

Metatechnical Evaluation System

(M.E.S.)

Manual

April 2002

**FEDERAL MINISTRY OF EMPLOYMENT AND LABOUR
ADMINISTRATION OF LABOUR SAFETY
TECHNICAL INSPECTORATE
CHEMICAL RISKS DIRECTORATE**

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(look for "Prevention of major accidents").

Cette brochure peut être également obtenue en français.

Deze brochure is ook verkrijgbaar in het Nederlands.

Communication

This brochure contains the second version of the Metatechnical Evaluation System.

The first version has been developed and tested in 1995 and 1996. In 1997, 1998 and 1999 the first version has systematically been applied in all "upper tier" Seveso companies (categorized according to the first Seveso directive).

In 2000 and 2001 a second version has been developed and tested. For this second version, we opted for a different structure of the question list and a different questioning technique. As for the content, however, there is continuity between both versions.

Introduction

The "Seveso II" directive on the control of major-accident hazards involving dangerous substances was approved on 9 December 1996. This European directive was enacted in Belgian law via the Cooperation Agreement of 21 June 1999 between the Federal State, the Flemish Region, the Walloon Region and the Brussels-Capital Region .

The "Seveso II" directive replaces the first Seveso directive of 24 June 1982 and places much more emphasis than the previous directive on the importance of safety management within the company. It has, after all, been generally accepted for quite some time that the fundamental causes of industrial accidents have their roots within the 'management' of a company. The safe operation of a company thus depends to a significant extent on the competence of the company in the field of safety management.

Safety management naturally should be more than the simple announcement of a vague declaration of intention by the general management of the company. Companies at risk of major accidents are expected to be able to:

- conduct a prevention policy that ensures a high level of protection*
- ensure the implementation of all suitable measures, systems, procedures and such like, which are necessary to ensure that the prevention policy is carried out in an effective manner.*

The operator must furthermore be able to demonstrate that such an ambitious accident prevention policy does actually exist and is implemented.

The "Seveso II" directive also sets higher standards for the inspections that have to be carried out by the Member States in those companies to which the directive applies. These inspections must consist of regular and systematic audits of the systems that exist within the establishments involved, including the organisational and management systems as well as those of a technical nature.

The Metatechnical Evaluation System (M.E.S.) is intended for the systematic auditing of the organisational and managerial competence of the companies that are concerned with managing of the risks of major chemical accidents. The first version of the M.E.S. was issued in June 1997 and was applied in more than 60 companies by the Chemical risks directorate. The second version is a far-reaching modification on the basis of the experiences and results of these audits.

The M.E.S. is in the first place intended to be an inspection instrument for the inspection teams that are charged with ensuring compliance with the stipulations laid down in the Cooperation Agreement of 21 June 1999. This manual will also be made freely available to the companies in order to allow them to prepare thoroughly for the M.E.S. audits.

Although the M.E.S. has not been developed specifically for carrying out internal safety audits, companies can use it to do initial surveys to allow them to draw their own appropriate conclusions in order to improve the management system in the domain of major accident prevention.

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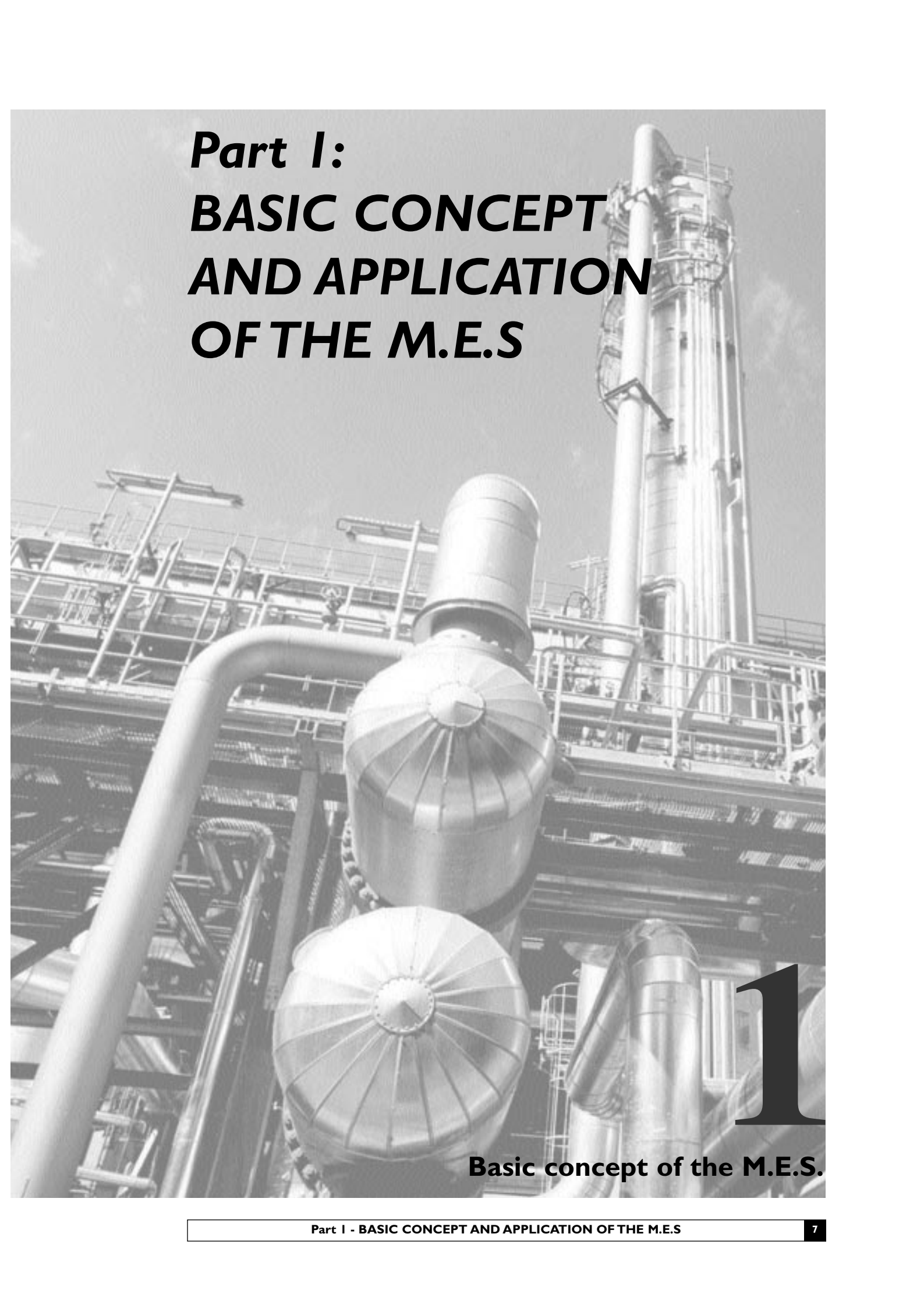
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A black and white photograph of an industrial plant. In the foreground, two large, spherical vessels with vertical ribs are connected by a network of pipes and walkways. In the background, a tall, cylindrical distillation column rises against a clear sky. The overall scene is a complex of metal structures and piping.

**Part I:
BASIC CONCEPT
AND APPLICATION
OF THE M.E.S**

1

Basic concept of the M.E.S.

1.1 The structure

The structure of the first version of the M.E.S. was based on the quality standard ISO 9001. For the second version a structure was chosen that matches more closely the activities that are needed to manage the risks of major accidents. The M.E.S. distinguishes between "Prevention Activities" and "System Activities". This distinction forms the first level in the structure of the questionnaire. The two types of Activities and their underlying levels in the structure are explained below.

1.1.1 Prevention Activities

Prevention Activities are those activities that ensure directly that the necessary measures to manage the risks of major accidents are in place and are operational.

We distinguish between the following three Prevention Activities:

1. Specifying measures
2. Implementing measures
3. Maintaining measures.

Specifying measures is in fact a double-sided activity: on the one hand the need has to be defined in order for measures to be taken, and on the other hand a choice must be made of which measures are to be taken in order to meet the needs that have been

established. The need to take measures flows from an analysis of the risks. The nature and quality of the measures result from the application of the general principles of the prevention hierarchy and of an evaluation of the risks.

Implementing measures is the step whereby the measures that have been set out on paper are put into place in practice. The input for this activity is formed by the detailed specifications that were drawn up on the basis of the risk analysis.

Finally the measures that have been implemented must be maintained so that they continue to meet the specifications after they have been implemented. They must remain in operation (whenever the risks are present) and must fulfil their function to the desired degree of reliability and with the desired result.

These three Prevention Activities were developed for the following five groups of prevention measures:

1. the process installation
2. operational procedures and instructions
3. measures for hazardous work
4. the emergency plan
5. personal protective equipment.

This produces a structure like that shown in Figure 1.1.

Figure 1.1 1 Prevention Activities	
1.1 The process installation	
1.1.1 Specifying the process installation	
1.1.2 Implementing the process installation	1.1.2.1 Detailed design 1.1.2.2 Construction and commissioning
1.1.3 Maintaining the process installation	1.1.3.1 Inspection 1.1.3.2 Preventive maintenance 1.1.3.3 Repairs 1.1.3.4 Changes to prevention measures
1.2 Operational procedures and instructions	
1.2.1 Specifying operational procedures and instructions	1.2.1.1 Operation of the process 1.2.1.2 Performance of manual tasks
1.2.2 Implementing operational procedures and instructions	
1.2.3 Maintaining operational procedures and instructions	
1.3 Measures for hazardous work	
1.3.1 Specifying measures for hazardous work	
1.3.2 Implementing measures for hazardous work	
1.3.3 Maintaining measures for hazardous work	
1.4 The emergency planning	
1.4.1 Specifying the emergency planning	
1.4.2 Implementing the emergency planning	
1.4.3 Maintaining the emergency planning	
1.5 Personal protective equipment	
1.5.1 Specifying personal protective equipment	
1.5.2 Implementing personal protective equipment	
1.5.3 Maintaining personal protective equipment	

A. The process installation

The first group of measures is the process installation. The term "process installation" must be interpreted in a wide sense and should include every form of equipment that is used to store and handle chemical substances, thus it includes not only chemical production processes but also, for instance, the storage and loading into tanks, the storage and handling of single packages or the filling of bottles. The process installation furthermore consists of both the physical equipment and the choice of the process (substances used, reactions, working conditions, etc.).

The first Prevention Activity, Specifying measures, applied to the process installation, corresponds to the drafting of the so-called 'conceptual' design. The conceptual design generally takes the form of a series of piping and instrumentation diagrams and associated documents. The M.E.S. requires that this conceptual design is also supplemented with a document that clearly specifies all risks and measures, the "process safety documentation". The criteria that the M.E.S. sets with respect to the risk analyses of the process and the measures to be taken (in other words the process installation) are based on the information report produced by the Chemical risks directorate, the "Process Safety Study" (reference no. CRC/IN/002-N, version 2). In order to have a good understanding of this section of the M.E.S. it is advisable to consult this report.

The second Prevention Activity, the Implementing the process installation, consists of the detailed design, the construction and the commissioning. The detailed design is regarded as a component of this Prevention Activity because in this phase of the design, no degree of freedom may be given when it comes to establishing essential safety characteristics of the process installation, such as for instance the design pressures, the choice of construction materials or the reliability of instrumental safety circuits. These design choices are without doubt part of the safety concept and must therefore be specified during the risk analysis and documented in the process safety documentation.

The third Prevention Activity, Maintaining the process installation, is obvious. Process installations must be inspected and maintained, so that they continue to meet the preset specifications (e.g. for wall thickness or reli-

ability). In addition the safety-critical design parameters and equipment (such as safety valves or safety circuits) cannot simply be changed or taken out of service without the necessary analysis being done or alternative measures being taken.

B. Operational procedures and instructions

A second group of measures is formed by the operational procedures and instructions. The M.E.S. regards these documents as having the same significance as the process installation. They have to be drawn up and maintained with the same amount of care as is given to the design and maintenance of, for example, pumps, heat exchangers and reactors.

When specifying operational procedures and instructions a distinction is made between the operation of the process and the execution of manual tasks.

The operation of the process consists of those activities that the personnel carry out as part of the control and safety system of the installation. Process installations are generally controlled from within a control room, but certain operations (e.g. the starting and stopping of pumps) can also be carried out in the installation. Safety-critical interventions on the part of the personnel must be identified in the risk analysis of the process installation (part 1.1.1 of the questionnaire). The drafting of the necessary operational procedures for the operation of the process actually requires an additional analysis, which must ensure that all the necessary operational procedures exist (for all parts of the installation and for all operational phases) and that they contain sufficient and correct information.

By manual tasks we mean activities carried out by personnel and that are part of the process operation (for example connecting and disconnecting flexible hoses, the manual loading of materials into a reactor, sample taking, the draining of a barrel). The risks that are associated with such tasks are generally dealt with in inadequately or not at all in the risk analysis techniques for process installations. This is why the M.E.S. demands that a specific risk analysis (a task analysis) must be undertaken to identify the risks associated with these manual tasks.

Note that in the terminology of the M.E.S. the operation of the process is described in operational procedures and the execution of manual tasks in instructions. If a company uses other terms, then the questions posed by the M.E.S. should, of course, be read with the appropriate terms.

Implementing operational procedures and instructions consists initially in the writing of ergonomically sound documents. These documents must then be distributed in a regulated manner and their users must be given the necessary information, instruction or training before they can be assumed to be capable of applying the procedures or instructions concerned.

To continue to ensure the correct application of operational procedures and instructions, supervision and regular training are needed. Periodic checks must also be made, together with the users, to determine whether the procedures and instructions are still appropriate in the face of what happens in practice.

C. Measures for hazardous work

A third group consists of the measures that are taken for hazardous work. These are non-routine jobs for which the measures need to be specified case by case. Just as with the process installation this has to be done on the basis of a risk analysis. That supposes therefore that not only the measures but also the risks of each hazardous job must be documented.

Measures for hazardous work usually fall into two categories: on the one hand there are measures to ensure that the installation that is being worked on is safe, and on the other hand, there are measures that are taken by those carrying out the work. Just as a number of checks and tests are carried out before a process installation is put into operation, the presence of measures during hazardous work must also be subjected to an independent check.

Measures taken during hazardous work are temporary measures. The criteria associated with the maintenance of these measures are thus related not only to the maintenance of the measures during the operation, but also to disengaging these measures and to putting the installation safely back into operation.

D. The emergency planning

A fourth group of measures consists of those that are taken in the context of the emergency plan. These measures must be based on an analysis of the residual risks. Residual risks are risks that remain after all measures have been taken to avoid major accidents. These residual risks in practice take the form of a series of representative accident scenarios. For each of these scenarios an intervention strategy can be defined that is appropriate to the intervention resources that are available. The general coordination of all activities during an emergency situation (such as the intervention at the location of the calamity, the evacuation, the initiation of the external emergency plan, etc.) must also be defined and recorded.

When we talk of Implementing the emergency planning we do not mean the execution of the emergency plan in an emergency situation, but rather that all the practical arrangements are made and are in place so that the emergency plan can be put into action whenever this is necessary. This includes the allocation of functions in the emergency plan, the formulation and distribution of the necessary instructions, the provision of the necessary resources with which to carry out the emergency plan.

Maintaining the emergency planning consists of keeping the emergency plan up-to-date, the periodic instruction and training of all those concerned, the periodic testing of the emergency plan and the inspection and maintenance of the intervention resources.

E. Personal protective equipment

Finally, a fifth group of measures covers personal protective equipment. The need to use personal protective equipment follows in principle from the risk analyses that were carried out for the process, the manual task, hazardous work and the emergency plan. As a rule however a supplementary analysis is necessary so that the correct type of personal protective equipment can be chosen. This analysis covers matters such as ascertaining the intensity and duration of exposure and setting the performance levels. Investigations can also cover the risks that are introduced through the use of personal protective equipment.

Implementing personal protective equipment covers the purchase of personal protective equipment that meets all specifications, the training of those using it and actually making it available to the users.

Maintaining personal protective equipment relates to the inspection and maintenance of the personal protective equipment and periodic training of the users.

1.1.2 System Activities

The System Activities form the frame of reference within which the Prevention Activities can be developed, applied and improved. Figure 1.2 provides a summary of the System Activities. These are typical elements that can be found in most management systems.

Figure 1.2	2. System Activities
2.1	Policy
2.2	Organisation
2.3	Document management
2.4	Selection and training
	2.4.1 Own personnel
	2.4.2 Third parties
2.5	Investigation of incidents and accidents
2.6	Information management
	2.6.1 Regulations
	2.6.2 External empirical information
2.7	Audit

A. Policy

It should not be surprising to find that the first System Activity consists of the establishment, follow-up, and evaluation of a clear policy in relation to major accidents. This is also an explicit obligation derived from the cooperative agreement both for the lower tier and upper tier establishments

B. Organisation

With respect to the element "Organisation" the M.E.S. focuses on establishing responsibilities in relation to the execution of the policy and to the proper function of a number of regulatory bodies such as the internal and external Services for Prevention and Protection at work, the Committee for Prevention and Protection at work and the environmental service.

