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Chalabhorn Research Institute

INTERNATIONAL CENTRE FOR ENVIRONMENTAL AND INDUSTRIAL TOXICOLOGY (ICEIT)

CRI's ICEIT has been designated as a
"UNEP Centre of Excellence for Environmental and Industrial Toxicology"

Princess Chulabhorn Calls for Global Partnership to Promote Secure Future for Mankind

Her Royal Highness Princess Chulabhorn urged world leaders to put aside their differences and develop a global partnership to help "set our planet on course for a more secure and equitable future".

"Let us put aside the immediate and local anxieties that inevitably concern us and reach a worthy agreement of global solidarity," she said.

Princess Chulabhorn made this statement at the plenary session of the United Nations Conference on Environment and Development (UNCED), held from 3 to 14 June 1992, in Rio de Janeiro, Brazil.

UNCED or the Earth Summit, the largest conference ever organized by the United Nations, was attended by more than 110 Heads of state and other senior officials from 170 countries.

Princess Chulabhorn led the Thai delegation at UNCED as Personal Representative of His Majesty King Bhumibol.

The deteriorating social, economic, political and ecological conditions were indications that the world's civilization now reached a critical stage, Princess Chulabhorn said.

Working in partnership, she said, world leaders should provide a framework, based on a set of principles, for individual and national actions.

"These principles must address the societal needs for equity, justice and peace, and promote compassion and respect among human beings," she said. "The government leaders gathering here have the



Her Royal Highness Princess Chulabhorn represented Thailand and His Majesty King Bhumibol at the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil. Sitting at her side is Royal Consort Group Captain Virayuth Disyasarin.

capacity to make far-reaching decisions."

The Rio Declaration, to be considered for adoption by the UNCED, contained those principles for international conduct to protect the environment and promote sustainable development.

"This, the first 'Earth Summit', represents a turning point in the history of mankind," she said. "We must use this opportunity to launch the global partnership that I and others have outlined."

Princess Chulabhorn highlighted some of the important principles to be considered at UNCED:

- Pursuit of sustainable development;
- Upholding of the right of States to exploit their own resources, without causing damage to the environment of other States or to areas beyond the limits of national jurisdiction;
- Reaffirmation of the intimate linkage between environmental protection and

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Princess Chulabhorn Calls for Global Partnership to Promote Secure Future for Mankind

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the development process;

- Eradication of poverty by giving priority to the special situation and needs of those developing countries affected by desertification and drought;
- Promotion of international cooperation to strengthen endogenous capacity-building for sustainable development — this could be done through improving scientific understanding and technology transfer;
- Recognition of the right to development for all peoples and States;
- Equitable sharing of responsibilities among States for environmental protection;
- Assurance that environmentally-sound policies would not impose restrictions on international trade.

The following is an excerpt of the text of statement made on 5 June 1992 by Her Royal Highness Princess Chulabhorn, who led the Thai delegation at the United Nations Conference on Environment and Development as Personal Representative of His Majesty King Bhumibol.

The statement briefly outlines Thailand's policy regarding the implementation of Agenda 21.

Thailand considers the implementation of Agenda 21 to be a national priority. Indeed, we have placed an emphasis on the need to integrate environment and sustainable development. Thailand's current five-year development plan (1992-1996) devotes considerable attention and resources to achieving objectives similar to those stated in Agenda 21. Hopefully, the problems of poverty and hunger in the country would be significantly reduced.

To conceive plan and implement integrated environment and development policies requires a cadre of trained and experienced personnel. To this end, it is necessary to increase national capacities by creating public awareness and by provid-

The Second Princess Chulabhorn Science Congress has attracted over 100 speakers from 21 countries to actively participate in the Congress Program. Highlights of some internationally recognized Plenary Lecturers include:

Dr. Nay Htun
Environmental Science, Policy and Management, and Capacity Building

Dr. Nay Htun is an internationally recognized figure in environmental science, policy and management areas. He has authored over 60 publications on environmental policies and management topics. With extensive international experience, Dr. Nay Htun continues to contribute to global environment/sustainable development issues, most recently exemplified in his role as Special Advisor/Director of Programmes with

ing education and training to all people. Only then will the country be able to identify, choose and utilise technologies for promoting sustainability.

The developing countries must strengthen their endogenous capabilities in all areas. Thus, building national capacities in areas such as research and human resources development could be a focus of international collaboration for the transfer of technology and expertise between countries.

