



**A Report on the Implementation of
Directive 1999/31/EC on the Landfill of
Waste**

May 2009

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1 Introduction

1.1 The Landfill Directive

Directive 1999/31/EC regulates the operation of landfill of waste in such a way as to prevent or reduce as far as possible negative effects of landfilling on the environment and human health, also taking into account the global environment. To this end, the Directive contains provisions on wastes and treatments acceptable or not in landfills, and lays down conditions for the permitting, operation and closure and after care of landfills.

The main elements of Directive 1999/31/EC are in particular:

- definition of 3 classes of landfill, namely for hazardous, non-hazardous and inert waste;
- measures to reduce the landfilling of biodegradable waste through the establishment of relevant targets, with a view to reducing global warming and promoting separate collection, recycling and recovery of such waste;
- a requirement that only waste that has been subject to treatment can be landfilled, as well as a ban of certain wastes from being landfilled;
- establishment of criteria for accepting waste in landfills (the detailed requirements are specified in Council Decision 2003/33/EC), as well as procedures for the reception of waste in landfills;
- procedures for permitting, control and monitoring during operation, and closure and aftercare.

They are complemented by specific technical requirements, as well as by a provision to integrate relevant costs in the price for landfilling;

This report is based on the questionnaire adopted by Commission Decision 2000/738/EC of 17/11/2000. It covers the period 2004-2006.

1.2 Remarks about this report

This report is a synopsis of the responses by Member States to the questionnaire (Commission Decision 2000/738/EC) covering the period 2004-2006. The synopsis summarizes these responses article per article and country per country and observes a limit of 100 words per response. The report is only based on the responses, for practical reasons the report does not differentiate between direct quotes from the Member States' responses and re-phrased or passages shortened with regard to the 100-words limit. All due care has been taken in completing this synopsis and in reflecting the quintessence of the responses. However, please mind that the original

responses from the Member States constitute the only “authentic” document as submitted by the Member States.

The report produced is solely based on the information made available by the Commission.

2 Incorporation into national law

2.1 National Law

All reporting Member States confirmed that they have provided the Commission with details of the current laws and regulations in force to incorporate Directive 1999/31/EC on the landfill of waste into national legislation.

The **Belgium (Flanders) and Portugal** cited their answers from the previous reporting period, while **Finland** cited both the previous report and other previous communication with the Commission.

The following countries detailed relevant national regulations that transposed the Directive: **Belgium (Brussels), Bulgaria, Cyprus, France, Greece, Hungary, Italy, Latvia, Luxemburg and Slovenia.**

The following countries indicated precisely (or included in a separate document) where each provision of the Directive had been transposed: **Belgium (Wallonia), the Czech Republic, Estonia, Ireland, Lithuania, the Netherlands, Poland, Romania, Slovakia, Sweden and the UK.**

There are currently no landfills in operation in the **Brussels** region of Belgium, although the Directive has been transposed into national law.

2.2 Use of landfill gas

*According to **paragraph 4.2 of Annex I** landfill gas must be collected, treated and used and, if it cannot be used to produce energy, it must be flared. **Paragraph 4.3 of Annex 1** requires that such collection, treatment and use of landfill gas must be carried on in a manner which minimises damage to or deterioration of the environment and risk to human health.*

Austria: According to § 22 of the Landfill Ordinance, 'sufficient capture and discharge of landfill gases' is required. The landfill gas needs to be recovered or treated. Principally, landfill gas has to be recovered if this is environmentally reasonable and technically possible. Otherwise, the landfill gas has to be treated. The document "Degasification of landfills" (no. 502) issued by the Austrian Water and Waste Management Union is recommended as technical standard.

In **Belgium (Flanders)** the use of collected landfill gas is provided for in Article 5.2.4.4.6 of the Flemish Government Decree of 1 June 1995. The landfill gas collected shall preferably be recovered as a source of energy. If recovery is not practicable, the landfill gas shall be flared.

In **Bulgaria** Article 22 of Regulation No 8 sets out requirements for the collection, processing and recovery of landfill gas. If it is uneconomical to

recover the gas for energy purposes, it is flared. Where municipal waste landfill sites do not meet the requirements of Regulation No 8, they are to be closed by the date of bringing into service a regional landfill serving the municipality concerned, and no later than 16 July 2009. Restoration plans must include a gas drainage system and all emissions are flared.

In **Cyprus** all new landfill sites have been designed to include landfill gas collection systems, and all collected gas will be burned on site. No energy utilisation is planned since organic components will be diverted from landfill.

In the **Czech Republic** Decree No 294/2005 Coll., referencing the Czech Technical Standard 83 8034, establishes the principles for the design, construction, testing and operation of gas installations at surface waste landfills where landfill gas is produced. The collection of landfill gas and its subsequent use for the production of energy is implemented mainly at large landfill sites.

Estonia named three landfill sites where gas is currently collected. There is a landfill gas-fired combined power and heat plant in Tallinn next to the now defunct Pääsküla landfill. 5-6 million m³ of gas is collected from the Pääsküla landfill each year and is used to produce around 12 000 MW/h of electricity, 10 000 MW/h of heat and 1000 m³ of biogas. The heat is used to heat buildings on the site and the electricity is sold to the national grid. Gas is also collected from the Väätsa landfill in Järvamaa and the new Tallinn landfill in Harjumaa. The collected gas is flared there. At other landfill sites gas collection conduits are installed in accordance with the growth of the quantity of waste deposited and the amount of gas produced.

In **Finland** the legal provision for the collection, treatment and use of landfill gas is made in the Government Decision on Landfills (861/1997). According to the Decision, the biogas produced at closed landfills must be collected and recovered or treated. Section 4 in Appendix 1 relating to the control of landfill gas came into force on 1.1.2002 and it concerns landfills that enter the after-care stage after that date. In addition, the competent authority can case-specifically require biogas collection at landfills which have been closed earlier, if there is the potential for any danger or harm to human health or the environment.

In **France** the design of the plant for landfill gas collection and processing must take account of both stages of the life-cycle of a cell – operational and post-operational. Operators must establish a surveillance programme for potential biogas discharges as per Articles 19 and 39 of the Decree of 9 September 1997, as amended. ADEME has published two guidance documents on the effective management of landfill gas, available from the ADEME website (www.ademe.fr). In 2004, landfill gas was used mainly for electricity generation: 24 landfills generated 65 MW, and 6 landfills generated heat. Biogas was also used in leachate evaporation plants. To encourage the development of gas recovery, new conditions for the purchase of electricity generated from biogas have been outlined in the Decree of 10 July 2006.

Germany's response simply refers to the "First Report of the Federal Government".

In **Greece** measures for the control of landfill gas are described in Annex 1, bullet 4 of JMD 29407/3509/2002. Out of the 41 municipal waste landfill sites in operation, 16 sites collect gas using an active pump system, while 9 collect gas using a passive pump system. 4 landfill sites burn the gas they collect. So far only 1 landfill site, in Athens, uses gas for energy production. The energy produced is supplied to the Public Power Corporation of Greece.

In **Hungary** there are about 30-40 landfill sites that collect landfill gas and around 10 that treat it. These figures are from a survey conducted in 2000.

Ireland states that this is a standard condition in waste licences, but gives no further details.

In **Italy** the measures on the use of landfill gas to produce energy, as well as measures to minimise risks to the environment and human health, are described in Legislative Decree No. 36 of 13 January 2003 (point 2.5 of Annex I).

In **Latvia** landfill gas is used to generate electricity at the *Getliņi* and *Sķēde* landfill sites. Points 28 and 29 of Cabinet Regulation No 474 of 13 June 2006 deal with requirements for the collection and treatment of landfill gas. If the collected gas cannot be used to obtain energy it is burned.

In **Lithuania** landfill gas was not collected or used for energy production during the reporting period.

In **Luxemburg** landfill gas is collected from all landfills that accept biodegradable waste. The gas is either flared or used in central heating systems.

In the **Netherlands** implementing rules to the Decree on landfill (soil protection) lay down provisions on the collection and treatment of landfill gas. Requirements for the flaring are laid down in the licence.

The table below gives an overview of landfill gas production and extraction over the years 2002-06 (at Dutch landfills). Landfill gas utilisation means utilisation in the production of energy (such as natural gas and electricity).

	Quantities of landfill gas (in 10 ⁶ m ³)				
	2002	2003	2004	2005	2006
Extracted	169	173	148	130	129
Utilised	128	117	106	98	99
Burnt	41	56	42	32	31

In **Poland** energy is recovered from landfill gas where possible, otherwise it is flared. Any electricity and heat generated from landfill gas is used for the requirements of the landfills themselves and any surplus is sold to external users. In 2004 landfill gas generated 26,496,562 MJ of thermal energy and

36,025,833 kWh of electricity. In 2005 it generated 44,311,707 MJ of thermal energy and 48,070,827 kWh of electricity.

Portugal stated that the information from the previous reporting period remains valid.

In **Romania** the Government Decision 349/2005 transposes the requirements for the collection and treatment of landfill gas. Technical Norms for the landfill of waste detail the operational and technical requirements, including those to minimise damage to the environment or human health. Collected gas is flared.

In **Slovakia** Project PS099/SK2: 'Collection and Exploitation of Greenhouse Gases from Landfills in Slovakia' concluded that the country had no landfills where landfill gas could be used for energy purposes, so should instead be flared.

In **Slovenia** requirements for the collection and treatment of landfill gas are dealt with in Article 41 of the Decree on the landfill of waste. Landfill site operators must produce estimates of the annual emissions of greenhouse gases, in accordance with Article 50(6) of the Decree.

In **Sweden** landfill gas is collected from 60 active landfill sites and 10 closed landfill sites and is used for heating, electricity production and motor fuel. Some gas is flared. During the consideration of licence applications for landfill sites, an assessment is made to establish whether there is a need to collect gas. To minimise environmental and health hazards during the collection and treatment of landfill gas, collection systems are monitored by site operators.

The UK: In England and Wales, Regulation 8 of the Landfill 2004 Regulations requires imposition of conditions in landfill permits for collection and utilisation of landfill gas. The Environment Agency has produced a suite of guidance on effective management of landfill gas. Emissions based regulation is fundamental to this guidance and provides for measures to minimise environmental damage. In Scotland, the 2003 Landfill Regulations, Schedule 3, paragraph 4 is relevant. In Northern Ireland no landfills are currently recovering energy from gas.

Résumé: Many Member States carry out energy production from landfill gas only where 'feasible' or 'economical', otherwise the gas is flared. Estonia, France, Greece, Latvia, the Netherlands and Sweden provided more positive details about the use of collected landfill gas for energy production. Cyprus, Lithuania, Romania and Slovakia do not produce energy from landfill gas. The majority of Member States did not specify measures to minimise damage to the environment or human health.

Given the importance of landfill gas, in terms of landfilling's impact on climate change, further investigation of the effectiveness of techniques for its control could be advisable in order to promote best practice in this field.

2.3 Minimisation of nuisances and hazards

Section 5 of Annex I requires measures to be taken to minimise nuisances and hazards arising from landfill through emissions of odours and dust, wind-blown materials, noise and traffic, birds, vermin and insects, formation and aerosols, fires.

All Member States for which replies were received have transposed this point into their national law. The most common method of transposition was to incorporate the obligation as set out in the Directive. Some Member States defined specific, detailed measures in their legislation, while others require such measures to be specified in the landfill site licence.

Examples of the measures reported by Member States to minimise nuisances and hazards include:

Emissions of odours: a ban on the deposition of organic waste; compaction of waste; covering waste with inert material (i.e. soil); air purifying installations; tree barriers; initial location of site far enough from residential buildings; optimal collection routes; immediate unloading of waste; vehicle cleaning facilities.

Dust and Windblown material: compaction; covering waste; spraying or sprinkling on problem areas; fencing, netting, litter screens, tree barriers, isolation barriers and heightened embankments; surrounding area and roads cleaned regularly; immediate unloading of waste; vehicle cleaning facilities.

Noise: minimise site opening times; perimeter barriers of fencing, soil or vegetation; modern technology such as silenced freight vehicles.

Traffic: surfaced roads; optimal collection routes; limiting times for emptying waste from vehicles.

Birds, vermin and insects: a ban on the deposition of organic waste; compaction; covering waste; recirculation of leachate; isolation barriers and the use of small working sectors; use of birds of prey or electronic devices to scare away birds; rat poison; insecticides; enclosing the site.

Formation and aerosols: isolation barriers; covering waste deposit areas with earth or other suitable material.

Fires: a ban on the deposition of combustible waste; prohibition on placing smouldering or burning waste in landfill cells; smoking on site prohibited; collection system protected to prevent entry of air; removal of dried vegetation from surrounding slopes; isolation barriers and firebreaks; recirculation of leachate; monitoring areas with fire-prevention camera systems; automatic fire fighting system; extinguishing plans, including reservoirs of water and soil minerals for extinguishing.

Résumé: The most common measures for the minimisation of nuisances and hazards are the covering or fencing of landfills. These solutions address a number of environmental concerns.

2.4 Waste acceptance criteria or lists

*Article 11 provides for procedures for the acceptance of waste in landfills, in accordance with the specifications in Annex II. Under the general principles set out in **Section 2 of Annex II** 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 **Austrian** Landfill Ordinance lays down limit values for landfill types, acceptance lists and, in Annex 5, analytical methods for waste analysis. Requirements concerning the adaptation of existing landfills to the state of the art of the landfill ordinance are contained in amendments to the Austrian Waste Management Law.

In **Belgium (Flanders)** there has been no change since the previous reporting period. In **Wallonia** an agreement on waste acceptance criteria was reached with research unit SERTIUS on 1 August 2006, amended 24 January 2008. Council Decision 2003/33/EC is implemented by the decree of the Government of the **Brussels Region** of 13 November 2003 amending Annex II of the decree of the Government of Brussels of 18 April 2002 on the landfilling of waste (Moniteur Belge of 18 December 2003).

In **Cyprus** all relevant criteria have been included in the national law K.Δ.Π. 282/2007.

In **Estonia** no additional criteria and methods of analysis have been enacted but under Section 18 of the Regulation on landfills the suitability of waste for landfilling must be in conformity with Council Decision 2003/33/EC. The protection of surface and ground water must be based on Minister of the Environment Regulation No 12 of 2 April 2004 'Limit values for the content of hazardous substances in surface and ground water' and Regulation No 17 of 11 March 2005 'Limit values for the content of hazardous substances in surface and sea water'.

In **Finland** the criteria and procedures for the acceptance of waste at landfills is addressed by Amendment 202/2006 to the Government Decision on Landfills (861/1997). Specific legislation for the Åland Islands is outlined in the Decree of the Province of Åland on the landfill of Waste (ÅFS 3/2007), paragraph 20.

France stated that it has outlined the criteria and procedures for admitting waste to landfills in the texts transposing Council Decision 2003/33/EC, but gave no further details.

In **Greece** no national list of criteria has been established for the acceptance or refusal of waste at landfills; however, the acceptance criteria set out in Council Decision 2003/33/EC are used by waste management bodies.

In **Hungary** a new Ministerial Decree No. 20/2006 has replaced the previous Decree No. 22/2001 (X. 10) KöM on the rules and certain conditions of landfilling and closing and after-care of landfills. It contains the same criteria and analysis methods as those in Council Regulation 2003/33/EC. The nature of the waste accepted by a particular landfill is specified in its permit by the Environmental Inspectorate.

In **Ireland** conditions for the acceptance of waste are site specific. Article 50 of Waste Management (Licensing) Regulations 2004 sets out the categories of waste accepted at different classes of landfill.

In **Italy** waste acceptance criteria are defined by the Decree of the Ministry of the Environment and Protection of Natural Resources of 3 August 2005, which replaced the previous Decree of 13 March 2003 on the same topic.

In **Latvia** Regulation No 474 established criteria and procedures for the acceptance of waste at landfills.

In **Lithuania** waste acceptance criteria and limit values are set out in the rules for the setting up, operation, closure and after-care of waste landfills as approved by Order No 444 of 18 October 2000, as amended. Further, analysis methods have been established by Order No D1-305 of 16 June 2005.

In **Luxemburg** acceptance criteria are outlined in Annex 2 to the Regulation of 24 February 2003 concerning the landfill of waste, amended by the Regulation of 17 February 2006.

In **the Netherlands** Article 1 of the Decree on waste landfill sites and landfill prohibitions lists the waste types that are banned from landfill and stipulates associated conditions.

In **Poland** the criteria for accepting waste at landfills, along with limit values and analytical methods are described in the Regulation of 7 September 2005 issued by the Minister of the Economy and Labour.

Portugal stated that the information from the previous reporting period remains valid.

Romanian legislation transposes the Council Decision 2003/33/EC by the Ministerial Order 95/2005 which establishes national lists of waste that is accepted by each landfill class. Each landfill site's environmental permit details which waste types are accepted by the site.

In **Slovakia** waste acceptance criteria is set out in Decree no. 283/2001 Coll. (Section 32 (4) – (7)) and in Act 223/2001 Coll. (Section 18 (g) and (h) and Annexes 5 and 6). A list of the waste which can be accepted at a landfill is

included in the operating licence for that landfill, and all waste is treated on a case-by-case basis.

In **Slovenia** a waste assessment is required before the waste can be disposed of at a landfill site, in accordance with Article 11 on the Decree on the landfill of waste. In the waste classification list mixed-composition waste is given a six-digit classification number and dangerous waste is also marked “*”. Article 6 of the Decree stipulates which waste may be disposed of at a given type of landfill (hazardous, safe, inert).

Council Decision 2003/33 EC is transposed in **Sweden** by the Environmental Protection Agency's rules (2004:10) on the landfill of waste. These rules lay down criteria and limit values for the various landfill classes. One exception is when non-hazardous waste is deposited at a site for non-hazardous waste where there are no criteria; such waste is also exempt from analysis.

