

REGULATION № 8
ON THE CONDITIONS AND REQUIREMENTS FOR BUILDING AND OPERATION
OF LANDFILLS AND OTHER FACILITIES AND INSTALATIONS FOR WASTE
RECOVERY AND DISPOSAL on 24.08.2004

Chapter One
GENERAL CONDITIONS

Article 1

With this regulation the conditions and requirements are determined for building and operation of:

1. landfills, where municipal, inert, industrial and/or hazardous waste are deposited, called shortly "landfills";
2. other facilities and installations for waste recovery and disposal.

Article 2

This regulation does not refer to:

1. spreading of sludge and similar matter on the soil for the purpose of fertilization or improvement of its quality, obtained from:
 - a) waste water disposal plants (sewage sludge) and
 - b) dredging operations;
2. use of inert waste for the relief restoration, filling-in works or for construction purposes of landfills and other targets,
3. deposit of non-hazardous dredging sludge:
 - a) alongside small waterways from where they have been dredged out and
 - b) in surface water including the bed and its sub soil,
4. deposit unpolluted soil or of non-hazardous inert waste in a result of studying, extraction, disposal, and storage of mineral resources as well as from the operation of mines and quarries.
5. installations for waste incineration.

Article 3

(1) For accomplishment of activities on waste recovery and disposal is required:

1. a permit for accomplishment of waste activities as set out in Art. 37 from Waste Management Act (WMA) further referred as "waste activities permit" or "permit";
2. an IPPC permit in accordance with Art.117 (1) from Protection of the Environment Act (EPA) further referred as "IPPC permit".

(2) In the Waste Management Activities Program on Art. 29 (1), point 2 from WMA, enclosed to the Annex for issue of a permit for accomplishment of waste activities or in the Annex for issue of an IPPC permit, shall be:

1. presented a detailed description of the site where the facilities or installations for waste recovery and disposal will be situated, pointing out its geological, hydro-geological and hydrological characteristics of the area;
2. indicated the methods for pollution prevention and restriction of the environmental components including the required ones with the Environmental Impact Assessment Decision issued as laid out in Chapter Six, Part III from EPA.
3. presented a plan for its own monitoring that will be designed regarding to waste landfill sites in accordance with Annex 3.

Article 4

The owner of a waste activities permit or of an IPPC permit is obliged to observe the requirements of:

1. management of wastes in accordance with environmental requirements;
2. safe exploitation of landfills and facilities and installations for recovery and disposal as laid out in Chapter Three, including their fire protection;
3. provision of healthy and safety working conditions;
4. improvement of staff qualification and training, engaged with the exploitation of landfills, facilities and installations for recovery and disposal, in accordance with Chapter Three.

Article 5

(1) Activities related with the waste management are carried out from the operators of the landfills and the relevant facilities and installations for waste recovery and disposal on a program endorsed by the Director of Regional Inspection for Environment and Water (RIEW) in accordance with Article 29 (1), point 2 of WMA.

(2) The programs for waste management in accordance with (1) are designed in accordance with the purposes and provision of Article 31 of WMA rendering an account of the purposes and measures laid down in the National Program for Waste Activities Management.

(3) In case when operators of landfills and relevant facilities and installations for waste recovery and disposal carry out activities only for disposal of daily, construction and mass widespread waste, the programs from (1) are conformed as well as with the requirements of (2) and with the purposes and measures laid down in the corresponding municipality program and the conditions and order for accomplishment of the activities for waste recovery and disposal according the regulations of municipality councils issued on Art.19 from WMA.

Article 6

Landfill sites, facilities and installations for waste recovery and disposal on Chapter Three are chosen and built – up in accordance with the requirements of the Regulation № 7 on the requirements to which the sites for situation of waste treatment facilities shall answer from 24.08.2004.

Article 7

Landfill sites as well as facilities and installations for waste recovery and disposal according Chapter Three are designed and built-up following the requirements of this regulation and the established in the country:

1. Standards for a design of foundations, built-up constructions and nets and facilities for the technical infrastructure.
2. Fire-safety construction technical standards (FSCTS).
3. Standards for admissible emissions and for environmental quality.
4. Sanitary – hygienic standards (SHS).
5. Fundamental requirements, assessment procedures of the correspondence with the requirements, and ways for certification of the correspondence according the regulations on Art.7 of the Law for the Technical Requirements of Goods (LTRG) and the requirements for organization and safety exploitation of facilities with extended risk in accordance with Art. 31 of LTRG.
6. Rules of control and construction acceptance of ground facilities, groundwork and foundations of buildings and facilities, building constructions, defence and

insulation covers, installation systems and building installations, industrial, hydro-technical and transport facilities.

Article 8

(1) Co-ordination and approval of the landfill projects and facilities and installations for waste recovery and disposal on Chapter Three is carried out following the order and conditions of Chapter Eight, part II of the Territorial Development Act (TDA), considering the decision conditions related with the Environmental Impact Assessment (EIA), issued in accordance with Chapter Six, Part III from EPA.

(2) Construction of landfills and facilities and installations for waste recovery and disposal on Chapter Three is carried out after issue of a building permit following the instructions of Chapter Eight, Part III from the TDA and observing the conditions of Art.7 (1) of WMA.

(3) For the facilities and installations for waste recovery and disposal included in the range of Annex 4 of EPA, the presence of an issued IPPC permit is a condition for issue of a building permit.

Article 9

(1) Approval and entering into operation of facilities and installations for waste recovery and disposal according Chapter Three are carried out under the conditions and order of Art.177 of TDA.

(2) The presence of a permit for accomplishment of waste activities or of a IPPC permit is a condition for entering into operation of the relevant facility or installation in accordance with Art.177 from TDA.

Chapter Two

LANDFILL SITES

Part I

General requirements for landfill sites

Article 10

(1) With this chapter the requirements for design, construction and exploitation and for closure of landfill sites are determined, including:

1. the measures, procedures and requirements for prevention or reduction in the highest possible level of negative effects of landfills on the environment, in particular upon the pollution of surface water, underground water, soil and air, including reduction of the greenhouse effect and the risk for human health, during the whole life-cycle of the landfill.

1. technical rules and regulations for landfills design and construction.

(2) The waste activities permit or the IPPC permit is issued if the requirements of (1) are observed.

Article 11

(1) Each landfill shall be classified in one of the following classes:

1. landfill for hazardous waste,
2. landfill for non-hazardous waste,
3. landfill for inert waste.

(2) In cases when on one landfill site sections and/or cells for disposal of more than one type waste are separated, the sections and the cells are classified in accordance with (1) as different sub-sites and for disposal of different types of waste.

Article 12

(1) The requirements of Article 15, Article 18-22, Article 35 (1), points 1 and 2, Article 36 points 1-4 except point 2 letter “b”, Article 37 (1) point 3, Article 40 (1) point 1, Article 41 and Annex 3 parts 3-5 do not refer to:

1. landfill sites for non-hazardous or inert wastes, situated on islands with a total capacity not exceeding 15000 tones or with an annual intake not exceeding 1000 tones, where this is the only one landfill on the island and where this is exclusively destined for the disposal of waste generated on that island.

2. landfill sites for non-hazardous or inert waste situated in isolated settlements when the landfill sites are destined for the disposal of waste generated only by that isolated settlement.

(2) The regulation in accordance with (1) is not applicable for the new-built landfills after closure of the existing landfill sites on (1) point 1.

Article 13

The requirements of Article 17 (1), excepting points 1 and 2, Article 18-22, Article 40 (1), points 5 and 6, Article 44 (1) and Annex 3 parts 2, 3 and 5 may not be applicable to underground storage of waste on an assessment of the body that issued the waste activities permit or of the IPPC permit.

Article 14

(1) In the landfill it is not accepted the deposition of:

1. liquid waste;

2. waste, determined as explosive, corrosive, oxidizing, easy flammable or flammable, as defined in accordance with Art. 3 of WMA;

3. hospital and other clinical wastes arising from medical or veterinary establishments and/or connected with their research activity, that are classified as infectious in accordance with Art. 3 of WMA;

4. whole used tires, excluding bicycle tires and tires with an outside diameter over 1 400 mm as follows:

a) whole used tires excluding tires used as an engineering material for construction of landfills, and

b) shredded tires

5. any other type of waste that does not respond to the criteria for acceptance of waste in the landfills in accordance with Annex 1.

(2) Waste for which it is not admissible an underground storage are pointed out in Part II, section 2, point 2.1. from Annex 1.

(3). Dilution or mixture of waste solely in order to meet the waste acceptance criteria for the relevant class landfill is prohibited.

Article 15

(1) With the waste management activity program, in accordance with the requirements of Article 31 (2), point 7 of WMA all financial means, necessary for building, operation, monitoring and closure and after-care activities of the site for a period of at least 30 years are pointed out.

(2) The price for the disposal of any type of waste at that site shall refund the expenses for the landfill building and shall cover the expenses for operation, monitoring, closure and after-care activities of the site for a period of at least 30 years.

(3) The price for waste disposal is determined with plan-bills for each of the activities for building, operation, monitoring, closure and after-care of the site, rendering an account of the expected annual waste volume for the whole period of landfill exploitation.

(4) The plan-bills in accordance with (3) are indivisible part of:

1. the contract for the assignment of the public procurement for the waste disposal activity – in cases when waste disposal is assigned by the mayor of the municipality under the conditions and order of the Public Procurement Act (PCA), or;
 2. the contract with which the relevant municipality assigns the waste disposal activity to a company with municipality partnership, or;
 3. decision of the municipality and the contract for management – in cases when the deposition is carried out independently from the municipality using municipal enterprise or;
 4. the other contracts for landfill operation assignment where the municipality is not a part.
- (5) The landfill operator has a duty to insure the public access to the plan-bill for determination of waste disposal price.

