

Developing a major accident prevention policy

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Abstract

The Major Accident Prevention Policy requirement of the EU Council Directive 96/86/EC (Seveso II) is outlined and some guidance for meeting the requirement given. A 'case study' of the development of an MAPP is presented. © 1999 Elsevier Science B.V. All rights reserved.

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1. Introduction

The requirement to have a major accident prevention policy (MAPP) is a new duty imposed on operators of establishments that come within the scope of the Council Directive (96/82/EC) (Seveso II). Associated with the MAPP there is also the requirement for the operator to have appropriate management systems to implement the policy. A technical working group of the European Commission produced some guidance on implementing the management systems and MAPP requirements of the Seveso II Directive (Ref. [1]). The European Process Safety Centre (EPSC¹), through its working party on safety management systems (SMS), provided some process industry input to that guidance, including some views on the MAPP. This paper outlines how it is proposed to implement the MAPP requirement within the ICI Group of companies in a manner consistent with the Commission guidance.

¹ The European Process Safety Centre (EPSC) is an international industry-funded organization which exists to provide an independent technical focus for process safety in Europe. It is a co-operative project administered by the UK Institution of Chemical Engineers, a registered charity, on behalf of the European Federation of Chemical Engineering (EFCE).

2. Summary of the MAPP requirement (Article 7)

Article 7 of the Council Directive on the Control of Major Accident Hazards Involving Dangerous Substances requires the operator of a ‘lower tier’ major hazard establishment to:

“...draw up a document setting out his major-accident prevention policy and to ensure that it is properly implemented. The major-accident prevention policy established by the operator shall be designed to guarantee a high level of protection for man and the environment by appropriate means, structures and management systems.” (Article 7(1)).

Article 7(2) then states “the document must take account of the principles contained in Annex III and be made available to the competent authorities for the purposes of, amongst other things, implementation of Articles 5(2) and 18.” For details see Annex III of the Directive.

Under Article 5(2) an operator is required to prove to the competent authority, at any time, that he has taken all the measures necessary to prevent major accidents and to limit their consequences for man and the environment.

Article 7 does not apply to ‘top tier’ establishments subject to Article 9 for which a safety report has to be prepared. However, the operator of a ‘top tier’ establishment does have to demonstrate through the safety report that the requirements of a MAPP have been implemented.

Under Article 18 competent authorities are required to inspect major hazard establishments and ensure that the operator can demonstrate that he has taken all necessary measures. In effect the competent authority has to check that the major accident prevention policy is adequate and has been implemented.

3. Guidance for drawing up a Major Accident Prevention Policy (MAPP) ²

(1) The MAPP may be a short and simple document (say typically a few pages) which sets down the objectives and responsibilities for the safe operation of a major hazard establishment and outlines the organisation and arrangements that are implemented through an appropriate system which covers the necessary requirements (Directive Annex III, para (a)).

(2) The MAPP does not need to describe the management system in detail but should indicate that the system covers, in particular (note Annex III para (c)):

- organisation and personnel
- identification and evaluation of major hazards
- design of new installations
- operational control, including management of change
- training and management of personnel
- emergency planning
- performance monitoring and audit.

² This section reproduces the views of the EPSC SMS working party.

(3) Many operators will already have a formal statement of safety policy (in some cases combined with statements of policy with regard to health and environment protection issues). If an existing policy already includes the requirements of the MAPP then no further document would be necessary. Where an existing safety policy document does not include the specific MAPP requirements then the operator has two options:

(a) Revise the existing policy document to include the MAPP requirements.

(b) Develop the MAPP as a separate document which could be, say, an addendum to the existing safety policy document.

(4) The MAPP may or may not be wholly establishment-specific. For example, an operator with several major hazard establishments could have one set of common performance standards and one management system which apply to all the major hazard establishments under the overall control of the one operator. In such cases the bulk of the MAPP document would be similar for all that operator's major hazard establishments. However the detail of how the policy and management system are implemented at each separate establishment would be specific to each establishment; but that detail need not be part of the MAPP itself.