Résumé: In relation to the transposition of waste acceptance criteria all responding Member States indicate that they have defined waste acceptance criteria and procedures, or that they use the acceptance criteria set out in Council Decision 2003/33/EC.

The situation and level of environmental protection in Greece could be further investigated as it is noted that there is no national list of criteria; although, it is noted that the Directive's criteria are used by waste management bodies.

Member State responses provide details of the legal measures through which the Directive's criteria are implemented. However, the information provided does not permit comparison in terms of whether Member States simply reproduce the criteria from the Directive, or interpret requirements differently based upon national circumstance. To understand fully the nature of acceptance criteria in Europe further investigation into the nature of transposition and approaches to implementation the ground would be necessary.

2.5 Collection of meteorological data

*According to **Section 2 of Annex III**, Member States should, as part of their reporting obligation under Article 15, supply data on the collection method for meteorological data. It is up to Member States to decide how the data should be collected (in situ, national meteorological network, etc.).*

In **Austria** meteorological data shall be collected at every landfill site. The use of data from the nearest meteorological monitoring station is allowed.

Belgium (Flanders) provided a summary table of the meteorological data collection method for each landfill. Some sites have their own weather station, whilst others use national meteorological network stations. **Wallonia** requires

a meteorological station to be installed at every landfill for biodegradable waste.

In **Bulgaria** landfill operators use data obtained from the nearest hydrometeorological service.

In **Cyprus** all new landfill sites have been designed to include automatic meteorological stations on site to measure the data referred to in Annex III.

In the **Czech Republic** the basic conditions for designing and constructing landfill sites are governed by Decree No 383/2001 Coll., Annex 1, and Decree No 294/2005 Coll., § 3 – reference to ČSN 83 8030 on the landfill of waste.

In **Estonia** meteorological data is collected by the observation network of the Estonian Meteorological and Hydrological Institute, which includes 22 weather stations, 3 hydrological stations and 51 observation stations. There are 23 automated weather stations in the observation network, which constantly record the weather. All the indicators required under point 2 of Annex III to the Directive are measured, i.e. volume of precipitation, temperature, wind direction and force, evaporation, atmospheric humidity. The data obtained from the network is sufficient to meet the requirements arising from the Landfill Directive.

Finland has made no changes to its meteorological data collection methods since the last reporting period.

France had no new information to provide since the last reporting period.

In **Greece** collection of meteorological data is carried out either by established meteorological stations at the landfill site or by the closest Meteorological Station of the National Network.

In **Hungary** meteorological data may be acquired either directly by the operator or under an agreement with the National Meteorological Network. The meteorological station for observation and registration of local climatic data collects the following data: wind speed, volume of precipitation, air temperature, atmospheric pressure, humidity and evaporation.

In **Ireland** the method for collection of meteorological data is outlined in the Landfill Monitoring manual, 2nd Edition, published by the EPA (2003). Meteorological data can be collected from an in situ weather station at the landfill site, a nearby meteorological station or a combination of both. Minimum meteorological monitoring requirements are also set out in this manual.

In **Italy** landfills must be equipped with a meteorological data collection station, as stated by Point 5.6 of Annex 2 to Legislative Decree No 36 of 13 January 2003.

In **Latvian** legislation a collection method for meteorological data is laid down in Regulation No 474.

In **Lithuania** the collection system for meteorological data is established by Order No 444 of 18 October 2000 of the Minister of the Environment (as amended). The landfill operator must collect the data referred to in Appendix 1 of the Order from the meteorological station nearest to the landfill. Data for the previous quarter is available from the Lithuanian Hydrometeorological Service on written request from the landfill operator. Appendix 1 to the Order specifies the data to be collected.

In **Luxemburg** the collection of meteorological data is site-specific. Data can be collected from national stations or on site.

The Netherlands replied that it does not consider hydrological balances a useful instrument.

In **Poland** meteorological data are collected from measurements taken at the landfill site or at a meteorological station that is representative of the location of the landfill site. The most frequent measurements taken at landfill sites are precipitation and temperature. Measurements of other parameters are carried out at meteorological stations.

No changes have taken place in **Portugal** concerning the collection of meteorological data since the previous reporting period.

In **Romania** provisions of Annex III, Section 2 have been transposed by GD 349/2005, Annex 4, Chapter 2.1 – Meteorological data. Measures for the collection of meteorological data (as part of a self-monitoring system) are outlined within the environmental permits and the achievement of these measures is controlled by National Environmental Guard.

Meteorological data in **Slovakia** is collected from the nearest weather station (SHMÚ [Slovak Hydrometeorological Institute] network) whose data are relevant to the landfill concerned. Landfill operators may collect data from their own weather station if there is no SHMÚ station nearby. Data collections and evaluations are made at set intervals. Data is collected and evaluated only if requested in a decision by the relevant government agency, or if needed for assessing the water balance at the landfill site. The following information is recorded: precipitation, temperature, the direction and force of the prevailing wind, evaporation, air humidity and other significant meteorological data.

In **Slovenia**, in accordance with Article 50 of the Decree on the landfill of waste, operators of landfill sites are obliged to take measurements of meteorological parameters as stipulated in Article 7 of the Decree. The measurements taken include: quantity of precipitation, air temperature, wind speed and direction, air humidity and evaporation. The required frequency of measurements is set out in Table 1 of the Annex.

In **Sweden** meteorological data is obtained from a nearby meteorological station where regular observations are made by Sweden's Meteorological and Hydrological Institute (SMHI).

The UK: in England, as part of the permit application the landfill operator is required to have a meteorological monitoring plan. Data can be obtained from a meteorological station or collected from on site monitoring. In Scotland independent data is collected through the national meteorological network, the UK Met Office. In Northern Ireland all operational landfill sites under a PPC Permit are required to collect meteorological data.

Résumé: All Member States that responded have put in place mechanisms for the reporting of meteorological data related to landfill sites.

The majority of Member States allow the use of data from the nearest meteorological station with the exception of the following: Belgium (Wallonia), where the installation of a meteorological monitoring station is required at every landfill receiving biodegradable waste; similarly in Italy stations are required at every landfill; and in Cyprus, where all new landfill sites must have their own automatic stations on site.

2.6 Monitoring of leachate, surface water, gas emissions

Section 3 of Annex III establishes requirements and sampling frequencies for monitoring leachate, surface water, gas emissions and atmospheric pressure.

In **Austria** the control of emissions encompasses testing of groundwater quantity and analysis of leachate, capture and control of non-contaminated water, analysis of state/quality of the receiving water and measurements of the parameters relevant for degasification.

Belgium (Flanders and Wallonia) had no new information to report.

In **Bulgaria** emissions from landfills are monitored in accordance with Annex 3 to Regulation No 8. Monitoring of the following is mandatory: the level and composition of groundwater (samples are taken from at least one point above the landfill and at least two points below the landfill); the volume and composition of the leachate; potential gaseous emissions and atmospheric pressure, in cases where biodegradable waste is landfilled.

In **Cyprus** all new landfill sites have been designed to include: at least one borehole at the groundwater inflow region and two boreholes in the outflow region to monitor groundwater; at least one borehole upstream and one downstream of the landfill site to monitor surface water; a surface water collection system on the landfill site. According to the landfill topography gas boreholes will be installed on site and in nearby areas.

In the **Czech Republic** monitoring is governed by the following legislation: Decree No 294/2005 Coll., § 3 – reference to ČSN 83 8030: Basic conditions for designing and constructing landfill sites; ČSN 83 8033: Disposal of leachate from landfill sites; ČSN 83 8034: Removal of gases from landfill; and

ČSN 83 8036: Monitoring of landfill. For waste coming under Act No 76/2002 Coll. on integrated pollution prevention and control (IPPC) the following applies: Decree No 554/2002 Coll. (application for an integrated permit).

Monitoring requirements are transposed in **Estonian** legislation through Sections 42-47 of the Regulation on landfills. Samples of surface water are taken and the properties are determined in accordance with the requirements and periodicity laid down in the Directive. In summary, once a year the quality of groundwater is assessed and compared to measurements made prior to the landfills establishment. The volume and composition of leachate is determined separately at each point where water is channelled from the landfill, as well as in each leachate collection point. The parameters to be measured and the substances to be analysed are determined on the basis of the composition of the waste deposited, the leaching properties of the waste, the probable composition of the leachate and the quality of the ground water as ascertained during the preliminary studies, having regard to the ground water transfer.

In **Finland** no change has been made to monitoring methods since the last reporting period. It is noted that this issue is discussed in detail in the answer that was given by the Ministry for Foreign Affairs of Finland on 15th of May 2007 to the Official Note of the Commission in the case 2006/ 2483 concerning the transposing the directive 1999/31/EC into national law [SG-Greffe(2007) D/201509, 23 March 2007] in sections 93-97. Regarding the Åland Islands: the operator is required to analyse groundwater, leachate and surface water at least three times a year.

France had no new information to provide since the last reporting period.

In **Ireland** this is dealt with in the Landfill Monitoring Manual, 2nd Edition, published by the EPA (2003).

In **Italy** the system for monitoring leachate, surface water and gas emissions is fully described in points 5.3 and 5.4 of Annex 2 to Legislative Decree No 36.

In **Greece** monitoring requirements are outlined in the environmental permits of landfill sites. Before operation commences, reference values for groundwater are established. During operation, leachate is monitored monthly by volume and every three months by composition. The chemical parameters analysed are: pH, COD, BOD, odours, conductivity, temperature, phenols, total P, As, Cd, Cu, Hg, Zn, volatiles, CN-, F-, N as NH₄, total suspended solids, total dissolved solids. Surface water is monitored at one point upstream and two points downstream of the landfill, every three months during operation. The volume and composition of gas emissions are monitored monthly from several sites in the landfill. Components analysed include: CH₄, CO₂, O, total Cl, total S, N, benzen, cloro-ethane. After closure, all measurements are taken bi-annually.

In **Hungary** the monitoring of leachate and surface water is governed by the Regulation: General Guidelines to Sampling Technologies, ISO 5667-2 1991. Site-specific requirements are outlined in the landfill's permit. Sampling and

measuring (quantitative composition of) leachate is performed at every site where leachate is drained from the landfill. When monitoring of surface water is stipulated by the permit, it is observed at a minimum of two sites: one upstream and one downstream of the landfill. Testing of landfill gas samples must represent the volume and composition of the emitted gas.

In **Latvia** monitoring requirements are laid out in Regulation No 474, Annex 4. Locations where measurements are to be taken, as well as the parameters for chemical analyses, are stipulated by the Regional Environmental Boards of the State Environmental Service. At least two sampling sites should be established upstream and downstream of the landfill to monitor surface water. For groundwater, at least one bore for sampling groundwater shall be set up where groundwater flows in the direction of the landfill or waste dump, and at least two where groundwater flows away from the landfill or waste dump. If existing data and the area's hydro-geological conditions indicate that there is a possibility of aquifers being contaminated, at least one deep bore shall be set up for the control of aquifers.

In **Lithuania** the Order No 444 of 18 October 2000 of the Minister of the Environment (as amended) establishes requirements for the monitoring of leachate, potential gas emissions and atmospheric pressure. Site-specific monitoring programmes are attached to each landfill's permit. Detailed requirements are set out in the appendix to the regulation.

In **Luxemburg** a programme of sampling and analysis requires checks to be carried out every three months.

In **the Netherlands** Article 8a of the landfill Decree on soil protection contains rules on monitoring. They state that the composition of the surface water is to be ascertained every three months from at least two locations (to be stipulated by the authority responsible), one upstream and one downstream. The regulation implementing the Decree contains rules on measuring leachate and groundwater (Article 10). The sampling frequency is one to three times a year, depending on the groundwater's flow rate. The samples are analysed for: acidity, electrical conductivity, chemical oxygen consumption, mineral oil, volatile organic halogenised hydrocarbons (VOX), chloride and Kjeldahl-N or ammonia (NH₃). The authority responsible may also indicate other parameters and adjust the monitoring frequency. The quantity of leachate is ascertained monthly. Samples are taken at representative locations and are representative of the leachate's average composition. Sampling is to take place at each location where leachate is discharged from the landfill. The Decree implementing the landfill Decree contains analysis protocols which must be complied with. Articles 5a and 19 of the implementing regulation contain the rules on gas emissions. They stipulate that the measurements, the composition and the atmospheric pressure must be representative of the whole landfill and that they must relate to the gases CH₄, CO₂ and O₂.

In **Poland** flows and composition of surface water are measured in at least two places (one above the landfill, the second below). These measurements are taken once during the preparation phase, every 3 months during the

operational phase, and every 6 months during the after-care phase. Flows and composition of leachate are measured monthly in each place it collects, prior to its purification. If the site has a water purification installation, measurements of the composition of purified water are taken at every point the purified water is discharged in order to check the effectiveness of the purification process. Flows of leachate are measured every month during the operational phase and every 6 months during the after-care phase. Leachate composition is analysed every 3 months during the operational phase and every 6 months during the after-care phase. Measurements of landfill gas are taken at appropriate locations in the landfill site, which are set in the instructions for the use of the landfill, in locations where it collects before the intake of the installation for gas purification and use or its safe disposal. Emission levels and gas composition are measured every month during the operational phase and every 6 months during the after-care phase. Measurements of atmospheric pressure are not required by Polish regulations, but many organisations that run landfill sites take atmospheric pressure measurements as part of measuring emission volumes.

Portugal had no new information to describe since the last reporting period.

In **Romania** requirements for such monitoring are laid out in GD 349/2005, Annex 4, Chapter 2.2. Provisions regarding self-monitoring (including leachate, surface water, gas emissions) are contained within environmental permits. All complying landfills for municipal waste have a leachate collection system and the leachate is treated before being discharged into the surface water or into a municipal wastewater treatment plant. In both cases, discharged treated leachate has to comply with the requirements established by water protection legislation.

Slovakia requires a series of requirements to be met to ensure the monitoring of leachate, surface water and landfill gas. For all samples must be taken at representatives points. Leachate is monitored every month while waste is being received. The composition of leachate and surface waters are tested four times per year during operation, twice per year after closure. For surface waters for each monitored surface flow one sample must be taken upstream and one downstream of the site. Possible emissions of landfill gas must be monitored monthly while waste is being received and half yearly after the closure of a specific cell. Data on atmospheric pressure, and the volume of methane, carbon dioxide and oxygen, must be recorded as a minimum.

In **Slovenia**, in accordance with Article 50 of the Decree on the landfill of waste, landfill operators are obliged to measure the emissions of substances into the air from the landfill, emissions of substances in the discharge of leachate and polluted precipitation and the pollution of surface water, to the extent and in the manner laid down in Annex 7 to the Decree.

In **Sweden** leachate is collected and piped to a reservoir for cleaning and analysis. Regular samples are taken from the reservoir, from selected points in and around the landfill site and from the outgoing water, and tested for selected parameters such as nutrients and metals. The impact on surface and groundwater is analysed at selected points up- and downstream of the site.

Gas discharges are measured by comparison of the amount of collected landfill gas with estimates of the amount of gas produced. There are also visual inspections of the site to detect gas leakage.

Within the **UK**, In England and Wales, Regulation 14 and Schedule 3 of the Landfill Regulations set out minimum monitoring requirements for leachate, surface water, gas emissions and atmospheric pressure. Site-specific monitoring requirements are incorporated within the permit. The Environment Agency has produced a significant body of technical guidance to underpin legislative requirements. In Scotland, Schedule 4 of the 2003 Regulations details monitoring requirements. Advice is also taken from the Scottish Environment Protection Agency's hydrogeology staff when determining appropriate trigger levels to be included in the permit. In Northern Ireland, permits require site operators to produce management plans.

Résumé: The majority of Member States provided significant detail on their monitoring regimes for leachate, surface water, gas emissions and atmospheric pressure. Commonly monitored parameters include: the level, flow and quality of groundwaters; gas emissions and atmospheric pressure; the volume and composition of leachate; surface water quality down stream of the landfills. Measurements made following the commencement of operations are commonly compared to the baseline prior to development. It is noted that in some Member States monitoring requirements may depend on the permit conditions set out for a landfill site; as well as the nature of the landfill, for example, whether it contains biodegradable material. Some Member States provided highly detailed accounts of sampling frequency and the exact nature of the substances tested.

The information provides a good summary of the types of activities conducted to ensure the monitoring landfill sites in the EU. It does not, however, provide an understanding of how monitoring requirements are implemented or how outcomes of monitoring are used. This would be important to understand in order to establish if monitoring provisions for landfills are adequate.

2.7 Cases where the measurement of volume and composition of surface water was not required

*On the basis of the characteristics of a landfill site, the competent authority may determine that measurements of volume and composition of surface water foreseen in **Section 3 of Annex III** are not required.*

The **Austrian** Landfill Ordinance does not foresee exceptions from the obligation to control the status and quality of surface water.

In **Belgium (Flanders)** the measurement of volume and composition of surface water is not necessary for landfills discharging their purified leachate

into the sewage system, as the water discharged is destined to end up in the water purification plant and not directly in the surface water. In **Wallonia** measurement requirements are set on a case by case basis where necessary.

In **Estonia** Section 37(3) of the Regulation on landfills allows the issue of a landfill permit – the Ministry for the Environment's county environmental service – to exempt the landfill operator from monitoring surface water if it is convinced that the site of the landfill and the type of waste pose no danger to surface water. This exemption is granted to landfills for inert waste and for the depositing of non-hazardous waste which is not inert waste and which results from prospecting and extraction, treatment and storage and which is deposited in a way that prevents environmental pollution and any threat to human health.

