EXPLANATORY MEMORANDUM TO THE

LANDFILL (ENGLAND AND WALES) (AMENDMENT) REGULATIONS 2005

2005 No. 1640

1. This explanatory memorandum has been prepared by Department for Environment, Food and Rural Affairs and is laid before Parliament by Command of Her Majesty.

This memorandum contains information for the Joint Committee on Statutory Instruments.

2. Description

2.1 These Regulations complete the implementation, in England and Wales, of Council Decision 2003/33/EC establishing criteria for the acceptance of waste at landfills ('the waste acceptance criteria') by setting the criteria to be met by monolithic waste. They also implement Directive 1999/31/EC ('the Landfill Directive') by prohibiting the acceptance at existing landfills of whole and shredded used tyres from 16th July 2006 and other specified types of waste from 30th October 2007.

2.2 The Regulations make amendments to the Landfill (England and Wales) Regulations 2002 (S.I. 2002/1559) and to the Landfill (England and Wales)(Amendment) Regulations 2004 (S.I. 2004/1375).

3. Matters of special interest to the Joint Committee on Statutory Instruments

3.1 Regulation 9 corrects a drafting error in the Landfill (England and Wales) (Amendment) Regulations 2004 identified by the Joint Committee on Statutory Instruments in its Twenty-Fourth Report of Session 2003 – 2004. It fulfils the Department's undertaking to the Committee to amend the provision in question before it came into force.

4. Legislative Background

4.1 These Regulations are made under section 2 of the Pollution Prevention and Control Act 1999.

4.2 The Landfill Directive provides stringent operational and technical requirements on waste and landfills, to provide measures, procedures and guidance to prevent or reduce as far as possible negative effects on the environment, in particular the pollution of surface water and groundwater, as well as any resulting risk to human health.

4.3 The Landfill Directive sets out general principles for acceptance of waste at landfills and general procedures for testing and interim guidelines. This was supplemented by Council Decision 2003/33/EC establishing the criteria and

procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to the Landfill Directive.

4.4 The main technical and regulatory requirements of the Landfill Directive were transposed in the Landfill (England and Wales) Regulations 2002 (S.I. No. 2002/1559). The 2002 Regulations were subsequently amended by the Landfill (England and Wales) (Amendment) Regulations 2004 (S.I. No. 2004/1375) in order to implement the requirements of the Council Decision. However, the 2004 Regulations did not make provision in respect of the waste acceptance criteria to be met by monolithic waste. The Council Directive requires Member States to set so as to provide the same level of environmental protection afforded by the criteria it expressly lays down in respect of granular waste. The 2005 Regulations set these criteria for monolithic waste.

4.5 The Landfill Directive prohibits the acceptance at landfills of certain specified types of waste, but under transitional arrangements provides for the delayed application of this provision to existing landfills. The Regulations amend the 2002 Regulations so as to prohibit the acceptance by existing landfills of whole and used tyres from 16th July 2006 and the other specified types of waste from 30th October 2007.

4.6 The Regulations make amendments to the 2002 Regulations both directly as well as indirectly by amendments made to the changes made to the 2002 Regulations by the 2004 Regulations. The direct amendments to the 2002 Regulations come into force on 16th July 2005, while the amendments to the 2004 Regulations come into force on 15th July 2005, the day before those Regulations have effect. The result, therefore, is that all the relevant changes in requirements brought about by both the 2004 Regulations and these Regulations come into effect on 16th July 2005.

4.7 A transposition note is attached to this memorandum.

5. Extent

5.1 This instrument applies to England and Wales.

6. European Convention on Human Rights

6.1 Not applicable.

7. Policy background

7.1 The requirements of the Landfill Directive and Council Decision have largely been transposed in England and Wales to meet our Community obligations.

7.2 Implementation of the provisions is a key component of the Government's commitment in reducing the UK's reliance on landfill, in order to reduce its environmental impact and because landfilling is a missed opportunity to recover value from waste. The result is that landfilling becomes a less attractive waste management option, both in terms of cost and convenience. This should encourage waste producers

to look for more acceptable alternatives (accepting that for some waste streams, there is little alternative to landfill).

7.3 The Government has worked closely with representatives of waste producers and the waste management industry to help develop the waste acceptance criteria and other aspects of the Directive.

7.4 There have been seven consultation exercises on different aspects of the Landfill Directive and Council Decision. The consultation paper for these Regulations was issued in December 2004. 46 responses were received. Changes were made to the Regulations following consultation to reflect the areas of concern that were raised.

7.5 The Department has published Interpretative Guidance on the 2002 and 2004 Regulations which is aimed at waste producers, waste managers, landfill operators and regulators. This is available on the Defra website at http://defraweb/environment/waste/topics/landfill-dir/pdf/reg-interpret.pdf. The Department intends to update the Guidance shortly to reflect the changes made by these Regulations. The Department has also held two seminars for industry, in December 2004 and April 2005, to promote understanding of the implications of implementation of the waste acceptance criteria.

8. Impact

8.1 A Regulatory Impact Assessment is attached to this memorandum.

9. Contact

John Galvin at Defra Tel: 020 7082 8519 or e-mail john.galvin@defra.gsi.gov.uk can answer any queries regarding the instrument.

TRANSPOSITION OF COUNCIL DECISION 2003/33/EC ESTABLISHING CRITERIA AND PROCEDURES FOR THE ACCEPTANCE OF WASTE AT LANDFILLS PURSUANT TO ARTICLE 16 OF AND ANNEX II TO DIRECTIVE 1999/31/EC

THE LANDFILL (ENGLAND AND WALES) (AMENDMENT) REGULATIONS 2005

Introduction

The overall objective of Directive 1999/31/EC ('the Landfill Directive') is to supplement the requirements of the Waste Framework Directive and prevent or reduce as far as possible the negative effects of landfilling on the environment as well as any resultant risk to human health. It seeks to achieve this through specifying uniform technical standards at Community level and setting out requirements for location, conditioning, management, control, closure and preventative and protective measures for landfills.

The Landfill Directive also includes some requirements that are aimed not at the engineering of the landfill but at the characteristics of the waste to be deposited. Examples are the requirements to treat most wastes before landfill and the classification of landfill sites (for inert, hazardous and non-hazardous waste).

Annex II of the Landfill Directive sets out general principles for acceptance of waste at landfills, general procedures for testing and interim guidelines. This was supplemented by the Council Decision 2003/33/EC ('the Council Decision') which sets out the full standards that waste must meet to be accepted at landfills. It introduces criteria and sets limit values for a number of contaminants, so harmonising another aspect of landfill regulation across Europe. The Council Decision also sets out the procedures for characterising waste, for checking compliance of waste with the relevant waste acceptance criteria, and for on-site verification that waste arriving at the landfill is correctly described.

These Regulations implement the Landfill Directive and the Council Decision, including making consequential changes to domestic legislation to ensure its coherence in the area to which they apply.

It is the responsibility of the Environment Agency to enforce the provisions of the Landfill Regulations.

Implementation

The Landfill Directive has been implemented in England and Wales by the Landfill (England and Wales) Regulations 2002 ('the 2002 Regulations'). The main requirements of the Council Decision have been implemented in England and Wales by the Landfill (England and Wales) (Amendment) Regulations 2004 ('the 2004 Regulations'), which amend the 2002 Regulations.

The Landfill (England and Wales) (Amendment) Regulations 2005 ('the 2005 Regulations') make further amendments to the 2002 Regulations (both directly and by way of amendment

of the 2004 Regulations) in respect of the implementation of both the Landfill Directive and the Council Decision.

The Landfill Directive

The 2005 Regulations implement the following requirements of the Landfill Directive:

- regulation 4 amends regulation 4(c)(i) of the 2002 Regulations (which provides for an exemption from the application of the regulatory regime for the deposit of non-hazardous dredging sludges alongside small waterways) to reflect the exact wording of that part of the third indent of Article 3(2) of the Landfill Directive which this provision implements;

- regulation 5 amends paragraph 1 of Schedule 4 to the 2002 Regulations (which provides for transitional arrangements in respect of existing landfills) to insert additional conditions in the waste management licences or landfill permits of existing landfills prohibiting from specified dates the acceptance of the categories of waste prescribed in Article 5(3) and 6(a) of the Landfill Directive, in accordance with the transitional arrangements in respect of existing landfills laid down in the second sentence of Article 14(c) of the Landfill Directive.

The Council Decision

The 2005 Regulations implement the following requirements of the Council Decision:

- regulations 10 and 11 amend the new Schedule 1 (which sets out the waste acceptance criteria) substituted in the 2002 Regulations by the 2004 Regulations so as to set limit values for polycyclic aromatic hydrocarbons, as required by section 2.1.2.2 of the Annex to the Council Decision;

- regulations 13 and 14 amend the new Schedule 1 (which sets out the waste acceptance criteria) substituted in the 2002 Regulations by the 2004 Regulations so as to set waste acceptance criteria for monolithic waste which provide the same level of environmental protection given by the criteria specified in section 2 of the Annex to the Council Decision, in accordance with the requirements of sections 2.2.2 (final sentence), 2.3.1 (final sentence), 2.3.2 (penultimate sentence) and 2.4.1 (final sentence) of that Annex;

- regulations 15 and 16 amend the new Schedule 1 (which sets out the waste acceptance criteria) substituted in the 2002 Regulations by the 2004 Regulations so as to provide for the sampling and testing methods applicable to the waste acceptance criteria set for monolithic waste, in accordance with section 3 of the Annex to the Council Decision.

Transposition

The second sentence of Article 14(c) of the Landfill Directive requires Member States to take measures to ensure that existing landfills comply with most of the requirements of the Directive before 16 July 2009. The amendments made to the 2002 Regulations by the 2005

Regulations prohibiting the acceptance of certain categories of waste will come into force on 16 July 2005 and will have effect from 16 July 2006 and 30 October 2007.

Article 7 of the Council Decision requires Member States to apply the waste acceptance criteria set out in section 2 of its Annex by 16 July 2005. The 2004 Regulations will be amended by the 2005 Regulations on 15 July 2005 and will come into effect on 16 July 2005.

