States of America. Tel: +1 (800) 272 4620; Fax: +1 (215) 674 2196.

Website: www.crcindustries.com

Website: www.news.thomasnet.com

Aqueous cleaner

Kyzen Corp., the United States, has launched LONOX L5610 aqueous electronics and stencil cleaning solution. LONOX L5610 is an alkaline aqueous blend designed for effective removal of flux, solder paste residues and some uncured adhesives from electronics assemblies and stencils. An efficient cleaner, L5610 is both people-safe and environmentally friendly. In addition to being easy to use, the cleaner is a RoHS compliant concentrate that is diluted with water, followed by a water rinse for complete removal of all soil and cleaner residues. The aqueous solution offers users numerous features, including low/no foam, low VOC, low COD/BOD, no HAPs, and a long bath life. It is non-inflammable, low-cost and effective at low concentrations. L5610 cleaner is multi-solder safe for use on all lead-free and eutectic solders in addition to most precious metals. While it is best used in polypropylene or stainless equipment, it is safe to use with PVDF, Kalrez, Teflon, and ceramic elastomers and filters. The cleaner is available commercially in 1, 5 and 55- gallon containers.

Website: www.emsnow.com

Non-inflammable cleaner for energized components

The new non-inflammable Cramolin Cleaner HFE, from ITW Chemische Produkte GmbH, Germany, was especially developed out of a new class of non-inflammable fluorinated compounds to allow safe and powerful cleaning of electrical components at energized equipment. Cramolin Cleaner HFE demonstrates excellent non-toxic values and low odour. It is designed for removing grease, oil dirt and flux residues. It is a fast-drying precision cleaner that evaporates without leaving any residues or forming explosive air-vapour mixtures. It is also non-inductive and has a good dielectric breakdown voltage (17 kV) mm). Cleaner HFE is suitable for cleaning equipment where it is not possible to switch off, such as machine controls, networks, switchboards and telecommunications industry.

Website: www.dataweek.co.za

FUMIGANTS

New ideas ensure ozone safety

Tobacco farmers in Zimbabwe have appreciated and accepted the float tray method of producing tobacco seedlings, which is meant to phase out the use of methyl bromide in tobacco production. The Tobacco Research Board has expressed its desire to have the ozone-depleting methyl bromide, used as a fumigant to kill harmful bacteria that affect tobacco seedlings, totally phased out by 2009. It has pledged to phase out 17 tonnes of methyl bromide this season while 7,500 farmers are expected to be trained in the use of the new seedling technique during the first phase of the programme. According to Mr. Patrick Chinamaringa of the Tobacco Research Board, the float tray system is environmentally friendly as compared with the use of methyl bromide.

Website: www.allafrica.com

Maximum residue limits for sulphuryl fluoride fumigant

ProFume gas fumigant (99.8 per cent sulphuryl fluoride) has taken a critical step towards international recognition as a viable alternative to methyl bromide. The adoption of maximum residue limits by the Codex Alimentarius Commission for its active ingredient sulphuryl fluoride enables the export of commodities around the world that have been fumigated with ProFume.

The Codex standards are recognized by the World Trade Organization as critical reference points for international trade. What is ordinarily an extensive, multi-year process of standard development by Codex was accomplished in only 30 months, owing to the increasing importance of sulphuryl fluoride as a methyl bromide alternative. Since its registration in 2004, ProFume has been used in over 150 commercial fumigations and is labelled for use throughout the United States. An expanded label for ProFume gas fumigant was registered by the Environmental Protection Agency in 2005 for tolerances in food processing facilities, including dried fruit and tree nuts, and cereal grains.

Website: www.grainnet.com