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Technical report: Workshop on Industrial Safety Related to Environment
Protection and Effluent Control in Pesticide Industry
Surabaya, Indonesia, 10-14 December 1990*

Prepared for the Governments of the Member States of the Regional Network
(Afghanistan, Bangladesh, China, India, Indonesia, Iran, Myanmar, Malaysia,
Pakistan, Philippines, Republic of Korea, Sri Lanka and Thailand)
by the United Nations Industrial Development Organization
acting as executing agency in association with the World Health
Organization, Food and Agriculture Organization, World Bank and
Economic and Social Commission for Asia and the Pacific
for the United Nations Development Programme

Based on the work of Ms. Aida V. Ordas, rapporteur
and adopted by the participants of the
Workshop on 14 December 1990

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INTRODUCTION

1. The workshop on "Industrial Safety Related to Environmental Protection and Effluent Control in Pesticide Industry" is one of the activities of phase III programme of RENPAP, (Regional Network on Pesticides for Asia and the Pacific) held in Surabaya, Indonesia, December 10 - 14, 1990.

2. The workshop was attended by representatives of member countries each from Afghanistan, Peoples Republic of China, Indonesia, India, Iran, Republic of Korea, Malaysia, Myanmar Philippines, Sri Lanka and Thailand. Nominees from Pakistan and Bangladesh were not present. Besides the representatives of the member countries, this workshop was attended also by UNIDO, (United Nations Industrial Development Organization) CIRAD (International Co-operation Center of Agricultural Research for Development), France and EPA (United States Environmental Protection Agency), USA and observers from the host country and other countries as well. The list of participants is attached (see annex 1) Participant from WHO (World Health Organization) could not attend as planned

RECOMMENDATION

3. The Workshop adopted the following recommendations.

i) Having considered the existing infrastructural facilities available in the Region, both in well-developed and relatively less developed countries;

- and having taken into account the need for process modification and plant design upgrading requirements in respect to production of active ingredients and their formulations which are not subject to patent coverage;

- and also, having felt the need for new formulation, packaging and application technologies; locating safer and cleaner technologies;

The Workshop recommends that:

UNIDO/RENPAP mechanism be used to provide the member countries with assistance for process modification, revamping of existing plants, and provide guidelines on plant designs meeting the basic minimum safety requirement, both for production of active ingredients and their formulation.

ii) Being concerned over the lack of facilities for exchange of information among the member countries of the Region in the areas of production, formulation, packaging and application technologies.

The Workshop recommends that:

UNIDO/RENPAP assist in strengthening the existing National facilities for data collection and dissemination of information in these areas.

iii) The workshop having discussed the necessity for the member countries to have uniform minimum safety standards with respect to active ingredient production and their formulation;

- and taking into account the need to identify appropriate protective clothing and equipment to be used in both active ingredient and formulation production plants; the need for assistance on safety audits/review of said plants.

- and also, the need for advice on relocation or rezoning of existing pesticide plants;

The workshop recommends that:

UNIDO/RENAP provide/develop information on minimum safety standards for pesticide production and formulation activities; provide guidance on identification of the appropriate protective clothing and equipment suitable for use in the Region; assist member countries in carrying out/implementing periodic safety audits/reviews in pesticide plants.

- iv) Taking note of the problems of waste disposal and the hazards associated with it; and the general non-availability of practical guidelines on waste minimization, containment, waste inventory monitoring, and treatment and disposal systems; and also the need for laboratory equipped with the right manpower and facilities to identify and quantify waste material;

The workshop recommends that:

- Each member country categorize waste from pesticide industry and consider to what extent these can be recycled/reused.
 - UNIDO/RENAP provide assistance in the establishment of methods by which non re-usable waste could be properly utilized/managed.
 - UNIDO/RENAP conduct a survey and drawout practical guidelines on waste minimization, containment, waste inventory monitoring, and treatment and disposal systems.
 - UNIDO/RENAP extend assistance in developing laboratory capability for waste identification and quantification by way of consultancy services and manpower training.
 - UNIDO/RENAP to consider the 1998 Jakarta meeting recommendations and speed up the setting of effluent standard limitations for pesticide industries in the region.
- v) Realizing the need for making management and workers of medium and small scale industries aware of the hazards involved in plant operation;

The workshop recommends that:

- UNIDO/RENAP assist in the development of suitable training modules directed towards creating awareness among management and workers of the potential hazards associated with plant operation.
- Member countries use RENAP media for creating awareness among all concerned.

