



Rijkswaterstaat
Ministerie van Infrastructuur en Milieu

ECRAN

Capacity building
workshop on compliance
with environmental
legislation

Training Inspection management

Risk Assessment

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10 September 2014

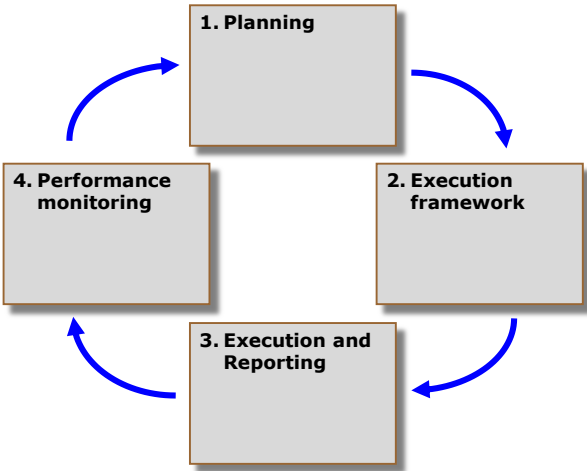


Content

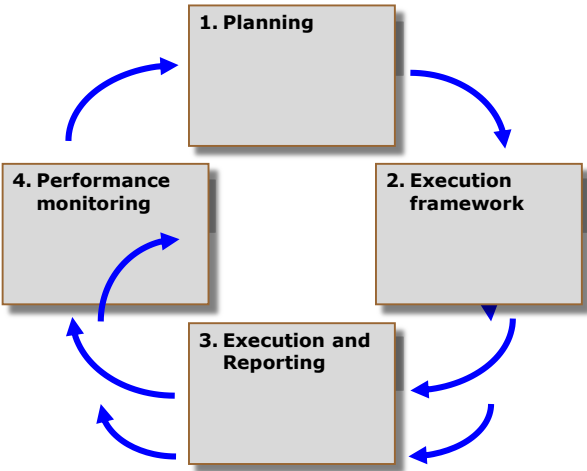
1. Environmental Inspection Cycle
2. **Setting Priorities**
3. Inspection Targets and Performance Monitoring
4. Inspection Plans



Environmental inspection cycle

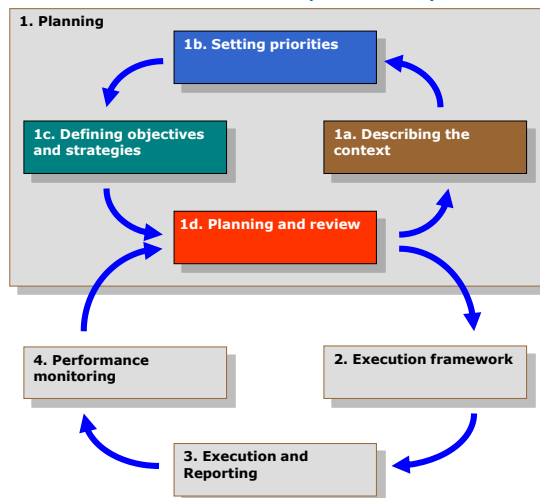


Environmental inspection cycle





Environmental inspection cycle



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Environmental planning cycle



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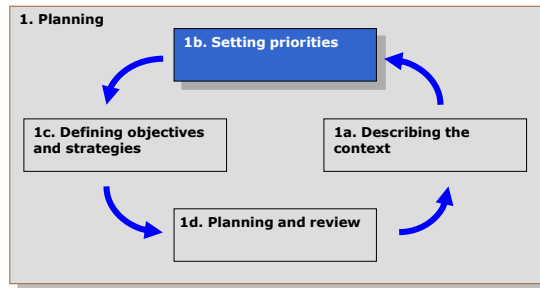
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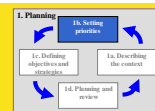


Risk Assessment



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Content

- **Introduction into Risk Assessment**
 - Impact criteria
 - Operator Performance criteria
 - Weight
- **Risk Assessment method used in Europe**
- **Integrated Risk Assessment Method (IRAM)**
 - How does it work?
 - The role of Operator Performance in IRAM
 - The Safety Net
 - Inspection profile

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Introduction into Risk Assessment

Risk

 =

Effect

 *

Probability

- What is Risk?
- Effect = Impact criteria
- Probability = Operator Performance criteria

Effect = Impact criteria (IPPC/IED)

