

European Commission, Brussels



**ASSESSING LEGAL COMPLIANCE WITH AND IMPLEMENTATION OF THE WASTE
ACCEPTANCE CRITERIA AND PROCEDURES BY THE EU-15**

07.0307/2008/510910/SER/G4

ANNEX TO THE FINAL REPORT

23 December 2009

BiPRO

Beratungsgesellschaft für integrierte Problemlösungen

Content

Index of Tables	5
Index of Figures	7
Index of Infoboxes	9
1 Annex I: Country reports	11
1.1 Country report Austria	11
1.2 Country report Belgium	25
1.3 Country report Denmark	45
1.4 Country report Finland	57
1.5 Country report France.....	65
1.6 Country report Germany	91
1.7 Country report Greece	113
1.8 Country report Ireland	127
1.9 Country report Italy	141
1.10 Country report Luxembourg	157
1.11 Country Report Netherland	163
1.12 Country report Portugal.....	175
1.13 Country report Spain.....	185
1.14 Country report Sweden	199
1.15 Country report United Kingdom.....	209
2 Annex II: Contact data and background documents	231
2.1 List of landfills visited	231
2.2 Contact persons for assessment of legal compliance with the WAC Decision and landfill visits	233
3 Annex III: Questionnaire	235

Index of Tables

Table 1.1-1:	Implementation of WAC Decision in Austrian Legislation.....	14
Table 1.1-2:	Austrian norms.....	17
Table 1.1-3:	Austrian norms for sampling and sample plan.	18
Table 1.2-1:	Implementation of WAC Decision requirements in Belgium (Brussels) Legislation	27
Table 1.2-2:	Implementation of WAC Decision requirements in Flemish Legislation	30
Table 1.2-3:	Belgian (Flanders) norms.....	32
Table 1.2-4:	Individual limit values for different PAH congeners in Flemish legislation.....	33
Table 1.2-5:	Implementation of WAC Decision requirements in regional legislation in the Walloon Region.....	35
Table 1.3-1:	Implementation of WAC Decision in the Danish Legislation	47
Table 1.3-2:	Danish sampling and analysis standards.....	50
Table 1.4-1:	Implementation of WAC Decision in the Finnish Legislation	58
Table 1.4-2:	Finish norms	59
Table 1.5-1:	Implementation of WAC Decision requirements in French Legislation.....	67
Table 1.5-2:	French norms	70
Table 1.6-1:	Implementation of WAC Decision in German Legislation.....	94
Table 1.6-2:	Comparison of German norms with the WAC Decision norms.....	99
Table 1.7-1:	Implementation of WAC Decision in Greek Legislation	114
Table 1.8-1:	Implementation of WAC Decision in Irish Legislation	129
Table 1.8-2:	Irish norms	131
Table 1.9-1:	Implementation of WAC Decision in Italian Legislation.....	143
Table 1.10-1:	Implementation of WAC Decision in Luxembourg Legislation	158
Table 1.10-2:	Luxembourg norms.....	159
Table 1.11-1:	Implementation of WAC Decision in Dutch Legislation.....	164
Table 1.11-2:	Dutch norms	167
Table 1.12-1:	Implementation of WAC Decision requirements in Portuguese Legislation	176
Table 1.12-2:	Portuguese norms	178
Table 1.13-1:	Implementation of WAC Decision in Spanish Legislation.....	187
Table 1.14-1:	Implementation of WAC Decision in Swedish Legislation	200
Table 1.14-2:	Swedish norms.....	202
Table 1.15-1:	Implementation of WAC Decision in the United Kingdom (England and Wales) Legislation.....	211
Table 1.15-2:	Implementation of WAC Decision in the United Kingdom (Northern Ireland) Legislation.....	215
Table 1.15-3:	UK (Northern Ireland) norms.....	216
Table 1.15-4:	Implementation of WAC Decision in the United Kingdom (Scotland) Legislation	219
Table 5-2.1-1:	Identified landfill sites and landfill visits	232
Table 2.2-1:	Landfill details.....	234
Table 2.2-2:	Standardised table for assessment of implementation	243
Table 2.2-3:	Questions related to practical enforcement of legal requirements of the WAC Decision	244
Table 2.2-4:	Competent contact persons for landfill of waste in National authorities of Member States	245
Table 2.2-5:	Overview on parameter relevant for analysis of implementation and other interesting issues to discuss.....	247

Index of Figures

Figure 1.1-1:	Overview of Langenlois Landfill (Austria)	21
Figure 1.1-2:	Flow chart of the waste acceptance procedure at Langenlois Landfill (Austria)	23
Figure-1.2-1:	Overview of the landfill Indaver Antwerp (Belgium, Flanders)	40
Figure 1.2-2:	Flow chart of the waste acceptance procedure at Indaver (Belgium, Flanders).....	42
Figure -1.3-1:	Overview of the landfill AV Miljø (Denmark).....	54
Figure 1.3-2:	Flow chart of the waste acceptance procedure at AV Miljø (Denmark)	55
Figure-1.4-1:	Overview of the landfill Pirkanmaan Jäthuolto Oy (Finland)	62
Figure -1.4-2:	Flow chart of the waste acceptance procedure at Pirkanma Jäthuolto Oy (Finland)	63
Figure 1.5-1:	Overview of landfill site Villeparisis (France).....	74
Figure 1.5-2:	Disposal of asbestos waste at the landfill site Villeparisis (France)	75
Figure 1.5-3:	Stabilisation plant of the landfill Villeparisis (France)	76
Figure 1.5-4:	Flow chart of the waste acceptance procedure at Villeparisis (France)	76
Figure 1.5-5:	Overview of the structure and installations of the class B and C landfills in Laval (France).....	79
Figure -1.5-6:	Flow chart of the waste acceptance procedure at Laval (France).....	81
Figure -1.5-7:	Flow chart of the waste acceptance procedure at Sonzay (France)	84
Figure 1.5-8 :	Aerial view of Lapouyade class B landfill site	86
Figure 1.5-9:	Flow chart of the waste acceptance procedure at Lapouyade (France)	87
Figure -1.5-10:	Flow chart of the waste acceptance procedure at Roussas (France).....	89
Figure 1.5-11:	Abstract of the internal waste acceptance handbook of COVED	90
Figure 1.6-1:	Overview of the landfill Currenta (Germany)	104
Figure 1.6-2:	Flow chart of the waste acceptance procedure at Currenta (Germany)	105
Figure 1.6-3:	Flow chart of the waste acceptance procedure at Herfa Neurode (Germany).....	108
Figure 1.6-4:	Overview of the landfill Burghof (Germany)	109
Figure 1.6-5:	Flow chart of the waste acceptance procedure at Burghof (Germany).....	111
Figure 1.7-1:	Flow chart of the waste acceptance procedure at Skalistiri – Fyli (Greece)	118
Figure -1.7-2:	Flow chart of the waste acceptance procedure at Chalkida (Greece)	121
Figure 1.7-3:	Flow chart of the waste acceptance procedure at Larissa (Greece)	124
Figure -1.8-1:	Flow chart of the waste acceptance procedure at Whiteriver (Ireland).....	134
Figure -1.8-2:	Overview of the landfill Greenstat at Knockharley (Ireland).....	135
Figure 1.8-3:	Flow chart of the waste acceptance procedure at Knockharley (Ireland)	136
Figure -1.8-4:	Flow chart of the waste acceptance procedure at Arthurstown (Ireland).....	139
Figure 1.9-1:	Flow chart of the waste acceptance procedure at Landfill Söles	148
Figure -1.9-2:	Flow chart of the waste acceptance procedure at Ginestreto, Sogliano al Rubicone, Italy	151
Figure 1.9-3:	Flow chart of the waste acceptance procedure at S´Arenaxiu, Cagliari (Italy)	154
Figure 1.10-1:	Overview of the landfill siteC (Luxembourg)	161
Figure 1.10-2:	Flow chart of the waste acceptance procedure at SIDEC (Luxembourg)	162
Figure 1.11-1:	Overview of the landfill Afalzorg /Netherlands).....	169
Figure -1.11-2:	Flow chart of the waste acceptance procedure at Afvalzorg (Netherlands).....	171
Figure 1.12-1:	Overview of the landfill SISAV (Portugal)	180
Figure 1.12-2:	Flow chart of the waste acceptance procedure at SISAV (Portugal).....	182
Figure 1.13-1:	Overview of the landfill C.T.R.U. de Góngora (Spain).....	189
Figure 1.13-2:	Flow chart of the waste acceptance procedure at C.T.R.U. de Góngora (Spain)	191
Figure 1.13-3:	Overview of the landfill SASIETA (Spain)	193
Figure 1.13-4:	Flow chart of the waste acceptance procedure at SASIETA (Spain).....	194
Figure 1.13-5:	Flow chart of the waste acceptance procedure at Cetransa (Spain)	196
Figure 1.14-1:	Overview of the landfill Högbytorp (Sweden)	205
Figure 1.14-2:	Flow chart of the waste acceptance procedure at Högbytorp.....	207

Figure 1.15-1:	Overview of the landfill East Northants	222
Figure 1.15-2:	Flow chart of the waste acceptance procedure at East Northants Resource Management Facility	223
Figure -1.15-3:	Overview of the landfill Black Mountain Phase II/III (United Kingdom, Northern Ireland).....	225
Figure 1.15-4:	Flow chart of the waste acceptance procedure at Blackmountain phase II/III (United Kingdom, Northern Ireland)	226
Figure 1.15-5:	Overview of Avondale Landfill (United Kingdom, Scotland)	227
Figure 1.15-6:	Flow chart of the waste acceptance procedure at Avondale Landfill (United Kingdom, Scotland).....	228

Index of Infoboxes

Infobox 1.4-1:	Criteria for monolithic waste to provide same level of environmental protection as for granular waste	52
Infobox 1.4-2:	Criteria for monolithic waste to provide same level of environmental protection as for granular waste	60
Infobox 1.14-3:	Criteria for monolithic waste to assure same level of environmental safety as for granular waste	203

1 Annex I: Country reports

1.1 Country report Austria

The WAC Decision is very well implemented in the Austrian legislation. Anyway in some cases small divergences are given.

In Austria, the WAC Decision has been implemented by the **2002 Waste Management Act** (Abfallwirtschaftsgesetz 2002) (as amended) and by the **2008 Ordinance on Landfills** (Deponieverordnung 2008).

In comparison with the WAC Decision requirements, the following minor differences can be observed in Austrian legislation. Part of them represent more stringent interpretation and requirements whereas other although compliant with WAC DECISION provisions (Member States are free to chose limits for class B subcategories) might lead to some potential problems at least in theory :

- The basic characterisation has to include a detailed assessment of the waste behaviour in the foreseen cell and its potential reactions with other waste (compatible waste groups)
- A variety of additional total content and leaching limit values are set for each subcategory of non-hazardous landfills.
- Limit values for landfills for C&D waste are much more stringent than those set for non-hazardous landfills by the WAC Decision.
- **Limit values for landfills for residual material are identical to those set for non-hazardous landfills by the WAC Decision.**
- **Limit values for landfills for mass waste (classified as subcategory of class B landfills) are identical to those set for class C landfills by the WAC Decision, although these types of waste can be in contact with asbestos waste in minor quantities (covering/filling material used in separate asbestos waste cells).**
- **For so-called mass waste landfills the national DOC limit is higher than the limit values set by the WAC Decision in case of combined disposal of non-hazardous waste with gypsum waste.**

Special provisions for the deposition of gypsum waste are not mentioned explicitly in Austrian Legislation. However, none of the subcategories of landfill class B (able to accept gypsum waste) may accept biodegradable waste as there is a ban for biodegradable waste in Austria. Gypsum waste normally arises on landfills for C&D waste, one of the subcategory of landfill class B, which fulfils all WAC DECISION criteria.

Asbestos waste is acceptable at all subcategories of non-hazardous waste landfills, in a separated cell according to the WAC Decision. Asbestos waste is the only hazardous waste that is allowed to be disposed above ground in Austria.

Austria does not have any hazardous waste landfill sites or underground storage systems. Hazardous waste, which cannot be treated to meet the **national criteria** of landfills for non-hazardous waste, is thus shipped to other countries (mainly Germany).

Apart from general provisions for waste acceptance and detailed acceptance criteria, it is noteworthy that Austrian legislation comprises in its Annexes highly detailed and comprehensive provisions as regards

sampling and sample planning in the different stages of waste acceptance, criteria for compliance with limit values set, physical stability and non-reactivity and same level of environmental protection for monolithic (solidified/stabilised) waste.

In addition to the state of implementation, a specific national enforcement tool for waste management shall be mentioned as example of good practice.

Nationwide software system for waste data management

In July 2009, the electronic data management (EDM) software system of the Federal Ministry for Agriculture and Forestry, Environment and Water Management (Lebensministerium) has been launched. This system will be implemented in different stages of development and shall be completed until January 2012.

The major advantage of the system is a reduction of administrative and reporting burden as well as a simplification of monitoring and data evaluation. The system manages all information transfer within the responsibility of the ministry. In this context, it also provides access, with corresponding reading and writing rights, to all registered parties involved in waste management in Austria. After initial registration to the system, all concerned authorities and departments of the ministry can view and handle relevant information and data from a specific company by. This procedure avoids multiple registrations and data transfers.

A subsection of the data base is the electronic registration of core information related to waste management (elektronisches Register abfallwirtschaftlicher Stammdaten (eRAS)). This register contains the core information of all landfills, registered waste management companies, sampling experts (laboratories) and landfill inspectors. Inter alia, this section is used for the generation, management and control of information related to basic characterisation and compliance testing.

In the future, every stakeholder who is involved in the waste management procedures as waste producer, consultant, contractor and landfill operator, has to be registered in the electronic data management system. With the registration, all necessary data (e.g. location, contact data, trade registry number, detailed organisational and construction data of landfills) are provided to the competent authorities.

The concerned parties (competent authorities, landfill operator, waste producer, and waste management company) have access to their relevant sections of the system. Before the waste can be accepted at a landfill, the waste producer has to provide a duly completed certificate with all relevant information (e.g. waste type (EWC code), waste origin, next destination of waste, quantities and chemical analyses).

According to the statistical methods and requirements stipulated in 2008 Ordinance on Landfills, analysis results are compared with the legal limit values. The electronic data management system, is automatically crosschecking all registered data with the registrations/permit of the corresponding companies and the requirements for the specific landfill section (cell) which has been foreseen for landfilling the waste. In case of inconsistency, an alarm is triggered.

In addition, the system generates a sampling plan including frequency and key parameters to be controlled. Depending on the height of the analyses result compared to the corresponding legal limit values (levels of "tolerance" 20%, 40%, 60%, 80% of the limit) specific intervals for compliance testing are set. If the foreseen landfill is not authorised to accept a specific type of waste, an alarm is triggered and a list of alternative registered landfills authorised for accepting this type of waste is indicated.

1.1.1 Assessment of legal compliance with the WAC Decision

The following table provides an overview on the legal documents transposing WAC Decision requirements into national legislation. Furthermore the table shows a qualitative assessment of the level of implementation or possible divergences which are further explained and justified in the following Sections.

Austria			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure			
1.1 Basic characterisation	Chapter 4 §12-14 and Annex 4 to 2008 Ordinance on Landfills	✓	
1.1.1 Function	Chapter 1 §3 (28) of 2008 Ordinance on Landfills	✓	
1.1.2 Fundamental requirements	Chapter 4 §11 (2) of 2008 Ordinance on Landfills	✓	
1.1.3 Testing	Annex 4 to 2008 Ordinance on Landfills	✓	
1.1.4. Cases where testing is not required	Chapter 4 §13 of 2008 Ordinance on Landfills	✓	
1.2 Compliance testing	Chapter 4 §15 and Annex 4 to 2008 Ordinance on Landfills	✓	
1.3 On-site verification	Chapter 4 §18 of 2008 Ordinance on Landfills	✓	
2. Acceptance criteria			
2.1 Landfills for inert waste		n/a	
2.1.1 Short list	Section 1 of Annex 2 to 2008 Ordinance on Landfills	+	Waste accepted without testing is more limited.
2.1.2 Limit values		n/a	
2.1.2.1 Leaching limit values	Table 3 and 4 of Annex 1 to 2008 Ordinance on Landfills	+	Further limit values are added.
2.1.2.2 Limit values for total content of organic parameters	Table 3 and 4 of Annex 1 to 2008 Ordinance on Landfills	✓	
2.2 Landfills for non-hazardous waste		n/a	
2.2.1 Without testing	Section 2 of Annex 2 to 2008 Ordinance on Landfills	✓	A list for waste to be accepted without testing is included for landfills for C&D waste and landfills for residual material. Austria introduced a ban to dispose biodegradable waste
2.2.2 Limit values for non-hazardous waste	Table 5 to 10 of Annex 1 to 2008 Ordinance on Landfills	~	Limit values set for mass waste landfills (class B) are identical with limit values from hazardous waste landfills from the WAC Decision.
2.2.3 Gypsum waste	Section 7 of §7 and §46 of 2008 Ordinance on Landfills	~	Gypsum waste is not allowed to be disposed with waste with a DOC limit value of 800mg/kg, which is exceeded in case of mass waste

Austria			
Category	Corresponding national legislation	Implementation	Comments
			landfills.
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii	Table 7 and 8 of Annex 1 to 2008 Ordinance on Landfills and Section 1 of §16 of 2002 Waste Management Act	n/a	
2.3.1 Leaching limit values	Table 7 and 8 of Annex 1 to 2008 Ordinance on Landfills	✓	
2.3.2 Other criteria	Table 7 and 8 of Annex 1 to 2008 Ordinance on Landfills	✓	
2.3.3 Asbestos waste	Chapter 3 §10 of 2008 Ordinance on Landfills	✓	
2.4. Landfills for hazardous waste	Annex 6 to 2008 Ordinance on Landfills and §16 of 2002 Waste Management Act	n/a	Only underground storage is allowed for hazardous waste. There are no underground storage sites in Austria.
2.4.1 Leaching limit values	---	n/a	
2.4.2 Other criteria	---	n/a	
2.5 Criteria for underground storage	Annex 6 to 2008 Ordinance on Landfills and §16 of 2002 Waste Management Act	✓	

Table 1.1-1: Implementation of WAC Decision in Austrian Legislation

1.1.1.1 Legal framework

The WAC Decision has been implemented by **2008 Ordinance on Landfills** (Deponieverordnung 2008) and by **2002 Waste Management Act** (Abfallwirtschaftsgesetz 2002).

According to §5 of 2008 Ordinance on Landfills, classes of landfills corresponding to the EU landfill typology are defined as follows:

- Landfills for excavated non-contaminated soil (out of the scope of the Landfill Directive due to Article 3, Section 2 of the Landfill Directive);
- Landfills for inert waste;
- Landfills for non-hazardous waste with the sub categories which names partly are continuous to the previous system of “landfill types”;
 - Landfills for C&D waste (Baurestmassendeponie);
 - Landfills for residual material, mainly residues from municipal solid waste incineration (MSWI) (Reststoffdeponie);
 - Landfills for mass waste, mainly mechanico-biologically treated waste (Massenabfalldeponie);
- Landfills for hazardous wastes, only allowed as underground storage according to §16 of 2002 Waste Management Act.

1.1.1.2 Acceptance Procedure

Basic characterisation

The WAC DECISION concept of basic characterisation – including the function of the basic characterisation, parameters for the fundamental requirements and prescriptions for testing – is implemented by definition of corresponding terms in §3, and by more detailed rules in §12-16 of 2008 Ordinance on Landfills.

Fundamental requirements are set in Section 9 of Annex 4 to the 2008 Ordinance on Landfills.

The basic characterisation has to correspond to the total waste amount if not regularly generated. In contrast, the basic characterisation for regularly generated waste has to comprise the results of several chemical analyses sampled over a period of one year. The basic characterisation has to be repeated every eight years.

During the preparation of the basic characterisation, which takes one year, a temporary approval certificate (vorläufiger Beurteilungsnachweis) is created. Once the basic characterisation, a fundamental approval certificate (grundlegender Beurteilungsnachweis) is issued which includes data proving that the waste can be deposited on a given landfill. Inter alia, name and address of the consultant who prepared the waste certificate, waste characteristics, and process of waste origin, waste producer, waste treatment and chemical analyses are indicated in the form.

The cases which do not require testing, are implemented by §13 of 2008 Ordinance on Landfills.

Compliance testing

Compliance testing is implemented by §15 and Section 1-4, Chapter 2 of Annex 4 to 2008 Ordinance on Landfills in accordance with the WAC Decision.

On-site verification

The on-site verification and its corresponding documentation is implemented by §18 and Section 5, Annex 4 to 2008 Ordinance on Landfills.

Depending on the waste type, different sampling intervals have to be respected concerning the on-site verification as stated in §19 and 20 of 2008 Ordinance on Landfills.

1.1.1.3 Waste acceptance criteria

By §8 of 2008 Ordinance on Landfills the possibility to authorise higher limit values for specific substances as listed in Section 2 of the Annex to the WAC Decision, are implemented accordingly.

In addition Section 7 §7 of the 2008 Ordinance on Landfills lists 10 exemptions where the TOC can exceed the limit value of 5%. These are:

- Solidified waste encapsulated with polymers or bitumen if disposed on landfills for residual or mass waste landfills.
- Polymer packed asbestos waste according to §10 of the 2008 Ordinance on Landfills

- Wastes containing elemental carbon, coal- or coke fractures excluding contaminated active carbon or coke, if this waste is disposed of in landfills for non-hazardous waste.
- “C&D waste for which no analytical testing is necessary” (see Annex 2 to the 2008 Ordinance on landfills)
- Non-contaminated excavation material and non-contaminated soil, if this waste is disposed of in landfills for excavated non-contaminated soil, according to Annex 4 of the Ordinance on landfills.
- MBT residues if it is disposed of in mass waste landfills according to Table 9 and 10 to the Annex 1 to the 2008 Ordinance on landfills and section 4 Part 2 of Annex 4 to the 2008 Ordinance on landfills.
- Waste which can be disposed of according to sections concerning TOC exemptions in § 8 of the 2008 Ordinance on landfills. (§8 of the 2008 of landfills involves authority permissions)
- Wastes from magnetite or cement bonded wood-wool insulating boards, cement bonded splint concrete, fire protection panels and artificial marble, if these wastes are disposed on landfills for C&D or mass waste.
- Residues from abrasive materials with organic carrier materials of glass fibre tissue wastes, if a thermal pre-treatment is unreasonable and if these types of waste are disposed of in mass waste landfills.
- MBT residues not resulting from wastes with easily degradable organic parts (e.g. household waste). These residues shall not exceed a caloric value of 6,600 kJ/kg dry substance and a TOC value of <8% and have to be disposed of at mass waste landfills.

According to the Austrian legislation only non-hazardous wastes are allowed to be disposed above ground. For this type of waste the WAC Decision has no TOC limit and therefore the exceptions are in compliance with the WAC Decision. In any case, the DOC leaching limit value has to be met anyway.

Criteria for monolithic waste to ensure the same level of environmental protection, stability and non-reactivity as well as physical stability and bearing capacity are set (Annex 5 to the 2008 Ordinance on landfills) and related procedures are described in detail. Monolithic waste is discussed as solidified waste. Limit values have to be met by the original non-solidified waste before treatment. According to §14 of the 2008 Ordinance on Landfills a suitability test has to be performed.

Compliance testing for monolithic waste have to be performed twice a year in accordance with §19 of the 2008 Ordinance on landfills. Sampling procedures are described in §20 of the 2008 Ordinance on landfills.

In addition to the limit values set in the Annex to the WAC Decision a considerable number of additional substances has to be tested according to Austrian legislation. (e.g. B, chromium (VI), cobalt, silver, tin, ammonium, cyanide, nitrate, nitrite and phosphate).

The **sampling and analysing standards** to be applied are listed in Section 3 of Annex 4 to 2008 Ordinance on Landfills. The recommended sampling and test methods are:

Measurement	Austrian standard
Leaching test	ÖNORM S 2115, ÖNORM EN 12457-4,
Calculation of dry matter	ÖNORM EN 14346
Analyses of Eluates – determination of pH, AS, Ba, Cd, Cl ⁻ , Co, Cr, Cr(VI), Cu, Mo, Ni, NO ₂ ⁻ , Pb, total S, SO ₄ ⁻ , V and Zn ²⁺	ÖNORM EN 12506
Analyses of Eluates – determination of ammonium, AOX, conductivity, Hg, phenol index, TOC, easily liberatable CN, F	ÖNORM EN 13370
Characterisation of waste determination of hydrocarbons of C ₁₀ to C ₄₀	ÖNORM EN 14039
Characterisation of waste – determination of TOC	ÖNORM EN 13137
Leaching behaviour test – Up flow percolation test	ÖNORM CEN / TS 14405
Digestion for subsequent determination of aqua regia soluble portions of elements	EN 13657
Preparation of the analytical sample	ÖNORM EN 15002
Characterisation of sludge, LOI	ÖNORM EN 12879
Sampling and preparation of solid waste for the determination of caloric value – determination of caloric value of mechanico-biologically treated waste	ÖNORM EN 13137, ÖNORM S 2118-1
Stability parameter for the determination of MBT waste Part 1 -3	ÖNORMS S 2027/ 1,-3
Characterisation of waste determination of hydrocarbons via gravity	ÖNORM EN 14345
Water condition – determination of hydrocarbon-index Part 2	ÖNORM 9377-2
Determination of PAH	ÖNORM L 1200
Soil quality – Static head space method	ISO 22155
Water condition – determination of AOX	ÖNORM EN ISO 9562
Water condition – determination of anionic surface-active substances	ÖNORM EN 903
German procedure for the water sewage and sludge analyses Part 17	ÖNORM EN 34814-17
Characterisation of waste – leaching behaviour dependency concerning pH	ÖNORM EN 14997
Characterisation of waste – determination of acid neutralisation capacity	ÖNORM CEN / TS 15364
Digestion with aqua regia	ÖNORM EN 13657
Microwave-assisted digestion with hydrofluoric, nitric, and hydrochloric acid mixture	---

Table 1.1-2: Austrian norms

In addition to these norms, specific additional standards are to be used for sampling and sample plan:

Austrian norms for sampling and sampling plan	
Characterisation of Waste- Sampling of waste materials- Framework for the preparation and use of a sampling plan	ÖNORM EN 14899
Characterisation of Waste- Sampling of waste materials- Part 1: Guidance on selection and application of criterions for sampling under various conditions	CEN / TR 15310-1
Characterisation of waste – Sampling of waste materials – Part 5 Guidance on the process of defining the sampling plan”	CEN / TR 15310-5
Sampling of soils for the performance of a waste analysis (consolidated version)	ÖNORM S 2121
Sampling of waste – Part 1 – Sampling of piles	ÖNORM S 2123-1
Sampling of waste – Part 2 – Sampling of solid waste from containers and transport vehicles.	ÖNORM S 2123-2

Table 1.1-3: Austrian norms for sampling and sample plan.

A Guideline “Erläuterungen zur Deponieverordnung 2008” which explains in detail the provisions of Chapter 1, 2, 3 and 8 of the 2008 Ordinance on Landfills has been elaborated by Austrian authorities.

Criteria for landfills for inert waste

The criteria for the acceptance of wastes at landfills for inert waste are implemented by §3 No. 30 and §5 (2) in general and more detailed in Annex 1, Table 3 (organic parameters) and 4 (leaching limit values), Annex 2 and Annex 4 of 2008 Ordinance on Landfills.

Leaching limit values in the Austrian legislation is identical to the WAC Decision. In addition, leaching limit values for a variety of additional further substances (e.g. cobalt, Ag, ammonium, cyanide, nitrate, nitrite and phosphate) are set. The limit value for PAHs (16 compounds) is set at 20mg/kg and for Benzo(a)pyrene at 2mg/kg.

Short list: Section 1 of Annex 2 to 2008 Ordinance on Landfills includes a list of waste that can be disposed of without testing. This list does not comprise EWC codes 2001 01, 1011 03, 1501 07 and is therefore more stringent than the WAC Decision. (Note: This short list of waste acceptable without testing is also valid for “landfills for residual material” a subcategory of class B landfills.

Further waste types that can be accepted at landfills without testing, are stipulated in §13 of 2008 Ordinance on Landfills.

Criteria for landfills for non-hazardous waste

According to §5 of 2008 Ordinance on Landfills, Austria determines between three subcategories of landfills for non-hazardous waste:

- Landfills for C&D waste (Baurestmassendeponie). Tables 5 and 6 of Annex 1 to 2008 Ordinance on Landfills;
- Landfills for residual material (Reststoffdeponie). Tables 7 and 8 of Annex 1 to 2008 Ordinance on Landfills;
- Landfills for mass waste (Massenabfalldeponie). Tables 9 and 10 of Annex 1 to 2008 Ordinance on Landfills.

All these subcategories of landfills are allowed to accept asbestos waste. If the landfill is not exclusively for asbestos waste, asbestos waste has to be disposed of in a separate compartment (in compliance with the WAC Decision).

A list of waste types to be accepted without testing is provided for landfills for C&D and residual waste. This list includes EWCs from the EU short list for inert waste as well as the EWCs 17 06 04, 17 08 02, 17 09 04.

Given national leaching limit values for “non-hazardous waste” disposal of asbestos waste would be in accordance with WAC Decision requirements on landfills for C&D waste and for residual material. Whereas acceptance of asbestos waste on mass waste landfills is not in line with WAC Decision requirements (due to higher leaching limits, corresponding to EU class C in national legislation)

The WAC DECISION management provisions for materials containing asbestos and other suitable asbestos waste are implemented accordingly by §10 2008 Ordinance on Landfills

Given national limit values for TOC and DOC disposal of gypsum waste would be in accordance with WAC Decision requirements on landfills for C&D waste and for residual material. Whereas acceptance of gypsum based material mass waste landfills is not in line with WAC Decision requirements (due to higher DOC limits for mass waste in national legislation).

Landfills for C&D waste

For waste that can be accepted without testing on landfills for C&D waste two lists are provided in Annex 2 to 2008 Ordinance on Landfills. One of these lists includes a selection of EWC codes listed in Section 2.1.1 (concerning inert waste landfills) of the Annex to the WAC Decision. The second list includes some additional Austrian waste codes defined by the ÖNORM S2100. These wastes (including ceramic, glass, C&D waste as well as soils) were integrated in the list, based on the provisions of Chapter 1.1.4 of the Annex to the WAC Decision.

The Austrian limit values for landfills for C&D waste are much more stringent than the limit values for landfills for non-hazardous waste (class B1b, Section 2.2.2) of the Annex to the WAC Decision , but not as strict as the limit values set for landfills for inert waste (class A) set in Section 2.1.2.1.

Landfills for residual material

For waste that can be accepted without testing on landfills for C&D waste two lists are provided in Annex 2 to 2008 Ordinance on Landfills. (see above).

The limit values for residual material (e.g. incineration residues) are the same as set for class B in Section 2.2.2 of the Annex to the WAC Decision with some additional limit values (e.g. for Al, Ag, nitrite, cyanide, ammonium and phosphate).

The limit value of Hg is more stringent compared to the WAC Decision and the DOC limit value is more stringent than stipulated by the WAC Decision.

In addition, content limit values are set for As, Cd and Hg, hydrocarbons, PAH and BTEX.

Landfills for mass waste

This landfill subclass is in particular designed for MBT residues. For these wastes, limit values for respiratory activity, gas formation and calorific value are applicable in order to minimise the biodegradability.

The leaching limit values for this subcategory of class B landfills correspond to the values set for class C in the WAC Decision except for more stringent values set for Hg, (0.5mg/kg TS instead of 2mg/kg in WAC). Furthermore, some additional limit values are set for ammonium and sulphate.

Note: The WAC Decision states that gypsum waste shall not be disposed of in landfills with a DOC of 800mg/kg TS (L/S=10l/kg), whereas the DOC limit value for landfills for mass waste is set at 2,500 mg/kg TS (L/S=10 l/kg). As the Austrian legislation does not prohibit the disposal of gypsum waste on landfills for mass waste it could be regarded to be not in compliance with the WAC Decision. In practice however, the impact is considered to be limited, because gypsum waste, which is normally a C&D waste, will normally be disposed on a landfill for C&D waste (which fulfils the WAC Decision) instead of the more expensive landfills for mass waste or residual waste

Note: WAC Decision limit values for class B landfills are set for non-hazardous waste, which is landfilled in the same cell with stable non-reactive hazardous waste (e.g. asbestos). Hence mass waste (non-hazardous) landfilled together with asbestos containing material (hazardous) would have to meet WAC Decision limits for class B landfills. As Austrian limits are higher an incompliance might thus be considered to exist. In practice big bags or other packaging containing asbestos waste within landfills for mass waste is embedded in mass waste, which according to Austrian legislation does not have to meet EU class B limits but only EU class C leaching limits or even more higher for DOC.

Acceptance criteria for waste acceptable at landfills for hazardous waste

According to §16 of the 2002 Waste Management Act, landfills for hazardous waste can only be authorised as underground storage sites. Acceptance criteria for hazardous waste are laid down in §5 (6) and Annex 6 of 2008 Ordinance on Landfills. Chapter 2 of Annex 6 contains a list of wastes, which are not acceptable at landfills for hazardous waste. This chapter complies with the requirements as set out for the acceptance of wastes at underground storages pursuant to Chapter 2 of Annex A of the WAC Decision.

Underground storage

WAC Decision Criteria for underground storage are fully implemented by Annex 6 to 2008 Ordinance on Landfills and §16 of 2002 Waste Management Act.

1.1.2 Site visit Austria

The organisation of the site visit was realised by the Austrian Ministry of Environment

Langenlois Landfill (non-hazardous landfill, class B landfill) has been selected.

The tasks of landfill operators start with the assessment of acceptability of a certain type of waste and comprise the actual acceptance of wastes arriving at the landfill. These procedures may differ by type of landfill and operator. Furthermore, some general information (e.g. location, size, technical standard,

accepted waste) as well as specific systems installed for documentation of waste flows may be helpful for the assessment of the on the ground enforcement of legal requirements.

Thus, the description of each landfill visit is structured into the sections “*general terms*” (background information) and “*waste acceptance procedures*” (basic characterisation, compliance testing, on-site verification).

1.1.2.1 Site visit to representative non-hazardous waste landfill (Langenlois landfill class B)

General terms

Langenlois Landfill is located about 60 km northwest of Vienna. Operation started in 1974. It is a non-hazardous waste landfill with an extension of about 15ha that are separated into 5 sections (Gneixendorf I-II and Langenlois I-III). Langenlois III is the only section still in operation. All landfill sites together have a capacity of about 1.5 million m³, of which the active cell has a capacity of about 450,000 m³. Approximately 40 % of the active cell is already filled.



Figure 1.1-1: Overview of Langenlois Landfill (Austria)

According to Austrian legislation, two different landfill types can be distinguished within this site. One part of the site is reserved for residual material (Reststoff), a second one for other non-hazardous wastes (mass waste (Massenabfall)), and within this cell there is an area for asbestos waste. The landfill for residual material is further split into areas for disposal of residues from thermal treatment and others. About 75% of the waste is landfilled on the landfill for residual material and about 25% on landfills for other non-hazardous wastes. The amount of asbestos waste is < 1%.

Typical wastes landfilled in Langenlois are wood and straw ashes. They account for approximately 90% of all wastes. Other wastes are contaminated sludge, asbestos, soil and C&D waste. The site is served by more than 100 customers.

The landfill comprises further treatment facilities such as storage areas for waste, wood for C&D waste, for hazardous waste and a composting plant.

Waste acceptance procedure

Langenlois Landfill has an internal software system that is linked to the central server and client companies for backup and bookkeeping purposes. There is also internet access available which facilitates access to a number of specialised e-government applications (EDM) provided by the Federal Environmental Agency and the Federal Ministry of Agriculture, Forestry, Environment and Water Management.

The process flow of waste acceptance at Langenlois III is the following:

1. Once the waste has been deemed to be acceptable at the landfill according to its license by the landfill operator, the document is controlled by more detailed evidence of conformity. This is part of the basic characterisation procedure which is mandatory for every waste of different origins. Besides, details of ownership, origin, composition and physical properties of the waste, this survey "Beurteilungsnachweis" includes an in depth chemical analysis, an evaluation of the environmental relevant contaminants in comparison of prescriptive limits and an expert statement, that the waste is suitable to be disposed on this very landfill Langenlois III. All waste streams, which can be accepted at the landfill, are registered into the computer system.
2. The waste deliveries arrive at the weighbridge and the driver reports to the weighbridge operator the loaded waste. This is done by specifying the waste producer and the origin or waste type. In the computer system it is checked if the waste can be accepted at the landfill site and where it has to be brought. If possible, the waste is visually inspected. In case of suspicion the supervisor is informed and a further proceeding is decided upon from case to case. If no suspicion arises, the waste can proceed. For proof of identity at least 2% of all waste deliveries to the landfill (minimum once a year for waste streams > 5,000t/a) have to be sampled and analysed regularly by the landfill operator, whereas a different laboratory than the one involved with the basic characterisation must be employed by the operator.
3. From the weighbridge the waste can be brought to different locations:
 - a) The waste is brought to the landfill site that consists of the three areas described above (see general terms). An employee of the landfill site equipped with a mobile phone is informed about the incoming waste. During the unloading process the waste is checked: In case of suspicion the waste is stored on top of the landfill site apart from the cell in exploitation. The supervisor is informed and the further procedure is decided depending on the type of waste. In regular time intervals spot tests are taken and analysed at an external laboratory.
 - b) The waste is brought to a hazardous waste storage area. This waste cannot be landfilled on this site and leaves the landfill site to be brought to a proper destination.
 - c) The waste is brought to the storage area for C&D waste. From here it either leaves the landfill site again or is used as construction material for the landfill site.
 - d) Green waste is brought to a composting area for biodegradation. The resulting compost is sold as fertilizer.

- e) The waste is brought to the waste wood storage area from where it also leaves the landfill site again.
4. After the waste is unloaded, the lorry is weighted again at the weighbridge. A weighbridge document is prepared including, amongst other, data about weighbridge document number, waste producer, contractor, waste type, date and time and vehicle registration number. One of the documents is kept at the landfill site, one is used for the invoice and the third is given to the driver. The paper documents and the electronic information are stored for an undefined time.

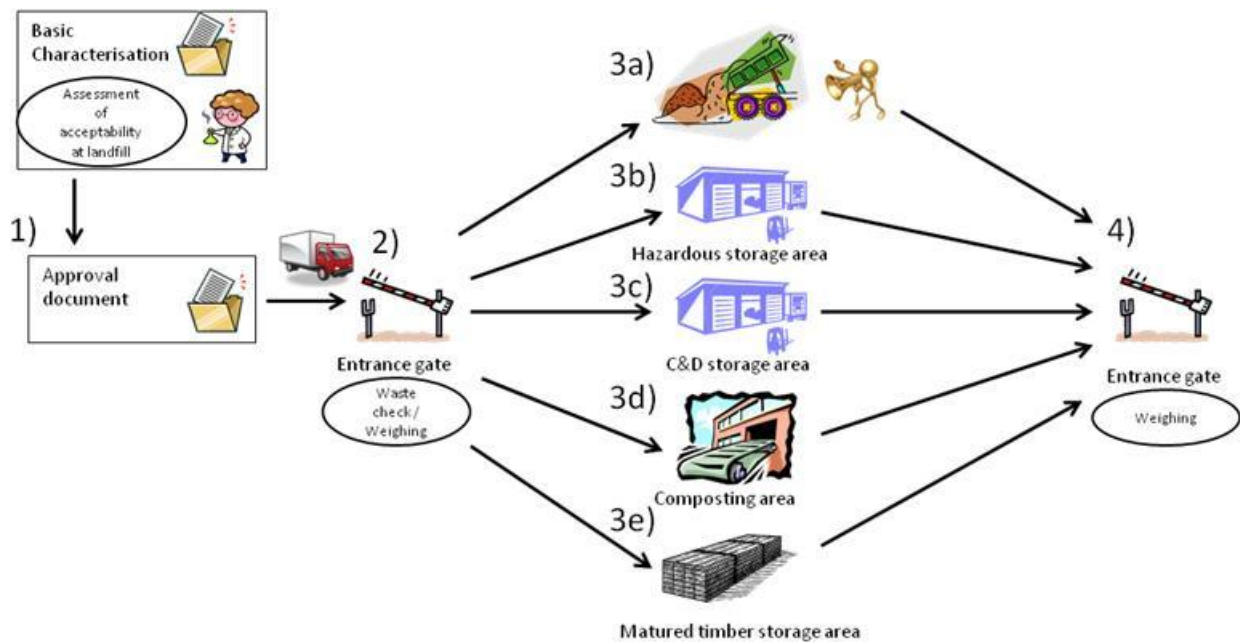


Figure 1.1-2: Flow chart of the waste acceptance procedure at Langenlois Landfill (Austria)

Basic characterisation

The party who intends to have the waste discharged at the landfill initiates the waste acceptance procedure. The waste producer/owner has to fill in a signed “waste information”- questionnaire to the operator. This document includes the most important information (e.g. information on waste producer, owner, source of waste generation and general information about the waste properties).

Testing for basic characterisation is performed as defined in the Austrian legislation described in chapter 7. The process of basic characterisation depends on waste type, amount and analysis results. In case of regularly generated waste streams as well as for repeatedly occurring waste, the basic characterisation takes one year.

Depending on mass of waste potentially landfilled within a year, the approval certificates described above will have to be provided several times throughout the year of basic characterisation. Each report is a temporary approval document for further landfilling and a piece of the basic characterisation puzzle. This is completed after one year by the basic report of conformity (grundlegender Beurteilungsnachweis).

Compliance testing

Compliance testing is performed as defined in Austrian Legislation (chapter 7).

The process of compliance testing includes waste analyses as well as statistical calculations. It takes into consideration the test results from the last twelve months.

On-site verification

On-site verification already takes place at the weighbridge, if the waste is not transported in a closed container. In any case, an employee of the landfill who is informed by mobile phone of the incoming waste type controls the unloading. If suspicion arises, the waste is put aside, sampled and analysed to proof its compliance with the operation permit. If the waste analysis turns out not to be consistent with the basic characterisation and the prescriptive limits of the landfill, the waste must be refused and returned to its former owner.

Expert proposals related to potential modifications of the WAC Decision

There are no proposals for the WAC Decision.

1.2 Country report Belgium

Waste legislation in Belgium is in the responsibility of the three different regions. Thus an assessment of the implementation of WAC DECISION requirements by national legislation cannot be performed on national level but has to be done separately for each administrative region as follows:

I. Brussels Capital region

The WAC Decision is literally implemented by the regional legislation of Brussels, including the obligation that the Ministry of Environment has to define and set criteria as requested in the WAC Decision. Furthermore, it has to determine sampling and testing according to Section 3 of the Annex to the WAC Decision. Remaining deficits are as follows:

- Further details and especially the criteria to be set by Member States are not mentioned in the Brussels legislation.

This has to be seen in the light of the fact that landfilling is not a waste management option anymore in the region. There are no active landfill sites in Brussels since more than 10 years.

II. Flanders

The WAC Decision is well implemented in the Flemish regional legislation with some minor differences related to:

- The necessity of a sampling plan according to CEN standards is mentioned, but not further specified
- The Obligation to document and report authorised higher limit values is not explicitly mentioned
- Leaching limit values for monolithic waste restricted to heavy metals
- Specific testing requirements and rapid test methods for on-site verification are not determined.

Supplementary to the WAC DECISION requirements, Flemish Legislation has set limit values for ANC, Cr VI and Cyanide. National limit values are set for non-hazardous wastes in class B landfills that do not accept stable non-reactive hazardous waste.

III. Walloon Region

According to current legislation waste acceptance procedures corresponding to on-site verification and information requirements (corresponding to basic characterisation requirements) are set. In addition current legislation specifies the waste types acceptable at specific types of landfills or generally excluded from landfilling. As regards more detailed acceptance procedures and criteria current legislation refers explicitly to the WAC Decision. WAC Decision requirements are to be complied with.

- Specific criteria and provisions to be defined by Member States are not yet set.

However, a proposal (Avant-projet (AP)) for a corresponding legislation has been elaborated and is currently under discussion. In case this ordinance will be adopted without changes WAC Decision requirements will be fully met except of the following:

- The obligation to measure the ANC.

1.2.1 Assessment of legal compliance with the WAC Decision in the Brussels-Capital-Region (BCR)

The following table provides an overview on the legal documents transposing WAC Decision requirements into the regional legislation of the BCR. Furthermore, the table shows a qualitative assessment of the level of implementation or possible divergences, which are further, explained and justified in the following Sections.

Belgium-Brussels			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure			
1.1 Basic characterisation	Article 1.1 Dossier 2002/38	✓	
1.1.1 Function	Article 1.1.1. Dossier 2002/38	✓	
1.1.2 Fundamental requirements	Article 1.1.2 Dossier 2002/38	✓	
1.1.3 Testing	Article 1.1 .3. Dossier 2002/38	✓	
1.1.4. Cases where testing is not required	Article 1.1 .4. Dossier 2002/38	✓	
1.2 Compliance testing	Article 1.2. Dossier 2002/38	✓	
1.3 On-site verification	Article 1.3. Dossier 2002/38	✓	
2. Acceptance criteria	Article 2. Dossier 2002/38	✓	
2.1 Landfills for inert waste	Article 2.1. Dossier 2002/38	n/a	
2.1.1 Short list	Article 2.1.1. Dossier 2002/38	✓	
2.1.2 Limit values	Article 2.1.2. Dossier 2002/38	n/a	
2.1.2.1 Leaching limit values	Article 2.1.2.1. Dossier 2002/38	~	The Ministry of Environment has to set criteria in accordance with the WAC Decision which includes inter alia the PAH limit value.
2.1.2.2 Limit values for total content of organic parameters	Article 2.1.2.2. Dossier 2002/38	✓	
2.2 Landfills for non-hazardous waste	Article 2.2. Dossier 2002/38	n/a	
2.2.1 Without testing	Article 2.2.1. Dossier 2002/38	✓	
2.2.2 Limit values for non-hazardous waste	Article 2.2.2. Dossier 2002/38	~	The Ministry of Environment has to set criteria in accordance with the WAC Decision.
2.2.3 Gypsum waste	Article 2.2.3. Dossier 2002/38	✓	
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii	Article 2.3. Dossier 2002/38	n/a	
2.3.1 Leaching limit values	Article 2.3.1. Dossier 2002/38	~	The Ministry of Environment has to set criteria in accordance with the WAC Decision.

Belgium-Brussels			
Category	Corresponding national legislation	Implementation	Comments
2.3.2 Other criteria	Article 2.3.2. Dossier 2002/38	✓	
2.3.3 Asbestos waste	Article 2.3.3. Dossier 2002/38	✓	
2.4. Landfills for hazardous waste	Article 2.4. Dossier 2002/38	n/a	
2.4.1 Leaching limit values	Article 2.4.1. Dossier 2002/38	~	The Ministry of Environment has to set criteria in accordance with the WAC Decision.
2.4.2 Other criteria	Article 2.4.2. Dossier 2002/38	✓	
2.5 Criteria for underground storage	Article 2.5. Dossier 2002/38	✓	

Table 1.2-1: Implementation of WAC Decision requirements in Belgium (Brussels) Legislation

1.2.1.1 *Legal framework (Brussels)*

The WAC Decision is implemented in the legislation of Brussels Capital by Dossier Arrêté du Gouvernement de la Région de Bruxelles-Capitale concernant la mise en décharge des déchets No 2002-04-18/38 concerning La Mise en décharge des déchets. (Dossier 2002/38).

The classifications of the landfills are according to the WAC Decision.

Brussels legislation does not contain specific provisions for the topics where the WAC Decision requests action from Member States, but stipulates that “the Ministry of Environment shall define the corresponding provisions.

1.2.1.2 *Acceptance Procedure (Brussels)*

Basic characterisation (Brussels)

The basic characterisation is literally implemented by Article I 1.1 of the Dossier No. 2002/38. Record keeping of the basic characterisation has to be kept five years.

Compliance testing (Brussels)

Compliance testing is literally implemented by Article 1.2. of the Dossier 2002/38. Record of compliance testing has to be kept for five years. Compliance testing shall be done at least once a year.

On-site verification (Brussels)

On-site verification is literally implemented by Article I 1.3 of the Dossier 2002/38. The Ministry of Environment shall define test requirements and rapid test methods for on-site verification. Samples have to be kept for at least one month.

1.2.1.3 *Waste acceptance criteria (Brussels)*

Section 2 of the Annex to the WAC DECISION is literally implemented by Article I 2 of the dossier 2002/38. This includes limit values and other criteria as stipulate in the WAC Decision. The standards are literally implemented in Article 3 of the dossier 2002/38.

A Guideline "Code van geode praktijk voor het aanvaarden en storten van afval op Vlaamse stortplaatsen" is available"

Criteria for landfills for inert waste (Brussels)

Criteria for landfills for inert waste are literally implemented by Article I 2.1. The Ministry of Environment has to determine the test methods and corresponding limit values according to the table in Article I 2.1.2.1 of the Dossier 2002/38. The Ministry of Environment has to define limit values for PAH.

Criteria for landfills for non-hazardous waste (Brussels)

WAC Decision criteria for landfills for non-hazardous waste are literally transposed by Article I 2.2 and 2.3 of the Dossier 2002/38. The Ministry of Environment has to set criteria for monolithic waste to provide the same level of environmental protection given in the corresponding tables. The Ministry of Environment has to set criteria to ensure that the waste will have sufficient physical stability and bearing capacity. Furthermore, it has to guarantee that hazardous monolithic waste is stable and non-reactive before accepted at landfills for non-hazardous waste.

Criteria for waste acceptable at landfills for hazardous waste (Brussels)

Criteria for waste acceptable at landfills for hazardous waste are literally implemented by Article 2.4 of the Dossier 2002/38. The Ministry of Environment has to determine the test methods and corresponding limit values according to the table in Article I 2.4.1 of the Dossier 2002/38. The Ministry of Environment has to set criteria for monolithic waste to provide the same level of environmental protection given in the corresponding tables.

Underground storage

Underground storage is literally implemented by Article 2.5 of the Dossier 2002/38.

1.2.2 Assessment of implementation WAC Decision requirements by regional legislation in Flanders

The following table provides an overview on the legal documents transposing WAC DECISION requirements into national legislation. Furthermore, the table shows a qualitative assessment of the level of implementation or possible divergences that are further explained and justified in the following Sections.

Belgium-Flanders			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure			
1.1 Basic characterisation			
1.1.1 Function	VLAREM II Article 5.2.4.1.3.1.	✓	
1.1.2 Fundamental requirements	VLAREM II Article 5.2.4.1.3.2.	✓	
1.1.3 Testing	VLAREM II Article 5.2.4.1.3.3.	✓	
1.1.4. Cases where testing is not required	VLAREM II Article 5.2.4.1.3.4.	✓	
1.2 Compliance testing	VLAREM II Article 5.2.4.1.4.	✓	
1.3 On-site verification	VLAREM II Article 5.2.4.1.5.	✓	
2. Acceptance criteria	VLAREM II Article 5.2.4.1.6.	✓	
2.1 Landfills for inert waste		n/a	
2.1.1 Short list	VLAREM II Article 5.2.4.1.7. §1, 2, 3	✓	
2.1.2 Limit values		n/a	
2.1.2.1 Leaching limit values	VLAREM II Article 5.2.4.1.7. §4.1.	✓	
2.1.2.2 Limit values for total content of organic parameters	VLAREM II Article 5.2.4.1.7. § 4.2.	✓	
2.2 Landfills for non-hazardous waste		n/a	
2.2.1 Without testing	VLAREM II Article 5.2.4.1.8. §3	✓	
2.2.2 Limit values for non-hazardous waste	VLAREM II Article 5.2.4.1.8. §5.1, 5.2	✓	
2.2.3 Gypsum waste	VLAREM II Article 5.2.4.1.8. §6	✓	
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii		n/a	
2.3.1 Leaching limit values	VLAREM II Article 5.2.4.1.9. §3.1, 3.2.	+	Limit value for Cr VI, cyanide is given
2.3.2 Other criteria	VLAREM II Article 5.2.4.1.9. §4.1, 4.2., 4.3	✓	
2.3.3 Asbestos waste	VLAREM II Article 5.2.4.1.9. §6	✓	
2.4. Landfills for hazardous		n/a	

Belgium-Flanders			
Category	Corresponding national legislation	Implementation	Comments
waste			
2.4.1 Leaching limit values	VLAREM II Article 5.2.4.1.10. §4.1, 4.2	+	Limit value for Cr VI, cyanide is given
2.4.2 Other criteria	VLAREM II Article 5.2.4.1.10. §5	✓	
2.5 Criteria for underground storage	VLAREM II Article 5.2.4.1.11.	✓	

Table 1.2-2: Implementation of WAC Decision requirements in Flemish Legislation

1.2.2.1 Legal framework (Flanders)

The WAC Decision is implemented into the national law of Flanders by the Flemish Environmental Regulation Vlaams Redlement betreffende de Milieuvergunning Article 5.2.4 (VLAREM II Article 5.2.4).

The landfills of Flanders are categorised into the following classes:

- Landfills for stable, non-reactive hazardous wastes and for non-hazardous industrial and comparable waste materials of mainly inorganic composition – category 3 landfills;
- Landfills solely for non-hazardous waste – category 2 landfills;
- Landfills for hazardous waste materials – category 1 landfills.

1.2.2.2 Acceptance Procedure (Flanders)

Basic characterisation (Flanders)

The basic characterisation requirements are fully implemented by Article 5.2.4.1.3 of the VLAREM II. Records of the basic characterisation have to be kept for ten years.

Compliance testing (Flanders)

EU compliance testing requirements are literally implemented by VLAREM II Article 5.2.4.1.4. Test results of compliance testing have to be kept for ten years.

On-site verification (Flanders)

On-site verification provisions are literally implemented by VLAREM II Article 5.2.4.1.5. Visual inspection before and after unloading is requested. Samples are periodically taken and shall be kept for a month. Testing requirements are not specifically addressed but referred to the sampling plan and the chapters on the different landfill classes. Rapid test methods are not determined.

1.2.2.3 Waste acceptance criteria (Flanders)

In accordance with EU requirements three classes of landfills have been defined:

- Landfill category 3: Above ground landfill for inert waste; (corresponding to landfill class A);
- Landfill category 2: Above ground landfill for non-hazardous waste; (corresponding to landfill class B); (comprising a subcategory for non-hazardous inorganic waste with specific regional limit values)
- Landfill category 1: Above ground landfill for hazardous waste; (corresponding to landfill class C).

Higher limit values: The possibility to exceed set limit values is mentioned in Flemish law in accordance with EU provisions. The obligation to document/report the annual number of permits issued under these exemptions to the European Commission however, is not explicitly mentioned.

Monolithic waste: If not specified otherwise in the environmental licence, the following leaching limit values apply for monolithic waste:

Parameter	Leachability [mg/m ²]
As	270
Cd	11
Cr	550
Cu	250
Hg	8
Pb	600
Ni	150
Zn	900

NEN 7345 shall be used as leaching test method (VLAREM II Article 5.2.4.1.8 §5 2., Article 5.2.4.1.9 §3, and Article 5.2.4.1.10 §4)

The operator must ensure that monolithic waste materials are stable and non-reactive before they are accepted on landfills for non-hazardous wastes. Furthermore the waste must have sufficient physical stability and bearing capacity. The environmental license can establish more specific criteria.

Limit values: A liquid/solid (L/S) ratio of 10 l/kg is chosen for all limit values requested by the WAC Decision.

Sampling and test methods: The test methods for the mandatory analysis are stipulated in VLAREM II Article 5.2.4.1.12 §2. If available, CEN standards have to be used. If not, used standards have to comply with a code of good practice. For basic characterisation, compliance testing and on-site verification a sampling plan in accordance with part 1 of the sampling standard drawn up the CEN. Methods for the general properties of waste materials, leaching tests, digestion of waste materials and analysis will be amended when more CEN standards are available.

In VLAREM II Article 5.2.4.1.8 §7 several norms are listed for landfills for exclusively inorganic non-hazardous wastes with a low level of organic/biodegradable substances. The recommended methods are:

Measurement	Belgium (Flanders) standard
Extractable non-polar hydrocarbons	EPA 9071, AAC 3/R
Total solvents	AAC 3/Q
Total extractable organohalogen compounds	AAC 3/N
Water soluble fraction	DIN 38414-S4
Loss due to burning	DIN 38414-S3 AA C2/II/A.2
TOC	AAC2/II/A.7
Shear strength of sludge	AAC2filA.4
Leaching behaviour	DIN 38404-S4
pH value	DIN 38404-C5; ISO/DIS/10523; AAC2/I/A.1
Phenols in the eluate	DIN 38409-H16; ISO 6439
Analyses of Eluates – determination of Arsenic	DIN 38405-D18; ISO/DIS 11969 en 11885; NFT90-119; AAC 2/I/.2
Analyses of Eluates – determination of Pb	DIN 38406-E6; ISO 8288 en ISO/DIS 11885; NFT90-119; AAC 2/I/B.1 en B.2
Analyses of Eluates – determination of Cd	DIN 38406-E19; ISO 8288 en ISO/DIS 11885; NFT90-119; AAC 2/I/B.1 en B.2
Analyses of Eluates – determination of Cr (VI)	DIN 38405-D24; ASTM D1687; AAC 2/I/B.6
Analyses of Eluates – determination of Cu	DIN 38406-E7; ISO 8288 en ISO/DIS 11885; NFT90-119; AAC 2/I/B.1 en B.2
Analyses of Eluates – determination of Ni	DIN 38406-E11; ISO 8288 en ISO/DIS 11885; NFT90-119; AAC 2/I/B.1 en B.2
Analyses of Eluates – determination of Hg	DIN 38406-E12; ISO 5666/1-2 en 5666-3; AAC 2/I/B.3
Analyses of Eluates – determination of Zn	DIN 38406-E8; AAC2/I/C.1
Analyses of Eluates – determination of F	ISO 10359-1 en 10304-1; DIN 38405-D4; AAC 2/I/C.1
Analyses of Eluates – determination of Ammonium	ISO 7150-1 en 7150-2; DIN 38406-E5; AAC 2/I/B.4
Analyses of Eluates – determination of Cyanide	DIN 38405-D14; ISO 6703-1; AAC 2/I/C.2
Analyses of Eluates – determination of Nitrites	ISO 6777 en 10304-1; AAC 2/I/C.3

Table 1.2-3: Belgian (Flanders) norms

EN 14429 is to be used for the analysis of the DOC value inert and non-hazardous waste landfills. (VLAREM II Article 5.2.4.1.7 §4 and Article 5.2.4.1.8 §5)

The mentioned code of good practice is stipulated in the guideline “Code van goede praktijk voor het aanvaarden en storten van afval op Vlaamse stortplaatsen”.

This guideline covers:

- the legal framework including the European framework, Flames framework and the definition of granular and monolithic waste,
- waste acceptance including: waste acceptance procedures: Basic Characterization, criteria for acceptance of asbestos waste and Sampling and testing
- Installation and operation: isolated cell / salt cell

Criteria for landfills for inert waste (Flanders)

The WAC Decision criteria for landfills for inert waste (short list and leaching limits) are fully implemented by VLAREM II Article 5.2.4.1.7 §1-4.

As concerns content parameter Flemish legislation is more precise than EU legislation.

For BTEX it specifies individual limits for the different substances (Benzene, Ethylbenzene, Styrene, Toluene, Xylene), with a sum value <6. Also for PAH it lists individual limit values between 8.5 and 400 mg/kg, which can be summed up to 713.5 mg /kg for the total PAH.

Limit values for different PAH congeners	
PAH	mg/kg DS
Benzo(a)anthracene	35
Benzo(a)pyrene	8,5
Benzo(g,h,i)perylene	35
Benzo(b)fluoranthene	55
Benzo(k)fluoranthene	55
Chrysene	400
Phenanthrene	30
Fluoranthene	40
Indeno(123cd)pyrene	35
Naphthalene	20

Table 1.2-4: Individual limit values for different PAH congeners in Flemish legislation

Criteria for landfills for non-hazardous waste (Flanders)

EU criteria for landfills for non-hazardous waste are fully implemented by VLAREM II Article 5.2.4.1.8 and Article 5.2.4.1.9. List of exempted wastes and leaching limit values for non-hazardous wastes that can be co-disposed with stable non-reactive hazardous waste correspond to WAC DECISION limits. WAC DECISION provisions for gypsum waste and asbestos waste are fully adopted.

The fact that hazardous waste must have sufficient physical stability and bearing capacity and that the operator has to ensure that the monolithic materials are stable and non-reactive before they are accepted is mentioned without being specified in more detail.

In addition to WAC Decision requirements leaching limit values are set for Chromium VI, and cyanide.

The obligation to determine the ANC (acid neutralizing capacity) is adopted. It is specified that the buffer capacity of the waste must be sufficient so that the limit values for leaching also remain the same in contact with infiltrating precipitation.

For monolithic waste a special list of limit values is provided (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn). The leachability of monolithic waste has to be determined by means of batch leaching test according to NEN 7345.

In addition to these requirements Flemish legislation comprises a detailed list of wastes acceptable at class B landfills and specifies in its Article 5.2.4.1.8 §4 additional limits these wastes have to comply with (soluble hydrocarbons <2%, total solvents <1%, total extractable organohalogens <1,000 mg/kg, dry weight of sludges >10 kN/m²).

The Flemish legislation sets specific regional content and leaching limit values for inorganic non-hazardous waste that is not co-disposed with stable non-reactive hazardous waste. (VLAREM II Article 5.2.4.1.8 §7). These limits are partly stricter, partly less stringent and cover certain additional substances (e.g. Nitrites, Ammonium, Cyanide, Cr VI, pH 4-13). Wastes exceeding these limits can still be disposed of in so called salt cells.

Criteria for waste acceptable at landfills for hazardous waste (Flanders)

Criteria for waste acceptable at landfills for hazardous waste are literally implemented by VLAREM II under Article 5.2.4.1.10. In addition to WAC Decision requirements leaching limit values are set for Chromium VI, and cyanide. The pH range is fixed to 4-13.

Underground storage

Underground storage is implemented in the Flemish legislation by Article 5.2.4.1.11 and in appendix 5.2.4.1. to this order.

1.2.3 Assessment of implementation of WAC DECISION requirements by regional legislation in the Walloon Region

Currently the regional legislation only contains an explicit legislation that landfill operators have to ensure that WAC Decision requirements are complied with, whilst specific criteria and provisions are requested to be developed by Member States are not yet set. The Walloon Government has already elaborated and discussed a draft legislative document to fully implement the requirements of the WAC Decision.¹ The date of adoption is not yet set, but it has been communicated that it will certainly not be before end of this year.

This document (in the following referred to as Avant-projet (AP)) is the basis of the following analysis, although the document does not represent the current legal situation in Wallonia. Technically, within the AP, it is intended to introduce changes into a number of other legal documents. However, all references in this analysis are made with regard to the respective paragraphs of the AP and not to the legislative documents to be changed in order to avoid confusion.

¹ "Avant-projet d'arrêté du Gouvernement wallon modifiant l'arrêté du Gouvernement wallon du 27 février 2003 portant conditions sectorielles d'exploitation des centres d'enfouissement technique, l'arrêté du Gouvernement wallon du 18 mars 2004 interdisant la mise en centre d'enfouissement technique de certains déchets, l'arrêté du Gouvernement wallon du 4 juillet 2002 relatif à la procédure et à diverses mesures d'exécution du décret du 11 mars 1999 relatif au permis d'environnement et l'arrêté du Gouvernement wallon du 4 juillet 2002 arrêtant la liste des projets soumis à étude d'incidences et des installations et activités classées"

Belgium-Wallonia			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure			
1.1 Basic characterisation	AP Annex I, Annex 3, §1.1	✓	
1.1.1 Function	AP Annex I, Annex 3, §1.1.1	✓	
1.1.2 Fundamental requirements	AP Annex I, Annex 3, §1.1.2	✓	
1.1.3 Testing	AP Annex I, Annex 3, §1.1.3	✓	
1.1.4. Cases where testing is not required	AP Annex I, Annex 3, §1.1.4	✓	
1.2 Compliance testing	AP Annex I, Annex 3, §1.2	✓	
1.3 On-site verification	AP Annex I, Annex 3, §1.3	✓	
2. Acceptance criteria		✓	
2.1 Landfills for inert waste	AP Annex I, Annex 4	n/a	
2.1.1 Short list	AP Annex I, Annex 3, §1.1.4	✓	
2.1.2 Limit values	AP Annex II, Annex 4B	n/a	
2.1.2.1 Leaching limit values	AP Annex II, Annex 4B	✓	
2.1.2.2 Limit values for total content of organic parameters	AP Annex II, Annex 4B	✓	
2.2 Landfills for non-hazardous waste	AP Annex V to IX	n/a	
2.2.1 Without testing	AP Annex I, Annex 3, §1.1.4	✓	
2.2.2 Limit values for non-hazardous waste	AP Annex V to VII	✓	
2.2.3 Gypsum waste	AP Annex VII, Annex 3bis, § B	✓	
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii		n/a	
2.3.1 Leaching limit values	AP Annex II, Annex 4B	✓	
2.3.2 Other criteria	AP Annex II, Annex 4B	~	No ANC to be evaluated
2.3.3 Asbestos waste	AP Annex VII, Annex 3bis, § A	✓	
2.4. Landfills for hazardous waste	AP, Annex IX	n/a	
2.4.1 Leaching limit values	AP Annex IX	✓	
2.4.2 Other criteria	AP Annex IX	~	No ANC to be evaluated
2.5 Criteria for underground storage	AP Annex X	✓	

Table 1.2-5: Implementation of WAC Decision requirements in regional legislation in the Walloon Region

1.2.3.1 Legal framework (Wallonia)

The legal framework for landfill of waste and implementation of the landfill directive consists of several legal documents which have been amended several times.

