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THE ROLE OF SAFETY REPORTS IN PREVENTING ACCIDENTS

KEY POINTS AND CONCLUSIONS

European Commission

The mission of the JRC-IPSC is to provide research results and to support EU policy makers in their effort towards global security and towards protection of European citizens from accidents, deliberate attacks, fraud and illegal actions against EU policies.

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Preface

The inspection function has always been considered one of the most powerful and dynamic tools available to Member State authorities for enforcement of the Seveso II Directive. For this reason, the European Commission along with competent authorities responsible for Seveso II implementation have long held this area as a priority for EU level technical cooperation. There is a strongly shared commitment to continuing to work together to increase the effectiveness of inspection practices and to ensure a consistent approach with respect to interpreting Seveso requirements through inspections across the Member States.

The Seveso Inspections Series is intended to be a set of publications reflecting conclusions and key points from technical exchanges, research and analyses on topics relevant to the effective implementation of the inspection requirements of the Seveso II Directive. These publications are intended to facilitate the sharing of information about Member States' experiences and practices for the purpose of fostering greater effectiveness, consistency and transparency in the implementation of Article 18 of the Directive. The series is managed by the European Commission's Technical Working Group on Seveso II Inspections (TWG 2), consisting of inspectors appointed by members of the Committee of the Competent Authorities for Implementation of the Seveso II Directive (CCA) to represent Seveso inspection programmes throughout the European Union. The Technical Working Group is coordinated by the Major Accident Hazards Bureau of the European Commission's Joint Research Centre with the support of DG Environment.

This publication, "The Role of Safety Reports in Preventing Accidents" is one of a series of publications that form part of the Seveso Inspections Publication Series. The publication series is one of a number of initiatives currently in place or in development to support implementation of the Directive and sponsored at EU level. In particular, a prime source of content for publications in this series is the Mutual Joint Visit (MJV) Programme for Seveso II Inspections. Launched in 1999, the European Commission's MJV Programme was intended to serve as a vehicle for promoting technical exchange among Member State Seveso II inspectors. The aim of the programme was to encourage the sharing and adoption of best practices for inspections through a system of regular information exchange. The visits would be hosted by different Member States (hence visits would be "mutual") and targeted for working inspectors of other Member States (and thereby "joint" visits) charged with assessing compliance with the

Seveso II Directive in industrial installations. The MJV Programme is managed by the Major Accident Hazards Bureau in consultation with the TWG on Seveso II Inspections.

Since 2005 the MJV programme has encouraged visits focusing on topics of specific interest for Seveso inspections as identified by the Technical Working Group. The conclusions and observations of inspectors participating in these workshops are published as part of the Seveso Inspections Series.

The mission of the TWG is to identify and recommend actions to promote exchange of information and collaborative research among the Member States for improving the quality and consistency of implementation of Seveso II obligations within the Seveso inspection authorities. The results of these efforts may also be published separately on the Seveso Inspections website, or combined with MJV summaries in the Seveso Inspections Series.

For more information on Seveso inspections, please visit the MAHB website (http://mahbsrv.jrc.ec.europa.eu) contain useful references to Seveso legislation, inspections and its implementation and related risk management and assessment projects.

Foreword

The objective of the Seveso II Directive is to prevent major accidents from occurring through requiring high standards of process and safety management on operators. Safety reports are the documents in which the operator of such a site demonstrates that the major accident prevention policy and a safety management system are in effect, that major accident hazards and risk have been identified and are adequately prevented and potential consequences limited, that adequate safety and reliability is incorporated in all aspects of the plant, and an effective internal emergency plan has been drawn up and implemented.

A good safety report allows the authorities to get a clear overview of what could happen, how accidents are prevented and what is being done to ensure that if an accident occurred, the consequences can be minimised and a clear mitigation plan is in place. Ideally, the safety report should also be a dynamic, living document that helps companies control and take into account the potential for major accident hazards in various operational decisions. In many cases, the safety report is, however, still only a report compiled for the authorities. Whilst there are many examples of excellent safety reports, producing a comprehensive, informative and accurate safety report still appears somewhat challenging for many companies.

The current MJV phase is focusing on challenges faced by the inspectors implementing the Seveso II Directive. As inspectors, we all work towards the same goal, a safe and prosperous industry as part of a safe society. Started 12 years ago when the Seveso II Directive was still new, the MJV program was designed to allow sharing of experiences and structure inspections implementation in the EU, so that we can learn from each other and work in unison, rather than in isolation. When we chose the safety report as the theme for the MJV seminar hosted by Finland, we hoped that the seminar would contribute not only to finding good ways for inspectors to work, but most importantly, to the work of preventing major accidents in companies.

For us who participated, the seminar was an opportunity for professional development, to learn from each other, and to network with people facing the same challenges in their daily work. The aim was to generate an overview of the wishes and expectations of inspectors from all across the EU on how a good safety report should look. This report was compiled to enable us to share the results from the many excellent discussions with our colleagues, authorities and companies throughout the EU.

We hope that the general feeling we participants had of a very successful working seminar has been captured, and hope it will contribute towards providing a bit of extra momentum and inspiration to "push" the safety report to become what it should be – a living document that guides and describes the everyday management of safety not only to inspectors, but to workers, management as well as contractors and other authorities

Helsinki, 12.12.2011

Päivi Rantakoski
Director
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Executive summary

During a three day seminar, inspectors from EU countries gathered in Tampere, Finland, to discuss and debate safety reports. Challenges, good practices and practical experiences were exchanged, both during and between sessions. The results from the seminar and a preceding questionnaire sent to Member States are presented in this report. Time seemed to pass too quickly and there were still many topics that would have warranted discussion. At the same time, a clear overview of the current challenges was created.

The objective of the Seveso II Directive is to prevent such major accidents from occurring through requiring high standards of process and safety management on operators. The Directive imposes specific obligations on operators of establishments where the amount of hazardous chemicals stored, handled, used or made is high. These specific obligations include having a safety management system and an internal emergency plan. Safety reports are the documents in which the operator of a so called upper tier site demonstrates that the major accident prevention policy and a safety management system are in effect, that major accident hazards and risk have been identified and are adequately prevented and potential consequences limited, that adequate safety and reliability is incorporated in all aspects of the plant and an effective internal emergency plan has been drawn up and implemented.

The preparation of a good safety report is a demanding task. Not only should it contain detailed and coherent information about the plant, processes and surrounding areas, it should also enable the authorities to get a clear overview of what the hazards and risks are, how safety is managed on a day to day basis and, most importantly, whether potential major accident risks have been adequately identified and evaluated and are sufficiently controlled. Due to the complexity of issues that have to be presented in the safety reports, the way these are prepared and presented can vary considerably based on the operators experience in preparing such documents, the time allocated to the preparation and who has been involved in the preparation.

A good safety report systematically demonstrates what could happen, how accidents are prevented and describes what is being done to ensure that if an accident occurred, the consequences can be minimised and a clear mitigation plan is in place. Ideally, the safety report should also be a dynamic, living document in proportion to the potential for major accident hazards, making the safety report a document easy to refer to in various operational decisions. In many cases the safety report is, however, still only a report compiled for the

authorities. Whilst there are many excellent examples of safety reports, producing a good safety report still appears somewhat challenging for many companies.

Before the seminar, a questionnaire was sent out to all members of the Technical Working Group II – Inspections. The results from the questionnaire were used to define the topics for the working sessions:

I. **Hazard identification and risk assessment in the safety report**
   - How should hazard identification and risk assessments be presented?
   - What reasons should be given for scenario selection?
   - How should scenarios be presented?

II. **Evidence of risk management**
   - What evidence should the company give about how risk assessments are used to define control measures and emergency preparedness?
   - What is a good way of linking the identified risks to the safety management system?
   - What are the key elements of risk management that you want to see in the safety report?

III. **Using the safety report in inspections**
   - How would you use the safety report when you plan the inspection?
   - What would you look for during the inspection to confirm that the safety report is true to reality?

During the seminar, three excellent presentations on different aspects of safety reports were heard. In the first presentation, the importance of defining the role of different personnel in relation to risk and safety was presented. Secondly, an overview of one company's experience of how safety reports can be used to improve safety was given. Finally, an overview of the recently renewed Finnish emergency preparedness planning system was given. All three presentations are found in the Appendices. Four presentations of experiences from different countries were made: Czech Republic, Germany (Hessen), Sweden and the UK. These highlighted the sometimes considerable differences in how the Seveso II Directive is implemented in practice in different countries.

The main part of the seminar was devoted to working sessions. The participants were faced with case examples and asked to provide concrete suggestions for how the case company should proceed with specific topics within the safety report. This approach was aimed to ensure that the discussion remained on a practical level. The results from the working sessions were presented and debated at times vigorously in plenary sessions.

The results indicate that whilst there are many practical differences in how the Seveso II Directive safety reports are evaluated and used in inspections, the challenges are almost universal. **Most challenges appear to be related to whether the safety report presents a coherent and convincing case that justifies the risk management decisions taken. The demonstration of safe management should be based on a systematic and comprehensive approach, showing the identification and evaluation of risks as well as the application of appropriate control measures to minimise the risks. In practice, this means that the document presents the "risk management story" in a coherent way:** all the descriptive parts are clearly linked to hazards, hazards are transformed into risks, risks become scenario choices, and scenarios determine risk management and emergency planning measures. Furthermore, all of these elements are taken into account in the safety management system.

Challenges related to identification and presentation of risk scenarios were a frequent topic of discussion. These aspects appeared to be the most difficult to evaluate. This seems to be due to the reliance on the operator's expert judgment and ability to not only to identify but also to succinctly describe the influence of different factors on the probability and extent of consequences of an accident. Similar problems were noted in relation to the inclusion of the choice of measures to minimise the risks. These discussions produced the following general conclusions and recommendations:

- **What increases safety:** The amount of time and manpower dedicated to safety report assessments and associated inspections of the Seveso II upper tier plants vary considerably between countries. It would be of interest to evaluate whether direct impacts from different approaches on safety can be detected. It would also be of interest to compare the amount of effort put into the safety report by companies and estimate the overall administrative burden of the Seveso II Directive's obligation to prepare a safety report. It could also be of considerable value to engage operators into a dialogue on what they would see as most beneficial to safety in terms of what and how an inspection structured. This could provide valuable insight into how authorities and companies can increase safety by working together
- **What type of help is needed:** Several guidances on how to prepare a safety report already exist, many of these include guidance on hazard identification and risk assessment. However, in light of the perceived challenges in this area, it would appear that existing guidance is not sufficient. However, it is not clear that guidance is the right kind of tool to employ, and the viewpoints of industry should indeed first be sought.
- **How should scenarios be chosen:** The scenario choices and descriptions appear to be found lacking in many cases. There are large differences be-

tween countries in how many scenarios are expected to be included in the safety report, as well as how these should be presented. As the definition of a scenario still raises questions among authorities, it is to be expected that this is also the case with companies. Instead of approaching the definition of a scenario theoretically, it may be of considerable use to develop model scenarios, where the actual scenario is written up in plain, easy to understand language and all relevant links to risk assessment, safety measures and emergency plans are shown.

- **How to report on risk management:** The safety report is – and should be – the first review of the adequacy of the risk management approach. It should therefore be easy to follow the whole chain of management steps, from initial identification of a hazard through to risk assessment and definition of how to control the risk and using which kinds of tools. Participants made many suggestions on how to improve in this area. In view of the very high relevance of this section not only for the assessment of the safety report, but for the safety of the site, it is suggested that more concrete tools and "model examples" are developed.
- **Focus on concrete examples:** A key message for inspections is that these should focus on concrete examples and use these to go through the entire chain of hazard identification, risk assessment, scenario choices, mitigation and prevention measures, and to look for clear evidence of the risk having been taken into account in the emergency planning.

Overall, the topic of safety reports was seen as difficult and several concrete suggestions have been described in this report for how to help companies improve in this respect. What appears to be lacking is the integration of company points of view into the discussion. Most importantly, companies view points from across the EU on what is difficult should be obtained and compared and contrasted to find out if there are clearly emerging topics in the different countries. This exchange could help find the tools and approaches that appear to be working well. These findings could then be shared across the EU as examples of best practices.

An evaluation of the relative administrative burdens created by the safety report obligation would provide data on how efficient the implementation of the Seveso II Directive is, and whether there are clear differences between countries. The results could then be compared and contrasted with the relative time taken by authorities in each country to review and approve the safety reports. Again, best practices could be found and shared, thereby taking a step towards harmonisation as well as enhancing efficiency.

Contents

1. Introduction

In the EU, Major Accident Hazard Industries are identified through the Seveso II Directive[1], based on the type and amount of chemicals any industrial plant uses, stores or handles. A major accident is then defined as involving uncontrolled development of an incident, involving chemicals listed in the Directive and leading to serious damage to human health, the environment or property[2]. Whilst relatively few such major accidents have occurred in the EU, examples since the turn of the century include the AZF Fertiliser Factory Explosion in September 2001 in Toulouse, France (30 killed, total insured costs 1.4 billion EUR, complete destruction of the plant and surrounding area including hundreds of houses)[3] , the Buncefield oil depot fire in Hertfordshire, UK in December 2005 (43 injured and companies fined 5.3 million GBP, significant damage to properties in the vicinity, the fire burned for several days, emitting large clouds of black smoke into the atmosphere[4,5]) and Enschede Fireworks Disaster in May 2000 (Netherlands 22 people killed; a 40 hectare area destroyed including 400 houses, material loss of 500 million EUR)[6].

The objective of the Seveso II Directive is to prevent such major accidents from occurring through requiring high standards of process and safety management on operators. The Directive imposes specific obligations on operators of establishments where the amount of hazardous chemicals stored, handled, used or made is high. These specific obligations include having a safety management system and an internal emergency plan. Safety reports are the documents in which the operator of a socalled upper tier site demonstrates that the major accident prevention policy and a safety management system are in effect, that major accident hazards and risk have been identified and are adequately prevented and potential consequences limited, that adequate safety and reliability is incorporated in all aspects of the plant and an effective internal emergency plan has been drawn up and implemented.

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1 96/82/EC, as amended by 2003/105/CE

2 MAHB: New Guidance on the Preparation of a Safety Report to meet the Requirements of Directive 96/82/EC as amended by Directive 2003/105/EC (Seveso II)

3 Dali (2008)

4 Macalister and Wearden (2010)

5 Buncefield Investigation (2010)

6 Health Protection Agency (2010)

The preparation of a good safety report is a demanding task. Not only should it contain detailed and coherent information about the plant, processes and surrounding areas, it should also enable the authorities to get a clear overview of what the hazards and risks are, how safety is managed on a day to day basis and, most importantly, whether potential major accident risks have been adequately identified and evaluated and are sufficiently controlled. Due to the complexity of issues that have to be presented in the safety reports, the way these are prepared and presented can vary considerably based on the operators experience in preparing such documents, the time allocated to the preparation and who has been involved in the preparation. Consequently safety reports can be of very different standards both with respect to the quality of the contents and the presentation thereof. This inevitably makes it challenging for the authorities to assess the actual level of safety at the site from the report.

The Mutual Joint Visit (MJV) in Tampere, Finland, which took place on the 7th – 9th September 2011 addressed this challenge. The focus was on the preparation of the safety reports and how safety reports are evaluated and finally, how safety reports are used in inspections. A clear aim of this MJV seminar was to share experiences and good practices relating to how the safety report can be used more efficiently by the authorities. Through comparing and contrasting different approaches and practices, good practices were identified. The potential requirements for guidance to help operators to prepare a better safety report were reviewed. In particular, the type of guidance or advice that the authorities can give the operators which would have a real effect on the actual safety level was discussed. The need for tools for the authorities on how to evaluate the safety of the site from the safety report was also discussed.

Viewed from the competent authority's eyes, the safety reports must also give enough information to enable decisions related to land use planning. In this report, the results from a questionnaire preceding the seminar and from the seminar are presented and discussed. The aim has been to provide an overview of current challenges and highlight practices from different Member States that have been found efficient. In order to review how the safety reports are assessed in different countries, the time taken to evaluate and give feedback on the findings were also analysed. This report starts with a brief overview of the methodology (Chapter 2) followed by a summary of the seminar presentations (Chapter 3). The main part of the report focuses on presenting and analysing the results (Chapter 4). Finally, the conclusions and recommendations are presented in Chapter 5. The report was prepared by Gaia Consulting in the autumn of 2011 under the guidance of Tukes, the Finnish Safety and Chemicals Agency.

2. Methods

2.1 Questionnaire

An internet questionnaire using the webropol tool was distributed to the Member State Authorities during the spring 2011. The objective of the questionnaire was to identify common challenges associated with the evaluation and use of safety reports. A key question for the questionnaire was to find out how Safety Reports are used during the preparation and execution of inspections in the plant. The second key question was to identify the key challenges the safety report preparation presents to the operators. The results from the questionnaire were used to define the themes of the working sessions in the seminar. Eighteen (18) completed questionnaires were received. The answers represented fifteen (15) of the EU-27 countries as well as the candidate country Croatia, Norway and Switzerland. The answers represent 55% of EU countries and 20% of candidate countries.

The questionnaire results in their entirety are given in Appendix 3. The analyses of the results are included in the discussion in chapter 4.

2.2 Seminar

The seminar took place in Tampere 7-9th September 2011. 52 persons participated in the seminar. The seminar was structured around three workshop sessions and their results (See Appendix 2 for participants). The entire seminar focused on discussing what makes a safety report **good for safety and good for inspectors and reviewers** (easy to review, easy to assess safety level and easy to use for inspections).

The seminar program is included in Appendix 5. Three freestanding presentations that highlight different parts of the safety report were given. These were:

- **Roles and Responsibility:** Who carries the can - safety engineer or line manager? (Graham Dalzell, EPSC)
- **The role of safety reports in preventing accidents** (Ismo Pentti, Borealis AG)
- **External emergency plans** (Kristine Jousimaa, Ministry of the Interior Finland)

The Major Accident Hazards Bureau's (MAHB) representative Maureen Wood also addressed the seminar and gave the MAHB's perspective on safety reports. In addition, four countries presented short overviews of their own experience

on safety reports (Claes Petersén, Sweden; Dagmar Dräger, Hessen, Germany; Mark Burton, United Kingdom; and Zuzana Machatova, the Czech Republic). The presentations are given in their entirety in Appendix 6.

Most of the time in the seminar was devoted to the three interactive workshops, run in four parallel working group sessions. 51 participants from 22 countries as well as a representative of JRC participated in the workshops. In each session, the participants joined a different session. The themes for the workshops were chosen based on the results from the questionnaire. The themes and key questions addressed in the three workshop sessions were:

I. **Hazard identification and risk assessment in the safety report**
   - How should hazard identification and risk assessments be presented?
   - What reasons should be given for scenario selection?
   - How should scenarios be presented?

II. **Evidence of risk management**
   - What evidence should the company give about how risk assessments are used to define control measures and emergency preparedness?
   - What is a good way of linking the identified risks to the safety management system?
   - What are the key elements of risk management that you want to see in the safety report?

III. **Using the safety report in inspections**
   - How would you use the safety report when you plan the inspection?
   - What would you look for during the inspection to confirmß that the safety report is true to reality?

In order to encourage the discussion in the working groups to stay at a very concrete and practical level, each working group was given the company and site description part of a safety report as the starting point. The four companies were chosen to represent different types of Seveso II plants. The chosen example companies were: a fertilizer plant, a paint factory, a chemical tank farm and a company engaged in electrolysis. The safety report descriptions were based on real safety reports by four Finnish companies. However, these were heavily edited and some fictional details added. **Under no circumstances should the descriptions be interpreted as accurate company data.** These four companies were then sited together in a **fictional industrial park within a busy port area.** By anchoring the discussion into real company examples, the target was to concrete discussions focusing on solutions rather than on discussing challenges at a more abstract level. Participants were asked to address the topics as if providing answers to questions from that particular company to the

authorities. In the working sessions, people worked first in pairs with a specific question, and then discussed their results in larger groups. The results from the workshops were summarized by the chairmen of each group after each session and presented for discussion in three plenary sessions. Finally, all results from the workshops were discussed in the closing session. These results are discussed in Chapter 3.

In the seminar, further data to validate the questionnaire results were sought using posters, on which the seminar participants could add comments and express their opinions. The questions and the results from the posters are presented in their entirety in Appendix 7.

2.3 Analysis

The results from the questionnaire and the posters were analysed both quantitatively and qualitatively. Questionnaire results were validated with the posters and any discrepancies between the two have been highlighted. After the seminar, a more detailed analysis of the similarities and differences between the results from the four parallel groups were analysed qualitatively.

3. Presentations

3.1 Graham Dalzell: Roles and Responsibilities: Who carries the can - safety engineer or line manager?

The presentation by Dalzell addressed responsibility for safety in relation to the role of the person within the company. He proceeded to discuss how responsibility should be broken down into different levels, based on the type of responsibility and the level of details and type of hazards that people at each level need to understand, manage and reduce. According to Dalzell, corporate HSE management systems generally consist of 10 – 16 elements, each with a series of supporting expectations. Dalzell then went on to argue that without a clear description of the interrelationship of these elements, the results can be a fragmented compliance culture, where each component is addressed in isolation. As a result, the approach to minimising risk is neither strategic nor holistic[7].

Two main themes ran through this presentation. Firstly, the importance of the corporate safety culture, and secondly, the importance of ensuring each level of management is dealing and responsible for the appropriate level of risks. According to Dalzell, the corporate safety culture can be classified as good or bad, depending on what kind of answers management expects to hear: the "yes" culture and the "no" culture. In essence, if management always expects to hear a yes answer, the safety culture is not on a good level. For example, if management asks questions such as: "is it safe" or "are the audit results good" or "has the safety report been accepted", Dalzell argued that the company is de facto demanding good news and thereby "living in ignorance of hazard and risk". Employees are not encouraged to deliver accurate overviews, but to ensure that they can answer yes. On the other hand, if the company actively encourages both management and employees to continuously question safety levels, it at the same time makes it easy to say "no" and stop potentially unsafe operations. Typical questions posed in such a corporate culture include "why is it hazardous", "what or who can fail" and "is it too dangerous to operate today".

In essence Dalzell argued that information must be distilled into specific knowledge for each person according to their role and responsibilities. Using these principles, the company should be able to demonstrate that they understand

[7] RISK ASSESSMENT or HAZARD MANAGEMENT? OECD Workshop of Sharing Experience in the Training of Engineers in Risk Management

the hazard and required barriers to prevent an incident as well as the potential consequences of an incident. Dalzell's advice to authorities reviewing safety reports was to pay specific attention to how well the hazards appear to have been understood and how closely the barriers in place are related to an in-depth understanding of what can go wrong.

A summary of the responsibilities and required hazard and risk management levels that can be related to the position in a company according to Dalzell is presented in Table 1.

Table 1: Relationship between responsibilities and hazard and risk management knowledge levels

LEVEL	HAZARD AND RISK MANAGEMENT KNOWLEDGE	TYPICAL RESPONSIBILITITES
Senior Management	• Overall corporate risk levels, both individual and societal • Comparative risk: similar and other industries • Spread of risk by business type and location • Change of risk patterns as business develops • Underlying risk drivers; e.g. age of facilities, geographical and political influences, business change • Public perception of risks relating to the company business • Risk from future growth options	• Set overall standards for tolerable risk and the investment levels to reduce that risk • Manage company in the knowledge of the risks • Set overall company targets which can realistically be achieved • Decide if specific businesses or facilities have intolerable risks which cannot practically be reduced and to close them down • Provide resources and infrastructure to support the business units in their management of risk • Manage future risk exposure of company
Local Management	• Business and facility risk levels • Spread of risk by facility • Spread of risk by hazard or activity • Spread of risk by types of personnel • Risks from future development options • Critical areas of ignorance and uncertainty • Overall and specific dependence upon business processes such as integrity management, competence and emergency response • Dependence on others; major contractors, corporate support	• Manage operations in knowledge of hazards and risks • Determine and implement the risk management strategy for each facility and major hazard • Set the priorities and determine the extent of risk reduction required to meet corporate standards • Shut down plants or limit activities if the operational risks exceed tolerable levels • Select safer concepts where the risks can be effectively managed within corporate limits • Optimise inherent safety and put in place effective hazard management on new designs • Provide local business processes and infrastructure to ensure competent people and plant integrity • Provide sufficient resources for operations and support services
Supervisors and technical experts	• Hazard management strategy and the critical measures to prevent, detect, control, mitigate and evacuate • Hazards of facility and the relative risks; characteristics of each of the major accident hazards; primary causes, severity, immediate consequences, potential and timing for escalation • Processes and people that ensure these measures are effective	• Operate the plant within clearly defined safe limits • Manage the hazards in line with the selected strategy and prioritise work in recognition of their relative risks • Control hazardous activities which may cause or exacerbate major accident hazards • Ensure that critical measures are suitable and effective through setting and meeting performance standards
Individual workers	• Understand hazards associated with their work • Know what is critical • Know performance standards and limitations of critical plant	• Comply with critical operating procedures • Maintain and work within their competence • Design the plant to meet the performance standards for its working life • Maintain the plant to the performance standards

3.2 Ismo Pentti: The role of safety reports in preventing accidents

In this presentation, the link between company values and approaches to safety management were highlighted. According to Pentti, Borealis has an impressive safety record and is continuously improving on both their own and contractor safety, as shown in Figure 1.

