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Good Practices for the Management of Inspections at Hazardous Installations: Project Report (Case Studies)

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Good Practices for the Management of Inspections at Hazardous Installations: Project Report (Case Studies)

IOMC

INTER-ORGANIZATION PROGRAMME FOR THE SOUND MANAGEMENT OF CHEMICALS

A cooperative agreement among FAO, ILO, UNDP, UNEP, UNIDO, UNITAR, WHO, World Bank and OECD

Environment Directorate

ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT

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Foreword

This document presents the results from a project of the OECD Working Party on Chemical Accidents (WGPA)[1] that aims to share experience and good practices for the management of inspections at hazardous installations through the collection of case studies. Nineteen examples of good practices have been provided in the framework of this project through 2020 from eleven delegations: Austria, Canada, Estonia, Finland, Germany, Italy, the Netherlands, Norway, Costa Rica, the Major Accident Hazards Bureau of the European Commission's Joint Research Centre (JRC MAHB), and the United Nations Economic Commission for Europe (UNECE). Delegations were invited to describe a practice that has been particularly effective for managing inspections at hazardous installations, for example that has helped solve a particular problem or has improved a practice that is no longer useful/ effective/appropriate. This report highlights some of the common goals and issues that could be identified from the case studies collected, as well as a set of general conclusions drawn from them.

The report was prepared with the support of the delegation of Norway and of Members of the Bureau of the OECD WPCA: Rachel McCann, (United Kingdom), Roland Fendler (Germany), Pavel Forint (Czech Republic), Mark Hailwood (Germany), Kimberly Jennings (United States), Torill Tandberg (Norway), and Maureen Wood (European Union).

[1] In January 2021, the OECD Working Group on Chemical Accidents (WGCA) was renamed the OECD Working Party on Chemical Accidents (WPCA). For consistency, the new denomination is used throughout the document.

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Good Practices for the Management of Inspections at Hazardous Installations: Project Report (Case Studies)

Introduction

1. Inspections are a key element of the overall strategy that public authorities should establish for ensuring the safety of hazardous installations. Inspections allow to see whether relevant regulations, standards and practices are being met, whether safety management systems are in place and function appropriately (with respect to technical, organisational, and human factor issues), and whether safety documentation is valid. Another important benefit from inspections is that they provide a basis for public confidence in the safety of hazardous installations.

2. In 2020, the OECD Working Party on Chemical Accidents (WPCA) initiated a project, the objective of which was to collect **examples of good practices for the management of inspections** at hazardous installations and share common challenges. The OECD Guiding Principles on Chemical Accident Prevention, Preparedness and Response[2] advise that "*Public authorities should share information and experience, within countries and internationally, concerning methods and tools related to inspections, and also share the outcome of specific inspections. Efforts should be made to promote such activities on an ongoing basis, and develop mechanisms that could be used to facilitate information sharing."* The project was developed with the aim to support this principle and encourage the sharing of experience across countries in the framework of the WPCA, also taking into account activities in this area in other international organisations, in particular these of the Major Accident Hazards Bureau of the European Commission's Joint Research Centre (JRC MAHB).

3. A template was circulated to WPCA members in January 2020 to collect case studies. Delegations were invited to describe a practice that has been particularly effective for managing inspections at hazardous installations, for example that has helped solve a particular problem or has improved a practice that is no longer useful/effective/appropriate.

4. Cases were provided by the following delegations: Austria, Canada, Estonia, Finland, Germany, Italy, the Netherlands, Norway, Costa Rica, the JRC MAHB, and the United Nations Economic Commission for Europe (UNECE). Also documentation was shared by delegations to accompany the case studies, for example the checklists developed for inspections, etc.

5. The following section presents some of the common goals and issues that could be identified from the case studies provided. It is followed by a set of general conclusions drawn from the case studies on inspection regimes and a table that provides a short summary for each case study received.

[2] OECD (2003), Guiding Principles for Chemical Accident Prevention, Preparedness and Response – 2nd Edition, Series on Chemical Accidents No 10, https://www.oecd.org/env/ehs/chemical-accidents/Guiding-principles-chemical-accident.pdf

Common issues from the case studies

6. The case studies received as part of the project cover a range of different topics relating to the management of inspections at hazardous installations. The text section below intends to regroup common issues across countries and case studies.