- The basic document is the decree on landfill of waste from July 1987 (Arrêté de l'Exécutif régional Wallon du 23 juillet 1987 relatif aux décharges contrôlées)
- The Regional decree of 1996 banned landfill of waste from January 2010 and requested a planning of landfill construction on the territory.

- The decree of 1998 adopted the Walloon WMP.
- The decree of 1999 (décret du mars 1999 relatif au permis d'environnement) most of the aspects of Directive 1999/31/EC have in adopted by establishing landfill classes and environmental permitting procedure.
- The Waste catalogue 1997
- The Arrêté du Gouvernement Wallon from 2003 (AGW 2003) transposed all technical requirements of the Landfill Directive except of the exclusion of certain waste streams.
- The Arrêté du Gouvernement Wallon from 2003 (AGW 2004) specifies all waste streams which are excluded from landfilling, adding additional waste types at different intervals. Since 2004 only "ultimate" MSW waste it is allowed for landfilling. From January 2010 the landfilling of organic biodegradable waste will be completely banned.

According to information from regional authorities the **Waste Acceptance Criteria Decision** (Decision 2003/33/EC) has not yet been transposed into regional law, but a proposal (avant-projet) has been elaborated which might enter into force by end of this year.

Acceptance procedures and sampling methods request a modification of the AGW from 27 February 2003. The acceptance criteria request a modification of AGW from 18 march 2004 (ban of landfill for certain waste types) and of AGW from 10 July 1997 (waste catalogue)

The classification of landfills (Centres d'enfouissement (CET)) as indicated in the AP is in line with the WAC Decision as follows:

- CET class 1 – landfills for hazardous waste;
- CET class 2 – landfills for non-hazardous waste with the subcategories;
- CET Class 2.1.a: landfill for inorganic non-hazardous wastes with a low organic/biodegradable content; which do not meet the criteria for co-disposal with stable non-reactive hazardous waste
- CET Class 2.1.b: landfill for inorganic non-hazardous wastes with a low organic/biodegradable content, which meet the criteria for co-disposal with stable non-reactive hazardous;
- CET Class 2.2: landfill for mixed non-hazardous wastes containing a substantial quantity of organic/biodegradable waste and inorganic wastes;
- CET class 3 – landfill for inert waste.

Under current legislation (AGW 2003) there are five classes of landfills:

- Class 1: Sanitary landfills for hazardous but non-toxic waste
- Class 2: Sanitary landfills for domestic and similar waste (Class 2a) or non-hazardous, non-toxic industrial waste (Class 2b)
- Class 3: Sanitary landfills for inert waste
- Class 4: Sanitary landfills for the disposal of certain wastes resulting from the cleaning and dredging of waterways and water bodies
- Class 5: Sanitary landfills for the exclusive use of industrial waste generators (internal landfills).

1.2.3.2 Acceptance Procedure (Wallonia)

Basic characterisation (Wallonia)

Following the AP, the basic characterisation is implemented by Annex 1, Annex 3, §1.1 and literally compliant to the wording of the WAC Decision. The record keeping period of the basic characterisation is not mentioned in this document but reference is made to Article 25 of the “Arrêté du Gouvernement wallon du 27 février 2003 portant conditions sectorielles d’exploitation des centres d’enfouissement technique”. This document is not publicly available.

Compliance testing (Wallonia)

Following the AP, compliance testing is implemented by Annex 1, Annex 3, §1.2 and literally compliant to the wording of the WAC Decision. Compliance testing shall be done at least once a year. The record keeping period for compliance testing is not mentioned in this document but reference is made to Article 25 of the “Arrêté du Gouvernement wallon du 27 février 2003 portant conditions sectorielles d’exploitation des centres d’enfouissement technique”. This document is not publicly available.

On-site verification (Wallonia)

Following the AP, on-site verification is implemented by Annex 1, Annex 3, §1.3, literally compliant to the wording of the WAC. Samples have to be kept for at least one month.

According to current legislation (AGW 2003, Art. 22) on-site acceptance procedures comprise technical equipment (weighing bridge, camera, and detection device for radioactivity) as well as a detailed obligation for a visual control on the basis of waste unloaded for this purpose (minimum one vehicle daily).

Art. 22 §4 explicitly obliges landfill operators to assure the execution of the obligations which are imposed on him by Decision 2003/33/EC, in conformity with article 16 and Annex II of Directive 1999/31/EC.

Pursuant to Art. 24 AGW 2003, all waste transports have to be accompanied by a transport document (bordereau d’identification) indicating the origin, the producer, weight, disposal date and EWC code, the license plate number, the internal identification code, the carrier identity. This information is to be kept for 5 years.

1.2.3.3 Waste acceptance criteria (Wallonia)

The WAC Decision standards are literally implemented in Section 2 of Annex 1 to the AP.

According to current legislation in force, all waste types meeting the criteria of the decree 1999 are acceptable if a further limitation is not required due to specific technical characteristics.

Waste according to Walloon legislation is classified in the three categories:

- B: Biodegradable
- NB: Non biodegradable
- C: Not biodegradable but compatible with category B

A mixed disposal of categories B and NB is prohibited.

Wastes excluded from landfill pursuant to AGW 2004 comprise the ones listed in Article 5 of the Landfill Directive plus a long list of other EWC codes, such as all separately collected waste fractions, MSW from commerce and institutions, batteries, WEEE, ELV, waste wood and other biodegradable wastes. Further exclusions are requested for 2004, 2007, 2009 and finally 2010.

Criteria for landfills for inert waste (Wallonia)

Criteria for landfills for inert waste are implemented by Annex IV of the AP. The chosen test method is L/S = 10 l/kg. The leaching limit values of the WAC Decision are fully transposed into the AP.

Detailed indicators for the BTEX compounds are introduced. Additional limit values are set for styrene. The leaching limit values for PAH are set as follows: Different PAH congeners are listed with limit values with concentrations between 8.5 and 400 mg/kg, which can be summed up to 713.5 mg/kg for the total PAH (10 congeners).

Under current legislation inert wastes are specified by EWC code and description in a table in the 1997 waste catalogue. Inert wastes may also be admitted in landfills for non-hazardous waste (class 2)

Criteria for landfills for non-hazardous waste (Wallonia)

Annexes V, VI, and VIII of the AP. implement criteria for the diverse classes of landfills for non-hazardous waste. Particular regulatory attention is paid to asbestos waste and gypsum waste addressed in Annex VII of AP. Evaluation of the ANC is not requested.

Current legislation (AGW 2004) comprises a long list of wastes that are excluded from landfill, because they can be recovered by other treatment methods, namely all separately collected waste fraction, and biodegradable waste.

Inert wastes, dredging sludge and stable non-reactive hazardous waste (e.g. solidified or vitrified) can be accepted if compliant with the analytical criteria (limit values).

Stable, non-reactive hazardous waste however, may only be disposed of in small quantities and in separate cells that do not receive biodegradable waste. The authorisation may only be given after an EIA from competent certified experts.

Criteria for class 2.1.a landfills

Criteria for landfills of class 2.1.a are laid down in Annex V of the AP.

A distinction of granular and monolithic waste is introduced. Monolithic waste is defined as waste of which a core sampling is possible on the basis of the protocol described in points 4.2 to 4.4 in French norm XP-X31-212 (version of July 1995); and which fulfils the criteria of diverse mechanical tests described in detail. Granular waste is defined as all wastes which is not monolithic. The limit values to be met are identical for both waste types categories.

Criteria for class 2.1.b landfills

Criteria for landfills of class 2.1.b are laid down in Annex VI of the AP.

The distinction of granular and monolithic waste is the same as for landfills of class 2.1.a. The limit values for both categories are identical.

L/S = 10 l/kg according to European standard EN-12457-2 or 4 is chosen for testing. The limit values are congruent with those set out in the WAC Decision.

Criteria for class 2.2 landfills

Annex VIII of the AP lay down criteria for landfills of class 2.2 in. Since no limit values are set for this type of landfill in EU legislation, no divergence can be identified.

Asbestos waste and gypsum waste

Criteria for the acceptance of asbestos waste at landfills are laid down in Annex VII of the AP.

The WAC Decision requirements for asbestos waste (chapter 2.3.3) and gypsum waste (chapter 2.2.3) are literally reflected in Annex VII of AP.

Criteria for waste acceptable at landfills for hazardous waste (Wallonia)

Criteria for landfills for hazardous waste are implemented by Annex IX of the AP.

Criteria for landfills for inert waste are implemented by Annex IX of the AP. The chosen test method is leaching test L/S = 10 l/kg and European standard EN-12457-2 or 4.

The leaching limit values for granular waste are implemented by AP, Annex IX, Annex 5, Part A congruently to respective WAC DECISION requirements. Furthermore limit values for phenol index and additional organic parameters (BTEX, PCB, and styrene) are defined as additional parameters to be tested. Evaluation of the ANC is not implemented.

Samples of monolithic waste are to be ground to particle <10 mm before leaching behaviour is tested according to EN-12457-4. The leaching limit values for monolithic waste, as set out in part B of the respective Annex correspond to the limit values for granular waste.

Underground storage

Underground storage is addressed in Annex X of AP.

A specific safety assessment has to be performed. Only waste which meet the criteria of the respective landfill class might be accepted at an underground storage for the pertinent class.

As regards hazardous waste, reference is made to the relevant Decree of Walloon Government (Annex 3 of the "Arrêté du Gouvernement wallon du 27 février 2003 fixant les conditions sectorielles d'exploitation des centres d'enfouissement technique") and has to undergo a specific acceptance procedure.

1.2.4 Site visit in Belgium

Organisation of the site visit in Belgium has been done in cooperation with the Flemish Ministry of Environment.

The landfill site **Indaver Antwerp** (hazardous landfill site, class C landfill) has been selected (see also Annex 2, Table 4-2).

The tasks of landfill operators start with the assessment of acceptability of a certain type of waste and comprise the actual acceptance of wastes arriving at the landfill. These procedures may differ by type of landfill and operator. Furthermore, some general information (e.g. location, size, technical standard, accepted waste) as well as specific systems installed for documentation may be helpful for the assessment of the on the ground enforcement of legal requirements. The description of each landfill visit is structured into the sections “general terms” (background information) and “waste acceptance procedures” (basic characterisation, compliance testing, on-site verification).

1.2.4.1 Site visit to representative hazardous waste landfill (Indaver Antwerp, landfill class C)

General terms

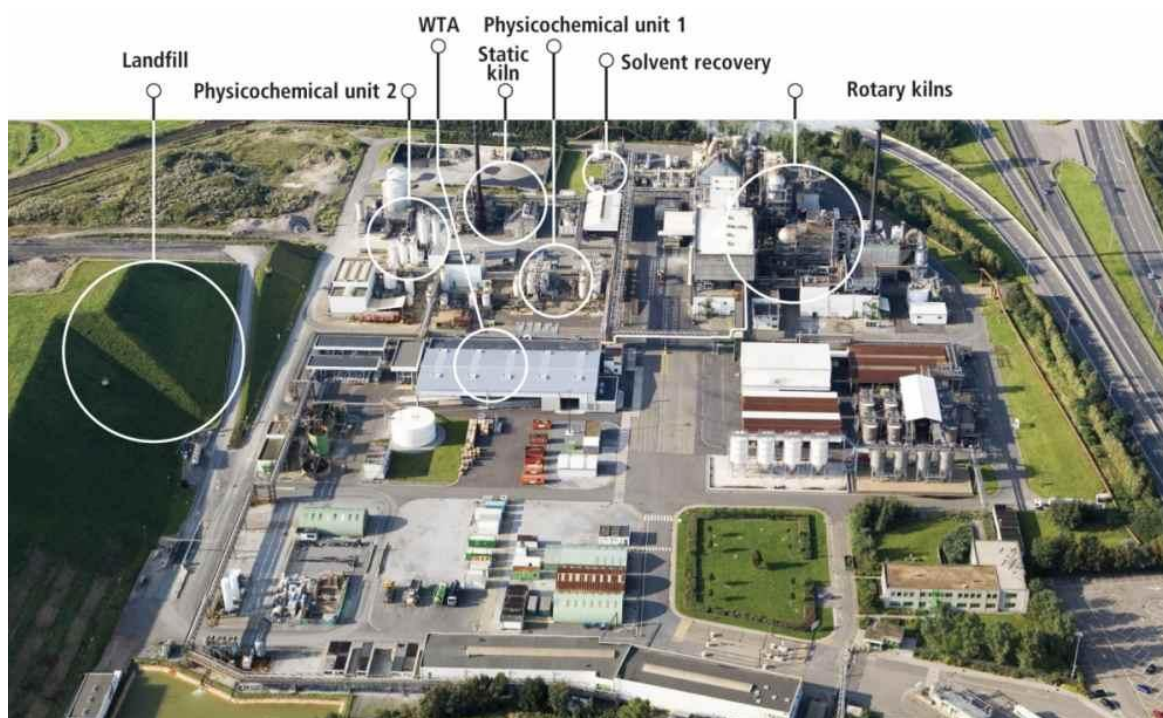


Figure-1.2-1: Overview of the landfill Indaver Antwerp (Belgium, Flanders)

The landfill site Indaver came into operation in 1987. Today, it consists of three different sections of which Section 1 was shut down in July 2009 due to the entry into force of the Landfill Directive 1999/31/EC. The landfilling covers an area of about 11ha, of which about 3ha have been closed down. The overall capacity is about 2,700,000m³. 50 % is already filled. The landfill will continue operating at least until 2020.

Wastes accepted on the landfill have two origins, either from internal treatment activities or from external origin. The first type of waste is external waste from industries in direct contact with the landfill site. This waste type accounts for about one third of the landfilled material. The other 70 % arise as residues from

the internal physico-chemical treatment facility. 40 % of these internal residues from the physico-chemical treatment plant have their origin from external waste; 30% arise from the treatment of different ashes from the internal hazardous waste incineration plant. In addition, asbestos waste is also deposited. Due to the fact that it is a hazardous landfill, there are no separated cells for this purpose.

The Indaver site at Antwerp is an integrated plant including a high temperature incinerator, a physico-chemical treatment facility and a landfill for hazardous waste.

Waste acceptance procedure

The analytical laboratory of Indaver, running the analyses for basic characterisation, compliance testing and on-site verification, collects all relevant data with an electronic Laboratory Information Management System (LIMS). This system is connected to the company management software (SAP) of Indaver. LIMS is also used to manage all acceptance procedures and instructions and the documentation of the waste data.

The process flow of waste acceptance at Indaver Antwerp is the following:

1. Once a waste type is deemed to be acceptable at the landfill, based on its characteristics as specified in the basic characterisation an identification form (Identificatieformulier van (gevaarlijke) afvalstoffen) or “CMR” transport form is filled in. It includes, among others, data about waste producer, contractor, landfill operator, EWC code, amount and the signature of the person responsible for the loaded waste.
2. The awaited load arrives at the entrance gate and the documents carried by the driver, are checked at the reception. If all documents such as the identification form or the CMR pass the check – by using the internal number from the documents and comparing it with the LIMS/SAP – the load will be verified by the laboratory. Therefore the laboratory at the entrance gate receives a signal from the reception to start the verification. The driver gets a note that is used at the weighbridge.
3. In the laboratory on-site verification by means of a visual inspection is performed. If necessary, a sample for analytical verification is taken. The results are registered in the computer and the waste enters the landfill site, if it passed the analyses.
4. The next station is the weighbridge from where the load continues its way either to the active landfill cell (place of unloading) of the landfill (Point 5), the high temperature incinerator (Point 6) or to the physico- chemical treatment facility (Point 7). At the weighbridge the driver uses the note which he received at the reception desk.
5. In front of the place of unloading the documents are checked again by the landfill operator to guarantee that no waste which should be treated physico-chemically or thermally is unloaded at the place of unloading. An employee of the landfill site equipped with a radio, advises the driver where to unload the waste and controls the disposal.
6. Waste that has to be incinerated is directed towards the high temperature incinerator. After the incineration of the waste, the different ash fractions are sent to the “place of unloading” (bottom ashes after deironisation) or the physico- chemical treatment plant for stabilisation (fly ashes / boiler ashes).

7. Waste brought to the physico-chemical treatment area has an external origin or is an internal waste from the high temperature incinerator. The stabilised treatment residues are landfilled.
8. Waste from the physico- chemical treatment facility and the high temperature incinerator is landfilled with samples taken and analysed in regular intervals.
9. After unloading, the lorry is weighed again at the weighbridge by using the received note from the reception desk.

The gathered information is printed and stored as a paper version as well as electronically saved without a specific time limit. Samples are kept for at least one month. Analysing results from the samples are stored in the software system without a time limit.

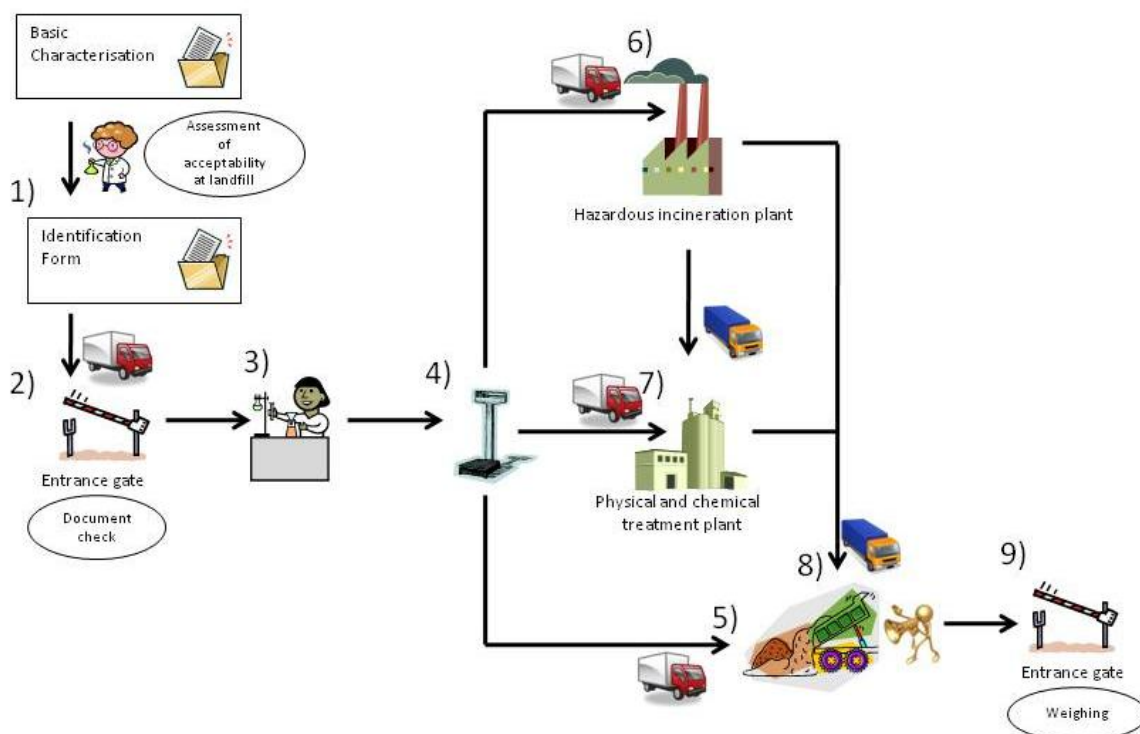


Figure 1.2-2: Flow chart of the waste acceptance procedure at Indaver (Belgium, Flanders)

Basic characterisation

In case of residues from the physico-chemical treatment facility, the basic characterisation of the waste as well as a list of historical data already is already available. The frequency and key parameters for the compliance testing are set.

In case of external waste the samples are handed over by the waste producer and analysed by the landfill operator with some support of the waste producer giving information (e.g. concerning the process of waste production or raw materials).

An electronic dossier for each waste is created in the LIMS. Each waste stream receives an internal reference number (**Abfallstoffstromnummer (ASSN)**). Each internal number has a basic characterisation stored in the system. It records also data on the waste producer, destination of landfilled waste on the landfill site, physical form of the waste or analytic results.

In case one of the waste parameters changes (e.g. the waste composition) and therefore would require another treatment, the waste receives a new internal number. For that reason one waste stream can have different internal reference numbers.

If the analytical results of the basic characterisation are within a range of $\pm 20\%$ of the legal limit value, the LIMS automatically defines that each load has to be verified for this parameter. Consequently during the basic characterisation the key parameter and frequency is defined. This approach is considered to be the on-site verification analyses. Criteria can be set more stringent than proposed by the LIMS but not less strict.

Before a quotation for a new waste stream can be given, its electronic dossier has to pass three consecutive steps (the laboratory agreement, the landfill operator agreement and the commercial agreement). If one of the involved departments cannot agree, the waste cannot be accepted.

Compliance testing

The company has a lot of historical data and experience concerning residues of the physico-chemical treatment facility. In the past compliance testing was performed once a week and is currently performed approximately once in three months with a main focus on metal leaching values. The stabilised and encapsulated waste is landfilled and after 28 days of curing the sampling is performed. In case the limit values are exceeded, local authorities are informed and a risk assessment for the environment is made. Furthermore, an investigation is started to identify the cause of the exceedance and to avoid this in the future.

The samples of external waste made by waste producers are regularly analysed. In case waste is accepted and only an after-control proves an exceedance of limit values, local authorities are informed. If necessary, the material is dug out of the landfill and is sent back to the waste producer.

The compliance testing includes the full range of analyses as done during the basic characterisation.

Trends of the analysed parameters are checked and based on these results, the frequency of sampling and the key parameters are set.

On-site verification

After arrival at the weighbridge, the documents are checked and the lorry is weighed. For this purpose the internal reference number on the documents carried with the load is cross-checked with the available LIMS data.

At least a visual inspection of the waste is made, before it may enter the landfill site. If necessary, samples are taken from the lorry and analysed in the laboratory.

After passing the weighbridge, the lorry driver is sent to the place of unloading. In front of the place of unloading the documents are checked a second time. Afterwards the waste can proceed to the disposal area. There the unloading is controlled by an employee of the landfill site.

In case of suspicion the supervisor is informed. As the case arises, it is decided how to proceed. In general the waste producer is contacted and the analysing results are checked again.

Expert proposals related to potential modifications of the WAC Decision

No proposals have been expressed for potential amendment of the WAC Decision.

1.3 Country report Denmark

The WAC Decision is very well implemented by Danish legislation.

Except of the following minor aspects there are no divergences:

- In exceedance to EU restrictions, Cd, Hg and Pb are excluded from the possibility to permit higher limit values in specific cases.
- In several landfill types and substances additional limit values are established
- Denmark has defined wide range of landfill subcategories in each landfill class with limit values being largely more stringent than set at EU scale.
- A short list for inert wastes exempted from testing is not contained in the Danish law, but there is referral to a national list from the EPA. Only after a corresponding basic characterisation was considered a waste can be add to the list.
- Provisions concerning underground storage are not set. (Due to the lack of underground storage systems in Denmark)
- Monolithic waste is defined, but specific criteria to assure the same level of environmental protection as mentioned in the WAC Decision are not set. However see section 1.3.1.3. for details.

1.3.1 Assessment of legal compliance with the WAC Decision

The following table provides an overview on the legal documents transposing WAC Decision requirements into national legislation. Furthermore, the table shows a qualitative assessment of the level of implementation or possible divergences which are further explained and justified in the following Sections.

Denmark			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure		n/a	
1.1 Basic characterisation		✓	
1.1.1 Function	§19- 20 and Annex 3 and 7 to Statutory Order No. 252 of 31 March 2009 on landfilling	✓	
1.1.2 Fundamental requirements	Annex 3 to Statutory Order No. 252 of 31 March 2009 on landfilling	✓	
1.1.3 Testing	Annex 3 and 7 to Statutory Order No. 252 of 31 March 2009 on landfilling	✓	
1.1.4. Cases where testing is not required	§29, Annex 3 and 7 to Statutory Order No. 252 of 31 March 2009 on landfilling	✓	
1.2 Compliance testing	§21-22, Annex 3 and 7 to Statutory Order No. 252 of 31 March 2009 on landfilling	✓	
1.3 On-site verification	§25 and Annex 7 to Statutory Order No. 252 of 31 March 2009 on landfilling	~	Period for sample keeping is not set

Denmark			
Category	Corresponding national legislation	Implementation	Comments
2. Acceptance criteria	§18 (3) and Annex 3 to Statutory Order No. 252 of 31 March 2009 on landfilling	+	No permit for higher limit values for Cd, Hg, Pb
2.1 Landfills for inert waste		n/a	
2.1.1 Short list	Section 2.3 of Annex 3 to Statutory Order No. 252 of 31 March 2009 on landfilling	✓	
2.1.2 Limit values		n/a	
2.1.2.1 Leaching limit values	Table 3.2, 3.3 and 3.4 of Annex 3 to Statutory Order No. 252 of 31 March 2009 on landfilling	+	Some leaching limit values for inert waste to be disposed on landfills for inert waste are more stringent than in the WAC Decision. Denmark has decided not to include the option to determine the limit value for TDS.
2.1.2.2 Limit values for total content of organic parameters	Table 3.1 of Annex 3 to Statutory Order No. 252 of 31 March 2009 on landfilling	+	Additional limit values are included.
2.2 Landfills for non-hazardous waste		n/a	
2.2.1 Without testing	§6 and 7 of Annex 3 to Statutory Order No. 252 of 31 March 2009 on landfilling	✓	
2.2.2 Limit values for non-hazardous waste	§6.5 of Annex 3 to Statutory Order No. 252 of 31 March 2009 on landfilling	~	Denmark has not implemented criteria for monolithic waste. It has decided not to include the option to determine the limit value for TDS.
2.2.3 Gypsum waste	§6.3 of Annex 3 to Statutory Order No. 252 of 31 March 2009 on landfilling	✓	
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii		n/a	
2.3.1 Leaching limit values	Table 3.9 of Annex 3 to Statutory Order No. 252 of 31 March 2009 on landfilling	~	Denmark has not implemented criteria for monolithic waste. Some leaching limit values for hazardous waste to be disposed on landfills for non-hazardous waste are more stringent than in the WAC Decision. Denmark has decided not to include the option to determine the limit value for TDS.
2.3.2 Other criteria	Table 3.6 and 3.7 of Annex 3 to Statutory Order No. 252 of 31 March 2009 on landfilling	+	Additional limit values are indicated.
2.3.3 Asbestos waste	§6.4 of Annex 3 to Statutory Order No. 252 of 31 March 2009 on landfilling	✓	
2.4. Landfills for hazardous waste		n/a	
2.4.1 Leaching limit values	§8 of Annex 3 to Statutory Order	~	Denmark has not implemented

Denmark			
Category	Corresponding national legislation	Implementation	Comments
	No. 252 of 31 March 2009 on landfilling		criteria for monolithic waste. Some leaching limit values for hazardous waste to be disposed on landfills for hazardous waste are more stringent than in the WAC Decision. Denmark has decided not to include the option to determine the limit value for TDS.
2.4.2 Other criteria	§8 of Annex 3 to Statutory Order No. 252 of 31 March 2009 on landfilling	+	A limit value for PCB is also set.
2.5 Criteria for underground storage		-	The Danish Ministry of Climate and Energy may, after the matter has been submitted to the parliamentary energy committee, authorize underground storage. Currently, there is no permit for underground storage. It is not expected to happen in the future.

Table 1.3-1: Implementation of WAC Decision in the Danish Legislation

1.3.1.1 Legal framework

The WAC Decision has been implemented in the Danish regulation by the Statutory Order No. 252 of 31 March 2009 (Statutory Order 252).

According to §5.2, 6.2 and 8.2 of Annex 3 of the Statutory Order, there are more subcategories for the different landfill classes as indicated by the WAC Decision.

The landfill classes are defined as follows:

- Inert waste landfills:
 - **IA0:** Inert waste landfills in a non coastal position with limit values more stringent than WAC Decision ;
 - **IA1:** Inert waste landfills in a coastal position with limit values identical to WAC Decision ;
 - **IA2:** Inert waste landfills in a coastal position with limit values more stringent than WAC Decision.
- Non-hazardous waste landfills (mineral waste landfills):
 - **MA0:** Non-hazardous landfills in a non coastal position with limit values more stringent than WAC Decision ;
 - **MA1:** Non-hazardous landfills in a coastal position with limit values identical to WAC Decision ;
 - **MA2:** Non-hazardous landfills in a coastal position with limit values more stringent than WAC Decision.

- Non-hazardous waste landfills (mixed waste landfills)
 - Mixed waste landfills in a non coastal position, no testing required.
 - Mixed waste landfills in a coastal position, no testing required.
- Hazardous waste landfills:
 - **FA0:** Hazardous landfills in a non-coastal position with limit values more stringent than WAC Decision
 - **FA1:** Hazardous landfills with limit values identical to the WAC Decision
 - **FA2:** Hazardous landfills with limit values more stringent than indicated in FA1
 - **FA3:** Hazardous landfills with limit values more stringent than indicated in FA2

1.3.1.2 *Acceptance procedure*

Basic characterisation

Basic characterisation is implemented by §19-20, 29, Annex 3 and 7 to the Statutory Order 252. In case of hazardous waste, the basic characterisation has to include physical stability and bearing capacity.

All relevant information of the basic characterisation has to be kept for 10 years.

Compliance testing

Compliance testing is implemented by §21 - 22 and Annex 3 and 7 to the Statutory Order 252. The waste producers are in charge of preparing the compliance testing, which has to be done at least once a year. In case of considerable difference to the basic characterisation, the landfill operator has to reject the waste and has to inform the authorities. Samples shall be retained for at least one year.

On-site verification

On-site verification is implemented by §25 and Annex 7 to the Statutory Order 252. The Danish legislation states that an on-site verification has to be performed at the entrance to the landfill site as well as at the landfill site. Spot test for non hazardous mixed waste shall be done at least once a month. As regarding inert waste, mineral waste and hazardous waste the competent (licensing) authority may put down requirements for testing as part of the on-site verification.

Period for sample keeping is not set.

1.3.1.3 Waste acceptance criteria

Higher limits: According to §18 of the Statutory Order 252 authorities can accept in specific cases waste with contamination exceeding the limit values. In addition to limitations in the WAC Decision there is no possibility to permit disposal of waste with higher Cd, Hg and Pb contents as well as higher TOC limit value for inert landfills. For a permit of higher limit values a weighted dilution factor has to be calculated which has to be < 1. Permits for higher limit values are described in Section 9 and 10 of Annex 3 to the Statutory Order 252.

Reporting on permits: To be able to report to the EU Commission, the competent authority – on request from the Danish EPA – shall forward the numbers of permits decided in the previous year according to §18, subsection 3 (and Annex 3, point 9) - including a short description of the basis for the individual permits (Danish Statutory Order no. 252 (cf. §28, subsection 1, point 2)).

Limit values are listed in Annex 3 to the Statutory Order 252. The limit values are given for L/S = 2 l/kg, L/S=10 l/kg and for the percolation test. Limit values that are identical with the WAC Decision are typed cursive and bold.

According to the Council Decision the limit value for TDS can be used alternatively to limit values for sulphate and chloride. Denmark has decided not to include the option to determine the limit value for TDS.

Excluding the use of TDS can be regarded as being more stringent in relation to the individual limit values for sulphate and chloride than allowing the use of TDS as in the Council Decision.

Measurement	Danish standard
Characterisation of waste - Determination of total organic carbon (TOC) in waste	DS/EN 13137
Characterisation of waste - Calculation of dry matter by determination of dry residue or water content	DS/EN 14346
Characterisation of waste - Leaching behaviour tests - Up-flow percolation test (under specified conditions)	DS/CEN/TS 14405
Characterisation of waste - Leaching; Compliance test for leaching of granular and sludges	DS/EN 12457 1-4
Characterisation of waste - Digestion for subsequent determination of aqua regia soluble portion of elements in waste	DS/EN 13657
Characterisation of waste - Microwave assisted digestion with hydrofluoric (HF), nitric (HNO ₃) and hydrochloric (HCl) acid mixture for subsequent determination of elements in waste	DS/EN 13656
Characterisation of waste - Analysis of eluates - Determination of pH, As, Ba, Cd, Cl-, Co, Cr, Cr(VI), Cu, Mo, Ni, NO ₂ -, Pb, total S, SO ₄ ²⁻ , V and Zn	DS/EN 12506
Characterisation of waste - Analysis of eluates - Determination of Ammonium, AOX, conductivity, Hg, phenol index, TOC, CN- easily liberatable, F-	DS/EN 13370
Characterisation of waste - Determination of hydrocarbon content in the range of C10 to C40 by gas chromatography	DS/EN 14039
Characterisation of waste - Leaching behaviour tests - Influence of pH on leaching with continuous pH	DS/CEN/TS 14429
Characterisation of waste - Leaching behaviour tests - Influence of pH on leaching with continuous pH-control	DS/CEN/TS 14997
Characterisation of waste - Leaching behaviour tests - Acid and base neutralisation capacity test	DS/CEN/TS 15364

Measurement	Danish standard
Characterisation of waste - Determination of polycyclic aromatic hydrocarbons (PAH) in waste using gas chromatography mass spectrometry (GC/MS)	DSF/prEN 15527
Characterisation of waste - Determination of selected polychlorinated biphenyls (PCB) in solid waste by using capillary gas chromatography with electron capture or mass spectrometric detection	DFS/prEN 15308
Water quality - Determination of 33 elements by inductively coupled plasma atomic emission spectroscopy.	DS/EN 11885
Water quality - Determination of dissolved anions by liquid chromatography of ions - Part 1: Determination of bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulphate	DS/EN 10304-170
Water analysis - Guidelines for the determination of total organic carbon (TOC) and dissolved organic carbon (DOC)	DS/EN 1484
Characterisation of waste - Determination of total dissolved solids (TDS) in water and eluates	DS/EN 15216
Characterisation of waste - Sampling of waste materials - Framework for the preparation and application of a sampling plan	DS/EN 14899

Table 1.3-2: Danish sampling and analysis standards

Guidelines are available in the internet:

http://www.mst.dk/Affald/Deponering/Vejledende_udtalelser_om_deponeringsbekendtgørelsen.htm

The listed Guidelines cover the topics: Characterization and classification, financial security for after-care period, tests and analyzes, after care and artificial barriers.

Criteria for landfills for inert waste

Limit values for landfills for inert waste are listed in Section 5 of Annex 3 to the Statutory Order 252. Each of the three different landfill classes for inert wastes has to meet different leaching limit values.

Class IA0:

- The DOC value is much more stringent than in the WAC Decision (50 mg/kg, 140 mg/kg, and 30 mg/l).
- The C_0 limit value for Sb of 0.1 mg/l in the WAC Decision.² has been corrected into 0.01 mg/l

Class IA1: limit values are identical to the WAC Decision.

Class IA2:

- The leaching limit value of Ba is more stringent (4 mg/kg, 12 mg/kg, and 2.5 mg/l).

The limit values for PAH (Fluoranthene, Benz(b+j+k)fluoranthene, Benz(a)pyrene, Dibenzo(a,h)anthracene and Indeno(1,2,3-c,d)pyrene) is set at 4 mg/kg for all inert waste landfills.

Additional total content values are set for Benzene (1,5 mg/kg) and Naphthalene (0,5 mg/kg).

² This is a typing failure in the Council Decision since the limit value for C_0 (percolating test) in Section 2.1 regarding Antimony (Sb) should be 0,01 mg/l instead of 0,1 mg/l.

A short list for inert wastes exempted from testing is not contained in the Danish law, but it is referred to a national list from the EPA. Only after a corresponding basic characterisation was considered a waste type can be added to the list.

Criteria for landfills for non-hazardous waste

Criteria for landfills for non-hazardous waste are listed in Section 6 of Annex 3 to the Statutory Order 252. Each of the three different classes for non-hazardous waste landfill has different leaching limit values for non-hazardous waste (so called mineral waste). Landfills for non-hazardous waste according to Danish legislation may not accept hazardous waste, hence there are no limit values set by the WAC Decision.

In case of the landfill class MA0 all limit values are much more stringent than the ones set in the WAC Decision for non-hazardous waste to be co-disposed with stable, non-reactive hazardous waste.

In case of the landfill class MA1 all limit values are identical to the ones set in the WAC Decision for non-hazardous waste to be co-disposed with stable, non-reactive hazardous waste.

In case of the landfill class MA2, there are some variances to the ones set in the WAC Decision for non-hazardous waste to be co-disposed with stable, non-reactive hazardous waste:

- The leaching limit value of Ba is for all three test methods more stringent (~70 % more stringent 10 mg/kg, 30 mg/kg, 6 mg/l);
- The leaching limit value of Cr is for all three test methods more stringent (~60 % more stringent 1.5 mg/kg, 4 mg/kg, 1 mg/l);
- The leaching limit value of Cu is for all three test methods more stringent (~30 - 70 % more stringent 15 mg/kg, 35 mg/kg, 10 mg/l).

Additional to the limit values for TOC, pH and ANC (must be evaluated) the Danish regulation includes further limit values (BTEX (15 mg/kg TS), PCB (10 mg/kg TS), mineral oil (450 mg/kg TS), PAH (75 mg/kg TS) and Naphthalene (5 mg/kg TS).

Gypsum waste is only allowed to be landfilled at landfills for mineral waste. Gypsum waste with a TOC content of more than 5 % has either to be treated to reduce the organic content or it has to be landfilled underground. Gypsum waste cannot be disposed on landfills for mixed waste.

Monolithic waste and granular waste are defined in the Danish legislation, but no criteria for the monolithic waste are set.

Concerning monolithic waste the Danish EPA gave the following statement:

The heading of Section 3: Programme for basic characterisation testing [of solid waste] in Annex 7 to the Statutory Order originally had a footnote that read: "In this context solid waste means waste that is not a gas or a liquid. Solid waste includes sludge and when selecting the test method no distinction is made based on particle size, i.e. no distinction is made between granular and monolithic waste. Waste with particle sizes larger than the 4 to 10 mm which is prescribed in the test methods to be applied shall be crushed (or removed in the case of stones present in contaminated soil) before testing in such a manner that the waste fulfils the prescribed conditions for testing (under equilibrium-like conditions)." This footnote has

disappeared from the published version of the Statutory Order, apparently by mistake. Text to this effect will be inserted in the Statutory Order, which is currently being revised due to changes in the Danish infrastructure.

A Study carried out under Danish leadership (DHI) in co-operation with Sweden (SGI) and Finland (VTT) providing results as mentioned below is used as basis for acceptance and analysis of monolithic waste:

Denmark, Norway, Finland, and Sweden cooperated within a project to set specific limit values for monolithic waste. The project showed – under the conditions used in scenarios and according to calculations based on test data – that the release of most components at the bottom of landfills will be very likely equilibrium controlled rather than diffusion controlled. Physical treatment (such as stabilisation) does not affect leached quantities. The top cover requirements in the landfill scenarios for non-hazardous and hazardous waste, allow so little water to penetrate into the landfill that it leads to equilibrium conditions.

Consequently, the same criteria and the same test methods as for granular waste were deemed to be used. The available test methods were concluded to correspond to most of the actual equilibrium controlled situation in the landfill. The material is to be crushed prior to testing in these test methods in order to accelerate the time to reach local chemical equilibrium.

Infobox 1.4-1: Criteria for monolithic waste to provide same level of environmental protection as for granular waste

The report can be downloaded at:

<http://www.norden.org/da/publikationer/publikationer/2006-555/>

Asbestos waste is allowed to be deposited on landfills for mineral waste (MA0, MA1 and MA2). All WAC DECISION provisions for management of asbestos waste are implemented in the Danish legislation

Section 7 of Annex 3 to the Statutory Order 252 includes mixed waste landfills which do not have any leaching limit values. The mixed waste may not be mixed with hazardous compounds. It may only be landfilled on landfills for mixed waste if it cannot be landfilled on landfills for inert or non-hazardous waste. On-site testing has to be done at least once a month.

Criteria for waste acceptable at landfills for hazardous waste

Criteria for landfills for hazardous waste are listed in Section 8 of Annex 3 to the Statutory Order 252. Each of the four different categories for hazardous waste landfill has different leaching limit values.

Class FA0: all limit values are much more stringent than the WAC Decision; a TDS value cannot be used instead of sulphate or chloride.

Class FA1: Limit values are identical to the WAC Decision, but a TDS value cannot be used instead of sulphate or chloride.

Class FA2:

- The leaching limit value of Cr is 50 % (12 mg/kg, 35 mg/kg, 7 mg/l) more stringent than the WAC DECISION limit;
- The leaching limit value of Cu is 30 - 70 % (30 mg/kg, 70 mg/kg, 20 mg/l) more stringent than the WAC DECISION limit;
- A TDS limit is not set (in accordance with the WAC Decision , because foreseen as alternative to the values for S and chloride)
- A PCB limit value is set at 50mg/kg TS (based on 2004/850/EC).

Class FA 3:

- The leaching limit value of Ba (25 mg/kg, 75 mg/kg, 15 mg/l) is more stringent than the WAC DECISION limit;
- The leaching limit value of Cr (3.5 mg/kg, 10 mg/kg, 2.5 mg/l) is more stringent than the WAC DECISION limit;
- The leaching limit value of Cu (25 mg/kg, 55 mg/kg, 17 mg/l) is more stringent than the WAC DECISION limit;
- The leaching limit value of Antimony (1 mg/kg, 3.5 mg/kg, 0.6 mg/l) is more stringent than the WAC DECISION limit;

Criteria for monolithic waste are the same as described in chapter “Criteria for landfills for no-hazardous waste.

Underground storage

Danish legislation does not stipulate provisions and acceptance criteria for underground storage.

The Danish Ministry of Climate and Energy might authorize underground storage, after approval by the parliamentary energy committee. Currently, there is no permit for underground storage. It is not expected to happen in the future.

1.3.2 Site visit in Denmark

The organisation of the site visit has been realised in close cooperation with the EPA of Denmark, which recommended to visit the landfill **AV Miljø**.

The tasks of landfill operators start with the assessment of acceptability of a certain type of waste and comprise the actual acceptance of wastes arriving at the landfill. These procedures may differ by type of landfill and operator. Furthermore, some general information (e.g. location, size, technical standard, accepted waste) as well as specific systems installed for documentation may be helpful for the assessment of the on the ground enforcement of legal requirements. The description of each landfill visit is structured

into the sections “general terms” (background information) and “waste acceptance procedures” (basic characterisation, compliance testing, on-site verification).

1.3.2.1 Site visit to representative non-hazardous and hazardous landfill (VA Miljø, landfill class B and C)

General terms

The landfill site VA Miljø is located in the south east of Copenhagen. It is owned by the two public organisations I/S Amagerforbraending and I/S Vestforbraending. The landfill started operating in 1989 and covers an area 400.000 m² (15 cells for non-hazardous waste and 4 cells for hazardous waste) on regained land. It has a total capacity of 2.000.000 m³ of which 90 % are already filled. It is expected that the landfill will continue operating until 2013.



Figure -1.3-1: Overview of the landfill AV Miljø (Denmark)

of

Waste for incineration is received as “waste for incineration” and are sorted prior to coming to the landfill with the purpose of temporary storage and later incineration.

Typical non-hazardous waste that is landfilled at this site are mixed waste, non-recyclable slag, polluted soil, asbestos, impregnated wood and waste from sweeping of road. Shredder light fluffs are the only hazardous wastes that are deposited.

The landfill site AV Miljø consists of different landfill types (landfill for hazardous waste and landfill for mixed non-hazardous waste). Another section is the storage of waste used for incineration. This part is not considered to be a landfill as it is regularly emptied and filled up again. There are no cells designated for mineral waste on the landfill site since mineral waste is landfilled together with mixed non-hazardous waste. It is considered suitable as construction materials for interim roads and coverage.

Waste acceptance procedure

The waste flows of the landfill site are controlled by an electronic data management system.

The process flow of waste acceptance at AV Miljø is the following:

1. Once a waste type is deemed to be acceptable at the landfill based on its characteristics as specified in the basic characterisation form, a declaration form is created (Deklaration for affald til AV Miljø). With this form the waste can be delivered to the landfill site. This form contains core information (e.g. waste producer name and address, transporter name and address, date and waste type). All necessary data of the waste are registered in the electronic data management system and are used for each arriving load.

2. a) Drivers with regularly generated waste have a personal identification card with general information (e.g. information of the identification number, driver identity number, registration number, contractor number, container number, waste type, date, time and weight). The card is used to enter the weighbridge on the landfill site. In addition, all information of the waste is registered in the electronic data management system. After weighing the waste, the driver receives a signal to enter the landfill site.
 - b) Drivers who deliver not regularly generated waste have to carry a declaration form with them. After stopping on the weighbridge, the driver brings this document to the weighbridge operator who enters the identification number and enters the corresponding information of the waste.
3. a) Private persons and companies can dispose their recyclable or re-useable waste at the civic amenity site, which is located outside of in front of the entrance to the landfill.
 - b) Loads with mixed waste dispose their waste on the landfill site for mixed waste. An employee of the landfill site controls the unloading. If the amount of non-acceptable waste is dominant, these parts are loaded onto the lorry again and send back. If the amount of non-acceptable waste is little it is separated and directly transported to a proper facility.
 - c) Loads with shredder light fluff are brought to the hazardous landfill site. An employee of the landfill site controls the unloading.
4. After unloading of the waste the Lorries are weighted again before leaving the landfill site. A weighbridge document is printed out, which includes among others data about identification number, waste producer ID, date, time, weight, waste type and vehicle transport number.

The gathered information about waste type, quantity, delivery date, location on the landfill is recorded as paper for five years and as an electronic version without time limit.

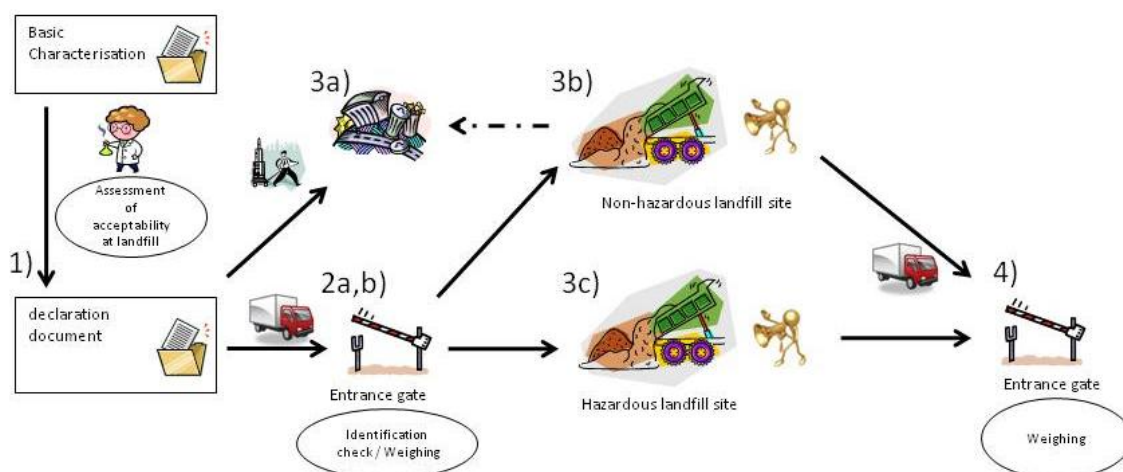


Figure 1.3-2: Flow chart of the waste acceptance procedure at AV Miljø (Denmark)

Basic characterisation

For new waste a basic characterisation document (AV Miljø, Skema 1, Skema 1a, Skema 2) has to be filled in by the waste producer in cooperation with the landfill operator. This document includes information on the waste characteristics (e.g. source of the waste, reason for the waste of being not recyclable or re-useable, treatment of the waste, description of the waste and annexes if necessary). After accepting the waste, a declaration document (Deklaration for affald til AV Miljø) is created and the data are registered in the electronic data management system. These data are either manually or automatically checked every time a new load arrives.

Compliance testing

Compliance testing is done once a year. Samples are taken by certified experts. A “Chain of Custody Report” is developed which describes the material flow from the waste producer until it is analysed.

On-site verification

A visual inspection is made when unloading the waste. If the waste contains material which is not accepted at the landfill site, this waste is loaded onto the lorry. It may also be brought to the civic amenity site at the entrance of the landfill site.

Expert proposals related to potential modifications of the WAC Decision

- Guidance for the WAC Decision should be elaborated.
- The Cd limit value in the leaching test is considered too strict.

1.4 Country report Finland

The wording and the requirements of the WAC Decision are fully transposed into Finish legislation except of the following information:

Finish legislation does not differentiate between monolithic and granular waste and explicit provisions for monolithic waste are not set.

1.4.1 Assessment of legal compliance with the WAC Decision

The following table provides an overview on the legal documents transposing WAC Decision requirements into national legislation. Furthermore, the table shows a qualitative assessment of the level of implementation or possible divergences that are further explained and justified in the following sections.

Finland			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure		n/a	
1.1 Basic characterisation		n/a	
1.1.1 Function	Government regulation 202/2006 on change of landfill decision, Article Section 1-16	✓	
1.1.2 Fundamental requirements	Government regulation 202/2006 Annex 2 Section 2.1.1.	✓	
1.1.3 Testing	Government regulation 202/2006 Annex 2 Section 2.1.2.	✓	
1.1.4. Cases where testing is not required	Government regulation 202/2006 Annex 2 Section 9.1.2.	✓	
1.2 Compliance testing	Government regulation 202/2006 Annex 2 Section 2.2.	✓	
1.3 On-site verification	Government regulation 202/2006 Annex 2 Section 2.3.	~	Visual control after unloading optional
2. Acceptance criteria	Government regulation 202/2006 Article Section 6 and 8a, Annex	✓	
2.1 Landfills for inert waste		n/a	
2.1.1 Short list	Government regulation 202/2006 Annex 2 Section 3.1.1 Table 1	✓	
2.1.2 Limit values		n/a	
2.1.2.1 Leaching limit values	Government regulation 202/2006 Annex 2 Section 3.1.2. Table 2	✓	
2.1.2.2 Limit values for total content of organic parameters	Government regulation 202/2006 Annex 2 Section 3.1.2. Table 3	✓	
2.2 Landfills for non-hazardous waste		n/a	
2.2.1 Without testing	Government regulation 202/2006 Annex 2 Section 3.2.1.	✓	
2.2.2 Limit values for non-hazardous waste	Government regulation 202/2006 Annex 2 Section 3.2.3. Table 5	~	Criteria for monolithic waste are not set in legislation but management is based on

Finland			
Category	Corresponding national legislation	Implementation	Comments
			results of scientific study
2.2.3 Gypsum waste	Government regulation 202/2006 Annex 2 Section 3.2.2.	✓	
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii		n/a	
2.3.1 Leaching limit values	Government regulation 202/2006 Annex 2 Section 3.3. Table 7	~	Criteria for monolithic waste are not set in legislation but management is based on results of scientific study
2.3.2 Other criteria	Government regulation 202/2006 Annex 2 Section 3.3. Table 8	✓	
2.3.3 Asbestos waste	Government regulation 202/2006 Annex 2 Section 3.2.3.	✓	
2.4. Landfills for hazardous waste		n/a	
2.4.1 Leaching limit values	Government regulation 202/2006 Annex 2 Section 3.3. Table 7	~	Criteria for monolithic waste s.o.
2.4.2 Other criteria	Government regulation 202/2006 Annex 2 Section 3.3. Table 8	✓	
2.5 Criteria for underground storage	Government regulation 202/2006 Annex 2 Section 3.4.	✓	

Table 1.4-1: Implementation of WAC Decision in the Finnish Legislation

1.4.1.1 Legal framework

The WAC Decision is implemented in Finish Legislation by Regulation 2002/2006 (Statsradets förordning 2002/2006) and Regulation 861/1997 (Statsradets beslut om avstjälplningplaster (861/1997)).

The landfill classification is according to the WAC Decision.

1.4.1.2 Acceptance Procedure

Basic characterisation

The basic characterisation is implemented by Section 2.1 of Annex 2 to Regulation 202/2006. Records of the basic characterisation shall be kept for three years.

Compliance testing

Compliance testing is implemented by Section 2.2 of Annex 2 of Regulation 202/2006. Records of compliance testing shall be kept for three years.

On-site verification

On-site verification is implemented by Section 7.1.2 of the Government Decision on Landfills and Section 2.3 of Annex 2 of Regulation 202/2006. Upon delivery to a landfill waste shall be checked in order to ensure that it conforms to the documentation presented, necessary samples shall be taken for compliance testing and the samples shall be stored for at least one month.

Proper rapid test methods shall be used, but the proper rapid test methods are not described more precisely. If no rapid test method is used, the waste shall be visually inspected when arriving or if needed after unloading. Samples shall be kept for one month.

1.4.1.3 Waste acceptance criteria

Section 2 of the WAC Decision is implemented by Section 3.5 of Annex 2 of Regulation 202/2006.

Authorisation of higher limit values is fully implemented in the Finish legislation.

The WAC Decision states in the tables of section 2.1.2.2., 2.3.2. and 2.4.2. that higher limit values can be excepted if given DOC values are not exceeded. In the Finish legislation even this higher TOC limits have to be permitted by the authorities. The maximum for the higher TOC value are twice the limit value for inert waste landfills and three times the limit value for non-hazardous waste landfills and hazardous waste landfills.

Reporting on such permit is regulated in Section 8a of the Government Decision on Landfills. Competent authorities shall report on a yearly basis to the Finnish Environment Institute on the implementation of the Government Decision, e.g. on possible permits to deviate.

Testing methods are defined in Section 4 of Annex 2 of Regulation 202/2006. The recommended methods are listed in Table 2:

Measurement	Finish standard
Sample taking	EPA 9071, AAC 3/R
TOC	SFS-EN13137
Calculation of dry substance	prEN 14346
Loss of ignition	prEN15169
Leaching behaviour test	prEN/TC 14405; SFS-EN12457/3
Microwave-assisted digestion	SFS-EN 13656 and SFS-EN 13657
pH, As, Ba, Cd, Cr, Co, Cr(IV), Cu, Mo, Ni, NO ₂ ⁻ , Pb, Total S, SO ₄ ⁻ , V and Zn	SFS-EN 12506
C ₁₀ -C ₄₀	SFS-EN 14039

Table 1.4-2: Finish norms

Further information can be found in the Guideline Ympäristöhallinnon Ohjeita 2/2006 (www.ymparisto.fi/download.asp?contentid=55778&lan=fi). This guideline contains information about

- landfill eligibility including, basic characterisation, basic definition, compliance testing, on site verification, sampling and testing and testing of granular and monolithic waste
- waste acceptance evaluation including the Government's decision in accordance with the mandatory criteria and Indicative non-hazardous waste acceptance criteria,
- Practical examples

The classification of the landfills is in accordance with the WAC Decision.

Criteria for landfills for inert waste

Criteria for landfills for inert waste are implemented by Section 3.1 of Regulation 202/2006. Given “L/S=10l/kg” values correspond to the limits in Section 2.1.2.1 of the Annex to the WAC Decision. Testing methods are defined under Section 4 of Annex 2 of Regulation 202/2006. The limit value for PAH is 40 mg/kg.

Criteria for landfills for non-hazardous waste

Criteria for landfills for non-hazardous waste are implemented by Section 3.2 of Regulation 202/2006. Figures for “L/S=10l/kg” are identical with the ones in Section 2.2.2 and 2.3.1 of the Annex to the WAC Decision. Testing methods are defined in Section 4 of Annex 2 to Regulation 202/2006. Provisions related to gypsum waste in consistency with EU Legislation are stipulated in Section 3.2.2 of Annex 2.

Finish legislation does not differentiate between granular and monolithic waste. Therefore the limit values which have to be applied for monolithic waste can be concluded to be the same as for granular waste. CEN standards have to be applied to analysis.

A Study carried out under Danish leadership (DHI) in co-operation with Sweden (SGI) and Finland (VTT) providing results as mentioned below is used as basis for acceptance and analysis of monolithic waste:

Norway, Finland, Denmark and Sweden cooperated within a project to set specific limit values for monolithic waste. The project showed – under the conditions used in scenarios and according to calculations based on test data – that the release of most components at the bottom of landfills will be very likely equilibrium controlled rather than diffusion controlled. Physical treatment (such as stabilisation) does not affect leached quantities. The top cover requirements in the landfill scenarios for non-hazardous and hazardous waste, allow so little water to penetrate into the landfill that it leads to equilibrium conditions.

Consequently, the same criteria and the same test methods as for granular waste were deemed to be used. The available test methods were concluded to correspond to most of the actual equilibrium controlled situation in the landfill. The material is to be crushed prior to testing in these test methods in order to accelerate the time to reach local chemical equilibrium.

Infobox 1.4-2: Criteria for monolithic waste to provide same level of environmental protection as for granular waste

The issue of sufficient physical stability and bearing capacity is not discussed in detail. But Finish legislation requests to take all necessary measures to assure that size reduction and degradation processes do not have any negative impacts.

EU provisions for asbestos waste are implemented by Section 3.2.3 of Annex 2.

Criteria for waste acceptable at landfills for hazardous waste

Criteria for waste acceptable at landfills for hazardous waste are stipulated in Section 3.2.3 and 3.3 of Annex 2 of Regulation 202/2006. Given “L/S=10l/kg” values correspond to the limits in Section 2.4.1 of the Annex to the WAC Decision. The corresponding test methods are described in Section 4 of Annex 2 to Regulation 2002/2006.

Criteria for monolithic waste are the same as described in chapter “Criteria for landfills for no-hazardous waste.

Underground storage

WAC Decision requirements for underground storage is fully implemented by Section 3.4 of the Annex 2 to the Government regulation 202/2006.

1.4.2 Site visits

Organisation of the site visit has been realised in close cooperation with the Environmental Ministry of Finland which recommended the landfill site **Pirkanmaan, Jätehuolto Oy**.

The tasks of landfill operators start with the assessment of acceptability of a certain type of waste and comprise the actual acceptance of wastes arriving at the landfill. These procedures may differ by type of landfill and operator. Furthermore, some general information (e.g. location, size, technical standard, accepted waste) as well as specific systems installed for documentation may be helpful for the assessment of the on the ground enforcement of legal requirements. The description of each landfill visit is structured into the sections “general terms” (background information) and “waste acceptance procedures” (basic characterisation, compliance testing, on-site verification).

1.4.2.1 Site visit to representative non-hazardous and hazardous waste landfill (Pirkanmaan Jätehuolto Oy, landfill class B and C)

The landfill site Pirkanmaan Jätehuolto Oy Tarastenjärven is located about 15 km northeast to Tampere and owned by a group of municipalities. Tampere is the biggest owner. There is a second landfill site (Koukkujärven) managed by Pirkanmaan Jätehuolto Oy on the other side of Tampere. These two landfill sites are operated in close cooperation and waste is disposed on either of the two sites depending on internal needs.

The landfill Tarastenjärven started operating in 1977 and was taken over by the current operator in 1994. It is a non-hazardous landfill site covering an area of over 100ha. The larger part (30ha) was closed in November 2007. Thus only 4ha with a capacity of 500,000m³ are left active. There is an additional section which may be prepared for landfilling. This would increase the total capacity up to 3,000,000m³. The installation comprises a composting area, a storage area for soils, a basin for liquid waste, a civic amenity site, a storage area for waste with high caloric value and a stabilisation area.

General terms



Figure-1.4-1: Overview of the landfill Pirkanmaan Jätehuolto Oy (Finland)

1) Weighbridge 2) civic amenity site 3) hazardous waste station 4) new landfill site 5) old landfill site 6) waste processing plant 7) Composting area 8) C&D waste segregation (Photo by Hannu Vallas)

As Pirkanmaan Jätehuolto Oy has contracts with all MSW collection companies, all MSW of the region is disposed of in one of the two landfill sites.

More than half of the landfilled quantities are household waste. The second larger quantity is industrial/commercial waste (mainly from SMEs and shops). In addition, there are small amounts of biowaste, ashes and contaminated soils.

Waste acceptance procedure

The waste management information system of the landfill site consists of three interacting software systems of the weighbridge, the billing station and the GPS system.

The waste acceptance process flow at Tarastenjärven is as follows:

1. Once a waste type is deemed to be acceptable at the landfill based on its characteristics as specified in the basic characterisation form (Kaatopaikkakelpoisuuden Arviointi (judgement form)), it can be delivered to the landfill site. This form contains core information (e.g. waste producer name and address, industry type, waste quality and composition) and specific information (concerning the waste and the signature of the landfill operator). In case of municipal waste no form has to be filled in.

2. Drivers with regularly generated wastes show their “client identification card” when they enter the landfill site at the weighbridge. The identification card carries important information concerning the client and transport company (e.g. customer number, driver identity number, registration number, transporter number, container number, waste type, date, time and weight). After transferring all data and weighing the loaded waste, the driver receives a signal to continue to the landfill site.

All other drivers show a consignment form or fill it in at the weighbridge. This document is handed over to the bridge operator who enters the customer number and the corresponding information of the waste management system (e.g. waste producer and waste type). A print-out of this consignment form (Jätekuormakirja) is created and signed.

3. After the entrance procedure, the load is sent to one of the following areas:
 - a) active place of unloading or separated area on the landfill for a further check in case of suspicion;
 - b) basin in order to dry the waste until it can be landfilled (liquid waste);
 - c) processing plant in order to produce refuse derived fuel (RDF) which is taken to power plants (mechanical waste);
 - d) composting area for biodegrading (green waste). The resulting compost is sold as product.
 - e) separation area in order to sort fractions (C&D waste);
 - f) civic amenity site in order to separate the waste and send it to specialised treatment facilities (private customer waste).

The unloading is supervised by an employee. If the load contains non-acceptable waste, the driver is stopped at the weighbridge and is sent back for reloading.

4. After the final weighing, the driver obtains a confirmation before leaving the landfill site.

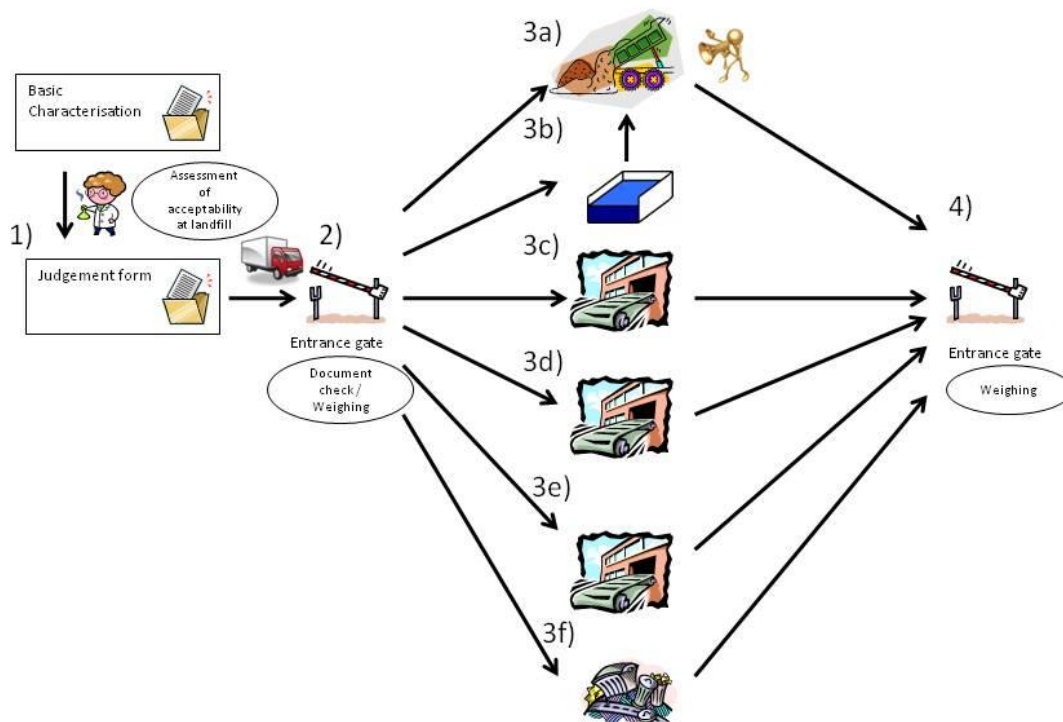


Figure -1.4-2: Flow chart of the waste acceptance procedure at Pirkanma Jäthuolto Oy (Finland)

Information about waste type, quantity, delivery date, location on the landfill is recorded for ten years as a paper version and without time limit in electronic format.