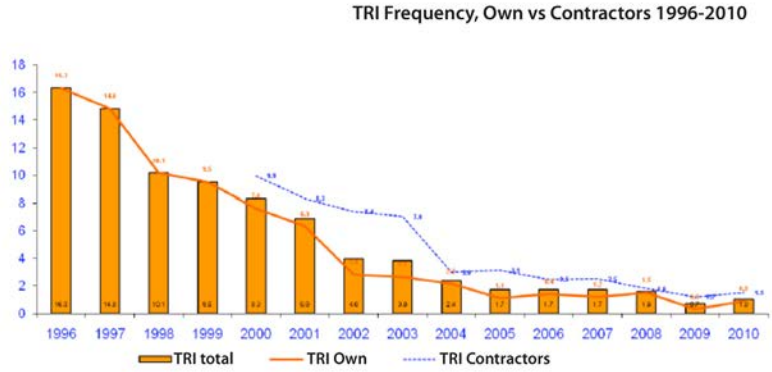


Figure 1: Decrease of total reportable incidents (TRI) in Borealis 1996-2010[8]

The foundation for the success in reducing incidents is, according to Pentti, Borealis' company culture, which empowers all employees to say "no" to unsafe operations, tasks or situations. Anyone finding something that is not safe is encouraged to put a stop to it. The company principle can be summed up in the statement "If you cannot do it safely, we do not do it all". Pentti emphasised that "safety management naturally should be more than the simple announcement of a vague declaration of intention by the general management of the company".

Borealis preventive approach comprises four phases as follows:

1. Define high hazard scenario's with impact outside fence in the permit request phase
2. Apply six step review method in the design phase and for modifications
3. Perform retrospective hazard analysis in the operation phase
4. Learn from near misses / incidents

[8] Ismo Pentti: The Role of safety Reports in Preventing Accidents. Presentation at MJV Seminar in Tampere, 2011

The output of the different risk review processes is used as input for the yearly business planning round. The improvement in safety has not happened on its own, but has required multiple investments over the years. Today, the main challenges are associated with older plants.

Borealis regards the safety report as a tool for identifying and controlling major accident scenarios that could have an impact outside the plant area. The obligation to prepare the safety report is used as an initiator towards identifying and analysing vulnerable areas close to the plant or the transport routes for dangerous goods. The potential effects of major accident scenarios on individual and group levels are evaluated against acceptable levels. However, Pentti did not specify what this acceptable level would be. The identified high hazard scenarios are also used as the basis for conceptual design of the plant. Pentti went on to discuss the definition of a process safety incidents, and argued that within this concept incident initiators other than purely system related (e.g. originating from within the process) have to be included and assessed. Other initiators (e.g. actions by others, weather related initiators), other incidents and longer chains of events leading to a potential incident must also be analysed.

Pentti pointed out that learning from incidents is influenced by the type of safety culture in the company. To enable effective learning, safety management must be much more than an announcement, reaching beyond the tangible trappings of manuals and posters, permeating into people's mindsets. At the same time, Pentti emphasised the importance of ensuring that safety management must be backed up by in depth understanding of the interrelationships between the different processes. At the same time, clear criteria for risk management have to be used to ensure that risk management efforts target the highest risks. To be able to do this, Borealis uses process safety indicators.

3.3 Kristine Jousimaa: Rescue services in Finland, External Emergency Plans – Regulation and Guidelines, Responsibilities and measures

Jousimaa's presentation focused on external emergency plans by the Rescue Services in Finland. The main focus of the presentation was on how good and consistent external emergency plans can be drawn up and how these can be tested through well planned emergency exercises. To start with, a brief over view of the rescue services organisation and in Finland was given. This was followed by an overview of the legislation. The Finnish rescue law and a decree issued on the control of major accidents involving dangerous substances have

just been reformed, and came into force on the 1st of July 2011. The regulation covers the drawing up of external emergency plans for Seveso upper tier establishments (about 140) and also for marshalling yards and docks through which large amounts of dangerous goods are transported; for military establishments' equivalent to Seveso uppertier establishments; and for nuclear sites and for waste facilities of extractive waste.

Jousimaa pointed out that the regional rescue services have found drawing up external emergency plans to be quite challenging when the only guidance was the legislation itself. As a consequence, the plans have been of varied quality from good to very poor. As the objective of the external emergency plan is to be a functional, action-steering document which rescue services can consult to quickly find all those essential matters relating to major hazard preparedness and rescue operations, the variance in quality was not seen as acceptable. There was therefore a clear need to develop guidance on the preparation of external emergency plans, so that these would better meet the intended function of a tool that rescue services can use for management and operational action.

In 2009, the Ministry of the Interior's Department for Rescue Services started work on guidance and a common template for external emergency plans. These were ready and in use in the beginning of 2010[9]. In lieu of the regulative update, the guidance will be updated according to the new regulation in 2011-2012. The aim of the external emergency plan guidelines and template is to:

1) make it easier to formulate the plan

2) harmonize the content and the structure of the plan

3) enhance the quality of the plans

4) emphasize the function of plan

It was also recognized that the planning, organization and implementation of emergency exercises designed to test the external emergency plans also needed to be improved. A review of the conducted exercises indicated that these have varied considerable in both quality and magnitude. In 2010, the Ministry of the Interior's Department for Rescue Services started a project with the Emergency Services College to plan and implement a course specifically aimed to train personnel from the rescue services as well as from the Seveso II upper tier establishments to plan, organize and execute emergency exercises for a Seveso site. A pilot course will be arranged in 2012.

[9] available at http://www.intermin.fi/intermin/biblio.nsf/CE768A8B4EAF1566C225769500454BAC/$file/352009.pdf

The Regional Rescue Services are responsible for drawing up and testing the external emergency plans. The Regional State Administrative agencies oversee and control drawing up, testing and quality of external emergency plans, and also report to the Ministry. The Department Services under the Ministry of the Interior is responsible for drafting national regulation and guidelines concerning external emergency plans and overseeing that they are implemented. The Department also contributes to cooperation with the other rescue authorities and also cooperates with other ministries and authorities. The Department is also the link to EU, to which it reports about external emergency plans and their testing.

In view of the many actors involved, coordination and cooperation has been recognized as requiring specific attention. According to Jousimaa, several actions have been taken in Finland to improve cooperation between the different rescue authorities and to enhance the implementation and quality of external emergency plans and emergency exercises. In 2010, the Department of Rescue Services conducted a "control visit" to Regional State Administrative Agencies to find out the latest situation concerning external emergency plans. The Regional State Administrative Agencies have been working together to draw up criteria for evaluating the quality of external emergency plans and associated exercises. They have also targeted enhanced cooperation between the Regional Rescue services in their areas. In conclusion, Jousimaa emphasized that, in order to enhance the quality of external emergency plans and exercise, it is important to further improve the cooperation between the different rescue authorities as well as between the rescue services and operators of major accident hazard plants.

3.4 Country presentations

3.4.1 The role of safety reports in preventing accidents in the Czech Republic

Zuzana Machatova presented an overview of the experiences, practices and identified challenges in the Czech Republic in relation to safety reports. After a brief overview of the legal and administrational framework in the Czech Republic, certain key statistics of Seveso establishments were given. In the Czech Republic there were 115 upper tier and 80 lower tier establishments in August 2011. The number of evaluations carried out annually has varied between 60 and 120 in the period of 2006-2011.

In the Czech Republic, the Ministry of Environment has issued a decree in which the principles to be followed when analysing and assessing major accident hazards are defined. The legal procedure includes decisions by regional authorities that are, amongst others, based on the recommendation from the Ministry of Environment. This recommendation is based on an expert's report made by the Occupational Safety Research Institute's department for evaluation safety documents. This evaluation is based on a checklist, and covers the descriptive information on the establishment, the evaluation of risk analysis and assessments of major accidents, an evaluation of the preventive safety measures and ends in a recommendation on completion of the safety report.

Machatova then focused the discussion on the safety report to the risk analysis and assessment of major accident hazards within the safety report. According to Machatova there are several challenges related to risk assessments in safety reports. Many safety reports don't contain all the information that would be needed. For example, some dangerous substances might be missing altogether, and there is often lack of information about dangerous chemical reactions. Scenario and hazard identification and risk analysis may also be inadequate. There are also many shortages identified in relation to the prevention policy and safety management system (see presentation slides in Appendix 6).

In the Czech Republic, the main benefits of safety report to the operator are according to Machatova the improved understanding and identification of risks and the implementation of a safety management system. The safety report is also used as a basis for inspections.

An identified challenge is the failure to include past accidents and incidents and an analysis of their causes; instead, the focus is on potential major accidents and worst case scenarios. The document therefore often remains a standalone, "dead document", that is prepared once and not kept up-to-date and with little connection to day-to-day safety management. The safety reports can also be too extensive and hence not easily used.

Machatova concluded that in order to increase both the quality of safety reports and usability of these as living documents require that a balance between the right amount of information and practical usage is found.

3.4.2 Lesson from the assessment of Seveso Safety Reports in Sweden

Claes Petersén described the safety report assessment in Sweden, the benefits they have identified to both the operators and authorities and the challenges related to safety reports. According to Petersén the main tasks of the safety report is to demonstrate that the operator has fulfilled his responsibilities re-

lated to:

- safety management system
- risk identification and preventive measures
- safety equipment and infrastructure
- the internal emergency plan.

Sweden has developed an Internet-based guidance on how to prepare a safety report, which contains an overview of each safety report section as well as useful links to further information[10]. When assessing the safety reports, the Swedish inspectors have found that the Safety Report Assessment Manual published by the UK Health and Safety Executive (HSE) is very useful[11]. In Sweden, the overall assessment process for each installation usually takes from 4 to 5 days, including inspections and safety report evaluation. In order to help the assessment, a table of criteria in check list format is used. There are three possible results from an assessment:

1) Minor deficiencies -> conclusion letter
2) Remarkable deficiencies -> more information needed
3) Large deficiencies -> demands and new SR needed

According to Petersén, most safety reports are assessed as having remarkable deficiencies, although there are also companies with large deficiencies.

Petersén commented on the main benefits of a safety report to the operator being the increased awareness of risks and hazards and that having to prepare a safety report forces the company to review their safety management system. Safety reports drawn up by external consultants were seen as detrimental to safety in some cases, as it can be diminish the learning process and thereby the benefits from it to the company.

Benefits for authorities were seen as coming from the snapshot of the risk scenery and how the safety management system meets the requirements from the risks present. It allows the inspection to be tailored to those areas found relevant, acting almost as a questionnaire prior to the inspection. Whilst the safety report in Sweden is seen as reflecting the standard of the safety work done by the operator, this is not necessarily always the case. Petersén emphasized that it is important to ensure the inspection verifies whether the safety report pres-

[10] Available at http://www.seveso.se/sv/Vagledningen/Sakerhetsrapport/Vadska-en-sakerhetsrapport-innehalla/

[11] Available at http://www.hse.gov.uk/comah/sram/

ents a true mirror of the actual safety level. Petersén also noted that whilst the safety report should act as a base from which the safety management system can be verified, there is still much to do in the terms of how much and what information from the safety management system should be included in the safety report.

Petersén then turned to the many challenges related to safety reports that still remain and identified three main challenges:

1. Approval criteria: The criteria for approval are still very unclear, and it is therefore difficult both for operators and the inspectors to define what is "good enough".
2. Scenarios: Choosing and advising on choice of scenarios is an issue where opinions vary. Should the worst cases or the most probable cases be chosen?
3. Level of risk assessment: How much can an operator be expected to do? Can a consequence/probability matrix be demanded from the operators?

Petersén further went on to discuss the assessment of the safety reports, highlighting that it is not always easy for the authorities to decide on what to demand and how to put the demand forward. Such difficult decisions on what to include as an advice and what to demand as an outcome of the assessment process remain challenging.

3.4.3 Safety Reports – Experience from Hessen, Germany

In this presentation Dagmar Dräger addressed the authority experience of safety reports in Hessen and highlighted the challenges in assessment and importance of the safety report. In Germany, the enforcement of the safety report requirements and assessment is the responsibility of the Länder and varies from state to state how it is structured. The experience indicates that the size of the report varies a lot, from 1 to 100 files, depending on the size of the facility. Dräger pointed out that whilst it is important to ensure that there are sufficient details included to demonstrate safe operations, too many details should be avoided as this will simply lead to authorities "drowning in paper".

In Germany many companies, especially smaller companies, use external consultants for producing safety reports. According to Dräger safety reports compiled by consultants are usually well structured and complete. However, the disadvantages of using external consultants are the lack of "ownership" of the safety report by the operator, insufficient maintenance and update and errors in details. External consultants are also used by some Länder for the assess-

ment of safety reports. Again there are clear advantages and disadvantages. By using a consultant you can reduce the workload of authorities and temporarily solve the problem of "the lack of competence" within the authority. However, this in turn makes it difficult to maintain long term competency inside the authority, and as firsthand knowledge of the safety report is lacking it makes inspections even harder to carry out.

The main challenges in assessments according to Dräger are:

- Range of disciplines and experts needed in assessing complex establishments
- Very time consuming to do well
- Authorities may lack experience, if they only have a couple of establishments. On the other hand some authorities are overloaded
- Dilemma between enough and too much detail in safety report

Dräger then went on to discuss what the safety report should be like and emphasized the importance of the safety report including a plausible, complete and correct representation of the technical aspects of the establishments, its hazards and risk control measures and the safety management system. Dräger pointed out that as systematic hazard identification and risk assessment is the core of the safety report, the control measure should relate clearly to these identified hazards. Further linkage to emergency planning and off-site emergency communication should also be visible. Through the safety management system processes, the safety report should be regularly reviewed and updated by the operator.

3.4.4 The COMAH Safety Report

Mark Burton from the Health and Safety Executive (HSE) UK Hazardous Industries Directorate (HID) presented the UK approach to the safety report. The Seveso II Directive is implemented as the Control of Major Accident Hazards Regulations (COMAH). The HSE HID has produced guidance for the assessment of a safety report, freely available on their website. This guidance on how to assess a safety report also functions as a good guidance on how to prepare a safety report. In addition, there are several technical guidance documents available on the HSE website.[12]

A new operator attempting the first safety report is first directed towards the various guidance documents and also has the opportunity to gain advice dur-

[12] See http://www.hse.gov.uk/comah/guidance.htm

ing site visits. Overall, the approach taken by the HSE is to provide guidance and advice on how to do things well.

The safety report assessment consists of several stages. The first step is a so-called early predictive screen assessment, followed by a more in-depth assessment by several team members. The results are communicated during the assessment process if more information is required. The conclusions sent to the operator will also include an intervention plan. Overall, the assessment takes 12 months to complete.

The UK has adopted a team approach to the review, whereby there are several technical experts giving opinions in relation to their area of expertise. The team is led by a regulatory inspector acting as the assessment manager. Areas that may be covered in the team include experts for consequence assessment, process safety, control and instrumentation, mechanical engineering etc. Human errors and human factors are analysed separately, and the environmental aspects are looked at by the Environmental Agency (or SEPA in Scotland). The safety report assessment is done through templates as provided in the guidance mentioned earlier.

Before 2010 all safety report assessments followed this approach. Since 2010, a modified approach has been adopted for changes to the safety report. In this lighter version, a meeting between the HID and the operator takes place some 6 months before the review is due. If there have been major changes, a full assessment team approach will be followed. If the changes are minor, a remodelled approach can be taken. Each such assessment takes 4 months and it is conducted by a smaller team consisting of a regulatory inspector looking at the descriptive part and the safety management system and emergency response assessment, a predictive inspector looking at the consequence assessments and a representative from the environmental authorities looking at the environmental aspects. During the 4 months, the so called technical read will take some 3 months, after which a site inspection is carried out by the team.

Burton then went on to discuss identified weaknesses in the safety reports. These include poor descriptions where no links between major accident hazards and the control and mitigation measures are apparent. The focus may be wrong, e.g. on personal safety rather than on major accident hazards. Furthermore, poor demonstration of major accident risk assessments which are proportionate to the site and failures to demonstrate that risks have been controlled to reduce risk as low as reasonably practicable are evident.

Finally, Burton went on to discuss what "good" looks like and highlighted that the main points to look for in the safety report are as follows:

- Demonstrate they know and understand the sites hazards

- Demonstrate a suitable risk assessments of their hazards
- Identify appropriate control measures
- Demonstrate a safety management system to operate the site
- 5-year reviews – Planning, measuring auditing and reviews – do they do what they say?

4. Results from the questionnaire and seminar

4.1 Overview of the questionnaire

The questionnaire was sent out to the members of the Technical Working Group II – Inspections members. With a total of eighteen (18) answers, the questionnaire does not give sufficient data to provide a complete overview of the situation in the 27 Member States that could be subjected to statistical analysis. However, a good indication of the overall situation can be deduced from the results.

Most answers were from the competent authorities, and six of the answers were representative for all the authorities in the MS concerned with evaluating safety reports. 82% (14) represent authorities that examines safety reports and 76% (13) represent authorities that carry out Seveso Inspections (N=17).

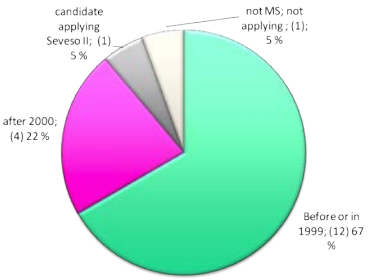


Figure 2: The application of Seveso and MS status of participant countries (N=18)

These were not all the same. Note that whether and how long the participants have been applying the Seveso Directive is given in Figure 2. [13], where all but 2 respondents are Member States.

[13] 15 Member States formed the European Union when the Seveso II Directive became effective in 1999 (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom). Of these,12 participated in the survey (all but Luxembourg, Spain and Greece). In 2004 10 additional Member States acceded and of these 2 (Malta and Czech Republic) participated.. In 2007, two more Member States, Romania and Bulgaria, joined the EU, of which Romania participated in the survey, For most new Member States, the effective implementation of notification and accident reporting process did not start until at least a year following accession into the EU. Croatia (candidate country) has transposed the Seveso II regulation into their legislation. Norway (Survey participant) has applied the Seveso Directive since 2005 through the FOR 2005-06-17 nr 672.

The objective of the questionnaire was to identify common challenges associated with the preparation and evaluation of safety reports. A key question for the questionnaire was to find out how safety reports are used during the preparation and execution of inspections in the plant. The questionnaire was structured around six main topics, as summarised in Figure 3.

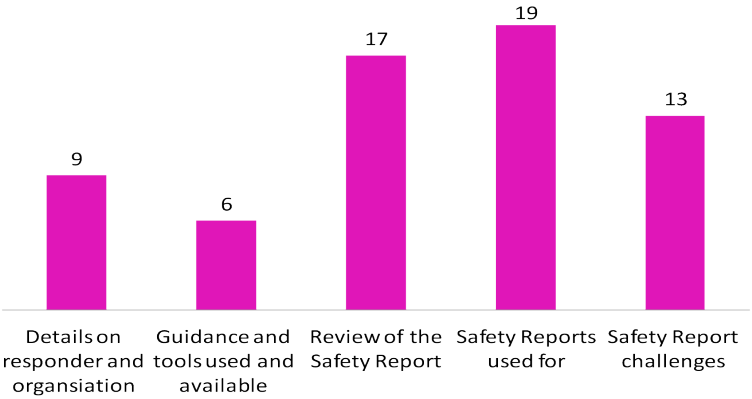


Figure 3: The questionnaire themes and number of questions per theme

The details on respondents and organisation were used mainly to allow cross tabulation of answers. The data was analysed to find the main challenges associated with the different ways safety reports are used. The way Member States review the safety report was analysed mainly from an administrative resource efficiency point of view. The identified safety report challenges were used to define the themes of the working sessions in the seminar and cross-checked for any trends with how much and what type of guidance Member States provide to operators.

It was clear from the questionnaire that there are large differences in the actual challenges although some clear trends were visible. For example, one country stated that there are no challenges related to evaluating safety reports and most inspections are done by using an inspection tool (questionnaire). Others considered assessing the risk scenarios and major accident scenarios to be challenging and yet a third group identified challenges which relate to lack of experience and training in carrying out the review of safety report. Selection of proper safety report issues for onsite inspections was a challenge for some.

To define what is good enough as well as other issues requiring expert judgement were seen as difficult. Such judgements require having an appropriate level of detail, deciding what is a proportionate assessment in terms of breadth

and depth of assessment, evaluating whether risk identification and ranking has been systematic and thorough, , determining whether or not the operator has demonstrated that risks are appropriately controlled were also seen as challenges. The most commonly stated challenges related to risk assessment and control. In addition, the translation of the safety report evaluation results into an inspection plan was brought up. As inspections are a vital part of the Seveso II Directive implementation in a country, this third aspect was decided to be included in the seminar. The results for these questions are presented together with the results from the working sessions.

4.2 Guidance, tools, use and review of the safety report

4.2.1 Use and impact of the safety report

The way safety reports are used in relation their intention differs widely. For example, the Portuguese representative stated that the safety report is never used for external emergency plans. In some of the newer Member States and in Norway, the safety report is only used sometimes for land use planning. On the whole the safety report is less used for land use planning and risk communication than for Seveso inspections and external emergency plans. In five countries (Germany, Denmark, France, Austria and Romania) the safety report is always used for all four topics (land use, risk communication, inspections and external emergency plans). Other identified uses of the safety report include risk communication between authorities, permitting procedure for accident examination, preparing information to the public and establishing external domino effect.

The safety report was almost uniformly seen as improving safety (> 94%; sixteen respondents, N = 17) in several ways in the questionnaire. The identified impacts included increased awareness and knowledge among company's management and corresponding changes and enhancement of the safety management system, both through processes and for example through clear identification of responsibilities. Overall training was also seen as increasing and thereby the overall level of awareness of risk increased. Actual investments into safety equipment or infrastructure were also identified by a respondent as an impact.

However, in the seminar, where opinions on these identified ways of improve-

ment were solicited in a poster, the results indicate a wide division of opinion, as shown in Figure 4. A slight majority viewed the safety report as increasing safety and the clear majority were of the opinion that preparing the safety report helps companies identify risks. Somewhat alarmingly, the largest number of votes was given to the statement that safety reports are written for the authorities. This finding indicates that whilst it may improve safety, the safety report is still far from the example given in the presentation by Borealis, e.g. it is not being uniformly used by companies as a tool for increasing safety.

