Environmental responsibility in Spain - Tools

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Nine years have passed since the publication of Law 26/2007 on Environmental Responsibility, and this legal framework has undergone a series of developments and amendments. This legislation foresees the constitution of financial guarantees as the result of an Environmental Risk Analysis (ERA). Several tools have been developed to support operators and simplify this task, such as the UNE 150008, MIRAT, Scale Tables, Methodological Guides, EDI and EROM. The purpose of this article is to present the tools developed in Spain to simplify and facilitate this ERA.

INDUSTRIAL SAFETY AND SEVESO

Human activities have been the leading cause of recent environmental deterioration that must now be addressed. First, by implementing resources to prevent and avoid contamination and degradation of natural resources and, second, in the event of damage, by proceeding to the restoration of the affected places to the condition prior to the contamination, assuming the costs of this repair.

The safety of industrial operations in the European business sector changed radically in 1976 after an industrial accident at a small chemical manufacturing plant in the Italian city of Seveso. Significant amounts of dioxin TCDD were released into the atmosphere, causing serious damage to the neighboring communities.(Image 1).

Image 1. Accident in Seveso (1976).

As a result of this accident, **Directive 82/501/EC** (named the **Seveso Directive**) was published in 1982. Considered a milestone, this Directive, contemplated the concept of risk and its analysis became critical factors in the design and operations of industrial facilities posing serious risks.

Since then, concern for safety and environmental aspects or risks has increased with the publication in 1996 of a review of the mentioned Directive (**Directive 96/82/ECC**), commonly referred to as **Seveso II**.

More recently, **Directive 2012/18/EU (Seveso III)** was published on July 24, 2012, related to the control of risks inherent to serious accidents involving dangerous substances, thereby revoking and updating the previous Directive. This Directive has been transposed into Spanish legislation through **Royal Decree 840/2015, dated September 21, approving the control measures for risks inherent to serious accidents involving dangerous substances.**

ENVIRONMENT AND DOÑANA – ENVIRONMENTAL RISK ANALYSIS (ERA)

In parallel with the field of safety, European legislation on environmental protection was implemented following the serious incident near the Doñana Nature Reserve at the Aznalcollar plant owned by Boliden Apirsa on April 25, 1998 when a mining waste reservoir burst its banks releasing toxic sludge.. The serious threat to one of Europe's largest and most valuable natural areas (Doñana) led the European Union to establish a **legal framework of responsibility** as regards the environmental risks derived of human activities.

Directive 2004/35/EC of the European Parliament and the Council, dated April 21, 2004, on environmental responsibility in relation to prevention and repair of environmental damage, responds to this need. It sets forth a common framework of responsibility for preventing and repairing damage caused to wild fauna and flora, water resources and the ground. Therefore, the Directive sets forth those public authorities must assume the task of ensuring that the liable operators themselves adopt or bear the costs of the necessary preventive measures or repairs of the affected environment.

Based on this Directive, Spain has developed a series of legal regulations, the timeline of which is shown in Image 2, comprising the benchmark framework

for environmental responsibility in Spain

As this image shows, the Spanish transposition of Directive 2004/35/EC is materialized through the **Environmental Responsibility Law (ERL, Law 26/2007), dated October 23**, thereby incorporating to Spanish legislation an **objective and unlimited** environmental responsibility scheme based on the principles of "damage prevention" and "the person who contaminates pays for it".

