European Union Network for the Implementation and Enforcement of Environmental Law

Integrated Risk Assessment Method II (IRAM II)

Final report

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Introduction to IMPEL

The European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) is an international non -profit association of the environmental authorities of the European Union (EU) Member States , and of other European authorities , namely from acceding and candidate countries of the EU and European Economic Area (EEA). The association is registered in Belgium and its legal seat is in Brussels, Belgium.

IMPEL was set up in 1992 as an informal Network of European regulators and authorities concerned with the implementation and enforcement of environmental law . The Network's objective is to create the necessary impetus in the European Community to make progress on ensuring a more effective application of environmental legislation . The core of the IMPEL activities concerns awareness raising , capacity building and exchange of information and experiences on implementation , enforcement and international enforcement collaboration as well as promoting and supporting the practicability and enforceability of European environmental legislation.

During the previous years IMPEL has developed into a considerable , widely known organisation , being mentioned in a number of EU legislative and policy documents , e.g. the 8th Environment Action Programme that guide European environmental policy until 2030, the EU Action Plan: "Towards a Zero Pollution for Air, Water and Soil" on Flagship 5 and the Recommendation on Minimum Criteria for Environmental Inspections.

The expertise and experience of the participants within IMPEL make the network uniquely qualified to work on both technical and regulatory aspects of EU environmental legislation.

Information on the IMPEL Network is also available through its website at: www.impel.eu

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Executive Summary

The IRAM II project is a follow up of IRAM I (Integrated Risk Assessment Method), which was developed to fulfil the requirements of Article 23 of the Industrial Emission Directive (IED). IRAM I is focused on the frequency of the site visits for environmental inspections. The IRAM II project checks on how much time will be needed for a site visit and on which environmental aspect (e.g., emissions to air) deeper focus should be necessary during a particular site visit.

Through the combination of IRAM I and IRAM II, an intelligent assignment of environmental inspectors is possible and also necessary, as there is a lack of personnel in environmental administrations in almost all EU countries. IRAM II is focused on both General Time Criteria and Specific Time Criteria. General Time Criteria can be applied to every industrial sector while Specific Time Criteria are only relevant for a particular industrial sector. For this reason, results based on Specific Time Criteria of different industrial sectors are not comparable. Therefore, it is better to use these specific criteria only to a limited extent and to resort more often to the general time criteria.

In order to make the best use of personnel, it is important to know not only how often a certain installation needs to be visited and how much time is needed for this site visit, but also which environmental aspects need to be inspected in more detail and which need to be inspected in less detail. This can be achieved by combining IRAM I and IRAM II.

Disclaimer

Quotation

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1. Aim – goal

Within the IMPEL easyTools project an Integrated Risk Assessment Method (IRAM I) has been developed, as an instrument to assist EU member states to fulfil the requirements of Article 23 of the Industrial Emission Directive (IED). IRAM I is a method to assess the actual and potential impact of installations on the environment and correlate this impact to the frequency of the site visits for environmental inspections. The same risk assessment procedure is applied on installations from different industrial sectors.

IRAM II is a new project that checks on how much time will be needed for a site visit and on which environmental aspect (e.g., emissions to air) deeper focus should be necessary during a particular site visit. According to the practice in each country, the total time needed for the whole inspection process (including preparation and follow-up of the site visit) could then be estimated.

The first step of the project was to develop a general approach that could be applied to installations from different industrial sectors, in particular sectors for which for Best Available Techniques Reference Documents (BREFs) have been developed. The second step was to develop the IRAM II methodology for specific industrial sectors / BREFs.

2. Definitions

- Environmental Aspect: an element of the activities of an installation that impacts or may impact the environment (e.g. emissions to water, waste production, noise…)
- General Time Criteria: time criteria that can be used for every installation
- Impact Criteria: criteria that can be used to evaluate the actual impact on environment with the risk assessment procedure
- Inspection Focus: a process for identifying the environmental aspects that have the greatest impact on the environment and on which the inspection should focus
- IRAM I: a method of environmental risk assessment developed by IMPEL
- IRAM II: a method of time estimation and inspection focus developed by IMPEL
- Risk Assessment: process for identifying potential hazards and actual impacts of the installation on the environment
- Operator Performance Criteria: criteria ensuring that operators adhere to relevant laws, regulations or industry standards in their operations. -
- Specific Time Criteria: time criteria that can only be used for the installation of a specific industry (BREF)
- Time Criteria: criteria that can be used to estimate the inspection time using the time estimation procedure
- Time Estimation: a procedure for estimating the time required to visit an installation and the time required for pre- and post-site visit activities

3. Smart use of human resources

Almost every EU country has a shortage of environmental inspectors. This shortage of human resources forces the inspection bodies to carry out work as smart as possible. Therefore, a smart planning of inspection work is needed. In order to plan inspections in a smart way, some questions should first be answered:
Which installations to inspect in the next period (e.g. next year)?