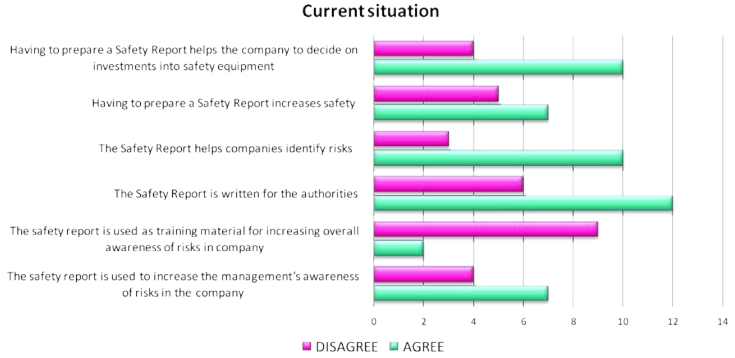


Figure 4: Ways in which the safety report improves safety in practice

The majority of the respondents to the questionnaire were indeed of the opinion that the safety report is normally treated by the company as an independent document that is not part of the management system and requires separate updating. However, in Ireland, France and Austria the safety report is seen as generally being part of the company´s management system. In the UK, the aim is to treat safety reports as living documents but unfortunately many duty holders still regard them as regulatory documents that have to be produced as a one off exercise.

The seminar participants indications on a poster that the way the safety report is perceived to be used (Figure 4) does not match the identified targets for how it should be used (Figure 5). Specifically, the differences in using the safety report as training material and increasing the management's awareness of risks in the company indicate that the safety report is not used as widely within companies as it could be.

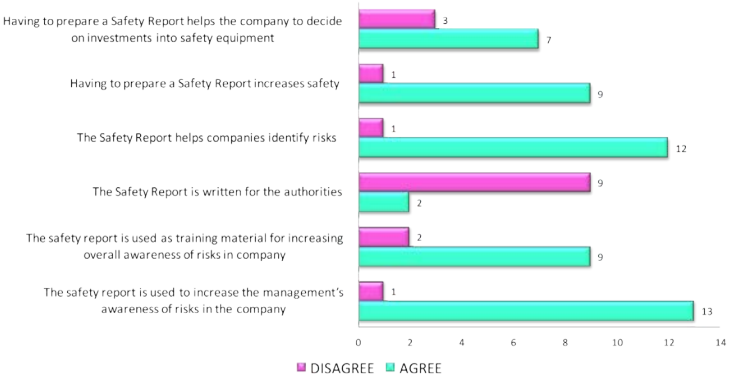


Figure 5: Ways in which safety report should improve safety

Numerous examples of **how the safety report has affected safety** were given in the questionnaire. These included development of or enhancement of the safety management system (seven), enhanced emergency preparedness (four), higher awareness amongst company's management (two) and others (three), investment in prevention (safety measures and control systems) (two), investments in new or better equipment/infrastructure (five) and training of personnel (four). In addition, the following improvements were identified by single respondents: development of safety indicators, improvements in change management, available information to public, substitution of substances, control of major accident hazards are viewed through the full life cycle of the establishment from design and commissioning through operation to decommissioning and demolition, more insight to the whole picture (risks to consequences to prevention, preparedness and response), identification of unacceptable risks and following risk-reducing actions and identification of unclear responsibilities.

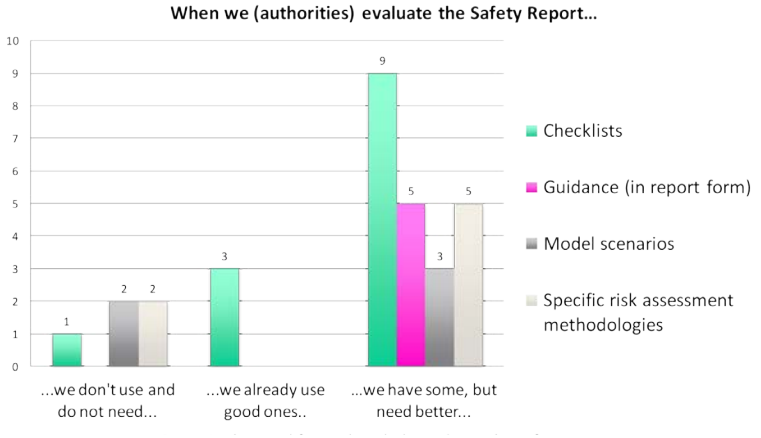
4.2.2 Guidance and tools

Most countries (14/18) have or are preparing national guidelines for safety reports. In addition to the national guidelines, the European Commission (MAHB)[14] safety report guidance was also mentioned as being used in many

[14] Guidance on the preparation of a safety report to meet the requirements of Directive 96/82/EC as amended by Directive 2003/105/EC (Seveso II). EUR 22113. See http://mahb.jrc.ec.europa.eu

countries. In Germany, separate guidelines produced in the different Länder are also used. Thirteen of the participating countries also have some kind of guidelines or tools to help the authorities in reviewing the safety reports (See also Chapter 3.4.3). Only two countries have neither.

The type and quality of guidance and tools in use by the authorities when assessing the safety report were asked for in the questionnaire and further probed through a poster in the seminar. The questionnaire indicated that **nearly 60% of respondents used specific tools when assessing safety reports**. Of these, five specified these tools were check lists. Specific guidance is available in eight of the participating countries. In Portugal and Sweden there are also software models available for the authorities to use. There was no distinctive difference between the old and the new Member States in this respect. The results from the poster (see Figure 6) indicate that whilst most countries have guidance and tools, there is a clear need for better tools to help the authorities evaluate the safety reports.



4.2.3 Evaluation of the safety report

The time taken to review the safety report varied widely between countries. There were also significant differences between the variance of time taken to review individual safety reports. **The average time taken to complete the review was under 14 days**. The time span from submitting the safety report to the company got the feedback was even more widely distributed (see Figure 7).

There would appear to be a correlation between the time taken to review and time to send the feedback, but the sample size was too small to establish clear patterns.

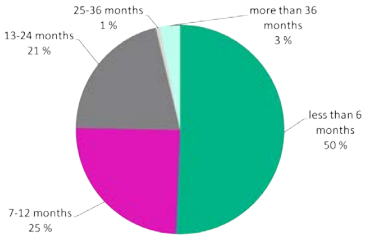


Figure 7: Time taken to send feedback to company (N= 16)

All the respondents emphasized that the days needed may vary a lot depending on the case. Some respondents estimated only the time needed within their own authority, some included the whole process and the time needed from all the authorities. As such, interpretation of the results is not very reliable.

Of the responding countries, in eight the review of the safety report is done in cooperation with more than one authority (e.g. environment, rescue, occupational health, and engineering). In seven countries, the safety report is managed by one authority, who consults with other authorities or use external consultants (if needed). For example in France, residents, local authorities, non-government organisations (NGOs), and more generally the public, may be involved if a public enquiry is conducted. In Austria, the technical assessment is done on regional level at the technical expert unit, and the district authority makes the decision based on the assessment.

In all countries the feedback to the operator is provided by the authority that manages the safety report review process. Usually this authority collects the remarks from possible other authorities and combines them to be sent to the operator.

For the evaluation, mostly in-house competence of the authority/authorities is used. At the other end of the spectrum is Malta, where external consultants carry out the examination, the responsible authority only gives input and review the results. Seven of the countries that responded stated that if expertise of certain specific area/special case is not available in-house, external expertise may be used from scientific institutions, specialists in Seveso and chemical risk issues, regulatory specialist, environmental specialist and other topic specialists (predictive, process safety, C&I, human factors, mechanical, civil etc.). Several respondents considered that competence was an issue both on the side of the inspectors (seven respondents, 42%) and on the side of the operators (12 respondents, 70,6 %) . Six respondents (35%) included "inertia" as a challenge, six (35%) mentioned lack of guidelines as an issue. One respondent defined inertia as resulting from the lack of ongoing support to inspectors in terms of guidance and professional development.

New requirements are sometimes set on the basis of the safety report (eight respondents; 47% when N=17). This is however not always the case. For ex-

ample in Belgium new requirements are never set merely on the basis of the safety report, but require input from an inspection. In the UK, any identified findings are also always verified by onsite inspections. In Finland, requirements are rarely set on the basis of the safety report, but may include clarification or requirements to collect and present data on near misses, improvement of maintenance systems and improvement of leak control. In Italy, a typical requirement is related to maintenance of safety critical equipments. In other countries, including Denmark, Sweden, France, Czech Republic and Croatia new requirements for the operator are often set on the basis of the safety report. For example in Sweden, typical requirements that are addressed are elaborations of the safety management system, need for better link between risk and preventive measure or the need for a better description of consequences.

These requirements are communicated to the operator during the evaluation of the safety report (53%, nine respondents), i.e. before any official conclusions, and/or are given or as part of the final conclusions (59%, ten respondents) (N=17). In the UK and the Netherlands, the requirements are communicated to the operator after the onsite inspecting. In the UK, urgent issues will however be dealt with during the assessment process, particularly if a serious deficiency is suspected. In Belgium, the requirements are communicated to the operator during the inspection. In Germany, the deficiencies of the safety report are discussed with the operator during the inspection, and if the deficiencies still exist, they become part of the final conclusions. In the Czech Republic, the usual practice is that the evaluation process consists of several steps, during which the operator should improve the safety report in accordance with the comments from authority.

4.2.4 Joint safety reports

As the issue has risen in the host country of the MJV, the questionnaire included a question on whether a joint safety report for an industrial park is acceptable. The answers indicated that approximately one third (35%; 6 respondents) was of the opinion that it is not acceptable, whereas 12 % (2 respondents) indicated a firm yes. 29% (five respondents) were of the opinion that it would be acceptable sometimes. In four countries (23%) a joint safety report was considered theoretically possible, even though as of yet there are no such cases. Joint safety reports are indeed rare and only a few examples were mentioned, these are either big industrial parks or situations where there is more than one operator in one facility. However, in Italy, some regional authorities may even require a joint safety report whereas in Denmark a joint safety management system is accepted, but the safety report has to be individual.

When the same question was asked at the seminar through a poster, a very different result was seen, as shown in Figure 8 a (survey) and 8 b (poster)

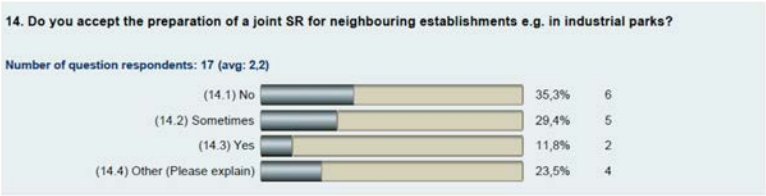


Figure 8a: The acceptance of a joint safety report (N=17)

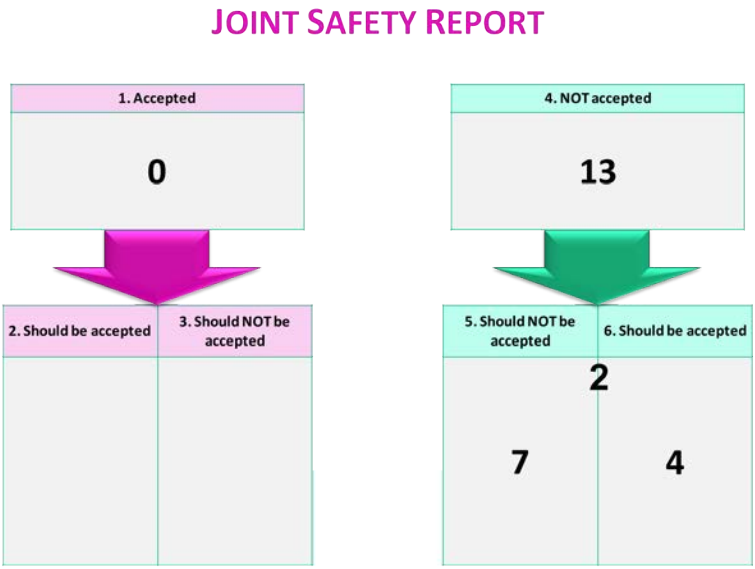


Figure 8b: The status of acceptance of a joint safety report today (upper box) and what should it be (lower boxes)

As Figure 8 (copy of the actual poster) shows, none of the 13 seminar participants that commented on this recognised that a joint safety report would be acceptable today. Views on whether a joint safety report should be acceptable in the future were not unanimous, although the majority appeared to be of the opinion it should not.

4.2.5 Public information and safety reports

Three different approaches to how much of the safety report is made available to the public were identified in the questionnaire:

- **All available:** In Belgium, Italy, France, Austria, Norway, Czech Republic, Ireland, Portugal and Malta safety reports are available to the public on request to the managing authority or the operator. In Finland the safety reports are available at the authorities' offices and at the establishments in question. In Romania it is the obligation of the operator to make the safety report available to the public and normally this happens through web pages, whereas in Croatia, the safety reports are available from the web pages of the authority. Portugal is potentially moving towards making the safety report publically available on the internet.
- **Partially available:** In Denmark, France and Austria, some information may be kept confidential and the public will often not be allowed to see the total safety report. In Sweden, safety reports are available based on the principle of public access to official records. In Germany, a short form is available from the operator on request.
- **Not available:** Only in the UK are the safety reports not made available to the general public based on national security reasons.

In general, the public is showing little interest in safety reports. Only Denmark stated that there has been very much interest from the general public. In the Netherlands, the general interest of the public is considered to be decreasing. In Norway, there has been some special cases (e.g. a new LNG-plant) where the public has been more interested. Most interest is expressed in relation to land use planning issues. In Italy, there have been cases where environmental organizations or citizens have used the safety report to promote legal actions against industrial projects.

4.3 Safety report challenges

The main part of the questionnaire looked at the challenges associated with safety reports. The results from the questionnaire and related posters are presented together with the results from the working sessions in the following sections.

The top five deficiencies in safety reports included risk and accident scenarios and linking descriptive parts **with risk, prevention and emergency planning** and **the safety management system**.

- For the newer EU Member States these challenges were considered to arise mainly due to **lack of experience and expertise** in the companies –the same reason was also stated by others. For example in Portugal, a reason for the challenges with identification and presentation of risk scenarios was considered to be due to lack of in-house qualified staff or software tools.
- The challenges related to identification and presentation of risk scenarios, and measures of protection and intervention to limit the consequences of an accident were noted by some as potentially due to the fact that t**hese aspects are the least concrete and require the operator to make assumptions in order to be able to describe them.** For example in the UK, some operators find it challenging to demonstrate that they have identified the link between the control measures they have in place and the major accident scenarios that they have identified. Others find it challenging to identify the most appropriate risk assessment methodologies and to present the evidence coherently and authoritatively.

There was a clear overlap of issues identified as relevant for scenario selection and those parameters highlighted as important in hazard identification and risk assessment. It would appear that these concepts are somewhat conceptually intertwined. For example, in Finnish, the common terminology for the step before risk assessment is literally translated as risk mapping or risk identification. This is in contrast with the terminology used by many, where the focus is on hazard assessment. This may have given rise to some confusion in the working sessions and was discussed during the seminar. In view of these discussions, some editing of the results from the working groups was made and for the purpose of this analysis, the following definitions have therefore been made:

- **Hazard identification** includes consideration of all the things that can give rise to unwanted consequences.
- ***Risk assessment*** includes estimation of consequences and frequencies of unwanted incidents.

- **Major accident scenarios** are detailed descriptions of the events that could lead up to a major accident as well as modelling and/or description of consequences to people, environment, buildings and infrastructure.
- **Reference scenario = Top event (loc) + dangerous phenomenon)**[15], i.e. scenarios are defined[16] as: "For land use planning purposes, scenarios describe the conditions that might lead to a major accident and the potential consequences. In more operational terms a major accident scenario describes usually the loss of containment (LOC) of a hazardous substance (or the change of state of a solid substance) and the conditions that lead to the realization of an undesirable consequence (fire, explosion, toxic cloud = the dangerous phenomenon)."

The main challenges were the subject of the three working sessions and the results from these as well as the associated questionnaire questions are discussed in the next three chapters.

4.4 Hazard identification and risk assessment in the safety report

4.4.1 The fundamental challenge of risk

The challenge most questionnaire respondents identified related to the identification of hazards, scenarios for major accidents and the assessment of the risk level (65%). Comments such as "the description of accident scenarios do not match reality" were common, as were perceived problems with the actual risk assessments, where both justifications for scenario occurrence and consequence assessments were found lacking. **This is of concern, as the ability to identify hazards and assess risks is the fundamental cornerstone of ensuring safety.** A most unfortunate failure identified was when the risk analysis simply does not match the plant in question, giving rise to questions of the validity of the entire safety report. Many respondents also found that not enough attention was given to long term effects, the spatial distribution of accident consequences and what the effects on people and the environment would be.

[15] IMPLEMENTING ART.12 OF THE SEVESO II DIRECTIVE: Overview of Roadmaps For LandUse Planning In Selected Member States: Edited by Claudia Basta, Michael Struckl and Michalis Christou EUR 23519 EN – 2008

[16] Land use planning guidelines in the context of article 12 of the Seveso ii Directive 96/82/EC as amended by Directive 105/2003/EC. EUR 22634. (at http://mahb.ec.europa.eu)

The first working session addressed how the identification of hazards and major accident scenarios as well as the assessment of risks should be described in the safety report. During the session, the advisory role of the competent authorities was discussed. Not all the EU competent authorities take an advisory role. In particular, this led to the question of how to disseminate advice or knowledge to companies about how to improve their safety reports if the authority approach is solely directed towards enforcement and monitoring.

The results indicate that there are large differences in what inspectors expect to see in the safety report in terms of hazard identification, risk assessment and scenarios. In the following, the results relating to each of the first working session discussion topics are presented and analysed.

4.4.2 Presentation of hazard identification

The groups were asked to debate the key elements of hazard identification that should be included in the safety report as well as how these could be presented. **The process description** was seen as highly relevant to allow the reviewer to get a clear understanding of what the plant and site looks like. Whilst the description of the processes was not generally seen as being an issue in safety reports, **the linkage between the descriptive part and the identified hazards was seen as an essential element that often is deficient.** References to process parameters such as pressure, temperature, types of reactions as well as a clear overview of what kind of tasks are carried out within the plant was seen as essential to hazard identification. A list of the types of hazards to be considered has been compiled from the seminar working sessions and is presented in Example 1.

Example 1: Hazard identification should include

- Hazards from the chemicals' inherent properties (e.g. flammability, toxicity etc.)
- Hazards from tasks and processes
- Natural hazards (e.g. floods, lightning),
- Human factors
- Potential for undesirable reactions between substances
- Infrastructure hazards such as lack of electricity or cooling water
- Potential hazards arising in nearby installations (e.g. domino effects)

All groups were unanimous in expecting **a clear overview of the substances present** and how the substance characteristics give rise to specific hazards. The other key elements expected included references to process conditions and parameters, identification of safety critical elements and an explanation of the

methodologies used. Consideration of hazards arising from transport, loading and unloading was seen as essential not only for the tank farm, but for all of the other types of companies too.

Suggestions for ways to present the hazard identification included flow diagrams and other means of relating the hazards to a clear overview of the processes, storage conditions and tasks carried out both during normal operations and during maintenance, shut downs and start ups. A suggestion for including hazards in a table format that is clearly related to the process description was put forward. In general the link between the process and site description and the identification of hazards was seen as a good practice that helps the operator in carrying out the risk assessment as well as helping the safety report assessor to get a good picture of whether all relevant hazards have been identified. There was little divergence in the suggestions between the groups in this respect, although the way this connection should be shown was advocated by the groups in two different ways, as summarised in Figure 9. A key linkage called for was the ownership of the risks (see also Dalzell presentation discussion, Chapter 3.1).

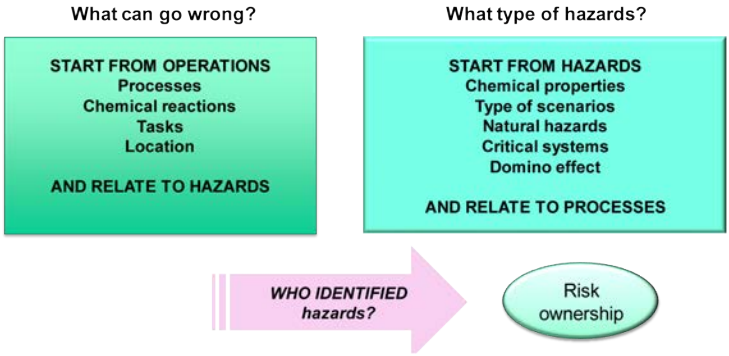


Figure 9: Differences in approaches to hazard identification

Whilst not directly an identification of hazards, the need to identify and describe the vulnerabilities of the environment, nearby residential and industrial sites as well as vulnerable sites such as schools or hospitals were mentioned by two of the groups. Two of the groups also called for a questioning approach, e.g. presenting the hazard identification in the format of "what can go wrong".

4.4.3 Methodology presentation

All groups were of the opinion that **the methodology used to identify hazards should be given**. It was seen as desirable that the company should show it had given thought to the choice of methodology. It was generally agreed that a combination of different methods may be needed. The elaboration of the composition of the analyst team that had done the hazard identification was seen as desirable.

Most groups also mentioned specific methods seen as good, the most frequently mentioned were fault tree analysis, Process Hazard Analysis (PHA), HAZOP, task analysis and different types of checklists. There was a general agreement that **the methodologies used should be proportional to the installation.** Particularly HAZOP was not seen as necessary for all plants, but more suitable to complex chemical reactions. The company should also relate the choice of specific methods to the complexity of the process. However, there were different opinions on the need to include a discussion or justification on why specific methodologies were chosen. These differences are summarised in Table 2.

NO	YES
	YES, to show team work included
NO, but show that method is proportional to risk	YES, but depends on complexity
NO, but should indicate how methods is used to identify critical areas, top events and scenarios	YES, to show how critical areas are found with the method
NO, as long as recognised method	YES; to show why specific hazards /risks are found with the method; to judge suitability for the process or events

Table 2: Differences in opinion in relation to methodology justification

Those who did not regard it as necessary to justify the methodologies mentioned that any internationally accepted method must be acceptable. Those who were of the opinion that a justification is needed mentioned amongst other reasons the fact that different methods can give different results and therefore the suitability of method to find different types of hazards need to be discussed.

4.4.4 Risk Assessments

There was a difference in opinion on what the risk assessments should include. Some participants saw that probability must be taken into account, whereas others did not. This reflects the different national approaches to probabilistic and deterministic risk assessment requirements. Indeed, in Sweden, risk assessments are not always required. All groups however agreed that the consequences should be described carefully. **Authorities take different approaches also in how much advice is given** in relation to risk assessments. The UK has produced a comprehensive guidance on the safety report assessment, which includes guidance on how to assess the risk assessment – the same guidance can be applied by the operator (See also Chapter 3.4.4). In Estonia, the operator can ask for specific advice and the authority helps with the risk assessment.

A plethora of different methodologies were mentioned as desirable; the most frequently mentioned tool was the risk matrix. A specific suggestion for how to present the risk assessment was put forward in one of the groups, which has been further elaborated by incorporating comments from other groups. The suggestion is described in Example 2 as a stepwise model.

Example 2: How to present the risk assessment

Step 1) Show that you have identified relevant hazards: Use spatial methods and divide the establishment into logical physical units. Identify the hazards related to the chemicals, reactions, conditions, tasks and processes etc. in each of the physical units.

Step 2) Make an initial risk assessment by evaluating the risks using a process and/or task evaluation. Identify high consequences.

Step 3) Use more refined methods to find out how the risk could be realised, for example Hazop or fault tree analyses. Describe the outcomes in a consolidated manner

(Step 4) Calculate the probabilities of the events.

Step 5) Choose those risks where there is a potential for the largest consequences and/or most probable risks and present and model these as scenarios.

It was generally agreed that there is **no single approach that would fit all situations,** but the risk assessments should take into account the suitability of different methodologies for different situations. Most groups stated that a short description of the methodology is desirable, alternatively this can be given through references and links to method description. Those who were in favour of including a justification of methodologies called for a statement on why the method has been used, what kind of risks the method is suitable for and why specific risks (and or hazards) are found using the method. Those who did not see a justification as necessary made reference to the general expectance of using recognised methods.

The outcome of the risk assessment should be a clear picture of the critical areas, top events and choice of scenarios. The outcomes of risk assessments should be proportional to the hazards and relate to what safety measures have been taken. Some of the participants were of the opinion that effects and consequences as a function of distance should be included. Risk indexes and probabilities were mentioned as desirable tools for identifying high risks (high probability, large consequence).

