CONTENTS

2 ESTABLISHMENT OF A REHABILITATION TASK FORCE

2.1 Introduction

2.1.1 Need for a Rehabilitation Task Force

The range of chemical accidents addressed by this manual is broad, including both chronic releases such as the leaching of hazardous waste sites and short-term, episodic events such as chemical spills or fires. The essential point of similarity is that these accidents cause in environmental contamination or natural resource damage to which a response is required.

This response can be divided into two major phases: - a short-term emergency response action and a longer term rehabilitation programme. In the emergency response phase the role of the initial response agencies is typically characterised by clear, well-defined responsibilities, for example spill containment, fire-fighting, etc. In contrast, a broader range of issues may have to be addressed to establish the most appropriate strategy for rehabilitation. Such issues include the extent of clean-up of environmental contamination required, the most cost-effective method to be used and how such rehabilitation should be funded, to mention but a few examples. The consideration of these types of issue at a pre-planning stage defines the need for a rehabilitation task force. In this way the necessary resources and organisational structure can be achieved rapidly in the event that a chemical accident occurs.

2.1.2 Purpose of Rehabilitation Task Force

The purpose of the rehabilitation task force, therefore, is to provide a coordinating role in rehabilitation of chemical accidents. Three major roles for the task force can be defined:

- assessment of rehabilitation needs;
- implementation of the rehabilitation plan; and
- the transfer and storage of information on the conduct of the rehabilitation programme.

Of these, the assessment of rehabilitation needs culminating in the development of an action plan is perhaps the most fundamental.

2.1.3 Objectives

The objectives of this chapter are to address how a rehabilitation task force should be structured and how it should function. In particular, consideration is given to the following three aspects:

- responsibilities of the task force;
- organisation and resources; and
- financing and budget control.

Clearly, no single approach is appropriate to all situations. The rehabilitation task force can be envisaged as functioning on several different levels depending upon the magnitude of the chemical accident, i.e. from international and national to regional and local levels. For the purposes of this manual our emphasis is on the international and national levels. In the following sections we examine alternative approaches are discussed and examples provided where appropriate.

2.2 Responsibilities of Task Force

2.2.1 Definition of Responsibilities

For the task force to be able to function in a timely and efficient manner, its responsibilities must be defined clearly in a planning document. For example, in the United States the National Oil and Hazardous Substances Contingency Plan (Fed. Reg., 1982) has identified three fundamental kinds of activity performed pursuant to the plan: planning and coordination, operations at the scene of a chemical accident and communications. These activities correspond broadly with the three major responsibilities for the task force defined in Section 2.1.2. Not only must these responsibilities be defined at the national level, but the responsibilities of regional and local response organisations should also be spelled out.

2.2.2 Assessment of Rehabilitation Needs

The purpose of an assessment of rehabilitation needs is to form the basis for rehabilitation plan. The following steps are envisaged as part of the assessment and are elaborated upon in Chapter 3 of this manual.

- Initial assessment.
- Data collection and site investigation.
- Assessment of health risk and damage to national resources.
- Development of a prefered rehabilitation strategy.

2.2.3 Design and Implementation of a Rehabilitation Plan

Once a rehabilitation plan has been developed, the next stage is to proceed to the detailed design and implementation of the plan. A number of discrete steps can be envisaged in the design and implementation phase.

The detailed design of the plan components including:

- specifications of equipment and materials;
- timing of work phases;
- identification of resources necessary; and
- preparation of cost estimates.

- Commissioning remedial works to qualified organisations.

- Operational coordination and review of progress.

- Monitoring of remedial works and adjustment of plan if necessary.

The management of each of these steps is a key responsibility of the rehabilitation task force.

2.2.4 Information Transfer and Storage

The task force must fulfil three roles in the transfer and storage of information.

- Dissemination of information on the progress of the rehabilitation both to organisations within the task force and to external authorities who may become involved.

- Provision of information to the public and to the media.