C. Document management

The System Activity "Document management" deals with the management of documents, mostly procedures that describe the Prevention and System Activities. This element does not therefore overlap with the Prevention Activities for operational procedures and instructions, even though some objectives will be of a similar nature for both types of documents.

D. Selection and training

In the System Activity "Selection and training", a distinction is made between own personnel and those of third parties.

For one's own personnel the MES evaluates the provision of initial and periodic training.

The criteria in relation to the selection and training of third parties have been drawn directly from the Welfare Act: the exclusion of third parties who do not comply to their obligations in respect of safety, the provision of training and instructions and ensuring that third parties abide by the internal safety regulations of the commissioning company.

E. Investigation of incidents and accidents

When investigating incidents and accidents the M.E.S. sets high standards with respect to the quality of the investigations. The investigation of an accident or incident may not be restricted purely to the direct technical causes, but must also try to find any failures in the field of the safety management system. In addition similar situations must be tracked down throughout the entire company.

F. Information management

In the section on "Information management" a distinction is made between the regulations and the so-called external empirical information. Examples of external empirical information are codes of good practice, standards, reports of accidents and incidents in other companies, publications about process safety. For both types of information, the demands are the same: the company has to

organise itself in such a way that this information is collected, investigated and the necessary actions are undertaken.

G. Audit

The final System Activity is "Audit". The kinds of audits that are meant here are aimed at the verification of whether all procedures and systems of the safety management system are correctly applied in practice. Establishing a summary of the relevant procedures and systems forms one component of determining the policy (see System Activity 1.2).

1.2 Questioning technique

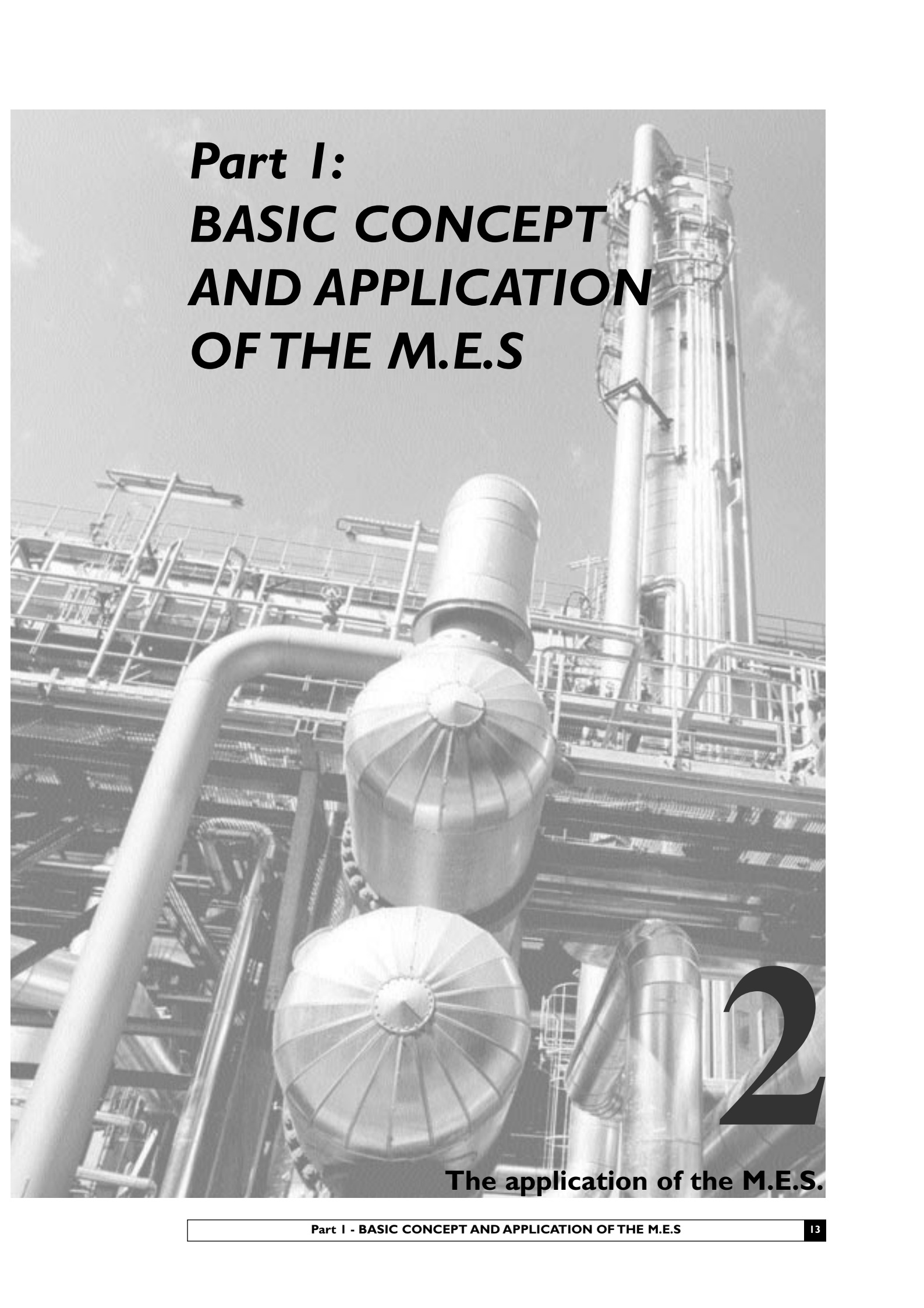
In the first version of the M.E.S. questions were asked about the presence of certain organisational measures, such as procedures and systems, for the management of the risks of major accidents. The second version of the M.E.S. sets out a number of objectives that could be established for the various Prevention and System Activities. For each objective an open question is formulated that invites the company to explain which organisational measures have been taken to ensure that the objective involved will be achieved.

A number of standard measures have been listed for each question. Criteria have also been formulated for a number of standard measures. These standard measures and criteria are based on the literature and the experiences of the inspectors of the Chemical risks directorate. They serve as a reference point for the evaluation of the responses to the open questions. The principle embraced here is that the standard measures and the accompanying criteria are minimum conditions for ensuring the achievement of the objective concerned. There may be deviations from these conditions. One possibility is for the company to demonstrate that it has taken other measures, which in a similar (or better) way ensure the achievement of the objectives concerned. A second possibility is for a company to demonstrate that a certain measure does not apply to its particular situation or offers nothing additional to the achievement of the objective. This flexibility when using standard measures and criteria

does, of course, also work in reverse: every single inadequacy that is determined does not necessarily have to match with the absence of a standard measure or with the failure to comply with a criterion.

It is expected that companies will provide coherent answers to the open questions posed by the M.E.S., which will at least provide clarity about the presence of the standard measures and the extent to which they are described in controlled documents. In certain cases it could be useful to provide information about the content of the measures on the basis of the criteria. It is however not the intention that all criteria should be considered systematically in the answer to the open questions. This would make the answer too long and it would lose coherence. The criteria can be used by the auditor to ask supplementary questions, as a response to the answer provided by the company.

This manner of questioning and assessment demands thorough preparation for the audit by the company and an active role during the application of the M.E.S. This is fully in line with the cooperative agreement that asks companies to demonstrate that the necessary measures have been taken to control the risks of major accidents.

A black and white photograph of an industrial plant. In the foreground, two large, spherical vessels with vertical ribs are connected by a network of pipes and walkways. In the background, a tall, cylindrical distillation column rises into the sky. The overall scene is a complex of metal structures and piping.

**Part I:
BASIC CONCEPT
AND APPLICATION
OF THE M.E.S**

2

The application of the M.E.S.

2.1 The various ways of using the M.E.S.

The second version of the M.E.S. should permit the inspection teams (who are charged with supervising compliance with the stipulations of the cooperative agreement) to apply this inspection instrument in a flexible manner. This flexibility is necessary to take account of various factors:

- the previous inspections (including the application of the M.E.S.)
- the status of the safety management system
- the time available to carry out the required minimum inspections in the Seveso companies.

The flexibility in the application of the M.E.S. is manifest in three domains: the nature, the extent and the depth of the audit.

2.1.1 Nature of the audit

An audit of the safety management system of a company cannot be a one-off event but must be repeated regularly.

When initially used the emphasis of the audit will principally lie in the evaluation (of the content) of the procedures and systems that are in place. This evaluation will be repeated when a first audit reveals that certain components of the safety management system are missing or show major weaknesses. Also whenever certain systems have undergone extensive changes (for example following a restructuring operation or a take-over) then it can be necessary to re-evaluate them.

The more that certain components of the safety management system correspond to the objectives, the measures and criteria of the M.E.S., the more time will become available for the verification of the implementation of these components in practice.

The nature of the audit can thus vary from (mainly) evaluation to (mainly) verification.

2.1.2 The scope and depth of the audit

The various components of the questionnaire can be used separately. The more audit components are used, the greater the scope of the audit.

By making use of the criteria the depth of the audit can also be increased. The time needed to deal with a certain component of the questionnaire will, naturally, also increase.

2.2 The practical course of a M.E.S. audit

The different variables that characterise any application of the M.E.S. – nature, extent and depth – were referred to above. It is not possible a priori to set up a blueprint for all the combinations. The blueprint described here applies to the first application of a particular M.E.S. component (this does not therefore necessarily have to be the first time that components of the M.E.S. are used in the company).

2.2.1 Scheduling an M.E.S. audit

The application of the M.E.S. is a systematic inspection that fits into the inspection programme that is drawn up for each company. The period of application and the components of the M.E.S. that will be examined during a particular audit are laid out in this programme.

The company will be informed sufficiently well in advance of the planned audit period, the components that will be dealt with and the time that should be provided for each component.

The company will draw up a concrete agenda on the basis of this information and in consultation with the inspectors involved.

2.2.2 Preparing the responses

As was already explained in Part 1.2 the responses to the open questions posed by the M.E.S. must be prepared thoroughly. The responses to these questions must be concise, coherent and to the point. A number of guidelines are given below for the preparation of the responses.

1. Prepare for the questions in writing. The time that is then spent on an audit can be shortened if the inspectors can read the most important elements of a response (core terms, names of procedures, etc.) from an overhead sheet, slide or simply a copy of the responses. A blank copy for use during the preparations can be obtained.

ned via the website of the Federal Ministry of Employment and Labour (www.meta.fgov.be).

2. Always try to understand the objective that is being dealt with in each question. This is a necessary condition to be able to give a response that is to the point and thus allow you, as necessary, to have a constructive exchange of ideas with the inspectors during the audit.
3. Use the standard measures as a sort of skeleton around which you can build up a coherent answer for each question. Complete your answer with additional measures that you consider necessary to achieve the objective. Give an explanation about any measures that are not present.
4. Refer to procedures and similar documents in which the measures present (responsibilities, agreements, working methods, etc.) are described. After all it should be apparent from the response that the company has systems in place to ensure that a certain objective will be achieved. The documentation of organisational measures in controlled documents is an essential component of every management system.
5. Be concise in your response. Try to spend an average of five to seven minutes responding to each question and make ten minutes your maximum. During the audit there will be supplementary questions asked after you have given your response.
6. Be honest and open.

Safety is the responsibility of the hierarchy. It is therefore obvious that for a certain M.E.S. component the responsible person concerned has a duty to prepare the questions and to respond to them during the audit.

2.2.3 The pre-audit

The goal of the pre-audit is to request the relevant procedures, instructions and similar documents in advance of the audit. This permits the inspectors to prepare for the audit. In addition it also ensures that the documents concerned are available to the inspectors during and after the audit. It is naturally important to provide them with the most recent versions. The inspectors have the

authority to demand ALL documents that they consider necessary for their audit.

During the pre-audit the presence of the prevention advisor is sufficient (on condition, of course, that he or she has access to all the documents being requested). The preliminary survey also provides an opportunity to discuss any practical problems or to clarify particular questions.

2.2.4 The audit

During the audit the emphasis will lie on responding to the questions. The company is expected to provide a response to each question that is concise, coherent and to the point. After each response the inspectors will ask supplementary questions. As indicated above the appropriate members of the hierarchy should provide the responses.

During the interviews the relevant documents (procedures, reports, records, etc.) will be made available to the inspectors.

In addition to the interviews the inspectors can, of course, carry out the necessary verifications and interview additional persons.

2.2.5 Reporting the results

One or two weeks after the questionnaire has been completed, any failures revealed in the safety management system will be discussed with the management board of the company on the basis of a draft final report. A number of marked strong points that function as examples can be included in this report. Each failure will be assigned a priority (see Table 2.1).

priority	significance
1	High priority <ul style="list-style-type: none"> • The lack of a Prevention or System Activity or of an essential component thereof, • A failure that has a (fairly) direct effect on process safety.
2	Normal priority: <ul style="list-style-type: none"> • A failure that at present is compensated by a certain practice, but which in the long run may become critical through the lack of a systematic approach or formal procedures, • A failure that has a (fairly) indirect effect on process safety.
3	Low priority <ul style="list-style-type: none"> • A failure in which the correction would contribute to the optimisation of the system.

This meeting is an opportunity for the inspector to explain his findings and to answer any questions. At the same time possible misunderstandings can also be rectified. It is however certainly not the intention that every finding should be discussed or that corrective measures should be considered. After all the company is expected to thoroughly evaluate the remarks before formulating an opinion.

During this meeting a time span is also agreed for the establishment of a corrective action plan (see later). This time span is usually two to three months.

After the meeting the definite report with the findings of the audit will be drawn up and sent to the board with a confirmation of the deadline for the submission of an action plan.

2.2.6 Drafting an action plan with corrective actions

Before the end of the agreed period the company will submit a proposal for an action plan to the inspection team. For each shortcoming this plan will indicate what corrective action will be undertaken. This information will consist minimally of a short description of the solution chosen, the person responsible for carrying out the action and a deadline. Priority must be given to solutions that realise the objectives at a higher level in preference to specific solutions for very specific outcomes.

2.2.7 The evaluation of and follow-up of the action plan

The inspection team will evaluate the proposal for the action plan. If necessary the company will be asked to revise or clarify certain standpoints or actions.

There are two techniques for following up the implementation of the action plan. The first technique consists of following up the actions of the action plan individually.

A second technique consists of planning a new application of the M.E.S. for those parts of the safety management system that were missing at the time of the audit or that showed a large number of shortcomings. Doing it in that way avoids any possible loss of coherence between the various actions that

might result from staggered individual follow-up.

Both techniques can, of course, be combined in the follow-up of a particular action plan. In any case the company is kept informed of the manner in which its action plan will be followed up.

PART 2: M.E.S. QUESTIONNAIRE



1

Prevention Activities

1.1 The process installation

1.1.1 Specifying the process installation

- 1 How does the company ensure that an appropriate risk analysis is planned and executed when new installations are being designed or modifications are made to existing installations?**
-

Measures

- 1 Every proposal to develop a new process or to modify an existing installation is the subject of a formal request.
- 2 For every request, the kind of risk analysis to be carried out is determined after submission.
- 3 The choice of the appropriate risk analysis technique is a consequence of the application of clear criteria whereby the complexity of the process and the hazard potential is taken into account.
- 4 The responsibility for the choice of an appropriate risk analysis technique is specified.

Criteria

- 1.1 The following possibilities are also covered:
 - a change in the process operation (process conditions, order of processes, etc.)
 - limited modifications at the initiative of the maintenance or production department
 - temporary changes
 - modifications during the construction of the installation
 - changes during shutdowns.
- 2.1 For projects where third parties are called in to execute the design, the risk analyses to be performed are laid down contractually.
- 3.1 The development of a new process or of important modifications takes place in various phases whereby the part of the risk analysis to be carried out in each phase is defined.
- 3.2 When new processes or important modifications are being developed then a hazard analysis is always performed.
- 3.3 For smaller projects a check is always made to see whether the hazard potential has changed. That is the case with:
 - the introduction of new substances
 - the introduction of new reactions
 - a change in the quantities of hazardous substances
 - a change in the process parameters.If the hazard potential changes then the hazard analysis for the installation involved must also be modified.
- 3.4 If the appropriate risk analysis techniques cannot be unambiguously defined on the basis of the criteria, then advice should always be obtained from the Prevention Advisor and/or Environmental Coordinator.
- 3.5 The risk analysis techniques that are available for use are defined. For each possible choice there is a written instruction for the execution thereof.
- 4.1 The person responsible for this is the production manager for the installation concerned or a design engineer with a similar position in the organisational chart.

2 How does the company ensure that all process hazards are systematically identified?

Within the context of the M.E.S. the identification of process hazards has a restricted, well defined meaning:

- the investigation of all relevant properties of chemical substances and reactions
- the identification of all substances and reactions present under normal and abnormal conditions in every part of the installation.