ANNEX B

June 2005

Final Regulatory Impact Assessment

Landfill (England and Wales) (Amendment) Regulations 2005

THE LANDFILL (ENGLAND AND WALES) (AMENDMENT) REGULATIONS 2005

PURPOSE AND INTENDED EFFECT OF THE MEASURE

1. OBJECTIVE

1.1 This final Regulatory Impact Assessment is concerned in the main with the transposition into legislation in England and Wales, through the Landfill (England and Wales) (Amendment) Regulations 2005, of those parts of European Council Decision 2003/33/EC (the Council Decision) that pass responsibility for setting the criteria to Member States (monolithic wastes, load bearing capacity and polycyclic aromatic hydrocarbons (PAHs)). It also covers the requirement in the Decision, and therefore in the Regulations, that in normal circumstances, the producer of the waste is responsible for ensuring that the characterisation information is correct. The Regulations also make some drafting and clarification changes to the Landfill (England and Wales) Regulations 2002 (the 2002 Regulations) and the Landfill (England and Wales)(Amendment) Regulations 2004 (the 2004 Regulations).

1.2 This final regulatory impact assessment supplements and extends previous regulatory impact assessments attached to Waste Strategy 2000, in the consultation paper *Limiting Landfill*[1] and in the second consultation paper on implementing the Landfill Directive[2].

2. BACKGROUND

2.1 The Landfill Directive[3] introduces progressive restrictions on the landfilling of biodegradable municipal waste and other wastes, and requires that waste only be accepted in a class of landfill (inert, hazardous and non-hazardous) if it meets the relevant acceptance criteria for that class of landfill. The purpose of the Council Decision[4] is to set out specific criteria and procedures for waste acceptance at the different classes of landfill.

2.2 The criteria and procedures are principally intended to ensure that any leachate produced within the landfill does not pose an additional risk to groundwater and surface water. To this end the Council Decision requires that the composition, leachability, long-term behaviour and general properties of a waste to be landfilled be determined as precisely as possible, and that before waste is accepted at a landfill site the holder or operator must be able to show that the waste can be accepted according to the permit conditions and waste acceptance criteria.

2.3 The Landfill (England and Wales) (Amendment) Regulations 2005 (the 2005 Regulations) pursue these objectives by setting the acceptance limit values for which the Council Decision passes responsibility to Member States. It also covers the

[1] Limiting Landfill, DETR 1999
[2] The Implementation of Council Directive 1999/31/EC on the Landfill of Waste, Second Consultation Paper, DETR 1999
[3] Directive 1999/31/EC on the landfill of waste
[4] European Council Decision 2003/33/EC on the criteria and procedures for the acceptance of waste at landfills

requirement in the Decision that the "producer of the waste or, in default, the person responsible for its management, is responsible for ensuring that the characterisation information is correct". The 'characterisation information' refers to the requirement that waste going to landfill is subject to Basic Characterisation (Level 1 of the Waste Acceptance Procedures) in compliance with Paragraph 5 of Schedule 1 of the 2002 Regulations (as amended).

2.4 In addition, this Regulatory Impact Assessment (RIA) also refers to some additional drafting changes or clarifications of the 2002 and 2004 Regulations that the 2005 Regulations bring about. These relate in the main to the application of the Landfill Directive's exclusions in Article 3.2 of the disposal of non-hazardous wet dredgings and the date for bringing certain requirements in respect of non-hazardous waste into force.

2.5 The 2005 Regulations apply in England and Wales; as waste is a devolved matter, this has been agreed by the National Assembly for Wales. However, a transfer of functions is expected to take place that will pass responsibility for pollution prevention and control matters in Wales to the National Assembly. The Assembly will then take responsibility for the 2005 Regulations in Wales. Separate Regulations will apply the requirements in Scotland and Northern Ireland.

3. LANDFILL

3.1 Landfilling is the most common means by which waste is disposed of across Europe. However, differences in technical standards and operating practices between member states have led to numerous incidents of gross land and water pollution. In response, the European Commission has introduced a number of measures to regulate landfill disposal and to establish a common framework that promotes waste prevention, minimisation, re-use and recycling above landfill disposal[5].

3.2 The Landfill Directive has brought forward progressive measures to further prevent or reduce as far as possible the negative effects of landfilling waste on the environment and on human health. It bans the landfill of liquids and certain solid wastes, introduces requirements for the treatment of wastes prior to landfill and sets out a framework for:

- the classification of landfill sites (inert, hazardous and non-hazardous)[6];
- procedures for waste acceptance to be adopted at landfills; and,
- the types of waste for each class of landfill specified by waste acceptance criteria.

Waste Acceptance Procedures

3.3 Annex II of the Landfill Directive sets out the general requirements of these waste acceptance criteria. This is based upon the following three level hierarchy:

[5] In particular EC Directive 91/156/EEC on waste (transposed into law in England and Wales through the Waste Management Licensing Regulations 1994 (SI No. 1056)
[6] From 16 July 2004

Level 1: ***Basic characterisation.*** This constitutes a thorough determination, according to standardised analysis and behaviour-testing methods, of the short and long-term leaching behaviour and/or characteristic properties of the waste.

Level 2: ***Compliance testing.*** This constitutes periodical testing by simpler standardised analysis and behaviour-testing methods to determine whether a waste complies with permit conditions and/or specific reference criteria. The tests focus on key variables and behaviour identified by basic characterisation.

Level 3: ***On-site verification.*** This constitutes rapid check methods to confirm that a waste is the same as that which has been subjected to compliance testing and that which is described in the accompanying documents. Where appropriate, it may merely consist of a visual inspection of a load of waste before and after unloading at the landfill site.

3.4 The Landfill Directive requires that before a waste can be landfilled, all of the properties of the waste which determine its suitability for landfill must be known (Level 1). Waste regularly generated is then periodically checked (Level 2) to ensure that those properties have not changed, and all waste is checked at the landfill (Level 3) to verify that it is the expected waste and that it has not been contaminated in storage or transport[7].

3.5 Interim national guidance on the acceptance criteria at new and existing landfill sites was published in 2002[8]. The Council Decision sets out the full measures for waste acceptance. These are required to be implemented by member states by 16 July 2005.

3.6 Basic characterisation (Level 1) is required for each type of waste, and the Council Decision places the responsibility for ensuring the characterisation is correct on the producer of the waste or, in default, the person responsible for its management. The Council Decision defines the functions of this characterisation as providing:

(a) basic information on the waste (type and origin, composition, consistency, leachability and – where necessary and available - other characteristic properties).

(b) basic information for understanding the behaviour of waste in landfills and options for treatment[9].

[7] In general, the responsibilities of the waste producer and landfill operator can be summarised as follows:

- Level 1 testing is the responsibility of the waste producer;
- Level 2 testing may be undertaken by both the producer and the landfill operator, but it is the responsibility of the landfill operator to ensure that only wastes that fulfil the waste acceptance criteria for a given site are accepted; and,
- Level 3 is the responsibility of the landfill operator.

[8] Environment Agency Guidance on National Interim Waste Acceptance Criteria and Procedures, Version 1.2 External Consultation Draft, August 2002 (under revision)

[9] laid out in Article 6(a) of the Landfill Directive

(c) assessment of wastes against limit values.

(d) detection of key variables (critical parameters) for compliance testing and options for simplification of compliance testing (leading to a significant decrease of constituents to be measured, but only after demonstration of relevant information).

Waste Acceptance Criteria

3.7 The acceptance criteria are summarised in Table 1. These cover a range of inorganic determinants in eluates derived from the European standard leaching test BS EN 12457 and other specific parameters, such as pH, acid neutralisation capacity and total organic carbon[10]. (Full details of the limit values and acceptance criteria are set out in the Council Decision, Annex A).

If the basic characterisation of a waste shows that the waste fulfils the criteria for a landfill class, the waste is deemed to be acceptable at this landfill class. If this is not the case, the waste is deemed to be not acceptable at this landfill class.

3.8 As a general rule, all wastes will require testing from 16 July 2005. The exceptions will be:

- wastes where a comprehensive dataset is already available from previous testing to the satisfaction of the Environment Agency;
- wastes which are listed in the Council Decision, the Landfill Regulations or other Environment Agency guidance as not requiring testing[11]; or,
- wastes whose composition can be predicted to the satisfaction of the Environment Agency from knowledge of the process producing the waste.

3.9 As a minimum, information will be required to determine waste acceptance to landfill and whether or not the waste is hazardous. The parameters used as the basis for determining the class of landfill at which the waste may be accepted are summarised in Table 1 below.

Table 1: Summary of Council Decision waste acceptance criteria[12]

Parameter	**Inert waste landfill**	**Stable non-reactive hazardous waste in non-hazardous landfill¶**	**Hazardous waste landfill**

[10] Environment Agency guidance on the sampling and testing of wastes to meet the waste acceptance procedures is currently being drafted and will be issued in due course. This will note that the range of eluate determinands may also need to be expanded beyond the restricted suite listed above and further information may be required to check whether the waste can be reduced, recycled or recovered

[11] This includes certain inert wastes, municipal waste, separately collected non-hazardous fractions of household waste and the same non-hazardous materials from other origins that have been treated prior to landfill. Separate provisions exist for gypsum wastes and asbestos wastes (see Annex A)

[12] Environment Agency, Guidance on Sampling and Testing of Wastes to meet Landfill Acceptance Procedures, Version 4.3a (December 2003)

Parameters determined on the waste			
Total organic carbon (w/w %)	3%	5%	6%*
Loss on ignition			10%*
BTEX (benzene, toluene, ethylbenzene and xylenes) (mg kg^{-1})	6		
PCBs (polychlorinated biphenyls, 7 congeners (7 congeners) (mg kg^{-1})	1		
Mineral oil C_{10}-C_{40} (mg kg^{-1})	500		
PAHs (polycylcic aromatic hydrocarbons)	To be set		
PH		>6	
Acid neutralisation capacity		To be evaluated	To be evaluated
Limit values (mg kg^{-1}) for compliance leaching test using BS EN 12457/ 3 at cumulative L/S 10 l kg^{-1} [13]			
As (arsenic)	0.5	2	25
Ba (barium)	20	100	300
Cd (cadmium)	0.04	1	5
Cr (chromium (total))	0.5	10	70
Cu (copper	2	50	100
Hg (mercury)	0.01	0.2	2
Mo (molybdenum)	0.5	10	30
Ni (nickel)	0.4	10	40
Pb (lead)	0.5	10	50
Sb (antimony)	0.06	0.7	5
Se (selenium)	0.1	0.5	7
Zn (zinc)	4	50	200
Cl (chloride)	800	15,000	25,000
F (fluoride)	10	150	500
SO_4 (sulphate)	1,000[#]	20,000	50,000
Total dissolved solids (TDS)[+]	4,000	60,000	100,000
Phenol index	1		
Dissolved organic carbon at own pH or pH7.5-8.0[@]	500	800	1,000

¶ And non-hazardous wastes deposited in the same cell * Either TOC or LOI must be used or hazardous wastes
** UK PAH limit values are under development
# Alternative limit values can be used to demonstrate compliance with the acceptance criteria for inert wastes as set out in the Council Decision.
+ The values for TDS can be used instead of the values for Cl and SO_4.
@ DOC at pH 7.5-8.0 and L/S10 can alternatively be determined using prEN 14429 test.