- Documentation of the rehabilitation action.

Documentation is particularly important both for legal reasons in the establishing of liability and cost recovery should this be necessary, and also for scientific reasons to provide a better understanding of the appropriate rehabilitation methods.

2.3 Organisation and Resources

2.3.1 Structure of Task Force

The structure of a rehabilitation task force will depend on the nature and magnitude of the chemical accident involved. A number of basic principles, however, can be established for determining the most appropriate structure.

- A lead rehabilitation agency must be designated. Whether a national, regional or local agency is chosen will depend very much on the magnitude of the accident. To avoid protracted negotiation the lead agency at each level of government should be pre-designated, and changed only on an exception basis when the characteristics of the accident indicate some other type of expertise is more appropriate.

- In order to maintain a manageable committee size for decision-making purposes, the number of participants directly involved in the task force should be kept to a minimum. This does not preclude, however, the task force having access to a larger number of groups or individuals outside the task force.

- Government agencies represented on the task force must include the following discipline areas:

- public health;
- environmental protection;
- fisheries and wildlife;
- natural resources;
- agriculture;
- emergency management; and
- occupational health.

o To facilitate effective communication among the members of the task force, it is important that training exercises are held to establish working relationships.

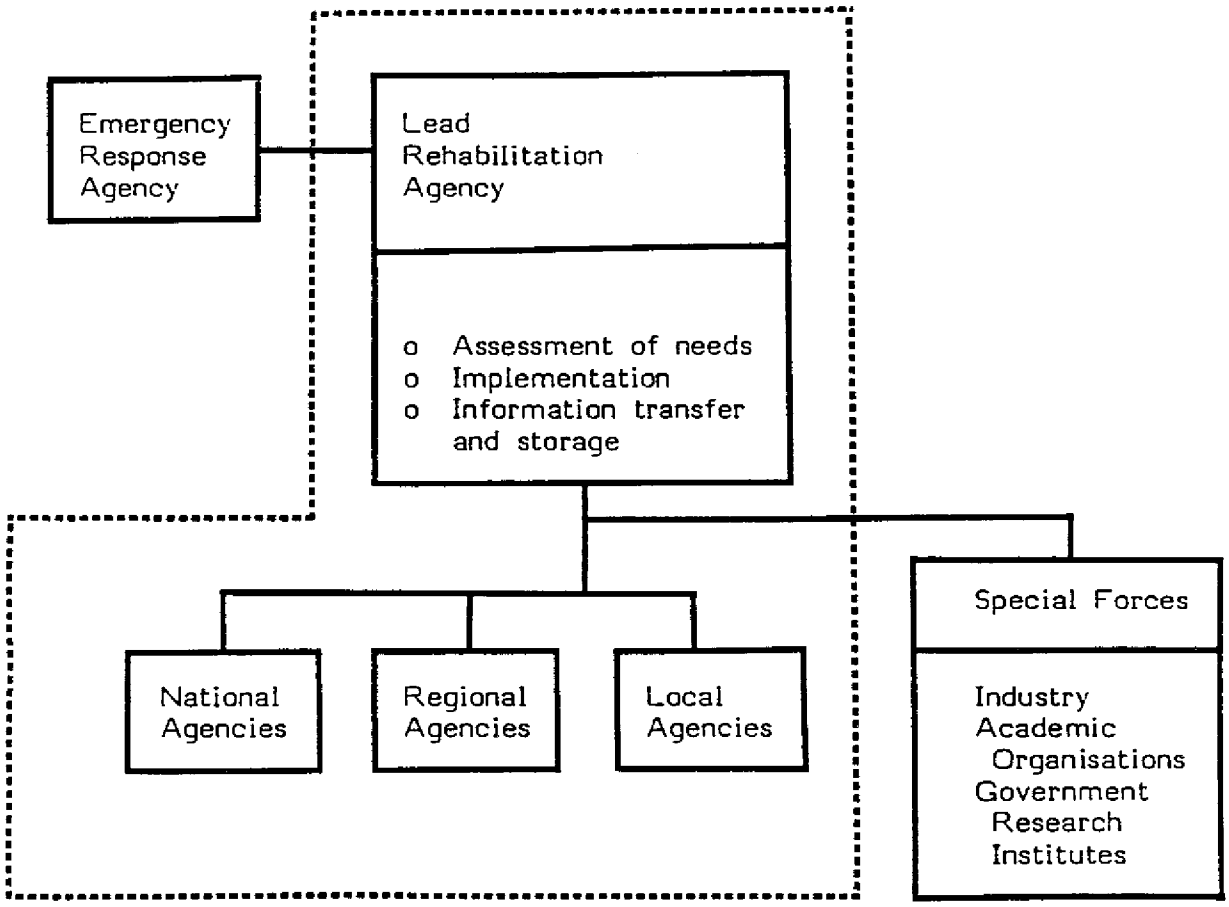
A possible task force structure that embodies these principles is presented in Figure 2.1. The organisations within the dotted outline constitute the task force members, while other organisations outside the dotted outline would be available in a supporting role if required.