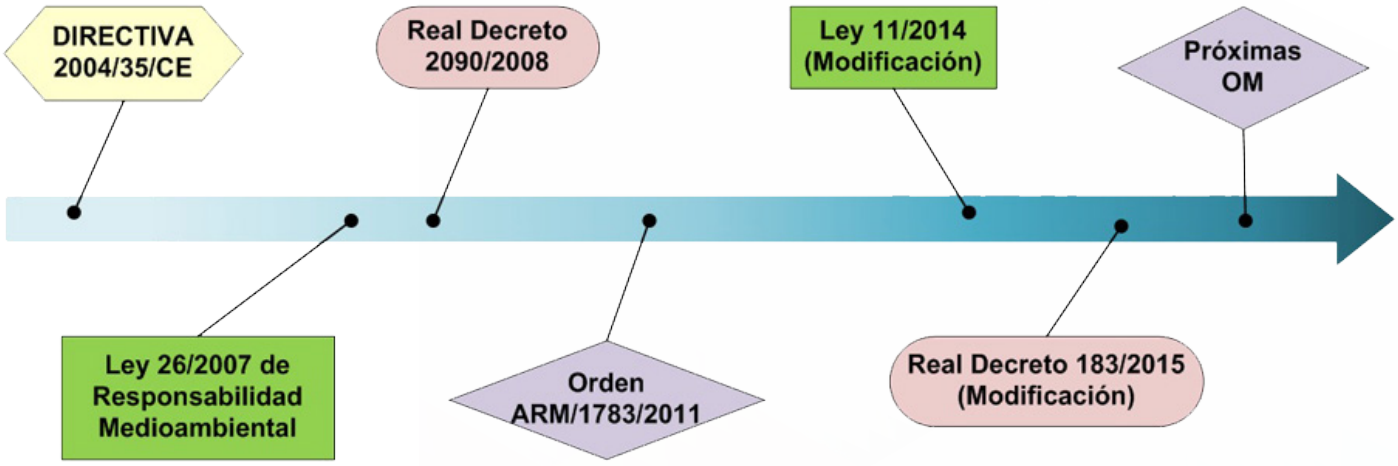

Ilustración 2: Cronograma publicaciones legales de responsabilidad ambiental española

This Law has been amended by Law **11/2014, dated July 3**, in response to the need for reinforcing prevention, simplifying and improving the application of the legal guidelines framework and rationalizing the mandatory financial guarantee only for those activities with greater environmental impact.

Environmental responsibility is a legal responsibility that is **objective** in nature, in that the obligation of acting is imposed on the operator regardless of any fault, willful misconduct, or negligence in the operator's behavior. Furthermore, this makes the new principle "the person who contaminates pays for and repairs it" effective in transferring the costs derived of repairing damage to public resources object of this law to the economic operators that caused the environmental damage.

Environmental responsibility is, furthermore, **unlimited**, as the content of the obligation of repair (or prevention, when applicable) assumed by the liable operator entails returning the damaged natural resources to their original condition, assuming all of the costs of the corresponding actions for prevention or repair, without limit.

Article 24 of the ERL sets forth that the operators of activities included in Annex III of said law must assume a **financial guarantee** that enables them to assume the environmental responsibility inherent to their business activity. The same Article determines the amount of this financial guarantee based on an **Environmental Risk Analysis (ERA)** of the activities to be carried out, in accordance with the methodology set forth in governmental regulations.

It is worth mentioning that environmental responsibility (objective and unlimited for these operators) is in effect since the publication of the Law in 2007, regardless of the obligation of constituting the mandatory financial guarantees, given that this action has already been postponed several times by different public bodies. Therefore, in the event of a

significant environmental accident, the person that caused it must take action in accordance with the provisions set forth in the ERL, despite the fact that the constitution of guarantees is not yet mandatory.

SUPPORT TOOLS – UNE 150008, MIRAT, GUIDES AND SCALE TABLES

Article **34 of Royal Decree 2090/2008, of December 22**, approving the Regulations that partially implement the ERL, stipulates that the Environmental Risk Analysis must be performed by the operators themselves or outsourced to a third party, completed in accordance with the scheme set forth in the **UNE 150008 Standard** or other, equivalent standards. The operator's ERA must also be verified.

The UNE 150008 recommends the following steps (Image 3):

1. Identify causes and dangers.
2. Identify triggering events.
3. Possible scenarios.
4. Assign the likelihood of occurrence.
5. Estimate the associated consequences on natural, human and socioeconomic settings.
6. Estimate the risk.
7. Evaluate the risk.
8. Manage the risk.