- When to perform each site visit?
- How much time is needed for each site visit?
- What is the content and the focus of each site visit?

The first two questions can be answered by carrying out a risk assessment. The higher the environmental impact of a certain installation, the more frequently this installation needs to be inspected.

Time estimation is a method that provides answers to the third question. Time estimation is the process of estimating the time required for a site visit.

A combination of both methods, risk assessment and time estimation, provides a basis for making smart use of available human resources.

However, sometimes even the combination of the two methods may not be enough. When human resources are very limited it is good to focus the time available for the site visit mainly on those environmental aspects that have the greatest impact on the environment. This is why we need an answer to the fourth question, and one method for answering this question is inspection focus.

4. Time estimation

IRAM I is a methodology for performing an environmental risk assessment and determining the frequency of sites visits. However, it is not possible with a risk assessment to estimate the time needed for a site visit / inspection. For example, if there is one emission source with a high emission load (e.g. a stack), this installation represents a high environmental impact, but it does not necessarily take a lot of time to inspect this source. On the other hand, dozens of emission sources with low emission loads may have a lower impact but require much more time to inspect.

We need a separate methodology which is the time estimation method. In addition, the impact criteria which are used for an IRAM I risk assessment are not suitable for time estimation. Therefore, different criteria need to be developed. Criteria that can be used to estimate inspection time are called time criteria.

Each time criterion is given a score based on its importance. The total of all time criteria scores correlates with the time required for a site visit. The higher the total score, the more time is required for a site visit. As inspection approaches are not the same in different EU countries, it is not possible to estimate the time needed in real time units (e.g., hours). Therefore, time is expressed in relative units – as a proportion of the maximum site visit time (e.g. percentage of a site visit).

Some impact criteria used for a risk assessment could also be used as time criteria for time estimation. However, this needs to be done carefully as the risk assessment used to determine the frequency of site visits already influences the time of the site visits (e.g. higher scores of the criteria mean both more frequent site visits and more time spent on the visit).

The time estimation method is primarily used for the estimation of time needed for the site visit, but it can also be used to estimate the time needed for all activities before and after the site visit. As a result, three types of time criteria can be developed:

- site visit time criteria
- pre site visit time criteria
- post site visit time criteria.

4.1 Site Visit Time Criteria

Site visit time criteria are used to estimate the time needed for a site visit. From the time of arrival at the site, to the time of departure from the site. Some of these criteria could be used for any installation and are called General Time Criteria. Specific Time Criteria on the other hand, refer only to specific industrial sectors (e.g. waste incineration).

However, tests have shown that the time estimation results obtained by applying the General Time Criteria are better than those obtained by applying the Specific Time Criteria when comparing different industries. Therefore, it is better to rely mainly on the General Time Criteria and to avoid the Specific Time Criteria for the reasons explained below.

4.1.1 General Time Criteria

The General Time Criteria can be applied to every industrial sector.

EXAMPLES:

I.i Type of installation – complexity

Criteria Parameter	Score
1 IED Annex I activity	1
2 IED Annex I activities	2
3 IED Annex I activities	3
4 or 5 IED Annex I activities	4
more than 5 IED Annex I activities	5

I.ii Number of emission sources to air (stacks, chimneys…)

Criteria Parameter	Score
No sources	0
1 or 2 sources	1
3 – 10 sources	2
11 – 20 sources	3
more than 20 sources	4

I.iii Number of emission sources to water (points of release…)

Criteria Parameter	Score
No sources	0
1 or 10 sources	1
11 – 20 sources	2
more than 20 sources	3

I.iv Protection against contamination of soil and water (Number of devices like tank pits, areas for the protection against penetration of pollutants, and interception ditches under connection pipelines for the protection against soil and water contamination)

Criteria Parameter	Score
No devices	0
1-5 devices	1
6-10 devices	2
11-15 devices	3
16-20 devices	4
more than 20 devices	5

I.v On-site treatment of waste waters

Criteria Parameter	Score
No on-site treatment	0
Primary/secondary centralized treatment	1
Tertiary centralized treatment	2
Primary/secondary decentralized treatment	3
Tertiary decentralized treatment	4

I.vi Diffuse emissions to air

Criteria Parameter	Score
No diffuse emissions	0
1-2 sources/areas of non-odorous emissions (e.g. dust)	1
1-2 sources/areas of odorous emissions (e.g. solvents)	2
3 or more sources/areas of non-odorous emissions (e.g. dust)	3
3 or more sources/areas of odorous emissions (e.g. solvents)	4