Article 16

(1) With the conditions for the waste activity, written in the IPPC permit in accordance with Article 42 (2) of WMA or Article 123 of EPA, the competent authority determines:

1. the class of the landfill;
2. the capacity of the landfill and the list of the waste permitted for deposit defined in types in accordance with Art. 3 of WMA;
3. requirements for the preparations for landfill operations, landfill activities, monitoring and control procedures, including determination of the indicators and the verge of the pollution of underground water in accordance with Annex III, point 4.1.3 and 4.1.4., as well as the relevant requirements for closure of the site and for after-care operations;
4. The obligation of the operator in accordance with Art. 27 of WMA to report to the relevant competent authority at least one time annually the type and the quantity of waste disposed and the results from the monitoring at the time of operation of the landfill, its closure and after-care operations.

(2). The competent authority determines the indicators and pollution level of groundwater in accordance with (1), point 3 after receiving a standpoint for co-ordination from the Director of the relevant Basin Department in cases, when competent authority is the Director of the RIEW.

Part II

Requirements for design and built-up of landfill sites for waste

Article 17

(1) The investment landfill projects foresee the necessary decisions for providing:

1. bearableness, sustainability and durability of the construction of the landfill and geological base (geological barrier) at exploitation and seismic pressure.
2. protection against entering of atmospheric, surface and/or underground waters into the disposed waste.
3. collection of polluted water and leachate of the landfill.
4. leading-away and purification of the polluted water and leachate of the landfill until reaching the standards for allowed emissions, determined with the permit for waste water discharge according the provisions of the Waters Act (WA) or in the IPPC permit under Art. 3 (1), point 2.

(2) The competent authority may determine with the conditions in the decision for Environmental Impact Assessment (EIA) or with the conditions of the IPPC permit, that requirements from (1), point 3 will not be applicable in cases when the landfill situation, the results of geological, hydro-geological and hydrological studies, the type and the

characteristics of the accepted waste, show that the landfill poses no potential hazard to the environment.

(3) The requirements of (1), points 2-4 are not applicable to landfills for inert waste.

(4) The protection in accordance with (1), points 2-4 is provided by means of drainage facilities, drainage systems for collection of the contaminated water and leachate and its lead out from the landfill body, and when it is necessary the facilities for purification in accordance with the IPPC permit on Art.3 (1), point 2 are foreseen.

Article 18

(1) A landfill must be situated and designed so that:

1. to prevent the pollution of soil, groundwater or surface water and
2. to ensure the efficient collection of leachate except the cases according Art.17 (2).

(2) Protection of soil, groundwater and surface water is achieved by means of the combined activities of:

1. a geological base and a bottom liner during the operational/active phase and
2. a geological base and the bottom and the top liner - during the post-exploitation period of the landfill.

Article 19

(1) The geological base is determined by the geological and hydro-geological conditions below and in the region of the landfill site and must provide sufficient attenuation capacity for prevention of a potential risk to soil and groundwater pollution.

(2) The landfill base and sides shall consist of mineral layers that respond to permeability and thickness requirements with a combined effect in terms of protection of soil, groundwater and surface water at least equivalent to the protection resulting from the following requirements of the permeability (filtration) coefficient - K:

1. landfill for hazardous waste: $K \leq 1,0 \cdot 10^{-9}$ m/s; thickness ≥ 5 m,
2. landfill for non-hazardous waste: $K \leq 1,0 \cdot 10^{-9}$ m/s; thickness ≥ 1 m,
3. landfill for inert waste: $K \leq 1,0 \cdot 10^{-7}$ m/s; thickness ≥ 1 m.

(3) The permeability coefficient in accordance to (2) is determined with the acting standard methods, in accordance with the requirements of the Bulgarian standards or with other calculation methods and approved equivalent methods that provide precision no less smaller than the standard methods.

(4). In case that the geological base does not meet the above conditions in accordance with (2) it can be strengthened by other means giving equivalent protection.

(5). When an artificially established geological base is set up, it should be no less than 0,5 meters thick.

(6) For the leachate collection from the body of the landfill for hazardous and non-hazardous waste, a sealing system must be added in accordance with the following principles so as to ensure that leachate accumulation at the base of the landfill is kept at a minimum by the follow technical means:

1. Artificial sealing liner (insulation geo-membrane) required;
2. Drainage layer ≥ 0.5 m required.

Article 20

(1) When the competent authority after a consideration of the potential risk for the environment decides that prevention of leachate formation is necessary, then with the conditions of the decision on EIA of the waste activities permit or of the IPPC permit, a surface sealing is prescribed. Recommendations for the surface sealing are as follows:

1. Gas drainage layer, artificial sealing liner (insulation geo-membrane), drainage layer > 0.5 m and top soil cover > 1 m - for the landfills with non-hazardous waste;
2. Artificial sealing liner (insulation geo-membrane), drainage layer > 0.5 m and top soil cover > 1 m - for the landfills with hazardous waste;

(2) In cases when no protection against leachate formation is required, the upper sealing layer consists only of top soil cover, as for landfills for biodegradable waste a gas drainage layer is additionally foreseen.

Article 21

The competent authority by means of the EIA decision or on the base of the IPPC permit may order, that the requirements of Article 19 and Article 20 are not applicable at all in the cases, when:

1. on the basis of an assessment of environmental risk, in particular to groundwater, taking into account the regulations for groundwater protection, the competent authority has decided, that collection and disposal of leachate is not necessary or,
2. on the basis of the assessment in accordance with point 1 it is specified that the landfill poses no potential hazard to soil, groundwater or surface water.

Article 22

(1) In the landfills for the biodegradable waste, facilities for collection, disposal and recovery of landfill emitted gas are designed and built-up.

(2) In case, that the recovery of the gas collected is economically inexpedient, the gas must be flared.

(3) Collection, disposal and use of landfill gas under (1) shall be carried out in a way that does not lead to risk to the human life and health, and risk to or deterioration of the environment

(4) Appropriate measures shall be taken in order to control the accumulation and release of landfill gas in the period of operation and after closure of the landfill in accordance with the provisions of the plan for control and monitoring in accordance with Annex 3.

Article 23

Requirements for the project decisions of the landfill body are determined in accordance with Annex 2.

Article 24

The materials and products used in the construction of landfills and the technical specifications that determine their characteristics are provided with the investment project and are controlled by assessment following the order of Art.142, (4-8) from TDA.

Article 25

(1) The accessory and serving buildings, facilities and installations needed for the operation of the landfill are designed in accordance with the endorsed landfill technology.

(2) A fence and a control checkpoint designed in accordance with the standards for physical protection of buildings are foreseen in order to restrain the free access to the site.

(3) Other facilities and/or installations for disposal of waste are also foreseen at the landfill (for example for separation, recycling, composting and others) by which a completion of the measures in Art.4 (1) from WMA and according the purposes in § 2 (2) of the final provisions for time reduction of the quantities of biodegradable waste are provided.

Article 26

The levelling of the sites for landfill construction shall be designed:

1. in order to provide a sufficient number of berms for anchoring of the artificial sealing liner (insulation geo-membrane) and geo-textile protecting it and to

- secure propitious relief for realization of construction and operation of the landfill considering the relief of the site;
2. in order to form longitudinal and cross-section slopes of the geological base and the bottom isolating shield that provide drainage of the leachate in order to secure the stability of the landfill body;
 3. when rendering account of the geological, hydro-geological and hydrological conditions, the technology of landfilling and the requirements for minimum slopes of ridge and air swaths of the top isolating shield.
 4. For maximum preservation of the natural relief;
 5. For balance of the excavation and embankment earth masses considering the necessity for providing of earth masses for the needs of landfilling and recultivation of the landfill.
 6. In order to preserve the landfill from flood of surface water by an construction of optimum slopes for their collection and leading away, including for restriction of the access of water to the landfill body;
 7. For provision of possibility for gravity leading away of waste water to the retention basins, purification facilities and the relevant water receivers.

Article 27

(1) Biological recultivation of landfills shall stipulate their plantation by grass, bushes and trees, typical of the relevant region taking into account its sanitary-protection characteristics, decorative characteristics and resistance to dangerous substances, released from the waste in the atmospheric air and the soil.

(2) In regions that in different seasons prevailing winds with speed over 10 m/sec are characteristic and when at the leeward part of the landfill urban territories or separate built-up properties under health protection are situated, protection areas with proper plantation situated at the side of the coming winds are foreseen.

Article 28

The construction of landfills is carried out in observation of the following requirements:

1. adherence to the legislative acts for control and acceptance of construction and installation work (CIW);
2. carrying out the particular types of CIW in accordance with the provisions of the investment project;
3. realization of control on building materials and technical equipment used in the construction of the landfill in a correspondence to the existing requirements in Art. 169 (1) of TDA by:
 - a) certification of the compliance of the construction products and technical equipment under the provisions of Art. 7 of LTRG;
 - b) performance of construction supervision according Art. 168 of TDA.
4. realization of the necessary single and complex requirements of the different types CIW – for the cases when this is required with a legislative act.

Article 29

(1) When accomplishing foundation, the compliance of the geological base with what is provided in the project and the determined conditions with geological and hydro-geological researches is controlled.

(2) When there are damaged sections of the geological base, technical undertakings for its consolidation are foreseen.

(3) In cases when with the undertakings according (2) cannot be ensured the achievement of the project requirements on the bearing capacity, stability and permeability coefficient, a change in the project decision of the bottom isolating shield of the landfill is done with the purpose for their fulfilment.

(4) Surplus earth masses from the construction of the landfill are used for covering with soil of the deposited waste and for recultivation of the landfill.

Article 30

(1) The control on the quality of the materials and the accomplishment of the prescript with the project technology for strengthening of the geological base of the bottom and the slopes of the landfill and on the technology for construction of the mineral sealing layer of the bottom and top insulation shield during execution of the construction is done by the construction supervision according Art.168 from TDA.