One difficulty sometimes experienced in chemical accident rehabilitation arises from the organisational structure of the agencies involved. For example, the lead agency of a rehabilitation task force may be an essentially single-discipline group whose main function is water resources or fire control, whereas, in many incidents, a chemical discharge poses a multi-media environmental problem. To address this problem, some government agencies have adopted a more integrated approach to chemical accidents, so that chemical accident rehabilitation expertise for a range of accidents from spills and fires to uncontrolled waste sites is combined in a single administrative unit. It has been suggested that this is an effective way of assembling the necessary range of specialists required, e.g. chemists, toxicologists health, explosives experts, waste disposal specialists, etc in such a way as to avoid duplication of resources and to improve organisation and communications.

2.3.2 Coordination with Other Groups

The initial response to most chemical accidents is usually handled by a local or regional emergency response agency when a rehabilitation task force becomes involved, the first relationship that has to be managed, therefore, is that between the local or regional authorities and those agencies with a higher level of authority or a broader mandate (see Figure 2.1). Information learned from the emergency response should not be lost during the transfer of responsibilities from the emergency response officials to the rehabilitation agency. Unless the situation warrants otherwise, the manager of the lead rehabilitation agency should attempt to integrate his operations with that of the local authorities, recognising the need for continuity. One way this can be accomplished is through a "cabinet-style" planning group for the task force structure.

Figure 2.1
Possible Structure for a Rehabilitation Task Force



Notes:

1. Organisations within dotted outline constitute task force members.

2. Lead rehabilitation agency may be at national, regional or local level depending on nature of accident.

In addition to the emergency response agencies, it is important that the task force also establishes links with other types of organisation that may be of assistance in the rehabilitation process. This linkage with other types of organisations or "special forces" is shown in Figure 2.1, and examples of their possible roles are outlined below.

- Industrial organisations such as chemical manufacturers or trade associations are often able to provide experts who may be the most knowledgable individuals on the properties of particular chemicals.

- Academic organisations and research institutes may play an important role in providing scientific information for the development of the rehabilitation plan.

- Finally, government research and development organisations can provide not only advice on rehabilitation strategies, but may also be able to provide equipment and materials. For example in the United States, the Environmental Protection Agency's, Environmental Emergency Response Unit is engaged in the shakedown and field demonstration of prototype equipment for chemical accident rehabilitation. This equipment can be made available for operational purposes when required.

2.3.3 Resources

In developing a rehabilitation plan, the task force will have to decide on the resources required. These can be grouped into three categories: staff; equipment; and contracted services.

It is desirable to have rapid access to these resources. This can be expedited by a number of pre-planning measures.

- Access to the appropriate staff can be expedited by existing relationships with the appropriate agencies.