Means for organisation and prioritisation of inspections – Risk-based inspection planning

7. One of the main issues that emerged from the case studies was how to prioritise inspections and make the best use of resources available, focusing on the less performing enterprises with regard to safety and allowing for more in-depth and focused inspections where it is the most necessary. Often a risk-based approach is chosen, with the support of structured tools, for example evaluation forms, and inspectors are asked to evaluate enterprises against specific criteria. The results of these inspections combined with different elements linked to the risk, hazard and safety status of the plant help to determine a plan for the frequency of inspections. This approach was seen as very valuable when limited resources are available and there are multiple regulations to enforce. It requires specific training of inspectors during its implementation, and some case studies raised the fact that it may initially appear as an extra burden for inspectors. But being able to focus the work where it is the most necessary, finally makes the day-to-day work more efficient and meaningful. The case studies raised the importance of a close cooperation with inspectors in the establishment of this system to make sure the evaluation is practical to perform. Some case studies mentioned the importance of having performance indicators to regularly assess the approach and being able to integrate emerging risks and innovation in the evaluation. Also it was highlighted that the plan established for the frequency of inspections should stay flexible enough to respond to, for example, regional specificities, accidents, etc.

8. Examples of risk-based type inspections systems can be found in the case studies from Canada, Finland, Netherlands and Norway.

9. The case studies from Germany and Italy provide insight to the organisation of inspections, the prioritisation, coordination and how the inspections are structured.

10. A case study provided by the JRC and the UNECE presents the results of a survey conducted across European Union (EU), European Economic Area (EEA) and UNECE countries on the hazard rating systems they use in inspections associated with monitoring and enforcement of major chemical hazard sites under the Seveso Directive and similar legislation.

Performing inspections in more efficient manner and for a better quality output

IT and electronic tools

11. Some countries presented as a case study the Information Technology (IT) and electronic tools that they have developed to facilitate the work of inspectors and to perform inspections in a more efficient manner. For example, Norway reported the development of a Joint Database (called FTD) aiming at facilitating the coordination of inspections across different authorities so that each can have access to an overview of the planned and performed inspections, and also access to all inspection reports. Developing such a database was not without challenges, in particular technical ones, but also showed clear benefits for coordinating and planning the content of inspections across different authorities. More details about the database, challenges and benefits are described in the case study prepared by Norway.

12. Estonia presented in its case study an electronic medium that is being developed to facilitate the work of inspectors in processing safety-related documents (e.g. notifications, safety reports, external emergency plans). The quality and content of the safety documents submitted very much vary, which creates a significant burden on inspectors when being reviewed, and there is no mandatory form for submission. With this new system, documents would be submitted into an electronic medium where they could be processed and information shared on approval and actions underway. The technical difficulties of setting up such a system were raised, but also the significant benefits with documents that will be more easily trackable, in a clearer format with the use of pre-defined fields. More details about the development of this e-medium is in Estonia's case study. Netherlands is also developing a new national approach to inspection of hazardous installations that will rely on the development of a new software able to process data used in the preparation for inspections.

13. Finland shared their experience in performing certain inspections remotely with the use of IT services. These remote inspections are only possible under specific criteria, for example if the operator and site are well known, if no major accidents or near misses occurred lately, and no significant changes have been made on the site. The full list of criteria can be found in Finland's case study. These remote inspections have been put in place at the request of industry and to save resources. Some of the benefits are that authorities do not have to travel to the site, saving working time, leaving more time for risk-based surveillance, allowing for key persons (from the company and authorities) to take part in the inspection for a short moment only. The case study also raised some challenges such as technical issues with the connection, and security issues.