Thailand has many institutions of higher learning, including the Chulabhorn Research Institute (CRI), that can provide training to other countries in areas such as human resource development and environmental toxicology and management. CRI has been designated by the United Nations Environment Programme as a "Centre of Excellence for Environmental and Industrial Toxicology".

Special attention should also be focussed on youths who will one day inherit the earth and on women who must play an equal role in the integration of environment and development.

the United Nations Conference on Environment and Development (UNCED) Secretariat in Geneva, Switzerland.

With a Ph.D. in Chemical Engineering from Imperial College, London University, Dr. Nay Htun began his many years of experience in Asia with senior management positions at EXXON Thailand, followed by his position as Associate Chairman and Professor of Environmental Engineering at the Asian Institute of Technology (AIT), Thailand, after which he joined the United Nations as Senior Programme Officer of Industry and Environment Office, United Nations Environment Programme (UNEP), in Paris, France, until July 1983 when he was appointed as the Director and Regional Representative for Asia and the Pacific, based in Bangkok, Thailand. During March and April 1990, he was Visiting Professor of International Environmental Policies, Tufts University, Medford, Massachusetts, USA, when he was recalled to join the UNCED Secretariat. In October 1992, Dr. Nay Htun will resume his position at UNEP Regional Office for Asia and the Pacific after two years on secondment at the UNCED Secretariat.

Dr. Nay Htun was conferred the title of Honorary Professor of Tongyi University, Shanghai, China, and Honorary Member of Thailand's Environmental Engineering Society in 1987. He is currently a board member of a number of non-profit organizations including: the International Institute for Energy Conservation (IIEC), and the World Resources Institute Council (WRI), both in Washington, D.C., USA; the International Advisory Board of the Chulabhorn Research Institute in Thailand, and the International Advisory Council for the Economic Development of Hainan Province (China).

Dr. Nay Htun's active participation at the Second Princess Chulabhorn Science Congress includes chairing and moderating a distinguished panel dis-

discussion in the Opening Plenary Session on Tuesday November 3 entitled *Integrating Science and Policy* and giving a Plenary Lecture in the prestigious Closing Session on Friday November 6 entitled *Capacity Building for Environmental Science and Technology*.

Dr. Roger Perry Hazardous Waste Management

Dr. Roger Perry has attained national and international recognition as an eminent scholar in the fields of air pollution control, waste treatment and environmental control. As a scientist, he is the Director of the Imperial College Centre for Toxic Waste Management, the Head of Environmental & Water Resources Engineering, Department of Civil Engineering and a Professor of Environmental Control & Waste Management, Imperial College of Science, Technology & Medicine. Dr. Perry is the Vice Chairman of the recently established Waste Management Industry Training Board and since 1984 has served as a member of the Senate and Academic Council of the University of London.

This exemplary academic career, combined with many years as a consultant to major chemical and engineering based industries, national and international governments, UNEP and World Health Organization, has resulted in over 20 years experience in some 30 countries and over 200 publications in peer review journals.

Dr. Perry has been the Conference Chairman of a number of major International Conferences including the International Conference on the Management & Control of Heavy Metals in the Environment (London) 1979; International Conference on Chemicals in the Environment (Portugal) 1986, 1988. He is also an active fellow of the Institution of Water & Environmental Management; Royal Society of Chemistry; Royal Society of Health and the Institute of Waste Management.

Dr. Perry will give a Plenary Lecture entitled *Professionalism in Waste Management — Training, Research and New Technologies*.

Dr. Otto Thomas Solbrig Biodiversity

Dr. Otto Solbrig is a leading expert and an internationally recognized figure in the area of Biodiversity. He was a member of the distinguished Expert Committee on Biodiversity for the United Nations Conference on Environment and Development (UNCED), and recently Dr. Solbrig co-authored the book *Biodiversity and Global Change* (1992).

Currently a Bussey Professor of Biology with the Department of Organismic and Evolutionary Biology at Harvard University, Cambridge, Massachusetts, USA, Dr. Solbrig has held an extensive array of distinguished positions at Harvard University since 1976. Dr. Solbrig has also held positions at

the University of la Plata, Argentina; University of California, Berkeley; University of Michigan, Ann Arbor; and the Universidad de Los Andes, Merida, Venezuela. Dr. Solbrig's research and teaching interests include population ecology, natural resource and land use, and biodiversity. These interests have culminated in eleven books and more than 200 articles.