The connection between risk analysis and the technical and organisational measures were seen as crucial. Documented and implemented barriers for preventing accidents and mitigation consequences should be presented. Different models, transport models of scenarios etc. as well as maps, diagrams, site of event, fire, explosion, danger zones and other means of visualisation of the risks were seen as desirable. The different types of consequences (death, injury, cubic meters of contaminated air, water, soil, entity of damage for property, for the company and outside the establishment) were also seen as important.

4.4.5 Based on what should scenarios be selected?

Scenario choice was seen as a stumbling block by many of the participants. The presentation of scenario prioritisation, for example in a matrix, and a clear systematic approach to risk ranking were called for by some. A discussion on what the company is doing with the results of the scenario selection was seen by some as desirable. In one group, a dynamic approach that takes into account potential changes and planning for the future was seen as desirable. This was also an area where there were clear divisions of opinion on how it should be presented. Some of the participants approached scenario selection through the assessment of consequences (worst cases), whether consequences reach outside the plant site boundaries (beyond the fence) and others through probabilities. Yet a third way was to identify scenarios through linkages to processes and activities, and choosing the top events in each process. Overall, there were several factors were the groups differed in opinion. These are summarised in Figure 10.

A group of almost universal scenarios can be detected from the assessments of which type of scenarios should be included for the four example plants (See Appendix 8 for scenario descriptions). These are given in Example 3.

Some countries require the site to identify all the major accident hazard scenarios they could have, where the definition of the major hazard is closely linked to probability. This means that also smaller events (smaller consequences) need to be considered. The two main approaches (deterministic, probabilistic) to scenario selection are summarised below.

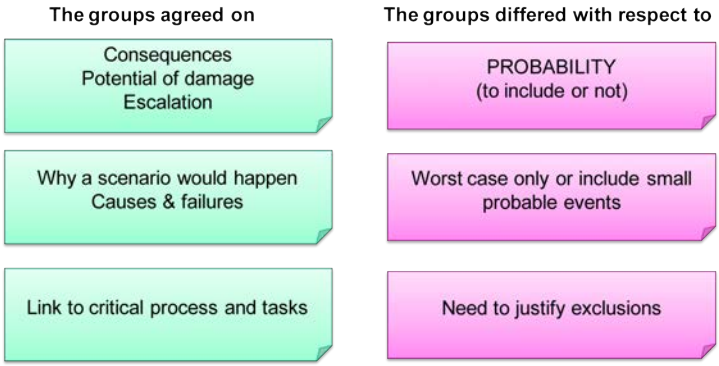


Figure 10. Similarities and differences in what is important in scenario selection

Example 3: Some universally mentioned scenario types to include

- Loss of containment from storage vessels (biggest volume, worst chemical)
- Overfills and leaks
- Runaway reactions
- Potential for non-wanted reactions between substances
- Domino effects inside the fence and within the industrial area
- Fires and explosions

Probabilistic: Scenarios are selected based on both probability and consequences (impact inside vs. outside the fences). For so called "unlikely scenarios" with a probability in the range of 10-6 or 10-8 there are different approaches in different countries. Some countries include only top events based on frequency. Others prefer a list of all scenarios, including low probability high consequence events as well as high probability low consequence events. Some participants mentioned the need to justify exclusions of top events, e.g. why is it very unlikely. For example in Belgium a clear overview of all potential scenarios, including low probability and low consequence scenarios, should be presented. This will allow the evaluator to verify the company's logic that these scenarios cannot become higher consequence events.

Deterministic: Some participants stated they only look at the severity of the consequences, not the probability, unless the occurrence would be highly unlikely and a documented justification is presented for exclusion of high consequence scenarios. The escalation potential of an event was seen as impor-

tant by some. In the deterministic approach, scenarios are selected based on the outcome potential, e.g. the largest consequences are selected. One group stated that the choice should be described in the safety report through a range of worst case effects (e.g. spread of a toxic gas cloud, fire etc.). Some stated that scenario selection should include a discussion of severity and effects both with and without existing barriers. Typical scenarios were called for, but this of course requires a clear definition of what a typical scenario is.

How good the scenario selection is in giving a comprehensive overview was linked to the expertise of the operator's representative, but the evaluating authority representative's expertise in providing guidance to scenario selection was also seen as relevant.

The number of scenarios expected to be included in the safety report ranged from 2-200, for example the group discussing the tank farm example mentioned they would expect to see approximately 20 scenarios. This is much more than is expected in for example Finland, where the average number of scenarios ranges from 3-10.

An important part in scenario selection was the reflection of vulnerability of the surrounding area, and some groups emphasised the accident history of the company itself (what is the worst case that has happened). All were unanimously of the opinion that **the reasons for why a scenario could happen and in which conditions it could happen should be included**. From an evaluation point of view, it was mentioned that the safety report would be scrutinised to see if:

- all the substances that could be onsite have been taken into account,
- the scenarios relate to the maximum volume of a chemical that could be involved and
- the process, activity or task is clearly indicated.

4.4.6 How should scenarios be described?

The questionnaire indicated that there are several challenges related to describing consequences. These include wrongly proportioned dispersion scenarios, lack of longtime effects of accidents, too little details and information to allow understanding of the spatial extent of risk for land use planning purposes, lack of details of concentrations and consequences to humans and the environment.

In the working groups, the importance **of describing the scenarios in both pictures and words** was raised. Care should be taken in using terminology

that those who operate and maintain the plant can understand what is said. One of the groups mentioned that the scenario description could be improved through **authorities providing a template guidance of how to describe a scenario**. Estonia and the Netherlands mentioned a specific format for describing scenarios. The paths that may lead to the scenario were identified as lacking by several groups. A clear review of the events and barriers preventing such events that may lead to the scenario was seen as desirable. Overall, the scenario should be clearly linked to control measures and an estimate of the adequacy of these control measures. To enhance the presentation of this, suggestions included use of bow-tie diagrams or fault tree analyses. The various points raised by the working groups have been summarized in Example 4.

Example 4: Characteristics of a good scenario description

1. Start with a discussion on why the scenario was chosen (e.g. probability, consequences)
2. Include reasons (initiators , causes) and paths (e.g. event trees) for how the accident scenario could occur
3. Describe what happens and where
4. Describe through models the consequence types (toxicity, heat effects, pressure etc.)
5. Describe effects on humans, environment, infrastructure and buildings
6. Give an overview of preventive and mitigation measures that are scenario specific
7. Present succinct conclusions

When describing the models and/or calculations used for the consequences of a scenario, one group mentioned the importance of including the inputs and outputs as well as a description of the model used. **The measure of reliability of the chosen model would be a clear advantage.**

4.5 Risk management in the safety report

4.5.1 What evidence should the company give about how risk assessments are used to define control measures and emergency preparedness?

Linking risk assessments and scenarios to risk management measures was generally perceived as lacking in many safety reports. The working groups were asked to summarise the kind of evidence they would look for in assessing the safety report of the particular plant. The most common evidence is summarised in Figure 11.

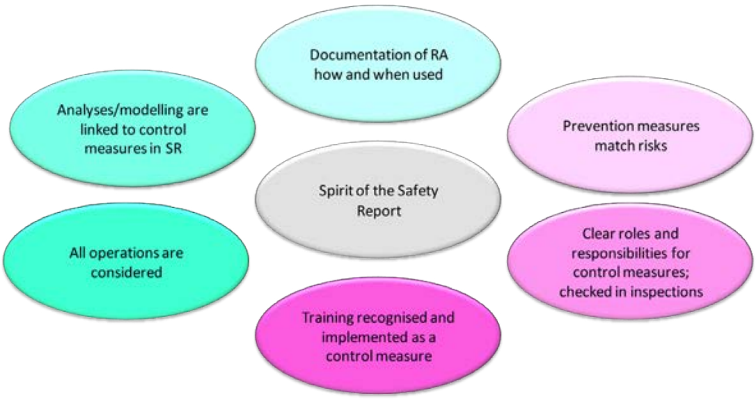


Figure 11: This would convince the participants that risks are used to define control measures

It was frequently mentioned that very convincing evidence is **that the knowledge of processes and risks are at a high level with both managers and workers.** This can of course only be verified in an on-site inspection. Indeed, many of the groups highlighted that the final assessment could only be done based on a demonstration on site and verification of the management measures being linked to risks and appropriate and adequate to control the risk.

However, in the safety report, the safety awareness and training towards this should be described and there should be evidence of measures taken to increase safety. A separate report on risk assessments should be available and referred to in the safety report.

The type of people (role, expertise) who are involved in doing the risk analysis and defining safety measures was also seen as an important indicator of effective linkages between risk and risk management. The report should also con-

tain clear evidence as well as details of the measures taken to prevent and mitigate the scenarios from occurring. Safety critical equipment should be clearly defined and evidence that critical operations and tasks have been analysed and risks detected. The measures to control the risks and barriers to scenarios occurring should be clearly identified and described in relation to the operation and clearly linked to the safety management system and process description. For each scenario and identified risk, clear descriptions of how:

- the risk is prevented from occurring,
- what detection measures there are to find an incident rapidly, and
- what measures are in place for controlling the risk.

None of the groups made reference to the hierarchy of control measures for chemical risks, i.e. elimination, substitution, engineering solutions and procedural solutions and lastly PPE (personal protective equipment). Another type of control measure grouping is technical, procedural, training and PPE. A suggestion for grouping the risk management measures based on what types of risks they control was, however, included in one group and a summary of this is given in Table 3.

Type of risk	Examples of expected control measures
Process risk	Deviation detection, procedures, emergency systems...
Degradation risks	Maintenance, material compatibility analysis, inspections...
Loss of containment	Bunding, leak detection, limitation of quantities stored....
Ignition	Area classifications, Atex, static electricity control measures...
Explosion	Blast resistance in buildings, window protections and design, siting and design...
Fire	Fire protection, fire drills, sprinklers, fire detection alarms ...
Gas	Gas detectors, water curtains, personal protective equipment, alarms...

Table 3: Risk types and risk management measures expected.

One of the groups approached this issue through procedures and identified processes in the safety management system for risk control and change management, another highlighted the importance of revisions and updating procedures. To show that the risks are controlled, one group would have expected to see evidence in the safety report of how many procedures are implemented, training provided, risk management policy and specific procedures naming the

risk and/or area /task/activity. It was also mentioned that examples of necessary control measures are hard to generalise, but two important ones can be identified:

- For storage of chemicals, there should be a clear overview of indicators and alarms for temperature, gas and levels,
- For reactors/processes, special attention should be paid to control of specific ratios of input materials and other factors influencing the safety of the reaction such as temperature and pressure control.

One of the groups continued on the importance of specificity, i.e. control, prevention and mitigation measures should be specifically described in relation to that particular risk. The training for workers should be very specific and address the identified risks rather than generic training modules. There should be clear links between documentation of hazard identification and risk assessments as well as risk management procedures. Resources used in defining control measures would help the evaluation – for example, engineers, chemists, HSE experts etc. as well as clear assignment of responsibilities and duties of personnel. On the other hand, it was also stated in one group that evidence of the standards applied are enough. An example of how the risk management measures can be linked to the risks in a tank farm was given by one of the groups. This is summarised in Example 5.

Example 5: Practical considerations of linking risk analysis to risk management on a tank farm

- Analysis of process deviations → alarms, interlocks, safety valves, ...
- Analysis of corrosion potential → inspection programs for primary containment
- Inventory of large inventories → emergency isolation systems
- Analysis of spreading of NH3 (gas, liquid) → gas detection, bunds
- Area classification → use of Atex material, shut down electrical systems, ...
- Domino effects due to fire → fire protection, fire proofing; spray systems, ..
- Explosion scenario → protection of occupied buildings
- Task analysis (personal exposure to NH3) → personal protective equipment

There was little preference for where in the safety report this evidence should be presented, although some mentioned the section for emergency preparedness and others suggested the scenarios and risk assessment presentation part. Others were of no strong opinion, e.g. either in the same place that risk assessment is presented or with a clear link to show where to find it, and many emphasised that there is no reason to put control measures in a separate section, these should be connected with the logical content and presented in all relevant chapters. Indeed, it was noted that in a good safety report, **the evidence of risk management permeates all parts of the safety report**.

Staffing and the specificity were seen as very important. There should be **a match between the scale of the scenario and the resources for emergency response:**

- Evidence of having used the results of risk assessments to define emergency preparedness include the linkage between scenarios and emergency measures, e.g. fire scenarios require preparedness for fire and toxic gas cloud release scenarios require preparedness for toxic gas clouds.
- Evidence of planning and participating in joint emergency exercises with authorities and nearby installations were called for.
- Documentation included in the safety report should also be used for planning, training and definition of specific emergency skills. Audits of the emergency preparedness as well as drills and evaluations thereof were seen as good tools for linking preparedness to actual risks.

The following were called for in various groups: Procedures and responsibilities should be clearly defined for emergencies related to specific risks, and maintenance programs identified and treated as a risk management measure. Critical elements must be shown to be monitored with a frequency that assures their reliability.

4.5.2 Linking Risk and Safety Management

Convincing evidence that the identified risks are used to shape the safety management system were mostly seen as being **available during inspections rather than evaluations** of the safety report. For example, making sure that information is given and received as well as understood a visit to the site is required. This was seen as best verified through interviews with workers and for example checking visitor receiving procedures are in place. Whilst the elements of the safety management system are the same for all companies, the information needed to evaluate that the safety management system is really effective is too detailed to include in the safety report. Key elements to address in the safety management system part of the safety were identified more or less similarly by all groups, with some slight deviations and differences which in part can be attributable to the limited time available to discuss this question. The key elements can be summarised as follows:

- Roles and responsibilities give clear indications both in relation to risk and risk control.
- Risk analyses are periodically reviewed and the risk assessment team includes different disciplines.

- There are clear procedures and guidelines on what levels of risk are acceptable.
- Plant design and maintenance as well as change management include review of risks.
- Training programs include specific references to identified risks and are not generalistic.
- Contractors, partners, etc. are included.
- Accidents and near misses are recorded and used for training and updating of risk assessments.
- Safety performance indicators are identified and monitored.
- There are clearly defined procedures for high risk work.
- Communication is given a prominent role and training as well as procedures are based on achieving clear understanding of the risks and control measures, etc.
- The management system is based on the Plan-Do-Check-Act cycle.

Several groups highlighted the importance of ensuring that the safety management system is based on real findings and consequences of identified risks. The management system should reflect the proportional importance of for example different procedures and roles. It should address specific scenarios with specific procedures rather than general procedures that must be adapted to each situation.

Key risk management areas that should be addressed include operations, plant integrity, people, relationship with others (e.g. contractors, etc.), emergency response, as well as specific references to risk and hazard management activities and procedures. This is summarized in Figure 12.

Figure 12: Key elements where risks and risk management is discussed in safety management system

The format of the safety management system was highlighted, particularly in respect to how it is written and when it is updated:

- is the language understandable to all?
- is the purpose clear?

- are references made to risks in procedures etc.?
- how is the update of the safety report included – as a living document or only every five years?

4.6 Using the safety report for inspections

4.6.1 Using the safety report for planning inspections

There were several differences in how the safety report would be used for planning inspections. These are summarised in Table 4.

USE SAFETY REPORT	DO NOT USE SAFETY REPORT
Content of inspection is based on Safety Report	Questionnaires on specific topics are used for inspection (Not Safety report)
Divide report in 5 parts => 5 year cycle to cover all parts	Safety report serves as background information only
During the inspection, checked that the safety report is true	Yearly topics are also chosen independently of the SR and are the same for all companies
Check any previous comments are implemented (mainly during inspection, but also brought into SR)	Certain topics are checked frequently and each year.
Questions to the operator are designed and compared with questions out of checklists against SR	Don't use the SR for planning the inspection, operator follow a law, in which guidelines for producing safety reports are reported. Authority checks if operator is in compliant with the guideline.

Table 4: Differences in how the safety report is used when planning inspections

Outcomes of previous inspections and the actions taken by the operator following the safety report assessment are used by some when planning the inspection. Historical data on the accidents occurred in the last years in the establishment are also used.

The description of the organizations, roles and responsibilities, training of workers, maintenance procedures and procurement procedures for selection of suppliers of equipment and services are also sometimes checked. Inspectors may also seek **evidence of the actuation of the emergency plan** (emer-

gency simulations) and relate control room data to safety report. Where there are many companies at the site, inspections may focus on whether the workers have a common basis of knowledge and if they follow internal courses and participate in joint drills and whether permits to work for the different companies are synchronized.

The safety report may often be used to familiarise the inspector with the plant. It provides valuable data on the process and substances as well as critical equipment that may be chosen to be verified. Specific issues the safety report is used for when planning inspections may include for example:

- Accuracy of scenarios, e.g. are there the stated chemicals on site, is the description of processes accurate.
- Are the reasons for scenario choices clear and do the personnel on site recognise these?
- Is there a balance between stated time, resources , scenarios, complexity, experts, personnel, accidents in the safety report and how can these be verified on site?

The way management procedures and systems are described may be used to find specific issues to focus on, such as control of raw materials, night storage, loading and unloading, communication language and methods, shut down systems and procedures, maintenance and lines of responsibilities.

4.6.2 Using the safety report during inspections

During the inspection, references may be made and data checked against reality in for example the following fields: substances, process parameters, materials, scenarios, maintenance, emergency planning, technical system for preventing top events (from the technical point of view and from the organi-sational point of view), training manuals and records, accident prevention measures and technical and procedural barriers for preventing and protecting. Often the use of the safety report during the inspection is related to how it is written and how detailed it is. **Not all Member States use the safety report as part of the inspection.**

Spot checks on for example maintenance programs, checklists, responsibilities and completeness of control over procedures may be carried out by some.

Inspections are also used to verify that the details in relation to the characteristics of hazardous substances and quantities are correct, and whether the level and identify of these substances are the same on site as in the report.

A check of the process description may be included, for example, through

checking if all types of reactions are described and in which reactors these take place. A printed reaction matrix would in some instances be asked for if it is not included in the safety report.

The awareness and ability to control domino effects and whether the "unintended reactions" are sufficiently well identified and understood by the personnel operating the site would also be evaluated. The safety management system may be checked in practice through interviews with plant management (manager, supervisor) and talks to operators during the inspections. How well procedures work and follow-through can be checked by looking at what is the real outcome of a procedure, for example, change management procedures used and recorded for last three changes implemented. Whether the technical and organisational measures for prevention of major accidents are implemented and in place as described in the safety report would also be one way of using the safety report during the inspections. Evidence of effective communication with the local community and neighbouring companies about prevailing risks could also be sought.

4.6.3 What would you look for during the inspection to confirm that the safety report is true to reality?

Considering historical experience (former accidents) for scenario identification; involvement of personnel in safety analysis and looking at how the causes for small events were some specifics identified as being good to verify. Numerous other suggestions included variations on the themes given in Example 6:

Example 6: What to check

- Ask for documents and checking they exist in reality, for example management of change process, work permit procedures
- Interview workers to check whether they have knowledge about the risk of the establishment and equipment for limiting the consequences of a major accident.
- Interview management to check they are aware and knowledgeable on the safety report.
- Check compliance with equipment list and appropriate function tests and inventory of substances.
- Check scenario relevance and preparedness through emergency plan and check that technical equipment is compliant with scenarios.

One group had addressed this question through the concrete approach given in Example 7.

Example 7: During inspections, we would check reality against safety report by…

… DISCUSSING

- What is the involvement of the company in writing of the report
- What is the timetable for implementing the recommendations (measures still to be implemented)
- Verification of understanding of the safety management system through interviews

…USING SPOT CHECKS

- Select a number of critical measures described and see if they are in place, maintained and inspected regularly (documentation, evidence of functionality)
- Whether the appropriate information has been given to fire brigades; communities
- Whether identified risks match control measures in place

…. ASKING FOR EVIDENCE

- Verification of inventories and check chemicals present
- Records & registrations to check training of personnel
- Reports of emergency drills
- Inspection reports to check execution of inspection programs

Other issues noted included the general notion to check whether the situation during the day of inspection reflects the safety report and if not, what are the differences and how have these been considered. In effect, this is an approach to checking the change management approach within the company. Several of the groups mentioned a focus on control measures as being rewarding and cited examples, such as, checking whether safety critical control measures are in place and recognised, checking if the described technical, operational and handling measures really are in place and kept in good condition. One group gave a concrete example for processes where reactors are used to focus on whether the reactors and reaction control match. For example, if reaction A requires temperature control and reaction B pressure control, and not all reactors have both capabilities, check how the company has made sure that only those reactors are used for that have the required control measures for specific reactions.

Another very concrete suggestion was to review the actions taken when an alarm goes off – what happens with the instrumentation, how are the operators instructed and how aware of the actions are they if a specific alarm goes off?

A more theoretic approach was suggested by another group, i.e. to check on the cause and consequence relationships through construction of a bow-tie diagram. Are the preventive measures (on the left of the diagram) in place and

identified, are the mitigation and repressive measures (on the right hand side of the diagram) in place and recognised? Examples on questions could include: "why is this particular measure a safety critical measure, how did you choose it, how is it maintained, how do you test it?" As a specific example that is tied in to the concrete day to day management of the safety in the plant this approach could focus on for example a safety critical valve.

The importance to check on the roles and responsibilities of key persons at different levels and operation of the management review was also mentioned. Key questions here were identified to include issues on how KPIs are applied, what are the frequencies of reviews, how are responsibilities and timetables for implementation decided and by whom etc.

Overall, there seemed to be a consensus that verification that the safety report matches reality is **best approached through applying specific questions to a concrete example**. This way the operator can relate to the question and the inspector check the understanding and awareness of the personnel as well as of the instructions and technical equipment in a very practical manner, which has the added benefit of being very difficult to cover through general statements of intent.

4.7 Suggestions for further work from the seminar participants

At the end of the seminar, the participants were asked to suggest areas where further work within the EU is required. A summary of some of the most frequent replies is provided below:

- To obtain an overview of the experiences from the companies side would complete the picture.
- To summarise what kind of databases, software and other tools are in use in each country could provide valuable sharing of data and already done work between Member States as well present a ready toolkit for companies.
- A review of how and what information is taken from the safety report in each country and how it is used. This could be further developed into a list of expectations and reasons for these, which could be very useful for sharing lessons learned between authorities.
- A comparison of best practices in each country would enable sharing

knowledge at a concrete level. At the same time, a discussion of the 5 year review process would be beneficial.

- Thresholds and definitions of acceptable risk as well as KPIs, SPIs and risk communication need to be further explore and communicated.

5. Conclusions and recommendations

5.1 General aspects and efficiency

The amount of time and manpower dedicated to safety report assessments and associated inspections of the Seveso II upper tier plants vary considerably between countries that participated in the questionnaire and the seminar. There appear to be large differences in how an evaluation is carried out, from team evaluations by technical experts from different disciplines to more or less one inspector working as the main assessor and inspector for the site. Whilst there has been no attempt to relate the overall time spent on reviews and inspections to overall safety levels and/or safety level improvements over time, it would be of considerable value to be able to define which practices are, in effect, efficient in improving safety at the major accident hazard sites.

It would be of interest to evaluate whether direct impacts from different approaches on safety can be detected. If so, this could be further developed and through comparing and contrasting the benefits, potentially identify examples of best practice that could be shared with the Member States.

It would also be of interest to compare the amount of effort put into the safety report by companies and estimate the overall administrative burden of the Seveso II Directive's obligation to prepare a safety report. This could be done, for example, using the Standard Cost Model[17].

5.2 Hazard identification and risk assessment in the safety report

Hazard identification and risk assessment appears to be among the most challenging issues both for the operators to produce and for the authorities to evaluate. This is of some concern as accurate hazard identification and consequent risk assessment and consequence modelling are the fundamental cor-

17 The Standard Cost Model measure the administrative costs imposed on business by central government regulation – see for example http://www.administrative-burdens.com/default.asp?page=15

nerstones of a safety report.

One can ask oneself, whether if a company operating a major accident hazard site is incapable of identifying and assessing the hazards, is that company a safe operator that should be allowed to continue the operations? On the other hand, it may be that in the quest for documentation, the only ability that is lacking is that of putting the practice onto paper in a good, coherent and comprehensive way. Indeed many of the authorities mention safety reports prepared by consultants as coherent and well written. At the same time, it was frequently mentioned in the seminar as well as in the questionnaire that reports done by consultants are more likely to be stand-alone documents with little relevance for the day-to-day safety management. Whilst the seminar participants agreed that the content of the safety report is more important than the format of it, this does not reduce the fact that a badly written or incomplete safety report makes it much more difficult for the authorities to assess the actual safety levels. How this dilemma could be solved is certainly a question that merits debate.

