IMPEL LANDFILL PROJECT
Landfill Directive Implementation

Analysis of the gaps found during the running of the Landfill Project

(DECEMBER 2016)

European Union Network for
the Implementation and Enforcement
of Environmental Law

Introduction to IMPEL

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

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

During the previous years IMPEL has developed into a considerable, widely known organisation, being mentioned in a number of EU legislative and policy documents, e.g. the 6th Environment Action Programme and the Recommendation on Minimum Criteria for Environmental Inspections.

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

Information on the IMPEL Network is also available through its website at:

www.impel.eu

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Executive summary:

During the duration of the project (2011-2016), participants have been working on a project Reinforcement program for inspections skills according to the landfill directive.

The Council Directive 1999/31/EC on the landfill of waste and the Council Decision of May 2002 establishing criteria and procedures for the acceptance of waste at landfills (2003/33/EC) set standards for the authorisation, design, operation, closure and aftercare of landfills.

Improving implementation of EU law is a high priority objective of both the European Commission and IMPEL. Recent reports on implementation of EU waste legislation have shown that "*implementation and enforcement of EU waste law remain poor particularly regarding the waste framework directive, the landfill directive and the waste shipment regulation*".

The project Landfill inspection started back in 2011. The objectives of the project:

- identification of good inspection practices, developing guidance;
- improve cooperation between IMPEL member countries to work towards a consistent regulatory and enforcement regime;
- to give feedback to policy makers on (effectiveness) of the various approaches and practices in the field of permitting and inspection of landfill sites in the IMPEL member countries.

In 2014 a survey was circulated amongst the project members; it was aimed at finding out the main differences in the implementation of the Landfill Directive and Council Decision in the Member States. In this regard, the project focused on the main critical topics highlighted within f the legislation and these are as follows:

- waste acceptance,
- sampling plan,
- groundwater trigger level,
- treatment of waste,
- stable non reactive waste,
- leachate management,
- requirements on top and bottom layers,
- meteoric and surface water,
- monitoring report.

An analysis of the legislation was performed as well, to detect the points left open to Member States decisions.

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ACRONYMS AND ABBREVIATIONS

ANC	Acid neutralization capacity
BC	Basic Characterization
CEN	European Committee For Standardization
CQA	Construction Quality Assurance
CT	Compliance testing
ECJ	European Court of Justice
EEA	European Economic Area
EEC	European Economic Community
EN	European Standard
EU	European Union
HP	Hazardous Properties
IMPEL	European Union Network For The Implementation And Enforcement of Environmental Law
IPPC	Integrated Pollution Prevention and Control
MS	Member States
NH	Non hazardous
TOC	Total Organic Carbon
WAC	Waste Acceptance Criteria

1. Introduction and purpose of the document

The aim of the document is to point out the implementation gaps of the “Directive 1999/31/EC of 26 April 1999 on the landfill of waste” and of the “Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills (2003/33)”.

Furthermore, it is meant to explore further the critical topics tackled by inspectors along the Landfill IMPEL Project highlighting available solutions.

To achieve this goal, a survey has been handed out to the participating members of the project. Nonetheless, the Landfill Directive And Council Decision have also been analysed.

1.1. Survey

A questionnaire with nine (9) topics related to the landfill Directive was sent to each of the participant countries to be duly filled by the responsible body and/or competent/relative entity.

Waste Acceptance

In 2014 a survey was circulated amongst the project members; it was meant to find out the main differences in the implementation of the Landfill Directive and the Council Decision within the Member States. The questionnaire covered most critical topics related to a landfill. The questions have been formulated to addressthe following topics:

- waste acceptance,
- sampling plan,
- groundwater trigger level,
- treatment of waste,
- stable non reactive waste,
- leachate management,
- requirements on top and bottom layers,
- meteoric and surface water,
- monitoring report.

The questionnaire (Annex 1 – Excel file) was filled in by the following Member States:

COUNTRY	ENVIRONMENTAL BODY	DRAFTER
	Environment agency	Max Folkett- Peter Elliott
	Sardinian environmental protection agency	Romano Ruggeri
	Federal ministry of agriculture, forestry, environment & water management	Franz Waldner (& M. Danzer - M. Kisser - R. Krasznai
	The administrative board of kalmar country	Nina Hansson
	Environmental service north sea canal area	Stuart Gunput - Arjen Snijder
	Czech Environmental Inspectorate	Vojtěch Hamerník (&Martin Zemek)
	Ministry of Environmental and Nature Protection	Ivan Pušić
	Malta environment and planning authority	Alvin Spiteri De Bono
	Chief Inspectorate for Environmental Protection	Anna Popławska
	Inspeção Regional do Ambiente	Elisabete Vieira
	APA (Portuguese Environmental Agency) and IGAMAOT (General inspection for agriculture, sea, environment and spatial planning, Portugal).	Ana Isabel Garcia
	Xefe de Servizo de Prevención e Control Integrados da Contaminación - Secretaría xeral de calidade e avaliación ambiental	Maria Diéguez Gómez

The questionnaire was focused on the following topics and related “open questions”:

TOPIC	Open question	Point of discussion
WASTE ACCEPTANCE: BASIC CHARACTERIZATION / COMPLIANCE TESTING	Who and how perform sampling of waste before landfilling?	Different approach in Member States have been identified. In Netherlands and Italy 3 steps of checking are foreseen: waste producer (basic characterization), operator (compliance testing), inspection authority (samples). In Czech no compliance testing is performed by the operator. In Sweden BC and CT are performed by the waste producer. In Croatia, the producer or waste holder are under an obligation of making the basic characterization and compliance testing.
SAMPLING PLAN	Development of sampling plan	Protocols of sampling are mentioned in the Council Decision, but usually the sampling plan is not presented and inspection authorities do not perform inspections on sampling. In Netherlands sampling plan is sent to supervising authority.
GROUNDWATER TRIGGER AND CONTROL LEVELS	How to define trigger and control levels for groundwater?	In Member States there is a misunderstanding and different interpretations of trigger levels, as indicated in the Council Directive. No examples are available of the application of the directive, all is based on assumptions. Trigger levels are not usually determined.
TREATMENT OF WASTE	Which treatments are necessary before landfilling the waste?	As far as Municipal Solid Waste, different approach have been observed: Netherlands uses to burn the residual part of the waste selection stream; other Member States consider (in some cases) as treated a residual waste coming from a well performed separate collection (infringement of the EU Directive up to the Commission).
STABLE NON REACTIVE WASTE	When can the waste be considered as stable and non-reactive?	Different approaches in MS have been observed: in Czech the waste must be stabilized, even if declassification is a preferred solution. In other MS (in some cases) leachate test is considered to be enough and no chemical-physical treatment is mandatory. No criteria are set to define the kind of treatment and what has to be checked by the competent authority and the producer.
LEACHATE MANAGEMENT	How is leachate managed and monitored?	Different approaches in leachate treatment (technologies) and management have been observed in MS.
REQUIREMENTS ON TOP AND BOTTOM LAYERS	How can top and bottom layers be inspected?	Requirements on the conditions of top and bottom layers seems to be different in MS. Difficulties are met by inspectors to assess the compliance with top and bottom criteria.
METEORIC AND SURFACE WATER	Monitoring and management of raining and surface water	Different interpretations are met in MS about water from precipitations and surface water management
MONITORING REPORT	Is the monitoring report compulsorily sent to Inspection Authority?	Monitoring report are not sent in all MS to the Supervising Authority. How are the report data handled by the Competent or Supervising Authority ?

1.2. Analysis of the points of Directive 1999/31/EC and Council Directive 1999/31/EC left open to Member States (shall/may)

Some of the critical points tackled by the project members arose from a different implementation/interpretation of some of the articles of the Landfill Directive and/or Council Decision that are left open to interpretation by the Member State to deceide upon.

As a result, it proved to be a a necessity to analyse the relevant legislation in order to detect the articles allowing Member States to take their own decision.

The results of this supplementary work are presented in Annex 2 and 3. Some of the outcomes are discussed throughout this document.