With such notable credentials, Dr. Solbrig membership has been sought by numerous prestigious national and international committees. Recently, Dr. Solbrig has been a member of the Biology Advisory Committee to the National Science Foundation; Chairman, Decade of the Tropics Program; Member of the Committee of the IUBS/SCOPE/UNESCO Program on Biodiversity; and Member, Committee for the International Council of Scientific Unions, of the U.S. National Academy of Sciences.

Dr. Solbrig is on the editorial board of many international journals including; *Biology International*; *Environmental Reviews*, and *Biodiversity Letters*. Among his honors have been his role as the President of the International Association for Plant Biostatistics; the President of the Society for the Study of Evolution and he is the Past President of the International Union of Biological Sciences (IUBS).

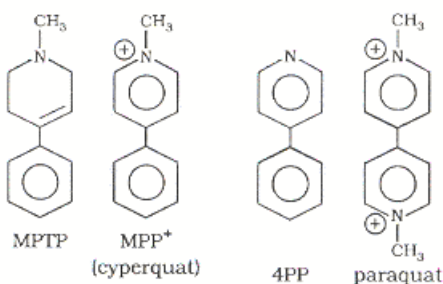
Dr. Solbrig will give a Plenary Lecture on *The Science of Biodiversity* at the Second Princess Chulabhorn Science Congress.

PARKINSON'S DISEASE MAY BE LINKED TO PARAQUAT

Ever since scientists have suspected that certain environmental toxins may be responsible for the rare Parkinson's disease, paraquat, a popularly-used herbicide, became a prime target of investigations.

So far, there has been no firm evidence suggesting that paraquat causes the illness; but its structural property and the symptoms of those exposed to the herbicide, which are similar to those of Parkinson's disease, indicate that the possibility should not be dismissed.

The element that links paraquat to Parkinson's disease is a chemical substance called MPTP (N-methyl-4-phenyltetrahydropyridine). MPTP is a by-product in the synthesis of a meperidine-related opiate marketed ille-



The molecular structures of N-methyl-4-phenyltetrahydropyridine (MPTP), its metabolite N-methyl-4-phenylpyridine (MPP⁺), the environmentally occurring analogue 4-phenylpyridine and the herbicide paraquat.

gally as synthetic heroin.

Many addicts injected themselves with this drug showed symptoms of se-

vere parkinsonism. Tests with monkeys receiving MPTP also indicated that the animals developed the same symptoms.

Parkinson's disease, previously believed to be a hereditary illness, is a slowly progressive neurodegenerative disorder characterized pathologically by the loss of neurons from the pigmented substantia nigra. The disease, which rarely occurs before the age of 50, gradually robs its victims of the ability to move.

The striking similarity between Parkinson's disease and MPTP-induced parkinsonism suggested that compounds similar to MPTP in structure or biological activity might be the cause of the illness.

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“If we don’t stop destroying the environment first, how can we deal with the problems?”

Her Royal Highness Princess Chulabhorn attended the United Nations Conference on Environment and Development (UNCED) at Rio de Janeiro, Brazil, as head of the Thai delegation. There, Thailand signed two conventions — on climate change and on biodiversity. Here she talked briefly about the implications of signing those two conventions and about Thailand’s implementation of Agenda 21.

She is President of the Chulabhorn Research Institute (CRI). She takes a keen interest in finding solutions to the country’s environmental problems. At her initiative, CRI undertakes many environment-related activities, including research and studies on environmental toxicology and sustainable development projects in southern Thailand to improve the quality of life of the people.

On the eve of her trip to the south of Thailand to promote reforestation campaigns in honour of Her Majesty Queen Sirikit’s 60th birthday, she granted an interview to a group of journalists.

Q: *What are Thailand’s most critical environmental problems?*

Princess Chulabhorn: First of all, we should divide the environmental problems in Thailand into two categories — those inside Bangkok and those outside Bangkok.

Outside Bangkok, the main environmental concern is the lack of fresh water resource for both consumption and agricultural purposes. There is a severe drought in all parts of the country because there is not enough rain this year. This problem is a result of climate changes brought about by the

massive destruction of forests in the past 20 years.

There are many ways to correct the situation. We have to stop cutting down more trees. If it’s feasible, we can build reservoirs. I mention it’s feasible only because sometimes it’s not feasible to build reservoirs. Another way to solve the problem of water shortage is what His Majesty the King has been doing in creating artificial rain.