(5) The MAPP is *not* a mini safety report. An operator will need to have evidence available, in the form of appropriate supporting documentation, to be able to demonstrate to a competent authority (CA) that the MAPP was being implemented. That information does not have to be sent to the CA but, typically, would be displayed to CA inspectors when they visit the establishment. However there may be situations where an operator finds it convenient to include some additional information within the MAPP document itself. Typically, the MAPP would be at the top of a hierarchy of management control measures which would increase in details and become more specific to the particular establishment at each stage down through the hierarchy (see Appendix A).

4. Implementing MAPP requirements — a case study

An outline of how the MAPP requirement can be substantially met within an existing system, using ICI as an example.

4.1. Strategy for prevention of major accidents

In the early days of the implementation of Seveso I (UK's CIMAH Regulations, 1984) a corporate brief was prepared which set down the approach for the management of ICI major hazard plants and the prevention of major accidents. Six fundamental requirements were defined: (a) Hazards are recognised and the worst consequences of loss of containment understood by the operations and business management responsible. (b) Appropriate equipment and facilities are provided which are 'fit for the purpose' of reducing the risk from the hazards as far as is reasonably practicable. (c) Systems and procedures exist to operate that equipment in a satisfactory manner within the design intent and to maintain its integrity. (d) Appropriate staff are provided and given

sufficient information, instruction, supervision and training to operate the equipment, systems and procedures. (e) Adequate arrangements to handle foreseeable emergencies exist and are practised. (f) Effective arrangements exist for promoting Safety, Health and Environment (SHE) protection, auditing SHE performance and progressing issues.

The brief went on to elaborate how these fundamental requirements were met in the company. Subsequently these requirements have been incorporated into the ICI SHE Management System. The six principles were also used as the starting point for a strategy for reviewing existing installations, as safety reports were prepared, and they form the basis for an ongoing process of SHE assurance, including the periodic review of process hazards (Ref. [2]).

It is intriguing to note the similarities between the six principles above and the requirements now specified in Annex III of the Seveso II Directive.

4.2. The ICI SHE Management System

Safety, Health and Environment requirements in ICI are implemented through a management system outlined in Fig. 1. The starting point is a formal statement of policy which sets down fundamental requirements to be met in managing safety, health and environmental protection in all activities worldwide. This mandatory Policy is reproduced in Appendix B. It makes clear that the responsibility for Safety, Health and Environment protection rests primarily with the ICI Board and it assigns responsibility for SHE in component businesses and companies to the Chief Executive Officers of those businesses. This Policy applies to all activities of the ICI Group, worldwide. Each

The ICI Group SHE Management System



Fig. 1.

The ICI Group SHE Standards*

1	Safety, Health and Environmental (SHE) Commitment	11	Emergency Planning
2	Management and Resources	12	Contractors and Suppliers
3	Communication and Consultation	13	Environmental Impact Assessment
4	Training	14	Resource Conservation
5	Material Hazards	15	Waste Management
6	Acquisitions and Divestments	16	Soil and Groundwater Protection
7	New Plant, Equipment and Process Design	17	Product Stewardship
8	Modifications and Changes	18	SHE Performance and Reporting
9	SHE Assurance	19	Auditing
10	Systems of Work		

* As currently defined (1998), revised Standards to be issued early 1999.

Fig. 2.

activity has a 'customised' local Policy which incorporates the Group Policy and adds the local organisation and arrangements put in place to implement the Policy.

The next element of the management system comprises a series of Group SHE Standards in which further essential more detailed mandatory requirements for implementing the Policy are set down. Currently there are 19 such Standards, listed in Fig. 2.³

The mandatory requirements of the Policy and SHE Standards are implemented at a specific operating location through Local Procedures. A series of advisory Guidelines indicate the principles that Local Procedures need to follow in order to satisfy the requirements of the Policy and SHE Standards. The adequacy of, and compliance with, Local Procedures is confirmed by the Audit and Assurance elements. These also identify opportunities for improvement locally and feed into the Review which identifies any needs for improvement to the system as a whole.

