easyTools - RISK ASSESSMENT GUIDANCE BOOK

European Union Network for
the Implementation and Enforcement
of Environmental Law

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Introduction to IMPEL

The European Union Network for the Implementation and Enforcement of Environmental Law is an informal network of the environmental authorities of EU Member States, acceding and candidate countries, and Norway. The European Commission is also a member of IMPEL and shares the chairmanship of its Plenary Meetings.

The network is commonly known as the IMPEL Network

The expertise and experience of the participants within IMPEL make the network uniquely qualified to work on certain of the technical and regulatory aspects of EU environmental legislation. 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. It promotes the exchange of information and experience and the development of environmental legislation, with special emphasis on Community environmental legislation. It provides a framework for policy makers, environmental inspectors and enforcement officers to exchange ideas, and encourages the development of enforcement structures and best practices.

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

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Executive summary: Under the name 'easyTools' a project team, led by Germany, collected information on the risk assessments that are used across Europe. Based on this information a new rule based methodology was developed and tested, called Integrated Risk Assessment Method (IRAM). This guidance book describes this methodology. Besides the methodology the project also developed a new web based tool (IRAM tool) that can be accessed by the IMPEL website (www.impel.eu). The manual of the tool can be found in annex 1 of this guidance book.	
Disclaimer: This report is the result of a project within the IMPEL-Network. The content does not necessarily represent the view of the national administrations.	

Content

Preface

From the very beginning the IMPEL network has been working on the improvement of inspection activities in its member countries. Milestones of these activities were the publications of "Minimum criteria for inspections" (1997-1999) and "IMPEL Reference Book for Environmental Inspection" (1999). This IMPEL work contributed to the European Union "Recommendation on minimum criteria for environmental inspections" (RMCEI) in 2001. IMPEL has continued to advance RMCEI, and developed the "Step by step guidance book for planning of environmental inspection" in 2007.

A key issue of the RMCEI and the guidance book is the prioritisation of environmental inspections. An essential part of this prioritisation is the risk assessment of human activities that can have an impact on the environment and human health. As a consequence some countries have developed risk assessment tools with specific sets of risk criteria that fit to their needs, which cannot be used by other countries because of different administrative structures.

To avoid this recurring in the future, the IMPEL Project "Doing the Right Things" developed the following recommendations (among others):

- Development of an easily used risk assessment tool
- Development of an advanced interactive IT tool that supports planning of environmental inspections
- Defining standard sets of risk criteria

Based on these conclusions the aim of the easyTools project was to develop a flexible and user friendly internet based IT tool for environmental risk assessment that also assists with the planning of inspections.

This guidance book gives a description of the tool which is called IRAM (Integrated Risk Assessment Method). With IRAM, IMPEL has gone a step further in the support of its member countries. For the first time IMPEL provides an interactive internet tool that can be accessed over the IMPEL web site.

The tool is very flexible and can be used for all kinds of inspections. It is very well suited to the needs of the Industrial Emissions Directive (IED) and the upcoming Seveso III Directive. Risk criteria for both directives were developed within the project and can be found in the Annex of this guidance book.

To meet the needs of the member countries the IRAM tool can be used in different languages and the national inspection coordinators can decide on the

inspection task, the risk criteria, and the setting of steering parameters that should be used. In the first training workshop in Cologne (Germany) in November 2011 representatives from 16 member countries learned how to use the programme and an easyTools user platform was set up on the IMPEL Basecamp information exchange internet tool.

I hope that this guidance book and the IRAM tool will give you useful support in the planning of environmental inspection based on risk assessment. If you have questions, comments or want to become a member of the easyTools user group please contact the IMPEL office: info@impel.eu

Zofia Tucinska, IMPEL chair

Summary

Pursuant to the Recommendation providing for minimum criteria for environmental inspections (RMCEI), the Industrial Emission Directive (IED) and the Directive on the control of major-accident hazards involving dangerous substances (SEVESO) all inspections should be planned in advance. The competent authority must draw up inspection plans and programs for installations and establishments, including the frequency of site visits. These frequencies should be based on a systematic risk appraisal. This project focussed on the systematic risk appraisal.

Under the name 'easyTools' a project team, led by Germany, collected information on the risk assessments that are used across Europe. Based on this information a new rule based methodology was developed and tested, called Integrated Risk Assessment Method (IRAM).

The methodology is based on the following principles:
1. The inspection frequency is determined by value of the highest score;
2. The inspection frequency is reduced by one step, if the set minimum number of highest scores (called "the Rule") is not met;
3. The inspection frequency can be changed by only one step up or down based on operator performance;
4. The higher the sum of scores, the longer the inspection time.

The risk score of each impact criterion is directly related to the final risk category and therefore to the inspection frequency. We also believe that all environmental aspects with a high score should get the necessary attention. The risk itself is defined by impact criteria and operator performance criteria. They represent the effect and the probability. The methodology comes with many steering mechanisms. One of them is the minimum number of highest scores, what we call "the Rule" (point 2 above). When setting this mechanism for example on 2 you will need at least 2 criteria (environmental aspects) with the same high score to keep this level of impact / attention. Other steering mechanisms are weighting terms for impact criteria and weighting factors for operator performance criteria and inspection profile; the risk ceiling; and a so called "safety net".

Besides the methodology the project also developed a new web based tool (IRAM tool) that can be accessed by the IMPEL website (www.impel.eu).
In annex 1 the manual of this tool can be found.

Further the project team makes the following recommendations for future IMPEL activities:
- the inspection coordinators in the Member Countries need to be assisted and instructed to work with the IRAM tool.
- tools should be develop that will further assist the inspecting authorities in inspection planning (e.g. reporting tools that will be able to merge and analysing risk assessment data and plan inspections).

1 Introduction

1.1 Background

RMCEI

In 2001 the European Parliament and the Council adopted the Recommendation providing for minimum criteria for environmental inspections (RMCEI 2001/331/EC). The purpose of the RMCEI is to strengthen compliance with, and to contribute to a more consistent implementation and enforcement of Community environmental law in all Member States.

The RMCEI establishes guidelines for environmental inspections of installations, other enterprises and facilities whose air emissions, water discharges or waste disposal or recovery activities are subject to authorisation, permit or licensing requirements under Community law ('controlled installations').

All inspecting authorities in the Member States should apply these guidelines. They concern amongst others minimum criteria on establishing and evaluating plans for environmental inspections. Since the adoption of the RMCEI experts within IMPEL have been discussing how to implement these planning criteria of the RMCEI.

IED

The Industrial Emission Directive (2010/75/EU), which came into force in January 2011, contains binding requirements for environmental inspections. An essential part of article 23 of the IED is the assessment of environmental risks. "The period between two site visits shall be based on a systematic appraisal of the environmental risks of the installations concerned and shall not exceed 1 year for installations posing the highest risks and 3 years for installations posing the lowest risks."

The systematic appraisal of the environmental risks shall be based on at least the following criteria:

(a) the potential and actual impacts of the installations concerned on human health and the environment taking into account the levels and types of emissions, the sensitivity of the local environment and the risk of accidents;

(b) the record of compliance with permit conditions;

(c) participation in the Union eco-management and audit scheme (EMAS).

SEVESO

The SEVESO II Directive (96/82/EC) also contains binding requirements for inspections. According to paragraph 18 the competent authority shall regularly draw up inspection plans and programs for routine inspections for all

establishments, including the frequency of site visits for different types of establishments.

Unless the competent authority has established a programme of inspections based upon a systematic appraisal of major-accident hazards of the particular establishment concerned, the programme shall entail at least one on-site inspection made by the competent authority every twelve months of each establishment covered by Article 9 (upper tier establishments).

In the draft Seveso III Directive the requirements for inspections will be broadened to lower tier establishments and streamlined with the IED.

Other kinds of environmental inspections

Although this guidance book focuses on the inspections derived from the above mentioned Recommendation and Directives, the methodology and the IRAM tool described in this guidance book can be used for inspection objects and activities that fall outside this scope, such as waste, wastewater, genetic engineering, fishery, nature protection *etc*.

IMPEL project Doing The Right Things (DTRT)

Pursuant to the RMCEI all inspection activities should be planned in advance. Practitioners have expressed the need for guidance to help the implementation of the minimum criteria on planning in the RMCEI. IMPEL developed a step-by-step guidance book under the project DTRT. The guidance book takes as starting point the Environmental Inspection Cycle, which consists of the following seven steps (see figure 1):

1a. Describing the context
1b. Setting priorities
1c. Defining objectives and strategies
1d. Planning and review
2. Execution framework
3. Execution and reporting
4. Performance monitoring
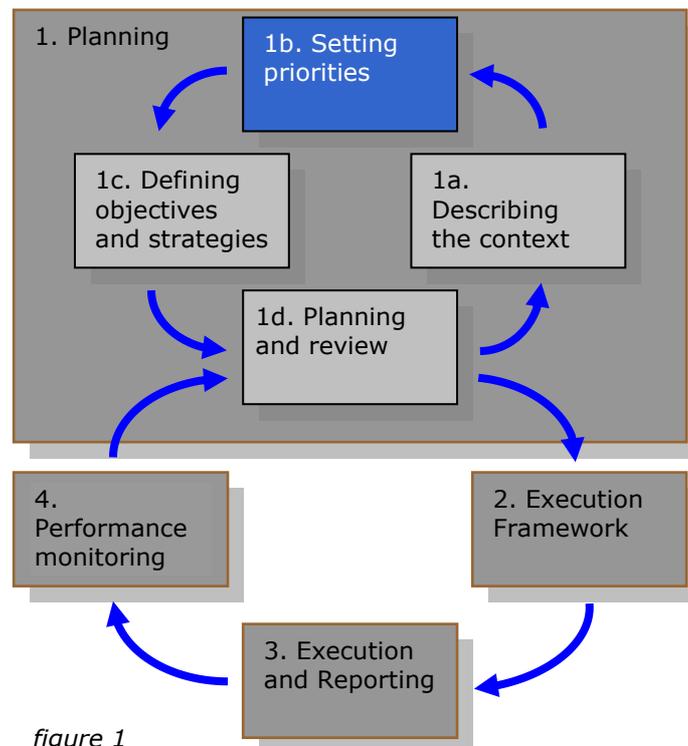
figure 1

The 4 steps 1a – 1d form the Planning Cycle. The output of the Planning Cycle is the inspection plan. In order to write the inspection plan the inspecting authority first has to identify the relevant activities that should be covered by the inspection plan and gather information on these activities. With this information the inspecting authority can perform an assessment of the risks of the identified activities and assign priorities to these activities (box 1b Setting priorities). This project (easyTools) gives descriptions in detail on how risk assessment tools could work in practice. A following step is to define (measurable) inspection objectives and targets for the activities to be inspected and to choose the best inspection strategy to accomplish these targets. All these steps contribute to the inspection plan. All these planning steps are described in the step-by-step guidance book that can be found here.

This project
The aim of this project is to develop a guidance book and a flexible and user friendly program for risk assessment within the planning of environmental inspections. The aim of this guidance book is to guide the user through the steps that are taken to build a risk assessment method for the planning of inspections. Furthermore, this guidance book will introduce the IRAM tool that is developed

by the easyTools workgroup, which will be made available to all member states on the IMPEL website.

The risk assessment method IRAM is based on results of an evaluation of risk assessment tools currently used in IMPEL member countries. Besides the tools also an evaluation of risk criteria is made. A list of risk criteria can be found in annex 2 and 3.

1.2 Risk based approach in the Member states

Different methods for risk based approach are being used across Member States. Based on the inventory made by the easyTools workgroup the methods can be classified in three groups: Linear Mean Value; Mean Value of Risk and; Maximum Value. Section 2.4 gives more detail on these methods.

All systems work either with a database or a spreadsheet within a network or in a stand-alone system. Although most methods and tools are a copy from systems used in other organizations or Member states they all have been tailor made to fit the exact needs of the inspecting authority. There are no good or bad systems. They come with their own advantages and disadvantages.

Because all inspecting authorities have their own tasks and responsibilities a fixed set of standard risk criteria cannot be given. The criteria mentioned in annex 2 and 3 of this guidance book should therefore only be seen as good examples.

This guidance book is limited to the final result of the easyTools workgroup. It is not intended to provide an extensive description of all the risk assessment tools that are used throughout the IMPEL Member countries. The Integrated Risk Assessment Method (IRAM) has been developed by the easyTools workgroup and has been tested by different inspecting authorities.

Sometimes the involvement of stakeholders in the development of the Impact criteria and the Operator Performance criteria might be necessary. For example, in some IMPEL Member Countries the outcome of a risk assessment is also used to set the level of the inspection fee that has to be paid by the operators. The IRAM tool is setup so that self-assessment by an operator is possible.

1.3 Structure of this guidance book

Chapter 2 describes risk assessment in general terms. Chapter 3 starts with a flow sheet that can be used as navigation map. It describes the process of risk assessment step-by-step. The manual of how the IRAM tool works can be found in annex 1.