Inside the Bangkok metropolis, there are many serious problems. Wastewater released by industries has contaminated rivers; as a result, many

aquatic species are disappearing. Heavy traffic congestion has caused the air quality in the city to deteriorate rapidly. Noise pollution from the traffic is damaging to human health.

I wish to stress that water shortage is becoming a critical problem for our country. You have to understand that this problem hasn’t just happened by itself. If you consider other factors involved, you will see that almost all problems are inter-related. The problem of water shortage stems from the fact that there is not enough rain or there is delayed rainfall. This situation is, in

turn, brought about by climate change, which is largely due to the loss of forest areas. These are critical environmental problems in Thailand, and they are all inter-related.

Q: *What are the solutions to these problems?*

Princess Chulabhorn: There are many ways to tackle these problems, but they require long-term measures. Take the problem of deforestation, for example. It doesn't take much time to destroy forests, but it needs decades to rebuild them.

What we ought to take as the first step to finding solutions to the problems is by raising awareness among the people at all levels, including those from the industrial sector and governmental and non-governmental agencies, to be conscious of and responsible for the consequences of their own actions on the environment. To this end, particular attention should be paid to youths because young people are more receptive to new ideas. With greater awareness created, people would be more inclined to obey laws or regulations, thus providing favourable conditions leading to solutions to environmental problems. The mass media also plays a vital role in helping create this public awareness.

Education, research and training programmes are also important steps in helping tackle our environmental problems. School curricula should be revised to incorporate more courses to teach students of our need to protect the environment.

So, I think that it is a good start to make people realise how important the environment is to sustaining life. When people are aware of this fact, they will stop harming the environment. Therefore, to stop destroying the environment is the first vital step to solving the problems. If we don't stop destroying the environment first, how can we deal with the problems?

Q: *Aside from deforestation, what are other environmental problems you are most concerned with?*

Princess Chulabhorn: I pay attention to all environmental problems. For example, I have always been concerned with how to promote development, especially in the quality of life of the Thai people, with minimum adverse impact on the environment. This is quite a challenging task for me. To improve the living conditions of the people and

at the same time, promote sustainable development, you have to look at all the issues involved. For example, when you consider the problem of deforestation, you will have to talk about other environmental issues as well, such as water shortage, industrial, agricultural and household wastes, and air pollution. To answer your question, I am concerned with all environmental problems.

Q: *What is the role of CRI in finding solutions to the country's environmental problems?*

Princess Chulabhorn: The main objective of CRI is to make use of scientific and technological knowledge for promoting sustainable development and for protecting and managing the environment. Its activities include research, education and training programmes, particularly on environmental toxicology. We also organize courses for post-graduate studies.

Q: *Do you have many difficulties in carrying out your work?*

Princess Chulabhorn: Very often. In anything you do, you will always face problems, big or small. Our biggest problem is the lack of funds. Financial support from sources within the country is very limited. We, therefore, try to seek help from donor countries, the United Nations and other international organizations.

Another major problem for us is the lack of human resources. We need people, who share our convictions, to work with us.

Q: *Where from do you get financial support for your reforestation efforts in southern Thailand?*

Princess Chulabhorn: The project receives financial support from the Royal Thai Government. Presently, I'm in the process of negotiating with Canada and Germany, which have expressed an interest in our reforestation campaigns because they are being implemented as part of a community development programme.

We cannot think of forests, without thinking of the poor people. The two go together. Germany is especially interested in this reforestation project. On this trip, I would like to convince our potential donors that Thailand is really serious about implementing this project. In the near future, we can look forward to receiving support from these two countries.

Q: *At the Earth Summit in Rio de Janeiro, Brazil, Thailand was one of the many countries that signed*

the Conventions on Climate Change and on Biodiversity. Please explain the implications of those two conventions.

Princess Chulabhorn: Thailand has signed the two conventions. Their contents contain vague provisions. Nevertheless, the developing countries will benefit more from those two conventions than the developed nations. A provision of the Convention on Biodiversity, for example, prevents the industrialised economies from exploiting the resources of the developing countries.

Q: *What are the commitments imposed on Thailand for having signed those two conventions?*

Princess Chulabhorn: Right now, we are not committed to anything, not until we have ratified those two conventions. Before they are open for ratification, more details need to be worked out first at the next session of the General Assembly starting in September.