Risk

 =

Effect

 *

Probability

Effect = Impact criteria

For Example:

- Quantity/quality of air pollution
- Quantity/quality of water pollution
- (Potential) pollution of Soil
- Waste production or waste management
- Amount of dangerous substances
- Local nuisance (noise, traffic)



Probability = Operator Performance

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

Probability = Operator Performance criteria:

For Example:

- Attitude
 - Compliance
 - Environmental management system (e.g. EMAS)
 - Age of the installation
-
- The influence is + or -

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Weight

- Not all criteria have the same importance
 - Therefore: Weighting
-
- Weighting is often Political
-
- Weighting factors (*) and
 - Weighting terms (+)



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How to determine the Risk Category?

We found 3 methods in EU:

- Linear Mean Value
- Mean Value of Risk
- Maximum Value

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Linear Mean Value

$$\text{Risk} = (\text{impact crit.1} + \text{impact crit. 2} + \dots + \text{ICn}) / n$$

All impact scores are added and the mean (or 'average') score is determined.

Disadvantages:

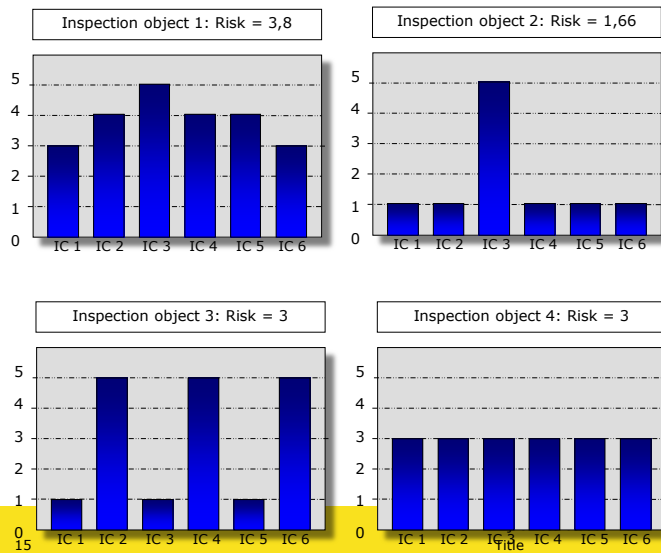
- high risks are levelled out by low risks
- the more criteria, the smaller the spread ('range')
- the limits of the risk categories are not transparent;
- not a real risk assessment because no probability factors in the calculation.

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Linear Mean Value: examples



Mean Value of Risk

$$\text{Risk} = (\text{impact crit. 1} + \text{impact crit. 2} + \dots + \text{ICn}) / n$$

Probability

Same as linear mean value, but Probability is introduced

Same disadvantages except 'Probability'

Plus "the result depends to a great extent on the setting of the probability factor".



Maximum value

Every inspection task has a fixed frequency, e.g.

- Seveso establishment – once a year;
- IPPC installation – every three years;
- Facility under Solvent Emissions Directive – every seven years; and so on.

Inspection frequency =

Max (inspection task 1, insp. task 2, ..., insp.task n)

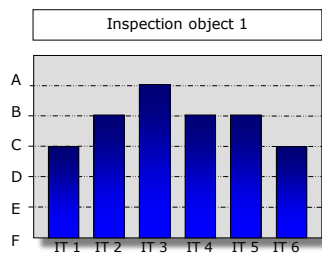
The highest frequency counts

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Maximum value: example



- 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

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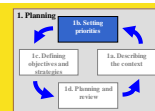
Maximum value: disadvantages

Disadvantages:

- No risk assessment within the inspection tasks
- Probability factors are missing
- Result is a relative higher number of high risk facilities
- No steering mechanisms

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Integrated Risk Assessment Method (IRAM) How does it work?

- IRAM differentiates between:
 - impact criteria
 - probability criteria
 - risk categories
- Impact criteria are linked to risk categories = inspection frequencies (like Max. Value method)
- IRAM uses “The Rule”

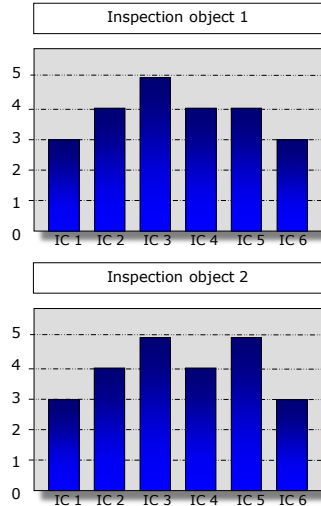
Rule: How many high-scores are needed to receive the highest inspection frequency?