- The use of equipment can be expedited if an existing inventory of such equipment exists (for example, the US EPA has a spill clean-up inventory system designed to provide information on the location of response and support equipment).

- The selection of contractors can be speeded up by the use of a pre-qualification process, whereby a short-list of organisations suitable for various types of chemical accident rehabilitation is prepared.

The types of resources required for accident rehabilitation will depend on the nature of the accident and the resulting impacts. For the purposes of this manual it is helpful to define two broad categories of impact: human health effects and natural resource damage.

(a) **Human health impacts**

Human health impacts can be considered in two groups: those situations for which exposure to toxic chemicals is known to have occurred and those situations where exposure is threatened.

- In the first situation the emphasis of the rehabilitation task force would be on post-emergency health treatment.
- A public health agency perhaps assisted by personnel from other medical facilities would play a major role in the rehabilitation programme. Some form of systematic clinical and epidemiological study on the effects of exposure on the local population might be carried out during the post-emergency stage.
- In the case of threatened exposure a different type of expertise would be required. Environmental scientists and engineers would play a critical role in predicting the magnitude and time-scale of exposure as well as the potential effects of the chemicals involved.

(b) **Natural resource damage**

Natural resource damage can clearly cover a broad range of situations, for example the pollution of surface and groundwaters, damage to fisheries, crops or forests. As is a case for human health impacts, expertise must be available to predict both the magnitude and duration of the environmental exposure as well as the nature of the damage or pollution. A broad range of government agencies must be available to provide the expertise necessary depending on the nature of the accident (see 2.3.1).

2.3.4 Examples of Organisational Structures

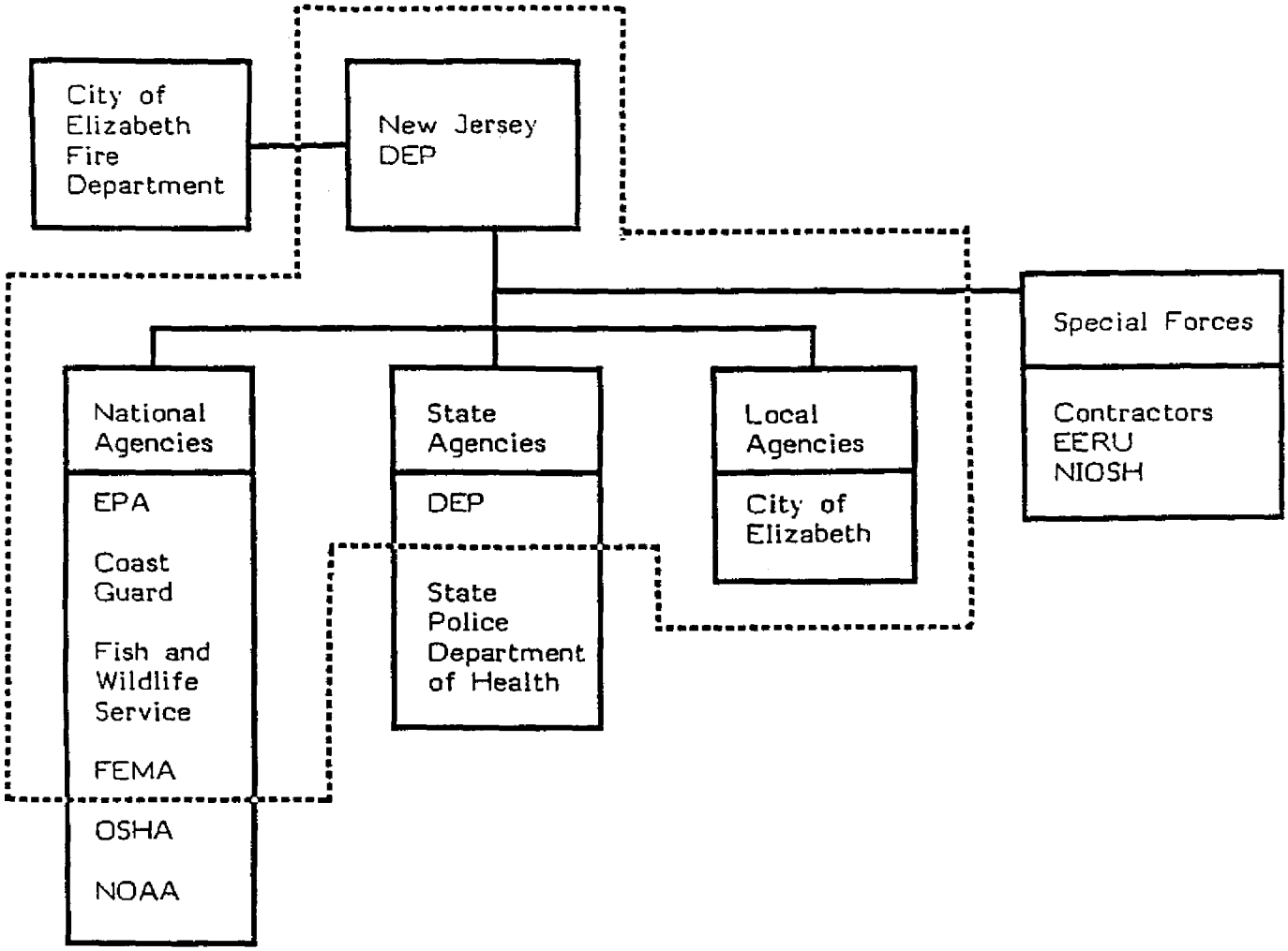
As described above, the task force structure for rehabilitation of chemical accidents will be specific to the type of accident involved. To provide some practical examples of how such task forces have been formed, in Annex 2A we have provided a brief case history of the rehabilitation programme for the Chemical Control Corporation site in Elizabeth, New Jersey (Scott, 1981). In 1981 a fire occurred at a chemical waste storage site in New Jersey. Following the emergency response to the fire itself, a major rehabilitation effort was mounted to clean up the site, the adjacent river and the local groundwater system. The structure of the rehabilitation task force employed, in this case the Regional Responce Team is shown in Figure 2.2

