

EMERGENCY PLANNING: THE LESSONS FROM RECENT MAJOR ACCIDENTS

R D Picken, HM Inspector of Health and Safety
Chemical and Hazardous Installations Division

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The UK strategy for dealing with the risks of major accidents involves their prevention at source and the mitigation of those that occur. A vital factor in mitigating the consequences of major accidents is emergency planning.

There are lessons to be learnt from the experience of recent major accidents in the UK in terms of the information needs of the emergency services and the public which lives and works around major hazard sites. Moreover the Seveso II Directive which the UK has to implement in 1999 specifically requires such considerations to be taken into account in drawing up both onsite and offsite emergency plans.

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Introduction

There are currently nearly 290 sites to which Regulations 7-12 of the Control of Industrial Major Accident Hazards Regs 1984 (CIMAH) apply. They include major chemical complexes, gas holders, mixed chemical warehouses, timber treatment sites using copper chrome arsenate as well as a miscellany of chemical processing factories. The requirements to which such sites are subject include the preparation of a safety report, the provision of information to the public, the preparation of an on site emergency plan by the manufacturer and an off site emergency plan by the local authority.

This paper focuses on onsite and offsite emergency plans and its thrust is the importance of learning the lessons evident from the hard experience of recent major accidents in the UK. All have produced valuable lessons for emergency planning. Moreover the Seveso II Directive spells out in greater detail the criteria that emergency plans should meet, introduces a new requirement for plans to be tested, reinforces those lessons and presents a greater challenge to emergency planners.

Legal Requirements

On and off site emergency plans are required by Regulations 10 and 11 of CIMAH. The requirements accept that although steps should be taken to ensure so far as is reasonably practicable that major accidents do not occur, such eventualities remain a possibility and thus

pre-planning is necessary beforehand to enable site personnel, the emergency services, and the public to know what action to take should one occur.

It is important to appreciate that preventive measures and emergency planning are not alternatives. Emergency planning is not a substitute for proper process/plant control. If there are frequent incidents on site the answer is not to refine emergency plans but to review the fundamental risk assessments on which the safety of the process plant is based and where necessary improve process controls. Nevertheless even on the best regulated sites, things can go wrong and there should be procedures to cater for these circumstances and to prevent relatively minor incidents escalating into a major accident.

The legal requirements are straightforward. Firstly they prescribe a procedure to be followed by both manufacturer and local authority in drawing up an emergency plan. Plans should only be prepared after consultation with appropriate personnel or bodies. For the manufacturer, these may include the emergency services, HSE, local authorities and employees. For local authorities this will include the manufacturer, HSE and other appropriate bodies, normally the emergency services, and (where the plant presents an environmental risk, relevant bodies charged with the protection of the environment). The salient point is that both onsite and offsite plans should complement each other.

Secondly emergency plans should be regarded as organic documents and should be kept up-to-date. For example changes of managerial structure or changes of personnel necessitate amendments to plans. Most inspectors can quote examples of emergency plans which referred to people who no longer worked at the premises or to posts and positions which did not exist following re-organisation etc. Moreover the plans should take account of developments in technology/toxicology and of experience gained through tests or responses on incidents. Changes in toxicological knowledge may indicate that a dangerous substance is more harmful than was originally thought. Emergency plans require reviews to determine the impact of these changes.

Thirdly plans should name those with particular responsibilities for handling the emergency so as to avoid ambiguity and confusion in their implementation.

Fourthly those at risk ie on site personnel or the public off site must be aware of the steps they should take to protect themselves and others in the event of a major accident. Employees should be trained and drilled so that they know what to do should an accident occur. Regulation 12 and Schedule 8 of CIMAH require companies to inform members of the public who live and work around their site about possible major accidents and what to do should one occur. Moreover the advice should be repeated and renewed on a regular basis. (HSE recommends every one or two years).

CIMAH therefore requires emergency plans to result from full consultation, possession of adequate knowledge, an exchange of information between the manufacturer and emergency services and that those likely to be at risk be provided with basic precautionary information.

Although the procedure for preparing a plan is prescribed, the format and the level of detail is left to the planners subject to the proviso that the final plans are adequate. HSE accept that it

is impossible to foresee every eventuality, every twist and turn that could occur during a major accident. The multiplicity of potential scenarios, militate against this. To attempt to cover all possible situations in detail would result in plans being unwieldy and more hindrance than help. Moreover there would be the risk that they became a straightjacket and removed the flexibility of response which is required in an emergency. In any emergency decisions are taken based on the expertise and professionalism of the emergency services rather than reference to the "master" plan.

