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Chulabhorn 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".

Training Workshop on

"Modern Techniques in Biotechnology"

The first workshop in the series, "Modern Techniques in Biotechnology I: Recombinant DNA Technology", was held at the Chulabhorn Research Institute on 4-13 October, 1993.

A series of training workshops on new techniques in biotechnology will introduce participants to new technologies and applications in the field of biotechnology and will provide opportunities for invaluable hands-on experience.

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CHEMICAL POLLUTION AND THE ELDERLY

Our environment contains over 750 000 different chemicals, natural and artificial. Each year, between 1000 and 2000 new substances are produced. Only a few of them have been studied in detail in terms of their effects on health, and even fewer for their effects on the health of the elderly. And yet this is a matter of some importance, since, in growing older, people are much more vulnerable to environmental hazards, because of changes in their physiological and biological processes.

The International Programme on Chemical Safety (1), whose Director at the World Health Organization (WHO) is Dr. Michel Mercier, has specialized in perfecting methods for evaluating the hazards of exposure to chemicals. Although much attention is devoted to such risk groups as infants, children and pregnant women, the elderly have been somewhat neglected by specialists until now.

In order to remedy this situation, a study has been devoted to "Principles for Evaluating Chemical Effects on the Aged Population". Its results have just been published in English in the Environmental Health Criteria series, which runs to almost 150 technical reports on the properties and dangers to health of chemicals or other constituents of the environment.

The specific problems of the elderly must be faced, because the elderly population is growing throughout the world, especially in developing countries. In 1988, there were 488 million people over the age of 60 in the world; the figure is expected to rise to 612 million by the year 2000, of whom 61% will be living in developing countries.

Delayed effects

Of all the chronic effects of chemicals on health, cancer is certainly the most worrying. Cancer causes almost a quarter of all deaths of men and women between the ages of 65 and 74, with lung cancer alone accounting for 10%. In humans, cancer seldom manifests itself until 10-40 years after exposure to carcinogenic agents, so that cancers caused by chemicals are to be observed in the aged population. However, it is extremely difficult to track down the past exposure responsible for the disease.

The conclusion of the newly-published study is that a great deal of research is still needed, especially into long-term effects of chemical substances in the environment on the health of the elderly. Having lived for many years in an environment containing a great variety of toxic substances, old people can suffer accumulated consequences, even if the levels to which they have been exposed are relatively low. The pathological signs of such accumulation appear much later, and it is difficult to distinguish the causes of the various possible effects.

The International Programme on Chemical Safety therefore advocates new research to gather experimental, epidemiological and clinical data on the particular toxicity of environmental chemicals in the elderly. A better understanding of the physiology of aging is also important, to avoid its premature onset. For better or worse, the chemicals around us affect the way the population ages and the health of the elderly. What we need to know is how, so that we can not only increase the number of years we have to live, but also improve their quality.

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(1) IPCS – Environmental Health Criteria 144 – Principles for Evaluation Chemical Effects on the Aged Population.

"Painter's Syndrome": Long-Term Neurotoxic Effects of Paint Solvents

A number of investigations in recent years have concluded that long-term exposure to paint solvents may cause chronic cerebral disease usually described as a possibly disabling pre-senile "dementia" or "painter's syndrome".

The chronic effects of over-exposure are distinct from the effects caused by acute episodic exposures in which narcosis is the principal effect.

However, much of the evidence based on neuropsychological examination of painters has been questioned due to absence or inadequate choice of control groups and accepted norms of variation of test results. Moreover, the degree of exposure to solvents is often inadequately quantified.

One problem in comparing the results of different studies has been the lack of standardised terms to describe the possible symptoms of chronic syndromes. A WHO meeting in Copenhagen in 1985 proposed a classification of the CNS disorders caused by longterm exposure to solvents into two categories: the organic affective syndrome consisting mainly of diffused psychiatric symptoms, and chronic toxic encephalopathy.