In **France** there is no monitoring system for landfills for inert waste. In non-hazardous waste landfills depending on the characteristics of the site the measurements may not be required.

In **Greece** such exemptions are examined at the allocation of environmental permits.

In **Ireland** there is no operational landfill facility at which the composition of surface water is not monitored. The volume of surface water is not monitored as it is deemed to be meteorological.

In **Luxemburg** landfills for uncontaminated inert waste are exempt from monitoring the volume and composition of surface water.

In **the Netherlands**, depending on the characteristics of the landfill, the Board of the Provincial Executive may stipulate in the licence that these surface water measurements are not required, for example, if water demonstrably cannot contribute to spreading contaminated substances. Also, sampling may take place less frequently if evaluation of the data shows that longer intervals are equally effective. The evaluation can take place on the basis of Article 9(3) of the landfill Decree on soil protection.

In **Poland** measurements of the volume and composition of surface water are not required for landfills with inert waste and for landfills with hazardous waste that only store waste with codes 17 06 01* - insulation materials containing asbestos and 17 06 05* - building materials containing asbestos. Such measurements are also not required if, as a result of an environmental evaluation or hydrological documentation, it appears that it is not possible to take these measurements (for example, the landfill is located at a significant distance from surface water).

In **Portugal** the competent authority may consider that such monitoring is not necessary, depending on the characteristics of the landfill.

In **Romania**, depending on the characteristics of the landfill location, the authority for environmental protection may decide that the measurement of

volume and composition of surface water is not needed. This is established by the environmental permit issued by local or regional environmental protection agency.

In **Slovakia** monitoring of surface water is not carried out on landfills where there is no surface flow. The relevant government agency decides whether or not monitoring is needed.

In **Slovenia** Article 50 of and Annex 7 to the Decree on the landfill of waste provide for such exemptions.

For **UK**, in England there is a landfill for permanent underground storage of hazardous wastes, located within a salt mine. The risk assessments provide adequate evidence that the geology of the permanent storage area will not provide a pathway for groundwater to enter the landfill. The nature of the operation, and the fact that only dry wastes will be permitted, will not provide a mechanism for leachate to form and escape from the disposal area therefore conditions regarding volume and composition of surface water are not required.

Résumé: Exemptions relating to the measurement of surface waters are applied by many Member States. In several cases these are granted for inert waste landfills; however, more commonly they are applied where it can be proven there is no risk of contamination based on the characteristics of a given landfill. In the latter cases it is noted by several Member States that such an assessment is conducted on a site specific basis during the permitting of a landfill. Few details are provided as to precisely how the risk posed by a given landfill is determined and on what criteria decisions as to the level of surface water measures are based.

Many Member States who responded vary the need for monitoring depending upon a landfill's characteristics. Information on precisely how such assessments are made and the criteria used to determine exemptions are, however, not clearly or consistently provided. To understand fully the impact of these exemptions and their application, further information on Member State implementation and the nature of exemptions applied would be needed.

3 Implementation of the Directive

3.1 Exemptions for non-hazardous waste from prospecting and extraction, treatment and storage of mineral resources, as well as from the operation of quarries

Article 3(3) of the Directive gives the possibility to Member States to declare that the deposit of non-hazardous waste, 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 provisions in Annex I points 2, 3.1, 3.2 and 3.3 relating to water control, leachate management and soil and water protection.

Bulgaria, Estonia, Hungary, Italy, Poland, Romania, Slovakia, Sweden and the UK stated that they have made use of this exemption.

In **Bulgaria** Articles 17(2) and 21 of Regulation no. 8 cover such exemptions, although no use of this option was made during the period covered by this report.

In **Estonia** the deposits of gangue produced from mining oil shale and situated in Ida-Virumaa are partially exempt from monitoring, specifically the Estonia mining gangue deposit and the Viru gangue deposit, which store 3.5 million tonnes and 1.1 million tonnes per year respectively. These landfills are fully exempt from gas monitoring and the soil is monitored once per year. The indicators are determined in pH.

In **Hungary** this is regulated by the Decree of the Minister for Environment and Water No. 20/2006 (IV. 5.) KvVM. Act No. XLIII. of 2000 on Waste Management and Act No. XLVIII. of 1993 on Mining provide general rules for the treatment of non-hazardous mining waste. The transposition into national law of Directive 2006/21/EC on the Management of Waste from the Extractive Industries is in progress.

In **Italy** Article 3 point 3 of the legislative decree no. 36 of 13 January 2003 provides possible exemptions concerning the control of water, the management of leachate and criteria for the protection of soil and water.

Poland has taken advantage of the option provided in Article 3(3) but provides no further details.

Romania has made use of the option but gave no explanatory details.

In **Slovakia** the Mining Act applies to waste from mining and the Water Act applies to waste deposited on sludge beds. A draft law on the handling of waste from the mining industry, which will further regulate this area, is currently in legislation.

In **Sweden** a general provision covering all the exemptions provided in Article 3(3) of the Directive has been included in Section 5 of the Regulation on the landfill of waste.

In **the UK** Scotland has made use of the option provided in Article 3(3). The exclusion is by virtue of the definition of waste in Directive 2006/12/EC.

Résumé: Just under half of all Member States responding noted that they had made use of the exemption related to the deposit of non-hazardous waste, other than inert waste, resulting from prospecting and extraction, treatment and storage of mineral resources from certain provisions in Annex I of the Directive. For the Member States that reported making use of this exemption, it is not always clear whether they have simply transposed the exemption into their national law, or if they had also made use of the exemption in practice. The two exceptions to this are Bulgaria, which has made no use of the exemption, and Estonia, which partially exempts deposits of gangue from mining oil shale in certain areas.

In order to provide a definitive picture of the treatment of such deposits in practice it would be prudent to clarify the situation in terms of the use of this clause, specifically for Hungary, Italy, Poland, Romania, Slovakia, Sweden and the UK.

3.2 Exclusion of islands and isolated settlements

According to Article 3(4) Member States may declare, at their own option, that certain provisions 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, are not applicable, under certain conditions, to (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 and (b) landfill sites for non-hazardous or inert waste in isolated settlements.

Bulgaria, Finland, France, Greece, Romania and the UK have made use of this option.

In **Bulgaria** Article 12 of Regulation no. 8 provides for this option, although it does not specify eligible sites. No actual use was made of this option during the period with which this report is concerned.

For mainland **Finland** no exemptions have been made. For the Åland Islands the issue is noted to have been discussed in the answer that was given by the Ministry for Foreign Affairs of Finland on 15th of May 2007 to the Official Note of the Commission in the case 2006/ 2483 concerning the transposing the directive 199/31/EC into national law [SG-Greffé(2007) D/201509. 23 March 2007] in sections 20-24.

France incorporated the exemption option for isolated settlements into national law by the Decree of 19 January 2006 in order to respond to specific circumstances only encountered in the department of Guiana (villages with no road access). No exemption was granted in the reporting period.

Greece supplied a list of exemptions for the previous report: see http://ec.europa.eu/environment/waste/pdf/lists/greece_en.pdf

Romania has made use of the option but gave no details.

The UK has one exempted site in Scotland. No further details were given.

Résumé: Six Member States reported making use of the provisions for the exemption of islands and isolated settlement. While it is noted that these six have transposed requirements into their national law; based on the responses, it appears that only Greece and the UK have actually specifically exempted isolated sites or islands in practice.

3.3 Exclusions for underground storage

Article 3(5) gives the possibility to Member States to declare, at their own option, that underground storage can be exempted from 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.

Bulgaria, Finland, Poland, Romania, Slovakia, Slovenia, and the UK have made use of the option provided for by Article 3(5).

In **Bulgaria** Article 13 of Regulation no. 8 provides for this option, although there are currently no underground waste storage facilities in the country.

In **Finland** the option on underground storage has been transposed into national law by Amendment 202/2006 to Section 2 of the Government Decision on Landfills (861/1997). There are currently no underground storage facilities.

Poland has made use of this option and currently has 4 underground storage facilities where waste under the following codes is stored: 01 01 02 – wastes from mineral non-metalliferous excavation, 01 05 08 – chloride-containing drilling muds and wastes other than those listed in 01 05 05 and 01 05 06 and 05 07 99 – wastes not otherwise specified. In 2004, 414 Mg of waste went to underground storage, 1775 Mg in 2005 and 10,325 Mg in 2006.

In **Romania** underground storage is exempted in compliance with the requirements of the waste framework directive, transposed into national legislation. There are currently no facilities for the underground storage of waste.

In **Slovakia** Section 34 of the Mining Act, 'Special Interventions into the Earth's Crust', provides for the option of underground storage. A decree on the disposal of waste by deep injection has not yet been adopted.

Slovenia commented that no permits were issued for the operation of underground storage sites during the reporting period.

There is currently no underground storage in **Sweden**, but a general provision covering all exemption possibilities referred to in Article 3(5) has been incorporated into Section 5 point 1 of the Regulation on the landfill of waste.

In **UK** the Landfill Regulations do not transpose the option regarding underground storage from the Landfill Directive. In permitting an underground water disposal facility within a salt mine, the Environment Agency determined what measures would be appropriate for the site on the basis of the environmental risks. In effect this means that the permit does not require controls for leachate management, artificial barriers, groundwater or landfill gas. The permit does impose conditions to minimise the impact on the environment such as accident prevention and waste acceptance.

Résumé: Seven Member States reported that they have transposed the exemptions applied to underground storage into national law. Only two, however, noted that they actually have underground storage sites in place at present: the UK and Poland.

3.4 National strategy for the reduction of biodegradable waste going to landfills

The treatment of biodegradable waste is a key element of the Landfill Directive, given the desire to reduce greenhouse gas emissions associated with disposal. The following section examines in turn the status of notifications of National Strategies for biodegradable waste; the classification of biodegradable waste; the experiences associated with implementing the strategy; the generation of biodegradable waste and adaptations to the strategies.

3.4.1 Status of notifications to the Commission of Strategy Development

In **Bulgaria** a draft national strategic plan for a phased reduction of the quantities of biodegradable waste sent for landfill has been drawn up. It was due to be adopted by the Minister for the Environment and Water by the end of 2007.

In **the Netherlands** waste policy with such intentions was already in force at the time of the implementation of Directive 1999/31/EC. The Dutch national waste management plan 2002-2012 defines landfill as the least desirable method of disposal, permitted only for waste substances which, whether temporarily or not, cannot be utilised or disposed of by incineration.

In **Slovakia** a national strategy for the reduction of biodegradable waste going to landfills has not been drawn up as a single, comprehensive document but instead is regulated through several legislative and strategic measures, and for this reason has not yet been notified to the Commission. The Ministry of the Environment of the Slovak Republic is setting up a working group on the handling of biodegradable waste. This is expected to result in the acceptance of the strategy in question. The following details of relevant Slovak legislation were supplied:

The targets set in Article 5 (2) of the Directive were incorporated into the Waste Management Programmes pursuant to Section 5 (1) (d) of Decree no. 283/2001 Coll. The Waste Management Programme of the Slovak Republic set the first targets for the year 2005, linking them with all the waste management programmes at regional and local level. New targets are set in the Waste Management Programme of the Slovak Republic for the years 2006-2010, which has already been approved by the government of the Slovak Republic, and these targets will again be incorporated into waste management programmes at lower level. The Slovak Republic used the provision of Article 5 (2), second paragraph, of the Directive: deadlines postponed by four years in relation to the deadlines in the Directive.

Résumé: All replying Member States indicated that they have developed a National Strategy for the reduction of biodegradable waste going to landfill and notified this to the Commission, with the exception of Slovakia and the Netherlands. The Netherlands comment that waste policy in relation to this was already in place prior to the Directive's adoption; meanwhile Slovakia has not developed one strategy on this but a series of measures that have been communicated to the Commission. It could not be discerned from Bulgaria's response whether their national strategy has now been adopted.

This assessment does not provide any understanding of the actions actually put in place to address biodegradable waste, simply if a strategy is in place and communicated to the Commission. Further research is necessary to understand the quality and nature of the strategies.

3.4.2 Classification of wastes as biodegradable waste and biodegradable municipal waste

*Within the Landfill Directive, **Article 2(m)** biodegradable waste is defined as 'any waste that is capable of undergoing anaerobic or aerobic decomposition, such as food and garden waste, and paper and paperboard'. **Article 2(b)** defines municipal waste as waste from households, as well as other waste which, because of its nature or composition, is similar to waste from household*

In **Austria** biodegradable waste comprises paper/cardboard/cartons, cemetery waste, garden and park waste, kitchen and canteen waste, market

waste and a certain share (about 50%) of bulky waste. Biodegradable municipal waste, in addition, comprises waste from other sources than households or similar areas, e.g. agricultural waste or waste from the food industry.

In **Belgium (Flanders)** biodegradable municipal waste includes: flammable domestic waste, flammable class 2 industrial waste and selectively collected biodegradable waste. Biodegradable other waste includes: sewage water purification sludge, wood, animal, paper and paperboard, garden waste and food. In the **Brussels region** biodegradable waste is defined as any waste that is capable of undergoing anaerobic or aerobic decomposition, such as garden waste, paper and cardboard. Municipal waste is waste fitting the above description whose origin is households and public buildings, or is similar in nature to these wastes.

In **Bulgaria** biodegradable waste is defined as any waste that is capable of undergoing anaerobic or aerobic decomposition, such as food and garden waste, paper and paperboard. Biodegradable municipal waste is defined as biodegradable waste generated by people in the course of essential day-to-day activities in their homes, as well as in administrative, social and public buildings. Waste from commercial premises and associated productive craft activities and from leisure and hospitality venues is considered to be equivalent to such waste if it does not have the characteristics of hazardous waste and if the amount or composition thereof is not such as to prevent it from being treated together with municipal waste.

In **Cyprus** biodegradable municipal waste includes paper, leather, textiles, kitchen waste and garden waste; biodegradable waste in general also includes manure and agricultural by-products.

The **Czech Republic** provided a comprehensive list of wastes classified as biodegradable waste and biodegradable municipal waste.

In **Estonia** the concept of biodegradable waste is laid down in Section 5 of the Waste Act. No types of biodegradable waste further to those on the EU's waste list have been laid down in Estonia.

In **Finland** biodegradable waste is defined as waste capable of undergoing aerobic or anaerobic decomposition, such as food, garden, paper and cardboard waste. Biodegradable municipal waste refers to biodegradable household waste or biodegradable waste of a comparable nature and composition from industrial, service or other operations.

France considers biodegradable municipal waste to be putrescible waste, garden waste, paper and paperboard falling under the Chapters 20 and 15 01 of the list of waste included in Annex II of decree no. 2002/540 of 18 April 2002 which transposes Decision 2000/532/EC as amended.

In **Greece** biodegradable waste is defined as waste that may undergo aerobic or anaerobic degradation, such as: food wastes, gardening wastes, paper and cardboard wastes, and biomass. Biodegradable municipal waste is defined as

biodegradable waste from domestic sources, as well as other biodegradable wastes whose nature or composition is similar to biodegradable domestic wastes.

In **Hungary** biologically degradable waste (biowaste) is waste containing organic material that decomposes anaerobically or aerobically.

In **Ireland** biodegradable municipal waste is defined as municipal waste capable of undergoing anaerobic or aerobic decomposition, and is categorised under four broad headings: paper and cardboard, organics (food and garden waste), wood and textiles. Non-municipal biodegradable waste streams include human and animal faecal matter or derivatives thereof (manure, sewage sludge); biological sludge from dairying, rendering, slaughtering and brewing industrial activities, animal and plant tissue, food waste, wood, cardboard, paper and textiles.

In **Italy** biodegradable waste includes food waste, garden waste, paper, cardboard, wood and natural textiles. Biodegradable municipal waste is anything included in the above categories that is also classified as municipal within the meaning of Article 184(2) of Legislative Decree No 152 of 3 April 2006.

Latvia uses the classification referred to in Regulation (EC) No 2150/2002 of the European Parliament and of the Council of 25 November 2002 on waste statistics for classifying biodegradable waste.

In **Lithuania** biodegradable waste means any waste that is capable of undergoing anaerobic or aerobic decomposition, such as garden waste, paper or cardboard. Biodegradable municipal waste has not been defined in Lithuanian national legislation, but on the basis of the above definition and the definitions of municipal waste in the Law on Waste Management it is possible to surmise that biodegradable municipal waste means municipal waste capable of undergoing anaerobic or aerobic decomposition.

Luxemburg cited the definitions in its national strategy.

In **the Netherlands** the following components are regarded as (almost) completely biodegradable: vegetable, fruit and garden waste, organic waste, paper and wood. Waste streams such as textiles, carpets and leather/rubber are also partially biodegradable. In classifying these components no distinction is made according to whether the waste is municipal or not.

Poland has a comprehensive list of waste types classified as biodegradable waste.

Romania considers biodegradable municipal waste as the biodegradable fraction of household and similar waste that are mixed collected, as well as the biodegradable fraction of other, separately collected, municipal waste (waste from parks and gardens, waste from street cleansing, bulky waste).

This constitutes food waste, garden waste, paper and cardboard, textiles, wood, as well as other biodegradable elements of the collected waste.

Slovenia considers the following waste as biodegradable municipal waste: waste paper, cardboard and textiles; waste from green biomass and natural wood from gardens and parks and waste from the processing of plants not intended for the production of food, such as, in particular, kitchen waste from households, canteens and restaurants; biodegradable waste produced in the preparation of food of plant origin and biodegradable waste produced in the preparation and processing of meat, fish and other foodstuffs of animal origin; waste from the treatment and processing of wood and other waste from wood, bark, cork and straw.

Sweden did not provide a definition, explaining that there is no definition of 'municipal' waste used in the country.