2. Landfill project overview

Improving implementation of EU law is a high priority objective for both the European Commissionand IMPEL. Recent reports on implementation of EU waste legislation have shown that "*implementation and enforcement of EU waste legislation remain poor particularly regarding the waste framework directive, the landfill directive and the waste shipment regulation*".

According to the waste management hierarchy, landfilling is the least preferred option and it should be limited to thebare minimum. Where waste needs to be landfilled, it must be sent to landfills which are compliant with the requirements of the Directive 1999/31/EC on the landfill of waste.

The Council Directive 1999/31/EC on the landfill of waste set standards for the authorization, design, operation, closure and aftercare of landfills.

The acceptance criteria and the acceptance process are specified further within the Council Decision 2003/33/EC. This includes a detailed description of waste characterisation procedures, limit values for the waste composition and leaching behavior, as well as acceptance procedures to be adhered with at each landfill site.

Member States must ensure that existing landfill sites may not continue to operate unless they comply with the provisions of the Directive and Council Decision.

Within the last years, important efforts have been undertaken in order to meet the established legal requirements. However, infringement cases, complains and petitions received by the European Commission show, that there are deficiencies within the implementation.

The project Landfill inspection started in 2011. The objectives of the project are:

- identification of good inspection practices, developing guidance and checklist;
- cooperation (and helping each other) between IMPEL member countries to work towards a consistent regulatory and enforcement regime;
- feedback to policy makers on the (effectiveness of) the various approaches and practices in the field of permitting and inspection of landfill sites in the IMPEL member countries;
- Improvement of enforcement cooperation between authorities concerned at landfills.

A core team to achieve these main project objectives worked together during the length of the project. The objectives have been achieved by:

- carrying out joint inspections in landfill across Europe to exchange experiences and knowledge: 16 Member States participated to the joint inspections with their inspectors, dealing with the main environmental critical aspects of landfill management;
- organizing a training session with the expert of the UK Environment Agency;
- developing Guidance and checklist to be used in the preparation of an inspection;
- extending the use of Basecamp under the IMPEL website for experts in all IMPEL member Countries as an exchange platform for information and specific questions, discussions etc.
- handing out a survey to highlight the gaps of the Landfill Directive across EU; 12 Member States filled in the survey.

The following Figure shows where the joint inspections have been performed during the project:

Figure 1: Landfill visited along the project

The following project reports are available on the IMPEL website:

- Report Landfill project (2011-2012)
- Report Landfill project (2013)
- Report Landfill project (2014)
- Landfill project report 2014: Annex III Inventory Analysis (protected)

3. Waste acceptance and sampling plan

3.1. Points of Landfill Directive and Council Decision open to Member States (MS)

Acceptance criteria for landfills

- MS are not prevented from maintaining or introducing more stringent protective measures than those established in Annex to Council decision. This could be of particular relevance with reference to the limit values for cadmium and mercury in section 2. Member States may also introduce limit values for components not included in section 2.
- MS shall define the period which a operator shall keep records of required information
- MS shall determine the testing requirements for on-site verification, including where appropriate rapid test methods.
- MS shall determine the period (not less than one month; see Article 11(b) of the Landfill Directive) which a operator shall keep samples taken periodically upon delivery and kept after acceptance of the waste
- MS shall define criteria for compliance with the limit values.
- MS shall determine which test methods and corresponding leaching limit values in tables should be used.
- MS may create subcategories of landfills for non-hazardous waste
- MS must set criteria to ensure that the waste will have sufficient physical stability and bearing capacity.
- MS shall set criteria to ensure that hazardous monolithic wastes are stable and non-reactive before acceptance in landfills for non-hazardous waste.
- MS shall set criteria for monolithic waste to provide the same level of environmental protection given by the above limit values.

Waste classification

- MS may consider waste as hazardous waste where (even though it does not appear as such onthe List of Waste) it displays one or more of the properties listed in Annex III. The Member State shall notify the Commission of any such cases.
- MS that has evidence to show that specific waste that appears on the list as hazardous waste does not display any of the properties listed in Annex III, it may consider that waste as non-hazardous waste. The Member State shall notify the Commission of any such cases.
- MS may consider waste as non-hazardous waste in accordance with the List of Waste.
- The assessment of the hazardous property HP 9 'infectious' shall be made according to relevant legislation or reference documents in the Member States.

Sampling of waste

MS may decide that:

- the sampling may be carried out by producers of waste or operators under the condition that sufficient supervision of independent and qualified persons or institutions ensures that the objectives set out in this Decision are achieved;

- the testing of the waste may be carried out by producers of waste or operators if they have set up an appropriate quality assurance system including periodic independent checking.

MS will (as long as a CEN standard is not available as formal EN) use either national standards or procedures or the draft CEN standard, when it has reached the prEN stage.

3.2. Different approaches in Member States

Acceptance criteria for landfills

- According to the Survey in a majority of MS the Basic Characterization (BC) and the Compliance testing (CT) is performed by the waste producer. Some MS replied that only the BC is performed by the waste producer while the CT is performed by the landfill operator.
- A majority of the MS request both compositional and leachate behavior testing, for the BC and leachate only for the CT;
- Some MS still landfill a very high amount of organic waste, therefore limit values for the acceptance of such non-hazardous waste at landfills have been established;
- Many MS do not have guidance on acceptance of waste; some MS have good guidance, but it's not available in foreign languages;
- This topic has proved to be difficult for the participating MS. There is a big need for more knowledge and understanding for the legislation, to improve inspections on the topic acceptance of waste. Training of inspectors on the topic of waste acceptance procedures is needed.

Waste classification

- Some MS do not have or have different criteria for HP14 (ecotoxic), when classifying waste according to hazardous properties;
- Many MS do not have guidance on classification of waste; some MS have good guidance, but it's not translated in other languages;
- This topic has proved to be difficult for the participating MS. There is a big need for more knowledge and understanding for the legislation, to improve inspections on the topic classification of waste. Training of inspectors on the topic of waste classification is needed.

Sampling of waste

- Protocols of sampling are mentioned in the Council Decision, but usually the sampling plan is not presented and inspection authorities do not perform inspections on sampling.
- The participating countries implement this topic by special conditions via the permit and also via national regulations.
- One proposed question in the survey, tackled if the sampling plan should be compiled by producer/operator and whether it is attached to the lab bulletin and sent to the supervising Authority. The replies show that it varies in every participating country and there is no harmonization of applicability. However, the majority of the participants have replied that it is produced by the producer and attached also by producer. The others have replied that the latter is either produced by both the producer and operator and not attached or also attached.

- This topic has proved to be difficult for the participating MS. There is a big need for more knowledge and understanding for the legislation, to improve inspections on the topic sampling of waste. Training of inspectors on the topic of how to write sampling plans and to perform waste sampling is needed.
- Some MS demand special qualifications (certifications), for producing a sampling plan and waste sampling.
- Many MS do not have guidance on sampling of waste and sampling plans; some MS have good guidance, but it's not translated into other languages.

3.3. Recommendations to EU Commission

Acceptance criteria for landfills

A service for translation of already existing MS and Commission guidance and checklists is desired.

Waste classification

- Provide criteria for hazardous property HP14 (ecotoxic),
- A service for translation of already existing MS and Commissions guidance and checklists is desired.

Sampling of waste

- there is a need for changes in legislation to establish a certification system.
- There is a need to establish a technical working group (especially with skills in statistics) to produce guidance for sampling plans and waste sampling.
- A service for translation of already existing MS and Commissions guidance and checklists is desired.

3.4. Recommendations to Member States

Acceptance criteria for landfills

- Issue guidance in MS language for waste acceptance procedures.
- Offer training for inspectors on the topic of waste acceptance.

Waste classification

- Issue guidance for classification of waste in MS languages.
- To improve the quality of classification of waste there is a need for changes in national legislation so waste that is a part of a "mirror-code", are classified by certified expertise.
- Offer education /training for inspectors on the topic of classification of waste.