Measures

- 1 The hazard analysis is executed according to a fixed method.
- 2 The results are documented in an orderly and uniform manner.
- 3 The practical organisation of the hazard analysis is defined.

Criteria

- 1.1 The creation of an inventory of all the substances involved is a component of the hazards study.
- 1.2 All the relevant characteristics that must be investigated for every substance are predefined. These include the following characteristics at least:
 - flammability
 - (acute) (respiratory and dermal) toxicity
 - thermal stability
 - reactivity
 - ecotoxicity
 - corrosiveness.
- 1.3 When new substances are introduced:
 - information about the safe use of the substance is requested from the supplier
 - a search is conducted for data and information on the basis of the experiences of other users
 - databanks are searched for accidents involving this substance
 - a search is conducted for the existence of recommendations regarding the safe use of this substance.
- 1.4 A component of the hazard analysis is establishing an inventory of all reactions (desired and undesired).
- 1.5 The characteristics of reactions to be investigated are predefined. This includes:
 - the reaction enthalpy
 - the heat capacity of the reaction mixture
 - the reaction speed
 - the adiabatic pressure and temperature increase.
- 1.6 Incompatibilities between substances are identified on the basis of an interaction matrix.
- 3.1 There is a statement of who must be involved in the hazard analysis.
- 3.2 The sources of information that are available and/or appropriate are predefined.
- 3.3 There is a list of research organisations that can perform tests if necessary.

3 How does the company ensure that all risks of major accidents can be identified systematically?

Within the context of the M.E.S. the identification of risks of major accidents has a restricted, well defined meaning. It refers to the identification of all causes and (types of) consequences of accidental releases with the potential to cause a major accident.

Measures

- 1 The causes of accidental releases of hazardous substances and/or energy are identified on the basis of a specific methodology.
- 2 The identification of the possible consequences of accidental releases of hazardous substances and/or energy is made on the basis of a specific methodology.
- 3 The probability estimate and the seriousness of the accidental releases of hazardous substances and/or energy are made on the basis of a specific methodology.
- 4 The practical organisation of the risk identification is specified.

Criteria

- 1.1 The methodology provides clear guidelines regarding the division of the installation into installation components to be investigated.
- 1.2 The most extreme limits of the process conditions are identified, such as:
 - the maximum and minimum temperature
 - the maximum and minimum pressure
 - the maximum and minimum concentrations.The most extreme limits of the external environmental circumstances are identified, such as:
 - the maximum wind load
 - the external heat radiation.
- 1.3 The method examines all phases of the process, such as:
 - commissioning
 - restarting after cleaning, inspection, maintenance
 - normal operations
 - stopping under normal circumstances
 - stopping in emergency situations.
- 2.1 This method takes account of both the internal risks and the risks for the environment (the natural habitat and man).
- 2.2 This method requires systematic mapping out of the dispersion routes and all damage receptors.
 - Dispersion routes: via the air, soil, surface water
 - Damage receptors: man, fauna, flora, infrastructure
- 3.1 Typical failures are divided into probability classes.
- 3.2 These failure frequencies are chosen conservatively on the basis of own experience, documentation from the supplier and data drawn from the literature.
- 3.3 Typical cases of damage are distinguished in terms of classes of severity. These damage cases relate to:
 - man (inside and outside the company)
 - the natural habitat (e.g. the surface of the polluted area, the distance that the pollution spreads out).
- 3.4 For risks to the environment (natural habitat and man) the risk perception of those living in the neighbourhood is also taken into account.
- 4.1 A multidisciplinary team carries out the identification of the risks of major accidents.

The following people are involved:

 - production personnel
 - inspection and maintenance personnel
 - Prevention Advisor
 - Environmental Coordinator.
- 4.2 The responsibility for forming the team is predetermined.
- 4.3 The team leader is completely independent of the project.
- 4.4 All team members are trained to use the technique chosen.
- 4.5 The information needed to carry out the methodology is clearly set out and is made available to the participants prior to the commencement of the analysis. This information includes:
 - the hazards as were identified in the hazard analysis
 - up-to-date process diagrams.

4 How does the company ensure that the prevention hierarchy is taken into account when measures are specified?

Measures

- 1 The prevention hierarchy that must be pursued is specified.
- 2 The pursuit of this hierarchy is formulated as one of the objectives of every design activity.
- 3 The design engineers are trained in the practical application of these principles.
- 4 Prevention measures are properly considered and documented according to a classification system that prioritises the measures in accordance with the prevention hierarchy.

Criteria

- 1.1 A possible prevention hierarchy could be:
 - measures that promote the inherent safety
 - passive measures (that prevent releases)
 - automatic active measures
 - procedural measures
 - damage limitation.
- 3.1 The company has a number of good reference texts in relation to inherent safety. One recommended work is for example "Inherently Safer Chemical Processes, A life cycle approach" from the Center for Chemical Process Safety, published by the American Institute of Chemical Engineers, New York, 1996.

5 How does the company ensure that the risks are assessed in a consistent manner?

Risk assessment means: giving a judgement about the risk, does one accept the risk or not, does the risk have to be further reduced or not?

In the detailed criteria one specific method for risk assessment is described. There are however other possibilities (see information report Process Safety Study, reference CRC/IN/002).

Measures

- 1 The company has explicit risk assessment criteria.
- 2 For every safety measure the desired reliability is set on the basis of the classification of the risk concerned in a risk class.

Criteria

- 1.1 The management of the company formally approves the criteria.
- 1.2 The risks are classified in terms of risk classes (by means of a risk matrix or a risk graph). Account is hereby taken of the probability and the seriousness for all damage receptors (man and the natural habitat).
- 1.3 The risks of the installation are evaluated with the control systems, but without the safety systems.
- 1.4 The standards that the safety measures for each risk class must meet in order to reduce the risk to an acceptable level are specified.

6 How does the company ensure that the management systematically investigates the recommendations from the risk analyses and that concrete actions are formulated if necessary?

Measures

- 1 Each risk analysis is concluded with a report of recommendations in respect to the measures to be taken or additional investigations that need to be undertaken.

- 2 The person who will decide about the actions to be undertaken is specified.
- 3 For each recommendation the decision is documented: either in terms of a concrete action to be undertaken, or as a reasoned argument about why the recommendation was not executed.

Criteria

- 2.1 It is possible to give the risk analysis team the authority to determine actions immediately. If there are financial restrictions, then the limits of this authority are clearly described.

7 How does the company ensure that the actions formulated which result from the risk analyses are carried out in a timely and effective manner?

Measures

- 1 There is a system for assigning priorities to actions.
- 2 For each action, a target date and a person responsible for ensuring its implementation are specified.
- 3 The working method used to follow up the implementation of the actions is specified.
- 4 The responsibility for following up the implementation of the actions is defined.
- 5 The execution of each action is documented.

Criteria

- 1.1 There is a distinction made between actions that have to be carried out before the installation goes into operation and actions that may be carried out after the installation goes into operation.
- 1.2 This assignment of priorities is a function of the risk class of the risk for which the measure was formulated.
- 3.1 A summary must be available at all times of the actions still to be undertaken (with target date, status and name of person responsible). From this summary it should be clear which actions have exceeded the target date.
- 3.2 Exceeding the target date may only occur following formal approval by one of the members of the management and the reasons for the postponement must be documented.
- 3.3 The following up of actions is reported regularly to the management.
- 5.1 Each action is formally concluded.
- 5.2 If an action is not carried out, then the reason for this is documented.

8 How does the company ensure that all prevention measures are documented in a well-organised manner as a function of the hazards and risks for which they were specified?

Measures

- 1 The results of the risk analyses are incorporated into a controlled document (further called the Process Safety Documentation), which at all times provides a summary of the hazards, risks and measures of the installations concerned.
- 2 The link with the release scenario for which it was formulated is indicated for each measure.

Criteria

- 1.1 This document must be modified each time new hazards or risks are identified or new measures are specified.

For example following:

- the execution of periodic risk analyses
 - risk analyses resulting from modifications to the installations
 - the investigation of incidents or accidents
 - the investigation of external empirical data.
- 1.2 The Process Safety Documentation must include for each component at least:
- the substances and reactions (desired and undesired)
 - the outer limits of the process and external environmental circumstances
 - the causes of accidental releases
 - the consequences of accidental releases
 - the measures.
- 2.1 Damage prevention measures are linked to the causes of the scenario.
- 2.2 Damage limitation measures are linked to the consequences of the scenario.

9 How does the company ensure that the risk analyses and the specified measures are periodically revised?

This revision checks the correctness and completeness of the following data:

- the hazard analysis
- the identification of the causes and the consequences of any possible accidents
- an assessment of the risks (seriousness and probability)
- the specified measures.

This can, for example, be done on the basis of a critical analysis of the Process Safety Documentation.

Measures

- 1 The company has a summary for each installation of all the risk analyses that have been performed.
- 2 The company has a schedule for the periodic revision of risk analyses.
- 3 Those persons responsible for drawing up the schedule are explicitly defined.

Criteria

- 2.1 This schedule clearly indicates when and which installations will be analysed and which technique will be used to do so.
- 2.2 The schedule also clearly indicates which persons are responsible for the revision of the risk analyses according to the schedule.
- 2.3 The minimum frequency is once every 5 years.

1.1.2 Implementing the process installation

A. Detailed design

1 How does the company ensure that the detailed design is well documented?

Measures

- 1 The company has established what the design documentation should comprise.
- 2 For each part of the design documentation the content and form are defined.
- 3 All components of the design documentation are included in a well-organised and structured classification.
- 4 Responsibility for the management of each part of the design documentation is defined.

Criteria

- 1.1 The design documentation includes:
 - "equipment data sheets"
 - detailed pipeline and instrumentation diagrams
 - wiring diagrams
 - a description of the logic of the process control
 - a description of the logic of the electronic safety systems (interlocks, alarms, emergency shutdown systems, etc.)
 - a hazardous area classification plan
 - a floor plan of the installation.
- 2.1 The company has established various categories of components and for each of these components a standard layout was drawn up for the "equipment data sheets". Typical categories are:
 - mechanical components such as pressure vessels and storage tanks, heat exchangers, piping, rotating equipment, filters, distillation towers, etc.
 - electrical equipment such as motors, switch boxes, etc.
 - measurement and control equipment such as sensors, detectors, actuators, etc.
- 2.2 The "equipment data sheets" contain at least the following information:
 - construction material
 - minimum and maximum pressure and temperature
 - the standards used (+ version)
 - the applicable regulations
 - etc.
- 2.3 The company has the necessary rules and conventions/standards for the drafting of:
 - the pipeline and instrumentation diagrams
 - the wiring diagrams
 - the logic of the process control
 - the logic of the electronic safety systems
 - hazardous area classification plans
- 2.4 If the detailed design is undertaken by a third party, then the content and form of the design documentation to be supplied is contractually fixed.

2 How does the company ensure that active safety-critical components are designed such that they meet the proposed functionality?

The following components must be considered as belonging to the group of active safety-critical components:

- all electronic safety circuits
- safety valves
- bursting disks.

Measures

- 1 The design criteria are documented for each active safety-critical component.
- 2 The desired reliability is documented for each active safety-critical component.
- 3 The operation of each active safety-critical component is the subject of a systematic failure analysis.

Criteria

- 1.1 Relevant design criteria for pressure relief systems are, for example:
 - all overpressure scenarios that were taken into account for sizing the relief system
 - the relief setpoints
 - the relief capacity
 - the possible presence of a two-phase flow during discharge
 - the substances to be discharged.

- 1.2 Relevant design criteria for electronic safety systems are, for example:
- the measurement range
 - the accuracy
 - the reliability
 - the response time
 - interference as a result of other measurements.
- 2.1 The desired reliability can be set in a quantitative manner or a qualitative manner.
The reliability can be set in terms of quality by, for example, providing various classes of reliability and giving rules for each of these classes for the detailed design.
- 2.2 The way that the detailed design must be demonstrated as having the proposed reliability is defined.
Possibilities are:
- via certificates (SIL classes according to IEC 61508, AK-class)
 - via reliability calculations.
- 2.3 Account is taken of:
- the frequency of inspection
 - the repair or replacement strategy (spare parts)
 - adverse influence factors (vibrations, corrosion, etc.).
- 3.1 Questions relating to pressure relief systems in general are:
- Was a check made of whether the pressure relief system should be designed for a two-phase flow?
 - Was a check made of whether a backpressure could be present on the discharge side?
 - When the relief pressure was determined, was a possible difference in pressure between the valve and the component being protected (vessel or pipeline) taken into account?
 - Was the pressure drop over the relief device inlet piping taken into account?
 - Was the pressure drop over the relief device outlet piping taken into account?
- 3.2 Specific questions for safety valves are for example:
- Was a check made of whether the opening pressure of the valve can be increased by deposits in the inlet pipe of the valve or on the valve seat?
 - Was a check made of whether the problem of "chattering" of safety valves will occur?
 - In the event that a bursting disk and a safety valve are placed in series: was the drop in pressure over both systems taken into account?
 - In the event that a bursting disk and a safety valve are placed in series: was a possible build-up of pressure between the bursting disk and the valve as a consequence of a leak in the bursting disk taken into account?
 - Were measures taken to prevent the safety valve being shut off (e.g. locking a shut-off valve in the safety valve in the open position, periodic inspection of the position of this shut-off valve)?
 - Was the safety valve included in an inspection programme?
- 3.3 Specific questions about bursting disks are, for example:
- Was a check made of whether the opening pressure of the bursting disk can be increased by deposits in the feed pipe to the bursting disk or on the bursting disk itself?
 - In the event that two bursting disks are placed in series, then was possible damage taken into account, which could occur to the second bursting disk through a premature failure (at a pressure lower than the relief set point) of the first bursting disk (such that both bursting disks fail at a lower pressure)?
- 3.4 Specific questions about blowdown systems are, for example:
- Was the dynamic load that is placed on the blowdown system upon discharge taken into account?
 - Were the reaction forces that are exerted on the end of the blowdown piping during discharge taken into account?

- Was the cooling caused by expanding liquefied gases during discharge taken into account?
 - Were measures taken to prevent the accumulation of water or condensate in the discharge piping?
 - In the event that the decision is made to have drainage holes to prevent the accumulation of water, was the possible release via these holes when blowing off also considered?
 - Was the possible blockage of the piping by the discharge products taken into account?
 - Was possible blockage of the piping by animals (birds) taken into account?
 - Was a check made to see whether the pressure relief system discharges at a safe location?
 - Is the material of the discharge piping resistant to the discharged products?
- 3.5 Specific questions about instrumentation are, for example:
- Are the measurements positioned such that they provide a representative value?
 - Is there a distinction between the zero value and an error value?

3 How does the company ensure that the installation is user-friendly?

Measures

- 1 The production department is involved in the detailed design.
- 2 A systematic ergonomic analysis of the detailed design is carried out.
- 3 There is a systematic ergonomic analysis of the user interface of the process control system.
- 4 Alarms and warnings are implemented according to a well-defined alarm philosophy.

Criteria

- 2.1 A checklist can be used for this.
A few examples of questions are:
 - Are the valves accessible?
 - Can the valves be easily operated?
 - Have measures been taken to prevent the valves being operated by accident?
 - Are local measurements easy to read?
 - Are the gangways wide enough?
 - Are the components numbered logically?
- 3.1 For this purpose a checklist can be used.
A few examples of questions are:
 - Do the screens provide a clear and complete overview of the installation?
 - Is connected information shown on a single screen?
 - Is a uniform colour code used (also suitable for colour-blind persons)?
- 4.1 A few principles of alarm management are:
 - There is a clear distinction between priority alarms and secondary alarms.
 - A summary can be obtained that lists only the priority alarms.
 - There are no alarms that do not merit action.

4 How does the company ensure that the installation is inspection- and maintenance-friendly?

Measures

- 1 The inspection department and the maintenance department are involved in the detailed design.
- 2 A systematic analysis is conducted of the inspection- and maintenance-friendliness of the design.

Criteria

- 2.1 A checklist can be used for this.
A few possible items from such a checklist are:
- accessibility for personnel
 - accessibility for equipment handling
 - sufficient space for the dismantling of components
 - possibilities for fitting lifting equipment or tools
 - possibilities for carrying out inspections of instrumentation during normal operations
 - possibility for emptying components completely
 - possibilities for isolating components (block-in)
 - manholes (sufficiently large and in sufficient numbers).

5 How does the company ensure that process equipment, which has been purchased, is in accordance with the design documentation?

Measures

- 1 The responsibility for drawing up the order documents is defined.
- 2 The responsibilities for initialling the order documents are defined.
- 3 There are guidelines regarding the form and the content of the order documents.
- 4 For every component that is to be delivered, the person who is to carry out the inspection on delivery is defined.