That is not to say however that emergency plans are incapable of improvement. Or that the fact that they could be improved means that the original plan was inadequate. Reviewing emergency arrangements after an accident or a drill is a common-sense way of reviewing procedures and such reviews are part and parcel of modern practice for any management discipline. It is for this reason that reviews and tests are carried out. However plans involve people who in emergencies often react unpredictably. That very unpredictability may require changes to procedures which, when they were originally considered in a reasoned and calm way, seemed fully adequate.

Recent Major Accidents

It is appropriate therefore to look at recent major accidents to determine what lessons they hold for emergency planners. The accidents considered are:

- a) the release of chemicals from International Biosynthetics 5 Ltd on 7 December 1991.
- b) the fire at Allied Colliods Ltd on 21 July 1992.
- c) the fire at Hickson and Welch Ltd on 21 September 1992.
- d) the chemical release and fire at the Associated Octel Company Ltd on 1 and 2 February 1994.

In all cases both on site and off site emergency plans were activated. The lessons to be learnt encompass.

- a) the information needs of the emergency services; and
- b) the information needs of the public.

Information Needs of The Emergency Services

For any emergency to be handled effectively and safely, the emergency services and in particular the fire brigade must be aware of which dangerous substances are involved and their properties. Such information facilitates informed decisions about preventive action onsite and off-site. Without it, emergency action can be severely compromised. Moreover the information has to be available before the incident rather than reliance being placed in its availability from the company during the incident. To give 3 straightforward examples where this issue caused problems.

- a) at the Associated Octel accident, the information available to the fire brigade was that the chemical involved (ethyl chloride) was toxic. Therefore when trying to locate and shut off the source of the leakage of EC, the brigade used protective clothing and respiratory protection to cope with the toxic risk. They were unaware that EC also exhibits the characteristics of a highly flammable liquid. Consequently in the early stages of the incident fire fighters were working in pools of a highly flammable liquid which thankfully was not ignited;
- b) during the Allied Colloids incident, the fire produced a dense smoke plume which drifted eastwards over populated areas causing public concern about potential environmental pollution and its likely toxicity. The company stated that the smoke was non-toxic. HSE's view was that given the cocktail of chemicals involved in the fire it was impossible to be so definite and that in all likelihood the smoke was to some extent at least toxic. Companies should assess the likely toxicity of products of combustion of foreseeable fires on site, so that considered information is available in an emergency. Had this basic information been available at the time, considerable confusion would have been avoided;
- c) during the International Biosynthetics incident a cloud of non-toxic blue vapour was released. Not all the police authorities responsible for a local major road received the information about the cloud and consequently, one carriageway was closed whilst the other retained open.

Information Needs of The Public

It is vital that if it becomes necessary to warn the public to take emergency action, the warning is given at the appropriate time. Too early, and unnecessary inconvenience and alarm may be caused; but if too late the public could be at risk. Emergency plans should allocate responsibility for raising the off site alarm and identify the criteria that should apply to prompt such action. For example at Allied Colloids the siren was only sounded half an hour after the Fire Brigade had been called. Fire officers and the company interpreted the situation differently. Yet the issue could have been discussed and resolved when the emergency plans were being drawn up.

Companies and emergency services should realise that if public concerns are not allayed, unnecessary alarm can be generated which may inhibit the effectiveness of any emergency action. Regulation 12 and Schedule 8 of CIMAH require information to be given to those members of the public who live and work around the site. Emergency planners should recognise that the spectacular nature of most major accidents means that the public who live and work outside the public information zone will be aware of the accident and be concerned for their safety. At the Associated Octel incident the emergency services were deluged with enquiries from people in towns some miles from the plant who had heard about the accident and who were (unnecessarily) worried. These concerns were aggravated by media reports that the plant was "20 minutes from Doomsday". Had reassurance been given promptly possibly over the media, a difficult situation might have been nipped in the bud.

The Seveso II Directive will throw many of these issues into sharper relief. It makes explicit much of which is only implicit in CIMAH, and makes some new requirements. It is difficult to estimate the full implications of Seveso II for companies and emergency planners. For example, the objectives to be achieved by emergency plans are spelt out ie

- to contain and control major accidents and limit their potential damage;
- to implement those precautions necessary to achieve that end;
- to give adequate information to the public, or emergency services etc;
- to provide for the restoration and clean up of the environment following a major accident.