Basic characterisation

Only for industrial waste (except household like waste), a basic characterisation has to be done. For this type of waste the “judgement form” has to be filled in. This form has to be delivered every year. If necessary, an additional paper (Kaatopaikkakelpoisuus selvitys) has to be added to describe the waste in detail. Furthermore, a chemical analysis has to be made. This is often done in cooperation with a consultant.

In case of contaminated soil an administrative document has to be applied. This document is signed by the authorities to declare that the contaminated soil can be landfilled. The document is prepared at the site of waste origin under control of a consultant.

Compliance testing

The waste producer performs compliance testing once a year. A certified expert takes the samples. Each year the basic characterisation form (Kaatopaikkaelpoisuuden) is sent to the landfill site. This process represents the compliance testing.

On-site verification

A visual inspection is performed when unloading at the active cell.

Expert proposals related to potential modifications of the WAC Decision

There are no proposals for the WAC Decision.

1.5 Country report France

The WAC Decision is generally implemented into French legislation, which in part even contains provisions that are more stringent.

Some differences and potential deficits have been observed as regards:

- The short list for inert wastes acceptable without testing is extended by inclusion of EWC 170605* asbestos waste bound to inert material
- Pre-treatment of MSW which is not explicitly mentioned as prerequisite for acceptance in legislation for landfills for non-hazardous waste
- The lack of an on-site sampling obligation³ for non-hazardous or inert waste
- Restriction to a visual inspection at the place of unloading is foreseen for inert waste landfills.
- The fact that a co-disposal of treated hazardous waste and non hazardous waste is not authorised in France in a non hazardous waste landfill justifies the fact that limit values for class B landfills as stipulated in the WAC Decision are not reflected in French legislation

1.5.1 Assessment of legal compliance with the WAC Decision

Table -1.5-1 provides an overview on the legal documents transposing WAC Decision requirements into national legislation. Furthermore the table shows a qualitative assessment of the level of implementation or possible divergences which are further explained and justified in the following sections.

France			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure			
1.1 Basic Characterisation	Arrêté du 31/12/2004, Annex 1; Arrêté 09/09/97, Annex 1; Arrêté du 30/12/02, Article 8	✓	
1.1.1 Function	Arrêté du 31/12/2004, Annex 1; Arrêté 09/09/97, Annex 1; Arrêté du 30/12/02, Article 8	✓	
1.1.2 Fundamental requirements	Arrêté du 31/12/2004, Annex 1; Arrêté 09/09/97, Annex 1; Arrêté du 30/12/02, Article 8	✓	
1.1.3 Testing	Arrêté du 31/12/2004, Annex 1; Arrêté 09/09/97, Article 6 and Annex I; Arrêté du 30/12/02, Article 8	✓	
1.1.4. Cases where testing is not required	Arrêté du 31/12/2004, Annex 1; Arrêté 09/09/97, Article 5, Annex I	✓	

³ See WAC Decision chapter 1.3 sentence four and five

France			
Category	Corresponding national legislation	Implementation	Comments
1.2 Compliance Testing	Arrêté du 31/12/2004, Annex 1; Arrêté 09/09/97, Article 6 and Annex I; Arrêté du 30/12/02, Article 8	✓	For stabilised waste this has to be done with the stabilised waste; Compliance testing is the responsibility of the landfill operator
1.3 On site verification	Arrêté du 31/12/2004, Annex 1; Arrêté 09/09/97, Article 7 and Annex I; Arrêté du 30/12/02, Article 8	✓	Different specifications for visual inspections in hazardous waste, non-hazardous waste and inert waste laws
2. Acceptance Criteria		~	All basic aspects are implemented but some modifications and additional specifications have been made
2.1 Landfills for inert waste	Arrêté du 31/12/04, Annex II; Arrêté du 15/03/06, Annex 1	~	Additional EWC codes are provided
2.1.1 Short list	Arrêté du 15/03/06, Titre IV and Annex 1	~	Two additional entries: Possibility to accept asbestos waste bound to inert material 170605* (C&D wastes with asbestos) under specific management conditions. 170302 (bituminous mixtures with simple test for tar) 200102 (separately collected glass) not acceptable
2.1.2 Limit values	Arrêté du 31/12/04, Annex II; Arrêté du 15/03/06, Annex 2	✓	
2.1.2.1 Leaching limit values	Arrêté du 31/12/04, Annex II; Arrêté du 15/03/06, Annexe 2	✓	TDS used instead of chloride/sulphate
2.1.2.2 Limit values for total content of organic parameters	Arrêté du 31/12/04, Annex II; Arrêté du 15/03/06, Annexe 2	✓	
2.2 Landfills for non haz waste	Arrêté 09/09/97,	+	Restricted to MSW and non-hazardous waste from other origin
2.2.1 Without testing	Arrêté 09/09/97, Article 5, Annex I 1(a)	~	Mandatory pre-treatment for MSW and similar waste not explicitly mentioned
2.2.2 Limit values for non hazardous waste		+	standardised leaching test for the substances stipulated in the WAC Decision as minimum requirement for all wastes subject to testing No limit values are specified as there is a complete ban to accept waste classified as hazardous
2.2.3 Gypsum waste	Arrêté 09/09/97, Annex VI (B)	~	Specific construction requirements for landfill sections accepting gypsum waste; acceptance without testing foreseen for a number of gypsum wastes, DOC and TOC limits related to other gypsum waste
2.3 Criteria for haz waste acceptable at landfills for	Not discussed	+	Not applicable as hazardous waste per se is not acceptable at class B

France			
Category	Corresponding national legislation	Implementation	Comments
non hazardous waste, Art 6 c iii			landfills
2.3.1 Leaching limit values		+	Not applicable as hazardous waste per se is not acceptable at class B landfills
2.3.2 Other criteria		+	Not applicable as hazardous waste per se is not acceptable at class B landfills
2.3.3 Asbestos waste	Arrêté du 15/03/06, Article 17-21; Arrêté du 09/09/97, Article 4	✓	Restricted to bounded asbestos waste
2.4. Landfills for haz waste	Arrêté du 30/12/02, Annex 1	✓	
2.4.1 Leaching limit values	Arrêté du 30/12/02, Annex 1 No. 3	✓	Criteria for monolithic waste are set
2.4.2 Other criteria		~	TOC can be achieved either without or after stabilisation Criteria for monolithic waste are set; but it is heavily debated in the scientific community whether the practice to perform the leaching test with the whole stabilised block is appropriate to assure a level of environmental protection as for granular waste
2.5 Criteria for underground storage	Code de l'environnement Art. R 515-9 to R 515-23	~	Long-term safety assessment mentioned once in context of application for permit extension

Table -1.5-1 Implementation of WAC Decision requirements in French Legislation

1.5.1.1 Legal framework

France has implemented the provisions of Waste Acceptance Criteria not within one legal document but in a number of Acts and Decrees.

The legal framework for landfills is laid down in Code ENV, Article L 541-20-1 and following.

Regarding landfills for inert waste the WAC Decision is implemented in French legislation by:

- Arrêté ministériel du 31/12/2004 relatif aux installations de stockage de déchets industriels inertes provenant d'installations classées (JO du 1/03/05). The ministerial decree from 31 December 2004 contains the requirements and conditions for landfills receiving waste from IPPC installations.
- Arrêté ministériel du 15 mars 2006 fixant la liste des déchets inertes admissibles dans des installations de stockage de déchets inertes et les conditions d'exploitation de ces installations. The ministerial decree from 15 March 2006 sets the conditions for landfills receiving inert waste from non IPPC sources, namely C&D waste as listed in WAC Decision as acceptable without testing, asbestos waste bound to inert material and encased bituminous waste (déchets bitumineux enrobés).
- Circulaire du 20 décembre 2006 relative aux installations de stockage de déchets inertes (BOMEDD n° 4 du 28/02/07).

- Major changes will be introduced by Code de l'environnement Art. R 541-65 à R 541-75 et R 541-80 à R 541-82: Stockage de déchets inertes (Décret n° 2006-302 du 15 mars 2006) which will be entering into force 1 January 2014.

Regarding landfills for non hazardous waste, the most important rules are laid down in:

- (Arrêté ministériel du 9 septembre 1997 relatif aux décharges existantes et aux nouvelles installations de stockage de déchets non dangereux (JO du 02/10/97) modifié par l'arrêté du 31 décembre 2001 (JO du 02/03/02), l'arrêté du 3 avril 2002 (JO du 19/04/02), l'arrêté du 19 janvier 2006 (JO du 16/03/06) et l'arrêté du 18 juillet 2007 (JO du 29/09/07)) The ministerial Decree from September 1997 as amended, specifies permit and technical requirements for class B landfills as well as acceptance procedures to apply.
- Circulaire du 6 juin 2006 relative aux installations de stockage de déchets non dangereux (BOMEDD n° 15 du 15/08/06)

Landfills for hazardous waste are addressed in the documents:

- Arrêté ministériel du 31 décembre 2002 relatif au stockage de déchets dangereux (JO du 16/04/03). The ministerial Decree specifies permit and technical requirements for class C landfills as well as acceptance procedures and criteria to apply.
- Circulaire du 10 juin 2003 relative aux installations de stockage de déchets dangereux (BOMEDD n° 03/21 du 15/11/03)

Certain criteria and provisions for underground storage related to hazardous waste and hazardous material can be found e.g. in:

- Law 75-633 amended by Law 92-646 of July 1992 (Titre III Dispositions applicable aux stockages souterrains de déchets)
- Décret n° 2006-283 Stockage souterrain de produits dangereux Art. 2 (prerequisites to get a permit) (6)..

A direct adoption of the requirements and text of the WAC Decision however could not be identified.

The concrete permit conditions and requirements are based on regional legislation (Arrêtés préfectoraux), which however, are conform to the ministerial decrees as mentioned above.

Acceptance procedures are discussed for non-hazardous waste in articles 4-7 of the Arrêté ministériel du 9 septembre 1997, for hazardous waste in articles 6-10 of the Arrêté ministériel du 31 décembre 2002 and for inert wastes in Article 8-14 of Arrêté 15/03/2006 and Articles 4-8 of the Arrêté 31/12/2004.

1.5.1.2 Acceptance Procedure

Basic Characterisation

The concept of basic characterisation, Compliance testing and On-site verification is implemented in the wording of the WAC Decision in each of the legal documents concerning landfills:

- for landfills for inert waste coming from industry in Arrêté du 31/12/2004, Article 6 and Annex 1; for landfills for inert waste the meaning of the WAC DECISION requirements acceptance procedures is reflected in the description of acceptance procedures in Arrêté du 15/03/2006, Articles 9 and 10.
- for landfills for non hazardous waste in Arrêté 09/09/97, Articles 5 and 6 and Annex 1;
- for landfills for hazardous waste in Arrêté du 30/12/02, Article 8 and Annex I.

The acceptance procedures for waste comprise the mandatory application of a prior information and prior acceptance procedure (IPA/CAP) in accordance with WAC Decision requirements. The procedures correspond to basic characterisation forms with and without chemical analysis, as well as the definition of waste streams excluded from testing requirements, as stipulated in the WAC Decision.

The obligation to check radioactivity of waste is an obligation exceeding the EU requirements.

Compliance testing

For all waste types where testing is required, compliance testing has to be performed every year. The period for record keeping and for the keeping of samples from basic characterisation and compliance testing is fixed as being three years after disposal or until a new characterisation has been performed.

As regards hazardous waste the following provisions are set. For stabilised waste compliance testing has to be done with the stabilised waste; compliance testing is the responsibility of the landfill operator.

The issue of variability is mentioned and further specified for all waste types. For results close to the limit values only small alteration of measurement results are acceptable. Regularly arising waste from different installations can be accepted with one analysis of accompanied by a variability study.

On-site verification

On-site verification is requested, but testing is only requested for hazardous waste.

For inert waste French legislation does not request a sampling and testing of the waste⁴. Basic characterisation however, has to comprise a chemical analysis in case of doubt or suspicion. Visual control has to be performed at the place of unloading.

For non-hazardous waste visual inspection has to be done at acceptance and at the place of unloading.

For hazardous waste on-site verification can be made before or after unloading, but always before landfilling and after treatment. The obligation to do a double sampling of each waste load delivered is an

⁴ This is in accordance with the WAC Decision for wastes on the list exempted from testing but should be included for any other waste and in case of doubts

obligation exceeding the EU requirements. A quick test (batch leaching test for 10 minutes) has been defined and is correlated to the compliance test results.

1.5.1.3 Waste Acceptance Criteria

The testing method to be applied in France for chemical analysis is a batch leaching test with L/S = 10 l/kg according to NF EN 12457-2. For non-hazardous waste substances investigated comprise heavy metals and as stipulated in the WAC Decision. In addition the phenol index⁵ has to be tested as additional parameter)

In France testing for chloride and sulphate is not requested. In accordance with the WAC Decision total dissolved solids (TDS) is used alternatively.

The moisture content (<30%) has to be determined.

The possibility to authorise three times higher limit values for specific substances in prefectural decrees is stipulated in national legislation but not used in practice for collective landfills sites.

According to French legislation the following standards have to be used for the analyses of the samples.

Measurement	French standard
Inert waste and granular hazardous waste leaching test	X 30 402-2
Non-hazardous waste leaching test	NF EN 12457-2
Leaching test monolithic hazardous waste	XP X 31-211
Detailed norms for hazardous waste	
Dry weight	NF ISO 11465
TOC	NF EN 13137
DOC, Hg, phenol index, fluoride, ANC	ENV 13370
TDS	NFT 90-029
pH, Cr (VI), Cr, Ba, Mo, Pb, Zn, Cd, Ni, Cu, As	ENV 12506
Sb	NF EN ISO 11885
Se	Pr EN 31969
PAH (soils)	ISO CD 13877
PCB, Organochlorine compounds	ISO 10382

Table 1.5-2: French norms

Criteria for landfills for inert waste

The acceptance criteria for inert waste are laid down separately in the Arrêté 31/12/04 on “(inert) waste coming from an industrial IPPC process” and the Arrêté du 15/03/06 on “inert wastes from non IPPC activities”. In general all limit values as requested in the WAC Decision are set and the values of the L/S ratio of 10 l/kg are used. The chloride and sulphate limit values are not included and therefore the TDS value has to be used. The limit value for PAH is set at 50 mg/kg dry substance. The Arrêté du 15/03/06 lists acceptable wastes being admissible without testing. The list corresponds largely to the one in the WAC Decision. Additional waste codes listed are: 170302 encased/coated bituminous mixtures after mandatory testing for tar and 170605* restricted to asbestos bound to inert material. On the other hand EWC 200102 is not listed in the French legislation.

⁵ Mandatory only for inert waste in 2003/33/EC

Criteria for landfills for non-hazardous waste

The Arrêté du 09/09/97 limits wastes acceptable for class B landfills for MSW, non-hazardous wastes from other origins and bounded asbestos wastes. It also includes all necessary specific acceptance criteria for asbestos waste and for gypsum waste. Except of limits for PCB content and dry matter, no limits are set for class B landfills at national level, but testing is mandatory and landfill operators are requested to define internal limits. Hazardous wastes as defined in the Arrêté du 19/01/06 and Décret 2002_540 may not be landfilled in class B landfills. Thus limit values for non-hazardous waste landfilled in the same cells as stable, non-reactive hazardous waste and specific criteria for hazardous waste acceptable at landfills for non hazardous waste are not applicable and not discussed in the document.

Criteria for landfills for hazardous waste

The acceptance criteria and limit values for hazardous wastes as set in the WAC Decision are implemented into French legislation by Arrêté du 30/12/02. Article 4 stipulates the obligation of testing except for asbestos waste, and the possibility to permit threefold limit values in specific cases (heavy metals and fluorides) within prefectural decrees. Articles 6, 43 and 44 define the asbestos wastes acceptable and the specific treatment conditions to apply. (Waste has to be delivered in sealed double big bags labelled in a way to clearly indicate the waste origin and producer. It has to be accompanied by a proof of proper waste disposal document (borderau de suivi) and may only be disposed of in cells were it is entombed into stabilised/solidified waste). Article 7 lists excluded waste such as fermenticible waste, or waste with a dry weight below 30%. ANC has to be measured except for stabilised waste. In case of stabilised waste the conformity analysis is to be performed on the stabilised waste (core sample). The analysis obligations for basic characterisation are further specified in terms of the obligation to use the same tests as for compliance testing and to include also a quick test, as requested for on-site verification.

Except of limit values for chloride and sulphate (alternative use of TDS) all leaching limit values as stipulated in the WAC Decision for hazardous waste are set accordingly. The limit values for a L/S ration of 10 l/kg are used. As concerns waste composition TOC is requested instead of LOI in accordance with WAC DECISION provisions. Additional requirements are the analysis of the moisture content, limits for pH, Cr VI and phenol index, and the analysis of PAH, PCB, BTEX, organochlorine compounds (VOC) and HCT for contaminated soils.

Monolithic waste has to meet the same limit values as granular waste. Characteristics of monolithic waste are determined on the basis of the national norm XP-X31-212. After sampling of a 4 days matured waste by means of moulding /coring, the stabilised waste block is subject to a 24h leaching test (L/S 10 l/kg).

Quick tests for on-site verification of hazardous waste are established in France. These tests comprise a lixiviation test for 10 min. as well as a testing for organic compounds (20 min)

1.5.2 Site visits in France

Organisation of the site visit has been done in close cooperation with the French Trade Union of waste management organisation (FNADE) which recommended the landfill sites and established the contacts with the operators. Due to the excellent cooperation and the high willingness to support the project finally five landfills have been selected for site visits.

- SITA hazardous waste landfill, Villeparisis
- Séché hazardous and non-hazardous waste landfill, Changé
- SITA, non-hazardous waste landfill (bioreactor), Sonzay, Tours
- VEOLIA, non-hazardous waste landfill de Lapouyade, Gironde
- COVED, non-hazardous waste landfill de Roussas, « La Combe Jaillet », Drome Department, Montélimar

(For further details please also see Annex 2, Table 4-2).

The visited landfills are exemplary for acceptance procedures and criteria of the landfills managed by the above mentioned private waste companies organised in FNADE.

In total the companies organised in FNADE cover 80% of the waste treatment activities in France, which corresponds to 85 Mio tonnes /year. For this purpose FNADE members manage 200 class B landfills, 75 class A landfills and all the existing 14 class C landfills. The annual share of landfilling controlled by FNADE is almost 25 Mio tonnes/year. Other major quantities are material recover and waste incineration. Class C landfills treat 1.1 Mio tonnes/year.

As regards basic characterisation, compliance testing and on-site verification all landfills visited follow the general requirements as set in French legislation on national scale. This includes the system of prior acceptance information or prior consent procedures (IPA/CAP), the chemical analysis, the annual renewing of the acceptance dossiers and the use of standardised quick tests for on-site verification on hazardous waste landfills, or the storage of information.

In addition companies have established additional acceptance requirements such as internal limit values for class B landfills, or a full chemical analysis for renewal of the dossiers, or the analysis of additional substances in hazardous wastes covered by pre-existing French legislation such as cyanides or chromium VI and phenols index although not requested by EU legislation.

In practice storage of information exceeds the requirements as is for the lifetime of the site plus the aftercare period.

According to expert information threefold exceedance of limit values for specific substances in practice is not authorised in France.

Since 1995, hazardous industrial waste in France has been subjected to hydraulic binder-based stabilisation/solidification pre-treatment prior to being deposited in dedicated landfills. An evaluation of this technology was performed in 2004 in the Eureka and Passify project.

Major concerns related to the WAC Decision as discussed in France

- Envisaged CEN standard for sampling are too complicated to be applicable in practice
- With requested percolation test relative to granular wastes, the CEN standard for basic characterisation does not allow a comparison with on-site verification and compliance testing any more
- Leaching limits for non-hazardous waste in the WAC Decision are partially very low.

1.5.2.1 Site visit to representative hazardous waste landfill (class C) in Villeparisis

General terms

The landfill site of Villeparisis is located about 25 km east to Paris. The landfill is owned and managed by SITA FD (Subsidiary of SITA operating hazardous wastes sites).

SITA FD is expert in recovery, treatment and disposal of wastes with 390 cooperation partners, an annual turnover of 163m€ and 507,000 tons of industrial hazardous waste treated. SITA FD is organised in three regional agencies which manage: 7 class C landfills (>50% of all 13 sites in France) with integrated on-site laboratories, 1 class A landfills, multimode platforms (for treatment and recovery of contaminated soils), 1 composting plant, 1 Ecohub (for classification of contaminated soils), 1 research and development centre.

Except of one plant near Nîmes all sites are in northern and eastern France. SITA FD has introduced a quality system for environmental management. All sites since 2007 are certified ISO 9001. The vast majority of sites is even double (ISO 9001 and 14001) or triple certified (ISO 9001 and 14001, OHSAS 18001). Villeparisis is triple certified; Sonzay is double certified.

The landfill started operation in 1977. In 1979 it received authorisation as class C landfill. 1995 the stabilisation plant has been authorised and since 2002 the permit for exploitation of the bio-centre has been issued.

The site covers an area of 43 ha. One older part for MSW (13 ha) was closed in 2002 and has been recultivated. Thus 30 ha are left active. The envisaged remaining exploitation time is 10-12 years. The active installation comprises a chemical laboratory, a stabilisation plant and a so-called biocentre (plateforme multimodale) where contaminated soil is biologically treated and recovered.

The permitted annual maximum tonnage is roughly 600,000 tonnes with 200,000 tonnes for stabilisation, 250,000 for direct disposal and 200,000 tonnes polluted soils for biological treatment.

The annual figures for 2008 amounted to 175,000 tonnes. 41% are directed towards stabilisation (52,000 tonnes in tanks, 7,000 t in big bags, and 13,400 t in container trucks), 25% are directly landfilled (sludges, bottom ashes, asbestos waste, contaminated soils), 13% are recoverable soils and 21% are soils directed towards biological degradation.

Major clients of the Villeparisis landfill are metal industry, petrochemical industry and chemical industry. Major waste types landfilled are MSWI ashes from the City of Paris, metallurgical process residues, sludges from WWTPs, mineral residues from chemical production, and contaminated soils and sludges. In addition asbestos waste is accepted.

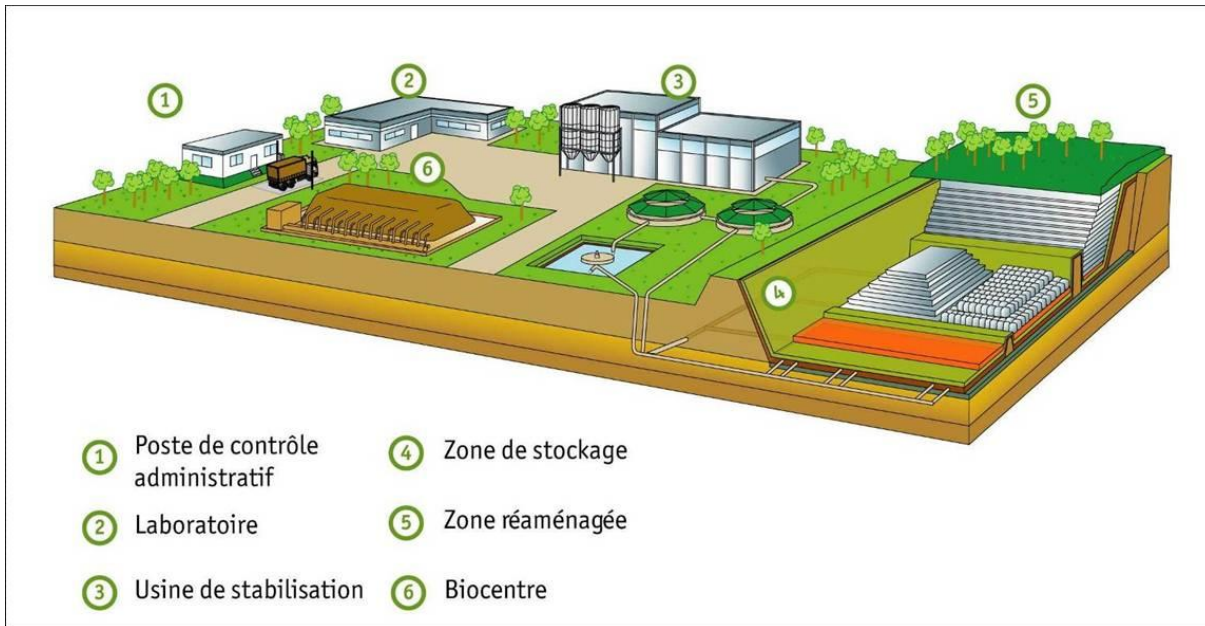


Figure 1.5-1: Overview of landfill site Villeparisis (France)

The site is equipped with a gas collection system for the old closed section with organic contents (300-400 m³/h). Due to low methane content the gas however, cannot yet be recovered but is flared. There is no gas production in the class C sections.

Leachate water and run-off water is collected and used for the stabilisation process.

Precipitation water is discharged into the environment after control.

Regular ground water monitoring is performed on site.

Waste acceptance procedure

The landfill disposes of an electronic waste information management system. In addition the complete acceptance procedure is compiled in a flow chart distributed to the employees as internal guidance document.

The waste acceptance process flow at Villeparisis is as follows:

1. Once a waste is deemed acceptable at the landfill based on the information in the basic characterisation form ("Fiche de renseignements" -information data sheet") and the results of the initial chemical analysis performed on-site with a 1 kg sample provided by the client, the waste producer is informed by means of a standardised "Acceptance certificate" (Certificat d'acceptation) that he can deliver to the landfill site and to which treatment his waste has been allocated. This form contains among others, waste producer name and address, industry type, waste quality and composition, additional special information concerning the waste and the signature of the landfill operator.

2. a) Transporters are identified via their name and the name of the contractor when they enter the landfill site at the weighing bridge. After having identified the corresponding file in the computer system, checked for radioactivity and transferred the weight, the driver receives a signal and a document (ticket chauffeur) to enter the landfill site.

b) This “ticket” contains the customers’ code for this specific waste batch and the license plate number as well as an indication of the treatment to undergo. This includes a sticker to be put on the verification sample taken (each truck). The correct reception of the waste at the indicated treatment facility is stamped onto the document with individual punches for each station.
3. After the weighing bridge the truck has to stop at the laboratory. There the waste is inspected, a sample is taken and is analysed with a quick test (norm NFX 31-210) for pH, heavy metals, fluoride, and organic compounds such, as TOC, TDS, dry weight, etc. Results are documented in a “fiche d’analyse”.
4. After analysing the waste it is brought to one of the following destinations:
 - a) The waste is directly landfilled. Waste is landfilled in separate cells for stabilised and non-stabilised waste. Asbestos waste is incorporated into cells of stabilised waste. Disposal is documented regularly in a topographic register.



Figure 1.5-2: Disposal of asbestos waste at the landfill site Villeparisis (France)

- b) The waste is transferred to the stabilisation plant. Stabilisation is a chemical process using in particular hydraulic binders (INERTEC technology). In addition the waste is solidified for mechanical purposes to a k , permeability factor of 10^{-9} m/s or 10^{-10} m/s. The composition of waste and reactive agents is adapted depending on the waste composition.



Figure 1.5-3: Stabilisation plant of the landfill Villeparisis (France)

c) The waste is transferred to the bio-centre

The on-site laboratory annually performs ~13,000 quick tests for on-site verification, 660 analyses for basic characterisation, 480 analyses for renewal of dossiers (compliance testing); 12,800 mechanical tests for stabilised waste and 2,550 tests for chemical composition.

The unloading is supervised by an employee, who calls for support and decision in case any suspicious load is observed.

5. After final weighing the driver obtains a confirmation of receipt on the “bordereau de suivi” before leaving the landfill site.

Information about waste type, quantity, delivery date, location on the landfill is recorded on paper and in electronic format for the operational period and a 30 years aftercare period.

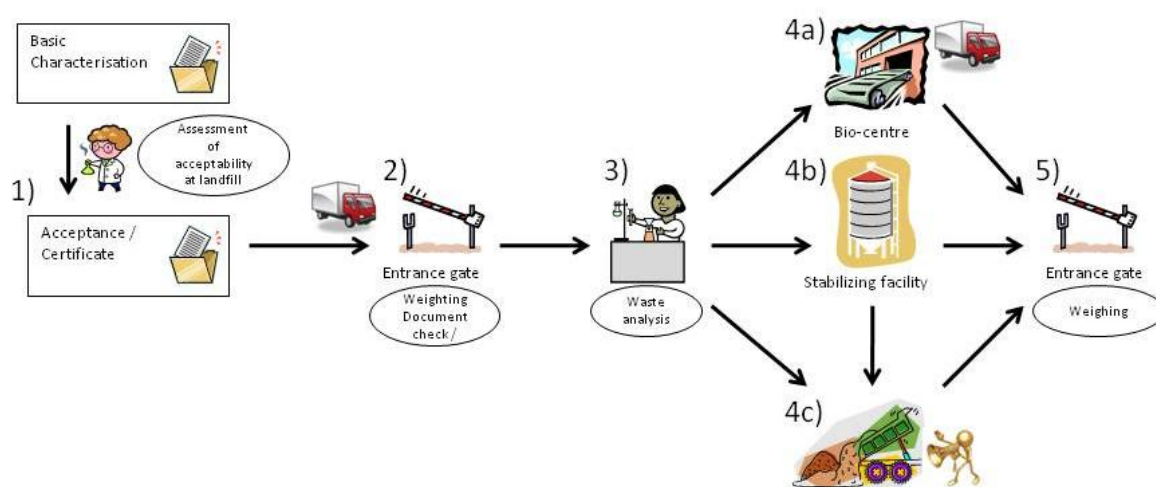


Figure 1.5-4: Flow chart of the waste acceptance procedure at Villeparisis (France)

Assessment of basic characterisation

Acceptance of waste is exclusively on the basis of a basic characterisation/compliance testing including chemical analysis (information data sheet). The basic characterisation has to be renewed every year.

The only waste accepted without chemical analysis is asbestos waste, which is delivered in big packs and is entombed (buried) within cells for stabilised waste.

In case of contaminated soils basic characterisation comprises chemical analysis for organic compounds such as hydrocarbons, phenols and PAH.

Compliance testing

Compliance testing corresponds to the annual renewal of the basic characterisation including the full list of chemical analyses.

On-site verification

On-site verification consists of a visual inspection at the point of entry (laboratory) with sampling and analysis based on a quick test for heavy metals and organic compounds.

Stabilised waste is furthermore subject to a leaching test after 4 days of maturation, in order to check whether it can be landfilled.

Expert proposals related to potential modifications of the WAC

- Leaching tests for monolithic waste as used in the NL and as currently developed under CEN are deemed as very strict and as not appropriate for estimation of leaching behaviour under disposal conditions, but only relevant for conditions as observed for construction materials. A standardised short test (24 hours) with a test to check the monolithic character of waste could be useful for pre-treated hazardous wastes on EU level.
- WAC DECISION limit values for Chloride and Sulphate being based on limits for drinking water are regarded as too strict compared to the other limits coming from drinking water regulation.

1.5.2.2 Site visit to representative hazardous and non-hazardous waste landfills (classes B and C) in Changé

General terms

The landfill sites in Changé are located about 70 km east to Rennes. The landfill is owned and managed by Séché Environnement a private waste management company.

Séché Environnement offers waste management services for MSW and hazardous industrial wastes including pre-treatment (sorting, disinfection of medical waste, physico-chemical treatment), recovery (solvents) and disposal (WI, landfilling). In total Séché Environnement manages 17 different treatment sites in France, all certified ISO 9001, 14001 or OHSAS 18001. Four sites are class B landfills, one is a class A landfill, all the landfills are certified ISO 14001 and OHSAS 18001. The landfill started operation as class B

landfill in 1985. A class C landfill was added in 1995 and a new class B landfill was put into operation in 2003 (after closure of the first class B site).

Apart from the landfills the site comprises a laboratory, a small civic amenity site for citizens, a stabilisation plant, a manual separation/sorting plant (for separately collected recoverables), a disinfection plant for infectious medical waste and an almost finished automated separation plant for mixed MSW with a focus on the production of RDF.

The installation is closely associated to an agricultural dehydration plant for feeding stuff, which uses the excess heat from biogas production. In addition a new installation for wood chip dehydration has recently been finalised which will allow to recovery waste heat from biogas production throughout the year.

The landfills in Changé have a combined surface of 360,000m² for non-hazardous waste and 246,000m² for hazardous waste. About 40% of the non-hazardous waste capacity is already filled, closed and recultivated.

The operative capacity for non-hazardous waste is 7,000,000m³. The authorised capacity for hazardous waste is 6,600,000m³.

The operating class B landfill receives annually about 600,000m³ of waste (>50% mixed MSW, shredder light fluff, sterilised medical waste, MSWI slags, WWTP sludges, non-recoverable compost fractions, ~25% sorting residues from industrial waste sorting plants). Waste is disposed off in small cells which are covered weekly by a temporary argil layer. The landfill comprises a “platform” for storage prior to recovery of wood waste (sold for chipboard production) and a new sorting line for production of RDF.

Major waste types accepted in the class C landfill are ashes from MSWI and HWI, dangerous filter cakes, galvanic sludges, and contaminated soils. In addition asbestos waste and gypsum waste is accepted. ~60% of the annual 250,000m³ disposed is stabilised before being landfilled.

The landfills are technically fully compliant with the landfill directive requirements. They are equipped with a double bottom sealing and drainage system exceeding the requirements.

Landfill gas from the class B landfills is collected and recovered (heat (15MW) and electricity (8MW) energetically by means of modern steam turbines. Biogas is regulated at a methane content of 30% (commonly 45-55%) in order to reduce to the optimum diffuse emissions. Leachate water (~2m³/h closed landfill, ~4m³/h operating landfill) is collected and treated on-site by means of reverse osmosis, before it is discharged into the natural water bodies.

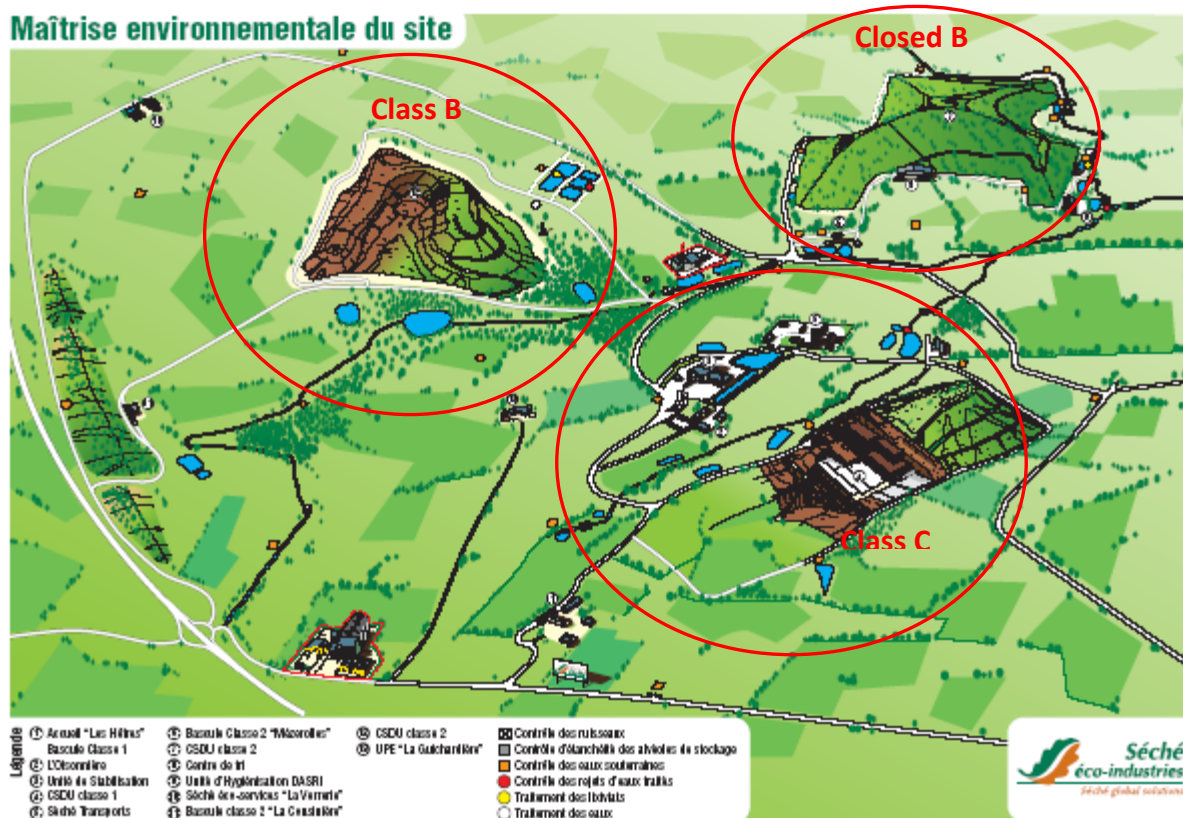


Figure 1.5-5: Overview of the structure and installations of the class B and C landfills in Laval (France)

Waste acceptance procedure

The landfill disposes of an electronic waste information management system.

The waste acceptance process flow at Changé is as follows:

1. Once a waste is deemed acceptable at the landfill based on the information and chemical analysis provided for the basic characterisation form, the waste producer is informed by means of an acceptance certificate (certificat d'acceptation) that he can deliver to the landfill site. This form contains among others, waste producers contact data, waste type and code, packaging and chemical analysis results if relevant.

Delivery of hazardous and non-hazardous waste is strictly separated, by means of two fully separated entries (2a) hazardous waste entry; 2b) non-hazardous waste entry). At arrival transporters are identified via their license plate and the name of the contractor. After having identified the corresponding file in the computer system and transferred the weight, the driver receives a signal to enter the landfill site.

2. As regards hazardous waste delivery is exclusively on agreement "en rendez-vous" that means that a list of expected transports is at disposal at the entrance gate. After having been identified and after a first visual inspection and eventual sampling, the driver receives a document ("bon d'accord de déchargement") which indicated the proper treatment method as well as all relevant data related to waste producer, truck and entry times and is to be signed by the employee at the place of unloading.

- a) Waste which does not has to undergo stabilisation can directly be landfilled
 - b) In case waste has to undergo stabilisation a second document (“fiche de suivi de production”) is provided which allows to completely following the reception and the proper stabilisation process. For each batch of hazardous waste a sample is taken for on-site verification by means of a quick test. If sampling cannot be performed at the gate a sampling bag will be provided for sampling at the solidification plant and sampling is entered into the computer. This procedure does not allow the driver to exit the site without having delivered his sampling bag.
 - c) The waste is transferred to the sterilisation unit (vapour sterilisation using excess heat from biogas production)
3. As concerns non hazardous waste there is no fixed date for delivery. Chemical on-site verification is performed in intervals, which are set depending on the waste properties. Depending on the classification and/or the result of the chemical analysis:
4. a) The waste is directly landfilled
- b) The waste is transferred to treatment platforms
- c) The waste is transferred to the sorting plants (so far manual sorting of plastics, glass, metal, paper/cardboard)
5. After final weighing the driver obtains a confirmation on his “bon d’accord de déchargement” before leaving the landfill site.

Information about waste type, quantity, delivery date, location on the landfill is recorded for the operational period and a 30 years aftercare period.

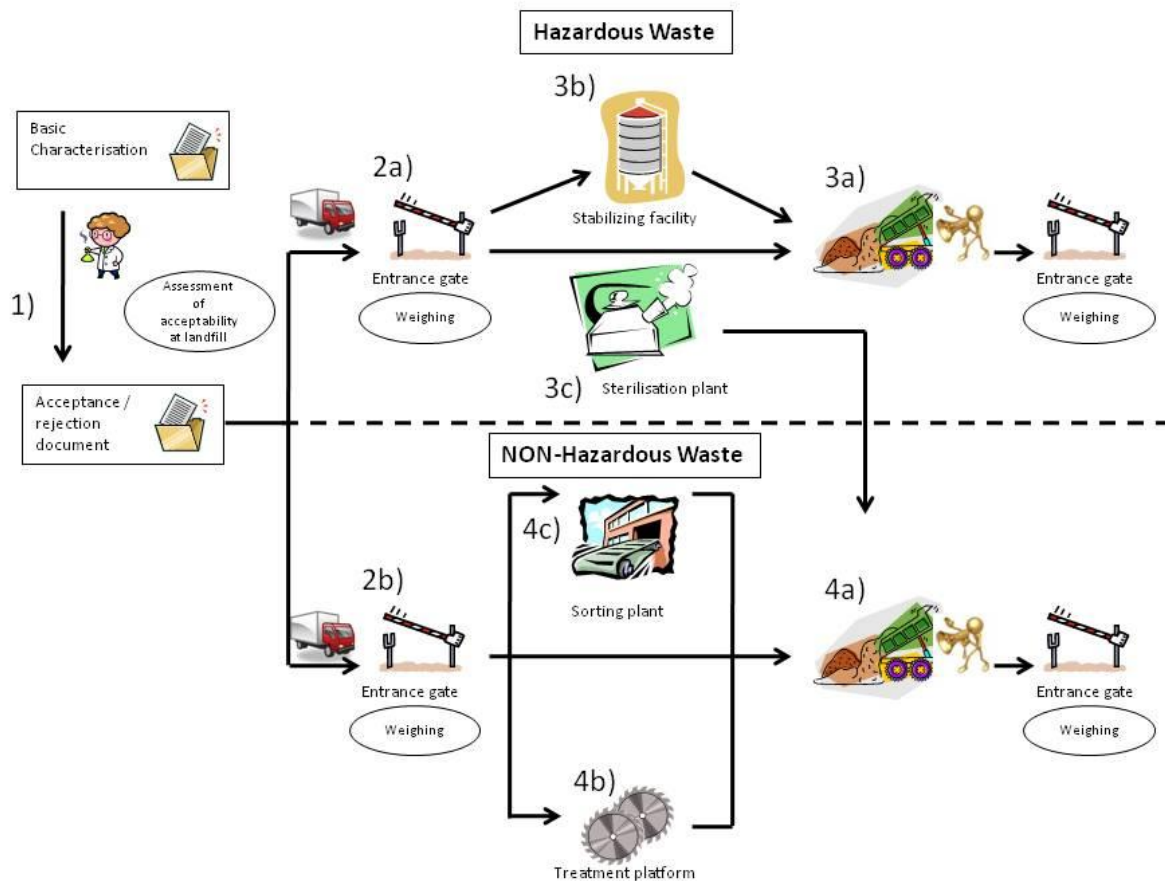


Figure -1.5-6: Flow chart of the waste acceptance procedure at Laval (France)

Assessment of basic characterisation

Acceptance of waste is exclusively on the basis of a basic characterisation including chemical analysis. The basic characterisation has to be renewed every year.

The only waste accepted without chemical analysis is asbestos waste, which is delivered in big packs and is entombed (buried) within cells for stabilised waste.

In case a non-hazardous waste is delivered to the landfill a company intern basic identification form “fiche d’identification préalable à l’admission de déchets” has to be filled in. MSW is accepted without chemical analysis, whereas homogenous waste fractions (e.g. sludges) have to undergo a chemical analysis for all substances that are requested by the landfill operator. No limit values are requested by authorities, but for reasons of security Séché is using the limit values as stipulated in the WAC Decision for non-hazardous waste landfilled together with hazardous waste.

For hazardous waste the procedure to be applied is similar, except of the fact that a full chemical analysis is requested in this case. For this purpose the waste producer has to send a sample which is analysed in the on-site laboratory. Apart from the substances requested by EU and national legislation, phenol index, cyanides, fluorides and chromium 6 are investigated. The analysis of contaminated soils, incompletely burned combustion residues and badly documented industrial residues comprises in addition PCB, PAHs and hydrocarbons.

The range of variability is checked by means of comparison of historical data in the context of the annual renewal of the dossiers.

Compliance testing

There is no specific compliance testing foreseen in French legislation as the basic characterisation including the full list of chemical analysis is renewed annually.

On-site verification

On-site verification consists of a visual inspection at the point of entry and at the place of unloading. In addition all hazardous waste undergoes a mandatory quick test for heavy metals and organic compounds.

The unloading is supervised by an employee, who calls for support and decision in case any suspicious load is observed.

It is noteworthy that on the class B landfill annually about 600 interceptions have been reported, which reflects the good formation and surveillance of the employees.

Expert proposals related to potential modifications of the WAC

There are no proposals for the WAC Decision.

1.5.2.3 Site visit to representative non-hazardous waste landfills (class B) in Sonzay

General terms

The landfill site of Sonzay is located about 15km northwest of Tours. The landfill is owned and managed by SITA Centre Ouest (agence régionale ouest) a private waste management company and thus applies internal SITA acceptance procedures. The landfill constitutes the MSW landfill for Tours and the Tours region. It started operation as class B landfill in 1985, with recent permit extension and technical adaptations in 2007. The current landfill is foreseen to be in operation until 2034.

The site is equipped and managed as bioreactor plant since 2004.

Sonzay is certified ISO 14001.

Apart from the landfill cells for MSW the site comprises a small civic amenity site for citizens, a leachate water treatment facility (reverse osmosis) and a biogas recovery plant.

The Sonzay site covers an area of 50ha with a remaining capacity of 2,700,00m³. The operating class B landfill receives annually about 135,000t of waste (>50% mixed MSW, residues from sorting plants, bulky waste, shredder light fluff, slags, sludges and soils). Waste is disposed off in small rectangular cells which are covered weekly by a temporary argil layer. Asbestos waste and gypsum waste is not accepted.

The landfill is technically fully compliant with the landfill directive requirements.

Landfill gas from filled cells is collected (2,000m³/h) and recovered (heat for reverse osmosis, electricity 20,000MWh) energetically. This corresponds to the annual electricity needs of 8,000 inhabitants. Biogas is regulated at a methane content of 45-55%. A flaring torch is installed for security reasons. Leachate water is collected and partly re-injected (from old cells), partly treated on-site by means of biological treatment (elimination of ammonium) and reverse osmosis (elimination of salts), before it is discharged into the natural water bodies. The sludges from reverse osmosis are dried and reintroduced into the landfill.

Waste acceptance procedure

The landfill disposes of an electronic waste information management system.

The waste acceptance process flow at Sonzay is as follows:

1. Once a waste is deemed acceptable at the landfill based on the information and chemical analysis provided for the basic characterisation form “identification préalable d’acceptation (IPA)”, the waste producer is informed by means of an acceptance certificate (certificat d’acceptation préalable CAP) that he can deliver to the landfill site. This form contains among others, waste producers contact data, waste type and code, packaging and chemical analysis results if relevant.
2. At waste delivery the driver is identified via his license number which is linked to the waste producer (dossier CLEAR) in the internal data management system. Validity of the treatment contract has to be checked in a second parallel data base (“suivi des IPA/CAP”). After checking of radioactivity, acceptability (valid IPA and CAP) and weighing, the truck is allowed to enter. There is only one active unloading platform where it can go to.
3. a) Waste that can be reused or is recyclable is sent to the civic amenity site. Here the waste is collected and sent to a corresponding external treatment facility.

b) the unloading is supervised by two employees, who call for support in case any suspicious load is observed
4. After final weighing at the exit gate the driver receives his confirmation of receipt on the weighing bill (“bon de pesée”).

The IPA is kept for five years. Information about waste type, quantity, delivery date, location on the landfill is recorded for the operational period and a 30 years aftercare period.

Acceptance procedures are laid down in flow charts and short written manuals (Entrance control/reception of loads and acceptance of wastes on a class B landfill).

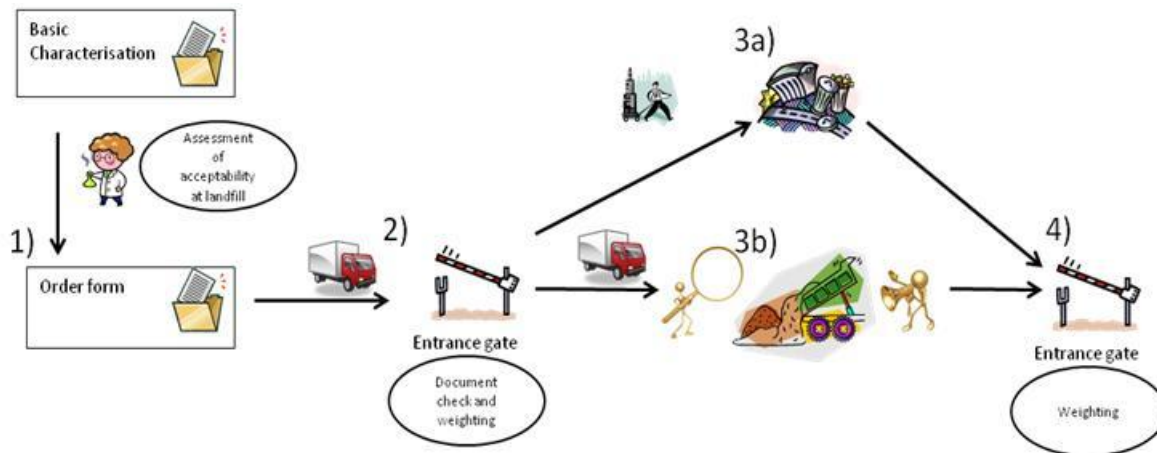


Figure -1.5-7: Flow chart of the waste acceptance procedure at Sonzay (France)

Assessment of basic characterisation

When waste shall be delivered to the landfill a basic characterisation form “identification préalable d’acceptation (IPA)” has to be filled in as requested according to national legislation. MSW is accepted without chemical analysis, whereas other, homogenous waste fractions (e.g. sludges) have to undergo a chemical analysis for all substances that are requested by the landfill operator. SITA has set internal acceptance criteria and limit values that correspond to the limits stipulated in the WAC Decision for non-hazardous waste landfilled together with hazardous waste. There are 5-10 IPAs for the city of Tours and an individual IPA is requested for each other municipality even if there is an inter-municipal waste collection system.

Acceptance of waste is on the basis of a basic characterisation which has to be renewed every year. Chemical analysis data are requested for sludges, slags, shredder light fluff and soils.

Compliance testing

There is no specific compliance testing foreseen in French legislation as the basic characterisation including the full list of chemical analysis is renewed annually.

On-site verification

On-site verification consists of a visual inspection at the point of entry (if open truck) and at the place of unloading.

Expert proposals related to potential modifications of the WAC

There are no proposals for the WAC Decision.

1.5.2.4 Site visit to representative non-hazardous waste landfills (class B) in Lapouyade (Gironde)

General terms

The landfill site is located about 50km northeast of Bordeaux and constitutes the regional MSW landfill for the Gironde region and adjacent departments. The landfill is owned and managed by VEOLIA PROPLETE a private waste management company.

VEOLIA is an international waste management company active in forty countries worldwide. In France VEOLIA is offering services to several thousand industrial clients and municipalities. Almost 1.3mtonnes of waste are collected annually, 16 treatment sites, from landfill to recycling and waste incineration are managed and 1.5mtonnes of waste are treated. VEOLIA installations are environmentally certified and are working with international quality standards and acceptance procedures. VEOLIA PROPLETE France in 2008 had: 38,552 employees; 13,500 industrial clients; 29 million citizens served; 378 treatment sites (50 landfills NHW, 48 incineration NHW, 154 sorting plants 77 composting plants,...); 15,529kt waste collected in 2008 and 17,823kt treated (6,022 kt landfilled). 1,026 sites are certified. The Lapouyade landfill is triple certified ISO 9001, ISO 14001 and OHSAS 18001.

The landfill started operation as class B landfill in 1997. The landfill is foreseen to be in operation until 2015, which corresponds to an exploitation time of roughly 20 years.

Apart from the landfill cells for MSW the site comprises a composting area, a leachate water treatment facility (reverse osmosis) and a biogas recovery plant.

The Lapouyade site covers an area of 47ha and a total capacity of 3,150,000m³ stored or landfilled. (12ha) are already filled and have been closed in 2005. 35ha are in operation. The operating class B landfill receives annually about 430,000tonnes of waste (~46% mixed MSW, ~29% non-hazardous industrial wastes, ~10% bulky waste or sorting residues and ~2% shredder light fluff). Waste is disposed off in small deep cells which are covered weekly by a temporary argil layer. The composting area has an annual capacity of 15,000tonnes/year.

The landfill is technically fully compliant with the landfill directive requirements. Superficial coverage is made by argil in order to allow controlled penetration of rain water.

Landfill gas from filled cells is collected and recovered. Heat is used in limited quantities (1MW) for the reverse osmosis. The main recovery operation is electricity production (30,000MWh/y) which equals the annual needs of 20,000 citizens. Leachate water is collected and treated on-site by means of reverse osmosis, before it is discharged into the natural water bodies.



Figure 1.5-8 : Aerial view of Lapouyade class B landfill site

Waste acceptance procedures

The landfill disposes of an electronic waste information management system.

The waste acceptance process flow at Lapouyade is as follows:

1. Once a waste is deemed acceptable at the landfill based on the information and chemical analysis provided for the basic characterisation form, the waste producer is informed by means of an acceptance certificate (certificat d'acceptation préalable CAP) that he can deliver to the landfill site. his form contains among others, waste producers contact data, waste origin, waste type, appearance and code, transporter, packaging, chemical analysis results if relevant, responsible expert for the dossier, maximum daily quantities.
2. At waste delivery the driver is identified via his license plate number which is linked to the waste producer and the validity of the treatment contract in the internal data management system. After checking of radioactivity, acceptability (valid IPA and CAP) and weighing the truck is allowed to enter. There is only one active unloading platform where it can go to. Overweighed trucks are refused. New transporters receive a site map with procedural and safety information. All trucks arriving at Lapouyade are covered standard type trucks from sorting and transfer stations, so that a certain pre-treatment of the waste has already taken place.
3. The unloading is supervised by two employees, who call for support in case any suspicious load is observed.
4. After washing of the tyres and final weighing at the exit gate the driver receives his confirmation of receipt on the weighing bill ("bon de pesée").

The IPA is kept for two years according to French legislation. Information about waste type, quantity, delivery date, location on the landfill is recorded for the operational period and a 30 years aftercare period.

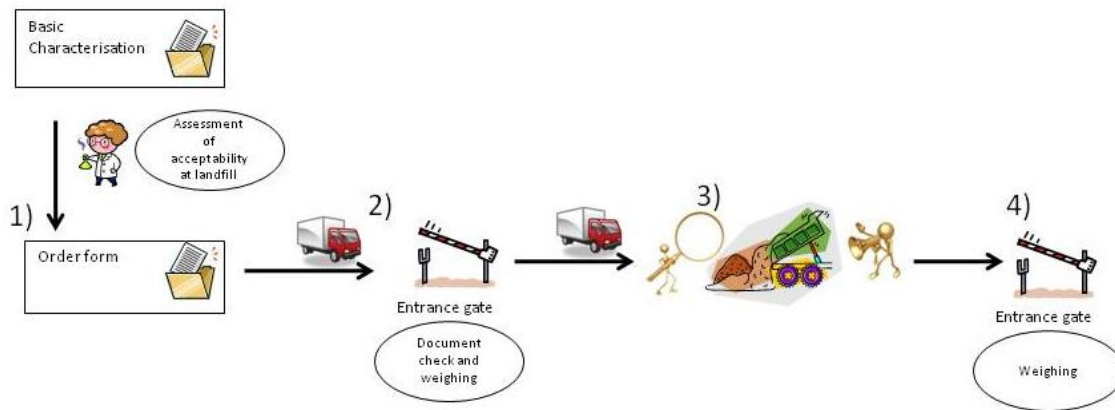


Figure 1.5-9: Flow chart of the waste acceptance procedure at Lapouyade (France)

Assessment of basic characterisation

In case a waste is delivered to the landfill a basic identification form “identification préalable d’acceptation (IPA)” has to be filled in for MSW, corresponding industrial/commercial waste and sorting residues, as requested according to national legislation. MSW is accepted without chemical analysis. All other wastes undergo the prior consent acceptance procedures “procédures d’acceptation préalable”. These include limit values and the request for a chemical analysis (leaching test for HM, chloride, fluoride, sulphate, hydrocarbons, PAHs, PCB, Phenols, TOC, pH and dry matter according to EN 12457-2). VEOLIA uses limit values that correspond to the limits stipulated in the WAC Decision for non-hazardous waste landfilled together with hazardous waste. For soils and sands

Acceptance of waste is on the basis of a basic characterisation (IPA/CAP) which has to be renewed every year. Chemical analysis data are requested for soils, sands, slags and shredder light fluff.

Compliance testing

There is no specific compliance testing foreseen in French legislation as the basic characterisation including the full list of chemical analysis is renewed annually.

On-site verification

On-site verification consists of a visual inspection at the point of entry (if open truck) and at the place of unloading. Additional sampling and analysis of delivered wastes does not take place.

Expert proposals related to potential modifications of the WAC

Leaching limits for non-hazardous wastes in the WAC DECISION are partly very low.

1.5.2.5 Site visit to representative non-hazardous waste landfill (class B) in Roussas

General terms

The landfill site of Roussas is located about 15km south to Montélimar or 80km north to Avignon and constitutes one of the 3 major landfills in the Drome department. The site also serves the adjacent Ardeche departments. The landfill is owned and managed by COVED a private waste management company.

COVED belongs to the group SAUR, and manages the entire chain of activities associated with the collection, cleaning, sorting, recovery, and treatment (hazardous waste -class II: non-toxic waste -class III: inert waste) of waste. With 2,700 employees, Coved performs public services for 5 million residents and treats 2.4mtons of waste per year in 115 sorting, treatment, and recovery centres. Thereto belong 34 non-hazardous waste landfills. All Coved landfills are ISO 14001 certified.

The landfill started operation as class B landfill in 1988. In 2006 the first section (Roussas I) was closed and a new landfill was opened. This is foreseen to be in operation until 2021.

Apart from the landfill cells for MSW the site comprises a sorting station for separately collected waste fractions, a small area for bounded asbestos waste (1,000t/y), and a baling station.

The Roussas site covers an area of 22ha and a total capacity of 2,000,000m³. (16ha) are already filled and have been closed in 2006. 6ha are in operation. The operating class B landfill receives annually about 150,000tonnes of waste (~80% mixed MSW, ~20% non-hazardous industrial wastes, bulky waste). Waste is disposed off in baled form.

The landfill is technically fully compliant with the landfill directive requirements. Superficial coverage is made by argil in order to allow controlled penetration of rain water.

Landfill gas from filled cells is collected and recovered. Leachate water is collected and treated on-site by means of reverse osmosis, before it is discharged into the natural water bodies. A part of the leachate water is recycled into the landfill to run the bioreactor.

Waste acceptance procedure

The landfill disposes of an electronic waste information management system. COVED has prepared very clear and instructive internal guidance documents, flow charts and short manuals for waste acceptance procedures and limit values to apply in all land fill classes.

The waste acceptance process flow at Roussas is as follows:

1. Once a waste is deemed acceptable at the landfill based on the information and chemical analysis provided for the basic characterization form, the waste producer is informed on the form that he can deliver to the landfill site. This form contains among others, waste producers contact data, waste origin, waste type, appearance and code, transporter, pre-treatment, packaging, chemical analysis results if relevant, maximum daily quantities, etc. The form also contains a list of non-acceptable wastes.

2. At waste delivery the driver presents himself with the name of the producer which is linked to the validity of the treatment contract in the internal data management system. After checking of radioactivity, acceptability (valid IPA and CAP) and weighing, the truck is allowed to enter.
3. MSW is delivered to the baling station.
4. In the baling station waste is loaded to specifically designed trucks which are able to climb up the steep slope of the old quarry which constitutes the basis for the landfill.

The unloading is supervised by one employee, who calls for support in case any suspicious load is observed.

5. Separately collected waste is brought to the sorting station and sent to a corresponding external treatment facility.
6. After washing of the tyres and final weighing at the exit gate the driver receives his confirmation of receipt on the weighing bill “bon de pesée”.

The IPA is kept for two years according to French legislation. Information about waste type, quantity, delivery date, location on the landfill is recorded for the operational period and a 30 years aftercare period.

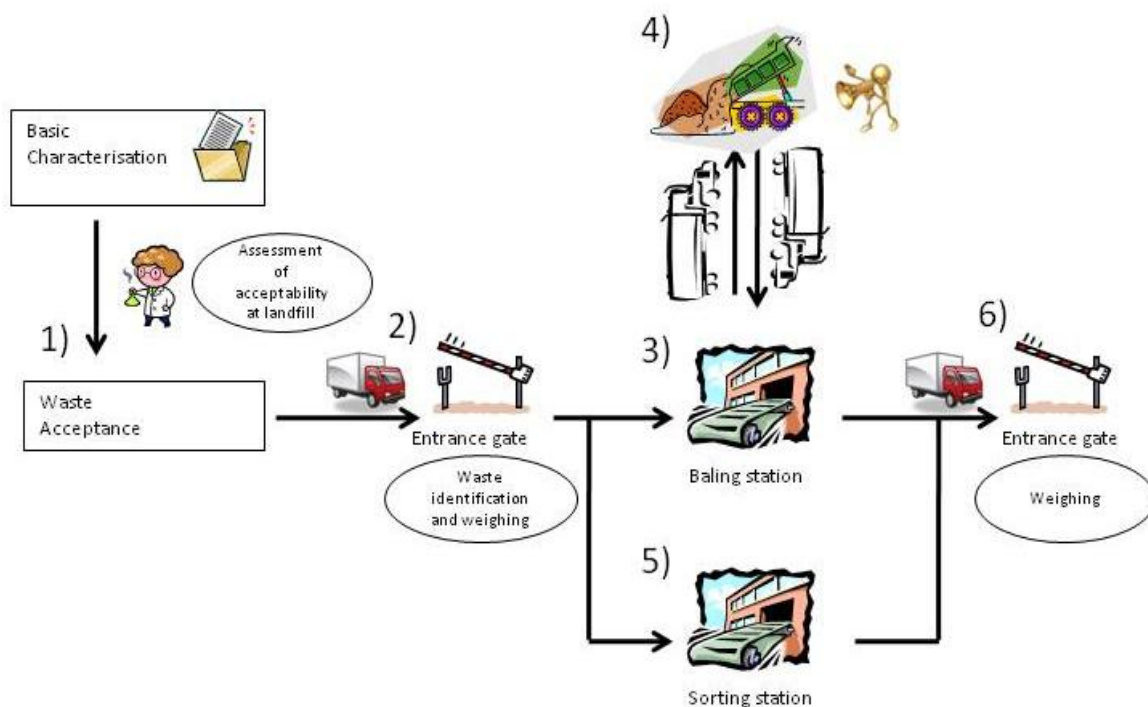


Figure -1.5-10: Flow chart of the waste acceptance procedure at Roussas (France)

Assessment of basic characterisation

When waste shall be delivered to the landfill a basic identification form “identification préalable d’acceptation (IPA/CAP)” has to be filled in. For homogenous waste COVED requests chemical analysis and uses limit values that correspond to the limits stipulated in the WAC Decision for non-hazardous waste landfilled together with hazardous waste.

Acceptance of waste is on the basis of a basic characterisation (IPA/CAP) which has to be renewed every year.

Compliance testing

There is no specific compliance testing foreseen in French legislation as the basic characterisation including the full list of chemical analysis is renewed annually.

On-site verification

On-site verification consists of a visual inspection at the baling station and at the place of unloading. Additional sampling and analysis of delivered wastes does not take place.

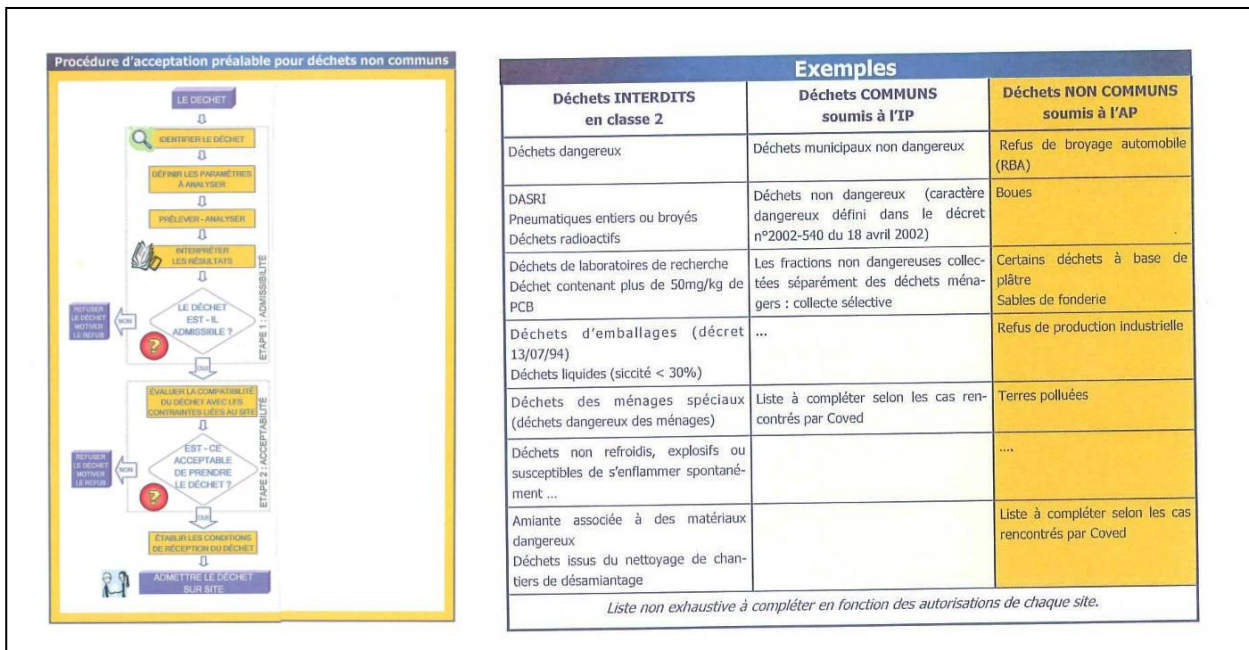


Figure 1.5-11: Abstract of the internal waste acceptance handbook of COVED

Expert proposals related to potential modifications of the WAC

There are no proposals for the WAC Decision.