Criteria

- 2.1 For process equipment this is the person responsible for the project (project manager).
- 3.1 Where possible certificates and guarantees that certify the accordance with the criteria set are demanded when the order is placed.
- 4.1 Process equipment that has been delivered is inspected on the basis of the specifications, under the supervision of the person responsible for the design.

B. Construction and commissioning

1 How does the company ensure that the installation constructed meets the approved detailed specifications?

Measures

- 1 Checks are made during the construction as to whether the installation being constructed matches the "approved for construction" piping and instrumentation diagrams.
- 2 For each project a programme is drawn up of the tests and inspections to be carried out in order to monitor whether the installation meets the detailed specifications.
- 3 The responsibility for the correct execution of this programme is defined.
- 4 There is a formal follow-up programme for the correction of the deviations found ("punch listing").
- 5 The construction phase is rounded off with a formal confirmation (attestation, certificate) of conformity with the specifications (possibly accompanied by a list of work still to be completed).

Criteria

- 2.1 There is a check on the use of the correct materials on the basis of material tests, certificates or other documentation.
- 2.2 This programme consists of a check that the equipment was correctly installed on the basis of checklists per type of equipment, such as for example:
 - pressure vessels
 - packed columns
 - control panels
 - safety valves
 - piping.
- 2.3 The mechanical integrity of the installation is tested (e.g. via water pressure tests).
- 2.4 The pressure tightness of the installation is checked.
- 2.5 The programme contains the legal checks, including:
 - electrical installations
 - steam equipment
 - pressure equipment.
- 4.1 All safety-critical deviations must be corrected prior to starting up.

2 How does the company ensure that there are no uncontrolled deviations from the approved detailed specifications?

Measures

- 1 Every intention to deviate from the approved detailed specifications is the subject of a formal request.
- 2 The responsibility for the assessment of the acceptability of deviations is defined.
- 3 The person responsible decides whether an additional risk analysis is necessary.
- 4 All deviations are formally approved for execution.
- 5 The responsibility for amending the process documentation is clearly defined.

Criteria

- 1.1 For this purpose a form is available.

3 How does the company ensure that the installation and its peripheral equipment are in a safe state before hazardous substances are introduced?

Measures

- 1 The responsibility for the start-up is clearly defined.
- 2 The person responsible for the start-up has an attestation that confirms the mechanical completion.
- 3 A systematic check is made on the presence and operation of the required safety equipment on the basis of a checklist.
- 4 The Prevention Advisor releases the installation prior to start up by issuing a commissioning report.
- 5 A systematic check is made of the state of the installation prior to the introduction of hazardous substances on the basis of a checklist.
- 6 The decision to commission part of the installation whilst another section is still under construction, is in the hands of the senior management.

Criteria

- 3.1 These checks relate to the safety equipment such as, for example:
 - emergency showers
 - fire fighting equipment.
- 3.2 These checks include functional tests of all electronic safety systems, such as:
 - interlocks
 - alarms
 - detection apparatus.
- 3.3 These checks include verifying the state of safety valves and bursting disks and whether they are properly fitted.
- 4.1 The commissioning report can be combined with other reports
- 5.1 There is a check that ensures that, for example:
 - all inspection and test equipment has been removed
 - all sources of ignition have been removed
 - the installation has been cleaned and dried
 - all bunds are empty
 - all rubbish lying about (including construction waste) is removed.

4 How does the company ensure that the process documentation is in accordance with the constructed installation?

Measures

- 1 There are systematic checks to see whether the process documentation is in accordance with the installation constructed. The documentation is amended as necessary.
- 2 The responsibility for the correctness of the documentation is clearly defined.

Criteria

- 1.1 When a non-conformity is found, then a check is made to see whether the deviation was approved.
- 1.2 If the deviation was not approved, then an assessment is made of whether the deviation can be permitted (see objective 2).
- 2.1 When construction is taking place under the supervision of third parties, then correct "as built" documentation forms part of the specifications.

1.1.3 Maintaining the process installation

A. Inspection

1 How does the company ensure that all safety-critical components are included in an inspection programme?

Measures

- 1 Safety-critical components are identified as such.
- 2 For every safety-critical component one person has a clearly defined responsibility for the inclusion of this component in an inspection programme.
- 3 The information transfer from the project team to the inspection department when there is a new construction is clearly described.
- 4 For each safety-critical component the frequency and content of the inspection are defined.

Criteria

- 1.1 The following components are in any case to be regarded as safety critical:
 - process vessels
 - piping
 - flexible hoses
 - pumps and compressors
 - instrumental safety circuits
 - mechanical safety systems
 - bunds
 - safety signalling systems
 - fire-fighting and intervention equipment
 - detection systems
 - warning and alarm equipment
 - emergency lighting and smoke evacuation.
- 1.2 This information is included in the Process Safety Documentation.
- 4.1 Components for which regulatory stipulations exist with regard to inspection are identified as such.
- 4.2 In some cases, a periodic inspection may not be necessary. This should however be explicitly documented.

2 How does the company ensure that the frequency and nature of the inspections are chosen as a function of the risks?

Measures

- 1 For each type of equipment the company has the necessary guidelines and criteria for defining the content and frequency of the inspection as a function of the risks.
- 2 For quantitative measurements trends through time are assessed.

Criteria

- 1.1 In the case of instrumental circuits the inspection frequency is a function of the required reliability of the circuit (defined in the risk analysis).
- 1.2 In the case of instrumental circuits the entire circuit is tested.
- 1.3 The inspection frequency of the fire fighting equipment must at the least meet the criteria of the codes that were used for the design (e.g. NFPA) or the supplier's specifications.
- 1.4 The nature and frequency of the inspection of safety valves depends on:
 - the consequences of over pressure
 - influences that prevent the valve from working properly (corrosion, deposits, back pressure, etc.)
- 1.5 The nature and frequency of the inspection of pressure vessels and piping depends on:
 - the hazard potential of the substances contained
 - the corrosive or erosive nature of the substances contained
 - the environmental circumstances and other external influences.
- 1.6 The inspection of atmospheric tanks consists of at least one limited inspection every 3 years and a general inspection every 20 years according to the Vlare II stipulations.

3 How does the company ensure that the inspections are carried out on time?

Measures

- 1 The working method for achieving a concrete schedule for the inspections to be carried out is defined.

- 2 For each inspection the very last inspection date is set.
- 3 The responsibility for ensuring the inspections are carried out on time is specified.
- 4 The very last inspection date can only be exceeded after senior management (above production and inspection) has granted explicit permission.
- 5 The (non)-timely execution of the inspection programme is reported to the management.

Criteria

- 1.1 This consists of:
 - Who initiates the inspections?
 - How is the concrete schedule worked out?
- 1.2 When initiating inspections 2 instances are taken into account:
 - periodic summaries from the inspection programme
 - inspection lists for shutdowns.
- 4.1 The company has a specific request form for permission to exceed the very last inspection date which clearly states:
 - the possible consequences of a postponement
 - the reasons for postponement.

4 How does the company ensure that the inspections are performed correctly?

Measures

- 1 For each piece of equipment (or type of equipment) the execution of the inspection is described.
- 2 Special qualifications required for the execution of the inspections are defined.

Criteria

- 1.1 The instructions for the execution of an inspection state:
 - the preparations
 - the inspection procedure
 - the criteria that the component must meet.
- 1.2 Thickness measurements on vessels and piping are done on the basis of a diagram on which the measurement points are indicated.
The measurement points are chosen to be at those points where the risk of corrosion or erosion is considered greatest, e.g.:
 - in bends and other points where the speed is high
 - where condensation occurs
 - at low points and in dead-end sections.

5 How does the company ensure that the necessary corrective actions are initiated?

Measures

- 1 The measurement results and observations are documented for each inspection.
- 2 The responsibility for deciding to keep using components that no longer meet the approval criteria is defined.
- 3 The responsibility for deciding to take corrective action is defined.
- 4 Decisions to take corrective actions are based on the possible consequence of any failure and on the basis of the probability of failure.
- 5 For each inspection the conclusions are documented.
- 6 Inspection results that deviate strongly from expectations are regarded as non-conformities. This means that the underlying causes of such a deviation are investigated and similar situations are sought out.

Criteria

- 2.1 This responsibility lies with the senior management.
- 4.1 Production managers are involved when the consequences of a possible failure are estimated.
- 4.2 There are clear guidelines to permit the estimation of the consequences to be carried out in an objective manner.
- 4.3 When the probability of failure is estimated, then maintenance managers are involved.
- 4.4 There are clear guidelines to permit the estimation of the probability to be carried out in an objective manner.
- 4.5 When the possible consequences and the probability of a possible failure are estimated then the Process Safety Documentation for the component concerned is consulted.
- 5.1 These conclusions indicate at the least:
 - whether the component can remain in operation
 - whether any repairs are necessary and what these are
 - the very last date on which the following inspection should take place.

B. Preventive maintenance

1 How does the company ensure that the necessary preventive maintenance is included in a maintenance programme?

Measures

- 1 The programme specifies the content and frequency of the preventive maintenance for each component.

2 How does the company ensure that the preventive maintenance has been carried out on time?

Measures

- 1 The working method is specified by which a concrete schedule for maintenance to be performed is realised.
- 2 The last date for performing any preventive maintenance is specified.
- 3 The responsibility for ensuring the timely execution is defined.
- 4 The last maintenance date may only be exceeded following explicit permission from the senior management.
- 5 The (non) timely execution of the preventive maintenance programme is reported to the management.

Criteria

- 1.1 The working method specifies among other matters:
 - who initiates the preventive maintenance services
 - how the actual schedule is realised.
- 1.2 With the initiation of preventive maintenance two matters are taken into account:
 - periodic summaries from the preventive maintenance programme
 - maintenance lists for shutdown.
- 4.1 The company has a requisition form for requests relating to exceeding the last maintenance date, which clearly state:
 - the possible consequence of a postponement
 - the reasons for a postponement.

3 How does the company ensure that the preventive maintenance is correctly performed?

Measures

- 1 There are instructions for the performance of the preventive maintenance services.
- 2 Any special qualifications required for the performance of the preventive maintenance are specified.

Criteria

- 1.1 The instructions specify:
 - the preparations
 - the procedure to be followed for preventive maintenance.

C. Repairs

1 How does the company ensure that the necessary repairs are carried out on time?

Measures

- 1 A work order is generated immediately for every necessary repair.
- 2 The last date by which the repair must be done is specified for each repair.
- 3 The responsibility for ensuring the effective performance of the planned repairs is specified.
- 4 Deviations from the last repair day may only occur after explicit approval by senior management and are documented.
- 5 The status of the repair programmes is periodically checked.

Criteria

- 5.1 A summary of the repair work still to be carried out is available at all times.
- 5.2 A summary of the repair work already completed is available.

2 How does the company ensure that the necessary repairs are carried out correctly?

Measures

- 1 The original specifications for each component are documented and used as the starting point for the drafting of the work orders.
- 2 Reasons are given for any deviation from the original specifications.
- 3 The qualification of those carrying out the repairs is specified for the various types of repair work.
- 4 There is a system that ensures that the correct replacement parts are used.
- 5 The work order clearly identifies the component to be repaired.
- 6 A responsible person from the production department indicates the component to be repaired on location.

Criteria

- 3.1 Only qualified welders may undertake welding work.
- 4.1 A list of approved suppliers is used. The purchase of spare parts from a different supplier can only take place following formal approval and is documented.
- 4.2 When the components are delivered then they are checked to see whether they meet the specifications. For safety-critical applications a certificate is demanded from the supplier or additional tests are conducted.

- 4.3 All spare parts are clearly identified in the stockroom to ensure the correct selection is made.
- 5.1 Place number and equipment number are permanent sections in the work order.

D. Changes to prevention Measures

1 How does the company ensure that safety systems are not the subject of unverified changes?

Measures

- 1 All proposals to change a safety system are the subject of a formal request.
- 2 All changes are the subject of a risk analysis (cf. Part "Specifying the process installation").
- 3 There is a registration system for temporary changes.
- 4 The responsibility for following up temporary changes is defined.

Criteria

- 1.1 The safety systems are (amongst others):
 - electronic safety circuits
 - alarms
 - safety valves and bursting disks
 - "emergency block valves"
 - detection systems
 - bunds.
- 1.2 The resetting of operating parameters must be regarded as a change (e.g. opening pressure alarm settings, etc.).
- 1.3 There is a form for requesting changes.
- 3.1 The temporary removal from operation of safety devices (bypassing interlocks, shutting off safety valves, removal from operation of detection systems, etc.) will also be regarded as a temporary change.
- 3.2 Every temporary change is recorded.
- 3.3 For every temporary change the following is specified:
 - reasons for the change
 - date of the change
 - maximum duration of the change.

I.2 Operational procedures and instructions

I.2.1 Specifying operational procedures and instructions

A. Operation of the process

1 How does the company ensure that the necessary operational procedures exist?

Measures

- 1 The operation of every part of the installation is described in an operational procedure.
- 2 Each phase of the process is described in an operational procedure.
- 3 Specific procedures are drawn up for the operation of the installations in abnormal circumstances.
- 4 The responsibility for drawing up operational procedures for new installation components or new process operations is specified.
- 5 The way in which information is passed on when there is a shift change is specified.

Criteria

- 2.1 There are operational procedures for each phase of the process:
 - the commissioning
 - the start up following cleaning, inspection, maintenance
 - the normal operation
 - stopping in normal circumstances (e.g. for maintenance)
 - stopping in emergency situations.
- 2.2 The operation in an emergency situation is described in emergency procedures for each part of the installation.
- 3.1 Abnormal circumstances could for instance be:
 - restarting the installation after an unexpected breakdown
 - testing a new operation of the process
 - production whilst certain components are being maintained.
- 5.1 Successive shifts have limited overlap.
- 5.2 Information is passed on using a logbook.

2 How does the company ensure that the operational procedures contain sufficient and accurate information?

Measures

- 1 Operational procedures are drawn up on the basis of the Process Safety Documentation.
- 2 There are guidelines for the content of operational procedures.
- 3 There are guidelines for the content of emergency procedures.
- 4 Process and design engineers are involved in the drafting of these procedures.
- 5 The users of operational procedures are involved in the drafting of these procedures.
- 6 There is a formal final check made by the person responsible for the installation.
- 7 The Prevention Advisor initials the operational procedures.

Criteria

- 2.1 The operational procedures indicate:
 - the hazards of the substances and processes involved
 - the limits of the safe operational range of the relevant parameters (pressure, temperature, capacity, concentration, etc.)
 - the consequences of exceeding these limits
 - the manner in which exceeding these limits can be avoided

- the actions of automatic safety systems
 - the alternative actions to be undertaken in the event that the normal steps cannot be undertaken or cannot be successfully completed.
- 3.1 Emergency procedures describe very clearly the conditions in which they must be adhered to. Possible situations are:
 - breakdown of utilities (e.g.. electrical supply, refrigeration, etc.)
 - extreme operational conditions (temperature, pressure, etc.)
 - failure of piping, vessels, tanks, etc.
 - the non-availability of instrumentation or control systems.
 - fire or a gas leak in the installation concerned or in a neighbouring installation.
 - 3.2 Emergency procedures indicate clearly under what circumstances and how the emergency plan should be initiated.
 - 3.3 Emergency procedures clearly indicate who has the authority to initiate the emergency plan.

B. Performance of manual tasks

1 How does the company ensure that the necessary instructions exist for the performance of routine manual tasks?

Non-routine tasks are considered hazardous work (see part 1.4).

Measures

- 1 All routine manual tasks are inventoried.
- 2 Each task is evaluated to consider whether an instruction is needed.

Criteria

- 2.1 This evaluation is done on the basis of:
 - the complexity and the risk of the task
 - the professional knowledge of the people performing the task.

2 How does the company ensure that the instructions contain sufficient, accurate information?

Measures

- 1 Instructions are drawn up on the basis of a task analysis.
- 2 There are guidelines with respect to the content of instructions.
- 3 The users of instructions are involved in the drafting of these instructions.
- 4 Instructions are given a formal final check by the person hierarchically responsible for the person doing the task.
- 5 The Prevention Advisor initials the instructions.

Criteria

- 1.1 The manner in which the task analysis is performed is specified.
- 1.2 The persons who are involved in the task analysis are specified.
- 1.3 The persons who perform the task analyses have received training for this job.
- 2.1 The instructions state:
 - the hazards of the substances concerned
 - the precautions to be taken
 - the mandatory personal protective equipment
 - the use of special tools (if necessary).

1.2.2 Implementing operational procedures and instructions

1 How does the company ensure that the operational procedures and instructions have the necessary ergonomic qualities?

Measures

- 1 Operational procedures and instructions are drawn up according to a fixed structure (i.e. a fixed order of chapters)
- 2 The company has clearly defined criteria in respect of the ergonomic qualities of the operational procedures and instructions.