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How does it work: an example



If the rule = “1”, then
the Risk category = 5

If the rule = “2”, then
the Risk category = 4

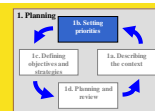
If the rule = “1”, then
the Risk category = 5

If the rule = “2”, then
the Risk category stays 5

If the rule = “3”, then
the Risk category = 4

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The role of Operator Performance in IRAM

Operator Performance criteria are used as Probability criteria.

Their role is to shift (‘move’) the Risk category and therefore the inspection frequency:

- good operator performance:
shift to a lower inspection frequency
- bad operator performance:
shift to a higher inspection frequency

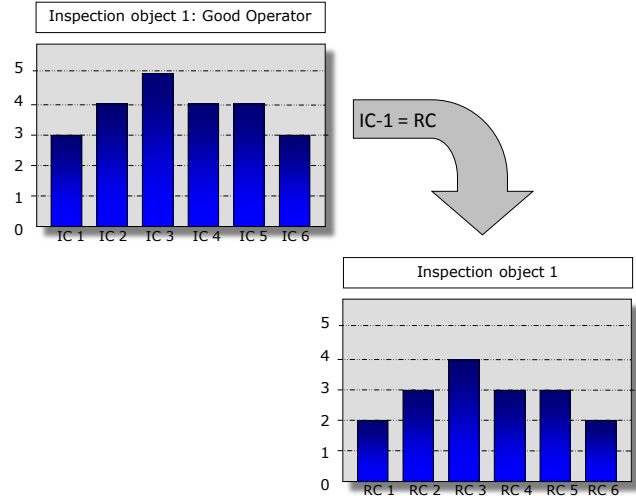
Operator performance criteria can be:

- -1 = good,
- 0 = moderate and
- +1 = bad

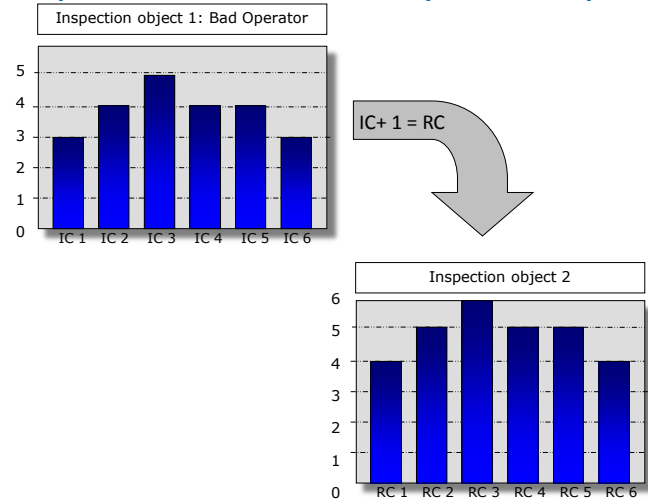
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Operator Performance: example 1: Good Operator Performance



Operator Performance: example 2: Bad Operator Performance





The Safety Net: Legal obligations and policy

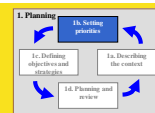
- Some Legislation can set minimum inspection frequencies
e.g. the new European Directive states:
 - Low risk = min. 1 inspection in 3 years
 - High risk = min. 1 inspection in 1 year
- IRAM also works with a “safety net” to comply with these legal obligations:

If result of IRAM < legal minimum frequency,
then result = legal minimum frequency



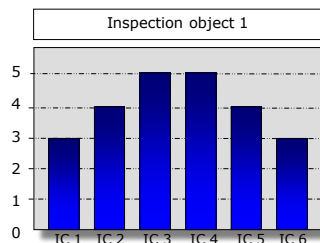
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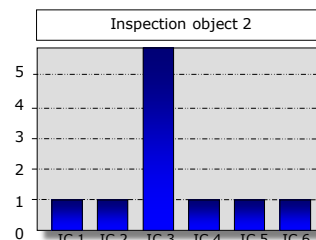
The inspection profile

Inspection time and focus can be derived from the inspection profile:



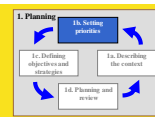
object 1 scores high on
several impact criteria

object 2 scores high
on just one criterion



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The inspection profile

Inspect time: You could use the % between max possible score and the actual score

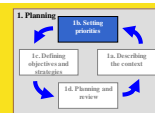
Examples:

- max possible score = 30 points
- Object 1: actual score = 24 points
- Object 2: actual score = 10 points

Can you use this when you know the max inspection time for a certain inspection?