OPENING CEREMONY

4. Ms. Ambar Suryosunarko, National co-ordinator mentioned that the workshop is held for 5 days (December 10-14, 1990 at the "ELMI Hotel" attended by around of 80 participants from RENPAP member countries, UNIDO, WHO, CIRAD (France), EPA (USA), Indonesia Pesticide Producers Association and Invitees from local/foreign bodies. She said that that there are 8 speakers, 5 speakers from Indonesia and the others from UNIDO, WHO, EPA (USA), CIRAD (France) and India.

She said that the objective of this workshop is to adopt measures on Regional/National basis to understand the awareness and assign responsibilities to industries, public and the governments, regarding environmental aspects of pesticides production; to adopt policies to solve problems of environmental pollution during pesticide production as well as the monitoring aspect of effluents and hazardous wastes; to improve the methods of analysis of effluents produced from pesticides Industry.

5. Mr. S.P. Dhua the Regional Coordinator mentioned that the RENPAP has now made a sharp focus towards strengthening the pesticides industry as a whole through a harmonized approach on industrial safety, hazard management, effluent control, industrial hygiene, adoption of safer and more effective application technologies and use of environment friendly pesticides formulations with the overall aim to reduce the load on the environment. To achieve this prime objective, the RENPAP has made concerted efforts to set up six Technical Coordinator Units which are meant to execute various components of the programme leading towards overall safety in production, handling, storage and keeping the environment clean and free from pollution. The Technical Coordinator Units are :

- Effluent Control/Waste Disposal in Indonesia
- Industrial Health and Occupational Safety in Philippines
- Pesticide Formulation Technology/Quality Control in India.
- Pesticide specifications and impurities in active ingredients at the manufacturing level in South Korea
- Eco Toxicology in Pakistan
- Residue Analysis/Bio Botanical pesticides in Thailand.

He stated that recently an International Conference on "Recent Developments in the field of pesticides and their applications to pest control in China and other developing countries of the region" was held in Shenyang, Peoples Republic of China from 8 - 14 October, 1990 and that he was called upon to spell out the message that he would be carrying to the member countries of the RENPAP derived from the proceedings of this well-organised conference. In this context, the most important messages that he presented before the delegates was the need felt by the conference on the preservation of the environment through the adoption of a series of actions including:

- i) development and use of environment friendly formulations which are cost effective;
- ii) encouraging appropriate packaging of pesticides which are easily disposable and cannot be reused;

- iii) developing and introducing botanical and bio-pesticide adopting a balanced and complementary approach vis-a-vis the chemical pesticides.
- i.) The UNIDO/UNDP to play a much greater role in the RENPAP participating countries in revamping and upgrading of the existing pesticide producing units to make these operationally safe and reduce air/water pollution through adoption of appropriate technology.

He said that in the context the workshop on Industrial Safety Related to Environmental Protection and Effluent control in pesticides industry is one of the most befitting programmes and The Technical Coordinator Unit here in Indonesia, is well poised to render the much needed assistance to the member countries of the region to offer training, demonstrations and expert consultancy which would be one of the major strengths of the RENPAP.

6. Mr. Narasimhan, UNIDO Country Director of Indonesia on behalf of the Director General of the United Nations Industrial Development Organization (UNIDO), Mr. Domingo L Siazon Jr., expressed his welcome to all the participants of the workshop. He mentioned further that RENPAP is a very important undertaking because it deals with a key element in the attempts of the Governments of the region to eradicate poverty and improve the living conditions of the people. The earth's fragile ecosystem is becoming increasingly valuable and coming to a stage where deliberate and organized efforts need to be made in order to preserve the environment, so that it can continuously sustain the developmental efforts. Indonesia has been in the forefront among the developing countries in efforts towards environmental protection and development of a system friendly towards environmentally sound and sustainable development. He said that it is therefore fitting that this workshop is being held in Indonesia.

7. A Senior Industrial Development Officer from UNIDO Vienna expressed his thanks to the Government of Indonesia for giving excellent facilities in hosting the workshop. He stated that environmental issues related to pesticide production and use are attracting attention from many organizations. Many restrictions, rightly placed on pesticides, will make it more expensive to introduce new compounds into the market and even many well known pesticides will disappear due to re-registration scheme being introduced by many countries. Effluent control and waste management will be one of the major topics mainly addressed to the developing countries with emphasizes on the small/medium scale operators. He expressed that the RENPAP which is new growing both in strength and facilities, will play a major role in Asia to become a model for other regions.

8. Mr. Wardijasa, the Director General for Basic Chemical Industry

The Director General remarked that the motto at all levels should be clean technology for clean environment and pesticide industries have to take care of protecting the environment by treating, controlling and monitoring the effluent.