Safe management is dependent on accurate identification of potential risks and management of these to prevent unwanted chains of events from taking place. As the linkages between risks and management measures was identified as a challenge by most countries, there appears to be a clear need for more work in this area. Guidance may be one solution, but is not the only one. Good guidance is very hard to produce, and at the same time it should be noted that not all of the member state competent authorities take an advisory role and guidance may not be an appropriate tool. In such cases, one must first determine from whom the guidance and advice should be provided.

Several guidance documents on how to prepare a safety report already exist; many of these include guidance on hazard identification and risk assessment. However, in light of the perceived challenges in this area, it would appear that existing guidance is not sufficient. This can be due to for example to how the guidance is written, e.g. how easy it is for companies to apply the guidance in practice. It could also be due to not enough operators being aware of or making use of the guidance documents and improvement could be seen through more efficient dissemination. It should however be noted that no critical assessment of the available guidance documents has been done as part of this reporting. **Neither is it clear that guidance is the right kind of tool to employ, and the viewpoints of industry should indeed first be sought.**

The need for presenting methods used and justification of methods used for hazard identification and risk assessment in the safety report divided opinions. Whilst some saw the need for justifications and descriptions, others were less convinced of this need and suggested any methods can be used as long as these are internationally recognised. However, as the quality of the assess-

ments done will inevitably be dependent on the methodology, **it is argued that including the choice of method and the justification for it could provide valuable insight to the evaluator on why there may be shortcomings in the process. At the same time, it is by no means advocated that lengthy descriptions of standard methods should be included in often already lengthy documents.**

The scenario choices and descriptions appear to be found lacking in many cases. There are large differences between countries in how many scenarios are expected to be included in the safety report, as well as how these should be presented. Many of the participants were calling for better definitions of what a scenario actually is. It appears that what can be seen as a good scenario selection in one country may not be acceptable in another. In view of the many multinational companies operating in the EU, harmonisation on the how many scenarios, what type of scenarios and in what level of detail these should be presented could be very welcome.

As the definition of a scenario still raises questions among authorities, it is to be expected that this is also the case with companies. **Instead of approaching the definition of a scenario theoretically, it may be of considerable use to develop model scenarios, where the actual scenario is written up in plain, easy to understand language and all relevant links to risk assessment, safety measures and emergency plans are shown. This could possibly be done for example through developing model scenarios for the most common types of incidents, including but not limited to loss of containment, release of toxic gas and pool fires. By building a library of good scenarios it would be possible to both provide authorities with guidelines on what a good scenario is when evaluating to , as well as providing best practice examples for companies.**

5.3 Risk management and the safety report

If hazard identification and risk assessments were identified as challenging for many operators regardless of the country, linking the identified and assessed risks to safety control measures and the emergency plan appears to be at least equally challenging. It is not clear why this should be the case, as it is hardly the case in practice that operators identify and implement safety control measures on a random basis without clear reasons for it.

Assessing the level of risk management and site safety is of course not an easy task to do from a document, not matter how well prepared. It requires verifica-

tion on site and discussion with personnel to assess how good the practice is. Nevertheless, the safety report is – and should be – the first review of the adequacy of the risk management approach. It should therefore be easy to follow the whole chain of management steps, from initial identification of a hazard through to risk assessment and definition of how to control the risk and using which kinds of tools. Addressing the risk management approach through an overview from hazard to control measures is much facilitated through the use of systematic yet easy tools such as the bow-tie diagram. It is perhaps the case that the current safety report structure is not the most amenable tool for such a holistic approach. However, most seminar participants were of the opinion that it mattered little where in the safety report such discussion is put forward and that the matter can be addressed in many sections. Such an opinion of course makes it easier for operators to comply without strict adherence to format issues, but on the other hand it may make for a very scattered and not coherent safety report.

Many suggestions on how to improve on this were put forward, both around the theme of how to better present the linkages (e.g. visually through diagrams etc.) and on how to present the reasons for choosing the particular control measures. In view of the very high relevance of this section not only for the assessment of the safety report, but for the safety of the site, it is suggested that more concrete tools and "model examples" are developed. For example providing concrete examples of the level of detail that is required on risk management for a particular risk could make the subject more easily approachable. Model answers may already be provided by some of the authorities and this potential should of course first be explored. **Visual models for how to present the links between the hazard, risk and risk management measures could provide a means of making this easier for companies to do.**

5.4 Using the safety report for inspections

There was less debate on the topic of using the safety report for inspections, perhaps because the topic is more related to how the inspectors work themselves than the two previous main topics. Here many concrete suggestions for different approaches which can be useful when planning the inspection were put forward. The key message appears to be that the inspection needs to focus on concrete examples and use these to go through the entire chain of hazard identification, risk assessment, scenario choices, mitigation and prevention measures, and to look for clear evidence of the risk having been taken into ac-

count in the emergency planning. In addition, checking the linkage between maintenance, technical testing, work process and task descriptions and safety management was highlighted as being particularly relevant.

Many of the suggestions and comments put forward in the working group sessions are clearly both tried and tested in practice. It would appear that this part of the working sessions provide the most "ready" input into real working practices – the previous two topics were perhaps challenging in the respect that the inspectors have little or limited input into the processes that occur whilst preparing the safety report. However, exceptions were of course also noted.

It could be of considerable value to engage operators in a dialogue on what they would see as most beneficial to safety in terms of how an inspection is structured. This could provide valuable insight into how authorities and companies can increase safety by working together. Such discussions could, for example, be organised as working sessions for authorities and companies in each Member State. (See also presentation by Jousimaa on coordination sessions.). The objective would be to identify effective verification measures for safety reports as verifications during the inspection are seen as impacting most on the actual safety level. The starting point should always be the actual safety level of a site, and targeted discussions on how to progress towards better standards could contribute to this.

5.5 Summary

Overall, the topic of safety reports was certainly seen by the participants as well chosen and much needed. There is a general agreement on what is difficult for companies, and several concrete suggestions have been described in this report for how to improve this.

What appears to be lacking is the integration of company points of view into the discussion. Most importantly, companies view points from across the EU on what is difficult should be obtained and compared and contrasted to find out if there are clearly emerging topics in the different countries. This would help find the tools and approaches that appear to be working well. These could then be shared across the EU as examples of best practices.

An evaluation of the relative administrative burdens created by the Safety Report obligation would provide data on how efficient the implementation of the Seveso II Directive is, and whether there are clear differences between coun-

tries. This could then be compared and contrasted with the relative time taken by authorities in each country to review and approve the safety reports. Again, best practices could be found and shared, thereby taking a step towards harmonisation as well as enhancing efficiency.

The overall results indicate that there is a clear need for further discussion into this topic. In many of the feedback forms, further work in the area was called for, both as MJV seminar topics and through separate assessments and reports. The broad topic of safety reports could benefit from being broken down into a series of meetings, perhaps held in each country as separate workshops involving industry and authorities. The results could then be brought together and presented for debate in a meeting for all Member States.

Appendix 1: Abbreviations and terminology

Bow-Tie diagrams A bow-tie diagram is a representation of all the initiators and consequences of a particular scenario, together with the safety barriers that are in place to prevent, control or mitigate the event. Such barriers are usually referred to as lines of defence (LOD) or layers of protection (LOP). [18]

Consequence Outcome of an event. NOTE 1: There can be more that one consequence from an event. NOTE 2: Consequences can range from positive to negative. However, consequences are always negative for safety aspects. NOTE 3: Consequences can be expressed qualitatively or quantitatively. (ISO/IEC 73).[19]

Hazard The intrinsic property of a dangerous substance or physical situation, with a potential for creating damage to human health and/or the environment (Seveso II Directive)

HAZIP **Hazard identification** (HAZIP) is a process of recognising that a hazard exists and defining its characteristics. (IEC 300-3-9)

HAZOP Hazard and Operability Study (HAZOP) is a method of identifying hazards that might affect safety and operability, using systematic critical group review structured by the use of guidewords, usually applied to process plant design. (HSE 2001/063)

[18] Guidance on Risk Assessment for Offshore Installations, Health and Safety Executive, available at: http://www.hse.gov.uk/offshore/infosheets/is_index.htm

[19] Draft Glossary of LUP Terms, available at: http://mahb.jrc.it/index.php?id=506&obj=6&doc=4

Identification and evaluation of major hazards	Adoption and implementation of procedures for systematically identifying major hazards arising from normal and abnormal operation and the assessment of their likelihood and severity (Seveso II Directive[20])
Loss of containment (LOC)	Event resulting in the release of material to the atmosphere. (PB CPR 18E)
Risk	The likelihood of a specific effect occurring within a specified period or in specified circumstances (Seveso II Directive21). Combination of the frequency, or probability, of occurrence and the consequence of a specified hazardous event. NOTE. The concept of risk always has two elements: the frequency or probability with which a hazardous event occurs and the consequences of the hazardous event (ISO/IEC 51)
Risk analysis	Systematic use of available information to identify hazards and to estimate the risk. (ISO/IEC 73) Systematic use of information to identify sources and to estimate the risk. Risk analysis provides a basis for risk evaluation, risk treatment and risk acceptance. Information can include historical data, theoretical analysis, informed opinions and concerns stakeholders. (API580)
Risk assessment	The overall process comprising a risk analysis (the systematic use of available information to identify hazards and to estimate the risk) and risk evaluation (procedure whether the desirable level of risk has been achieved)[21] Overall process comprising a risk analysis and a risk evaluation. (ISO/IEC 73)
Safety Report	Report on the safety of an establishment, as required by Council Directive 96/82/EC of 9 December 1996. (PB CPR 18E)

[20] Council Directive 96/82/EC on the control of major-accident hazards involving dangerous substances

[21] Land use planning guidelines in the context of article 12 of the Seveso ii Directive 96/82/EC as amended by Directive 105/2003/EC,draft 2006

Scenario Describes the conditions that might lead to a major accident and the potential consequences. In more operational terms a major accident scenario describes usually the loss of containment (LOC) of a hazardous substance (or the change of state of a solid substance) and the conditions that lead to the realization of an undesirable consequence (fire, explosion, toxic cloud = the dangerous phenomenon). [22]

[22] Land use planning guidelines in the context of article 12 of the Seveso ii Directive 96/82/EC as amended by Directive 105/2003/EC,draft 2006

Appendix 2: List of Participants

Questionnaire respondents

Name	Title	Organisation	Country
Jan H.G. Slijpen	Head Seveso Inspection Team South-Netherlands	Directorate for Major Hazards Control Dutch Labour Inspectorate Ministry of Social Affairs and Employment	The Netherlands
Peter Vansina	Head of inspection policy	Belgian Federal Public Service Employment, Labour and Social Dialogue The Department for the supervision of chemical risks	Belgium
Dagmar Dräger	Head of Department	Regierungspräsidium Darmstadt	Germany
Anne-Mari Lähde	Chief safety engineer	Finnish Safety and Chemicals Agency (Tukes)	Finland
Ragnhild Gjöstein Larsen	Head of Norwegian Seveso Koordinating Committee/ Senior principal engineer	Directorate for Civil Protection and Emergency Planning	Norway
Zuzana Machatova	Expert officer	Ministry of the Environment Depatment of Environmental Risk	Czech Republic
Ceci Paolo	Expert	Ministry for the Environment and Territory and Sea (MATTM)	Italy
Klaus Hougaard	B.sc. Chemical Engineering	Danish Environmental Protection Agency	Denmark
Mocanu Mariana	Commissioner	National Environmental Guard General Inspectorate for Emergency Situations National Environmental Protection Agency	Romania

Senzaconi Francisc	Commissioner	National Environmental Guard General Inspectorate for Emergency Situations National Environmental Protection Agency	Romania
Duta Magdalena	Commissioner	National Environmental Guard General Inspectorate for Emergency Situations National Environmental Protection Agency	Romania
Tim Beals	HM Principal Inspector of Health and Safety	Health and Safety Executive (HSE)	UK
Carina Fredström	Administrative Officer, Supervision Section	Swedish Civil Contingencies Agency (MSB)	Sweden
Alice Doherty	Inspector	Health and Safety Authority	Ireland
Florian Veyssilier	Policy Officer	French Ministry of Ecology, Sustainable Development, Transportation and Housing	France
Vincent Attard	Senior Manager (Engineering)	Occupational Health and Safety Authority (OHSA)	Malta
Hrvoje Buljan	Head of Department for Risk Installations and Remediations	Ministry of Environmental Protection, Physical Planning ans Construction (MEPPPC)	Croatia
Maria do Carmo Palma	Head of Unit – Environmental Risks and Emergencies Unit	Portuguese Environment Agency	Portugal
Ernst Simon	Head of Sector	Regional Government of Styria	Austria
Dirren	Christophe	Authority of Control (State Valais in Switzlerdand) for the major accident	Switzerland

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Seminar participants

Last name	First name	Organization	Country
Ahonen	Leena	Finnish Safety and Chemicals Agency	Finland
Ahvenainen	Seppo	Finnish Safety and Chemicals Agency	Finland
Arus	Sirje	Estonian Technical Surveillance Authority	Estonia
Astorri	Francesco	Italian National Institute for Environmental Protection and Research ISPRA	Italy
Barroqueiro	Alvaro	IGAOT	Portugal
Browne	Ben	Health & Society Authority	Ireland
Burton	Mark	Health & Society Executive	United Kingdom
Casier	Maud	Grande Arche de la Défense Paroi Nord	France
Dalzell	Graham	Independent Hazard Consultant representing EPSC	England
De Nictolis	Paola	Ministry of Interior-National Firebigades	Italy
De Pauw	Christof	Environmental Inspectorate Flemisch Region	Belgium
Dirren	Christophe	Authority of Control(State Valais in Switzlerdand) for the major accident	Switzerland
Doherty	Alice	Healt & Safety Authority	Ireland
Dräger	Dagmar	Regierungspräsidium Darmstadt	Germany
Eilo	Kaimar	Estonian Technical Surveillance Authority	Estonia
Gilbert	Ylva	Gaia Consulting	Finland
Grosse Daldrup	Rainer	Bezirksregierung Munster	Germany
Heinimaa	Tanja	Finnish Safety and Chemicals Agency	Finland
Jousimaa	Kristine	Ministry of the Interior	Finland

Joziasse	Erik	Ministry of Empoloyment and Social Welfare	The Netherlands
Kipinoinen	Mirva	Finnish Safety and Chemicals Agency	Finland
Klewenhagen	Malgorzata	Voivodship Inspectorate for Environmental Protection in Warsaw	Poland
Klicek	Miljenka	Ministery of Environmental Protection, Physical Planning and Protection	Croatia
Kononen	Hannu	Finnish Safety and Chemicals Agency	Finland
Kristensen	Anders T.	Danish Ministry of the Environment, Environmental Protection Agency Aarhus	Danmark
Kukkola	Timo	Finnish Safety and Chemicals Agency	Finland
Kyriacou	Themistoclis		Cypros
Loginov	Taria	Finnish Safety and Chemicals Agency	Finland
Lähde	Anne-Mari	Finnish Safety and Chemicals Agency	Finland
Machatova	Zuzana	Ministry of the Environment of the Czech Republic	Czech Republic
Mocanu	Mariana	National Environmental Guard	Romania
Nilssen	Vibeke Henden	Directorate of Civil Protection and Emergancy Planning (DSB)	Norway
Norlander	Peter	MSB	Sweden
Palmen	Mirja	Finnish Safety and Chemicals Agency	Finland
Pentti	Ismo	Boralis Ag, Health, Safety and Environment	Germany
Penttinen	Heikki	Finnish Safety and Chemicals Agency	Finland
Petersén	Claes	Swedish Working Environment Authority	Sweden
Pietikäinen	Sanna	Finnish Safety and Chemicals Agency	Finland

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Rantakoski	Päivi	Finnish Safety and Chemicals Agency	Finland
Reinalter	Matthias	Abteilung Emissionen Sicherheitstechnik Anlagen	Austria
Roerbech	Nanna	Danish Environmental Protection Agency	Danmark
Salomaa-Valkamo	Johanna	Finnish Safety and Chemicals Agency	Finland
Senzaconi	Francisc	General Inspectorate for Emergency Situations	Romania
Slijpen	Johannes(Jan)	Ministry of Social Affairs and Employment, Dutch Labour Inspectorate	The Netherlands
Taskó-Szilágyi	Eszter	National Directorate General for Disaster Management	Hungary
Teräsmaa	Erkki	Finnish Safety and Chemicals Agency	Finland
Thorsen	Arne Johan	Petroleum Safety Authority	Norway
Valanto	Tapani	Finnish Safety and Chemicals Agency	Finland
Vansina	Peter	Federal Public Service Employment, Labour and Social Dialogue	Belgium
Wood	Maureen	European Commission, Joint Research Centre, Major Accident Hazards Bureau	Italy
Välimäki	Marita	Finnish Safety and Chemicals Agency	Finland
Väljaots	Erki	South-Estonian Rescue Centre	Estonia

Appendix 3: Questionnaire results

There was a total of 18 responses to the survey (The Netherlands, Belgium, Germany, Finland, Italy, Denmark, UK, Sweden, Ireland, France, Portugal, Austria, Czech Republic, Malta, Norway, Romania, Croatia, Switzerland). Of the 18 respondents, 56% (10 respondents) were from primarily environmental authorities, 6 from occupational safety and health inspectorates, 2 from civil protection administrations, and one from a chemical health and safety authority. As indicated in question 8, more than half of respondents (65%) answered for his/her own authority only or some authorities in the country (including the "Other" response). In other cases (35%), the respondent answered for all the Seveso inspectorates in the country. Hence, the collective responses can be considered representative of a broad spectrum of Seveso inspectorates but not all Seveso inspectorates in the covered countries.

Note that the Swiss reply came after the questionnaire was closed, and is therefore not represented in the Figures taken directly from the questionnaire report.

Part 1: Information on the respondent

In this section information Questions 1-5 asked details regarding the identification of the respondent and his/her organisation, and contact information was collected. For purposes of confidentiality, this information has been withheld.

Question 6 (on the next page) describes the role of the respondent's authority in Seveso inspections. Question 7 provides additional information provided by various respondents on the competent authorities involved in their countries.[1]

[1] Please note that all responses to the "comments" questions of this survey have been altered to remove references that specifically identify the country and their specific authorities. This is a precautionary measure following the established policy for MJV reports to assure anonymity of responses for those countries and authorities for which this may be important. When substitutions have been made, the information will appear in italics. When information is omitted, the missing portion will be substituted by an elipse (…). Only identifying information has been omitted. The substance of the remarks has been fully preserved.

6. Please tick all statements below that are applicable for your organization.

Number of question respondents: 17 (avg: 3,9)

7. Please explain your answer further as necessary in the space below.

I. The regional environmental licensing and inspection authorities are the organisations regarding the examination of safety reports, our Directorate contributes to the examination in close cooperation with them and the regional fire brigades.

1. Technical Secretariat for Seveso II Coordination. Concerning inspections, my organisation is coordinating the planning of annual Seveso Inspections through the Seveso Coordinating Committee. The inspections are shared between the 5 competent authorities, in order to make sure that we meet our obligations. The coordinating committee also draws up long term, risk based, inspection plans for chosen establishments, and for establishments who owns many similar type of

7. Please explain your answer further as necessary in the space below.

3. The regional competent authority (CA) is responsible for this process. The CA completes the result of the examination of the SR of all involved authorities but the Ministry if the Environment provides the expert's statement of every SR. This statement is the key document for the final decision.
4. My organisation coordinates the Seveso inspection and the collaboration between all the inspection authorities involved.
5. My organisation is a regional one. Legislation is national. We are the competent authority for issuing permits, doing Seveso inspections and the examination of safety reports. We have the lead for all these responsibilities.
6. Regarding safety reports my organisation is coordinating input from the safety report examination of all *the country's* competent authorities, and compiling all this feedback into one answer to the establishment, sent from *our authority.*
7. The term "lead" must be understood as "coordinate" the examination of safety report and the Seveso inspections between three equal authorities, who have their own legislation and do their own enforcement hereof.
8. The main competent authorities responsible for the enforcement of the SEVESO II Directive in *our country* are national level, *including the Ministry of Interior emergency management inspectorate, the Ministry of Environment, the Environment Agency and the Environment Inspectorate. The regional level authorities consist of the regional environmental protection agencies and the regional inspectorates. At local level the local emergency management inspectorates, the local environmental protection agencies and the local environmental inspectorates are involved.*
9. *Our country* has a joint Seveso Competent Authority *of the national occupational safety and health authority and the regional environment authorities ... The labour safety authority* works as part of a team with *the environment authority* as appropriate. The labour authority provides the majority of the resources and tends to lead on administration of Seveso matters.
10. My authority examines safety reports and writes comments about them before the licensing authorizations in parallel with the regional Seveso inspection authorities. My organization does not perform any Seveso Inspections itself but we supervise, evaluate and provide competence development for one of the regional authorities that perform the Seveso inspection.

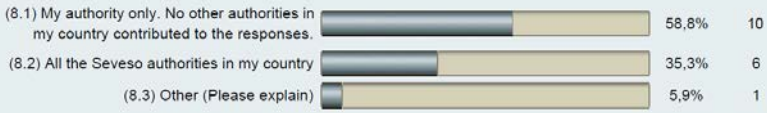
7. Please explain your answer further as necessary in the space below.

11. *Our* Competent Authority (CA) is composed of three government entities, the *occupational safety and health authority*, the environmental protection authority and … the *civil protection authority*. The *occupational safety and health authority* has the lead in co-ordinating the administrative actions of the CA.

12. The *environment agency* is the national competent authority responsible for the evaluation of notifications, SMS, Safety Reports and shares with civil protection authorities, the evaluation of the internal emergency plan.

8. Responses in this completed questionnaire represent the opinions of:

Number of question respondents: 17 (avg: 1,5)



9. Additional comments:

1. Our organisation is competent for internal process safety, this means for process safety risks that affect the people working within the Seveso sites. We are also assigned as an evaluating authority for safety reports. When we evaluate safety report, we focus on internal process safety risks, not issues of land use planning or external emergency planning. Evaluating safety reporting is not our main activity, that is inspecting Seveso companies.

2. In *my country* we have different organisational structures in the different *regions*.

3. When going through the survey, I had help from my colleague … who is the technical secretary of the Coordinating Committee. The national environmental authority is responsible for the implementation of the Seveso Directive.

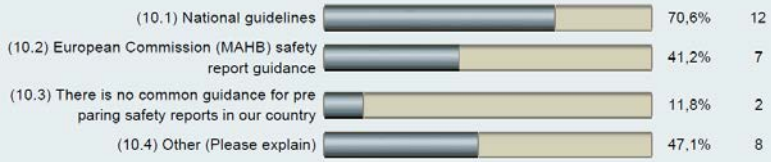
4. Opinions after discussions with all authorities at national level.

5. Since I have a rather good picture on how things work I will try to deliver answers that cover the complete national situation. The other authority at national level and regional level is the occupational safety and health authority and at regional level only the country administrative offices.

Part 2: General information

10. What guidance is used in your country for the preparation of safety reports?

Number of question respondents: 17 (avg: 2,2)



Question [10.4] (What guidance is used in your country for the preparation of safety reports?. Other (Please explain))

1. Guideline of the *regions*
2. Examples from other safety reports though our guideline is not that specific in how to make a safety report.
3. Guidance developed in twinning projects.
4. Guidance produced by *the occupational safety and health authority*.
5. MAHB safety report guidance translated into *our language*.
   National and international literature .
6. The new national manual for SR preparation is under construction through a G2 Project G2G Education for developing professional environmental protection activities in relation to the Seveso II Directive.
7. Practices among consultants created out of earlier review comments.
8. Guideline of the regions .
9. Examples from other safety reports though our guideline is not that specific in how to make a safety report.
10. Guidance developed in twinning projects.
11. Guidance produced by *the occupational safety and health authority*.