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The inspection profile

Inspection focus: you could use the profile to determine the focus of your inspection.

- Examples:
- Object 1: focus is on items 2, 3 4 and 5
- Object 2: focus is on item 3

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The inspection profile

- Other possibilities
- In a multi annual inspection plan for complex inspection objects like object 1:
 - Item 3 and 4 are inspected every year;
 - Item 2 and 5 are inspected every second year (additionally);
 - Item 1 and 6 are inspected every third year (additionally)

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Working groups

- Develop a set of risk criteria that are relevant for your organisation.
- Take in mind
 - The data that is available
 - The environmental problems
 - Political interest and goals
- Feed back

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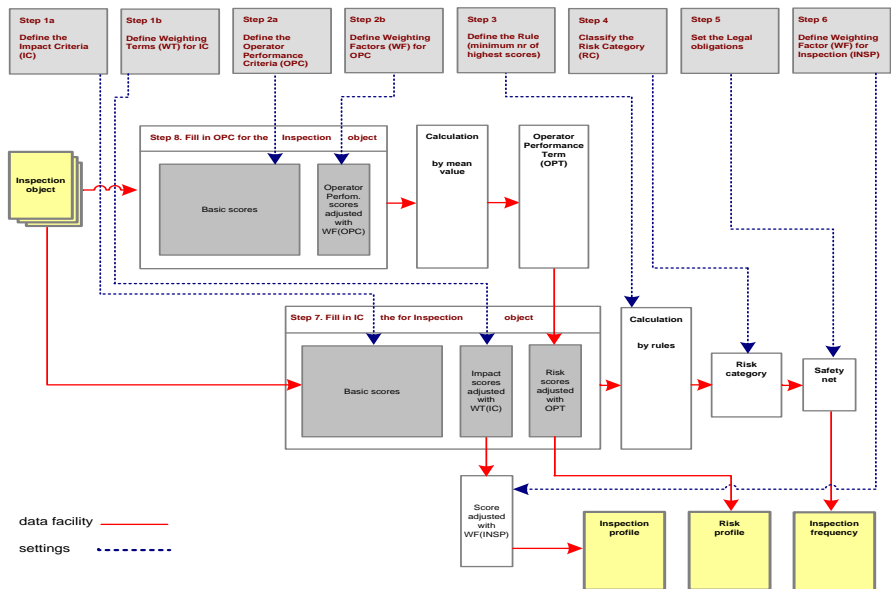
Releases to air

Score	Definition
0	Activity is not mentioned in Annex 1 of the EPRTTR Regulation and there are no releases to air
1	Activity is mentioned in Annex 1 of the EPRTTR 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 EPRTTR 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 EPRTTR 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 EPRTTR 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 EPRTTR Regulation and the sum of the releases to air - normalised to the thresholds* of Annex 2, column 1a - is >10



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

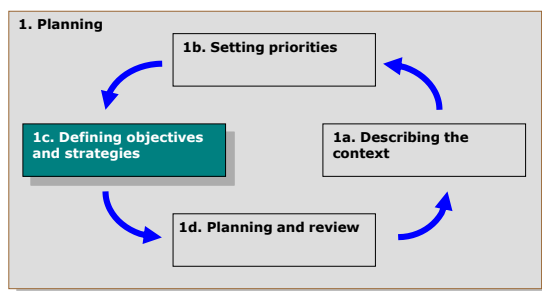


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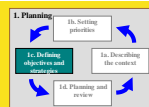


Setting Inspection targets and performance monitoring



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Content

- Targets
 - Input
 - Output
 - outcome
- Setting inspection targets
 - Environmental Inspection Cycle
 - Aspects to be considered
- Performance monitoring
- Practical and organisational aspects
- Case Study