A later report prepared by a specialist committee of the Royal Society of Chemistry for the Commission of the European Communities on "Long-term Neurotoxic Effects of Paint Solvent" examined available epidemiological studies on individual solvents to which painters are exposed with the object of forming a judgement on the validity of the claim that long-term exposure to such solvents induces the development of a chronic cerebral condition.

The report surveyed epidemiological studies on white spirit, toluene, xylene and trimethylbenzenes and various other components of paint formulations including pigments, extenders, benders, additives and other materials for water-based, latex paints.

An examination of general epidemiological studies on painters led the report to conclude that a while some evidence regarding the existence of a chronic, pre-senile dementia syndrome has been refuted, sufficient evidence remains to suggest that the occurrence of the syndrome cannot be ruled out.

Although there is no clear evidence that current "Threshold Limit Value" (TLV) levels are not adequate for safe working, there does appear to be some evidence of intellectual impairment among painters who have been judged as having received high cumulative exposures.

GLOBAL APPROACH TO THE MANAGEMENT OF HAZARDOUS WASTES, THEIR TRANSBOUNDARY MOVEMENT AND DISPOSAL

In response to the growing recognition of the health and environment risks associated with hazardous wastes, the Parties to the Basel Convention decided to cooperate and develop international legal instruments to control the generation, transboundary movement, transport, disposal and recovery of these wastes.

Taking into account the fact that the quantity of generation of wastes of all kinds is still increasing, the rapid pace of industrialization will necessitate careful attention to hazardous wastes prevention and management for decades to come.

Increased international co-operation was also considered necessary to assist developing countries to manage and treat the wastes they generate in an environmentally sound way.

UNEP has, since the early 80's, been involved in the management of environmental hazardous wastes, including control of their transboundary movements and their environmentally sound disposal. In 1987, UNEP's Governing Council adopted the Cairo Guidelines on Environmentally Sound Management of Hazardous Wastes and requested the preparation of a global legal instrument to control transboundary movements of such waste that led to the adoption of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989).

The Basel Convention entered into force in May 1992 and received until today 64 ratifications. In addition, several activities, referred to in Chapter 20 of Agenda 21, have been carried out by the Secretariat of the Basel Convention. The Secretariat was also requested to assist in the implementation of some decisions of the Governing Council of UNEP, which are related to hazardous wastes.

Model national legislation for the control of transboundary movements of hazardous wastes and their disposal has been developed and distributed particularly to developing countries to assist in the promulgation of their implementing national legislation for the Basel Convention. Also assistance in this regard has been provided for capacity building.

Preliminary assessment of the feasibility of establishing regional centres for training and technology transfer has been undertaken. Detailed feasibility studies on the offers made to establish such centers in Africa, Asia, Latin America, and Eastern and Central Europe are under preparation. More concrete practical steps have been made, in particular for the centre expected to be hosted by China.

A draft protocol on liability and compensation for damage resulting from the transboundary movements of hazardous wastes and their disposal has already been developed by the legal working group of the Convention which met in October 1993. Further consideration of the draft is scheduled for 1994.

The first draft of the paper on the transboundary movements of hazardous wastes and their disposal destined for recovery operations developed by the Technical Working Group of the Basel Convention, which met in June and September 1993, provides elements that are considered important for the environmentally sound management of hazardous wastes with a view to assisting countries in their efforts to assess the suitability and practicability of transboundary movement of such wastes destined for recovery operations. This document has been circulated to Parties and non-Parties for their comments and will be undergoing further review before it is submitted to the second

(Continued on page 8)

Reduction of Lead and Copper Levels in School Drinking Water

Many past studies have established that lead and copper reach drinking water through plumbing materials and that lead in water may influence blood-lead levels in humans. However, the leaching of these metals is unpredictable, and methods of elimination have been difficult to evaluate.

A recent study conducted by the New Jersey Department of Environmental Protection and Energy has quantitated the amount of lead in drinking water fountains in 50 schools in New Jersey.