For a more detailed description of the ICI SHE Management System and others, particularly in relation to meeting the requirements of Seveso II, see Ref. [3].

A feature of the continued improvement of the ICI SHE Management System is its development and adaptation so that any particular statutory requirements, such as those stemming from the Seveso II Directive, are incorporated.

³ After this paper was prepared the ICI Group SHE Standards were reviewed and revised Standards will be issued during 1999. All the principles that meet the MAPP requirements will be retained.

A key part of any management system is the arrangements for measuring and monitoring performance. In the ICI system the basic requirements are set by the Group SHE Standards 18 and 19. Performance indicators include the recording of traditional ‘lagging’ measures of injury rates and incidents (dangerous occurrences, near-misses, etc.). However the successful implementation of a SHE policy is the avoidance of such incidents, hence the use of ‘lagging’ measures alone does not give sufficient feedback on performance to guide management action on a day to day basis. This is particularly the case for major hazard activities where the probability of major incidents must be very low. There has to be some way of giving assurance that the absence of low probability events is due to good management and not just good luck. To do that, there needs to be an emphasis on ‘leading’ measures. Such measures range from: simple indicators of the routine implementation of the specific elements of the management system (e.g. measures of progress with training programmes, follow-up of improvement actions, etc.); through general monitoring of the approach and actions of people (the ‘human factors’) using periodic attitude surveys and behaviour observation and feedback techniques; to formal auditing of the management system. The audit process is particularly important. It includes frequent monitoring to check that SHE procedures are actually being followed and also periodic in-depth specialist assessments to confirm that the procedures themselves are appropriate for control of the risk. Outputs from the audits are indications of the extent of conformance with requirements and recommendations of actions to improve where necessary.

Ref. [4] gives more details of the framework for performance measurement applied in ICI and examples of specific performance measures from several companies are given in Ref. [5].

4.3. Coverage of MAPP requirements by ICI SHE Management System

With regard to the MAPP requirements, each of the elements specified in Annex III of the Seveso II Directive is covered by one or other of the ICI Group SHE Standards.

Hence the MAPP for each ICI major hazard establishment consists primarily of its ‘customised’ ICI Group SHE Policy together with the relevant Group SHE Standards. The statement of fundamental requirements is thus largely the same for all ICI major hazards establishments. How the requirements are implemented at the establishment is detailed in the Local Procedures which are specific to the establishment. The MAPP will identify the most important of those procedures but the procedures themselves will not be part of the MAPP.

The MAPP will be completed by including an outline of the organisation arrangements and key responsibilities for implementing the policy at the establishment. It will be issued by the senior manager who has overall direct responsibility for the establishment as a whole. That specific responsibility for the establishment has been delegated to that senior manager by the Chief Executive Officer of the business of which the establishment is a part. Prime responsibility thus passes back to that CEO and ultimately to the ICI Board by virtue of the ICI Group SHE Policy (as noted in Section 4.2)

Appendix C gives the proposed ‘model’ which each ICI major hazard establishment will adapt to form its MAPP.

5. Concluding comment

Some ideas for the development of an MAPP have been discussed. For organisations with well developed SHE systems it should be a straightforward process and many organisations should be able to show that they have established systems which effectively cover the requirements of an MAPP. For organisations with less well developed systems, the six principles in Section 4.1 above may be a useful starting point.

The Directive indicates that the MAPP should be ‘proportionate of the major-accident hazards presented by the establishment’. In practice, it is likely that it is not so much the MAPP itself that will vary with the degree of hazard as what is put in place to manage the hazard, i.e. the local detailed procedures. The basic principles for preventing major accidents are much the same for all major hazards, but the extent and complexity of control measures will clearly vary in proportion to the hazards.

Preparing an MAPP may be relatively easy. What is more important, and more difficult, is putting the requirements into practice. But, whilst actions (at least the right actions) are more important than words, the statement of policy should not be dismissed as merely words on paper. It should be a carefully considered and clear statement of intent which leaves no doubt about what has to be put in place and complied with. And, as such, it provides a basic ‘yardstick’ against which performance can be measured — that is, ‘do we do what we say we do?’