Sampling of waste

- Provide guidance in MS language for waste sampling and the production of sampling plans.

- To improve the quality of sampling of waste there is a need for changes in national legislation so waste sampling and the production of sampling plans are performed by certified experts.
- Offer education /training for inspectors on the topic of waste sampling and sampling plans.

3.5. Recommendations to Inspectors

The majority of the countries inspect the topic via the inspection of BC and CT, while the remaining participating countries use other type of methods such as inspection by the landfill supervisor and inspectors as well as inspection of documents and data.

The following are some useful tips for inspectors:

1. Before preparing an inspection study guidance recommended in “Inspection guidance book for landfill inspection 2016”
   - Sampling
   - Classification
   - Acceptance of waste.

2. Preparing for an inspection
   - Read the guidance
   - Fill in checklist according to national legislation
   - Select waste stream (below some examples)
     - mirror-code waste
     - waste from category 1705, category19 or a category that ends with 99
     - waste that is not-regularly generated
     - inert-waste (according to limit values)

3. When performing the inspection, follow the guidance and a prepared checklist.

4. Treatment of waste before landfilling

4.1. Points of Landfill Directive and Council Decision open to Member States

According to Article 6(a) of Landfill Directive, some treatment is required prior to landfilling for most wastes. It is specified in Appendix B "Overview of landfilling options provided by the Landfill Directive" of the Council Decision of 19 December 20012, that the general definition of 'treatment' is relatively broad and to a large extent left to the competent authorities in the Member States.

The legislation does not define criteria for determining what pre-treatment option is appropriate in different circumstances, or to what extent negative impacts should be reduced.

However, in choosing which pre-treatment to apply, the objectives of preventing and reducing negative impacts on the environment and human health alike must be taken into account. The criterion of pursuing the best environmental outcome overall may also be relevant.

The following are the legislation articles dealing with the treatment of waste:

Council Directive 1999/31/EC

Article 2 Definitions

(h) "**treatment**" means the physical, thermal, chemical or biological processes, including sorting, that change the characteristics of the waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery;

Article 6: Waste to be accepted in the different classes of landfill

(a) **only waste that has been subject to treatment is landfilled**. This provision may not apply to inert waste for which treatment is not technically feasible, nor to any other waste for which such treatment does not contribute to the objectives of this Directive, as set out in Article 1, by reducing the quantity of the waste or the hazards to human health or the environment.

Council Decision of 19 December 2002

1. Procedure for the acceptance of waste at landfills

1.1.2. Fundamental requirements for basic characterisation of the waste

(c) Description of the waste **treatment** applied in compliance with Article 6(a) of the Landfill Directive, or a statement of reasons why such treatment is not considered necessary.

2.2.1. […] The wastes may not be admitted if they have not been subjected to ***prior treatment*** according to Article 6(a) of the Landfill Directive, or if […].

The Malagrotta judgement (European Court of Justice of 15 October 2014 in case C-323/13)

It confirmed the Landfill Directive's principle that all waste capable of undergoing pre-treatment must be pre-treated before being landfilled. In addition, the ECJ clarified that Member States are not free to apply any pre-treatment whatsoever, but must search and implement the most appropriate pre-treatment option in order to reduce as far as possible negative impacts on the environment and human health.

According to the ECJ, this pre-treatment must as a minimum include an adequate selection of the different waste streams and the stabilization of the organic fraction of waste.

It is relevant to observe that separate collection has not been considered as a treatment method, enough to guarantee that the residual fraction has not to be biologically treated.

4.2. Different approaches in Member States

Usually the permits do not contain specific conditions for the treatment of waste; it is mandatory according to the national regulation transposing the Landfill Directive.

The main difference among MS concerns the way inspectors assess that the waste has been pre-treated before landfilling; treatment is responsibility of the waste producer and different strategies can be applied to assess it.

Majority of the participants performs routine inspections on site as well as inspect paperwork; others ask for the BC when inspecting the waste producer plant. Normally, they check for the waste source, and for the waste previous treatment, normally mechanical or compaction.

At the landfill operator inspection involves checking the self-monitoring system: what it says about control of documentation (BC), if the waste is treated and with what technique. Also they look for information on TOC, content of water, and other information that shows if treatment is needed.

Inspection on the pretreatment of the waste before landfilling is not a priority. Pre-treatment methods differ across MS; one MS considers the on-site compaction (in order to reduce volume) provided by the operator, as a treatment.

The majority of the participating countries have some sort of existing guidelines.

4.3. Recommendations to EU Commission

- An EU Guidance on the pre-treatment of waste is required, especially for specific waste streams, the latter is highly desirable.

4.4. Recommendations to Member States

- Transpose or better clarify the principles established by the Malagrotta judgment in the legal order;
- When high rate of separate collection is performed, define criteria to assess that a further treatment does not help to prevent or to reduce as much as possible the negative environmental impacts and risks to human health;
- Issue waste reports and guidelines with best practices to pre-treat of specific waste streams.

4.5. Recommendations to Inspectors

- Check the Basic characterization at the waste producer; goes to the source of the waste;
- Check the self-monitoring system at the landfill operator: ask for documents to assess if the waste is treated and with what technique;
- Look for information on TOC, content of water, and other information that shows if treatment is needed;
- Ask to view documentation for some different types of waste (the most common waste on the landfill, a waste with a waste code with a mirror-entrance, and a waste that is not

common, and control that the BC for the selected wastes are according to the regulation, and if they have been treated;

- Visual inspections of the waste entering the landfill;
- Check the organic content
- Ask for the treatment plant source of the waste: cross check of the permit;
- Plan an inspection to the waste producer.

5. Stable non reactive waste

5.1. Points of Landfill Directive and Council Decision open to Member States

According to the Council Decision 2003/33/EC, stable, non-reactive means that the leaching behaviour of the waste will not change adversely in the long-term, under landfill design conditions or foreseeable accidents:

- in the waste alone (for example, by biodegradation),
- under the impact of long-term ambient conditions (for example, water, air, temperature, mechanical constraints),
- by the impact of other wastes (including waste products such as leachate and gas).

Member States **shall** take measures in order that landfill for non-hazardous waste may be used for […]:

(iii) stable, non-reactive hazardous wastes (e.g. solidified, vitrified), with leaching behaviour equivalent to those of the non-hazardous wastes referred to in point (ii), which fulfil the relevant acceptance criteria set out in accordance with Annex II. These hazardous wastes shall not be deposited in cells destined for biodegradable non-hazardous waste.

Member States **shall** set criteria to ensure that hazardous monolithic wastes are stable and non-reactive before acceptance in landfills for non-hazardous waste.

Additional stability criteria for stable, non-reactive hazardous waste **are to be set** at Member State level.

5.2. Different approaches in Member States (results of the survey)

Different approaches in MS have been observed: UK sets, in national regulation, additional strict criteria (WAC) for stable non-reactive waste acceptance, distinguishing granular waste (shear strength of at least 50 kPa for cohesive waste, or an in situ bearing ratio of at least 5% for non-cohesive waste) and monolithic waste (unconfined compressive strength of at least 1 MPa after 28 days curing, dimensions of greater than 40 cm along each side, or a depth and fracture spacing when hardened of greater than 40 cm ecc.).

Italy, in order to align the national regulation to the Council Decision 2003/33/EC, amended the national decree adding geotechnical test for stable non reactive waste, to be performed according to WAC established by UK Environment Agency. Moreover, leaching test methods have been indicated to assess acid neutralization capacity (ANC).

Usually, in MS no additional criteria, beside the ones included in the Council Decision 2003/33/EC, are set to define the acceptability of stable non-reactive waste; no further indications are given to define the kind of treatments and what has to be checked by the competent authority and the producer. In some cases, leachate test is considered to be enough and no chemical-physical treatment is mandatory.

5.3. Recommendations to EU Commission

- Promote a study to collect best available techniques BAT's regardingthe treatments used to achieve a stable non-reactive waste for different categories of waste; the study should

list the criteria set to comply with the Council Decision 2003/33/EC and the monitoring actions taken to assess it.