The study showed that one-time, morning flushing of schools' drinking water may not provide day-long protection for children. It is important, therefore, that drinking water should be monitored for metals that may leach from plumbing and that samples should be taken first draw, after flushing, and at some point during the school day. In this way, school managers can determine if there is a potential lead or copper problem and whether flushing can reduce the problem for day-long protection. Once this information is available, action can be taken to alleviate the problem.

CHILDHOOD LEAD POISONING

A recent study of research investigations into childhood lead poisoning and its treatment by Dr.Carol Angle of the Department of Pediatrics, University of Nebraska Medical Center, concludes that childhood lead poisoning, which along with iron deficiency is the most readily recognized and directly preventable cause of developmental delay, might be considered more an economic rather than a medical problem. Exfoliated coats of lead paint from deteriorated housing and the associated dust and soil contamination often present in substandard habitation are a contributory factor. Investigations suggest that the prevalence of excessive body burdens of lead as well as the manifestations of neurobehavioural deficits are increased by poverty, poor living conditions and indifference on the part of the family and the community.

International Training Courses in Pollution Control and Management and Environmental Toxicology

Prevention of chemical hazards and safeguarding human health and the environment from the adverse effects of chemicals requires personnel with a thorough knowledge of both toxicology and appropriate technology together with management skills applicable to government, industrial and academic sectors. At present, in the developing world, there is a serious lack of qualified and trained personnel in these critically important and increasingly essential areas.

The International Center for Environmental and Industrial Toxicology (ICEIT) of the Chulabhorn Research Institute, in response to this perceived need, has given the highest priority to organizing the forthcoming training program to assist developing countries in human resource development to cope with the increasing use of chemicals worldwide.

The training program which consists of two intensive training courses:

- Pollution Control and Management
- Environmental Toxicology

will be organized by ICEIT in collaboration with the Asian Institute of Technology (AIT) with the assistance of experts from leading universities/institutes in North America, Europe and international organizations so that the current knowledge and technology developed in the industrialized world will be transferred and applied to local situations.

This program addresses the training needs of both engineers and health scientists in the vitally important area of chemical toxicity in relation to safety evaluation and assessment, management and planning, and policy formulation. Thus, the program aims to integrate the fundamental principles of toxicology and engineering practices to foster a multidisciplinary approach for the safe use of chemicals for sustainable development.

Course Structure

The course will be given in English and will consist of lectures, small group discussion, and case studies which include presentations of specific environmental problems to be resolved by trainees working in small groups. There will also be field visits. The use of data bases such as the International Register of Potentially Toxic Chemicals (IRPTC) data base will be demonstrated.

Participants

The training program is designed for mid-level professionals with background in science or engineering, working in industry or in agencies concerned with the use, control and toxicity of chemicals.

Background knowledge in one of the following disciplines is recommended: chemistry, biochemistry, biology, environmental sciences, engineering and medicine. Participants with backgrounds in sciences or engineering are encouraged to take the complete program (2 courses) which cuts across the two major disciplines of environmental engineering and health science.

Registration

Registration is limited; to assure a place, we urge you to register as soon as possible and no later than *September 1, 1994.* For further information please contact Office of The Secretariat.

Correspondence:

The Secretariat:
International Training Courses in Pollution Control and Management and Environmental Toxicology
Chulabhorn Research Institute,
Office of Scientific Affairs
c/o Faculty of Science,
Mahidol University,
Rama 6 Road,
Bangkok 10400, THAILAND
Tel: 66-2-247-1900
Fax: 66-2-247-1222

Course I: Pollution Control and Management

(Duration 2 weeks: November 7-18, 1994)

Course fee US$ 800
Course fee, accommodation and meals US$ 1,525

Course Content:

Session 1: Monitoring Industrial Pollution and Analytical Techniques

- Basic Concepts of Ecosystems Analysis
- An Overview on Organic Contaminants, Focussing on Monitoring of a few Chlorinated Organic Pollutants, through Immission Studies
- Ecotoxicology: Application to Pollution Control and Assessment
- Analysis of Some Micro Pollutants
- Wastewater Characteristics