Question [10.4] (What guidance is used in your country for the preparation of safety reports?. Other (Please explain))

12. MAHB safety report guidance translated into *our language.*

13. National and international literature .

14. The new national manual for SR preparation is under construction through a G2 Project G2G Education for developing professional environmental protection activities in relation to the Seveso II Directive.

15. Practices among consultants created out of earlier review comments.

11. Additional comments:

1. http://www.brzo99.nl/aspx/getaspx?xd1=/views/brzo/xdlipage&ltmldt=204741&Sitldt=220&Varldt=88 (in Dutch language only).
2. The guidance on safety reporting does not reflect the latest point of view. An update is planned for 2012.
3. http://www.dsb.no/Global/Farlige%20stoffer/Dokumenter/Storulykke%20guidelines/EU-veiledning%20sikkerhetsrapport%20-%20norsk%20oversettelse.pdf
4. Decree No. 256/2006 Coll. on the details of the system of major accident prevention - Methodological guideline for the processing of the "Analysis and evaluation of major accident risk" document - Methodological guidelines for the preparation of the 'Principles, aims and policy of major accident prevention" and "Description of safety management system" documents - Methodological guideline for the preparation of the "Safety report" document - Methodological guideline for the preparation of the "Review of the safety report" document.
5. Decree 31.03.1989 "preliminary analysis to identify critical areas of industrial activity & analysis and assessment regarding the safety of industrial activities at major-accident hazard". Decree 15.05.1996 "analysis criteria and evaluation of safety reports relating to the deposits of LPG". Decree 20.10.1998 "analysis criteria and evaluation of safety reports relating to the deposits of flammable liquids and/or toxic liquids". All documents are only in Italian language, and they are not available on web.
6. Report 112. Qualitative and quantitative risk acceptance criteria -1989 http://www2.mst.dk/Udgiv/publikationer/1989/87-503-7938- 0/pdf/87-503-7938-0.pdf Safety Risks - Gas accident http://www2.mst.dk/Udgiv/publikationer/2007/978-87-7052-378-3/pdf/978-87-7052- 379-0.pdf Acceptance Criteria in Denmark and EU http://www2.mst.dk/udgiv/publications/2009/978-87-7052-920-41pdf1978-87-

11. Additional comments:

7. Guidance developed in twinning projects: 1. Twinning Project R0/200211B/EN/02 Implementation of the VOC's, LCP AND Seveso II Directives PHARE — Program 2002: Twinning project between the Romanian Ministry of Environment and Water Management and the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety 2. Joint Twinning Project R02004/IB/EN-05 "Implementation and Enforcement of the Environmental Acquis Focused on IPPC and Risk Management " Joint Romanian/French/Danish/Polish Project Region 3 South Muntenia Romanian/French/Danish/Polish Project 3. Twinning Light Project RO/2007/IB/EN102 TL „Specific support for implementation of 96/82/EC Directive Seveso It and 2003/105/EC Directive" 4. Twinning Light Project R012007/1B1OTIO4 TL „Support for improving the General Inspectorate for Emergency Situations capacity in assessments of the risks/major accidents effects".
8. Guide to the Control of Major Accidents Hazards Regulations 1999 (as amended) http://www.hse.gov.uk/pubns/priced11111.pdf. Preparing Safety Reports http://www.hse.gov.uk/pubns/priced/hsg190.pdf
9. This is my judgment after some discussions (since we have not directly asked the operators what they use). I think they mainly use the national guidelines which consist of prescriptions with comments given out by the *national civil protection authority* and *the occupational safety and health authority* respectively.
10. The guidance document on safety report assessment is available at: http://www.hsa.ie/eng/Your_Industry/Chemicals/Control_of_Major_Accident_Hazards/Assessment_of_Safety_Reports_Comah_Regs.pdf
11. Circulaire du 10 mai 2010 (link = http://www.ineris.fr/aida/?q=consult_doc/navigation/2.250.190.28.8.12386/4/2.250.190.28.6.15)
12. Most of the safety reports for the upper tier Seveso sites, which are under the control of the same operator were prepared by a UK consultant using HSE guidelines

12. Are there any specific tools (guidelines, checklists, models, software, etc.) that you use for reviewing safety reports?

Number of question respondents: 17 (avg: 1,8)

Question [12.3] (Are there any specific tools (guidelines, checklists, models, software, etc.) that you use for reviewing safety reports?. Other (Please explain))

12. Regional authorities (both the county administrative boards and the *occupational safety and health* inspectorates) rather often use a few models. One is now being up-dated.

13. Varies from one authority to the other. My organisation has a check list. The coordinating committee is now considering making a joint checklist to be used by all 5 authorities. This check list will also be made available to the establishments.

13. Additional comments:

1. Several documents have been sent to the email adress regarding chicklists for SR, MAPP, SMS and publication additional requirements for a SR.

2. There are no national guidelines for the examination of safety reports. But some *regions* have their own ones.

3. We have a workbook with which we assess SRs. It focuses on four aspects: 1. Strengths 2. Slight shortcomings, unclear points 3. Notable shortcomings, further explanations requested with a letter from *our authority* 4. Points for verification and clarification during inspection visits.

4. I will send a copy of the check list that my organisation is using to the organisers.

5. Checklist of evaluation of the SR (64 pages).

6. The references are the same listed in point 11.

9. Safety Report Assessment manual http://www.hse.gov.uk/comah/srarniindex.htm Safety Report Assessment Guides http://www.hse.gov.uklcornahisrag.htm Guidance for Operators on the Review and Revision of Safety Reports http://www.hse.gov.uk/comah/report-review.pdf Safety Report Assessment Procedure for revised safety reports http://www.hse.gov.uk/comahiguidance/assessment-inspection-procedure.pdf.

10. *Our MJV participant* will send a copy of a checklist by e-mail directly to the organisers within a few days.

11. Circulaire du 10 mai 2010 (link = http://www.ineris.friaidaPg=consult_doc/navigation/2.250.190.28.8.12386/4/2.250.190.28.6.15) - Inspectors vademecum (technical handbook)

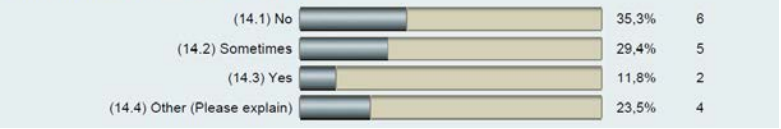
13. Additional comments:

12. An external (Italian) consultant, with experience in the evaluation of Seveso Safety Reports, was engaged by the CA to assist in the evaluation of the Safety Reports; he made use of MAHB guidelines and Italian guidelines.
13. We have prepared a checklist to support the evaluation of SR and the SMS. Also, we have some software models available.

[Note: All guidance/checklists sent by the respondents are listed in Appendix 4.]

14. Do you accept the preparation of a joint SR for neighbouring establishments e.g. in industrial parks?

Number of question respondents: 17 (avg: 2,2)



Question [14.4] (Do you accept the preparation of a joint SR for neighbouring establishments e.g. in industrial parks?. Other (Please explain))

1. At present this kind of situation (neighbouring upper tier sites), does not exist in *our country.*

2. In principle, no.

3. No case in the past

15. Additional comments (include a description of any special terms or conditions for joint SRs):

I. There is a huge Seveso Industrial Park in *our country* … which has an umbrella safety report for several Seveso-II installations in the industrial park.

2. It is a theoretical possibility. So far no actual cases.

3. This has been done only in one case, where 3 interconnected parts of a refinery are owned by 3 different groups of owners, and these 3 parts of the refinery have one joint operator.

4. There is only 1 case in our country. The reason is that one operator was divided into two operators. When there has been a request to take into account the domino effect of neighbouring establishments, in several cases, CA decided to classify the establishment as the SEVESO one because of domino effect even if the amount of dangerous substances was lower.

5. Depends on each regional authority - In some cases the Authority requires the operators *to develop* a joint SR (i.e. in some industrial parks)

6. Where one company is responsible for operating neighbouring companies, we have examples where the SMS is the same for all companies. There are individual safety reports, but references to the SMS for the operating company are made in the safety reports for the other companies.

7. In theory, we would accept if eq. two operators both establish two similar SR, one each, that includes themselves and the other operator as long as it is clear who is responsible for what. In that way domino effects are clearly demonstrated as well as some more "extra information" in both cases. The opposite, when several independent operators refer to only one common safety report, would however not be acceptable. Neither of these cases are common approaches in *my country.*

8. Safety reports are plant-specific. However, neighbouring plants can share a joint emergency plan.

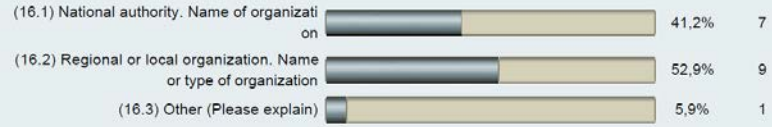
9. In our national legislation, the safety report is the responsibility of the operator. A joint SR would raise additional issues in terms of liability. Also, until the present moment we have not had requests in this sense. Only some cases where several establishments are under the responsibility of the same company group were addressed to the … environment agency.

10. Joint SR could theoretically be accepted if the responsibility for the content is clearly defined. More practical could be that just parts of the SR especially emergency plans are prepared jointly.

Review of safety reports in your country

16. To what authority does the operator submit the safety report?

Number of question respondents: 17 (avg: 1,6)



Question [1 6.1] (To what authority does the operator submit the safety report?. National authority. Name of organization)

1. *The national civil protection authority*
2. *The national occupational health and safety authority*
3. *The national occupational health and safety authority*
4. *The national environment authority*
5. *The national occupational health and safety authority*
6. *The chemical health and safety authority*

Question (16.2) (To what authority does the operator submit the safety report?. Regional or local organization. Name or type of organization)

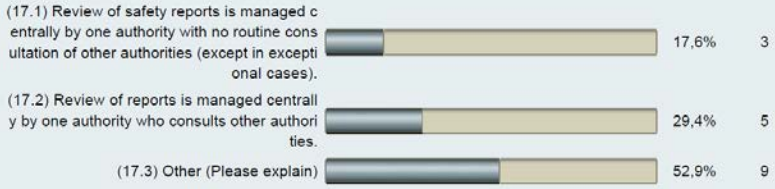
1. The district authority (legally competent authority)
2. Each of the 3 regions has a focal point for SR
3. Municipality or Province: department for Environmental Licensing
4. Regional Competent Authority
5. Regional Technical Committee
6. The authority of environment, who are the coordinating authority

Question [16.3] (To what authority does the operator submit the safety report?. Other (Please explain))

1. Both to the regional *occupational health and safety authority* and to the country administration boards and as a part of the application in connection with a license permission process.

17. What is the process for reviewing safety reports?

Number of question respondents: 17 (avg: 2,4)



Question [17.3] (What is the process for reviewing safety reports?. Other (Please explain))

15. All competent authorities examine the safety reports, *our authority* compiles the answers and sends one joint response to the establishment.
16. Assessed by the Joint Competent Authority.
17. By 2 competent inspection authorities, namely the regional licensing authorities, labour inspectorate and regional fire brigades.
18. Regional or local authorities review the safety report.
19. Review of reports is managed by local services with consultation of other authorities.
20. Review of reports is managed regionally by the *technical review committee.*
21. Up to four authorities review the safety reports in parallel.

18. Additional comments:

1. The 3 Competent Inspection authorities examine the safety report for completeness in a desk review. The correctness of an SR is done during the first initial Seveso inspection onsite including a general review for correctness of the SR, MAPP and SMS.
2. The safety report is examined only by one authority (ours). If we have any questions we check the problems during the Seveso inspection of the site, if necessary together with other competent authorities.
3. *Our authority* asks for opinions from the environment, rescue and occupational health authorities.
4. In *our country* the law requires a technical evaluation of the SR, not only a review.
5. The review of the safety report is made by three authorities in common with regional or local level. The authority of environment is the coordinating authority.
6. Review of safety reports is managed at local level by all the competent authorities: The *local inspectorates for emergency management*, local environmental protection agencies, *and the county environmental inspectorates.* The operator is obliged to elaborate and submit the safety report.
8. Safety reports are assessed by a joint Competent Authority (CA) team involving *the occupational safety and health authority* and *the environment authority* ... Joint assessment conclusions are agreed. The process is administered/managed by *the occupational safety and health authority* on behalf of the CA.
9. *The national emergency management authority* and the county administration boards review them as a part of the license process. The county administration boards often consult also the local authorities and *the occupational safety and health authority* in this review process. The county administration boards, *the occupational safety and health authority* and the local authorities do it as part of the inspections.
10. The Authority may consult with the environmental agency on the information in a safety report that is relevant to the possible risks of environmental pollution from a major accident.
11. Residents, local authorities, NG0s, and more generally the public, may be involved if a public enquiry is conducted.
12. The *occupational safety and health authority,* as lead authority, engages an external consultant to review the safety report and submit a report with conclusions. During this process *the occupational safety and health authority*, *the environmental protection authority* and *the civil protection authority* provide input and are consulted on the feedback given, before the final document is agreed upon.

18. Additional comments:

13. New regulation on major accident prevention will involve environmental and other competent inspections in reviewing the SR.
14. The district authority (legally competent) does not make the assessment because they have no experts. The technical assessment is done at regional level in the technical expert unit. The result of the assessment is sent to the district authority for decision making.

19. Which authority manages the process described in your response to question 17? (Please provide additional explanation as necessary to clarify the process.)

1. The local or regional environmental licensing authorities (municipality or province (county)).
2. The focal points collect the remarks for all the evaluating authorities and communicate them to the operators. The regional focal points evaluate the reports also (for external effects). All evaluations are treated equally. A report is only approved when approved by all the evaluating authorities For some (diffiult) cases a meeting is held between the evaluating authorities in order to establish a common approach for a specific SR.
3. This is the competent authority for *pollution* control. It (we) are the competent authority for issuing permits, doing Seveso inspections and the examination of the safety reports. We have the lead for all this responsibilities. It is a regional authority.
4. *The chemical health and safety authority.*
5. *The national civil protection authority* (as coordinating authority).
6. The Regional Competent authority (CA) is responsible for this process. The CA completes the result of the reviewing of SR of all involved authorities but the Ministry of the Environment provides the expert's statement of every SR. This statement is the key document for final decision. Expert's statement of SR for the Ministry is carried out by the *occupational safety research institute.*

19. Which authority manages the process described in your response to question 17? (Please provide additional explanation as necessary to clarify the process.)

7. The *joint committee* makes a review and a technical evaluation of the SR. The*joint committee* is composed of a representative of the regional fire brigade, the regional environmental agency, the regional labour inspectorate, the local institute for accident prevention and safety at work, the region, province, municipality, and the provincial order of engineers.

8. The authorities of emergency and fire protection, working environment and environment (coordinating authority).

9. The safety report is submitted at the Risk secretariat of the *local environmental protection agency.* The risk secretariat is at the disposal of the *local inspectorate for emergency management* and *the county environmental inspectorate* in order to elaborate their points of view regarding the safety report.

20. Which authority/authorities provide(s) official feedback on the results of the review to the operator? (Please provide additional explanation as necessary to clarify the process.)

1. The local or regional environmental licensing authorities (municipality or province (county)).

2. The regional focal points combine the evaluation reports of all the evaluating authorities and send them to the operators.

3. This is again our authority. We examine the safety report. Give a written feed back to the operator and we also do a legal adjustment (with technical and organisational measures) if necessary.

4. The chemical safety and health authority.

5. *The Ministry of Civil Protection* (as coordinating authority).

6. The regional competent authority.

7. At the end of the technical examination the *joint committee* must communicate its final conclusion.

8. Each authority make their own individual feedback/approval on the result of the review. As the coordinating authority, the authority of environment send these "approvals" joint to the company .

9. Local environmental protection agencies estimate time used to review the safety report is between 30 days and 1,5 years .

20. Which authority/authorities provide(s) official feedback on the results of the review to the operator? (Please provide additional explanation as necessary to clarify the process.)

10. *The occupational safety and health authority* as part of the overall management function.
11. The authorities work in parallel. We all have an equal responsibility to cooperate. The time table for the license permission process is decided by the permitting authority which makes the feedback come to the operator almost simultaneously. The county administrative boards and the *occupational safety and health* inspectorates often, but not always, have a rather well-timed inspection review process. This could be ameliorated.
12. *The occupational safety and health authority.*
13. Local inspection services.
14. *The occupational safety and health authority* provides official feedback to the operator by means of a letter.
15. *The Ministry of Environment*.
16. The competent authority (district level).

21. No. of days to review & discuss within my authority.

Number of question respondents: 16

	1-6 days (value: 1)	7-13 days (value: 2)	14-20 days (value: 3)	21 days or more (value: 4)
10% of reports (avg: 3; total: 3)	**33,3%** 1	**0%** 0	**0%** 0	**66,7%** 2
25% of reports (avg: 2,5; total: 8)	**12,5%** 1	**37,5%** 3	**37,5%** 3	**12,5%** 1
50% of reports (avg: 2,143; total: 7)	**42,9%** 3	**28,6%** 2	**0%** 0	**28,6%** 2
75% of reports (avg: 2,25; total: 4)	**25%** 1	**50%** 2	**0%** 0	**25%** 1
100% of reports (avg: 3,125; total: 8)	**25%** 2	**0%** 0	**12,5%** 1	**62,5%** 5
avg: 2,6; total: 30	26,7% 8	23,3% 7	13,3% 4	36,7% 11

22. Please provide any additional explanation/comments in the space below.

1. For the answer 10 021: number of days = number of man days, only the number of man days spent by our organisation. The total evaluation time (including the efforts of the other evaluation services is of course much higher.
2. Usually we need the same time for the examination. Because of a manpower shortage we use a spotcheck system .If we have more time we take more spotchecks depending of the amount of safety relevant plant components.
3. The response for question 21 applies for expert's statement on the SR of the Ministry. When we would count days for all involved authorities we had to move the answers one column to the right.
4. The *joint committee* carries out an examination and also a technical evaluation of the SR (the time spent is estimated as some months).
5. Often there are requests for clarifications or more information. The period of time between the reception of a safety report and the communication of conclusions to the operator depends on the type of establishment, for simple ones the time is shorter while for a complex installation is longer.
6. The figures have been rounded quite widely so do not add up to 100%. The length of time taken to assess reports will depend on such factors as the complexity of processes, the range of major accident hazards present and the severity of the potential consequences arising from the occurrence of a major accident (39098178)
7. The number of days refer to the review in the inspection process.
8. The engagement of an external consultant, organising site visits, consultations and approval of the final report is a lengthy process.
9. At least 7109 different competent authorities are involved in the SR evaluation.
10. About 90 days

23. What competences does your authority (or the authorities) use for the examination of SRs?

Number of question respondents: 17 (avg: 1,3)

Question [23.1] (What competences does your authority (or the authorities) use for the examination of SRs? . In-house competences (within the authority/authorities)(Please explain))

1. According to *regulation* transposing Seveso Directives into ... legislation, the competent authorities can involve external sources (consultants) for additional expertise.
2. Our process safety inspectors are qualified.
3. Qualified Competent Seveso Inspectors from the 3 authorities.
4. Regulatory specialist, environmental specialist, topic specialists (predictive, process safety, C&I, human factors, mechanical, civil etc.
5. Seveso inspectors are trained to deal with the general aspects of reports.
6. Specialists in Seveso and chemical risk issues.
7. The *Joint Committee* is composed of different technical authorities.
8. The Seveso inspector's competence, nothing special.
9. The technical expert unit covers all issues.

Question [23.2] (What competences does your authority (or the authorities) use for the examination of SRs? . Competences acquired from external sources (e.g. consultants)(Please explain))

10. External consultants are engaged to carry out the evaluation of the Safety Report, with input and review of findings by the CA.
11. If precise technical expertise is required, third-party advice may be sought.
12. In some special cases.
13. Limited use where the specialism is not available in house.
14. Local fire brigade and environmental competencies.
15. Only used in the permitting procedure, when a new safety report is needed.
16. Scientific institution - Expert's statement of SR for the Ministry is carried out by *the research institute*, consultants.

24. How soon does the company receive the authority's final conclusions?

Number of question respondents: 16

	less than 6 months (value: 1)	7-12 months (value: 2)	13 – 24 months (value: 3)	25 – 36 months (value: 4)	more than 36 months (value: 5)
10% of reports (avg: 2,375; total: 8)	25% 2	25% 2	37,5% 3	12,5% 1	0% 0
25% of reports (avg: 2; total: 5)	20% 1	60% 3	20% 1	0% 0	0% 0
50% of reports (avg: 2,2; total: 10)	30% 3	40% 4	20% 2	0% 0	10% 1
75% of reports (avg: 2; total: 7)	42,9% 3	14,3% 1	42,9% 3	0% 0	0% 0
100% of reports (avg: 2,143; total: 7)	42,9% 3	14,3% 1	28,6% 2	14,3% 1	0% 0
avg: 2,162; total: 37	32,4% 12	29,7% 11	29,7% 11	5,4% 2	2,7% 1

25. Please provide any additional explanation / comments in the space below.

1. Due to official procedures for notification to the public etc, 25% of SR requires more than 6 months.
2. Figure in 024 relates to *two of our three* regions. There is an obligation to evaluate reports for new establishments within 60 calendar days and for existing establishments within 9 months.
3. Less than 6 month is based on the end of the examination and not based on the arrival date of the safety report at the authority.
4. This depends on how many rounds we need to go with the establishments if we are not satisfied with their first (or second or third....) version of the safety report. My answer in 24) does therefore add up to 110%, because of the options. The correct numbers are: 50% less than 6 months, 40% 7-12 months, and 10% 13-24 months.

25. Please provide any additional explanation / comments in the space below.

5. The usual practice is that the evaluation process consists of several steps, the operator should improve the SR in accordance with the comments from CA.
6. The company receives the authorities' final conclusions in less than 1 months after the end of the examination/evaluation of SR.
7. We normally use most of the time in dialog with the company about the authorities' requirement for the content of the safety report. When the authorities have accepted the content of the safety report as sufficient in accordance with the Seveso directive, the company will receive the authorities final conclusions in less than 3 months.
8. The figures have been widely rounded and do not add up to 100%. Full new reports will take longer to assess than revised reports. The assessment conclusions for a 5-year review should be sent within six months of receipt. The conclusions on the assessment of a completely new report should be sent within 12 months of receipt.
9. This refers to the inspection process. In the license process the time for the comments from the emergency management authority is much shorter. The license process can however go on for longer.
10. The authority's policy is to assess a safety report within 4 months of receipt from the operator. Depending on other factors (e.g. other work commitments, resources, etc.), this may take longer. The authority would aim to meet the operator as soon as possible after the initial assessment to discuss the findings. The length of time it takes for the operator to receive the authority's final conclusions will depend on how much additional information is required from the operator, resources within the authority etc.
11. The safety reports were submitted within 10 months of each other following the transposition of the Seveso II Directive which affected the length of time required to assess them.
12. Less than 6 months.

26. Safety reports are used for … (Please tick one answer per topic)

Number of question respondents: 17

	Always (value: 1)	Often (value: 2)	Sometimes (value: 3)	Never (value: 4)
Seveso inspections (avg: 1,375; total: 16)	**75%** 12	**12,5%** 2	**12,5%** 2	**0%** 0
Land-use planning (avg: 1,941; total: 17)	**41,2%** 7	**23,5%** 4	**35,3%** 6	**0%** 0
External emergency plans (avg: 1,588; total: 17)	**64,7%** 11	**17,6%** 3	**11,8%** 2	**5,9%** 1
Risk communication (avg: 1,875; total: 16)	**50%** 8	**12,5%** 2	**37,5%** 6	**0%** 0
avg: 1,697; total: 66	57,6% 38	16,7% 11	24,2% 16	1,5% 1

Uses of safety reports

27. Any other purpose. Please describe and explain your answers as necessary.

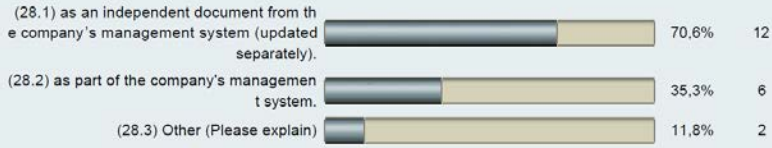
1. External risks communication (what to do in case of an accident) is done by the authorities, not by the operator. This communication is based on information in the SR.
2. For the permitting procedure for accident examination.
3. Information to the public (reports are sent out on demand).
4. As request by the national law in Italy for the risk communications is used (prevalently) a specific "information sheet for the population and for the workers", using a standard format.
5. Risk communication between authorities.