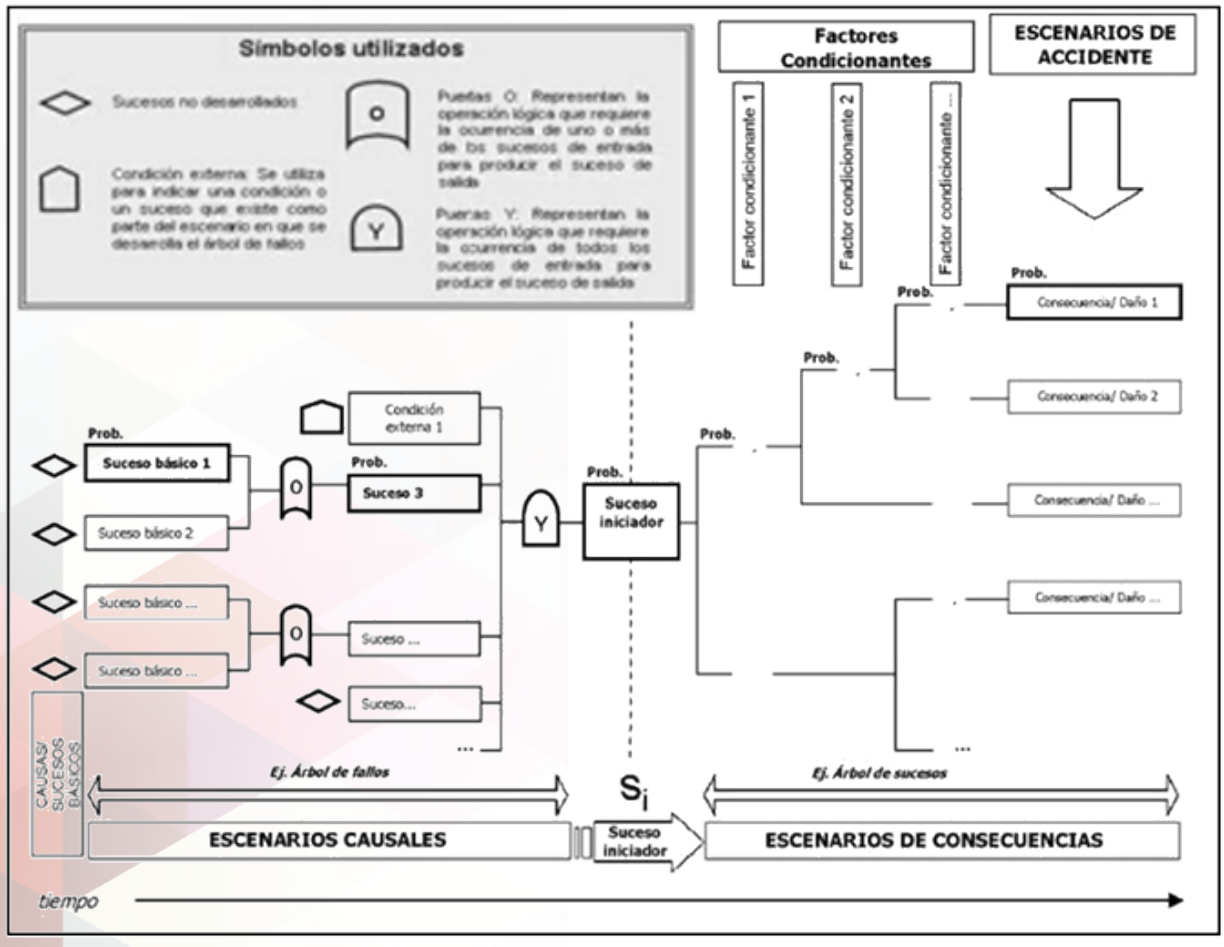

Image 3: Methodological scheme included in the UNE 150008 Standard

Royal Decree 2090/2008 also introduces the analysis of sectoral risks (Image 4), voluntary instruments for facilitating the evaluation of risk scenarios, as well as of reducing their cost for the business sector that implements it. These may be differentiated according to the level of homogeneity of the companies in the sector and the danger entailed for the environment, as set forth in:

- Methodological Guide (MG),
- Scale Table (ST), and
- Standard Environmental Risk Report Model (MIRAT).