2. Introduction into Risk assessment

The main goal of a risk assessment is to prioritize the workload of an inspecting authority. The result of an assessment might be an inspection frequency of inspection objects with a related inspection effort or the classification of their risk and the tasks that an inspecting authority has to perform. The reason for prioritizing our workload is that inspecting authorities have limited resources (inspectors and finance), which should be distributed among the inspection objects in an accountable way. In a risk-based approach, most inspection effort should be expended on the objects with the highest risks (highest risk first).

To begin, it is necessary to make some basic assumptions and to define concepts:

Risk is a function of the severity of the consequence (the effect) and the probability this consequence will happen: Risk = f (effect, probability)

In this guidebook, Risk is defined as:

Risk	=	**Effect**	*	**Probability**

Effect depends on the source (how powerful is it?) and on the receptor (how vulnerable is it?); What is the impact of the source on the receptor?

In this guidebook, effect is represented by **Impact Criteria[1].**

Probability is considered to be a function of the level of management, the level of compliance with laws, regulations, permits, attitude, the age of the installation, *etc.*

In this guidebook, probability is represented by **Operator Performance Criteria[2].**

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[1], [2] *We realize that in this method Impact criteria can also include some probability.*

There are many definitions for the concept "Risk".
In this guidance book we use the following definition: The Risk of an (industrial) activity in inspection planning is defined as the (potential) impact of the activity on the environment or the human health if the operator is not compliant with the regulations by law or permit conditions

2.1 Impact Criteria (IC)

$$\boxed{\text{Risk}} = \boxed{\text{Effect}} * \boxed{\text{Probability}}$$

To assess the effect, the object is rated against impact criteria. The impact criteria can differ between inspecting authorities and tasks. When assessing the risk for IPPC (IED) installations examples of appropriate impact criteria include:

- Quantity/quality of air pollution
- Quantity/quality of water pollution
- (Potential) pollution of soil and ground water
- Waste production or waste management
- Amount of dangerous substances
- Local nuisance (noise, odour)

For SEVESO establishments examples of appropriate impact criteria include:

- External safety
- Complexity of the production
- Organisation of damage limitation
- Domino establishments
- Past impacts

In assessing the impact, the severity of the consequence and the vulnerability of the receptor are taken into account.

In order to account for both the magnitude of the emission and the sensitivity of the receptor, you must use 2 impact criteria for that item. e.g. Air:
- IC1 = amount of the substance that is emitted
- IC2 = the distance and vulnerability of the surroundings

2.2 Operator Performance Criteria (OPC)

Risk	=	**Effect**	*	**Probability**

Probability is considered to be influenced by the quality of management, the level of compliance with laws, regulations, permits etc., the attitude of the operator, the age of the installation, etc. To take this into account, the object can be scored against operator performance criteria, e.g.:

- Attitude
- Compliance
- The implementation of an environmental management system e.g. EMAS
- Age of the installation.

Operator performance criteria can influence the risk in a positive way (good compliance) or in a negative way (age of the installation).

2.3 Weighting factors (WF) and weighting terms (WT)

Not all the impact criteria or operator performance criteria within a risk assessment necessarily have the same importance. For that reason, weighting is introduced, so one criterion gets a higher weight in the calculation than another. Using weighting is often a political choice. It allows the inspection authority to easily adjust the risk assessment and set new priorities when there is political importance.

Within IRAM two types of weightings are used, term and factor.
We speak of a "<u>weighting term</u>" (WT) when it is added:
- IC(weighted)=IC + WT

We speak of a "<u>weighting factor</u>" (WF) when it is multiplied:
- OPC(weighted)=OPC * WF(OPC),
- Inspection profile=IC(weighted) * WF(INSP)

2.4 Determination of the risk category

After assessing the different factors that influence the risk of the inspection object, the risk category can be determined. In the course of the easyTools project different types of risk assessment methods from several European countries were studied. In the end these methods could be reduced to three different types. All others were variations of these.

Types of Risk Assessment Methods

1. Linear Mean Value
   Risk = (C1W1 + C2W2 + … + CnWn)/n
2. Mean Value of Risk
   Risk = (C1W1 + C2W2 + … + CnWn)/n * P
3. Maximum value
   Inspection frequency = Max(IT1,IT2, …,ITn)

   C = impact criterion
   W = weighting factor
   P = probability of occurrence
   Max = maximum of
   IT = inspection task with fixed frequency

Linear mean value method

In the linear mean value method all impact or risk criteria are added with or without weighting and the resulting sum is divided by the number of criteria. The resulting mean or average values correspond to a certain risk category.

The main disadvantages are:
- high risks from some criteria are levelled out by low risks from other criteria;
- the more criteria are included in the assessment, the smaller is the dispersion of the results;
- the limits of the risk categories are not transparent;
- it is no real risk assessment because there are no probability factors in the calculation.

Different scorings for an inspection object are presented in the 4 examples below clarifying the disadvantages mentioned above.

Risk = (IC1+IC2+IC3+IC4+IC5+IC6) / total number of ICs

Risk = (3+4+5+4+4+3)/6 = 3.8
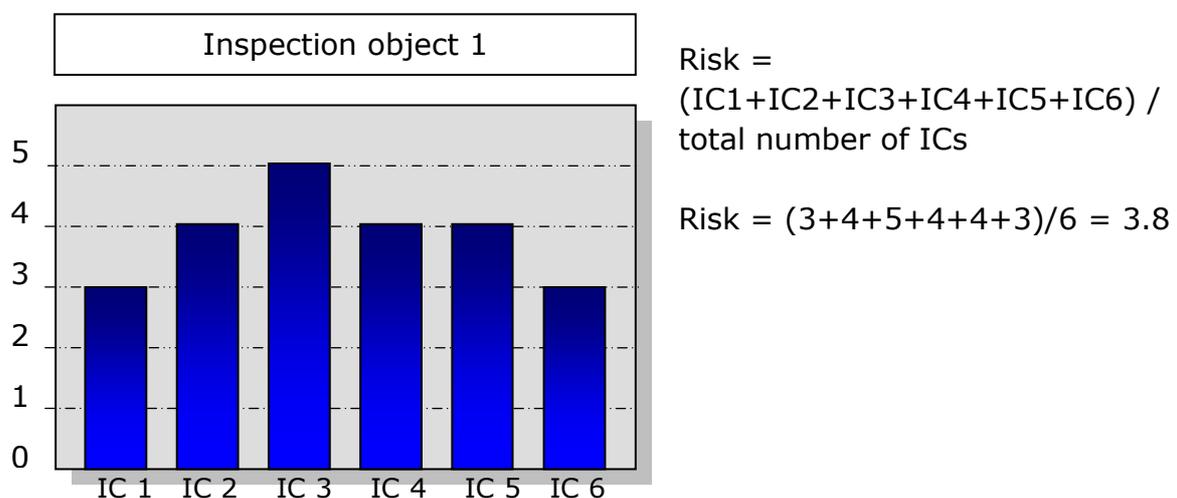
Inspection object 2
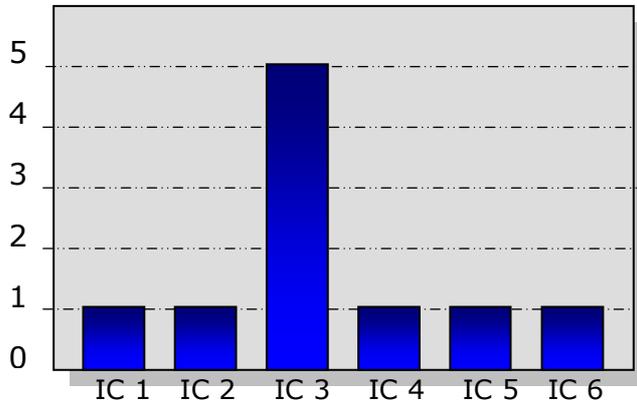
Risk = (1+1+5+1+1+1)/6 = 1.7

Inspection object 3
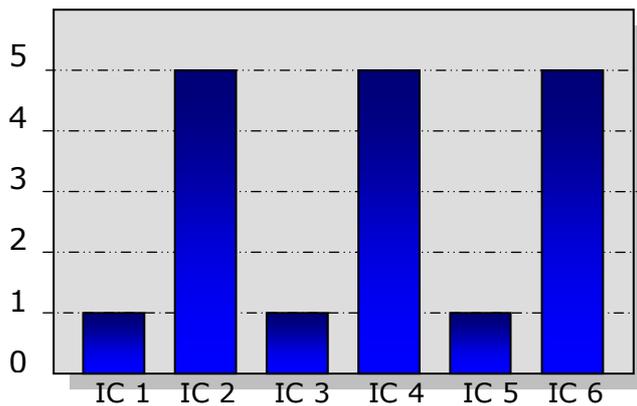
Risk = (1+5+1+5+1+5)/6 = 3

Inspection object 4
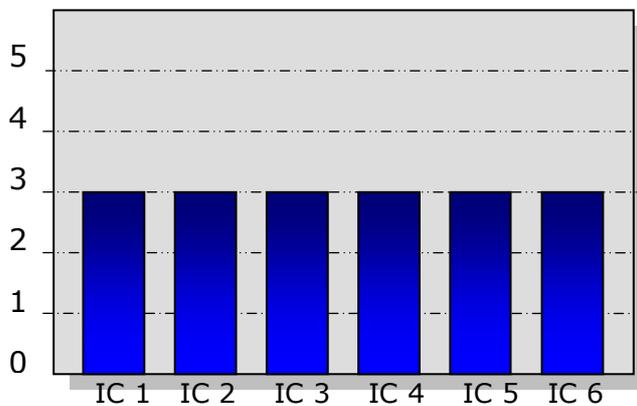
Risk = (3+3+3+3+3+3)/6 = 3

Mean value of risk method

The mean value method is similar to the linear mean value method. The main difference is that there are probability factors in the calculation. These factors could include the performance of the operator or the type of installation (e.g. IPPC, SEVESO).

Risk = (IC1+IC2+IC3+IC4+IC5+IC6) / total number of ICs * P

The main disadvantages are again:
- high risks from some criteria are levelled out by low risks from other criteria;
- the more criteria are included in the assessment, the smaller is the dispersion of the results;
- the limits of the risk categories are not transparent.

And:
- the result of the calculation depends to a great extent on the setting of the probability factor.

Maximum value method

In the maximum value method the result of the risk assessment depends on the frequency settings for different inspection tasks. In the example that was analysed the settings were:
- Seveso establishment – once a year;
- IPPC installation – every three years;
- Facility under Solvent Emissions Directive – every seven years; and so on.

Always the highest frequency is valid for the assessed facility.

A = inspection once a year
B = inspection once every 2 years
C = inspection once every 3 years
D = inspection once every 4 years
E = inspection once every 5 years
F = no inspections
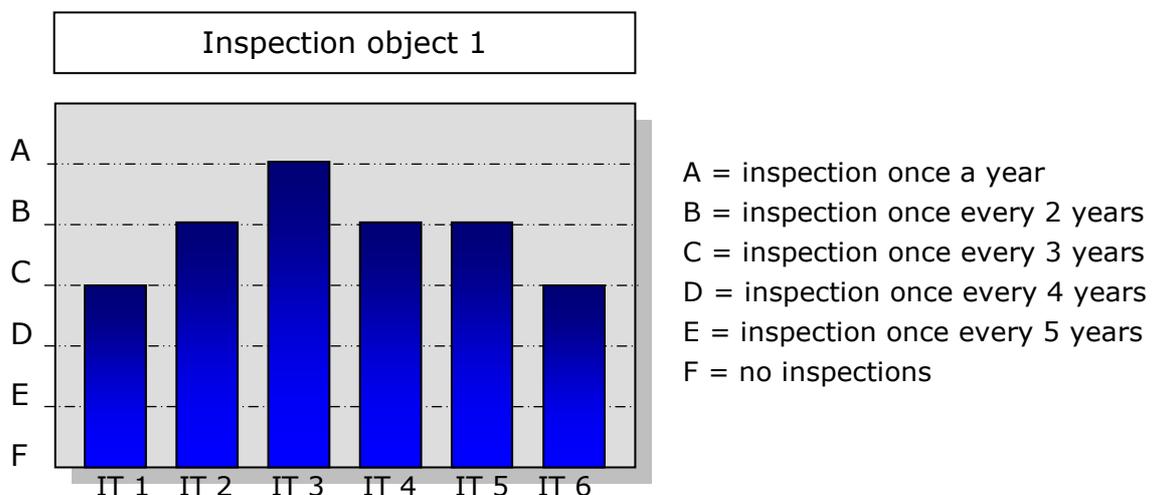
Inspection frequency = Max(IT1,IT2,IT3,IT4,IT5,IT6)

The highest Inspection Task is IT3 with a score A (frequency once a year), this means the Risk category for this inspection object triggers a inspection frequency of once a year.