[13] The leaching limit values were derived by the Technical Adaptation Committee by risk modelling based on the technical requirements for the protection of soil and groundwater for the different classes of landfill imposed by Annex I of the Landfill Directive.

Impact considerations

3.10 Landfills have the potential for a range of negative impacts on the environment and human health, including being a major cause of pollution to groundwater and surface water across Europe. The Council Decision is principally concerned with controlling the inputs to landfill such that any leachate produced does not pose a risk to groundwater and surface water. These further amendment regulations therefore contribute to the impact of the Council Decision in providing a higher degree of protection to the environment than would otherwise be the case. In doing so, it also contributes to meeting the requirements of the Groundwater Directive[14].

4. OPTIONS

4.1 The Landfill (England and Wales) (Amendment) Regulations 2005 (the 2005 Regulations) pursue these objectives by placing a duty on waste producers to ensure that the characterisation information is correct and by setting criteria for which the Council Decision passes responsibility to Member States (monolithic wastes, load bearing capacity and polycyclic aromatic hydrocarbons (PAHs)).

Business as usual

4.2 The disposal of wastes to landfill is extensively regulated in England and Wales under the Environmental Protection Act 1990, the Pollution Prevention and Control Regulations 2000, the Landfill Regulations 2002 and is subject to requirements under the Groundwater Directive. These encompass many of the requirements now set out in the Council Decision.

4.3 The principal additional requirements introduced by this Council Decision are:

- The definition of procedures to determine acceptability of waste at landfills;
- The setting of strict acceptance criteria for the disposal of wastes to different classes of landfill; and,

Specification of the methods to be used for sampling and testing of waste.

The 2005 Regulations extends these requirements to those wastes for which the Council Decision passes responsibility to Member States to set (in the main, hazardous and stable non-reactive hazardous *monolithic* wastes).

4.4 ‘Business as usual’ implies non-compliance with these additional requirements. It also fails to keep up with changes in European legislation, nor does it enhance the Government and Environment Agency's roles in contributing to sustainable development. Moreover, the ‘Business as usual' increases the risk of infraction for non-compliance. ‘Business as usual’ is therefore not a feasible option but provides a useful baseline for comparison.

[14] Council Directive of 17 December 1979 on the protection of groundwater against pollution caused by certain dangerous substances (80/68/EEC)

ROLE OF THE PRODUCER IN CHARACTERISATION OF WASTE

4.5 Correct characterisation of waste will play an important role in achieving the overall objective of the Landfill Directive. Avoiding acceptance of inappropriate wastes (for engineering or geological reasons) at landfills helps to meet the aim of the Directive to prevent or reduce as far as possible the negative impacts on the environment and any resultant risks to human health of landfilling waste. The Council Decision 2003/33/EC containing the Waste Acceptance Criteria specifies that "the producer of the waste or, in default, the person responsible for its management, is responsible for ensuring that the characterisation information is correct".

Option 1

4.6 One option would be just to amend the Regulations to merely quote the Council Decision requirement. It would be up to the Environment Agency as the regulatory body how they regulate and monitor what waste is going into each landfill site, and whether this waste is what the site is permitted to receive.

Option 2

4.7 The Decision requires the characterisation information to include:

(a) the source and origin of the waste;

(b) the process producing the waste (including a description of the process, its SIC Code and the characteristics of its raw materials and products);

(c) the waste treatment applied in compliance with regulation 10, or a statement of reasons why such treatment is not considered necessary;

(d) the composition of the waste, including where relevant, an assessment of it against the relevant limit values in Part 3 of Schedule 1 of the 2004 Regulations and, where necessary and available, its other characteristic properties;

(e) the appearance of the waste (including its smell, colour, consistency and physical form);

(f) the Code applicable to the waste under the European Waste Catalogue;

(g) in the case of hazardous waste, the relevant properties which render it hazardous according to Annex III of the Hazardous Waste Directive;

(h) evidence demonstrating that the waste is not prohibited under regulation 9 of the 2002 Regulations;

(i) the landfill class at which the waste may be accepted;

(j) the likely behaviour (including, where relevant, leaching behaviour) of the waste in a landfill and any additional precautions that need to be taken at the landfill as a consequence; and

(k) whether the waste can be recycled or recovered.

Option 3

4.8 This option is not to make any change to existing provision in the 2002 Regulations and rely these where a waste is received at a landfill that is unable to meet WAC limit values that can be shown this was through an act or omission of the producer.

4.9 To meet the requirements above, all waste should be accompanied by a written description of the waste containing at least the following information:

the source and origin of the waste;

the process producing the waste (including a description of the process, its SIC Code and the characteristics of its raw materials and products);

the appearance of the waste (including its smell, colour, consistency and physical form);

the Code applicable under the European Waste Catalogue;

in the case of hazardous waste, the relevant properties which render it hazardous according to Annex III of the Hazardous Waste Directive;

evidence demonstrating that the waste is not prohibited under regulation 9 of the 2002 Regulations; and

whether the waste can be recycled or recovered.

4.10 There are already various documents which are required to accompany waste and there is no wish to duplicate the requirement to provide information. An option, therefore is that the provisions in paragraph 3.5 may be met by including the relevant information on any written description of waste which is already required to accompany the waste, for example:

(a) a transfer note required by regulation 2 of the Environmental Duty of Care Regulations 1991

(b) a consignment note required to accompany a consignment of hazardous waste pursuant to article 5(3) of Council Directive 91/689/EC[15]; or

(c) any document required pursuant to Articles 7(1) and (2) of Regulation (EC) No 1774/2002[16].

4.11 The complete "characterisation information" as set out in paragraph 4.7, showing that the waste can be safely disposed of in a landfill, must accompany the waste to a landfill site in order to allow the operator to assess whether the waste can be accepted into that landfill.

([15]) the Hazardous Waste Directive
([16]) Animal By-products Regulation

4.12 This option is not to make any change to existing provision in the 2002 Regulations and rely these where a waste is received at a landfill that is unable to meet WAC limit values that can be shown this was through an act or omission of the producer.

LIMIT VALUES FOR MONOLITHIC WASTES

4.13 The Council Decision requires member states to set criteria for monolithic waste to provide the same level of environmental protection given by the limit values for granular wastes in the Decision.

Option 1

4.14 The limit values and testing proposed in the Consultation are set out below. The proposed limit values are set out in Table 1; the values are for both stable non-reactive hazardous wastes in separate cells in non-hazardous landfills, and hazardous waste in hazardous landfills. Table 2 sets out the proposed values for loss on Ignition and Total Organic Carbon at hazardous waste sites have been retained and apply to the waste entering the monolithic treatment plant.

Table 1: Proposed leaching limit values for Monolithic Wastes

Parameter	Stable non-reactive Haz Waste in Non-Haz Waste Landfills	Hazardous Waste in Haz Waste Landfills
Limit Values[5] (mg m^{-2}) for characterisation using 64 d tank test (NEN 7345)		
As (arsenic)	1.3	20
Ba (barium)	45	150
Cd (cadmium)	0.2 (0.03)	1.0 (0.04)
Cr (chromium total)	5	25
Cu (copper)	45	60
Hg (mercury)	0.1 (0.01)	0.4 (0.01)
Mo (molybdenum)	7	20
Ni (nickel)	6	15
Pb (lead)	6	20
Sb (antimony)	0.3	2.5
Se (selenium)	0.4	5
Zn (zinc)	30	100
Cl^- (chloride)	10,000	20,000
F^- (fluoride)	60	200
SO_4^{2-} (sulphate)	10,000	20,000
DOC (Dissolved Organic Carbon)	must be determined	must be determined
PH	must be determined	must be determined
Electrical Conductivity ($\mu S.cm^{-1}.m^{-2}$)	must be determined	must be determined

[5] These units do not apply to pH values or to Electrical Conductivity

Table 2: Other Proposed Parameters for Wastes Entering the Monolithic Treatment Plant

Parameter	Stable non-reactive Hazardous Waste in Non-Hazardous Landfills	Hazardous Waste in Hazardous Landfills
LOI [7](Loss on Ignition)	10%	10%
TOC (Total Organic Carbon)	6%	6%

Proposed Testing Procedures

Characterisation of Wastes Entering the Monolithic Treatment Plant

4.15 If they are to carry out their legal obligations, treatment plant operators should obtain sufficient characterisation data (preferably from the waste producer) for each of the wastes entering his plant, particularly with respect to variability in composition and leachability. He/she should aim to obtain characterisation data for waste streams produced under normal and worst-case operational conditions in order to ensure that his product recipe is robust enough to generate a monolithic waste that is a consistent WAC-compliant product for landfilling. The wastes entering his plant must comply with the TOC/LOI values given in Table 2 above.

Characterisation of the Products of the Monolithic Treatment Plant

4.16 Characterisation for a site risk assessment for the receiving landfill and for preparing the product recipe should comprise the following tests:

- **64-day NEN 7375 tank test for monolithic waste.** The 64-day tank test quantifies long term diffusive leaching from the stabilised waste product. Cumulative data from the full test should meet full 64 day leaching limit values for monolithic wastes given in Table 1 above. If a cementaceous binder is used the test should be conducted on waste forms that have cured for 28 days, as this test also serves to indicate the longevity of the waste form. The full 8 stage 64-day test enables the demonstration that the emission follows a solely diffusive form and not an advective/fully solubility controlled form similar to granular wastes.
- **Maximum availability for leaching (NEN 7371)[8] on the ground monolith, pH dependent leaching (prEN 14429)[9] and calculation of ANC/BNC, both on the ground monolith.** The tests on the ground monolith can be used for landfill site risk assessments to quantify the source term and to predict changes in leachability should the monolith be overlain by waste of different pH and buffering capacity.