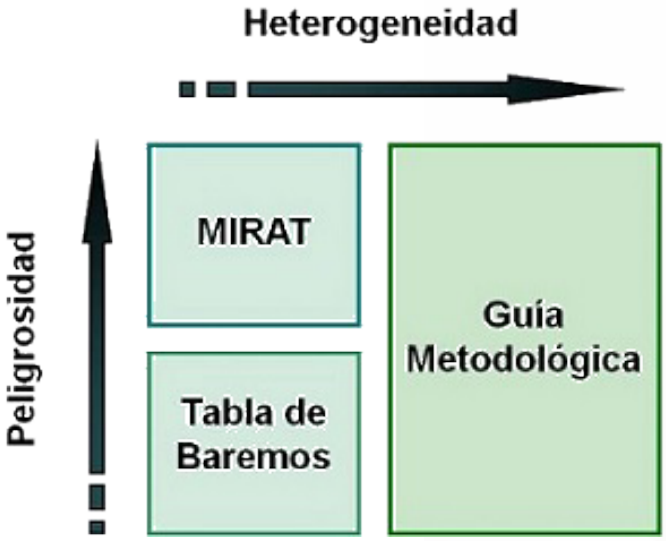

Image 4: Graph for selecting the sectoral risk analysis tool, depending on its characteristics.
Source: website of the Ministry of Agriculture, Food and Environment (MAGRAMA)

Until March 15, 2016, the Technical Committee for the Prevention and Repair of Environmental Damage associated with the MAGRAMA, through the General Directorate for Quality and Evaluation of the Environment and Natural Resources, has approved ten MIRATs, six MGs and one ST, information about which is available for consultation and updates through http://www.magrama.gob.es/es/calidad-y-evaluacion-ambiental/temas/responsabilidad-mediambiental/analisis-de-riesgos-sectoriales/herramientas.aspx#para11.

Royal Decree 2090/2008 has been amended by Royal Decree 183/2015, dated March 13, the main modifications of which are summarized as follows:

- The constitution of financial guarantees will only be mandatory for high-risk operators (activities related with ICPC, Seveso and certain mining tailings).
- Verification of the ERA is substituted by the operator's declaration of responsibility.
- A new methodology is proposed for the risk analysis, based on calculating an **Environmental Degradation Index** (EDI) and quantifying and monetizing the most serious scenario using the **Environmental Responsibility Offer Model (EROM)**

PRESENTATION OF THE EDI AND EROM

The EDI is an IT application developed by the General Directorate for Quality and Evaluation of the Environment and Natural Resources that presents **semi quantitative** results. The purpose of this method is to **obtain an estimation, using a degradation index associated with each accident scenario** identified in the operator's ERA based on a series of estimators of the amount of damaged resources and costs for the repair of the natural resources protected by legislation, therefore prioritizing the accident scenarios by magnitude, depending on the possible environmental damage that may be generated. It also intends to **simplify for the operator the process of constituting a financial guarantee.**

With this new method, the financial guarantee is determined as follows:

1. The **accident scenarios** and the **likelihood of occurrence** are identified for each.
2. An **EDI** associated with each accident scenario is estimated, a new step in this procedure, by following the steps set forth in the new Annex III of RD 2090/2008, derived of RD 183/2015.
3. The risk associated with each accident scenario is calculated as the combination of the scenario's likelihood of occurrence and the EDI.
4. The scenarios with the lowest associated EDI, comprising 95 percent of the total risk, are selected.
5. The scenario with the highest EDI among the selected accident scenarios will be chosen as the **benchmark scenario** and will be used for calculating the amount of the mandatory financial guarantee.