5.4. Recommendations to Member States

- Transpose or better clarify the requests of Council Decision 2003/33/EC in terms of:
  - evaluation methods of acid neutralization capacity (ANC);
  - set criteria to ensure that the waste will have sufficient physical stability and bearing capacity;
  - define examples of treatments that can be applied;
  - set criteria to ensure that hazardous monolithic wastes are stable and non-reactive before acceptance in landfills for non-hazardous waste.

5.5. Recommendations to Inspectors

- Assess the kind of treatment the waste undego in order to be considered as stable non-reactive;
- If necessary, perform an inspection at the treatment plant;
- Ask for the Basic Characterization: check compliance with the leaching limit values and additional limits set for pH, TOC;
- Check the way ANC (acid neutralisation capacity) has been evaluated;
- Visual check that stable, non-reactive hazardous wasteare landfilled in a separate cell away from municipal waste.

6. Leachate, meteoric water, groundwater (trigger levels)

6.1. Points of Landfill Directive and Council Decision open to Member States

Leachate and meteoric water

According to Council Directive 1999/31/EC, Annex I:

2. Water control and leachate management

Appropriate measures shall be taken, with respect to the characteristics of the landfill and the meteorological conditions, in order to:

- control ***water from precipitations*** entering into the landfill body,
- prevent ***surface water*** and/or groundwater from entering into the landfilled waste,
- collect contaminated water and leachate. If an assessment based on consideration of the location of the landfill and the waste to be accepted shows that the landfill poses no potential hazard to the environment, the competent authority may decide that this provision does not apply
- treat contaminated water and leachate collected from the landfill to the appropriate standard required for their discharge.

Annex III "Control and monitoring procedures in operation and after-care phases"

3. Emission data: water, leachate and gas control

Sampling of leachate and surface water if present must be collected at representative points. Sampling and measuring (volume and composition) of leachate must be performed separately at each point at which leachate is discharged from the site.

Monitoring of surface water is present shall be carried out at not less than two points, one upstream from the landfill and one downstream. […] For leachate and water, a sample, representative of the average composition, shall be taken for monitoring.

Groundwater

According to Council Directive 1999/31/EC, Annex III "Control and monitoring procedures in operation and after-care phases"

4. Protection of groundwater

A. Sampling

The measurements must be such as to provide information on groundwater likely to be affected by the discharging of waste, with at least one measuring point in the groundwater inflow region and two in the outflow region. This number can be increased on the basis of a specific hydrogeological survey and the need for an early identification of accidental leachate release in the groundwater.

Sampling must be carried out in at least three locations before the filling operations in order to establish reference values for future sampling.

B. Monitoring

The parameters to be analysed in the samples taken must be derived from the expected composition of the leachate and the groundwater quality in the area. In selecting the parameters for analysis account should be taken of mobility in the groundwater zone. Parameters could

include indicator parameters in order to ensure an early recognition of change in water quality (1).

C. Trigger levels

Significant adverse environmental effects, […], should be considered to have occurred in the case of groundwater, when an analysis of a groundwater sample shows a significant change in water quality. A ***trigger level*** must be determined taking account of the specific hydrogeological formations in the location of the landfill and groundwater quality. The trigger level must be laid down in the permit whenever possible.

The observations must be evaluated by means of control charts with established control rules and levels for each downgradient well. The ***control levels*** must be determined from local variations in groundwater quality.

6.2. Different approaches in Member States (results of the survey)

In MS there is a misunderstanding and different interpretations of trigger and control levels, as indicated in the Council Directive. No examples are available of the application of the directive but only assumptions. One of the reason is that in some MS threshold limits to contaminants in groundwater are set in the legislation; in other MS, a hydrogeological risk assessment is required in order to determine the risk to groundwater posed by the landfill and at this stage trigger levels (compliance limits) will be determined. Trigger levels can therefore depend on the background values. In most of MS trigger levels are not determined and are not included in the permit. In some cases trigger levels depend on the results of the monitoring system and are determined by the Competent authority. It is not common to apply the request to set both control levels and trigger levels in the permit, and definitions are not univocal.

Different approaches in leachate treatment (technologies) and management have been observed in MS; leachate is usually treated in situ and in other cases it is sent (as a waste) to waste water treatment plants. Inspection can be performed by the analysis of data or in some cases; samples are taken of the leachate before and after the treatment, for internal analysis. In some MS recirculation of the leachate is allowed.

Different interpretations were met in MS about water from precipitations and surface water management: in some cases surface water is meant to be river body water whether present close to the landfill, while in other cases it is considered to be as meteoric water to be collected and stored in a first rain sized tank.

Consequently, monitoring performed by operator an competent authority can differ in MS.

6.3. Recommendations to EU Commission

- Clarify the concepts of control and trigger levels, distinguishing situations where threshold limits for groundwater are either set in national legislation or not.
- Define the situations when a risk assessment analysis should be performed.
- Provide definitions of Surface water, Runoff water, and precipitation water to be prevented from entering the landfill body and clarify which is the water that should be monitored.
- The following point in Annex 3 is considered practically difficult to implement and has no real value: "Monitoring of surface water if present shall be carried out at no less than two points, one upstream from the landfill and one downstream.

6.4. Recommendations to Member States

- The basis for the Water management must have an inventory on the risks on the specific location. Based on the risk assessment determine what important aspects should be monitored and with the necessary frequency. Whenever applicable, the minimum frequency as written in the Annex 1 has to be met. Risk assessments should be updated periodically.
- Provide a Guideline explaining the requests of Landfill Directive concerning water and groundwater management (definitions of control levels, trigger levels, need of a risk assessment, surface water vs meteoric water ecc).
- Indicate in which circumstances leachate can be recirculated.

6.5. Recommendations to Inspectors

- Check the minimization of the level of leachate in the bottom of the landfill;
- Whenever possible the amount of leachate recycling must be minimized; landfill cell should therefore be as small as possible;
- Check whether the operator drew up an action plan to be put in place in case of a breach of the compliance limits of contaminants in groundwater;
- Check for trends of groundwater pollutants concentrations;
- Take samples of groundwater and of treated leachate before discharging.

7. Biogas control (Landfill gas, LFG)

7.1. Points of Landfill Directive and Council Decision open to Member States

Gas control

One of the main purposes of the Landfill Directive is to minimise the contribution of landfill sites to the production of greenhouse gases. This is to be achieved by taking measures to reduce the production of methane and also through landfill gas controls (recital 16 of the Directive).

According to Council Directive 1999/31/EC, Annex I:

4. Gas control

- Appropriate measures shall be taken in order to control the accumulation and migration of landfill gas (Annex III).
- Landfill gas shall be collected from landfills receiving biodegradable waste and the landfill gas must be treated and used. If the gas collected cannot be used to produce energy, it must be flared.
- The collection, treatment and use of landfill gas under paragraph 4.2 shall be carried on in a manner which minimises damage to or deterioration of the environment and risk to human health.

Annex III "Control and monitoring procedures in operation and after-care phases"

3. Emission data: water, leachate and gas control

Gas monitoring must be representative for each section of the landfill. The frequency of sampling and analysis is listed in the following table:

	Operating phase	After-care phase
Potential gas emissions and atmospheric pressure (CH_4, CO_2, O_2, H_2S, H_2, etc).	MONTHLY - H_4, CO_2, O_2, regularly other gasses according to the composition of the waste deposited with a view to reflecting its leachate properties.	EVERY SIX MONTHS - Efficiency of the gas extraction system must be checked regularly.

The frequency of sampling could be adapted on the basis of the morphology of the landfill waste (in tumulus, buried, etc). This has to be specified in the permit.

7.2. Different approaches in Member States (results of the survey)

The survey lacks information concerning biogas control in MS. Biogas was although included in the guidance and checklist. During the last inspections the differences in approach came into sight and was inspected on sight in certain MS.

Consequently, data for different MS could not be extracted from the survey.