Structured forms, checklists, questionnaires

14. Many of the case studies reported the development of tools in the form of checklists or questionnaires to facilitate the work of inspectors. These also facilitate the writing of more structured and clearer reports from inspections that can eventually be shared with industry. For example, the Costa Rican Fire Department developed a specific tool to carry out Liquefied Petroleum Gas (LPG) inspections. This tool contains the risk levels for each of the aspects evaluated, enabling the inspector to assess each point according to its compliance: "Complies", "Does not comply", or "Does not apply". In the Netherlands, as part of the development of a new national approach for inspections at hazardous installations, checklists of points of attention have been developed for inspectors. These checklists aim for a more structured data collection and better monitoring and assessment of whether establishments are in control of the safety standards that they are required to meet. This means not only looking at documentation and internal management procedures, but also seeking for technical evidence. Checklists are already available for assessing domino effects, safety reports, and emergency organisations.

15. In the state of Baden-Württemberg, Germany, a structured form for inspections has been developed in an attempt, as far as possible, to achieve a uniform inspection process across the four regional government offices. The first version of this was developed in 2000, and has been updated and amended in the light of past experience. The document has been created as a MS-Word template so that every inspector can easily use it. A description of the tool is available in the relating case study. This standardised form allows not only for a process-orientated approach that provides for a robust documentation of the legally compliant execution of the inspection, it also generates an inspection report for the operator of the establishment.

16. Finland reported the use by the Finnish Safety and Chemical Agency of a set of pre-defined questions that is sent, together with an agenda, to the operators in advance of an inspection. Answers can be reviewed in more details during the inspection, and are also

used in the inspection report. The case study highlights the great benefits of this practice and positive feedback from operators. Operators are well prepared for the inspection, which allows for more time for the site walk-through for example. If writing the agenda and questions requires additional preparation, the inspections are seen as more efficient and reports easier to develop.

17. In Italy, a specific "Coordination Table of Seveso Competent Authorities under the Italian Ministry of the Environment" has been established to ensure an homogeneous application of the Seveso Directive in the whole country. The Coordination Table ensures, through working groups, the definition of guidelines concerning aspects of common interest, and allows a joint examination of themes and questions to ensure a coordinated approach.

18. Norway provided a case study on the establishment of a system to perform inspections for enterprises with multiple Seveso plants in a more efficient manner. Following inspections of such companies, the non-conformities identified in the inspected sites are expected to be followed up in all other plants by the enterprise itself. The Coordinating Committee for Seveso in Norway developed criteria for performance of inspections with enterprises, and also a template for evaluation of audit frequency for the enterprise and its underlying Seveso-sites.

Qualification and training of inspection personnel - Ensuring the proper competencies and skills for inspectors and inspection teams

19. Having the appropriate training and skills in a team of inspectors was expressed as a critical issue in many of the case studies received. The case study from Austria highlights that with the digitalisation of sites, having IT specialists or inspectors with IT competencies is important. Canada dedicated a case study on an informal mechanism that has developed at Environment and Climate Change Canada (ECCC). At ECCC there is an Enforcement Branch that serves every programme, as inspectors cover multiple subjects and do not necessarily have the same familiarity with the different regulations under each programme, and may not necessarily have a scientific education. The case study shows how enforcement officers can bring along, on inspections, scientific compliance promotion officers who are tied to the programme that manages the regulation, or reach out to them after the inspection. The case study of the state of Baden-Württemberg, Germany, reports a similar mechanism. In addition to the technical staff, the inspection authorities have legal and administrative employees who often work with teams of inspectors. To support the Baden-Württemberg inspectors in the implementation and enforcement of the Seveso III Directive, a small unit of the State Institute for the Environment provides advice, training and support on questions related to chemical process safety, and in particular for the investigation of incidents.

20. The case study provided by Costa Rica shows how the Costa Rican Fire Department has been actively involved in the inspections carried out at establishments with LPG systems, in technical collaboration with the Ministry of Health, and developed a tool with the aspects required in regulations to standardise LPG inspections. Regarding training of inspectors, officials from the Costa Rica Fire Department with high expertise on LPG systems trained inspectors from the Engineering Unit. The Costa Rican Fire Department requested the support of the National Learning Institute (INA) to reinforce the training of their inspectors, in accordance with the Executive Decrees. The INA is one of the entities in charge of establishing the technical training programmes related to LPG at national level. The Engineering Unit, together with the Federated College of Engineers and Architects of Costa Rica (CFIA), has also collaborated in the training of external LPG technicians who are also entitled to proceed with inspections.