Q: *What are the major purposes of your trip to the south?*

Princess Chulabhorn: The first objective of this trip is to promote reforestation campaigns in southern provinces of Thailand in honour of Her Majesty Queen Sirikit's 60th birthday. Her Majesty the Queen is a pioneer in launching nation-wide environmental conservation campaigns, especially those related to reforestation. One of her outstanding achievements was the Pa Rak Nam (Forests love Water) project, which was launched 10 years ago.

The second objective is to follow up on the UNCED. We want to show the world that Thailand is serious about implementing the goals of Agenda 21. I believe that Thailand is among the first few countries to implement Agenda 21. We should be able to meet the Agenda's objective in increasing our forests by 30 per cent of the total land areas by the year 2000.

The third objective is to try to save our country from further environmental destruction. We cannot allow any more deforestation. If we don't plant more trees, there will be an acute shortage of water for consumption, agriculture and daily use. Water shortage is not a problem confined only to Thailand, but is also affecting other countries. In 5 to 10 years time, without a global effort to avert drought, all countries will be fighting for water, instead of for oil.

PESTICIDES HELP INCREASE FOOD PRODUCTION, BUT ARE HARMFUL TO ENVIRONMENT

There is no doubt that chemical substances have played a major role in the development of human societies, in agriculture and health; in industry and transport; and in housing and the production of consumer goods.

In recent years there has been increasing concern around the world over chemicals in the environment. Such concern has arisen in response to information on the widespread distribution of chemicals stemming from human activities and from the potentially harmful effects of those chemicals on humans or on the ecological systems which sustain humans.

*To promote public awareness and a comprehensive understanding of certain chemicals, the International Register of Potentially Toxic Chemicals (IRPTC) of the United Nations Environment Programme (UNEP) has made a periodic review of environmentally harmful chemical substances. In its latest report, *Chemical Pollution: A Global Review*, IRPTC has included pesticides in its areas of study.*

The report is published jointly by IRPTC and the global environment monitoring system's Monitoring and Assessment Research Centre (MARC), under UNEP's Earthwatch Programme, with financial support from the government of the Netherlands. The content of this article is taken from the report.

Each year, pests and weeds have done considerable damage to crops. In North America, Europe and Japan, the damage is estimated to be around 10 to 30 per cent of the total crops; the loss of crops is much higher in developing countries.

Locusts are among the major pests causing the most damage to crops. The crop with the greatest use of insecticides is cotton.

The use of pesticides has almost doubled every 10 years between 1945 to 1985 and is expected to double again in developed countries before 1995. Until 1985, about 80 per cent of all pesticides were used in the United States, Western Europe and Japan. In Africa, the amount of pesticides used is expected to triple in five years.

Application of pesticides not only kills pests but also their predators and parasites, thereby disturbing natural regulating mechanisms. In addition, pollinating insects which are vital, especially for many tropical crops, may be affected by pesticides.

Another problem is the pests' resistance to specific pesticides. This starts a vicious circle of repeated applications of pesticides with higher dosages, leading to more resistant species. Arthropods, plant pathogens, nematodes and rodents have all developed resistance to pesticides.

The effects of pesticides extend beyond agricultural systems. During and after application, pesticides may be transported by wind or water to surrounding compartments, resulting in hazardous concentrations in the surface water and in soils. Long-term effects may be expected when persistent pesticides are used that do not degrade easily or disappear by volatilization or adsorption. Those pesticides and their metabolites may even migrate to ground-water systems and contaminate present and future drinking-water resources.

In the past, the side effects of pesticides on birds and mammals were often related to the use of persistent organochlorine insecticides. However, less persistent pesticides may also cause side-effects. Spraying or accidental release of the toxic compounds may cause acute mortality or long-term effects in the populations of birds, fish and other aquatic animals.

Secondary poisoning by feeding on prey containing pesticide residues may also affect many organisms. Effects on non-target organisms not only depend on the types of pesticides used, the dose rate and the usage pattern, but also on local circumstances such as the condition of the soil and water, climate, disturbance cycles (e.g., drought, floods), geomorphology and ecosystem structure, on the presence of areas and species of recognised ecological value



Pesticides are being used in greater amounts to increase food production.

and on the potential for recovery of affected species. Risk assessments of a pesticide therefore cannot be extrapolated from one location to another.