Criteria

- 2.1 The title accurately describes the activity involved.
- 2.2 The objective is clearly described in full.
- 2.3 References to other operational procedures and/or instructions are limited.
- 2.4 Operational procedures or instructions which are referred to are clearly identified.
- 2.5 Documents that are referred to are listed separately.
- 2.6 Special precautions:
 - are marked conspicuously and clearly recognisable (as a special precaution)
 - are stated before (and not after) the step to which they apply
 - state the possible consequences of an incorrect action (the failure to take heed of the precaution)
 - are also included as a "step" in the procedures/instructions.
- 2.7 If the procedures or instructions are to be carried out by more than one person, then for each step the person performing it must be clearly specified.
- 2.8 The procedures or instructions use short, concise sentences.
- 2.9 If several items (components, equipment) are involved in a particular step, then they are listed. They are not included in a section of continuous text.
- 2.10 Each item is clearly defined (e.g. via a tag number).
- 2.11 Parameters are expressed quantitatively. Margins are not expressed in terms of percentages.
- 2.12 The procedures or instructions state the alternative actions to be undertaken if the usual steps cannot go on or cannot be completed successfully. The deviation from the usual routine is stated before (and not after) the alternative action.
- 2.13 If the person doing the work is required to take certain decisions on the basis of certain conditions or criteria, then these conditions or criteria will be indicated before the possible actions (and not after).
- 2.14 If a certain action is the result of a combination of various conditions, then these are listed separately (underneath each other and not in continuous text).
- 2.15 There must be clarity about any calculations that have to be performed. In the event of more complex calculations a formula or table is provided.
- 2.16 Any tables or graphs allow the necessary information to be found in a simple way. The tables contain only the information needed to carry out the procedures/instructions.
- 2.17 Tables and graphs should be included as far as possible in the text (not in annexes).
- 2.18 The various steps required for the performance of the procedures or instructions are numbered and described separately, step by step.

2 How does the company ensure that the necessary explanation, schooling or training is given before new or amended procedures or instructions are put into operation?

Measures

- 1 For all operational procedures and instructions the potential users are clearly defined.
- 2 The content of the schooling or training is specified.
- 3 For each procedure a record is kept of who has received which schooling or training and when.
- 4 The responsibility for giving this schooling or training is defined.

Criteria

- 1.1 All operational procedures and instructions specify who the potential users are.
- 2.1 The procedure indicates what the required schooling method is for each category of users.
- 2.2 Modifications to procedures/instructions are indicated.

3 How does the company ensure that only the most recent versions of the operational procedures and instructions are used?

Measures

- 1 All operational procedures and/or instructions are uniquely identified.
- 2 There is a simple way of checking which is the latest version of all operational procedures or instructions.
- 3 The numbers and location of the copies are specified.
- 4 An owner is allocated for each copy.
- 5 The responsibility for the distribution of operational procedures and instructions is specified.
- 6 There is a system for removing out-dated versions.
- 7 Printouts of electronic versions have a limited period of validity that is clearly marked on the printout.

Criteria

- 1.1 All operational procedures and instructions carry:
 - a revision number
 - the date of issue
 - the date it takes effect
- 1.2 Temporary procedures/instructions are identified as such.
- 1.3 The last valid date is always indicated on temporary procedures/instructions.
- 2.1 There is a general list with the latest version of all operational procedures and instructions.
- 3.1 There is a distribution list for all operational procedures and instructions.

4 How does the company ensure that the operational procedures and instructions are made available to the users easily?

Measures

- 1 The operational procedures and instructions are organised according to a logical classification so that searches are simple.
- 2 In the case of electronic distribution every user has access to the network.
- 3 In the case of electronic distribution every user has the possibility of printing out the procedures or instructions in order to take a copy into the installation if the correct performance of a procedure or instruction requires this.
- 4 Emergency procedures are fast, direct and always accessible.

Criteria

- 1.1 The titles of procedures/instructions indicate the contents clearly.
- 4.1 Emergency procedures occupy a separate place in the manuals with operational procedures.
This place is the same in all manuals.
An alternative is a separate manual with the emergency procedures.
- 4.2 Emergency procedures are printed on coloured paper.
An alternative is a separate manual with a different colour of cover.
- 4.3 In the case of electronic access the emergency procedures can be called up on any screen by pushing a single button.
- 4.4 The latest version of the emergency procedures is always available on paper.

1.2.3 Maintaining operational procedures and instructions

1 How does the company ensure that the personnel continue to have sufficient knowledge and skills to be able to operate the process in a safe manner?

Measures

- 1 The topics on which periodic schooling or training are given are specified.
- 2 The minimum frequencies, with which these topics must be presented, are specified.
- 3 The responsibility for the practical organisation of these periodic schooling sessions is clearly specified.
- 4 After each schooling or training session a check will be made to see whether it has achieved the desired result.
- 5 The schooling or training is recorded for every employee.

Criteria

- 1.1 The following topics should be dealt with, as a minimum:
 - knowledge of the hazardous properties of the substances and reactions involved
 - critical process parameters, the consequences of exceeding these and the corrective actions to be undertaken
 - operational emergency procedures.

2 How does the company ensure that the operational procedures and instructions are not amended in an unverified manner?

Measures

- 1 For all operational procedures and instructions there is a clear definition of who has authority to make modifications.
- 2 The way in which the users of the operational procedures and instructions can submit a proposal for modification is specified.
- 3 The responsibility for making a decision about a proposal to modify is also specified.
- 4 There is a formal ban on making handwritten modifications to official copies of operational procedures or instructions.
- 5 There is a system for announcing temporary or frequently modified instructions in a controlled manner.
- 6 The modification of electronic versions is protected.
- 7 A reserve copy is made of all procedures/instructions.

Criteria

- 2.1 There is a form for submitting suggestions for modifications to existing operational procedures and instructions or for the creation of new ones.
- 2.2 The persons to whom these forms must be submitted are specified.

3 How does the company ensure that the operational procedures and instructions are regularly revised?

Measures

- 1 The minimum frequency for the revision of operational procedures and instructions is defined.
- 2 The users are involved in the periodic revision of the operational procedures and instructions.

I.3 Measures for hazardous work

I.3.1 Specifying measures for hazardous work

1 How does the company ensure that all hazardous work is conducted in a controlled manner?

Measures

- 1 Those activities that are regarded as hazardous work are defined.
- 2 All these activities constitute the subject of a written work order.
- 3 For the work order a form is used that ensures that the description of the work is complete.
- 4 For every work order, it is clear who has the authority to draw it up.

Criteria

- 1.1 Different classifications can be used.
 - On the basis of the nature of the activity:
 - opening piping
 - sealing leaks
 - hot work
 - excavation activities
 - entry of confined spaces
 - clearing a blocked line
 - work that could disrupt normal emissions.
 - On the basis of the equipment that has to be worked on:
 - sprinkler systems
 - piping
 - detection systems
 - installations that can cause emissions such as water purification installations, flares, heating installations, etc.
- 1.2 The simplest solution is to regard all work that takes place in a zone where hazardous substances are present as hazardous work.
- 1.3 Work that is carried out by third parties in and around installations that contain hazardous substances, is regarded in every case as hazardous work.
- 1.4 Another possibility is to define what should not be regarded as hazardous work.
- 3.1 The work order describes the precise content of the job.
- 3.2 The work order states the exact location of the operations:
 - the department
 - the installation
 - the piece of equipment on which the work has to be done (clearly identified via identification codes).
- 3.3 The work order states the reasons for carrying out the work.

2 How does the company ensure that a suitable risk analysis has been carried out prior to the performance of hazardous work?

Measures

- 1 The manner in which the risk analysis for hazardous work must be carried out is specified.
- 2 The company has guidelines for various types of hazardous work in which the typical risks for these operations are described. These guidelines are used to support the risk analysis that is carried out for every actual operation.
- 3 The hazards and risks linked to the operations are listed and documented in the work description or on the work permit form.
- 4 The responsibility for performing the risk analysis is specified.

- 5 The persons who should be involved in the risk analysis are specified.
- 6 The persons involved in the risk analysis have been given training in the identification of risks of operations and the specification of prevention measures.
- 7 Modifications to the operations being carried out or to the circumstances in which they are carried out form the subject of a supplementary risk analysis.
- 8 An alarm situation results in the suspension of all work permits.

Criteria

- 1.1 This analysis examines:
 - the hazards and risks inherent to the installation on which work has to be done
 - the hazards and risks inherent to the hazardous work that has to be carried out
 - possible interactions between different activities that are being done simultaneously
 - the risks inherent in solitary working
 - the possible impact of the hazardous work on neighbouring installations
 - the possible impact of the hazardous work on the environment (natural habitat and people outside the company).
- 2.1 Examples of types of operations are:
 - the opening of the installation (piping, vessels, etc.)
 - operations whereby ignition sources are introduced ("hot work")
 - entering confined spaces
 - civil engineering operations such as excavation operations, lifting operations, supporting piping, etc.
 - exceptional transport through or nearby hazardous installations.
- 3.1 The work order or work permit states the substances that could be released and the possible consequences for those carrying out the work.
- 5.1 Those possibly involved are:
 - a representative of the department in which the hazardous work is to be carried out
 - a representative of the service that is carrying out the hazardous work
 - the Prevention Advisor
 - the Environmental Coordinator.
- 6.1 This training is repeated periodically (max. every 3 years).

3 How does the company ensure that the prevention measures ensure a consistent level of safety when hazardous work is being carried out?

Measures

- 1 The responsibility for establishing the measures is defined.
- 2 Typical measures for the various types of hazardous work are specified and documented. They serve as the basis for the measures that must be specified separately for each case
- 3 Those performing the risk analysis are given periodic training in the typical measures for different types of hazardous work.
- 4 The entire body of measures is evaluated and approved by someone who is independent of those who have specified the measures.
- 5 Spot checks are carried out periodically to check whether the specified measures are in accordance with the guidelines.

Criteria

- 2.1 Typical measures for the opening of installations are:
 - isolation (blocking-in)
 - locking out pumps and valves
 - cordoning off the vicinity
 - rinsing

- emptying and depressurising
 - checking the installation to ensure it is empty and depressurised
 - guidelines for opening flanges
 - PPE on the basis of the worst exposure scenario on opening.
- 2.2 There are clear guidelines that prescribe the way in which piping has to be shut off depending on the risks. Possible ways of shutting off piping are, for example:
- - via valves
 - - via locked valves
 - - via spectacle blinds or blind flanges
 - - by removing pieces of piping
- If locks are used to secure valves there are clear guidelines that regulate the use of such locks.
- 2.3 Typical measures for entering confined spaces are:
- emptying and cleaning (according to written instructions)
 - isolation (by removing piping or the use of spectacle blinds)
 - testing the atmosphere for oxygen, hazardous products and LEL
 - breathing protection devices (the rules for the type to be chosen are specified)
 - presence of a standby attendant, whose duties are clearly stated
 - means of communication between attendant and person entering the space
 - means with which the attendant can call for additional help
 - equipment to allow the attendant to put an end to any life-threatening condition in which a victim may be.
- 2.4 Typical measures for hot work are:
- LEL measurement before commencing and frequently or continuously whilst the work is being done
 - covering up openings into which sparks could fall
 - stand-by extinguishing equipment
 - standby attendant with fire-fighting equipment
 - removal of inflammable materials
 - no other work to be carried on in the vicinity (e.g. opening an installation).
- 2.5 Typical measures for excavation work:
- - there is a location map on site with the underground piping and cables
 - - measures against holes collapsing
 - - movement permits for heavy vehicles.
- 2.6 Typical measures for hazardous work that could disrupt normal emissions are:
- - removal of waste products to recognised processors
 - - stricter monitoring (e.g. continuous measurements)
 - - partial shut-down of the installation
 - - presence of absorbent materials
 - - presence of local catchment facilities
 - - presence of buffer capacity
 - - presence of extra catchment facilities.
- 4.1 In the case of a work permit the responsible person gives approval for the operation to be carried out in accordance with the stipulations in the work permit.

4 How does the company ensure that the prevention measures are specified clearly and in sufficient detail?

Measures

- 1 The measures are indicated on a work permit form on which a number of standard measures are sufficiently clearly indicated.
- 2 The work permit form provides enough space in which to specify additional measures (in addition to the standard measures).

- 3 A distinction is made between measures that are taken to ensure the safety of the installation prior to the commencement of the work and measures that have to be taken by those carrying out the work.
- 4 Where the installation has to be isolated using spectacle blinds or blind flanges, a list is provided and a plan that states where these are to be located.
- 5 The work permit form provides a list of the accompanying documents.

Criteria

- 1.1 Personal protective measures are clearly described:
 - not simply "gas mask with filter" but "gas mask with filter of type ..."
 - not simply "gloves" but also which type (material)
 - not simply "glasses" but also which type (open, closed, etc.).
- 1.2 A hot work permit states the hazardous area classification of the location where the work is to be done.
- 1.3 The works permit states special working instruments or tools that have to be used (e.g. spark-free).
- 4.1 If particular components are referred to (valves, pumps, piping sections, etc.) these are:
 - clearly specified via an identification code that is also affixed on site
 - clearly indicated on a diagram that is attached to the work permit.
- 4.2 The spectacle blinds and blind flanges are numbered.
- 5.1 Accompanying documents could be:
 - spectacle blind lists
 - process diagrams
 - other work permits
 - measurement results.

1.3.2 Implementing measures for hazardous work

1 How does the company ensure that the installation is out of service and secured before the hazardous work commences?

Measures

- 1 The responsibility for ensuring that the installation is secured, is specified.
- 2 A check on the measures on site is provided, independently of the person carrying out these measures.
- 3 The responsible person signs for the release of the installation on the permit form. Only then can the hazardous work be commenced.

Criteria

- 1.1 The person responsible for ensuring the safety of the installation on which work is to be done is the person responsible for production in the installation.
- 2.1 This check is registered for each prevention measure on the work permit form or some other relevant document (e.g. spectacle blinds list).

2 How does the company ensure that the persons carrying out the hazardous work have taken the necessary prevention measures before commencing the work?

Measures

- 1 The work permit is discussed with the person carrying out the work before the work is performed.
- 2 The responsibility for taking the prevention measures that ensure safe performance of the work is specified.
- 3 A person who is independent of the person performing the work checks the presence of the measures on location.

Criteria

- 1.1 During this discussion it is made clear to the person carrying out the work:
 - what the hazards and risks are that are related to the work
 - what measures have been taken to ensure the installation is safe
 - what measures must be taken during the work.
- 1.2 The work permit form indicates that this discussion has taken place.
- 2.1 Generally this is a hierarchically senior person to the person carrying out the work.
- 3.1 This check is registered for each measure on the work permit form.

1.3.3 Maintaining measures during hazardous work

1 How does the company ensure that the installation is kept out of service and secured for the entire duration of the hazardous work?

Measures

- 1 The length of time for which the measures must be maintained is clearly indicated on the work permit form.
- 2 The permits for work being completed are displayed in a systematic manner in the control room(s) of the installation(s) involved.
- 3 When there is a shift change then the following shift formally acknowledges the current work permits and the measures that were taken to ensure the safety of the installation.
- 4 Permits with a time span of more than 1 day must be revalidated on a daily basis.

Criteria

- 1.1 Time data to be included in the work permit form:
 - the starting time
 - the time at which the permit lapses or must be renewed.
- 2.1 The work permits are made available at one fixed, designated location in the control room.
- 2.2 The work permits are classified so that there is always a clear overview of:
 - the hazardous work that has been requested (not yet commenced)
 - the hazardous work in progress
 - the completed hazardous work
 - the postponed work permits.

2 How does the company ensure that the measures for the safe execution of the hazardous work remain in force during the entire duration of the hazardous work?

Measures

- 1 The responsibilities for maintaining the measures during the execution of the hazardous work are clearly defined.
- 2 The person carrying out the work keeps a copy of the work permit at the location of the hazardous work.
- 3 There is a system of periodic checks on the adherence to the measures during the execution of the hazardous work.

Criteria

- 2.1 The copy is protected against external influences (rain, wind, etc.).

3 How does the company ensure that the installation can be brought back into operation safely after the hazardous work has been completed?

Measures

- 1 After completion of the hazardous work a check is made as to whether the work was performed correctly.
- 2 The installation can only be taken into operation via a formal start-up procedure.

Criteria

- 1.1 In this connection the tidiness and orderliness of the work place are be examined.
- 1.2 The person responsible confirms the completion of the work by means of a signature on the work permit form.
- 2.1 Starting up the installation is done on the basis of a checklist which verifies the following points:
 - the correct position of valves
 - the operation of the safety systems (e.g. locks on interlocks)
 - absence of blind flanges.