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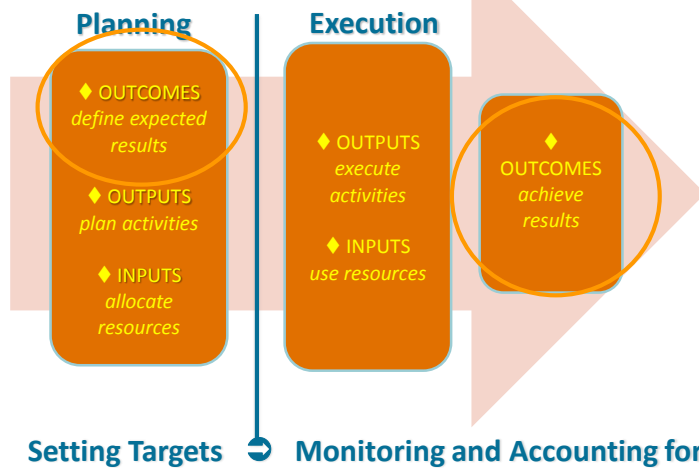
We are heading for...



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Inputs, Outputs & Outcomes



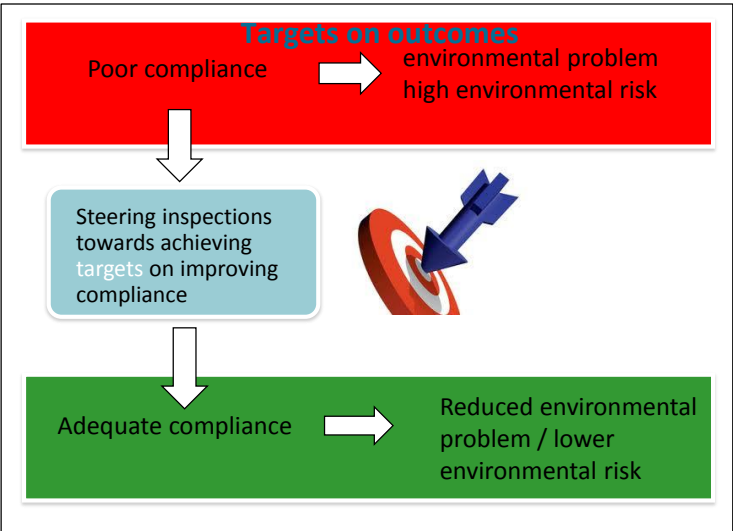
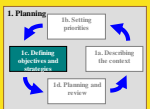
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Targets on outcomes

- What is expected from an inspection authority?
That it will help solve an environmental problem or control or reduce an environmental risk
- And how can an inspection authority provide that?
By persuading or forcing regulatees (operators) to improve their compliance



Summarising...





Inspection targets

on input

Equipment

Staff

on output

Number of site visits

Number of measurements

Number of validated emission reports

on outcome


Improvement of compliance leading to improvement of environment


Improvement of compliance leading to control or reduction of risks of environmental deterioration

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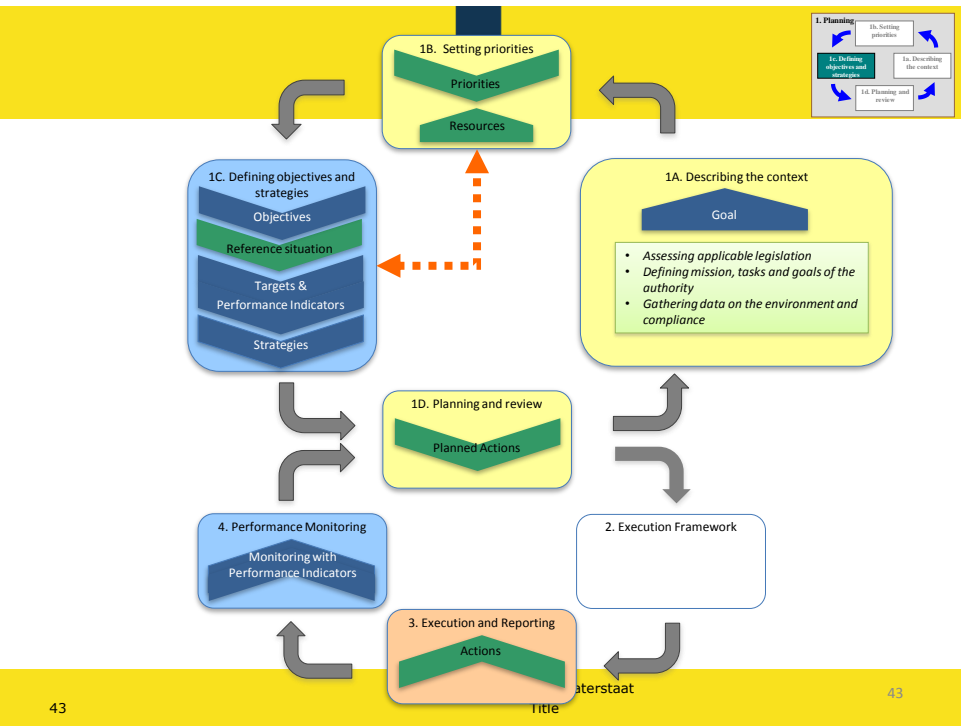