Appendix A. Control of Major Accident Hazards Directive — a hierarchy of management measures

In effect, the Directive calls for a control regime which, in practice, leads an operator to have, for a major hazard establishment, a hierarchy of measures, proportionate to the hazards to be controlled, which would typically be as follows:

A.1. Major Accident Prevention Policy — MAPP

A brief document which sets down the objectives and responsibilities for the safe operation of a major hazard establishment and outlines the organisation and arrangements that are implemented through a management system. The policy should indicate that the management system covers, in particular, the following aspects:

- organisation and personnel
- identification and evaluation of major of hazards
- design of new installations
- operational control, including management of change
- training and management of personnel including contractors
- emergency preparations
- performance monitoring and audit.

The MAPP can be a part of an operator’s more general safety policy.

A.2. Management system

A formal system which includes the specific arrangements and procedures to be followed for safe control of the establishment and which makes clear the responsibilities

for implementing those procedures, e.g. the detailed procedures for hazard and risk assessment, management of change, audit, etc.

A.3. Working documents

These are the results of the implementation of the management system and include:

- details of the hazards identified and their evaluation
- the operating instructions
- ‘permits to work’ documentation and authorised persons
- modification proposals and assessments
- inspection records
- emergency plans
- audit plans and reports
- etc.

The detail and specificity of the measures increases down through levels 1, 2 and 3. For an operator with several major hazard establishments essentially the same MAPP and overall management system could apply to all of those establishments but the working documents would be specific to individual establishments. For a ‘top tier’ establishment, some information from each level of measures is incorporated into the Safety Report called for by Article 9 of the Directive.

This description is a general indication only. In practise the particular arrangement of measures and ‘documentation’ may vary from one operator to another.

Appendix B. Safety, health and environment policy in the ICI group

B.1. ICI Group organisation

The ICI Group comprises Imperial Chemical Industries (ICI) based in the UK, and its subsidiary companies at home and overseas, each with a Board of Directors which has legal responsibility for that Company’s operations. The Group’s activities encompass many different businesses and territories, and include a wide range of international businesses.

Each international business embraces the relevant operations of ICI and its subsidiary companies, and is led by a Chief Executive Officer, who is responsible for the strategic direction and development of his international business on a worldwide basis.

The ICI Board determines the objectives and broad policies of the Group and provides overall direction.

B.2. ICI Group policy

ICI will ensure that all its activities worldwide are conducted safely; the health of its employees, its customers and the public will be protected; environmental performance will meet contemporary requirements, and that its operations are run in a manner acceptable to the local communities.

In particular we will accomplish the following.

- Comply with relevant laws and regulations and take any additional measures we consider necessary.
- Ensure that all our activities are being carried out in accordance with the ICI Group Safety, Health and Environment Standards.
- Set demanding targets and measure progress to ensure continuous improvement in safety, health and environmental performance.
- Require every member of staff to exercise personal responsibility in preventing harm to themselves, others and the environment, and enable them to contribute to every aspect of safety, health and environmental protection.
- Manufacture only those products that can be transported, stored, used and disposed of safely.
- Seek to develop new or modified products which assist in conserving the environment and lead to sustainable development.
- Provide appropriate safety, health and environmental training and information for all our staff, contractors and others who work with us, handle our products, or operate our technologies.
- Communicate openly on the nature of our activities and report progress on our safety, health and environmental performance.
- Promote the interchange of safety, health and environmental information and technology throughout the ICI Group and make our expertise and knowledge available to relevant statutory authorities.
- Encourage, through positive interaction within the industry, the worldwide development and implementation of the principles of the Chemical Industries 'Responsible Care' initiative and the International Chamber of Commerce's 'Business Charter for Sustainable Development'.

This Policy applies throughout ICI and our subsidiaries worldwide.

We encourage our related companies to adopt policies which accord with this Policy.

B.3. Responsibilities

The prime responsibility for Safety, Health and Environmental Policy rests with the ICI Board.

An Executive Director appointed by the ICI Board has a specific responsibility for overseeing Safety, Health and Environmental matters across the ICI Group.