7.3. Recommendations to EU Commission

- Define the situations when a risk assessment analysis should be performed.

- Provide information on preventing emission of greenhouse gasses through regulating the potential emission of old and already closed landfills. The ACUMEN project results could be used.

7.4. Recommendations to Member States

- The basis for the Gas management must have an inventory on the risks on the specific location. Based on the risk assessment determine what important aspects should be monitored and with the necessary frequency. Whenever applicable, the minimum frequency as written in the Annex 1 have to be met. Risk assessments should be updated periodically (frequency of 5 to 10 years?).
- The operator should model and estimate the generation of landfill gas throughout the lifecycle of the site as guide to the design and phasing of the gas extraction scheme. There are a variety of gas generation models commercially available which can predict landfill gas generation based on the types and quantities of waste accepted at the site. The model should be kept up to date using site specific data such as actual waste inputs.

7.5. Recommendations to Inspectors

- Assess compliance with all self monitoring requirements;
- Emissions results: check compliance with ELV for engines (energy use);
- Check whether a landfill gas management plan is implemented in conjunction with good operational practices (e.g. not leaving odorous waste uncovered);
- Check operational data, such as flow rate, pressure, temperature and inlet gases will be registered.

8. Top and bottom

8.1. Points of Landfill Directive and Council Decision open to Member States

The objectives of all conditions set in the Directive are that throughout the period of the landfill the harmful impact on the environment should be minimized, particularly the contamination of surface water, groundwater, soil and air, including the effect of greenhouse gases and reduced the risk to human health which could arise from waste disposal and the life of the landfill.

The above is relatively easy to achieve when designing and building new landfills or in the construction of the upper sealing layer on the old landfill, but there are problems with the most important and the lower sealing layer in particular with existing old landfills.

The concept of geological barriers specific geological and hydrogeological properties below and in the vicinity of the landfill can be interpreted differently due to the numerous varieties of geological layers across the member states despite of possibility of artificial sealing layer (sandy and rocky, clay or other areas).

Should the use of an artificial sealing layer is necessary to check whether the geologic surface is sufficiently stable to prevent settlement that may cause damage to the artificial sealing layer.

Member States shall define criteria for arranging basic sealing layer and side edges of landfills in order to ensure the stability of the landfill and to prevent settlement that may cause damage to the lower sealing layer

Technical solutions that should prevent the penetration of waste in the drainage layer should be defined.

8.2. Different approaches in Member States (results of the survey)

From the questionnaire sent to each of the participanting countriy, it resulted that all participating countries have transposed the provisions of the 1999/31/EC Directive on the general conditions for landfills into national legislation.

The majority of the Member States have implemented the topic via national law however there are a number of significant differences related to the bottom and the surface layer conditions. The differences are seen where the above mentioned provisions are specified in the IPPC permit or special national regulation, within the building permit, or there are no special regulations imposed at all.

Each Member State has prescribed the minimum criteria for the bottom and top layer within certain types of national regulations.

From the questionnaire it was concluded that there are a large number of differences in the control of these topics between Member States. Either inspectors or the competent authority monitor the project documentation throughout various stages: when the request is submitted, during the various stages of construction and development, as well as through routine inspections and data review. No authorized person or inspectors are involved in the supervision of construction works. Some of the participating countries also reported that they have no expertise to perform such inspections.

When individual Member States were asked about any existing guidelines with regards to the control of landfills, reported answers included all possibilities: a number of Member States do have guidelines set up, whereas others replied that, do not have any guidelines set up or the question was not applicable.

8.3. Recommendations to EU Commission

A suggestion to the EU Commission is that it is necessary to have a separate set of conditions for old landfills and a set of conditions for new landfills. There should also be a set of conditions for the surface of landfills, both for existing and new landfills;

It is also suggested that the EU Commission should define the geological layers that a landfill cell can work on, as well as define any artificial materials that can be used – including any technical characteristics of the individual layers;

Furthermore, it would be useful having a special regulation that can be applied in all the Member States that outlines precise technical specifications;

Another suggestion to the EU Commission would be that the Commission should analyse whether project documentation, supervision by the competent authority during construction and the use of the permit for landfill parts, are sufficient evidence of properly constructed landfill layers; or if it would be necessary to have control inspections throughout the construction of the individual layers.

A further suggestion would be that, based on the existing guidelines from a number of individual Member States, the Commission should create and make applicable a guide and check list that can be used by the inspectors that are supervising the whole of the project.

8.4. Recommendations to Member States

- Produce guidance for this topic in MS main language;
- Education/training for inspectors who are dealing on inspections of landfills
- Define the necessary step to give sufficient evidence of properly constructed landfill layers: project documentation, supervision by the competent authority during construction and if necessary control inspections throughout the construction of the individual layers.

8.5. Recommendations to Inspectors

- Supervise the operators self-monitoring system on quality control of the construction and how documentation shall be performed;
- Check the construction quality assurance (CQA) document; assessment of design specification submitted by the operator;
- Visit the building site during construction to supervise that everything is according to the construction plan, self-monitoring system and that the correct building material is used;

9. Reporting of the operator

9.1. Points of Landfill Directive and Council Decision open to Member States

The Council Directive 1999/31/EC, at Article 9 Content of the permit, states:

"(d) the obligation on the applicant to report at least annually to the competent authority on the types and quantities of waste disposed of and on the results of the monitoring programme […]".

According to Article 12 Control and monitoring procedures in the operational phase, *Member States shall take measures in order that control and monitoring procedures in the operational phase meet at least the following requirements […].*

At a frequency to be determined by the competent authority, and in any event at least once a year, the operator shall report, on the basis of aggregated data, all monitoring results to the competent authorities for the purpose of demonstrating compliance with permit conditions and increasing the knowledge on waste behaviour in the landfills.

9.2. Different approaches in Member States (results of the survey)

The majority of the participating countries have opted for reporting annually, and this frequency is usually included in the permit. Monitoring reports are not sent in all Member States to the competent Authority; it can be the permitting Authority in some cases.

The self-monitoring data sent by the operator (monitoring reports) are in some MS stored in databases; the submitting procedure of the monitoring data to the Competent Authority can be electronic form as well. In some other MS monitoring reports are stored as hard copy.

The majority of the participating countries had opted to inspect the topic via checking the results and draw up conclusions from that. While the remaining had various replies such as checking results and monitor, routine checks and data review as well as summaries of data and reports.

The Authority receiving the monitoring report usually checks the results of the report, but not all MS draw up conclusions about that in a final document. The analysis of the report is considered an inspection as well.

At first step, monitoring report is checked to assess that it contains all measurement and data that are prescribed in IPPC permit. At second step, in some MS trends are checked and assessed. According to the results of the analysis, new conditions can be prescribed in IPPC report as a reaction for new situation in landfill that emerges from report.

9.3. Recommendations to EU Commission

No critical situations have been pointed out.

9.4. Recommendations to Member States

No critical situations have been pointed out.

9.5. Recommendations to Inspectors

- Where the inspection authority is not the Authority receiving the self monitoring reports, ask for a copy before going to the landfill to preliminary prepare the inspection on a desk study;
- Analyse the self monitoring reports to check trends of consumptions, emissions, ecc;
- Check laboratory results to assess compliance with emission limit values;
- In case of critical situations found out from the reports (breach of the limits, ecc), perform a non routine inspection to assess the measures taken by the operator to solve the problem;
- Take samples by internal lab or third part lab to compare results to the one provided by the operator;
- Send back to the operator and to the Permitting Authority a final document with the results of the monitoring report analysis;
- Perform audit visiting during self monitoring activities of the operator to check the correctness of the sampling procedures.