[7] Either Loss on Ignition or Total Organic Carbon

[8] NEN 7371 (1995) Leaching characteristics of solid (earth and stony) building and waste material. Leaching tests. Determination of the availability of inorganic components for leaching. ICS 13.030-70, 91.00 Netherlands Normalisation Institute (NEN).

[9] CEN (2002c) prEN 14429. Characterisation of waste – leaching behaviour tests – influence of pH on leaching with initial acid/base addition. Comité Europeén de Normalisation CEN TC292/WG6, Brussels.

Compliance testing of the Monolithic Waste at the Landfill

4.17 Until a standard short compliance leaching test is provided by CEN, it is proposed that the compliance test for monolithic waste entering a landfill will be a shortened version of the standard 64 day tank test (NEN 7375). Cumulative leaching from the first four steps of the test will be the level 1 characterisation benchmark against which periodic compliance testing will be checked. The sample used for compliance testing prior to acceptance at the landfill must be at least 40mm in any direction. There will be no requirement to cure the sample before compliance testing. Fortunately the mathematics of the system are simple and therefore the waste acceptance criteria for monolithic wastes to be accepted at landfills will be ¼ of the values given in Table 1, provided the monolith is formed from waste that contained no more than 6% Total Organic Carbon or 10% Loss on Ignition. Electrical conductivity does not have to be determined for compliance.

Table 3 Proposed tests for characterisation and compliance testing

Test method	**Purpose**
1. Characterisation of wastes entering the Monolithic Treatment Plant	
Schedule 1 para 5(1) of LF Amendment Regs 04	*Those elements of this schedule that will assist in ensuring that the output of the plant is consistent and compliant with the monolithic WAC values*
Determination of TOC in waste, sludge & sediments (EN 13137, 2001)	Total Organic Carbon or Loss on Ignition
2. Characterisation of the Products of the Monolithic Treatment Plant	
Block size	The waste form to be landfilled must be greater than 40cm along each side. (The sample tested should be greater than 40mm in any direction).
Schedule 1 para 5(1)of LF Amendment Regs 04	All relevant items

Test method	Purpose
Diffusion test (tank test for monolithic wastes) (NEN 7375, 1995)	**Characterisation leaching test on monolithic wastes** To assess the leachability of wastes which have been solidified for reuse or disposal. The test is conducted on samples > 40mm in any direction using a volume of leachant approx 5 times greater than that of the solid. 8 leaching steps are carried out over 64 days. The test is static (no agitation) and can be conducted at natural pH (unbuffered deionised water), or pH 7-8 (CO_2 sparging), or at pH 12.5 (NaOH). Results are generally interpreted on a surface area basis (mg/m^2) rather than a liquid to solid ratio basis (mg/kg). Eluate concentrations for the following parameters should be determined: pH, EC, As, Ba, Cd, Cr (total), Cu, Hg, Mo, Ni, Pb, Sb, Se, Zn, Cl, F, SO_4. Concentrations of the parameters in Table 1 plus DOC should be reported as cumulative 64-day release expressed as mg/m^2.
Maximum availability leaching test (NEN 7371, 1995)	**Characterisation leaching test on ground monolith** To determine the potential (maximum) availability of contaminants for leaching under worst-case environmental conditions. Samples are finely ground, tested at high L/S ratios and with pH control. The cumulative results in mg/kg represents the contaminant source-term for risk assessments based on leaching to the aqueous environment. The test also provides acid/base neutralisation capacity (ANC/BNC) data at the two pH values used in the test (e.g. pH7 and pH4).

Test method	Purpose
pH dependence tests (prEN 14429 or draft WI292033 2002)	**Characterisation test on ground monolith** To determine the effect of falling or increasing pH conditions on the leachability of ground monolithic or granular wastes. Separate sub-samples of the prepared waste are leached at L/S10 for 48 hours while eluate pH is maintained at 8 values between pH 4-14. The pH values should be equally spaced and include testing at natural pH (no pH control) There are two test methods either with continuous pH control or in batch mode. The main test applications are to enable leachability predictions for waste: • after chemical treatment (e.g. admixing with acid or alkaline wastes) prior to landfilling; • after landfilling, should local porewater/leachate pH conditions change. A full range of acid/base neutralisation capacity (ANC/BNC) values can be determined from both test methods.
3. Compliance testing of the Monolithic Waste at the Landfill	
Part of Diffusion test (tank test for monolithic wastes) (NEN 7345, 1995)	**Compliance leaching test on Monolithic Waste** The first four steps of the NEN 7375 diffusion test (see above) will be used as the compliance test on samples (greater than 40mm in any direction) of uncured monolithic wastes. Cumulative release over the first four steps will be compared with the limit values presented in Table 1. The compliance limits are ¼ of the full 64 day test limit values. Concentrations of the monolithic leaching limit parameters plus DOC should be reported as cumulative mg/m^2 4-day release together with pH values.
Draft WI 292010 (Compliance test for leaching of monolithic waste, 2002)	*A draft CEN/TC2 compliance test has been prepared based on 3 leaching steps conducted within a 48 hour period, however the draft text is still fluid and not yet appropriate for the development of compliance limit values.*

Option 2

4.18 Another option would be to specify that monolithic waste be crushed to make it granular so that it can be tested as granular (using BS EN 12457), thereby avoiding the need for the 64-day tank test. Some other Member States are adopting this approach. However, monolithic wastes cannot be tested in this way unless they also

are ground to a particle size of less than 4mm. The results of doing so are unpredictable. There is, for example, a substantial possibility that such wastes would fail to meet the leaching limit values for stable, non-reactive wastes. This is because leaching is determined by the surface area accessible to the liquid the sample is immersed in. The smaller the particle size the larger the ratio of surface area/volume. A monolith has a very low ratio of surface area/volume and it is this low value which makes the waste low leaching. When ground, leaching will be significantly increased.

4.19 Given this unpredictability, the risk that the test results would show an adverse result that may or may not be accurate and that there are no cost/benefit implications, we do not feel that this option should be explored further.

CRITERIA TO ENSURE SUFFICIENT PHYSICAL STABILITY AND BEARING CAPACITY OF GRANULAR AND MONOLITHIC WASTE

Option 1

4. 20 Section 2.3.2 of the Council Decision requires Member States to set criteria to ensure that granular stable non- reactive hazardous waste deposited in cells in non-hazardous sites will have sufficient physical stability and bearing capacity.

4.21 In addition Member States are to set criteria to ensure that hazardous monolithic wastes are stable and non-reactive before acceptance in landfills for non-hazardous waste. We propose cohesive materials should have a bearing capacity not less than 50 kPa. The minimum shear strength of clays used as liner materials is of the order of 30 kPa. It is difficult for vehicles to move around if values are any lower than this. A shear strength of 50 kPa provides a material that is suitable for heavy goods vehicle traffic at slow speed on a temporary basis.

4.22 For cohesive materials the undrained shear strength should, we suggest be measured by using a hand shear vane according to BS 1377-9:1999, methods of test for soils for civil engineering purposes - part 9: insitu tests, test 4.4. This is a relatively simple test that can be conducted using the same method for both characterisation and compliance testing.

4.23 We propose that Monolithic wastes should have an unconfined compressive strength not less than 1.5 MPa. There is a need to ensure that the strength of the material is sufficient to ensure that it does not fracture under its own weight or under the loading placed above it within a landfill, as this could lead to an increased fracture density and subsequent increased leaching.

4.24 The value above is arrived at by assuming that the internal gradients of a monolithic waste cell are no different from those on a conventional landfill and that the density of the monolithic waste is of the order of 2.2 t m^{-3}. The moisture content of the waste is taken to be 15% and the average height/depth of the fill 40 m. The actual compressive strength should be based on a site specific assessment that will be particularly important where the geometry of the site might lead to additional

loading or tensile strengths (e.g. for a steep land raise or steep internal, unsupported, slopes).

4.25 The strength properties of monolithic waste are a function of time and possibly ambient temperature and humidity. Therefore it seems sensible that unconfined compression tests should be performed under known conditions using the method given in BS EN 12390-3:2002, testing hardened concrete - part 3: compressive strength of test specimens.

Option 2

4.26 It would be possible to set different criteria that may ensure that granular stable non- reactive hazardous waste deposited in cells in non-hazardous sites will have sufficient physical stability and bearing capacity and that hazardous monolithic wastes are stable and non-reactive before acceptance in landfills for non-hazardous waste. However, the levels suggested would appear to be appropriate and there are no cost/benefit implications from suggesting something different. Since the consultation it has been identified that there are other well established civil engineering tests that may be more appropriate.

ACCEPTANCE LIMIT VALUES FOR POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) AT INERT LANDFILLS

4.27 The Council Decision requires member states to set a limit for the polycyclic aromatic hydrocarbon (PAH) content of wastes accepted for disposal at inert waste sites. Materials that may be disposed of at inert landfills containing PAHs include soils (including naturally occurring sands and clays) and stones, concrete, bricks and tiles. Of these, soils are the most likely source of PAHs.

4.28 In terms of human health receptors within the UK, the contaminated land exposure assessment (CLEA) programme considers 17 PAHs for which national authoritative health criteria values (HCVs) and soil guideline values (SGVs) are being derived.

4.29 However the CLEA methodology is not considered entirely appropriate for landfills as it relates only to one of the pathways to the environment from landfill – i.e. through the soil. Also, we would like to avoid banning from landfill soils that are allowed in the gardens of residential properties.

4.30 Some field data from recent soil analyses and outlining the Serious Risk Concentration (SRC_{human}Soil) values for 16 PAHs have been derived by the Dutch[11] can provide alternative method to measure health risk. These fall into 5 bands that might form the mechanism to establish WAC values for the commonly measured PAHs. Such an approach might provide greater flexibility to landfill operators while maximising environmental protection.

4.31 However the disadvantages of both theses approaches is that neither address

[11] Lijzen, J.P.A. et al. (2001) Technical evaluation of the intervention values for soil/sediment and groundwater. RIVM report no 711701.

the fate and transport of the compounds under consideration. Therefore modelling work was undertaken for the 17 individual compounds using scenarios used for the determination of waste acceptance criteria (WACs) for inert waste sites.