The main disadvantages are:
- There is no risk assessment within the inspection tasks;
- It is not a real risk assessment because there are no probability factors in the calculation;
- The outcome of this total assessment will show a higher number of inspections compared to other methods;
- There are no steering mechanisms;
- The inspection frequencies of less import inspection tasks do not influence the result. This information about the inspection object is not used.

2.5 Rule based method (IRAM)

The Rule based method, IRAM (Integrated Risk Assessment Method) was developed by the easyTools project team by combining the advantages of the three methods, while limiting the disadvantages.

IRAM also differentiates between impact criteria, probability criteria and risk categories. The scores of the impact criteria are directly linked to the risk categories and therefore to the inspection frequencies, similar to the maximum value method. In the maximum value method an inspection task - such as Seveso inspections - induce the highest inspection frequency, but in IRAM the inspection coordinator decides before the start of the assessment how many highest scores of an inspection task are needed to induce the highest inspection frequency. Within IRAM this is called "The Rule". The more impact criteria are used for the assessment the higher the number of highest scores that is "necessary" to induce the highest inspection frequency. This is a clear difference to the mean value methods; the highest scores cannot be levelled out by low scores of other criteria. IRAM comes with 4 important principles, see box below.

IRAM Principles
1. The inspection frequency is determined by value of the highest score;
2. The inspection frequency is reduced by one step, if the set minimum number of highest scores (called "the Rule") is not met;
3. The inspection frequency can be changed by only one step up or down based on operator performance;
4. The higher the sum of scores, the longer the inspection time.

Example:

The highest score for all impact criteria is "5" which equals to the highest risk category and the highest inspection frequency of (for instance) once a year. If the minimum number of highest score is 2, the inspection frequency of once a year is induced when at least two impact criteria have a maximum score of "5". In that case the risk category is also "5". If only one impact criteria has the maximum score of "5" the risk category will be lowered by one step to "4" and the inspection frequency is less than once a year.
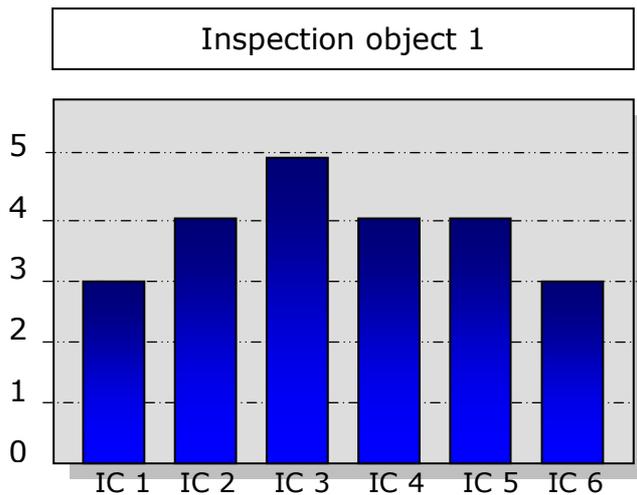
Inspection object 1

If the rule ="1", "only one highest score is enough", then the Risk category = 5

If the rule ="2", "two highest scores are needed", then the Risk category is lowered by one step (Risk category = 4).

Inspection object 2
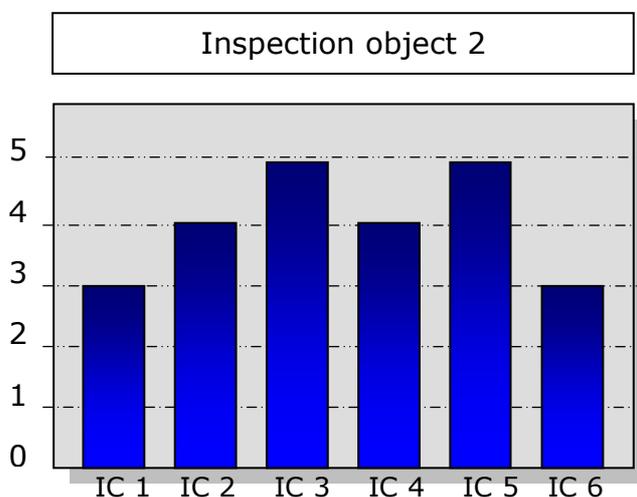
If the rule = "1", "only one highest score is enough", then the Risk category = 5;

If the rule = "2", "two highest scores are needed", then the Risk category stays 5;

If the rule = "3", "three highest scores are needed", then the Risk category is lowered by one step (Risk category = 4).

2.6 Role of probability criteria

In IRAM, the operator performance criteria (OPC) are used as probability criteria. Their role is to shift the Risk category and therefore the inspection frequency. In case of good operator performance the shift will be to a lower inspection frequency and in case of bad operator performance the shift will be to a higher inspection frequency. For this reason the operator performance criteria can be

scored with "-1" (good), "0" (moderate) and "+1" (bad). In case of good operator performance one point is subtracted from each impact score and in case of bad operator performance one point is added to each impact score. By introducing these probability criteria, the impact scores are transformed into risk scores.

As a result the inspection frequency will be one step lower or respectively one step higher. In case of more than one operator performance criterion the result of the scoring will be the average of all OPC scores, rounded to the integer. This avoids that the shift of the inspection frequency will be bigger than one step.

Example Inspection object 1:
The operator performance of this inspection object is good: OPC = "-1"
This means: 1 point is subtracted from each impact score;
The impact scores are turned into risk scores.

Inspection object 1

IC-1 = RC
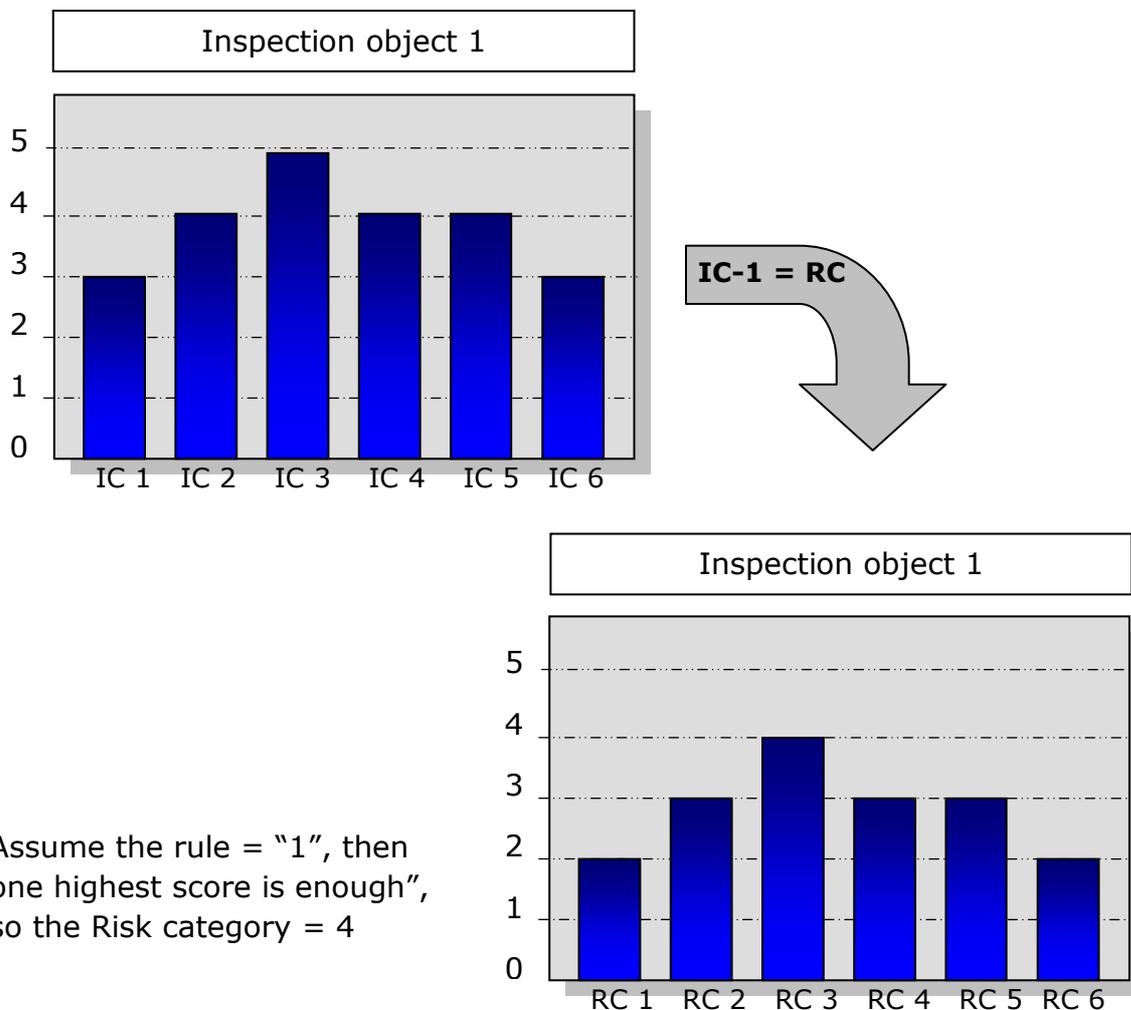
Assume the rule = "1", then one highest score is enough", so the Risk category = 4

Inspection object 1

Example Inspection object 2
The operator performance of this inspection object is bad: OPC = +1;
This means: 1 point is added to each impact score.

Inspection object 2

IC+1 = RC

Inspection object 2
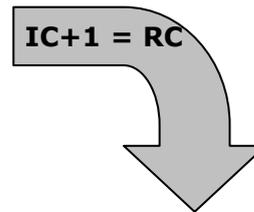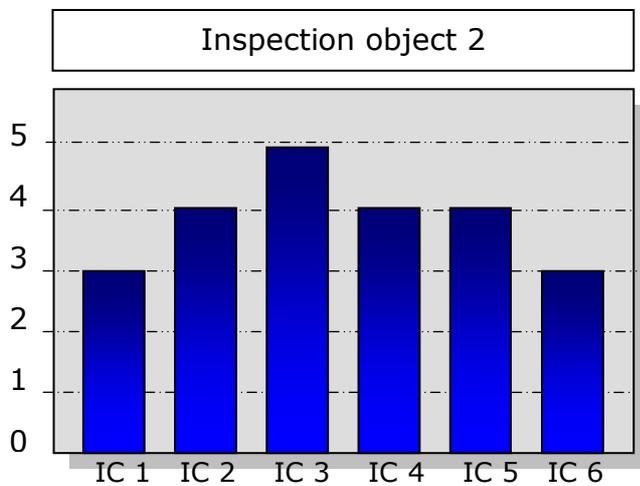
Assume the rule ="1" again, then one highest score is enough, so the Risk category = 6.
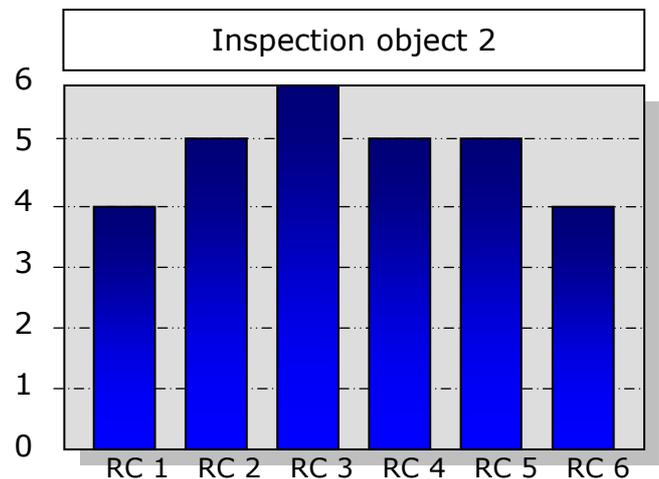
Note that if the maximum risk category was defined to be 5, then the final risk category for this inspection object will be the maximum = 5.
If so desired, the inspection authority can decide on a higher inspection frequency for this specific inspection object.

The result is a Risk profile that could be used by the inspector to choose the most important subjects for inspection.

2.7 Legal obligations and policy, the safety net

After assessing the risk of an inspection object and calculating the risk category, an inspection frequency can be assigned to the inspection objects.
Sometimes legal obligations with respect to the minimum inspection frequency per inspection object need to be taken into account. For example the new IED sets the minimum inspection frequency for low risk installations at 1 inspection in 3 years.

To make sure we comply with these legal obligations IRAM will also introduce a so called "safety net". This safety net will ensure that the inspection frequency for this inspection object will never be lower than the legal minimum inspection frequency.