Setting inspection targets (on outcomes)
in the Environmental Inspection Cycle

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Goals	<p>A Goal states in general wordings a situation or state of play the authority wishes to achieve. A goal is normally derived from the mission of the authority and is set on a strategic level.</p>
Priorities	<p>Priority areas are selected on the bases of a risk assessment, looking at compliance and environmental impacts/risks</p>
Resources	<p>The final selection of priority areas will need to take account of the resources available.</p>
Objectives	<p>An objective specifies a goal for a certain priority area.</p>
Reference situation	<p>Clarifying the characteristics of the prioritized area (what is the problem/situation and what is causing the problem) and establishing the baseline from which the target can be defined.</p>
Targets & Performance Indicators	<ul style="list-style-type: none">A target is based on an objective and defines a concrete outcome in terms of an improvement of compliance or of the environment.Performance indicator on input: an indicator stating a certain input at a certain moment, used for monitoring resources.Performance indicator on output: an indicator stating a certain output at a certain moment, used for monitoring and demonstrating progress in carrying out actions.Performance indicator on outcome: an indicator stating a certain outcome at a certain moment, used for monitoring and demonstrating progress in achieving a target.
Strategies	<p>A strategy outlines a mix of actions that aim at influencing the compliance behaviour and engaging stakeholders to help achieving the target.</p>
Planned actions & Actions	<p>The inspection plan describes the targets, indicators and strategy; the inspection schedule describes the planned actions. Planned actions are implemented during execution.</p>
Monitoring with Performance Indicators	<p>Performance is monitored against the performance indicators using data gathered during execution. The results of the monitoring may trigger a review/revision of the targets, indicators, strategies and actions for the next year.</p>

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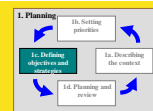
Setting Targets – Aspects to be considered

- Define the targets as SMART (Specific, Measurable, Achievable, Realistic, Timely) as possible;
- Select the key regulatory requirements that should be complied with;
- Select the targeted population;
- Select the proper timeframe (multi annual targets);

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Performance Monitoring

- Performance monitoring is a process to measure whether you are achieving your targets and objectives.
- Here are the main steps in the process:
 - Decide which areas you need to measure;
 - Collect relevant and reliable data;
 - Analyse the data and turn it into useful information;
 - Understand your performance and assess the need for corrective action.
- Performance indicators need to be meaningful (*i.e. linked to the targets*), clear and easy to measure.

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Case study

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Description

Region A

800 IPPC installations

Risk assessment: IRAM

Criteria on Impact and Operator performance

Outcome RA: HR – 160 installations

 MR – 240 installations

 LR – 400 installations

Description

Operator performance consist of the criteria:

Compliance / Attitude / EMS



Extra weight

Compliance has 3 sub levels:

- High level of compliance 60 %
- Medium level of compliance 25 %
- Low level of compliance 15 %

Goals

Priorities

Resources

Objectives


Reference situation

Targets & Performance Indicators

Strategies

Planned actions & Actions

Monitoring with Performance Indicators



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Describing the context

Goals

To control or reduce the risk of environmental deterioration by improving compliance of the sites with highest potential risk for the environment