(2) At the construction of the top and bottom isolating shield are observed and controlled:

1. deformations of the base by the efficient burden that should not endanger the wholeness of the isolating geo-membrane and of the shields as a whole;
2. the project structure and the quality of the materials for the mineral sealing layer;
3. the level of congestion, water composition and homogeneity at laying mineral materials as a laboratory test is completed minimum at every 1000 m²;
4. adherence to the project elevations and slopes;
5. the depth of the layers of the used material of every 100 m² laid out material;
6. the permeability coefficient of the firm isolating layers as a laboratory or field test is done minimum at every 2000 m².

Article 31

(1) When laying down isolating layers, it is not admissible the formation of gaps in the place of the connection of the insulation of the slopes with this of the bottom of the landfill.

(2) At landfills with elevation scheme of operation (cupola landfill) the isolating layers of the slopes are done as a continuation of the insulation of the bottom.

Part III

Requirements to the operation of the landfill

Article 32

(1) At the landfill is accepted only waste, for which is known:

1. its composition and characteristics,
2. its leachability;
3. its long-term behaviour.

(2) the procedure and the criteria for acceptance of waste at the different classes landfills including methods for testing and determination of the limit values of the key characteristics of accepted waste are pointed in Annex 1, and the classification of the waste by type and characteristics is made in accordance with the regulation of Art. 3 of WMA.

Article 33

(1) In the application for waste activities permit or IPPC permit the landfill operator specifies the identification code and the name of the accepted to the landfill waste determined with the provision in accordance with Art. 3 of the WMA.

(2) The competent authority in accordance with the landfill type includes in the waste activities permit or in the IPPC permit the list of waste types, which can be accepted in the landfill.

Article 34

(1) The criteria for acceptance of waste at a relevant class of landfill may be determined with the aim:

1. to protect the environment, in particular ground and surface water,
2. to preserve the protection of the environment systems together with the isolating shields and the leachate drainage and disposal system,
3. to ensure the desired waste-stabilization processes within the landfill,
4. to protect against harmful impact on the human health;

(2) Regarding the aims of paragraph 1, with the criteria for waste acceptance in the different landfill types in accordance with Annex 1 are laid down requirements for;

1. the waste type (municipal, construction, industrial or hazardous)
2. the waste composition and characteristics;
3. the amount of organic substances in the waste;
4. the biodegradability of the organic waste components,
5. the amount of the determined as hazardous components in the waste,
6. the leachability of the determined as hazardous components in the waste,
7. eco-toxicological characteristics of the waste and the generated leachate.

Article 35. (1) For the determination of the types of waste acceptable in corresponding class of landfill testing of waste is carried out in three stages as follows:

1. Basic characterization of waste with use of standardised or approved analysis methods and methods testing the behaviour of waste in the conditions of the landfill, by testing of the short and long-term leaching and/or the composition and the characteristics of the waste.

2. Test for determination of the compliance which consists in periodical testing by simplified procedures for testing of definite key parameters for determination of the compliance of received results with the results from the basic characterization and with the terms of the waste activities permit or the IPPC permit and/or with the criteria for acceptance of waste.

3. On-site verification including a visual inspection of each load of waste before and after unloading at the landfill site to confirm that waste:

- a) is the same type as that which was subject of the test for compliance and
- b) is the same as that is described in the accompanying documents.

(2) The waste owner makes basic waste characterization in accordance with (1), point 1, Part I, Chapter One, point 1.1 of the Annex 1.

(3) The landfill operator conducts a test for determination of the compliance at least one time yearly, which is focused on the key parameters, defined by the basic characterization of the waste and its behaviour in the leaching in accordance with (1), point 2 of Annex 1.

(4) The reports with the test results (in accordance with paragraph 1, point 1 and 2) are kept from the landfill operator by the time fixed in Art. 44 (1) and the results are presented to the competent authority on its demand.

(5) The landfill operator checks up all the waste arriving in the landfill at the control station in the sequence, determined in Part I, chapter 1, point 1.3 from Annex 1.

(6) The waste can be released from testing of paragraph 1, point 1 in accordance with Part I, Chapter One, point 1.1.4 of the Annex 1. The release is made by the competent authority, issued the waste activities permit or IPPC permit after explanation of the unimplementability of the testing, lack of suitable procedures for testing and criteria for acceptance or the legislative provision for testing.

(7) At the determination of characteristics and the testing of the waste are used methods in accordance with Part I, Chapter Three of Annex 1.

Article 36

The waste acceptance procedures in the landfills include:

1. presentation of the appropriate documentation (before or at the time of delivery, or at the first from series of deliveries, when the type of waste remains unchanged) from the holder or the operator of the waste as a proof, that:

a) the waste can be accepted at that site in accordance with the conditions set out in the waste activities permit or in the IPPC permit;

b) the waste answers the criteria of acceptance, established in this Part and in Part I, Chapter Two of the Annex 1.

2. Conducting entering control from the landfill operator, which consists of:

a) checking of the waste accompanying documentation;

b) measurement with an automatic weighting machine and electronic registration of the waste quantity, going into the landfill;

c) visual inspection of the waste at the entrance and at the point of deposit in order to verify the compliance of the waste with the description provided in the documentation submitted by the holder;

d) representative samples have to be taken in order to determine the compliance in accordance with Art. 35 (1), point 2, which shall be kept by the operator at least for three months;

3. keeping a register-book of the quantities and characteristics of the landfilled waste according the provision of Art. 27 of WMA, in which shall be registered the date of delivery, identity of the producer, including the person collecting and delivering the municipal waste, origin and identification code of the waste, and in the case of hazardous waste, the precise location of their deposition site.

4. written conformation for the acceptance of each delivery of waste provided by the landfill operator or by a person authorised by the operator;

5. immediate notification for the non-acceptance of the waste on the side of the operator submitted to the competent authority who signed the waste activity permit or the IPPC permit, when waste cannot be accepted at the landfill.

6. immediate notification on the side of the operator submitted to the competent authority who signed the waste activity permit or the IPPC permit, in the case of delivery of waste, which is subject of transboundary import and refusal for its acceptance at the landfill in accordance with the provision of Art. 72, paragraph 2 of WMA.

7. undertaking of the necessary measures on side of the landfill operators in the range of Article 12 in order to ensure:

a) a regular visual inspection of the waste at the point of deposit in order to guarantee that only non-hazardous waste from the island or from the isolated settlement is accepted at the site;

b) keeping of a register-book for the waste deposited at the site in accordance with the provision of Art. 27 of WMA.

Article 37

(1) The acceptance of the waste at the different classes of landfills is accomplished in observation of the following requirements:

1. at landfills for hazardous waste shall be deposited only hazardous waste;
2. at landfills for non-hazardous waste shall be deposited:
 - a) municipal waste, which fulfils the criteria for the acceptance of waste at a landfill, in accordance with Annex 1, Part I, Chapter Two, point 2.2.1.1.
 - b) non-hazardous waste of other origin (industrial, construction etc), which fulfils the criteria for the acceptance in accordance with Annex 1, Part I, Chapter Two, point 2.2.;
 - c) stable, non-reactive hazardous waste (e.g. solidified, vitrified), with leaching intensity equivalent to that of the non-hazardous waste fulfilling the relevant acceptance criteria in accordance with Annex 1, Part 1, Section 2, point 2.3.
3. at the landfills for inert waste shall be deposited only inert waste.

(2) The waste in accordance with (1), point 2, letter "c" shall not be deposited in cells designed for biodegradable non-hazardous waste.

Article 38

(1) At the landfill is accepted pre-treated waste.

(2) (1) is not applied for:

1. inert waste which pre-treatment is technically unfeasible;
2. other types of waste when the owner of waste puts in proof that pre-treatment will not contribute significantly for the reduction of the quantity or the hazardous characteristics of the waste, for the reduction of risk for the human health and restriction of harmful impact on the environment, caused from the waste deposition during the whole life cycle of the landfill.

Article 39

(1) At the landfill operation the operator shall:

1. accomplish control of the type and composition of the entering for disposal waste.
2. observe the accomplishment of the requirements in Art. 38 for pre-treatment of waste before their deposition.
3. observe the deposition technology, including daily covering with soil the working landfill area.
4. control the technological status of the equipment and the reliability of earth and building constructions and facilities.
5. recultivate the filled landfill cells.

(2) The deposition is accomplished by the operator and is controlled by the competent authority in accordance with the established rules and operation requirements, determined with the operational plan, which is an indivisible part of the technology project for deposition – Article 39, point 4 of WMA and specialized working maps in accordance with (3)

(3) For the landfill operation in sections and/or cells the operator designs a specialized working map, register and information systems following Chapter 4 "Specialized maps, registers and information systems. Additional cadastral data" of the Cadaster and Property Register Act, which documents the following data:

1. type and quantity of waste, deposited in the fields (parts of the working horizon) with area not wider than 1000 sq. m and height of deposition not higher than 2 m.
2. identification number of the field.
3. way of deposit, including depth and slope of the layers and type of machines, accomplishing the congestion.
4. duration of the deposition by date.

5. deviation from stipulations of the operational plan and other specific data for the field.

(4) The specialized working maps in accordance with (3) are completed for every working section of the landfill.

Article 40

(1) The landfill operator shall during the operational phase:

1. carry out a control and monitoring plan, developed as specified in Annex 3, as well as the measures, pointed in the waste activity permit or in the IPPC permit;

2. inform duly the competent authority about any pollution or harm on the environment above the acceptable standards determined at the implementation of the control and monitoring plan;

3. accomplish on its account the instructions of the competent authorities for elimination of the negative consequences from the pollution or the harm on the environment above the acceptable standards.

4. ensure the locking of the landfill gates out of the working time, trustful security for restriction of the free access to the landfill territory and prevention of the illegal waste dump at the landfill.

5. undertake measures to minimize the dangers and the damages caused by:

a) emissions of odours and dust,

b) wind-blown waste,

c) noise and traffic sources,

d) birds, vermin and insects,

e) formation of aerosols,

f) fires.