Therefore Table 4 below gives WAC values derived by a process similar to that conducted for the inorganic WACs at inert waste sites[12]. The compounds were considered to be List I substances and therefore the compliance point was taken to be the base of the unsaturated zone. It also gives a comparison between the WAC values (environment effects measure) and SRC_{human}Soil (health effects measure).

Table 4

WAC	**PAH Compound**	**SRC_{human}Soil**
mg/kg		**mg/kg**
920,000	Naphthalene	870
1.6	Acenaphthylene	26000
900	Acenaphthene	>100000
>1*e[30]	Fluorene (9H-Fluorene)	23000
0.08	Phenanthrene	23000
1.0	Anthracene	25500
0.21	Fluoranthene	30300
0.5	Pyrene	>100000
4.5	Chrysene	32000
11.0	Benzo (a) anthracene	3000
13.0	Benzo (b) fluoranthene	2800
12.0	Benzo (k) fluoranthene	3200
0.5	Benzo (a) pyrene	280
8.5	Dibenzo (a,h) anthracene	70
167.0	Indeno (1,2,3-c,d) pyrene	3200
8.3	Benzo (g,h,i) perylene	19200
1.4	Coronene	-

4.32 For the purposes of simplicity, bearing in mind that this approach achieves the right environmental outcome, just one limit value is proposed for the total of 17 PAHs rather than individual limit values for the various components that make up the total and that this should lie between 100 - 150 mg/kg $^{-1}$. The value preferred is 100 mg/kg $^{-1}$.

4.33 There are other options; e.g. choosing a different single figure in the range 100 - 150 mg/kg $^{-1}$ or use individual values for individual compounds. However, on the former, no evidence points to any particular alternative figure and the latter would require the analysis of 17 compounds in inert waste, an effort which would be difficult

[12] Hjelmar, O. et al. (2002) Development of Acceptance Criteria for Landfilling of Waste: An Approach Based on Impact Modelling and Scenario Calculations. Proc 7th International Landfill Symposium, Sardinia, CISA, Cagliari.

to justify on costs grounds (the cost of the analyses would be the major cost in waste acceptance at inert landfills).

DRAFTING AND CLARIFICATION CHANGES TO THE LANDFILL (ENGLAND AND WALES) REGULATIONS 2002 AND THE LANDFILL (ENGLAND AND WALES)(AMENDMENT) REGULATIONS 2004.

4.34 Some organisations responsible for the management of waterways in England use dedicated disposal lagoons situated at intervals near or alongside waterways to dispose non-hazardous wet dredgings removed from waterways in the process of waterways management. The Government recognised that there were questions of how the **exclusions from the scope of the Directive in Article 3.2** should be applied to this activity. This would be particularly relevant when the Landfill Directive's ban on landfilling of liquid wastes comes fully into force (unlikely to be before 2007 – see paragraphs 4.35 - 4.36 below).

4.35 To remove any uncertainty that these activities can take place under the Directive, the 2005 Regulations amends Regulation 4(c) of the 2002 Regulations by substituting a copy out of the Directive wording for the wording currently in the 2002 Regulations.

4.36 Also, the Government has yet to decide on the **implementation date** for the main remaining non-date specific requirements of the Landfill Directive at existing landfills which include:

a. treatment of non-hazardous waste prior to landfilling;

b. ban on liquid wastes at non-hazardous sites;

c. ban on other wastes at non-hazardous sites e.g. tyres.

All the provisions of the Landfill Directive must be in force by 2009, but as all landfills are to be regulated under Pollution Prevention and Control regime, the provisions must be in force by 30 October 2007.

4.37 A common single date of 30 October 2007 was proposed as the implementation date for these requirements. The alternative of applying the bans on a site by site as they are permitted could lead to waste being transported to sites which have not yet been permitted rather than being disposed of locally. Operators would also have an incentive to attempt to delay the permitting process which may mean other environmental benefits of the Directive are postponed. We also believe it is fairer on all existing operators to apply the bans at the same time.

4.38 A risk assessment option in the Council Decision on criteria and procedures for accepting waste at landfills allows the limit values for some parameters to be up to 3 times higher than the WAC limit value at individual sites, provided that waste producers or landfill operators demonstrate through risk assessment that there would be no additional risk to the environment.

4.39 Given the significant resource implications for the Environment Agency in adopting the risk assessment option without any restriction and the need to reconcile the opposing views of waste producers on the one hand and waste management companies on the other, it was decided to limit the option to individual wastes types (i.e. EWC code) destined for specific hazardous mono-fill sites. Since that decision was taken, concern has been expressed that it is too restrictive. As a result, the Government is considering amending the 2004 Regulations to extend the option to cover individual waste types destined for mono-fill separate cells in hazardous waste landfill sites .

4.40 There were no direct cost implications attached to any of these changes.

5. BENEFITS

ROLE OF THE PRODUCER IN CHARACTERISATION OF WASTE

Option 1

5.1 To only quote the Council Decision requirement in the Regulations is unlikely to lead to significant reductions, if any, in regulatory costs for the Environment Agency. However, the waste industry and waste producers could claim such a minimalist approach in the regulations would create uncertainty, at least for a while pending the Agency making it known how it intends to regulate.

5.2 We did not see any environmental advantages with this option.

Option 2

5.3 Use the Duty of Care or, for hazardous waste, consignment note, system to convey the correct characterisation information would perhaps be the most cost-effective way of enforcement. To specify in the Regulations the information that is needed to be entered on Duty of Care forms/consignment notes would bring certainty as to how the requirements will be enforced. Any cost increase is likely to be negligible or at the most minimal, as much of the information needed for characterisation should already be provided on the Duty of Care/Consignment note, and the only new information required would be on testing. Moreover, those additional testing costs are included in the final Regulatory Impact Assessment that accompanied the Consultation Outcome for the 2004 Regulations.

Option 3

5.4 It is open to waste producers to complete a separate note to meet the requirements of the 2005 Regulations. This is for them to decide, taking into account convenience, costs and hopefully environmental benefit (the need to fill a separate and more detailed form may focus producers or waste managers on the need for correct characterisation). Also, a separate note may enable landfill operators to be more confident in the loads they accept for disposal, thereby furthering the aims of the Landfill Directive of preventing or reducing the environmental risks of landfilling.

5.5 We did not see that this option would bring any financial advantages.

LIMIT VALUES FOR MONOLITHIC WASTES

5.6 Meeting the terms of the Decision by developing specific criteria and testing methods for monolithic wastes appears to be the best approach (paragraphs 4.12 – 4.15).

CRITERIA TO ENSURE SUFFICIENT PHYSICAL STABILITY AND BEARING CAPACITY OF GRANULAR AND MONOLITHIC WASTE

5.7 The option outlined in paragraphs 4.19 – 4.24 was based on scientific investigation and tests but has proved unpopular with consultees. As a result, it has been proposed to use a unrefined compressive strength test and lower the strength value to be achieved.

ACCEPTANCE LIMIT VALUES FOR POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) AT INERT LANDFILLS

5.8 The option outlined in paragraphs 4.26 – 4.31 to use just one WAC value of 100mg/kg would bring greater environmental protection, providing the least risk to groundwater. Setting a higher limit value could conceivably bring a reduced cost burden for landfill operators and waste producers due to the need to treat the waste to a less stringent standard. However, any advantage was likely to be marginal. Setting individual values for individual compounds, could possibly bring environmental benefits (by reducing the incentive to landfill) and allow the more harmful ones to be targeted, but there would be cost disadvantages, as testing would become the most expensive part of sending waste to landfill.

DRAFTING AND CLARIFICATION CHANGES TO THE LANDFILL (ENGLAND AND WALES) REGULATIONS 2002 AND THE LANDFILL (ENGLAND AND WALES)(AMENDMENT) REGULATIONS) 2004.

5.9 Potentially, removing any uncertainty that the activities of dredging and of non-hazardous wet dredgings disposal are excluded from control by the 2002 Regulations could create environmental disadvantages. However, it is generally accepted that this is a low risk activity that will still be controlled by waste management licensing and the Environment Agency are confident that this activity does not present an environmental risk. Moreover, allowing the waterways industry to continue much as now in the way it handles non-hazardous wet dredgings will not lead to the increased costs of waste disposal that could arise if the terms of the Landfill Regulations were deemed to apply.

5.10 Applying a common single implementation date of 30 October 2007 would help avoid the waste being transported to sites which have not yet been permitted rather than being disposed of locally. Operators would also not have an incentive to delay the permitting process which may have meant that other environmental benefits of the Directive would have been postponed. Nor would there be the

competition difficulties that could arise if those operators who were permitted have to apply the rules, but those who had yet to complete the permitting exercise would not.

5.11 Extending the risk assessment option in the Council Decision to cover individual waste types destined for mono-fill separate cells in hazardous waste landfill should be environmentally neutral as waste producers or landfill operators must demonstrate through risk assessment that there would be no additional risk to the environment. There could be cost benefits to some waste producers as it provides an additional waste disposal option that could reduce treatment costs.

6. BUSINESS SECTORS AFFECTED

6.1 All sectors of UK industry that send hazardous waste to landfills in England and Wales will be effected by the 2005 Regulations. Waste producers who wish to send their waste to landfill have to ensure characterisation of their waste is correct. Even if by default this falls on another party who is responsible for the management of the waste, they would still need to ensure that information about the waste provided to the waste manager is sufficient to enable them to carry out their obligations.

6.2 Many sectors sending non-hazardous waste to landfill in England and Wales will be affected by the ban on landfilling liquid wastes and other wastes, and the requirement to treat non-hazardous waste, although not until October 2007, the less the likely impact on costs and disruptions.

6.3 The limit values for polycyclic aromatic hydrocarbons (PAHs) at inert landfills are likely to affect demolition and construction industries. Of the materials from these sectors, soils are most likely to contain PAHs.

6.4 Organisations that have responsibility for management of waterways would be affected by a decision to change the wording of Regulation 4(c), as this would mean that dedicated disposal lagoons where non-hazardous dredgings are deposited would not be regulated as landfills. Also, the ban on landfilling liquid wastes would have no effect as non-hazardous wet dredgings could continue to be disposed of in dredging lagoons.

7. COSTS

7.1 Although not explicit, the system in place already meets the Directive (i.e. we already require all waste landfilled to be characterised so this information must be provided). If information is not correct, there will be a duty of care offence. As a result, the cost figures in earlier RIAs, attached to Waste Strategy 2000 and to consultations on implementing other aspects of the Landfill Directive, include the costs of the provisions in this consultation. Some of the tables on costs that were included in earlier RIAs are therefore reproduced here (see Annex A and B).