27. Any other purpose. Please describe and explain your answers as necessary.

6. Also used in establishing external Domino effect. (39186537) .1
7. The Safety Report is a component in the licence permitting application for the establishments on the upper tier. (-38626816)
8. On-site safety level improvement (-38971544)
9. The operator may use it to prepare the information to the public (-39010925)
10. Demonstration that the operator has identified all the risks and has implemented the appropriated measures. The positive opinion on the examination of the SR is one of the requirements of our national licensing scheme. (-39264214)

28. The safety report is normally treated by the company…

Number of question respondents: 17 (avg: 1,5)



Question [28.3] (The safety report is normally treated by the company. Other (Please explain))

1. Some information of the SMS, and related organization of the operator, is part of the SR.
2. [No explanation given.]

29. Additional comments:

1. The safety report describes the SMS. The SMS is part of the general management system of the company.
2. As requested by the Seveso Directive (Annex II) and by national law.
3. The company's safety management system is part of the safety report. Also the SMS is part of the management system of the company.
4. The aim is to treat safety reports as living documents but unfortunately many duty holders still regard them as regulatory documents that have to be produced as a one-off exercise.|
5. E.g.some parts like mostly the routine ones are part of the company's management system. Other parts are solely prepared for the safety report.
6. Usually the safety report is an independent document but its preparation and revision are foreseen in the safety management system. This does not means that a more pragmatic approach is implemented to support a yearly evaluation of the SMS.

Public information and safety reports

30. How are the safety reports made available to the general public?

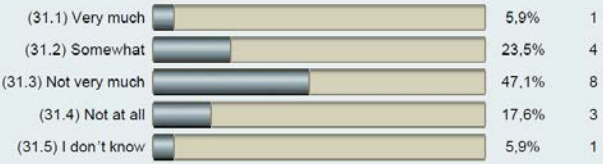
1. By official publications on websites, newspapers, regional news information, etc.
2. Via the regional focal points for SR.
3. There exists a short form which is available for the public. The public can ask the operator for it. Usually this short form is available at the front desk of the operators site.
4. At the authorities' offices or at the establishments in question
5. On demand from the public.
6. CA has to provide the public discussion. CA has to make accessible the approved SR.
7. Each Region receives by the operator a dedicated copy of the SR. The public may have access to the SR by specific request to the Regional Authority.

30. How are the safety reports made available to the general public?

8. In accordance with our implementation of the Seveso Directive the public has to apply for the safety report. In order to reduce the risk of terrorism, the public will often not be allowed to access the total content of the safety report .
9. It is the obligation of the operator to put the safety report at the disposal of the public. The operator usually places it on his website. In order to provide information to the public the operator also uses "open days".
10. They are not, for reasons of national security. Information from them can be requested through freedom of information legislation but is subject to exemptions and exceptions on the grounds of national security and personal and commercial confidentiality.
11. All the time by the principle of public access to official records.
12. It is the responsibility of the operator to make the safety report available to any member of the public who requests it.
13. In the scope of the public enquiry, safety reports are available in town councils (but not on the Internet). However, due to safety or intellectual property concerns, some information may be kept confidential.
14. According to local legislation the public may ask the operator to make available the safety report.
15. The SR is available on the web page of *the Ministry of Environment*.
16. The safety reports are made available to the general public, upon request. However, it is foreseen in the national legislation that the safety report should be made available on the internet.
17. SR are open to the public on request. Operator may call for exclusion of some parts for privacy reasons.

31. Have the general public shown interest in SRs?

Number of question respondents: 17 (avg: 2,9)



32. Please explain your answer:

1. General interest of the public is decreasing. Severe accidents may have impact on the interest for SRs.
2. In all the years only a few people from the general public have shown interest. Most public consultations are done by consultants and other companies.
3. I know only about two visitors at all. This experience is the same in all regions of the country. It is not specific for my region. People are not interested.
4. Normally only consultants show any interest.
5. Depends on the plant. For instance we have a new LNG-plant where there has been a lot of controversies. In such cases the interest is greater. Newspapers and other media are normally the ones that show interest.
6. It is usually of interest for local issues.
7. The "information sheet for the population and for the workers" is more used than the "public" copy of the SR.
8. The operator is responsible, in the light of the law, for informing the public and has also to take over the costs. The public is also informed during the permitting procedure. There are made announcements at the Local Halls and in the media. The population is also participating in public debates organized by environmental authorities during permitting procedure.
9. It tends to be special interest and pressure groups who have the most interest in safety reports .
10. It happens from time to time that journalists or neighbours ask about the information in the safety reports but not very often.
11. Residents living beside concerned plants have shown interest in SRs, mostly through the public enquiry process. However, the lack of technical knowledge keeps general public from understanding such documents.
12. To the best of my knowledge there have been no requests from the public to view any safety report.

32. Please explain your answer:

6. We have not much experience - first SRs were available 6 months ago.
7. We do not receive a lot of requests to consult this kind of documentation.
8. Only very few cases in the past.

33. Has there been any reaction from members of the public, certain organizations or communities to information in specific reports?

Number of question respondents: 17 (avg: 2,2)

34. If yes, please describe the situation(s).

1. Only during the course of the permitting procedures.
2. Not very often. In the above-mentioned LNG-case we received some comments regarding the risk assessments.
3. Usually it is the protest against the new construction or spreading of the establishment.
4. In some cases environmental organizations or citizens have used the SR to promote legal actions vs industrial projects, also relating to "non-Seveso" environmental acts (i.e. EIA, IPPC, etc.).
5. If information is obtained via freedom of information legislation it is usually because the person seeking the information has a particular focus of interest. They may then use the information to engage the attention of the media or elected representatives if they have concerns about, for example, how well a Seveso site is managed, or where it is located.

34. If yes, please describe the situation(s).

6. In a few cases. E. g., when projects for new buildings are stopped because of the proximity to a Seveso establishment.
7. Reactions from members of the public or communities aimed more at the safety reports consequences, i.e land-use planning, than at the safety reports themselves. The type of reaction depends on the relations between operators, local authorities and residents.
8. Most of the reactions have been at regional level. from the community point of view.

Results of the safety report review process

35. In your opinion, has the preparation of an SR had a positive influence on the establishment's safety?

Number of question respondents: 17 (avg: 2,1)

36. Please give examples (e.g. investments in new or better equipment, enhancements to safety management systems, safety-related systems, emergency preparedness).

1. Enhancement of SMS, higher awareness amongst company's management.
2. In our experience, improvements are the result of inspections, not of writing SR.
3. The safety report is written for the benefit of the operator. It is a chance for the operator to think about the safety of his plant. So sometimes the awareness of safety problems has been strengthened, investments have been taken.

36. Please give examples (e.g. investments in new or better equipment, enhancements to safety management systems, safety-related systems, emergency preparedness).

4. All above-mentioned and developing of safety indicators, dDeveloping of management of change.
5. More awareness regarding identified risk scenarios and the necessity to ensure that the emergency preparedness is in accordance with the scenarios. Identification of unacceptable risks and following risk-reducing actions. Identification of unclear responsibilities. Some establishments use the SR for training purposes (new employees).
6. Improving of safety management systems, emergency preparedness .
7. The activity related to the preparation of the SR (first of all the risk analysis) improves the knowledge of hazard and therefore the safety, especially when the drawing up of the SR involves the internal resources of the establishment.
8. The safety report and the safety management system are very important and are fundamental for the overall safety of an establishment and operators are aware of it.
9. The extent of the influence is variable depending on the attitude and culture of the operator. All of the quoted examples in the question have occurred at one time or another. One important advantage of preparing a safety report is thinking about the control of major accident hazards through the full lifecycle of the establishment from design and commissioning through operation to decommissioning and demolition.
10. The preparation of the safety report makes the operator face the whole picture and draw up "lines" from risks to consequences to prevention, preparedness and response. In this way potential gapes can be clarified and mended.
11. Enhancements to safety management systems, emergency preparedness.
12. - On-site risk reduction; - Investments in better equipment; - Enhancements to safety management systems; Emergency preparedness; - Information to public.
13. Strengthening of the SMS, upgrading of equipment/ infrastructure, better awareness by management, training of personnel were influenced by the preparation and subsequent review of the SR.

36. Please give examples (e.g. investments in new or better equipment, enhancements to safety management systems, safety-related systems, emergency preparedness).

14. Usually, the improvements that occurred as an outcome of the SR review process are related to enhancements to SMS, investments in prevention/safety measures (safety related systems, control systems, retention measures, etc).

15. SR and the other elements of Seveso (inspections, LUP) lead to a higher level of safety by: better equipment, substitution of substances, installing or improving SMS.

37. Please list the top 5 most common deficiencies in the SRs. (Please feel free to list > 5 if appropriate.)

1. Correct scenarios; Risk matrix Identification of risks; Use of correct risk identification methods; Correct description of all elements of SMS.

2. Description of accident scenario's and (technical) measures, information on SMS, emergency planning often to lengthy, not tothe point and not always consistent with reality.

3. In former times deficiencies have been caused by the wrong use of guidelines, e.g. for classifications. Today it is often a bad description of equipment or procedures or too small dispersion scenarios. We check only the documents. Onsite inspections with the help of the safety report are more effective. Connection between risks and prevention methods Identification of risk analyses and risk scenarios Presentation of the environment of the establishment Material of safety reports not well organized Management of change.

4. •Insufficient identification of risk, risk scenarios (including insufficient specification of probability and consequences) •Insufficient overall description of safety management systems •Insufficient documentation of routines for safe operation, maintenance and systematic work in order to prevent major accidents •Lack of or insufficient descriptions regarding management of change •Insufficient documentation of external emergency preparedness resources •Insufficient documentation of chemicals and their properties •Lacking or insufficient description of surroundings, including neighboring establishments

37. Please list the top 5 most common deficiencies in the SRs. (Please feel free to list > 5 if appropriate.)

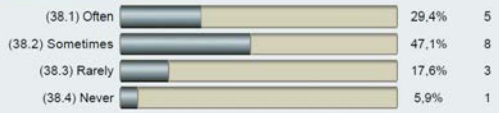
5. - inconsistent data actualisation - not updated date of tasks given in SR - risk analysis is not elaborated in the range adequate to the present risk - documentation of SMS with operational regulations is missing - presentation of changes without documentation - bad human factor analysis.
6. Noncompliance of risk analysis with the "current arrangement" of the plants. The SR drew up by outside consultants and it is not fully known/adopted by all worker=rs of the establishment (workers and management). The maintenance programs does not match with the results of the risk analysis. The evaluation of the human factor does not take in account the results of the risk analysis. The incorrect set up of the emergency team (in number and/or effective involvement) relating to the results of risk analysis.
7. Identification and assessment of hazards in normal and abnormal functioning conditions and sometimes lack of P&I diagrams.
8. •Failure to demonstrate the direct link between the major accident scenarios and the control measures intended to prevent them occurring •Failure to produce a representative set of major accident scenarios -failure to provide sufficient evidence to demonstrate that the MAPP and SMS have been put into effect •Failure to demonstrate that a systematic and sufficiently comprehensive approach to the identification of risk reduction measures has taken place •Failure to show that the measures adopted to prevent and mitigate major accidents make the risks from a major accident ALARP.
9. •Risks are defined but the measures are not always linked to the potential risks, but more out of e.g. tradition. •The consequences are not described in a comprehensible way, eg. distances, concentrations and how a discharge will effect humans. • The fore seeable disturbances of the processes and how they shall be handled. •Long-time effects of accidents. •The internal plan is not operative .
10. More detail required re: consequence assessment, emergency planning, human factors.
11. Sufficiency of listed hazardous phenomena. • Consideration of potential accident causes. • Justification of the occurrence probabilities used •Justification of the safety barriers' level of performance. •Justification of the models chosen for the hazardous effects.

37. Please list the top 5 most common deficiencies in the SRs. (Please feel free to list > 5 if appropriate.)

14. Insufficient information on SMS. Insufficient technical detail. Gaps in the presentation of the environment. Lack of detailed information necessary to understand spatial extent of risks and for land use planning purposes. Lack of information on prevention and mitigation measures.
15. Completeness of the data presented; Data are not accurate (old risk analyses). Annexes are not clear enough. SMS documentation is not appropriate. Methodology for communication with local community is not presented.
16. General risk analysis approach that is based on standardized information related to those type of establishments/process but with no critical approach taking into account the differences; •Lack of discussion on possible additional measures/recommendations. •Environmental analysis (needs improvement)
17. The hazard analysis. •Description of the environment. •SMS. •Internal emergency plan. •Splitting up the establishment into safety relevant installations.

38. On the basis of an SR, does the authority set new requirements for the operator concerning elements of safety management (e.g. the SMS, technical measures for accident prevention, emergency planning)?

Number of question respondents: 17 (avg: 2)

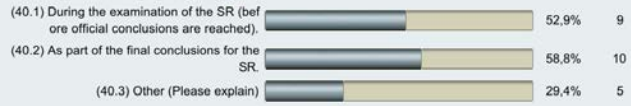


39. Please explain in more detail as necessary, including (if applicable) typical safety elements and/or type of requirements that might be addressed.

1. New requirements are normally set after an onsite Seveso inspection in which SRs can be an important document.
2. If we think that on the basis of the information in the safety reports there might be a problem, there will always be an inspection. Measures are (by our organisation) never imposed merely on the evaluation of the SR as a document.
3. Usually the deficiencies are found when we take care for the permitting, the emergency planning and so on, when we do the detailed work.
4. Collection of near misses Improvement of maintenance systems Improvement of leak control of depots.
5. Mainly, new requirements are addressed through inspections or on the basis of more specific technical demands in approvals/ licenses/other national legislation managed by the competent authorities.
6. A typical prescription concerning the SMS is related to maintenance of equipment that is indicated as critical for safety (as a result of the risk analysis).
7. Generally there are new requirements set during the examination of the SR, during inspections.
8. Assessment of the safety report is only part of the overall intervention strategy. Although the information in the safety report is taken at face value (unless there is existing evidence to the contrary) it has to be verified by inspection. The safety report also informs the inspection strategy and it is through a combination of these activities that new requirements might be set for operators. Inspection plays a critical role and the aim is to maximise the time available for it rather than having extended periods of time for assessment.
9. The routines in the safety management system may for example often need to be completed. The line between risk and preventive measure is missing. The consequences needs to be better described.
10. Safety management system update - Technical barriers update/replacement.
11. The CA sends a letter to the operator with recommendations following the review of the safety report. These would include recommended actions on deficiencies identified.
12. Planning and practising of training for emergency preparedness improvement of fire protection measures ... New scenarios should be put in the SR.

40. When are these requirements communicated to the operator?

Number of question respondents: 17 (avg: 1,8)



Question 40.3 (When are these requirements communicated to the operator? . Other (Please explain)).

1. After inspecting onsite the correctness of the SR.
2. As a part of the licensing process. Through guidance.
3. During inspections.
4. Following inspection arising from SR assessment.
5. This may vary.

41. Additional comments:

1. If we would notice deficiencies during the examination of the safety report we would talk during the examination and - if the deficiencies still exist, it become part of the final conclusions.
2. The usual practice is that the evaluation process consists of several steps, the operator should improve the SR in accordance with the comments from CA.
3. Urgent issues will be dealt with during the assessment process, particularly if a serious deficiency is suspected. Requirements may also be communicated as part of the final conclusions for the SR and also following inspection arising from the assessment of the SR.

42. In your opinion, which parts of the SR have turned out to be the most challenging for companies? (Choose a maximum of 2 of the following.)

Number of question respondents: 17 (avg: 3,8)

43. Please explain why these are challenging:

1. That is based on experience form the field.
2. Lack of proper (internal) risk studies (HAZOP, etc.). Problems with confidentiality, Operators are free to decide the way they describe their (internal) process safety risks, but often we don't know why SR is considered by operators as an extra effort, without much (any) added value.
3. The risk scenarios are almost always too small. Usually they don't have an impact outside of the plant. So we have to discuss why the sources of emissions are too small.
4. The Directive is regarded as a bit complicated. Our guidance might not be good enough. Regarding risk identification and risk scenarios, this depends highly on the type of establishment and their competence.
5. It is very complex (and critical for the operators) to perform a good balance between the safety requirements and the commercial requirements (also considering the environmental/safety image of the establishment).
6. The safety report is assessed by local competent authorities. At the beginning due to lack of experience there were challenging parts for the companies like information on SMS, identification and presentation of risk scenarios.
7. Some operators find it challenging to demonstrate that they have identified the link between the control measures they have in place and the major accident scenarios that they have identified
   -Some operators find it challenging to identify the most appropriate risk assessment methodologies .
   -Even when the evidence exists, some operators find it challenging to present the evidence coherently and authoritatively.
8. Probably because these are the least concrete and you have to make assumptions in order to be able to describe them.
9. The approach taken by the operator may be less conservative than the Authority would accept.
10. Because of the probabilistic approach chosen by France for safety reports.
11. Lack of experience and expertise.
12. Our companies don't have enough experience.
13. Because often the operator does not have in house qualified staff nor software tools (to predict consequences).

44. What do you as an inspector feel is most challenging when inspecting SRs?

I. Selection of proper SR issues for onsite inspections.

2. We see no challenges when inspecting SR. Most inspections are done on the basis of an inspection tool (questionnaire), The SR helps the inspector to prepare and to pick some items for verifications. SR are considered as a source of back ground information, but our inspection system can work independently from the reception and quality of the SR.

3. The risk scenarios.

4. Risks scenarios, we have not had good criteria or guidelines.

5. 1) Safety reports are built up very differently, not easy to compare one to the other. 2) Not easy to define what is good enough 3) Level of detail in the assessment of the SR 4) Not to differentiate too much between establishments, and yet take into account that you have to treat complex establishments differently than the more simple ones.

6. Comparison of current state in the establishment and described stale in SR.

7. To verify the compliance of the operator's risk analysis with the effective hypothetic hazards.

8. Measures of protection and intervention to limit the consequences of an accident.

9. -Deciding what is a proportionate assessment in terms of breadth and depth of assessment.
-Making a judgment about whether or not the operator has demonstrated that risks are controlled ALARP.
-Managing the assessment process when a multi-disciplinary learn is involved and the deadlines are tight.

10. To judge about the levels of requirements.

11. Assessing the major accident scenarios.

12. To review with a critical mind the probabilities of occurrence and intensity of hazardous effects that are provided by operators.

13. Lack of experience and training in carrying out the review of safety report.

44. What do you as an inspector feel is most challenging when inspecting SRs?

14. Lack of knowledge and experience in review of risk analyses, scenarios, safety management system.
15. Not applicable to *my authority* — Under the responsibility of a different authority
16. New techniques of hazard analysis; SMS because of a new aspect in the establishments' documentation.

45. What do you consider to be the greatest challenges in your country when it comes to safety reports? (Please tick all that apply.)

Number of question respondents: 17 (avg: 3)

Question [45.7] (What do you consider to be the greatest challenges in your country when it comes to safety reports? (Please tick all that apply.). Something else? (Please specify))

1. Poorly qualified consultants.
2. Internal resources.
3. Lack of experience at the beginning.

46. Please explain your answers:

1. SRs should be dynamic documents. Regularly it appears that Seveso operators consider SRs as an administrative obligation and a burden andit is prepared only for government authorities. Operators should be better aware of the usefulness of the SR for their company and its management.

2. Inertia seems to be a big problem!!!! Lack of competence and lack of guidelines heightens this problems. Inspectors are left alone. Only one inspector should examine a safety report which is written by a team of experts. How should this work????

3. The companies are not any more so interested in reviewing and updating their safety reports as they were when Seveso II directive was implemented.

4. 1) Operator competence varies greatly with the complexity of the establishments. 2) Sometimes authorities have too little competence in order to make a good evaluation of the risk assessments. 3) Lack of guidelines makes it difficult for establishments to know the authorities expectations.

5. The trainings were of great help.

6. -Good communication is needed between CA's and operators to ensure that they get the necessary guidance to produce an acceptable report. This means good liaison and contact with the operator well before a revision is due
-Any regulator would welcome more resources the need is to prioritise the work and carry out proportionate assessments so that the available resources are deployed to the best effect. Even then there will be occasional bottlenecks when a specific assessment competency, e.g. predictive assessors, is in short supply.

46. Please explain your answers:

7. Other work demands may be prioritised

8. Prior to *our country's* accession to the EU in 2004, *our country* did not have legislation similar to the Seveso Directive, and hence capacity for implementation had to be built from scratch. Resources are limited, as is local expertise, and knowledge has mostly been acquired through experience, interaction with foreign experts (primarily through a couple of Twinning Light projects) and contacts made through the CCA.

9. Operators, as well as competent authorities don't have much experience in writing the SR, because we started with these activities a year ago.

10. There is a lack of qualified resources. This is a very specific technical field that usually requires specific training, not always available in *our country*. Regarding operators, they also have some difficulties, which obliges them to support themselves in consultancy companies.

4 7. What might you need in your country in order to work better with questions related to safety reports?

1. The official procedures for reviewing, examining and assessing SRs could be simpler. *Our country's* procedure is still too complex. It is a useful document for preparation of Seveso inspections onsite.

2. Guidelines and a training from experts!

3. More time and better guidelines.

4. 1) Templates and clear critera for all personnell evaluating SR's 2) Better guidelines for establishments.

5. There are a few qualified and experienced consultants, which are able to produce high-quality SR. The operators do not take enough care about SR, because of the lack of finance and time.

6. Additional training.

7. We have remodeled the way we deal with SR assessment following *a major* accident. The new system has been running for a year and it is too early to reach final conclusions on the effectiveness of the changes. We have a system of review and a business improvement plan in place. These will probably lead to further changes in the future.

4 7. What might you need in your country in order to work better with questions related to safety reports?

8. More guidance on how to write a Safety Report and more information on how to judge the requirement levels for the authorities. Especially concerning the scenarios in both cases.

