Slovenian approach in taking over the SEVESO II directive

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Abstract

Slovenia is approximating to the European Union. Regarding harmonisation of environmental legislation there are several topics which deserve special attention. These are environmental health, integral pollution and prevention control, and industrial accidents.. Due to the lack of consistent regulation on these topics at national level, a question of appropriateness of direct taking-over and adopting European legislation was raised. An example of such discussions is the SEVESO II Directive.

This paper presents results of the study performed by the Institut "Jožef Stefan" in 2000. The study explored philosophy and the context of SEVESO II Directive and potential differences in its understanding between European Union and Slovenia. The main focus was on the analysis of the history and development of Annex I to the Directive, and its content: a list of dangerous substances and qualifying quantities for the application of articles 6, 7 and 9 of the Directive. In addition we interpreted relevance of the properties of the listed substances as a source of hazards, importance of site and demographic situation when evaluating migration and/or accumulation of released pollutants, exposure as a key factor for human health damage, and environmental valuation in the context of creating environmental policy. As special addition to this analysis we made a sensitivity analysis in which we explored how much the number of installations, for which the Directive applies in Slovenia, changes due to changing qualifying quantities for the application of articles 6, 7 and 9 of the Directive. We got the following results: variation of this number is between 29 and 62 when changing qualifying quantities between factors 1 and 0.1.

Based on study results we proposed to the Administration of the Republic of Slovenia for Civil Protection and Disaster Relief, which was the commissioner of the study, to adopt SEVESO II Directive as it is. The parallel

recommendation was to continuously work on building safety culture in Slovenian industry.

1 Introduction

European Union (EU) as well as Central/Eastern European countries have to face challenges and problems of over increasing dimension and complexity from a wide range of disasters and emergencies, many of them arising from technological hazards. Recent examples include the cyanide spill in Romania and the fireworks explosion in the Netherlands. There is no doubt that major accidents involving loss of life, health consequences, material and environmental damage will continue to occur throughout Europe/World. In order to cope with hazards from industrial installations and reduce risks a systematic approach enframed into legislative enforcement has been developed in the EU after the accident in 1976 in pharmaceutical industry in Seveso, Italy. In this accident several kilograms of dioxins were emitted into the atmosphere. Six years later the so called Seveso Directive 82/501/EEC has been adopted. In 1996, considering development and additional needs for controlling hazards and health risks from industrial installations the European Council adopted Seveso II Directive (96/82/EC) as the key element of European legislation on the control of major-accident hazards involving dangerous substances. It entered into force in February 1997 and gives the Member States of the EU a two years transposition period to implement its requirements in their national legislations (Kirschsteiger [1,2]).

Slovenia is in the process of approximation to the EU which encompasses harmonization of legal framework – *aquis communitaire*. In terms of environmental legislation, an issue of transposing Seveso II Directive appeared. A question has been raised about the need of making certain modifications to the Directive before adopting it. The responsibility about this specific issue is split between the Ministry of Environment and the Ministry of Defence where the Ministry of the Environment covers the topics related to hazards, risk evaluation and licensing while emergency planning is in the domain of the Administration of the Republic of Slovenia for Civil Protection and Disaster Relief which operates under the Ministry of Defence. In 2000, the named administration prepared a draft of the Decree on emergency planning associated with accidents which involve dangerous substances basing it on the Seveso II Directive, particularly its Annex 1. The mechanism of determining those who are obliged to make emergency plans according to this Decree is the qualifying quantities similar to those in Annex I of the Seveso II Directive. Before adopting the Decree the Administration wants to resolve the following questions/dillemas:

- Will there be included all Slovenian establishments where major accidents could occur by applying qualifying quantities as they are in Annex I of the Seveso II Directive?

- Is there any reason to adapt/modify the qualifying quantities in Annex I of the Seveso II Directive before adopting them in Slovenia? What would be benefits/pitfalls of such modifications?

The Administration of the Republic of Slovenia for Civil Protection and Disaster Relief together with the Office for Risk Management at the Ministry of the Environment commissioned a study to examine these questions and give recommendations for resolving the dillemas. The study has been done by the Institut "Jozef Stefan" Ljubljana, Slovenia.