7.2 As the costs have already been accounted for, it is possible that some of these provisions will actually reduce expected increases. For example, for PAHs,

using just one limit value is for the total of 17 PAHs rather than individual limit values for the various components that make up the total will reduce costs. Also, testing costs for monolithic wastes may be less than having to use inappropriate procedures designed to test granular wastes.

7.3 There are no additional costs in respect of the other proposals; indeed clarifications may actually reduce costs marginally.

8. CONSULTATION WITH SMALL BUSINESS

8.1 We brought small businesses into the consultation process through the Federation of Small Businesses, Forum of Private Businesses, and the Small Business Services, as well as through trade organisations.

8.2 We have taken steps to raise awareness amongst producers of hazardous waste of the hazardous waste acceptance criteria that will be in force from 16th July 2005. Examples that aimed specifically at SMEs have included:

- set up of a specialist website (www.hazardouswaste.org.uk) to provide information about landfill and hazardous waste changes;
- produced leaflets reports for distribution to waste producers to ensure they are aware of the changes;
- Ministers, Government and Environment Agency officials have also spoken at many landfill and hazardous waste related events, some of which were organised by industry groups, such as ESA;
- organised a series of hazardous waste road shows which took place in Manchester, Bristol, Birmingham and London during April and May 2005.

8.3 In withdrawing the waste characterisation proposal; there will be little or no impact on SMEs.

9. COMPETITION ASSESSMENT

9.1 Competition is an essential part of a healthy economy, providing low prices, innovation, choice and efficiency. Some regulations can effect one or more of these types of benefits of competition. These effects may occur in markets directly affected by the regulation or in markets facing 'knock-on' effects from those markets originally affected.

9.2 The markets that will be affected are for the services supplied by waste management companies for:
a. Landfill;
b. Incineration;
c. Waste treatment.

9.3 Market structure and concentration varies between these markets. There are only 16 (energy from waste) incineration plants that deal with waste but the largest are run by only a few operators. In terms of tonnage dealt with, one company

disposes of 30% of the waste with 3 plants. Three other companies dispose of between 10-20% each. This might appear to be a highly concentrated market but once capacity is reached it is unlikely new plant can be built on a short time-scale. It is also not a unique market as there can be substitution because there are alternatives; recycling plants are more costly but can be brought on-stream relatively quickly.

9.4 The vast majority of landfills are operated by small companies that run fewer than five sites. There are however bigger players in the market with 27 companies operating 10 or more sites and 4 large companies operating 30 or more sites. These medium and large companies would offer a full waste management service, providing access to treatment, recycling and composting facilities as well as disposal.

9.5 While the 2005 Regulations are likely to have little direct impact on the structure of these markets, landfill legislation in its entirety will as at the national level there will continue to be pressure to favour the lowest cost waste management companies to treat and dispose of waste.

9.6 If these increased costs encourage a reduction in waste production and diversion from landfill of the waste that is produced, then companies taking such steps could potentially gain competitive advantage over companies in the same field of production that do not take such steps. Of course any such competitive pressure that would encourage more sustainable waste management is to be welcomed as furthering the objectives of the Landfill Directive to reduce the environmental impact of landfilling, as well as any resulting risk to human health.

10. ENFORCEMENT AND SANCTIONS

10.1 Enforcement of the waste acceptance criteria will be carried out by the powers given to the Secretary of State in England and Wales under the Landfill (England and Wales) Regulations 2002 (as amended). The Environment Agency is the regulatory authority in England and Wales.

10.2 Sanctions for breaches of the Council Decision on waste acceptance criteria will be fines levied by the European Court of Justice on the UK.

11. MONITORING AND REVIEW

11.1 Monitoring will be carried out in England and Wales by the Environment Agency.

11.2 Defra is committed to carry out reviews of the legislation if it becomes apparent that such a review is necessary. Similarly, Defra will respond appropriately to any communication or proposal by the European Commission that means a review of legislation is necessary. The Landfill Directive includes a provision for regular reports to the European Commission by member states on its implementation. Some aspects of the Directive will be the subject of a formal review in 2014.

12. CONSULTATION

12.1 This final regulatory impact assessment supplements and extends previous regulatory impact assessments presented in the consultation paper *Limiting Landfill*[17], in the second consultation paper on implementing the Landfill Directive[18] and with the consultation paper on the Landfill (England and Wales)(Amendment) Regulations 2004 to include the Waste Acceptance Criteria contained in Council Decision2003/33/EC.

12.2 The RIA formed part of the consultation package of material sent out to known interested parties, placed on the Defra website and was subject to discussion in stakeholders groups[20]. The RIA invited consultees to comment on the implications and costs associated with the changes to the legislation. Out of the 46 responses to the consultation paper, the RIA drew only 7 responses. The measures proposed in the consultation directly affect operators of landfill sites and indirectly affect others in the waste management industry and waste producers. The major policy resulting from the consultation are discussed in the submission to Ministers and in the full Government response to the consultation. This is detailed further under recommendations.

12.3 It is important to point out that for several years, representatives of waste producers, waste management industry, Environment Agency and the Government have met as the Landfill Directive Implementation Group and its predecessors to help develop the waste acceptance criteria and other aspects of the Directive and subsequently to advise on implementation issues. For example, industry has made input on matters such as the criteria for monolithic wastes and limit values for polycyclic aromatic hydrocarbons in inert waste in the 2005 Regulations consultation. We have ensured that industry has been kept abreast of the changes and undertook a number of activities/events to raise awareness and help to pave the transition as smoothly as possible. Details of these are detailed in Annex C.

12.4 The consultation outcome will be published on the Defra website ensuring that the Government's response is publicly available. Copies of all responses will be available at the Defra Information Resource Centre.

13. SUMMARY AND RECOMMENDATIONS

[17] Limiting Landfill, DETR 1999

[18] The Implementation of Council Directive 1999/31/EC on the Landfill of Waste, Second Consultation Paper, DETR 1999

[20] The Landfill (England and Wales) Regulations 2002. Proposed Amendments to include the Waste Acceptance Criteria (WAC). A consultation paper 2003. The Partial RIA can be found on the Defra website at http://www.defra.gov.uk/corporate/consult/landfill-regs/ria.pdf, and the full RIA following consultation at http://www.defra.gov.uk/corporate/ria/2004/landfill.pdf

Summary 13.1 Landfills have the potential for a range of negative impacts on the environment and human health. The Landfill Directive brought forward progressive restrictions to prevent or reduce these impacts as far as possible, including bans on the landfill of liquids and certain solid wastes, together with requirements for treatment of wastes prior to disposal. For the purposes of this regulatory impact assessment, meeting the Landfill Directive requirements represents 'business as usual'. This will require sustained capital investment over the coming decade and result in increased costs for the disposal of waste. These increased costs will largely fall on the waste producer through various fees and charges, which is consistent with the Polluter Pays Principle.

13.2 Council Decision 2003/33/EC set out specific criteria and procedures for waste acceptance at the different classes of landfill. These are principally aimed at controlling the inputs to landfill such that any leachate produced does not pose an additional risk to groundwater and surface water. The Council Decision gave Member States the responsibility to set their own criteria for monolithic waste in landfills to provide the same level of environmental protection given by the limit values for granular wastes in the Decision, and to set a limit for Polycyclic Aromatic Hydrocarbons (PAHs) content in waste accepted at inert landfill sites.

13.3 As the Council Decision is required to be implemented by 16 July 2005, the provisions on monolithic waste acceptance criteria, and limit values for PAHs in inert landfills must be implemented by that date. Failure to implement raises the risk of fines by the European Commission, which run at about £65k per day (£23.7m per year).

13.4 The Government's proposals were set out in the consultation paper, issued on 15 December 2004.

Recommendations

In view of the benefits and costs assessed for each proposal and the risks associated it is recommended that the following proposals to be adopted. They will have the following effects:

Specifying the role of the producer in waste characterisation

In response to the concerns expressed by many (particularly on behalf of SMEs) we recommend relying upon the existing provisions of the Landfill Regulations 2002 (as amended) to require the characterisation of waste as opposed to creating a new offence. The existing provisions will be supplemented by strengthening of the waste description requirements of the Duty of Care. This will also enable proposals for waste description requirements emanating from other European Directives such as ELV and WEEE Directives to be included. A consultation on these and other changes to the Duty of care is planned for later in 2005. Whilst it is important that those people whose waste is taken to landfill provide the appropriate characterisation of their waste, the application of the responsibility for full characterisation on all producers of waste (whether or not it is going to landfill) would be disproportionate and over implement the requirements of the Council Decision. In withdrawing the

proposed amendment outlined in the consultation, we need to take care that this change is not interpreted as passing the onus for characterisation onto the landfill operators. On the contrary, the responsibility for characterising waste and fulfilling the waste acceptance criteria will continue to fall generally on the producer or the person making the decision to consign the waste to landfill. This change should be presented as the Government wanting to apply characterisation appropriately and proportionately, in accordance with Better Regulation. Additional benefits of this approach are no further financial or administrative burden on industry. As a result of not creating a new offence to the proposed 2005 Regulations, the Regulations will now be amendment Regulations rather than stand-alone Regulations. Producer of waste not for landfill will not be subject to the Regulations.

Limit values and testing methods for hazardous monolithic wastes for disposal in landfills for hazardous waste and for stable and non-reactive hazardous monolithic wastes for disposal in separate cells at landfills for non-hazardous wastes

The UK is required to set criteria to meet the terms of the Council Decision by developing specific criteria and testing methods for monolithic wastes. There was some criticisms in the consultation proposals as being too restrictive. In response, the Government will provide a choice to operators producing monolithic waste of meeting WAC limit values for granular waste. The criteria to be met are detailed in the 2005 Regulations to provide clarity and certainty to industry. In addition, Defra will support the Environment's Agency Landfill Regulation Group on development of standard for monolithic waste and commit to a review of the criteria and testing methods in light of experience here and in Europe. At present, monolithic waste is not being landfilled in the UK and therefore there are currently no additional costs being incurred by industry.