I.4 The emergency planning

I.4.1 Specifying the emergency planning

1 How does the company ensure that the emergency planning is based on representative accident scenarios?

Measures

- 1 The representative accident scenarios are formally listed and described.
- 2 The working method for defining these representative accident scenarios is specified.
- 3 Someone is appointed responsible for the management of the list with representative accident scenarios.
- 4 "Triggers" are provided to revise and as necessary amend the list of representative scenarios.

Criteria

- 1.1 The minimum amount of information that the description of the accident scenarios must contain is specified.
- 2.1 The Process Safety Documentation (see part 1.1.1 "Specifying the process installation") of the installations concerned should be taken as the starting point in the selection of representative accident scenarios.
- 2.2 The representative scenarios are selected by a multidisciplinary group that includes:
 - the person responsible for production in the installation
 - an expert in the field of emergency planning
 - the Prevention Advisor
 - the Environmental Coordinator.
- 2.3 When selecting representative scenarios, any relevant incidents and accidents that have taken place in the company and in other companies are also taken into account.
- 2.4 Domino effects are also taken into account.
- 4.1 The representative accident scenarios are reviewed when:
 - new substances are introduced
 - when the use of a particular substance is ceased
 - changes are made in the quantity of the substances present
 - changes are made to the design
 - changes are made to the distribution route (e.g. re-laying of the sewers)
 - changes are made in the local vicinity.
- 4.2 The representative accident scenarios are reviewed at least once every 3 years.

2 How does the company ensure that for each representative scenario the intervention strategy and the necessary resources for intervention are specified?

Measures

- 1 The method of working for defining the internal intervention strategy is specified.
- 2 The goal of the internal intervention is clearly defined for each scenario.
- 3 The duties of the intervention team are described for each scenario.
- 4 The duties to be carried out by the production personnel of the installations are described for each scenario.
- 5 The material resources required for the intervention on site are defined for each scenario.
- 6 The composition of the intervention team is defined.
- 7 For each installation the minimum staffing required for safe exploitation is specified.

Criteria

- 1.1 The intervention strategies are defined by a multidisciplinary group that includes:
 - the person responsible for production in the installation
 - an expert in the field of emergency planning
 - the Prevention Advisor
 - the Environmental Coordinator.
- 1.2 The internal intervention strategies are discussed with the external intervention services.
- 2.1 Goals could for example be:
 - the rescue and evacuation of the personnel, no active measures to combat the emergency situation
 - suppression of incipient emergency situations (e.g. extinguishing a fire in the early stages)
 - combating fully developed emergency situations (e.g. extinguishing a blaze).
- 2.2 For every scenario it is specified in which situations evacuation must be undertaken and in which situations the choice must be to shelter in buildings.
- 2.3 The notification of external emergency services is included in the intervention strategy.
- 5.1 The resources required for the intervention on site are listed:
 - fire fighting equipment
 - resources for combating leaks (absorbent powders, wedges, pins, plugs, etc.)
 - resources to prevent the spread of hazardous substances
 - rescue equipment
 - communications equipment
 - personal protective equipment.
- 5.2 There is a list with equipment that can be supplied from external sources (neighbouring company, fire brigade, etc.) as a possible supplement to the internal resources.
- 5.3 The required resources are defined in consultation with the fire brigade.
- 6.1 The number and the function of the members of the intervention team are defined.

3 How does the company ensure that the activities are coordinated in an emergency situation?

Measures

- 1 The overall response of the company to an emergency situation is clearly described.
- 2 The various functions and tasks necessary for the proper execution of the emergency plan are listed and described.
- 3 The location and equipment of the crisis centre are specified.

Criteria

- 1.1 The overall response of the company is described in a step diagram starting from the notification of a (possible) emergency situation right through to the termination of the emergency situation.
- 2.1 The most important functions and tasks are related to:
 - the general responsibility during the emergency situation
 - the participation in the crisis team
 - the securing of the installations
 - the supervision of the intervention on site
 - the reception and escorting of the external intervention services (e.g. fire brigade)
 - the initiation of the various phases of the emergency plan
 - the determination of how extensive the evacuation should be
 - the coordination on the premises of the evacuation

- the coordination in the shelter locations
 - care of the injured
 - external communications (with the government, the media, the families of the victims).
- 2.2 The descriptions of the functions and task specify among other matters:
- the tasks to be performed
 - the place in which they must be performed (the entrance to the company, the crisis centre, etc.)
 - the means of communication to be used
 - the person to whom matters should be reported.
- 3.1 The crisis centre is sufficiently large to accommodate the maximum number of members of the crisis team.
- 3.2 The technical documentation in the crisis centre includes:
- the emergency plan
 - the emergency stop procedures
 - the accident scenarios and corresponding intervention strategies
 - an inventory of the intervention resources
 - a map of the local area with access roads
 - a general map of the company (internal roads, control room, buildings, assembly points, evacuation routes, etc.)
 - a map of each unit with product inventory and localisation of radioactive sources
 - a map of the pipelines and isolation valves
 - a map of the fire extinguishing water net (fire extinguishing water reserves, pump capacities, separation taps, hydrants, water cannons, sprinklers, water curtains, etc.)
 - a map of the sewers and drainage system
 - a map with the electricity distribution network (underground and overhead cables, sub-stations, etc.)
 - the hazardous area classification plan
 - a map with medical resources
 - general maps of the company to make notes on
 - a map of the detection systems
 - material safety data sheets for all substances.
- 3.3 Crisis centre equipment includes:
- emergency electrical supply
 - emergency lighting
 - telephone
 - mobile phone
 - radio link to the intervention(s)
 - fax
 - writing materials
 - writing board (whiteboard)
 - overhead projector
 - photocopier
 - telephone numbers of government services and emergency services to be notified
 - telephone numbers of neighbouring companies
 - computer programs to carry out dispersion calculations.

1.4.2 Implementing the emergency plan

1 How does the company ensure that all emergency plan functions can be fulfilled at all times?

Measures

- 1 For each function in the intervention team there is a matching function in the normal process operation.
- 2 For each function in the intervention team there is someone appointed to act as reserve in the event that the person concerned is unavailable.
- 3 Other employees with a function in emergency situations can always be contacted and can reach the company relatively quickly.

Criteria

- 1.1 The functions for normal operation are occupied under all circumstances (day, night, and vacation periods).
- 1.2 The functions are also explicitly specified during shift changes (i.e. are the functions to be fulfilled by the new shift or the shift that is being relieved or by both).
- 3.1 Via telephone, semaphore, mobile phone, etc.
- 3.2 There is a list of the names and contact details of all persons who must be called up in the event of an emergency.
- 3.3 The employees called up can reach the company, even in the event of the access roads to the company being blocked (agreements with the local authorities about this, identification badges, etc.).
- 3.4 The time that the employees called up need to reach the company is taken into account.

2 How does the company ensure that everyone has clear instructions with regard to emergency situations?

Measures

- 1 There are instructions relating to the recognition and notification of emergency situations.
- 2 There are instructions for contacting the external emergency services (100 service).
- 3 There are instructions that prescribe how people should react to warning and alarm signals.
- 4 There are instructions for the intervention leader.
- 5 There are instructions for the evacuation leaders.
- 6 There is a document control system that manages the distribution of the written emergency plan instructions.

Criteria

- 1.1 It is clearly specified to whom an emergency situation must be notified.
- 1.2 The emergency number is indicated on every telephone.
- 2.1 These instructions state the content of the notification to the external emergency services. These instructions include:
 - the nature of the accident (fire explosion, gas leak, water pollution, etc.)
 - the location of the accident
 - the substances involved and quantities
 - the number of victims.
- 4.1 The following tasks and responsibilities can be assigned to the intervention leader:
 - the decision regarding the strategy to be followed (offensive / defensive)
 - the decision regarding evacuation
 - the decision regarding the resources and personnel to be used
 - the decision regarding the personal protective equipment to be used.

- 6.1 There is a distribution list with the copies of the emergency plan.
- 6.2 Each copy states:
 - the revision number
 - the publication date.
- 6.3 There is a system for removing out-of-date versions.

3 How does the company ensure that employees are evacuated on time and any missing personnel are traced?

Measures

- 1 The evacuation signals are specified.
- 2 Visitors, truck drivers and third parties are informed about the evacuation signals.
- 3 The assembly points are clearly defined and marked.
- 4 There is a system for checking whether anyone is missing.

Criteria

- 1.1 The evacuation signal must be continuous.
- 3.1 There are several assembly points (depending on the wind direction).
- 3.2 For incidents with toxic gases or vapours evacuation is to gas-tight shelters.
- 4.1 All visitors and employees of third parties are registered when entering the company premises.
- 4.2 There is a registration system for those present in an installation.
- 4.3 The list of all those present is available at the assembly points.

1.4.3 Maintaining the emergency planning

1 How does the company ensure that the information in the emergency plan is up to date?

Measures

- 1 Small changes (telephone numbers, etc.) are immediately included in the emergency plan.
- 2 The responsibility for keeping the emergency plan up to date is specified.
- 3 The information in the emergency plan is periodically verified.

Criteria

- 1.1 Names and telephone numbers are listed in an appendix so that when there are changes the entire emergency plan does not have to be revised.

2 How does the company ensure that the necessary periodic training with respect to the emergency planning is given?

Measures

- 1 The training requirement for every employee is included in a training programme.
- 2 The frequency of repetition of every training course in the training programme is specified.
- 3 Every training course is registered per employee.
- 4 The person who follows up the implementation of the training programmes is specified.

Criteria

- 1.1 The training requirements of every employee cover matters such as:
 - the recognition of possible emergency situations

- the notification of such emergency situations
 - how to react to warning and alarm signals
 - knowledge of the evacuation procedures
 - the use of portable fire extinguishers.
- 1.2 Training requirements for the intervention personnel:
- hazards and possible accident scenarios within the installations
 - intervention techniques for combating fire, gas clouds, etc.)
 - rescue techniques
 - first aid.

3 How does the company ensure that the proper operation of the emergency planning in practice is tested and evaluated?

Measures

- 1 There is a programme for holding intervention and emergency plan exercises.
- 2 The exercises are based on the representative scenarios.
- 3 Such exercises are always followed by an evaluation.

Criteria

- 1.1 The programme ensures that all shifts get a chance to participate in these exercises.
- 1.2 The programme ensures that exercises are also held outside normal office hours.
- 1.3 Every 3 years the full emergency plan is tested (see Article 18 of the Cooperation Agreement or Article 11, point 4 of the Seveso 2 directive). The external emergency services will participate in this exercise.
- 1.4 Evacuation exercises are held at least once a year.
- 3.1 It may be necessary to revise the intervention strategy as a result of the evaluation.

4 How does the company ensure that all resources in the context of the emergency planning are in a state of readiness?

Measures

- 1 All intervention equipment is included in inspection or maintenance programmes.
- 2 For all intervention equipment the content and frequency of the required inspections or the required maintenance is specified.
- 3 The results of the inspection are recorded for all intervention equipment.
- 4 The responsibility for the proper performance and follow-up of the inspection programmes for the intervention equipment is specified.

Criteria

- 1.1 Fire fighting equipment includes:
 - sprinklers
 - fixed monitors, hydrants, water cannons
 - fire pumps
 - fire fighting water reserves
 - fire fighting water network
 - extinguishing equipment
 - fire engines
 - smoke vents
 - fire doors.
- 1.2 Personal protective equipment includes:
 - gas suits

- gas masks
 - self-contained breathing apparatus.
- 1.3 Means of communication include:
- emergency radios
 - warning and alarm signals
 - emergency telephones.
- 1.4 Other equipment that can be regarded as intervention materials are, for example:
- absorption material
 - sandbags
 - mobile monitor sprayers
 - leak sealing material.

I.5 Personal protective equipment

I.5.1 Specifying personal protective equipment

1 How does the company ensure that the personal protective equipment is selected in accordance with the identified risks of major accidents?

Measures

- 1 There is an inventory of all tasks that require the use of personal protective equipment according to the risk analyses conducted for these tasks.
- 2 For each use of personal protective equipment a risk analysis is conducted.
- 3 For each use of a piece of personal protective equipment the performance levels are defined.
- 4 The risk analysis is included in a dossier for each piece of personal protective equipment.

Criteria

- 1.1 Relevant risk analyses are:
 - the risk analysis of the process
 - task analyses
 - analyses for hazardous work
 - establishing the intervention strategy in the context of the emergency plan.
- 2.1 In this analysis account is taken of the intensity and duration of exposure and this in both the (normal) operational circumstances as well as in possible accident situations.
- 2.2 The risks that are introduced by the use of the PPE are also analysed.
- 3.1 To define the "nominal protective factor" for breathing equipment an estimate is needed of:
 - the nature of the substances that (could be) are released
 - the quantities that (could be) are released
 - the dispersion
 - the maximum concentration
 - the exposure time.

2 How does the company ensure that the personal protective equipment is selected in accordance with the operating circumstances?

Measures

- 1 The choice of personal protective equipment is made on the basis of a market survey.
- 2 The choice of personal protective equipment is made on the basis of a test phase in which the personal protective equipment is tested by future users in realistic operating conditions.
- 3 The choice of personal protective equipment is discussed in the Committee for Prevention and Protection at work.

I.5.2 Implementing personal protective equipment

1 How does the company ensure that the personal protective equipment is purchased in accordance with the regulations and the criteria formulated?

Measures

- 1 The order forms for personal protective equipment have a fixed structure that allows all criteria to be specified.

- 2 The Prevention Advisor will initial the order form for new types of personal protective equipment.
- 3 The responsibility for inspection when personal protective equipment is delivered is clearly specified.
- 4 In the event of additional safety criteria being specified, then the Prevention Advisor draws up a commissioning report.

Criteria

- 1.1 The order form describes all the risks against which the personal protective equipment should offer protection. This information is copied from the dossier of the particular piece of personal protective equipment.
- 1.2 The order form states any additional requirements in the safety field that are not covered by the CE mark. This information is copied from the dossier of the particular piece of personal protective equipment.
- 1.3 The order form requires a CE mark in accordance with the category of the piece of personal protective equipment.
- 1.4 The order form demands a certificate that shows that the additional safety requirements that are not covered by the CE mark have been met.
- 1.5 The order form requires instructions to be provided with the personal protective equipment.

2 How does the company ensure that the employees receive the necessary information and training for the use of the personal protective equipment?

Measures

- 1 Appropriate instructions are drawn up for each type of personal protective equipment.
- 2 The Prevention Advisor will initial the instructions.
- 3 The possible users are defined for each piece of personal protective equipment.
- 4 The initial training for the use of each type of personal protective equipment is defined.
- 5 The initial training for the use of each type of personal protective equipment is recorded for every potential user.

Criteria

- 1.1 These instructions are based on the users' manual provided by the supplier.
- 1.2 The instructions are clear and easily understood by the possible users.
- 1.3 The instructions indicate the circumstances in which the personal protective equipment is to be used as well as predictable abnormal situations.
- 1.4 The instructions indicate the risks against which the personal protective equipment provides protection.

3 How does the company ensure that the personal protective equipment is available at all times for possible users?

Measures

- 1 There is a distribution system for personal protective equipment.
- 2 In the event of a user of personal protective equipment being responsible for the storage thereof, then he has suitable storage space available for this purpose.

1.5.3 Maintaining personal protective equipment

1 How does the company ensure that all personal protective equipment is subject to the necessary inspections and maintenance?

Measures

- 1 All personal protective equipment that requires inspection or maintenance is identified and inventoried.
- 2 The frequency of the inspections and/or the maintenance for each piece of this personal protective equipment is specified.
- 3 There is a system that initiates the inspections and maintenance services for the personal protective equipment.
- 4 For each type of personal protective equipment there are instructions concerning the inspection and/or maintenance.
- 5 The inspections and maintenance services are registered for each piece of personal protective equipment.
- 6 The users of personal protective equipment have been given the necessary instructions as to how to determine whether their personal protective equipment needs to be replaced or repaired.

Criteria

- 1.1 All personal protective equipment to be inspected or maintained carries a unique identification code.
- 1.2 Personal protective equipment to be inspected or maintained is listed on one or more lists in which the following information is kept up-to-date: the type, the identification code and the place of use.
- 2.1 Safety harnesses, and other anti-fall safety devices should be checked annually by a recognised body, as well as each time that they prevent someone from falling.

2 How does the company ensure that the necessary periodic training in the use of personal protective equipment is given?

Measures

- 1 For each type of personal protective equipment the periodic training requirements are defined.
- 2 The schooling and training is recorded for every user.

PART 2: M.E.S. QUESTIONNAIRE



2

System activities

2.1 Policy

1 How does the company ensure that a clear prevention policy is pursued?

The Cooperation Agreement makes a distinction here between lower tier establishments (Article 9) and upper tier establishments (Article 10). Both types of establishment must organise and describe certain activities, which are nominally listed. For lower tier establishments these activities may be the subject of different control systems (Article 9 §1). Upper tier establishments must have a single safety management system that is part of the entire management system of the establishment, which manages all necessary activities and organisational measures. In practice there is of course no objection and indeed it is even recommended that the lower tier establishments should also have a single safety management system and allow themselves to be inspired, at least as far as the major accident prevention policy is concerned, by the stipulations of the Cooperation Agreement for upper tier companies.