I.vii Use of energy

Criteria Parameter	Score
1 or 2 energy sources (e.g. types of fuels, electricity) and energy management system in place	1
1 or 2 energy sources (e.g. types of fuels, electricity) and no energy management system in place	2
3 or more energy sources (e.g. types of fuels, electricity) and energy management system in place	3
3 or more energy sources (e.g. types of fuels, electricity) and no energy management system in place	4

I.viii Waste management (Number of waste storages and waste processing units)

Criteria Parameter	Score
No units	0
1 unit	1
2 units	2
3 or 4 units	3
5 – 7 units	4
more than 7 units	5

I.ix Alternative criteria for waste management

Criteria Parameter	Score
Off-site waste processing and disposal and no transboundary shipment of waste	1
Off-site waste processing and disposal and transboundary shipment of waste	2
In-situ waste processing and/or disposal and no transboundary shipment of waste	3
In-situ waste processing and/or disposal and transboundary shipment of waste	4

I.x Use of water

Criteria Parameter	Score
No use of water	0
Water intake from grid and water management system in place	1
Water intake from grid and no water management system in place	2
Water intake from natural sources (e.g. lake, river, sea, groundwater) and water management system in place	3
Water intake from natural sources (e.g. lake, river, sea, groundwater) and no water management system in place	4

4.1.2 Specific Time Criteria

Specific Time Criteria are only relevant for a specific industrial sector - BREF (e.g. intensive rearing of poultry or pigs, waste incineration…). For this reason, results based on Specific Time Criteria from different industrial sectors are not comparable. It is, therefore, better to use these specific criteria on a small scale and to use the General Time Criteria more often.

The complexity of an installation depends also on the kind of monitoring, sampling methods and scope of the verifications. Not all parameters or BATs require the same attention.

EXAMPLES:

II. Ferrous Metals Processing Industry (FMP) time criteria

II.i Number of FMP sectors (i.e. hot rolling, cold rolling, wire drawing, hot-dip coating and batch galvanising)

Criteria Parameter	Score
1 sector	1
2 sectors	2
3 or 4 sectors	3
more than 4 sectors	4

II.ii Number of all BATs (sum of BAT in the BAT conclusions of the BREF document).

Criteria Parameter	Score
1 – 10 BAT	1
11 -20 BAT	2
21 – 30 BAT	3
31 – 40 BAT	4
more than 40 BAT	5

II.iii Number of production lines (sum of production lines of all sectors)

Criteria Parameter	Score
1 lines	1
2 lines	2
3 or 4 lines	3
more than 4 lines	4

III. Waste Incineration (WI) time criteria

III.i Number of incineration lines

Criteria Parameter	Score
1 line	1
2 lines	2
3 or 4 lines	3
more than 4 lines	4

III.ii Number of BATs

Criteria Parameter	Score
1 – 5 BAT	1
6 - 10 BAT	2
11 – 20 BAT	3
more than 30 BAT	4

III.iii Type of installation

Criteria Parameter	Score
Incineration	1
Co-incineration	3

III.iv Waste hazard

Criteria Parameter	Score
Non-hazardous	1
Hazardous	3

III.v Number of waste categories (e.g. municipal, sewage sludge, clinical waste..)

Criteria Parameter	Score
1	1
2	2
3 or more	3

III.vi Treatment of slags/bottom ashes (if this is not already considered among the general time criteria of in-situ waste management)

Criteria Parameter	Score
Off-site	1
On-site	3

III.vii Number of different types of waste (EWC) which can be incinerated

Criteria Parameter	Score
5 <= x < 25	1
25 <= x < 50	3
>= 50	5

Some more possible time criteria:

- Kind of injection: e.g. from bunker, from lorry, liquid injection, injection via pipe bridge
- Number of waste treatment facilities
- Number of storage facilities: e.g. tanks, waste bunker, waste parking space, …

IV. Intensive rearing of Poultry or Pigs (IRPP) time criteria

IV.i Number of units (plants) where livestock is bred

Criteria Parameter	Score
1 unit	1
2 units	2
3 or 4 units	3
more than 4 units	4

IV.ii Number of on-farm processes and activities (e.g. nutritional management of poultry and pigs, feed preparation (milling, mixing and storage), rearing (housing) of poultry and pigs, collection and storage of manure, processing of manure, manure land spreading, storage of dead animals).

Criteria Parameter	Score
1 or 2 activities	1
3 or 4 activities	2
5 to 7 activities	3

IV.iii Number of auxiliary activities (e.g. on-farm manure processing, heat and power generation/recovery, land spreading)

4.2 Pre/post site visit time criteria

The site visit is only one part of the overall inspection process. Some preparatory activities are carried out before the site visit, and some are carried out after the site visit. Therefore, in order to plan the inspections it is useful to estimate the total time needed for the whole inspection process (pre site visit + site visit + post site visit).