6. undertakes measures and provides the necessary installations and equipment to prevent the dissipation of the landfill waste onto public roads and the surrounding land.

7. undertakes the necessary measures to prevent accidents and limit their consequences;

(2) In accordance with the terms of the waste activities permit or the IPPC permit but at least one time yearly, the operator shall report, on the basis of aggregated data, all monitoring results to the competent authorities who issued the permit in order to prove the fulfilment of the permit terms and assessment of the landfill behaviour.

Article 41

The operator is responsible for the quality control of the analytical operations. For this purpose the operators assigns to independent testing laboratories, accredited by the Executive Agency "Bulgarian accreditation agency" the control and monitoring procedures and/or the testing of the representative samples in accordance with Art. 36 point 2(d).

Part IV

Closure of the landfill for waste

Article 42

(1) The procedure for landfill closure or closure of part of it or landfill cell shall start when one of the follow cases is present:

1. when the relevant terms for closure pointed out in the waste activity permit or in IPPC permit are met;

2. when the competent authority has expressed a positive decision at the request of the landfill operator to cease the landfill activity before the expiration of the term of the waste activity permit, respectively of the IPPC permit;

3. by reasoned decision of the competent authority for closure of the landfill.

(2) a landfill or part of it or a cell of it shall be considered as definitely closed only after written confirmation of the competent authority in virtue of a on-site inspection and assessment of the fulfilment of the landfill closure plan.

(3) the landfill closure in accordance with (2) shall not in any way release the operator from the responsibilities, evolving from the terms of the waste activities permit or the IPPC permit.

Article 43

(1) The landfill closure is accomplished in accordance with a preliminary prepared plan as the basic stages in it are determined with the investment project of the landfill.

(2) Landfill closure plan in accordance with (1) includes the following activities:

1. dismantling of the constructed permanent facilities, which are not related with the protection of the environment and with the future functional purpose of the area as the work-schedule of their dismantling, the technology of dismantling and the necessary qualification of the specialists and workers, engaged with the dismantle are pointed in the plan.
2. The surface sealing of the landfill, which is accomplished in accordance with the project for construction of the upper liner, including the technical and biological recultivation and the foreseen anti-erosion and anti-landslide activities.

Article 44

(1) The operator shall accomplish the maintenance and the after-care operations for landfill site, including monitoring and control of the environmental parameters for term not shorter than 30 years after the landfill closure or for as long as may be defined by the competent authority in accordance with the terms of the waste activities permit or the IPPC permit, taking into account the potential hazard of the landfill for the human health and the environment.

(2) The monitoring of the parameters of environment in accordance with (1), related with the maintenance and the after-care operations for the landfill, is accomplished by the landfill operator in accordance with the plan for control and monitoring set out in Annex 3.

(3) In case of pollution or harm on the environment above the acceptable standards, determined at the accomplishment of the plan for control and monitoring, the operator shall notify the competent authority in due time and shall accomplish on his account the instructions of the competent authorities for elimination of the negative consequences.

Chapter Three

OTHER FACILITIES AND INSTALLATIONS FOR WASTE RECOVERY AND DISPOSAL

Part I

Requirements to the facilities and the installations for biological treatment of biodegradable waste

Article 45

(1) For the biological treatment of the biodegradable waste the facilities and installations are constructed for:

1. composting;
2. anaerobic treatment;

3. mechanical or biological treatment;

(2) Facilities and installations for biological treatment of biodegradable waste are situated:

1. on open and covered sites;
2. in the closed premises.

(2) The method of biological disposal of biodegradable waste is determined depending on:

1. The waste composition including the morphological composition, capability for biochemical destruction, pH of the medium, the ratio carbon/nitrogen, availability of toxic compounds, activity and type of the micro-organisms, availability of biogene elements and water content;

2. The possibilities of the facilities and installations for creation of optimal conditions for biological treatment of relevant waste by type and composition, including the temperature of the medium, the way of the process accomplishment, the way of waste preparation, time for process elapse, possibilities for the use of the end product;

(3) Facilities and installations for biological treatment of biodegradable waste shall answer the following requirements:

1. the biological treatment shall be carried out in a way that minimize the harmful impact on the environment and the human health from the gas emissions and from the pollution of the surface and the underground water;

2. the biological treatment shall be accomplished by observing the concrete technology in order to get compost and fermentation products suitable for improvement of the quality and characteristics of the soil, as well as of the other end products, resulting from concrete technology.

Article 46

Biodegradable waste recovery by biological treatment is foreseen as an IPPC site, which can include:

1. basic facilities and installations for biological treatment, including:

- a) open or covered sites for composting in static heaps, heaps with the forcing aeration and/or with the mechanical turn;
- b) bioreactors – horizontal or vertical, with continuous or discontinuous regime of working, static or dynamic, cells, bio-tunnels with the rotation cylinder, etc.
- c) mesofilic and termofilic ferments;
- d) biogas recovery installation;

2. additional facilities and installations, including for:

- a) waste pre-treatment – installations for cutting, fragmentation, separation, overload, bolt etc.
- b) aeration with depression or compression;
- c) deposition, bolt, overload, packaging of the products etc.
- d) air purification and filtration from the unpleasant smell, bio-filters etc.
- e) making the materials in heaps, tunnels and others depending on the technology – mixture machines, conveyors, lifting machines, piling machines etc.;
- f) mechanical aeration;

- g) biogas purification from admixtures;
 - h) preserving of liquid and hard fermentation products;
 - i) preserving of biogas – reservoirs for biogas etc.
3. service buildings and facilities, including administrative and municipal buildings, technical infrastructure, garages etc.

Article 47

The basic facility or installation for biological treatment and the relevant service and additional buildings are determined depending on the type, composition and quantity of the waste, the possibilities for use of the end product and the requirements for protection of the human health and the environment.

Article 48

In order to be ensured the secure operation of the facilities and installations, used by biological treatment of the biodegradable waste and for protection of the human health and the environment, it is required:

1. the construction of the facility to insure possibilities for:
 - a) continuous observation and correction of the temperature, humidity and physico-chemical properties of the waste;
 - b) air circulation in the waste mass (for the facilities and installations by Art. 45 (1), points 1 and 3);
 - c) gathering and recovery of the generated biogas (for the facilities and installations by Art. 45 (1), point 2);
 - d) restriction of the pollution of the geological base, surface and underground water and air.
2. facilities and installations for the biological treatment of biodegradable waste must answer the following requirements also:
 - a) noise protection in accordance with the sanitary standards;
 - b) vibrations protection in accordance with the sanitary standards and the standards for the design of the foundations which are put on the impact of dynamic loads of machines.
3. the service buildings, premises and facilities to ensure the healthy and safety working conditions and the protection of the components of the environment in observation of the requirements of the legal acts for ensuring of healthy and safety working conditions, pointed in Chapter Four.

Part II

Facilities and installations for pre-treatment of waste

Article 49

Facilities and installations for pre-treatment of waste (separation, packaging, cutting, fragmentation etc.) are foreseen as:

1. additional sites to the basic facilities and installations for waste recovery and disposal;
2. independent sites for waste treatment.

Article 50

(1) Facilities and installations for the pre-treatment of waste (devices for sorting, vibrating-screens, installations for fragmentation and separation, including shredders, grinders, magnet, ballistic and other separators, installations for briquetting, baling, packaging etc) must ensure the protection of the environment in the same degree as the basic facilities and installations for waste recovery and disposal.

(2) Facilities and installations, sources of harmful radiations (electromagnetic separators, high-frequency generators) must answer the sanitary rules and standards.

Part III

Requirements to the operation of the facilities and installations for the waste recovery and disposal

Article 51

(1) The entering control of the waste is accomplished at the control checkpoint on the territory of the facilities and installations for waste recovery and disposal.

(2) The entering control of the waste is accomplished by the operator of the facilities and installations and includes:

1. checking of the documentation, accompanying the waste;
 2. measurement with an automatic weighting machine and electronic registration of the waste quantity, going into the landfill;
 3. visual inspection of the waste;
 4. taking of samples for the testing of accepted waste, when it is necessary to be ascertained if the waste responds to:
 - a) the requirements in accordance with the type, composition and characteristics, determined from the facilities and installations technology and/or
 - b) the waste description in the documentation, accompanying the delivery.
 5. keeping of the required documentation in accordance with the provision of Art. 27 of WMA, legalized by the Regional Inspection for Environment and Water (RIEW).
- (3) The operator of the landfill or an authorized person shall always provide written acknowledgement of the receipt of each delivery of waste accepted on the site.

Article 52

(1) Waste recovery and/or disposal are accomplished by the operator and is controlled by the competent authority in accordance with the set out rules and the operation requirements, determined with the operation plan, indivisible part of the technology project in accordance with Art. 39, point 4 from WMA.

(2) During the time of operation of the facilities and installations for waste recovery and disposal the operator shall:

1. accomplish the control regarding to the type and composition of the accepted for treatment waste;
2. keep to the technology for waste recovery and disposal;

3. observe the technology equipment and the reliability of the building constructions and facilities;

4. accomplish control regarding to emission the harmful substances in the air, surface and underground water, soil pollution and the impact on the other components of the environment in accordance with the requirements of legal acts in the field of the protection of the environment and the prescription of the competent authority that issued the permit or the IPPC permit.

Article 53

At the operation of the facilities and the installations for recovery and disposal of waste the necessary measures for protection against accidents and for restriction of their negative consequences shall be undertaken.

Article 54

The servicing, maintenance and the technical surveillance of the facilities and installations for waste recovery and treatment, classified as facilities with high danger are accomplished by observing of the relevant regulations of Art. 31 from LTRG.

CHAPTER FOUR

SECURING OF HEALTHY AND SAFETY WORKING CONDITIONS

Article 55

The operators of the landfills and of the facilities and installations for waste recovery and disposal according to Chapter Three are obliged to ensure healthy and safety working conditions for all employees and workers.