2.8 "How much time will it take?": the inspection profile

The outcome of the risk assessment sets the frequency of inspections. The frequency however doesn't tell us how much time we need for an inspection. A very complex inspection object may take more time to inspect than a simple object. Besides technical complexity we also have to take into account the scope of the inspection: will it be a fully integrated inspection or an inspection only on the most important environmental issues? This last part of complexity, the inspection profile, can be included in a risk assessment model and will give information on the question "how much time will this take me".
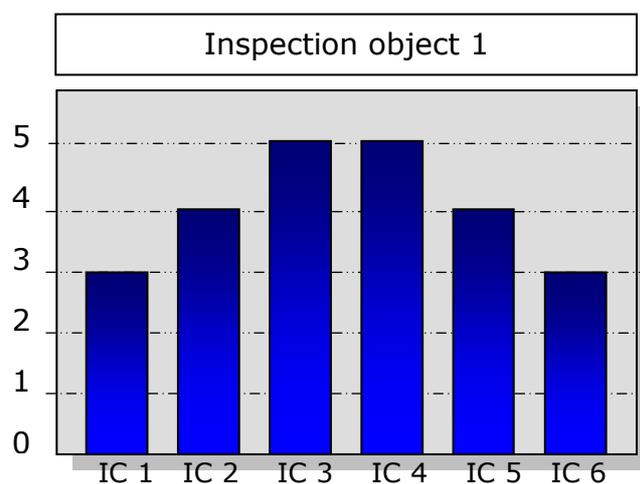
Examples:

2.8 (a) Inspection object 1 scores high on several impact criteria:
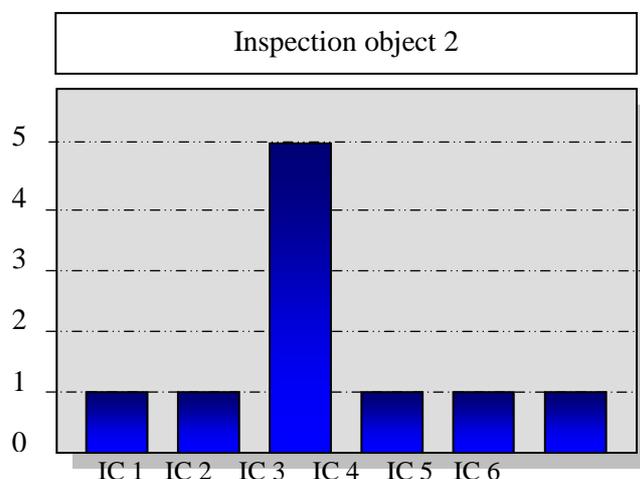
2.8 (b) Inspection object 2 scores high on just one impact criterion:

The (theoretical) maximum of all the scores = 5+5+5+5+5+5=30
The sum of the scores of inspection object 1 = 3+4+5+5+4+3=24
The sum of the scores of inspection object 2 = 1+1+5+1+1+1=10

The inspection % output from IRAM (i.e. how much time to inspect) is reported as a range of 4 categories in 25% increments. The highest range (100%-75%) is termed 'D' and the lowest (0%-25%) is 'A'. For example, if the required inspection time for a full integrated inspection for both examples of inspection objects above is, say 30 hours, then:

Calculation	Resulting inspection effort category
Inspection object 1 requires 24/30=0,8=**80%** of 30 hours	Category D
Inspection object 2 requires 10/30=0,36=**30%** of 30 hours	Category B

Various options exist for implementing the inspection % ranges outlined above, such as:

- o **Integrated inspections** might be directed where the inspection profile is larger than 50% (i.e. Categories C&D)
- o **Inspection on themes** (e.g. inspection focussing only on Impact Criteria 3 in the 2.8 (b) above) might be directed where the inspection profile is lower than 50% (i.e. Categories A&B)

In addition to the required inspection time that is allocated to inspection objects 1 and 2, the inspection authority can also use the "inspection profile" to determine the focus of the inspection. For object 1 this would be the environmental aspects under impact criteria 2, 3, 4 and 5, while the inspection for object 2 focuses on impact criterion 3.

Another way to deal with complex inspection objects such as object 1 is to work with a multi annual inspection plan:

IC3 and IC4 are inspected every year;
IC2 and IC5 are inspected every second year additionally;
IC1 and IC6 are inspected every third year additionally

3. IRAM: The integrated risk assessment method

Figure 2 shows the basic steps of the Risk Assessment model. Risk assessments start by first defining your criteria and settings. The criteria and Weighting Factors and Terms are defined in step 1a, 1b, 2a and 2b. Next, define "the Rule" (the minimum number of highest scores), the classification of the risk category (in combination with the inspection frequency) the legal obligations, and the weighting factor for inspections. This is done in steps 3 to 6. These settings are normally made by a coordinator and will apply to all the inspection objects that are being assessed under a specific inspection task. In the final steps (7 and 8) the actual data relating to each of the inspection objects are entered.

In the following sections all steps are explained in more detail (worked example of IRAM included in Annex 4).
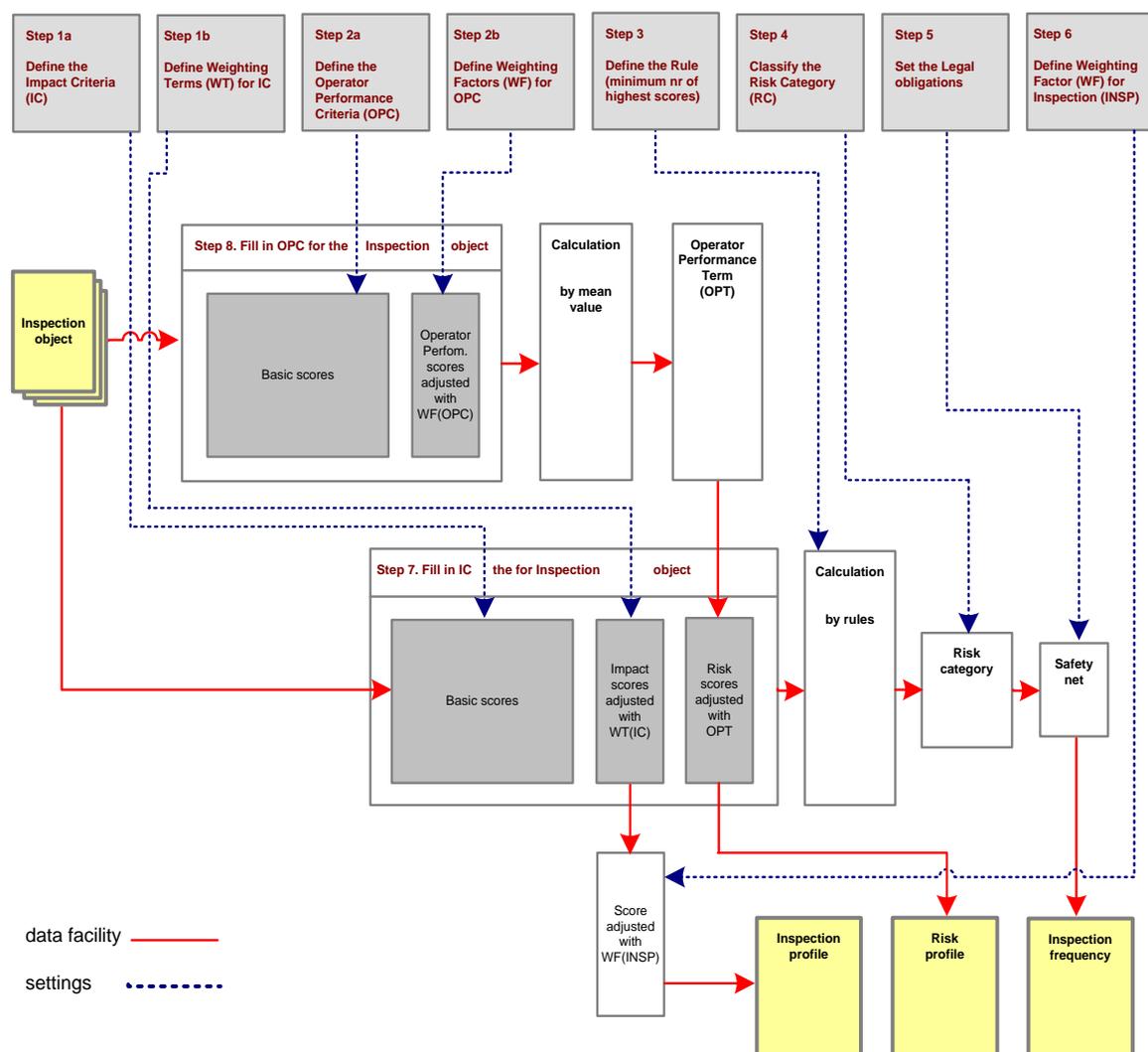
Figure 2

IRAM Principles
1. The inspection frequency is determined by value of the highest score;
2. The inspection frequency is reduced by one step, if the set minimum number of highest scores (called "the Rule") is not met;
3. The inspection frequency can be changed by only one step up or down based on operator performance;
4. The higher the sum of scores, the longer the inspection time.

3.1 Step 1a – Define the Impact Criteria

In step 1a the impact criteria are defined.

Each inspection object is scored against a set of impact criteria, and every impact criterion itself is defined with a set of sub criteria (often with thresholds).

In section 2.1 a list of possible Impact criteria is given. If we take the Impact criterion "emission to air" as an example, the set of sub-criteria and the scoring range could look like this:

Example emission to Air

Score	Definition
0	Activity **is not mentioned** in Annex 1 of the EPRTR Regulation and there are **no releases** to air
1	Activity **is mentioned** in Annex 1 of the EPRTR Regulation but **no threshold** of Annex 2, column 1a, is exceeded and there are **no other releases** to air
2	Activity **is or is not mentioned** in Annex 1 of the EPRTR Regulation, **no threshold** of Annex 2, column 1a, is exceeded but there are **other releases** to air
3	Activity **is mentioned** in Annex 1 of the EPRTR Regulation and **the sum** of the releases to air - normalised to the thresholds* of Annex 2, column 1a - is **>1**
4	Activity **is mentioned** in Annex 1 of the EPRTR Regulation and **the sum** of the releases to air - normalised to the thresholds* of Annex 2, column 1a - is **>5**
5	Activity **is mentioned** in Annex 1 of the EPRTR Regulation and **the sum** of the releases to air - normalised to the thresholds* of Annex 2, column 1a - is **>10**
* Ratio of release to threshold value	

In this example the range is set from 0 to 5

The number of Impact criteria that will be used in the assessment is up to the inspecting authority. This can be different per organisation and per task. Note that "the Rule" (see section 3.5) is closely linked to the number of criteria that are used and that the scores are directly related to the Risk categories and therefore to the inspection frequencies.

Other examples of Impact criteria for IPPC/IED and Seveso can be found in annex 2 and 3.

3.2 Step 2a – Define the Operator Performance criteria

Along with the impact criteria, the inspection object is also assessed against operator performance criteria, see section 2.2 for examples. Here the criteria are also defined with a set of sub-criteria and a scoring range.

The scoring range of the operator performance is different from the one used for impact. The impact is the main driver and can only be adjusted by the operator performance. This effect can be positive, negative or neutral and can be regulated by the scoring range of the operator performance criteria. The smaller the range, the less the effect. Within IRAM a range of -1 to + 1 is used.

If we take the operator performance criterion "compliance" as an example the set of the sub-criteria and scoring range could look like this:

Example compliance

Score	Definition
-1	No relevant non compliances of the installation with the permit conditions or violation of the operator duties
0	One relevant non compliance of the installation with the permit conditions or violation of the operator duties
1	More than one relevant non compliance or one important non compliance with the permit conditions or violation of the operator duties

An inspection object with a high impact and a bad operator performance will receive more attention than an inspection object with a similar impact but with a good operator performance.

Other examples of Operator performance criteria for IPPC/IED and Seveso can be found in annex 2 and 3.

3.3 Step 1b and 2b – Define the Weighting Term and Factor

Impact criteria and operator performance criteria don't always have the same importance. For that reason, weighting is introduced, so one criterion can get a higher weight in the calculation than another. Weighting terms and factors are part of the steering mechanisms.

The importance of weighting is explained in section 2.3.

By introducing a weighting term, for example 2, for the impact criterion "emission to air", 2 is added to the defined impact criterion. That way, we define air as two categories more important than the other impact criteria.

In the operator performance criteria, weighting is done with a weighting factor; the criterion is multiplied by the factor. For example, if the weighting factor for the operator performance criterion "compliance" is 2, the score of this criterion

would be multiplied by 2. The importance of "compliance" is doubled compared to other OPC.

Another way to steer is to use a (temporary) ceiling on one or more impact criteria, the risk ceiling. For these impact criteria it will not be possible to give a higher score than the defined ceiling. For example, if we set the ceiling for the impact criterion 'noise' on 3, it will not be possible to give 'noise' a higher score than 3, although the remaining criteria could have a maximum of 5. In this example noise will normally not be responsible for a high risk classification and the resulting inspection frequency (see section 3.5 for risk classification).

This step is also part of the steering mechanism.

3.4 Step 3 – Define "the Rule"

In step 3 we define "the Rule". In section 2.5 and 3.1 we already mentioned that the Rule is closely linked to the number of Impact criteria and that the more impact criteria we use the higher the Rule will be.