1.6 Country report Germany

The implementation of the WAC Decision requirements by national law of is generally realised in Germany with quite a number of aspects being regulated in more detail and limit values and acceptance criteria being in general set more stringent.

On the other hand there is some reading of the WAC Decision , which is not fully reflected in German legislation or where German law has set slightly different requirements.

Divergences (minor deficits and requirements that are more stringent) have been observed in the following fields:

Basic characterisation:

- **A request to provide information on the process producing the waste, necessary additional precaution to be taken at the landfill and the mandatory check if the waste can be recycled or recovered is not mentioned in the new German Landfill Ordinance.** According to German interpretation, such request would be redundant, because process information is provided via other parameter such as EWC code, the company internal denomination, the producer declaration or the declaration analysis according to the Waste Recovery and Disposal Records (NachwV 2006). "Precaution to be taken" is already covered by the overall obligation to minimise emissions to the extent possible, and the obligation to prioritise recycling and recover is already set in Art. 5(2) of the Waste Law (KrW-/AbfG).
- Requirements related to test information to be provided for basic characterisation is elaborated in more detail than requested by EU law.
- The fact that a differentiation between regularly and not regularly generated waste is not discussed in German legislation explicitly, is explained by the mandatory sampling and testing regime for all wastes based on quantity and intervals (see PN 89) which automatically implies a compliance testing procedure for regularly arising wastes, without necessity to discuss the theory behind.

On-site verification:

- **Visual inspection generally has to take place at the entrance gate (before unloading) but can also take place at the place of unloading in justified cases.**
- A more stringent requirement is the fact that the possibility to make the on-site verification at the point of dispatch in case of disposal of the waste at a facility controlled by the waste producer (WAC 1.3. second sentence) is not set.
- An example of good practice is the fact that detailed provisions for regular on-site sampling/testing are set.

Waste acceptance criteria:

- **There are some additional possibilities to exceed TOC limits for class C landfills, which are not foreseen in the WAC Decision.** In this context it however has to be taken into account that these limits apply to inorganic carbon and residues from accidental fires or natural catastrophes as well as

to wastes from excavation of old dumps or historical hot spots provided all combustible fraction have been separated before. Disposal has to be performed in a separate cell.

- Further possible exemptions have been set for non-hazardous waste, where EU provisions do not apply.
- **On the other hand, it should be noted that TOC limit values in German Legislation are generally more stringent than indicated by the WAC Decision and they apply to all types of waste disposed off at a certain landfill class including inert and non-hazardous waste.**
- Apart from TOC and pH limits for all landfill classes LOI and cyanide limits are set for all wastes in exceedance to EU provisions. Furthermore German legislation requests compliance with a biodegradability limit and a heating value as additional prerequisite of authorisation of a higher TOC level.
- **As regards management of asbestos waste final top cover, no works at the place of disposal and measures to limit use after closure are not mentioned in the corresponding article on asbestos,** but are covered by Annex 1 (2.3) which contains a general obligation for a final top cover for all landfill types and Annex 5 (10), (9 and 4) “take appropriate measures to avoid that humans can come into contact”. Detailed information on practical management of asbestos waste has been compiled in a specific manual of the National Expert Working Group on Waste management (LAGA).
- **Criteria for sufficient physical stability and bearing capacity for hazardous waste are not explicitly mentioned,** but according to §9 the landfill operator has to assure sufficient stability and bearing capacity of the landfill body for all landfill classes and types of waste, which is explained in more detail in Annex 5, point 4 (sentence 6 and 7). Physical stability and bearing capacity have to be justified and documented in a so-called Stability Proof (Standisicherheitsnachweis).
- **A determination of the ANC is not requested explicitly in the legislation.** In this context, it is important to note that the German translation of the WAC Decision does not request such an analysis for class B but only for class C. In addition it should be noted that ANC is contained as parameter in the list of substances to be analysed in Annex 3(2) “acceptance criteria”, although the reading “limit values have to be complied with might be misleading as regards the necessity to measure ANC, because no limit is set. Some additional explanation might thus be helpful.
- **A higher DOC level can be authorised in case of inorganic carbon.** As inorganic carbon is already distracted in the calculation formula for DOC this reading is without practical effect and according to information from German authorities will be deleted in the upcoming revision of the DepV.
- **For non-hazardous waste landfills the pH minimum value is set at >5.5 instead of 6 in the WAC Decision.** On the other hand German legislation requests a compliance with the pH value for all types of waste disposed off in a class B landfill, whereas EU legislation does not restrict non-hazardous waste in any way, so that the German regulation can be regarded as more stringent in the end.
- **The PCB value refers to 6 congeners instead of 7.**
- As concerns stabilised waste limit values have to be complied with by the original compounds already before stabilisation

1.6.1 Assessment of legal compliance with the WAC Decision

The following table provides an overview on the legal documents transposing WAC Decision requirements into national legislation. Furthermore, the table shows a qualitative assessment of the level of implementation or possible divergences which are further explained and justified in the following Sections.

Germany			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure		n/a	
1.1 Basic Characterisation	§2 (18) DepV 2009	n/a	
1.1.1 Function	§8 DepV 2009	✓	
1.1.2 Fundamental requirements	§8 DepV 2009	~	Information on the process producing the waste, necessary additional precaution to be taken at the landfill and check if the waste can be recycled or recovered is not explicitly requested
1.1.3 Testing	§8 DepV 2009	~/+	Differentiation between regularly and not regularly arising waste not explicitly addressed; detailed provisions to assess variability of characteristic properties within a waste batch
1.1.4. Cases where testing is not required	§8 (2), (7) DepV 2009	✓	
1.2 Compliance Testing	§8 DepV 2009	✓	detailed provisions to assess variability of characteristic properties over time (testing frequency based on waste type and quantities)
1.3 On-site verification	§8 (4) DepV 2009	~/+	Visual inspection generally has to take place at the entrance gate (before unloading) but can also take place at the place of unloading in justified cases. The possibility to make the on-site verification at the point of dispatch in case of disposal of the waste at a facility controlled by the waste producer (WAC 1.3. second sentence) is not set
2. Acceptance Criteria	Annex 3 DepV 2009	✓	
2.1 Landfills for inert waste		n/a	
2.1.1 Short list	§8 DepV 2009	✓	
2.1.2 Limit values	Annex 3 DepV 2009	n/a	
2.1.2.1 Leaching limit values	Annex 3 DepV 2009	✓	
2.1.2.2 Limit values for total content of organic parameters	Annex 3 DepV 2009	~/+	The PCB limit value refers to 6 congeners instead of 7, The German TOC limit value is more stringent, in addition limits are set for pH, cyanide, LOI, lipophilic substances
2.2 Landfills for non-hazardous waste		n/a	
2.2.1 Without testing	§8 DepV 2009	+	No disposal of untreated MSW
2.2.2 Limit values for non-hazardous waste	§8 and Annex 3 DepV 2009	+	The subcategory DKI has much more stringent limit values than set by the WAC Decision.

Germany			
Category	Corresponding national legislation	Implementation	Comments
2.2.3 Gypsum waste	§6 (4) DepV 2009	✓	
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Art 6 c iii	§6 DepV 2009	n/a	
2.3.1 Leaching limit values	Annex 3 DepV 2009	✓	
2.3.2 Other criteria	Annex 3 DepV 2009	~/+	The minimum pH level is set at 5.5. More stringent limits for TOC and LOI but additional possibilities for exceedance. The ANC does not have to be evaluated.
2.3.3 Asbestos waste	§§6, 8 DepV 2009	✓	
2.4. Landfills for hazardous waste		n/a	
2.4.1 Leaching limit values	Annex 3 DepV 2009	✓	
2.4.2 Other criteria	Annex 3 DepV 2009	~/+	Higher DOC level can be authorised in case of inorganic carbon. Additional restrictions but also additional possibilities for exceedance for TOC and LOI. The ANC does not have to be evaluated. Additional limits for cyanide and lipophilic substances.
2.5 Criteria for underground storage	§ 6 to 8 and Annex 2 DepV 2009	✓	

Table 1.6-1: Implementation of WAC Decision in German Legislation

1.6.1.1 Legal framework

Until 2009, the WAC Decision has been implemented in Germany by:

- 1994 Waste Law (KrW-/AbfG), as amended;
- 2002 Ordinance on landfills (DepV 2002);
- 2001 Ordinance on environmentally compatible storage of waste from human settlements and on biological waste treatment facilities (AbfAbIV 2001);
- 2005 Ordinance pertaining to the recovery of waste at surface landfills and amending the commercial wastes ordinance (DepVerwV 2005);
- 2006 Ordinance for Implementation of Decision 2003/33/EC on Criteria and Procedures for Waste Acceptance at Landfills⁶
- 2006 Ordinance on Waste Recovery and Disposal Records (NachwV 2006).

In April 2009, a new Ordinance on landfills has been adopted in the framework of a legislative project to simplify landfill related legislation. The new Ordinance came into effect in July 2009. Simultaneously, in July 2009, DepV 2002, AbfAbIV 2001 and DepVerwV 2005 went out of force.

To conclude, the legislative framework since July 2009 is set by

⁶ Verordnung zur Umsetzung der Ratsentscheidung vom 19.12.2002 zur Festlegung von Kriterien und Verfahren für die Annahme von Abfällen auf Abfalldeponien, vom 13.12.2006, BGBl. T 1 Nr.59, S. 2860 ff

- 1994 Waste Law (KrW-/AbfG), as amended;
- 2009 Ordinance on landfills (DepV 2009);
- 2006 Ordinance on Waste Recovery and Disposal Records (NachwV 2006).

The analysis in this report is based on the legislative as in place since July 2009.

Sampling and testing requirements are laid down in Annex 4 of the DepV 2009. Further specifications on sampling schemes are set in the national sampling guideline LAGA PN 98. This guideline defines the practical procedures for the physical, chemical and biological investigation in relation to the disposal and recovery of waste. It covers, among others, the requirements for a sampling plan, specific location of sampling, minimum amounts of single, mixed and labour samples, minimum size of samples, the preparation of single, mixed and collective samples and the correct conservation, labelling, packaging and transport of samples.

1.6.1.2 Acceptance Procedure

According to §6 DepV 2009 waste may only be deposited if compliant with the acceptance criteria for the specific landfill classes.

All information related to basic characterisation, compliance testing and on-site verification has to be documented in the landfill “operating journal” (Betriebstagebuch), which according to §13(2) has to be stored until the end of the aftercare period of the site.

Detailed specific provisions for sampling in relation to basic characterisation, compliance testing and on-site verification are set in PN 98. This includes apart from sampling strategy and sampling plan the determination of homogeneity and heterogeneity, number of samples by volume of waste batch or number of bags, volume of samples and separate analysis of different fractions in case of heterogeneity.

Basic characterisation

The WAC concept of basic characterisation is implemented by § 2 No. 18 and § 8 of DepV 2009.

In this context § 2 No. 18 stipulates the function of basic characterisation (1.1.1 WAC Decision). The fact that the waste producer or the waste collector is responsible for correctness of information is specified in §27 (1) (5) in terms of the necessity of being “correct, complete and in due time”. Non-compliance is declared an administrative offence and can be fined.

§ 8(1) contains the fundamental requirements corresponding to 1.1.2 of the WAC Decision and the allocation of responsibility for basic characterisation (waste producer or waste collector). WAC requirements a), c) – g) are fully reflected in the text. For hazardous wastes, information can be provided via the documents (Entsorgungsnachweise) according to the NachwV 2006.

Para b) of the WAC (information on the process producing the waste) and paras j) and k) (necessary additional precaution to be taken at the landfill and checking if the waste can be recycled or recovered) are not specifically mentioned in the German legislation. According to German authorities, this is due to the fact that, information on the producing process can be derived from the EWC code, the company internal denomination, the producer declaration or the declaration analysis according to the Waste Recovery and

Disposal Records (NachwV 2006). The second aspect - from the point of view of German authorities - is included in the overall obligation to minimise emissions to the extent possible, whereas the obligation to prioritise recycling and recover is set in Art. 5(2) of the Waste Law (KrW-/AbfG) and thus did not need to be repeated in the DepV.

Requirements related to para d) WAC (waste composition and leaching behaviour) and chapter 1.1.3 WAC (testing is generally required) are elaborated in more detail (sampling protocol, analysis report to be provided) and are more ambitious than requested by EU law.

A differentiation between regularly and not regularly generated waste and the related procedural provisions (WAC Decision 1.1.3 a) and b)) are not in particular addressed in German legislation explicitly. This however, can be explained by the fact, that German legislation comprises as sampling regime for all wastes based on quantities and/or fixed time intervals (see PN 89), which automatically implies a "compliance testing procedure for regularly arising wastes, without necessity to discuss the theory behind before.

German legislation requests the waste producer/collector to provide a proposal for key parameter and the control frequency as part of the basic characterisation and to perform a new basic characterisation in case of changes in the production process, which can be regarded as implementation of 1.1.3 a) WAC Decision. In addition, PN 98 provides detailed provisions for sampling in order to assure reliable information about the compositional range of a waste. A specific procedure to assess variability of characteristic properties over time however, is not provided.

WAC chapter 1.1.4 ⁷ a) and b) is reflected in §8(2) and (7). Article 8(7) provides a short list of inert wastes exempted from testing requirements in accordance with the WAC Decision. In addition to WAC provisions, the share of other compounds (namely metal, plastics, soil, wood, rubber) has to be <5% by volume if an exemption from testing requirements shall be accepted. Asbestos waste according to §8(2) is only exempted from testing requirements if there is no indication for contamination with other substances.

In exceedance to WAC requirements German law does not offer the possibility to exempt waste from testing because this is impractical or appropriate testing methods are unavailable (1.1.4 c)). This is possible, because untreated MSW cannot be landfilled and appropriate analysis methods are available for all substances required.

As defined in Section 1.4 of Annex 5 to the DepV 2009, all related information shall be documented in the operating journal (Betriebstagebuch), which has to be stored until the end of the aftercare phase.

Compliance testing

Compliance testing is implemented by § 8(3) and Annex 4 of DepV 2009. Whilst there is no specific information about the function of the compliance testing, there are detailed provisions about the frequency of compliance tests (minimum every 1,000 tons or once per year) and the sampling procedures and analysis methods to apply. Responsibility for compliance testing is allocated to the waste producer/collector. The related information has to be provided to the landfill operator at waste delivery.

Analysis results have to be kept in the operating journal until the end of the aftercare phase.

⁷ „cases where testing is not required“

On-site verification

On-site verification and the corresponding documentation is implemented by § 8(4) of DepV 2009.

Upon every waste delivery the landfill operator shall immediately verify the load. This shall include a check of an existing basic characterisation and compliance test documents, determination of the waste quantity, waste code and waste type, and a visual inspection (appearance, consistency, colour and smell). German legislation allows in specific justified cases that a visual inspection is performed at unloading only.

§8(5)DepV 2009 defines the procedures for on-site testing. For “new” or “newly characterised” wastes, on-site testing has to be performed as follows:

- Non-hazardous and inert waste: the first 500 t (full analysis)
- Hazardous waste: the first 50 tonnes (full analysis)

Afterwards on-site sampling for testing of key parameter has to be routinely done every 2,500t or at least once a year for hazardous waste and every 5,000 tonnes or once a year for non-hazardous waste.

Control samples shall be kept for at least one month. Sampling and analysis methods are the same as for basic characterisation and compliance testing. Rapid testing is not foreseen in German legislation.

1.6.1.3 Waste Acceptance Criteria

German legislation (DepV 2009, §2 (19)) defines 5 different **categories of landfills**:

- Class 0 landfill (DK 0), above ground landfill for inert waste; corresponding to landfill class A;
- Class I landfill (DK I), above ground landfill for mineral waste with low organic content and low pollutant releases in leaching tests (corresponding to a subcategory of landfill class B);
- Class II landfill (DK II), above ground landfill for mineral waste with a little higher organic content (TOC < 3 %, LOI < 5 %) and releases in leaching tests; (corresponding to a subcategory of landfill class B. Limit values largely identical to those stipulated in the WAC Decision Annex 2.2.2);
- Class III landfill (DK III), above ground landfill for non-hazardous and hazardous waste with higher contamination and stronger releases in leaching tests than acceptable for landfill class II; (corresponding to landfill class C);
- Class IV landfill (landfill class IV, DK IV), Underground storage site (corresponding to landfill class D).

Besides these landfill classes, German legislation defines “long-term storage centres” and “Mono-landfills” of the same categories and subject to the same acceptance criteria and limit values.

According to §6, allocation of specific waste types to landfill classes is as follows:

- Inert wastes may be deposited on class 0 to class IV landfills.
- Non-hazardous waste may be deposited on class I to IV landfills.

- Hazardous waste may be deposited generally only on class III and IV landfills. In accordance with EU provisions, it however, can also be landfilled on a class II or I landfill if compliant with the corresponding limit values.

The waste acceptance criteria (limit values) for specific landfill classes are implemented in German Legislation (Annex 3 of DepV 2009). Criteria and procedures for assessment of compliance for monolithic waste are specified in §6(2).

Criteria for compliance with limit values set for the different landfill categories are defined in German legislation. Compliance with acceptance criteria and limit values has to be achieved for each single waste stream without mixing with other substances and wastes. If necessary, pre-treatment shall be performed (see §6(1)). According to Annex 4(4) to the 2009 Landfill Ordinance (Deponieverordnung), results from compliance testing can be regarded as the same as from the basic characterisation, if the following deviances are not exceeded and the median of all analyses is below the limit value set: LOI 100%, TOC 100%, caloric value 1,000 kJ/kg, other solid criteria each 100%, pH value 1, leaching criteria 100% each, AT₄ and GB₂₁ 50% each, and total solid content 100%. Specific criteria are also set for MBT waste.

Acceptance criteria for mixed and stabilised wastes are defined in §6 (1) and (2). According to these provisions, limit values have to be met in the original waste for mixed and partly stabilised waste. For fully stabilised waste compliance has to be alternatively tested with a crushed sample (size < 10 mm) of the matured stabilisation product with the stronger pH-stat-test (at pH = 4 and pH = 11).

Acceptable exceedance of limit values: According to §6 (6) higher concentrations than limit values set (namely TOC and LOI) can be authorised by competent authorities under following conditions:

- Class C landfill (separate cell): hazardous and non-hazardous wastes from accidental fires or natural catastrophes.
- Class B landfill (separate cell): non-hazardous wastes from accidental fires or natural catastrophes

This applies also for residues from accidents comprising asbestos and other artificial hazardous mineral fibres, if a separation is not possible or economically feasible and there is no alternative treatment method available and for wastes from an excavation of an old dump site or an historical hot spot (Altlast) provided all combustible fractions have been separated before.

The specific substances and admissible exceedance are further specified in Annex 3(2).

Acceptable exceedance of limit values generally follows the provisions of the WAC Decision. However there are some additional specific provisions and exemptions set in German legislation as discussed below. Limit values may not be exceeded for MBT residues, for which specific additional parameter are set. In accordance with EU legislation (no limits set) contamination with relevant substances can be authorised up to 3 times the limit value set for DK II case of a Mono-landfill⁸ class I.

A register of authorised exceedance has to be established by the competent authority.

The test methods for the chemical analyses are stipulated in Annex 4 of DepV as follows:

⁸ Landfill or landfill section restricted to disposal of specific mass wastes with similar reactivity and composition

Measurement	DepV 2009
Determination of TOC (sludge and sediments)	DIN EN 13137
Calculation of dry matter	DIN EN 14346
Leaching behaviour test Up-flow percolation test	DIN CEN/TS 14405 / DIN 19528
Leachate preparation for parameter determination	DIN 12457-4
Digestion for subsequent determination of aqua regia soluble portions of elements	EN 13657
Microwave-assisted digestion with hydrofluoric, nitric, and hydrochloric acid mixture	---
Analyses of Leachate – determination of Co, Cr(VI), Cu, NO ₂ ⁻ , total S, V	---
Leachate – determination of pH	DIN 38404-5
Leachate determination of DOC	DIN EN 1484
Leachate - determination of phenol index	DIN 38409-16
Leachate – determination of As	DIN EN ISO 11969 / DIN EN ISO 11885 / DIN EN ISO 15586 / DIN EN ISO 17294-2
Leachate – determination of Pb, Cd, Cu, Ni, Zn ²⁺ , Cr _{total}	DIN EN ISO 15586 / DIN EN ISO 11885 / DIN EN ISO 17294-2
Leachate – determination of Se	DIN EN ISO 11885 / DIN EN ISO 17294-2
Leachate – determination of Cl ⁻	DIN EN ISO 10304-2 / DIN 38405-1 / DIN EN ISO 15682
Leachate – determination of SO ₄ ²⁻	DIN EN ISO 10304-2 / DIN 38405-5
Leachate – determination of F	DIN 38405-4 / DIN EN ISO 10304-1
Leachate – determination of Ba, Mo	DIN EN ISO 11885
Leachate – determination of Sb	DIN EN ISO 11885 / DIN EN ISO 15586 / DIN 38405-32 / DIN EN ISO 17294-2
Leachate – determination of ammonium, AOX, TOC,	
Leachate – determination of easily liberatable CN ⁻	DIN 38405-14
Leachate – determination of conductivity	DIN EN 27888
Leachate – determination of Hg	DIN EN 1483 / DIN EN ISO 17852
Determination of hydrocarbon content in the range of C ₁₀ to C ₄₀ by gas chromatographic	prEN 14039
Determination of BTEX	DIN 38407-9
Determination of LOI	DIN EN 15169
Determination of PCB	DIN EN 15308 / DIN 38414-20
Determination of PAK	DIN EN 15527
Determination of density	DIN 18125-2
Determination of caloric value	DIN EN 15170
Conductivity of leachate	DIN EN 27888
Determination of AT ₄	Description
Determination of Gas production	Description
Sample taking	LAGA PN 98

Table 1.6-2: Comparison of German norms with the WAC Decision norms

Criteria for landfills for inert waste

Criteria for landfills for inert waste are implemented by Annex 3(2), § 8 and Annex 4 (sampling and analysis methods) to DepV 2009.

A short list of wastes acceptable without testing is stipulated in § 8. It is identical to the list provided in the WAC Decision.

Leaching limits values correspond to the WAC values L/S=10 mg/kg are used, but the unit is (mg/l) instead of (mg/kg). Apart from EU requirements limit values are set for cyanide (<0.01 mg/l) and pH (6.5 – 9).

Limit values for total content of organic parameter are largely identical to WAC section 2.1.2.2. A limit value for PAH (EPA) is set at 30 mg/kg. In accordance with EU provisions a higher TOC values until a maximum of 6 % can be authorised, in case the DOC limit is met.

In addition to EU provisions, higher levels can be authorised if the concentration is caused by elemental/inorganic carbon.

However, German legislation defines a stricter TOC limit (1%, compared to 3% set in the WAC Decision) and a LOI limit (<3%). Apart from this German legislation stipulates a biodegradability limit and a heating value limit as additional pre-requisite to authorise a higher limit.

In concretisation of the restriction for content of other material of the WAC Decision, German legislation requests a limit of 5 % for soil and dredging sludge (170504, 170506 and 200202) as an additional prerequisite for acceptance without testing.

Due to historical reasons the limit for PCB is defined as sum value of 6 congeners, whereas the WAC Decision sets the same value as sum 7 congeners. According to information from German authorities, this shall be changed with the upcoming review of the Landfill Ordinance.

A limit for extractable lipophilic substances is set in addition to EU limits.

Criteria for landfills for non-hazardous waste

Acceptance criteria and limit values for landfills for non-hazardous waste are implemented by § 8 and Annex 3(2) and 4 to the DepV 2009. In accordance with EU requirements (para 2.2 of the WAC Decision) Germany defined two subcategories of landfills (class I and II).

Class I and class II landfills can accept non-hazardous and hazardous waste if compliant with the limit values set. In addition, there are a number of further limitations and specifications for certain types of waste, as follows:

- Residues from MBT⁹ may only be landfilled on class II landfills, if separated from gypsum waste or hazardous waste and if all combustible and recoverable fractions have been largely separated before.
- Monolithic stabilised wastes (EWC code 190305) may be accepted on class I and II landfills if the organic compounds responsible for hazard characteristics of the original waste have been completely destroyed during the stabilisation process.

The issue of stabilised waste is not specifically addressed in relation to class B landfills, but discussed more generally for all types of landfill. Compliance of stabilised monolithic¹⁰ waste with limit values has to be determined by means of a leaching test at pH 4 and 11 (according to the procedures defined in Annex 4,

⁹ TOC up to 18% although low biodegradability

¹⁰ Vollständig stabilisierte Abfälle §6(2)

3.2.1.2) with a sample of matured waste (max 28 days), which has been ground to a size of <10 mm before the leaching test¹¹.

Specific requirements for gypsum waste (pursuant to 2.2.3 WAC Decision) are not explicitly mentioned anymore in the new German legislation. Compliance with WAC requirements however is assured due to the exclusion of co-disposal with MBT residues (see above), and the general TOC limit <3 %.

Asbestos waste can be accepted without testing according to § 8 (2) of DepV 2009. However, it may only be deposited in separate cell and if there is no indication of any other contamination resulting in exceedance of limit values. Specific criteria and management provisions for the disposal of asbestos waste as stipulated in chapter 2.3.3 of the WAC Decision are set in Annex 5 (4) to the German DepV 2009. Requirements related to other hazardous substances, separate disposal, daily coverage or sprinkling and landfill register are fully reflected in the German law.

The provisions concerning final top cover, no works carried out and measures taken to limit possible uses are not stated explicitly in the corresponding article on asbestos, but are covered by Annex 1 (2.3) which contains a general obligation for a final top cover for all landfill types and Annex 5 (10), (9 and 4) “take appropriate measures to avoid that humans can come into contact”. In addition detailed information on practical management of asbestos waste has been compiled in a specific manual of the National Expert Working Group on Waste management (LAGA).

Leaching limit values of DK II correspond to WAC class B limits for L/S 10 l/kg, even if they are given in mg/l in German legislation.

Apart from EU requirements limit values are set for cyanide (<0.1 mg/l DK I <0.5 mg/l DK II) and pH (5.5 – 13). Although this comprises a slightly lower value than the pH 6 stated in the WAC Decision for stable non-reactive, hazardous waste it is far more stringent overall as it also applies for non-hazardous waste, which constitute the pre-dominant part of waste landfilled on class B. Leaching limit values for DK I are generally more stringent than EU class B limits except for Fluoride, Sulphate, Chloride, and Arsenic.

Limit values for Antimony, Selenium, Molybdenum, Barium, Sulphate, and Chloride are not applicable if the landfill has been used for non-hazardous waste only since 2005. This is in accordance with EU provisions, as the WAC Decision does not set limits for non-hazardous waste without co-disposal of hazardous waste.

As concerns other criteria, **all wastes** destined for landfill class I and II may not exceed and LOI of 3-5% and a TOC of 1-3%. This is much more stringent than the 5% TOC limit for hazardous waste set in the WAC Decision. On the other hand higher levels can be permitted in case of elementary carbon and limits are not applicable for ashes and slags from high temperature processes (non-biodegradable carbon) due to life cycle deliberations. A limit for extractable lipophilic substances is set in addition to EU limits.

A mandatory determination of the ANC is not discussed explicitly in German legislation, but ANC is comprised in the list of limit values to comply with in Annex 3(2) on acceptance criteria, although without further explanation which could be somewhat misleading.

In this context it is noteworthy to take into account, that the German translation of the WAC Decision requirement for class B reads: “still has to be determined” in the meaning of “has to be added to the WAC

¹¹ This procedure is not necessary if the waste has met the limit values before undergoing stabilisation

document” and not in the meaning of “shall be determined for the waste”, as suggested by the wording of the English version.

Specific criteria for physical stability and bearing capacity of the deposited waste are not set in the Ordinance, but the operator is requested in annex 5(4) to but according to §9 the landfill operator has to assure sufficient stability and bearing capacity of the landfill body for all landfill classes and types of waste. Annex 5, point 4 (sentence 6 and 7) requests the operator to assure sufficient stability and bearing capacity of the entire construction by means of a so-called Stability Proof document (Standisicherheitsnachweis).

Criteria to ensure that hazardous monolithic wastes are stable and non-reactive before acceptance are set by the obligation to meet limit values under the conditions and procedures mentioned above.

Criteria for waste acceptable at landfills for hazardous waste

The acceptance for hazardous waste landfills are implemented by Annex 3(2) and §8 of DepV 2009.

Leaching limits and other criteria are largely identical to the WAC Decision limits, even if the values are given in (mg/l) instead of (mg/kg). In addition to EU requirement German legislation has set a limit values for cyanide (<10 mg/l) and pH (4-13). A limit for extractable lipophilic substances is set in addition to EU limits. Furthermore, German legislation stipulates a biodegradability limit and a heating value limit as additional prerequisite for an acceptable exceedance.

German legislation stipulates the possibility to authorise exceedance of the DOC level by a factor of two in single justified cases, and a level of 3,000 mg/kg (300 mg/l) in case of inorganic bound carbon. As inorganic carbon is already distracted in the calculation formula for DOC, this reading however, is without practical effect and according to information from German authorities, will be deleted in the upcoming revision of the DepV.

The TDS limit does not apply for ashes from for wood combustion plants (according to Ordinance for small and medium combustion plants). LOI and TOC limit is not applicable according to the DepV 2009 for ashes from brown coal combustion and residues from high temperature metallurgical processes. German authorities argue that the exemptions from compliances with set limits for combustion residues is justified by the low remaining biodegradability and because an additional energy consuming treatment is not justified from an ecological point of view in particular as regards ashes from wood combustion plants.

Underground storage

The criteria for underground storage of the WAC Decision is implemented by § 3 (2), § 6 to 8 and Annex 2 of DepV 2009. The legal requirements and procedures described fully correspond to the WAC Decision requirements.

Expert proposals related to potential modifications of the WAC Decision

According to a letter of the “Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit” to the European Commission, German authorities and industry would like to suggest a re-consideration of the following aspects in the WAC Decision:

- TOC and LOI limits for hazardous waste landfills.
A number of wastes have an elevated organic content although this is not biodegradable and

current test methods for determination of TOC and LOI tend to produce falsely positive results. Thus, it should be possible to authorise higher values if it can be proved that inorganic or at least non-biodegradable compounds cause them.

- DOC limit value for hazardous waste landfill
A number of largely mineral industrial wastes (sludges and sands) regularly exceed set DOC limits, but show no or only a poor biological degradation, so that a thermal pre-treatment would be counterproductive from the ecological point of view. Hence, it is suggested to increase the value from 100 mg/l up to 300 mg/l or at least 200 mg/l, and to allow an exceedance of the set limits for all classes of landfills, if it can be proved that the value is due to inorganic compounds.
- Sb limit value: Based on toxicological considerations it is suggested to adapt the Sb limit to the one for As.

1.6.2 Site visits in Germany

The organisation of the site visits has been realised in close cooperation with the German Ministry of Environment which recommended certain country authorities for further selection of appropriate sites.

The landfill sites **Currenta Leverkusen Bürrig** (hazardous landfill, class C landfill), **Herfa Neurode** (underground storage, class D landfill), **Ludwigsburg** (inert and non-hazardous landfill, class B landfill) have been selected.

The tasks of landfill operators start with the assessment of acceptability of a certain type of waste and comprise the actual acceptance of wastes arriving at the landfill. These procedures may differ by type of landfill and operator. Furthermore, some general information (e.g. location, size, technical standard, accepted waste) as well as specific systems installed for documentation may be helpful for the assessment of the on the ground enforcement of legal requirements. The description of each landfill visit is structured into the sections “general terms” (background information) and “waste acceptance procedures” (basic characterisation, compliance testing, on-site verification).

1.6.2.1 Site visit to representative hazardous waste landfill (Currenta landfill class C)

General Terms

The landfill site Currenta is located in Leverkusen in the west of Germany and has started operation in 1972. It is a hazardous waste landfill with an extension of 65 ha, a total capacity of 25,000,000 m³ and a remaining capacity of 10,000,000 m³. The site is expected to remain under operation for several decades. The landfill is located in Leverkusen close to a large chemical production facility for among others fine chemicals and plastics. The company is a major industrial client of Currenta and has an internal disposal site at the landfill.

The ratio between internal and external waste is about 75% versus 25 %. Waste which are deposited on this hazardous landfills are mostly mineral production residues with low organic content and contaminated C&D residues and waste water treatment sludges.

The landfill is part of an integrated treatment plant comprising a hazardous waste incineration plant and an industrial waste water treatment plant besides the landfill.



Figure 1.6-1: Overview of the landfill Currenta (Germany)

With entry into force of the new technical standard requirements, the old landfill sections have been closed and secured according to the EU requirements. A new landfill appropriate to EU standards has been installed on top of the old site. The site is equipped with a leaching water collection system connected to an industrial waste water treatment plant. Gas is monitored. However, gas production is so low, that recovery or flaring is not possible and necessary.

Waste acceptance procedure

Currenta is equipped with an internal waste management information system (Abfall Management Information System (AMIS)). in order to manage all acceptance procedures and documentation of the waste data.

The process flow of waste acceptance at Currenta is the following:

1. Once a waste type is deemed to be acceptable at the landfill based on its characteristics as specified in the basic characterisation, a confirming document “release certificate” is filled in by the landfill operator. This document repeats the most important information (e.g. composition, waste producer or waste description, an internal identification code) and is sent to the waste producer. It indicates that this waste type is accepted at the landfill and has to be accompanied by an internal consignment note. If this is missing, it cannot be printed and have to be prepared before arrival.

Without an internal consignment note a passing at the gate is not possible. It includes specific information (e.g. waste type, concentrations, amount, date of delivery, waste code, waste producer/collector and packaging details and signatures from different handovers from the waste producer until the landfill site.

Internal waste deliveries carry the internal consignment note. For external deliveries this internal consignment note is prepared at the entrance. If the waste is not announced, the delivery has to wait until this internal covering letter is issued.

The announced waste deliveries have to carry a record of proper waste management (legally defined) and a release certificate.

2. At the weighbridge the driver receives a running ticket determining the location for disposal. This running ticket is not kept. If there is a reason for suspicion the waste is unloaded at a separated place until the analysing results are available.
3. At the indicated place of unloading, the running ticket is checked and the major visual inspection is performed.
4. When returning to the check point and entrance gate, the lorry is weighted a second time for documentation of the actual waste quantity delivered.

The gathered information about waste type, quantity, delivery date, location on the landfill is recorded as paper and as an electrical version for more than 7 years.

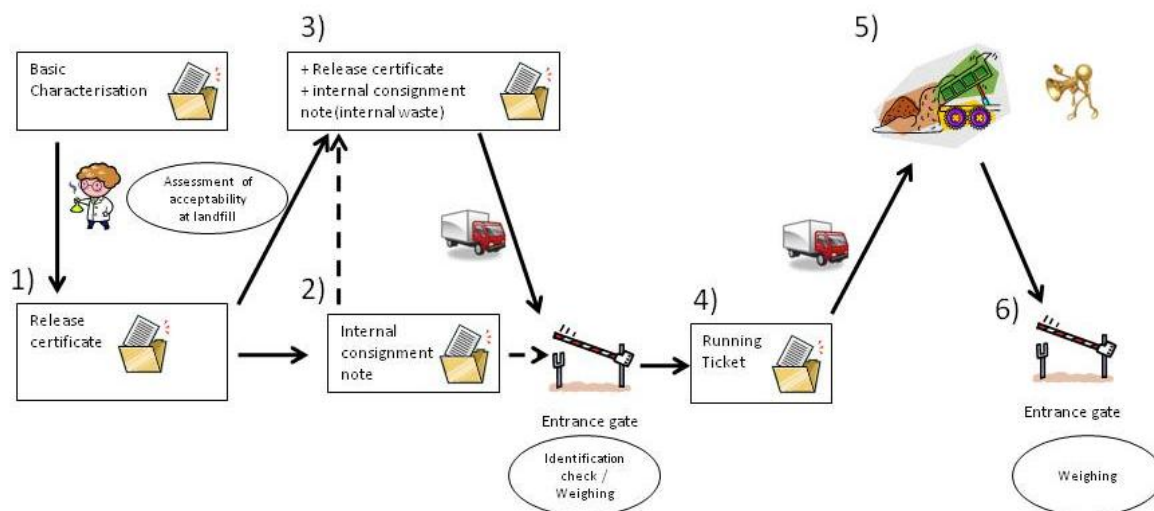


Figure 1.6-2: Flow chart of the waste acceptance procedure at Currenta (Germany)

Basic characterisation

In case a new waste type shall be delivered. The basic characterisation is checked for consistency and completeness. If necessary, additional analyses are requested by the landfill operator.

The landfill operator also defines the key parameter for compliance testing to be provided.

If the waste according to the evaluation of the basic characterisation is deemed acceptable at the landfill and all documents are present, a so called “release certificate” is prepared and signed by the landfill operator. Afterwards it is sent to the waste producer. This document is mandatory to start the waste delivery.

Generally all wastes accepted at Currenta have to be accompanied by a chemical analysis. Only asbestos waste delivered in sealed big bags is accepted without testing.

Compliance testing

According to the German legislation the operator of the landfill determines the key parameters of the compliance testing.

Compliance testing on the key parameters is done by the landfill operator in an external accredited laboratory. After every 200,000 t of delivered material or every ¼ year – whichever occurs first– a compliance testing is made. The amount and duration of the deliveries is computer controlled and an alarm is triggered in case of exceedance. In special cases analyses can be done in an internal laboratory whenever necessary.

Consistency with basic characterisation values is checked and assessed in accordance with Annex 4 of the DepV. Samples are taken by Guidance PN98 trained and qualified employees during the depositing process.

On-site verification

When arriving at the entrance check point, the lorry is weighted and a check of the documents is made. For this purpose the identification code of the documents carried with the load is cross checked with the existence of an internal consignment note. In case of internal waste delivery the internal consignment note is printed out and carried along by the driver. For external waste the internal consignment note is on hand at the check point.

A visual inspection of the open Lorries is made with support of installed mirrors and cameras. After acceptance, the lorry driver receives a “running ticket” indicating the point of unloading. The waste is then transported to the allotted location on the landfill. At the point of destination a qualified employee of the landfill checks the “running ticket”, controls the discharge and undertakes an organoleptic control.

In regular intervals – or in case of suspicion – samples of the waste are taken during unloading in accordance to PN 98. The samples are analysed by a certified laboratory. If the limit values are exceeded and no permit is given or can be given by the authorities, the corresponding waste has to be removed from the landfill. In case of suspicion of the waste quality an internal laboratory can perform the measurements before discharge. In case of an exceedance of limit values, the authorities may give permission within the legal range. Otherwise the waste is refused.

Other Safety Procedures

During the disposal of incinerated sludges, water is added to the material to avoid dust formation.

Expert proposals related to potential modifications of the WAC

The DOC value is considered to be too strict. Measuring ANC is not useful as limit values are missing.

1.6.2.2 Site visit to representative underground storage system (Herfa Neurode landfill class D)

General terms

Herfa Neurode is located in the middle of Germany about 60km southeast of Kassel. Since 1972 Herfa Neurode is an underground storage site. It is the first underground storage system worldwide. The salt rock formations entirely free of water and proved to be for million years gas-tight. It has a capacity of 200.000t/a limited by the capacity of the entrance elevator which is the needle eye of the disposal plant.

The wastes are stored in a depth of 700 to 800meters in the middle of a 300meter thick rock salt bed. This salt bed is sealed by clay layers with a total thickness of about 100meters.

The accepted waste has to fulfil the requirements as set by the WAC Decision.

Typical waste types are cyanide-laden waste, Hg containing waste; filter dust from aluminium production, residues from incinerator plants, transformers and capacitors. All wastes have to be packed in sealed containers.

Waste acceptance procedures

Once a waste type is deemed to be acceptable at the landfill based on its characteristics as specified in the basic characterisation, a confirming document "release certificate" is filled in by the landfill operator.

The announced waste deliveries have to carry a record of proper waste management (legally defined). This has to be checked at the entrance to the landfill site and is kept for documentation.

The completeness and correctness of each delivered waste record of proper waste management are controlled. Additionally, a compliance testing is done for each delivery.

At the entrance of the elevator to the underground storage system, the waste is delivered to the employees of the underground storage site.

The storage system is structured in substance group areas. Each waste unit is labelled with an internal code to identify the waste substance group. The location for deposition is defined for each waste and therefore traceable.

The location of each substance group is saved electronically and as a paper version without time limit. Samples are stored without time limit.

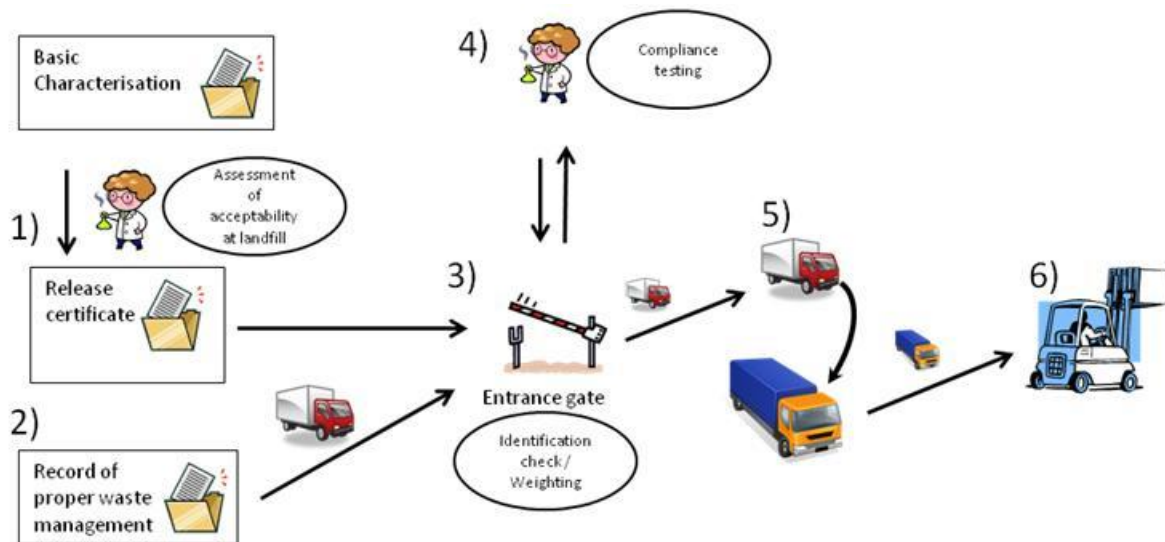


Figure 1.6-3: Flow chart of the waste acceptance procedure at Herfa Neurode (Germany)

Basic characterisation

Before a type of waste is accepted for the first time, the waste producer has to deliver a description of the waste generation process, a waste analyses and a waste sample. This sample will be tested again in the internal laboratory to check compliance with acceptance criteria. Additionally, the appropriate transport packaging (big bag, steel container or steel drum) will be selected. Furthermore, the key parameters for basic characterisation and compliance testing are defined. Depending on the waste type, a notification document has to be filled in.

Compliance testing

Four palettes of each waste load are taken. Every palette contains either 4 drums or one big bag which are all analysed. As a first step a check for explosive gases is performed (limit = 10% lower explosive limit (LEL)). Depending on the waste type additional gas analyses may be necessary. The holes are closed with a screw and rubber sealant in case of the drums and with a hot melt adhesive in case of Big bags. Only if the tests are satisfactorily the drums and big bags are opened and a sample is taken. All taken samples from one load are combined and at least an X-ray fluorescence analysis (XRF) as well as pH-measurements is performed.

The notification document of each waste load is checked... In addition an internal document with detailed information on the analyses to be performed accompanies the notification document (e.g. which type of gases have to be checked, consistency, containing substances). The waste producer is not informed of the internally established criteria and analyses performed. Each combined sample is analysed according to the internal covering letter.

On-site verification

Waste loads arrive by train or lorry. Each of it is checked concerning its quantity, labelling and packaging. Furthermore, corresponding notification documents are verified.

If the waste cannot be accepted, it is sent back. The refusal ratio is very low. Only 0.05% of all deliveries were not acceptable until today.

After clearance the waste is transported via a shaft to the galleries. A qualified employee of the site transports the waste to a location defined by the internal code labelled on the waste.

All waste samples are stored in a separated room close to the deposition without a specific time limit. Each sample is labelled with the delivery day and origin of the material.

Landfill safety standards

All necessary safety standards necessary for the operation of a corresponding landfill are installed or given.

Other Safety Procedures

The underground storage system is built according to the "Room and Pillar-system". Its safety standard is triplicate.

- All waste is either in big bags, steel container or steel drums.
- After the complete emplacement of a chamber, the area is sealed to other parts with a brick wall or a protective barrier made of salt.
- After the sealing of an emplacement field all accesses are closed with 15m thick massive dams.

Expert proposals related to potential modifications of the WAC Decision

There are no proposals for the WAC Decision.

1.6.2.3 Site visit to representative non-hazardous landfill (Burghof landfill class B)

General terms

The landfill Burghof is situated in the south of Germany close to Stuttgart, Baden-Württemberg. The landfill started operating in 1978 and is expected to continue for the next 15 to 20 years. It comprises an area of 56 ha of which 43ha is landfill area. The maximum loading capacity of Burghof is about 10.4million m³ of which 4.1million m³ are already used.

The landfill site consists of six different areas:

- Civic amenity site,
- MBT area,
- A since 2005 inoperative municipal solid waste area,



Figure 1.6-4: Overview of the landfill Burghof (Germany)

- An area for asbestos waste,
- A landfill area according to DK I (landfill class B),
- A landfill area according to DK II (landfill class B).

The landfill site also includes a transfer station for among others electrical waste, industrial waste similar to domestic waste and bulky waste. These wastes are only collected for further treatment in other places and not disposed.

The collected landfill gases are used for electricity generation. In the future, gas is planned to be used either to dry biomass or to sell it to a nearby company.

A WWTP is used to pre-treat leachate of the inoperative municipal solid waste area. The leachate of the other landfill areas and the pre-treated water of the WWTP are transferred to a municipal WWTP.

Typical wastes accepted at Burghof are mineral waste (e.g. moulding sand, glass fibre materials), ashes, asbestos waste, gypsum waste and MBT waste.

Waste acceptance procedure

1. Once the waste type is deemed to be accepted at the landfill site, an order form is generated. This includes important information on the waste (e.g. source of the waste, waste type, duration of validity of order, depositing area and order number). This order form has to be carried with the waste and is cross checked with the order form deposited at the entrance area. When the two documents are identical as set, the load is weighted and the can pass to the corresponding landfill area.
2. a) Re-useable or recyclable waste is sent to the civic amenity site where it is gathered and afterwards delivered to external treatment facilities.

Waste for the bio-mechanical treatment is sent for unloading to the MBT area. Afterwards the lorry returns to the weighbridge. The generated new waste from the MBT is sent to external facilities.

3. b) Waste that shall be landfilled is sent to the controlled disposal area. A false disposal at an inactive cell without control by employees would be recognised quickly as all inactive cells are covered. Waste sample taken during the deposition, are analysed in a certified laboratory. After unloading the lorry returns to the weighbridge.
4. When returning to the weighbridge, the lorry passes the entrance gate and is weighted again for documentation of the actual waste quantity delivered.

Recently a GPS system has been installed in the landfill engineering vehicles to record the deposition of the different wastes in a software system.

The documents are only stored as a paper version in an operating journal and have not been removed during the least 12 years.

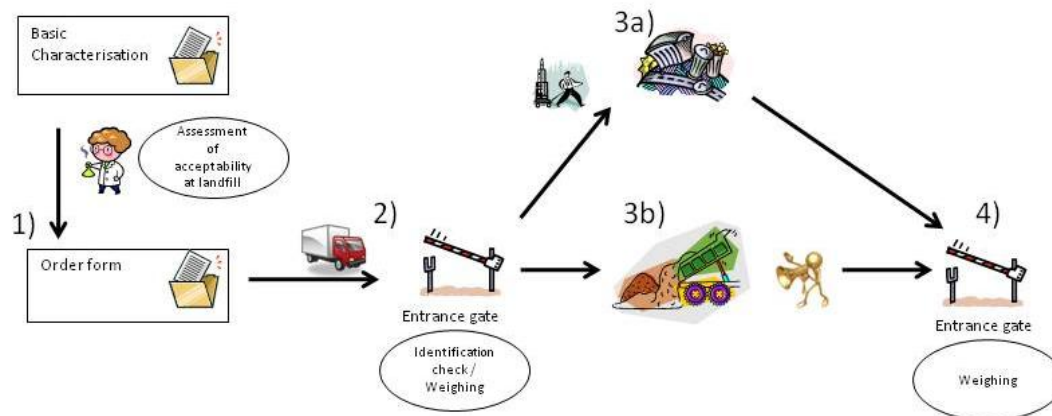


Figure 1.6-5: Flow chart of the waste acceptance procedure at Burghof (Germany)

Basic characterisation

Before a type of waste is accepted for the first time the waste producer has to name the source and deliver analysing results. The results are compared with the legal limit values and further analyses are asked for if necessary. Once all required analyses are available the location for deposition on the landfill site is defined and a notification document is completed by the waste producer. The basic characterisation has to be done for each waste by the waste producer, in general once a year. The analysing results are passed to the landfill operator. In some cases the intervals for basic characterisation can vary depending of the waste (e.g. every 1,000t for debris, every 200,000t for MBT waste).

Instead of compliance testing only basic characterisations are made because costs are nearly the same.

Additionally, one or two spot test samples per month of all incoming waste loads are taken and analysed by a certified laboratory.

Compliance testing

A specific compliance testing is not performed, but all necessary analyses are made equal to a full compliance testing.

On-site verification

For each delivery the order form is compared with the deposited order form at the reception. In case of conformity the load is weighted and a visual inspection is made with a mirror. Then it continues to the deposition area indicated by the order form. The landfill employees at the point of deposition are informed about the incoming waste by walkie-talkie. The discharge is controlled by employees who perform an organoleptic control. Sometimes it is taken a spot test sample according to PN 98. In case of suspicion the supervisor is informed and together with the landfill employee of the place of unloading is decided if a sample shall be taken. When the waste does not fulfil the acceptance requirements, it is dug out and sent back to the waste producer. The waste producer has to pay for the expenditures. In case the analysed waste does fulfil the requirements, the expenditures are covered by the landfill operator.

Expert proposals related to potential modifications of the WAC Decision

There are no proposals for the WAC Decision.

1.7 Country report Greece

The WAC Decision is implemented into Greek Legislation in terms of a referral to WAC Decision requirements. Greek legislation has implemented the Landfill Directive 1999/31/EC including its Article 16 and Annex II.

This is interpreted as sufficient to request compliance with WAC Decision provisions. It however, has to be noted that due to this practice:

- None of the specific provisions which shall be determined by Member States pursuant to the WAC Decision has been defined in national legislation.

1.7.1 Assessment of legal compliance with the WAC Decision

The following table provides an overview on the legal documents transposing WAC Decision requirements into national legislation. Furthermore, the table shows a qualitative assessment of the level of implementation or possible divergences which are further explained and justified in the following Sections.

Greece			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure		n/a	
1.1 Basic characterisation	C.M.D. 29407/3508, (FEK 1572/16.12.2002), Article 20 - Annex II, Section 3 (Measures and Conditions for the sanitary landfill of the waste)	~	It is not specifically mentioned, but stated that: <i>“Basic Characterisation is thoroughly determined by standardized methods for analysis and testing of performance, short and medium term leachability and basic properties of waste.”</i>
1.1.1 Function		~	Referred to Landfill Directive 1999/31/EC, but criteria are not set.
1.1.2 Fundamental requirements		✓	Referred to Landfill Directive 1999/31/EC
1.1.3 Testing		✓	Referred to Landfill Directive 1999/31/EC
1.1.4. Cases where testing is not required		✓	Referred to Landfill Directive 1999/31/EC
1.2 Compliance testing	C.M.D. 29407/3508, (FEK 1572/16.12.2002), Article 20 - Annex II, Section 3, §2 (Measures and Conditions for the sanitary landfill of the waste)	~	
1.3 On-site verification	C.M.D. 29407/3508, (FEK 1572/16.12.2002) Article 20 - Annex II, Section 3, §3 (Measures and Conditions for the sanitary landfill of the waste)	~	
2. Acceptance criteria		✓	Referred to Landfill Directive 1999/31/EC
2.1 Landfills for inert waste		n/a	
2.1.1 Short list		✓	Referred to Landfill Directive 1999/31/EC
2.1.2 Limit values		n/a	

Greece			
Category	Corresponding national legislation	Implementation	Comments
2.1.2.1 Leaching limit values		~	Referral to Landfill Directive 1999/31/EC, but criteria are not set.
2.1.2.2 Limit values for total content of organic parameters		~	Referral to Landfill Directive 1999/31/EC, but criteria are not set.
2.2 Landfills for non-hazardous waste		n/a	
2.2.1 Without testing		✓	Referral to Landfill Directive 1999/31/EC, but criteria are not set.
2.2.2 Limit values for non-hazardous waste		~	Not implemented in Greek Legislation
2.2.3 Gypsum waste		✓	Referral to Landfill Directive 1999/31/EC.
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii		n/a	
2.3.1 Leaching limit values		~	Referral to Landfill Directive 1999/31/EC, but criteria are not set.
2.3.2 Other criteria		~	Referral to Landfill Directive 1999/31/EC, but criteria are not set.
2.3.3 Asbestos waste		✓	Referral to Landfill Directive 1999/31/EC.
2.4. Landfills for hazardous waste		n/a	
2.4.1 Leaching limit values		~	Referral to Landfill Directive 1999/31/EC, but criteria are not set.
2.4.2 Other criteria	C.M.D. 24944/1159/2006, §5.1	✓	Referral to Landfill Directive 1999/31/EC.
2.5 Criteria for underground storage	set only for hazardous waste by C.M.D. 24944/1159 (FEK 791/30.06.2006), Chapter 6	✓x	It is stated that: "The criteria for underground deposition (D12) of hazardous waste as well as the safety evaluation criteria of the specific landfill sites, are set by the WAC Decision of the Council of the European Union".

Table 1.7-1: Implementation of WAC Decision in Greek Legislation

1.7.1.1 Legal framework

The WAC Decision is implemented into the Greek Legislation by the Common Ministerial Decision (C.M.D.) 29407/3508 (FEK 1572/16.12.2002), Common Ministerial Decision (C.M.D.) 8668 (FEK 287/02.03.2007) and Common Ministerial Decision (C.M.D.) 24944/1159 (FEK 791/30.06.2006).

The landfills are classified as in the EU Directives.

1.7.1.2 *Acceptance Procedure*

Basic characterisation

Basic characterisation is not specifically mentioned in the Greek Legislation but depositing waste on a landfill demands relevant waste acceptance criteria corresponding to Article 16 and Annex II of the EU Landfill Directive. It is mainly implemented by C.M.D. 29407/3508 (FEK 1572/16.12.2002) Article 20 (Annex II Section 3).

Records for basic characterisation shall be preserved without a specific time limit.

Compliance testing

Compliance testing is not specifically mentioned in Greek Legislation. Although, depositing waste on landfills demands compliance testing corresponding to Article 16 and Annex II of the Landfill Directive. It is partly implemented by C.M.D. 29407/3508 (FEK 1572/16.12.2002) Article 20 (Annex II, Section 3, §3).

Records for compliance testing shall be preserved without a specific time limit.

On-site verification

The type of waste accepted at each landfill class is defined in accordance with Article 16, Annex II of the Landfill Directive. However, special control provisions related to specific testing requirements or rapid testing methods for the on-site verification as required by the WAC Decision, are not elaborated.

Furthermore, there are no specific provisions on periodic sampling of waste delivered to a landfill as requested in the WAC Decision.

1.7.1.3 *Waste acceptance criteria*

Sampling and testing as listed in the WAC Decision is not implemented by Greek Legislation.

Criteria for landfills for inert waste

The criteria for landfills for inert waste are implemented by Article 20, Section 4 part 2 of Annex II to C.M.D. 29407/3508 (FEK 1572/16.12.2002). It is stated that landfills have to comply with the WAC Decision established under Article 16, Annex II of the Landfill Directive. The acceptance criteria are only implemented for inert wastes noticed by Article 2 (e) of C.M.D. 29407/3508 (FEK 1572/16.12.2002).

Furthermore, a Draft Presidential Decree (“Alternative management of waste from construction and demolition”) is under progress.

Criteria for landfills for non-hazardous waste

Specific criteria for landfills for non-hazardous waste are not set in Greek Legislation.

Criteria for waste acceptable at landfills for hazardous waste

The criteria for landfills for hazardous waste are implemented by §5.1, C.M.D. 24944/1159 (FEK 791/30.06.2006) according to the WAC Decision and C.M.D. 29407/3508 (FEK 1572/16.12.2002). Furthermore, there is a preliminary list of unacceptable waste at landfill sites for hazardous waste.

Underground storage

It is stated that: "The criteria for underground deposition (D12) of hazardous waste as well as the safety evaluation criteria of the specific landfill sites, are set by the WAC Decision of the Council of the European Union".

1.7.2 Site visits in Greece

The organisation of the site visits has been realised in close cooperation with the Greek Ministry of Environment, Physical Planning & Public Works which recommended certain country authorities for further selection of appropriate sites.

The landfill sites **Fyli** (non-hazardous landfill, class B landfill), **Chalkida** (non-hazardous landfill, class B landfill) and **Larissa** (non-hazardous landfill, class B landfill) have been selected.

The tasks of landfill operators start with the assessment of acceptability of a certain type of waste and comprise the actual acceptance of wastes arriving at the landfill. These procedures may differ by type of landfill and operator. Furthermore, some general information (e.g. location, size, technical standard, accepted waste) as well as specific systems installed for documentation may be helpful for the assessment of the on the ground enforcement of legal requirements. The description of each landfill visit is structured into the sections "general terms" (background information) and "waste acceptance procedures" (basic characterisation, compliance testing, on-site verification).

1.7.2.1 Site visit to representative non-hazardous waste landfill (Skalistiri - Fyli landfill class B)

General Terms

The active landfill site Skalistiri of Western Attica Phase 'A' is administrated by the municipality of Fylis. It forms part of the Integrated Waste Management Site of Western Attica, municipality of Ano Liossia. There the landfill gas is used for power production.

The site is at an altitude of between 75 to 200m and covers a total area of 1,000,000m². It is split into two phases:

- Operating Phase 'A' covering 350,000m², active since 2008 and located between the settlements of Fyli and Ano Liossia;
- Filled Phase 'B', a separated site containing independent facilities, is in the process of being capped.

The total design capacity of both phases is 27,000,000m³ with an expected lifetime of 17years, accepting 825,000t/a.

The landfill site, Phase 'A', comprises the main disposal area split into four independent cells, a leachate collection system and treatment area utilizing reverse osmosis techniques, a landfill gas collection system

(to be utilized by the neighbouring power station installation) with emergency flaring facility, a bulky waste shredding facility, an unloading area for waste sampling (future facility), a testing installation for radioactive wastes (future facility), a repairing station, a wheel wash installation, an entrance area consisting of the guards house and gate, the weighbridge installations (eight units, four entrances and four exits) and the central administration building.

The site is a disposal facility for municipal wastes. It also accepts commercial/industrial wastes with the same properties as domestic waste, produced in the western part of the Attica Region, serving a population of approximately 3,600,000. The site also accepts wastes from the neighbouring MBT plant. The disposal of hazardous waste and inert wastes are not permitted at this landfill site as prescribed by the site environmental permit. Inert loads are accepted but they are only used as waste cover material.

The Integrated Waste Management Site of Ano Liossia includes apart from the aforementioned power production a MBT facility, a waste separation facility, a medical waste incineration plant, a leachate treatment facilities, a municipal solid waste landfill I and II of Ano Liossia (both class B), inoperative since 2006. They are both in the final process of being capped and restored. An old non-engineered disposal area of Ano Liossia is now capped and fully restored.

Waste acceptance procedure

1. The landfill site accepts commercial and industrial wastes from the private sector, or companies from municipalities. The waste deliverers have to be in contract with the site operator, the Association of Communities and Municipalities in the Attica Region (ACMAR). For a contract the waste deliverers have to hold a solid non-hazardous waste disposal license from the Ministry of Environment, Physical Planning and Public Works, as required by the EWC and the corresponding Greek Ministerial Decision (KYA 50910/2727/2003). The approved license includes the waste type that would be accepted for disposal at the specific landfill site and usually is valid between two and five years.

After a contract is prepared, the waste carriers receives an 'e-pass' to enter the landfill site. Each pre-declared vehicle is equipped with such a pass. Unannounced ('One off') loads of non municipal waste transports are not accepted.

The landfill operator fills in an internal consignment note for municipal carriers and an issuance of waste transfer note for non municipal carriers.

2. Once the industrial or commercial waste type has been deemed as acceptable for disposal at the landfill site, and the 'e-pass' is issued, the waste producer acquires waste transfer forms including a brief description of the transferred waste. The carrier is obliged to obtain a transfer form for each individual load. The documents are procured from the central offices of the site operator (ACMAR) and have to be transported with the waste load by the driver to be checked at the weighbridge. Inter alia, date and time of entry, weighbridge number and operator, vehicle registration details, customer/waste carrier details, incoming waste type, weight, on-site destination are checked and recorded. Occasionally, a visual inspection of the incoming waste load takes place, if suspicion of non-compliance arises.
3. After weighing the load and controlling the waste transfer form, the waste lorry is permitted to enter the site. At the designated disposal area, site employees are present to guide and assist the

waste carrier: In addition, the landfill employees conduct the visual inspection of the deposited waste load. As regards municipal waste, visual inspection is made exclusively at the disposal area.

- Before leaving the landfill site, the waste carrier passes again the weighbridge and is weighted for a second time. Date and time of exit, weighbridge number and operator, vehicle registration details (from the 'e-pass' and photo recognition of registration plate), the exact empty weight are recorded and in the case of wastes with the designation "for deposition" a deposition certificate is issued.

After the disposal of each waste load, the order form is handed over to the weighbridge operator and the hardcopy is stored in an operational journal for a period of at least five years. The electronically recorded weighbridge data is stored for an indefinite period.

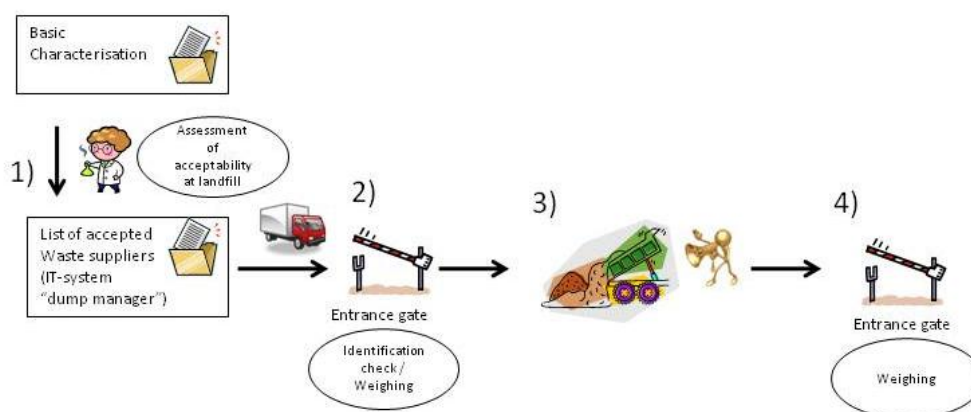


Figure 1.7-1: Flow chart of the waste acceptance procedure at Skalistiri – Fyli (Greece)

Basic characterisation

Before any waste producer (except for municipalities) is allowed to dispose waste at a particular landfill site, they have to obtain a specific disposal license.

For the disposal license the following data have to be provided by the waste producer:

- A copy of operation license of the waste producer facilities, accompanied with a full description of the applied site processes (raw materials and products);
- Approved copies of (1) Environmental Impact Study of the company, (2) Approval of Environmental Permit Terms from the Greek Ministry of Environment, Physical Planning and Public Works regarding operations and its waste production, (3) Waste Management Plan, according to the IPPC Directive;
- Solid waste classification based on the EWC and a description of the waste content for disposal (i.e. data for the leachability, colour, odour and shape of waste for disposal);
- Estimation of annual waste generation and transfer methods for solid waste (by expert company or not);
- Declaration by the representative of the interested facility that the transferred waste is not hazardous. In addition, the EWC and treatment methods have to be indicated.

