



## Review of [Seveso III Directive](#)

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The Seveso Directive (Directive 82/501/EEC) was first adopted by the European Union in 1982 following a major hazardous material accident in the Italian town of Seveso in 1976 and was intended to prevent the possibility of similar future accidents. The directive had its first major addendum in 1996, the new Seveso II Directive (Directive 96/82/EC) integrated lessons learned from other hazardous material accidents to improve the regulation and increase citizen safety and access to information. Then in 2012, another major addendum to the directive was instituted, resulting in the Seveso III Directive (Directive 2012/18/EU), further improving the regulation according to lessons learned from past disasters. Most importantly for the Oregon DEQ's SB1567 rulemaking process, the Seveso III directive requires that hazardous facilities account for and mitigate the risks from natural disasters.

As a European Union directive, Seveso III applies to all member states of the Union, however it is up to each individual state how they will meet the directive's requirements in their national law and implementation programs. This review document begins by outlining the requirements of the Seveso III Directive before turning to Italy and Germany as examples of the directive's implementation. For each of these member states, the information provided in this review comes from secondary sources which explain the state's program, either presentations or academic literature, as their laws are not available in English.

### **Seveso III Directive**

The Seveso III Directive, henceforth the Seveso Directive, establishes rules for the prevention of industrial accidents involving hazardous materials and requires that owners and operators enact "safety and risk-reduction measures" to prevent accidents and to "minimize effects" if an accident should occur. The Seveso Directive assigns a "general obligation" to facilities to "prevent major accidents,"

“mitigate their consequences,” and to “take recovery measures.” Facilities are required to draft and submit a Major-Accident Prevention Policy (MAPP) which describes the operator’s “overall approach and measures” to reduce the risk of accidents alongside Safety Reports which contain risk assessments and mitigation actions, described further below.

The Seveso Directive requires that facilities engage local authorities in emergency response planning and provide the public “sufficient information on the correct action(s)” to be taken during an accident. Local authorities are also required to implement land-use planning or “additional technical measures” to ensure that risks to the public and the environment are “maintained at an acceptable level.” Finally, local authorities are required to “ensure effective implementation and enforcement” through routine and non-routine inspections of facilities, which shall not be longer than one year apart for especially dangerous installations. During inspections, operators must demonstrate that they have “taken the appropriate measures... to prevent major accidents,” have the means to limit the consequences of an accident “on and off-site,” that the information contained in the safety reports adequately reflects the facility conditions, and that the public has received the appropriate information.

### ***Safety Reports***

Member states of the EU must require that facilities submit safety reports which demonstrate that “major-accident hazards and possible major-accident scenarios have been identified” and that action has been taken to “prevent such accidents and to limit their consequences.” First, facilities provide a description of the installation and the identification of internal and external sources (e.g., natural disasters) which may lead to an accident. Then, a risk analysis is performed before appropriate prevention measures are identified and implemented.

Risk analysis include a “description of the possible major-accident scenarios and their probability or the conditions under which they occur,” and this includes “a summary of the events which may play a role in triggering each of these scenarios.” As mentioned, the causes of an accident to be analyzed must be both internal and external. Internal causes of an accident may be, for example, human error, equipment malfunction, or corrosion. External sources which must be

considered include domino effects and natural causes. Once accident scenarios have been identified, facilities must evaluate and describe the consequences of these accidents through modeling, maps, etc., and review past “incidents with the same substances and processes used” to derive lessons learned and appropriate accident prevention measures.

Following the risk assessment facilities must implement and demonstrate the appropriate measures of protection and intervention to limit accident consequences. This includes organizational measures, response resources, and other measures taken to reduce risk. For domino effects, facilities located “together as to increase the likelihood of major accidents, or aggravate their consequences... should cooperate in the exchange of information and in informing the public.” For general accident scenarios, facilities must describe the “equipment installed... to limit the consequences of major accidents,” and demonstrate that “adequate safety and reliability have been taken into account in the design, construction, operation and maintenance of any installation, storage facility, equipment and infrastructure connected with its operation.”