"The Rule" is a number (1 or higher) and works like this:
- Rule 1 means: there is only one highest score (of an impact criterion) required to equate the score of this impact criterion to same risk category.
- Rule 2 means: there are at least two highest scores (of impact criteria) required to equate the score of these impact criteria to the same risk category.
- Rule 3 means: there are at least three highest scores (of impact criteria) required to equate the score of these impact criteria to the same risk category.

If the number of highest scores does not meet the Rule, the Risk category will be lowered by a maximum of 1 step.

This step is part of the steering mechanism.

3.5 Step 4 – Classify the Risk Category

In this step we link the risk category to the inspection frequency. Within IRAM there is a direct relation between the Risk Category and the inspection frequency.

This relationship is a policy decision of the inspecting authority, for example:
- RC0 = no routine inspections
- RC1 = min 1 inspection in 5 years
- RC2 = min 1 inspection in 4 years
- RC3 = min 1 inspection in 3 years
- RC4 = min 1 inspection in 2 years
- RC5 = min 1 inspection every year

The risk category can also be used in allocating (human) resources for different inspection tasks.

This step is part of the steering mechanism.

Note that this step is not part of the internet IRAM tool – rather a policy decision for the inspecting authority as to how to use the outputs of IRAM.

3.6 Step 5 – Set the Legal Obligations and Policy (safety net)

In step 5 we set the legal obligations and or policy (per inspection object) with respect to the minimum and the maximum inspection frequency. In section 2.6 we mentioned that this "safety net" is necessary to make sure we will stay within the boundaries of national and European legislation and the policies of an organization.

The safety net will limit the drop in the risk category to a defined lowest risk category. This would be the case where the actual result of the risk assessment is lower than a given limit (e.g. if one cannot inspect a given facility less that once every three years). On the other hand an inspection authority may choose a highest inspection frequency that should not be exceeded. In this case a highest risk category can be set. This setting will change the risk category to the highest risk category if the result of the risk assessment is higher than that.

These steps are part of the steering mechanism.

3.7 Step 6 – Define the Weighting Factors for Inspections

With weighting factors for inspections we can influence the inspection profile, see section 2.3). Some environmental aspects (that are linked to a certain impact criteria) will take more time to inspect than others (because of size or complexity). For example if we would set the weighting factor for inspections for the impact criterion for waste management on 2, the scoring of waste will have a bigger influence on the inspection profile.

This step is also part of the steering mechanisms.

3.8 Step 7 – Fill in the Impact Criteria scores

In step 7 we fill in the impact scores for the inspection objects. The impact scores are combined with the weighting terms.
The table below gives a simplified impact score of 2 inspection objects.
We use 6 Impact criteria, set the weighting term of Air on 1 and the Rule on 1.

Impact criterion	Air	Water	Waste	Safety	Health	Quality

Weighting Term		1	0	0	0	0	0
	Range:	<0, 5>	<0, 5>	<0, 5>	<0, 5>	<0, 5>	<0, 5>
Inspection object 1		3	3	3	3	3	3
Inspection object 2		5	1	4	1	5	1
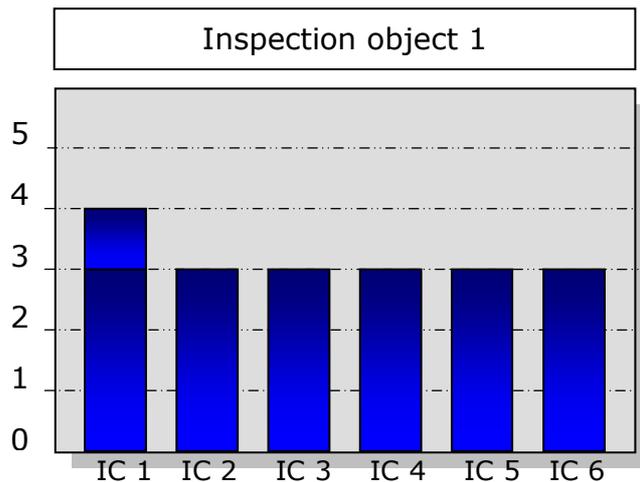
Inspection object 1

For inspection object 1 the score would look like this:

The Risk category for this object (without the influence of other mechanisms) would be 4. If the Rule would be set on 2, the risk category would be 3.
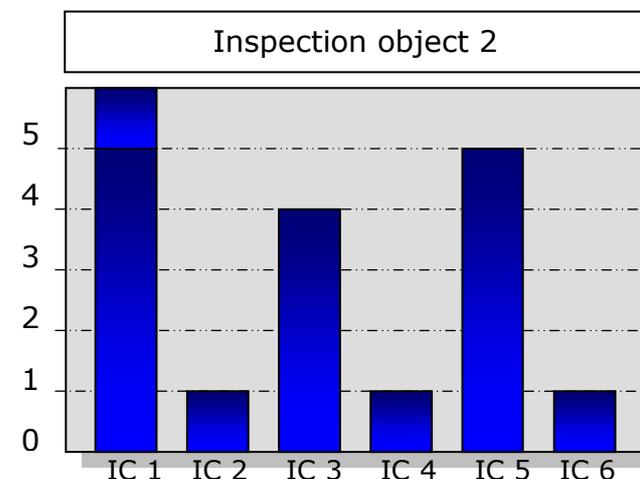
Inspection object 2

And for inspection object 2 the score would look like this:

The Risk category for this object (without the influence of other mechanisms) would be 6. If the Rule would be set on 2, the risk category would be 5
Note: If the highest risk category is set to "5" also the first result will be 5.

3.9 Step 8 – Fill in the Operator Performance scores

In step 8 we fill in the scores for the operator performance for the inspection objects. The operator performance scores are combined with the weighting factors. The table on the next page gives a simplified operator performance score of the same 2 inspection objects. We use 3 criteria and set the weighting factor on compliance on 2. Note that the Rule is only applicable to the impact criteria and not here.

Operator criterion Performance		Attitude	Compliance	EMAS	Operator performance term
Weighting factor		1	2	1	
	Range:	<-1, +1>	<-1, +1>	<-1, +1>	<-1, +1>
Inspection object 1		1	0	1	1
Inspection object 2		0	-1	0	-1

From the scores, an average operator performance score is calculated, the operator performance term (OPT).

In the table above, inspection object 1 scores an operator performance term of 1, and inspection object 2 scores an operator performance term of -1.
The calculation with the weighting factor (in case of object 2) worked as follow: compliance with factor 2 scored two times -1, the other criteria both scored 0. Operator performance term is -2 divided by 4 = -0.5, which is rounded to the integer: -1. In case the weighting factor would be 1 the operator performance term would be 0 because -1/3 = -0.33, which is rounded to the integer: 0.

The way the operator performance (term) influences the risk assessment is that it induces a shift on the impact score. The impact scores, combined with the OPT-score (that results from the operator performance scores), give Risk scores! A good operator performance term (-1) lowers the risk, so it leads to a risk score that's lower than the impact score. A bad operator performance term (+1) raises the risk and will lead to a higher risk score. An average operator performance term (0) will not change the risk.

If we look at the same inspection objects the graphs (after adjusting the impact criteria with the operator performance term) would now look like the following:
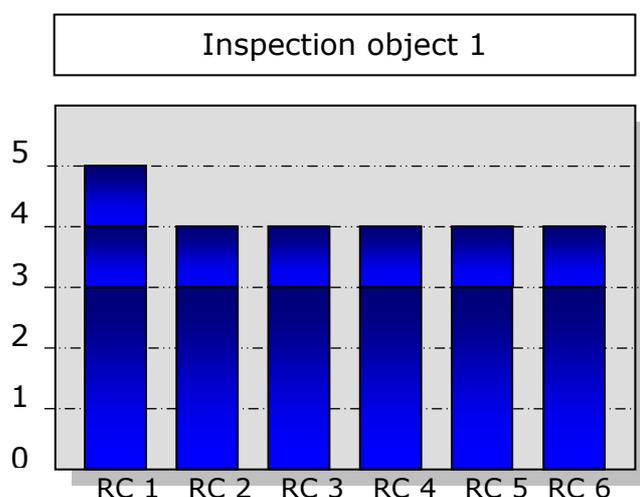
Inspection object 1

For inspection object 1 the score would look like this because the OPT is added to every criterion: +1.

The Risk category for this object would be 5. If the Rule would be set on 2, the risk category would be 4.
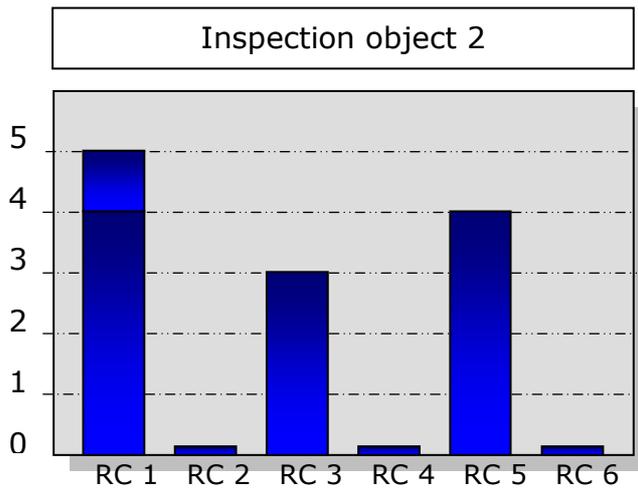
Inspection object 2

And for inspection object 2 the score would look like this because the OPT is added to every criterion: -1.

The Risk category for this object would be 5. If the Rule would be set on 2, the risk category would be lowered to 4.

Annex 1

**Description of the tools for the
Integrated Risk Assessment Method (IRAM)**

The tools for the "Integrated-Risk-Assessment-IRAM" reflect the results of the easyTools project 2010 and 2011. IRAM makes a distinction between two different kinds of assessment criteria: impact criteria and operator performance criteria. **Impact Criteria (IC)** such as emissions, environmental sensitivity etc. are used to assess the possible impacts of different hazards to the environment and the human health. **Operator Performance Criteria (OPC)** are used as a measure for the probability of occurrence of an impact. In combination, the impact criteria and the operator performance criteria describe the environmental and health risk of the assessed inspection object (e.g. an industrial installation). IC are scored for each inspection object by the responsible inspector according to the presetting by the inspection coordinator, e.g. 0 = no impact, 1 = low impact, 2 = moderate impact, …, n = maximum impact. OPC are scored by the inspector in the following way: -1 = good operator performance, 0 = moderate operator performance and 1 = bad operator performance.

From the scores of the operator performance criteria the average – the **Operator Performance Term (OPT)** - is calculated by the programme. The OPF can take the values of "-1", "0", or "1". The OPT is added to each impact score by the programme giving the risk profile. As a result the risk category will be one step lower for "-1" and one step higher for "1" (see below).

"The Rule": calculation of the risk category
In IRAM the minimum number of highest risk scores determines the risk category and the inspection frequency: "x" or more than "x" highest scores result in a risk category with the same score (and an inspection frequency related to this score as set by the inspection coordinator). If there are less than "x" highest scores, the risk category and inspection frequency will be one step lower. In IRAM the number "x" is free to choose under "Number of highest scores". For up to 5 impact criteria the number of highest scores may be 1, for up to 10 it may be 2, and for up to 15 it may be 3.

Inspection effort
In IRAM the sum of the (weighted) impact scores are related to the inspection effort; the higher the scores the more effort has to be put into the inspection and more time is needed for the inspection. If all scores are at maximum level the result of the inspection effort is 100%. Beginning from this the inspection coordinator may assign fractions of the maximum inspection time to 80, 60 or 40% inspection effort. The inspection % output from IRAM (i.e. how much time to inspect) is actually reported as a range of 4 categories in 25% increments. The highest range (100%-75%) is termed 'D' and the lowest (0%-25%) is 'A'.

Steering parameters

IRAM uses a lot of steering parameters to make it fit for different demands of the inspection tasks and the inspection authorities. The most import is the minimum number of highest scores (see above). The default value is "2". Other steering parameters are:

Lowest risk category (safety net) – the resulting risk category of the assessment cannot be lower than the set value. The default value is "1".

Highest risk category - the resulting risk category of the assessment cannot be higher than the set value. The default value is "5".

Maximum possible score (of an impact criterion) – the inspector cannot score higher than the set value; it is also used for the determination of the inspection effort. If the maximum score of one criterion is lower compared to other criteria it cannot induce the highest inspection frequency (kind of weighting). The default value is "5".

Shift of score (weight) – is used to put a weighting term (addition) on this specific impact criterion. The default value is "0"; the weight should be in the range from "-2" to "2".

Weight of criterion – is used to put a weighting factor (multiplication) on this specific operator performance criterion. The default value is "1"; the weight should be in the range from "1" to "3"; fractions are also possible. In spite of this multiplication the result of the mean value will not be smaller or bigger than -1 or 1. The advantage of weighting is that the most important operator performance criterion (e.g. compliance) will count more than the others.