For the approval of the solid non-hazardous waste disposal license, the above mentioned documents are checked and approved by:

- The Ministry of Environment, Physical Planning and Public Works;
- The landfill site expert employees (chemist, safety officer of the site);
- Municipal Council.

The basic characterisation is declared by the waste producer and will be checked by the Ministry of Environment, Physical Planning and Public Works, the Municipal Council and site employees. They are obliged to compare the received data with the legal limit values and request further analyses if necessary. Once this license is approved and issued, it is not necessary to repeat this basic characterisation procedure.

Concerning municipal waste, the basic characterisation does not take place. It is specified that only non-hazardous waste according to the EWC is disposed.

Compliance testing

Specific compliance testing is not performed. However, all necessary analyses are made during the basic characterisation.

On-site verification

For each delivery the order form is controlled. The waste is weighted and a visual inspection is realised at the entrance area. The employees at the disposal area are informed about the forthcoming delivery in order to apply a visual inspection on the incoming waste load (particularly to waste loads designated for deposition).

In case of suspicion they have to inform the landfill supervisor and decide together whether the load shall be deposited or not. If the incoming waste does not meet the requirements of the license, it is sent back to the waste producer and a chemical analysis has to be done by the waste producer. This analysis is usually performed by the on-site chemist. Otherwise, in case of specialised analysis, it can be carried out by authorized institutes.

Expert proposals related to potential modifications of the WAC Decision

There are no proposals for the WAC Decision.

1.7.2.2 Site visit to representative non-hazardous waste landfill (Chalkida landfill - landfill class B)

General Terms

The landfill site of Chalkida is located in the region of Giamina Dokou on the island Evia, approximately 9 km north of the municipality of Chalkida. It started operating in 2006 and will continue for the next two years. For 25 years (1980-2005) this site was operated as a dump site. This dump facility did not comply with the standards set by the Landfill Directive, and the waste disposal was uncontrolled.

The site covers an area of about 8ha of which 6ha are already in use. The maximum loading capacity of this site has been estimated to 630.000m³.

Chalkida includes an entrance area (consisting of the weighbridge and the main administration building), a main disposal area (consisting of two active cells), a leachate treatment area (consisting of constructed FWS wetlands) and a landfill gas treatment area (consisting of a flare combustion system).

It does not include any pre-treatment waste facilities. The collected landfill gases are burned with a flare combustion system, which is located west of the operative cells. The produced leachate is collected and treated in the free water surface (FWS) wetlands.

The site is the disposal facility for commercial, industrial and municipal wastes that are similar to domestic waste, produced in the central municipalities of Evia. In particular, the described site serves nine municipalities (Amarynthos, Anthidona, Aulida, Dirfys, Eretria, Lilantia, Messapia, N. Artaki and Chalkida).

The disposal of hazardous waste is not permitted at this landfill site.

Since 2008 a waste recycling facility close to the city of Chalkida is in operation. Thus the landfill site does not accept recyclable waste anymore and no waste producer (municipalities, individual or companies) is allowed to deliver any recyclables.

Concerning municipal waste, only waste characterised as domestic and non-hazardous waste is accepted. No specific acceptance procedures are applied to the incoming municipal loads.

Waste acceptance procedure

1. a) For municipal waste no acceptance procedure is applied
- b) For commercial and industrial waste from the private sector the waste

The landfill site also accepts commercial and industrial waste. The waste deliverers must be in contract with the site operator. To obtain a contract is, the waste deliverer have to hold a solid non-hazardous waste disposal license by the Municipal Water Company of Chalkis (DEYAX), as required by the European Waste Catalogue and the Greek Ministerial Decision (KYA 50910/2727/2003). The approved license includes the waste type that would be accepted for disposal into the specific landfill site and usually is valid between two and five years.

Once the industrial or commercial waste type has been accepted for disposal in the landfill site, an order form is filled in by the waste producer including a brief description of incoming waste load. The exact load amount is not indicated on the order form.

2. This order form has to be carried with the waste load by the load carrier to be controlled at the entrance area. When arriving, the exact load (weight) is checked by the weighbridge of the entrance area. Occasionally, a visual inspection of the incoming waste load takes place at that moment. After weighing and controlling the order form, the lorry can pass.
3. At every active disposal area, site employees are present for the visual inspection of the waste load that is deposited. As regards municipal waste, visual inspection takes place only at the disposal area.
4. When returning to the entrance area, the waste lorry is weighted a second time for confirmation of the actual waste amount delivered.

After the disposal of each waste load, the order form is handed over to site employees and it is stored as hardcopy in an operational journal for a not specified period.

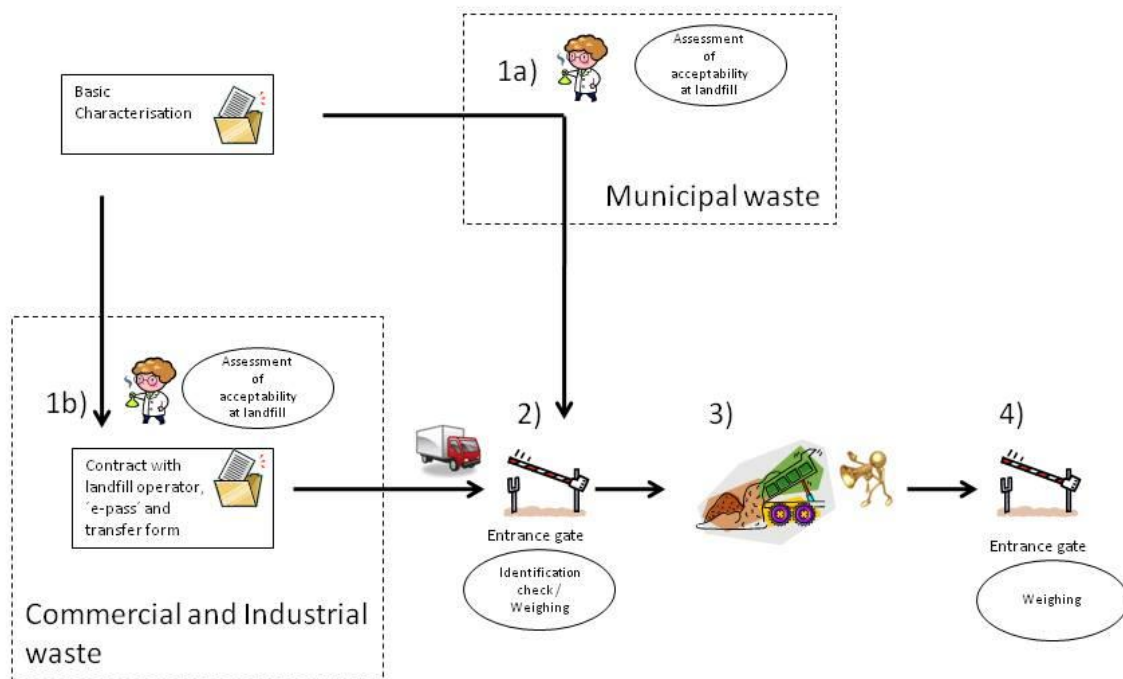


Figure -1.7-2: Flow chart of the waste acceptance procedure at Chalkida (Greece)

Basic characterisation

As previously mentioned, before any waste producer (except for municipalities) is accepted to dispose waste at the particular landfill site, they have to obtain a specific disposal license. During that stage, the basic waste characterisation is declared by the waste producer this is checked by the DEYAX, municipal council and site employees. They are obliged to compare the legal limit values and further analyses are asked for if necessary. Once this license is approved and issued, it is not necessary to repeat this basic characterisation procedure.

For the issuance of that license, the interested party has to provide the following documents to the Municipal Water Company of Chalkis:

- A copy of operation license of the interested facility, accompanied with a full description of the applied processes on site (raw materials and products).
- Approved copies of 1) Environmental Impact Study of the company 2) Approval of Environmental Terms from the Greek Ministry for the Environment, Physical Planning and Public Works regarding its waste disposal 3) Waste Management Plan, as set by the Directive 96/61/EC).
- Solid waste classification based on the EWC and on a description of waste content for disposal (e.g. data for the leachability, colour, odour and shape of waste for disposal).
- Estimation of annual waste generation and transfer methods for solid waste (by expert company or not)
- Declaration by the representative of the interested facility that: “the transferred waste is not hazardous and belongs to the following categories under the EWC... and can be treated by”.

For the approval of the solid non hazardous waste disposal license, the above mentioned documents are checked and approved by:

- DEAYX
- the landfill site expert employees (chemist, safety officer of the site)
- municipal council

Concerning municipal waste, the basic characterisation does not take place at any point. It is only specified that only waste that is not considered as hazardous by the EWC to be disposed.

Compliance testing

Special compliance testing is not performed, but all necessary analysis is done during the basic characterisation.

On-site verification

For each delivery an order form has to be shown. The waste is weighed and a visual inspection may occur at the entrance area. The employees at the disposal area are informed about the incoming delivery to perform a visual inspection on the incoming waste load. In case of suspicion (unusual odour, shape and debris) they have to inform their supervisor and together decide if the load shall be deposited. If the incoming waste does not meet the requirements of the license, it is sent back to the waste producer and a chemical analysis has to be carried by the waste producer. This analysis is usually performed by the on-site chemist. Otherwise, in case of specialised analysis, it can be carried out by expert authorized institute.

Expert proposals related to potential modifications of the WAC Decision

There are no proposals for the WAC Decision.

1.7.2.3 Site visit to representative non-hazardous waste landfill (Larissa landfill class B)

General Terms

The Larissa landfill is located in the Municipality of Makrighori of the Larissa Prefecture, 3km NW of Mauroolithos village and about 25km to the NW of the city of Larissa. The total acquired land is 150ha. The total area of the facilities is 56ha, of which 20ha have been developed as landfilling area. It has a total volumetric capacity of 3,240,000m³ for MSW and an expected lifetime of greater than 30years. The landfill site is constructed in a natural depression with smoothly dipping sides (15%-25%). The depression floor is 850 m long along its axis and dips 5% to the NNW, and the vertical height of the sides is circa 20m. The altitude of the landfill area varies between +180m to +230m. The area, in which the landfilling takes place, is not immediately visible from the surrounding area, characterised by urban and cattle-breeding activities. The landfill site is situated in gneisses and locally, up to 4 m depth, the sandy clay soil from the weathering of the gneisses crops out.

For the time being the landfill of Larissa serves mainly the Municipality of Larissa, of approximately 160.000 inhabitants and 60.000tons of municipal solid waste (MSW) per year, however it is planned to accept the MSW of the whole prefecture of Larissa with a population of approximately 300.000 inhabitants, it can accept 100.000tons of MSW per year.

The design and the operation of the landfill site of Larissa complies with the most advanced technical specifications, as well as empirical data and current practice and is in conformity to the Directives of the European Union. The landfill is gradually developed in independent phases, in order to achieve, separately for each Phase, an optimum control of the leachate and landfill gas. Each Phase is designed to accept MSW up to 4 years, and it is independent from the others by means of a separate collection systems for leachate and landfill gas collection.

The landfill site of Larissa includes a main disposal area, split into eight independent cells, a leachate collection system, a landfill gas collection system including flare units, an equipment service building a material Recovery Facility (MRF) for the manual separation of recyclables, a waste tyre shredder, an administration Building, a laboratory, an infrastructure networks: The landfill is connected to the electrical grid, water supply from groundwater wells and an automation and monitoring facilities

All data is also recorded and transported via a modem to a PC in the administration building (from where the remote control and operation of the treatment plant is carried out) and to a monitoring panel in the entrance guard room, in order to allow for the continuous monitoring of the operation of the treatment plant, 24hours per day.

The site is a disposal facility for municipal wastes and also accepts commercial / industrial wastes that have the same properties of domestic waste, produced in the prefecture of Larissa. The disposal of hazardous wastes and inert wastes are not permitted at this landfill site as prescribed by the site environmental permit.

Waste acceptance procedure

1. The landfill site accepts commercial and industrial waste from the private sector, or contracted companies from municipalities. In order to send the waste to the landfill the waste deliverer has to have a disposal license from the landfill operator.

The approved license includes the waste type that would be accepted for disposal into the specific landfill site and is only valid once.

Once the industrial or commercial waste type has been deemed as acceptable for disposal into the landfill site, the waste producer fills in a waste transfer forms which includes a brief description of the transferred waste. The carrier is obliged to obtain a transfer form for each individual load, these are obtained from the central offices of the site operator

As regards municipal waste, only waste that is characterised as domestic and is not considered as hazardous waste is accepted. Otherwise, no specific acceptance procedure is applied to the incoming municipal loads.

‘One off’ loads from non municipal waste transports are not accepted.

2. The waste transfer forms and the disposal licence have to be transported with the waste load by the waste lorry driver and it is checked at the weighbridge area.

After weighing and waste transfer form control, the waste carrier is permitted to enter the site.

3. At the designated disposal area (cell), site employees are present for the guidance and assistance of the waste carrier, the site employees also conduct the visual inspection of the waste load that is deposited. As regards municipal waste, visual inspection occurs only at the disposal area.
4. Upon returning to the exit, the waste carriers again pass through the weighbridge for a second time

After the disposal of each waste load, the order form is handed over to the weighbridge operator and this hardcopy is stored in an operational journal for a period of at least five (5) years. The electronically recoded weighbridge data is stored for an indefinite period.

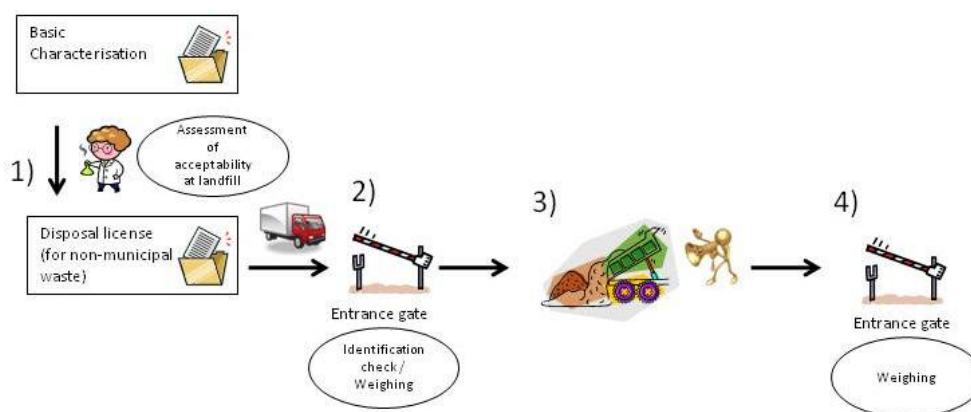


Figure 1.7-3: Flow chart of the waste acceptance procedure at Larissa (Greece)

Basic Characterisation

As previously mentioned, before any waste producer (except for municipalities) is able to dispose of waste at the particular landfill site, they have to obtain a specific disposal license. During that stage, the basic waste characterisation is declared by the waste producer this being checked by the site operator. They are obliged to compare the legal limit values and further analysis is asked if it is necessary. This license is valid only once and it is necessary to repeat this procedure every time by the waste producers (except for municipalities).

For the acceptance of commercial and industrial waste from the private sector, or contracted companies from municipalities, the interested parties must firstly request for a disposal license from the site operator.

For the issuance of this license the interested party has to provide the following documents:

- An application form submitted to the site operator, clearly stated the type of waste (e.g. industrial, commercial, expired food, sludges, other) as well as the waste quantity
- A chemical Analysis of the waste by an expert authorised institute.

For the approval of the solid non hazardous waste disposal license, the above mentioned documents are checked and approved by the landfill site employees and the Municipal Council employees.

The Site Operator has the right of withdrawal of the waste disposal license, in case of:

- Non-compliance with the orders;
- Failure to provide the appropriate documentation regarding the transfer of wastes (if requested);
- Unauthorized load transfer and/or discharge (i.e. liquid or toxic or infectious or hazardous waste, carcasses, etc.).

The provocation of any problems with the proper and orderly operation of the waste deposition site caused by the waste carrier or any authorized by them employee.

Concerning municipal waste, the basic characterisation does not take place at any point. It is only specified that only waste that is not considered as hazardous is disposed.

Compliance testing

Special compliance testing is not performed, but all necessary analysis is done during the basic characterisation.

On-site verification

For each delivery an order form has to be shown. The waste is weighed and a visual inspection may occur at the entrance area. The employees at the disposal area are informed about the forthcoming delivery and they have to apply a visual inspection on the incoming waste load, this particularly applies to waste loads designated for destruction. In case of suspicion (unusual odour, shape and debris) they have to inform their supervisor and he decides if the load shall be deposited. If the incoming waste does not meet the requirements of the license, photographic evidence is taken and a non compliance letter sends to the waste producer.

Expert proposals related to potential modifications of the WAC Decision

There are no proposals for the WAC Decision.

1.8 Country report Ireland

The WAC Decision is implemented into Irish Legislation by requiring that landfills must comply with the EU Landfill Directive and in particular Annex II on waste acceptance criteria and procedures (Article 50 of 2004 Waste Management (Licensing) Regulation). However it has to be noted that:

- The actual Decision 2003/33/EC is not referred to in Irish legislation.

Irish authorities consider that such references would also include Commission Decision 2003/33/EC, through Article 16 of the Directive (requiring the Commission to adopt proposals for the standardisation of control, sampling and analysis methods in relation to the annexes). In addition the Environmental Protection Agency (EPA) through the imposition of conditions on licences for landfills (under Section 41 of the Waste Management Acts 1996-2008) ensures conformity with Commission Decision 2003/33/EC.

- The criteria and methods which shall be determined by Member States pursuant to the WAC Decision are not defined in the investigated legislation documents.

Some of them are included in the EPA licences onto which 2004 Waste Management (Licensing) Regulations refers to. These include the time of record keeping of the basic characterisation or compliance testing.

The EPA is currently reviewing the waste licenses and will include the time for sample keeping.

Criteria to provide that monolithic waste has the same environmental protection as granular waste and physical stability and bearing capacity of granular hazardous waste to be disposed on landfills for non-hazardous waste are neither covered by the national legislation nor by the Environmental protection agency (EPA) licenses.

The determination for methods for sampling and testing as mentioned under Section 3 of the WAC Decision and determination of testing methods and the corresponding limit values is not implemented in the Irish Legislation but have to be agreed with the EPA in the licenses.

All landfills in Ireland contain biodegradable waste, but do not accept non-reactive stable hazardous waste. For these reason the limit values provided by the WAC Decision are not applicable.

There are no landfills for hazardous waste in Ireland.

1.8.1 Assessment of legal compliance with the WAC Decision

The following table provides an overview on the legal documents transposing WAC Decision requirements into national legislation. Furthermore, the table shows a qualitative assessment of the level of implementation or possible divergences which are further explained and justified in the following sections.

Ireland			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure		n/a	
1.1 Basic characterisation		✓	
1.1.1 Function	Section 41 of Waste Management Acts 1996 - 2008 and Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	~	Time for record keeping of the basic characterisation is not defined.
1.1.2 Fundamental requirements	Section 41 of Waste Management Acts 1996 2008 and Article 49+50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	✓	
1.1.3 Testing	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	✓	
1.1.4. Cases where testing is not required	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	✓	
1.2 Compliance testing	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	~	Time for record keeping of compliance testing is not defined.
1.3 On-site verification	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	~	Visual inspection before and after unloading is not mentioned.
2. Acceptance criteria	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	✓	
2.1 Landfills for inert waste		n/a	
2.1.1 Short list	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	✓	
2.1.2 Limit values		n/a	
2.1.2.1 Leaching limit values	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	~	Test methods are not defined
2.1.2.2 Limit values for total content of organic parameters	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	✓	
2.2 Landfills for non-hazardous waste		n/a	
2.2.1 Without testing	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	✓	
2.2.2 Limit values for non-hazardous waste	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	~	Criteria for monolithic waste in order to provide the same level of environmental protection as given for granular hazardous waste are not set.

Ireland			
Category	Corresponding national legislation	Implementation	Comments
2.2.3 Gypsum waste	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	✓	
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii		n/a	
2.3.1 Leaching limit values	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	~	Criteria for monolithic waste in order to provide the same level of environmental protection as given for granular hazardous waste are not set.
2.3.2 Other criteria	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	~	Criteria for physical stability and bearing capacity are not set
2.3.3 Asbestos waste	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	✓	
2.4. Landfills for hazardous waste		n/a	
2.4.1 Leaching limit values	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	~	Criteria for monolithic waste in order to provide the same level of environmental protection as given for granular hazardous waste are not set
2.4.2 Other criteria	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	✓	
2.5 Criteria for underground storage	Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004)	✓	

Table 1.8-1: Implementation of WAC Decision in Irish Legislation

1.8.1.1 Legal framework

The WAC DECISION requirements are implemented into the Irish Legislation by the **Waste Management Acts 1996-2008** and the **Waste Management (Licensing) Regulations 2004** (S.I. No. 395/2004).

The landfills are classified as in the EU Directives.

The EPA of Ireland is in charge of the waste licenses of the landfill sites and has published several guidelines. Amongst them the “Municipal solid waste pre-treatment & Residuals Management Guideline” shall assist delivery of the national obligation to establish EU requirements concerning the EU Waste Framework Directive, the EU Landfill Directive and the EU IPPC Directive.

Furthermore, the consultation document “Paper tool of the procedure of the identification of the hazardous components of waste” shall support waste classification into hazardous waste and non-hazardous waste.

1.8.1.2 Acceptance Procedure

Basic characterisation

Basic characterisation is not particularly mentioned in the Irish Legislation. Nevertheless, depositing waste on a landfill demands relevant waste acceptance criteria corresponding to Article 16 and Annex II of the Landfill Directive, and therefore the WAC Decision. The Landfill Directive is implemented by Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004).

Required records shall be preserved for a legally not specified time.

Compliance testing

Compliance testing is not explicitly mentioned in Irish Legislation. However, depositing waste on a landfill demands relevant waste acceptance criteria which correspond to Article 16 and Annex II of the Landfill Directive and therefore the WAC Decision. The Landfill Directive is implemented by Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004).

Required records shall be preserved for a legally not specified time.

On-site verification

The type of waste accepted at each landfill class is stated in accordance with Article 16, Annex II of the Landfill Directive. However, there is no provision related to the verification of it as visual inspection before and after unloading is not mentioned. On-site verification is only required by the license of the EPA.

Testing requirements and rapid testing methods for on-site verification are not specified in the legislation.

No specific provision on the period of time, taken samples shall be kept, is defined as requested in the WAC Decision.

1.8.1.3 Waste acceptance criteria

The criteria for compliance with the limit values set out in Section 2 of the Annex in the WAC Decision are not defined in Irish Legislation.

The analysing test methods to be used are not legally mandatory, but requested by the EPA:

Measurement	Ireland standard
Chromium 6 specification in solid matrices	I.S. CEN/TR 14589
Digestion of waste samples using alkali-fusion techniques	I.S. CEN TR 15018
Guidance on selection and application of criteria for sampling under various conditions	I.S. CEN TR 15310-1
Guidance on sampling techniques	I.S. CEN TR 15310-2
Guidance on Procedures for sub-sampling in the field	I.S. CEN TR 15310-3
Guidance on procedures for sample packaging, storage, preservation, transport and delivery	I.S. CEN TR 15310-4
Guidance on the process of defining the sampling plan	I.S. CEN TR 15310-5
Leaching behaviour tests- up-flow percolation test	I.S. CEN TR 14405
Leaching behaviour tests-influence of pH on leaching with initial acid/base edition	I.S. CEN TR 14429
Leaching behaviour tests-influence of PH on leaching with continuous pH-control	I.S. CEN TR 14997
Leaching behaviour tests-Acid and base neutralization capacity test	I.S. CEN TR 15364

Measurement	Ireland standard
Analyses of Eluates – determination of pH, As, Ba, Cd, Cl ⁻ , Co, Cr, Cr (VI), Cu, Mo, Ni, NO ²⁻ , Pb, S _{TOTAL} , SO ₄ ²⁻ , V and Zn	I.S. EN 12506
Methodology for the determination of the leaching behaviour of waste under specified conditions	I.S. EN 12920
Analyses of eluates – Determination of ammonium, AOX, conductivity, Hg, phenol index, TOC, easily liberatable CN ⁻ , F ⁻	I.S. EN 13370
Terminology-Part 1: Material related terms and definitions	I.S. EN 13965-1
Terminology-Part 2: Management related terms and definitions	I.S. EN 13965-2
Determination of hydrocarbon content in the range of C ₁₀ to C ₄₀ by gas chromatography	I.S. EN 14039
Determination of hydrocarbon content by gravimetric	I.S. EN 14345
Calculation of dry matter by determination of dry residue or water content	I.S. EN 14346
Preparation of waste samples for ecotoxicity tests	I.S. EN 14735
Determination of TOC in waste, sludge and sediments	---
Leaching- Compliance test for leaching of granular waste materials and sludges	---
Digestion for subsequent determination of aqua regia soluble portion of elements (partial digestion of the solid waste prior to elementary analysis, leaving the silicate matrix intact.	---
Microwave assisted digestion with hydrofluoric (HF), nitric (HNO ₃), and hydrochloric (HCl) acid mixture for subsequent determination of elements (total digestion of the solid waste prior to elementary analysis	---

Table 1.8-2: Irish norms

Waste acceptance procedures have to be agreed with the EPA and have to be in line with the WAC Decision requirements. The EPA licenses also require records to be kept of accepted waste.

Criteria for landfills for inert waste

The criteria for landfills for inert waste are implemented by Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004). Accordingly, landfills must comply with the WAC Decision.

Criteria for test methods and limit values of leaching from landfills for inert waste are not defined.

PAH limit value for landfills for inert waste is set at 100 mg/kg by the EPA in the corresponding licenses.

Criteria for landfills for non-hazardous waste

The criteria for landfills for non-hazardous waste are implemented by Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004). Accordingly, landfills must comply with WAC Decision established under Article 16, Annex II of the Landfill Directive (i.e. the WAC Decision).

Criteria for monolithic waste in order to provide the same level of environmental protection as given for granular hazardous waste are not set.

The disposal of municipal waste on landfills for non-hazardous waste without testing is not implemented.

Criteria for hazardous granular waste in order to ensure its physical stability and bearing capacity for depositing on landfills for non-hazardous waste are not implemented. The criteria to proof that the

monolithic hazardous waste is non-reactive and stable to allow its disposal on landfills for non-hazardous waste are not given.

According to Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004) non-reactive stable hazardous waste shall not be disposed on landfills for non-hazardous waste if it contains biodegradable waste. As all landfills in Ireland contain biodegradable waste, landfilling of non-reactive stable hazardous waste is not possible in Ireland.

Special treatment of gypsum waste or asbestos waste is not explicitly addressed. Consequently, the obligation to cover the zone of deposit of asbestos waste is not mentioned.

Criteria for waste acceptable at landfills for hazardous waste

The criteria for landfills for hazardous waste are implemented by Article 50 of Waste Management (Licensing) Regulations 2004 (S.I. No. 395/2004). Accordingly, landfills must comply with WAC DECISION requirements established under Article 16, Annex II of the Landfill Directive, i.e. the WAC Decision).

Criteria for monolithic waste to provide the same level of environmental protection as given for granular hazardous waste are not set.

Currently, there are no hazardous landfills in Ireland.

Underground storage

Underground storage is only implemented into Irish Legislation by requiring that landfills must comply with the EU Landfill Directive

1.8.2 Site visits in Ireland

The organisation of the site visits has been realised in close cooperation with the EPA which recommended certain country authorities for further selection of appropriate sites. The landfill sites **Whiteriver** (non-hazardous, landfill class B), **Knockharley** (non-hazardous landfill, landfill class B) and **Arthustown** (non-hazardous landfill for municipal solid waste, landfill class B).

There are no hazardous landfill sites in Ireland. As all landfill sites contain biodegradable waste, deposition of gypsum waste is not possible in Ireland.

The tasks of landfill operators start with the assessment of acceptability of a certain type of waste and comprise the actual acceptance of wastes arriving at the landfill. These procedures may differ by type of landfill and operator. Furthermore, some general information (e.g. location, size, technical standard, accepted waste) as well as specific systems installed for documentation may be helpful for the assessment of the on the ground enforcement of legal requirements. The description of each landfill visit is structured into the sections "general terms" (background information) and "waste acceptance procedures" (basic characterisation, compliance testing, on-site verification).

1.8.2.1 Site visit to representative non-hazardous landfill (Whiteriver, landfill class B)

General terms

The landfill site Whiteriver is located about 50km north of Dublin and approximately 12km northwest of Drogheda. It is a mere non-hazardous landfill and started operating in 1983. Its area comprises 25ha of which 17ha can be used for landfilling. Nearly 100,000t wastes per year are accepted at Whiteriver. Today the landfill has a remaining capacity of ca. 900,000t and will continue working until 2018.

The landfill site has two different types of customers. One type comprises 15 major companies with waste collection permission (all together about 20 loads per day). The other type consists of a large number of private customers disposing irregularly small amounts of private waste (up to 50-60 loads per day), but their overall impact on the landfill site is small.

The majority of the disposed waste at Whiteriver landfill is municipal waste (~90%) which does not require testing.

The landfill site is equipped with four Closed Circuit Television cameras (CCTV cameras) to supervise the weighbridge (visual inspection of the load and the vehicle registration number), the tyre cleaning area and the inspection and quarantine area as well as the public place of unloading.

Waste acceptance procedure

The process flow of waste acceptance at Whiteriver is the following:

1. The landfill site has contracts with customers with a waste collection permit for non-hazardous waste. These deliveries arrive regularly at the weighbridge. The commercial customer carries an own weighbridge document for the personal and waste load identification. This document is shown at the weighbridge of the landfill site. Private customers arrive irregularly.
2. Both types of customers arrive at the weighbridge where the landfill employee generates an official receipt including customer and waste related data (e.g. vehicle registration number, customer, waste type, EWC code, weight of the vehicle before and after unloading, date, time and charge). This official receipt is signed by the driver after the second weighing. The load is also visually checked with a CCTV camera. If there are doubts about the acceptance of the waste or if a sample has to be taken, the waste load is sent to the inspection area.
3. Private customers bring their waste to a separated public place of unloading where the waste is transferred into a skip. The area is regularly controlled and non acceptable wastes (e.g. WEEE) are brought to the quarantine area. The skips are unloaded into the landfill site from the employee of the landfill site.
4. At the inspection area spot tests are made. For this purpose the waste is unloaded and checked. If the waste can be accepted, it is brought to the landfill area.
5. If the waste is not acceptable, it is brought to the quarantine area next to the inspection area.
6. If the waste can be accepted, the driver transports it to the place of unloading. Only one place of unloading exists at a given time. The disposal at the working face is visually inspected and controlled by a machine driver of the landfill.
7. When returning to the weighbridge, the lorry passes a second weighing for the documentation of the actual waste quantity. Before leaving, the driver signs the official receipt and keeps a copy.

The gathered information is stored as a paper version for at least seven years and additionally an electrical version without time limit is kept.

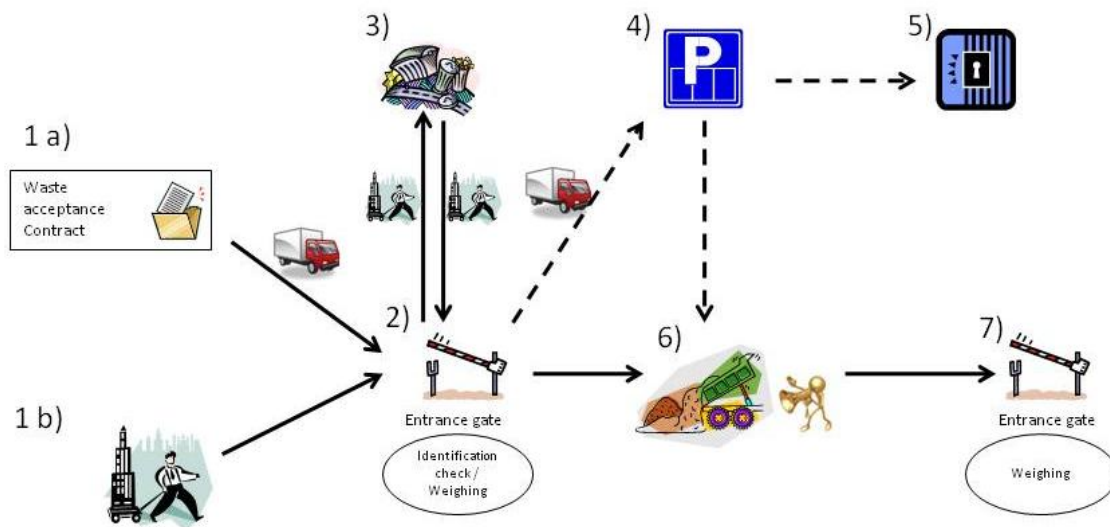


Figure -1.8-1: Flow chart of the waste acceptance procedure at Whiteriver (Ireland)

Basic characterisation

Sludges are the only waste deposited at this landfill site which needs to be tested for basic characterisation. Testing for basic characterisation is performed by the waste producer in cooperation with the landfill operator. The overall percentage of sludges at the landfill site is < 5 %.

Compliance testing

Sludges have to be analysed twice a year. The samples are taken at the water treatment plant and then sent to an external laboratory. Only if the waste is below the limit values, it is sent to the landfill site.

On-site verification

On-site verification is done at the weighbridge with a CCTV camera as well as on the landfill site by an employee.

Expert proposals related to potential modifications of the WAC Decision

There are no proposals for the WAC Decision.

1.8.2.2 Site visit to representative non-hazardous landfill (Greenstar at Knockharley, landfill class B)

General terms



Figure -1.8-2: Overview of the landfill Greenstat at Knockharley (Ireland)

The landfill site Knockharley is located about 35km northwest of Dublin and 15km southwest from Drogheda. The total area of the landfill site comprises 330ha of which 25ha can be used for landfilling. The capacity of the landfill site is 3,300,000m³. About 800,000m³ of the areal are already filled. The site is divided in seven section/phases with four cells each. From the total of 28 cells only ten are already developed. Of these eight are already filled and the 9th is active.

90 – 95% of the waste at this landfill site is household waste or similar waste. About 5-10% of the waste is filter cake which has to be tested.

The total yearly capacity is 175,000t of waste for disposal and another 25,000t/a of C&D waste for recovery at the facility.

Waste acceptance procedure

The landfill is equipped with a waste integrated management system (WIMS). The software is controlled and updated with new customer and waste related data, by the company headquarters. In total, the company headquarters administrates the information of four landfills and twelve transfer stations... Daily inputs of the loads are registered at the weighbridge at the landfill site. However, changes of saved data can only be made by the company headquarters.

The process flow of waste acceptance at Knockharley is the following:

1. Once a waste type is deemed to be acceptable at the landfill based on its characteristics as specified in the basic characterisation, the different loads arrive at the landfill site.

The announced waste deliveries have to carry a certificate of waste consignment including customer and waste related data (e.g. name of the company, vehicle number, name of the waste carrier, EWC code and waste composition and nature of waste).

2. At the weighbridge, the waste load is weighted and a weighbridge document is generated including customer and waste related data (e.g. name of the waste producer and licence plate number, EWC code and waste description, weight of the vehicle before and after unloading, destination name, vehicle registration number, date and time, landfill and customer order number as well as the signature of the driver and the bridge operator). A visual test of the waste is done with an installed camera.
3. In case of suspicion, the waste load is sent to a waiting area for further investigation by the landfill supervisor. If the waste is not acceptable, it is sent back; otherwise it is unloaded at the active cell of the landfill.
4. At the active cell the unloading is controlled by an employee of the landfill site. In case of suspicion, the supervisor is informed to investigate the waste. If the waste is not acceptable, it is dug out and brought to the quarantine section, if such manoeuvre would not entail additional risks for health and safety of humans.
5. When returning to the check point, the lorry is passing the entrance gate and a second weighing for the documentation of the actual waste quantity is made. Finally the weighbridge document is signed.

The gathered information about waste type, quantity, delivery date, location on the landfill is documented on paper for ten years at the landfill site and afterwards at the company company headquarters for a not defined time. The electronic version is kept without time limit.

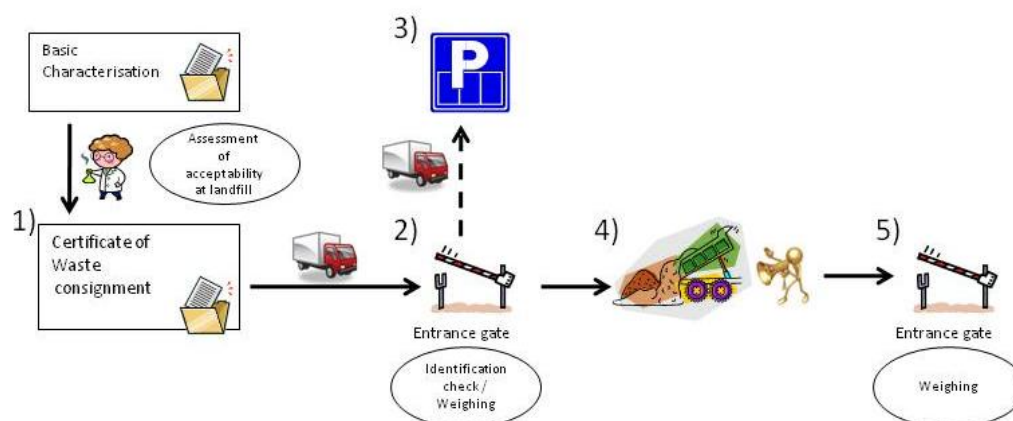


Figure 1.8-3: Flow chart of the waste acceptance procedure at Knockharley (Ireland)

Basic characterisation

For the delivery of a new waste type, the waste producer has to fill in a waste acceptance control form. Therefore the landfill manager visits the site of waste production and undergoes a visual inspection. If necessary, a sample is analysed in an external laboratory. Together with the landfill operator the EWC code is defined. The form includes customer and waste related data (e.g. name and address of customer, waste producer and waste carrier, description of waste arising process, physical description, EWC code, composition, treatment, quantity, delivery method, type of waste and for filter cakes the analysis). During the process of the basic characterisation, the frequency of compliance testing is defined.

Compliance testing

In general compliance testing is done at least once a year. However frequency can differ in case of irregular arriving quantities of waste.

Furthermore, the compliance testing may cover the whole basic characterisation or only some key variables dependent on specific experiences with the concerned waste. All samples are taken at the site of waste production. Only if the waste fulfils the limit values, it is sent to the landfill site.

On-site verification

Arriving at the weighbridge, the lorry is weighted and a check of the certificate is generated, if waste consignment is performed. A visual inspection is done with an installed camera. In case of suspicion the waste load is sent to the waiting area for further inspection.

After acceptance, the lorry driver transports the waste to the allotted location on the landfill. At the point of destination a qualified landfill employee controls the disposal. In case of suspicion the landfill manager is informed. If necessary, the waste is transferred to the quarantine section.

Expert proposals related to potential modifications of the WAC Decision

The DOC limit value is too strict due to the fact that it may be easily exceeded in case of filter cakes.

The sulphate limit value is considered to too high.

1.8.2.3 Site visit to representative non-hazardous landfill (Arthurstown, landfill class B)

General terms

The landfill site Arthurstown is a non-hazardous landfill site located approximately 25km southwest of Dublin. It accepts only baled municipal waste. In the moment there are 2 baling stations which send their baled waste to the landfill site. The site started operating in October 1997 and will be closed in December 2010. Its area comprises 72ha but only 27ha are used for landfilling. It has a total capacity of 4,600,000t of which 4,300,000t is already filled.

The site produces 12,000m³ gas/h, generating about 13MW. This is the biggest power generation facility from a landfill site in Ireland.

Waste acceptance procedure

The storage of the data is managed with a software system provided by the same company that delivered the weighbridge.

The process flow of waste acceptance at Arthurstown is the following:

1. The wastes from the contracted baling centres are sent to the weighbridge.
2. Each driver has a swipe card, which he uses at the weighbridge. The card contains general information (e.g. data about the baling centre, vehicle and driver, time and date as well as the net weight of full load). The information is automatically saved and the incoming weight is recorded. The driver may then proceed to the marshalling-yard area.
3. At the marshalling-yard area each baling centre has its own area. Each area has several storing positions with full containers and empty containers. One end contains the full containers and the other end the empty containers. The driver of the baling station places his full container on hydraulic stillages at one end of the storing positions and picks up an empty container from the other end.
4. After the change of the container the lorry returns to the weighbridge. Before leaving, the lorry is weighted again. All information is recorded again to indicate the total weight receive of the transaction.
5. A landfill owned off-road truck picks up the full container at the marshalling-yard and transports them to the active landfill cell site. Then continuously two bales are hydraulically pressed out of the back of the container at the same time. These bales are grabbed by a hydraulic grab and stacked into position at the working face.
6. The empty container is returned to the marshalling-yard and is put on hydraulic stillages for collection. Then is sent back to the baling station.

The gathered information about the baling centre, waste quantity and delivery date is recorded electronically and stored for an undefined time. These data are used for regular reports, invoices and overviews.

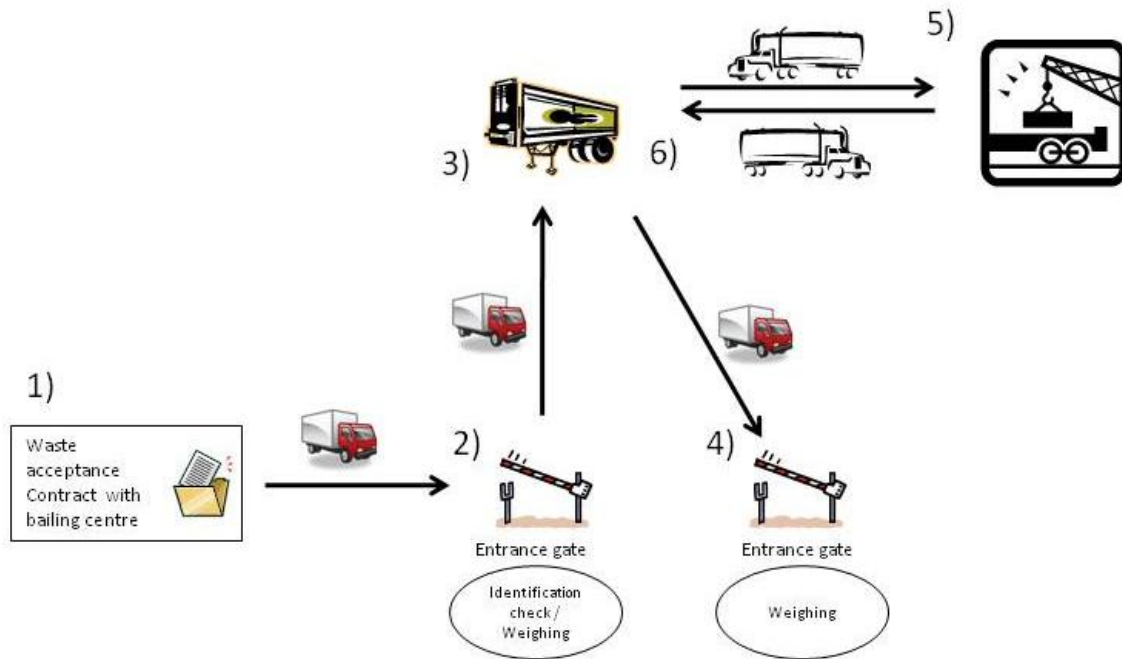


Figure -1.8-4: Flow chart of the waste acceptance procedure at Arthurstown (Ireland)

Basic characterisation

This landfill site only accepts baled municipal waste. The baling centres separate the waste and have to bale the waste before landfilling.

Compliance testing

Compliance testing is done at the working face by an employee who reports to the facility manager in case of suspiciousness. The facility manager inspects the waste load and rejects it if necessary. The process is recorded.

On-site verification

The waste loads which enter the landfill site cannot be visually checked at the weighing bridge, because all incoming containers are completely close to all sides. The weighbridge operator secures and controls that every load enters the landfill site by using the weighbridge with the swipe card. At the end of the day the operator checks in cooperation with the baling centres the amount of loads and the overall weight.

A full verification is only made during the unloading of the container at the active landfill site. Therefore the grab operator is trained to recognise not acceptable waste. If a waste load does not seem to be acceptable, the facility manager is informed and rejects the waste load. It is then returned to the baling station. This procedure is recorded.

Expert proposals related to potential modifications of the WAC Decision

There are no proposals for the WAC Decision.

1.9 Country report Italy

In general, the WAC Decision is implemented into Italian Legislation by **Decreto Ministeriale 03/08/2005**. This legal document requires that national landfills must comply with the WAC DECISION requirements. However, some specific provisions to be determined by Member States pursuant to the WAC Decision are not defined in the investigated documents. The identified divergences are as follows:

- Criteria for monolithic waste are not set
- The TOC values are only valid for biodegradable material (excluding resins or polymers)
- The indicated pH-value for the measurement for the DOC limit value of soil when TOC > 30.000 mg/kg is fixed with 7 (WAC Decision 7,5 – 8)
- ANC is not mentioned
- Criteria to ensure sufficient physical stability and bearing capacity of the waste are not set
- The short list for waste to be accepted without testing at landfills for inert waste is extended.

Some leaching limit values for non-hazardous waste and hazardous waste acceptable at landfills for non-hazardous waste as well as the limit values for waste acceptable at landfills for hazardous waste are stricter than the limit values listed in the WAC Decision.

By the Decreto Legislativo 13 gennaio 2003, n. 36, Article 6, §1 (p) (implementation of the Landfill Directive), waste with a calorific value of >13,000kJ/kg is not allowed to be landfilled anymore. The limit value has been fixed at 31 December 2008 (Article 6, comma 3, del decreto-legge 28 dicembre 2006, n. 300).

1.9.1 Assessment of legal compliance with the WAC Decision

The following table provides an overview on the legal documents transposing WAC Decision requirements into national legislation. Furthermore, the table shows a qualitative assessment of the level of implementation or possible divergences which are further explained and justified in the following sections.

Italy			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure		n/a	
1.1 Basic characterisation	Decreto Ministeriale 3 agosto 2005, Annex 1, §1-4	✓	
1.1.1 Function	Decreto Ministeriale 3 agosto 2005, Annex 1, §1	✓	
1.1.2 Fundamental requirements	Decreto Ministeriale 3 agosto 2005, Annex 1, §2	✓	
1.1.3 Testing	Decreto Ministeriale 3 agosto 2005, Annex 1, §3	✓	

Italy				
Category	Corresponding national legislation	Implementation	Comments	
1.1.4. Cases where testing is not required	Decreto Ministeriale 3 agosto 2005, Annex 1, §4	✓		
1.2 Compliance testing	Decreto Ministeriale 3 agosto 2005, Article 3	✓		
1.3 On-site verification	Decreto Ministeriale 3 agosto 2005, Article 4 and previous Decreto Legislativo n. 36 del 13 gennaio, Article 11, §3	✓		
2. Acceptance criteria	Decreto Ministeriale 3 agosto 2005, Article 10, §4	✓		
2.1 Landfills for inert waste		n/a		
2.1.1 Short list	Decreto Ministeriale 3 agosto 2005, Article 5 table 1	~	The short list is extended.	
2.1.2 Limit values	Decreto Ministeriale 3 agosto 2005, Article 5 table 2	n/a		
2.1.2.1 Leaching limit values	Decreto Ministeriale 3 agosto 2005, Article 5 table 3	✓		
2.1.2.2 Limit values for total content of organic parameters	Decreto Ministeriale 3 agosto 2005, Article 6 §1; Decreto Ministeriale 25 de ottobre 1999; N. 471; Annex 1, Table 1	~	Organic limits do not apply to inert organic compounds as resin and polymers. The indicated pH-value for the measurement for the DOC limit value of soil when TOC > 30.000 mg/kg is fixed with 7 (WAC Decision 7,5 – 8).	
2.2 Landfills for non-hazardous waste		n/a		
2.2.1 Without testing	Decreto Ministeriale 3 agosto 2005, Article 6 §1	+	Italy introduced a ban to dispose biodegradable waste Wastes on a positive list is defined in a Ministerial decree	
2.2.2 Leaching limit values for non-hazardous waste	Decreto Ministeriale 3 agosto 2005, Article 6 table 5	~	Monolithic wastes is not mentioned, additional and more stringent limit values are set, PCB limit 10 mg/kg, PCDD/PCDF 2µg/kg, limits for cancerogenic substances	
2.2.3 Gypsum waste	Decreto Ministeriale 3 agosto 2005, Article 6 table 5b	✓		
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii		n/a		
2.3.1 Leaching limit values	Decreto Ministeriale 3 agosto 2005, Article 6 §3 and table 5	~	, Monolithic wastes is not mentioned, additional and more stringent limit values are set	
2.3.2 Other criteria	Decreto Ministeriale 3 agosto 2005, Article 6, §3	~	TOC limits not applicable for inorganic carbon e.g. polymers and resins and other non-biodegradable mixtures it is not stated that the ANC has to be evaluated, criteria for physical stability and bearing capacity are not set	

Italy			
Category	Corresponding national legislation	Implementation	Comments
2.3.3 Asbestos waste	Decreto Ministeriale 3 agosto 2005, Annex 2	+	Additional limit values are provided
2.4. Landfills for hazardous waste		n/a	
2.4.1 Leaching limit values	Decreto Ministeriale 3 agosto 2005, Article 8, table 6	~	Monolithic wastes is not mentioned, additional and more stringent limit values are set
2.4.2 Other criteria	Decreto Ministeriale 3 agosto 2005, Article 8	~	TOC limits not applicable for inorganic carbon e.g. polymers and resins and other non-biodegradable mixtures. it is not stated that the ANC has to be evaluated,
2.5 Criteria for underground storage	Decreto Ministeriale 3 agosto 2005, Article 9; Annex 4 to Decreto Ministeriale 3 agosto 2005	✓	

Table 1.9-1: Implementation of WAC Decision in Italian Legislation

1.9.1.1 Legal framework

The WAC Decision is implemented into Italian Legislation by the **Decreto del Ministero dell'Ambiente e della tutela del territorio 3 agosto 2005** "Definizione di criteri di ammissibilità dei rifiuti in discarica" (defining criteria for waste acceptance at landfills) DM 03/08/2005.

Certain aspects are also regulated by Decreto Legislativo 13 gennaio 2003, n. 36 concerning the implementation of the Landfill Directive.

The landfills are classified as in the EU Landfill Directive.

1.9.1.2 Acceptance Procedure

Basic characterisation

The basic characterisation is implemented by DM 03/08/2005, Article 2, and *ibid.* Annex 1, according to the WAC Decision.

Required records shall be preserved for a period of five years.

Compliance testing

Compliance testing is implemented by DM03/08/2005, Article 3, and *ibid.* Annex 3, according to the WAC Decision.

Required records shall be preserved for a period of five years.

On-site verification

On-site verification is implemented by DM 03/08/2005, Article 4, according to the WAC Decision, and includes visual inspection before and after unloading and a check of the required documents.

Sampling is mentioned in Italian Legislation. However, the frequency of sampling has to be decided by the local authorities (Region or Province). Samples shall be taken at least once a year. The samples have to be preserved at the landfill for at least two months.

Testing requirements and rapid testing methods for on-site verification are not specified in the legislation.

1.9.1.3 Waste acceptance criteria

The following test methods are defined in Annex 3 of DM 03/08/2005:

- IRSA, CNR, Norm CII-UNI 9246: for sampling organic waste;
- UNI 10802: sampling, preparation and analysis for other waste;
- ENV 12457/1-4; ENV 12506 and ENV 13370: Preparing and analysing of eluates.

Further details concerning analysing methods are described in DM 06/09/1994.

Criteria for landfills for inert waste

The criteria for landfills for inert waste are implemented by Article 5 of DM 03/08/2005 in accordance with the WAC Decision.

The national leaching limit values are calculated at a liquid to solid ratio of 10l/kg and limit values indicated in mg/l (in contrast to the values of the EU – given in mg/kg dry substance).

The shortlist is extended for two types of waste: 01 04 13 (waste from stone cutting and sawing other than those mentioned in 01 04 07) and 17 09 04 (mixed C&D waste other than those mentioned in 17 09 01, 17 09 02 and 17 09 03).

In the Italian Legislation the organic limit values do not apply for inert organic compounds as resin and polymers. The indicated pH-value for the measurement of the DOC of soil in cases of TOC > 30,000mg/kg is fixed with 7 (indicated in 2003/33/EC at 7.5 – 8).

The limit values for PAH are determined in an older decree of the Ministry of Environment, DM n. 471 25/10/99. The PAH limit values for 9 different PAH types are set (Benzo[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo[g,h,i]perylene, Chrysene, Dibenzo[a]pyrene, Dibenzo[a,h]anthracene, Indenopyrene and Pyrene) with limit values between 5 and 50mg/kg dry substance and a maximum total amount of 100mg/kg dry substance.

Criteria for landfills for non-hazardous waste

The criteria for landfills for non-hazardous waste are implemented by Article 6 of DM 03/08/2005.

In addition to the WAC DECISION criteria, Italian legislation determines limit values concerning amongst others the minimum of dry matter (25%), maximum value for cyanide (0.5mg/l), organic solvents (aromatic – 0.4 mg/l; nitrogen – 0.2mg/l; chlorinated – 2mg/l) and pesticides (non phosphorus – 0.05mg/l; total - 0.1mg/l). The limit values of the L/S=10l/kg column are used. The limit values are identical, except more stringent limit values set for Cd (0.02mg/l) and Hg (0,005mg/l).

The Ministry of Environment plans to establish a positive list containing those wastes acceptable at landfills for non-hazardous waste without testing, as defined in DM 03/08/2005, Article 6, §1 (b). Autonomous Regions as Trentino-Alto Adige did already release such positive lists.

Criteria for monolithic waste to provide the same level of environmental protection as given for granular hazardous waste are not defined. But solidified stable and non-reactive waste can be disposed of in landfills for non-hazardous waste, if the leaching test results are within the WAC DECISION compliant limit values as set in Article 6, Table 5 of DM 03/08/2005.

Non-hazardous gypsum based materials can be disposed of in landfills for non-hazardous waste. These wastes may only be landfilled in cells where no biodegradable waste is disposed.

Criteria for hazardous waste acceptable at landfills for non-hazardous waste

The criteria for hazardous waste acceptable at landfills for non-hazardous waste are included in Italian Legislation at article 6. For this sort of wastes are laid down the same leaching limit values as for non-hazardous waste (as the WAC Decision does).

In addition to criteria from the WAC Decision, Italian Legislation determines limit values for minimum dry matter at 25% and maximum values for cyanide (0,5 mg/l), organic solvents (aromatic – 0,4 mg/l; nitrogen – 0,2 mg/l; chlorinated – 2 mg/l) and for pesticides (non phosphorus – 0,05 mg/l; total -0,1 mg/l). In the analysing method L/S=10 l/kg is used. The other limit values are identical, except for Cd (0,02 mg/l) and Hg (0,005 mg/l).

The other criteria are identical to the WAC Decision except for the added exclusion of non biodegradable organic material from the quantification of TOC.

In Italian Legislation, the obligation to determine the ANC is not set.

Criteria for the physical stability and bearing capacity of stable non-reactive hazardous granular waste to be deposited on landfills for non-hazardous waste are not implemented.

The criteria for asbestos waste are implemented by Annex 2 of DM 03/08/2005. In addition to the WAC Decision, Italian Legislation also includes the following limit values:

- Content of asbestos \leq 30% of weight;
- Storage density $> 2\text{g}/\text{cm}^3$;
- Relative density $> 50\%$;
- Liberation rate $< 0,6$.

Furthermore, Italian Legislation defines the final top cover at a minimum of 20cm deep soil.

Criteria for waste acceptable at landfills for hazardous waste

The criteria for landfills for hazardous waste are implemented by Article 8 of DM 03/08/2005. Additionally to the WAC Decision, the national legislation determines also limit values for PCB (50mg/kg), Dioxin o Furan (0.01mg/kg) (calculation after Table 6) and Dry matter (> 25%).

In addition to the limit values listed in Section 2.4.1 of the WAC Decision , Italian Legislation sets leaching limit values for cyanide (5mg/l), organic solvents (aromatic – 4mg/l; nitrogen – 2mg/l; chlorinated – 20mg/l) and for pesticides (non phosphorus – 0.5mg/l; total -1mg/l) in percolate (L/S010). The other limit values are identical to the WAC DECISION criteria, except for Cd (0.2mg/l) and Hg (0.05mg/l).

Italian Legislation excludes non-biodegradable organic material from the quantification of TOC.

Underground storage

Acceptance criteria for waste to be landfilled in underground storages are set in the Decreto del Ministero dell’Ambiente e della tutela del territorio 3 agosto 2005. In Article 9 of the document wastes that are not acceptable and/or may not be disposed of in underground storage are listed. In Annex 4, the security requirements for underground disposal are defined. Concerning the regulation of underground storage, the Italian Legislation fully complies with the WAC Decision.

1.9.2 Site visits in Italy

The site visits have been organised in cooperation with the regional waste management authorities in order to represent the geographically different implementation levels.

Söles Landfill at Glurns, Provincia di Bolzano, Trentino-Alto Adige (landfill for non-hazardous waste) and the **landfill of Ginestreto**, Provincia Forlì - Cesena, Emilia Romagna (landfill for non-hazardous waste) and the **landfill of S’Arenaxiu**, Comune di Perdiana, Provincia di Cagliari, Sardegna (landfill for non-hazardous waste) have been selected.

Currently, there is only one public landfill for hazardous waste in the region of Piemonte as the landfill for hazardous waste near Brindisi (Puglia) has been closed. In addition, there are a few private hazardous landfills, limited to selected industrial operators (e.g. in Ravenna).

The tasks of landfill operators start with the assessment of acceptability of a certain type of waste and comprise the actual acceptance of wastes arriving at the landfill. These procedures may differ by type of landfill and operator. Furthermore, some general information (e.g. location, size, technical standard, accepted waste) as well as specific systems installed for documentation may be helpful for the assessment of the on the ground enforcement of legal requirements. The description of each landfill visit is structured into the sections “general terms” (background information) and “waste acceptance procedures” (basic characterisation, compliance testing, on-site verification).

1.9.2.1 Site visit to representative non-hazardous landfill (Söles Landfill, landfill class B)

General terms

Söles Landfill located at Glurns/Glorenza and is operating since 1981. Since 2004 it is, according to the new regulatory framework, classified as landfill for non-hazardous waste from the public and industrial sector. The landfill is owned and operated by the Regional Administration of Vinschgau/Val Venosta and serves an area of about 1,441km² and 35,000 inhabitants.

The landfill is located close to a water depuration plant and an irrigation water storage. It comprises two disposal areas. The first one covers an area of 13,700m² and was closed in 1993, when it reached its maximum capacity of 120,000m³ of landfilled waste. The second one is operating since 1991 and will probably be closed in 2011 reaching its maximum capacity. The active cell covers an area of 17,000m² with a total capacity of 170,000m³ of waste. Currently about 20,000m³ is filled.

15,980t of non-hazardous wastes have been deposited in Söles Landfill in 2008. Roughly two thirds of them were public collected municipal waste, one third was commercial waste.

Waste acceptance procedure

The landfill is equipped with a waste information management system (DUMP-MANAGER). The whole documentation of the waste acceptance procedure (e.g. registration of the permitted deliverer, waste type and amount of wastes (weighing), issuance of the confirmation of acceptance, billing) is recorded in the system.

The process flow of waste acceptance at Söles is the following:

1. Once a waste type is deemed to be acceptable at the landfill based on its characteristics as specified in the basic characterisation it can be delivered to the landfill site. The deliverers are assigned companies for public waste collection and companies, which can deliver selected and in advance approved commercial wastes. The accredited deliverers are recorded in the information system. For new, not yet recorded deliverers a primary evaluation is required.
2. The operator verifies the accompanying documents (waste identification module (FIR), according to the Italian Regulation for waste transport) and carries out a visual inspection to verify the compliance with the information of the basic characterisation.

If the control document and visual inspection is compliant, the lorry can pass the entrance gate to the weighbridge. Simultaneously the waste deliveris recorded in the computer system.

The lorry is weighted in the entrance area and then place of unloading is indicated to the lorry driver.

3. At the indicated place of unloading, landfill employees are waiting to assist and supervise the unloading (visual inspection). Doubts and special characteristics are clarified by phone with the operator at the entrance station.

4. At the return to the landfill entrance, the lorry is weighted again, and the weight is registered in the computer system. Finally, the FIR is postmarked to confirm the disposal.

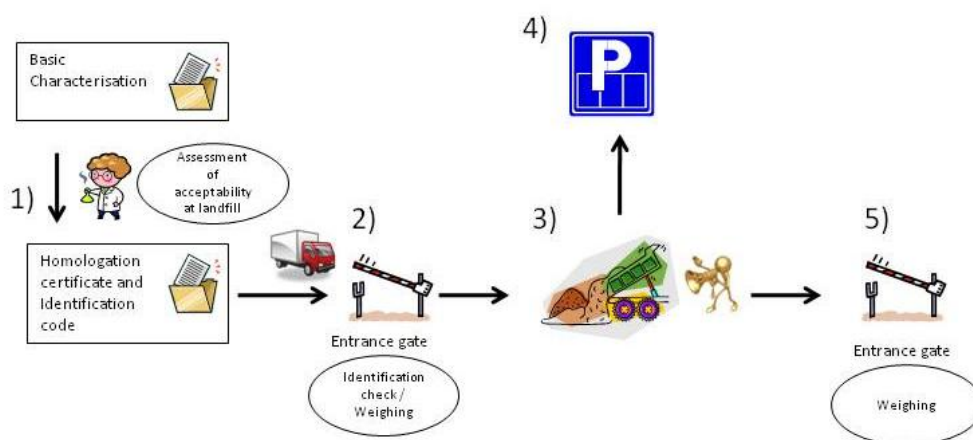


Figure 1.9-1: Flow chart of the waste acceptance procedure at Landfill Söles

Basic characterisation

To the request of waste disposal follows an evaluation of the waste based on the basic characterisation submitted by the waste producer. This happens on the basis of a list released by the local government (Decision n. 1104, 2 April 2007, waste acceptance criteria, see Annex 1), which is part of the landfill- authorisation through the regional environment agency. The list contains those EWC waste types which can be deposited.

Waste is classified into the following three groups:

- Green waste = list of waste to be deposited without special characterisation;
- Blue waste = list of waste to be described by a simplified characterisation and a standardised form (self-statement of the waste-producer);
- Red waste = list of waste to be analysed by an analytical characterisation (e.g. waste probably containing hazardous substances).

Wastes delivered for the first time, an analytical characterisation is required and a temporary storage is equipped in containers until waste acceptance and definitive release.

Compliance testing

Compliance testing is done by the landfill operator every time a new waste type shall be accepted. In case of simplified characterisation by a self-statement, the operator can request additional information and external verification. Occasionally, the head of the environmental agency of the local administration can visit the places where the waste is produced, in order to verify the plausibility of the given information.

The regional environmental agency determines the detailed criteria for those waste types requiring for analytical characterisation. The criteria define the necessary parameters and the frequency of testing (generally once a year, e.g. for ashes from district heating plants), to verify consistency with the limit values

set for the basic characterisation. The test analysis must be conducted by independent and qualified laboratories on the basis of standardised methods. The regional environmental agency conducts random verifications of samples and analyses them in a certified public environmental laboratory.

This described system is so far not completely elaborated. The regional environmental agency is currently developing in cooperation with landfill operators of the region precise testing regulations for every relevant waste type. Some simplified temporary arrangements through the provincial government have been enacted.

On-site verification

The landfill area is comparatively small, well manageable place of unloading. The landfill employee is operating in continuous cooperation with the driver and communicates by phone. Therefore, an internal written documentation is not necessary.

Important elements of the on-site verification are:

- Control of the documents and identification of the deliverer;
- Visual inspection of the waste before and during the weighing;
- Visual inspection during the unloading process;
- Clarification of special features via phone (entrance/place of unloading);
- Sampling and deposit of waste on a temporary place if divergences are recorded.

On-site verification is performed once a year regarding those waste types not included in the red list. The samples are analysed by a certified laboratory. In case of non-compliance waste will not be accepted. Unknown waste typologies require the authorisation issued by the competent local authority.

Applied quality, safety and environmental standards

The Landfill Direction provided a guideline to inform on the Landfill Directive requirements. It covers special technical monitoring and assurance measures.

The landfill is accredited according to ISO 9001 and 14001.

Due to weather conditions (partly extreme wind occurrences), special measures (boundary fence, consequent cover of the emplacement) and landfill burning (cooling storages for heated wastes) have been taken.

Expert proposals related to potential modifications of the WAC Decision

There are no proposals for the WAC Decision.

1.9.2.2 Site visit to representative non-hazardous landfill (Ginestreto, Sogliano al Rubicone, landfill class B)

General terms

The landfill of Ginestreto is located in Emilia Romagna and operates since 1990. It covers a total area of 200.000m², with a maximum loading capacity of about 3,775,000m³, of which 2,225,000m³ are already used. The landfill is supposed to continue operating until 2020. Since 1998 biogas is extracted and used for power production.