In many countries, pesticides are subsidised by governments to stimulate agricultural production. Reduction of these subsidies will lead to more economic use of the pesticides and will promote the implementation of Integrated Pest Management (IPM). In the concept of IPM, the use of pesticides is restricted through combination with other pest control methods such as proper monitoring for pest outbreaks in relation to weather conditions, the use of insect traps, natural predators, pest-resistant cultivars, mixed cropping and crop rotation. As side effects are often a result of improper use or improper choice of products in relation to the local conditions, education and training for farmers on the level of application should be encouraged. Education is very important to IPM, and, if mis-use of pesticides is mainly caused by the lack of education, IPM will not be a feasible alternative.

Many countries have developed legislation for the registration, trade and use of pesticides. Statistics on import

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TOXIC WASTES: POISONING THE PLANET

The durability, toxicity and sheer amounts of waste products throughout the world have become overwhelming. Mounds of garbage generated by prodigious consumption; hazardous substances, including acids, metals, radioactive wastes; chemicals created by industry — even human waste — all put environmental and human health at risk.

Consider these cases: some 2,500 people died and many thousands more were injured in the 1984 Union Carbide chemical accident in Bhopal, India; several hundred people died, and food crops throughout Europe became inedible, following an explosion at the Chernobyl nuclear power station in 1986.

The most dangerous concentrations of wastes come from large industry: petroleum refiners, chemical and pesticide manufacturers, miners, and makers of synthetics and weapons.

Worldwide, some 338 million tonnes of hazardous wastes are produced each year. Typically buried in landfills or dumped into leakey surface

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and use, however, are seldom available. Deficient infrastructure is often the cause of excessive and unsafe use of pesticides. Legislation on the control of distribution, application, packaging and labelling is also weak.

Various international guidelines and programmes have been developed to supply governments and users with information on hazards connected to the use of pesticides. These have been developed either jointly or independently by bodies such as the following:

- Food and Agriculture Organization (FAO);
- World Health Organization (WHO);
- Organization for Economic Co-operation and Development (OECD);
- European Economic Community (EEC);
- United Nations Environment Programme (UNEP);
- UNEP/IRPTC;
- International Programme on Chemical Safety (IPCS) of UNEP/WHO/the International Labour Organization (ILO).

containers, corrosive acids, toxic metals and other such poisons can percolate into soil and water resources. They are also dumped at sea or burned in improperly-fitted incinerators, which allow toxic fumes and ash to escape.

People working and living near danger zones suffer from increased cancers, nerve disorders, miscarriages, birth defects and other irreversible afflictions.

Human activities also rely on growing numbers of chemicals, most of which have never been adequately tested to determine how hazardous they are to human or ecological health.

PCBs (polychlorinated biphenyls), a group of aromatic synthetic chemicals mainly used in industrialised countries, have been transported as far as the Arctic, where they have contaminated fish, animals and humans.

Most developing countries have no toxic control laws, making them



The most dangerous concentrations of wastes come from large industry.

cheap and easy dumping grounds for products banned in industrialised countries. Europe sends an average of about 120,000 tonnes of hazardous waste to the "third world" each year.

Human sewage contains disease-causing viruses, bacteria and other pathogens, while solid wastes from consumer durables, packaging and other everyday rubbish also have an impact on health and ecology. Furthermore, because much of human garbage does not degrade, it will affect the human and natural environments long after those who generated it are gone.

This article is reproduced from UN CHRONICLE, June 1992.

CANADA ADOPTS TOUGH CONTROL ON TOXIC INDUSTRIAL CHEMICALS

Canada's Environmental Protection Act (CEPA) was adopted in June 1988 to impose tighter control and improve management of industrial chemicals manufactured in or imported into the country.

Under CEPA, a complete toxicological assessment of all new chemicals manufactured in or imported into Canada is required to indicate the substances' potential hazards to the environment and human health. Such assessment will determine whether or not a substance needs to be controlled throughout any or all stages of its life-cycle.

Because of the large numbers of existing chemicals (estimated to be around 35,000 to 40,000) and the limited human and financial resources, strategies were needed to set priorities for such assessments. Section 12

of the Act requires the compilation of a "Priority Substances List", identifying some 50 substances or narrow classes of substances to be given first consideration for assessment for potential environmental and human health hazards and for possible restrictive control.