On account of the importance to the region, the Government of Indonesia has agreed to take up the task as focal point for effluent control/industrial safety of the region through the workshop by exchanging of experience and improving capabilities.

With the establishment of National Pesticide Development Centre, in Indonesia sponsored and assisted by UNDP/UNIDO, it will act as the technical coordinating unit on industrial safety, effluent control, hazard analysis in pesticides production and to provide training to meet the requirement and to sustain the eco-system of the region.

ELECTION OF CHAIRPERSON

9. Mrs. Sri Ambar Suryosunarko of Indonesia was proposed a. Chairman and Mrs. Aida V. Ordas of Philippines was proposed respectively as Rapporteur. Proposed officers were agreed by all participants of the workshop. In order to make the sessions more active during the course of the workshop some experts in turn acted as Chair person as well, namely Mrs. Sri Ambar Suryosunarko from Indonesia, Mr. Djufri Latief from Indonesia, Mr. B. Sugavanam from UNIDO Vienna and Mr. S.P. Dhua from UNIDO/RENPAP India.

ADOPTION OF AGENDA

10. Agenda submitted was adopted with small changes due to the absence of the Representative of WHO (see annex 1 for agenda).

COUNTRY PAPERS

11. All delegates of member countries presented their country papers abstracts of which are as follows:

11.1. AFGHANISTAN

After the revolution of 1979 the use of pesticides was limited and during the last two years pesticides have been purchased for use in the northern parts of Afghanistan through the assistance of the Soviet Union. Each year about 200 - 300 tons BHC were distributed free of charge to Afghanistan by USSR. In 1990 additional aid was given in terms of 200 tons Roger, 400 tons Dimethoate and some Chlorpyrifos.

11.2. CHINA

Pesticides play a very important role in the agricultural production of China. The high demand/need for such inputs triggered the development of the pesticide industry in the country. Output of these pesticide plants is such that it can satisfy the domestic demand in agriculture. In 1989, the plants produced 200,000 MT of technical material, as a.i. and 650,000 MT formulated products.

Associated with this industrial development are problems on pollution of the environment by pesticide-contaminated wastes. These problems have been the concern of the government of china since 1972. Today, China has completely managed organizations, laws and statutes on environmental protection. System for waste monitoring and disposal are likewise in place, such as the following:

- (a) Integrate using waste and waste recycling
- (b) Promote pollution reduction through technological innovation.
- (c) Separation of clean and waste water flow.
- (d) Treatment of waste water.
- (e) Localized pollution control to be promoted.

In view of the government's efforts to lower pesticide prices; and the large volume of pesticide production in the country, effective implementation of environmental protection measures is constrained/limited.

11.3. IRAN

At present all pesticide requirements for agricultural production and public health are met through imports.

Total consumption of formulated products is 18,000 tons per annum (in a.i. content).

Projects under various stages of execution include the following:

Insecticides :

Production of diazinon, malathion, fenitrothion and dimethoate with total capacity of 3,600 tons per year of active ingredient.

Fungicides :

A multi-purpose plant for production of dithiocarbamate fungicides such as mancozeb, zineb, maneb, ziram, thiram, with total capacity of 2,000 tons/year.

Herbicides :

Plants for the production of 2,4-D, MCPA and alachlor/ butachlor with a total capacity of 4,500 tons/year of active ingredient for effluent treatment of these plants very advanced regulatory standards have been considered in designing criteria. The environmental protection agency of Iran is responsible for environmental and safety control at all industries.

11.4. INDONESIA

The paper dealt with a chronological review of environmental legislation and its implementing agency, from national level to district level. The paper gave a brief description of the development of pesticide industry, installed capacity and type of pesticide produced, effluent treatment facilities and handling of contaminated waste.

It is concluded that the condition of effluent treatment facilities in the pesticide industry in Indonesia show a disheartening wide variety of treatment problems.

This condition is mainly due to the lack of well-trained and skilled human resources; the limited financial resources; low level of law enforcement activity; and unavailability of pesticide parameter in the existing effluent standard.

11.5. INDIA

India has 15% of the world population and 2.5% geographical area, and 40% of land is available for cultivation. With the present population of 700 million expected to cross 1,000 million in 2,000 AD the pressure on increasing food production is understandable. Besides, India is primarily an agricultural country, its population living in 0.6 million villages, more than 50% of which have a population less than 500. More than 50% of the agricultural holdings

are marginal and the average holding is very much smaller than those in the United States and Western Europe. The total food production in India in 1985 - 1986 was 150.4 MT which has risen to an expected requirements of food grains and by the year 2,000 AD would be 220 MT.