Article 56

At the organization and the realization of the working activity in regard to the operation of the landfills and of the facilities and installations for waste recovery and disposal in accordance with Chapter Three, the requirements of the legal acts for safety and healthy working conditions for the different types of activity, types of work and working equipment, in regard to the activities for recovery and disposal of waste, are fulfilled.

Article 57

During the operation of the landfills and the facilities and installations for waste recovery and disposal in accordance with Chapter Three fire protection is ensured in accordance with the requirements of FSCTS as:

1. the buildings are designed and constructed in accordance with the requirements of FSCTS;

2. at the operation of the landfills and the facilities and installations for waste recovery and disposal in accordance with Chapter Three the necessary equipment and inventory for fire protection in accordance with the requirements of FSCTS is ensured.

Article 58

The employers and the persons, who manage the working activities are obliged to develop and approve instructions for healthy and safety working conditions for the separate types of working places.

Chapter Five

REQUIREMENTS FOR STAFF QUALIFICATION AND TRAINING

Article 59

The management of the landfills and the facilities and installations for waste recovery and disposal in accordance with Chapter Three shall be assigned to a technically competent, natural person who possesses the required qualification.

Article 60

(1) The staff, engaged with the waste management activities, shall attend obligatory training courses and courses for qualification improvement in accordance with the measures, foreseen in the waste management activity program.

(2) the training and the qualification of the staff are carried out at the expense of the operator.

(3) the training in accordance with (1) obligatory includes:

1. waste management;
2. organization of the activities for waste recovery or disposal and of the activities related with the protection of the components of the environment for each separate work place.
3. obligations and responsibilities, related with the protection of the environment.
4. labour safety and safety technique and activities in crisis situations in facilities and installations for disposal of waste.

COMPLEMENTARY PROVISIONS

§ 1 For the purposes of this regulation:

1. "anaerobic decomposition" is a biological decomposition of the biodegradable waste in lack of oxygen, by controlling conditions and under the influence of micro-organisms in order to be produced bio-gas and fermentation products;

2. "biodegradable waste" is any kind of waste that is anaerobic or aerobic decomposable, such as food and garden waste, and paper and paperboard;

3. "landfill gases" are all the gases generated from the waste landfill.

4. a "landfill" is a waste disposal site for the deposit of the waste onto or into land (underground), including internal waste disposal sites (i.e. landfill where a producer of waste is carrying out its own waste disposal at the place of production), and a permanent site (i.e. more than one year) which is used for temporary storage of waste, but excluding: facilities where waste is unloaded in order to permit its preparation for further transport for recovery, disposal or disposal elsewhere, and storage of waste prior to recovery or disposal for a period less than three years as a general rule, or storage of waste prior to disposal for a period less than one year;

5. "eluate" means the solution obtained by a laboratory leaching test

6. "life cycle of the landfill" is the period including building, operation, closure and post operational care for the landfill;

7. an "applicant" means any person who applies for a landfill permit

8. "leaching" is taking out by leachate from the landfill body of all the chemical components, presented on Tables 2, 4, 5 and 7 of Annex 1 of the Regulation;

9. "isolated settlement" are settlements:

- a) with no more than 500 inhabitants per municipality or settlement and no more than five inhabitants per square kilometres and,
- b) where the distance to the nearest urban agglomeration with at least 250 inhabitants per square kilometres is no less than 50 km, or with difficult access by road to those nearest agglomerations, due to harsh meteorological conditions during a significant part of the year.

10. "inert waste" is the waste that:

- a) does not undergo any significant physical, chemical or biological transformations;
- b) is not dissolvable, does not burn or does not participate in other physical or chemical reactions;
- c) is not bio-degradable and/or has no negative effect on other substances with which it comes into contact in a way harming human health or polluting the environment;
- d) the total leachability and pollutant content of the waste and the ecotoxicity of the leachate must be insignificant, and in particular not endanger the quality of surface water and/or underground water;

11. "installation for waste recovery or disposal" is a stationary or movable technical facility or equipment for accomplishing of activities or operations, related with the waste recovery and disposal, situated at the area of the landfill site;

12. "leachate" means any liquids percolating through the deposited waste and emitted from or contained within a landfill;

13. "competent authority" in accordance with the requirements of this regulation including duly undertaking of necessary and proper measures and activities for their accomplishment as:

- a) the Minister of the Environment and Water – for the landfills, facilities and installations in accordance with chapter Third, Annex 4 of the EPA, as well as in the cases in accordance with Art. 37 of WMA.

- b) Director of the Regional Inspectorate for Environment and Water – in case of Art. 37 (1) of WMA and Art. 117 (3) of EPA.

14. "composting" means the exothermic and thermophilic biological decomposition of biodegradable waste in the presence of oxygen and under controlled conditions by the action of micro- and macro-organisms in order to produce compost.

15. "compost" means the stable, sanitized and humus-like material rich in organic matter and free from offensive odours resulting from the composting process.

16. "mechanical/biological treatment" is the disposal of the residual municipal waste, unsorted waste or other biodegradable waste, uncompostable or anaerobic-decomposable with the aim to reduce the quantity of the waste;

17. "non-hazardous waste" means waste which does not possess hazardous characteristics and is not classified as hazardous waste in accordance with the proposed regulation and Art. 3 of WMA;

18. "operator" means the natural or legal person who is landfill owner or is responsible for a landfill in accordance with the requirements of the internal legislation in the field of protection of the environment. The person may be different during the different phases of the operation and of the after-care activities;

19. "underground storage activity" means a permanent waste storage activity in a deep geological cavity (mining ore facility) such as a salt or potassium mine;

20. "underground storage facility" is a facility for underground storage of waste;

21. "pre-treatment" are all the physical, thermal, chemical or biological processes, including sorting, that change the characteristics of the waste in order to reduce its quantity or hazardous nature, in order to facilitate its further treatment or to enhance its ability for recovery;

22. "holder" means the producer of the waste in accordance with Article 5 (1) of WMA.

23. "post-operational care for the landfill" are the activities for maintenance of the landfill site after its closure, realization of control and observation of the environmental

parameters (monitoring) and elimination of eventual negative consequences of the landfill impact on the environment and human health for the determined by the competent authority post-operational period of the landfill;

24. "facilities for waste recovery and disposal" is each construction facility, installation or other stationary or movable technical facility or equipment for the accomplishment of activities and operations related with the recovery and disposal of waste, including the service technical infrastructure and additional and service buildings, construction facilities or movable facilities;

25. "existing landfill for waste" is a landfill which is in operation or which operation is ceased, but without written confirmation from the competent authority to the operator for the closure of the landfill;

26. "liquid waste" means any waste in liquid form including waste water but excluding sludge from water treatment plant;

27. "stable non-reactive hazardous waste" is the waste, which leaching behaviour does not change significantly during long time period in accordance with the designed landfill conditions or as a result of incidents, which may be caused by:

- a) the waste itself (for example in result of biodegradation);
- b) the continuous environmental impact on it (for example from water, air, temperature and mechanical impacts);
- c) other waste impact (including residual products as leachate and gas).

28. "fermentation products" are the products, formed as a result of anaerobic decomposition of the separate collected biodegradable waste.

TRANSITIONAL AND CONCLUDING PROVISIONS

§ 2. (1) The Minister of Environment and Water confirms the National strategy for gradual reduction of the quantity of biodegradable waste destined for landfilling.

2. The strategy shall ensure the accomplishment of the following purposes:

1. not later than 2010 the quantity of biodegradable municipal waste, destined for landfilling, must be reduced to 75% of the total quantity (by weight) of biodegradable municipal waste produced in 1995;

2. not later than 2013 the quantity of biodegradable municipal waste, destined for landfilling, must be reduced to 50% of the total quantity (by weight) of biodegradable municipal waste produced in 1995;

3. not later than 2020 the quantity of biodegradable municipal waste, destined for landfilling, must be reduced to 35% of the total quantity (by weight) of biodegradable municipal waste produced in 1995;

§ 3 (1) In accordance with the Strategy, §2 (2) in the programs, Art. 29 (1), point 1 of WMA corresponding measures for the gradual reduction of biodegradable waste destined for landfilling are foreseen.

§ 4. (1) The provisions of the Art. 32 (1), point 2 and 3, Art. 35 (1), point 1, 2, 3 letter "a", Annex 1 except Part I, Chapter Two, point 2.2.3 and all other provision, which transmit to Annex 1 shall be applied from 1.01.2007.

(2) Until the term in (1) comes, at the landfills for non-hazardous waste is deposited:

1. municipal waste;
2. non-hazardous waste with other origin (industrial, construction etc.);
3. waste, containing asbestos, keeping to the conditions in Part I, Chapter Two, point 2.3.3. of Annex 1.

(3) The Minister of Environment and Water no later than the term in (1) defines with an order the procedures for basic characterization of the waste and for testing for determination of the compliance.

(4) The Minister of Environment and Water no later than the term in (1) defines with an order the procedures for testing of the waste and the requirements for on-site verification, including the methods for quick test of the waste.

(5) The Minister of Environment and Water no later than the term in (1) defines with an order the criteria for acceptance of monolithic waste at the relevant classes of landfill for waste.

§ 5 (1) The operation of the existing landfill is to be ceased when in term to 30.09.2005 the landfill has not a plan for compliance with the provisions of this regulation, approved by the competent authority in accordance with Art. 37 of WMA.

(2) The operators of the existing landfills in term to 31.03.2005 are obliged to prepare and to present for the approval to the Director of the RIEW, on which territory the landfill is situated, a plan for compliance with the provisions of this regulation.

(3) The plans for compliance of the existing landfills with the provisions of this regulation are approved by:

1. The Director of the RIEW, on which territory the landfill is situated, for the landfills, where the municipal and inert waste is deposited.

2. The Minister of Environment and Water or authorized by him person after presentation of standpoint from the Director of the RIEW – for the landfill, where the industrial and hazardous waste is deposited.