In developing the list, a nine-member panel was established to consider candidate substances, using such criteria as: production or imported quantities; the volume transported; the frequency of recorded spills, accidents

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U.S. MANUFACTURER TO PHASE OUT CFCs SOONER

Du Pont has announced recently that it will move up its scheduled phase-out of the ozone-depleting chlorofluorocarbons (CFCs) and halons well before the international deadline.

According to *Chemistry & Industry* (4 November 1991), the United States-based company's proposed action was in response to a new United Nations study which indicates that the problem of ozone depletion is far worse than previously believed. Du Pont said it would stop producing halons by 1994 and CFCs by 1996.

Parkinson's Disease May Be Linked to Paraquat

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Paraquat is structurally similar to MPTP. A test conducted on a 32-year-old citrus farmer who worked with the herbicide for 15 years showed that he later developed clumsiness, stiffness and intermittent tremor of the left arm, all symptoms comparable with Parkinson's disease.

Interest in possible environmental causes of Parkinson's disease has intensified recently with reports of a low concordance of Parkinson's disease among twins. This suggests that the disease is not inherited.

Three studies of monozygotic twin pairs in which one of the twins had the disease failed to demonstrate a high concordance of Parkinson's disease within twin pairs. An illness with a hereditary component will have a similar prevalence in each member of a monozygotic twin pair. In contrast, an illness largely determined by environment will not be similarly prevalent between members of twin pairs, unless those twins were both exposed to the same agent.

Of all herbicides currently in use, paraquat is the least harmful to humans. It was introduced into the market in 1962.

Because of its potency and low price, its use in Thailand has increased rapidly in the last few years, up from 4,500 tonnes in 1985 to more than 6,600 tonnes in 1988.

Sources: *Lancet*, 1986, Vol.2, p.1163, *Nature*, 1985, Vol.317, p.198-199. *Neurology*, 1992, Vol.42, p.261-263. *TINS*, Vol.12, No.2, 1989, p.49-54.

The Montreal Protocol on Substances that Deplete the Ozone Layer, which came into effect on 1 January 1989, calls on industrialised countries to stop using CFCs by the year 2000 and hydrochlorofluorocarbons (HCFCs), partially chlorinated CFC substitutes, by 2040. Developing countries with low CFC consumption, however, are given a ten-year grace period.

According to the study by the

Japanese Researchers Find Method of Destroying CFCs

Recent experiments in Japan have found a method of destroying environmentally harmful chlorofluorocarbons (CFCs) on a large scale, according to a news report.

The method involves putting CFCs into a tube along with water vapour and heating electrically the sub-

Canada Adopts Tough Control on Toxic Industrial Chemicals

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or releases into the environment; the volumes released in environmental contaminations; the levels of exposure encountered in the environment; and the extent of a mammalian toxicity database for human risk assessment.

A numerical rating system, from a scale of 0 to 4.0, was developed for each of the criteria to give weighting to the completeness of information available on each substance and to generate priority ratings.

An initial list of some 200 highly toxic chemicals was drawn up from among 35,000 substances. The number was then reduced to 60 and later to 44 after the substances were grouped into "classes". The Priority Substances List was published in the *Canada Gazette* on 11 February 1989.

For more information on Canada's environmental and health risk assessments, please write to either of the following addresses:

National Health and Welfare, Communications Branch Tunney's Pasture, Ottawa, Canada, K1A 0K9

Environment Canada, Publications, Environmental Conservation and Protection Ottawa, Canada, K1A 0H3

United Nations Environment Programme and the world Meteorological Organization, ozone depletion now covers most of North America, Europe, the former Soviet Union, Australia and New Zealand. Large areas of Latin America are also affected.

The situation poses an increased risk of skin cancers and cataracts for hundreds of thousands of people, the study says.

stances to a temperature of about 10,000 celcius (18,000 Fahrenheit) to produce plasma.

"This destroys the CFCs, leaving hydrochloride, hydrofluoride and carbon dioxide," the report quoted a Japanese researcher as saying. "The hydrochlorides can either be recycled or neutralised, and the hydrofluorides can be collected and used for other purposes."

Only a small amount of carbon dioxide, believed to be the main cause of global warming, is produced.

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Correspondence should be addressed to:

ICEIT NEWSLETTER
Chulabhorn Research Institute
Office of Scientific Affairs
c/o Faculty of Science,
Mahidol University
Rama 6 Road, Bangkok 10400,
Thailand
Telex: 84770 UNIMAHITH
Telefax: (662) 247-1222
Tel: (662) 247-1900