Session 2: Industrial Pollution and Control

- Industrial Processes and Wastes Characterization
- Strategies in In-plant Waste Minimization and Clean-up Technology
- Liquid Effluent Treatment and Industrial Effluent Standards
- Chemical Climate and Atmospheric Trace Gases
- Hazardous Waste Generation and Processing
- Biological Mine Water Treatment
- Hazardous Waste Disposal
- Clean-up of Hazardous Waste Contaminated Sites
- Monitoring of Biological Effects

Session 3: Non-industrial Pollution

- Some Strategies for Monitoring of Persistent Micro Pollutants Based on Twenty Years of Monitoring
- Indoor Air Pollution
- Dust and Atmospheric Aerosal

Session 4: Impact Assessment Procedure

- Environmental Impact Assessment
- Case study: Impact of Bleached Pulp Mill Effluents on the Aquatic Environment
- Information Technology (IT) and Development

Session 5: Preventive Strategy and Technology

- Policy and Trends in Environmental Education and Management
- Cleaner Processes and Recycling Options
- "Acid Rain" Prevention and Control
- Municipal Solid Waste Utilization
- Controlled Release of Biologically Active Agents for Purposes of Agricultural Crop Management.

List of Faculty:

- K. Bhattarai, Asian Institute of Technology
- I.S. Hansen, Danish Hydraulic Laboratory, Denmark
- S. Muttamara, Asian Institute of Technology
- C. Polprasert, Asian Institute of Technology
- L. Reutergardh, Swedish Environmental Protection Agency, Sweden
- U. Stoll, Asian Institute of Technology
- Wei-Han Su, Chinese Academy of Sciences. P.R. China
- O. Svanberg, Swedish Environmental Protection Agency, Sweden
- R.D. Stueart, Asian Institute of Technology
- T.B. Suselo, Asian Institute of Technology
- T. Umita, Iwate University, Japan
- C. Visvanathan, Asian Institute of Technology
- D.L. Wise, Northeastern University, U.S.A.
- Byung-Soo Yang, National Fisheries University of Pusan, Korea.

Course Venue:

AIT Center
(Room #B202, 2nd Foor),
AIT 58 Moo 9, Km. 42,
Phaholyothin Highway,
Klong Luang, Pathumthani 12120
Tel: 66-2-524-5250-1
Fax: 66-2-524-5207

Course II: Environmental Toxicology

(Duration 2 weeks: November 21 – December 2, 1994)

Course fee US$ 600
Course fee, accommodation and meals US$ 1,385

Course Content:

Session 1: Chemicals in the Environment

- Chemicals in the Environment
- Dioxin Case Study
- Exposure to Chemical Hazards
- Fate and Distribution of Chemicals in the Environment (I)
- Fate and Distribution of Chemicals in the Environment (II)

Session 2: Principles of Toxicology

- Threshold and Dose Response Relationships
- Absorption, Distribution and Excretion
- Metabolism
- Factors Affecting Toxicity
- Methods of Assessment of Toxic Chemicals
- Cellular Responses to Toxic Injury

Session 3: Chemical Carcinogenesis and Occupational Cancer

- Cancer, A Definition
- Mechanisms of Carcinogenesis: DNA Damage
- Non-Genotoxic Mechanisms of Carcinogenesis
- Environmental Carcinogenesis: Case History-Aflatoxin B_1

Session 4: Target Organ Toxicology: Responses to Environmental Toxicants

- Liver Toxicity
- Nervous System Toxicity
- Pulmonary Toxicity
- Renal Toxicity
- Skin Toxicity

Sission 5: Industrial Chemicals Posing a Threat to Health and Environment

- The Toxicity of Industrial Chemicals
- Toxicological Bases for Regulating Chemical Exposure in the Workplace
- Industrial Chemical Toxicity: A Case Study of Cadmium