(4) The plans in accordance with (2) foresee the measures for stoppage of the operation, closure and/or bringing the existing landfills in compliance with the requirements of this regulation, with dead-line for the realization of the plans as follows:

1. landfills for inert and non-hazardous (municipal, construction and industrial) waste – to 16.07.2009;

2. landfills for hazardous waste – to 31.12.2006;

3. landfills in accordance with Annex 1 of WMA – to 31.12.2014.

(5) on the basis of the information, presented together with the plan in accordance with (3), the competent authorities shall take decision for approval or for returning of the plans, as they can stipulate and prescribe measures and terms for their implementation, that can be shorter than the terms, determined in (4) after evaluation of the risk for the environment and for the human health.

(6) The dead-line for stoppage of the operation of the existing landfill for municipal waste is until the entering into operation of the relevant municipal regional landfill, which is foreseen with the National program for the waste activity management.

(7) For the available landfill, which will be closed to 31.12.2006 the requirements for surface sealing in accordance with Article 20 and Annex 2, chapter 4 can not apply as a whole in case that the human health and environment are not threatened.

(8) The competent authorities can ask for additional information by persons, who implement and present the plans for clarifying the facts and circumstances, related with the available landfill, with the aim to make decision.

(9) Instructions for plans implementation of the available landfill in accordance with the requirements are approved with an order of the Minister of Environment and Water.

§ 6. The edict of Art. 14 (1), letter “b” has to be applied from 16.07.2006.

§ 7. The edict of Art. 38 has to be applied from 01.01.2007.

§ 8. The Regulation is issued on the grounds of Art. 15 (2) from the WMA.

**MINISTER FOR ENVIRONMENT AND WATER
(Dolores Arsenova)**

Agreement:

**MINISTER FOR HUMAN HEALTH
(Silavtcho Bogoev)**

**MINISTER OF AGRICULTURE AND FORESTS
(Mehmed Dikme)**

**MINISTER OF THE REGIONAL DEVELOPMENT AND PUBLIC WORKS
(Valentin Tzerovski)**

Annex 1 to the Regulation for the conditions and requirements for building and operation of landfill and other facilities and installations for waste recovery and disposal

This Annex introduces the procedures and criteria for the waste acceptance at the landfills and the accomplishment of safety assessment of the underground storage of waste.

PART I. PROCEDURE AND CRITERIA FOR WASTE ACCEPTANCE AT THE LANDFILLS

SECTION 1. PROCEDURE FOR THE ACCEPTANCE OF WASTE AT THE LANDFILLS

1.1. Basic characterization of the waste

The basic characterization of the waste is the first step in the acceptance procedure and constitutes a full characterization of the waste by gathering all the necessary information for their safety disposal of the waste in the long-term aspect. The basic characterization is required for each type of waste.

1.1.1. Scope of basic characterization

The basic characterization of the waste includes:

(a) Basic information on the waste – type (municipal, construction, industrial or hazardous) and origin, composition, consistency, behaviour at leachability and — where is necessary and possible — other features characterizing the waste.

(b) Basic information for understanding the behaviour of waste in landfills and for the possibilities for treatment in accordance with the requirements of Article 38 of the Regulation.

(c) Comparison of the waste characteristics with the limit values for waste acceptance at the relevant class of landfill.

(d) Detection of key parameters for compliance testing and options for simplification of compliance testing (with the purpose to decrease significantly the tested constituents, but only after presentation of relevant information). Characterization may deliver ratios between basic characterization and results of simplified testing procedures as well as the frequency for compliance testing.

1.1.1.1. If the basic characterization of waste shows that the waste fulfils the criteria for the relevant landfill class as laid down in section 2, the waste can be accepted at this landfill class.

1.1.1.2. The producer of the waste or, in default, the person responsible for its management, is responsible for ensuring that the characterization information is correct.

1.1.1.3. The operator shall keep records of the required information for a period to be defined by the Article 44 (1) from the Regulation.

1.1.2. Fundamental requirements for basic characterization of the waste

- (a) Source and origin of the waste;
- (b) Information on the process producing the waste (description and characteristics of raw materials and products);
- (c) Description of the waste disposal applied in compliance with Article 38) of the Landfill Regulation, or a statement of reasons why such disposal is not considered necessary;
- (d) Data on the composition of the waste and the leaching behaviour, where relevant;
- (e) Appearance of the waste (smell, colour, physical form)
- (f) Code in accordance with the Article 38 from Waste Management Act (WMA);
- (g) For hazardous waste in case of mirror entries: the relevant hazard properties in accordance with Article 3 of WMA;)
- (h) Information to prove that the waste does not fall under the exclusions of Article 14 (1)) from the Landfill Regulation;
- (i) The landfill class at which the waste maybe accepted;
- (j) If necessary, additional precautions to be taken at the landfill;
- (k) Check if the waste can be recycled or recovered.

1.1.3. Testing

1.1.3.1. As a general rule waste must be tested to obtain the above information (point 1.1.2.). In addition to the leaching behaviour, the composition of the waste must be known or determined by testing. The tests used for basic characterization must always include those to be used for compliance testing.

1.1.3.2. The content of the characterization, the extent of laboratory testing required and the relationship between basic characterization and compliance checking depends on the type of waste. A differentiation can be made between:

- (a) wastes that are regularly generated in the same process;
- (b) wastes that are not regularly generated.

1.1.3.2.1. Wastes regularly generated in the same process.

These are individual and consistent wastes regularly generated in the same process, where:

- a) the installation and the process generating the waste are well known and the input materials to the process and the process itself are well defined,
- b) the operator of the installation provides all necessary information and informs the operator of the landfill of changes to the process (especially changes to the input material).
- c) the process will often be at a single installation. The waste can also be from different installations, if it can be identified as single stream with common characteristics within known boundaries (e.g. bottom ash from the incineration of municipal waste).

For these wastes by point 1.1.3.2.1. the basic characterization will comprise the fundamental requirements listed in section 1.1.2 and especially the following:

- a) compositional range for the individual wastes,
- b) range and variability of characteristic properties,
- c) if required, the leachability of the wastes determined by a batch leaching test and/or a percolation test and/or a pH dependence test,
- d) key variables to be tested on a regular basis.

If the waste is produced in the same process in different installations, information must be given on the scope of the evaluation. Consequently, a sufficient number of measurements must be taken to show the range and variability of the characteristic properties of the waste. The waste can then be considered characterized and shall subsequently be subject to compliance testing only, unless significant change in the generation processes occurs.

For wastes from the same process in the same installation, the results of the measurements may show only minor variations of the properties of the waste in comparison with the appropriate limit values. The waste can then be considered characterized, and shall subsequently be subject to compliance testing only, unless significant changes in the generation process occur.

Waste from facilities for the bulking or mixing of waste, from waste transfer stations or mixed waste streams from waste collectors, can vary considerably in their properties. This must be taken into consideration in the basic characterisation.

1.1.3.2.2. Wastes that are not regularly generated

These wastes are not regularly generated in the same process in the same installation and are not part of a well-characterized waste stream.

Each batch produced of such waste will need to be characterized. The basic characterization shall include the fundamental requirements by pointed in section 1.1.2. for basic characterization. As each batch produced has to be characterized, no compliance testing is needed.

1.1.4. Cases where testing is not required

1.1.4.1. Testing for basic characterization can be dispensed with in the following cases:

(a) the waste is on a list of wastes not requiring testing as laid down in section 2 of this Annex;

(b) all the necessary information, for the basic characterization, is known and duly justified to the full satisfaction of the competent authority;

(c) certain waste types where testing is impractical or where appropriate testing procedures and acceptance criteria are unavailable.

1.1.4.2. The practical unavailability of the appropriate testing procedures and acceptance criteria must be justified and documented, including the reasons why the waste is deemed acceptable at this landfill class.

1.2. Compliance testing

1.2.1. When waste has been deemed acceptable for a landfill class on the basis of a basic characterization pursuant to section 1.1, it shall subsequently be subject to compliance testing to determine if it complies with the results of the basic characterization and the relevant acceptance criteria as laid down in section 2.

1.2.2. The function of compliance testing is periodically to check regularly arising waste streams.

1.2.3. The relevant parameters to be tested are determined in the basic characterization. Parameters should be related to basic characterization information; only a check on critical parameters (key variables), as determined in the basic characterization, is necessary. The check has to show that the waste meets the limit values for the critical parameters.

1.2.4. The tests used for compliance testing shall be one or more of those used in the basic characterization. The testing shall consist at least of a batch leaching test. For this purpose the methods listed under Section 3 shall be used.

1.2.5. Wastes that are exempted from the testing requirements for basic characterization in section 1.1.4(a) and section 1.1.4(c) are also exempted from compliance testing. They will, however, need checking for compliance with basic characterization information other than testing.

1.2.6. Compliance testing shall be carried out at least one time yearly and the operator must, in any event, ensure that compliance testing is carried out in the scope and frequency determined by basic characterization.

1.2.7. Records of the test results shall be kept for a period that is determined by the Article 44 (1) of the Regulation

1.3. On-site verification

1.3.1. Each load of waste delivered to a landfill shall be visually inspected before and after unloading. The required documentation shall be checked according to the provision of Article 27 (1) of WMA.

1.3.2. For waste deposited by the waste producer at a landfill in his control, this verification maybe made at the point of dispatch.

1.3.3. The waste maybe accepted at the landfill, if it is the same as that which has been subjected to basic characterization and compliance testing and which is described in the accompanying documents. If this is not the case, the waste must not be accepted.

1.3.4. Upon delivery, samples shall be taken periodically. The samples taken shall be kept after acceptance of the waste for a period (not less than one per three months after waste acceptance).

SECTION 2. WASTE ACCEPTANCE CRITERIA

This section sets out the criteria for the acceptance of waste at each landfill class, including criteria for underground storage.