Measures

- 1 The company has a written declaration of policy with respect to safety.
- 2 The prevention policy with respect to major accidents is defined in writing.
- 3 A lower tier establishment has a document in which there is a description of the manner in which the prevention policy for major accidents is put into practice.
- 4 An upper tier establishment has a safety manual that describes the safety management system.
- 5 The concrete objectives of the policy in the medium term are specified in the Global Prevention Plan.
- 6 The concrete objectives of the policy in the short term are specified in the Annual Action Plan.
- 7 For every member of the hierarchy the objectives to be attained in the safety and environment domain are specified annually.

Criteria

- 1.1 The policy declaration is signed by the director.
- 1.2 The policy declaration is regularly revised and is therefore of recent date.
- 1.3 The policy declaration embraces:
 - the will to adhere to the legal safety requirements
 - the undertaking to strive to continually improve in the domain of safety
 - the will to adhere to best practices and to take account of advancements in techniques.
- 2.1 The description of the prevention policy covers the general objectives and principles that are upheld by the operator for the management of the risks of major accidents (for lower tier establishments: Article 9 §2 of the Cooperation Agreement, for upper tier establishments: Article 10 §1 2° of the Cooperation Agreement).
- 2.2 The policy pursued for the prevention of major accidents must guarantee a high level of protection for both man and the environment (for lower tier establishments: Article 9 §1 of the Cooperation Agreement, for upper tier establishments: Article 10 §1 1° of the Cooperation Agreement).
- 2.3 For lower tier establishments this policy is stated in a document that also describes the manner in which this policy is put into practice (see measure 3 of this objective).
- 3.1 This document describes the manner in which the following activities are organised within the establishment (see Article 9 §2 of the Cooperation Agreement):
 - a) the training of the personnel
 - b) working with third parties
 - c) the identification of the hazards and the evaluation of the risks of major accidents;
 - d) the assurance of safe exploitation, in all circumstances (both by normal operation as well as during start up, temporary shut down and maintenance) of the installations, processes, equipment and storage locations concerned)

- e) the design of new installations, processes or storage locations and the implementation of modifications to existing installations, processes or storage locations
 - f) the management of emergency situations
 - g) the drafting and performance of periodic inspection and maintenance programmes
 - h) the notification and investigation of major accidents and near-misses
 - i) other activities that are linked to "good management", such as the periodic evaluation and revision of the prevention policy and of the manner in which this policy is put into practice.
- 3.2 This document furthermore contains a description of the prevention policy (see measure 2 of this objective).
- 4.1 The safety manual identifies the various components of the safety management system.
- 4.2 The safety manual identifies (i.e. names, lists) for each component of the safety management system the organisational measures (structures, responsibilities, practices, procedures, processes, tools) that make it possible to put that component into practice.
- 4.3 The safety manual describes, for each component of the safety management system, the logical connections between the organisational measures identified as being necessary to put that component into practice.
- 4.4 The following points are dealt with in the safety management system:
- 1° the organisation and the personnel:
 - a) The duties and responsibilities of the personnel involved in the management of the major accident hazards at all levels of the organisation
 - b) The management of the procedures for identifying the training requirements for these members of personnel and for the organisation of this training
 - c) The involvement of the personnel
 - d) The management of the procedures for working with third parties
 - 2° the identification and evaluation major accidents hazards: the management of the procedures for systematic identification of the major accidents hazards that can occur during normal and abnormal operations, as well as for the evaluation of the risks associated with these
 - 3° the operational control: the management of the operational procedures and operating instructions to ensure safe exploitation under all circumstances (both during normal operations as well as during starting up, temporary stoppage and maintenance among others), of the installations, processes, equipment and storage locations involved
 - 4° design management: the management of the procedures for the design of new installations, processes or storage locations and for the planning and implementation of modifications to existing installations, processes or storage locations
 - 5° the planning of emergency situations: the management of the procedures in order to, through a systematic analysis, recognise the predictable emergency situations and to work out, test and revise the emergency plans, in order to be able to cope with such emergency situations
 - 6° the supervision: the management of the procedures that ensure permanent supervision of the fulfilment of the objectives that were specified by the operator in his prevention policy and in his safety management systems for the implementation of the necessary corrective actions if shortcomings were to be established
 - 7° the audit and the revisions:
 - a) the management of the procedures for the periodic and systematic evaluation of the major accident prevention policy and of the efficacy and suitability of the safety management system

- b) the management of the procedures for the periodic revision and up-dating of the prevention policy and the safety management system by the operator.

The procedures, as intended in the first section, 6°, also consist of:

- 1°the drafting and implementation of periodic inspection and maintenance programmes
 - 2°the notification of major accidents
 - 3 ° the notification of near-misses, especially those where the protective measures have failed
 - 4°the investigation of these accidents or near-misses and the compliance with the lessons that can be drawn from this.
- 5.1 In the Global Prevention Plan concrete activities are included that also state the target date and person(s) responsible for implementation.
 - 5.2 The employer submits every modification or amendment to the Global Prevention Plan for advice to the Committee for Prevention and Protection at work.
 - 6.1 In the Annual Action Plan concrete activities are included that also state the target date and person(s) responsible for implementation.
 - 6.2 The employer submits the draft version of the Annual Action Plan for advice to the Committee for Prevention and Protection at work. This happens at the latest by the first day of the second month prior to the beginning of the working year to which the plan applies (1 November).

2 How does the company ensure that all employees know the policy in the field of safety?

Measures

- 1 The policy declaration is posted up in suitable places.
- 2 An explanation of the policy statement is a component of the training given to new personnel.
- 3 Safety matters are raised in internal news channels (e.g. the company newspaper).
- 4 The hierarchy regularly conducts walk-about during which attention is systematically paid to safety.

3 How does the company ensure that the safety policy is systematically implemented and evaluated?

Measures

- 1 There is a system for following up the effective and timely execution of the actions from the Global Prevention Plan and the Annual Action Plan.
- 2 The safety policy is systematically on the agenda in management meetings.
- 3 There is systematic compliance with the annual objectives with respect to safety for the members of the hierarchy.

Criteria

- 2.1 At these meetings important accidents and incidents are discussed.
- 2.2 Among those present at the meetings are:
 - the Prevention Advisor
 - the Environmental Coordinator
 - the managing director of the establishment
 - the accountable manager(s) of all production departments
 - the accountable manager(s) of the maintenance and/or inspection department.
- 2.3 At these meetings the various departments systematically report on the implementation of the safety policy.

2.2 Organisation

1 How does the company ensure that the Internal and External Services for Prevention and Protection at work are able to complete their duties correctly, in accordance with the regulatory stipulations?

Measures

- 1 The duties of the Internal and External Services for Prevention and Protection are clearly defined.
- 2 The relationships between the departments of the Internal Service for Prevention and Protection, the department charged with medical supervision and the central Internal Service for Prevention and Protection are clearly defined.
- 3 The reporting hierarchy of the Prevention Advisors are unambiguously specified in an organisation chart.
- 4 The minimum length of time permitted for the attainments of the Prevention Advisors is defined on the basis of an estimate of the time required to fulfil the duties allocated.
- 5 The Prevention Advisor has a personal meeting with the managing director of the site every month.
- 6 The Prevention Advisors have the appropriate safety training.

Criteria

- 1.1 The duties that are carried out by an external service are specified contractually.
- 3.1 The Prevention Advisor entrusted with leading the internal Service for Prevention and Protection at work reports directly to the person in charge of the day-to-day management of the company and has direct access to the person in charge of the day-to-day management of the technical business unit or business units.
- 3.2 The Prevention Advisor entrusted with leading a department of the Internal Service for Prevention and Protection at work reports directly to the person in charge of the day-to-day management of the technical business unit for which the department was established and has direct access to the person in charge of the day-to-day management of the company or organisation.
- 4.1 This minimum length of time is approved by the Committee for Prevention and Protection at work.

2 How does the company ensure that the tasks and responsibilities of the personnel with regard to the safety management system are specified at all levels in the organisation?

Measures

- 1 All responsible functions in the safety management system are listed.
- 2 The responsibilities in respect of the safety management system are specified in the function descriptions.
- 3 All functions that are responsible for safety in the safety management system are allocated by name.
- 4 All modifications at the level of the organisation are assessed for their impact on the safety policy.

3 How does the company ensure that the Committee for Prevention and Protection at work can carry out its assignments properly, in accordance with the regulatory stipulations?

Measures

- 1 The managing director of the establishment chairs the Committee for Prevention and Protection at work.
- 2 In the Committee for Prevention and Protection at work an employer's representative is present from every production department as well as from the maintenance and/or inspection department.
- 3 The Committee for Prevention and Protection at work is informed of all letters from the authorised inspectorates.
- 4 A set of rules and regulations to organise and keep the meetings of the Committee for Prevention and Protection at work has been drawn up.

Criteria

- 4.1 The rules and regulations:
- consist of the rules relating to the place and the time of the meetings
 - indicate the name and first name of the ordinary and the proxy members who represent the employer and the name and first name of the ordinary and proxy members who represent the employees
 - indicate the name and first name of the chairman and as the case may be of his deputy
 - describe the task of the chairman and the manner in which he can permit someone else to deputise for him
 - describe the way in which a point can be written into the agenda
 - describe the manner in which the members are called to the meeting
 - describe the course of the meeting
 - describe the required quorum to make the proceedings of the meeting valid and the way that agreements are reached
 - describe the way in which inspection is permitted of the reports, advisory documents and all other documents that must be made available by the employer to the committee
 - describe the manner in which and the length of time for which the committee archive must be stored and the further regulations regarding the inspection thereof by the members of the committee
 - describe the rules regarding the appointment of the representatives and the composition of those representatives
 - describe the type and the resources, especially with regard to the form of the minutes book or an equivalent means of reporting, which are made available to the members of the committee
 - describe the rules relating to the possibilities for the employees' representatives to have contact with the employer, his representatives, the members of the hierarchy, the Prevention Advisor and the employees
 - describe the further rules regarding the preparatory meetings and concerning supplementary meetings
 - describe the way in which, as the occasion arises, experts will be invited.

4 How does the company ensure that the environmental service carries out its duties properly, in accordance with the regulatory stipulations?

Measures

- 1 The environment coordinator has been trained at Level A.

2.3 Document management

1 How does the company ensure that all activities of the safety management system are described in procedures?

Measures

- 1 The company has a summary of all safety-relevant procedures.
- 2 The responsibility for drawing up these procedures is specified.
- 3 The responsibility for approving these procedures is specified.
- 4 The authority to modify these procedures is specified.

2 How does the company ensure that the procedures of the safety management system contain sufficient and correct information?

Measures

- 1 The company has the necessary guidelines in place with respect to the content of the procedures of the safety management system.
- 2 The users are involved in drawing up the procedures of the safety management system.
- 3 The final responsibility for the content of the procedures of the safety management system is specified.
- 4 The Prevention Advisor revises the procedures of the safety management system.
- 5 The procedures of the safety management system are drawn up according to a set structure.
- 6 The titles of procedures of the safety management system clearly reflect what the contents are.

3 How does the company ensure that only the most recent version of the procedures of the safety management system is used?

Measures

- 1 All procedures of the safety management system are clearly identified.
- 2 For each procedure of the safety management system it is easy to check which is the latest version.
- 3 The number and the location of the copies are specified.
- 4 An owner is designated for each copy.
- 5 The responsibility for the distribution of the procedures of the safety management system is specified.
- 6 There is a system for the removal of out-of-date versions.
- 7 Printouts of electronic versions have a limited validity that is clearly indicated on the printed copy.

Criteria

- 1.1 Each procedure of the safety management system is marked with:
 - the revision number
 - the date of issue
 - the date it takes effect.
- 2.1 There is a general list with the latest version of each procedure of the safety management system.
- 3.1 There is a distribution list for each procedure of the safety management system.

4 How does the company ensure that the necessary explanation, schooling or training is given before a new or amended procedure of the safety management system goes into operation?

Measures

- 1 For each procedure of the safety management system the potential users are explicitly defined.
- 2 The content of schooling or training is defined.
- 3 Modifications are indicated on the document concerned.

5 How does the company ensure that the procedures of the safety management system are easily available to the users?

Measures

- 1 The procedures of the safety management system are collected together according to a logical classification so that searches are simple.
- 2 In the case of electronic distribution each possible user has access to the network

6 How does the company ensure that the procedures of the safety management system are not modified in an unverified manner?

Measures

- 1 For each procedure the authority to make modifications is clearly defined.
- 2 When modifications to procedures of the safety management system are distributed then the reason for the modification is given.

7 How does the company ensure that the procedures of the safety management system are periodically reviewed?

Measures

- 1 The periodicity of reviews is specified.
- 2 A review programme is drawn up every year.
- 3 The review date is indicated on each document (even if no modifications were made).

2.4 Selection and training

2.4.1 Own personnel

1 How does the company ensure that for each safety-relevant function the necessary initial training is given?

Measures

- 1 The desired profile has been established for every safety-relevant function.
- 2 There is a formal training programme for each function.
- 3 Each time that a function is filled, a check should be made on the training requirements of the person selected.
- 4 The initial schooling and training followed is recorded for each employee.
- 5 Employees may not carry out any duties before following the necessary initial schooling or training.

Criteria

- 1.1 This profile describes:
 - the diplomas and experience required
 - the required personality characteristics.
- 1.2 Safety-relevant functions are in any case:
 - the Prevention Advisor
 - production personnel
 - inspection and maintenance personnel.
- 2.1 This programme consists of:
 - the theoretical courses
 - the practical training courses
 - the duration of any traineeship.
- 2.2 The training programme for operators deals with the following safety topics:
 - the hazards and risks of the installations that they operate
 - the actions that have to be undertaken in order to keep the process within safe working limits
 - the operational emergency procedures
 - the emergency plan.
- 2.3 The training programme for design and production engineers deals among other matters with the following safety topics:
 - risk analysis techniques
 - the safety management system.
- 2.4 Operators and maintenance personnel are supervised in their new jobs via a system of guardianship.
- 2.5 For "on the job" training all sub-tasks are listed separately.
- 2.6 The Prevention Advisor is involved in drawing up the training programmes.
- 3.1 This applies both to new members of personnel as well as those recruited internally.
- 3.2 This also applies to temporary employees. They follow the same training as that which would be required for permanent employees who do the same job.
- 5.1 Training rosters are used that indicate which employees have followed any particular schooling/training.

2 How does the company ensure that the necessary periodic training is given?

Measures

- 1 The training requirements in the company are analysed periodically.
- 2 For certain safety training courses the minimum frequency of repetition is specified.
- 3 The periodic schooling or training that has been followed is recorded for each employee.

Criteria

- 1.1 The training requirement is in part determined on the basis of an analysis of accidents and incidents.
- 1.2 Employees are given the opportunity to suggest additional training they could follow.
- 1.3 Each member of the hierarchy defines what the training requirements are of his subordinates.
- 2.1 Safety training courses that must be repeated periodically include:
 - hazardous substances
 - the work permit system
 - the hazards and procedures in relation to entering confined spaces
 - the schooling and training of confined space attendants.

3 How does the company ensure that the training provided effectively gives the employees the necessary capabilities and skills?

Measures

- 1 The objectives are specified for each training course.
- 2 The content is specified for each training course.
- 3 The way in which the course is given is specified for each training course.
- 4 There is a specification for each training course of who is permitted to give the course.
- 5 The required resources are specified for each training course.
- 6 After each training course there is an evaluation of whether the objectives of the training course were achieved.
- 7 Each training course is formally concluded.
- 8 The training courses are periodically evaluated and revised.

Criteria

- 3.1 Possible training methods are:
 - formal classroom training
 - informal training during safety meetings
 - self study
 - "on the job" training.
- 4.1 The criteria allowing a person to give training are specified.
- 4.2 There is a list with the name or names of the possible trainer(s) for each training course.
- 5.1 Training resources may be:
 - written courses
 - slides & overhead sheets
 - computer packages
 - process simulators
 - training videos.
- 6.1 During this evaluation a check is made of whether the employees who have successfully completed their training are also effectively able to perform the allocated tasks properly (that is to say an evaluation of the training, not the participants).
- 8.1 During this evaluation a check is made of whether the content of the training is still in accordance with the content of the tasks to be performed.

2.4.2 Third parties

1 How does the company ensure that third party companies that are known to fail to comply with the obligations in respect of safety are banned?

Measures

- 1 The selection of "new" third parties takes place (in part) on the basis of an audit in the field of safety.
- 2 Each third party is evaluated periodically or after the completion of an operation.
- 3 The criteria in respect of the evaluation for the continuation of the collaboration with third parties are specified.