2.4 Financing and Budget Control

2.4.1 Financing Mechanisms

A pre-requisite for government involvement in rehabilitation of chemical accidents is a means of financing the rehabilitation work. Two broad financial mechanisms can be identified: recovery of funds from responsible parties; and establishing of a general fund for accident rehabilitation.

Figure 2.2
Rehabilitation Task Force for Chemical Control Fire, Elizabeth, New Jersey



Notes:

1. Dotted line denotes Regional Response Team.

2. Abbreviations
   - DEP: Department of Environmental Protection
   - EPA: Environmental Protection Agency
   - FEMA: Federal Emergency Management Administration
   - OSHA: Occupational Safety and Health Administration
   - NOAA: National Oceanic and Atmospheric Administration
   - EERU: Environmental Emergency Response Unit
   - NIOSH: National Institute of Occupational Safety and Health

(a) **Recovery of funds from responsible parties**

For recovery of funds from responsible parties to be an effective financing mechanism, there needs to be a clear legislative framework for determining liability. Historically, ambiguities and loop-holes in legislation have made it difficult for such financing mechanisms to work effectively. For example, the so-called "revolving fund" established under the Clean Water Act in the United States was limited to discharges of oil and specifically designated hazardous materials to surface waters and adjoining coast lines. This led to difficulties in applying the provisions of the Act in spite of obviously serious, environmental or public health problems from non-designated hazardous material spills.