Since most of the area available for cultivation has already been put to use and per hectare yield has also only a marginal potential for further increase, the need to conserve whatever is produced becomes even more acute. According to the present estimates 50% of the potential of food production in India is lost due to insects, pests, plant pathogens, weeds, rodents, etc.

More than 40,000 insects have been recorded in India of which 1,000 have been listed as potential pest of economic plants. Of these, only 500 have been found to cause serious damage at one time or the other and of these 500, 70 have been causing damage consistently.

Pesticides have, therefore, been given the status of an essential input increasing agricultural production by preventing crop losses before and after harvesting. Over 137 pesticides are registered for use in India, out of which around 60 are indigenously manufactured.

11.6. KOREA

Pesticide consumption has remarkably increased during the last few decades in Korea, and such a demand has promoted the local production of various pesticides and their formulations. In 1989, the consumption of pesticides was 171,484 tons based on formulation, corresponding to 23,280 tons of a.i. and the production of technicals was 20,363 tons.

However, large scale use of pesticides per unit area has brought about public concerns on the potential hazards. In this respect, the Government has continuous efforts on the pesticide management as well as on the control of industrial effluents.

To protect environment, the legislative and administrative management was reinforced together with the investment of funds.

The environmental water quality is divided into five grades according to different use category and the permissible discharge standards of industrial effluents were prescribed to maintain water quality.

11.7. MALAYSIA

The Pesticides ACT 1974 controls all pesticides imported manufactured and sold in Malaysia. The implementation and enforcement of the act is by a Pesticides Board which comprises of head of various Government and statutory bodies concerned with the pesticides and headed by the Director General of Agriculture to ensure progressive and effective implementation of the several rules and regulations that were introduced under the provision of the act.

Besides, there are also a few other relevant institutional requirements or laws which control certain aspects such as Environmental Quality Act 1974 and its subsidiary legislations which deals with prevention, abatement and control of pollution and improvement of the environment ; the Poison (sodium arsenite) Ordinance 1949 which control the sale, storage and use of Sodium Arsenite; the food act 1983 which contains provisions for control of pesticides residues in food. The administration of the Environmental Quality Act

1974 and its subsidiary legislation come directly under the purview of the Department of Environment, within the ministry of Science Technology and Environment where its control of various legislations is distributed under different agencies.

11.8. MYANMAR

A pilot plant for liquid pesticide formulation is jointly established by the co-operation of UNIDO, UNDP and the Government of UNION OF MYANMAR and is operational since June 1990.

For the time being, the Plant is producing liquid insecticide only, i.e. E.C. formulations namely : Fenitrothion 50 E.C., Cypermethrin 10 E.C., Diazinon 40 E.C., Phenthoate 50 E.C., Endosulfan 35 E.C.

Government policies towards safety in the work place and control and monitoring of effluent from pesticide industries and disposal of hazardous waste are also introduced. Government has already issued the Pesticide Law, which is going to be enforced in the early 1991. Environment protection commission (national level) has also been formed in August 1990.

The industries concerned have the responsibility for the monitoring of effluent wastes. The formulator, i.e. pilot plant for pesticide formulation has to take all the responsibilities for safety in the Plant and control and monitoring of effluent from the plant and disposal of hazardous waste. The plant management is taking all necessary steps so as to comply with the FAO Code of Conduct on registration and UNIDO's assistance for waste minimization.

As we are the youngest member of RENPAP, any assistance in providing Myanmar with the necessary information in connection with the pesticide formulation, safety environment protection and effluent control is welcome.

11.9. PHILIPPINES

In the Philippines, the fertilizer and Pesticide Authority (FPA) is mandated with the authority and responsibilities to regulate/control the manufacture, formulation, importation, exportation, repacking, distribution and use/ application of pesticides, fertilizers, and other agricultural inputs. One of the objectives of such regulation is to maximize the benefit to be derived from pesticides, while reducing, if not totally eliminating, the hazards associated with its use/handling, so as to protect the health and well-being of the people, and the environment, in general.

The Pesticide Industry in the Philippines, is generally dependent on importation, formulation, and repacking activities. The environmental control aspects of these activities are guaranteed by certain aims which are vested not only to FPA, but also with the following :

- a. Environmental Management Bureau (EMB) of the Department of Energy and Natural Resources (DENR).
- b. Laguna Lake Development Authority (LLDA), and the;
- c. Local Government

FPA has established coordination and linkages with Agencies in its intensive monitoring program, directed towards promoting occupational health and environmental safety in pesticide plant operation.