In the **UK** Biodegradable waste is defined as any waste capable of undergoing anaerobic or aerobic decomposition, such as food or garden waste, paper and cardboard. Biodegradable municipal waste refers to waste from households as well as waste, which because of its nature or composition is similar to waste from households, which is capable of undergoing anaerobic or aerobic decomposition.

Résumé: Some Member States have established lists of wastes considered biodegradable; meanwhile others have transposed the definition set out in Article 2 b) and/or m) of the Directive literally, without specifying in more detail which waste types are covered by this definition. Many countries used a common definition for biodegradable waste: waste capable of undergoing anaerobic or aerobic decomposition such as food or garden waste, paper and cardboard. Some countries report not having a definition for 'municipal' waste in their country. The Netherlands are noted as the only Member State to distinguish between waste that is almost completely biodegradable ie food, paper etc, and that which is partly biodegradable such as textiles and carpets.

3.4.3 Experiences with the application of the strategy

The following Member States described their current strategy or future plans without giving details of application experiences: **Belgium (all regions), Cyprus, the Czech Republic, Hungary, Ireland, Luxemburg, Romania and Slovenia.**

Below are the Member States who detailed experiences, outcomes and successes.

Austria practices the separation of the biodegradable fraction for which efficient waste collection systems have been established. On the other hand, the disposal of biodegradable waste is subject to strict requirements such as

limits to Total Organic Carbon. The targets set out in Article 5(2) were attained in 2001.

In **Bulgaria** during the period 2003-2007, household composting was introduced in a total of 26 small settlements. Consultations were held with mayors of municipalities, citizens and State institutions, and anticipated difficulties were identified, including getting people accustomed to the separate collection of the biodegradable fraction of municipal waste and finding the means to cover investment and operating costs relating to the treatment of biodegradable waste at the current level of municipal waste tax.

For **Estonia** between 2005-2006 municipal biowaste started to be collected separately.

Finland reported that the target set in the directive for the year 2009 has already been met.

In **France** the organic treatment of biowaste developed significantly over the period 2004 to 2006, with the construction or start-up of several methanisation units. Also, a several sites committed themselves to organic pre-treatment prior to landfilling.

Greece listed the total amount of waste diverted from landfill: in 2004, 365,212 tonnes were diverted; in 2005, 405,216 tonnes; and in 2006, 461,079 tonnes (these figures include: collected paper and biodegradable municipal waste). This was mainly achieved through the recycling of packaging wastes and the separation, recycling and composting of domestic waste.

Italy has seen a reduction in the quantity of organic waste sent to landfills and is confident of achieving the objectives outlined in its strategy.

In **Lithuania** the prohibition at landfills on the acceptance of green garden and park waste promoted the construction of sites for composting such waste. Several companies were founded for composting waste generated by catering establishments and food not suitable for human consumption. By the end of 2006, six facilities had been put in operation for the generation of gas from sludge, slurry and other biodegradable waste.

In **the Netherlands** the ban on the landfill of combustible waste has proven a successful instrument.

Poland explained that it is only just beginning to implement the strategy and is experiencing significant problems obtaining funds for the construction of plants for the treatment of biodegradable waste.

Portugal cited its answer in the previous reporting period, but noted that the expected increase in solid urban waste incineration capacity may not become reality, since the new plant on which the previous forecast was based will not in fact be built.

Over the past two years in **Slovakia** there has been a marked increase in the construction of composting facilities. The targets set in the Directive now appear to have been achieved. However, a problem was noted concerning the compost produced, as there seems to be a lack of interest in it as a commodity.

In **Sweden** the strategy has produced a considerable decrease in the amount of organic waste going to landfill, particularly in the past few years. For example, the proportion of household waste landfilled has decreased substantially. In 2006 only 5% of household waste was sent to landfill, compared to 15% in the previous reporting period.

The UK: in England a review of progress in England has been set out in “A Review of England’s Waste Strategy: A Consultation Document and its annexes published on 14 February 2005. In Northern Ireland the targets for the initial years of the Landfill Allowance Scheme have been met.

Résumé: Most Member States replied with explanations of their current strategy rather than the issues relating to their experiences of implementing it. Of those who gave relevant replies, the most common experience was seeing a reduction in the quantity of organic waste going to landfill. Finland noted that they have already achieved the target set in the Directive for 2009. Positive efforts made include the establishment of collection of biodegradable waste and the establishment of composting schemes; the start up of methanisation units in France; the prohibition of the landfilling of garden and park green waste; establishment of biogas plants; and a ban on combustible waste, which the Netherlands notes to have been particularly effective.

Two specific challenges were noted. Poland is experiencing problems obtaining funding to deliver change; meanwhile, Slovakia has encountered a lack of interest in the compost produced from its centralised composting scheme.

Those Member States whose answer did not supply the relevant information (Belgium (all regions), Cyprus, the Czech Republic, Hungary, Ireland, Luxemburg, Romania and Slovenia) should be asked for clarification. Latvia should be asked to supply relevant information, or to explain its absence. More detail on experiences could be collated to provide an understanding of how best to develop and implement strategies on biodegradable waste management into the future.

3.4.4 Amounts of biodegradable municipal waste produced in 1995

Cyprus submitted data of 1993, **Finland** of 1994, **Greece** of 1990 and **Lithuania** of 2000.

The amounts reported for 1995 are summarised in Table 1.

Belgium (Wallonia) did not submit this information. **Belgium (Brussels)** reported that exact data was not known but estimations were provided. **Sweden** stated that reliable data are not available.

Greece gave data for 1990, but noted that the targets of its National Strategy have been based on data of the year 1997.

3.4.5 Amounts of biodegradable municipal waste and other biodegradable waste going to landfills

The amounts of biodegradable municipal waste and other biodegradable waste going to landfill in each year of the reporting period (2004-2006) are reported and summarised in Table 2.

Data provided by some Member States was incomplete or has not been included in Table 2 for the following reasons:

The **Brussels region of Belgium** has no landfills and although some waste is sent to landfill in Wallonia, it was reported that the biodegradable fraction of this was very small, and no precise figures were given. **Cyprus** supplied data for the year 1993. The data given by **Estonia** and **Slovenia** was not in an interpretable format. **Hungary** did not submit the relevant information. **Portugal** reported that information for 2006 was not yet available due to ongoing improvements to the data recording system and that figures would be sent to the Commission as soon as they become available.

Some Member States provided details of biodegradable waste going to landfill broken down by waste stream. These are detailed below.

:

Austria: For 2005, the total of biodegradable municipal waste going to landfills was 122640 tonnes, whereby residual/bulky waste made up for 121000 tonnes, garden waste for 80 tonnes, food for 1560 tonnes. Paper/cardboard did not figure among the fractions going to landfill ("0" tonnes). Biodegradable waste from other sources amounted to 1,147 tonnes, whereby food made up for 170 tonnes, wood for 832 tonnes and paper/cardboard for 145 tonnes.

Belgium (Flanders)

A breakdown was not provided for biodegradable municipal waste. Of the total biodegradable other waste going to landfill, in 2004 294 tonnes was paper/paperboard, 1332 tonnes was wood, and 4324 tonnes was animal / vegetable waste. In 2005 165 tonnes was paper/paperboard, 228 tonnes was wood, 6134 tonnes was animal / vegetable waste and 17 tonnes was urban sludge. Data for 2006 was not available at the time of replying.

France

In 2004, of the total biodegradable household waste going to landfill, garden waste made up 336,000 tonnes and non-household paper/paperboard packaging made up 343,000 tonnes. In 2005, of the total biodegradable household waste going to landfill, garden waste made up 350,000 tonnes and

non-household paper/paperboard packaging made up 272,000 tonnes. In 2006, of the total biodegradable household waste going to landfill, garden waste made up 325,000 tonnes and non-household paper/paperboard packaging made up 250,000 tonnes.

Germany: In 2004, 6,743,000 tons of waste featuring biodegradable elements were put to landfill. 5,721,000 was household or similar waste collected by public waste management services, 5,000 tons was waste included in the bioton (separate waste bin for bio-waste), 777,000 tons were bulky waste and 240,000 tons other separately collected waste streams. In 2005, only 3,032,000 tons of household waste featuring biodegradable elements were put to landfill, of which 2,544,000 tons were household waste collected by the public waste management service, 344,000 tons bulky waste, 2,000 tons waste from the bioton and 240,000 tons from other fractions.

Other municipal waste featuring biodegradable elements was 1,835,000 tons in 2004 and 948,000 tons in 2005. Fractions similar to household waste but not collected by the public waste management service made up for 1,325,000 tons in 2004 and 592,000 in 2005. The rest were street/garden/park waste with 494,000 and 351,000 tons respectively and market waste amounting to 16,000 and 5,000 tons.

Ireland

Of the biodegradable municipal waste landfilled in 2004, 446,306 tonnes was paper and cardboard; 696,955 tonnes was organics; 146,986 tonnes was textiles; 14,180 tonnes was wood. Of the biodegradable municipal waste landfilled in 2005, 449,957 tonnes was paper and cardboard; 696,883 tonnes was organics; 146,790 tonnes was textiles; 13,939 tonnes was wood. Comparative data for 2006 was not expected to be available until early 2008.

Latvia

In 2004 the biodegradable waste sent to landfill comprised the following waste streams: 34 tonnes of waste paper and cardboard packaging; 5073 tonnes of other paper and cardboard wastes; 2471 tonnes of sawdust and shavings; 9281.2 tonnes of other wood wastes; 44.8 tonnes of miscellaneous textile wastes; 188.6 tonnes of animal waste from food preparation and products; 77 tonnes of vegetable waste from food preparation and products; 89 tonnes of mixed waste from food preparation and products; and 180.6 tonnes of green wastes.

In 2005 the biodegradable waste sent to landfill comprised the following waste streams: 803.92 tonnes of sludges from industrial processes and effluent treatment; 2645.8 tonnes of sawdust and shavings; 6136.4 tonnes of other wood wastes; 42.45 tonnes of miscellaneous textile wastes; 2361.6 tonnes of mixed waste from food preparation and products; and 12452.57 tonnes of green wastes.

In 2006 the biodegradable waste sent to landfill comprised the following waste streams: 211.766 tonnes of waste paper and cardboard packaging; 384.2 tonnes of sawdust and shavings; 7057 tonnes of other wood wastes; 27 tonnes of miscellaneous textile wastes; 3795.82 tonnes of mixed waste from food preparation and products; and 17679.272 tonnes of green wastes.

Lithuania

According to the Environmental Project Management Agency, the breakdown of other biodegradable waste sent to landfills in years of the reporting period are as follows:

- 2004: 28.94 tonnes of plant tissue waste, 5.4 tonnes of forestry waste, 551.22 tonnes of waste from washing, cleaning and mechanical chopping of raw materials, 344.63 tonnes of material not suitable for use or consumption.
- 2005: 609.89 tonnes of plant tissue waste, 4.8 tonnes of forestry waste, 397.2 tonnes of waste from washing, cleaning and mechanical chopping of raw materials, 307.17 tonnes of material not suitable for use or consumption.
- 2006: 585.3 tonnes of plant tissue waste, 0.6 tonnes of forestry waste, 431 tonnes of waste from washing, cleaning and mechanical chopping of raw materials, 543.16 tonnes of material not suitable for use or consumption.

Poland provided a comprehensive breakdown of waste stream but referred to wastes only by their code so this information has not been included. See Annex 3 of Poland's response for more details.

Portugal

Of the biodegradable municipal waste going to landfill in 2004, 672,275 tonnes was paper and cardboard, while 1,008,413 tonnes was made up of fermentable products. In 2005, paper and cardboard made up 664,538 tonnes, and fermentable products came to 996,806 tonnes. Figures for 2006 were not available.

Slovakia

The amount of biodegradable waste going to landfills in 2004 comprised, amongst others: 5,614 tonnes of wastes from the sorting of paper and cardboard destined for recycling; 15,748 tonnes of sludges from the treatment of urban waste water; 394 tonnes of paper and cardboard; 678 tonnes of biodegradable kitchen and canteen waste; and 78 tonnes of textiles.

The amount of biodegradable waste going to landfills in 2005 comprised, amongst others: 3,498 tonnes of wastes from the sorting of paper and cardboard destined for recycling; 19,709 tonnes of sludges from treatment of urban waste water; 170 tonnes of paper and cardboard; 1,492 tonnes of biodegradable kitchen and canteen waste; and 1,612 tonnes of textiles.

The amount of biodegradable waste going to landfills in 2006 comprised, amongst others: 451.55 tonnes of wastes from the sorting of paper and cardboard destined for recycling; 29,829.63 tonnes of sludges from treatment of urban waste water; 73.25 tonnes of paper and cardboard; 484.54 tonnes of biodegradable kitchen and canteen waste; and 2.69 tonnes of textiles.

Résumé: Some responses were difficult to interpret due to formatting issues, notably those from Estonia and Slovenia. As the question did not specify which categories of waste it required for the breakdown of waste streams, the answers received from Member States were varied. Some were extremely detailed, such as those from Lithuania and

Slovakia, and have been abbreviated for inclusion above. Other countries did not supply a breakdown at all.

3.4.6 Adaptations of the strategies

The **Czech Republic, Italy, Latvia, the Netherlands** and **Sweden** have no current plans for amendments.

Slovakia has no amendments planned as its strategy has not yet been submitted and accepted as a comprehensive document.

Austria: The strategy outlined above will continue. Compared to levels in A 2001-2003 documents the mass of biodegradable waste has decreased.

Belgium (Flanders) cited the previous report, which stated its intention to continue reducing the amount of biodegradable waste going to landfill beyond the targets of the Directive through continued application of landfill bans, additional incineration and processing capacities, measures for waste prevention and more advance selective collection. **Wallonia** outlined several measures whose primary objective is the reduction of household and industrial waste: invest more in waste prevention, promote 'sort, reuse, recycle' behaviour and punish the production of harmful waste. To further reduce waste, and apply the polluter pays principle, eight new taxation measures were outlined in the fiscal decree of 1 January 2008. The **Brussels region** does not envisage any modifications to the current strategy.

Bulgaria replied that if there were found to be a lack of progress or inadequate implementation of the National Strategic Plan, the responsible body would make the necessary adjustments to legislation to ensure that the biodegradable waste reduction targets are met.

In **Estonia** the Minister of the Environment Regulation No 4 of 16 January 2007 provides for the separate collection of biodegradable municipal waste to promote the recycling of this waste and reduce the amount sent to landfill. Two waste incineration plants are to be built (in Tallinn and Tartu), each with a volume of 100 00 tonnes/year, and a mechanical-biological waste processing centre is to be constructed in Ida-Virumaa.

Finland cited the information given in the previous reporting period and added that the proposal for a national waste policy to the year 2016 introduces actions to reach the targets set in the Directive. These actions include, among others, increasing the recycling and energy recovery of waste. Finland expects to see increased recycling and recovery of energy from waste.

In **France**, as referred to in its answer to question 4c) on experience with practical application of the strategy, a national support plan for domestic composting prepared together with ADEME was launched in November 2006. This is designed to ensure the objective laid down in Directive 1999/31/EC is reached by 2016.

In **Greece** after completion of the planned facilities at national scale, the National Strategy will be adapted on the basis of more realistic data.

In **Hungary** any modifications required in order to fulfil the objectives will be introduced during the periodical supervision of the programme.

In **Ireland** existing licences will be amended to provide for site-specific pre-treatment objectives.

In **Lithuania** the State Strategic Waste Management Plan was amended for approval in 2007.

Luxemburg is in the process of revising its waste management plan. Separate collections of organic waste are planned, together with the establishment of a network of central composting plants. Current collections of recyclables are to be strengthened.

In **Poland** the strategy will be updated to make it consistent with the assumptions in the '2010 national waste management plan' approved by the Council of Ministers on 29 December 2006.

Portugal cited the information given in the previous report. In addition, it noted that the confirmation of specifications for the quality of the compost and its application were not yet final.

In **Romania** the national strategy for the reduction of biodegradable waste going to landfills will be adapted according to the results of Regional Waste Management Plans' implementation.

Slovenia intends to introduce a ban on the disposal of waste from green biomass and natural wood (waste from gardens and parks and waste from the processing of plants intended for food) and the composting of kitchen waste.

The UK:

In England a review of the strategy took place in 2005 and a consultation document issued in February 2006. A new strategy was published in May 2007 and has been communicated to the Commission. In Wales a review of the Waste Strategy for Wales 2002 is scheduled for 2008. In Scotland consideration is given as to whether the strategy needs to be amended to reflect a new commitment to move towards a zero waste society. A review of the Northern Irish waste management strategy took place in 2004-2005 and a consultation document issued in October 2005. A new NI waste management strategy was published in March 2006 and communicated to the Commission.

<p>Résumé: Of the Member States who plan to amend their national strategy, the most common amendment was the addition or expansion of facilities for the separate collection, and treatment of organic waste.</p>
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3.5 Number of existing landfills

Data summarising the information received from Member States on the number and nature of existing landfills can be found in Table 3.

Austria has no landfills for hazardous waste. The highest number of landfills is for inert waste. All landfills comply with the Directive. No sites have been re-equipped, but a number of sites have been closed.

In **Belgium (Flanders)** all landfills comply with the Directive. In **Wallonia** only a few landfills are in compliance. Landfills for inert waste are more numerous than those for other waste types.

In **Bulgaria** there is a relatively high number of landfills and it was reported that the large majority do not comply with the Directive.

Only 1 of **Cyprus'** 116 landfills for non-hazardous waste complies with the Directive. There are no landfills for hazardous or inert waste.

In **Estonia** over half the number of landfills do not comply with the Directive.