21. In Italy, an initiative was developed to support collaboration and coordination between Seveso and IED-IPPC environmental inspectors. This initiative has shown interesting improvements in order to achieve inspection objectives (both for Seveso and IED-IPPC inspections) and to prevent and reduce environmental risks. For example, the application of Best Available Techniques (BAT) requires industrial facilities to define a Leak Detection and Repair programme (LDAR), which allows the monitoring and containing of fugitive emissions.

22. Across case studies the importance was raised of a regular training for inspectors, and in particular when new systems are being put in place.

Management of resources

The importance of cross agencies/authorities collaboration

23. A number of the case studies raised the importance of cross agencies/authorities coordination for the development of inspection plans. The Netherlands is developing a new national approach for inspections at hazardous installations. One of the main goals is to design a uniform and coordinated inspection approach in all regions and across inspectorates, while respecting regional specificities and different responsibilities. Costa Rica reported how inspections of LPG systems at national level have been strengthened through the application of two Executive Decrees. The case study highlighted the importance for new regulations such as those to be elaborated within an inter-institutional committee, in order to take into consideration the responsibilities and interests of each institution involved. In Norway, four national authorities contributed to the development of a joint database for inspections. As lesson learnt from thi database development, the case study raised the importance for all inspection authorities to be involved in this type of project with equal commitment of all parties. The case study from Italy highlighted that the coordination amongst different authorities for inspection activities has allowed to take advantage of the different skills and knowledge of individual inspectors (e.g. in fire prevention, environmental protection, safety at work).

Campaigns to address specific needs

24. Some of the case studies reported the development of specific campaigns to address particular issues and needs. Two cases from Norway provided such examples. The first one was an annual nationwide inspection campaign for all local fire brigades. The majority of establishments handling hazardous chemicals in Norway are not under the Seveso III Directive, and therefore not inspected by the DSB (the Norwegian Directorate for Civil Protection) but by the local fire brigades. This was a change that came into force in 2009, and at that time the local fire brigades were not used (and often did not have the competency) to inspect sites handling hazardous chemicals. As a result, after 2009, fewer inspections were performed in these sites. To improve the situation, the DSB decided to arrange an annual nationwide inspection campaign for local fire brigades with the hope to enhance local competency regarding dangerous substances, and to increase the amount of inspections in areas where challenges had been identified (for example refrigerating plants using ammonia, different sites using LPG, moveable container filling stations for fuel, filling stations for LPG). The second case described a particular campaign targeted at smaller explosive storage sites. The DSB received information about challenging safety and security at small and medium-sized explosives storage sites, but did not have capacity to perform the necessary follow-up and inspections. A team of two persons working as blasters were temporarily engaged by the DSB for one year to perform unannounced inspections all over Norway.

25. In the context of the application of two new decrees for reinforcing the safety of LPG systems in Costa Rica, prevention campaigns have been developed through the official website with illustrative videos, to create awareness in the population about the importance of maintaining a LPG system that complies with the provisions of the regulations. Also, the information provided contains recommendations relating to the prevention, human security and fire protection, which are necessary to avoid emergencies in homes, businesses or companies. The Costa Rican Fire Department will continue with national awareness campaigns on the handling of LPG and to promote the installation of safe LPG systems.

Mechanisms to facilitate exchanges amongst inspectors across countries

26. One case study described the goal and functioning of the EU Technical Working Group for Seveso Inspections (TWG 2), managed by the Major Accident Hazards Bureau of the European Commission's Joint Research Centre. Controlling major chemical hazards is a communal responsibility, and the effectiveness of these controls depends on access to the collective knowledge of the community. For over 15 years, the TWG 2 has fostered the pooling of knowledge acquired within the EU competent authorities for inspection of major chemical hazard sites, to verify and motivate compliance with good risk management practices in accordance with the obligations imposed by the EU Seveso Directive. A detailed description of the operation of the group, its outputs, benefits and lessons learnt from its functioning is available in the case study.