The landfill is owned and operated by Sogliano Ambiente Inc. The municipality of Sogliano holds 70% of Sogliano Ambiente Inc. The site is classified as landfill for non-hazardous waste and serves the districts of Uso - Rubicone and Rimini.

The landfill includes the following areas:

- disposal area called Ginestreto 1, exhausted in April 2005;
- disposal area called Ginestreto 2, operating since May 2005;
- stations for treatment and burning of biogas (used only for emergency);
- a biogas power plant.

Waste acceptance procedure

The process flow of waste acceptance at Ginestreto is well documented and comprises an internal process description. The landfill is equipped with a waste information management system („winwaste“). The computer system records the whole documentation of the authorisation as well as the delivery according to the legal framework (e.g. registration of the deliverer with authorisation certification, documentation of the waste characteristics and instructions for the deliverer, registration of the amount of delivered wastes (weighing), documentation of irregularities, issuance of the acceptance confirmations and billing).

The process flow of waste acceptance at “Ginestreto 2” is the following:

1. Once a waste type is deemed to be acceptable at the landfill based on its characteristics as specified in the basic characterisation, a confirming document (conformity certificate) is filled in by the administration office (not located on the landfill site). This document collects the most important information as composition, waste producer and waste description and contains therefore the relevant instructions for the collaborator at the landfill entrance.
2. At the entrance gate the weighbridge operator verifies the accompanying documents (FIR) and carries out a visual inspection to verify the compliance with the information of basic characterisation. For the visual inspection the employee can compare the waste with special example pictures. In case of commercial waste a conformity certificate is necessary to proceed to the weighbridge. The employee checks the conformity certificate and the transport documents. Then the reverse side of the transport form is stamped with the date. The waste is transported to the indicated place of unloading.
3. At the place of unloading the lorry is awaited by two landfill employees (the controller and the driver of the compact engine). The controller receives the documents and verifies the applied stamp as well as the conformity of the waste with the existing information. When the waste is dumped, an exact visual inspection is conducted, as the collaborator on the compact engine

examines the composition of the waste. In case of differences and doubts, a sample is taken from the waste. If the waste appears to be acceptable, a stamp with the indication “waste verified and conform” and the date is applied and the documents are sent back.

4. After disposal the lorry driver moves back to the entrance gate and the definitive acceptance of the waste is confirmed. The lorry is weighed again and the amount of waste is registered in the computer system. Thereafter the “FIR” for the confirmation of the disposal is stamped.

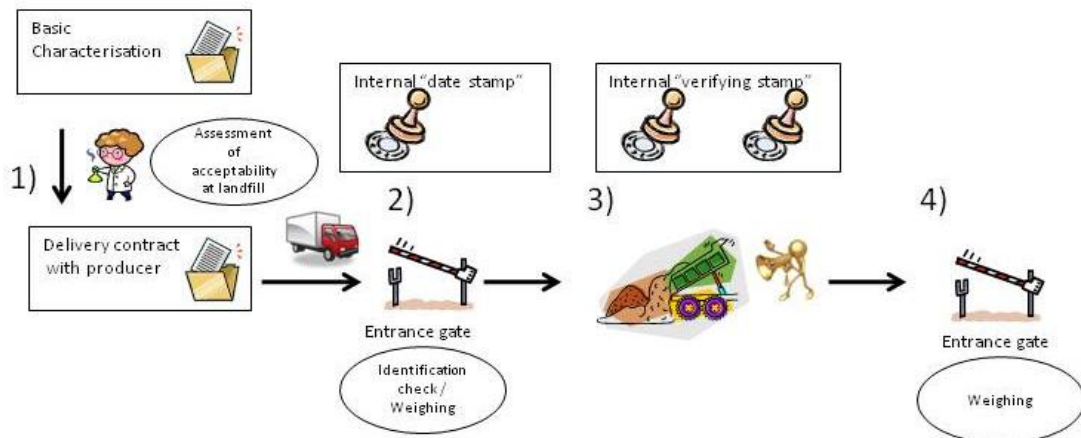


Figure -1.9-2: Flow chart of the waste acceptance procedure at Ginestreto, Sogliano al Rubicone, Italy

Basic characterisation

First of all, a „waste acceptance programme“ is implemented for the long-term management of the landfill. This document is an integrated component of the customer contract, which is concluded with every deliverer after the characterisation process.

After the request of waste disposal, which has to be made by a standardised form and the delivery of diverse informational documents as indicated in the Annexes, an evaluation of the waste is performed, based on the basic characterisation submitted by the waste producer.

For publicly collected municipal waste by publicly assigned collection and disposal companies, a separate contract is concluded and a basic characterisation is not necessary.

Waste delivered for the first time, is controlled visually by the landfill employee. Together with the person responsible for technical features a “provisory acceptance with reservations” is conducted. The waste is kept in closed containers at a temporary storage area placed outside of the place of unloading, until the basic characterisation and the conformity certification is finished. In this period recorded sampling with three retained samples is conducted and the samples must be stored for at least two months for customer dissatisfactions, analytical retests and governmental controls.

The sampling is carried out according to Annex 3 of the Ministerial Decree of 03/08/05 (“UNI-Norm” 10802).

Based on the analysis report an official communication to the waste deliverer is carried out. If the official notification is compliant, the conformity certificate is released.

Compliance testing

Compliance testing is done by the landfill operator every time a new waste type shall be delivered. During the visual inspections and examinations photographic documentations are carried out. Additional analyses of parameters, which have to be identified, are listed in the national regulative framework for the waste acceptance criteria at landfills.

Two different levels are defined. A simplified characterisation for definitely non-hazardous wastes with a few important sum parameters and a detailed characterisation for non-hazardous wastes, with special codes with hazardous substances with a broad list of chemical and physical parameters.

The analyses are conducted by certified laboratories, with fixed basic conditions about standards and storage times (max. seven working days).

According to Italian legislation, compliance testing has to be done at least once a year. The application of this regulation is valuable for the current year and should be examined in terms of practicability and reasonability for every waste type. Different testing periods related to delivered quantities can be chosen.

So far, only sporadic spot checks in order to test the conformity were realised.

On-site verification

The visual inspection is performed in the entrance area, at the place of unloading and during the manipulation on the landfill body. It is carried out every day and for each delivery. The control is supported by well structured reference documents as well as a clear internal notification to assure traceability.

The information on the conformity certificate gives concrete instructions to the landfill employee and is therefore very important for the on-site verification.

For every delivery registration the transport form is added as a fix attachment. In the entrance area the documentation control is mainly performed. At the active face the waste content control is more important and a double visual inspection is conducted by trained employees. In case of suspicion, the acceptance is blocked; the waste is brought to the temporary storage to take a sample.

Applied quality, safety and environmental standards

The landfill is accredited according to ISO 9001 and 14001 as well as EMAS. Additionally, the landfill possesses a certified security management system.

To avoid emissions, the operated part of the landfill is treated by biogas-stabiliser, especially after landfilling dusty wastes.

In front of the landfill, there is a sorting line for commercial waste & scrap. Therefore, only non recyclable commercial waste, mixed municipal waste (residual waste < 25% organic rate) as well as sieved overflow is brought into the landfill. Only few amounts of sludge and ashes are deposited.

Expert proposals related to potential modifications of the WAC Decision

There are no proposals for the WAC Decision.

1.9.2.3 Site visit to representative non-hazardous landfill (S'Arenaxiu, Perdiana, landfill class B)

General terms

The landfill is located in the municipality of Perdiana near Cagliari in Sardegna and is managed by the company Ecoserdiana SpA. The landfill covers an area of about 40ha with a quarry.

The landfill comprises the currently active disposal area for non-hazardous waste (S'ARENAXIU), three closed disposal areas for non-hazardous waste with biogas extraction plants and another closed disposal area for non-hazardous waste (Su Siccesu).

The extracted biogas is used for energy as well as for low and high temperature heat production, for a liquid waste and sludge treatment plant. The two plants, the CHP and the treatment-plant, are located in a distance of 2.5km and are connected with a small pipeline for the biogas supply.

The operative landfill called S'ARENAXIU covers an area of 0.9ha with a maximum loading capacity of 132,000m³. Typically industrial solid waste types with hazardous components are landfilled. The landfill features the technical standard of a landfill for hazardous wastes and the authorisation procedure for this waste category is taking place since ten years. The landfill site has a permit for non-hazardous commercial wastes of the province Cagliari and a special agreement for a certain amount of hazardous wastes. Special control measures are arranged with the administration.

Waste acceptance procedure

The landfill is equipped with a waste management information system (IMS) connected with the administration office in Cagliari. The acceptance procedure is carried out by technical operators and accompanied, if necessary by external consultants (e.g. in case of new waste delivering). The landfill is operating in close cooperation with the local authority.

The process flow of waste acceptance at S'Arenaxiu is the following:

1. Once a waste is deemed to be acceptable, the landfill operator prepares an authorisation or "acceptance certificate" containing the most important information (e.g. waste producer, waste composition, waste origin, special advises for the disposal process) and an internal waste identification code. Without release certificate, no waste can pass the entrance gate of the landfill.
2. During the waste acceptance at the entrance area, the operator examines the acceptance as well as the accompanying documents (FIR) and carries out a visual inspection to verify the compliance. The deliverer signs a declaration of responsibility regarding the acceptance of the waste. After the document check and the registration of the weight the lorry can proceed to the indicated place of unloading, which is close to the entrance gate.
3. On the place of unloading the collaborator has been informed about the waste load. He identifies the lorry and gives unloading instructions. During the unloading process another visual inspection is

carried out, especially in terms of the consistency and of unacceptable shares, because there is deposited mostly contaminated soil, sludge and slag.

4. In case of divergences and doubts, the entrance office and the laboratory have to be informed and the verification procedure has to be initiated; the waste is brought to an inspection area. If the waste is acceptable, the waste can be delivered to the place of unloading indicated by the employees.
5. When the lorry comes back to the entrance area, the vehicle is weighted again and the amount of waste is registered in the computer system. Finally, the "FIR" is stamped for the to confirm the disposal.

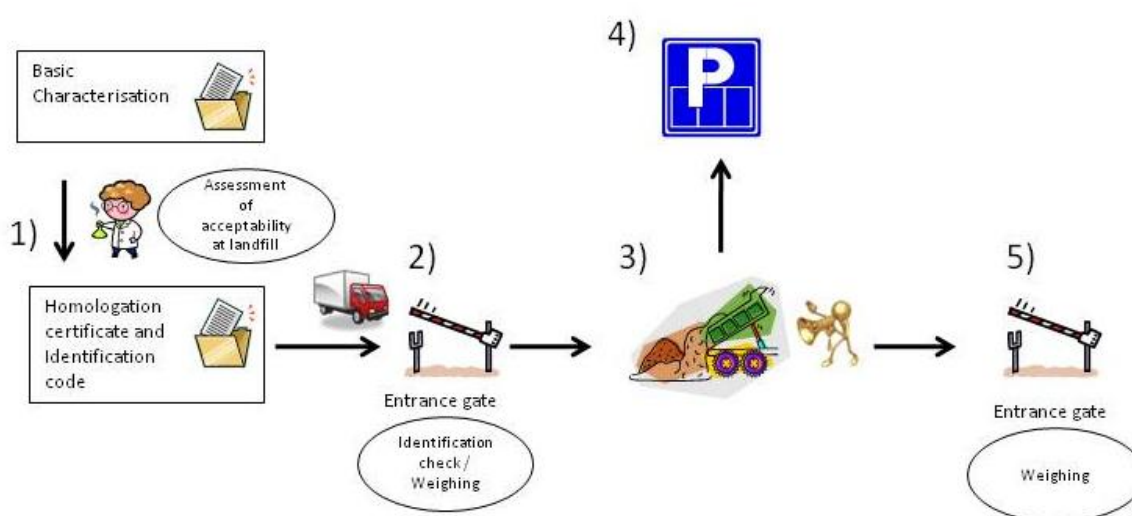


Figure 1.9-3: Flow chart of the waste acceptance procedure at S'Arenaxiu, Cagliari (Italy)

Basic characterisation

As the landfill site is classified as landfill for non-hazardous wastes with a special agreement for hazardous wastes. For every landfilled waste type an analytical characterisation with external control has to be made.

When applying for disposal the waste producer must follow a standardised acceptance procedure in the administration office of Ecoserdiana. During the acceptance procedure, the waste deliverer as well as the waste type has to be analysed. The waste producer has to provide a detailed analysis and a basic characterisation of the waste type. The deliverer is registered temporarily in the IMS. In case of compliance, a contract of disposal is made.

On the basis of the analysis report an official communication to the waste deliverer is carried out as well as a waste acceptance certificate.

Compliance testing

Based on the basic characterisation which is submitted by the waste producer, an evaluation of the waste is made. At the very first delivery, the waste has to be delivered in big bags. The first delivery is temporarily deposited in a separated section of the landfill site. These samples are marked and a list is kept to record the actual state of treatment. The landfill employees prepare the samplings together with external experts.

Therefore, a sampling document is filled in and the sampling is sent to a qualified laboratory. The sampling is carried out according to Annex 3 of the Ministerial Decree of the 03/08/05 ("UNI 10802"). An external laboratory carries out a chemical analysis to verify compliance with the basic characterisation and the waste acceptance criteria. In case of non-compliance, the waste is not accepted and the local control authority is informed.

The physico-chemical analysis of the wastes during the acceptance is very broad. The parameters to be defined are listed in the annexes of the effective legislation of 2003. The analysis is exclusively conducted by qualified laboratories. Retained samples are preserved for two years in a special room on the landfill site.

The validity of the waste acceptance document is not exceeding one year. After this period the analytical characterisation with new samplings has to be repeated. For special waste types (like ashes from the waste incineration) the validity is even shorter (e.g. four months).

On-site verification

The visual inspection is conducted in the entrance area as well as on the place of unloading. It is carried out for each delivery.

Additionally, for each delivery a retain sample is taken and preserved for the period of two years.

Applied quality, safety and environmental standards

The landfill is accredited according to ISO 9001 and 14001 as well as OHSAS 18000.

New waste deliveries are covered daily with soil or inert material. The landfill body and its impermeability are continuously monitored by a geo-electrical (leakage detection) system. The technical monitoring of the baseline sealing layer is conducted additionally by external specialised companies every six month.

A detailed risk analysis is repeated regularly in coordination with the authority; the last analyse was conducted in 2008

Expert proposals related to potential modifications of the WAC Decision

There are no proposals for the WAC Decision.

1.10 Country report Luxembourg

The WAC Decision is nearly literally implemented in Luxembourg Legislation. Divergences exist insofar, that:

- **Monolithic waste is not mentioned**
- **Specific criteria to assure sufficient physical stability and bearing capacity of hazardous waste destined for class B landfills are not set.**
- **In addition to the EU provisions national legislation defines a set of limit values for a sub-category of landfills for inert waste with superficial coverage. In this landfill category the phenol index is set at 0.5 mg/l instead of 0.3 mg/l set in the WAC Decision for an uncovered inert waste landfill. (Due to the coverage the reduced penetration of rain water the environmental impact of this divergence is expected to be negligible)**
- **In addition to the EU provisions national legislation defines a set of limit values for a sub-category of landfills for inert waste with future superficial coverage. In this landfill category BTEX and PCB limits are not set (LU)**

On the other some of the national limit values are more stringent than the ones set in the WAC Decision.

1.10.1 Assessment of legal compliance with the WAC Decision

The following table provides an overview on the legal documents transposing WAC Decision requirements into national legislation. Furthermore, the table shows a qualitative assessment of the level of implementation or possible divergences which are further explained and justified in the following sections.

Luxembourg			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure		n/a	
1.1 Basic characterisation	Legislation 36 §1	✓	
1.1.1 Function	Legislation 36 §1 (1.1.1)	✓	
1.1.2 Fundamental requirements	Legislation 36 §1 (1.1.1)	✓	
1.1.3 Testing	Legislation 36 §1 (1.1.1)	✓	
1.1.4. Cases where testing is not required	Legislation 36 §1 (1.1.1)	✓	
1.2 Compliance testing	Legislation 36 §1 (1.1.2)	✓	
1.3 On-site verification	Legislation 36 §1 (1.1.3)	✓	
2. Acceptance criteria	Legislation 36 §2	✓	
2.1 Landfills for inert waste		n/a	
2.1.1 Short list	Legislation 36 §2 (2.1)	+	The list is shortened compared to the WAC Decision.
2.1.2 Limit values	Legislation 36 §2 (2.1)	n/a	
2.1.2.1 Leaching limit values	Legislation 36 §2 (2.1)	~	Some limit values are more stringent compared to the WAC Decision (e.g. Cd, Zn). The limit value for the phenol index for inert waste I

Luxembourg			
Category	Corresponding national legislation	Implementation	Comments
			landfills is only 0.5mg/l instead of 0.3 mg/l.
2.1.2.2 Limit values for total content of organic parameters	Legislation 36 §2 (2.1)	✓	
2.2 Landfills for non-hazardous waste	Legislation 36 §2 (2.2)	n/a	
2.2.1 Without testing	Legislation 36 §2 (2.2)	+	Luxembourg introduced a ban to dispose biodegradable waste.
2.2.2 Limit values for non-hazardous waste	Legislation 36 §2 (2.2)	~	Some limit values are more stringent compared to the WAC Decision. Monolithic waste is not mentioned
2.2.3 Gypsum waste	Legislation 36 §2 (2.2)	✓	
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii	Legislation 36 §2 (2.3)	n/a	
2.3.1 Leaching limit values	Legislation 36 §2 (2.3)	~	Monolithic waste is not mentioned
2.3.2 Other criteria	Legislation 36 §2 (2.3)	~	Criteria for physical stability and bearing capacity are not defined
2.3.3 Asbestos waste	Legislation 36 §2 (2.3)	✓	
2.4. Landfills for hazardous waste		n/a	
2.4.1 Leaching limit values	Legislation 36 §2 (2.4)	~	Monolithic waste is not mentioned
2.4.2 Other criteria	Legislation 36 §2 (2.4)	✓	
2.5 Criteria for underground storage	Legislation 36 §2 (2.5)	✓	

Table 1.10-1: Implementation of WAC Decision in Luxembourg Legislation

1.10.1.1 Legal framework

The WAC Decision is implemented by the « Recueil de Legislation No 36 Mise en décharge des déchets » (Legislation 36).

The landfills are defined as the following:

- Inert waste landfills
 - Inert waste landfill type I covered and uncovered
 - Inert waste landfills type II;
- Non-hazardous waste;
- Hazardous waste.

1.10.1.2 Acceptance Procedure

Basic characterisation

The basic characterisation is literally implemented by §1 (1.1) of the Legislation 36. Record keeping has to be stored until the ulterior use of the landfill.

Compliance testing

The basic characterisation is literally implemented by §1 (1.2) of the Legislation 36. Record keeping has to be stored until the ulterior use of the landfill.

On-site verification

The on-site verification is identical to §1 (1.3) of the Legislation 36. The authorities have to determine the testing requirements and rapid test methods in accordance to the national legislation. Samples have to be kept for one year.

1.10.1.3 Waste acceptance criteria

The allowed maximum limit values of the WAC Decision are literally implemented by §2 of the Legislation 36.

In §3 of Legislation 36 norms are listed as given in the WAC Decision:

Measurement	Luxembourg standard
Determination of TOC (sludge and sediments)	EN 13137
Calculation of dry matter	prEN14346
Leaching behaviour test – Up-flow percolation test for inorganic constituents	prEN 14405
Leaching – Compliance test for leaching of granular waste materials and sludges	EN 12457/ 1-4
Digestion for subsequent determination of aqua regia soluble portions of elements	EN 13657
Microwave-assisted digestion with hydrofluoric, nitric, and hydrochloric acid	EN 13656
Analyses of Eluates – determination of pH, AS, Ba, Cd, Cl ⁻ , Co, Cr, Cr(VI), Cu, Mo, Ni, NO ₂ ⁻ , Pb, total S, SO ₄ ⁻ , V and Zn ²⁺	ENV 12506
Analyses of Eluates – determination of ammonium, AOX, conductivity, Hg, phenol index, TOC, easily liberatable CN, F	ENV 13370
Determination of hydrocarbon content in the range of C ₁₀ to C ₄₀ by gas chromatographic	prEN 14039

Table 1.10-2: Luxembourg norms

Criteria for landfills for inert waste

Criteria for landfills for inert waste are literally implemented by §2 (2.1). Luxembourg Legislation uses the limit values of the percolation test. The PAH (EPA 16) limit values are 0.001mg/l (percolation test) and 10mg/kg for inert waste I and 0.0005mg/l (percolation test) and 1mg/kg for inert waste II. The list for waste that can be disposed on landfills for inert waste without testing is shorter in comparison to the WAC Decision. Some of the limit values are more stringent (e.g. Cd, Zn).

Only In case of covered inert waste landfills type I the phenol index is 0.5mg/l instead of 0.3mg/l and no limit values are given for PCB and BTEX.

Criteria for landfills for non-hazardous waste

Criteria for landfills for no-hazardous waste are implemented by §2 (2.2), (2.3).

Luxembourg Legislation contains a list of waste that can be accepted on landfills for non-hazardous wastes. The waste types are the same as listed in the WAC Decision for inert waste landfills.

The limit values of the percolation test are used. Some of the limit values are more stringent in comparison to the WAC Decision (e.g. Cd, Cu, and Hg).

On the other hand criteria for monolithic waste to provide the same level of environmental protection as for granular waste are not set. Criteria to ensure that wastes have sufficient physical stability and bearing capacity, according to Section 2.3.2. of the WAC Decision, are not set but it has to be assured that the waste can withstand the mechanical stress on the landfill. Furthermore, criteria to ensure that monolithic hazardous waste for landfills for non-hazardous waste are stable and non-reactive are not set.

Additional to the WAC Decision a breathing activity (AT_4) of the waste is set at a limit value. This value describes the necessary oxygen which is necessary for the complete decomposition of the waste. The limit value is set at 10mg O_2 /g dry matter waste.

Criteria for waste acceptable at landfills for hazardous waste

Criteria for landfills for hazardous waste are implemented by §2 (2.4). The limit values of the percolation test are used. Criteria for monolithic waste to provide the same level of environmental protection as for granular waste are not set.

The limit values of the percolation test are used. Some of the limit values are more stringent in comparison to the WAC Decision (e.g. Cd, Cu, and Hg).

The test methods defined in Section 3 of the WAC Decision are literally implemented.

Underground storage

Underground storage is fully implemented by §2 (2.5) and Annex V.

1.10.2 Site visit in Luxembourg

The organisation of the site visit has been realised in close cooperation with the Environmental Ministry of Luxembourg which recommended the landfill site **SIDEC**.

The tasks of landfill operators start with the assessment of acceptability of a certain type of waste and comprise the actual acceptance of wastes arriving at the landfill. These procedures may differ by type of landfill and operator. Furthermore, some general information (e.g. location, size, technical standard, accepted waste) as well as specific systems installed for documentation may be helpful for the assessment of the on the ground enforcement of legal requirements. The description of each landfill visit is structured

into the sections “general terms” (background information) and “waste acceptance procedures” (basic characterisation, compliance testing, on-site verification).

1.10.2.1 Site visit to representative non-hazardous landfill (SIDEDEC, landfill class B)

General terms

The public owned landfill site SIDEDEC (Syndicat Intermunicipal from the three municipalities Diekirch, Ettelbrück und Colmar-Berg) is located about 30km north of Luxembourg and serves the indicated municipalities. Today 55 of the 116 municipalities are part of this joint waste management authority, of which there are three different in Luxembourg.



Figure 1.10-1: Overview of the landfill siteC (Luxembourg)

SIDEDEC covers the whole range of the waste management from the north of Luxembourg. The location Fridhaff consists of a civic amenity site, a compost plant and a residual waste landfill site.

Waste that cannot be re-used or recycled is treated in a MBT plant and the residues are landfilled.

The landfill site started operating as a SIDEDEC landfill in 1972 and comprises an area of 8ha with a volume of 1,750,000m³. The remaining capacity is about 240,000 m³. It is planned that the landfill site will continue about ten years.

40,000t of waste is landfilled per year of which about 25% can be sent to an incineration plant. 30,000t/a rare composted and landfilled.

In total 23,000t of the annually landfilled waste are delivered by the public collection and 17,000 are direct deliveries.

The waste delivered to the landfill site is either from a public or private collecting system.

Waste acceptance procedure

The waste management system is supported by a computer software system and contains the relevant information of the customers.

The process flow of waste acceptance at SIDEDEC is the following:

1. With each load a cover letter (Fiche d'accompagnement) has to be carried with the load as it includes important waste and customer related data (e.g. data of the municipality of waste source, the landfill operator, EWC code and date).
2. At the weighbridge the cover letter is checked and a weighbridge document is prepared with support of the software. The weighbridge document contains among others information about the municipality of waste source, vehicle registration number, date, time, weight, EWC code, incoming and outgoing weight, price, and contractor.

In case of a new customer, the contact details and further data can be registered in the software system.

3. The waste is sent to the MBT plant to be unloaded.
4. After the waste disposal the driver returns to the weighbridge, where the lorry is weighted again.
5. After being treated by the MBT plant, the waste reduced its amount about 50% and the composted waste is transported by an employee of the landfill site to the place of unloading where it is unloaded.

The cover letter, and the weighbridge document are stored for ten years and the software is kept without time limit.

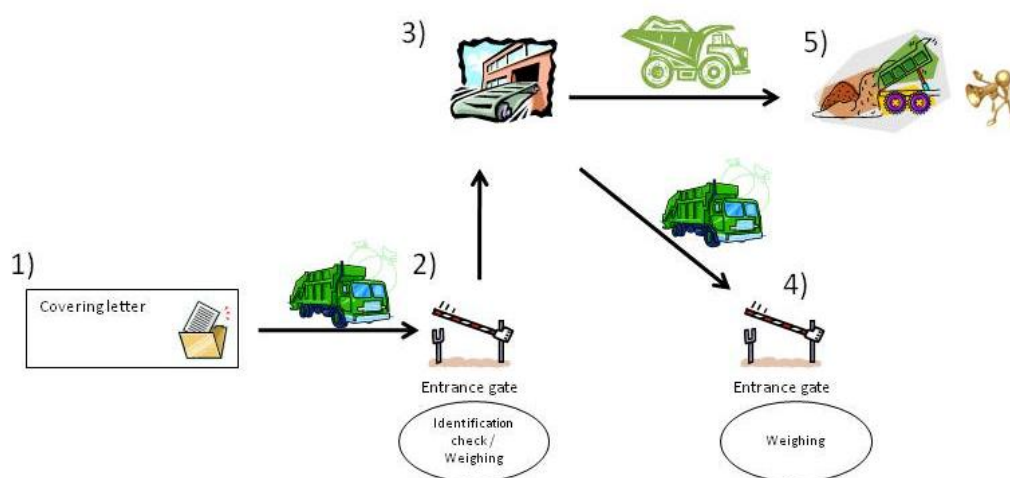


Figure 1.10-2: Flow chart of the waste acceptance procedure at SIDEC (Luxembourg)

Basic characterisation

Basic characterisation is not done because the waste is household waste and does not have to be tested.

Compliance testing

Compliance testing is not done because the waste is household waste and does not have to be tested.

On-site verification

The first visual inspection is made at the weighbridge. In case of suspicion concerning the waste composition, the waste is sent to a separated area. Otherwise it is sent to the MBT plant where to be unloaded. At the MBT the excavator driver digs the waste into the shredder. Thereby another verification takes place.

Expert proposals related to potential modifications of the WAC Decision

There are no particular recommendations concerning the WAC Decision.

1.11 Country Report Netherland

The Implementation of the WAC Decision is very well implemented in Dutch Legislation. However, some minor deviations exist as follows:

- **Visual inspection may occur at the place of dispatch.** The WAC Decision is interpreted, that the “before disposal inspection” consists of the inspection of the paperwork and the visual inspection after deposition consists of the visual inspection of the waste itself.
- **The requirement to measure the ANC is not set.**
- **For asbestos waste the daily covering is only stipulated for not properly packed asbestos waste.** In the Dutch regulation a proper packaging is considered to be a proper covering in compliance with the WAC Decision.
- **As regards basic characterisation, para f), h), i) and k) of Section 1.1.2 of the Annex to the WAC Decision is not mentioned in national legislation.** On the other hand, national law defines about 40 types of waste listed as waste that may not be land filled (art 1. Bssa). It is the responsibility of the landfill operator to check on this.

Dutch Legislation does not require testing for waste exclusively consisting of particles with a grain size of more than 40mm. **This type of waste is considered as impractical for testing.** It is considered that sampling of bigger particles in such a way that it will lead to a laboratory sample that is representative for the entire batch (This can be considered to be in accordance with section 1.1.4 (c) of the Annex to the WAC Decision). Furthermore it is stated that crunching big particles is considered to lead to higher leaching values and therefore will not give the right image of the waste.

It is not explicitly mentioned that compliance testing shall at least contain a batch leaching test, but that the compliance testing shall include all critical parameters. In consequence, if any leaching parameter is critical, a leaching test is required.

1.11.1 Assessment of legal compliance with the WAC Decision

The following table provides an overview on the legal documents transposing WAC Decision requirements into national legislation. Furthermore, the table shows a qualitative assessment of the level of implementation or possible divergences which are further explained and justified in the following sections.

Netherland			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure		n/a	
1.1 Basic characterisation	Article 10.39 a) of Environmental management act (EMA) referred to in Article 10 of Decree on notification of industrial waste and hazardous waste (Dn)	n/a	
1.1.1 Function	Article 10.39 a) of EMA in Article 10 of Dn	✓	
1.1.2 Fundamental requirements	Article 10 of Decree on notification of industrial waste and hazardous waste	~	f), h) i) and k) of Section 1.1.2 of the Annex to the WAC Decision is missing
1.1.3 Testing	Article 10 of Dn and Article 11 h) Decree on landfill and bans on the unloading of waste	✓	

Netherland			
Category	Corresponding national legislation	Implementation	Comments
	and hazardous materials (Dlbdw)		
1.1.4. Cases where testing is not required	Article 10 a) Dn	~	Article 10 a) §2 d) excludes waste exclusively consisting of particles > 40mm.
1.2 Compliance testing	Article 11 h) Dlbdw and §3.2 of the RegAWL	~	It is not mentioned that compliance testing shall at least contain a batch leaching test.
1.3 On-site verification	Article 11 g) h) Dlbdw	~	Visual inspection before and after unloading of each load is not explicitly mentioned
2. Acceptance criteria	Article 11 f) and Annex to Dlbdw, Article 17 of Dumping Decree, ground protection (Ddgp)	✓	
2.1 Landfills for inert waste		n/a	
2.1.1 Short list	Article 11 f) and Annex 1 Table 1.1 Dlbdw, Article 10 a) Dn	✓	
2.1.2 Limit values	Article 11 f) and Annex 1 Table 1.2 Dlbdw	n/a	
2.1.2.1 Leaching limit values	Article 11 f) and Annex 1 Table 1.2 Dlbdw	✓	
2.1.2.2 Limit values for total content of organic parameters	Article 11 f) and Annex 2 Dlbdw	✓	
2.2 Landfills for non-hazardous waste	Article 10 a) Bm, Article 11 f) and Annex 2 Dlbdw		
2.2.1 Without testing	Article 11 f) and Annex 2 Table 2.1 Dlbdw	✓	
2.2.2 Limit values for non-hazardous waste	Article 11 f) and Annex 2 Table 2.1 DLbdw	✓	
2.2.3 Gypsum waste	Article 11 f) Dlbdw	✓	
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii	Article 11 f) Dlbdw, Section 2 RegAWL	n/a	
2.3.1 Leaching limit values	Article 11 f) and Annex 2 Table 2.1 Dlbdw	✓	
2.3.2 Other criteria	Article 11 f) and Annex 2 Table 2.2 Dlbdw	~	ANC is not mentioned.
2.3.3 Asbestos waste	Article 10 a) Bm, Article 11 f) and Annex 2 Dlbdw, Article 6 Ddgp	~	Not all requirements for asbestos waste listed in the Annex to the WAC Decision are implemented.
2.4. Landfills for hazardous waste		n/a	
2.4.1 Leaching limit values	Article 11 f) and Annex 3 Table 3.1 Dlbdw	✓	
2.4.2 Other criteria	Article 11 f) and Annex 3 Table 3.2 Dlbdw	~	ANC is not mentioned.
2.5 Criteria for underground storage	Article 5 a) Ddgp, Article 5.13 Environmental management (Establishment and Licences) Decree (Emeld) Article 11 f) and Annex 4 Dlbdw	✓	

Table 1.11-1: Implementation of WAC Decision in Dutch Legislation

1.11.1.1 *Legal framework*

The WAC Decision has been implemented in Dutch regulation by

- Decision on acceptance of waste at landfills (NL Decision),
- Environmental Management Act (EMA),
- Decree on landfills and bans on the dumping of waste and hazardous materials (Dlbdw),
- Decree on notification of industrial waste and hazardous waste (Dn),
- Environmental Management (Establishments and Licences) Decree. (Emeld),
- Decree of amending various Decrees in connection with the implementation of the WAC Decision (Decision 250),
- Dumping degree, ground protection (Ddgp)
- Regulation on acceptance of waste at landfills (RegAWL).

Additional legislations are the Regulation on acceptance of conditioned hazardous waste at landfills (RegACHWL) and the Regulation on landfills and bans on the dumping on waste (RegLBDW).

The “Regulation on acceptance of waste at landfills” will replace the “Regulation on acceptance of conditioned hazardous waste at landfills” and will change the “Regulation on landfills and bans on the dumping on waste”.

The sampling procedure is defined in a private document (VKB-protocol 1004). In the regulations this protocol is appointed for sampling. The protocol will be published online: (www.SIKB.nl following the links “richtlijnen” and “BRL SIKB 1000”). For the control testing on the landfill only certain paragraphs of the VKB.-1004 apply.

The landfill classes are in accordance with the EU classification.

1.11.1.2 *Acceptance Procedure*

Basic characterisation

Basic characterisation is implemented by Article 10.39 of EMA and Article 10 of Dn. Some fundamental requirements for the basic characterisation of waste are not implemented (e.g. EWC code, in case of mirror entries of hazardous waste relevant hazardous properties, information to prove that the waste does not fall under the exclusion of Article 5(3) of the Landfill Directive, landfill class at which the waste may be accepted).

Records of the waste shall be kept five years after the last delivery of this waste.

According to Dutch regulation testing is not required for waste which exclusively consists of particles with a grain size of more than 40mm.

Compliance testing

Compliance testing is implemented by Article 11 h) of Dlbw and §3 of the RegAWL. It is stipulated that compliance testing has to be made at least once a year. Furthermore, records of the analyses of the samples shall be retained for a period of five years. The calculation of the variance is described in detail. However, the obligation to carry out at least a batch leaching test for the compliance testing is not particularly mentioned

Samples shall be kept for one year.

On-site verification

On-site verification is implemented by Article 11 g) and h) of Dlbw. According to the national legislation visual inspection may occur at the place of dispatch. In case the landfill is part of the same facility as the facility in which the waste has been produced, it is not clearly stipulated that each load has to be visually inspected before and after unloading.

The competent authorities may couple an obligation of the frequency to the permit and additionally define a place for a thorough inspection.

Samples from the visual inspection shall be kept for one month.

1.11.1.3 Waste acceptance criteria

In comparison to the WAC Decision higher limit values are set in the Annex to the Dlbw. Any refusal to accept waste shall voluntarily made known to the competent authorities.

According to §3.3 of the RegAWL the Guidelines AP04-A, Ap04-V, AP04-SB and AP04-E have to be used for the analyses of the samples.

Measurement	Dutch standard
Determination of TOC (sludge and sediments)	AP04-SG, SIKB protocol 3001 / Draft NEN 5753 or Draft NEN 5753 with exception of pre-treatment NEN 5739
Calculation of dry matter	AP04-SG, SIKB Protokolls 3001 / Draft NEN 5748
Analyses of Eluates – determination of Pb, Cd, Zn, Ni, As, Cr and C	AP04-SG, SIKB Protokolls 3001 / NVN 7321, draft NEN 6964; NVN 7322, draft NEN 6966; NEN 6453, draft NEN 6965; Draft NEN 6427
Analyses of Eluates – determination of Mo, Ba, Sn, Co and V	AP04-SG, SIKB Protokolls 3001 / NVN 7321, draft NEN 6964; NVN 7322, draft NEN 6966; Draft NEN 6427
Analyses of Eluates – determination of Hg	AP04-SG, SIKB Protokolls 3001 / NEN 7324
Analyses of Eluates – determination of Hg	
Analyses of Eluates – determination of Sb	AP04-SG, SIKB Protokolls 3001 / NVN 7323, draft NEN 5760; NVN 6611, draft NEN 6964; NVN 7322, draft NEN 6966; Draft NEN 6427
Analyses of Eluates – determination of Se	AP04-SG, SIKB Protokolls 3001 / NVN 7323, draft NEN 5760; NVN 6612, draft NEN 6964; NVN 7322, draft NEN 6966; Draft NEN 6427
Analyses of Eluates – determination of SO ₄ ⁻	NEN EN ISO 14403-2

Measurement	Dutch standard
Analyses of Eluates – determination of easily liberatable CN ⁻	NEN EN ISO 14403
Analyses of Eluates – determination of easily liberatable F	NEN 6589 and NEN 6483
Analyses of Eluates – determination of Br ⁻ and Cl ⁻	NEN EN ISO 14403-2
Analyses of Eluates – determination of Na and K	AP04-SG, SIKB Protokolls 3001 / NVN 6426, draft NEN 6966; NEN 6423, NEN 6424, draft NEN 6965; NEN 6442 Draft NEN 6427
Sample Pre-treatment	AP04-V draft NEN 5709, NEN 7360
Leaching behaviour test Up-flow	---
Eluates preparation for parameter determination	---
Digestion for subsequent determination of aqua regia soluble portions of elements	---
Microwave-assisted digestion with hydrofluoric, nitric, and hydrochloric acid mixture	---
Analyses of Eluates – determination of ammonium, phenol index, AOX and TOC,	---
Determination of hydrocarbon content in the range of C ₁₀ to C ₄₀ by gas chromatographic	---

Table 1.11-2: Dutch norms

Several additional standards of analyses in soil as mineral oil, TOC and EOX are described in the Guideline AP04-SG

Criteria for landfills for inert waste

Criteria for landfill for inert waste are implemented by Article 11 f) and Section 1 of the Annex to the Dlbw, and in Article 10 a) of the Dn.

Leaching limit values are listed in Table 1.2 and 1.3 of the Annex to the Dlbw. All values are identical with the limit values provided by the WAC Decision. The limit value for PAH is set at 40mg/kg. The limit values of L/S ratio of 10 are used.

Criteria for landfills for non-hazardous waste

Criteria for landfill for non-hazardous waste are implemented by Article 11 f) and Section 2 of the Annex to Dlbw, and in Article 10 a) of the Dn.

The leaching limit values for non-hazardous waste and stable non-reactive hazardous waste are identical to the WAC Decision. The limit values of the L/S ratio of 10 are used. The necessity to measure the ANC is not mentioned.

Criteria for monolithic waste are set as regards hazardous waste that has undergone a stabilisation treatment (Section 2 and the Annex to RegAWL). This includes a limit for physical stability (>1N/mm²) and leaching limits.

Requirements for testing compliance of a given sample with set leaching limits are as follows:

- Leaching test over 64 days (cumulative emission acc. to NEN 7345) with a complete (not ground) matured sample (28 days)
- Additives <25%
- Disintegration rate of sample <1%
- Exceedance of set limits is acceptable under certain conditions:
 - Br, Cl, SO₄: waste without additive contains less than 20% of these parameters
 - All substances: waste in question does not make up more than 10% of the total capacity of that compartment and is not situated right at the border of that compartment

WAC Decision management provisions for gypsum waste are fully adopted.

Requirements for asbestos waste are largely implemented in Article 6 of the Ddgp. But the WAC Decision requirement, that “the zone of deposit is covered daily and before each compacting operation” is interpreted in a way that properly packed asbestos waste is considered as a daily coverage. All other asbestos waste shall be covered over at the end of each work day. All asbestos waste shall be covered over prior to traversing this waste with plant (Art. 6 c).

Criteria for waste acceptable at landfills for hazardous waste

Criteria for landfill for non-hazardous waste are implemented by Article 11 f) and Section 3 of the Annex to Dlbw, and in Article 10 a) of the Dn. The leaching limit values for landfills for hazardous waste are identical to the requirements of the WAC Decision. The limit values of the L/S ratio of 10 are used.

The necessity to measure the ANC is not mentioned.

Underground storage

Underground storage is implemented by Article 5 a) Ddgp, Article 5.13 Environmental management (Establishment and Licences) Decree (Emeld) Article 11 f) and Annex 4 Dlbw

1.11.2 Site visit in the Netherlands

The organisation of the site visit has been realised in close cooperation with the Environmental Ministry of the Netherlands which recommended the landfill site **Afvalzorg**.

The tasks of landfill operators start with the assessment of acceptability of a certain type of waste and comprise the actual acceptance of wastes arriving at the landfill. These procedures may differ by type of landfill and operator. Furthermore, some general information (e.g. location, size, technical standard, accepted waste) as well as specific systems installed for documentation may be helpful for the assessment of the on the ground enforcement of legal requirements. The description of each landfill visit is structured into the sections “general terms” (background information) and “waste acceptance procedures” (basic characterisation, compliance testing, on-site verification).

1.11.2.1 Site visit to representative non-hazardous and hazardous landfill (Afvalzorg, landfill class B and C)

General terms

The landfill site Afvalzorg is located about 12 km North West of Amsterdam. The landfill started operating in 1987. It is a publicly owned company and the shareholders are the province of North-Holland and the province of Flevoland.

The polder covers an area of about 80ha of which 72ha are used for landfilling. Of these 72ha the exploitation of 13ha has ended. Afvalzorg has an overall capacity of about 9,500,000m³. There is no expiry date in the permit but with the expected filling rate the landfill site is expected to be filled in three or four years. A new permit for an additional capacity of 3,700,000m³ is planned to increase the height of the existing landfilling area. If the permit is issued, the landfill could continue operating for another 20 to 25 years.



Figure 1.11-1: Overview of the landfill Afalzburg /Netherlands)

At the time of the landfill visit the landfill site consisted of two different landfilling areas. Two cells, in total 3,5ha, were used only for landfilling fly ashes and air pollution control residues from waste incineration plants. Due to the high potential of leaching these residues were stored in watertight bags. As these materials, in their natural form, do not meet the WAC DECISION requirements for hazardous granular waste, this way of storing should have stopped since 16 July 2009. At that time, on the major part of the landfill site (55.5ha), landfilling of a mixture of hazardous and non-hazardous waste was allowed. Since 16 July 2009 the landfill should be separated in two parts. One part consisting of cells for non-hazardous waste and stable non-reactive hazardous waste and another part designated for hazardous waste.

The landfill site contains a soil separation plant separating sand from the clay particles and organic matter, whereas the contamination is normally in the clay and organic fraction. The sand is stored and, after certification, it can be sold to different construction projects.

70% of the wastes are contaminated soils and residues of soil separation treatment. Other wastes are asbestos waste, dredging sludges (which are dried at the landfill site) and mineral waste, drilling mud, inorganic industrial sludges as well as air pollution control residues from waste exoneration.

Waste acceptance procedure

The software controlled waste management system of the landfill site stores all necessary information. The employees have different access rights to enter information into the system. The company headquarters of Afvalzorg is based on the Nauerna Landfill. Pre-acceptance is centralised and based in the company headquarters. Therefore the information of other landfill sites (e.g. information about waste analytical

information or financial issues) operated by Afvalzorg are also entered into the software system e.g. information about waste analytical information or financial issues.

The process flow of waste acceptance at Afvalzorg is the following:

During the pre-acceptance procedure the holder of the waste informs the account manager of the necessary information. This includes the general name of the waste, the amount, the origin, the appearance and the chemical quality. If the waste may be land filled within the national legislation (In the Netherland there is a landfill ban for about 34 types of waste), and it meets the acceptance criteria of the landfill, and the holder accepts the conditions, a contract is drawn up. To this contract an identification number is given. This identification number is registered in the database and connects all the information about this waste stream. Furthermore a covering letter "Begeleidingsbrief" is made for the transportation of the waste to the landfill site.

Since there is a landfill ban on contaminated soil that can be treated for re-use, an extra formal declaration is needed to landfill a batch of contaminated soil. This declaration is issued by a Governmental agency (SenterNovem). To get this declaration the batch of soil has to get examined and analysed by a certified and registered organisation in order for this agency to be able to decide on the status of the soil. Before being able to bring contaminated soil to be landfilled a declaration with states that the batch can be landfilled has to be handed in by the owner of the soil to the landfill owner. The same procedure accounts for residues from soil treatment and drainage sludges.

The waste flow at Afvalzorg is the following:

1. Once a waste type is deemed to be acceptable at the landfill based on its characteristics as specified in the basic characterisation the waste can be sent to the landfill. Every incoming waste load has to have a covering letter (Begeleidingsbrief). This document contains the contract number to identify the waste stream at the weighbridge as well as customer and waste related information (e.g. waste source, waste producer, waste stream number, landfill operator and waste description).
2. The weighbridge operator accesses the information by entering the contract identification number and compares the information on the covering letter with the electronic information (e.g. EWC code, waste producer, waste description, waste treatment, contractor and if available analyses).

If the information complies with the electronic data, the weighbridge operator registers the weight of the loaded lorry. He sends the lorry to the specific section of the landfill site where the load can be unloaded.

3. The weighbridge operator informs the employee at the place of unloading with a radio set about the arrival of the waste. With a given interval (part of the permit) loads have to undergo an intensive check (whether an intensive visual inspection or a control of the sampling). The intervals of such intensive controls are indicated by the electronic waste management system.

4. The control employee checks the waste contents of every load after unloading. In case of suspicion, an intensive control takes place. Therefore, the employee performs an intensive visual check and if required samples are taken and analysed by an independent laboratory. The inspection is documented. If the results of the check comply with the information of the contract, the lorry can return to the weighbridge. In case of non-compliance, a higher ranked employee (normally the site manager or the deputy site manager) is charged to proceed. If necessary the office is informed to take further measures. These can range from making a new contract (if acceptance within the permit is possible) to sending the waste to another waste treatment facility (only with corresponding permit).
5. After unloading the waste, the empty vehicles are weighted again at the weighbridge before leaving the landfill site. At the weighbridge a weight document is prepared including customer and waste related data (e.g. weighing bridge document number, date, time, landfill operator, contractor, waste producer, weighed before and after unloading as well as information about landfill taxes).

The location of the place of unloading where the load was discharged is added to the database. In a later stage the information from any control testing is added to the contract.

The information is stored as a paper version and electronically without time limit.

The location also has areas where materials can be stored temporarily. These stored batches can undergo further testing before a decision is made for disposal or (further) treatment. In some cases direct re-use, cleaning, stabilisation or separation is a better option in comparison to landfilling or even required.

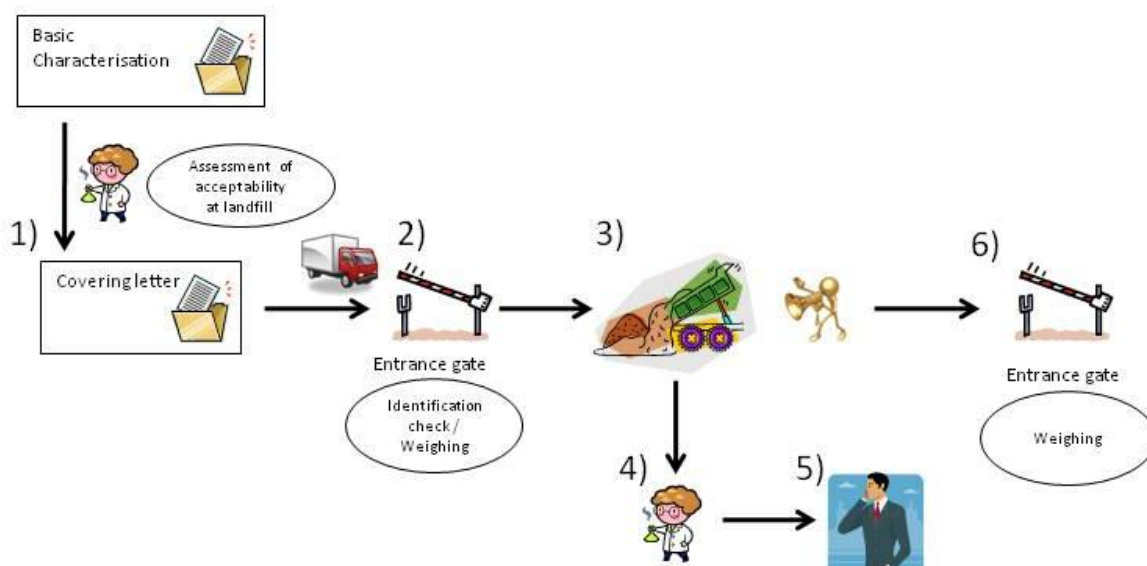


Figure -1.11-2: Flow chart of the waste acceptance procedure at Afvalzorg (Netherlands)

Basic characterisation

As off 16th July 2009 the information that a holder of waste has to provide before he can deliver waste to a landfill will be expanded. For wastes that go to a landfill for hazardous waste or are landfilled on a site for non-hazardous waste together in a cell for stable non-reactive hazardous waste or a cell for gypsum, the holder has to provide a basic characterisation with analyses of the complete list of parameters as given by the EU-WAC. The sampling as well as the analysis has to be performed by a specialised and certified organisations.

If a holder has preformed the basic characterisation on five single batches of the same waste stream he can stop the further characterisation of this waste stream according to the national legislation of the Netherlands. There is now enough information about the variability of the waste to be able to point out the key parameters and see this waste stream as regular waste. The landfill owner can now take over the control in the form of compliance testing.

Compliance testing

Until July 2009 the account manager was in charge of defining the key parameters and frequency of compliance testing. With the new regulation, compliance testing will be done in accordance with Dutch Legislation. The frequency is defined according to the variability of a waste and its potential exceedance of a limit value.

On-site verification

A visual inspection is performed at the place of unloading the waste. In case of suspicion, the landfill employee – who generally is in charge of the visual control – informs the supervisor (facility manager).

Then, one of the following proceedings is chosen:

- The waste is accepted and stays at the landfill site in case of compliance;
- The waste is not accepted. The permit holder of the landfill is responsible for further waste treatment steps to be take. He can only upload the waste onto the lorry and sent it back to the deliverer if the deliverer has an appropriate permit him to accept waste again. If this is not the case, another permit holder has to be contracted to bring the waste back.
- The waste is brought to the stockpile area for further investigation. Depending on the results of this investigation, further steps are taken in a case by case decision.

Recommendations for the WAC Decision

There are CEN standards for the analyses of monolithic waste, but dedicated limit values are missing in the WAC Decision.

Waste that contains 80% of material with particles > 40mm should not necessarily be tested as the material is crunched into smaller pieces for testing. Consequently, the resulting leachate values are much higher than from the original material. Therefore, the measuring results are not representative for the behaviour of the waste at the landfill. This theory has recently been confirmed by tests (commissioned by the Dutch Government) on railroad sleepers and roofing felt.

Visual on-site verification before unloading does not seem practical. It will only provide information on what is lying on top. The full load can only be truly inspected during unloading. The first sentence of Section 1.3 of the Annex to the WAC Decision should therefore be: "Each load of waste delivered to a landfill shall be visually inspected".

During the assessment of the analyses of the waste, it is not regulated what shall be done with the waste in the meanwhile. This is not a problem as long as the waste can be landfilled. Storage of all the waste at the production site until the results from the laboratory are produced is practically not possible (storage room and handling costs). If only the batches (loads) that have been sampled are stored and the loads that do not require sampling are landfilled, the storage does not prevent the possible landfilling of loads that do not meet the criteria.

There should be a clear distinction between biodegradable organic matter and non- biodegradable organic matter. The carbon limit values as TOC, DOC and LOI do not take in account the reactivity (possible negative influence) in the landfill site and consequently do not address what they intended to address. It is no problem to landfill stable carbon. Two examples of which there is even a positive influence of carbon are activated carbon filters and resins from ion exchangers. The limit values for TOC and DOC are also a problem for landfilling of contaminated soils soil cleaning residues and drainage sludge. Even if it is proven that further treatment is not possible these materials contain (for the most) a high TOC and DOC. But to a very large extent this is stable humic substance. It is not possible to bring down these concentrations. Even if a technical solution would be available, this treatment will always be worse to the environment than direct landfilling. There should be a derogation possibility when it can be proven that for some types of waste bringing down the TOC/DOC does not add to the environmental safety of the landfill site.

1.12 Country report Portugal

The WAC Decision is nearly literally implemented by the new Portuguese Legislation.

Minor divergence exist as concerns the following aspects:

- The obligation to pre-treat MSW acceptable at class B landfills without testing is not explicitly mentioned
- No specific criteria/provisions are set to ensure that hazardous waste which shall be disposed at landfills for non-hazardous waste is stable and non-reactive and has sufficient physical stability and bearing capacity.

1.12.1 Assessment of legal compliance with the WAC Decision

The WAC Decision is transposed by Decreto-Lei Nr. 183/2009 of 10 August into Portuguese Legislation.

The following table provides an overview on the legal document implementing WAC Decision requirements into national legislation. Furthermore, the table shows a qualitative assessment of the level of implementation or possible divergences which are further explained and justified in the following sections.

Portugal			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part A	✓	
1.1 Basic characterisation	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part A, §1	✓	
1.1.1 Function	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part A, §1.1	✓	
1.1.2 Fundamental requirements	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part A, §1.2	✓	
1.1.3 Testing	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part A, §1.3 and 1.4	✓	
1.1.4. Cases where testing is not required	Decreto-Lei Nr. 183/2009 of 10 August Annex IV, Part A, §1.8a)-c)	✓	
1.2 Compliance testing	Decreto-Lei Nr. 183/2009 of 10 August Annex IV, Part A, §2	✓	
1.3 On-site verification	Decreto-Lei Nr. 183/2009 of 10 August Annex IV, Part A, §3	✓	
2. Acceptance criteria	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, Section I-II	✓	
2.1 Landfills for inert waste	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, Section III, §1	✓	
2.1.1 Short list	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, Section III, 1 Table 1	✓	

Portugal			
Category	Corresponding national legislation	Implementation	Comments
2.1.2 Limit values	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, III,1 Table 2	✓	
2.1.2.1 Leaching limit values	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, III, 1 Table 2	✓	
2.1.2.2 Limit values for total content of organic parameters	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, III, 1 Table 3	✓	
2.2 Landfills for non-hazardous waste	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, III, 2	✓	
2.2.1 Without testing	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, III, 2.1	✓	
2.2.2 Limit values for non-hazardous waste	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, III, 2.1, Table 4	✓	
2.2.3 Gypsum waste	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, III, 2.4	✓	
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article6 c iii	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, III, 2.3	✓	
2.3.1 Leaching limit values	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, III, 2.3.2, Table 5	✓	
2.3.2 Other criteria	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, III, 2.3.2, Table 5 and Table 6	~	Further criteria to ensure the non-reactivity and physical stability and bearing capacity are not explicitly mentioned.
2.3.3 Asbestos waste	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, III, §2.5	✓	
2.4. Landfills for hazardous waste	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, III, §3	✓	
2.4.1 Leaching limit values	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, III, §3.1, Table 7	✓	
2.4.2 Other criteria	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, III, §3.1, Table 8	~	No criteria specifying physical stability and bearing capacity
2.5 Criteria for underground storage	Decreto-Lei Nr. 183/2009 of 10 August, Annex IV, Part B, III, §4	✓	

Table 1.12-1: Implementation of WAC Decision requirements in Portuguese Legislation

1.12.1.1 *Legal framework*

Decreto-Lei Nr. 183/2009 of 10 August into Portuguese Legislation has implemented the WAC Decision. Large parts of the WAC Decision have even been implemented literally.

1.12.1.2 *Acceptance Procedure*

Basic characterisation

The WAC Decision wording for basic characterisation has been fully adopted in (Annex IV, Part A, 1). The information concerning the basic characterisation has to be kept by the installation operator until the end of the operation time.

Compliance testing

Compliance testing is implemented by Annex IV, Parte A, §2 and nearly in every aspect literally compliant to the wording of the WAC Decision. Compliance testing shall be performed at least once a year. Samples have to be kept for a period of three years.

On-site verification

On-site verification requirements are implemented by Annex IV, Parte A, §3. Samples have to be kept for at least one month. Further information on quantity and frequency of sampling however is not provided. Rapid test methods are not mentioned.

1.12.1.3 *Waste acceptance criteria*

Higher limits can be permitted by competent authorities in the cases foreseen in the WAC Decision. In line with the WAC DECISION requirements, the annual number of permits issued under this provision shall be reported to the European Commission by competent authorities of Portugal at intervals of three years (Annex IV, Parte B, Section III and Chapter IX, Article 52).

Monolithic waste: Criteria for monolithic waste are set by Annex IV, Part B, III, §2.3.3. Monolithic waste has to meet the same limit values as corresponding granular waste until further provisions are set at national or European scale.

The sampling plan is to be developed in accordance with the EN 14899¹² specified by five technical reports CEN/TR 15310-1 to 15310-5.

Sampling and analysis are fully based on EN norms. No national standard is used.

As required by the WAC Decision, sampling and testing for basic characterization and compliance testing shall be carried out by an independent laboratory.

¹² Characterisation of waste. Sampling of waste materials. Framework for the preparation and application of a sampling plan.

Measurement	WAC DECISION standard
Characterisation of waste - Determination of total organic carbon (TOC) in waste	EN 13137
Characterisation of waste - Calculation of dry matter by determination of dry residue or water content	prEN 14346
Characterisation of waste – Determination of total dissolved solids (TDS) in water and eluates	prEN 15216
Characterisation of waste – Determination of polycyclic aromatic hydrocarbons (PAH) value in the soil, sludge and waste	prEN 15227
Characterisation of waste – Determination of selected polychlorinated biphenyls (PCB)	EN 15308
Characterisation of waste – Determination of the ANC	EN 15364
Characterisation of waste - Leaching behaviour tests - Up-flow percolation test (under specified conditions)	prEN 14405
Characterisation of waste - Leaching; Compliance test for leaching of granular and sludge	EN 12457/1-4
Characterisation of waste – Influence of the pH on leaching with initial acid/base addition	CEN/TS 14429
Characterisation of waste – Influence of pH on leaching with initial acid/base addition	CEN/TS 14997
Characterisation of waste - Digestion for subsequent determination of aqua regia soluble portion of elements in waste	EN 13657
Characterisation of waste - Microwave assisted digestion with hydrofluoric (HF), nitric (HNO ₃) and hydrochloric (HCl) acid mixture for subsequent determination of elements in waste	EN 13656
Characterisation of waste - Preparation of test portions from the laboratory sample	EN 15002
Characterisation of waste - Analysis of eluates - Determination of pH, As, Ba, Cd, Cl-, Co, Cr, Cr(VI), Cu, Mo, Ni, NO ₂ -, Pb, total S, SO ₄ ²⁻ , V and Zn	ENV 12506
Characterisation of waste - Analysis of eluates - Determination of Ammonium, AOX, conductivity, Hg, phenol index, TOC, CN- easily liberatable, F-	ENV 13370
Characterisation of waste - Determination of hydrocarbons (C10 to C40) by gas chromatography	prEN14039

Table 1.12-2: Portuguese norms

Criteria for landfills for inert waste

Criteria for landfills for inert waste are fully implemented by Annex IV, Parte B, Section III, §1. The chosen test method is L/S = 10l/kg. National legislation fully adopted the short list and the limit values of the WAC Decision.

The leaching limit value for PAH is set at 100mg/kg and covers the testing of the following 16 substances: acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, Indeno(1,2,3-cd)pyrene, naphthalene, phenantrene, pyrene.

Criteria for landfills for non-hazardous waste

Criteria for landfills for non-hazardous waste are implemented by Annex IV, Part B, III, §2 of the above mentioned Decree. National legislation fully adopts the leaching and organic content limits of the WAC Decision including the obligation to measure the ANC.

Note: The national legislation sets higher leaching limit values for As, Cd, Cr total, Hg, Sulphate and chloride and COT for non-hazardous waste in case there is no co-disposal with hazardous waste.

In specific situations the licensing entity (competent authority) can authorise three different types of subcategories for class B landfills (Annex IV, §2.6):

- a) landfills for inorganic waste with a low amount of organic or biodegradable material;
- b) landfills for predominantly organic waste divided into a reactive, biological landfill and landfills for organic waste which has been treated or
- c) landfills for mixed non-hazardous waste with a substantial amount of either organic or biodegradable and inorganic waste).

For the acceptance of waste at these subcategories of landfills, the criteria are established on a case-by-case decision considering the waste characterisation, inherent risks of emissions and concerning the site. Exemptions for limit values of DOC, TOC and TDS are possible.

The requirements for gypsum waste are fully compliant to the WAC Decision and stated in Annex IV, Part B, III, §2.4.

Criteria for the acceptance of asbestos waste at landfills for inert waste are laid down in Annex IV, Part B, III, §2.5 and 2.6.

Criteria for waste acceptable at landfills for hazardous waste

Criteria for landfills for hazardous waste are fully implemented by Annex IV, Part B, III, §3. The leaching limit values and other criteria are fully compliant to the respective WAC DECISION requirements.

Criteria for underground storage

The defined procedures and requirements for underground storage are established in Annex IV of Decreto-Lei Nr. 183/2009, Part B, III, §4. The defined criteria are fully in line with the WAC Decision.

1.12.2 Site visit in Portugal

The organisation of the site visit has been realised in cooperation with the Portuguese Ministry of Environment (Ministério do Ambiente, do Ordenamento do Território do Desenvolvimento Regional). The landfill site SISAV (hazardous landfill site, class C landfill) has been selected.

The tasks of landfill operators start with the assessment of acceptability of a certain type of waste and comprise the actual acceptance of wastes arriving at the landfill. These procedures may differ by type of landfill and operator. Furthermore, some general information (e.g. location, size, technical standard,

accepted waste) as well as specific systems installed for documentation may be helpful for the assessment of the on the ground enforcement of legal requirements. The description of each landfill visit is structured into the sections “general terms” (background information) and “waste acceptance procedures” (basic characterisation, compliance testing, on-site verification).

1.12.2.1 Site visit to representative hazardous waste landfill (SISAV landfill class C)

General terms

The landfill site SISAV is located about 100km North East of Lisbon. It started operation in June 2008 and is a private company –Egeo. 2.5% belong to the municipality.

SISAV is a pure hazardous landfill site comprising 34ha of which 9ha are corresponding to the disposal area itself. Another 9ha are corresponding to the treatment facilities.

The landfill has a volume of 900,000m³ and continue operating at least until 2020. The is equipped with a laboratory, several waste treatment facilities, a storage area and the landfill site.



Figure 1.12-1: Overview of the landfill SISAV (Portugal)

will
site

Approximately twelve direct clients and seven waste management companies serving for different waste producers bring their waste to SISAV.

The received material is a broad mixture of different hazardous wastes.

Waste acceptance procedure

The landfill is equipped with an intranet comprising an all-embracing quality management system connected to the software system B-green. It collects all necessary waste management data.

Furthermore, the competent authorities of Portugal are able to access to the intranet and inspect the waste management data.

The process flow of waste acceptance at SISAV is the following:

1. Once a waste type is deemed to be acceptable at the landfill based on its characteristics as specified in the basic characterisation, an acceptance paper (Certificado de aceitação de residuo) is prepared and sent to the customer. In case the waste is not acceptable, a rejection paper (Declaração de não aceitação de residuo) is issued and transmitted.
2. The notified waste load arrives at the gate and the driver has to fill in a visit paper (visitante) which also has to be signed at the unloading point of the landfill.

3. After the vehicle passes the entrance gate, it stops at the weighbridge and the gate operator notes the weight.
4. The waste is transported to the laboratory where the driver hands over the waste transport document (Guia de acompanhamento de resíduos) including the acceptance number. This number is used for identification on all documents. One of the three transport documents is kept at the landfill site. The other two are given to the contractor and the waste producer (or waste holder). After checking the documents, the driver receives an internal document (Ficha de admissão de resíduo) indicating the next waste treatment or unloading destination. In case of unpacked waste (e.g. waste transported in tanks or open containers) a sample is taken and immediately analysed.

Depending on the waste, it has to be delivered to different treatment areas of the landfill site.

5. Waste fulfilling legal requirements and therefore accepted for landfilling, is sent directly to the place for unloading. Heavily contaminated solids are brought to the stabilising facility. Liquid waste that is delivered in tanks is sent to the inorganic physico-chemical treatment facility or to the storage area for the organic physico-chemical treatment area.
6. Packaged waste is sent to an intermediate storage area. All packages are opened and a visual inspection is performed or rapid test methods are made. If a visual inspection is not enough rapid test methods are not suitable to apply or in case of suspicion, a sample is sent to the laboratory to be analysed more detailed. The waste receives a number used for the internal process flow. Then the waste is stored in the storage area until further treatment can be realised.