4.2.1 Pre site visit activities:

Pre site visit activities usually include the study and analysis of various information sources (previous site visit reports, permits, monitoring reports, databases, etc.), preparation of the trip (administrative procedures, accommodation, travel, etc. and traveling itself.

EXAMPLES:

V. Pre site visit time criteria:

V.i Location – travel

Criteria Parameter	Score
Almost no travel	1
Same day travel	2
One overnight stay	3
Two overnight stays	4

V.ii Administrative procedures (inspection order, financial approval, procedures needed to organise travelling and booking of a hotel)

Criteria Parameter	Score
Same day travel	1
Overnight stay	2

V.iii Preparation study (could be linked to the general complexity TC)

Criteria Parameter	Score
Simple activity	1
Normal activity	2
Complex activity	3

V.iv Availability of information about the operation of the plant

Criteria Parameter	Score
Good	1
Medium	3
Bad	5

4.2.2 Post site visit activities:

Activities after the site visit mostly include: writing a report, administrative procedures, procedures for minor offence, enforcement procedures, etc. The time needed for these post site visit activities is difficult to estimate because the activities depend on the findings during the site visit and are almost impossible to predict in advance. In particular, post site visit activities depend on the number of non-compliances found during the site visit. The more non-compliances are found, the more activities will follow and the more time will be needed. It is also not possible to predict the number of non-compliances in advance, but we can estimate the probability of their occurrence. The IRAM I methodology includes Operator Performance Criteria, that address this aspect. Therefore, the Operator Performance Criteria can be used to estimate the time needed for the post site visit activities.

EXAMPLES:

VI. Post site visit time criteria (after the site visit):

VI.i Operator performance (OPC – IRAM)

The maximum follow up time must be defined first

OPC	Amount of time needed
-1	25% of max follow up time
0	50% of max follow up time
1	100% of max follow up time

4.3 Balancing of scoring

Time estimation scoring is a relative method and therefore it is sometimes difficult to compare scores between different time criteria for an installation.
For example, the type of installation may have a greater impact on the time needed for a site visit than checking the protection against contamination of soil and water. For this reason it is sometimes useful to give more weight to the type of installation time criteria. We can do this by using the “Shift of score” or “Inspection weight” functions of the IRAM tool.

However, this type of balancing may not be necessary as we will use the same method of time estimation and the same time criteria for all installations. Even if it is difficult to compare two different criteria (e.g. type of installation vs protection against contamination of soil and water) one criterion (e.g. type of installation) will be applied in the same way for all installations.

5. Inspection focus

In order to make the best use of human resources, it is important to know not only how often a particular installation needs to be visited and how much time it takes, but also which environmental aspects need to be inspected in more detail and which need to be inspected in less detail.

The method for determining this aspect is called inspection focus and it uses the risk assessment results of the IRAM I procedure. IRAM I correlates the impact criteria of different environmental aspects with the time spent on inspection. Aspects with a higher environmental impact receive more inspection time and are therefore inspected more carefully.

Two possible inspection focus methodologies were discussed:

A) Environmental aspects with a higher impact on the environment (higher scores) will be inspected during every site visit. Aspects with lower impact (lower scores) will be inspected less frequently.

EXAMPLE:
Inspection frequency of an environmental aspect:
a) The inspection frequency of the site is every year:
Score 5: every time, score 4: every second time, score 3: every third time, score 2: every fourth time, score 1: every fifth time.
b) The inspection frequency of the site is every two years:
Score 5: every time, score 4: every time, score 3: every first/second time, score 2: every second time, score 1: every second/third time.
c) The inspection frequency of the site is every three years:
Score 5: does not exist, score 4: every time, score 3: every time, score 2: every first/second time, score 1: every first/second time.

B) All environmental aspects must be inspected on every site visit but for those with a higher environmental impact (higher score) more time will be dedicated.

EXAMPLE:
a) 100 % time available for site visit
All environmental aspects (correlated to impact criteria) will be fully inspected.

b) 75 % time available for site visit
For 75 % of the environmental aspects with the highest scores a detailed inspection will be conducted and for the remaining aspects at least a basic check (e.g. basic check list).

c) 50 % time available for site visit
For 50 % of the environmental aspects with the highest scores a detailed inspection will be conducted and for the remaining aspects at least a basic check (e.g. basic check list).

d) 25 % time for site visit
For 25 % of the environmental aspects with the highest scores a detailed inspection will be conducted and for the remaining aspects at least a basic check (e.g. basic check list).