In **Finland** most landfills for hazardous waste are in compliance, but a large proportion of landfills for non-hazardous waste are not.

In its response, **France** referred to 'collection centres' and 'internal landfills'. Only the number of 'internal landfills' has been included in the table, as the term 'collection centres' was thought to refer to waste transfer stations or similar. In the 'Other' category, 275 unauthorised landfills were noted to still exist, while 639 unauthorised landfills have been closed. France reported: since 2004 the French authorities have been carrying out an action plan to have unauthorised landfills closed. In a circular of 23 February 2004, all those involved were reminded of their responsibilities and the means at their disposal to meet them. It also requested prefects to ensure that deliveries of waste to unauthorised landfills ceased. While 942 sites were identified in September 2004 and 693 were still in operation in June 2005, there were only 275 sites still in operation on 1 January 2007. Most of these are small sites receive only rubble, garden waste and bulky household waste. The Court of Justice of the European Communities ruled against France for not having taken all the necessary measures to close down the large number of unauthorised landfills on its territory (judgment of 29 March 2007 – Case C-423/05).

Furthermore, the 40 inert waste landfills in compliance with the Directive are all industrial waste landfills; the remaining 549 are for construction waste. France stated: as part of the action taken to comply with the judgment of the Court of Justice of the European Communities of 15 December 2004 (Case C-172/04), a special authorisation scheme for landfills for inert building and construction waste was introduced by Law No 2005-1319 of 26 October 2005. Existing sites had until 1 July 2007 to submit their applications. In view of that deadline, landfills for inert building and construction waste will be brought into line with the Directive by the end of 2007 at the latest.

Finally, the 24,000,000 tonnes of rest capacity quoted for hazardous waste is noted to be in collection centres.

Germany¹

	Landfill for hazardous waste (landfill type III)	Landfill for non-hazardous waste (landfill type I and II)	Landfill for inert waste (Landfill Type 0)	Others ²
Number of Landfills which were licensed between 01.01.2004 and 31.12.2006	0	3	8	2
Number of existing landfills ³	88	2,777	1,636	6
Number of landfills compliant with the Directive ⁴	34	451	565	6
Number of landfills closed between 01.01.2004 and 31.12.2006 ⁵	13	55	42	0
Number of landfills having	2	31	4	0

¹ The following table encompasses all landfills not only those subject to the IPPC Directive.

² This column contains underground landfills and long-term storage facilities.

³ Number of landfills including those still accepting waste, those in the closure stage and in the after-care stage.

⁴ Number of landfills having been notified according to § 14 and 15 of the Landfill Ordinance or whose continuation has been requested and which may be operated according to the law on 31.12.2006.

⁵ Only landfills which have been introduced to the closure phase in this period.

undergone important changes ⁶ between 01.01.2004 and 31.12.2006				
Number of landfills updated between 01.01.2004 and 31.12.2006 ⁷	13	55	42	0
Rest capacity (Mio t.) ⁸	49,21	348,29	209,31	12,35

Both of the two hazardous waste landfills in **Greece** comply with the Directive; only half of those for non-hazardous waste comply, 9 of which have been re-equipped. Greece has no landfills for inert waste.

In **Hungary** all hazardous waste landfills comply with the Directive and 18 have been closed since 2004. Just under a third of landfills for non-hazardous waste comply and a reported 1189 have been closed. The number of inert waste landfills is low, but the number that complies with the Directive has not been indicated.

In **Ireland** all landfills comply with the Directive. 20 of those for non-hazardous waste have been re-equipped. There are no landfills for hazardous waste.

In **Italy** all landfills comply with the Directive. Information on the number of landfills closed was not given and that on re-equipped landfills was reported as not available.

In **Latvia** there is only one landfill for hazardous waste and this complies with the Directive. Only 5 of the 100 landfills for non-hazardous waste comply, 193 have been closed and 1 has been re-equipped. There are no landfills for inert waste.

⁶ Number of Landfills for whose important change in accordance with § 31 para. 2 Waste Management Law a certain administrative procedure ("Planfeststellungsverfahren") was necessary.

⁷ Number of Landfills whose continuation was permitted in accordance with § 14, 15 of the Landfill Ordinance and which have been updated.

⁸ Capacity on the basis of the announcement/application according to § 14, 15 of the Landfill Ordinance.

Lithuania has no landfills for hazardous waste. None of the landfills, regardless of type, comply with the Directive. 180 non-hazardous landfills have been closed, along with 1 inert landfill and 115 other. No data was available for the rest capacity.

In the **Netherlands** all 22 landfills comply with the Directive and 19 have been closed. No distinction was made between landfill types. It was reported that most landfills are organised and equipped such that they can receive both hazardous (with the exception of C1 waste) and non-hazardous waste. For diverse reasons, in practice various licences contain restrictions with regard to acceptance.

Poland reported a large number of landfills – a total of 1133. Three quarters of hazardous waste landfills comply with the Directive, while under half of those for non-hazardous waste and for inert waste comply. Many landfills have been closed or re-equipped.

Portugal has closed its only landfill for hazardous waste. 53 of the 55 non-hazardous landfill sites comply with the Directive and the remaining two were reported as being under consideration. Three have been closed. Similarly 6 of the 8 inert waste landfills comply, while the remaining two are under consideration. There are 7 other tips, but no further details were given.

Romania has 53 hazardous waste landfills, only 6 of which comply. A further 47 have been closed. Of the 368 non-hazardous waste landfills, only 33 comply. 53 have been closed. One of the two existing landfills for inert waste has been closed, while one other has been closed. No landfills have been re-equipped. In addition, 16 catch pits from oil extraction and 21 tailing ponds from extractive industry were listed as existing other landfills (another 16 catch pits and 16 tailing ponds have been closed since 2004).

In **Slovakia** less than half the number of landfills of every type was reported to be in compliance with the Directive. Data on existing landfills was from 2006; data on the number of landfills in compliance is from 2005.

In **Slovenia** both landfills for hazardous waste comply, one has been re-equipped. Over two thirds of the landfills for non-hazardous waste are in compliance, two have been closed and 4 have been re-equipped. 4 landfills for inert waste comply, 2 have been closed, and 4 have been re-equipped. The rest capacity was not given; it was reported that data will be available from 2007 onwards.

Sweden reported that approximately half the number of hazardous waste landfills complies, 5 have been closed, 4 have been re-equipped. Of the 217 landfills for non-hazardous waste, only 47 comply. 53 have been closed and 12 have been re-equipped. Additionally, it was reported in this category that there are 9 sites for mining waste. A quarter of inert waste landfills comply and 20 have been closed. There are 4 other waste landfills and 5 have been closed, but no further details on type were given.

Most landfills for hazardous waste in **the UK** do not comply and a further 204 have been closed. Just over half the number of non-hazardous landfills complies with the Directive, and a further 189 have been closed. 42 have been re-equipped. A quarter of landfills for inert waste comply, 397 have been closed and 13 have been re-equipped. Other landfills were reported but their type was not specified.

Résumé: The following Member States reported that all their landfills comply with the Directive: Austria, Belgium (Flanders), Ireland and Italy.

There were several issues with data making comparison in terms of landfill number problematic:

- Belgium (Flanders) reported the rest capacity for hazardous waste landfill in cubic metres rather than tonnes.
- Bulgaria did not state how many landfills for inert waste comply with the Directive.
- The Czech Republic indicated only the number of existing landfills, without detailing how many comply with the Directive, the number that have been closed, or re-equipped. It stated that an assessment of sites was due to be completed during 2007.
- The rest capacity for all landfill types given by Italy was measured in cubic metres.
- The most recent information supplied by Slovakia on the number of existing landfills was from 2006 while the most recent data for compliance and rest capacity was from 2005. No information was given on the number of landfills closed or re-equipped.

3.6 Costs of landfilling

Article 10 provides that 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, 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 Member States shall ensure transparency in the collection and use of any necessary cost information.

Austria: When issuing a permit, the authority has to make sure that an adequate “guarantee” is procured assuring the conditions linked to the permit, especially with regard to the closure and after-care of the landfill. As a consequence, the landfill operator has to claim a certain level of fees for disposal in order to finance the operation according to the state of the art and the after-care.

In **Belgium**, there are no landfill sites in use in the Brussels Region, and the Flemish and Walloon Regions reported no changes or new information since the previous reporting period.

In **Bulgaria**, Article 15 of Regulation No 8 requires that prices are set for the landfilling of waste that reflect the costs of establishing the landfill and cover the costs of the operation, monitoring, closure and after-care of the landfill site for a period of at least 30 years. The price takes into account the anticipated annual volume of waste received over the entire period of the landfill's operation. The Waste Management Law is due to be amended to require any operator disposing of waste at a landfill to make monthly deductions in a blocked bank account. The funds accumulated during the landfill's period of operation will be used for the closure and after-care of the landfill site.

Cyprus has recently established the Management Authority of landfill sites, which is responsible for ensuring that the provisions of landfill directive are met, including those under Article 10.

In the **Czech Republic**, the relevant measures are incorporated into national legislation (Act No 185/2001 and Decree No 294/2005).

In **Estonia**, Section 66(5) of the Waste Act states that waste-shipment service charges should cover the costs of the setting up, operation, closure and after-care of waste-disposal sites (including landfills). Section 91 requires a financial guarantee to obtain a landfill permit. Government support is also available to extend waste processing plants which comply with requirements. The Environmental Fees Act lays down pollution charges for landfilling waste; the fee level depends on whether or not the landfill meets the requirements. The pollution charge for depositing household waste in a sub-standard landfill site is twice as high, and will increase further. The money received is directed to environmental measures, including the construction and cleaning-up of landfills.

In **Finland**, the information provided during the reporting period 2001-2003 remains valid. Further details are included in the answer provided by the Ministry for Foreign Affairs of Finland on 15 May 2007 to the Official Note of the Commission in case 2006/2483 concerning transposition of Directive 1999/31/EC into national law [SG-Greffe(2007) D/201509, 23 March 2007] in sections 53-59. For the Åland Islands, paragraph 24 of the Decree of the Province of Åland on the Landfill of Waste (3/2007) requires the operator, upon acceptance of waste, to take fees to cover the cost for the landfill and its closure and after-care procedures.

In **France**, compliance with Article 10 is ensured by Decree No 2000-404 of 11 May 2000 on the annual report on the cost and quality of the public waste disposal service. ADEME (the French Environment and Energy Management Agency) has also set up a national observatory on costs, to collect and distribute information on the costs of and prices for municipal waste disposal.

In **Greece**, Article 12 of JMD 29407/3508/2002 requires that the costs for operation and extension works of landfills is covered by the price charged by the Waste Management Bodies for the disposal of waste.

In **Hungary**, the costs of landfilling are dealt with by several regulations, notably the Act on Waste Management (Act No. XLIII of 2000), the Decree of the Minister for Environment on Rules and Certain Conditions of Landfilling and Closing and After-Care of Landfills (No. 22/2001 (X. 10.) KöM) and the Decree of the Minister for Environment and Water on Rules and Criteria of Landfilling and Landfill Sites (No. 20/2006 (IV.5.) KvVM).

In **Ireland**, section 53A of the Waste Management Act (as amended) obliges landfill operators to impose charges for the disposal of waste at a landfill facility. These charges shall not be less than the total costs of development, operation, closure, restoration and aftercare of the facility. Article 51 of the Waste Management (Licensing) Regulations 2004 allows the Environmental Protection Agency to require a landfill operator to provide a verifiable statement showing how such charges were determined.

In **Italy**, the measures related to costs are set out in Article 15 of Legislative Decree No 36 of 13 January 2003.

In **Latvia**, the cost of waste disposal at landfills is laid down in accordance with Cabinet Regulation No 281 of 22 June 2001: A methodology for calculating tariffs for public services in sectors regulated by local governments. The cost of biodegradable waste disposal at landfills is laid down in accordance with Cabinet Regulation No 371 of 8 July 2003: Procedures for laying down the costs of hazardous waste disposal in landfill sites.

In **Lithuania**, according to Order No 444 of 18 October 2000 of the Minister of the Environment (as amended), a landfill project should contain an evaluation of the waste disposal costs per tonne and per inhabitant, taking into consideration the necessary investments and the costs of operation, closure and after-care of the site for at least 30 years after the closure. The new version of the waste management rules (approved by Order No 722 of 30 December 2003 of the Minister of the Environment) provide that the price charged by municipalities for the collection and management or disposal of any type of waste should cover all the costs of the waste management system, including the costs of the closure and after-care of the facilities.

In **Luxembourg**, the relevant provisions of Article 10 of the landfill Directive are included in Article 11 of the national legislation (Regulation of 24 February 2003 concerning the landfill of waste). There is also an obligation to constitute a financial guarantee, in accordance with Article 8 of the law of 17 June 1994 relative to the prevention and management of waste.

In **The Netherlands**, Article 8.36(f) of the Law on environmental management requires landfill operators to charge rates which cover their costs.

In **Poland**, regulations require that the manager of a landfill should take into account the costs of construction, operation, closure, reclamation, control and monitoring of the landfill site when setting tariffs.

In **Portugal**, the information provided during the reporting period 2001-2003 remains valid.

In **Romania**, Articles 10-12 of GD 349/2005 provide that the costs for waste landfilling are covered by waste generators and holders, and that costs for landfill construction, operation and after-care are to be covered by the tariff for each type of waste. Industrial companies operating their own landfills must keep separate accountant registers for waste landfilling. When applying for a permit, the landfill operator must provide proof of the financial guarantee that must be maintained during the entire period of operation, closure and after-care of the landfill. The landfill operator must also create a fund for closure and after-care; this fund should be added to quarterly until the whole cost for closure and after-care is covered.

In **Slovakia**, measures related to costs are set out in Section 22 of Act 223/2001 Coll. The landfill operator must make set up a financial reserve whilst the landfill is in operation (the formula for calculating it is given in the Act), and must submit annual reports on the financial reserve. The funds are used for closure of the landfill and for reclamation and monitoring of the site after closure. An operator of more than one landfill must create a separate financial reserve for each landfill.

In **Slovenia**, the requirements of Article 10 of the landfill Directive were transposed into national law in Article 45 of the Decree on the landfill of waste. The Environment Protection Act defines the principles of payment for pollution of the environment (i.e. 'polluter pays').

In **Sweden**, the provisions on charges for cleaning-up in Chapter 27 Sections 4-6 of the Environmental Code have been supplemented with a provision in Chapter 15 Section 35 clarifying the principle that the polluter pays. The provision stipulates that the price charged to anyone dumping waste must cover all the costs of dumping. The cost calculation must include all costs of setting up and operating the landfill and, if possible, all costs necessary for compliance with the obligations applying to landfill operations. Section 33 of the landfill Ordinance refers to the requirement for landfill operators to lodge a financial guarantee.

In **the United Kingdom**, for England and Wales, provisions concerning the cost of landfilling are met by Regulation 11 of the Landfill Regulations. The landfill permit requires the operator to charge enough for the disposal of waste in its landfill to cover the costs of setting up, operating, closure and aftercare of the landfill, as well as the costs of making the financial provision. A guidance note by the Environment Agency suggests ways in which these costs can be assessed. In Scotland, Regulation 13 of the 2003 Regulations and Regulation 4 of the 2000 Regulations require operators to show provision in accounts prior to grant of licence, and to maintain provision during operation. In Northern Ireland, operators applying to run a landfill must

demonstrate financial provision for the life of the landfill site including aftercare and restoration.

Résumé: All Member States who provided information on this point had included measures in their national legislation to transpose the provisions of Article 10 on costs of landfilling. The majority stated that the fees charged for sending waste to landfill must cover the costs identified in Article 10. A significant number of Member States also stated that a financial guarantee is required by an operator in order to obtain a permit for a landfill. Some Member States reported that appropriate bodies or agencies in the country are responsible for monitoring the costs of landfill and ensuring that landfill operators have the funds to cover those costs. A handful of Member States reported that they provide, in national legislation or guidance, calculation or assessment methods to assist landfill operators in determining the costs. A small number of Member States reported that they require landfill operators to create a separate stand-alone fund for the closure and after-care of a landfill.

Denmark, Malta, Spain did not provide any information on this point. Belgium, Germany and Portugal stated that there was no change since the previous reporting period.

The Member States who reported on this point seem to have taken the necessary measures.

3.7 After-care of closed landfills

Article 13 lays down conditions that have to be met in order for a landfill to start the closure procedure, as well as for it to be considered as definitely closed. After that the operator shall be responsible for its maintenance, monitoring and control (including landfill gas, leachate and groundwater) 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 EN 177 EN competent authority of any significant adverse environmental effects revealed and shall take corrective measures as appropriate.

Austria: Measures concerning after-care are prescribed already in the permit of the landfill installation. The waste authorities can claim the closure of a landfill site if the permit conditions are not complied with. The closure can also be claimed if the landfill operator fails to provide a “guarantee” (see above).

The **Flanders** and **Walloon** regions of **Belgium** have not made any amendments to its closure procedure since the last reporting period.

The **Brussels** Region of **Belgium** does not have any landfills currently in operation, but measures exist for previously closed landfills where there is still

biological degradation activity which risks the pollution of groundwater. Article 15 of the Order of 18 April 2002 regulates this situation and the IBGE has the power to request studies of the subsoil, ground water or other emissions from the landfill and may also take measures to prevent or reduce any risks to health or the environment. If waste in a landfill is still decomposing, the landfill manager must obtain an environmental permit so the IBGE can set conditions for site management, in particular for the monitoring and management of gases and leachate.