To determine this amount, first the environmental damage generated by the selected scenario is quantified and, second, the generated environmental damage of the benchmark scenario is monetized, the value of which will be equal to the cost of the primary repair project. The amount may be calculated using the **EROM** IT application also developed by the General Directorate for Quality and Evaluation of the Environment and Natural Resources to offer operators support in **monetizing the damage associated with the selected scenario**, as part of the procedure for defining the financial guarantee described above.

It is important to emphasize in this regard that, if the primary repair corresponding to the benchmark scenario for calculating the financial guarantee consists solely of natural recovery, then its amount will be equal to the value of the damage associated with the accident scenario with the highest EDI among the selected scenarios, the primary repair of which is different from natural recovery.

With this new procedure, to define the amount of the financial guarantee, it is only necessary to quantify and monetize the environmental damage generated for one selected benchmark scenario, requiring a reasonable allocation of resources by operators, given that i**t is not necessary to quantify and monetize the totality of the scenarios identified** in the ERA, as obligated by the previous standard.

Once the operator has constituted the financial guarantee, the corresponding declaration of responsibility must be presented.

Operators who, upon completion of the ERA for their activity and quantification of their mandatory financial guarantee may be exempt from this guarantee, in accordance with the provisions of Article 28 of the ERL, are:

- Operators with activities likely to cause damage that entail repairs evaluated in amounts lower than 300,000 euros.
- Operators with activities likely to cause damage that entail repairs evaluated in amounts between 300,000 and 2 million euros, and who certify by presenting certification issued by independent bodies

that they are permanent and ongoing members of either the European Eco-Management and Audit Scheme (EMAS) or the UNE EN ISO 14001 Environmental Management System in effect.

Compared with other European public bodies, the efforts of the Spanish public administration system, must be mentioned as regards making support tools available to the country's business sector for simplifying their development of the ERA.

PRIORITIZATION OF OPERATORS

On another hand, **Order ARM/1783/2011, dated June 22** (ERA Order) was published on June 29, 2011, defining the prioritization and timetable for approving Ministerial Orders that will make the constitution of financial guarantees mandatory for economic and professional activities included in Annex III of the ERL.

In accordance with this Order, priority 1, the most pressing, is assigned to:

- Activities affected by RD 1254/1999 (Seveso II), approving the control measures for risks inherent to serious accidents involving dangerous substances.
- Combustion facilities with a thermal combustion power greater than 50 MW (Section 1.1 of Law 16/2002 dated July 1, on Integrated Control and Prevention of Contamination (ICPC).
- Facilities for the evaluation of hazardous waste, including used oil management, or for the elimination of this waste at sites other than dumps, with a capacity of greater than 10 tons per day (Section 5.1 of the ICPC Law).

Priority level 2 includes:

- Gas and oil refineries (Section 1.2 of the ICPC Law).
- Coking plants (Section 1.3 of the ICPC Law).
- Facilities for smelting or brute steel production (primary or secondary fusion), including the corresponding continuous smelting facilities with a capacity of more than 2.5 tons per hour (Section 2.2 of the ICPC Law).
- Ferrous metal transformation facilities through the application of protective coatings on cast metal with a treatment capacity of more than 2 tons of brute steel per hour (Section 2.3c of the ICPC Law).
- Ferrous metal foundries with a production capacity exceeding 20 tons per day (Section 2.4 of the ICPC Law).
- Chemical facilities for the manufacture of salts such as ammonium chloride, potassium chlorate, potassium carbonate (potash), sodium carbonate (soda), perborates, silver nitrate (Section 4.2d of the ICPC Law).
- Chemical plants that use a chemical or biological process for the manufacture of basic pharmaceutical products, including intermediate products (Section 4.5 of the ICPC Law).
- Landfills (of all waste types) that receive more than 10 tons per day or with a total capacity of over 25,000 tons, excluding inert waste landfills (Section 5.4 of the ICPC Law).

The publication of the Ministerial Order that will require the constitution of a financial guarantee is currently pending for activities of priorities 1 and 2, the project of which has been drafted by the MAGRAMA since April 7, 2015.