The first 3 criteria are familiar in the existing regime and offer few problems for those who prepare emergency plans. Even though incidents may have demonstrated that some plans were deficient in certain areas, the problems have resulted from points of detail rather than from fundamental disagreement with the principles. But the fourth criterion relating to restoration and clean up of the environment is new. Guidance will be necessary for duty holders on how to meet this requirement. To fulfil this objective, planners will have to consult bodies responsible for environment safety.

Annex IV also specifies what information must be included in emergency plans. Again most will cause no problems but others are relevant to the points made earlier. For example:

- a) Onsite plans should include information about how warning will be given that an accident has occurred and about the arrangements for alerting emergency services, or
- b) Offsite plans should contain arrangements for providing the public with specific information about the accident and the behaviour it should adopt.

(The full text of Annex IV forms Appendix I).

Environmental Considerations

It is occasionally forgotten that the Seveso Directive is directed at not only major accidents to people but to the environment as well. Seveso II reinforces this point by specifying for the purposes of accident reporting what constitutes a major environmental accident, by requiring measures to be taken to clean up the environment should one occur and by specifying threshold quantities of eco-toxic substances that will trigger application of the upper tier requirements.

Coping with environmental risks involves emergency services with difficult decisions. The public immediately adjacent to the scene of the accident may not be at risk. If any members of the public are at risk, it could be those miles away who for example depend on an aquifer

for their water supply. Therefore the emergency services may have to initiate remedial action by bodies/authorities in adjacent areas to for example safeguard water supplies or to protect rivers etc. Difficult questions such as whether to fight a fire on site with water or foam, or at all, because of the risks of fire water run off have to be resolved. But whatever resolution is achieved, it should be achieved in discussions and agreement before the accident as part of the consultation process in drawing up an emergency plan.

Public Consultation

Seveso II will also extend the consultation process by requiring Local Authorities who draw up offsite plans to consult with the public. How for these purposes the "public" will be defined and what form that consultation will take, has yet to be decided. But as the recent major accidents have indicated, the public is very interested in accidents that occur on their doorstep and planners will have to address the issue of the information needs of the public.

Conclusion

Recent major accidents have therefore demonstrated that handling emergencies rarely goes smoothly. But pre-planning and learning those lessons waiting to be learnt, helps in coping as efficiently as possible with those emergencies that do occur. COMAH, with requirements for testing and its greater environmental focus will be a challenge to manufacturers and emergency services. However the challenge will have to be met if we are to deal successfully with the risks posed with top tier sites.

ANNEX IV

DATA AND INFORMATION TO BE INCLUDED IN THE EMERGENCY PLANS SPECIFIED UNDER ARTICLE 11

1. Internal emergency plans

- (a) Names or positions of persons authorised to set emergency procedures in motion and the person in charge of and co-ordinating the on-site mitigatory action.
- (b) Name or position of the person with responsibility for liaising with the authority responsible for the external emergency plan.
- (c) For foreseeable conditions or events which could be significant in bringing about a major accident, a description of the action which should be taken to control the conditions or events and to limit their consequences, including a description of the safety equipment and the resources available.
- (d) Arrangements for limiting the risks to persons on site including how warnings are to be given and the actions persons are expected to take on receipt of a warning.
- (e) Arrangements for providing early warning of the incident to the authority responsible for setting the external emergency plan in motion, the type of information which should be contained in an initial warning and the arrangements for the provision of more detailed information as it becomes available.
- (f) Arrangements for training staff in the duties they will be expected to perform, and where necessary co-ordinating this with off-site emergency services.
- (g) Arrangements for providing assistance with off-site mitigatory action.

2. External emergency plans

- (a) Names or positions of persons authorised to set emergency procedures in motion and of persons authorised to take charge of and co-ordinate off-site action.
- (b) Arrangements for receiving early warning of incidents, and alert and call-out procedures.
- (c) Arrangements for co-ordinating resources necessary to implement the external emergency plan.
- (d) Arrangements for providing assistance with on-site mitigatory action.

- (e) Arrangements for off-site mitigatory action.
- (f) Arrangements for providing the public with specific information relating to the accident and the behaviour which it should adopt.
- (g) Arrangements for the provision of information to the emergency services of other Member States in the event of a major accident with possible transboundary consequences.