2 National implementations of the Seveso II Directive in EU

Regarding transposition of the Seveso II Directive into national legislation, particularly Annex I and the qualifying quantities there in, there are two basic components to be considered. One is risk evaluation and reporting (risk assessment & safety report) while the other is emergency planning with effective and complete information system. In reference with the first one the situation in some European countries and Slovenia is as follows (for details see Kirschsteiger [2]):

In the United Kingdom, probabilistic safety assessment is not mandatory in the safety report. However, the Health & Safety Executive may find it easier to accept conclusions, which are supported by quantified arguments. A quantitative assessment is also convenient way of limiting the scope of the safety case by demonstrating either that an adverse event has a very remote probability of occurring or that a particular consequence is relatively minor.

In the Netherlands, different requirements are imposed by legislation according to whether worker safety or that of the general public is at issue. The occupational safety report must include a descriptive identification of hazards, organisational information and on-site emergency information. The report is established in close collaboration between representatives of the Ministry of Labour and the industry. External safety is on the other hand the responsibility of the Ministry of Housing, Physical Planning and the Environment. The external safety report is based on a full QRA.

In France, the licensing application is subject to a public enquiry. Only in certain particularly "risky" situations, an independent assessment is required or the analysis of particular hazards. Since no account is given of probability even certain rather improbable scenarios are fully evaluated and depicted in the report.

Italy has issued detailed guidelines not only for the compilation of the safety reports, but also for the "safety declaration" which is required for installations involving inventories of hazardous substances below the notification obligations.

In Germany, there is a mandatory licensing procedure, based on a deterministic philosophy, which implies that a safe facility will have practically zero risk, which can be achieved by adequate design of redundancies in the safety barriers (hardware and procedures). Therefore, the safety report is

essentially limited to the identification of possible hazards and a description of measures taken to prevent failures or to contain their consequences within the establishment (i.e., facility).

In Slovenia, there is a requirement for submitting risk assessment as a part of environmental impact report. Risk assessment can be both, quantitative and qualitative. Environmental impact report is obligatory in the licensing procedure. In addition, industry (in the whole context of dealing with hazardous materials) will be required to obey the SEVESO II Directive – this regulation is to be adopted in 2001.

Other countries in the European Union follow practices similar to the above but with a flexible scheme in the adoption of reliability and quantitative risk estimates. It is important to recognise both probabilistic and deterministic approach in evaluating risk as a background for the overall safety philosophy. This, eventually, influences the specific qualifying quantities. As a general rule it can be accepted that the probabilistic approach tolerates higher amounts of dangerous substances in the establishments than deterministic one.

With regard to emergency planning and information systems (especially in regard with informing the public about hazards and potential risks) the establishments are obliged to follow certain procedures and are accordingly classified into three groups based on qualifying quantities in Annex I of the Seveso II Directive. For this classification there exist lower and upper tier which define when an establishment is excluded from further administrative consideration and has no specific obligations – these are establishments which deal with dangerous substances at quantities below lower tier; when an establishment is obliged to notify the responsible administration about handling, storing, producing, transporting, etc., certain dangerous substance(s) without presenting a specific safety report – in this group are establishments which deal with dangerous substances at quantities between lower and upper tier; and when an establishment has to make and submit a safety report and an internal emergency plan. Internal emergency plan needs to be consistent with the external one. With these documents the establishment demonstrates that the safety measures designed or in operation are adequate and enough to maintain the specific and overall risks at tolerable levels – in this group are establishments which deal with dangerous substances at quantities above upper tier.

The qualifying quantities (lower and upper tier) obviously have practical consequences in terms of a number of establishments that are obliged to make safety report and emergency plan. In that view it is important to underline the political and financial aspect of the qualifying quantities. Therefore, each country which plans to implement the Seveso II Directive is interested to analyse the consequences of this implementation. A review of national implementations of the Seveso II Directive in EU gave the following summarised result:

- United Kingdom, Netherlands, Germany, Spain and Italy adopted the same qualifying quantities as are in the Directive,

- Austria, Sweden and France have lower qualifying quantities for some of the dangerous substances (e.g., oxygen, bromine, methanol, explosives, oil derivates). The reason is a continuation, i.e., maintaining of the national, more stringent regulation from the past.
- The overall policy is to enforce as comparable legislation as possible throughout the EU for the purpose of establishing similar operating conditions for enterprises on a common market.