9. Not sure - I think our guidance document is comprehensive.

10. Technical and financial assistance for training for Seveso inspectors.

11. Capacity building for operators and for competent authorities.

12. Permanent qualified staff.

Appendix 4: Guidance and checklists from different countries

Veiledning til utarbeidelse av sikkerhetsrapport for å oppfylle kravene i direktiv 96/82/EC med endringer i direktiv 2003/105/EC (Seveso II), Norway, available at: http://www.dsb.no/Global/Farlige%20stoffer/Dokumenter/Storulykke%20guidelines/EU-veiledning%20sikkerhetsrapport%20-%20norsk%20oversettelse.pdf

Kvantitative og kvalitative kriterier for risikoaccept, MiljØproject Nr. 112 (Qualititative and quantitative risk acceptance Criteria), Denmark, 1998, available at: http://www2.mst.dk/Udgiv/publikationer/1989/87-503-7938-0/pdf/87-503-7938-0.pdf

Afdækning af muligheder for etablering af standardværktøjer og/eller -kriterier til vurdering af sund-heds- og miljørisici i forbindelse med større uheld (gasudslip) på risikovirksomheder (Safety Risks - Gas accident), Denmark, 2007, available at: http://www2.mst.dk/Udgiv/publikationer/2007/978-87-7052-378-3/pdf/978-87-7052-379-0.pdf

Acceptance Criteria in Denmark and EU, Denmark, 2009, available at: http://www2.mst.dk/udgiv/publications/2009/978-87-7052-920-4/pdf/978-87-7052-921-1.pdf

A Guide to the Control of Major Accidents Hazards Regulations 1999 (as amended), UK, available at:http://www.hse.gov.uk/pubns/priced/l111.pdf

Preparing Safety Reports, UK, 1999, available at: http://www.hse.gov.uk/pubns/priced/hsg190.pdf

Health and Safety Authority Guidance Document Safety Report Assessment (Rev. 5), Ireland, 2006 available at: http://www.hsa.ie/eng/Your_Industry/Chemicals/Control_of_Major_Accident_Hazards/Assessment_of_Safety_Reports_Comah_Regs.pdf

Circulaire du 10/05/10 récapitulant les règles méthodologiques applicables aux études de dangers, à l'appréciation de la démarche de réduction du risque à la source et aux plans de prévention des risques technologiques (PPRT) dans les installations classées en application de la loi du 30 juillet 2003, France, available at: http://www.ineris.fr/aida/?q=consult_doc/navigation/2.250.190.28.8.12386/4/2.250.190.28.6.15

Controlelijst PBZO-document (Checklist Assessment MAPP), The Netherland Aandachtspuntenlijst VBS – Initiële inspectie (Checklist SMS), The Netherlands

Leidraad voor het opstellen van een veiligheidsrapport, Federaal Ministerie van Tewerkstelling en Ar-beid, Belgium, 2001

Guide pour rédiger un rapport de sécurité, Ministère fédéral de l'Emploi et du Travail, Belgium, 2001

DSB- hjelpedokument til gjennomgang av sikkerhetsrapport, versjon 1, Direktoratet for samfunnssikker-het og beredskap, Norway, 9/2008

Controlelijst voor de volledigheidsbeoordeling van veiligheidsrapporten (Checklist Completeness Safety Report), The Netherlands, 2008

Aanwijzingen voor implementatie van BRZO 1999 (PGS 06 BRZO Requirements SR Dutch), Publicatie-reeks Gevaarlijke Stoffen 6, VROM, 2008

Safety Report Assessment manual, UK, available at: http://www.hse.gov.uk/comah/sram/index.htm

Safety Report Assessment Guides, UK, available at: http://www.hse.gov.uk/comah/srag.htm

Guidance for Operators on the Review and Revision of Safety Reports, UK, available at: http://www.hse.gov.uk/comah/report-review.pdf

Safety Report Assessment Procedure for revised safety reports, UK, available at: http://www.hse.gov.uk/comah/guidance/assessment-inspection-procedure.pdf

Appendix 5: Seminar programme

European Commission

Committee of Competent Authorities: Mutual Joint Visit ('MJVs') Programme on Inspections under Seveso II directive

Workshop on the role of safety reports in preventing accidents

Tampere 7th –9th September 2011

Programme

Wednesday 7th September
Room Häggman

Time	Topic	Speaker
	Chair	Päivi Rantakoski, Finland
09:30	Welcome	Päivi Rantakoski/ Finnish Safety and Chemicals Agency (Tukes) Director, Industrial Plants Surveillance
9:40	Practical Information	Anne-Mari Lähde/Tukes Chief Safety Engineer, Process Safety
9:45	Main issues from participants' questionnaire	Leena Ahonen/Tukes Senior Safety Engineer, Process Safety
10:30	Roles and Responsibility: Who carries the can - safety engineer or line manager?	Graham Dalzell, EPSC
11:15	The role of safety reports in preventing accidents	Ismo Pentti/ Borealis AG Vice President -Health, Safety and Environment
13:30	MAHB's perspective on safety reports	Maureen Wood/ MAHB European Commision, Joint Research Centre, Ispra, Italy

13:45	Introduction to workshops	Ylva Gilbert Business Director HSEQ & Risk Management
14:30-17:00	Workshop (part 1)	All

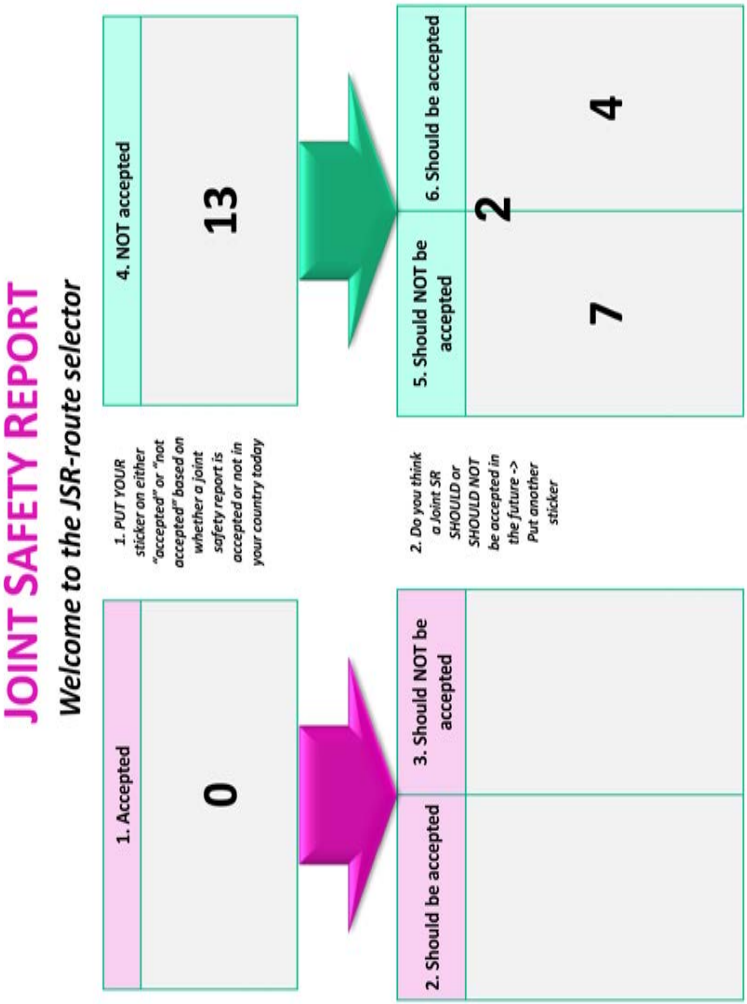
Thursday 8th September
Room Häggman

Time	Topic	Speaker
	Chair	Anne-Mari Lähde
9:00-10:00	Plenary meeting results from the workshop (part 1) discussion	5-minute presentation by each group
10:15	External emergency plans	Kristine Jousimaa/ Ministry of the Interior (Finland) Senior Engineer
10:45	Workshop (part 2)	All
13:30	Participants' experience in safety reports (10 minutes per person)	Claes Petersén, Sweden Dagmar Dräger, Germany (Hessen) Mark Burton, Great Britain Zuzana Machatova, the Czech Republic
14:45-16:30	Workshop (part 3)	All

Friday 9th September
Room Häggman

Time	Topic	Speaker
	Chair	Päivi Rantakoski, FInland
09:00-10:30	Plenary meeting results from workshops parts 2 and 3 discussion	15 -20 minute presentation by each group
11:00	Summary of workshop results and final discussions	Päivi Rantakoski/Tukes Director, Industrial Plants Surveillance

Appendix 6: Poster questions and results



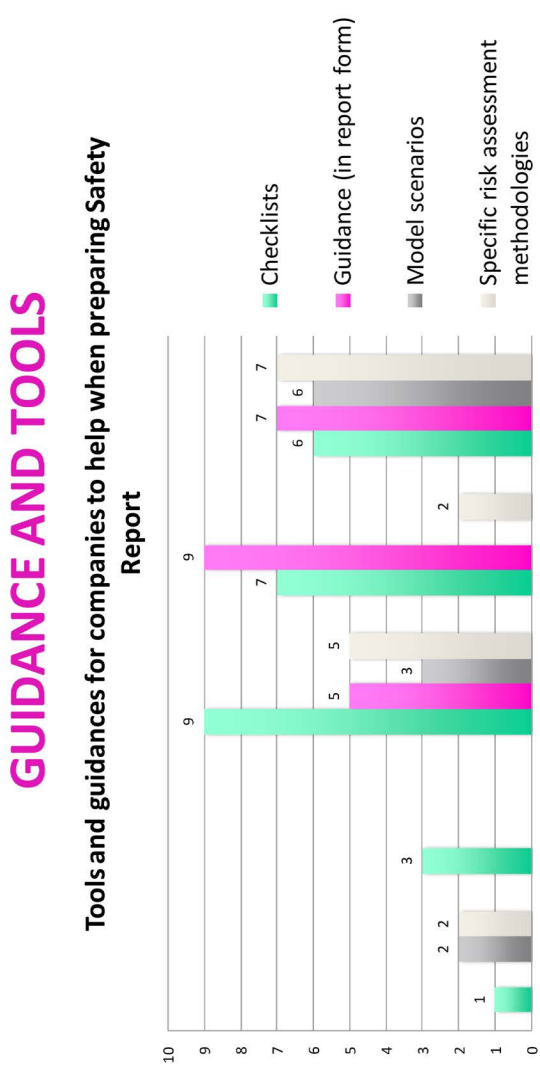
GUIDANCE AND TOOLS

Welcome to the GT-matrix

PUT a sticker in the box for each statement in the matrix you agree with!

	When we (authorities) evaluate the Safety Report...			Tools and guidances for companies to help when preparing Safety Report	
	...we don't use and do not need...	...we already use good ones..	...we have some, but need better...	We provide these	These are needed
Checklists	**1**	**3**	**9**	**7**	**6**
Guidance (in report form)			**5**	**9**	**7**
Model scenarios	**2**		**3**		**6**
Specific risk assessment methodologies	**2**		**5**	**2**	**7**

Appendix 6: Poster questions and results



Appendix 6: Poster questions and results

USING THE SAFETY REPORT

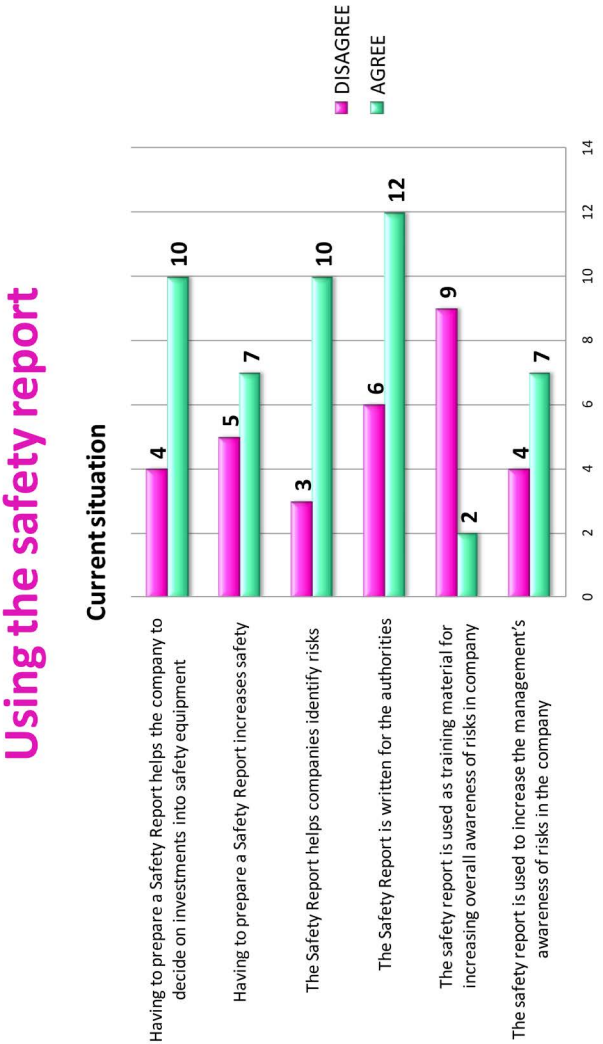
Welcome to the SR vote wall

Do you agree with the statements?
VOTE using the green or red stickers!

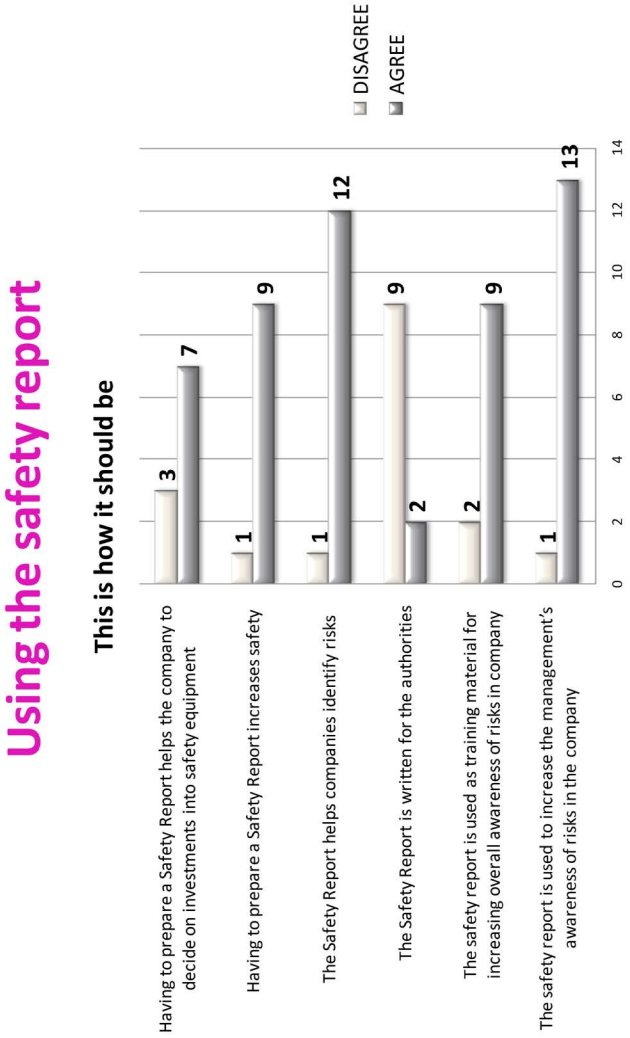
AG REE

DIS-AG REE

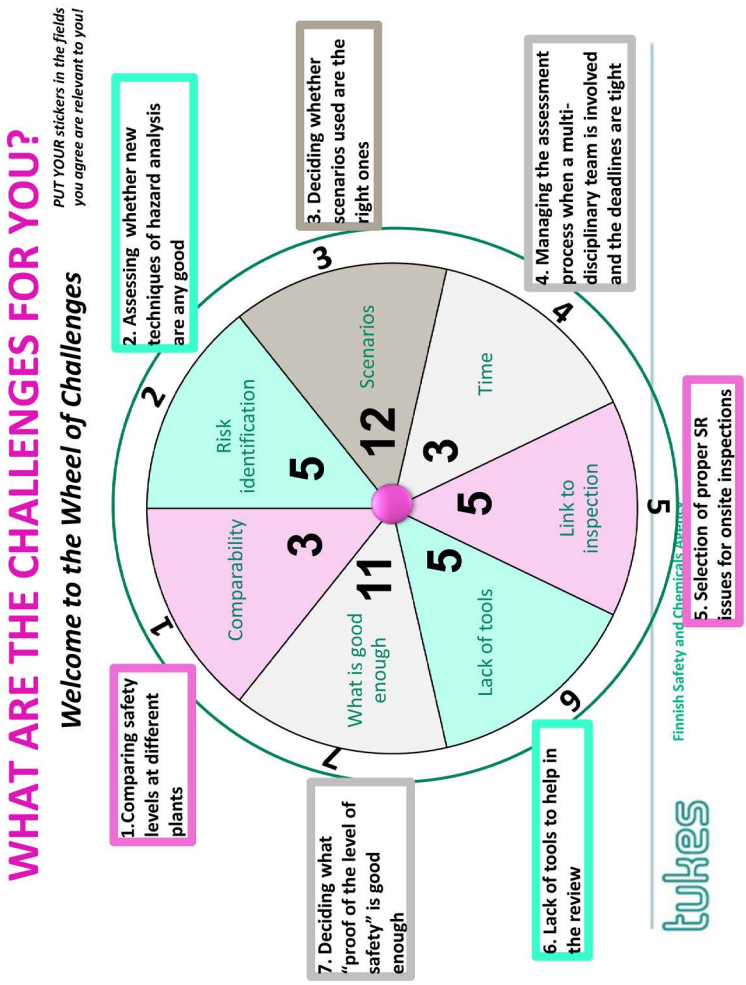
	Current situation	This is how it should be
The safety report is used to increase the management's awareness of risks in the company	Agree: 7 Disagree: 4	Agree: 13 Disagree: 1
The safety report is used as training material for increasing overall awareness of risks in company	Agree: 2 Disagree: 9	Agree: 9 Disagree: 2
The Safety Report is written for the authorities	Agree: 12 Disagree: 6	Agree: 2 Disagree: 9
The Safety Report helps companies identify risks	Agree: 10 Disagree: 3	Agree: 12 Disagree: 1
Having to prepare a Safety Report increases safety	Agree: 7 Disagree: 5	Agree: 9 Disagree: 1
Having to prepare a Safety Report helps the company to decide on investments into safety equipment	Agree: 10 Disagree: 4	Agree: 7 Disagree: 3



Appendix 6: Poster questions and results



Appendix 6: Poster questions and results



Appendix 6: Poster questions and results


WHAT ARE THE CHALLENGES FOR YOU?
Deciding what "proof of the level of safety" is good enough
11
Lack of tools to help in the review
5
Selection of proper SR issues for onsite inspections
5
Managing the assessment process when a multi-disciplinary team is involved and the deadlines are tight
3
Deciding whether scenarios used are the right ones
12
Assessing whether new techniques of hazard analysis are any good
5
Comparing safety levels at different plants
3
0
2
4
6
8
10
12
14

IN MY VIEW, SAFETY REPORTS....

Welcome to the SR billboard

WRITE your opinion on post-it and STICK it to the fence!

...would be more use for the company if...	....would be easier to review if...	...would make it easier to compare safety levels if...
1) the SR is used in a practical way and not only formally (a document for authorities)	1) The SR must have the exact same structure as Annex II in the directive	1) The companies use the KPI and SPI
2) The top managers will be more interested by the quality of SR and its appliance	2) It is important that SRs are "living documents". The changes on site and in surroundings (new neighbours) should be reflected in SRs as soon as they are occurring	2) The improvements in safety are highlighted
3) The managers understands that SR is a frame interface for integration with authorities in systematic way	3) There were requirements for describing the hazards and the consequences of them	3) We had common process safety indicators
4) staff, supervisors and directors would take part in preparing it		4) We had European commonly accepted guidelines for writing and examining safety reports
5) It requires a "cause & prevention" analysis, rather than an estimate of probability		5) Common thresholds for acceptability of risk (for fire, explosion, toxic release) and environmental effects
6) It required the company to have a hazard register as an internal document containing all major hazards. This would be the basis for managing hazards on a day to day basis and the basis for reporting the scenarios for the SR		

European Commission

Joint Research Centre – Institute for the Protection and Security of the Citizen
Seveso Inspection Series Volume 4
The role of safety reports in preventing accidents key points and conclusions:
A joint publication of the European Commission's Joint Research Centre and the Finnish Safety and Chemicals Agency (TUKES)

Ylva Gilbert, Jatta Aho, Leena Ahonen, Maureen Wood and Anne-Mari Lahde.
Luxembourg: Publications Office of the European Union
2012 – 138 pp. – 21 x 29.7 cm

Abstract
This expert report reflects conclusions and key points from two surveys and a workshop involving Seveso inspectors from around Europe on the role of safety reports in preventing major chemical accidents. The Seveso Directive requires operators of so-called "upper-tier" major hazard sites to submit safety reports detailing the major risks associated with the site and how they are controlled. Safety reports are the documents in which the operator of such a site demonstrates that the major accident prevention policy and a safety management system are in effect, that major accident hazards and risk have been identified and are adequately prevented and potential consequences limited, that adequate safety and reliability is incorporated in all aspects of the plant, and an effective internal emergency plan has been drawn up and implemented. A good safety report allows the authorities to get a clear overview of what could happen, how accidents are prevented and what is being done to ensure that if an accident occurred, the consequences can be minimised and a clear mitigation plan is in place. Ideally, the safety report should also be a dynamic, living document that helps companies control and take into account the potential for major accident hazards in various operational decisions. In many cases, the safety report is, however, still only a report compiled for the authorities. The report indicates that while there are many practical differences in how the Seveso II Directive safety reports are evaluated and used in inspections within the EU and its Seveso partner countries, the challenges are almost universal. Most challenges appear to be related to whether the safety report presents a coherent and convincing case that justifies the risk management decisions taken. The report describes the key challenges, providing several examples of good practice for improving safety reports (operators) and verifying safety reports during inspections (authorities). It also identifies a number of specific areas where it could be useful to develop common tools and solutions to improve overall effectiveness of safety reports as an active and useful mechanism for site risk management.

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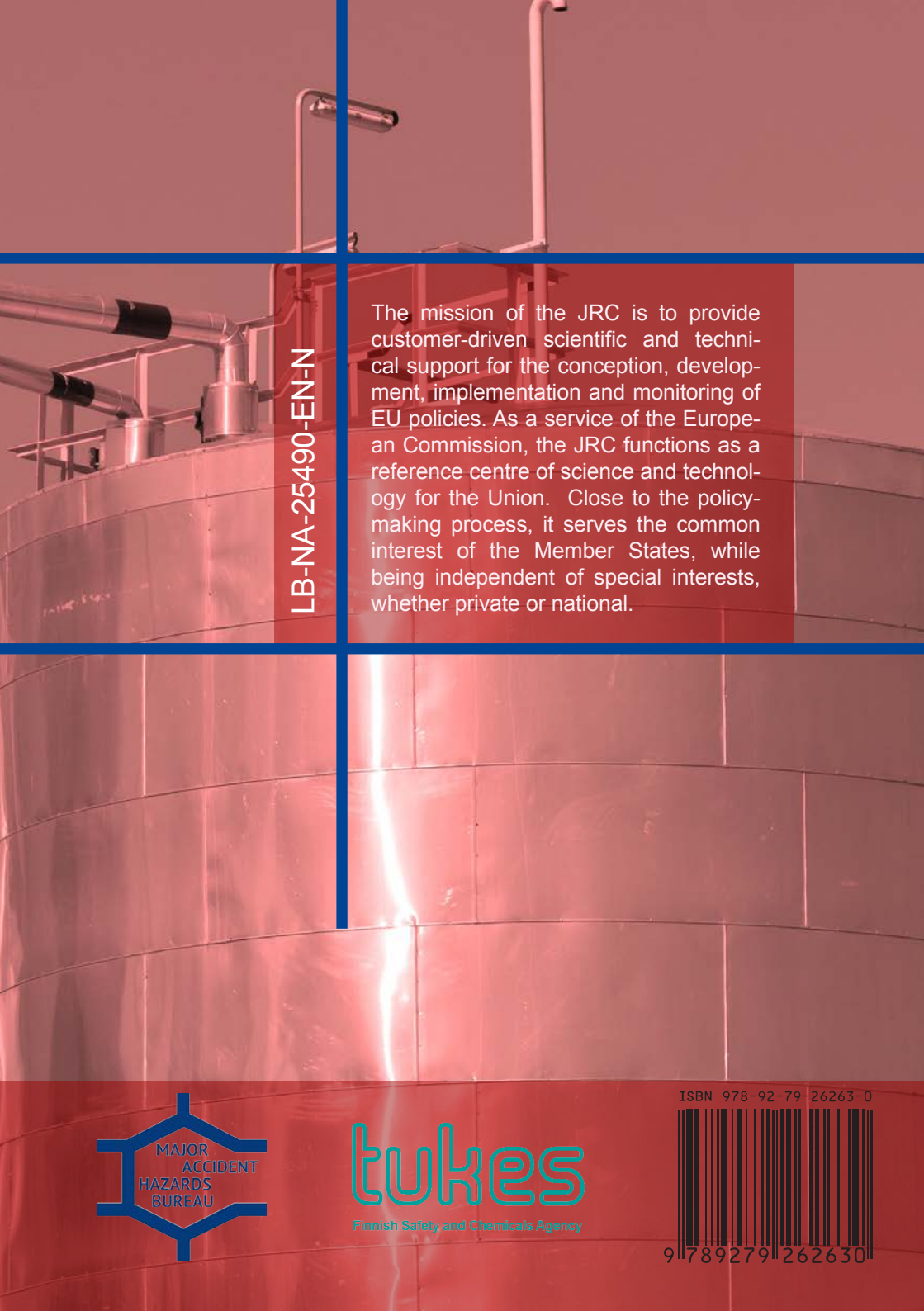

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