Criteria for stable non-reactive granular wastes in separate cells at landfills for non-hazardous waste to ensure it will have sufficient physical stability and bearing capacity

The consultation outlined the criteria to ensure sufficient physical stability and bearing capacity of granular and monolithic waste is based on scientific investigation and test undertaken by the Environment Agency. In light of the comments received and further discussions with the Agency, it is proposed that the bearing capacity to be replaced by unconfined compressive strength. We will adopt testing methodologies based on well established civil engineering practice. Furthermore, the 1.5 Mpa was deemed to be too high and that the unconfined compressive strength for monolith waste be lowered to 1 Mpa. This reduction will be easier for landfill operators to achieve but at the same time provide the same environmental protection.

Limit values for Polycyclic Aromatic Hydrocarbons (PAHs) at landfills for inert waste

Despite some criticism concerning both the total PAH limit and the suite of 17 PAHs the limit will be applied to, we recommend to proceeding as outlined in the

consultation and set a total PAH level of 100mg/kg. These proposals will (a) be in line with similar work between Defra and the Environment Agency on soil limit values and (b) provide suitable protection for groundwater. Setting individual values for individual compounds, could possibly bring environmental benefits (by reducing the incentive to landfill) and allow the more harmful ones to be targeted, but there would be cost implications, as testing would become a more expensive part of sending waste to landfill.

Application of Article 3(2) of the Directive exclusions to non-hazardous wet dredgings

We propose that the exclusion from the Landfill Directive in respect of non-hazardous wet dredgings be implemented as set out in the consultation so that it mirrors the Landfill Directive. This will enable the deposit of wet dredgings along the banks of inland waterways to be regulated through the waste management licensing regime. The regulations will be supported by revised interpretative guidance. Continuing to operate under the waste management licensing system in the way it handles non-hazardous wet dredgings result in lower costs of waste regulation. The Environment Agency supports this approach.

Implementation date(s) in relation to "existing" sites for the ban on landfilling certain non-hazardous wastes and the requirements for all non-hazardous waste going to landfill to be pre-treated.

Whilst there was considerable support for a single implementation date, we propose bringing the ban on used whole and shredded tyres forward to 16 July 2006. This date is fully supported by the tyre recovery industry, which says it has sufficient capacity and infrastructure in place to handle the relatively small proportion of used tyres currently being landfilled.

The total ban on the landfilling of liquid and the requirement of all waste will become effective from 30 October 2007. This date meets the Government's promise to give two years notice of the date chosen. This also coincide with the date when all PPC permitted sites must meet the terms of the Landfill Directive and the likely end of the re-permitting programme. Moreover, the Government and the Environment Agency will work together with affected industry sectors on guidance for pre-treatment requirements for non-hazardous waste. The work on this will start very shortly.

Extending the risk assessment option to cover individual waste type destined for mono-fill separate cells in hazardous waste landfill sites

26 respondents were in favour of extending the risk assessment option to include individual waste types destined for mono-fill separate cells in hazardous waste landfills. A number of them would like the risk assessment option be extended to allow more than one waste to be deposited together, provided that it could demonstrate that the wastes were compatible. In response to industry's request but to ensure that the deposit of any wastes in excess of the WAC limit values is both permissible and properly regulated, the Government has decided to extend the risk assessment option to specified waste types each of which will need to be subject to

separate risk assessment. Each risk assessment will be on judged on a case by case basis by the Environment Agency that it is environmentally safe to allow compatible waste to be deposited together. There will be costs associated with the preparation of risk assessment by operators and their evaluation by the Environment Agency. However, landfill operators have welcomed this measure and the proposal to allow such hazardous waste to be deposited together (where compatible) will save on engineering costs compared with the consultation proposal. We also wish to discourage landfilling of hazardous waste that cannot meet the WAC limit values in favour of other recovery or disposal routes.

14. CONCLUSION

Because of the changes we have made to the proposal key considerations in the partial RIA are now redundant. For instance reliance on the existing provisions to characterise waste will maintain the status quo and there are no new measure to be assessed. This approach is welcomed by SMEs and fully endorsed by the Department of Trade and Industry. The fact that monolithic waste is not produced and landfilled in the UK similarly means there are no current cost implications for waste producers or landfill operators. Using one limit value for the total of 17 PAHs rather than individual limit values for the various compounds that make up the total will also reduce costs. Any clarification or removal of requirements from the Landfill Directive will always be well-received by industry. In this instance, the clarification on the non-hazardous wet dredgings means that these activities will not be subject to the requirements of the landfill regulations.

15. DECLARATION

I have read the Regulatory Impact Assessment and I am satisfied that the benefits justify the costs.

Signed: **Ben Bradshaw**
Minister for Local Environmental Quality, Department for Food, Environment and Rural Affairs

Date: **17th June 2005**

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ANNEX A

EXTRACT FROM REGULATORY IMPACT ASSESSMENT ON THE 2004 REGULATIONS:

"ASSESSMENT OF HAZARDOUS SOLID WASTE TREATMENT COSTS

The annual additional disposal costs for hazardous solid wastes resulting from the pre-treatment requirements of the Landfill Directive have been assessed at between £13m and £75m[19]. These costs are detailed in Table A1.

The Council Decision now introduces limits on the total organic carbon content of landfilled inert and hazardous wastes. The impact for inert wastes is that this may require some additional sorting or separation of these wastes at source, with the organic-rich fraction receiving additional treatment. The cost implications are estimated at between £0 and £5 per tonne.

The impact on hazardous solid wastes is that treatment by biological, chemical and physical systems may not be adequate to meet the limits, and that these wastes will therefore need to be directed to thermal systems at significantly increased costs. Table A2 illustrates the extreme case where 100% of affected streams are directed to thermal treatment. Annual treatment costs are seen to roughly double, to between £32 and £126m, and average price of £16 to £63 per tonne disposed."

[19] The Implementation of Council Directive 1999/31/EC on the Landfill of Waste, Second Consultation Paper, DETR 2001.

Table A1: Treatment cost estimate for hazardous solid wastes

Waste Type	Quantity landfilled (1998/99), kt	waste min	in house reuse	merchant recycling	complex phase sep centrif + settle	high cost physical	Wetox/DEM pretreat	anaerobic	biological + pretreat	combustion	other thermal; e.g pyrolysis/gasification plasma/vitrification	solidification	remediation	do nothing	Cost of change (£k/y) low	Cost of change (£k/y) high	Cost (£)/tonne low	Cost (£)/tonne high
Waste resulting from exploration, mining, dressing and further treatment of minerals and quarry	1.8								10%	10%		20%	30%	30%		49	115	26.50	62.50
Waste from agricultural, horticultural, hunting, fishing & aquaculture primary production, food preparation & processing	0.6	10%							26%	29%			35%			15	35	23.50	55.80
Wastes from wood processing and the production of paper, cardboard, pulp, panels & furniture	1.4	5%							8%	29%			56%	2%		49	100	33.70	69.10
Wastes from the leather and textile industries	1.0	5%		13%		2%			2%	27%	13%		38%			35	88	33.60	84.30
Wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal	103.9	5%		11%	15%						37%		10%	23%		1969	7276	18.90	70.00
Wastes from inorganic chemical processes	52.7	5%		8%		8%				2%		10%	55%	10%	3%	1481	3089	28.10	58.60
Wastes from organic chemical processes	42.1	5%		5%			15%	5%	20%	5%	15%		19%	9%	2%	871	2253	20.70	53.50
Wastes from the manufacture, formulation, supply and use (mfsu) of coatings	37.2	12%		19%		8%			29%	10%	3%	3%	16%			501	1809	13.40	48.60
Wastes from the photographic industry	0.2	5%		2%		42%				1%			50%			4	7	21.30	39.60
Inorganic wastes from thermal processes	81.1	5%	25%	5%								20%	45%			2212	5405	27.30	66.70
Inorganic waste with metals from metal treatment and the coating of metals; non-ferrous hydro-metallurgy	10.6	5%	20%										75%			299	581	28.30	55.00
Wastes from shaping and surface treatment of metals and plastics	32.0	8%	10%		15%	5%			12%		20%		15%		15%	373	1289	11.70	40.30
Oil wastes (except edible oils, 050000 and 120000)	72.0				40%				10%		30%			20%		864	3385	12.00	47.00
Wastes from organic substances employed as solvents (except 070000 and 080000)	7.9	5%	10%	40%	20%					5%	20%					130	608	16.50	77.00
Packaging absorbents, wiping cloths, filter materials and protective clothing not otherwise specified	37.5	5%		30%					10%	15%			10%		30%	563	2026	15.00	54.00
Waste not otherwise specified in the catalogue	26.8	17%		6%					21%	21%	2%		32%		1%	488	1421	18.20	52.90
Construction and demolition waste (including road construction)	1,340.6	23%										7%	7%	39%	23%	-1910	35172	-1.40	26.20
Wastes from human or animal health care and/or related research	1.9	0%							25%	25%	17%		33%			58	130	31.10	69.90
Wastes from waste treatment facilities, off-site waste water treatment plants and the water industry	116.4			10%				1%	4%	7%		36%	37%		5%	4419	9427	38.00	81.00
Municipal wastes and similar commercial, industrial and institutional wastes including separately collected fractions	10.5	2%	10%	36%				4%	3%	12%			18%	7%	8%	207	751	19.70	71.40
Unknown	13.1	5%							20%	25%			40%	10%		334	754	25.50	57.50
TOTAL ALL WASTES (kt/y)	**1,992**	**336**	**27**	**60**	**51**	**9**	**6**	**4**	**48**	**33**	**76**	**163**	**265**	**578**	**335**				
COST OF CHANGE																**13010**	**75721**	**6.50**	**38.00**

Table A2: Treatment cost estimate for hazardous solid wastes assuming all wastes previously treated by biological, chemical and physical systems require combustion to meet total organic carbon limits