In **Bulgaria** articles 42-44 of Regulation No 8 govern landfill closure procedures, maintenance and after-care. Measures taken include: dismantling permanent structures not related to environmental protection and sealing the surface of the landfill by means of technical and biological reclamation. Reclamation plans must be agreed by the Ministry of the Environment and Water. The environmental parameters related to the maintenance and after-care of landfill sites are monitored by the landfill operator in accordance with the monitoring plan provided for in Annex 3 to Regulation No 8.

Cyprus reported that preparatory studies for the development of Environmental Monitoring Measures are ongoing.

In the **Czech Republic** the closure of landfills is governed by the following regulations:

- Act No 185/2001 Coll.: articles 20(i), 21, paragraphs 1(b) and 2, and articles 49-52.
- Decree No 294/2005 Coll.: articles 10, 11 and 3 paragraph 1.
- Reference is also made to the following technical standards: ČSN 83 8035 on the landfill of waste: Closure and rehabilitation of landfill; and ČSN 83 8036 on the landfill of waste: Monitoring of landfill.

In **Estonia** closure methods and after-care plans vary according to the volume of the landfill, whilst taking into account the site's original environmental impact assessment. For smaller landfills, with approval from the issuing authority of the landfill permit, simple methods may be used: shaping the landfill body to reduce the area of cells, compression, slanting the point of deposit and covering the landfill body with earth. For larger landfills, or those with a significant environmental impact, an after-care treatment plan is drawn up, which includes monitoring. If limit values are exceeded the landfill operator must implement the necessary environmental protection measures. An amendment to the Waste Act, pending at the time of reporting, states that the treatment plan must last for 30 years.

Finland cited the information it supplied in the last reporting period, as well as the answer given by the Ministry for Foreign Affairs of Finland on 15th of May 2007 to the Official Note of the Commission in the case 2006/ 2483 concerning the transposing the directive 1999/31/EC into national law [SG-Greffe(2007) D/201509, 23 March 2007] in sections 65-72. In the Åland Islands landfill closure is governed by the Decree of the Province of Åland on the Landfill of Waste (3/2007), particularly paragraph 23, which assigns responsibility to the operator for control procedures, including the analysis and

monitoring of landfill gas, leachate and groundwater, during the whole after-care period.

In **France** the permanent closure of landfills governed by the rules on classified installations must be followed by restoration of the site and the closure notified in accordance with Article 34-1 of Decree No 77-1133 of 21 September 1977, as amended, applying Article L.512-17 of the Environment Act. For other landfills (inert waste landfills requiring the authorisation provided for in Article L.541-30-1 of the Environment Act), the decommissioning measures are laid down in Title III of the Decree of 15 March 2006. ADEME has developed a tool for assessing working scenarios for landfill restoration. The guide, published in October 2005, is entitled "Remise en état des décharges: Méthodes et Techniques" "Landfill restoration: Methods and Techniques" (Ref. No 5545).

Germany had no new information to report since the last reporting period.

In **Greece** the closure of the landfill site is followed by a restoration procedure and an after-care period of 30 years. Restoration measures include: sealing the landfill surface; continuation of leachate collection and treatment, and construction – if not existing – of a gas collection system; soil covering and appropriate planting.

In **Hungary** closure of a landfill is followed by an after-care period.

In **Ireland** measures taken for closed landfills are guided by the 1999 EPA manual on landfill restoration and aftercare. The manual advises on restoration design, after-use, soils and soil handling operations, vegetation establishment and management and the production of site specific restoration and aftercare management plans. Maintenance requirements of the environmental pollution control systems and on-going monitoring requirements during the aftercare period are also outlined. Closure issues are covered in conditions of licences. Local authority waste management plans deal with historical sites.

In **Italy** guidance for new landfills is laid down in Article 13(1) of Legislative Decree No 36. It includes compliance with the requirements of relevant plans for post-operative management and environmental recovery which were submitted with the original site permission application. For existing landfills, measures must be indicated in the upgrade plans provided for in Article 17(3) of Legislative Decree No 36.

In **Latvia** closure and after-care is governed by Regulation No 474. Certain provisions must be complied with during landfill rehabilitation: removal of wastes that may be processed; compaction of remaining waste and the forming of an incline; a covering layer shall be formed from a 0.5 metre layer of soil with low water permeability or a corresponding anti-filtration layer with a specified rock-permeability coefficient, and which has a guaranteed service life at least as long as the operating period of the landfill and the monitoring period after the closure of the landfill. Surface layers for hazardous waste landfills require: an artificial, compacting layer of insulating material in

accordance with the requirements of paragraph 24 of this Regulation; a non-permeable mineral layer whose thickness is greater than 0.5 metres; a drainage layer whose thickness is greater than 0.5 metres. Monitoring continues for 30 years after the closure of the landfill.

In **Lithuania** Order No 444 of 18 October 2000 of the Minister of the Environment (as amended) requires the following measures: covering with an at least one-metre-thick soil layer; where it is necessary to prevent leachate formation, a surface sealing no less than 0.5-metre-thick consisting of a mineral layer or of a mineral layer and an artificial insulating sheet may be required; where the landfill contains biodegradable waste a gas drainage layer may be installed under the sealing layer.

In **Luxembourg** the provisions for the closures of the landfill site are included in Article 14 of Regulation of 24 February 2003 concerning the landfill of waste. Provisions are also detailed in the landfill's permit.

In **the Netherlands** Articles 8.47 to 8.51 of the Law on environmental management contain rules on closed landfills. Landfill operators must draw up an after-care plan, which is subject to approval by the authority responsible. Chapter 6 of the regulation implementing the landfill Decree on soil protection also contains rules on closed landfills. These include: monitoring of the quantity and composition of the leachate and surface water; measurement of the composition and atmospheric pressure of gas emissions; the efficiency of the gas collection system; maximum and minimum groundwater levels are ascertained, all half-yearly.

In **Poland** reclamation measures form part of the process of closing a landfill or some part of it, and these ensure that the landfill does not impact negatively on surface water, groundwater and air. Monitoring of the landfill must be carried out by the landfill's management for 30 years after closure. This involves measurements of precipitation, settlement of the surface of the landfill, volume of flows and composition of surface waters, volume and composition of leachate, levels and composition of groundwater, emissions and composition of landfill gas. The landfill management sends monitoring results on an annual basis to the regional environmental protection inspector.

Portugal had no new information to report since the last reporting period.

In **Romania** Article 17 – 21 of GD 349/2005 provides for landfill closure and after-care. Before ceasing operation, each landfill operator has to obtain from the environmental authority an environmental approval that contains measures and actions to be taken in order to avoid adverse environmental effects during and after landfill closure. The closure project has to be designed and put in place according to the conditions established in the environmental approval (and environmental permit, if the case). The National Environmental Guard controls the accomplishment of the measures provided in the environmental approval / permit. Technical measures to be taken for closure and after-care (including monitoring) are provided by GD 349/2005 and by the Technical Norms for waste landfilling.

In **Slovakia**, following closure, landfills must be capped with: an artificial sealing liner, an impermeable mineral layer, a gas drainage layer, a drainage layer and a topsoil cover. When the certificate of closure is issued the operator must ensure that the landfill is monitored and controlled for a minimum of 30 years, and a maximum of 50 years.

Slovenia has transposed Article 13 of the Directive by the following Slovenian legislation: Articles 56, 57 and 58 of the Decree on the landfill of waste.

In **Sweden** Section 33 of the landfill Ordinance stipulates a minimum period of 30 years for after-care and monitoring. Operators must submit annual environmental reports describing the main environmental impact of the operation. Chapter 25a, Section 4p of the Environmental Code indicates the conditions for the closure of a landfill site.

The UK: in England and Wales the landfill Sector Guidance Note clarifies the responsibilities of the operator during the aftercare phase, stressing that they remain bound by their permit conditions (including site monitoring and any necessary remedial actions) and to notify the Environment Agency of any significant adverse environmental effects. In Scotland site closure plans must address the following requirements: provision and location of leachate, groundwater and landfill gas monitoring boreholes; adequate monitoring frequency; provision of results; setting of trigger levels; adequate capping standard. The licence remains in force for as long as required, taking into account the time during which the landfill could present hazards. Northern Ireland has a site closure programme. The EHS are currently modifying all the licenses of those sites which have stopped accepting waste to ensure conditions within the license require the installation of remediation works and to minimise the impact on the environment.

Résumé: The majority of Member States have included measures in their national legislation to transpose the provisions of Article 13. Typically, landfill operators are required to monitor environmental parameters (including landfill gas, leachate and groundwater) during the after-care phase, for as long as is deemed necessary by the appropriate environmental authority. In most Member States, closure is undertaken according to a plan drawn up in advance (often as part of the licence/permit issuing process for a landfill), and following on on-site inspection. Some Member States (including France, Ireland and the UK) have developed guidance on the closure of landfills. Typical techniques promoted by Member States include: sealing of the surface; installation of a top liner; drainage and gas drainage layers; biological reclamation and appropriate planting; removal of waste that can be processed; compaction of waste; maximum gradients for side slopes. Estonia reported that simpler techniques are permitted for small landfills.

Cyprus stated that detailed studies are underway for the environmental monitoring measures to be implemented for the closure of landfills. The Belgian regions of Flanders and Wallonia, Finland, Germany and Portugal stated that there was no change since the previous reporting period.

The Member States who reported on this point seem to have taken the necessary measures, however, if a true picture of implementation of after-site care is desired further research will be necessary to ascertain the exact approaches adopted across Europe.

3.8 Description of the planning procedure for landfills

Section 1 of Annex I sets out general requirements to be taken into consideration for the location of a landfill including relationship to residential and recreational areas, hydrological and geological conditions, distance to water bodies, risk of flooding and protection of nature conservation sites.. The landfill can be authorised only if the consideration of these requirements, or the corrective measures to be taken, indicate that the landfill does not pose a serious environmental risk.

Austria: Applications for permits for landfill installations have to included in project documents giving insight into the suitability of the site meaning at the beginning of the permitting procedure, relevant features of the site (proximity to residential areas, hydrogeology) and the requirements for landfill site. Certain areas (water protection areas, etc.) are excluded from becoming landfill sites. The requirements for landfill sites are laid down in the Landfill Ordinance.

The **Belgian** regions reported no new information since the 2001-2003 report.

In **Bulgaria** requirements on the siting of landfills are set out in Regulation No 7 of 24 August 2004 on the requirements to be met by sites for waste-treatment facilities (published in State Gazette No 81/2004). Under Article 3 of Regulation No 7, any land on which a landfill is to be sited is to be identified in a land-use plan. The specific site of a landfill will be determined by a study, followed by the designation of a potential site within the land use plan. Authorisations based upon the plan sites follow the subsequent steps: the development of an investment plan; an environmental impact assessment; issuing of approval for the project; issuing of a permit; development of the landfill. Under Article 9(1) of the Regulation criteria for the location of landfills are set out. This includes requirements regarding the distances to sensitive areas such as farmland, urban areas and water bodies and sets out restrictions linked to water body, nature conservation sites, cultural features and abstraction locations. Article 9(2) of the Regulation sets out locals where landfills are not permitted including in national parks, archaeological sites, areas at risk of subsidence, floodplains and water abstraction safeguard zones.

Cyprus simply confirms that planning procedures for landfills take into consideration the criteria set out in Annex 1. It is noted that these were evaluated using a combination of a multicriteria decision support system and GIS.

In the **Czech Republic** applications for *landfill construction* are subject to an approval procedure under Act No 183/2006 Coll., on spatial planning and building regulations (the Building Act). It is, however, noted that landfills are not governed by any special arrangements under that Act.

In **Estonia** the Directive's requirements, as set out in Annex I, Part 1, are translated into requirements for the location of landfill sites within Section 7 of the Estonian Regulation on landfilling. It should be noted that an additional criteria is adopted, that when selecting the location of the landfill site account must also be taken of the fact that the landfill should have as long a period of use as possible - at least 25 years. The distance of the landfill from other buildings must ensure that environmental nuisances caused to them by the landfill are kept to a minimum. As a result that distance must be at least 300 metres. There must be no water, sewerage, heating or gas pipes or electricity or communication cables passing through the landfill and no overhead transmission lines passing over the cells. Various locations are compared when selecting the location of the landfill, an environmental impact assessment is carried out, and the results are published.

The **Finnish** response noted that there had been no developments since the 2001 to 2003 reporting period. It is, however, highlighted that specifically in relation to the Åland Islands that when siting a landfill a description of the effects on the environment (miljökonsekvensbeskrivning) must be carried out, that takes account of all the requirements in Annex I, Section 1.

In **France** the siting of landfills is governed by rules set out for 'classified installations'. Their siting must be substantiated by an impact study, which must be enclosed with the application for authorisation. The criteria for site selection are set out separately, within different Decrees for hazardous waste, non-hazardous waste and inert landfills. For hazardous landfills the choice of site must be supported by an in-depth geological and hydrological study. The location of landfills must be compatible with higher level plans for waste disposal; plans for regional or inter-regional plans for disposal of special industrial waste and departmental/inter-departmental plans for the disposal of household or similar waste, for hazardous and non hazardous waste respectively.

For **Greece** it is simply reported that issues related to Annex I are examined at the stage of the procedure of the Primary Environmental Assessment of the planned landfills.

Hungary notes that the selection of landfill location is based on the prescriptions of Decree No. 22/2001. (X.10.) KÖM and of Decree No. 20/2006 (IV.5.) KvVM. Based on these requirements landfills may be built in accordance with the national and regional waste management plans, with settlement plans, and with the local building code, complying with the national building and urban planning requirements. Landfills are required to be located in industrial zones or - based on the settlement plan - in outskirts of urban developments.

In **Ireland** statutory waste management plans prepared by local authorities include details of the sites for landfill facilities either in the form of specific locations or through a series of site selection criteria. In assessing an application for a landfill licence on a specific site, the Environmental Protection Agency must have regard both to the content of the statutory waste management plans and to the prescribed requirements of the Landfill Directive, the EIA Directive, and the IPPC Directive (where applicable).

Italy simply notes that details on landfill planning is set out in points 1.1 and 2.1 of Annex 1 to Legislative Decree No 36 of 13 January 2003 and they comply with the Directive.

Latvia notes that Cabinet Regulation No 474 sets out details on the location of landfills, in accordance with the land use plans developed by relevant local authorities. In line with this regulation the location of landfills must have regard to factors set out in Annex I, Part 1. In addition other factors are explicitly added including the prevailing wind direction to avoid nuisance in local residential areas. In addition landfills are explicitly forbidden to be constructed in protected areas; areas where for the entire operating period it is not possible to ensure that the groundwater level is less than one metre below the base of the landfill; and in active coastal areas. There are additional requirements in terms of technical and economic justifications if landfills are to be built using state and/or European funds.

In **Lithuania** the need for a landfill must be defined within a county waste management plan. During the feasibility study for a landfill it is necessary to conduct an environmental impact assessment of the proposed activity. The specific location of a given landfill should be determined in accordance with the Special Conditions for Land and Forest Use approved by Government resolution No 343 of 12 May 1992 establishing landfill sanitary protection zones and restrictions on the selection of the site for a landfill. This sets out criteria in line with Annex I, Part 1 including requirements in relation to water bodies, residential areas, areas prone to flooding and abstraction sites. In addition there are explicit requirements related to locations of landfills in or near to forests.

Luxembourg notes that there is not procedure for the development of landfill sites for hazardous and non-hazardous waste. This is justified by the fact that there is no immediate need for new landfill sites of this type. For landfill sites for inert waste, the selection of new sites must be made according to a detailed procedure prescribed by the Regulation of 9 January 2006 making obligatory the sectoral plan 'landfill sites for inert waste'. (Mémorial A no. 23 of 13 February 2006).

The **Netherlands** state that there is sufficient capacity for the landfill of waste. Consequently, during the planning period of the national waste management plan approval will not be granted for creating new landfills or expanding existing locations.

In **Poland** the creation of a landfill in a given location must be included in a regional waste management plan. It is specified that all landfills cannot be

located: near major groundwater basins and main useful aquifers; in protected areas around national parks and nature reserves; in conservation value forests; in river valleys and other water bodies; in areas that are in a flood risk area or where there is the potential for flooding; in landslip and sinkhole areas, including those resulting from karst events, and in avalanche areas; in land inclined at more than 10°. In addition there are further requirements that restrict the location to all landfills except those for inert waste. These further considerations include the avoidance of: areas of tectonic or glaciotectionic activity; in areas where there are outcrops of compact porous, karst or cavernous rocks; on soil classified as I-II; in areas where the surface could be subject to deformation as a result of mining; in protective areas for spas; and in mining areas.

Portugal notes that information submitted in the report concerning 2001-03 remains valid.

Romania states that Annex I, Section 1 of the Directive has been transposed into national law by Annex 2, section 1 (General requirements for landfill location and design); this contains provisions regarding criteria for choosing landfill location. These include issues related to territorial planning, geological and hydrogeological conditions, protection of nature and human health etc. In addition criteria for analysing the proposed locations for landfills are set out including general requirements for landfill design and construction. It is noted that landfill projects (including location) are subject to the EIA procedure.

In **Slovakia** it is stated that landfill planning takes particular account of the criteria specified in Annex I, part 1 including: the safe distance of the landfill from residential and recreational areas, waterways, reservoirs and water resources; the geological, hydrogeological and geological engineering conditions in the area; protection of the countryside and cultural heritage of the area. In addition criteria are set out in relation to the sustainable impact on the area and the possibility of extreme weather events and their impact. In addition conclusions drawn from assessment of the environmental impact are taken into account.

Slovenia simply states that the requirements of Annex 1, Section 1, to the Directive have been fully transposed into Slovenian law (Articles 30 and 31 to the Decree on the landfill of waste).