Other good practices

Inspections of LPG systems – implementation of amendments/new regulations

27. Two case studies specifically focused on the development of new regulations to reinforce inspections of LPG systems. In Québec, Canada, amendment of a regulation has been made to expand the inspection for certain natural gas and propane storage or distribution plants. Storage or distribution plant safety standards were rather for within the property lines of a plant. The amendment brought to the regulation was to make sure that safety is also considered and insured in the neighbourhood of a plant, for both new and existing plants of LPG of over 5000 USWG (United States Water Gallons) and 4.5 metric tonnes and over.

28. In 2020, the Costa Rican Fire Department has attended 959 emergencies related to leaks of LPG. Since 2008, the Costa Rican Fire Department has collaborated with other institutions such as the Regulatory Authority for Public Services (ARESEP), the Costa Rican Petroleum Refinery (RECOPE), the Ministry of Environment and Energy (MINAE) and the Ministry of Health, in the development of measures that ensure security throughout the LPG distribution chain. As a result of these efforts, in 2018 the government enacted two Executive Decrees, which allowed for the reinforcement of inspections of LPG systems. Since 2018, the Fire Department has carried out 1440 LPG inspections.

General conclusions and lessons learnt

29. Inspections are a critical element in ensuring the overall safety of hazardous installations. The subject is covered in the OECD Guiding Principles of Chemical Accidents Prevention, Preparedness and Response [2nd Edition, Sections 3a & 3c] [3]. The collected case studies underline the importance of inspections, the need for the development of various inspections methodologies and to make inspections more efficiently performed. Some of the conclusions and lessons learned from the case studies are:

- Inspection activities require a structure to allow targets to be met with the available resources. This can be achieved through an inspection programme;
- Inspection programmes may require specialised training to address individual specific goal;
- Inspection programmes benefit from the provision of tools to assist the inspectors in the execution of their work. These tools may present the pertinent points which should be addressed in an on-site visit. For a targeted inspection focused on a particular technology or process, tools provided might describe the technical and organisational requirements, suitable methods for addressing and managing the risks associated with the technology, lessons learned from accidents, catalogues of questions and checklists. Tools may be useful for the performance, documentation and reporting of the inspection activity whether on paper, as an electronic document or through a database;
- Planning and preparation enable the inspectors to deliver better results;
- Cooperation and coordination between relevant authorities should ensure the easier organisation of inspection activities taking account the risks associated with the site, and help to perform inspections in a more efficient way;
- Inspections campaigns are targeted and efficient methods for both authorities at all levels (local, regional and national) and industry. Inspection campaigns may cover topics such as: implementation of new regulation; ensuring that the lessons learned from accidents are implemented across an industrial sector; new technologies (e.g. anaerobic bio-gas plant) are addressed in a systematic and uniform manner across a region or jurisdiction.

Summary of the case studies

30. This section provides a table with a short summary of each of the case studies received per country/institution. Should the reader be interested in accessing the full text of the case studies or wish to have more information about specific ones, the OECD Secretariat can be contacted at: EHS.Contact@oecd.org.

[3] OECD (2003), Guiding Principles for Chemical Accident Prevention, Preparedness and Response – 2nd Edition, Series on Chemical Accidents No 10, https://www.oecd.org/env/ehs/chemical-accidents/Guiding-principles-chemical-accident.pdf