Effective implementation of occupational health and safety standards for these plants is constrained by the following problems/limitations :

1. Government Agencies are often inadequately funded, ill-equipped and under staffed for environmental protection tasks. Technical expertise is likewise inadequate.
2. The need for practical guidelines for dealing specifically and in detail with pesticide contaminated waste problems.
3. General lack of awareness on the part of generator and the public as to the hazards of the waste materials.
4. The need to strengthen linkages with other agencies carrying out similar environmental protection measures. Availability of relevant information materials for this purpose should be enhanced.
5. The need to up grade laboratory capability/support facilities for the purpose.

Assistance from international organizations, like UNIDO in terms of making available technical expertise, equipment/facilities and making possible access to relevant information on environmental control aspects of pesticide, will be most appreciated.

11.10. SRI LANKA

All pesticides used in Sri Lanka are imported to the country as ready to use products or as technical grade for local formulations. There are about 10 firms engaged in this activity and are all backed by multinational companies for the supply of raw materials.

Pesticides are widely used in Sri Lanka in Public Health work and in agriculture. Some pesticides are prohibited for import and use and some are restricted on sale.

The main problem of pesticides in Sri Lanka is due to its acute toxicity in addition to soil, water and air pollution. Most formulating factories do not have effluent treatment systems. Wastes produced by then factories are of great concern to the authorities.

The department of labour has authority for health and safety of formulating factories. Environmental issues are handled by the Central Environmental Authority and the Department of Agriculture is directly involved in the prevention of overuse and misuse of pesticides. The Registrar of Pesticides, by statute, is the licensing authority for pesticides.

The control of Pesticide Act no. 33 of 1980 makes provision to regulate the import, formulation, packing, labelling, storage, transport, sale and use of pesticides.

The Environmental Act provides by statute that a license be obtained from the Central Environmental Authority so as to prevent any environment pollution from all industries.

Non availability of expert scientific staff, lack of laboratory facilities for monitoring pesticide quality and quantity and storage of enforcement officers are a serious handicap.

11.11. THAILAND

During the past decade, Thailand has developed a number of industrial activities. However, with high increase in the economic growth rate, the exploration of natural resources and environmental deterioration are also on the increase.

Environmental pollution is becoming a problem of great concern, especially toxic substances and heavy metal pollutants discharged from factories. Six Government agencies are involved in solving these problems. One has prepared guidelines for environmental management, the others concerned in enforcement in various fields such as factories, public health, agriculture, workers health and safety and transportation.

The Industrial Works Department (IWD) which has full responsibility for the control of all factories' pollution problems has decided not only to establish the strict permit system procedures and monitoring programs but also to initiate a joint toxic waste treatment center to serve factories which have a problem on treatment facilities.

In view of the insufficient treatment facilities and disposal sites as well as inadequate human resources for operating the plant and monitoring its efficiency, problems still remain and there is a need to strengthen the technology of effluent treatment and monitoring system.

12. LECTURES

12.1 Effluent control of pesticides industry in PT Petrosida Gresik; Indonesia by Fatimano Mendrofa

PT Petrosida Gresik as a Domestic Investment, is a subsidiary company of PT Petrokimia Gresik (Persero). It is the first pesticide plant for a.i production in Indonesia, and is producing two groups of pesticide ingredients, as follows :

- a. Carbamate pesticides group consist of :
 - BPMC-
 - MIPC-
 - Carbofuran-
 - Carbaryl-
- b. Organophosphate pesticides group. At the present time it produces only Diazinon-

The pollutants produced by the above processes are solid and liquid wastes. Therefore, in supporting the process activities, PT Petrosida Gresik is provided by an effluent treatment unit.

Based on the pollutant wasted out from the process the unit divided into 3 kinds of processing as follows :

- a. Chemical treatment process.
- b. Biological treatment process.
- c. Incineration process.

The capacity of waste treatment units, are as follows:

- Waste water treatment capacity 70 m³/day, consists of 30 m³/day from the carbamate unit and 40 m³/day from the Diazinon unit.
- Incineration unit, capacity 0.7 ton/day.

12.1 Effluent control at Petrokimia Gresik by Baroto Sugeng Pudjianto, presented by Y. Rus Isdiyatna

Petrokimia Gresik Industrial Area consists of a group of companies. Two of them are pesticide plants.

PT Petrosida Gresik produces pesticide active ingredients, and the other plant PT Petrokimia Kayaku formulates pesticides.

The basis of the effluent control is to manage the effluent as pollutant substances in compliance with the environmental standard.

The aspect of the pollution control is minimizing the generation of waste and removing it before discharging to the external environment.

The paper described Petrokimia Gresik Industrial activities for maintaining and controlling the solid, gas, and liquid waste on each of its plants.