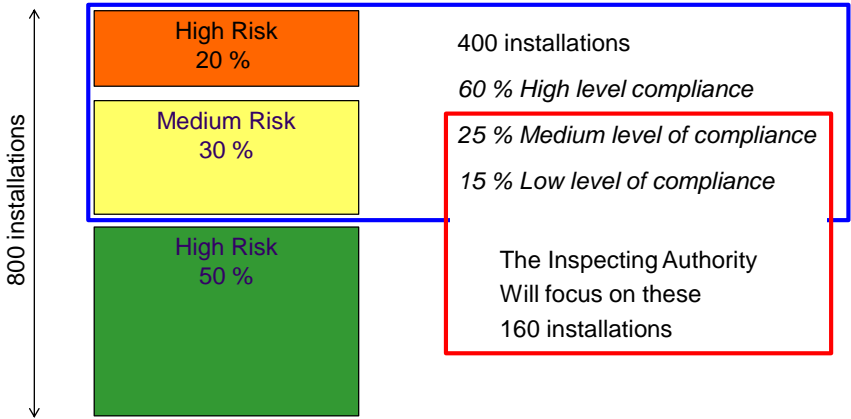
Setting priorities


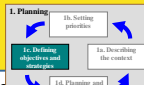
Priorities


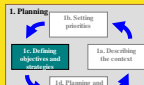
Resources

Inspection of IPPC sites focusing on the installations with the highest risk (HR and MR) and on installations with a lower level of compliance (the latter meaning the installations with the risk criteria compliance classified as LC)

60% of the inspectors will be allocated to this project.



		 	
Defining objectives and strategies	Objectives	<p>Reduce the risk of environmental damage by the IPPC (IED) sites the level of compliance of the IPPC (IED) sites scoring a worst classification on the compliance risk criteria</p>	
	Reference situation	<p>Region with 800 IPPC sites Risk classification 2012: 20% HR, 30% MR and 50% LR Compliance Criteria classification in 2012: 60% HC, 25% MC and 15%LC</p>	
	Targets & Performance Indicators	<p>By the end of 2013</p> <ul style="list-style-type: none"> The LC sites will be reduced to 60% of the level in 2012 The HR sites will be reduced to 40% of the level in 2012 <p>By the end of 2014</p> <ul style="list-style-type: none"> The LC sites will be reduced to 80% of the level in 2012 The HR sites will be reduced to 60% of the level in 2012 30% of the sites classified MC in 2012 will improve category to HC 20% of the sites classified MR in 2012 will improve category to LR 	
	Strategies	<p>Inspection frequency based on risk classification. Adequate enforcement actions on the LC sites to reduce its non compliances Analysis of the reason that leads to the actual level of compliance of the high risk sites that are simultaneously LC</p>	
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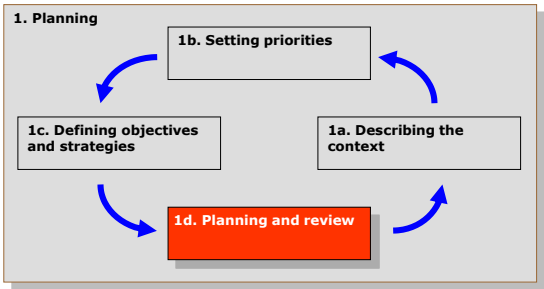
		 	
Planning and execution	Planned actions & Actions	<p><u>2012</u></p> <ul style="list-style-type: none"> Integrated inspection at all installations to collect information and assess the risk. <p><u>2013</u></p> <ul style="list-style-type: none"> Adequate enforcement actions on all the LC sites, especially the ones with high risk classification in order to reduce the non compliances. Inspection of all high risk sites Inspection visit to 50% of MR sites and 33% LR sites <p><u>2014</u></p> <ul style="list-style-type: none"> Follow-up inspections in order to check whether the measures were implemented and if compliance has improved (in case of HR and LC sites) and inspection of the MR and MC sites that have the highest risk classification within the respective group. 	
	Monitoring with performance indicators	<ul style="list-style-type: none"> % of sites in each risk category (HR, MR, LR) % of sites in each (risk criteria) compliance category (HC, MC, LC) 	
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Inspection plan



Content

- Inspection plan
- Inspection Schedule / Programme
- Review

Inspection Plan

- Internal use
- External use
- Available to public
- Justification



Inspection Plan

What should be in:

- Defined time period and areas
- Scope
- Priorities
- Objectives and targets
- Inspection Activities
- Strategies and procedure
- Inspection Schedule (annex ?)

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Inspection Schedule

What should be in:

- Defined time period of max 1 year
- List of all the installations
- Inspectors or inspection-units
- Type of inspections
- Date, week or months
- Amount of time (resources needed)
- Possible cooperation with other organisations

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Review

When should you review:

- Periodically based on performance monitoring
- In responds to changes to policies, regulated community or other changing situations

What should be reviewed:

- Inspection plan
- Inspection Schedule



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