Annex 1: Overview of the points of Directive 1999/31/EC and Council Directive 1999/31/EC left open to MS

Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste.			
Article	**Topic**	**Text**	
3.3	**Scope**	Without prejudice to Directive 75/442/EEC Member States **may** declare at their own option, that the deposit of non-hazardous waste, to be defined by the committee established under Article 17 of this Directive, other than inert waste, resulting from prospecting and extraction, treatment and storage of mineral resources as well as from the operation of quarries and which are deposited in a manner preventing environmental pollution or harm to human health, can be exempted from the provisions in Annex I, points 2, 3.1, 3.2 and 3.3 of this Directive	MAY
3.4		Without prejudice to Directive 75/442/EEC Member States **may** declare, at their own option, parts or all of Articles 6(d), 7(i), 8(a)(iv), 10, 11(1)(a), (b) and (c), 12(a) and (c), Annex I, points 3 and 4, Annex II (except point 3, level 3, and point 4) and Annex III, points 3 to 5 to this Directive not applicable to:	MAY
		(a) landfill sites for non-hazardous or inert wastes with a total capacity not exceeding 15000 tonnes or with an annual intake not exceeding 1000 tonnes serving islands, where this is the only landfill on the island and where this is exclusively destined for the disposal of waste generated on that island. Once the total capacity of that landfill has been used, any new landfill site established on the island shall comply with the requirements of this Directive;	
		(b) landfill sites for non-hazardous or inert waste in isolated settlements if the landfill site is destined for the disposal of waste generated only by that isolated settlement.	
3.5		Without prejudice to Directive 75/442/EEC Member States **may** declare, at their own option, that underground storage as defined in Article 2(f) of this Directive can be exempted from the provisions in Article 13(d) and in Annex I, point 2, except first indent, points 3 to 5 and in Annex III, points 2, 3 and 5 to this Directive.	MAY
5.1	**Waste and treatment not acceptable in landfills**	Member States **shall** set up a national strategy for the implementation of the reduction of biodegradable waste going to landfills, not later than two years after the date laid down in Article 18(1) and notify the Commission of this strategy. This strategy **should** include measures to achieve the targets set out in paragraph 2 by means of in particular, recycling, composting, biogas production or materials/energy recovery. Within 30 months of the date laid down in Article 18(1) the Commission shall provide the European Parliament and the Council with a report drawing together the national strategies.	SHALL SHOULD
5.3		Member States **shall** take measures in order that the following wastes are not accepted in a landfill:	SHALL
		(a) liquid waste;	
		(b) waste which, in the conditions of landfill, is explosive, corrosive, oxidising, highly flammable or flammable, as defined in Annex III to Directive 91/689/EEC;	
		(c) hospital and other clinical wastes arising from medical or veterinary establishments, which are infectious as defined (property H9 in Annex III) by Directive 91/689/EEC and waste falling within category 14 (Annex I.A) of that Directive.	
		(d) whole used tyres from two years from the date laid down in Article 18(1), excluding tyres used as engineering material, and shredded used tyres five years from the date laid down in Article 18(1) (excluding in both instances bicylce tyres and tyres with an outside diameter above 1 400 mm);	
		(e) any other type of waste which does not fulfil the acceptance criteria determined in accordance with Annex II.	
6	**Waste to be accepted in the different classes of landfill**	Member States **shall** take measures in order that:	SHALL
		(a) only waste that has been subject to treatment is landfilled. This provision may not apply to inert waste for which treatment is not technically feasible, nor to any other waste for which such treatment does not contribute to the objectives of this Directive, as set out in Article 1, by reducing the quantity of the waste or the hazards to human health or the environment;	

		b) only hazardous waste that fulfils the criteria set out in accordance with Annex II is assigned to a hazardous landfill;	
		(c) landfill for non-hazardous waste may be used for:	
		(i) municipal waste;	
		(ii) non-hazardous waste of any other origin, which fulfil the criteria for the acceptance of waste at landfill for non-hazardous waste set out in accordance with Annex II;	
		(iii) stable, non-reactive hazardous wastes (e.g. solidified, vitrified), with leaching behaviour equivalent to those of the non-hazardous wastes referred to in point (ii), which fulfil the relevant acceptance criteria set out in accordance with Annex II. These hazarouds wastes shall not be deposited in cells destined for biodegradable non-hazardous waste,	
7	**Application for a permit**	Member States **shall** take measures in order that the application for a landfill permit must contain at least particulars of the following:	SHALL
		(a) the identity of the applicant and of the operator when they are different entities;	
		(b) the description of the types and total quantity of waste to be deposited;	
		(c) the proposed capacity of the disposal site;	
		(d) the description of the site, including its hydrogeological and geological characteristics;	
		(e) the proposed methods for pollution prevention and abatement;	
		(f) the proposed operation, monitoring and control plan;	
		(g) the proposed plan for the closure and after-care procedures;	
		(h) where an impact assessment is required under Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment(8), the information provided by the developer in accordance with Article 5 of that Directive;	
		(i) the financial security by the applicant, or any other equivalent provision, as required under Article 8(a)(iv) of this Directive.	
8	**Conditions of the permit**	Member States **shall** take measures in order that:	SHALL
		(a) the competent authority does not issue a landfill permit unless it is satisfied that:	
		(i) without prejudice to Article 3(4) and (5), the landfill project complies with all the relevant requirements of this Directive, including the Annexes;	
		(ii) the management of the landfill site will be in the hands of a natural person who is technically competent to manage the site; professional and technical development and training of landfill operators and staff are provided;	
		(iii) the landfill shall be operated in such a manner that the necessary measures are taken to prevent accidents and limit their consequences;	
		(iv) adequate provisions, by way of a financial security or any other equivalent, on the basis of modalities to be decided by Member States, has been or will be made by the applicant prior to the commencement of disposal operations to ensure that the obligations (including after-care provisions) arising under the permit issued under the provisions of this Directive are discharged and that the closure procedures required by Article 13 are followed. This security or its equivalent shall be kept as long as required by maintenance and after-care operation of the site in accordance with Article 13(d). Member States may declare, at their own option, that this point does not apply to landfills for inert waste;	
		(b) the landfill project is in line with the relevant waste management plan or plans referred to in Article 7 of Directive 75/442/EEC;	
		(c) prior to the commencement of disposal operations, the competent authority shall inspect the site in order to ensure that it complies with the relevant conditions of the permit. This will not reduce in any way the responsibility of the operator under the conditions of the permit.	

10	**Cost of the landfill of waste**	Member States **shall** take measures to ensure that all of the costs involved in the setting up and operation of a landfill site, including as far as possible the cost of the financial security or its equivalent referred to in Article 8(a)(iv), and the estimated costs of the closure and after-care of the site for a period of at least 30 years shall be covered by the price to be charged by the operator for the disposal of any type of waste in that site. Subject to the requirements of Council Directive 90/313/EEC of 7 June 1990 on the freedom of access to information on the environment(9)Member States shall ensure transparency in the collection and use of any necessary cost information.	SHALL
11.1	**Waste acceptance procedures**	Member States **shall** take measures in order that prior to accepting the waste at the landfill site: (a) before or at the time of delivery, or of the first in a series of deliveries, provided the type of waste remains unchanged, the holder or the operator can show, by means of the appropriate documentation, that the waste in question can be accepted at that site according to the conditions set in the permit, and that it fulfils the acceptance criteria set out in Annex II; (b) the following reception procedures are respected by the operator: - checking of the waste documentation, including those documents required by Article 5(3) of Directive 91/689/EEC and, where they apply, those required by Council Regulation (EEC) No 259/93 of 1 February 1993 on the supervision and control of shipments of waste within, into and out of the European Community(10); - visual inspection of the waste at the entrance and at the point of deposit and, as appropriate, verification of conformity with the description provided in the documentation submitted by the holder. If representative samples have to be taken in order to implement Annex II, point 3, level 3, the results of the analyses shall be kept and the sampling shall be made in conformity with Annex II, point 5. These samples shall be kept at least one month; - keeping a register of the quantities and characteristics of the waste deposited, indicating origin, date of delivery, identity of the producer or collector in the case of municipal waste, and, in the case of hazardous waste, the precise location on the site. This information shall be made available to the competent national and Community statistical authorities when requested for statistical purposes; (c) the operator of the landfill shall always provide written acknowledgement of receipt of each delivery accepted on the site; (d) without prejudice to the provisions of Regulation (EEC) No 259/93, if waste is not accepted at a landfill the operator shall notify without delay the competent authority of the non-acceptance of the waste.	SHALL
11.2		2. For landfill sites which have been exempted from provisions of this Directive by virtue of Article 3(4) and (5), Member States shall take the necessary measures to provide for: - regular visual inspection of the waste at the point of deposit in order to ensure that only non-hazardous waste from the island or the isolated settlement is accepted at the site; and - a register on the quantities of waste that are deposited at the site be kept. Member States shall ensure that information on the quantities and, where possible, the type of waste going to such exempted sites forms part of the regular reports to the Commission on the implementation of the Directive.	SHALL SHALL SHALL
12	**Control and monitoring procedures on the operational phase**	Member States **shall** take measures in order that control and monitoring procedures in the operational phase meet at least the following requirements: (a) the operator of a landfill shall carry out during the operational phase a control and monitoring programme as specified in Annex III; (b) the operator shall notify the competent authority of any significant adverse environmental effects revealed by the control and monitoring procedures and follow the decision of the competent authority on the nature and timing of the corrective measures to be taken. These measures shall be undertaken at the expense of the operator. At a frequency to be determined by the competent authority, and in any event at least once a year, the operator shall report, on the basis of aggregated data, all monitoring results to the competent authorities for the purpose of demonstrating compliance with permit conditions and increasing the knowledge on waste behaviour in the landfills; (c) the quality control of the analytical operations of the control and monitoring procedures and/or of the analyses referred to in Article 11(1)(b) are carried out by	SHALL