3 Philosophy of taking over Seveso II Directive in Slovenia

The qualifying quantities in Annex I of the Seveso II Directive are a practical tool for classifying eligible establishments into above mentioned three groups. It is actually a triggering mechanism for the preparation of safety reports and emergency plans, as well as for demonstration of the adequacy of preventive safety measures. In Slovenia, the Directive is going to be transposed through the "Decree on emergency planning associated with accidents which involve dangerous substances". The qualifying quantities have been a subject of the evaluation in terms of whether there is a need, or a benefit, to define lower and upper tier in a more stringent way in Slovenia than this is the case in the Seveso II Directive, and what do the qualifying quantities specifically mean in terms of risk? Investigation of these issues revealed the following understanding/philosophy of transposing Seveso II Directive in Slovenia:

1. There are more than one factor which determine qualifying quantities, i.e., lower and upper tier. By no means these values do not represent specific threshold for health effect or a certain environmental damage. Risk, dose-effect relationship, and biological damage are complex issues. Therefore it is not appropriate (and is not possible) to explain them solely through the quantity of a substance. This is also not possible by means of the so-called dangerous characteristics of a substance. Strictly chemically speaking, there is no dangerous characteristic of a substance at all, however, when this term is used in semi-professional discussions it is more about health, biological, and social implication of a substance than about its intensive or extensive physical/chemical property (Fawcett and Wood [3]).
2. Understanding of risk assessment as a multi stage procedure clearly supports this explanation. Namely, risk is a result of hazard and exposure, which means that without exposure there is no risk. Exposure is, again, a complex and multi component issue which does not deal only with amounts, i.e., concentrations/doses of a substance but also, if not primarily, the ways of how a substance comes into contact with a receptor – modes and pathways of exposure.
3. Relativisation of qualifying quantities as specific thresholds for health and environmental damage is therefore appropriate. The qualifying quantities should be seen as a triggering mechanism of where and when to start verifying and auditing safety systems in a specific economic/industrial and social environment.

4. Since the named substances in Annex I of the Seveso II Directive have been included on the list based on their properties and potential to cause damage when in contact with a biological cell (e.g., flammability, toxicity, cancerogenity, danger for the environment, etc.), and because these characteristics are not site specific (for example, potassium cyanide has the same toxic potential in Berlin, Paris or Ljubljana) it is clear that there is no reason for different treatment of these substances in Slovenia in comparison with their treatment elsewhere, including the EU.
5. Other topics of comparison between Slovenia and EU are: potential for occurrence of accidents, exposure assessment, vulnerability of the environment/receptors, and intensity/seriousness of the consequences. All of these items are very much site specific so general comparison is not applicable and therefore not reliable at the level of transposing a piece of environmental legislation. What could be done anyway at this stage in this regard and has actually been performed in the study of the Institut "Jozef Stefan" is a check whether there exist extra ordinaries at any of the industrial sites which is expected to become eligible in terms of upper tier by the Seveso II Directive or national Decree on emergency planning. This check out revealed no such extra ordinaries so no need for adaptation of qualifying quantities towards stringency has not been identified.
6. The concluding observation and synthesized recommendation in the study was that the Annex I of the Directive should not be treated isolated from the overall spirit, context, and purpose of the Seveso II Directive. The Directive is a living piece of legislation which will probably change over time so it should be seen as a developing policy in the field of environmental safety and health.

4 Analysis of the consequences of the implementation of Seveso II Directive in Slovenia

This analysis has been focused on the number of establishments which will be obliged to prepare safety report and internal emergency plan after implementation of the Seveso II Directive in Slovenia. One of the basis for this analysis was a database of the Administration of the Republic of Slovenia for Civil Protection and Disaster Relief for 233 enterprises with approximately 5000 quantitative information on the quantities of dangerous materials in their possession/use/treatment. This database was not complete and consistent, and contained certain errors (for example wrong R statements for a specific substance). Nevertheless, after cleaning the database we produced the initial lists/sets of establishments classified according to the lower and upper tier, i.e. into the following three categories:

- establishments with no obligations,
- establishments with an obligation to notify responsible administration about presence/using of dangerous substances in their activity,

- establishments which need to submit safety report and emergency plan to the authority and inform the public about hazards and risks.