The Chief Executive Officers of the businesses are responsible for developing and maintaining a SHE implementation strategy and monitoring system for their respective businesses consistent with the ICI Group Standards and Guidelines to ensure full compliance with the ICI Group Policy.

The Board of each ICI subsidiary is responsible for establishing, implementing and monitoring SHE policy and standards for that company which are consistent with the local laws and ICI Group Policy Standards and Guidelines as supplemented by the implementation strategy of the Chief Executive Officer of their sponsoring business.

Each operating site within ICI is required to establish and maintain an annual improvement plan which incorporates measures to meet Group SHE performance targets.

The Chief Executive Officers are required regularly to review the overall SHE performance of their businesses with the Executive Directors of the Board.

The Group Safety, Health and Environment Manager is responsible for promoting SHE matters and for regular reporting to the Board.

Appendix C. Proposed model Major Accident Prevention Policy for ICI major hazard establishments

ICI xxxxxxxxxxxxxxxxxxxx (*insert name of component business or company and name of major hazard establishment*)

Major Accident Prevention Policy (MAPP) for the purposes of the (*insert title of the local legislation implementing the Control of Major Accident Hazards involving Dangerous Substances Directive 96 / 82 / EC*)

It is the policy of this establishment to manage its major hazards to provide a high level of protection to all persons and the environment liable to be affected by major accidents. This is achieved by applying the ICI SHE Management System to meet the requirements set by the ICI Group Safety, Health and Environment Policy as stated in the general SHE Policy for the establishment and the ICI Group SHE Standards. These requirements are implemented at the establishment via the audited local procedures, called for by the management system, which cover the specific measures for major hazard control.

This MAPP comprises the following parts: (1) the general SHE policy for the establishment; (2) the relevant ICI Group SHE Standards; (3) The organisation, arrangements and responsibilities for implementing the MAPP. (4) A tabulation indicating how the ICI Group SHE Standards cover the necessary legal requirements and listing the principal local procedures which implement the requirements at the establishment.

C.1. Safety, Health and Environment Policy

(Insert text of the establishment general SHE Policy.)

C.2. Relevant ICI Group Safety, Health and Environmental Standards (1998 version)

C.2.1. Safety, Health and Environmental (SHE) Commitment (GS1)

ICI's Safety, Health and Environmental Policy applies throughout the ICI Group. Subsidiary companies shall establish as appropriate such safety, health and environmental (SHE) policies and standards as are necessary to comply with local laws and be consistent with the ICI Group Policy and these Group SHE Standards. The appropriate organisation and arrangements to implement the ICI Group SHE Policy and Standards shall be put in place. The conduct expected and the accountabilities of employees for SHE performance shall be established.

C.2.2. Management and resources (GS2)

Line management shall lead the implementation of the ICI Group Safety, Health and Environment Policy and shall establish and monitor programmes aimed at the continu-

ous improvement of performance to defined goals. Appropriate SHE and engineering support resources and facilities shall be available to assist line management to carry out its responsibilities. The responsibility, authority and inter-relation of those personnel charged with the implementation of these Standards shall be defined.

C.2.3. Selection and training (GS4)

Competencies and expertise for safety, health and environment protection shall be taken into consideration in the selection and placement of employees. Training needs shall be identified and satisfied to ensure that all employees have the necessary skills and behave with proper regard for the safety and health of themselves and others, and for environmental protection. Training and validation arrangements shall be regularly reviewed.

C.2.4. New plant, equipment and process design (GS7)

There shall be systems for the management of projects and the design of all new facilities, plants, equipment and processes. Design and construction shall be in accordance with relevant Group Engineering Guidelines, local codes and regulations. Relevant studies shall be carried out to identify hazards and assess risks to people and the environment. Hazards shall be eliminated or the consequent risks reduced as far as is reasonably practicable. The basis for control of the risks shall be documented. New plants shall comply with the most demanding environmental legislation reasonably anticipated in any one of the territories in which the ICI Group operates that process.