		competent laboratories.	
13	**Closure and after care procedures**	Member States **shall** take measures in order that, in accordance, where appropriate, with the permit: (a) a landfill or part of it shall start the closure procedure: (i) when the relevant conditions stated in the permit are met; or (ii) under the authorisation of the competent authority, at the request of the operator; or (iii) by reasoned decision of the competent authority; (b) a landfill or part of it may only be considered as definitely closed after the competent authority has carried out a final on-site inspection, has assessed all the reports submitted by the operator and has communicated to the operator its approval for the closure. This shall not in any way reduce the responsibility of the operator under the conditions of the permit; (c) after a landfill has been definitely closed, the operator shall be responsible for its maintenance, monitoring and control in the after-care phase for as long as may be required by the competent authority, taking into account the time during which the landfill could present hazards. The operator shall notify the competent authority of any significant adverse environmental effects revealed by the control procedures and shall follow the decision of the competent authority on the nature and timing of the corrective measures to be taken; (d) for as long as the competent authority considers that a landfill is likely to cause a hazard to the environment and without prejudice to any Community or national legislation as regards liability of the waste holder, the operator of the site shall be responsible for monitoring and analysing landfill gas and leachate from the site and the groundwater regime in the vicinity of the site in accordance with Annex III.	SHALL
14	**Existing landfill sites**	Member States **shall** take measures in order that landfills which have been granted a permit, or which are already in operation at the time of transposition of this Directive, may not continue to operate unless the steps outlined below are accomplished as soon as possible and within eight years after the date laid down in Article 18(1) at the latest: (a) with a period of one year after the date laid down in Article 18(1), the operator of a landfill shall prepare and present to the competent authorities, for their approval, a conditioning plan for the site including the particulars listed in Article 8 and any corrective measures which the operator considers will be needed in order to comply with the requirements of this Directive with the exception of the requirements in Annex I, point 1; (b) following the presentation of the conditioning plan, the competent authorities shall take a definite decision on whether operations may continue on the basis of the said conditioning plan and this Directive. Member States shall take the necessary measures to close down as soon as possible, in accordance with Article 7(g) and 13, sites which have not been granted, in accordance with Article 8, a permit to continue to operate; (c) on the basis of the approved site-conditioning plan, the competent authority shall authorise the necessary work and shall lay down a transitional period for the completion of the plan. Any existing landfill shall comply with the requirements of this Directive with the exception of the requirements in Annex I, point 1 within eight years after the date laid down in Article 18(1); (d) (i) within one year after the date laid down in Article 18(1), Articles 4, 5, and 11 and Annex II shall apply to landfills for hazardous waste; (ii) within three years after the date laid down in Article 18(1), Article 6 shall apply to landfills for hazardous waste.	SHALL
15	**Obligation to report**	Obligation to report at intervals of three years Member States shall send to the Commission a report on the implementation of this Directive, paying particular attention to the national strategies to be set up in pursuance of Article 5. The report **shall** be drawn up on the basis of a questionnaire or outline drafted by the Commission in accordance with the procedure laid down in Article 6 of Directive 91/692/EEC(11) The questionnaire or outline shall be sent to Member States six months before the start of the period covered by the report. The report **shall** be sent to the Commission within nine months of the end of the three-year period covered by it. The Commission **shall** publish a Community report on the implementation of this Directive within nine months of receiving the reports from the Member States.	SHALL

ANNEX 1 3.3.	**Protection of soil and water**	3.3. In addition to the geological barrier described above a leachate collection and sealing system must be added in accordance with the following principles so as to ensure that leachate accumulation at the base of the landfill is kept to a minimum: Leachate collection and bottom sealing >TABLE> Member States **may** set general or specific requirements for inert waste landfills and for the characteristics of the abovementioned technical means. If the competent authority after a consideration of the potential hazards to the environment finds that the prevention of leachate formation is necessary, a surface sealing may be prescribed. Recommendations for the surface sealing are as follows: >TABLE>	MAY
ANNEX 2.2	**General prinicples**	The composition, leachability, long-term behaviour and general properties of a waste to be landfilled must be known as precisely as possible. Waste acceptance at a landfill can be based either on lists of accepted or refused waste, defined by nature and origin, and on waste analysis methods and limit values for the properties of the waste to be accepted. The future waste acceptance procedures described in this Directive shall as far as possible be based on standardised waste analysis methods and limit values for the properties of waste to be accepted. Before the definition of such analysis methods and limit values, Member States **should** at least set national lists of waste to be accepted or refuses at each class of landfill, or defined the criteria required to be on the lists. In order to be accepted at a particular class of landfill, a type of waste must be on the relevant national list or fulfil criteria similar to those required to be on the list. These lists, or the equivalent criteria, and the analysis methods and limit values shall be sent to the Commission within six months of the transposition of this Directive or whenever they are adopted at national level. These lists or acceptance criteria should be used to establish site specific lists, i.e. the list of accepted waste specified in the permit in accordance with Article 9 of this Directive.	SHOULD
		The criteria for acceptance of waste on the reference lists or at a class of landfill **may** be based on other legislation and/or on waste properties.	MAY
ANNEX 2.5	**Sampling of waste**	Sampling of waste may pose serious problems with respect to representation and techniques owing to the heterogeneous nature of many wastes. A European standard for sampling of waste will be developed. Until this standard is approved by Member States in accordance with Article 17 of this Directive, the Member States **may** apply national standards and procedures.	MAY
ANNEX 3.2	**Metereological data**	Under their reporting obligation (Article 15), Member States **should** supply data on the collection method for meteorological data. It us up to Member States to decide how the data should be collected (in situ, national meteorological network, etc.). Should Member States decide that water balances are an effective tool for evaluating whether leachate is building up in the landfill body or whether the site is leaking, it is recommended that the following data are collected from monitoring at the landfill or from the nearest meteorological station, as long as required by the competent authority in accordance with Article 13(c) of this Directive: >TABLE>	SHOULD