For the initial numbers of establishments in each category we performed sensitivity analysis in terms of how these numbers change due to the linear change of the qualifying quantities by a factor of 20. By this analysis we wanted to find out how much the number of eligible establishments changes if Slovenia applies more stringent legislation. Stringency has been defined in terms of the ratio between initial, i.e. Seveso II Directive qualifying quantities and the quantities which could Slovenia apply. The following ratios were examined: 1.0 (no stringency applied), 0.5 (stringency by factor of 2), 0.25 (stringency by factor of 4), 0.1 (stringency by factor of 10), and 0.05 (stringency by factor of 20). The results are shown on Figure 1.

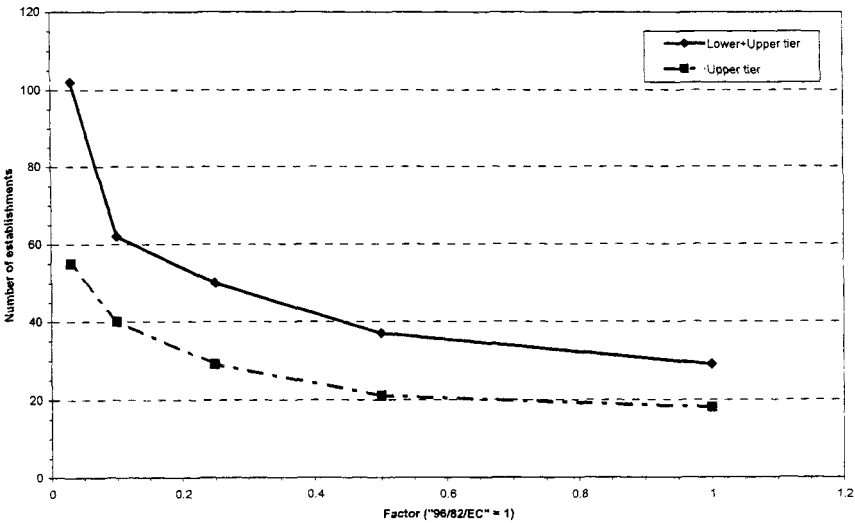

Figure 1: Results of the sensitivity analysis

There are 18 establishments which will be obliged to prepare safety report and internal emergency plan. Additional 11 establishments will have to notify the using of dangerous substances in their activities. These figures do not change considerably even if the qualifying quantities are more stringent by a factor of 2 or 4. When the stringency factor is 10 the numbers are 39 for the upper tier establishments and 62 altogether.

The uncertainty of the evaluations is up to 50 %, mostly due to incompleteness and inconsistency of the initial database which has been used for producing the initial numbers of establishments.

We compared results with another, independent, database of the enterprises in Slovenia which deal with chemicals/dangerous substances. This database has been provided by the Office for chemicals at the Ministry of Health. There are

304 enterprises on this list which export, import, produce, store or otherwise deal with chemicals. Some of the enterprises on this list are not included in the list of the Administration of the Republic of Slovenia for Civil Protection and Disaster Relief which served as a primary source of information for our analysis. We expect therefore that the total number of eligible establishments will slightly increase in the next iteration of the sensitivity analysis.

5 Conclusion

When less developed countries want to apply a specific piece of environmental legislation a very common way is to check how was the issue in question solved by the most developed, as well as comparable countries. In regard with the Seveso II Directive and its implementation in Slovenia a question appeared, whether there is a need for additional stringency of the qualifying quantities listed in Annex I of the Directive. Based on the analysis of experience of several EU countries in that connection, as well as analysis of the consequences for Slovenia in terms of the number of enterprises which will be obliged to make safety report and internal emergency plan we concluded that additional stringency is not needed/justifiable. The Seveso II Directive should be transposed into Slovenian legislation in its original form.

Since we understand the transposition of the Seveso II Directive more than just as an administrative step towards harmonised environmental legislation we recommend that it should be used as a basis and framework for building safety culture in Slovenian industry. This could be done in different ways; one is to motivate enterprises to perform at least minimal internal safety review of their activity in spite they are not formally eligible to do so according to the transposed Seveso II Directive. The reason for doing so anyway is contribution to the good image and name of the enterprise, its credibility and building trust among industry and the public. Partnership and mutual trust among industry, administration and different social groups is still imperative in spite it has been politically declared long ago; most popular recent expression of this is "sustainable development".

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