C.2.5. Management of change (GS8)

Any modifications to facilities and the arrangements for their operation, including personnel, shall not compromise and, where possible, shall improve SHE performance. Proposals for changes to plant, equipment, processes and control systems shall be registered and assessed, and modifications shall be authorised. Necessary hazard studies and risk assessments shall be carried out, appropriate design considerations made and all changes properly implemented and recorded.

C.2.6. SHE assurance (GS9)

All facilities and the arrangements for their operation shall be equipped and maintained to ensure continued safe operation, the health of people and the minimum practicable adverse environmental impact. There shall be periodic reviews of hazards to identify opportunities for the elimination or reduction of hazards and routine inspections of plant, equipment and premises to ensure their fitness for purpose and full accord with Group Engineering Guidelines. These reviews and inspections shall take into account process hazards, engineering integrity, containment of materials, fire protection systems and other measures, such that there is continued conformance with exposure limits and reduction of risks as far as is reasonably practicable. Appropriate records relating to equipment, plant or facilities and their processes shall be maintained in a plant dossier. A health assessment programme shall be established and maintained and employee

records including demographic and occupational data retained in a retrievable form to facilitate epidemiology.

C.2.7. Systems of work (GS10)

Systems of work shall be drawn up and maintained to ensure the safety and health of people and the protection of the environment. Hazards shall be eliminated or consequent risks reduced as far as is reasonably practicable. Control measures shall be implemented and monitoring programmes arranged to demonstrate safe and healthy working conditions, safe behaviour and effective protection of the environment and assets.

C.2.8. Emergency plans (GS11)

The nature and scale of all reasonably foreseeable emergencies, including transport emergencies, shall be identified. Adequate formal arrangements, appropriate to the hazards and risks involved, shall be established to deal with these emergencies. The arrangements shall be made in association with the public emergency services and appropriate voluntary co-operative schemes. Plans shall be communicated and regularly rehearsed and reviewed.

C.2.9. Contractors and suppliers (GS12)

The safety, health and environmental implications of all aspects of work carried out by others on behalf of the ICI Group shall be considered. Competent contractors shall be selected, monitored and supplied with sufficient information to ensure that the safety and health of their employees is not put at risk by ICI Group activities. The contractor shall be required to provide sufficient information to ensure that the safety and health of ICI employees or others is not put at risk or ICI environmental standards compromised by the contractor's activities. The purchase and supply of raw materials, equipment and services shall be specified and monitored to ensure SHE requirements are met.

C.2.10. SHE performance and reporting (GS18)

All locations shall report safety, health and environmental performance. Incidents and public complaints shall be recorded, investigated and appropriate corrective action taken to prevent recurrence. Records of performance and incidents shall be maintained and information and statistics reported to the Group as required by the ICI Executive.

C.2.11. Auditing (GS19)

Formal auditing procedures shall be defined and implemented to ensure that the systems and behaviours adopted to meet these Standards are soundly established, maintained and observed. Deficiencies identified during audit shall be formally recorded, their implications assessed and corrective actions prioritised, implemented and recorded.

C.3. Organisation, arrangements and responsibilities

(Insert an outline of the management organisation with key roles identified and relevant supporting services indicated.)

C.4. 4. Cross check of necessary requirements against ICI Group SHE Standards and listing of relevant establishment procedures

Management system elements required by Directive 96/82/EC	Relevant ICI Group SHE Standards *	Relevant establishment procedures
Organisation and personnel, including training and contractors	GS 1 and 2 GS 4 and 12	(List against each element the reference number of the main relevant local procedures and append a listing of the titles of those procedures.)
Identification and evaluation of hazards	GS 7 and 9	
Operational control	GS 9 and 10	
Management of change	GS 8	
Planning for emergencies	GS 11	
Monitoring performance, audit and review	GS 18 and 19	

* Numbers of Standards as currently defined (1998), revised Standards will be issued during 1999 and relevant Standard numbers will change.

References

- [1] Guidance on Safety Management Systems to meet the requirements of Council Directive 96/82/EC (Seveso II), to be published by the European Commission.
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