Criteria

- 1.1 The minimum safety level that a contractor must have is specified.
- 1.2 A check is made through the following modes of whether the third party has a safety management system:
 - a VCA certificate is required
 - the company has a questionnaire that must be completed by the third party
 - the third party is audited.
- 1.3 The accident figures of the third party are taken into account.
- 2.1 A report is drawn up after each operation.

2 How does the company ensure that the employees of third parties have received the appropriate training and instructions?

Measures

- 1 The necessary information is provided to the employers of the third parties in respect of the risks and the precautions to be taken when performing the work (to be taken by the third parties).
- 2 There is a clear specification of who will give all employees of third parties training about the safety instructions (the employer of the third party or the company commissioning the work).
- 3 There is monitoring of whether the employees of third parties have been given and understand the necessary training and instructions.

Criteria

- 1.1 The training is given prior to the start of the operation.
- 1.2 In the training in addition to a general section there is also a section that is specific to the operations that have to be performed.
- 2.1 The persons who give the training must themselves have been given additional training for this purpose.
- 2.2 These arrangements are specified in writing.
- 3.1 There are agreements relating to giving instructions to people who do not understand or have insufficient understanding of the language(s) in which the available safety instructions are written.
- 3.2 The monitoring can be done by means of targeted spot checks.

3 How does the company ensure that third party companies comply with the safety regulations that are particular to the company?

Measures

- 1 A contract is signed with every third party in which the third party is bound to comply with the safety regulations of the company.
- 2 Systematic checks are organised by the company to monitor whether the third party is effectively complying with the safety regulations.
- 3 The supervisory personnel are ordered to intervene in the event of shortcomings in the field of safety and to correct these shortcomings or to have them corrected.
- 4 There is an immediate response to every violation of the safety regulations that has been ascertained.

Criteria

- 1.1 Actions resulting from the violation of the safety regulations are contractually charged to the contractor.

2.5 Investigation of incidents and accidents

1 How does the company ensure that all unwanted events such as accidents, incidents and hazardous situations are notified and recorded?

Measures

- 1 The definition of an accident, an incident and a hazardous situation is specified.
- 2 For the notification of accidents, incidents and hazardous situations there are one or more forms.
- 3 Every employee can report accidents, incidents and hazardous situations.
- 4 It is clear to every employee to whom they should report accidents, incidents or hazardous situations.
- 5 The company regularly organises motivation campaigns to encourage workers to report accidents, incidents and hazardous situations.
- 6 Third party companies are also required to report accidents and incidents.

Criteria

- 1.1 The definitions are expressed in terms of damage to:
 - the employees
 - the environment (natural habitat and people).
- 2.1 These forms are available to all possible users.
- 2.2 These forms provide space for the following information:
 - the time and the place of the unwelcome event or situation
 - the names of any victims
 - the effective and potential seriousness of the situation or event
 - the probable causes
 - any witnesses.
- 2.3 A general form for all sorts of reports makes the reporting system simpler.

2 How does the company ensure that the reported unwelcome events are investigated in a suitable manner?

Measures

- 1 For each report of an unwelcome event or situation it is clear who is responsible for the investigation.
- 2 For each report it is clear which technique is to be used to trace the causes of the unwelcome situation.
- 3 For each report it is clear who is responsible for composing the investigation team.
- 4 For each investigation the period within which the investigation should be completed is specified.
- 5 The required content of the investigation report is specified.

Criteria

- 2.1 A responsible manager will choose the technique depending on the actual and potential seriousness of the unwelcome situation.
- 2.2 The possible techniques are listed and described.
- 2.3 Each time the investigation examines whether the accident or incident has brought new hazards or risks to light and whether a revision of the Process Safety Documentation is required.
- 2.4 The investigation will examine whether internal standards need to be modified.
- 5.1 The report records:
 - the participants in the investigations
 - the description of the facts

- the causes of the unwelcome situation or event
- the effective and potential seriousness
- the recommendations in respect of actions to be taken
- the actions effectively undertaken.

3 How does the company ensure that in addition to technical defects, shortcomings at the level of the safety management system are also investigated?

Measures

- 1 The method of investigation provides for a questionnaire that is aimed at establishing failures in the management system.
- 2 The investigation report contains a specific section in which the conclusions about the management system can be written.
- 3 The hierarchical level to which these conclusions must be reported is specified.
- 4 Unwelcome events are a reason to evaluate the quality of the safety study of the installation involved.

Criteria

- 4.1 A first important question concerns the quality of the identification of hazards. Is the unwelcome event attributable to insufficient knowledge of the hazardous properties of a substance or a reaction?
If yes:
 - How can this lack of knowledge be explained?
 - Has there ever been an investigation carried out into the hazardous properties of the substance or reaction involved?
 - Was a method used for this that ensured the completeness of the investigation?
 - Was it used correctly?
 - Are additional risk analyses necessary in order to trace, everywhere that the substance or reaction occurs, the risks associated with the "(re)discovered hazardous property(ies)?"
- 4.2 A second important question relates to the quality of the identification of the risks of major accidents.
Was the cause of the unwelcome event previously identified in a risk analysis?
If not:
 - How can this be explained?
 - Were risk analyses ever carried out for the installation, work post, action, etc. involved?
 - Was this done using a method that was capable of tracing the cause?
 - Was this method used correctly?
 - Do the risk analyses for the installation involved (and possibly other installations) need to be repeated?
- 4.3 A third important question relates to the presence of prevention measures. Were prevention measures formulated in previous safety studies and were they implemented effectively?
- 4.4 A fourth important question relates to the quality of the measures specified. Is the unwelcome event attributable to the fact that the specified prevention measures were of too low a quality (too low reliability, not effective)?
If yes:
 - Were risk-reducing criteria applied?
 - Do these risk-reducing criteria ensure that there is sufficient reduction of the risk?
 - Were errors made when the prevention measure was implemented?
- 4.5 A fifth important question relates to the state of the prevention measure (for material prevention measures) or the extent to which it was applied (for procedural prevention measures).

Can the unwelcome event be attributed to the poor condition of the prevention measures?

If yes (for material prevention measures):

- Is the prevention measure included in an inspection programme?
- Was this programme carried out correctly?
- Is the inspection technique and frequency properly chosen depending on the risk?

If yes (for procedural prevention measures):

Is the procedure or instruction concerned included in a periodic training programme?

4 How does the company ensure that similar situations or actions are traced throughout the entire company?

Measures

- 1 The investigative method demands the tracing of similar situations or actions in the rest of the company.
- 2 The report of the investigation includes a specific section that reports the conclusions for the rest of the installation and the company as a whole.

5 How does the company ensure that the hierarchy evaluates the recommendations from the investigation and formulates actions?

Measures

- 1 The person(s) to whom the conclusions of the investigation must report are specified.
- 2 The responsibility for the implementation of any actions at the level of the installation or the company as a whole is specified.
- 3 The conclusions of the investigation are reported back to the person who notified the situation.
- 4 Decisions in connection with the recommendations that have been formulated are documented: either there is a concrete action described, or a reasoned argument is given for not carrying out the recommendation.

Criteria

- 2.1 The formulation of concrete activities involves:
 - the responsible person(s) who will implement them
 - a target date.

6 How does the company ensure that actions that are the result of the evaluation of internal accident and incident investigations are carried out in a timely and effective manner?

Measures

- 1 There is a method for assigning priorities to actions.
- 2 A target date and a responsible person are designated for each action.
- 3 The working method for following up the actions is specified.
- 4 The responsibility for following up the proper execution of the actions is specified.
- 5 The execution of each action is documented.

Criteria

- 3.1 A summary of the actions that still are to be executed can be obtained at all times. This summary must show clearly what actions are overdue.

- 3.2 The target date may only be exceeded following formal approval by a member of the hierarchy and if the reasons for postponement are documented.
- 3.3 The follow-up of the actions is regularly reported to the management.
- 5.1 Each action is formally concluded.
- 5.2 If the action has not been executed then the reasons for this are documented.

2.6 Information management

2.6.1 Regulations

1 How does the company ensure that it is informed in time of new relevant regulations?

Measures

- 1 The channels through which the company stays up to date and informed of new relevant regulations in the domain of safety at work and environmental protection are specified.
- 2 For each channel the person responsible for implementing the regulations involved is designated.

2 How does the company ensure that the installations and the organisational structure are evaluated for conformity with the regulations and that the necessary recommendations are formulated?

Measures

- 1 For each channel the person responsible for the investigation into the impact of the new regulations on the installations and the organisational structure is designated.
- 2 The impact of changes in the regulations is documented.

Criteria

- 2.1 This documentation contains:
 - a description of the regulations
 - an evaluation of the conformity of the installations and/or the organisation
 - the actions that result from this evaluation.

3 How does the company ensure that the hierarchy evaluates the recommendations and that the necessary actions are defined?

Measures

- 1 The hierarchical level to which these conclusions must be reported is specified.
- 2 The responsibility for deciding on the possible execution of the recommendations and for determining any concrete actions is explicitly defined.
- 3 Decisions in connection with the recommendation formulated are documented: either a concrete action is described, or the reasons why the recommendation has not been executed are documented.

Criteria

- 3.1 The formulation of a concrete action involves:
 - a person responsible for carrying it out
 - a target date.

4 How does the company ensure that actions that result from the evaluation of new regulations are carried out in a timely and effective manner?

Measures

- 1 There is a method for assigning priorities to actions.
- 2 For each action a target date and a responsible person are designated.
- 3 The working method for implementing the actions is specified.

- 4 The responsibility for monitoring the proper execution of the actions is specified.
- 5 The execution of each action is documented.

Criteria

- 3.1 A summary of the actions that still are to be executed can be obtained at all times. This summary must show clearly what actions are overdue.
- 3.2 The target date may only be exceeded following formal approval by a member of the hierarchy and if the reasons for postponement are documented.
- 3.3 The implementation of the actions is regularly reported to the management.
- 5.1 Each action is formally concluded.
- 5.2 If the action has not been executed then the reasons for this are documented.

2.6.2 External empirical data

1 How does the company ensure that relevant external empirical data are gathered?

Relevant empirical data are: - codes of good practice - standards - reports of external accidents and incidents - publications about process safety.

Measures

- 1 The channels that can be used to gather external empirical data are specified.
- 2 For each channel the responsibilities for implementing the empirical data are defined.

Criteria

- 1.1 Information from other sites within the same group is collected, for example via:
 - a periodical or ad hoc circular
 - intranet and internet.
- 1.2 Information is also collected from associations of companies, such for example:
 - associations of producers of the same or similar products
 - users' groups of the same patented procedure
 - associations of companies with equivalent activities.
- 1.3 The company has professional literature at its disposal, for example:
 - publications from the "Center for Chemical Process Safety" of the "American Institute of Chemical Engineers"
 - publications from the "European Process Safety Center"
 - publications from the British "Institution of Chemical Engineers".
- 1.4 The company subscribes to specialised journals, for example:
 - Loss Prevention Bulletin (published by IChemE)
 - Process Safety Progress (published by AIChE).
- 1.5 The company systematically consults specialised websites, for example those of the following organisations:
 - the "Environmental Protection Agency" (United States) (the website contains among other matters, information about accidents)
 - the "Chemical Safety and Hazards Investigation Board" (United States) (the website contains among other matters, information about accidents)
 - OSHA (United States) (the website contains among other matters information about safety at work in general and hazardous substances in particular).
- 1.6 The company regularly participates in study days, congresses or symposia about process safety.
- 1.7 The company regularly consults databanks with accidents and incidents in the process industry, for example:
 - MARS (databank with major accidents run by the Major Accident Hazards Bureau (MAHB))
 - The Accident Database (IChemE).

2 How does the company ensure that new empirical data are investigated for their relevance for the company and that as necessary the necessary recommendations are formulated?

Measures

- 1 There is a form for the investigation of external empirical data (analogous to a form for the investigation of internal empirical data (accidents, incidents, and hazardous situations)).
- 2 For each information source a responsible person is designated who investigates the empirical data for their relevance for the company and whether they should be transferred to a person who is more suitable to carry out this investigation.
- 3 New empirical data is discussed in a process safety committee.
- 4 The investigation of new empirical data is documented.

Criteria

- 2.1 The investigation examines whether the external empirical data bring new hazards or risks to light and whether the Process Safety Documentation should be revised.
- 4.1 This documentation consists of:
 - a description of the empirical data
 - an evaluation of the applicability within the company
 - the actions that follow from this evaluation.

3 How does the company ensure that the hierarchy evaluates the recommendations from the investigation and formulates the necessary actions?

Measures

- 1 The responsible persons to whom the recommendations from the investigation must be reported are defined.
- 2 The responsibility for taking the decision about a possible implementation of the recommendations is defined.
- 3 Decisions connected to the formulated recommendations are documented: either a concrete action is described, or the reasons for not carrying out the recommendation are documented.

Criteria

- 3.1 The formulation of a concrete action involves:
 - a person responsible for carrying it out
 - a target date.

4 How does the company ensure that actions that are the result of the investigation of empirical data are carried out in a timely and effective manner?

Measures

- 1 There is a method for assigning priorities to actions.
- 2 For each action a target date and a responsible person are designated.
- 3 The working method for following up the actions is specified.
- 4 The responsibility for following up the proper execution of the actions is specified.
- 5 The execution of each action is documented.

Criteria

- 3.1 A summary of the actions that still are to be executed can be obtained at all times. This summary must show clearly for which actions the target date has been exceeded.
- 3.2 The target date may only be exceeded following formal approval by a member of the hierarchy and if the reasons for postponement are documented.
- 3.3 The follow-up of the actions is regularly reported to the management.
- 5.1 Each action is formally concluded.
- 5.2 If the action has not been executed then the reasons for this are documented.

5 How does the company ensure that the empirical data gathered is stored in an accessible manner for internal use?

Measures

- 1 For each information source there is a responsible person designated to archive the information.
- 2 The information is classified according to a system that permits rapid searches through keywords.
- 3 The relevant empirical data will (if possible) be incorporated into internal standards.

2.7 Audit

1 How does the company ensure that the correct application of the procedures of the safety management system is monitored?

Measures

- 1 All procedures of the safety management system are subject to a verification audit.
- 2 The audit frequency is fixed for all procedures.
- 3 An audit programme is drawn up each year that defines which procedures in which departments will be audited.
- 4 For each procedure there is a fixed way of conducting the audit.

Criteria

- 4.1 This includes:
 - which questions should be asked
 - who should be asked these questions
 - how the responses to these questions should be evaluated
 - which documents should be inspected
 - how these documents should be evaluated.

2 How does the company ensure that the management evaluates the results of these audits and where necessary takes corrective action?

Measures

- 1 Each audit is concluded with a report with the findings and recommendations.
- 2 The audit results are reported to the management.
- 3 The management discusses the audit results systematically.

3 How does the company ensure that the formulated actions are carried out in a timely and effective manner?

Measures

- 1 There is a method for assigning priorities to actions.
- 2 A target date and a responsible person are designated for each action.
- 3 The working method for following up the execution of the actions is specified.
- 4 The responsibility for following up the proper execution of the actions is specified.
- 5 The execution of each action is documented.

Criteria

- 3.1 A summary of the actions that still are to be executed can be obtained at all times. This summary must show clearly for which actions the target date has been exceeded.
- 3.2 The target date may only be exceeded following formal approval by a member of the hierarchy and if the reasons for postponement are documented.
- 3.3 The follow-up of the actions is regularly reported to the management.
- 5.1 Each action is formally concluded.
- 5.2 If the action has not been executed then the reasons for this are documented.

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Glossary

The M.E.S. contains some terms that are specific for the Belgian regulations regarding safety at work and the protection of the environment.

Internal Service for Prevention and Protection at work (ISSP)

The regulatory name for the safety service of the company. Each company must have one. The duties of this service are regulatory prescribed. In certain cases companies with multiple sites are obliged to have one central ISSP and a department of this ISSP for each of its sites.

External Service for Prevention and Protection at work

If the Internal Service for Prevention and Protection at work cannot fulfil all its regulatory duties, a company must make an appeal to an External Service for Prevention and Protection at work. These External Services are officially accredited for this by the authorities.

Prevention Advisor

The regulatory name for the head of the Internal Service for Prevention and Protection at work or one of his deputies. He is a neutral person between the employer and the employees.

Environmental Coordinator

Every Seveso-company must make an appeal to an Environmental Coordinator. His task is to advise on matters of environmental protection. He can be an employee of the company or an external consultant. In some cases the Environmental Coordinator and the Prevention Advisor is one and the same person.

Committee for Prevention and Protection at work

A committee that is composed of an elected delegation of the employees and a delegation of the management. It has a monthly reunion on matters of safety and health at work.

General Prevention Plan

This is a five year action plan on safety and health at work that every employer must have.

Annual Action Plan

This is a one year action plan on safety and health at work derived from the General Prevention Plan.

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