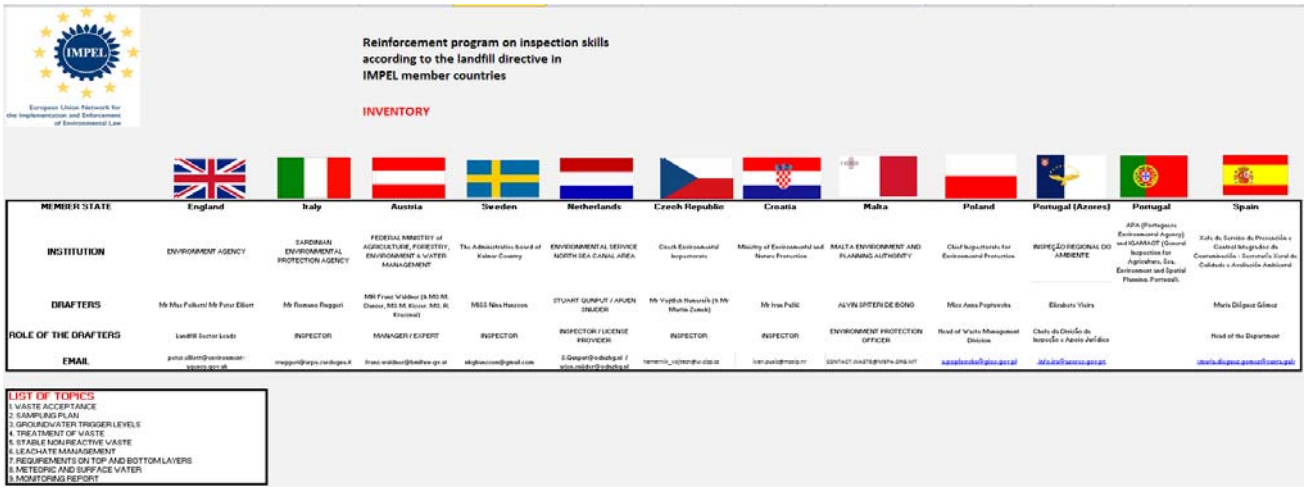
COUNCIL DECISION of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC			
Article	**Topic**	**Text**	
5		In the absence of specific Community legislation, Member States **shall** apply national criteria and procedures.	SHALL
ANNEX	**Protective measures**	In accordance with Article 176 of the Treaty, Member States are not prevented from maintaining or introducing more stringent protective measures than those established in this Annex, provided that such measures are compatible with the Treaty. Such measures **shall** be notified to the Commission. This could be of particular relevance with reference to the limit values for cadmium and mercury in section 2. Member States **may** also introduce limit values for components not included in section 2.	SHALL/ MAY
1.1.	**Basic characterisatio**	The operator **shall** keep records of the required information for a period to be defined bythe Member State.	SHALL

	n		
1.3.	**On-site verification**	Member States **shall** determine the testing requirements for on-site verification, including where appropriate rapid test methods.	SHALL
		Upon delivery, samples **shall** be taken periodically. The samples taken shall be kept after acceptance of the waste for a period that will be determined by the Member State (not less than one month; see Article 11(b) of the Landfill Directive	
ANNEX 2	**Waste acceptance criteria**	Member States **shall** define criteria for compliance with the limit values set out in this section.	SHALL
2.1.2.2.	**Limit values for total content of organic parameters**	TOC 30000 mg/kg(*) In the case of soils, a higher limit value **may** be admitted by the competent authority, provided the DOC Value of 500 mg/kg is achieved at L/S = 10 l/kg, either at the soil's own pH or at a pH value between 7,5 and 8,0.	MAY
2.2.	**Criteria for landfills for non-hazardous waste**	Member States **may** create subcategories of landfills for non-hazardous waste.	MAY
2.2.2.	**Limit values for non-hazardous waste**	Member States **shall** set criteria for monolithic waste to provide the same level of environmental protection given bythe above limit values.	SHALL
2.3.1.	**Leaching limit values**	Member States **shall** set criteria for monolithic waste to provide the same level of environmental protection given bythe above limit values.	SHALL
2.3.2.	**Other criteria**	TOC 5% *) If this value is not achieved, a higher limit value **may** be admitted by the competent authority, provided that the DOC value of 800 mg/kg is achieved at L/S = 10 l/kg, either at the material's own pH or at a pH value between 7,5 and 8,0.	MAY
		Member States must set criteria to ensure that the waste will have sufficient physical stability and bearing capacity. Member States **shall** set criteria to ensure that hazardous monolithic wastes are stable and non-reactive before acceptance in landfills for non-hazardous waste.	SHALL
2.4.1.	**Leaching limit values**	Member States **shall** set criteria for monolithic waste to provide the same level of environmental protection given by the above limit values.	SHALL
3	**Sampling and test methods**	Member States **may** decide that: 1. the sampling maybe carried out by producers of waste or operators under the condition that sufficient supervision of independent and qualified persons or institutions ensures that the objectives set out in this Decision are achieved; 2. the testing of the waste maybe carried out by producers of waste or operators if they have set up an appropriate quality assurance system including periodic independent checking. As long as a CEN standard is not available as formal EN, Member States will use either national standards or procedures or the draft CEN standard, when it has reached the prEN stage.	MAY
Appendix A 2.2.	**Lists of waste suitable for underground storage**	Member States **may** produce lists of wastes acceptable at underground storage facilities in accordance with the classes given in Article 4 of the Landfill Directive	MAY
Appendix B	**Overview of landfilling options provided by the Landfill Directive**	The general definition of 'treatment' is relatively broad and to a large extent **left** to the competent authorities in the Member States.	LEFT
		Member States **may** define subcategories of landfills for non-hazardous waste in accordance with their national waste management strategies as long as the requirements of the Landfill Directive are met.	MAY
		Further sub classification of non-hazardous landfills maybe desired by some Member States, and monofills and landfills for solidified/monolithic waste **may** be defined within each subcategory (see the footnote below table 1). National acceptance criteria **may** be developed by the Member States to ensure proper allocation of non-hazardous waste to the various subcategories of non-hazardous waste landfills. If sub-classification of non-hazardous waste landfills is not desired, all non-hazardous waste (subject of course to the provisions of Articles 3 and 5 of the Landfill Directive) **may** go to a landfill for mixed non-hazardous waste (class B3).	MAY
Table 1		Landfill of inert waste: Criteria for leaching and for content of organic components are set at EU level (section 2.1.2). Criteria for content of inorganic components **may** be set at Member State level.	MAY

	Landfill for inorganic non-hazardous waste with a low content of organic/biodegradable matter: Criteria for leaching and content of organics (TOC) and other properties are set at EU level, common for granular nonhazardous waste and for stable, non-reactive hazardous waste (section 2.2). Additional stability criteria for the latter are to be set at Member State level. Criteria for monolithic waste must be set at Member State level	
	Surface landfill for hazardous waste: Criteria for leaching for granular hazardous waste and total content of certain components have been laid down at EU level (section 2.4). Criteria for monolithic waste must be set at Member State level Additional criteria on content of contaminants can be set at MS level	

Annex 2: Results of the survey

GO TO THE SURVEY



LIST OF TOPICS
1. WASTE ACCEPTANCE
2. SAMPLING PLAN
3. GROUNDWATER TRIGGER LEVELS
4. TREATMENT OF WASTE
5. STABLE NON REACTIVE WASTE
6. LEACHATE MANAGEMENT
7. REQUIREMENTS ON TOP AND BOTTOM LAYERS
8. METEORIC AND SURFACE WATER
9. MONITORING REPORT

MEMBER STATE	INSTITUTION
Austria	Federal Ministry of Agriculture, Forestry, Environment & Water management
Croatia	Ministry of Environmental and Nature Protection
Czech republic	Czech Environmental Inspectorate
England	Environment Agency
Italy	Sardinian Environmental Protection Agency
Malta	ERA Environment and Resources Authority
Netherlands	Environmental Service North Sea canal area
Poland	Chief Inspectorate for Environmental Protection
Portugal	APA (Portuguese Environmental Agency) and Igamaot (General Inspection for Agriculture, sEa, Environment and Spatial Planning, Portugal).
Portugal (Azores)	Inspeção Regional do Ambiente
Spain	xefe de servizo de prevención e control integrados da contaminación - secretaría xeral de calidade e avaliación ambiental
Sweden	The Administrative Board of Kalmar Country