Inspection weight – is used to put a weighting factor (multiplication) on the inspection effort of this specific impact criterion. The idea behind it is that some kinds of inspections need more effort and take more time than others. The inspection weight will also be multiplied with the maximum score to give the maximum inspection effort of the specific criterion. The default value is "1"; the weight should be in the range from "1" to "10".

For the linear mean value method (see below):

Weight of criterion – is used to put a weighting factor (multiplication) on the specific risk criterion. The default value is "1"; the weight should be in the range form "1" to "10". Note that with this method there is no difference between impact and operator performance criteria. With this method the sum or mean value of the risk scores can be used to determine the risk category.

Beginners should start with the default values and only introduce other steering values when they are familiar with the method.

Results

Under "Risk Profile" the calculated risk scores for every impact criterion of the inspection object are displayed. The risk profile indicates which criteria are more important and which are less. The information of the risk profile can be used for the inspection planning. No impact criterion scored with "0" can be increased or decreased by the operator performance or a weighting factor. No risk score can be lower than "0".

Under "Inspection Profile" the weighted impact criteria (shift of score and inspection weight: see above) are displayed. The scores tell us how much

inspection effort is needed for every criterion in relation to the other criteria. The information of the inspection profile can be used for the inspection planning.

The risk category is calculated from the highest score of all risk criteria and the number of highest score. If the number is bigger than or equal to "minimum number of highest score" the risk category will be identical to the highest score. If the number is smaller than that the risk category will be identical to the highest score minus 1. If the risk category would be bigger than "highest risk category" it will be reduced to "highest risk category". If - on the other hand - the risk category would be lower than "lowest risk category" it will be increased to "lowest risk category" (safety net!).

From the sum of weighted impact scores (sum of inspection profile) the "inspection effort (%)" is calculated as a percentage of the "Maximum inspection effort". The inspection % output from IRAM (i.e. how much time to inspect) is reported as a range of 4 categories in 25% increments. The highest range (100%-75%) is termed 'D' and the lowest (0%-25%) is 'A'. For assigning the risk categories and the inspection efforts to inspection frequencies and inspection times an example was developed within an Excel programme (see below).

As an alternative the "Sum of risk profile" or the "Mean of risk profile" can also be used to determine risk categories if appropriate.

Linear mean value method

An alternative approach to the integrated risk assessment method is realised with the linear mean value method. It is independent from IRAM and should only be used if IRAM seems to be inadequate for the specific inspection task. In the linear assessment approach all risk criteria (there is no difference between impact and operator performance criteria) are considered as equal and are combined in a linear equation together with weighting factors:

Risk = $(RC_1*WF_1 + RC_2*WF_2 + … + RC_n*WF_n)/(WF_1 + WF_2 + … + WF_n)$

with RC = Risk Criterion and WF = Weighting Factor.

1. Internet based programme:

http://84.40.9.12:8080/lip/authenticate.do

For registration the "Register" button from the start page has to be pushed. A registering form will be developed in which the user has to fill in the following data: first name, surname, user identification, e-mail address and the language. After the register button is pushed an e-mail containing the password will be forwarded to the user e-mail address. After the user gets the password he can logon into system by entering the user ID and password on the start page of the IRAM tool.

To get an easy and flexible tool three types of registered users of IRAM were developed: administrator, inspection coordinator and inspector. These users have different levels of access into system.

The administrator has the highest level of authority in the IRAM tool. His responsibilities are:

- Give the inspection coordinator role to nominated users
- Delete registered users
- Hold contact with the programmers

There will be two persons who will get the role of administrator. One of them will be the project leader of the "easyTools" Project and the second one will be the Secretary of IMPEL.

The inspection coordinator has the following responsibilities:

- To put the inspectors of his administration under his coordination.
- To create forms for the inspection tasks.

The inspection coordinator will be set by one of the two administrators after nomination by the competent authority.

After logon into system using the ID and password the inspection coordinator gets five menus:

- *Forms*, which includes the Integrated Risk Assessment for Inspection Planning template
- *Master data,* containing the User Administration template
- *Folders A –Z,* which cover all folder developed within the tool
- *Forms A – Z,* which contain all IRAM forms developed within the tool
- *Search,* which facilitates to find a certain form by following criteria: title, author or keywords
- *Support,* with the source code and the description of the Java script used for the programming of the tool.

The User Administration template allows changing the coordinator's inspection identification data including password. Also under this field the inspection coordinator can chose the inspectors who will be under his coordination by marking the box corresponding to the inspector's ID/name. Unmarking this box will release the inspector from his coordination.

Under the Integrated Risk Assessment for Inspection Planning template using the button "New record" the inspection coordinator can create a new form for risk assessment. A single form has to be developed for each inspection task under the responsibility of his administration. As a fist step the inspection coordinator has to choose the method he wants to use for risk assessment:

- IRAM method by clicking in the box corresponding to Integrated Risk Assessment Method or
- LMVM method by clicking in the box corresponding to Linear Mean Value Method.

Using the "+" button beneath the impact criteria box and operator performance criteria box new criteria can be created. Here the name and the graduation of score (between "0" and "maximum score") have to be set for each criterion. For this the inspection coordinator can use the examples given the guidance book or the inspection authority can develop new ones.

Under the IRAM method the inspection coordinator has to set the steering values like lowest/highest risk category, minimum number of highest score,

maximum score, weight term/factor, and inspection weight. The lowest risk category should be set according to regulatory request (for example for IPPC/IED installations the minimum inspection frequency must be at least one inspection every three years). The steering values set by the inspection coordinator are mandatory for the inspectors under his coordination.

Every form developed by the inspection coordinator will be stored in the folder "Integrated Risk Assessment for Inspection Planning". Also a compilation of these forms will be found under the drop down menu of "Inspection task" from the IRAM form.

The tool also offers the possibility to modify the existing risk assessment forms.

The inspector has the lowest level of authority in the IRAM tool. Her responsibility is to fill in the data into the form developed by the inspection coordinator.

The inspector enters into system using the ID and password. Under menu "Forms" on the start page of the IRAM tool the inspector can open the folder "Integrated Risk Assessment for Inspection Planning" where the forms developed by his inspection coordinator can be found. For flexibility reasons a compilation of these forms will be found under drop the down menu "Inspection task" from the IRAM form.

First the identification number and the name of the inspection object (e.g. IPPC installation, Seveso establishment, waste water purification plant or landfill) must be entered by the responsible inspector. Also the date of the last inspection and the address data can be entered for identification purposes.

Then the inspector has to enter values for "lowest risk category" and "highest risk category". For that he/she has to check if there are any regulatory demands for an inspection task (like at least one inspection every three years for IPPC/IED installations). The corresponding risk category has to be entered in the "lowest risk category" cell. If after the calculation the Risk category will be lower than that it will be increased to the set value for "lowest risk category". All other results will not be changed. Also if the calculated risk category will be higher than the value entered for the "highest risk category" it will be decreased to this value. All other results will remain unchanged.

In the next step the scores for all impact criteria have to be entered according to the settings of the inspection coordinator. The range of scores lies between "0" and "maximum score". The description of each score from this range is set by the inspection coordinator and can be seen under the corresponding drop down menu.

Next the scores of the operator performance criteria (OPC) have to be entered. The range of scores lies between "-1" and "1". The description of each score is set by the inspection coordinator and can be seen under the corresponding drop down menu.

After clicking the calculator button on top of the form the results of the calculation are shown in and under the "Risk and inspection profile" box. The tool will calculate the following parameters:

- Highest score
- Number of highest risk scores
- Risk category
- Maximum inspection effort (100%)
- Sum of inspection profile
- Inspection effort (percentage)
- Inspection category
- Sum of risk profile and
- Mean of risk profile.

An inspection frequency is not calculated because the assignment of frequencies to risk categories may be different in the member countries, and the risk category can also be used for the assessment of different inspection tasks.

All entered and calculated data can be downloaded into inspector's computer by clicking "Download XLM" or "Download CVS" buttons. The XML and CVS files will be named according to the ID of the inspection object and date of assessment. Also the tool will develop a printable file (PDF) if the "Print" button is pushed.

The XML files can also be uploaded into the IRAM tool for recalculations with changed risk scores or with different steering values. This could be done with the help of the "Upload XML" button.

The XML and CVS files can be read into databases to see all data together and compare them.

The tool could be used in English and German. For other languages there is a need for translation. The translation can be performed by the by the member state in need using translation forms provided by the IMPEL secretary.

Risk assessment without registration

For risk assessment without registration any interested user could use the menu "Integrated risk assessment" on the start page of tool. The tool will generate an assessment form through which the user could set the method he wants to use for risk assessment:

- IRAM method by clicking in the box corresponding to Integrated Risk Assessment Method or
- LMVM method by clicking in the box corresponding to Linear Mean Value Method.

The form can be further developed by adding the criteria used for performing the risk assessment box using the "+" button beneath the impact criteria box and operator performance criteria. For each impact criterion and operator

performance criterion the user has to fill in the score and the steering values (maximum score, weight term/factor). Also the user must set the lowest/highest risk category, minimum number of highest score). These can be taken from the guidance book or the user can develop new one. The lowest risk category should be set according to legislative request (for example for IPPC/IED installations the minimum inspection frequency must be at least one inspection every three years).

For the linear mean value method only risk criteria have to be entered.

Further the user has to fill in the form his name, the name and ID of the inspection object, the inspection task and the date of inspection planning which are mandatory fields. Optionally the tool offers the possibility to fill in the date of last inspection. This information might be useful for developing an inspection plan or if the Access data base is use for data storing and processing.

When all data are entered for calculation the user has to click on the button "Calculation of the integrated risk assessment". The tool will calculate the following parameters:

- Highest score
- Number of highest risk scores
- Risk category
- Maximum inspection effort (100%)
- Sum of inspection profile
- Inspection effort (percentage)
- Inspection category
- Sum of risk profile and
- Mean of risk profile.

All entered and calculated data can be downloaded to the inspector's computer by clicking "Download XLM" or "Download CVS" buttons. The XML and CVS files will be named according to the ID of the inspection object and date of assessment. Also the tool will develop a printable file (PDF) if the "Print" button is pushed.

To update the data used for assessment the tool offers the possibility to upload the XML files. This could be done with the help of the "Upload XML" button.

2. Excel Tool

The Excel tool was developed by the easyTools project as an example of a database for the assessment results with the full functionality of the IRA Method. The data can be read in from the csv files of the internet based programme and are processed in the Excel tool. The steering values can be changed by the

inspection coordinator to study how they influence the full set of assessed inspection objects.

Inspection Coordinators Page

On the first table "Steer" of the Excel programme nearly all steering parameters can be entered by the inspection coordinator. They are valid for all inspection objects under assessment in a specific inspection task. Up to 15 impact criteria and up to 5 operator performance criteria that shall be used by the inspectors for the assessment can be entered here. The inspection coordinator can choose these criteria from the guidance book or create new ones. They have to be identical with the criteria used in the internet based programme.

To each impact criterion the maximum score has to be entered because from that the maximum inspection effort is calculated. If there is a need to change the weight of some impact criteria, weights can be entered in the next column under "shift of score (weight)". It is also possible to enter an inspection weight on each impact criterion, as the inspection efforts related to the criteria can differ.

From the "number of highest scores" the risk category is calculated. From the number of highest scores on forward the risk category is identical to the highest score (the Rule); otherwise the risk category is "highest score - 1".

It is also possible to put a weight on the operator performance criteria. The weight will be multiplied with the score.

In the following column the possible scores regarding risk categories are entered. To every risk category an inspection frequency has to be assigned. In the following two columns fractions of the maximum inspection effort and the corresponding allocated inspection times are entered by the inspection coordinator.

Inspectors Page

On the table "IRAM" the name and the identification number of the inspection object, the settings for the lowest and highest risk category and the scores of the impact and operator performance criteria can be read in from the corresponding csv-files of the IRAM web application by using the input button of the "Data input" table. The data are displayed on the IRAM table. All csv files can be opened, and imported together in one action. On this page the date of the first inspection has to be entered by the inspector for each inspection object. These data are needed for the calculation of the follow up inspections.

Assessment Results

On the table "Results" the calculated risk scores for every impact criterion of every inspection object are displayed in the "Risk Profile" box. No impact criterion scored with "0" can be increased or decreased by the mean operator performance or a weighting factor. No risk score can be lower than "0".

In the box "Inspection Profile" the weighted impact criteria (shift of score and inspection weight: see "Steer" page) are displayed. The scores tell us how much inspection effort is needed for every criterion in relation to the other criteria.

The next two columns under "Results" display the highest scores of all risk criteria and the numbers of highest scores for every inspection object. If the

number is bigger than or equal to "number of highest score" the risk category will be identical to the highest score. If the number is smaller than that, the risk category will be identical to the highest score minus 1. If the risk category is bigger than "highest risk category" it will be reduced to "highest risk category". If - on the other hand - the risk category is lower than "lowest risk category" it will be increased to "lowest risk category" (i.e. the so-called 'safety net').