In certain circumstances, up to three times higher limit values for specific parameters listed in this section (other than dissolved organic carbon (POB/DOC) in sections 2.1.2.1, 2.2.2, 2.3.1 and 2.4.1, BTEX, PCBs and mineral oil in section 2.1.2.2, total organic carbon (TOC) and pH in section 2.3.2 and loss on ignition (LOI) and/or TOC in section 2.4.2, and restricting the possible increase of the limit value for TOC in section 2.1.2.2 to only two times the limit value) are acceptable, if

a) the competent authority gives a waste activities permit or IPPC permit for specified wastes on a case-by-case basis for the recipient landfill, as at issuing of the permit it takes into account the characteristics of the landfill and its surroundings and the state of the environment, and

b) emissions (including leachate) from the landfill, taking into account the limits for those specific parameters in this section, will present no additional risk to the environment in accordance with a risk assessment.

2.1. Criteria for landfills for inert waste

2.1.1. List of wastes acceptable at landfills for inert waste without testing

2.1.1.1. Wastes in Table 1 are assumed to fulfil the criteria as set out in the definition of inert waste in §1, point 10 of the Additional provisions of the Regulation and the criteria listed in section 2.1.2. The waste can be admitted without testing at a landfill for inert waste.

2.1.1.2. The waste must be a single stream (only one source) of a single waste type. Different wastes contained in the list by Article 33 (2) for the correspondent landfill maybe accepted together, provided they are from the same source.

2.1.1.3. In case of suspicion of inert waste contamination either from visual inspection or from knowledge of the origin of the waste testing should be applied or the waste refused. If the listed wastes are contaminated or contain other material or substances such

as metals, asbestos, plastics, chemicals, etc. to an extent which increases the risk, associated with the waste sufficiently to justify their disposal in other classes of landfills, they may not be accepted in a landfill for inert waste.

2.1.1.4. If there is a doubt that the waste does not fulfil the definition of inert waste in accordance with v § 1, point 10 of the Additional provisions of the Regulation and the criteria listed in section 2.1.2 or about the lack of contamination of the waste, testing must be applied. For this purpose the methods listed under section 3 shall be used.

Table 1

EWC code	Description	Restrictions
1011 03	Waste glass-based fibrous materials	Only without organic binders
1501 07	Glass packaging	
1701 01	Concrete	Concrete Selected C & D waste only (*)
1701 02	Bricks	Concrete Selected C & D waste only (*)
1701 03	Tiles and ceramics	Concrete Selected C & D waste only (*)
1701 07	Mixtures of concrete, bricks, tiles and ceramics	Concrete Selected C & D waste only (*)
1702 02	Glass	
1705 04	Soils and stones	Only from garden and parks waste; Excluding top soil, peat
1912 05	Glass	
2001 02	Glass	Glass Separately collected glass only
2002 02	Soils and stones	Only from garden and parks waste; Excluding top soil, peat

Note:

(*). Selected construction and demolition waste (C & D waste): with low contents of other types of materials (like metals, plastic, soil, organics, wood, rubber, etc). The origin of the waste must be known.

It is not accepted:

a) No C & D waste from constructions, polluted with inorganic or organic dangerous substances, e.g. because of production processes in the construction, soil pollution, storage and usage of pesticides or other dangerous substances, etc., unless it is made clear that the demolished construction was not significantly polluted.

b) No C & D waste from constructions, treated, covered or painted with materials, containing dangerous substances in significant amounts.

2.1.1.5. Waste not appearing in Table 1 must be subject to testing as laid down under section 1 to determine if it fulfils the criteria for waste acceptable at landfills for inert waste as set out in 2.1.2.

2.1.2. Limit values for waste acceptable at landfills for inert waste

2.1.2.1. Leaching limit values

The following leaching limit values apply for waste acceptable at landfills for inert waste, calculated at liquid to solid ratios (L/S) of 2 l/kg and 10 l/kg for total release and directly expressed in mg/l for C₀ (the first eluate of percolation test at L/S = 0,1 l/kg). Testing methods for limit values determination (see section 3) are pointed in Table 2.

Table 2

Component	L/S = 2 l/kg	L/S = 10 l/kg	C ₀ (testing for percolation)
	mg/kg dry substance	mg/kg dry substance	mg/l
As	0.1	0.5	0.06
Ba	7	20	4
Cd	0.03	0.04	0.02
Cr total	0.2	0.5	0.1
Cu	0.9	2	0.6
Hg	0.003	0.01	0.002
Mo	0.3	0.5	0.2
Ni	0.2	0.4	0.12
Pb	0.2	0.5	0.15
Sb	0.02	0.06	0.1
Se	0.06	0.1	0.04
Zn	2	4	1.2
Chloride	550	800	460
Fluoride	4	10	2.5
Sulphate	560 (*)	1 000 (*)	1 500
Phenol index	0,5	1	0,3
POB (DOC) (**)	240	500	160
OPTB (TDS) (***)	2 500	4 000	—

Note:

(*). If the waste does not meet these values for sulphate, it may still be considered as complying with the acceptance criteria if the leaching does not exceed either of the following values: 1 500 mg/l as C₀ at L/S = 0,1 l/kg and 6 000 mg/kg at L/S = 10 l/kg. It will be necessary to use a percolation test to determine the limit value at L/S = 0,1 l/kg under initial equilibrium conditions, whereas the value at L/S = 10 l/kg maybe determined either by a batch leaching test or by a percolation test under conditions approaching local equilibrium.

(**). If the waste does not meet these values for DOC at its own pH value, it may alternatively be tested at L/S = 10 l/kg and a pH between 7,5 and 8,0. The waste maybe considered as complying with the acceptance criteria for DOC, if the result of this determination does not exceed 500 mg/kg.

(***). The values for total dissolved solids (TDS) can be used alternatively to the values for sulphate and chloride.

2.1.2.2. Limit values for total content of organic parameters

For waste, accepted in landfill for inert waste are applied except the limit leaching values, pointed in Table 2, and also the limit values for total content of organic parameters, in accordance with Table 3.

Table 3

Parameter	Value Mg/kg
Total organic carbon – TOC	30 000 ⁽¹⁾
Benzene, toluene, ethylbenzene and xylenes – BTEX	6
Polychlorinated biphenyls, 7 congeners – PCBs	1
Mineral oil (C10 to C40)	500
Polycyclic aromatic hydrocarbons - PAHs	1 000

Note:

1. For soils the competent authority, issued the permit for waste activities or the IPPC permit can allow higher admissible values in the case that value of 500 mg/kg for DOS is achieved at L/S = 10 l/kg, by properly pH of the soil or by values of pH between 7.5 and 8.

2.2. Criteria for landfills for non-hazardous waste

In this Annex limit values are laid down only for non-hazardous waste, which is landfilled in the same cell with stable, non-reactive hazardous waste.

2.2.1. Wastes acceptable at landfills for non-hazardous waste without testing

2.2.1.1. Municipal waste as defined in § 1, τ. 2 of the additional decrees of WMA that is classified as non-hazardous in the Regulation, Article 3 of WMA, separately collected non-hazardous fractions of household wastes and the same non-hazardous materials from other origins can be admitted without testing at landfills for non-hazardous waste.

2.2.1.2. The wastes in accordance with point 2.2.1.1. may not be admitted if they have not been subjected to prior disposal in accordance with Article 38 (1) of the Regulation, or if they are contaminated to an extent which increases the risk associated with the waste sufficiently to justify their disposal in other facilities.

2.2.1.3. They may not be accepted in cells, where stable, non-reactive hazardous waste is accepted pursuant to point 2.2.1.1. of the Regulation.

2.2.2. Limit values for non-hazardous waste

2.2.2.1. In Table 4 the following limit values apply to granular non-hazardous waste accepted in the same cell as stable, non-reactive hazardous waste, calculated at L/S = 2 and 10 l/kg for total release and directly expressed in mg/l for C₀ (in the first eluate of percolation test at L/S = 0,1 l/kg). Granular wastes include all wastes that are not monolithic.

Methods (see Part 3) for determination of corresponding limit values in the procedure of waste testing are pointed in Table 4.

Table 4

Components	L/S = 2 l/kg	L/S = 10 l/kg	C ₀ ,(percolation test)
	mg/kg dry substance	mg/kg dry substance	Mg/l
As	0,4	2	0,3
Ba	30	100	20
Cd	0,6	1	0,3
Cr total	4	10	2,5
Cu	25	50	30

Hg	0,05	0.2	0,03
Mo	5	10	3,5
Ni	5	10	3
Pb	5	10	3
Sb	0,2	0.7	0,15
Se	0,3	0.5	0,2
Zn	25	50	15
Chloride	10 000	15 000	8 500
Fluoride	60	150	40
Sulphate	10 000	20 000	7 000
-DOC ⁽¹⁾	380	800	250
-TDS ⁽²⁾	40 000	60 000	-

Note:

1. if the waste does not meet these values for DOC at its own pH, it may alternatively be tested at L/S = 10 l/kg and a pH of 7,5-8,0. The waste maybe considered as complying with the acceptance criteria for DOC, if the result of this determination does not exceed 800 mg/kg.

2. The values for total dissolved solids (TDS) can be used alternatively to the values for sulphate and chloride.

2.2.2.2. The criteria for monolithic waste have to provide the same level of protection of the environment as given by the above limit values, pointed in Table 4.

2.2.3. Gypsum waste

Non-hazardous gypsum-based materials should be disposed of only in landfills for non-hazardous waste in cells where no biodegradable waste is accepted. The limit values for TOC and DOC given in sections 2.3.2 and 2.3.1 shall apply to wastes landfilled together with gypsum-based materials.

2.3. Criteria for hazardous waste acceptable at landfills for non-hazardous waste pursuant to Article 37 (1), point 2 “c” of the Regulation

Stable, non-reactive means that the leaching behaviour of the waste will not change adversely in the long-term, under landfill design conditions or foreseeable accidents:

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

2.3.1. Leaching limit values

2.3.1.1. The following leaching limit values apply to granular hazardous waste acceptable at landfills for non-hazardous waste, calculated at L/S = 2 and 10 l/kg for total release and directly expressed in mg/l for C₀ (the first eluate of percolation test at L/S = 0,1 l/kg) are dived in Table 5. Granular wastes include all wastes that are not monolithic in the process of limit values determination, used methods in corresponding with Part 3.