12.2 Waste management in PT ICI Pestisida Indonesia by Thomas Widyatmodjo and Ety Indrawati L.

Based on the company's policy, PT ICI Pestisida Indonesia provides its plant with:

- Waste water treatment plant.
- Extractor of air through chemical solution scrubber.
- Dust collector, and
- Incinerator facilities.

12.3. Environmental management by Nabel Makarim, Ministry of State for Population and Environment, Indonesia

Institutions to manage the environmental impact were developed - according to the changing situation in 1990 the Environmental Impact Control Agency (EICA) was formed by Presidential Decree with mission to assist the President in the control of environmental impacts.

The strategy of EICA are : accurate and periodic report, increase public participation, institutional development, in selected areas.

No permanent pollution by 2,000 is aimed: clean water program (PROKASIH) which is divided into multi-year sub-targets focused on priority areas, air pollution from non-stationary sources, hazardous waste management, city cleaning (ADIPURA), Environmental Impact Assessment, Law Enforcement and Development of Laboratory System.

12.4 Recent Technological Developments in the Field of Effluent Control and Waste Disposal in the Pesticide Industry - WASTE MINIMIZATION by George M. Jett, EPA (USA)

This paper presented an argument for the implementation of waste minimization in the pesticide industry as a solution to the constant rising costs to treat and the need to reduce the volume of toxic waste generated.

The approach introduces membrane filtration as an alternative to the traditional activated carbon and hydrolysis followed by biological treatment systems currently employed. A full scale formulation system in the United States achieving 56.3 % waste reduction with significant cost savings is presented to support this point. The full scale system selected 90 % removal of the active ingredient (A.I.) in the wastestream as the objective for cost payout. The cost payout was in one year.

The full scale system is followed up with a bench scale treatability study the EPA commissioned on sixteen (16) pesticides from different groups representing the major categories of pesticides. The bench scale study showed that 99 % of the make up pesticide waste could be removed by one of the three types of membranes filters tested (aramid, cellulose acetate and thin film composite) demonstrating that the full scale system is not an isolated situation. The waste minimization process is a four step process that is explained in detail with references provided. The four steps are planning, assessment, feasibility and implementation.

12.5 Environmental aspect of pesticide production by Y. Rus Isdiyatna, Indonesia

Pesticides have both beneficial and detrimental characteristics. Pesticides are used to control noxious pests, but since they are classified as hazardous and toxic substances they have great potential impact to environment if they are not well managed.

In a pesticide production process, waste may be generated. The waste may contain hazardous and toxic materials. The waste should be controlled and treated to comply with the environmental standard.

The environmental standards are regulated by law or government regulations. It may differ from country to country. But it is understood that law and regulations are developing more strictly in compliance with public awareness to living environment.

12.6 Handling, safety and monitoring of effluent by Y. Rus Isdiyatna, Indonesia

Industrial processes produce side products which may cause pollution to the environment.

Efforts on the environmental pollution control for an industry could be given as elimination, reclamation, processing, and landfill.

Intensive monitoring on securing operational/producing stage. collecting and storing waste and transportation are needed for the preservation of healthy and non-polluted environment.

Monitoring is an effort to minimize the negative impact from industrial activities which could be carried out periodically or continuously depending on the character and condition of the wastes.

11. Handling, Safety, Monitoring and Permits Development in the Field of Effluent Control in the Pesticide Industry by George M. Jett, EPA (USA)

This paper presented an overview of the information necessary to establish a regulatory basis for the pesticide industry. This included review of the handling and safety elements for the safe development of the pesticide industry including logistics and hazard recognition that a pesticide effluent monitoring program requires. Reference sources, recommendations and a review of the standard safety equipment necessary for a safe sampling event were presented. Useful training and guidance as well as the legislative basis required to establish a successful programme were presented.

The paper presented a detailed sample plan, the need for acceptable analytical methods with the general objective of establishing an effluent discharge permitting program for the reduction or elimination of waste effluents. The monitoring and reporting requirements, specific elements and considerations were reviewed including sampling types, location and frequencies. The permit programme example was taken from U.S. National Pollution Discharge Elimination System for the Clean Water Act, Effluent Limitations Guidelines process. The process was briefly reviewed including the objectives, development, framework, basis for implementation, insurance processes and enforcement through compliance inspection and routine monitoring.

12.8 Pesticide Industrial Policy, Mr. Mathur, UNIDO consultant

Any pesticides Industrial policy would be country specific and would be an instrument for achieving sustainable pre-determined objectives based on concern at any given point of time.

Based on the Indian experience and situation, an agenda for action towards, developing a policy has been drawn-up.

This taken into account :

- a. The present status of the industry,
- b. The concerns of the Government and others on various issues connected with Pesticides, and
- c. Certain objectives which flow and if these concern and are brought to be achieved.