Country/ organisation	Subject of the Good Practice	Short summary
Austria	Lessons learnt from inspections	This case study describes the results of three cases of inspection. The first brings to the fore the role of inspection and collaborative work following an inspection to resolve difficult technical issues, in this case finding a solution to increase safety at a large ammonia tank located nearby a city. The second shows the increasing importance of having IT specialists, or inspectors with IT competencies, as part of the inspection team with the increasing digitalisation of sites. The third case highlights the importance for inspectors, in some instances, to be able to take stringent measures following an inspection.
Canada	Scientific compliance officers to accompany enforcement officer when performing an inspection - Having the proper expertise when performing inspections	At Environment and Climate Change Canada (ECCC), there is an Enforcement Branch that serves every programme within ECCC, having multiple subjects to cover. Enforcement officers do not necessarily have the same familiarity with the different regulations under each programme, and may not necessarily have a scientific education. When enforcement team performs inspections, they may not always have the expertise to thoroughly look at possible non-compliances. The case study shows how, as an informal mechanism, enforcement officers can bring along for an inspection a scientific compliance officer that is tied to the programme that manages the regulation.
	Risk based inspection planning	ECCC administers a broad range of laws and regulations. No enforcement programme can be everywhere, all of the time, and the Enforcement Branch needs to make choices about where to allocate finite resources. One of these choices is breadth of coverage versus depth of impact. The case study relates to improvements that were done with the development of a risk-based inspection framework that helped to prioritise inspections.
	Technical Risk Assessment Reports for certain natural gas and propane storage or distribution plants - Amendment to Québec Regulation	This case study relates to the amendment of a regulation in Québec to expand the inspection for certain natural gas and propane storage or distribution plants. Storage or distribution plant safety standards are rather for within the property lines of a plant. The amendment brought to the Regulation is to make sure that safety is also considered and insured in the neighbourhood of a plant, for both new and existing plants of LPG of over 5000 USWG and 4.5 metric tonnes and over. Some of those plants have been embedded in the urban tissues and have the potential to create a catastrophe been so close to the general public.
Estonia	E-service/electronic medium to all Seveso and non-Seveso establishments	In the area of chemical safety, companies have to submit a variety of documents: notification, risk assessment, safety report, safety management systems and external emergency plans. Documents are submitted for approval to the competent authorities (Estonian Rescue Board and The Consumer Protection and Technical Regulatory Authority) as a Word or pdf file. There are no standardised forms for receiving the documents, and the quality of what is received varies very much. Officials have to review all these documents, which creates a significant burden. This case study shows how, to optimise the work, a system was created for the submission of chemical safety documents into an electronic medium.

Finland	Agenda with several questions sent to the operator before an inspection	This case study describes a practice of the Finnish Safety and Chemical Agency (Tukes) that is to send an agenda with several questions to the operator in advance of an inspection. Answers can be reviewed in more detail during the inspection and are used in the inspection report. The case study presents the benefits, challenges and lessons learnt from this practice.
	Remote inspections	This case study describes a practice of the Finnish Safety and Chemical Agency (Tukes) to perform remote inspections with a mix of a “normal” inspection but conducted remotely, and the request to the operator for specific photos of the site prior to the remote inspection. The case study presents the benefits, challenges and lessons learnt from this practice.
	Risk-based inspections	This case study describes the risk-based inspection system that is being used by the Finnish Safety and Chemical Agency (Tukes) to prioritise inspections. The risk-based inspection system is established on multiple factors: inspection results, the technical risk value of the plant, and its safety status. The case study presents the benefits, challenges and lessons learnt from this practice.
Germany	Structured Inspections	This case study describes the organisation of inspections in the State of Baden-Württemberg. Notably, the use of clear criteria, i.e. upper-tier establishments at least yearly and lower-tier establishments at least every three years, instead of a “risk-based inspection frequency” approach, and the development of a form to facilitate the work of inspectors and bring a more structured and uniformed approach to inspections.
Italy	Planning, organising and conducting Safety Management System (SMS) and Environmental inspection activities in Italian Seveso and IED-IPPC establishments	This case study describes the organisation of the inspection system for Seveso and IED-IPPC establishments in Italy, taking into account national specificities - more than 1000 Seveso establishments, different in size and activity. It describes how the inspection planning is determined and inspections are prioritised, key aspects of inspections, tools that have been developed to support the work of inspectors and means to facilitate coordination and cooperation.
Netherlands	National approach for inspections at hazardous installations	This case study describes a new national approach that is being developed with the aim to expand and update the existing inspection method in such a way that it enables a uniformed and coordinate approach for inspections in all regions and inspectorate bodies, still taking into account regional specificities. The case study also relates to the development and use of focus lists to support inspectors in conducting inspections, providing a more structured approach.