After unloading, the lorry is sent back to the weighbridge (see point 9).

7. The landfill site is equipped with several treatment facilities for the incoming waste comprising a stabilisation facility as well as an inorganic and organic physico-chemical treatment facility.
 - a) There are two stabilisation treatment facilities differing in their stabilisation process. External lorries, which have been unloaded at the stabilisation facility, are sent back to the weighbridge (see point 9). After the stabilisation samples are taken and analysed. If the stabilised waste can be accepted for landfilling, it is landfilled by using an internal lorry.
 - b) At the inorganic physico-chemical treatment facility (Inorganic PnC) a filter cake is produced which has to be brought to the stabilising treatment facility. Lorries which have been unloaded at the inorganic PnC are sent back to the weighbridge (see point 9).
 - c) Waste for the organic physico-chemical treatment (organic PnC) is stored in tanks. The waste for this storage area is either directly from the lorry or from the intermediate storage area. The storage area is connected to the organic PnC.
 - d) At the organic PnC a floated residue is obtained and brought to the stabilising treatment facility. Lorries which have been unloaded at the storage place for inorganic PnC are sent back to the weighbridge (see point 9).

All treatment plants have an internal document defining the in and outgoing waste. Furthermore, it allows a control of the waste flow.

8. Before incinerating waste with high caloric value for energy production, it is collected and stored in a separated area.
9. At the weighbridge the lorry is weighted a second time and the data are entered into the computer system by the gate operator.
10. At the gate the signed visiting paper and the internal document is given to the gate operator.

All air or water that was polluted during the process is either reused or further treated to avoid any environmental impact. This includes among others biological air filter or biological treatment of water.

The gathered information is recorded as a paper version for five years and as an electronically without a specific time limit. Samples are kept for six months.

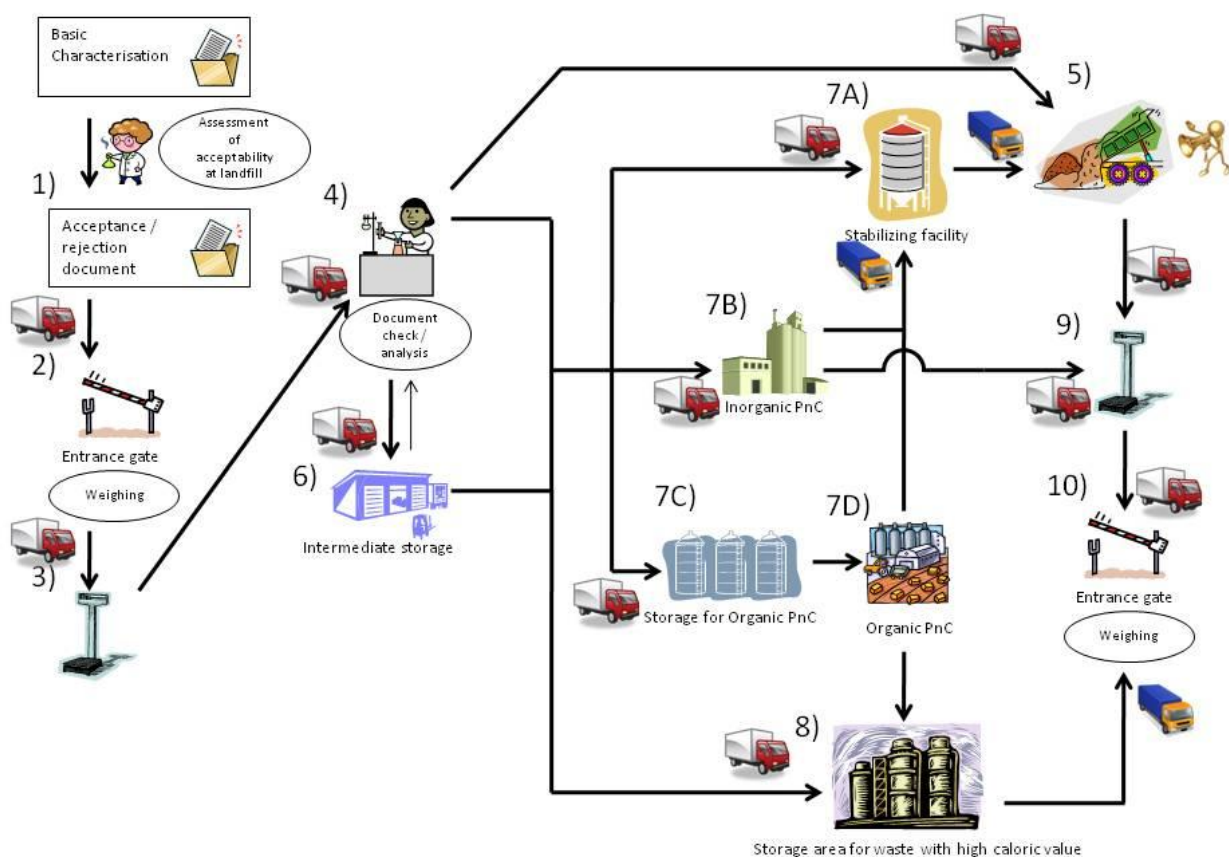


Figure 1.12-2: Flow chart of the waste acceptance procedure at SISAV (Portugal)

Basic characterisation

After SISAV is contacted by the waste producer or waste holder, an application form (Pedido de aceitação de residuo) is sent to the waste producer. The waste producer fills in the document and sends it – together with a sample – back to the landfill operator.

The sample is analysed in the internal laboratory Of SISAV and compared with the description and results of the waste producer. The key parameters of these waste types are defined. After analysing, the acceptance or rejection document is issued and sent to the waste producer.

Compliance testing

Each load is controlled by compliance testing of the key parameters that have been set with the basic characterisation. Sample taking is either done directly by the laboratory or at the intermediate storage area. If visual inspection and/or rapid test methods are not available or sufficient, the samples are sent to the laboratory.

The typical rapid test methods available at the landfill as chemical kits are, among others, used for the determination of PCB, phenols, cyanides, ammonia and chromium oxide.

On-site verification

At the entrance gate the waste can be checked visually. The waste is either directly sampled at the laboratory or in the intermediate storage area. Rapid test methods are performed if suitable.

During this process an organoleptic control is made as well. Every waste load sent to the landfill is sampled after each treatment and is additionally controlled visually during the unloading at the landfill site.

Expert proposals related to potential modifications of the WAC Decision

For water discharge of biological treatment, limit values for Chloride and Sulphate concentration should be higher.

For waste acceptance at landfills, LOI and TOC limit values should be higher.

1.13 Country report Spain

Up to now all legal documents concerning Landfill of waste have been released before 2003. The Landfill Directive including Annex II is implemented in Spanish Legislation by means of the Real Decreto 1481/2001. This is interpreted as sufficient to assure compliance with WAC Decision requirements, however it has to be noted that:

- All decisions and criteria which have to be set by the member states are missing.

According to Spanish share of competencies between central and regional governments, the different autonomous regions of Spain are expected to implement the WAC Decision.

Accordingly, some regions had enacted legislation regarding waste acceptance in landfills before the WAC Decision was adopted (e.g. Cataluña by Decree 1/1997 on landfills).

In addition some regional governments have recently enacted regulations to set the WAC DECISION requirements in their legislation (e.g. País Vasco: Decree 49/2009 of 24 February, regarding landfilling of wastes and backfilling operations (Official Gazette nº 54 ZK - BOPV 18 March 2009, Cataluña: Decree 69/2009 of 28 April, establishing criteria and procedure on the acceptance of waste at landfills (Official Gazette - Diari Oicial de la Generalitat de Catalunya nº 5370 – 30th April 2009).

On the other hand other regions do not have specific legislation regarding waste acceptance at landfills yet and apply ad hoc decisions whenever a permit is granted to a specific installation.

In order to assure a coordinated approach for the future, the central Spanish government has included among the measures proposed in the Waste National Integrated Plan 2008-2015 the implementation of acceptance criteria in landfills, in particular the implementation of WAC Decision.

As a first step, the Ministry of Environment and Rural and Marine Affairs (MoERMA) has started a study to evaluate the implementation of the WAC Decision in the different regions and landfills in Spain; and to have a technical recommendation on the development of those aspects and criteria that have been left open by the WAC Decision to the interpretation by Member states. The study shall be finished in December 2009.

Based on that technical assessment, the MoERMA will work on a proposal to be agreed with the regional governments and sectors (i.e. landfill operators, laboratories etc.) to reach a harmonised interpretation and implementation of the WAC Decision in Spain. Details of the proposal will be agreed by the MoERMA and the regional governments.

Although there is any decision yet, it can be assumed that the proposal is planned to be part of an amendment of Annex II to Royal Decree 1481/2001.

The authorisation of landfills and their inspection and control (as waste management activities) is mainly a matter of competency of the regional governments and (in the case of municipal wastes) of local entities. Criteria established in WAC Decision are usually included by most regional competent authorities in environmental permits (IPPC and waste management permits) granted to landfills.

Due to the WAC Decision, there is a need for some very specific requirements to be developed or implemented in a harmonised manner in the Spanish autonomous regions (e.g. criteria for stability of

monolithic wastes, sample keeping from on-site verification, PAH value). This would be the object of a possible proposal by the MoERMA, following the results of the study which is performed in 2009.

The Spanish ministry opinion is that the WAC Decision is directly enforceable without any need to enact a specific legal text to transpose them into Spanish legislation and that it is in fact Spanish legislation since WAC Decision was adopted by EU Council.

1.13.1 Assessment of legal compliance with the WAC Decision

The following table provides an overview on the legal documents transposing WAC Decision requirements into national legislation. Furthermore, the table shows a qualitative assessment of the level of implementation or possible divergences which are further explained and justified in the following sections.

Spain			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure		n/a	
1.1 Basic characterisation		n/a	
1.1.1 Function		✓	Referred to Landfill Directive 1999/31/EC.
1.1.2 Fundamental requirements	Real Decreto 1481/2001, Annex II, Article 2, Nivel 1 Real Decreto 833/1988, Chapter I Section 2, Article 17 and Article 37 Real Decreto 833/1988 Chapter IV Article 45	~	Para g) to k) of chapter 1.1.2 WAC DECISION is missing.
1.1.3 Testing		✓	Referred to Landfill Directive 1999/31/EC,
1.1.4. Cases where testing is not required		✓	Referred to Landfill Directive 1999/31/EC.
1.2 Compliance testing	Real Decreto 1481/2001, Annex II, Article 2, Nivel 2	~	Minimum requirements and record keeping for compliance testing are not implemented
1.3 On-site verification	Real Decreto 1481/2001, Annex II, Article 2, Nivel 1, 2, 3	~	Record keeping is not implemented in national legislation.
2. Acceptance criteria		✓	Referred to Landfill Directive 1999/31/EC.
2.1 Landfills for inert waste		n/a	
2.1.1 Short list		✓	Referred to Landfill Directive 1999/31/EC.
2.1.2 Limit values		n/a	
2.1.2.1 Leaching limit values		~	Referred to Landfill Directive 1999/31/EC, but criteria are not set.
2.1.2.2 Limit values for total content of organic parameters		~	Referred to Landfill Directive 1999/31/EC, but the PAH value is not set.
2.2 Landfills for non-hazardous waste		n/a	
2.2.1 Without testing		✓	Referred to Landfill Directive 1999/31/EC.
2.2.2 Limit values for non-hazardous		~	Referred to Landfill Directive 1999/31/EC, but criteria are not set.

Spain			
Category	Corresponding national legislation	Implementation	Comments
waste			
2.2.3 Gypsum waste		✓	Referred to Landfill Directive 1999/31/EC.
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii		n/a	
2.3.1 Leaching limit values		~	Referred to Landfill Directive 1999/31/EC, but criteria are not set.
2.3.2 Other criteria		~	Referred to Landfill Directive 1999/31/EC, but criteria are not set.
2.3.3 Asbestos waste		✓	Referred to Landfill Directive 1999/31/EC.
2.4. Landfills for hazardous waste		n/a	
2.4.1 Leaching limit values		✓	Referred to Landfill Directive 1999/31/EC.
2.4.2 Other criteria		✓	Referred to Landfill Directive 1999/31/EC.
2.5 Criteria for underground storage		✓	Referred to Landfill Directive 1999/31/EC.

Table 1.13-1: Implementation of WAC Decision in Spanish Legislation

1.13.1.1 Legal framework

The provisions of the WAC Decision are not yet implemented in Spanish Legislation.

However, the Landfill Directive including Annex II is implemented in Spanish Legislation by means of the Real Decreto 1481/2001 of 27 of December (Boletín Oficial del Estado no. 25 (from 29 January 2002) (Real Decreto 1481/2001).

Additional requirements concerning the WAC Decision are defined in the following decrees and legal documents:

- Real Decreto 833/1988 (Boletín Oficial del Estado no. 182 of 30th of July 1988), amended by Decreto Royal 952/1997 (BOE no. 160 from 5 July 1997) basic requirements for the production and management of hazardous waste (Real Decreto 833/1988);
- Ley 10/1998 of 21 April (Boletín Oficial del Estado no. 96 of 22 April 1998), chapter II “De la gestión de residuos”, Article 13, 3 (to keep the documentation (del registro documental) for 5 years) (Ley 10/1998).

In Ley 10/1998, chapter II “De la gestión de residuos”, Article 13, 3, it is determined to keep annual records of waste for five years (the documentation of the “registro documental” concerning waste quantity, nature, origin, destination, frequency of collection, transport medium, valorisation methods or elimination of the managed waste).

According to Annex II to Real Decreto 1481/2001, Section 1 of Annex II on acceptance criteria and Section 2 of Annex II on acceptance procedures, these were provisionally applied until the WAC Decision has been adopted and come into force.

The landfills are classified as in the EU Landfill Directive.

1.13.1.2 Acceptance Procedure

Basic characterisation

In Annex II to the Real Decreto 1481/2001 of 27 of December, Article 2. “Procedimientos generales de prueba y admisión de residuos”, Nivel 1 parts of the basic characterisation are defined.

The Spanish ministry considers that Annex II of Real Decreto 1481/2001 has been partly or totally superseded by specific requirements of the WAC Decision.

Real Decreto 833/1988 of 20th of July, Chapter I, Section 2, Article 17, a-h and Chapter I, Section 2, Article 37,1 stipulates that the waste producer and the landfill operator have to document several waste parameters for hazardous waste. These parameters are part of the basic characterisation requirements pursuant to EU Legislation, however, other parameter are missing.

In Chapter I, Section 2, Article 37, 3 a time period of five years for documentation for hazardous waste is set.

In Chapter IV, Article 45, 2, 4, 5 the obligation to take three samples that are analysed in laboratories is set.

Compliance testing

In Annex II of the Real Decreto 1481/2001, Article 2, Nivel 2, parts of the compliance testing are defined.

The Spanish ministry considers that Annex II of Real Decreto 1481/2001 has been partly or totally superseded by specific requirements of the WAC Decision.

Regarding compliance testing, it is defined that testing has to be performed for every 200th ton of waste brought to a landfill. In case waste delivered to a landfill does not reach 200tons a year or in case the waste is regularly generated in the same process, it has to be tested at least once a year.

On-site verification

Annex II of the Real Decreto 1481/2001, Article 2, Nivel 3, contains provisions for some parts of the on-site verification requirements.

The Spanish ministry considers that Annex II of Real Decreto 1481/2001 has been partly or totally superseded by specific requirements of the WAC Decision.

According to Annex II of the Real Decreto 1481/2001 Article 2, Nivel 3, rapid test methods - this can consist of a visual inspection of the waste before and after unloading – have to be applied to control that the delivered waste corresponds to the one subject of the compliance testing and is consistent with the description in the documents.

Before waste can be accepted at a specific landfill, it has to undergo basic characterisation and compliance testing. Furthermore, wastes have to comply with the specific criteria as laid down in the landfill permit. Finally, all waste batches have to be subject to on-site verification.

1.13.2 Site visits in Spain

The organisation of the site visits has been realised in close cooperation with the Spanish Ministry of Environment and/or support of regional authorities.

The landfill sites **Centro de Tratamiento de Residuos Urbanos de Góngora** (C.T.R.U. de Góngora) (non-hazardous landfill site, class B landfill), **SASIETA** (non-hazardous landfill site, class B landfill), **Cetransa** (hazardous landfill site, class C landfill) have been selected.

The tasks of landfill operators start with the assessment of acceptability of a certain type of waste and comprise the actual acceptance of wastes arriving at the landfill. These procedures may differ by type of landfill and operator. Furthermore, some general information (e.g. location, size, technical standard, accepted waste) as well as specific systems installed for documentation may be helpful for the assessment of the on the ground enforcement of legal requirements. The description of each landfill visit is structured into the sections “general terms” (background information) and “waste acceptance procedures” (basic characterisation, compliance testing, on-site verification).

1.13.2.1 Site visit to representative non-hazardous waste landfill (Centro de Tratamiento de Residuos Urbanos (C.T.R.U.) de Góngora, landfill class B)

General terms

The landfill site C.T.R.U. de Góngora is located about 10km southeast of Pamplona. It is a public company owned by Servicios de la Comarca de Pamplona S.A. and started operation in 1992. It is a mere non-hazardous waste landfill covering an area of about 50ha. It has a total capacity of 9,300,000m³. About 50% are already filled. According to a political agreement the site is expected to remain in operation at least until 2022.



Figure 1.13-1: Overview of the landfill C.T.R.U. de Góngora (Spain)

The landfill site includes a civic amenity site, the landfilling area and two separation plants for packages and wood as well as an internal laboratory.

The most typical waste at this landfill site is household waste. The major amount of household waste of the region (ca. 70%) is disposed at C.T.R.U. de Góngora.

Furthermore, waste from different industries, comprising similar commercial wastes papers and cartridges (50%), light fragments, sands and unrecyclable plastics, are landfilled at the site. In total, the landfill serves about 280 industrial customers.

Since 1997 the landfill site is equipped with a biogas installation producing about 720kW which can be increased up to 2MW.

Waste acceptance procedure

The landfill is equipped with an electronically waste management information system to manage all acceptance procedures and to document processed waste data.

The process flow of waste acceptance at C.T.R.U. de Góngora is the following:

1. Once a waste type is deemed to be acceptable at the landfill based on its characteristics as specified in the basic characterisation, the awaited load can arrive at the weighbridge.

The driver carries a transport document (Albáran) including customer and waste related data (e.g. name and address of the waste producer, waste type, EWC, vehicle registration number, internal number, the details of the contractor as well as a stamp and signature of the waste producer).

2. With the internal number the deposited document of the application form (Albarán entradas) can be invoked in the data management system. The corresponding registered data are compared with the transport document. After acceptance and weighing of the waste load, the lorry is sent to the treatment or unloading area. Waste loads without a transport document may not pass the entrance gate.

3. Depending on the waste type the load is sent to one of the following landfill areas:

- a. Civic amenity site for pre-separated wastes delivered by public waste service companies from the consumers (e.g. glass). This waste is gathered, stored and sent to a recycling facility.
- b. Separation facilities, either for wood or for packaging to separate the waste into recyclable materials and disposable materials. The employees are informed of the incoming load by radio.

The recyclable material leaves the landfill site and is sent to a recycling facility. The disposable material is regularly analysed by the internal laboratory and landfilled.

- c. Active place of unloading for disposable household waste or non-hazardous industrial waste. The involved employees are informed by radio of the incoming waste. The unloading is controlled by the caterpillar driver working the waste into its final position.
4. After unloading, the lorry is weighted again at the weighbridge. The weighbridge document (Albarán entrada) is completed and printed out. The document is signed by the weighbridge operator. One copy is given to the driver and a second is kept for storage.

The gathered information is recorded as a paper version and electronically without a specific time limit. Samples are kept for one month. Analysing results from the samples are stored as a paper version for five years and electronically without a time limit.

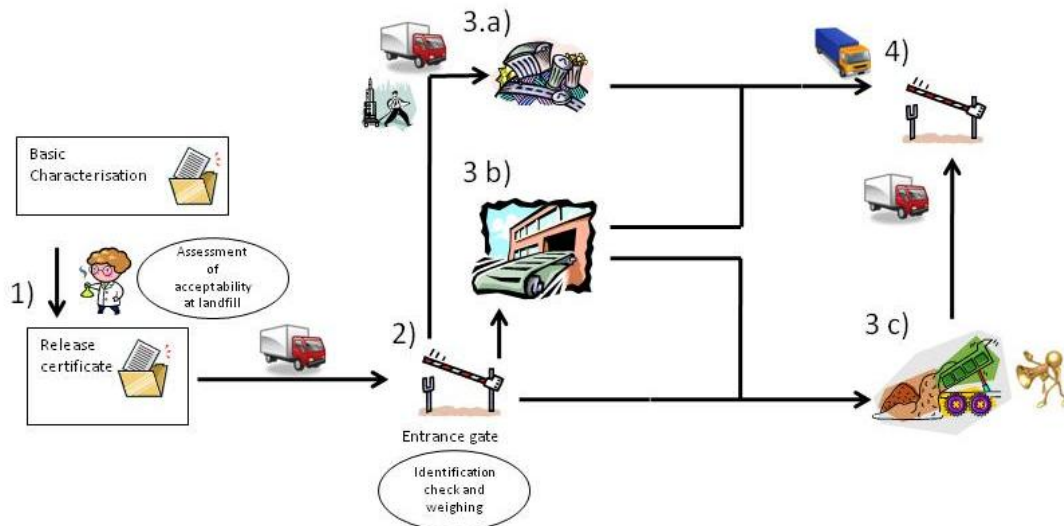


Figure 1.13-2: Flow chart of the waste acceptance procedure at C.T.R.U. de Góngora (Spain)

Basic characterisation

Basic characterisation as well as compliance testing is only done for industrial waste.

In the data document (Verificación de datos) including data about the waste producer and the contractor are delivered. Customers are also asked to fill in an analysing report (Documentación análisis del residuo) to give detailed information on the waste and its characteristics (e.g. information on the industrial activity of the client, the concrete process of the waste origin, as well as products used within the production process. Furthermore, it has to be indicated characteristics of the waste (type and composition), treatment of the waste, treatment company (if existent), analysing results (from a qualified laboratory according to the WAC Decision) and if possible a characterisation of the waste in the annex).

Additionally a sample has to be delivered to laboratory of C.T.R.U. de Góngora.

The delivered sample is analysed. In case the documents as well as the analysing results are compliant, the waste producer is informed on the waste acceptance. This information letter can include additional requirements to be fulfilled (e.g. size and general agreed condition of the waste).

Compliance testing

According to the basic characterisation compliance testing and testing frequency is defined by the landfill manager in cooperation with the laboratory.

In general, compliance testing is done once a year.

In particular cases, the compliance testing of currently 25 customers is realised more often. The testing frequency is defined on a case to case basis which takes especially the newest compliance test and historical data (concerning the variability, waste type and waste producer) into account.

Sampling for compliance testing is done by employees of the landfill laboratory. The taken sample is sent to the central certified laboratory which belongs to the landfill owner Servicios de la Comarca de Pamplona S.A., however, it does not belong to the landfill site itself.

On-site verification

After arrival at the weighbridge, the documents are checked and the lorry is weighted. In this context, the internal documents carried with the waste load are cross checked with the deposited data in the waste management system.

A visual inspection is made with support of installed cameras.

After accepting the waste at the weighbridge, the lorry driver is sent to the allotted landfill area. At the point of destination a qualified employee of the landfill controls the disposal of the waste.

In case of suspicion, waste is unloaded separately. Then the supervisor is informed and if necessary a sample is taken. In case the waste load is not acceptable, it is separated into disposable and non-disposable waste if possible. The non-disposable waste has to be picked up by the waste producer.

Expert proposals related to potential modifications of the WAC Decision

On-site verification of the waste before unloading is considered as useful, however it seems to be not applicable for all incoming loads at the weighbridge as some containers are closed on top. Therefore a check at the entrance area is not possible.

Several limit values as the DOC limit value are considered to too strict.

1.13.2.2 Site visit to representative non-hazardous waste landfill (SASIETA landfill class B, household waste)

General terms

The landfill site SASIETA is located close to the village Beasain and about 35km southwest of San Sebastián. It was opened in 1991 and will be operating until 2012. The landfill will be closed due to its exploit capacity and a planed incineration plant, which will be built close to San Sebastián. This incineration plant will start operating in 2012. Therefore many landfills within the Basque region have already been closed. Consequently, the amount of waste delivered to the landfill of Beasain has increased in the last years.

SASIETA is a public entity owned by the Cámara de Sasieta. The accepted wastes consists of municipal waste from the region as well as biodegradable waste of twelve to 15 small companies of the region.



Figure 1.13-3: Overview of the landfill SASIETA (Spain)

The landfill site has a size of 130ha and is divided into two phases. The first phase is already filled and is in a process of a final closure. The second one is in operation. Until the landfill will be closed it is envisaged to amplify the landfill area for further landfilling until it will be closed.

Until 1997 SASIETA also served as a disposal area for non-hazardous industrial waste. With the inauguration of a private landfill close to Beasain, the deposition of industrial waste stopped.

The landfill is also equipped with a civic amenity site which is opened to the public. Recyclable materials as glass, plastic, metal and paper-cardboard are collected in the containers. From there they are transported to the corresponding recycling facilities.

Since 2002 a landfill gas facility was installed. Currently, the second phase of the landfill site produces about 3.2GWh of electrical power per year (with an engine-generator of 475kW). The first phase was disconnected from the grid due to its poor landfill gas production.

The landfill site is the smallest landfill of the region which produces electrical power. It is planned to increase the power of the generators up to 600kW because of an overproduction of landfill gas.

Waste acceptance procedures

The landfill is equipped with an electronic waste management information system to manage all acceptance procedures and the documentation of the waste data.

The process flow of waste acceptance at SASIETA is the following:

1. Customers with a contract with the landfill site arrive at the weighbridge. All general data are therefore already contained in the computer system when the waste arrives. The driver fills in a weighbridge document (Ticket de Pesada) including customer and waste related data (e.g. date, time, internal number, waste type, origin and company). The weighbridge document is dropped in a mail box. The mail box is emptied daily and the data of the waste loads are entered in the computer system.
2. The waste load is transported to a gate. The gate is passed either by entering a personal pin code or by a remote control.
3. From the gate the waste is transported to the place of unloading. The process of unloading is controlled by a landfill employee working the waste into the landfill.
4. The lorry leaves the landfill site without further weighing.

The location of each substance group is saved electronically and as a paper version without time limit.

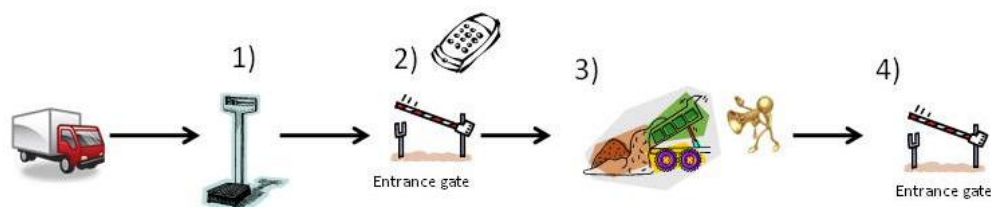


Figure 1.13-4: Flow chart of the waste acceptance procedure at SASIETA (Spain)

Basic characterisation

Basic characterisation of household waste is not realised as it is not necessary in accordance to the WAC Decision.

Compliance testing

Compliance testing of household waste is not realised as it is not necessary in accordance to the WAC Decision.

On-site verification

During disposal of the waste at the active place of unloading, the unloading process is controlled by a landfill employee.

Expert proposals related to potential modifications of the WAC Decision

There are no proposals for the WAC Decision.

1.13.2.3 Site visit to representative hazardous waste (Cetransa landfill class D)

General terms

The landfill Cetransa is situated northeast of Valladolid and started operating in 1993. It is expected to continue operating for the approximately next 20 years. The overall area comprises 20ha with a total volume of about 1,700,000m³ of which 800,000m³ are already occupied.

It is a privately owned company. However, one third of the equity belongs to the public company Empresa para la gestión de residuos industriales, S.A. (EMGRISA).

It is a mere hazardous landfill site. About 30 different clients deliver ~97% of the waste. Most of them (two third) deliver their waste several times a week or even daily. The composition of the waste is treated and untreated sewage sludge (~40%), different contaminated soils (~40%) and other different hazardous wastes (~20%). Small amounts of asbestos waste packaged in big bags are also part of the landfilled waste.

The landfill site comprises a physico-chemical pre-treatment facility, a storage area, a certified laboratory and the landfill area situated about 4km apart from the landfill central administration and treatment area.

Waste acceptance procedure

The landfill site is equipped with an electronic waste management system for the storage of all waste related information.

The process flow of waste acceptance at Cetransa is the following:

1. Once the waste type is deemed to be accepted at the landfill site an acceptance document (Documento de aceptación) is issued. For the shipment of waste a notification document (Notificación previa de traslado de residuos tóxicos y peligrosos) as well as a nationwide control document for the notification of the shipment of hazardous waste (Documento de control y seguimiento de residuos peligrosos) is required for the control by official institutions. The waste producer has to fill in the control document before shipping the notified waste.

Copies of the document are given to the National Ministry of Environment, the Regional Autonomous Ministry of Environment, the waste producer, the waste transporter and the landfill operator. In total seven copies are sent to the indicated institutions with signatures and stamps of the corresponding companies involved.

The driver of the waste also has to carry a transport document (Carta de porte) containing information of the waste (e.g. weight, EWC, type of package, date, destination, waste declaration as well as the signature and stamp of the waste producer and the signature of the driver).

In some cases the landfill operator supports the waste producer in filling in the control document.

2. The notified waste load arrives at the landfill site and the driver presents the control document to the weighbridge operator. The acceptance number is entered into the software system and the

data are cross checked for compliance. From each incoming waste a sample is taken and an organoleptic control is performed. After weighing the waste load, a first weighbridge document is prepared with a stamp of the landfill operator, control document number and the gross weight.

3. Depending on the waste the load is sent to one of the following areas:

a) Active place of unloading. Waste not necessary to be treated is directly sent to the active place of unloading. The employee is informed on the arrival by radio. The unloading of the waste is controlled by the employee and the driver of the waste presents the first weighbridge document which is signed by the employee of the landfill site.

b) Chemical stabilising facility. Waste that needs further treatment is sent to the stabilisation facility. After unloading, the first weighbridge document is signed. The waste is stabilised and a new basic characterisation is carried out. Even after stabilisation the waste is considered to be hazardous. This is not always the case at other landfill sites of Spain.

After acceptance the waste can be landfilled.

c) Separation area. In some cases the waste is separated. Re-useable and recyclable wastes are sent to corresponding facilities.

d) Storage area. Waste that cannot be stabilised at the landfill site brought to a storage area. After unloading the first weighbridge document is signed by an employee of the landfill site. Waste at the storage area leaves the landfill site again and is sent to corresponding facilities. These waste types are among others hydrocarbons, car batteries, batteries, paints and PCB containing waste.

4. After unloading, the driver moves to the weighbridge and gives the signed first weighbridge document to the weighbridge operator. After weighing, a second weighbridge document is created including data for the invoice (e.g. weight before and after unloading, performed treatment, date and the notification document code).

The documents are stored as hardcopy for five years and as electronic version without time limit. Samples from onsite verification are kept for three months.

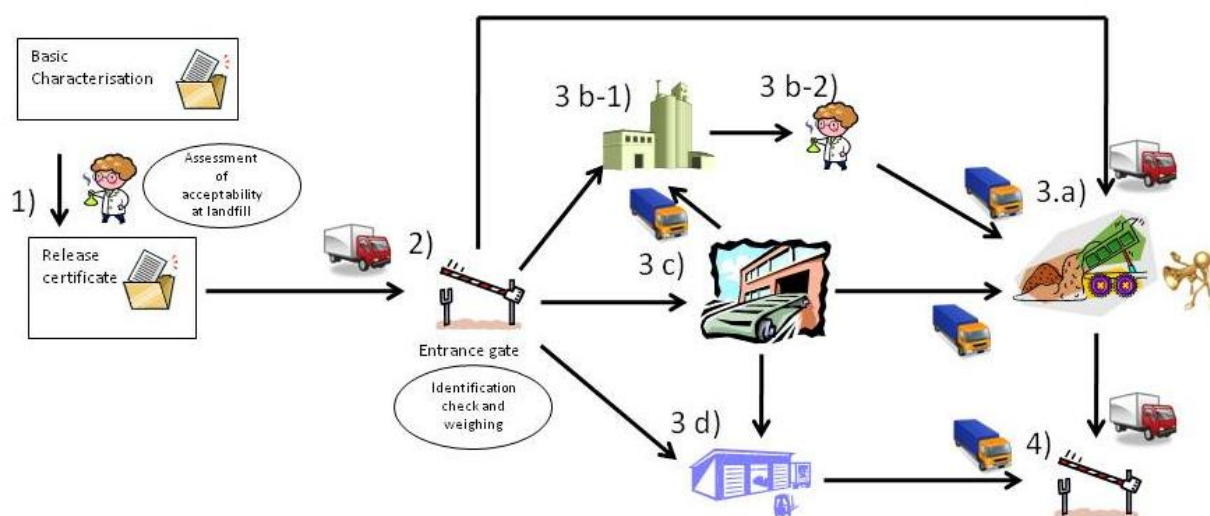


Figure 1.13-5: Flow chart of the waste acceptance procedure at Cetransa (Spain)

Basic characterisation

For every waste type that shall be landfilled a request document (Solicitud de admisión de residuos industriales) including customer and waste related data (e.g. waste producer, industry and waste type, physical state of waste, pH value, viscosity, chemical composition, waste classification, packaging, signature and stamp of waste producer). In some cases analyses of the waste are also included by the waste producer.

In either case the waste is analysed by the landfill operator. In general, the samples are delivered by the waste producer. In some cases the samples are taken on the site of the waste origin by the internal laboratory of the landfill site.

A characterisation document (Caracterización de residuos) is issued including the acceptance number, general description of the waste, data of the waste producer, internal identification number, chemical analysis and the signature of the responsible employee.

After the preparation of the characterisation document, a acceptance document (Documento de Aceptación) is prepared and sent to the waste producer. It includes among the most important information (e.g. acceptance number, packaging of the waste, data of the waste producer, signature and stamp of the landfill operator). The document is valid for a period of one year after the last waste delivery.

Compliance testing

Annually or after every 200th tonne of waste, a new compliance testing has to be made.

On-site verification

An organoleptic control is performed at the weighbridge after a sample has been taken of the waste load. Additionally, a visual inspection takes place during unloading the waste. In case of suspicion, the waste is brought to a quarantine section. After informing the landfill supervisor and the waste producer, it is decided on a case to case basis how the waste is further treated.

Expert proposals related to potential modifications of the WAC Decision

- For some waste types (e.g. ashes) the Chloride and sulphate concentrations are considered to be too strict. None of the alternatives to landfill for waste with high levels of chloride and sulphate leaching is environmentally and economically satisfactory. It is proposed to increase these parameters in order to be able to accept such waste.
- There should be a differentiation of carbon (DOC) into biodegradable and non-biodegradable waste. Considering that wastes with organic contents which can be recovered, must be recovered and not landfilled. The proposal is to increase the limit value of DOC, or to consider the biodegradable fraction in the DOC limit value.
- Decreto 69/2009 de la Generalidad de Cataluña, which sets the criteria and the acceptance of waste at controlled landfills, is a reference example in Spain for applying this approach.
- The development of a Guideline for the WAC Decision would be useful in order to facilitate the uniform application of the requirements across the EU even if that guide would be mandatory.

1.14 Country report Sweden

In general, the WAC Decision requirements are implemented into the national legislation of Sweden. However, it is divergent in some points to the WAC Decision.

- Sampling s during on-site verification is not mentioned, neither is a period for sample keeping set. (a related amendment of national law is currently in a revision process.)
- Monolithic waste is not mentioned
- Acceptance criteria for underground storage are not set.

1.14.1 Assessment of legal compliance with the WAC Decision

The following table provides an overview on the legal documents transposing WAC Decision requirements into national legislation. Furthermore, the table shows a qualitative assessment of the level of implementation or possible divergences which are further explained and justified in the following Sections.

Swedish			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure		n/a	
1.1 Basic characterisation		n/a	
1.1.1 Function	Naturvårdsverkets författningssamling (NFS) 2004:10; 4, 5, 6, 17 and 36 §§, NFS 2006:10, Mottagningskriterier för avfall till deponi Handbook 2007:1	✓	
1.1.2 Fundamental requirements	(NFS) 2004:10 5 § point 1 – 8. The Environmental Code - Miljöbalken (1998:808) 2 kap 2 § and 26 kap 19 §; Förordning (1998:901) om Verksamhetsutövarers egenkontroll; The Landfill Ordinance SFS 2001:512 8 § and 15§ NFS 2006:10; Mottagningskriterier för avfall till deponi Handbook 2007:1	✓	
1.1.3 Testing	NFS 2004:10 6-11, 13, 15 and 16 § NFS 2006:10; Mottagningskriterier för avfall till deponi Handbook 2007:1	✓	
1.1.4. Cases where testing is not required	NFS 2004:10 12§	✓	
1.2 Compliance testing	NFS 2004:10 6, 14, 17, 18 and 19 §§	✓	
1.3 On-site verification	NFS 2004 10: 36, 37, 38 and 40 §§ NFS 2000:15 2-5 and 7 §§	~	Sample keeping is not defined
2. Acceptance criteria	SFS 2001:512 15 a §	✓	
2.1 Landfills for inert waste		n/a	
2.1.1 Short list	NFS 2004:10 24 §	✓	
2.1.2 Limit values		n/a	
2.1.2.1 Leaching	NFS 2004:10 22 §	✓	

Swedish			
Category	Corresponding national legislation	Implementation	Comments
limit values			
2.1.2.2 Limit values for total content of organic parameters	NFS 2004:10 23§	✓	
2.2 Landfills for non-hazardous waste		n/a	
2.2.1 Without testing	NFS 2004:10 12, 25 and 27 §§	✓	
2.2.2 Limit values for non-hazardous waste	NFS 2004:10 30 §	~	Monolithic waste is not mentioned
2.2.3 Gypsum waste	NFS 2004:10 26 §	✓	
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii		n/a	
2.3.1 Leaching limit values	NFS 2004:10 30 §	~	Monolithic waste is not mentioned
2.3.2 Other criteria	NFS 2004:10 3, 28 – 31 §§	✓	
2.3.3 Asbestos waste	NFS 2004:10 32 §	✓	
2.4. Landfills for hazardous waste		n/a	
2.4.1 Leaching limit values	NFS 2004:10 33 and 34 §§	~	Monolithic waste is not mentioned
2.4.2 Other criteria	NFS 2004:10 35 §	✓	
2.5 Criteria for underground storage	Förordning (2001:512) 5§	—	The implementation is still pending

Table 1.14-1: Implementation of WAC Decision in Swedish Legislation

1.14.1.1 Legal framework

In Sweden the WAC Decision is implemented in the national legislation by:

- Naturvårdsverkets författningssamling 2000:15 (NFS2000:15),
- Naturvårdsverkets författningssamling 2004:10 (NFS2004:10),
- Naturvårdsverkets författningssamling 2006:10 (NFS 2006:10),
- Landfill Ordinance - Förordning (2001:512) (SFS 2001:512).

1.14.1.2 Acceptance Procedure

Basic characterisation

The basic characterisation of the WAC Decision is implemented by §§4 – 16 of NFS 2004:10 and NFS 2006:10 which refers to the according sections of NFS 2004:10. Records of the basic characterisation have to be kept for ten years. The waste producer is in charge of the basic characterisation.

Compliance testing

Compliance testing of the WAC Decision is implemented by §§6, 14, 17, 18 and 19 of NFS 2004:10. Records of compliance testing have to be kept until a new basic characterisation has been made.

On-site verification

On-site verification of the WAC Decision is implemented by §§36, 37, 38 and 40 of NFS 2004:10. It is stated that under normal circumstances visual inspection shall be sufficient to assess if the waste is in compliance with the documents. In particular cases, the control shall include testing of delivered waste to verify that the waste is in compliance with the documentation. No rapid test methods are defined.

It is not stated that samples shall be taken or that they shall be kept for a special period of time. A proposed amendment which is yet not legal foresees to keep the samples for one month if sampling is required.

The Swedish EPA is working on updates and revisions on NFS 2004:10. The organisation is about to include a sentence on this in §37.¹³ The revision of NFS 2004:10 is scheduled to be circulated for comments in near future.

In NFS 2004:10, §40 it is stated that the landfill operator shall have a plan for the control of delivered waste. Landfill operators are also obliged to fulfil NFS 2000:15 (regulation on the performance of measurements and sampling in certain operations).

In NFS 2000:15, §2 it is determined that the operator shall carry out those measurements and samplings necessary in order to control that the relevant regulations are fulfilled and that the conditions in the permit are fulfilled as well as that the operator has knowledge about how the activities performed are effecting the environment.

In NFS 2000:15, §3 it is stated that the instruments and methods for sampling and compliance testing as well as for the analyses must fulfil their purpose according to NFS 2000:15, §2.

In NFS 2000:15, §4 it is defined that Swedish or international standard shall be used for measurements, sampling and analyses methods.

In NFS 2000:15, §5 it is stated that the operator shall document every operation step – from the measurements, sampling to the analyses – and that this documentation shall be saved for five years. In NFS 2000:15, §7 the regulation is linked to SNFS 1990:11 (regulations on supervision of water at authorized laboratories etc.) as well as to the regulation concerning annual environmental reporting (NFS 2000:13).

¹³ The proposal mentioned by the EPA was: "If sampling is required for this control, selected representative samples shall be kept for at least one month."

1.14.1.3 Waste acceptance criteria

The WAC Decision is implemented by §15 of SFS 2001:512, §§15, 16, 21, 28, 33, 35 a) and 35 b) of NFS 2004:10 and in NFS 2006:10.

Testing methods are implemented by Annex 1 of NFS 2004:10.

Measurement	Swedish standard
TOC	SS-EN13137
Calculation of dry substance	SS-EN 14346
Analyses of eluates	SS-EN 13370
Leaching behaviour test	SIS-CEN/TC 14405; SS-EN12457-3
Microwave-assisted digestion	SS-EN 13656 and SS-EN 13657
pH, As, Ba, Cd, Cr, Co, Cr(IV), Cu, Mo, Ni, NO ₂ ⁻ , Pb, Total S, SO ₄ ⁻ , V and Zn	SFS-EN 12506
C ₁₀ -C ₄₀	SS-EN 14039

Table 1.14-2: Swedish norms

Guidance documents, such as the handbook 2007:1 acceptance criteria for waste to be landfilled, are available at the EPA homepage.

<http://www.naturvardsverket.se/Documents/publikationer/620-0144-2.pdf>

The classification of the landfills is in accordance with the WAC Decision.

Criteria for landfills for inert waste

The WAC Decision criteria for landfills for inert waste are literally implemented by §§21- 24 of NFS 2004:10. Limit values from Section 2.1.2.1 of the Annex to the WAC Decision are determined in the table columns "L/S=10l/kg" and "C₀ percolation test". The corresponding test methods are described in Annex 1 of NFS 2004:10.

The limit values of carcinogenic PAH (Benzo(a)anthracene, Chrysene, Benzo(a)pyrene, Benzo(k)fluoranthene, Benzo(b)fluoranthene, indeno(1,2,3,-cd)pyrene and dibenzo(a,h)anthracene) are set at 10mg/kg dry substance and the sum of other PAH (Naphthalene, Acenaphthalene, Fluorene, Phenanthrene, Anthracene, Flouranthene, Pyrene and Benzo(ghi)perylene) is set at 40mg/kg dry substance.

Criteria for landfills for non-hazardous waste

Criteria for landfills for non-hazardous waste are implemented by §§12, 25, 26 and 27 of NFS 2004:10.

All non-hazardous waste can be accepted at a landfill for non-hazardous waste without testing if the waste is not going to be landfilled together with hazardous waste or gypsum based waste.

The criteria for non-hazardous and stable and non-reactive hazardous waste landfilled at a landfill for non-hazardous waste are set in §§28 – 32 of NFS 2004:10. The WAC Decision limit values for "L/S=10l/kg" and C₀ percolation test the according test methods are described in Annex 1 of NFS 2004:10.

According to Swedish Legislation the same test methods are valid for monolithic waste as for granular waste.

The Nordic countries cooperated within a project that aimed to set limit values for monolithic waste. However, it was shown in this project that for the conditions used in these landfill scenarios and calculations based on test data it is very likely that the release of most components at the bottom of the landfill will be equilibrium controlled rather than diffusion controlled. Physical treatment does not affect leached amounts in these scenarios for land filling. The top cover requirements in the landfill scenarios for non-hazardous and hazardous waste allows so little water through that landfill that it leads to equilibrium conditions. The conclusions were consequently made that it is relevant to set the same criteria and to use the same test methods as for granular waste. The available test methods were concluded to correspond to the most to the actual equilibrium controlled situation in the landfill. The material is to be crushed prior to testing in these test methods in order to accelerate the time to reach local chemical equilibrium.

Infobox 1.14-3: Criteria for monolithic waste to assure same level of environmental safety as for granular waste

Under §31 of NFS 2004:10 it is stated that stable non-reactive hazardous waste is not allowed to be disposed on landfills for non-hazardous waste together with biodegradable waste.

According to §26 of NFS 2004:10 gypsum based waste is not allowed to be disposed on landfills containing > 800mg/kg DOC (from a L/S = 10l/kg test at a pH value between 7.5 and 8.0) and > 5% TOC.

Criteria for physical stability and bearing capacity as stipulated in the WAC Decision are implemented by 28§ of NFS 2004:10.

The definition of stable and non-reactive waste is given in §3 of NFS 2004:10. The criteria for stable and non-reactive hazardous waste are defined in §§28 – 32 of NFS 2004:10.

Treatments of asbestos waste according to the WAC Decision are implemented by §32 of NFS 2004:10.

Criteria for waste acceptable at landfills for hazardous waste

Criteria for waste to be deposited on landfills for hazardous waste are implemented by §§33 - 35 of NFS 2004:10. The determined limit values of Section 2.4.1 of the Annex to the WAC Decision are defined in the table columns headed "L/S=10l/kg" and "CO percolate test". The corresponding test methods are described in Annex 1 to NFS 2004:10.

According to Swedish Legislation the same test methods are valid for monolithic waste as for granular waste which is described more precisely in the chapter "Criteria for landfills for non-hazardous waste" of this Country Report.

Criteria for underground storage

The regulations that cover landfills are applicable for underground storage with the exemptions stated in §5 of the Landfill Ordinance, "förordning (2001:512) om deponering av avfall". The need for further regulations regarding underground storage according to Section 2.5 of the Annex to the WAC Decision has been recognized.

The Swedish EPA has proposed additional changes of the ordinance to the Government. The matter is pending.

Underground storage

The implementation is still pending.

1.14.2 Site visit in Sweden

The organisation of the site visit has been realised in close cooperation with the Swedish EPA which recommended the landfill site **Högbytorp Ragn Sells**.

The tasks of landfill operators start with the assessment of acceptability of a certain type of waste and comprise the actual acceptance of wastes arriving at the landfill. These procedures may differ by type of landfill and operator. Furthermore, some general information (e.g. location, size, technical standard, accepted waste) as well as specific systems installed for documentation may be helpful for the assessment of the on the ground enforcement of legal requirements. The description of each landfill visit is structured into the sections “general terms” (background information) and “waste acceptance procedures” (basic characterisation, compliance testing, on-site verification).

1.14.2.1 Site visit to representative non-hazardous and hazardous landfill (Högbytorp, landfill class B and C)

General terms

The landfill site Högbytorp is located 35km northwest of Stockholm and is part of the private company Ragn-Sells. Operation started in 1964. The facility covers an area of 117ha of which about 80ha is used for landfilling.

It is expected that the landfill site will at least continue operating for the next 25 years. The landfill site comprises three areas, a closed landfill site with biodegradable waste (30ha), a non-hazardous landfill site (20ha) and a hazardous landfill site (30ha).

The closed landfill site produces landfill gas which is transported about 3km via pipeline to another company for district heating.



Figure 1.14-1: Overview of the landfill Högbytorp (Sweden)

The majority of the waste brought to the landfill site is pre-treated in a separated area. Because of this pre-treatment, the landfill operator is considered to be the waste producer at the same time. Therefore, 60 % are internal waste. The rest is external waste which is split into big waste producers (35% of all waste producers) and very small waste producers (5% of all waste producers). The pre-treatment includes separating and solidification. The landfill site also has a buffer area for intermediate storage of waste for further investigations.

The landfill site accepts yearly about 700,000t of waste with a maximum permitted uptake of 1,200,000t/a.

Typical wastes delivered at the non-hazardous landfill site are polluted soils or sludges from car washing machines from petrol stations.

Typical wastes for the hazardous landfill are ashes.

The landfill site started working in accordance with the WAC Decision in January 2009. Therefore, many procedures have not yet proven their reliability.

Waste acceptance procedure

All relevant data of the waste is stored in a computer software programme.

The process flow of waste acceptance at Högbypörp is the following:

1. Each waste load arriving at the landfill site is weighted. Depending on the waste type different procedures are performed at the weighbridge.
2. a) Ashes are delivered from well-known customers. The ashes have a basic characterisation and the driver has a card used at the weighbridge. All data are automatically entered into the computer system. After weighing the driver receives a signal to enter the landfill site. At the landfill site the ashes are analysed and stabilised. Afterwards they are analysed again. If the analysing results fulfil the limit values, the waste is deposited.

b) Oily water is delivered from well-known customers. The oil waters have a basic characterisation and the driver has a card used at the weighbridge. All data are automatically entered into the computer system after weighing the driver receives a signal to enter the landfill site. At the site the oil is separated from the water. Afterwards, the sludge is gathered from the water and finally, after composting, landfilled. The water is brought to a WWTP, the oil is sold.

c) For mixed waste, there are three different procedures:
 - I) Regularly generated mixed waste which is already separated and well-known enters the landfill site. The driver has a card used at the weighbridge. All necessary data are stored in the computer system and after weighing the driver receives a signal to enter the landfill site. A visual inspection is made via an installed camera. A landfill employee is informed by radio about the arrival of the new waste load to control the deposition of the waste. It is rarely possible that the driver is not familiar with the landfill site. Then the specific site of deposition is shown to him.
 - II) Regularly generated mixed waste which is not already separated, but well-known, enters the landfill site. The separation is realised by a separation company that is part of Ragn-Sells. The driver has a card used at the weighbridge. All necessary data are stored in the computer system and after weighing the driver receives a signal to enter the landfill site. He transports the waste to the separation area. At the separation area the re-useable and recyclable waste is separated. Only waste which is not recyclable or re-useable is landfilled. In case the original waste does not have the correct composition of re-useable waste, recyclable waste and waste to be landfilled, the facility supervisor is informed and a new pricing of the original waste is made.

III) Irregularly arriving mixed waste that is not well-known enters the landfill site. The driver has a document with a registration number which he hands to the weighbridge operator. The registration number is entered into the computer system and the corresponding customer is selected. After weighing, the driver receives a signal to enter the landfill site. The waste is transported to the separation area. After separation, the price for the waste is established depending on the waste composition.

d) Construction waste is considered to be external waste. Generally, the validity of contracts for the acceptance of construction waste does not exceed twelve months. The driver has a document with a registration number which he hands to the weighbridge operator. The registration number is entered into the computer system and a corresponding customer is selected. After weighing the driver receives a signal to enter the landfill site. Visual inspection is realised via an installed camera. A landfill employee is informed by radio on the arrival of the new waste load to control the waste deposition. It is rarely possible that the driver is not familiar with the landfill site. Then the specific site of deposition is shown to him.

3. At the indicated unloading location, a landfill employee controls the deposition. In case of suspicion, he confers with the office. .
4. When the unloaded lorry returns to the weighbridge, it is weighted for a second time. The weighing is triggered either with the card of the driver or by the weighbridge operator.

The gathered information on waste type, quantity, delivery date, deposition location on the landfill is recorded as a paper version for ten years.

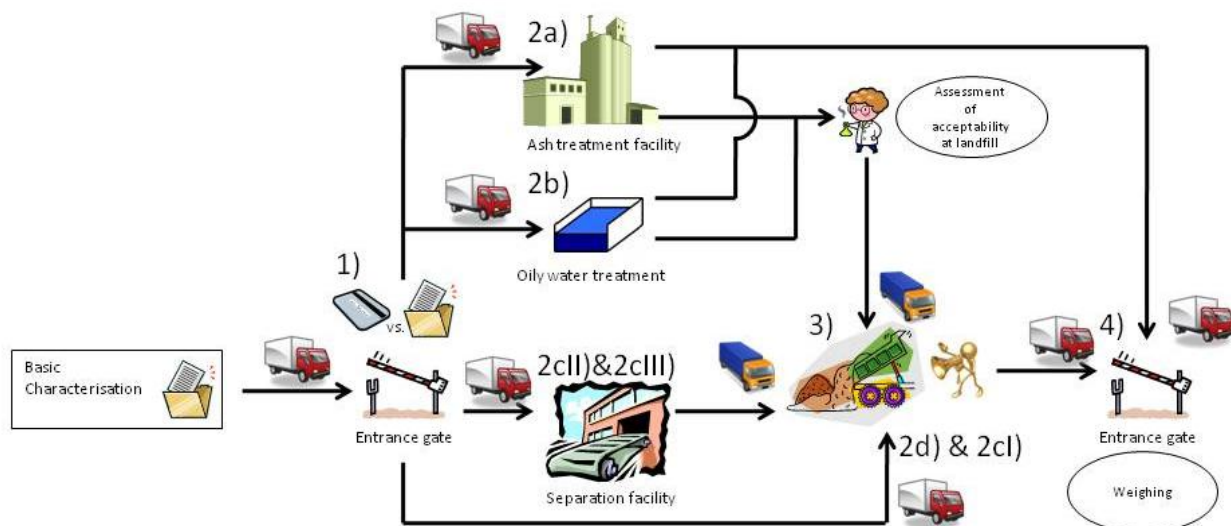


Figure 1.14-2: Flow chart of the waste acceptance procedure at Högbytorp

Basic characterisation

New waste is accepted at the landfill site and brought to a buffer area. After separation of re-useable and recyclable waste, the rest of the waste is analysed. This basic characterisation document (Grundläggande karakterisering) is issued by the waste producer, who is in this case the landfill operator.

In case of soils, this document is called different (Karakterisering av förorenade massor), but contains the same information. These basic characterisation documents include the most relevant information on the waste (e.g. organisation number, waste producer, waste producer address, type of waste, type of industry and of the waste origin, EWC, material code of Rag-Sells, landfill type for landfilling and in the annex the analysing results). Sampling is done by certified internal employees. Depending on the necessary waste treatment, a price for each delivered tonne is calculated.

If the analysis results exceed the limit values, the waste has to be stabilised until it fulfils the limit values. All analysis results are documented. Their variability is evaluated and recorded corresponding to an EPA Handbook.

Waste arriving in small amounts and/or irregular at the landfill site is separated, analysed, stabilised and, if the analysing results are below the limit value, the waste is landfilled.

In case external waste shall be landfilled without any further treatment, a sample of the waste is taken; analysed and a basic characterisation form is filled in. If the waste fulfils the acceptance criteria, it can be deposited.

Compliance testing

Compliance testing is envisaged to be realised once a year. As the landfill site works with this new management plan since January 2009, compliance testing has not been performed until today. Compliance testing will be performed as described in the document "Provplan Överensstämelseprovning".

On-site verification

Waste that has to be brought to the treatment area is not checked because separation and stabilisation is done at the treatment area. The waste ends up in a new type of waste which then has to be analysed.

Waste which was separated externally is checked with a camera and a landfill employee is informed by radio about the arriving waste load. The employee controls the disposal of the waste.

Expert proposals related to potential modifications of the WAC Decision

Before a higher limit value has been accepted for a specified waste, (Section 2. Waste acceptance criteria of the Annex to the WAC Decision) it has been shown that a higher limit value will not present an additional risk to the environment. Still, the higher limit value is only accepted for a specified waste with a specified origin. The same risk assessment has therefore to be made over and over again when similar waste from other plants has to be assessed, regardless if it is the same parameter (e.g. higher limit value for Cl⁻ from another combustion plant). An acceptance of a higher limit value for a certain parameter ought to be applicable for all waste types at a certain landfill.

For small amounts of waste the WAC Decision requirements should not have to be applied.

1.15 Country report United Kingdom

I) England and Wales

The WAC Decision is nearly completely implemented in the national legislation of the UK England and Wales.

- In Schedule 10 of the environmental permit the main differences or additional exemptions to the WAC Decision are included in some points of §7. The exemptions comprise the points (a) to (e) as follows: (a) in point 1.1.1 and 1.2. the periods referred to are defined in each case two years; (b) point 1.1.2 (b) have to be read as requiring the SIC code of the process producing the waste to be part of the information referred to, (c) in point 1.1.2 (g) the words “in case of mirror entries” have to be ignored; (d) the third sentence of section 2 has to be ignored and finally in (e) in points 2.1.2.1, 2.2.2, 2.3.1 and 2.4.1. the table columns headed “L/S=10l/kg have to be used to determine limit values.
- The missing legal parts are either part of the permits of the landfills or of a corresponding guidance.
- Acceptable higher limit values as set in Section 2 of the Annex to the WAC Decision are only possible for landfills for hazardous waste.
- The test methods are not defined in the legislation, but provided in guidelines and according to §5 (3) b) the regulator has to exercise its relevant function to ensure compliance with the requirements imposed on the MS by Article 3 of the Annex to the WAC Decision.
- Accepting gypsum and asbestos waste are implemented with small stricter changes.

II) Northern Ireland

The WAC Decision is well implemented in the UK (Northern Ireland) legislation.

- Concerning landfills for inert waste, it is not stated that an acceptance permit for waste with higher limit values, can be issued.
- Visual inspection is not implemented in the Northern Ireland Legislation.

I) Scotland

The implementation of the WAC Decision into the Scottish Legislation is nearly literally implemented.

- In case it is recognized, during the on-site verification, that waste is not the same as from the basic characterisation refusing of waste is not explicitly mentioned.
- Another divergence is that not packaged asbestos waste does not have to be sprinkled as asked for in the WAC Decision (sprinkling is included in a corresponding guideline published by the Scottish Environmental Protection Agency (SEPA).

1.15.1 Assessment of legal compliance with the WAC Decision in England and Wales

The following table provides an overview on the legal documents transposing WAC Decision requirements into national legislation. Furthermore, the table shows a qualitative assessment of the level of implementation or possible divergences which are further explained and justified in the following sections.

United Kingdom – England and Wales			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure		n/a	
1.1 Basic characterisation		n/a	
1.1.1 Function	§5 (1) g) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	✓	
1.1.2 Fundamental requirements	§5 (1) g) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	✓	
1.1.3 Testing	§5 (1) g) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	✓	
1.1.4. Cases where testing is not required	§5 (3) a) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	✓	
1.2 Compliance testing	§5 (3) a) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	✓	
1.3 On-site verification	§5 (3) a) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	✓	
2. Acceptance criteria	§7 d) i) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	~	Environmental permits for higher limit values are only given for hazardous waste landfills.
2.1 Landfills for inert waste		n/a	
2.1.1 Short list	§5 (3) b) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	✓	
2.1.2 Limit values		n/a	
2.1.2.1 Leaching limit values	§7 e) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	✓	
2.1.2.2 Limit values for total content of organic parameters	§§5 (3) a), 7 f) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	✓	
2.2 Landfills for non-hazardous waste			
2.2.1 Without testing	§5 (3) b) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	✓	
2.2.2 Limit values for non-hazardous waste	§7 e) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	✓	
2.2.3 Gypsum waste	§7 g) of Schedule 10 to the	+	The criteria for “gypsum based

United Kingdom – England and Wales			
Category	Corresponding national legislation	Implementation	Comments
	Environmental Permitting (England and Wales) Regulations 2007		materials” from the WAC Decision are valuable for “gypsum based material and other high sulphate bearing materials.”
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii		n/a	
2.3.1 Leaching limit values	§7 e) §9 a) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	✓	
2.3.2 Other criteria	§5 (3) b) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	✓	
2.3.3 Asbestos waste	§§5 (3) b), 7 h) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	+	The criteria for “suitable asbestos waste” from the WAC Decision are valuable for “suitable material”.
2.4. Landfills for hazardous waste		n/a	
2.4.1 Leaching limit values	§7 e) and §9 b) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	✓	
2.4.2 Other criteria	§8 b) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	✓	
2.5 Criteria for underground storage	§5 (3) b) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007	✓	

Table 1.15-1: Implementation of WAC Decision in the United Kingdom (England and Wales) Legislation

1.15.1.1 Legal framework (England and Wales)

The WAC Decision is implemented into the national legislation of England and Wales by Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007 (EPR 2007).

The landfills are classified in accordance with the Landfill Directive.

1.15.1.2 Acceptance Procedure (England and Wales)

Basic characterisation (England and Wales)

Basic characterisation is implemented into the national legislation by §5 of the EPR referring to Article 4, 5/ (3), 5(4), 6, 8, 9, 10, 11 (1), 12, 13, 14 of the Landfill Directive. Under §7 (a) records for basic characterisation shall be kept for 2 years.

Compliance testing (England and Wales)

Compliance testing is implemented into the national legislation by §5 of the EPR referring to Article 4, 5/ (3), 5(4), 6, 8, 9, 10, 11 (1), 12, 13, 14 of the Landfill Directive. Under §7 (a) record for compliance testing shall be kept for two years.

On-site verification (England and Wales)

Regulators must exercise their relevant functions so as to ensure compliance with the requirements imposed on the Member State. A determination of testing requirements or rapid test methods is not noted. Time of sample keeping from on-site verification is not set. But it is specified in the permits defining that samples have to be retained for one month and analysing results for two years.

1.15.1.3 Waste acceptance criteria (England and Wales)

Higher limit values according to the WAC Decision are implemented by Schedule 10, §7 e) to the Environmental Permitting (England and Wales) Regulations 2007. Landfills for hazardous waste can accept waste up to 3 x the limit values (if agreed by the authorities) of the WAC Decision. The specific parameters (Other than Dissolved Organic Carbon) are defined in the permits.

Reporting the annual number of acceptance permits for landfilling waste with higher limit values to the European Commission, has to be ignored according to Schedule 10, Section 7 d) to the Environmental Permitting (England and Wales) Regulations 2007.

The Environment Agency of UK (England and Wales) has written Guidance concerning the WAC Decision which is:

- Guidance on waste destined for disposal to landfill:

http://www.environment-agency.gov.uk/static/documents/Business/wacv2_1006008.pdf

- Guidance on sampling and testing of waste to meet WAC Decision:

http://www.environment-agency.gov.uk/static/documents/Business/sampling_and_testing_1069398.pdf

Sample and testing methods from section 3 of the Annex to the WAC Decision is referred to and shall be used. They are also included in Guidelines.

Criteria for landfills for inert waste (England and Wales)

Criteria for landfills for inert waste are implemented by Schedule 10, §7 e) to mentioned Regulations of 2007. Table column headed "L/S=10l/kg" must be used to determine limit values.

The limit value for PAH is 100mg/kg. Acceptance of waste at landfills for inert waste without testing is implemented by Schedule 10, §5 (3) to the Environmental Permitting (England and Wales) Regulations 2007 referring to Article 3 of the WAC Decision.

Criteria for landfills for non-hazardous waste (England and Wales)

Waste acceptance at landfills for non-hazardous waste is implemented by §5 (3) of Schedule 10, Environmental Permitting (England and Wales) Regulations of 2007.

§7 (g) of Schedule 10, of to the Environmental Permitting (England and Wales) Regulations 2007 implements the deposition of gypsum based materials according to the WAC Decision and also includes other high sulphate bearing materials.

The landfilling of gypsum waste and other wastes with high sulphate content together with biodegradable waste has been banned in England and Wales since July 2005.

Criteria for landfills for non-hazardous waste are set by §7 e) of Schedule 10, to the Environmental Permitting (England and Wales) Regulations 2007. Table column headed “L/S=10l/kg” must be used to determined limit values.

Criteria for monolithic hazardous and non-hazardous waste for landfills for non-hazardous waste, to provide the same level of environmental protection as granular waste are set by §9 a) of Schedule 10, to the Environmental Permitting (England and Wales) Regulations 2007, including criteria to ensure sufficient physical stability and bearing capacity as well as criteria to ensure that monolithic waste is stable and non-reactive .The compressive strength has to be at least 1MPa after 28 days curing. Before treatment to render the waste monolithic, the limit values for loss on ignition of 10%, or the total organic carbon of 6% have to be met. Furthermore the pH value, electrical conductivity and ANC have to be measured and the dimension has to be more than 40cm along each side.

By Schedule 10, §7 (h) to the Environmental Permitting (England and Wales) Regulation 2007 the deposition of asbestos materials is implemented. For the concerning construction materials not only suitable asbestos waste, but the term “suitable waste” is used. This is to allow the deposition of materials that are fixed to or contaminated by asbestos, e.g. timber, so that the dangerous practice of separating the asbestos from the other materials is unnecessary.