Certain basic assumptions here are to be made in the contexts of a Pesticides Industrial Policy which are :

- a. A decree if Governmental instruction is necessary to achieve certain goals,
- b. Development of natural basic Pesticides industry is a desired goal,
- c. The country has the legal infrastructure for regulations industrial development and also has accepts to some technology.

Pesticides policy would centre around the following product groups :

1. Technical grade material.
2. Formulations, and
3. Chemical intermediates used for manufacturing technical pesticides.

While an integrated pesticides policy should cover all aspects of pesticides starting from research through manufacturing and marketing some major elements of the policy need to be focussed upon such as R & D, licensing transfer of technology, safety and environment, pricing and tariff and quality control.

For developing an agenda for action towards a pesticide industrial policy an analysis of the existing status of the industry is also necessary.

Some major areas of concern of the policy maker is given in Annex III.

Objectives for policy are given in Annex IV. While this is primarily relevant for India, it may also be relevant to other, countries with varying depending upon situation of each and policy objectives.

As regards R & D and technology the policy should concentrate on process technology given the high cost of basic research and uncertain return. The process research should aim for developing:

- formulations which reduce the load on environment to make the technology, thrusts effective, the following areas need to be focussed.
 - a. Technology for high volume demand products,
 - b. Where breakthrough technology is claiming a high licence fee.
 - c. Technology for products nearest to the market
 - d. Technology for newer formulations

Safety and environment are of very high concern areas for Pesticide Industry, the policy should take care of the following aspects :

- a. Location of pesticide plants,
- b. Centralization of agencies responsible for pollution and safety control schemes,
- c. Encouragement of hazard based management technology,
- d. Careful selection of manufacturing process.

Licensing policy of the Government while encouraging indigenisation, should infuse in the consumers' interest that such an indigenisation programme should be implemented for major products.

Further, licensing and registration procedures should be such as to facilitate transfer of technology from abroad, and not to impede the same.

In order to encourage indigenous production of technological grade pesticides as well as to maintain reasonable prices, a flexible tariff mechanism coupled with cost-effective measures, phased indigenisation programme will have to be followed in tandem. Market intervention by the Government wherever necessary should only be the last resource to maintain prices at reasonable levels but subsidies of any kind should not be resorted to.

12.9 Methods of sampling and analysis for adequate effluent control by Wahyono Hadi and Farid Effendi, Indonesia

An appropriate environmental management is known to be an important point in the sustainable development to fulfil the needs of present and future generations.

One of the technical aspects of the environmental management is the industrial waste water monitoring by the plant operation manager for a better effluent control or by competent institution for an environmental management.

Another aspect of the environmental management is river water monitoring intended for investigation the conformity of the Governor Decree No. 413/1987 and investigating the assimilative capacity of the receiving water.

12.10 Safety and Waste Management in laboratory and pilot scale operation, by Secretariat of UNIDO, Vienna

The paper dealt with awareness, responsibilities to be cultivated both at the management and the shop floor levels. The safety measures to be taken at laboratory and pilot scale operations were elaborated and how simple management techniques could reduce major portion of the waste generated. It also covered the concern being raised on many so called 'inerts' used in pesticides and Concern on Substances Hazardous to Health (COSHH) and two video pictures prepared by ICI were shown. A proposal was made to follow uniform Material Data Sheet for RENPAP countries.

12.11 Pesticide Data Collection, Work of CIRAD (France) by Mr. Deuse

The speaker explained the work carried out by CIRAD organization in the area of data collection and the main centre with all computer data storage retrieval facilities available at Montpellier which could be used worldwide. He also explained the various data available on their mainframe on pesticides and how it is being made available to developing countries in Asia and Africa and proposed certain areas where collaboration between RENPAP and CIRAD are possible. He also displayed various documents published by CIRAD.

**AGENDA OF
TRAINING/WHORKSHOP ON INDUSTRIAL SAFETY RELATED TO
ENVIRONMENTAL PROTECTION AND EFFLUENT CONTROL
IN PESTICIDE INDUSTRY**

Surabaya, December, 10 - 14, 1990

Sunday, December 9, 1990

- All Participants are kindly requested arrive at Surabaya.