Norway	Risk-Based Inspection Intervals - Individual Inspection Plans for Seveso Establishments	This case study shows how Norway has established a system to perform inspections for Seveso establishment in a more efficient manner. In Norway all inspections shall be risk based, but according to the Seveso II and III Directives there shall be annual inspections in upper-tier sites, and inspections every 3 years (4 years with Seveso II) in lower-tier sites. Some establishments perform very well, and do not need as frequent inspections. This frequency for lower-tier sites was also difficult to maintain. The Norwegian Coordinating Committee for Seveso developed templates for evaluation of inspection frequency for upper-tier sites. The inspectors were asked to evaluate the establishments during their inspections, and fill in the evaluation form. The form was to be sent to the Coordinating Committee, and the agreement was that providing all authorities in the coordinating Committee agree, the inspection frequency for the establishment would be changed.
	Inspection of Enterprises with many Seveso Plants	This case study shows how Norway has established a system to perform inspections for enterprises with multiple Seveso plants in a more efficient manner. Following inspections of enterprises with multiple Seveso plants, the non-conformities identified in the inspected plants are expected to be followed up in all other plants by the enterprise itself. The Coordinating Committee for Seveso in Norway developed criteria for performance of inspections with enterprises, and also a template for evaluation of audit frequency for the enterprise and its underlying Seveso-sites.
	Country wide Inspection Campaigns	The majority of establishments in Norway handling hazardous chemicals are not under Seveso III Directive, and therefore not inspected by DSB (the Norwegian Directorate for Civil Protection), but by the local fire brigades. This was a change that came into force in 2009, and at that time the local fire brigades were not used to, and often did not have the competency to inspect sites handling hazardous chemicals. Therefore, after 2009 fewer inspections were performed in these sites. This case study shows how DSB arranged an annual nationwide inspection campaign for all local fire brigades.
	One year Inspection campaign targeted at smaller Explosive Storage Sites	This case study describes a particular campaign targeted at smaller explosive storage sites. DSB received information about challenges regarding safety and security at small and medium-sized explosives storage sites, and did not have capacity to perform the necessary follow-up and inspections. A team of two persons working as blasters were temporarily engaged by DSB for one year to perform unannounced inspections all over Norway.
	Joint Database (FTD) on HSE Inspections	This case study describes the development of a joint database for inspections (in the year 2000). This database was trying to solve a problem that Norwegian Industry Associations pointed out to the authorities regarding lack of coordination of inspections in industry. It was pointed out that the burden on industry was large, because authorities had no coordination regarding the timing of inspections, that often the same areas within the plants were inspected, and that there was little or no knowledge of the results of each other's inspections. The database called FTD was established in order to improve this situation, and to make it easier for the authorities to get an overview of planned and performed inspections, and access to inspection reports.

Costa Rica	Inspection of Liquefied Petroleum Gas at national level through the application of Executive Decrees N° 41150 MINAE-S and N° 41151 MINAE	This case study describes the implementation of new regulations for the inspection of LPG systems and the development of a specific tool to support inspections at establishments with LPG systems. This tool contains the risk levels for each of the aspects evaluated, enabling the inspector to evaluate each point according to its compliance. The case study also shows how the training of inspectors has been reinforced to address the specificities of LPG systems.
JRC MAHB	Good Practice Exchange across Countries – The EU Technical Working Group for Seveso Inspections (TWG 2)	This case study describes the goal and functioning of the EU Technical Working Group for Seveso inspections (TWG 2), managed by the Major Accident Hazards Bureau of the European Commission's Joint Research Centre. This case is provided because it can be easily adapted to country level as a mechanism for continually improving the effectiveness of inspections, to raise competence of inspectors and identify and address new challenges. It helps to support common approaches across countries in the same region and within countries where the inspection function is decentralised across different regions and ministries.
UNECE - JRC MAHB	Hazard Rating Systems in EU and UNECE countries	This case study highlights the results from a survey that was conducted soliciting responses from EU, EEA and UNECE countries on the hazard rating systems they use in inspections associated with monitoring and enforcement of major chemical hazard sites under the EU Seveso Directive and similar legislation. The findings from this effort were summarised in the joint EU-UNECE publication *An Overview of Methodologies for Hazard Rating of Industrial Sites,* published in 2016.