(b) **Establishing of a general fund**

Perhaps, the most well-known general fund for chemical accident rehabilitation is the Hazardous Substance Response Trust Fund (commonly referred to as Superfund) in the United States, which provides funding for studies of hazardous substance releases to the environment, and the development and implementation of rehabilitation actions. The focus of Superfund has tended to be on hazardous wastes site clean-up. In financing a Superfund-type programme, three principle sources of funds can be considered: a chemical feedstock tax, waste-end tax, general tax revenues, or some combination of all three (Office of Technology Assessment, 1985). At this time, these types of approach, however, have not been adopted in any European countries

2.4.2 Budgeting

Finally, while a financing mechanism ensures that funds are available for accident rehabilitation, it is also important that a mechanism exists for allocation of budgets to specific rehabilitation actions.

The rehabilitation of chemical accident sites, particularly in the case of human victims, is an area of special public concern that should not be encumbered by bureaucratic and time-consuming procedures. It is therefore important that a stream-lined approach is developed to permit the release of funds in an expeditious manner.

It is recommended that budget control guidelines be established as a part of a rehabilitation plan. These guidelines should define criteria for release of funds for specific purposes and indicate clearly the individuals who are responsible for authorising funding at different levels of expenditure.

REFERENCES TO CHAPTER 2

Federal Register (July 16, 1982). National Oil and Hazardous Substances Contingency Plan 47,(137), 31180.

Scott, M.P. (1981). Study on the Hazardous Materials Spills Situation in Michigan and New Jersey with Reference to the Canadian Situation. Prepared by M M Dillon Ltd for Environment Canada.

Office of Technology Assessment (Congress of the United States) (1985). Superfund Strategy.

ANNEX 2A

CASE STUDY: FIRE AT CHEMICAL CONTROL CORPORATION, ELIZABETH, NEW JERSEY

(Abstracted from Study on the Hazardous Materials Spills Situation in Michigan and New Jersey with Reference to the Canadian Situation (Scott, 1981))

The Chemical Control Corporation fire occurred at a chemical waste storage facility in Elizabeth, New Jersey. The facility was located on a three acre site, which fronts onto the Elizabeth River on one side and onto the Arthur Kill, a shipping channel to New York, on the other.

Prior to the fire, the facility had been closed down at the request of the New Jersey Department of Environmentap Protection (DEP). Investigations by the Department discovered that the site housed some 60,000 drums of petroleum and chemical wastes, many deteriorated and leaking, literally jammed on the property. Also in the loft area of the main building were 800 laboratory-pack drums holding samples of various chemicals, explosives, radioactive and etiological agents. The facility was subsequently placed in receivership in February 1979, after the owners had failed to clean up the site, and a major clean-up effort was mounted by the DEP.

By April 1980, some 9,000 drums of chemicals had been removed along with some of the most hazardous materials, including 500 pounds of explosives, 7 pounds of radioactive materials and 83 compressed gas cylinders. The situation, however, was changed dramatically on the night of 21 April 1980 when a fire broke out at the site with multiple explosions.

The exact sequence of notification is not clear but the Elizabeth Fire Department, the Coast Guard, Captain of the Port, New York, DEP and EPA Region II Office were promptly notified of the situation.

Because of their current involvement with the facility at the time of incident, the DEP were able to respond rapidly and assist the Fire Department with their detailed knowledge of the chemicals on the site. Air sampling stations were also set up to respond to the threat from the large cloud of smoke and vapour generated by the fire. An EPA helicopter flying 1,500 feet about the site quickly made measurements of benzene, toluene, xylenes and ethylene dichloride and found levels of less than 1 ppm. It was fortunate that a lot of the most hazardous materials had already been removed, and the high flame temperature of the fire and good meteorological conditions for dispersion, apparently combined to reduce the severity of effects on air quality.

Through the efforts of the **Elizabeth Fire Department,** the fire was contained to the centre of the site and had been brought under control by the next day, although "hot spots" requiring attention would remain for some time. All the buildings on the site had been reduced to burnt-out shells and many of the chemicals in the centre of the fire had been completely destroyed. Drums at the periphery of the site however had either been left intact or had been over-pressurised and burst by the heat of the fire.