THE ERA: AN EXAMPLE

To understand and reaffirm the above, below follows a very simplified practical example of a risk analysis, focusing on the determination of the benchmark scenario for quantifying environmental damage, to afterward calculate the value of its repair.

Description of the facility:
Cleaning products manufacturing plant in Alcalá de Henares (Madrid). Raw materials are stored in overhead tanks and diesel used for combustion in an underground storage tank. Raw materials are mixed in "reactors" (mixing and stirring tanks, without chemical reaction) and end products are packed in plastic bottles.

ERA:
First, the conditions as well as the surroundings of the facilities must be studied to identify sources of danger and the targets of the ERL that may be affected. Once these factors are identified, the following questions must be answered: "What can occur?" and the triggering events that may generate a risk must be predicted. This evaluation phase is critical, given that whatever is omitted here will remain unanalyzed in subsequent phases.

With this information, the accident scenarios are proposed, as described below:

- Accident scenario 1: Breakage of an underground diesel storage tank (25 m3) and partial leakage of its content.
- Accident scenario 2: Spill of ammonia (10 m3) when filling an overhead tank, running into the water drainage system and migrating through the rainwater drainage system into a river nearby the facilities.
- Accident scenario 3: Spill of solid raw materials due to the perforation of a storage tank as a result of the collision of an electric wheelbarrow, migrating through the rainwater drainage system into a river nearby the facilities.
- Accident scenario 4: Fire outbreak at the manufacturing plant, resulting in the generation of 12 m3 of firewater, migrating through the rainwater drainage system into a river nearby the facilities.

Una vez determinados los escenarios accidentales se realiza la estimación de la significatividad de los daños para cada uno de dichos escenarios, obteniendo los distintos valores del IDM que se muestran en la siguiente tabla. El riesgo se obtiene como el producto entre la probabilidad de cada escenario y la estimación del IDM obtenida para cada uno de ellos, como se recoge en la tabla 1:

Table 1: Calculating risk

Accident scenario	L_{As}	EDI value	Risk
S.1	2	6,507.44	13,014.88
S.2	4	13,158.49	52,633.96
S.3	3	3,756.21	11,268.63
S.4	2	16,555.22	33,110.44

Then, after having prioritized the scenarios from highest to lowest EDI and calculating the associated risk percentage as well as the accumulated risk of each, the benchmark scenario is used to determine the amount of the financial guarantee using the one with the highest EDI among the scenarios that group together 95 percent of the risk, as shown in Table 2:

Table 2: Selecting the benchmark scenario

Accident scenario	L_{As}	EDI value	Risk	Accumulated risk	% accumulated risk
S.4	2	16,555.22	33,110.44	110,027.91	100
S.2	4	13,158.49	52,633.96	76,917.47	69.91
S.1	2	6,507.44	13,014.88	24,283.51	22.07
S.3	3	3,756.21	11,268.63	11,268.63	10.24

As shown in the table above, the resulting benchmark scenario is number four, and this one will be monetized using the EROM to determine the amount of the financial guarantee.

CONCLUSION

Following the toxic waste dump around Doñana, environmental responsibility legislation has followed the path of legislation governing safety in serious accidents. A common framework for liability has existed in Spain since 2007. To help support prevention at Organizations with significant environmental risk, these must complete an Environmental Risk Analysis (ERA) that serves as the basis for determining the amount of their financial guarantees.

The efforts of the Spanish public administration and environmental sector for making tools -such as the UNE 150008, MIRAT, Scale Tables, Methodological Guides, EROM and EDI- available to the affected organizations for developing their ERA in a less costly and more structured manner is praiseworthy.

In the event of an accident that causes significant environmental damage, the person responsible for these must assume the repair within the framework set forth by this Law, objectively and without limit, regardless of whether or not the financial guarantees are mandatory, pending approval of the Ministerial Order, the text of which was drafted by the MAGRAMA almost a year ago for activities comprising priorities 1 and 2.