Chemical Disasters

Need for improved safety measures

From the European Regional Programme on Chemical Safety
World Health Organization

The accidental release of methyl isocyanate in Bhopal, India, resulting in more than 2,500 deaths, has tragically highlighted the urgent need for every country to develop adequate response systems for dealing with chemical emergencies. With the ever-increasing volume of chemicals being extracted, manufactured, transported, stored, used or disposed of as wastes, it is inevitable that such accidents will happen with increased frequency all over the world.

The ways in which countries deal with accidents in general are highly variable and reflect differences in governmental structure, culture and history. Most countries have some sort of emergency response system or set of systems for traditional accidents However, the accidental release of toxic chemicals adds a requirement for information and expertise for which most emergency response systems are not prepared.

Any emergency response system is designed to reduce the impact of an accident by rapid containment. In the case of toxic chemical accidents, it is also necessary to know the nature of the chemicals, how to deal with them, the toxic, physical and chemical properties of the materials and the level of risk tact, both for the emergency crews and the adjacent population. In this manner, an accident involving the release of potentially toxic or hazardous chemicals is different from other emergencies (traffic accident, fire, train derailment, etc.).

Chemical emergencies may arise in a number of ways. Some of the more important types are as follows:

- disaster/explosion in a plant handling or producing potentially toxic substances;
- accidents in storage facilities handling large quantities of various chemicals;
- accidents during the transportation of chemicals;
- misuse of chemicals, resulting in contamination of foodstuff, the environment, overdosing of agrochemicals, etc ;
- improper waste management, such as uncontrolled dumping of toxic chemicals, failure in waste management systems or accidents in wastewater treatment plants.

Emergency Response Systems

Main objectives of emergency response systems

Accidents can occur in any industry and in almost any activity in spite of efforts to prevent them. In particular, those industries or activities dealing with toxic chemicals have a high potential for loss or damage

The main subject of an emergency response system is to minimize any possible adverse impacts of accidents on people, environment and property. This requires the establishment of a system which makes optimum use of all available resources for speedy containment of the incident, protecting the health and safety of the people, both nearby residents and workers, as well as minimizing damage to the environment and property. The emergency response system must also provide adequate and accurate information to all relevant auth-

public and provide ultimately for the safe rehabilitation of affected areas.

Systemic approach to the establishment of emergency response systems

If the contingency plan is to provide the expected results, i.e. significantly minimize the adverse impacts of the accidents, its development cannot be undertaken on an *ad hoc* basis, considering only selected parts of processes, operations or areas. Contingency planning should be a continuous activity, taking into account previous experience and both the present as well as future state of the industrial systems. This involves changing the emergency response system as changes occur in the processes, operations, products, plants and areas. The emergency response system must reflect the actual conditions, limitations and resources as they exist at any given time.

The responsibility for contingency planning should rest upon an individual with assistance and advice from a committee established for that purpose. The final responsibility, however, should be clearly defined. The development of a comprehensive emergency response system should not imply that people responsible for planning this system should necessarily also operate the system.

The variety of operations, where an emergency could occur, is infinite. In each case, however, the system and its subsystems should be defined and possible synergistic effects investigated. This will provide a clearer picture of the probable impacts and consequences of potential accidents and provide a better basis for an emergency response system.

A comprehensive systems approach to the development of an emergency response system requires a process of contingency planning, including the following steps:

Mass exodus of frightened Bhopal residents on the eve of official efforts to neutralize the poisonous gas.

- points, processes and/or activities;
- Estimation of possible chemical emissions;
- Knowledge of effects of toxic chemicals;
- Knowledge of possible protective and remedial measures;
- Designation of responsibilities;
- Preparation of plan for action;
- Establishment of the liaison with external authorities;
- Resources for handling the emergency;
- Communication.

Structure and elements of emergency response systems

It is necessary to establish at each level of the country-wide structure a "focal point"[1] to coordinate emergency response activities within the relevant area under their responsibility. The person named as the focal point shall also be responsible to process, transmit and receive all necessary information to the public administration and to the public and to facilitate the speedy provision of all necessary help.

While differing in particulars, depending on the scope of the emergency, the response systems should include the following elements:

- The alert system,
- Evaluation of situation, classification of the accident;
- Decision and alerting of the emergency response systems,
- Provision of information;
- Provision of external help;
- Decision on, and implemen-

[1] The function of a focal point at operator level is often carried out by the "safety officer"