Day - 1 Monday - December 10, 1990

- 08.30 - 09.00 - Registration of Participants.
- 09.00 - 10.00 - Inaugural Session :
 - Welcome address by Ms. Sri Ambar Suryosunarko.
 - Address by Regional Coordinator of RENPAP. (Dr. S.P. Dhua)
 - Address by UNIDO Representative Jakarta
 - Address by UNIDO Representative Vienna
 - Inaugural address by Director General of Basic Chemical Industry, Ministry of Industry; followed by official Opening of the training/whorkshop.
- 10.00 - 10.30 - B r e a k
- 10.30 - 12.00 - Election of chair person/appointment of rapporteur.
 - Adoption of agenda.
 - Presentation of Country Pappers.
- 12.00 - 13.00 - L u n c h
- 13.00 - 17.00 - Presentation of Country Papers.

Day - 2, Tuesday, December 11

- 08.30 - 10.00 - Lecture on Effluent Control In Pesticides Industry at Petrokimia Gresik and Petrosida Gresik.
 - Handling, safety and Monitoring of Effluent by Petrokimia Gresik.
- 10.00 - 10.30 - B r e a k
- 10.30 - 12.00 - Lecture by the Representative of Ministry of State for populations and Environment Mr. Nabil Makarim

- 12.00 – 13.30 – Lunch
- 13.30 -- – Plant Visit

Day -3, Wednesday, December 12

- 08.30 – 10.00 – Lecture on pesticides manufactures waste water treatment, effluent regulations, pollution prevention by UNIDO consultant (Mr. Jett)
- 10.00 – 10.30 – Break
- 10.30 – 12.30 : Lecture on worker safety; improved analitical methods and water quality criteria by UNIDO consultant (Mr. Jett)
 - Video
- 12.30 – 13.30 – Lunch
- 13.30 – 15.00 – Environment aspect of Pesticide Production by Petrokimia Gresik, and other paper by ICI
- 15.00 – 15.30 – Break
- 15.30 – 17.00 – Lecture on Handling, Safety and Monitoring of Effluent by UNIDO expert *

Day - 4, Thursday, December 13

- 08.30 – 10.00 – Industrial Policies Related to Safety by Mr. Mathur (India)
 - Video
- 10.00 – 10.30 – Break
- 10.30 – 12.00 – Lecture on Methods of Sampling and Analysis for Adequate Effluent Control by "Institute of Tecnology Sepuluh November Surabaya"
- 12.00 – 13.00 – Lunch
- 13.00 – – Free

Day - 5, Friday, December 14

- 08.30 – 10.00 – Waste Management in laboratory and Pilot Scale Operations by Senior Industrial Development Officer, UNIDO, Vienna
- 10.00 – 11.00 – Follow up of the Seminar on November 28, 1988 in Jakarta (Implementation of Recomendation).
- 11.00 – 13.30 – Lunch
- 13.30 – 15.00 – Other Bussiness and Adoption of Report.
- 15.00 – 15.30 – Break
- 15.30 – 16.00 – Distribution of Certificates
 - Closing Ceremony

* Talks were given by Mr. Dhua of REMPAP and by Mr. Deuse of CIRAD on Datacollection.

ANNEX 2

LIST OF PARTICIPANTS

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ANNEX 3

Some major concerns of Policy Makers.

1. Concern with safety in manufacture and use of pesticides.
2. Concern with environmental degradation and pollution that manufacture and application of pesticides may result in.
3. Concern with conservation of hard currency and to that extent restrictions on import.
4. Concern with self-reliance in industry in general and pesticide industry in particular.
5. Concern with making available to the farmers all agricultural inputs including pesticides at reasonable prices.

ANNEX 4

Objectives

1. To focus Research and Development for developing pesticides which entail a minimum load on environment.
2. To develop indigenous technology for the manufacture of pesticide within the country and to facilitate transfer and upgradation of such a technology from out side.
3. To achieve a high degree of self-reliance in the manufacture of pesticide.
4. While developing self-reliance in the industry, to simultaneously ensure that the price of pesticide are kept at reasonable levels. In other words, to aim at cost-effective indigenisation of the industry and market intervention wherever necessary to ensure reasonable prices.

ANNEX 5

UNIDO COMMENTS

The report giving examples of the workshop on Industrial Safety related to environment protection and effluent control in pesticide industry is major step in the realization of the problems faced by many Asian countries in the production of hazardous substances.

The participants in the workshop have made a number of recommendations which will have to be followed either by using local funds, national IPF or Regional IPF.

Within the framework of RENPAP, Indonesia as Technical co-ordinator for environmental safety/effluent control in pesticide industry will be able to provide more technical expertise once the National Pesticide Development Centre is established.

Some of the papers presented in the workshop have already been published in the latest RENPAP Gazelte Vo.1, No.2, 1991.

The workshop also enabled the participants to visit a biological treatment plant in a pesticide production plant. The workshop also for the first time gave the opportunity to make use of local expertise in organizing various activities of the including presentations of some of the leading papers.