Waste Type	Quantity landfilled (1998/99), kt	waste min	in house reuse	merchant recycling	complex phase sep centrif + settle	high cost physical	Wetox/DEM pretreat	anaerobic	biological + pretreat	combustion	other thermal; e.g pyrolysis/gasification	plasmavitrification	solidification	remediation	do nothing	Cost of change (£k/y) low	Cost of change (£k/y) high	Cost (£)/tonne low	Cost (£)/tonne high
Waste resulting from exploration, mining, dressing and further treatment of minerals and quarry	1.8									20%		20%	30%	30%		57	137	31.00	74.50
Waste from agricultural, horticultural, hunting, fishing & aquaculture primary production, food preparation & processing	0.6	10%								55%			35%			22	55	35.30	87.20
Wastes from wood processing and the production of paper, cardboard, pulp, panels & furniture	1.4	5%								37%			56%	2%		54	114	37.30	78.70
Wastes from the leather and textile industries	1.0	5%		13%		2%				29%	13%		38%			36	90	34.50	86.60
Wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal	103.9	5%		11%						15%	37%		10%	23%		2666	8979	25.60	86.40
Wastes from inorganic chemical processes	52.7	5%		8%		8%				5%		10%	55%	10%		1552	3278	29.50	62.20
Wastes from organic chemical processes	42.1	5%		5%			15%			32%	15%		19%	9%		1371	3498	32.50	83.00
Wastes from the manufacture, formulation, supply and use (mfsu) of coatings	37.2	12%		19%		8%				39%	3%	3%	16%			993	3120	26.70	83.80
Wastes from the photographic industry	0.2	5%		2%		42%				1%			50%			4	7	21.30	39.60
Inorganic wastes from thermal processes	81.1	5%	25%	5%								20%	45%			2212	5405	27.30	66.70
Inorganic waste with metals from metal treatment and the coating of metals; non-ferrous hydro-metallurgy	10.6	5%	20%										75%			299	581	28.30	55.00
Wastes from shaping and surface treatment of metals and plastics	32.0	8%	10%			5%				42%	20%		15%			982	2867	30.70	89.70
Oil wastes (except edible oils, 050000 and 120000)	72.0									50%	30%			20%		2485	7419	34.50	103.00
Wastes from organic substances employed as solvents (except 070000 and 080000)	7.9	5%	10%	40%						25%	20%					201	782	25.50	99.00
Packaging absorbents, wiping cloths, filter materials and protective clothing not otherwise specified	37.5	5%		30%						55%			10%			1238	3827	33.00	102.00
Waste not otherwise specified in the catalogue	26.8	17%		6%						43%	2%		32%			753	2127	28.00	79.20
Construction and demolition waste (including road construction)	1,340.6	23%								23%		7%	7%	39%		12005	72278	9.00	53.90
Wastes from human or animal health care and/or related research	1.9	0%								50%	17%		33%			79	186	42.30	99.80
Wastes from waste treatment facilities, off-site waste water treatment plants and the water industry	116.4			10%						18%		36%	37%			4942	10756	42.40	92.40
Municipal wastes and similar commercial, industrial and institutional wastes including separately collected fractions	10.5	2%	10%	36%						28%			18%	7%		277	919	26.40	87.30
Unknown	13.1	5%								45%			40%	10%		452	1069	34.50	81.50
TOTAL ALL WASTES (kt/y)	**1,992**	**336**	**27**	**60**	**0**	**9**	**6**	**0**	**0**	**471**	**76**	**163**	**265**	**578**	**0**				
COST OF CHANGE																**32680**	**127493**	**16.40**	**64.00**

ANNEX B

EXTRACT FROM THE IMPLEMENTATION OF COUNCIL DIRECTIVE 1999/31/EC ON THE LANDFILL OF WASTE, SECOND CONSULTATION PAPER

"Directive Impact on Waste Management Costs

Waste arisings

Waste Strategy 2000 estimated that industrial and commercial waste arisings in England and Wales totalled some 78 million tonnes in 1998/99. Since then the Environment Agency has completed a national waste survey which indicates a slightly lower figure of 75 million tonnes, but with some significant differences in the constituent mix. The latter estimates are used in this assessment.

Of the total 75 million tonnes, some 49 per cent (36 million tonnes) is estimated to be deposited to landfill and is therefore likely to be subject to the requirements of the Directive. This includes some 2.6 million tonnes of special and non special solid and liquid wastes and contaminated soils, which, in future may require treatment prior to landfilling to appropriately designated landfills In addition, it is estimated that construction and demolition generates a further 72.5 million tonnes of waste, a proportion of which (estimated at 16 million tonnes) is non-inert and will require treatment as non-special solid waste prior to landfill.

Waste Treatment Costs

Under the Directive, liquid wastes (both special and non-special liquid wastes) will be banned from landfill, and most solid wastes will require treatment prior to landfill. This represents a wide range of wastes, including:

- Contaminated packaging
- Alkaline and acidic wash liquors
- Fats and greases
- Spent solvents and solvent recovery wastes
- Oily wastes and sludges
- Asbestos-bearing wastes
- Slags, ashes and gas cleaning residues
- Organic contaminated soils
- Metal bearing wastes
- Filter cakes

Some currently landfilled wastes may be amenable to further treatment to enable their reuse or recycling. Others are the residual end products of other treatment processes (e.g. filter cakes from effluent treatment and sludges from solvent recovery processes) with little potential for further recovery. For these, landfill disposal may represent the best practicable environmental option. However, the Directive may now require their further treatment in order to meet acceptance criteria for the different classes of landfill.

Treatment options exist for most waste streams both for in-house and merchant use. In addition, more novel options (often employing high technology solutions, for

example high temperature plasma melting) are increasingly available, often from overseas suppliers, and will increasingly be deployed depending on market conditions.

The impact assessment now requires consideration of the overall treatment costs under the different options for implementation. A comprehensive assessment would require detailed knowledge of the composition of the various waste streams coupled with capital and operating costs for each treatment option. Information at this level of detail is not available. Rather, an assessment has been made of likely cost ranges based on a qualitative understanding of the various waste streams, coupled with in-house indicative cost data for treatment, transport, disposal and income from revenues. This analysis has been used to derive representative treatment cost ranges for the generic waste streams. These are presented as additional costs above typical current landfill costs.
The modelling results indicate an additional cost to waste producers of treatment and disposal resulting from the Directive in the range £97 to £696m per year. This extreme range reflects the range of low to high per tonne treatment costs. Probability analysis indicates that the *mean* additional cost is likely to be £400m per year, with a range of £290m to £500m per year at the 90 per cent confidence interval.

The largest contribution to these costs, both in absolute terms and to the range, stems from the 34 million tonnes per year of non-special solid waste. However, this assessment excludes wastes from the construction and demolition sector which may contribute up to a further £104m (high estimate), but for which waste minimisation and beneficial use as a construction material (including in landfill design) may result in a significant cost saving (saving of £48m, low estimate).

The largest uncertainty in this analysis derives from the cost range associated with composting and in-house recycling. Reductions in these costs could significantly reduce the overall additional cost to waste producers resulting from the Directive. The analysis indicates that special [hazardous] liquid wastes are likely to see the highest per tonne additional costs, closely followed by special [hazardous] solid wastes. Non special wastes may require less treatment and/or have greater scope for minimisation/recycling, which reflects in their lower per tonne additional costs. However, per tonne costs for individual wastes and/or treatments may both be significantly lower (e.g. recycling) or higher (e.g. thermal treatment) than the aggregate costs indicated.

The assessment also indicates that some 1.5m tonnes of additional capacity may be required for the treatment of special solid and liquid wastes, and some 18.5m tonnes capacity for non-special solid wastes. Based on nominal plant capacities, the analysis indicates that some 1700 treatment plants may be required for non-special solid wastes, the majority (1150) being simple sorting plants for the separation of both recyclable and undesirable materials. Some 380 compost plants are also indicated, together with 20 combustion plant with a combined 2.2m tonnes per year capacity. It is probable that industry will look to private sector waste management companies to deliver most of this capacity, although some companies may wish to develop facilities in house.

Such decisions will be driven by commercial considerations. For the private sector waste management companies, the decisions may be linked to opportunities for developing joint facilities for municipal waste treatment. In particular, many

biodegradable commercial and industrial wastes are excellent feedstocks for co-composting or co-digestion with organic fractions of municipal waste, and most municipal waste incinerators accept a proportion of industrial and commercial waste.

On the other hand, solidification facilities for some 250,000 tonnes per year of non-special solid waste and 220,000 tonnes per year of special solid and liquid wastes are indicated, i.e. 4 or 5 facilities. However, UK experience with such facilities is mixed and no merchant facilities currently exist. Future investment in such facilities is considerably more speculative and may be considerably more difficult to secure."

ANNEX C

WASTE POLICY AND THE LANDFILL DIRECTIVE

Details of events/activities

- conducted seven rounds of public consultation on aspects of the Landfill Directive, two of which dealt specifically with waste acceptance criteria;
- set up the Hazardous Waste Forum in December 2002 to bring together key stakeholders to advise on the way forward on the management of hazardous waste;
- formed the Landfill Directive Implementation Group in March 2003. The Group provided stakeholder input into the process and negotiations in Europe that developed Council Decision 2003/33/EC establishing waste acceptance criteria and procedures;
- established the Landfill and Hazardous Waste Implementation Programme (LHIP) in April 2004 to drive the changes required to successfully implement landfill and hazardous waste legislation;
- set up a Communications Group for LHIP with strategic communication campaigns in place. This Group involves Defra, Environment Agency, DTI, Small Business Services, Envirowise, Environmental Services Association and Chartered Institution of Waste Management (CIWM);
- set up a specialist website (www.hazardouswaste.org.uk) to provide information about landfill and hazardous waste changes;
- produced leaflets and reports for distribution to waste producers to ensure they are aware of the changes;
- organised two WAC seminars. The first on 6 December 2004 to continue to promote understanding of the implications in implementing WAC and to assist industries in preparations for it. The second seminar on 15 April 2005 provided a further opportunity for Government, waste managers, waste producers, regulators and policy makers, to catch up on what progress had been made towards meeting WAC;
- Ministers, Government and Environment Agency officials have also spoken at many landfill and hazardous waste related events, some of which were organised by industry groups, such as ESA;
- organised a series of hazardous waste road shows aimed specifically at SMEs which took place in Manchester, Bristol, Birmingham and London during April and May 2005;
- produced an interpretative note (published in September 2004, available from www.defra.gov.uk) on the Landfill Regulations which covers many aspects of the Regulations, including on WAC, to help industry understand the Government's view on what the Regulations mean in practice;
- the Environment Agency has published a regulatory guidance note on WAC, available on the Agency's website at www.environment-agency.gov.uk;
- the Environment Agency set up a Landfill Regulation Group in April 2005 to develop a common understanding on the way forward for landfill and to act as a forward-looking forum concentrating on practical implementation of the Landfill Regulations and the impacts on waste industry and the Environment Agency.