The following day, a meeting of the Regional Response Team was convened including:

- **City of Elizabeth**
- **New Jersey Department of Environmental Protection**
- EPA
- **Coast Guard**
- **Fish and Wildlife Service**
- **Federal Emergency Management Administration**

The Captain of the Port, New York (Coast Guard) was the designated federal on-scene-coordinator (OSC). It was decided by the meeting however, that the DEP would act as the lead agency for control of site clean-up, because of its familiarity with the site and expertise in chemical handling. Since the fire had resulted in a discharge to a navigable water, federal clean-up funds were authorised from the "revolving" fund (under Section 311 of the Clean Water Act) with the State effectively acting as an agent for the Coast Guard.

The following immediate steps to protect public health were decided upon.

- o Fishing bans to be posted for the affected areas.
- o All floating drums to be secured. A contractor was engaged to provide boats and set up a boom.
- o Programs to be initiated to assess the health consequences of those affected by the fire. A telephone line was set up by the **New Jersey Department of Health** to receive reports of any chemically-related illnesses. The **National Institute of Occupational Safety and Health** was also requested to carry out medical examinations on the fire fighters who in general were not properly equipped for a chemical fire.

Initial clean-up was then directed at two areas: the testing of air, water, soil and exposed surfaces on- and off-site to determine levels of contamination; and the immediate stabilisation of the drums in the Elizabeth River bank.

During the clean-up activities, Fire Department personnel remained on-scene and a Coast Guard fire boat was standing by to deal with smouldering debris and the localised "hot spots" which remained. Site security was provided by the **City Police** assisted by a team of State Police specially trained for chemical incidents. (The **New Jersey State Police** maintain a number of Technical Emergency and Management Specialists (TEAMS) at strategic locations throughout the State.)

The response activities were coordinated through regular meetings of the Regional Response Team, and a programme was developed for clean-up of the site.

To carry out this programme, safety standards were developed by the State's occupational health experts and representatives of the **Occupational Safety and Health Administration** (OSHA). Based on air sampling results, three areas were defined in the vicinity of the site:

- clean: no breathing device required;
- warm: vapour mask required; and
- hot: self-contained breathing apparatus required

and all personnel were obliged to comply with these requirements. This later led to a dispute with one of the contractors, which was subsequently replaced.

Three main **clean-up contractors** were engaged in carrying out the site clean-up.

The clean-up programme proceeded by first removing drums from the site to the staging area in such a way as to clear a path to the river bank and then along the river bank. This procedure was adopted to allow the construction of the containment berm, which was completed some six weeks after the incident.

Thereafter, the batching and bulking of compatible chemicals and contaminated materials was carried out prior to their removal for disposal. It is estimated that approximately 60 million pounds of debris and contaminated soil, and 50,000 crushed drums were removed. In addition, more than one million gallons of contaminated water were treated using the mobile activated carbon treatment system provided by the **EPA's Environmental Emergency Response Unit** (EERU). The treated water was then discharged to the Arthur Kill.

Attempts were made by the **National Oceanic and Atmospheric Administration** (NOAA) to locate drums sunk in the Elizabeth River by conducting an underwater survey using side-scan sonar. These attempts were unsuccessful apparently because of the shallow depth of the river. A microwave bottom survey was subsequently carried out with more success and the drums removed.

It might be thought that this concluded the clean-up operation, but further studies by the DEP went on to identify a serious groundwater contamination concern. Moreover, it became apparent that there was a significant discharge of contaminated groundwater into the Elizabeth River. This qualified any further clean-up activity for federal assistance from the "revolving" fund which would otherwise not have been available for groundwater cleanup.

The solution adopted for groundwater cleanup was to use a recovery system to lower the groundwater table on-site below the river level and so abate the leaching. The recovered groundwater was treated to remove the pollutants and the treated water reinjected to the aquifer.

In summary, the incident provides a good example of an emergency posing severe environmental and public health risks. A complex response procedure was required involving federal, state and municipal responders working together in a coordinated rehabilitation task force.