From the sum of weighted impact scores (sum of inspection profile) the "inspection effort (%)" is calculated as a percentage of the "sum of maximum inspection profile" (see above). The inspection % output from IRAM (i.e. how much time to inspect) is reported as a range of 4 categories in 25% increments. The highest range (100%-75%) is termed 'D' and the lowest (0%-25%) is 'A'.

Inspection Programme

On the table "Plan" the calculated risk categories and inspection efforts are linked to the inspection frequencies and inspection hours set by the inspection coordinator on the "Steer" table.

Under "Inspection date" the date of the first planned routine inspection is displayed. The dates of the two following inspections are calculated by the programme.

The inspection objects can be sorted e.g. in decreasing risk categories.

Data Import

On the Import table the import of data from downloaded IRAM csv files are managed. How it works is specified on the table. It is also possible to delete imported files.

Linear Assessment Results

On the table "Linear" an alternative approach to risk assessment is used. It is independent from the IRAM method and should only be used if the IRAM method appears inadequate for the specific inspection task. In the linear assessment approach all risk criteria are considered as equal and are combined in a linear equation together with weighting factors (i.e. there is no difference between impact and operator performance criteria).

In this case Operator Performance Criteria have to be entered just as Impact Criteria in the "Steer" table according to the settings in the internet based programme because only the scores of the Impact Criteria from the "IRAM" table are used for calculation.

It is possible to enter a weight on each criterion (blue field between criteria names and calculated scores), since the priorities or the risks of the criteria can differ.

Inspection frequencies are allocated to the calculated "Linear mean values" according to the steering box on top of the "Linear" table.

Under "First inspection" the inspector has to enter the date of the first planned routine inspection. The dates of the two following inspections are calculated by the programme.

The inspection objects can be arranged in proper order, e. g. decreasing risk categories.

3. Access Tool

IRAM is a useful risk assessment tool. For each inspection object – installation we get one xml file. Our purpose is to compare results of many xml files, to analyze them and to make an annual program / schedule. Therefore xml files have to be merged together.

The Access tool was developed by the easyTools project as an example of a tool for reporting. The data can be read in from the xml files of the internet based IRAM programme and are processed in the Access tool.

Converting xml files

The xml files produced by IRAM tool are not accepted by MS Access 2003 and have to be converted into an acceptable form. A special programme XmlDataConvert.exe (and XmlData.xslt) converts xml files. Therefore, files XmlDataConvert.exe and XmlData.xslt have to be in the same folder.

1. Copy as many xml files as you wish produced by IRAM tool into one folder ("Input Folder"; like D:\IRAM\IN\).
2. Run XmlDataConvert.exe programme and set the path for Input Folder (like D:\IRAM\IN\) and Output Folder (another empty folder for converted xml files; like D:\IRAM\OUT\). Press the CONVERT button.
3. A "Conversion succeeded." message confirms that conversion of xml files was successful.

Importing xml files

After conversion, xml files have to be merged into one database. This is Xml_trap.mdb and it runs in MS Access 2003 environment. Because of this MS Access 2003 have to be installed on PC. If you use higher version of MS Access (like Access 2007), an Xml_trap.mdb file has to be converted into a higher version of Access before importing xml files.

1. Run Xml_trap.mdb and pres the IMPORT XML button.
2. Set the path of an Output Folder (like D:\IRAM\OUT\) and press the IMPORT button.
3. An "Import Completed" message confirms importing of xml files into the MS Access database.

Merging additional xml files into Access is done simply by the same procedure.

Reporting – An annual plan

Before publishing an annual plan the frequency of planed inspections regarding a Risk Category have to be set. This is done by pressing the SET FREQUENCY button and entering the appropriate data. The time unit of a frequency is month.

1. After setting a frequency press the OPEN PLAN button and a document with an annual plan will open.

This is an annual plan based on a very simple model and does not take into account time need for inspections and available resources.

Additional analysis

For an additional analysis of data it is possible to export data form Access to Excel by pressing an EXPORT TO EXCEL button.

Delete of data

Before starting a new plan, it is necessary to delete all old data otherwise old and new data will be mixed. This is done by pressing the DELETE DATA button.

Remark

In different EU countries, they use different date formats. The IRAM tool uses a dot as a date separator. Because of that an option PLAN will not work, if we do not use a dot as a date separator (like 28.03.1968) in Windows.

Therefore, a Windows setting have to be done, if in your country a dot as a date separator is not used.

This setting is:

Start / Settings / Control Panel / Regional and Language Options / Regional Options / Customize / Date / Date separator: . (dot)

Annex 2: Example risk criteria for IPPC/IED installations

Impact Criteria

1. Type and kind of installation

Score	Definition
0	Non-IPPC installation without need of an environmental permit
1	Non-IPPC installation without need of an environmental permit but object of environmental regulations
2	Non-IPPC installation that needs an environmental permit
3	IPPC installation; Non-IPPC installation as relevant part of a lower tier Seveso establishment
4	IPPC installation as relevant part of an upper tier Seveso establishment or with obligatory environmental impact assessment
5	IPPC installation as relevant part of an upper tier Seveso establishment and with obligatory environmental impact assessment

2. Impacts on human health or the environment

Score	Definition
0	No environmental complaints, environmental accidents or incidents in the last 5 years
1	At least one minor environmental complaint, minor environmental accident or incident in the last 5 years
2	More than two minor environmental complaints, minor environmental accidents or incidents in the last 5 years
3	At least one relevant environmental complaint, relevant environmental accident or incident in the last 5 years
4	One important or more than two relevant environmental complaints, environmental accidents or incidents in the last 5 years
5	One important or more than two relevant environmental complaints, environmental accidents or incidents in the last 2 years

3. Releases to air

Score	Definition
0	Activity **is not mentioned** in Annex 1 of the EPRTR Regulation and there are **no releases** to air
1	Activity **is mentioned** in Annex 1 of the EPRTR Regulation but **no threshold** of Annex 2, column 1a, is exceeded and there are **no other releases** to air
2	Activity **is or is not mentioned** in Annex 1 of the EPRTR Regulation, **no threshold** of Annex 2, column 1a, is exceeded but there are **other releases** to air
3	Activity **is mentioned** in Annex 1 of the EPRTR Regulation and **the sum** of the releases to air - normalised to the thresholds* of Annex 2, column 1a - is **>1**
4	Activity **is mentioned** in Annex 1 of the EPRTR Regulation and **the sum** of the releases to air - normalised to the thresholds* of Annex 2, column 1a - is **>5**
5	Activity **is mentioned** in Annex 1 of the EPRTR Regulation and **the sum** of the releases to air - normalised to the thresholds* of Annex 2, column 1a - is **>10**
* Ratio of release to threshold value	

4. Releases to water / off-site transport in waste water

Score	Definition
0	Activity **is not mentioned** in Annex 1 of the EPRTR Regulation and there are **no releases** to water or off-site transports in waste water
1	Activity **is mentioned** in Annex 1 of the EPRTR Regulation but **no threshold** of Annex 2, column 1b, is exceeded and there are **no other releases** to water or off-site transports in waste water
2	Activity **is or is not** mentioned in Annex 1 of the EPRTR Regulation, **no threshold** of Annex 2, column 1b, is exceeded but there are **other releases** to water or off-site transports in waste water
3	Activity **is mentioned** in Annex 1 of the EPRTR Regulation and **the sum** of the releases to water or off-site transports in waste water - normalised to the thresholds* of Annex 2, column 1b - is **>1**
4	Activity **is mentioned** in Annex 1 of the EPRTR Regulation and **the sum** of the releases to water or off-site transports in waste water - normalised to the thresholds* of Annex 2, column 1b - is **>5**
5	Activity **is mentioned** in Annex 1 of the EPRTR Regulation and **the sum** of the releases to water or off-site transports in waste water - normalised to the thresholds* of Annex 2, column 1b - is **>10**
* Ratio of release or off-site transport to threshold value	

5. Releases to land

Score	Definition
0	Activity is **not mentioned** in Annex 1 of the EPRTR Regulation and there are **no releases** to land
1	Activity **is mentioned** in Annex 1 of the EPRTR Regulation but **no threshold** of Annex 2, column 1c, is exceeded and there are **no other releases** to land
2	Activity **is or is not mentioned** in Annex 1 of the EPRTR Regulation, **no threshold** of Annex 2, column 1c, is exceeded but there are **other releases** to land
3	Activity **is mentioned** in Annex 1 of the EPRTR Regulation and **the sum** of the releases to land - normalised to the thresholds* of Annex 2, column 1c - is **>1**
4	Activity **is mentioned** in Annex 1 of the EPRTR Regulation and **the sum** of the releases to land - normalised to the thresholds* of Annex 2, column 1c - is **>5**
5	Activity **is mentioned** in Annex 1 of the EPRTR Regulation and **the sum** of the releases to land - normalised to the thresholds* of Annex 2, column 1c - is **>10**
* Ratio of release to threshold value	

6. Off-site transfer of waste

Score	Definition
0	No activity specific waste
1	Non-hazardous waste <2,000 t/y or hazardous waste <2 t/y
2	Non-hazardous waste >2,000 t/y or hazardous waste >2 t/y
3	Non-hazardous waste >20,000 t/y or hazardous waste >5,000 t/y
4	Non-hazardous waste >50,000 t/y or hazardous waste >10,000 t/y
5	Non-hazardous waste >100,000 t/y or hazardous waste >20,000 t/y

In case of transfrontier shipment of waste into foreign countries (at risk) the limits for scoring are lower:

3	TFS: non hazardous waste >1,000 t/y or hazardous waste >100 t/y
4	TFS: non hazardous waste >5,000 t/y or hazardous waste >500 t/y
5	TFS: non hazardous waste >20,000 t/y or hazardous waste >5,000 t/y

7. Input of waste

Score	Definition
0	No waste input
1	Non-hazardous waste <2,000 t/y and hazardous waste <2 t/y
2	Non-hazardous waste >2,000 t/y or hazardous waste >2 t/y
3	Non-hazardous waste >50,000 t/y or hazardous waste >1,000 t/y
4	Non-hazardous waste >100,000 t/y or hazardous waste >5,000 t/y
5	Non-hazardous waste >250,000 t/y or hazardous waste >10,000 t/y

In case of transfrontier shipment of hazardous waste from foreign countries (at risk) the limits for scoring are lower:

Score	Definition
3	TFI: hazardous waste >500 t/y
4	TFI: hazardous waste >1,000 t/y
5	TFI: hazardous waste >5,000 t/y

8. Quality of the local environment

Score	Definition
0	There is no contribution by the installation and therefore no influence on the environmental quality
2	There is contribution by the installation but the environmental quality is better than the ambient standard
3	There is contribution by the installation and the environmental quality is kept at the ambient standard
4	There is contribution by the installation to the violation of environmental quality standards by less then 3%
5	There is contribution by the installation to the violation of environmental quality standards by more then 3%

9. Sensitivity of the local environment

Residential area, schools, kindergartens, hospitals, homes for the elderly, drinking water catchment areas, flood areas, nature conservation areas* or FFH-areas (nature 2000)*, and wetland programmes*.
In case of more than one object/area the smallest distance counts.
*: Shall be assessed one score lower than the others.