Session 6: Pesticides and Agrochemicals

- Pesticides: Classification, Registration & Code of Conduct, Safety and Exposure of Pesticides
- Mechanisms of Pesticides Toxicology
- Safe and Efficient Use of Pesticides
- Treatment of Pesticide Poisoning

Session 7: Risk Assessment and Management of Chemicals

- Environmental Epidemiology
- Risk Assessment: The Process
- Risk Estimation of Exposure to Carcinogens
- Factors Affecting the Risk Assessment Process
- Risk Assessment for Incinerator: Case Study
- Risk Management
- Risk Communication
- Regulatory Toxicology (Air and Water)

List of Faculty:

- R.A. Becker, State of California, Environmental Protection Agency, USA
- G.C. Becking, Interregional Research Unit, International Programme on Chemical Safety, WHO, Research Triangle Park, USA
- J.F. Borzelleca, Medical College of Virginia, USA
- D. Calamari, University of Milan, Italy
- J.H. Duffus, The Edinburgh Centre for Toxicology, Heriot-Watt University, U.K.
- D.J. Ecobichon, McGill University, Canada
- H. Greim, Institute of Toxicology, GSF-Forschungszentrum fur Umwelt und Gesundneit GmbH, Neuherberg, Germany
- G.C. Hard, American Health Foundation, USA
- T. Kjellstrom, Division of Environmental Health, WHO, Switzerland
- R. Plestina, International Programme on Chemicals Safety, WHO, Geneva, Switzerland
- M. Ruchirawat, Chulabhorn Research Institute, Thailand
- R.C. Shank, University of California, USA

Course Venue:

Siam City Hotel
477 Si-Ayuthaya Road
Bangkok 10400
Tel: 66-2-247-0121
Fax: 66-2-247-0165

"Partnerships for Change" A Follow-up to the Rio Earth Summit

A working conference "Partnerships for Change" was held in Manchester, United Kingdom from 20 – 22 September, 1993. It brought together 350 participants from environment and development groups, local government and communities, and business and industry from 87 countries.

The aim of the conference, first announced by the United Kingdom Prime Minister, Mr. John Major, at the Rio de Janeiro Earth Summit in 1992 was to focus on the practical achievement of sustainable development through global partnerships.

The three day conference provided a forum for exchanging ideas and experience, sharing problems and solutions, identifying obstacles and finding ways to overcome them.

Case-studies presented at the conference were wide ranging, covering topics as diverse as urban living, managing wildlands and technological development.

In his opening address at the conference, United Kingdom Environment Secretary, Mr. John Selwyn Gummer, stated:

"It is the lessons from the experience of the participants, drawn out in the workshops and in the case study discussions, that will be the main part of the output of the conference. We will use this material to create a practical guide, "Partnerships in Practice". We have promised to submit this guide to the United Nations Commission on Sustainable Development as a contribution to its work.

ESCAP ENVIRONMENT PANEL TO MEET HERE

The new Committee on Environment and Sustainable Development set up by ESCAP had its first meeting on 4 October 1993 in Bangkok. The meeting discussed environmental degradation in Thailand and other Asian-Pacific countries caused by their rapid economic growth over the last decade.

The Committee on Environment and Sustainable Development was established by ESCAP last year to emphasize the need to integrate environmental considerations into development planning.

ESCAP set up the committee in response to the continued degradation of the environment in the region, and also as a result of a number of global developments, including the 1988 publication of the report by the World Commission on Environment and Development. Following the Conference on Environment and Development in Rio and the adoption of Agenda 21, the UN established a Commission on Sustainable Development, to which ESCAP will now report on the implementation of Agenda 21 in the Asia and Pacific region.

A meeting of experts was convened to prepare for the first session of ESCAP's new committee. In his opening address, Mr. Rafeeuddin Ahmed, executive secretary of ESCAP, warned that "unless the desire to ensure a sustainable future becomes a central concern of national governments and of all citizens as well, the continuing deterioration of the economy's natural life-support capabilities will eventually overwhelm efforts to improve living conditions in the region."