Criteria for waste acceptable at landfills for hazardous waste (England and Wales)

Waste accepted at landfills for hazardous waste is implemented by §5 (3) of Schedule to the Environmental Permitting (England and Wales) Regulations 2007. The criteria for monolithic waste to provide the same level of environmental protection as given for granular non-hazardous waste are set under §9 b) of Schedule 10 to the mentioned Regulations. The compressive strength has to be at least 1MPa after 28 days curing.

Criteria for landfills for hazardous waste are implemented by §7 e) of Schedule 10 to the Environmental Permitting (England and Waste) Regulations 2007. Table columns headed “L/S=10l/kg” are the determined limit values, but the test methods are only determined in the corresponding EA guidance.

Underground storage

Underground storage is implemented by §5 (3) b) of Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2007.

1.15.2 Assessment of legal compliance with the WAC Decision in Northern Ireland

The following table provides an overview on the legal documents transposing WAC Decision requirements into national legislation. Furthermore, the table shows a qualitative assessment of the level of implementation or possible divergences which are further explained and justified in the following Sections.

United Kingdom (Northern Ireland)			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure		n/a	
1.1 Basic characterisation		n/a	
1.1.1 Function	§5 of Schedule 1 of the Landfill Regulations (NI) 2004	✓	
1.1.2 Fundamental requirements	§5 of Schedule 1 of the Landfill Regulations (NI) 2004	✓	
1.1.3 Testing	§§5 and 6 and Part IV of Schedule 1 of the Landfill Regulations (NI) 2004	✓	
1.1.4. Cases where testing is not required	§5 (4) of Schedule 1 to the Landfill Regulations (NI) 2004	✓	
1.2 Compliance testing	§6 of Schedule 1 of the Landfill Regulations (NI) 2004	✓	
1.3 On-site verification	Regulations 12 (1) of the Landfill Regulations (NI) 2004	~	Visual inspection is not implemented
2. Acceptance criteria	Footnote (a) Table 4 §14 and footnote (a) Table 6 §17 Part III of Schedule 1 of the Landfill Regulations (NI) 2004	+	Waste with higher limits cannot be permitted for inert waste landfills
2.1 Landfills for inert waste		n/a	
2.1.1 Short list	§§9, 10 of Schedule 1 of the Landfill Regulations (Northern Ireland) 2004	✓	
2.1.2 Limit values		n/a	
2.1.2.1 Leaching limit values	§11(a) of Schedule 1 of the Landfill Regulations (NI) 2004	✓	
2.1.2.2 Limit values for total content of organic parameters	§11(b) of Schedule 1 to the Landfill Regulations (NI) 2004	✓	
2.2 Landfills for non-hazardous waste			
2.2.1 Without testing	§§12,13 of Schedule 1 to the Landfill Regulations (NI) 2004	✓	
2.2.2 Limit values for non-hazardous waste	§14 of Schedule 1 to the Landfill Regulations (NI) 2004	+	The limit value for Hg is more stringent.
2.2.3 Gypsum waste	§15 of Schedule 1 to the Landfill Regulations (NI) 2004	✓	
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii		n/a	
2.3.1 Leaching limit values	§14 of Schedule 1 to the Landfill Regulations (NI) 2004	✓	
2.3.2 Other criteria	§14 (Table 5) of Schedule 1 to the Landfill Regulations (NI) 2004	✓	
2.3.3 Asbestos waste	§16 of Schedule 1 to the Landfill	✓	

United Kingdom (Northern Ireland)			
Category	Corresponding national legislation	Implementation	Comments
	Regulations (NI) 2004		
2.4. Landfills for hazardous waste		n/a	
2.4.1 Leaching limit values	§17 of Schedule 1 to the Landfill Regulations (NI) 2004	+	The limit value for Hg and Cd are more stringent.
2.4.2 Other criteria	§17 (Table 7) of Schedule 1 to the Landfill Regulations (NI) 2004	✓	
2.5 Criteria for underground storage	§18 of Schedule 1 to the Landfill Regulations (NI) 2004	✓	

Table 1.15-2: Implementation of WAC Decision in the United Kingdom (Northern Ireland) Legislation

1.15.2.1 Legal framework (North Ireland)

The WAC Decision is implemented into the national legislation of Northern Ireland by:

- Schedule 1 of Regulation 12 and Schedule 1 of the Landfill Regulations (Northern Ireland) 2003 (Regulation 2003);
- the Landfill (Amendment) Regulations (Northern Ireland) 2004 (Regulation 2004);
- the Landfill (Amendment No.2) Regulations (Northern Ireland) 2007. (Regulation 2007).

The landfills are classified according to the Landfill Directive.

Further information for Northern Ireland is provided by the guidelines of the EA of England and Wales. These guidelines are “Guidance for waste destined for disposal in landfill” explaining the practical implication of the Landfill Directive on the waste types that can be sent to landfills and “Guidance on sampling and testing of wastes to meet landfill waste acceptance procedures”. Additionally, a briefing note “Waste testing – advice for waste producers and landfill operators” was published.

1.15.2.2 Acceptance Procedure (Northern Ireland)

Basic characterisation (Northern Ireland)

Basic characterisation is implemented by Part II §5 of Schedule 1 of Regulation 2004 and §6 of Regulation 2007. Under §5 (5) of Regulation 2004, it is defined that records for basic characterisation shall be retained by the landfill operator for at least two years after the date of characterisation.

Compliance testing (Northern Ireland)

Compliance testing is implemented by Part II §6 of Schedule 1 of Regulation 2004. Under Part II §6 (4) of Regulation 2004 it is defined that records of the compliance testing shall be kept by the operator for a period of not less than two years.

On-site verification (Northern Ireland)

On-site verification and the corresponding documentation is implemented by §5 (3) of Regulation 2004.

The visual inspection before and after unloading is implemented by § 12 (1) of Regulation 2003.

Samples and results shall be kept for at least one month.

1.15.2.3 Waste acceptance criteria (Northern Ireland)

The acceptance of higher limit values as proposed in Section 2 of the WAC Decision , is implemented in the Northern Ireland legislation by footnote (a) Table 4 §14 and by footnote (a) Table 6 §17 Part II of Schedule 1 to the Landfill Regulation (NI) 2004.

Testing methods are defined under §19 Part III Schedule 1 of Regulation 2004 amended by Regulation 2007. The methods are listed in Table 2:

Measurement	Northern Ireland standard
Compliance test for leaching of granular waste materials and sludges	EN 12457/ 1-4
Analyses of Eluates, pH, As, Ba, Cd, Cr, Co, Cr(IV), Cu, Mo, Ni, NO ₂ ⁻ , Pb, Total S, SO ₄ ⁻ , V and Zn	EN 12506
Determination of eluate, ammonium, AOX , conductivity, Hg, phenol index, TOC, easily leachable CN ⁻ , F ⁻	EN 13370
Determination of TOC in waste, sludge, and sediments	EN 13137
Microwave-assisted digestion with hydrofluoric, nitric, and hydrochloric acid mixture	EN 13656
Digestion for subsequent determination of aqua regia soluble portions of elements	EN 13657
Characterisation of waste determination of hydrocarbons of C ₁₀ to C ₄₀	EN 14039
Calculation of dry matter	prEN 14346
Framework for the preparation and application of a sampling plan	prEN14899
Methods of test for cement-stabilised and lime-stabilised materials	BS 1924-2:1990
Methods of test for Soils for Civil Engineering purpose	BS 1377-9:1990
Leaching behaviour test – Up flow percolating test	DD CEN/TS 14405:2004
Leaching characteristic of soil and stony building and waste materials. Determination of leaching of inorganic components from building and monolithic waste materials with the diffusion test	EA NEN 7375:2004
Leaching characteristic of solid (earth and stony) building and waste materials. Determination of leaching of the availability of inorganic components for leaching	EA NEN 7371:2004
Determination of the loss on ignition of dry mass	EN 12879
Leaching behaviour test-Influence of pH on leaching with initial acid/base addition	prCEN/TS 14429

Table 1.15-3: UK (Northern Ireland) norms

The methods for sampling and testing are defined under §20, Part III Schedule 1 of Regulation 2004 amended by Regulation 2007.

For the leaching testes EA NEN 7371:2004, prCEN/TS 14429 and EN 12457 / 1-3 the monolithic waste has to be crushed before testing.

Criteria for landfills for inert waste (Northern Ireland)

The criteria for landfills for inert waste are fully implemented by Part III §9, 10, 11 and 20 of Schedule 1 to Regulation 2004. A liquid/solid ratio of 10l/kg has been selected for the determination of the limit values.

The limit value for PAH¹⁴ is 100mg/kg and implemented by §8 of Regulation 2007.

Waste at landfills for inert waste without testing is implemented by Part III §10 of Regulation 2004.

Criteria for landfills for non-hazardous waste (Northern Ireland)

Non-reactive hazardous waste and non-hazardous waste accepted on landfills for non-hazardous waste is implemented by Part III §12 and 13 of Regulation 2004 and §10 of Regulation 2007. A liquid/solid ratio of 10l/kg has been selected for the determination of the limit values. Criteria to ensure that monolithic waste for landfills for non-hazardous waste provide the same level of environmental protection as for granular waste are set under §10 of Regulation 2007.

In Part III §14 Table 4 it is defined that the chief inspector may include conditions in a permit authorising limit values for specific parameters (other than dissolved organic carbon) up to three times higher limit values for waste accepted in a mono-landfill. Therefore, the characteristics of the landfill and its surroundings have to be considered as well as the risk assessment to ensure that emissions (including leachate) from the landfill present no additional risk to the environment. This paragraph was substituted by §10 of Regulation 2007. According to §10 Table 5 of Regulation 2007 only for TOC a higher limit value is permitted by the chief Inspector, provided that the DOC limit value of 800mg/kg is achieved at L/S=10l/kg, either at the materials own pH or a pH value between 7.5 and 8.0.

Criteria to ensure that granular hazardous waste has sufficient physical stability and bearing capacity are defined under Part III §14 (iii) of Regulation 2004, amended by §10 Regulation 2007. Latter is an in situ shear strength of 50kPa for cohesive waste or an in situ bearing ratio of 5% for non-cohesive waste.

Criteria to provide that hazardous monolithic waste is stable and non-reactive, are set under Part II §14 (b) of Regulation 2004, which was amended by §10 of Regulation 2007. To ensure that monolithic waste has the same environmental impact as granular waste the monolithic waste has to be crushed and analysed as granular waste. The analysing results have to be validated with the same limit values as set for granular waste.

Gypsum and asbestos waste are implemented by Part III §14 of Regulation 2004 accordingly.

¹⁴ PAHs (Polycyclic Aromatic Hydrocarbons) shall mean Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene."

Criteria for waste acceptable at landfills for hazardous waste (Northern Ireland)

Criteria for waste acceptable at landfills for hazardous waste are defined in Part II §17 of Regulation 2004.

As for landfills for non-hazardous waste, higher limit values for landfills for hazardous waste can be permitted by the authorities.

Criteria to ensure that hazardous monolithic waste is stable and non-reactive, are determined in Part II §17 (b) of Regulation 2004, which was amended by §11 of Regulation 2007. To ensure that monolithic waste has the same environmental impact as granular waste the monolithic waste has to be crushed and analysed as granular waste. The analysing results have to be validated with the same limit values as set for granular waste.

The limit values of Cd and Hg are more stringent in comparison with the WAC Decision.

Underground storage

The criteria mentioned in Section 2.5 of the Annex to the WAC Decision are implemented by §18 of Regulation 2004.

1.15.3 Assessment of legal compliance with the WAC Decision in Scotland

The following table provides an overview on the legal documents transposing WAC Decision requirements into national legislation. Furthermore, the table shows a qualitative assessment of the level of implementation or possible divergences which are further explained and justified in the following Sections.

United Kingdom (Scotland)			
Category	Corresponding national legislation	Implementation	Comments
1. Procedure		n/a	
1.1 Basic characterisation		✓	
1.1.1 Function	Landfills (Scotland) Direction 2005; Part 2 Section 5, Part 2 Section 6, Part 3	~	It is not explicitly mentioned to refuse waste in case the basic characterisation of the waste does not fulfil the set criteria.
1.1.2 Fundamental requirements	Landfills (Scotland) Direction 2005; Part 2 Section 5 (1),	✓	
1.1.3 Testing	Landfills (Scotland) Direction 2005; Part 2 Section 5, Part 2 Section 6, Part 2 Section 7	✓	
1.1.4. Cases where testing is not required	Landfills (Scotland) Direction 2005; Part 2 Section 5, Part 3 Section 10, Part 3 Section 13	✓	
1.2 Compliance testing	Landfills (Scotland) Direction 2005; Part 2 Section 5, Part 2 Section 6	✓	
1.3 On-site verification	Landfills (Scotland) Regulations 2003; §14		

United Kingdom (Scotland)			
Category	Corresponding national legislation	Implementation	Comments
2. Acceptance criteria	Landfills (Scotland) Direction 2005; Part 3	✓	
2.1 Landfills for inert waste		n/a	
2.1.1 Short list	Landfills (Scotland) Direction 2005; Part 2 Section 5, Part 3 Section 10	✓	
2.1.2 Limit values		n/a	
2.1.2.1 Leaching limit values	Landfills (Scotland) Direction 2005; Part 2 Section 5, Part 3 Section 10	✓	
2.1.2.2 Limit values for total content of organic parameters	Landfills (Scotland) Direction 2005; Part 2 Section 5, Part 3 Section 10	✓	
2.2 Landfills for non-hazardous waste		n/a	
2.2.1 Without testing	Landfills (Scotland) Direction 2005; Part 2 Section 5, Part 3 Section 10	✓	
2.2.2 Limit values for non-hazardous waste	Landfills (Scotland) Direction 2005; Part 3 Section 14 (2) and (3)	✓	
2.2.3 Gypsum waste	Landfills (Scotland) Direction 2005; Part 3 Section 15	✓	
2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii		n/a	
2.3.1 Leaching limit values	Landfills (Scotland) Direction 2005; Part 3 Section 14	✓	
2.3.2 Other criteria	Landfills (Scotland) Direction 2005; Part 3 Section 14	✓	
2.3.3 Asbestos waste	Landfills (Scotland) Direction 2005; Part 3 Section 16	~	A plan of the deposition and sprinkling the asbestos waste are not implemented
2.4. Landfills for hazardous waste		n/a	
2.4.1 Leaching limit values	Landfills (Scotland) Direction 2005; Part 3 Section 17	✓	
2.4.2 Other criteria	Landfills (Scotland) Direction 2005; Part 3 Section 17 (1)	✓	
2.5 Criteria for underground storage	Landfills (Scotland) Direction 2005; Part 3 Section 18	✓	

Table 1.15-4: Implementation of WAC Decision in the United Kingdom (Scotland) Legislation

1.15.3.1 Legal framework (Scotland)

The legal texts of Scottish Legislation that implement the WAC Decision consists of The Landfill (Scotland) Direction 2005 (Direction 2005) and The Landfill (Scotland) Regulations 2003 No.235 (2003 Regulation).

Further guidelines are provided by the SEPA (e.g. “The criteria and procedure for the acceptance of waste at landfills (Scotland) Direction 2005v”, “The disposal in landfills for non-hazardous waste of stable, non-reactive hazardous wastes”, “The disposal in landfills for non-hazardous waste of gypsum wastes” and “The disposal in landfills for non-hazardous waste of asbestos waste wastes”. The complete set of guide-lines is online available at the homepage of SEPA (http://www.sepa.org.uk/waste/waste_regulation/landfill.aspx).

1.15.3.2 Acceptance Procedure (Scotland)

Basic characterisation (Scotland)

The basic characterisation is implemented in Scottish Legislation by the Landfill Scotland Direction 2005 part 2, Section 5, 6 and 7; and Part 3 Section 10, 13.

Records of basic characterisation have to be kept for a period of two years.

Compliance testing (Scotland)

Compliance testing is implemented by Direction 2005 Part 2, Section 5 and 6.

Records of compliance testing have to be kept for a period of two years.

On-site verification (Scotland)

On-site verification is implemented by §14 of the Landfill (Scotland) Regulations 2003. Neither testing requirements for on-site verification nor rapid test methods are defined. Refusing acceptance of waste, which is not the same as subjected to basic characterisation and compliance testing and described in the accompanying documents, is not explicitly mentioned.

Samples shall be kept for one month.

1.15.3.3 Waste acceptance criteria (Scotland)

Higher limit values are not mentioned in Scottish Legislation. According to Direction 2005, Part 3, Section 19 sampling and testing shall be carried out in accordance with Section 3 of the Annex to the WAC Decision.

Criteria for landfills for inert waste (Scotland)

The criteria for landfills for inert waste are fully implemented by Direction 2005, Part 3, and Section 9 - 11. It is not mentioned that higher limit values can be accepted under certain circumstances. The limit value for PAH is 100 mg/kg. Testing shall be carried out according to Section 3 of the Annex to the 2002 Decision.

Criteria for landfills for non-hazardous waste (Scotland)

The criteria for landfills for non-hazardous waste are fully implemented by Direction 2005, Part 3, and Section 12 - 16.

Criteria for monolithic waste to provide the same level of environmental protection as for granular waste is implemented by Direction 2005 Part 3 §14 (2) and (3). The monolithic waste is separated in two waste parts on that is already monolithic and the other, which is treated to become monolithic.

Waste which is treated to become monolithic has to follow the limit values as are set for non-hazardous waste to be disposed on landfills for non-hazardous waste. Furthermore the LOI has to be < 10% and the TOC < 6%.

Monolithic non-hazardous and stable non reactive hazardous waste have to follow leaching limit values which are stricter compared to the limit values set for non-hazardous waste, to be disposed on landfills for non-hazardous waste. For the monolithic waste the DOC, pH, electrical conductivity and the ANC have to be evaluated. Furthermore a load bearing capacity of 1.5MPa is defined as well as the definition the waste must be at least 40cm in any direction or have a fracture spacing of at least 40cm. to ensure that monolithic waste has the same level of environmental protection as given for granular waste.

Testing shall be carried out according to Section 3 of the Annex to the 2002 Decision.

In case of asbestos waste, the WAC Decision demands to sprinkle asbestos waste which is not packaged, whereas the Direction 2005 it is asks to damp it down. The Direction 2005 does not specifically ask to keep a plan of the location of the landfill where asbestos wastes are deposited.

Criteria for waste acceptable at landfills for hazardous waste (Scotland)

The criteria for landfills for hazardous waste are fully implemented by Direction 2005, Part 3, Section 17. Criteria for monolithic waste to provide the same level of environmental protection as for granular waste are implemented by Direction 2005 Part 3 17 (2). The criteria are similar as described for the monolithic waste in the section for non-hazardous waste landfills but the limit values are according to the landfills for hazardous waste.

Testing shall be carried out according to Section 3 of the Annex to the WAC Decision.

Criteria for underground storage (Scotland)

The criteria for underground storage are fully implemented by Direction 2005, Part 3, Section 18.

1.15.4 Site visits

The organisation of the site visits has been realised in close cooperation with the British Ministry of Environment, the EA of Northern Ireland and the Environmental Quality Directorate of the Scottish Government. The following sites have been chosen:

- **East Northants Resource Facility** (hazardous landfill, class C landfill; England).
- **Blackmountain Phase II/III** (inert landfill, class A landfill; Northern Ireland).
- **Avondale Landfill** (non-hazardous and hazardous landfill, class B and C landfill; Scotland).

The tasks of landfill operators start with the assessment of acceptability of a certain type of waste and comprise the actual acceptance of wastes arriving at the landfill. These procedures may differ by type of

landfill and operator. Furthermore, some general information (e.g. location, size, technical standard, accepted waste) as well as specific systems installed for documentation may be helpful for the assessment of the on the ground enforcement of legal requirements. The description of each landfill visit is structured into the sections “general terms” (background information) and “waste acceptance procedures” (basic characterisation, compliance testing, on-site verification).

1.15.4.1 Site visit to representative hazardous landfill (East Northants Resource Management Facility (Augean), landfill class C)

General terms

The landfill site East Northants Resource Management Facility is located about 20 miles west of Peterborough and started operation in 2000 gaining its hazardous only permit in 2004. Over a 1 millionm³ of hazardous and non-hazardous waste and has been deposited with free capacity of about 600.000m³ remaining. It is expected that the landfill site will continue operating until October 2013. The majority (~ 95%) of the deposited waste are recurring waste streams from a small amount of waste producers, the remaining waste are from one off jobs. Typical wastes at this landfill are contaminated soil or filter cake.



Figure 1.15-1: Overview of the landfill East Northants Resource (United Kingdom, England & Wales)

The landfill gas from the previous deposition of biodegradable materials is managed by a gas collection and flaring system within the permit boundary.

Waste acceptance procedure

The waste management system of the landfill site consists of two different software programs which interact with each other. The programs are called WEIGHSOFT and SWOPS. WEIGHSOFT controls the of waste at the landfill site whereas the SWOP program includes all the necessary information regarding the incoming waste streams.

The process flow of waste acceptance at East Northants resource facility is the following:

1. Once a waste type is deemed to be acceptable at the landfill based on its characteristics as specified in the basic characterisation, a quotation form is filled in by the landfill operator. During the process of the quotation form development a T-number is generated, which is unique for each waste type, and is used for an internal identification. The quotation form contains among others, company name, date, short waste description, estimated tonnes, comments, waste description and prices for deposition for each waste type. This waste is sent to the waste producer. If the waste producer agrees to this Quotation he signs a booking form.

All the relevant data from the waste are entered into the SWOP system.

2. The announced waste deliveries are required by law to carry a consignment note with them which includes the company name, the vehicle number as well as the consignment note code and relevant waste description.
3. At the weighbridge these consignment note is checked with the data stored within the SWOP system. Only if all necessary data both on the consignment note and the SWOPS system are present and correlate will further progress be possible. Data such as weight, consignment note code, and waste producer are recorded. Furthermore a visual check of the incoming waste stream is carried out by the weighbridge operative using CCTV. At the weighbridge an Advice/Waste Note is printed. One copy is kept at the landfill site another is given to the driver.
4. If a compliance test is required on the incoming waste load is either sent to the internal laboratory or to the place of disposal and a laboratory employee takes a sample. The frequency of the sampling is determined by the Technical Assessors who bases this on the variability of the waste stream and the amount of waste to be disposed of.
5. At the indicated location for unloading, an employee of the landfill site controls the deposition and asks for backup from the office if there is a reason of suspicion.
6. After deposition of the waste the vehicle returns to the weighbridge where they are weighed again which will then calculate the exact amount of waste deposited within the landfill.

The gathered information about waste type, quantity, delivery date, location on the landfill is recorded as a paper version and stored for two years and as an electrical version without time limit. The samples are kept for three months.

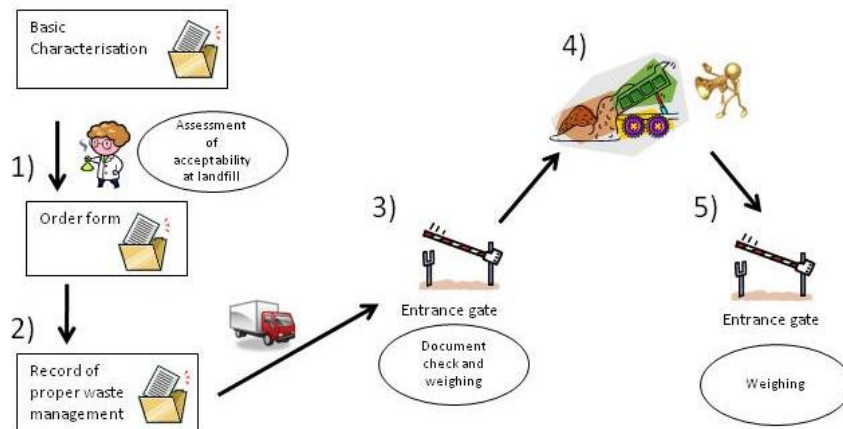


Figure 1.15-2: Flow chart of the waste acceptance procedure at East Northants Resource Management Facility

Basic characterisation

The waste producer sends for each new waste stream corresponding analysing results and a sample to the landfill operator. The technical assessment team analyses the waste and determines its acceptability at landfills. If the waste is acceptable, a producer declaration form is prepared (including e.g. waste composition and concentrations, waste producer address and a general description of waste).

Once the quotation and booking form have been signed, the waste can be accepted for disposal but still delivery has to be announced in advance (pre-booked) so the landfill is aware of the wastes arriving at the site at any one day.

Compliance testing

The technical assessment team defines the frequency of compliance testing and enters the intervals into the waste software program, which triggers an alarm whenever a sample has to be taken again. The frequency is depending on waste properties and can change according to the “history” (old analysis data) of the waste.

Samples are taken at the internal laboratory or during the unloading of the waste. Analysis results are sent to the technical assessment team, for further consideration and procedural changes when necessary.

In case of exceedance of a limit value the waste producer is contacted and the reason of the exceedance is investigated. Steps are taken to avoid further exceedance of limit values. If the same waste fails the test too regularly the waste is not accepted anymore. Exceeding limit values of a waste type regularly end up in a higher compliance testing frequency.

The decision whether compliance testing is in accordance with the basic characterisation, is based on expert knowledge and expertise.

On-site verification

When arriving at the entrance check point, the lorry is weighted and the documents are controlled. For this purpose the vehicle number and the consignment note code on the documents carried with the waste load is entered into the waste software program. A visual inspection of the waste load is realised by CCTV where possible. In other cases this is carried out by the site manager or a landfill employee.

After acceptance, the lorry driver transports the waste to the allotted location on the landfill. At the point of destination, a qualified landfill employee supervises the disposal and undertakes an organoleptic control.

Other Safety Procedures

The landfill vehicles are equipped with a GPS system recording the place of deposition.

Expert proposals related to potential modifications of the WAC Decision

There are no proposals for the WAC Decision.

1.15.4.2 Site visit to representative inert landfill (Blackmountain Phase II/III, landfill class A)

General terms

The landfill site Blackmountain Phase II/III is an inert landfill site located approximately 4km north of the center of Dunmurry, with Belfast 5.5km to the east of the site. Since the 1970s, the site was formerly operated as a quarry by White Mountain Quarries. The total site area is about 190ha, of which more than 30ha is occupied by the quarry void. The landfill is expected to accept up to 700,000t of inert waste per annum and the total void is estimated to be 3,500,000m³. The site will be developed as a single phase landfill. Blackmountain Phase II/III is currently applying to double their volume.



Figure -1.15-3: Overview of the landfill Black Mountain Phase II/III (United Kingdom, Northern Ireland)

Typical wastes at this landfill site are different non-contaminated soils.

Waste acceptance procedure

The process flow of waste acceptance at Blackmountain Phase II /III is the following:

1. Once a waste type is deemed to be acceptable at the landfill a duty of care is prepared by the waste producer and has to be signed by the contractor. Finally, the landfill operator signs the document.
2. Once a waste load arrives at the weighbridge, the vehicle number, company name and waste type is entered into the software system. The data sheet is printed and signed by the driver. It includes customer and waste related data (delivery date and time waste description and weight. The weight of the lorry is either known (form previous visits), estimated or measured when the lorry leaves the landfill site. One copy of the data sheet is given to the waste producer and a second copy to the contractor. A further copy is kept at the landfill site.
3. The document indicates which waste type is deposited on the landfill site and is the basis of calculation. The weighbridge operator controls the waste with an installed CCTV camera. The record is kept for one month and allows post-controls. The driver transports the waste to a pit into which the waste is disposed.
4. An excavator driver shovels the waste from the pit over the edge into the void. He separates materials not allowed to be landfilled at the site. If the non-acceptable waste exceeds a significant amount the facility supervisor and the bridge operator is informed. Hereon, the contractor is

stopped at the weighbridge and is sent back to the place of unloading to be reloaded if the waste is not accepted. In case, the vehicle is already off-site, the waste is stored in a quarantine area until the haulier is contacted to return to the site to remove the waste.

- The lorry of the accepted waste is weighted a second time at the weighbridge before leaving the landfill site.

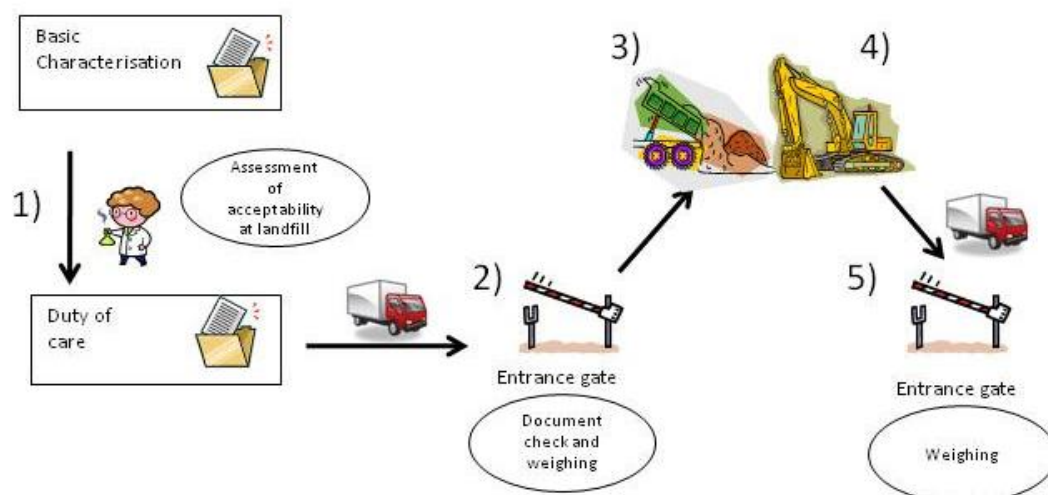


Figure 1.15-4: Flow chart of the waste acceptance procedure at Blackmountain phase II/III (United Kingdom, Northern Ireland)

Basic characterisation

Every waste deposited at Blackmountain Phase II/III is inert waste acceptable without testing. In consequence, a basic characterisation is not realised.

Compliance testing

In general, compliance testing is not performed at the landfill site as there is no basic characterisation to compare the waste to. In case of suspicion, the relevant questionable waste is transported to the waste inspection area. After that, the waste manager is informed to assess the waste. If he is not sure of the acceptability at the landfill, the regulator is consulted for clarification until clarification is obtained.

On-site verification

The waste is visually checked twice: at the weighbridge with support of the installed CCTV camera and when the inert waste is excavated shovel by shovel from the pit into the void.

Expert proposals related to potential modifications of the WAC Decision

There are no proposals for the WAC Decision.

1.15.4.3 Site visit to representative non-hazardous and hazardous landfill (Avondale Landfill, landfill class B and C)

General terms

Avondale Landfill is located about 30km west of Edinburgh and started operating in the December 1999.

It comprises four areas, as follows:

- An existing non-hazardous area circa (3,000,000t), almost completely filled;
- A new non-hazardous area (4,600,000t);
- A Stable Non-reactive Hazardous Waste area (SNHW) (83,000m³);
- A hazardous area (370,000m³).



Figure 1.15-5: Overview of Avondale Landfill (United Kingdom,

Typical wastes that are accepted at the landfill site are asbestos waste, gypsum waste and contaminated soils. Latter are from previous industrial site cleaning (oil or heavy metal contaminated wastes) for hazardous waste landfill sites.

Domestic waste and commercial industrial waste are typical non-hazardous wastes with a delivery ratio of equal amounts. Commercial industrial waste consists of biodegradable waste (e.g. organic material, paper, plaster, wood and sludges).

A typical waste for the SNHW is again contaminated soils from Brownfield sites.

The landfill gas is used for power production with a production of 8.6 MWh.

It is expected that the landfill site will continue to operate approximately at least until 2020.

Waste acceptance procedure

All information about the delivered waste load and waste origin are stored in a computer system. The process flow of waste acceptance at Avondale Landfill as per the following:

1. Once a waste type is deemed to be acceptable at the landfill based on its characteristics as specified in the basic characterisation, a quotation form is filled in by the landfill operator and this is sent to the waste producer. If the quotation is agreed an approval/CAF Form is completed. This form includes among other information about the customer, waste code, EWC, waste description, origin and composition. This form is signed by the site compliance manager, the sales manager, the

financial staff and the landfill manager. All this data is entered into the landfill management software, and a frequency of compliance testing is defined.

In the case of hazardous waste an additional Waste Booking form has to be filled in, which includes among others date of delivery, company name, number of single or multi day disposal-loads per day, SEPA Section 62 note number and vehicle type. Only if this Waste Booking Form is signed by the waste producer the waste will be accepted at the landfill.

2. The vehicle carrying the waste enters the landfill site at the weighbridge where a SEPA document (Waste Transfer Note or Section 62) about the waste is shown by the driver. These documents are compared with the data in the landfill management software by the weighbridge operator. The identification of the waste is through the CAF number. The weight is measured and the driver can pass if there is no objection. There are 4 copies of the SEPA document which are given to SEPA, contractor, waste producer and landfill operator. Additionally the waste is visually checked with an installed camera.

In case a sample has to be taken the software program triggers an alarm. The taken sample is analysed at an external laboratory.

The hazardous landfill area and the non-hazardous landfill area have separate weighbridges. After crossing either of them, it is not possible to reach the other landfill area anymore.

3. At the indicated location for unloading, a landfill employee controls the deposition and consults the office in case of suspicion. If necessary, the sample is taken at the place of disposal.
4. When returning to the weighbridge, the lorry is weighed again to record the net weight and to complete the documentation.

The gathered information about waste type, quantity, delivery date, location on the landfill is recorded as a paper version for one year; additionally it is recorded electronically without time limit.

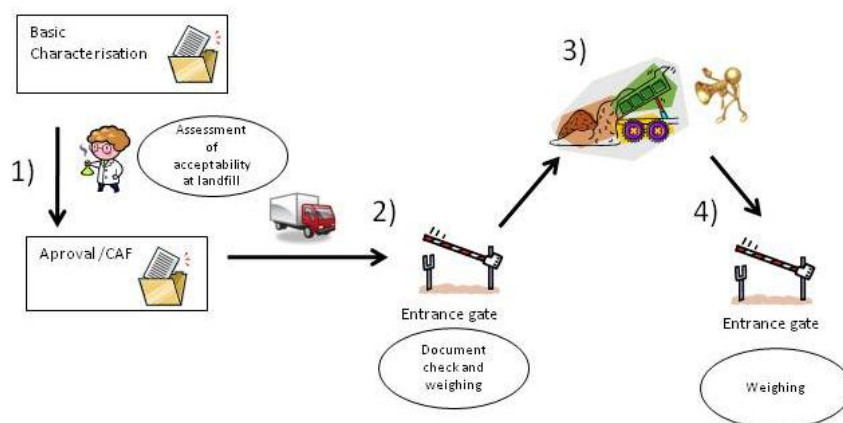


Figure 1.15-6: Flow chart of the waste acceptance procedure at Avondale Landfill (United Kingdom, Scotland)

Basic characterisation

In the first step, the waste producer has to fill in a waste enquiry form provided by the landfill site. An initial waste enquiry front sheet is issued which includes all necessary information about the waste for a basic characterisation in the Annex (e.g. quote number, customer advice form number (CAF No.), waste category (hazardous, non-hazardous, SNHW, waste type, pricing and quantity (tonnage)).

Compliance testing

During the process of basic characterisation, the frequency of compliance testing is defined. This frequency can be changed depending on specific experiences with the corresponding waste type. The testing is realised in cooperation with an external laboratory.

On-site verification

At arrival at the entrance check point, the waste lorry is weighted and the documents are controlled. For this purpose the CAF number is entered into the software system. The load is inspected visually by installed cameras. This is possible as the lorries are open on top.

After acceptance the waste is transported to the allotted location on the landfill site. At the point of destination a qualified employee of the landfill controls the disposal and undertakes an organoleptic control. If necessary, samples are taken

Expert proposals related to potential modifications of the WAC Decision

It was mentioned that the TOC limit value of 6% for hazardous waste, disposed on landfills for hazardous waste, is too strict

2 Annex II: Contact data and background documents

2.1 List of landfills visited

MS	Landfill site	Landfill address	Landfill type
AT	NUA Aballwirtschaft GmbH Langenlois	Gneixendorf 3500 Krems	Non-Hazardous
BE	INDAVER Antwerp	Poldervlietweg 5 Haven 550 2030 Antwerpen 3	Hazardous
DK	AV Miljø	Avedøreholmen 97 2650 Hvidovre	Hazardous, Non-hazardous
FI	Pirkanmaan Jätehuolto Oy /Tampere	Tarastenjärventie 66 Tampere	Non-hazardous
FR	Sita Villeparisis		Hazardous
	Séche Chagé		Hazardous, Non-hazardous
	SITA Sonzay	Rue Edouard Branly – Za st eloi 86000 Poitiers	Non-hazardous
	Veolia Lapouyarde	near Tours	Non-hazardous
	Coved Roussas		Non-hazardous
DE	Currenta Leverkusen	SAD Leverkusen Chempark Leverkusen 51368 Leverkusen	Hazardous
	K+S Herfa Neurode	Werk Werra Postfach 1163 36267 Phillipsthal	Underground
	AVL Burghof	Vaihingen- Horrheim Unter dem Burghof	Non-hazardous
GR	Fili's Landfill site	6 Andersen str. 11525, Athens	Non-hazardous
	Chalkida's Landfill site	69, Neofitou str. 34100 Chalkida	Non-hazardous
	Larissa's Landfill site	1 Ionos Dragoumi str., 41222 Larissa	Non-hazardous
IE	Whiteriver Landfill site	Whiteriver and Gunstown Townland, Dunleer, County Louth	Non-hazardous
	Greenstar Knockharley Landfill Greenstar	Knockharley, Kentstown, County Meath	Non-hazardous
	Arthurstown Landfill	Kill, County Kildare	Non-hazardous
IT	Ginestreto	Provincia Forli-Cesena Emilia Romagna	Non-hazardous
	Sogliano	Cagliari Sardinia	Non-hazardous
	Glurns	Glurns, Südtirol	Non-hazardous
LU	Sidec Diekirch	Fridhaff 9378 Diekirch	Non-hazardous
NL	NV Afvalzorg Holding	Nauerna 1 1566 PB Assendelft	Hazardous, Non-hazardous
PT	SISAV	Rua Cabeçı di Seixo Eco Parque do Relvão 4140-671 Carregueira	Hazardous
ES	C.T.R.U. Navarra		Non-hazardous
	Sasieta Beasain	Martina Maiz 3, behead 20.200 Beasain	Non-hazardous

MS	Landfill site	Landfill address	Landfill type
	Asegre Valladolid	Ctra. De Cabezón, km6,200 47155 Santovenia de Pisuerga (Valladolid)	Hazardous
SE	Ragn sells Högbytorp Upplands-Bro	Ragn-Sells Avfallsbehandling AB Högbytorp S-197 93 Bro	Hazardous
UK	Augean East Northants Resource Facility	Stamford Road Kings Cliffe Northamptonshire, PE8 6XX England	Hazardous
	Blackmountain Phase II/III Landfill site	Blackmountain Quarry Hannahstown Road, Belfast	Inert
	Avondale Landfill Falkirk	Avondale Quarry, Polmont, Falfirk FK2 0YG, Scotland	Hazardous, Non-hazardous, SNHW

Table 5-2.1-1: Identified landfill sites and landfill visits

2.2 Contact persons for assessment of legal compliance with the WAC Decision and landfill visits

Contact Persons							
MS	Landfill	Ministry or Organisation			Landfill		
		Contact Person	E-mail	Telephone	Contact Person	E-mail	Telephone
AT	NUA Aballwirtschaft GmbH Langenlois	Mr Franz Mochty	Franz.Mochty@bmlfuw.gv.at	+43 6642510580	Mr Andreas Budnikowski	andreas.budischowsky@nua.at	+43 2252/805 04 201
BE	INDAVER Antwerp	Ms Martinee Blondeel	Martine.Blondeel@lne.vlaanderen.be	+32 25538177	Mr Alain Konings	alain.konings@indaver.be	+ 32 3 568 49 84
DK	AV Miljø Hvidrove	Mr Hansen Jørgen	jogha@mst.dk	+45 72544184	Mr Jonas Nedenskov	jne@amfor.dk	+45 32 68 94 48
FI	Pirkanmaan Jätehuolto Oy /Tampere	Mr Ari Seppänen	Ari.seppanen@ymparisto.fi	+358 20 490 7332	Mr Rantala	Pentti.Rantala@Pirkanmaan-jatehuolto.fi	+358 32405111
FR	Sita Villeparisis	Ms Vergnon	c.vergnon@fnade.com	+33 33153290	Ms Isabelle Martin	isabelle.martin@sita.fr	+33 142 91 66 54
	Séche Chagé	----	----	----	Mr Lévassieur	H.Lévassieur@tredi.groupe-seche.com	+33 1 53 21 52 59
	SITA Sonzay	Ms Vergnon	c.vergnon@fnade.com	+33 33153290	Mr David Aniel	david.aniel@sita.fr	+33 549 01 99 01
	Veolia Lapouyarde	Ms Vergnon	c.vergnon@fnade.com	+33 33153290	Mr Philippe Belbèze	philippe.belbeze@veolia-proprete.fr	+33 1 46 69 31 69
	Coved Roussas	Ms Vergnon	c.vergnon@fnade.com	+33 33153290	Mr Vincent Milanov	vmilanov@coved.fr	+33 4 37 85 14 70
DE	Currenta Leverkusen	Mr Michael Tiedt	Michael.tiedt@lanuf.nrw.de	+49 201 7995-2547	Mr. Günther Hesse	Guenter.Hesse@currenta.de	+49 2143072588
	K+S Herfa Neurode	Mr Kurt Bartke	Kurt.Bartke@hmulv.hessen.de	+49 611/8151270	Mr. Gerold Jahn	gerold.jahn@kali-gmbh.com	+49 6624 81-3050
	AVL Burghof	Mr. Alfred Gamm	Alfred.gamm@lubw.bwl.de	+49 721 5600-2295	Mr Tschackert	Albrecht.Tschackert@avl-ludwigsburg.de	+49 7141 1445600
GR	Fili's landfill site	Mr Ioannis Machairas	imahairas@dpres.minenv.gr	+30 210 8668979	Mr Kostas Mnimatidis	kmnimatidis@yahoo.gr	+30 210 6701000
	Chalkida's Landfill site	----	----	----	Ms Maria Myrou	melkath@larissa-dimos.gr	+30 2221092336
	Larissá landfill siter	----	----	----	Mr George Kyramas	xyta@deyax	+302410680229
IE	Whiteriver & Gunstown	Mr. Stephen McCarthy	s.mccarthy@epa.ie	00353 21 4875540	Mr Damien Holmes	Damien.Holmes@louthcoco.ie	+353 416851623
	Greenstar Knockharley	Mr. Stephen McCarthy	s.mccarthy@epa.ie	00353 21 4875540	Mr Reinhard Wilkes	Reinhard.Wilkes@greenstar.ie	+353 863888150
	Arthurstown Landfill	Mr. Stephen McCarthy	s.mccarthy@epa.ie	00353 21 4875540	Mr John Smith	Arthurstownlandfill@eircom.net	+353 45877674
IT	Ginestreto (Sogliano Ambiente Spa)	Mr Maurizio Barlini	maurizio.barlini@provincia.fc.it	0039 0543-714243	Ms Daniela Cappelletti	capelletti@soglianoambiente.it	+39 0541/948910
	S'Arenaxiu (Ecoserdiana Srl)	Ms Amelia Pillai	apillai@regione.sardegna.it	0039 070 6066686	Mr Raffaele Garau	raffaele.garau@ecoserdiana.com	+39 070 2116300
	Deponie Glurns	Mr Andreas Marri	Andreas.marri@provinz.bz.it	0039 0471 411886	Mr Hansjörg Dietrich	hansjoerg.dietrich@bzgvin.it	+39 0473 736850
LU	Sitec Diekirch	Mr Serge Less	Serge.less@aev.etat.lu	+352 405656-1	Mr Schmitz	A.Schmitz@sitec.lu	+352 8089 8338
NL	NV Afvalzorg Holding	Ms Marja Achterberg	Marja.achterberg@minvrom.nl	+0031 70 339 4906	Mr Otto Feenstra	O.Feenstra@afvalzorg.nl	+31 888010801
PT	SISVA	Ms Ana Lima	Ana.lima@apambiente.pt	--	Mr Carlos Cardoso	Carlos.cardoso@egeo.pt	+351 249000500
ES	C.T.R.U. Navarra	Mr Francisco Aleza Enciso	faleza@mma.es	+34 91597 58 45	Mr Miguel Sanz Izco	'miguel.sanz.izco@cfnavarra.es'	+34 848 42 75 84
	Sasieta Beasain	Mr Francisco Aleza Enciso	faleza@mma.es	+34 91597 58 45	Mr Enparantza	enrike@sasieta.net	+34 943161555
	Asegre Valladolid	Mr Francisco Aleza Enciso	faleza@mma.es	+34 91597 58 45	Mr Palomino	LPalomino@asegre.com	+34 915563560
SE	Ragn sells Högbytorp	Ms Charlotta Bromann	Charlotta.bromann@environment.ministry.se	+46 8 405 19 76	Mr Lars Tolgén	Lars.Tolgen@ragnsells.se	+46 771888888
UK	Augean East Northant Resource	Mr Budd David	David.Budd@defra.gsi.gov.uk	+44 2072384351	Mr James Wathen	jameswathen@augeanplc.com	+44 1780 444 906

Contact Persons							
MS	Landfill	Ministry or Organisation			Landfill		
		Contact Person	E-mail	Telephone	Contact Person	E-mail	Telephone
	Management Facility						
	Blackmountain Phase II/III	Mr Michael Moody	Michael.moody@doeni.gov.uk	+44 2890 569355	--	--	--
	Avondale Falkirk	Mr Gary Gray	Gary.gray@scotland.gsi.gov.uk	+44 161 244 0363	Mr Cockburn	TCockburn@avondalelandfill.co.uk	+44 1324718178

Table 2.2-1: Landfill details

3 Annex III: Questionnaire

QUESTIONNAIRE

related to „Assessing compliance with and implementation of the waste acceptance criteria and procedures by the EU-15” on behalf of the European Commission, DG Environment

1 Aim of the questionnaire

The aim of the questionnaire is to provide relevant info to the consultants under the framework of the project explained in the recommendation letter that the Commission has signed.

2 Background information

The waste criteria acceptance Decision 2003/33/EC came into force in December 2002 and establishes criteria and procedures for the acceptance of waste in landfills. This Decision entered into force in July 2004 and the requirements laid down had to be applied by 16 July 2005.

The objectives of the questionnaire are:

- To obtain Information about the grade of implementation of the waste acceptance criteria legislation
- To gather the relevant national legislation concerning the implementation of the waste acceptance criteria legislation
- To collect data about chosen parameters that shall be determined from each Member State separately (e.g. period of record keeping, test methods).

3 Introduction on using the questionnaire

We have developed this questionnaire in a way that allows answering in a time saving and efficient way. The questionnaire is using this electronic version.

The fields where input is desired are in gray. Some of these are text fields where written input is wanted, others are checked which can be activated or disabled with a mouse-click.

If a question is unclear or if you desire to discuss a certain aspect please do not hesitate to contact us:

Dr. Peter Hofbauer
BiPRO GmbH
Tel: +49-89-18979050
Fax: +49-89-18979052
E-mail: Peter.Hofbauer@bipro.de

We intend to contact you in order to discuss open questions or specific topics after having received your completed questionnaire. You may also indicate in the questionnaire if you would like to discuss a certain point with us.

We would kindly ask you to return even incomplete forms if some questions cannot be answered.

4 Returning the completed questionnaire

Please return the completed questionnaire to Peter.Hofbauer@bipro.de.

It would be very helpful if we could receive feedback before Christmas 19 December 2008 (the ultimate deadline for feedback is 15 January).

Questionnaire

1 Procedure

1.1 Basic Characterisation

1.1.1 Functions of basic characterisation

The functions of basic characterisation are listed in section 1.1.1. of the Annex to the EU Waste Acceptance Criteria Decision 2003/33/EC (hereinafter referred to as WAC Decision) ¹ :			
Are the functions of basic characteristic implemented in the national legislation according to 2003/33/EC?		Please name the legal document and corresponding paragraph.	
Yes	<input type="checkbox"/>	Exceeded	<input type="checkbox"/>
No	<input type="checkbox"/>	Partial	<input type="checkbox"/>
[Redacted]			

1.1.2 Fundamental requirements for basic characterisation of the waste

There are fundamental requirements for basic characterisation of the waste which are listed in section 1.1.2. of the Annex to the WAC Decision:			
Are the fundamental requirements for basic characterisation implemented in the national legislation according to the Annex to the WAC Decision?		Please name the legal document and corresponding paragraph.	
Yes	<input type="checkbox"/>	Exceeded	<input type="checkbox"/>
No	<input type="checkbox"/>	Partial	<input type="checkbox"/>
[Redacted]			

1.1.3 Testing

In general wastes must be tested for basic characterisation. The testing is listed in 1.1.3 of the Annex to the WAC Decision:			
Is the testing of waste for the basic characterisation implemented in the national legislation according to the Annex to the WAC Decision?		Please name the legal document and corresponding paragraph.	
Yes	<input type="checkbox"/>	Exceeded	<input type="checkbox"/>
No	<input type="checkbox"/>	Partial	<input type="checkbox"/>
[Redacted]			

¹ Council Decision 2003/33/EC of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC (OJL 11, 16.1.2003, p. 27)

1.1.4 Cases where testing is not required

Testing for characterisation can be dispensed in cases according to section 1.1.4. of the Annex to the WAC Decision	
Are the cases mentioned above implemented in the national legislation according to the Annex to the WAC Decision?	Please name the legal document and corresponding paragraph.
Yes <input type="checkbox"/> Exceeded <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>	<input type="text"/>
What is the period of time the operator shall keep record of the basic characterisation information?	<input type="text"/>

1.2 Compliance testing

Compliance testing is to periodically check regular arising waste streams and is described in section 1.2. of the Annex to the WAC Decision	
Is compliance testing implemented in the national legislation according to the Annex to the WAC Decision?	Please name the legal document and the corresponding paragraph.
Yes <input type="checkbox"/> Exceeded <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>	<input type="text"/>
What is the period of time the test results of compliance testing shall be kept?	<input type="text"/>

1.3 On site verification

Online verification is the visual inspection before and after unloading, and the corresponding documentation is described in section 1.3. of the Annex to the WAC Decision	
Is online verification implemented in the national legislation according to the WAC Decision?	Please name the legal document and corresponding paragraph.
Yes <input type="checkbox"/> Exceeded <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>	<input type="text"/>
What are the testing requirements for onsite verification?	<input type="text"/>
Are any rapid test methods defined?	<input type="text"/>

2 Waste acceptance criteria

In certain circumstances, higher limit values for specific values listed in section 2 of the Annex to the WAC Decision can be accepted	
Is the reporting of permits for the acceptance of higher values implemented in the national legislation according to the WAC Decision?	Please name the legal document and corresponding paragraph.
Yes <input type="checkbox"/> Exceeded <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>	<input type="text"/>
Please name the legal document and corresponding paragraph of: The implementation of the criteria for compliance with the limit values set out in section 2 of the Annex to the WAC Decision	<input type="text"/>

2.1 Criteria for landfills for inert waste

2.1.1 List of waste acceptable at landfills for inert waste without testing

Waste acceptable at landfills for inert waste without testing is listed in section 2.1.1 the Annex to the WAC Decision	
Is the list for waste acceptable at landfills for inert waste without testing implemented in the national legislation according to the WAC Decision?	Please name the legal document and corresponding paragraph.
Yes <input type="checkbox"/> Exceeded <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>	<input type="text"/>

2.1.2 Limit values for waste acceptable for inert waste

2.1.2.1 Leaching limit values

Test methods from section 3 and limit values from section 2.1.2.1. of the Annex to the WAC Decision shall be determined for the leaching limit values of inert waste.	
Are the above mentioned determinations for the leaching limit values implemented in the national legislation according to the WAC Decision?	Please name the legal document and corresponding paragraph.
Yes <input type="checkbox"/> Exceeded <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>	<input type="text"/>

2.1.2.2 Limit values for total content of organic parameters

Inert waste must meet limit values according to section 2.1.2.2. of the Annex to the WAC Decision.	
Are the above mentioned limit values implemented in the national legislation according to the WAC Decision?	Please name the legal document and corresponding paragraph.
Yes <input type="checkbox"/> Exceeded <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>	<input type="text"/>

2.2 Criteria for landfills for non-hazardous waste

2.2.1 Waste acceptable at landfills for non-hazardous waste without testing

Municipal waste according to section 2.2.1. of the Annex to the WAC Decision admitted without testing at landfills for non-hazardous waste	
Is the admission for landfilling of municipal waste at landfills for non-hazardous waste without testing implemented in the national legislation according to the WAC Decision?	Please name the legal document and corresponding paragraph.
Yes <input type="checkbox"/> Exceeded <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>	<input type="text"/>

2.2.2 Limit values for non-hazardous waste

Test methods from section 3 and limit values from section 2.2.2. of the Annex to the WAC Decision shall be determined for the leaching limit values of granular non-hazardous waste.	
Are the above mentioned limit values implemented in the national legislation according to the WAC Decision?	Please name the legal document and corresponding paragraph.
Yes <input type="checkbox"/> Exceeded <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>	<input type="text"/>
Please name the legal document and corresponding paragraph of: Setting of criteria for monolithic waste to provide the same level of environmental protection as given for granular non-hazardous waste.	<input type="text"/>

2.2.3 Gypsum waste

Gypsum based materials shall be disposed according to section 2.2.3. of the Annex to the WAC Decision	
Is the implemented in the national legislation according to the WAC Decision?	Please name the legal document and corresponding paragraph.
Yes <input type="checkbox"/> Exceeded <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>	<input type="text"/>

2.3 Criteria for hazardous waste acceptable for non-hazardous waste pursuant to Article 6(c)(iii)

2.3.1 Leaching limit values

Test methods from section 3 and limit values from section 2.3.1. from the Annex to the WAC Decision shall be determined for the leaching limit values of granular hazardous waste.	
Are the above mentioned limit values implemented in the national legislation according to the WAC Decision?	Please name the legal document and corresponding paragraph.
Yes <input type="checkbox"/> Exceeded <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>	<input type="text"/>
Please name the legal document and corresponding paragraph of: Setting of criteria for monolithic waste to provide the same level of environmental protection as given for granular hazardous waste.	<input type="text"/>

2.3.2 Other criteria

Granular hazardous waste must meet criteria according to section 2.3.2. to the Annex of the WAC Decision.	
Are the above mentioned criteria implemented in the national legislation according to the WAC Decision?	Please name the legal document and corresponding paragraph.
Yes <input type="checkbox"/> Exceeded <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>	<input type="text"/>
Please name the legal document and corresponding paragraph of: a) Setting of criteria to ensure that the waste will have sufficient physical stability and bearing capacity. b) Setting of criteria to ensure that hazardous monolithic wastes are stable and non-reactive before accepted in landfills for non-hazardous waste.	a) <input type="text"/> b) <input type="text"/>

2.3.3 Asbestos waste

Construction materials containing asbestos and other suitable asbestos waste may be landfilled at landfills for non-hazardous waste in accordance with section 2.3.3. of the Annex to the WAC Decision	
Are the above mentioned landfilling terms for constructing materials implemented in the national legislation according to the WAC Decision?	Please name the legal document and corresponding paragraph.
Yes <input type="checkbox"/> Exceeded <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>	<input type="text"/>

2.4 Criteria for waste acceptable at landfills for hazardous waste

2.4.1 Leaching limit value

Test methods from section 3 and limit values from section 2.4.1. of the Annex to the WAC Decision shall be determined for the leaching limit values of granular waste acceptable at landfills.	
Are the above mentioned limit values implemented in the national legislation according to the WAC Decision?	Please name the legal document and corresponding paragraph.
Yes <input type="checkbox"/> Exceeded <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>	<input type="text"/>
Please name the legal document and corresponding paragraph of: Setting of criteria for monolithic waste to provide the same level of environmental protection as given for granular waste acceptable at landfills.	<input type="text"/>

2.4.2 Other criteria

Granular hazardous waste must meet criteria according to section 2.4.2. of the Annex to the WAC Decision .	
Are the above mentioned criteria implemented in the national legislation according to the WAC Decision?	Please name the legal document and corresponding paragraph.
Yes <input type="checkbox"/> Exceeded <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>	<input type="text"/>

2.5 Criteria for underground storage

The acceptance of underground storage must meet the requirements according to section 2.5. of the Annex to the WAC Decision.	
Are the above mentioned requirements implemented in the national legislation according to the WAC Decision?	Please name the legal document and corresponding paragraph.
Yes <input type="checkbox"/> Exceeded <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/>	<input type="text"/>

3 Guidance documents

Do Guidance documents concerning Waste acceptance criteria exist?	Yes <input type="checkbox"/> No <input type="checkbox"/>
If these Guidance documents are publicly available; please add a source to look for	<input type="text"/>

Nation				
Category		Corresponding national legislation	identical	divergent
1. Procedure				
	1.1 Basic characterisation			
	1.1.1 Function of basic characterisation			
	1.1.2 Fundamental requirements for basic characterisation			
	1.1.3 Testing			
	1.1.3 Cases where testing is not required			
	1.2 Compliance testing			
	1.3 On-site verification			
2. Acceptance criteria				
	2.1 Landfills for inert waste			
	2.1.1 Short list			
	2.1.2 Limit values			
	2.1.2.1 Leaching limit values			
	2.1.2.2 Limit values for total content of organic parameters			
	2.2 Landfills for non-hazardous waste			
	2.2.1 Without testing			
	2.2.2 Limit values for non-hazardous waste			
	2.2.3 Gypsum waste			
	2.3 Criteria for hazardous waste acceptable at landfills for non-hazardous waste, Article 6 c iii			
	2.3.1 Leaching limit values			
	2.3.2 Other criteria			
	2.3.3 Asbestos waste			
	2.4. Landfills for hazardous waste			
	2.4.1 Leaching limit values			
	2.4.2 Other criteria			
	2.5 Criteria for underground storage			

Table 2.2-2: Standardised table for assessment of implementation

WAC Decision	Detailed questions to be clarified during site visit if not before	
1.1.1 / 1.1.2.	1. What is the sampling procedure? (sampling plan)	
1.1.3.	2. How is compositional range and variability determined? How is differentiated between regularly arising wastes from one and several installations? 3. What is the sampling plan drawn up?	
1.1.4.	4. Which are the waste types where the exemption from testing requirements is applied?	
1.2.	5. What is the sampling procedure? 6. Which methods are applied for compliance testing? 7. What testing frequency is used?	
1.3	8. What are the testing requirements for on-site verification? 9. Which, if any, rapid test methods are available and used?	
2	10. What are the criteria set for compliance with limit values? 11. What are the substances and settings where the exemption of 3 times the limit value is applied? 12. Which of the test methods and limit values are used? 13. Which are the criteria set for monolithic waste to provide same level of environmental protection than for granular waste? 14. Which limits and criteria are applied for different subcategories of class B landfills? 15. Which are the criteria set to ensure stability and non-reactivity, sufficient physical stability and bearing capacity? 16. How is the disposal of gypsum waste? 17. How is the disposal of asbestos waste practically performed; what are the consequences for the geological barrier? 18. What criteria are set in addition to the WAC DECISION requirements? 19. Who is storage organised until analysis results are available? 20. How is authorised to do the sampling - testing? 21. How is the quality assurance organised? 22. Which specific test and sampling standards are applied? 23. Etc.	(for all landfill classes)

Table 2.2-3: Questions related to practical enforcement of legal requirements of the WAC Decision

Contacts with the different ministries of the EU-15				
	Contact Person	Working place	Replied	
Austria	Franz Mochty	Austrian Federal ministry of agriculture, forestry, environment and water management	✓	
Belgium	Brussels	Barbara Dewulf	IBGEBIM	✓
	Flanders	Johann Debeer	Flemish government, Nature and Government Department	✓
	Wallonia	Alain Houtain	Public service of Wallonia, Department for soil and waste	✓
Denmark	Trile	Danish Ministry of Environment (EPA)	✓	
Finland	Ari Seppänen	Ministry of the Environment, Dept. of Env.	✓	
France	Benedict Cretin	Ministry of Ecology, Sustainable Development and Town and Country Planning	✓	
Germany	Rüdiger Wagner	Federal Ministry for the Environment, Nature conservation and Nuclear Safety	✓	
Greece	Fanis Lolos	Enviroplan – local subcontractor	✓	
Ireland	Pat Fenton	Waste Infrastructure and Regulation Section Environment Division Department of the Environment, Heritage and Local Government	✓	
Italy	Rupert Rosanelli	Syneco Consulting – local subcontractor	✓	
Luxembourg	Lucien Lux	Ministry of environment	✓	
Netherlands	Marja Achterberg	Ministry of Housing, Spatial Planning and the Environment, Waste policy department	✓	
Portugal	Ana Lima	Department for Environmental Politicise and Strategies (DPEA)	✓	
Spain	Francisco Aleza Enciso	Ministerio de Medio ambiente y medio rural y marino	✓	
Sweden	Erika Nygren	Swedish environmental protection agency	✓	
United Kingdom	England	Liz Sheppard / David Budd	Department for Environment, Food and Rural Affairs (Defra)	✓
	Northern Ireland			
	Wales			
	Scotland	Gary Gray	Scottish Government Environmental Quality Directorate Waste Regulation Team	✓

Table 2.2-4: Competent contact persons for landfill of waste in National authorities of Member States

WAC DECISION procedure and criterion	Parameter for decision on equivalency and implementation & additional interesting issues to discuss
1.1. Basic characterisation	Intention and text transposed into national legislation?
1.1.1. Functions	Intention and text transposed into national legislation?
1.1.2. Fundamental requirements	Intention and text transposed into national legislation? Concrete requirements, documentation form
1.1.3. Testing	Intention and text transposed into national legislation? Specific testing requirements for regularly arising wastes to show range and variability of characteristic properties
1.1.4. Testing is not required	Intention and text transposed into national legislation? Specific interpretation of (b) and (c)
1.2. Compliance testing	Intention and text transposed into national legislation? <ul style="list-style-type: none"> • Which approach is taken and which methods are used for compliance testing? • What frequency is requested? • How is checking for compliance with basic characterisation information other than testing ensured? • What period is set for record keeping?
1.3. On-site verification	Intention and text transposed into national legislation? What requirements are set for on-site verification? Are there rapid test methods defined?
2. Waste acceptance criteria	Intention and text transposed into national legislation? <ul style="list-style-type: none"> • Higher limit values accepted? • Permits issued under this provision? • Criteria for compliance with limit values?
2.1. Landfills for inert waste	Intention and text transposed into national legislation? Practical enforcement of “in case of suspicion/if there is a doubt .. testing should be applied” Verification of “selected C&D waste”
2.1.2. Limit Values	Intention and text transposed into national legislation?
Leaching limits	Which test methods and limit values are to be used?
Limits for total content of organic parameters	Limit values for PAHs
2.2 Landfills for non-hazardous waste	Intention and text transposed into national legislation? Practical enforcement of acceptance procedure for wastes acceptable without testing (MSW, separately collected fractions, same materials from other sources) including “subject to prior treatment” and “contaminated to an extend ..”? Subcategories of landfill for non-hazardous waste? Related limit values and acceptance criteria?.
2.2.2. Limit Values	Intention and text transposed into national legislation? Which test methods and limit values are to be used? Criteria for monolithic waste

WAC DECISION procedure and criterion	Parameter for decision on equivalency and implementation & additional interesting issues to discuss
2.2.3. Gypsum Waste	Intention and text transposed into national legislation?
2.3. Hazardous waste acceptable at landfills for non-hazardous waste, Article 6 (c)(iii)	Intention and text transposed into national legislation?
2.3.1. Leaching limits	Intention and text transposed into national legislation?
	Which test methods and limit values are to be used?
	Criteria for monolithic waste
2.3.2. Other criteria	Intention and text transposed into national legislation?
	Criteria for physical stability, for bearing capacity, for stability and non-reactivity of monolithic waste?
2.3.3. Asbestos waste	Intention and text transposed into national legislation?
	(Further specifications? Concrete enforcement?)
2.4. Landfills for hazardous waste	Intention and text transposed into national legislation?
2.4.1. Leaching limits	Intention and text transposed into national legislation?
	Which test methods and limit values are to be used?
	Criteria for monolithic waste
2.4.2. Other criteria	Intention and text transposed into national legislation?
2.5. Underground storage	Intention and text transposed into national legislation?(including Annex A)
.	<ul style="list-style-type: none"> • Specification of requirements for site specific safety assessment • List of excluded wastes • Lists of wastes acceptable • Procedural requirements for secure separation from mining activities, classification in groups of compatibility etc
Sampling and test methods	Intention and text transposed into national legislation?
	Sampling plan?
	Test methods and standards used

Table 2.2-5: Overview on parameter relevant for analysis of implementation and other interesting issues to discuss

Contact details:

BiPRO GmbH
Grauertstr. 12
81545 Munich, Germany
Phone: +49-89-18979050
Fax: +49-89-18979052
URL: <http://www.bipro.de>