Score	Definition
0	No sensitive areas in the surroundings or distance is >10 km
1	Sensitive areas outside the influence sphere of emissions or distance is <10 km
2	Sensitive areas within the influence sphere of emissions or distance is <5 km
3	Sensitive areas within the influence sphere of mayor accidents or distance is <1,5 km
4	Sensitive areas close to facility premises, the distance is <100 m
5	Facility lies within a sensitive area or in the direct vicinity

10. Risk of accidents

Score	Definition
0	No (categories of) dangerous substances covered by Annex I of the Seveso-II Directive
1	Sum of (categories of) dangerous substances covered by Annex I of the Seveso-II Directive - normalised to the thresholds of Column 2*) - is >1
2	Sum of (categories of) dangerous substances covered by Annex I of the Seveso-

	II Directive - normalised to the thresholds of Column 2*) - is >2
3	Sum of (categories of) dangerous substances covered by Annex I of the Seveso-II Directive - normalised to the thresholds of Column 2*) - is >4 or - normalised to the thresholds of Column 3 - is >0.75
4	Sum of (categories of) dangerous substances covered by Annex I of the Seveso-II Directive - normalised to the thresholds of Column 3*) - is >1
5	Sum of (categories of) dangerous substances covered by Annex I of the Seveso-II Directive - normalised to the thresholds of Column 2*) - is >50
*) Ratio of managed amount to threshold value	

11. Noise

Score	Definition
0	No relevant emissions
1	Noise emissions are more than 5 dB(A) below limit value
2	Noise emissions are more than 1 to 5 dB(A) below limit value
3	Noise emissions are plus or minus 1 dB(A) around limit value
4	Noise emissions exceed limit value by 1 to 5 dB(A)
5	Noise emissions exceed limit value by more than 5 dB(A)*)
*) This can't only be handled by routine inspection, action is needed	

Operator Performance Criteria

1. Compliance

Score	Definition
-1	No relevant non compliances of the installation with the permit conditions or violation of the operator duties
0	One relevant non compliance of the installation with the permit conditions or violation of the operator duties
1	More than one relevant non compliance or one important non compliance with the permit conditions or violation of the operator duties

2. Attitude of the operator

Score	Definition
-1	Operator reacts immediately after recognising a condition of relevant non-compliance
0	Operator reacts after receiving a warning letter form the competent authority
1	Operator reacts only after repeated warning letters or after a formal administrative decree of the competent authority

3. Environmental management system

Score	Definition
-1	Site is registered under EMAS and the operator is working successfully with this environmental management system
0	Site is not registered under EMAS but the operator is working successfully with an accepted environmental management system
1	Site is not registered under EMAS and the operator is not working with an accepted environmental management system

Annex 3: Example risk criteria for Seveso establishments

Impact and Operator Performance criteria

Criteria group 5a (1):

Potential impacts taking into account major-accident hazards

1. Knowledge on the establishment

Score	Definition
1	-
2	Lower tier establishment with good knowledge of the facility
3	Lower tier establishment without good knowledge of the facility
4	-
5	Upper tier establishment with good knowledge of the facility
6	Upper tier establishment without good knowledge of the facility

2. Dangerous substances

Score	Definition
1	The sum of all ratios*) - related to Annex 1, column 2, of the Seveso II Directive - is > 1
2	The sum of all ratios*) - related to Annex 1, column 2, of the Seveso II Directive - is > 3
3	The sum of all ratios*) - related to Annex 1, column 2, of the Seveso II Directive - is > 5 or - related to Annex 1, column 3, of the Seveso II Directive - is > 0,75
4	The sum of all ratios*) - related to Annex 1, column 3, of the Seveso II Directive - is > 1
5	The sum of all ratios*) - related to Annex 1, column 3, of the Seveso II Directive - is > 50
6	The sum of all ratios*) - related to Annex 1, column 3, of the Seveso II Directive - is > 100
*) Ratios of the handled amounts (dangerous substances or categories of dangerous substances and mixtures) and limit values of part 1 and 2 of Annex 1	

3. Organisation of damage limitation

Score	Definition
Lower tier establishments:	
1	Accredited plant fire brigade **or** professional fire brigade plus staff trained in fire fighting on the facility
2	Professional fire brigade **or** voluntary fire brigade plus staff trained in fire fighting on the facility
3	Voluntary fire brigade
Upper tier establishments:	
4	Accredited plant fire brigade
5	Professional fire brigade plus staff trained in fire fighting on the facility
6	Professional fire brigade **or** voluntary fire brigade

Criteria group 5a (2):

Potential impacts taking into account the sensitivity of the local environment

1. Neighbourhood Seveso establishments or other facilities or conditions:

Pipelines, high voltage power lines, risks of earthquakes or floods, and so on

Score	Definition
Lower tier establishments:	
1	No domino establishment and no establishment with other facilities in the neighbourhood or conditions that can cause danger
2	Domino establishment with one neighbouring establishment or establishment with one other facility in the neighbourhood or one condition that can cause danger
3	Domino establishment with more than one neighbouring establishment or establishment with more than one other facility in the neighbourhood or more than one condition that can cause danger
Upper tier establishments:	
4	No domino establishment and no establishment with other facilities in the neighbourhood or conditions that can cause danger
5	Domino establishment with one neighbouring establishment or establishment with one other facility in the neighbourhood or one condition that can cause danger
6	Domino establishment with more than one neighbouring establishment or establishment with more than one other facility in the neighbourhood or more than one condition that can cause danger

2. Sensitive objects and conditions in the neighbourhood:

Residential areas, schools, kinder gardens, hospitals, old people's homes, places of public assembly, water ways, railways, highways, airports, ground water and surface water protection areas, catchment areas of drinking water suppliers, nature protection areas, flood areas

Score	Definition
	Lower tier establishments:
1	No sensitive objects or conditions at a distance <1000 m (for the substances acrolein, phosgene, hydrogen chloride und chlorine the distance is <1500 m)
2	No sensitive objects or conditions at a distance <200 m
3	Sensitive objects or conditions at a distance <200 m
	Upper tier establishments:
4	No sensitive objects or conditions at a distance <1000 m (for the substances acrolein, phosgene, hydrogen chloride und chlorine the distance is <1500 m)
5	No sensitive objects or conditions at a distance <500 m
6	Sensitive objects or conditions at a distance <500 m

Criteria group 5a (3):

Potential impacts taking into account the risk of accidents

1. Process risks, complexity of installations:

Need for adjustment control and surveillance:
low: establishment with low frequented storage facility
medium: establishments with big storage facilities, which are repeatedly used per day or continuous production
high: establishments with multi purpose installations , production with a lot of manual adjustment controls, installations with a lot of different substances or continuously changing substances, discontinuous productions, installations that need a lot of maintenance
Automation level: A high level of automation reduces risks such as faulty operation; a high level of automation is given when the safety relevant processes are under full procedural control.

Score	Definition
Lower tier establishments:	
1	Little need for installation specific control or surveillance **or** establishment with only one safety relevant installation
2	Moderate need for installation specific control or surveillance (in case of high automation level only 1 point) **or** establishment with 2 safety relevant installations
3	Much need for installation specific control or surveillance (in case of high automation level only 2 points) **or** establishment with more than 2 safety relevant installations
Upper tier establishments:	
4	Little need for installation specific control or surveillance **or** establishment with less than 4 safety relevant installations
5	Moderate need for installation specific control or surveillance (in case of high automation level only 4 points) **or** establishment with less than 9 safety relevant installations
6	Much need for installation specific control or surveillance (in case of high automation level only 5 points) **or** establishment with more than 8 safety relevant installations

2. Detection systems for the prevention of accidents

Score	Definition
Lower tier establishments:	
1	Automated systems or permanent manning or inspection walks of trained staff
2	Inspection walks of guard service
3	Not organized
Upper tier establishments:	
4	Automated systems or permanent manning
5	Inspection walks of trained staff
6	Inspection walks of guard service or not organized

Criteria group 5a (4):

Actual impacts

1. Serious complaints, serious accidents and near-misses, incidents and occurrences of non-compliance in the past

Score	Definition
	Lower tier establishments:
1	No serious complaints, serious accidents and near-misses, incidents and occurrences of non-compliance in the last five years
2	One serious complaint, serious accident or near-miss, incident or occurrences of non-compliance in the last five years
3	Several serious complaints, serious accidents or near-misses, incidents or occurrences of non-compliance or at least one mayor accident in the last five years
Upper tier establishments:	
4	No serious complaints, serious accidents and near-misses, incidents and occurrences of non-compliance in the last five years
5	One serious complaint, serious accident or near-miss, incident or occurrences of non-compliance in the last five years
6	Several serious complaints, serious accidents or near-misses, incidents or occurrences of non-compliance or at least one mayor accident in the last five years

2. Control of incidents, near misses and accidents by the operator

Score	Definition
-1	Ideal control of incidents, near misses and accidents in the last five years or there were no
0	Control of incidents, near misses and accidents caused official letters, deficits were corrected
+1	Control of incidents, near misses and accidents need a strong guidance by the competent authority

Criteria group 5b:

Record of compliance with the requirements of this Directive

1. Required records and documents based on the Seveso II Directive:

(e. g. safety report, emergency plan, safety management system, operating instructions)

Score	Definition
-1	All records and documents are available and they don't have significant deficits
0	All records and documents are available but they have some significant deficits
+1	Not all records and documents are available; there is a lack of some import documents.

2. Results and assessment of previous inspections

Score	Definition
-1	Up to 5 deficits but no significant breach of operator obligations
0	Up to 10 deficits or one significant breach of operator obligations
+1	More than 10 deficits or more than one significant breach of operator obligations

3. Attitude of the operator

Score	Definition
-1	Immediate remedial actions (without warning letter)
0	Remedial actions after warning letter
+1	Repeated warning letters necessary or remedial actions only after administrational enforcement

Criterion 5c:

Participation of the operator in the Union eco-management and audit scheme (EMAS), pursuant to Regulation (EC) No 1221/2009 of the European Parliament and of the Council

Score	Definition
-1	The establishment is certified according to the eco-management and audit scheme (EMAS), pursuant to Regulation (EC) No 1221/2009 of the European Parliament and of the Council
0	The establishment is not certified according to the eco-management and audit scheme (EMAS), pursuant to Regulation (EC) No 1221/2009 of the European Parliament and of the Council

Annex 4: Work example of IRAM

- **IED installations**

	Installation IED 1 ID 001		Installation IED 2 ID 002	
	Characterisation	**Score**	**Characterisation**	**Score**
Impact criteria				
Type and kind of installation	IPPC installation	**3**	IPPC installation and relevant part of lower tear Seveso establishment	**3**
Impacts on human health or the environment	No complains, accidents or incidents in the last 5 years	**0**	1 relevant accident 3 years ago	**3**
Releases to air	Sum of PRTR releases to air is 0.7	**3**	Sum of PRTR releases to air is 6.7	**4**
Releases to water / off-site transport in waste water	Sum of PRTR releases to water is 7.5	**4**	Sum of PRTR off-site transport in wastewater is 3.2	**3**
Releases to land	No releases to land	**0**	No releases to land	**0**
Off-site transfer of waste	Off-site transfer of non-hazardous waste is 9,600 t/y	**2**	Off-site transfer of 2.700 t/y hazardous waste to Germany	**3**
Input of waste	No waste input	**0**	Input of non hazardous waste is 75,000 t/y	**3**
Quality of the local environment	Quality standards are kept without problem	**2**	Contribution to violation of NO_2 air quality limit is below 3%	**4**
Sensitivity of the local environment	Installation is surrounded by a nature conservation area	**4**	Installation lies in the direct vicinity of a residential area	**5**
Risk of accidents	No dangerous substances	**0**	Ratio of dangerous substances is 0,9 compared to Column 3	**0**
Noise	No relevant noise emissions	**0**	Noise emission are nearly kept	**3**

	Installation IED 1 ID 001		Installation IED 2 ID 002	
	Characterisation	Score	Characterisation	Score
Operator performance criteria				
Compliance	3 relevant non compliances at the last inspection	**1**	1 relevant non compliance at the last inspection	**0**
Attitude of the operator	Operator is not willing to do anything	**1**	Operator always reacts immediately	**-1**
Environmental management system	No accepted environmental management system	**1**	Site is registered under EMAS	**-1**
Assessment results **using the Rule "minimum number of highest score: 2"**				
Risk category		**5**		**3**
Inspection effort category (%)		**B (31%)**		**C (54%)**

- **Seveso II establishments**

	Seveso 1 ID 003		Seveso 2 ID 004	
	Characterisation	**Score**	**Characterisation**	**Score**
Impact criteria				
Knowledge of the establishment	Lower tier establishment without good knowledge	**3**	Upper tier establishment with good knowledge	**5**
Dangerous substances	The sum of all ratios compared to column 2 is 3.7	**2**	The sum of all ratios compared to column 3 is 125	**6**
Organisation of damage limitation	Municipal professional fire brigade	**2**	Municipal professional fire brigade	**6**
Neighbourhood Seveso establishments or other facilities or conditions	No dangerous facilities in the surroundings	**1**	Gas pipeline is crossing the site of the establishment	**5**
Sensitive objects or conditions in the neighbourhood	Next residential area at a distance of 300 m	**2**	Flood area is surrounding the establishment	**6**
Process risks, complexity of installations	2 safety relevant installations	**2**	Moderate need of surveillance and high level of automation	**4**
Detection systems for the prevention of accidents	No organized surveillance of the establishment	**3**	Inspection walks of trained staff	**5**
Serious complaints, serious accidents and near-misses, incidents and occurrences of non-compliance in the past	3 serious accidents and near misses in the last 3 years	**3**	1 serious non compliance 3 years ago	**5**
Operator performance criteria				
Control of incidents, near misses and accidents by the operator	Operator had big difficulties to manage the mentioned accidents and incidents	**1**	Operator was well prepared to manage the mentioned accident	**-1**

	Seveso 1 ID 003		Seveso 2 ID 004	
	Characterisation	Score	Characterisation	Score
Required records and documents based on the Seveso II Directive	Records and documents need improvement, some relevant were missing	**1**	Records and documents are well prepared	**-1**
Results and assessment of previous inspections	Some minor deficits and 1 relevant case of non compliance	**0**	3 minor deficits	**-1**
Attitude of the operator	Operator is not willing to do anything	**1**	Operator always reacts immediately	**-1**
Participation of the operator in EMAS	No participation in EMAS	**0**	No participation in EMAS	**0**
Assessment results using the Rule "minimum number of highest score: 2"				
Risk category		**4**		**5**
Inspection effort category (%)		**B (37%)**		**D (87%)**