FORTHCOMING EVENTS

Thailand will host a ministerial – level meeting of 117 member states of the Vienna Convention for the protection of the Ozone Layer, and its implementing arm, the Montreal Protocol, in November 1993.

At a recent press conference, Thailand's Deputy Industry Minister Mr. Pornthep Techapaibul said that Thailand had been approached by the United Nations Environment Programme (UNEP) to host the international meeting in Bangkok. The meeting will be held at the UN Conference Centre (UNCC) from November 15 – 24, 1993 and is expected to draw 1,000 to 1,500 international delegates.

The deputy minister stated: "The meeting will not only stimulate the awareness of local industry of the need to end the use of ozone depleting substances, but will also be a proof of Thailand's commitment to save the environment."

Mr. Sivavong Changkhasiri, the permanent secretary for industry, told the press conference the private sector had been very cooperative over the government policy to abide by the Vienna Convention and implement the Montreal Protocol.

He said that it was expected Thailand would be able to phase out the use of ozone depleting substances by 1998, ahead of the time frame in the protocol.

Scientific research was continuing to find a substitute for ozone depleting substances.

SOLID WASTE MANAGEMENT

A recent study on Bangkok's solid waste management sponsored by the Japanese International Cooperation Agency (JICA) stated that sanitary land filling is to be the main urban waste disposal system adopted by the Bangkok Metropolitan Authority (BMA) and private contractors in the immediate future. However, the study recognised that the landfill method of solid waste disposal has serious limitations and that, in the longer term, the incineration method was inevitable, despite the higher cost.

BMA formerly relied on open dumping and open air burning waste disposal before starting the landfill method in the early 1980's in its three waste sites.

Many of the open dump sites have now suffered severe groundwater and soil contamination and require costly clean-up before durable, sanitary and up-to-standard landfills can be built.

In the United states, the Environmental Protection Agency (EPA) requires that sanitary landfills are lined with an impermeable flexible membrane liner to completely contain waste and that strict monitoring systems are in place to prevent contamination of waste waters in the surrounding area.

Training Workshop on "Modern Techniques in Biotechnology"

(Continued from page 1)

The first workshop in the series, "Modern Techniques in Biotechnology I: Recombinant DNA Technology", was organized at the Chulabhorn Research Institute from 4-13 October, 1993.

A format of theoretical lectures followed by intensive hands-on practical training was adopted.

Five internationally renowned experts drawn from academia, government and industry participated in the workshop together with four local experts in the field of recombinant DNA technology. 80 participants attended the 3-day lecture programme and 24 participants were selected for the 7-day intensive practical sessions.

An important feature of the hands-on sessions was a laboratory briefing and discussion period at the beginning and end of each day.

The programme for the series features the following workshops:

- Modern Techniques in Biotechnology I: Recombinant DNA Technology (October 4-13, 1993)
- Modern Techniques in Biotechnology II: Advanced Molecular Biology Techniques (October, 1994-tentative)
- Modern Techniques in biotechnology III: Environmental Biotechnology (1995)
- Modern Techniques in Biotechnology IV: Agricultural Biotechnology (1996)

Global Approach to the Management of Hazardous Wastes, their Transboundary Movement and Disposal

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meeting of the Conference of the Parties.

The Basel Convention Secretariat has been called upon to carry out a series of priority activities within available resources in chapter 20 of Agenda 21 in collaboration with other offices in UNEP, in particular the Industry and Environment Programme Activity Centre, the Environmental Law and Institutions Programme Activity Centre and UNEP regional offices, and with other UN organizations such as ECE, FAO, ILO, IMO, UNIDO, WHO and the World Bank. The realization of the programme has started since several of the activities in Agenda 21 are covered by provisions of the Convention.

A manual to facilitate the implementation of the Convention has been developed by the Secretariat and used by the Parties and will be widely disseminated in early 1994.

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