In **Sweden** when a new landfill is planned an environmental impact assessment must be drawn up and several different potential sites must be described. This assessment can cover various aspects such as the impact on culture and natural assets and the plans the local authority has for the area. A balanced review is then undertaken of the local authority's plans for the different areas and the impact on the environment and health that the landfill may conceivably have. The site assessed as having the least impact across the board is then selected.

In the **UK** requirements for the location of landfills are transposed by different Regulations for England and Wales, Scotland and Northern Ireland. For England and Wales articles 5 and 8 and Schedule 2 of the Landfill

Regulations place a specific responsibility on Waste Planning Authorities to consider the requirements of Annex 1, Section 1. The relevant waste management plans will also have a bearing on the location of landfills. Both the Environment Agency and the Waste Planning Authorities have a role in determining landfill location. In Scotland articles 5 and 10 and Schedule 3 of the 2003 Regulations are used to determine the location of landfills. In Northern Ireland it is noted that when reviewing planning applications for landfill sites all the elements detailed under Annex I are taken into account. These are used as the basis for recommendations and requests for further information.

Résumé: The majority of Member States reported that they have planning procedures in place that take into account the considerations in Annex 1 Section 1 of the Directive. This is either expressed as an affirmation that requirements have been transposed into national law or by the provision of detailed criteria. The nature of criteria provided varies, these are either simply a repetition of those set out in Annex I (for example in the case of Slovakia or Romania) or represent the translation of the Annex I requirements into more detailed provisions relevant for a given Member State (for example Poland). Several Member States impose specific prohibitions or restrictions on landfills in national parks or other protected areas, and areas with certain water or geographical conditions. Estonia requires landfills to be established with as long a period of use as possible (at least 25 years).

Most Member States also specifically mentioned that an environmental impact assessment must be carried out for proposed landfills. However, many highlight this as part of an evaluation process for a given site rather than the best practice use of this tool eg at an earlier stage encompassing the consideration of alternative sites. Only Sweden clearly reports using the EIA process in this former way. Several Member States reported that landfills must be compatible with, or included in, other relevant waste management plans (usually regional plans). In some cases a detailed land-use plan is also required. In some Member States, standard land-use planning requirements are applied to landfills.

Denmark, Malta and Spain did not provide any information on this point. Belgium, Finland, Germany and Portugal stated that there was no change since the previous reporting period.

Luxembourg does not have a specific planning procedure for hazardous and non-hazardous waste landfills, as there is no immediate need for new landfills of these types. The Netherlands will not grant approval for any new landfills or extensions to landfills during the planning period of the national waste management plan; capacity may be exchanged between landfills, however.

The Member States who reported on this point seem to have taken the necessary measures, although implementation does differ through the adoption of variable criteria and approaches to the use of these criteria.

The use of EIA appears wide spread, but it is not clear if alternative sites are being properly considered in the majority of Member States.

3.9 Technical requirements

Section 2 of Annex I sets out general requirements for water control and leachate management. Member States were asked to describe technical measures in place to ensure these requirements are delivered.

Austria: Waters flowing to the landfill installation have to be diverted. After closure of landfills, all landfills have to be subject to surface sealing. The capture of leachate and contaminated waters and their treatment is required by the Landfill Ordinance.

For **Belgium** no new information is provided, see 2001- 2003 report.

In **Bulgaria** Article 17(1) of Regulation No 8 establishes requirements whereby provision must be made in investment plans for landfills to protect landfilled waste against the entry of atmospheric water, surface water and/or groundwater; collect contaminated water and leachate from the landfill; and remove and treat contaminated water and leachate from the landfill so as conform with the emission standards set in the wastewater discharge permit. Technical measures promoted include installing drainage equipment and a system for collecting and removing leachate from the body of the landfill, including a synthetic geomembrane liner and a drainage layer and, if necessary, equipment is provided for treating the leachate in accordance with the wastewater discharge permit or the integrated permit.

Cyprus sets out details of monitoring requirements for groundwater and surface water bodies, based on the Technoeconomical Study completed for all the new landfill sites which are under construction or at the designed stage. Further details concerning the actual control of leachate etc are not provided.

In the **Czech Republic** requirements in relation to water control and leachate are set out in Decree No 294/2005 Coll., § 3 with reference to technical standard ČSN 83 8033 on the landfill of waste – Disposal of leachate from landfill sites. This technical standard is applicable for the collection, channelling, concentration and quality inspection of leachate from waste landfills and for the agents performing these activities.

In **Estonia** during a landfills use and after care phase the amount of rainwater absorbed into the waste is kept to a minimum and surface and ground water is prevented from flowing into the landfilled waste. The landfill is covered by an impermeable cover and precipitation falling onto the landfill is drained. For example, the now defunct Orissaare landfill was covered with a plastic sheet. Leachate from the landfill's leachate system is collected and channelled for appropriate purification. The landfill operator takes regular samples of rainwater, leachate, surface water and ground water and sends the results of the analysis to the environmental service.

Finland notes that a description of measures was provided in the previous reporting period. Methods in 2006 were filtration and absorbing of the landfill water in 69 landfills and other kind of purification in 44 landfills. From 61 landfills surface waters and leachate were directed to the wastewater treatment plant and from 1 landfill to the water body.

In relation to the Åland Islands; an operator shall, when applying for a permit, present a plan for technical measurements of the parameters. The competent authority will consider if the measures suggested in the plan are sufficient before granting the permit.

France notes that no new information is available further to that provided in the 2001 to 2003 reporting period.

In **Greece** the technical measures for water control and leachate management, in order to meet requirements within Annex I, are laid down in the environmental permit of each landfill. The common measures taken include: the control of precipitation entering the landfill body via compaction of wastes and soil covering; the prevention of surface waters entering the landfill body by the construction of a peripheral drainage trench system; the collection of contaminated water and leachate through the construction of leachate collection network; and the treatment of leachates. Leachates are collected through a collection network and are led to the treatment plant. The treated effluents can be used for irrigation purposes of the site vegetation or for recirculation at the waste body in order to keep the appropriate humidity conditions in the waste body.

In **Hungary** it is noted that an integral part of the bottom insulating system within a landfill is an effective percolation system for collecting, draining, and monitoring the leaching water. The percolation system between the waste and the first insulating layer (percolating quilt) is composed of at least two layers. The collecting and draining system of leachate is above the insulation and, between this and the waste, a filtering-protecting layer is incorporated. It has double function: first it channels leachate into the collection and drainage system and, on also prevents the system from blocking by the fine particles washed out from the waste.

Ireland notes that there are standard conditions in waste licences issued by the Environmental Protection Agency, that deal with leachate management infrastructure and monitoring.

Italy states that within Annex 1 of Legislative Decree No 36 it is stipulated that a landfill must be planned with appropriate measures to ensure effective waste water and leachate management. Especially for landfills dedicated to non-hazardous and hazardous waste, rainwater runoff must be diverted away from the landfill perimeter using appropriate channelling; the leachate and waste water must be appropriately captured, collected and treated for the lifetime of the landfill and for a period of not less than 30 years from the date the landfill is closed.

In **Latvia** requirements for water and leachate management are set out in Regulation No 474. Paragraph 18.1 stipulates that the design of zones in which waste is to be accepted and processed shall include a covering of water-impermeable and chemically resistant asphalt or concrete, or that an anti-filtration layer be located under standard asphalt or concrete. For household and hazardous waste landfills, a permeability coefficient of not greater than 10^{-9} m/s shall be achieved; for inert waste landfills, no greater than 10^{-7} m/s. The composition and depth of the covering layer shall be stipulated in the design of the construction. In turn, waste storage compartments shall be provided with a specially constructed anti-filtration covering, a leachate and waste-water collection and conveying system, and a surface water and groundwater contamination monitoring system. The base and interior walls of waste storage compartments shall be constructed from an insulating layer of natural material. Further specific requirements engineering standards for landfill insulation and drainage are set out.

Paragraph 26 of the Regulation, states that leachate shall be conveyed away from waste storage compartments to a leachate-collecting apparatus. The leachate-collecting apparatus shall be equipped with a pipe-work and pump system for conveying the leachate to a waste-water treatment plant in the landfill or for transporting to the local authority's waste-water treatment plant. To reduce the volume of leachate, the leachate may be utilised for spraying over stored waste. The leachate-collecting apparatus shall be provided with leachate-inflow volume-measurement equipment and the capability to take samples of the leachate. The leachate-collecting apparatus shall be constructed from water-impermeable and chemically inert material. Leachate-treatment equipment shall be designed having regard to the quantity of leachate and fluctuations in contamination levels depending on the amount of precipitation and the time of year.

In **Lithuania** rules for the setting up, operation, closure and after-care of landfills under Order No 444 of 18 October 2000 include requirements water control and leachate management. This includes the following requirements: that landfills be designed to take account of local hydrological, hydrogeological and meteorological conditions; that water from precipitation entering the landfill body be controlled; that surface and groundwater be prevented from entering the landfilled waste. There are specific requirements for the development barriers and the separate collection of leachate and non contaminated water. Before discharging into surface water bodies, contaminated water or leachate must be treated to the appropriate standards set in normative environmental protection document LAND 10–96 "Leachate contamination limits".

Luxembourg states simply that water control and leachate management includes the following techniques: the phased exploitation of the landfill site; the covering of the parts in use by waterproof materials/covers/layers; and the collection and treatment of leachate.

In **Netherlands** the landfill Decree on soil protection contains rules on under and over sealing of landfills. Guidelines on undersealing, geohydrological insulation, impermeable final completion (oversealing) and additionally draft

procedures on the monitoring of groundwater must be met. In order to protect soils requirements for undersealing must be met including the placing of an intermediate layer of gravel below the waste and above the underseal (at least 0.2 metres thick) to channel water away from the waste. In terms of the overseal, inspections must be conducted every six months on various features to identify leaks and monitor leachate.

In **Poland** technical measures provided to ensure that the requirements of Annex I Section 2 (on water control and leachate management) are: precipitation measurements carried out at the landfill site or in a representative meteorological station; creating an external system of drainage canals around landfill sites that prevents surface and ground water from flowing into the site; equipping landfill sites with a leachate drainage system designed in such a way as to ensure it works reliably during the period the landfill's operation and for at least 30 years after its closure; and the collection of landfill leachate and its purification to the extent that it can be dealt with by a water purification plant or can be discharged into water or into the soil.

Portugal noted that the information set out in the report concerning 2001-03 remains valid.

Romania stated that Annex I, Section 2 of the Directive has been transposed by Annex 2, Section 2.1 from GD 349/2005 containing measures on water control and leachate management. Provisions include: measures to be taken in order to control water entering into the landfill body; collection of contaminated water and leachate; treatment of contaminated water and leachate. Inert waste landfills are exempt from these provisions. Technical measures to be taken in order to assure water control and leachate treatment are provided by the Technical Norms for waste landfilling.

Slovakia comments that on landfill sites measures are taken to control leachate and to manage the seepage regime by controlling the penetration of precipitation water into the body of the landfill and preventing the penetration of surface and groundwater into the body of the landfill. A perimeter drainage system and a drainage layer must be constructed, and leachate from the landfill is captured and treated to a standard acceptable for discharge into the drainage system or a receiver. Leachate is either treated on site or removed to a wastewater treatment plant.

Slovenia simply stated that requirements of Annex 1, Section 2, in the Directive have been fully transposed into Slovenian law within Articles 33, 37, 38 and 40 of the Decree on the landfill of waste.

In **Sweden** leachate is collected and piped to a reservoir for further cleaning and analysis. Samples are taken regularly from the reservoir, from selected points in and around the landfill site and from the outgoing water and tested for selected parameters, e.g. nutrients and metals. The impact on surface and groundwater is also analysed at selected points up and downstream of the site.

For the UK, within England and Wales Paragraph 2 of Schedule 2 of the 2002 Landfill Regulations sets out requirements to control surface water and groundwater ingress and for the collection and treatment of contaminated water and leachate. These requirements do not apply to inert landfills. The operator is required to describe the measures that they will adopt in their permit application and the landfill permit requires the operator to use these techniques. The Environment Agency's Landfill Sector Guidance Note contains recommendations on how these requirements can be achieved. These include surface water collection systems designed to cope with predicted storm events, and at the operational stage measures such as capping cells as soon as practicable and making arrangements for the long term management of groundwater. Prevention of groundwater ingress is interpreted in a risk based manner. Specific advice is also provided on leachate management within the Environment Agency's Guidance on the treatment of non-hazardous and hazardous landfill leachate.

In Scotland requirements are set out in Schedule 3, paragraph 2 of the 2003 Regulations. Leachate management is carried out in accordance with the Management Plan. Contaminated water is collected, treated and discharged.

For Northern Ireland all sites operating must comply with a number of conditions relating to the collection, treatment/management and monitoring of surface water management and leachate management. Permits require site operators to produce management plans for the management of surface water and leachate which must be agreed by the Chief Inspector, failure to comply with the agreed actions for the management of the elements will result in a breach of the permit and therefore potential suspension or revocation of the permit depending on the severity of the breach.

In regard to the landfill sites which have now stopped accepting waste as of 30 March 2007 or before, the waste management licence will be modified to set conditions to require an assessment of the current conditions and where appropriate the requirement for collection, treatment and monitoring surface water and leachate to ensure compliance with the 2003 NI Landfill Regulations.

Résumé: The majority of Member States reported on water control and leachate management techniques outlining various technical measures to ensure that the issues in Annex 1 Section 2 of the Directive are met. Several Member States have technical standards or guidelines in place for landfill operators. Some Member States also stated that technical measures must be outlined in advance of a landfill permit being granted. All Member States that responded reported that they have systems for collecting and treating (either on-site or at wastewater treatment plants) leachate. Many Member States also mentioned: the installation of drainage equipment for precipitation; protection against various sources of water entering the landfill (atmospheric, surface and ground water); provisions for monitoring or sampling waters; and the use of impermeable covers. Romania and the UK stated that inert landfills are exempt from requirements in this area.

Denmark, Malta and Spain did not provide any information on this point. Belgium, France, Germany and Portugal stated that there was no change since the previous reporting period.

The Member States who reported seem to have transposed the necessary measures, several also provide details as to how this is translated into practice via guidance and permit requirements. From the information provided, however, it is not possible to ascertain if waters and leachate are effectively controlled across the EU or a full list of good practice techniques employed. In order to ascertain this it would require more detail study of permit conditions, national guidelines, implementation and enforcement mechanisms.

3.10 Technical requirements for inert waste landfills

*According to **Section 3.4 of Annex I** the requirements in paragraphs 3.2 and 3.3 of this Annex relating to a geological barrier and a leachate collection and sealing system may be adapted by national legislation for inert waste landfills.*

In response to the question, have general or specific requirements as set out in Annex 1 been provided for inert waste landfills? **Austria, Flanders, Cyprus, Estonia, Hungary, Ireland, Italy, Poland, Slovakia and Slovenia** all responded that they had been applied Annex 1 to inert landfills.

Bulgaria, Finland, Latvia, the Netherlands, Romania, Sweden, Luxembourg and the majorities of countries of the UK responded that they had not applied these requirements or that inert landfills had been exempted from certain requirements under Annex I. Finland, Latvia, the Netherlands and Sweden simply responded that requirements do not apply with exemptions from given elements provides in Romania, Bulgaria, Luxembourg and the UK.

In Bulgaria landfills for inert waste are subject to the general requirements of Annex I to the Directive. In the case of inert landfills It is, however, possible based on Article 17(3) of the Regulation not to apply requirements on: the protection of landfilled waste against the entry of atmospheric water, surface water and/or groundwater; collection of contaminated water and leachate from the landfill; the removal and treatment of contaminated water and leachate from the landfill so as conform with the emission standards set in the wastewater discharge permit.

In Romania landfills for inert waste are exempted from requirements for water control and leachate management under Annex I, Section 2. Within Luxembourg the same requirements are no obligators for inert waste landfills; although it is noted that stricter acceptance criteria for waste in cases where the geological barrier of a landfill site for inert waste does not correspond to the requirements of point 3.2 of Annex 1 of the Directive are applied. In England and Wales, and Scotland requirements on leachate and water control under Annex I section 2 are also not applied for inert landfills. In addition

Annex I, Section 3 requirements may also be reduced based on an assessment of environmental risk. The Environment Agency for England and Wales has produced a guidance note on inert landfills to clarify the particular requirements of the Landfill Regulations for this class of sites.

For the **Czech Republic, France, Greece, Lithuania, Portugal and Germany** it remains unclear exactly how these provisions are applied. The former four Member States in their response simply quoted the legislation on landfilling of relevance rather than specifying exact application to inert landfills. Portugal and Germany stated that its response from 2001-2003 stands.

Résumé: A slight majority of Member States responded that they apply Annex I of the Directive to inert landfills. A minority of Member States simply responded that requirements do not apply to inert landfills. Meanwhile, Romania, Bulgaria, Luxembourg and the UK stated that they provide specific exemptions for inert landfills; the most common being in relation to Section 2 of Annex I related to water control and leachate.

Denmark, Malta and Spain did not provide any information on this point. Belgium, Germany and Portugal stated that there was no change since the previous reporting period. For the Czech Republic, France, Greece and Lithuania it remains unclear the exact nature of implementation given the limitations of their responses.

There appear to be differences in approach to the treatment of inert landfills across Europe. There is also a lack of information about precise practices in a number of Member States. If the treatment of inert landfills represents a cause for environmental concern, further research is needed into what are appropriate requirements and a clearer message on inert landfills should be provided within the Directive.