### **Italy’s Implementation of the Seveso Directive**

As Described by [Marrazzo \(2022\)](#) and [Mazzini & Marrazzo \(2021\)](#)

Italy’s implementation of the Seveso Directive requires that hazardous facilities enact “all necessary measures to prevent major accidents and/or limit their consequences,” and that facilities demonstrate this prevention to the regulatory authority through inspections and descriptions of administrative controls (Marrazzo, 2022). Hazardous facilities must establish a Major Accident Prevention Policy (MAPP) that describes the overall aims and principles for the prevention and control of major accidents. Facilities must adopt a Safety Management System that documents policies and objectives, ensures policy implementation, and identifies and implements corrective actions. Facilities must maintain an internal emergency plan, and facilities must provide safety reports to the regulatory authority which contain:

- Risk assessments that identify possible causes of accidents including natural disasters.
- Risk analyses that evaluate the possible outcomes and their probability of occurring in each accident scenario. This includes, for example, evaluating the likelihood of consequences of boiling liquid expanding vapor explosion (BLEVE), jet fires, flash fires, vapor cloud explosions, etc. (Mazzini & Marrazzo, 2021).
- And include the measures implemented to prevent accidents and/or reduce their consequences, including locking or shut down systems, fire prevention measures and systems, etc. (Mazzini & Marrazzo, 2021).

Facility safety reports are evaluated by a Regional Technical Committee composed of representatives from the Fire Brigade and other national agencies with pertinent expertise. This committee confirms that facilities have taken adequate measures to prevent accidents, have sufficient means to limit the consequences of an accident “inside and outside the site,” have provided accurate information in the safety report, and that facilities have made the appropriate information available to the public (Marrazzo, 2022). During this phase information is drawn from the safety reports to assist with offsite emergency planning and land-use planning (Mazzini & Marrazzo, 2021).

### **Germany’s Implementation of the Seveso Directive**

As Described by” Krausmann, E., Koppke, K., Fendler, R., Cruz, A., Girgin, S. (2017). Qualitative and Semiquantitative Methods for Natech Risk Assessment. In E. Krausmann, A. Cruz, E. Salzano (Eds.). *Natech Risk Assessment and Management*. Elsevier. ISBN: 9780128038079

The German Major Accident Ordinance implements the Seveso Directive into German national law and requires that facilities take precautions to prevent accidents and limit their consequences “according to the state of the art in safety.” Germany has issued the Technical Rules for Installation Safety (TRAS) to specify the obligations for operators. TRAS 310, which describes the rules for assessment

and prevention of risks from flooding and precipitation events, is the focus of Krausmann et al. (2017) and therefore of this review.

Each of the TRAS rules defines the probabilities and intensities of the natural hazards which a facility must account for by defining the appropriate recurrence rates (for flooding generally 100 years). Facilities must then conduct a hazard source identification which investigates the impacts of each hazard source on the facility site, both as a “single hazard” or “in combination with other natural hazards” (e.g., rain on snow event). Once the expected impacts to the site have been established, a risk analysis is conducted to examine how each “safety-relevant part” of the facility—which includes storage tanks, fire suppression systems, etc.—will be impacted in each hazard scenario. Then, the risk analysis considers the effects of the disaster scenario on the facility as a whole and evaluates for interactions between different equipment failures as well as the simultaneous nature of damage to multiple facility components.

In total, the developed accident scenarios must consider:

- The simultaneous damage from natural disasters, which includes the risk of a release larger than the single largest tank due to multiple tank failures.
- The potential dispersion of materials into water or air.
- The limited availability of internal emergency response resources and measures to mitigate consequences.
- The limited availability and access of external response resources.
- The potential for domino effects within a facility and with nearby facilities.

Once accident scenarios have been developed, facilities are required to develop “protection concepts” to mitigate the chances and consequences of accidents (e.g., floodproofing or secondary containment). These protection concepts should include multiple lines of defense (e.g., multiple layers of floodproofing or secondary containment). Once these protection concepts have been defined and implemented, facilities must develop a final scenario for a “major accident despite precautions,” which is to be used to specify measures to mitigate the effects of such an accident by creating an internal alarm and emergency plan and providing relevant information to local authorities for the creation of external alarm and emergency plans.