3.11 Reduction of technical requirements

*According to **Section 3.4 of Annex I** the requirements in paragraphs 3.2 and 3.3 of this Annex relating to a geological barrier and a leachate collection and sealing system may be reduced if, on the basis of an assessment of environmental risks, the competent authority has decided that collection and treatment of leachate is not necessary or it has been established that the landfill poses no potential hazard to soil, groundwater or surface water.*

In response to the question, have the requirements set out in Annex 1, paragraph 3.2 and 3.3 been reduced for certain landfills? **Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Greece, Ireland, Latvia, the Netherlands, Slovakia, Slovenia and Sweden** all responded no. Meanwhile, **Estonia, Finland, France, Hungary, Italy, Lithuania, Luxembourg, Poland, Portugal, Romania and the majority of countries of the UK** all responded that, yes, paragraphs 3.2 and 3.3 of Annex I had been reduced based on the

assessment of environmental risk. Details on where such requirements have been reduced are set out below.

In **Estonia** the requirements for inert waste landfills and for sites for depositing gangue from oil shale mining in terms of both ground and covering constructions have been relaxed. This decision was reached based on the fact that these types of waste do not give rise to leachate or landfill gas. There is, therefore, no need for a drainage layer or gas collection.

In **France** In the case of installations for mono-storing hazardous waste, the technical requirements provisions on the recovery and treatment of leachate may be adapted where a study, including an assessment of the risks for the environment and health, shows that the proposed alternative measures are equivalent. This type of storage may only be authorised after the Higher Council for Classified Installations has delivered an opinion (Article 46 of the decree of 30 December 2002). No authorisation adapting these provisions was granted in the period 2004 to 2006.

For the mono-storing of non hazardous waste requirements may be adapted, if an assessment of environment risks shows there is no potential risk for the soil, underground water or surface water. No authorisation adapting these provisions was granted in the period 2004 to 2006.

In the case of landfills for inert waste, in accordance with the option provided for in point 3.4 of Annex I to the Directive, it is not necessary to collect and treat leachate or provide a geological barrier, given that this waste is inert.

Finland notes that for some landfills the requirements have been reduced or adjusted. Requirements for the landfill base and sides construction there have been reductions at 11 landfills (1 hazardous waste, 6 non-hazardous waste, 4 inert waste). Leachate collection and bottom sealing requirements have been reduced at 57 landfills (1 hazardous waste, 56 non-hazardous waste). These reductions are justified by the limited environmental effects of the landfills in question. The hydrogeological conditions and other environmental effects of the landfill areas have been considered, as well as the quality of the deposited waste. It should be noted that in the case of the exemptions for the hazardous waste landfill, this was considered necessary to use a wet cover over the top to prevent the oxidation of the sulphide-containing tailings.

In **Hungary** if it is established, based on preliminary surveys followed by environmental impact assessment, that a landfill poses no potential hazard to the geological medium, to the underground and surface waters or to the air; the Inspectorate is authorised to reduce the requirements appropriately.

In **Lithuania** following an assessment of environmental risk requirements of paragraph 3.3 on the covering landfills have been reduced during the closure all old and small landfills which do not comply with the established requirements.

In **Luxembourg** landfill sites dealing with inert waste are subject to reduced requirements.

Poland notes that landfills for inert waste are exempted from the requirements of paragraphs 3.2 and 3.3 in Annex I to the Directive.

In **Romania** it is specified that if the competent authority, based on the results of environmental studies regarding water control and leachate management, establishes that the landfill does not pose any potential harm for soil, groundwater and surface water, conditions required by the Directive (Annex I, 3.2 and 3.3) do not apply.

For the **UK**, in England and Wales there are provision with allow the reduction, although not the removal, of requirements in line with 3.2 and 3.3 of Annex I. This reduction is permissible to an appropriate extent on the basis of environmental risk assessment. The Environment Agency has provided further guidance on where the requirements could be reduced with regards to leachate drainage and gas drainage layer. For leachate drainage, a layer at least 0.5m thick is required for all landfills where leachate is to be collected so as to allow leachate extraction and minimise the leachate. A reduction in the thickness of the layer from 0.5m or an alternative drainage system may be considered as part of the site specific risk assessment, provided the proposed design can meet the overall requirements of the drainage system over its entire design life. It is made clear that an effective leachate drainage system is at least as important as the lining system in managing the groundwater risk. The ability to abstract leachate from the drainage layer is essential over the entire lifecycle of the landfill and is therefore required. There are also specific guidelines related to gas drainage and the capping systems for landfills.

In Scotland the reduction of these requirements is permitted, where it is established that collection and treatment of leachate is not necessary or where it is established that the landfill poses no potential hazard to soil, groundwater or surface water.

In Northern Ireland is has been deemed that requirements set out in Annex 1, paragraph 3.2 and 3.3 are a minimum requirement and therefore the specification has not been reduced for any landfill in Northern Ireland.

Résumé: Approximately half of all Member States, who responded, make use of the ability to reduce requirements in relation to 3.2 and 3.3 of Annex I in the landfill Directive - Estonia, Finland, France, Hungary, Italy, Lithuania, Luxembourg, Poland, Portugal, Romania and the majority of countries of the UK. Of these several (Poland and Luxembourg) report simply exempting inert landfills. Meanwhile the remainder employ risk based assessments primarily during the approval of permits for landfill operation, which may lead to the reduction in requirements depending upon the risks identified.

Denmark, Malta and Spain did not provide any information on this point.

The results provide no understanding of the extent of reductions within a given Member State nor the approach taken to risk based

assessments and the potential environmental impact of this. It may be of use to investigate this further into the future.

4 Résumé

4.1 Mode of reporting

Member States were generally thorough in their responses, however, there were two key issues in terms of summaries provided. Firstly the majority of Member States tended simply to reflect of whether measures had been transposed into national law but did not comment on if actions had proved effective or lead to improvements in practice. Secondly, responses in terms of the quantification of different aspects of implementation were inconsistent. This resulted in an inability to compare the performance across Member States.

4.2 Implementation of the Directive including possible gaps

In relation to questions focused on the **incorporation** of requirements into national law the following conclusions were identified.

- **Transposition** - All Member States confirmed that they have provided details to the Commission of laws and regulations in place to transpose the landfill Directive.
- **Energy Production from Landfill Gas** - Many Member States carry out energy production from landfill gas only where 'feasible' or 'economical', otherwise the gas is flared. Given the importance of landfill gas, in terms of landfilling's impact on climate change, further investigation of the effectiveness of techniques for its control could be advisable in order to promote best practice in this field.
- **Waste Acceptance Criteria** - All responding Member States indicated that they have transposed waste acceptance criteria as set out in the Directive into national law with the exception of Greece. Member State responses provide details of the legal measures through which the Directive's criteria are implemented. However, the information provided does not permit comparison in terms of whether Member States simply reproduce the criteria from the Directive, or interpret requirements differently based upon national circumstance. To understand fully the nature of acceptance criteria in Europe further investigation into the nature of transposition and approaches to implementation on the ground would be necessary.
- **Monitoring of environmental impacts** - The majority of Member States provided details on monitoring regimes for leachate, surface water, gas emissions and atmospheric pressure. Monitoring requirements specified for a landfill in many Member States will vary depending upon permit conditions and the nature of the landfill. The information provides a good summary of the types of activities conducted to ensure the monitoring of landfill sites in the EU. It does not, however, provide an understanding of how monitoring requirements are implemented or how outcomes of monitoring are

used. This would be important to understand in order to establish if monitoring provisions for landfills are adequate.

- **Exemptions from Requirements** - Many Member States who responded vary the need for monitoring depending upon a landfill's characteristics. Information on precisely how such assessments are made and the criteria used to determine exemptions are, however, not clearly or consistently provided. To understand fully the impact of these exemptions and their application, further information on Member State implementation and the nature of exemptions applied would be needed.

The following issues related to the **implementation of the Directive** were identified:

4.2.1 Biodegradable waste

Some Member States have established lists of wastes considered biodegradable but the majority have transposed directly the definition as set out in Article 2 of the Directive ie that biodegradable waste is that capable of undergoing anaerobic or aerobic decomposition such as food or garden waste, paper and cardboard. A subset of Member States also provides a detailed breakdown of the different wastes considered to fall within this broader definition of biodegradable waste. Some countries do not have a definition for 'municipal' waste in their country and this has, therefore, not been applied.

4.2.2 National Strategies for the reduction of biodegradable waste going to landfill

Under the Landfill Directive, Member States are required to develop National Strategies for the reduction in biodegradable waste going to landfill. They are intended to facilitate the achievement of targets in this area.

The vast majority of Member States reported that they have national strategies in place and that these have been communicated to the Commission. Several Member States highlighted their experiences in terms of implementation of the strategy commenting that the quantity of organic waste going to landfill has reduced. Measures adopted within such strategies included the expanded use of composting and the collection of green waste; the banning of the landfilling of certain types of biodegradable waste; and the establishment of biogas or methanisation units.

The assessment does not provide any understanding of the actions actually put in place to address biodegradable waste, simply if a strategy is in place and communicated to the Commission. Further research is necessary to understand the quality and nature of the strategies. Moreover, responses actually detailing experiences in terms of implementation of the strategies were limited. Many Member States provided information that proved to be of limited relevance and they could be requested to clarify this (Belgium (all regions), Cyprus, the Czech Republic, Hungary, Ireland, Luxemburg, Romania and Slovenia). Were more detail on real experiences to be collated this would provide an understanding as to how best to develop and implement strategies on biodegradable waste into the future.

4.2.3 Data on biodegradable waste to landfill and number of landfills

Member States were requested to report on the level of biodegradable waste and the capacity of landfills. The information provided by Member States was inconsistent in terms of the units used and also the categories in which the data was provided. In the future it would be useful to clarify the exact nature of information required and the exact nature of the breakdown between different categories. Without this it is difficult to compare approaches across Europe.

4.2.4 Costs of Landfilling

A key feature of the landfill Directive is its requirements in relation to the costs associated with landfilling. The Directive attempts to internalise the costs for all elements of a landfill's lifecycle making producers of waste responsible for costs associated with set up, operation, closure and aftercare.

The majority of Member States responding indicated that requirements for the costs to those disposing of waste to landfill take account of all elements of the landfill's life cycle ie set up, operation, closure and aftercare – as specified in the Directive. In addition a significant number also stated that a financial guarantee is required by an operator in order to obtain a permit for a landfill. Some Member States reported that appropriate bodies or agencies in the country are responsible for monitoring the costs of landfill and ensuring that landfill operators have the funds to cover those costs. A handful of Member States reported that they provide, in national legislation or guidance, calculation or assessment methods to assist landfill operators in determining the costs.

4.2.5 Planning for Landfills

The majority of Member States reported that they have measures in place to transpose requirements on the locating of landfills as set out in Annex I Part 1 of the Directive. This includes taking account of: the distances to residential and recreation areas, waterways, water bodies and other agricultural or urban sites; the existence of groundwater, coastal water or nature protection zones in the area; the geological and hydrogeological conditions in the area; the risk of flooding, subsidence, landslides or avalanches on the site; and the protection of the nature or cultural patrimony in the area.

Several Member States have set out detailed criteria elaborating on details set out generally within the Annex of the Directive; meanwhile others rely on these broader requirements accompanied by an emphasis on techniques such as impact assessment. In terms of the use of EIA, many Member States seem to employ this purely as a mechanism for reviewing the impacts at a given site rather than the consideration and comparison of alternatives. Member States often set out in local development plans potential locations or needs in terms of landfill capacity. The Member States who reported on this point seem to have taken the necessary measures, although implementation does differ through the adoption of variable criteria and approaches to the use of these criteria. The use of EIA appears wide spread, but it is not clear if alternative sites are being properly considered in the majority of Member States.

4.2.6 Application of technical specifications set out in Annex I on 'General Landfill Requirements'

Many Member States set out in detail the mechanisms employed for the management of water and leachate associated with landfills. Details are not, however, provided as to how requirements are translated into practical action at landfills. Various responses indicate that permit conditions or guidelines are employed but no consistent picture emerges. In terms of exemption or reduction in the technical requirements, approximately half of all Member States responding exempt inert landfills from at least some requirements. In addition, several Member States reported other types of landfills being subject to reduced requirements dependant upon the characteristics and the risk posed. From the information provided, however, it is not possible to ascertain if waters and leachate are effectively controlled across the EU or a full list of good practice techniques employed. In order to ascertain this it would require more detail study of permit conditions, national guidelines, implementation and enforcement mechanisms.

4.2.7 Treatment of Inert Landfills

There appears to be differences in approach to the treatment of inert landfills across Europe, accompanied by a lack of information about precise practices in a number of Member States. If the treatment of inert landfills represents a cause for environmental concern, further research is needed into what are appropriate requirements and a clearer message on the appropriate treatment of inert landfills should be provided within the Directive.

4.2.8 Reduction in Technical Requirements

Approximately half of all Member States, who responded, make use of the ability to reduce requirements in relation to 3.2 and 3.3 of Annex I in the landfill Directive – focusing on provision of geological barriers and the development of leachate collection and sealing systems. Of these several (Poland and Luxembourg) report simply exempting inert landfills. Meanwhile, the remainder employ risk based assessments primarily during the approval of permits for landfill operation. The responses provide no understanding of the extent of reductions within a given Member State nor the approach taken to risk based assessments and the potential environmental impact of this. It may be of use to investigate this further into the future.

ANNEX – Tables Summarising Generation of Biodegradable Municipal Waste, Landfilling of Biodegradable Waste and Landfill Capacity

Table 1. Generation of Biodegradable Municipal Waste in 1995 (tonnes) (Question II, 4d)

Member State	BMW generation 1995
Austria	2,675,300
Belgium (Wallonia)	
Belgium (Brussels)	257,272
Belgium (Flanders)	3,397,080
Bulgaria	2,247,500
Cyprus (1993)	129,100
Czech Republic	1,530,000
Estonia	317,000
Finland (1994)	2,100,000
France (1)	18,615,000
Germany	28,410,000
Greece (1990) (2)	2,100,000
Hungary	2,340,000
Ireland	1,289,911
Italy	16,757,000
Latvia	460,000
Lithuania (2000)	612,182
Luxembourg	142,166
Netherlands	2,406,000
Poland	4,380,000
Portugal (3)	2,252,720
Romania	4,800,000
Slovakia (4)	695,000
Slovenia	445,000
Sweden	
United Kingdom	18,260,000

Note:

(1) 2,200,000 tonnes of which was garden waste; 2,492,000 tonnes of non-household paper/paperboard packaging

(2) 660,000 tonnes of paper/cardboard; 1,440,000 tonnes of food and green wastes

(3) 1,359,400 tonnes of food and garden waste

(4) 238,000 tonnes of paper and cardboard; 457,000 tonnes of kitchen and restaurant waste and garden and kitchen waste

Table 2. Landfilled biodegradable waste, 2004-2006 (Question II4,e)

1000 Tonnes/year	Austria			Belgium (Flanders)			Belgium (Brussels)			Belgium (Wallonia)			Bulgaria		
Year	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Biodegradable municipal waste	134	123	123	40	27	7				806	821				
Other biodegradable waste	183	115	117	6	7										
Total biodegradable waste	317	238	240										1,482	1,514	

1000 Tonnes/year	Cyprus			Czech Republic			Estonia			Finland			France		
Year	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Biodegradable municipal waste				1312	1363	1426				1778	1232		6949	6800	6852
Other biodegradable waste										862	788		679	622	575
Total biodegradable waste							24	23	18	2040	2020		7629	7422	7432

1000 Tonnes/year	Germany			Greece			Hungary			Ireland			Italy		
Year	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Biodegradable municipal waste	6743	3032	0							1304	1308				
Other biodegradable waste	1835	948	0												
Total biodegradable waste	8578	3980	0	2608	2412	2405							11000	10680	

1000 Tonnes/year	Latvia			Lithuania			Luxembourg			The Netherlands			Poland		
Year	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Biodegradable municipal waste				477	474	477				240	280	400 approx			
Other biodegradable waste															
Total biodegradable waste	355	335	370				22	27	23				5142	4937	5293

1000 Tonnes/year	Portugal			Romania			Slovakia			Slovenia			Sweden			The UK		
Year	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006	2004	2005	2006
Biodegradable municipal waste	1681	1661		4060	4430								243	14	58	17200	15400	14300
Other biodegradable waste													294	132	248			
Total biodegradable waste							118	106	160				538	146	306			

Table 3 - Rest capacity for landfills - Unless specified in 1000, tonnes

	For hazardous waste	For non-hazardous waste	For inert waste	For other waste
Rest capacity (1000 tonnes)				
Austria	0	41,919	31730	0
Belgium - Brussels				
Belgium - Flanders	5714057 m3	6,449		2893
Belgium - Wallonia	2315	18,102	16502	270
Bulgaria	5419	95,139	9457	
Cyprus		800		
Czech Republic	6205	42,373	11332	
Estonia (1)	253668	2,322	145,860	0
Finland	11,006	48,777	478	0
France	24,000,000 cc			
Germany				
Greece (2)	194			
Hungary	1950	44,165	623	
Ireland		13,000	6000	
Italy (3)	422,222 m3	39,793,372 m3	9,968,840 m3	
Latvia				
Lithuania				
Luxembourg		1,302,000 m3	19,100,000 m3	
Netherlands		48,341		
Poland	6987	1,743,266	40114	
Portugal				
Romania	100	930,000	10	

Slovakia	3321	18,513	5287	
Slovenia				
Sweden	2355	11,807	7134	
UK	13747	443,199	86057	

NOTE:

(1) Hazardous landfill capacity includes 253530 for the landfill of oil shale waste

(1) Inert landfill capacity includes 145000 for the landfill of oil shale gangue

(2) Data only exists for one of the two existing landfills

(3) Landfill rest capacity for other waste: 11,080,220 m3 Type 1; 16,997,094 m3 Type 2A; 7,576,125 m3 Type 2B; 94,515 m3 Type 2C