Table 5

Components	L/S = 2 l/kg	L/S = 10 l/kg	C ₀ (percolation test)
	mg/kg dry substance	mg/kg dry substance	Mg/l

As	0,4	2	0,3
Ba	30	100	20
Cd	0,6	1	0,3
Cr total	4	10	2,5
Cu	25	50	30
Hg	0,05	0.2	0,03
Mo	5	10	3,5
Ni	5	10	3
Pb	5	10	3
Sb	0,2	0.7	0,15
Se	0,3	0.5	0,2
Zn	25	50	15
Chloride	10 000	15 000	8 500
Fluoride	60	150	40
Sulphate	10 000	20 000	7 000
DOC ⁽¹⁾	380	800	250
TDS ⁽²⁾	40 000	60 000	-

Note:

1. If the waste does not meet these values for DOC at its own pH, it may alternatively be tested at L/S = 10 l/kg and a pH of 7,5-8,0. The waste maybe considered as complying with the acceptance criteria for DOC, if the result of this determination does not exceed 800 mg/

2. The values for TDS can be used alternatively to the values for sulphate and chloride.

2.3.1.2. The criteria for monolithic waste shall to provide the same level of protection of the environment as given by the limit values of granular waste, pointed in Table 5.

2.3.2. Other criteria for acceptance of stable non-reactive hazardous waste in landfill for non-hazardous waste

2.3.2.1. In addition to the leaching limit values under section 2.3.1, granular hazardous wastes must meet the following additional criteria, pointed in Table 6:

Table 6

Parameters	values
total organic carbon – TOC	5% ⁽¹⁾
pH	minimum 6
acid neutralisation capacity – ANC	Must be evaluated

Note:

1. If this value is not achieved, a higher limit value maybe admitted by the competent authority, provided that the DOC value of 800 mg/kg is achieved at L/S = 10 l/kg, either at the material's own pH or at a pH value between 7,5 and 8,0.

2.3.2.2. Granular hazardous waste must set criteria to ensure that the waste will have sufficient physical stability and bearing capacity.

2.3.2.3. The criteria for monolithic wastes shall be set out in order to ensure that hazardous monolithic wastes are stable and non-reactive before acceptance in landfills for non-hazardous waste.

2.3.3. Conditions for asbestos waste acceptance at the landfills for non-hazardous waste

Construction materials containing asbestos and other suitable asbestos waste may be landfilled at landfills for non-hazardous waste without testing.

For landfills receiving construction materials containing asbestos and other suitable asbestos waste the following requirements must be fulfilled:

- the waste contains no other hazardous substances than bound asbestos, including fibres bound by a binding agent or packed in plastic,

- the landfill accepts only construction material containing asbestos and other suitable asbestos waste. These wastes may also be landfilled in a separate cell of a landfill for non-hazardous waste, if the cell is sufficiently self-contained.

- in order to avoid dispersion of fibres, the zone of deposit is covered daily and before each compacting operation with appropriate material and, if the waste is not packed, it is regularly sprinkled;

- a final top cover is put on the landfill/cell in order to avoid the dispersion of fibres;

- no works are carried out on the landfill/cell that could lead to a release of fibres (e.g. drilling of holes);

- after closure a plan is kept of the location of the landfill/cell indicating that asbestos wastes have been deposited for the term pursuant to Article 44 (1) of the Regulation;

- after closure a plan is kept of the location of the landfill/cell indicating that asbestos wastes have been deposited. Appropriate measures are taken to limit the possible uses of the land after closure of the landfill in order to avoid human contact with the waste.

For landfills receiving only construction material containing asbestos, the requirements set out in Articles 19 and 20 of this Regulation can be reduced, if the above requirements are fulfilled.

2.4. Criteria for waste acceptable at landfills for hazardous waste

2.4.1. Leaching limit values for hazardous waste

2.4.1.1. The following leaching limit values apply for granular waste acceptable at landfills for hazardous waste, calculated at L/S = 2 and 10 l/kg for total release and directly expressed in mg/l for C₀ (in the first eluate of percolation test at L/S = 0,1 l/kg). Granular wastes include all wastes that are not monolithic. Member Methods for the waste testing, pointed in Part 3, to assess the corresponding limit values in the Table 7 should be used.

Table 7

Components	L/S = 2 l/kg		L/S = 10 l/kg		C ₀ (percolation test)
	mg/kg substance	dry	mg/kg substance	dry	Mg/l
As	6		25		3
Ba	100		300		60
Cd	3		5		1,7
Cr total	25		70		15
Cu	50		100		60
Hg	0,5		2		0,3
Mo	20		30		10
Ni	20		40		12
Pb	25		50		15
Sb	2		5		1
Se	4		7		3
Zn	90		200		60
Chloride	17 000		25 000		15 000
Fluoride	200		500		120
Sulphate	25 000		50 000		17 000
DOC ⁽¹⁾	480		1 000		320
TDS ⁽²⁾	70 000		100 000		-

Note:

1. If the waste does not meet these values for DOC at its own pH, it may alternatively be tested at L/S = 10 l/kg and a pH of 7,5-8,0. The waste may be considered as complying with the acceptance criteria for DOC, if the result of this determination does not exceed 1 000 mg/kg.

2. The values for TDS can be used alternatively to the values for sulphate and chloride.

2.4.1.2. The criteria for monolithic wastes have to provide the same level of protection of the environment as the limit values for the granular hazardous waste, pointed in Table 7.

2.4.2. Other criteria for acceptance of granular hazardous waste in the landfill for hazardous waste

In addition to the leaching limit values under section 2.4.1, granular hazardous wastes must meet the following additional criteria, pointed in Table 8:

Table 8

Parameters	Value
Loses – LOI ⁽¹⁾	10 %
Total organic carbon TOC ⁽¹⁾	6 % ⁽²⁾
Acid neutralisation capacity – ANC	Has to be calculated

Note:

1. Either LOI or TOC must be used.

2. If this value is not achieved, a higher limit value maybe admitted by the competent authority, provided that the DOC value of 1 000 mg/kg is achieved at L/S = 10 l/kg, either at the material's own pH or at a pH value between 7,5 and 8,0.

2.5. Criteria for underground storage

2.5.1. For the acceptance of waste in underground storage sites, a site-specific safety assessment as defined in Part II of the Annex must be carried out. Waste maybe accepted only if it is compatible with the site-specific safety assessment.

2.5.2. At underground storage sites for inert waste, only waste that fulfils the criteria set out in section 2.1 maybe accepted.

2.5.3. At underground storage sites for non-hazardous waste, only waste that fulfils the criteria set out in section 2.2 or in section 2.3 maybe accepted.

2.5.4. At underground storage sites for hazardous waste, waste maybe accepted only if it is compatible with the site-specific safety assessment. In this case, the criteria set out in section 2.4 do not apply. However, the waste must be subject to the acceptance procedure as set out in section 1.

SECTION 3. SAMPLING AND TEST METHODS

3.1. Sampling and testing for basic characterization and compliance testing shall be carried out by laboratories, authorized by the Executive agency “Bulgarian accreditation agency”.

3.2. It is allowed that:

a) the sampling may be carried out by producers of waste or operators under the condition that sufficient supervision of independent and qualified persons or institutions,

authorized by the Executive agency “Bulgarian accreditation agency” to achieve the requirements of this Annex;

b) the testing of the waste maybe carried out by producers of waste or operators if the have set up an appropriate quality assurance system including periodic independent checking.

3.3. Sampling and testing for basic characterization and compliance testing shall be carried out in accordance with:

3.3.1. European standards, entering as Bulgarian standards.

3.3.2. European standards, entering as Bulgarian standards – when standards in accordance with point 3.3.1. are not available

3.3.3. National standards – when standards in accordance with points 3.3.1. and 3.3.2. are not available.

3.3.4. International and national standards of other countries – when standards in accordance with points 3.3.1, 3.3.2. and 3.3.3. are not available.

3.3.5. Methods improved together with the laboratory accreditation from the Executive Agency “Bulgarian accreditation agency”, when standards in accordance with points 3.3.1., 3.3.2., 3.3.3. and 3.3.4. are not available

3.4. For the sampling of waste — for basic characterization, compliance testing and on-site verification testing — a sampling plan shall be developed in accordance with the acting Bulgarian standard or approved methods in order of point 3.3.4.

Part II SAFETY ASSESSMENT FOR ACCEPTANCE OF WASTE IN UNDERGROUND STORAGE

1. Safety philosophy for underground storage. All types

1.1. The importance of the geological barrier

1.1.1. Insulation of wastes from the biosphere is the ultimate objective for the final disposal of wastes in underground storage. The wastes, the geological barrier and the cavities, including any engineered structures constitute a system that together with all other technical aspects must fulfil the corresponding requirements.

1.1.2. The disposal of the waste by means of underground storage is allowed under condition that the long-term safety of the underground storage for the water quality is demonstrated in accordance with the requirements of the Water law and other secondary acts fo its implementation.

1.1.3. It is prohibited the direct discharge of pollutants into groundwater only in the cases, when it is allowed by the permit for use of a water subject.

1.2. Site-specific risk assessment in case of underground storage

The assessment of risk for the underground storage requires the identification of:

- a) the hazard (in this case the deposited wastes),
- b) the receptors (in this case the biosphere and possibly groundwater),
- c) the pathways by which substances from the wastes may reach the biosphere, and
- d) the assessment of impact of substances that may reach the biosphere.

Acceptance criteria for underground storage are to be derived from, *inter alia*, the analysis of the host rock, so it must be confirmed that no site-related conditions specified in the Regulation, Article 13 from WMA.

The acceptance criteria for underground storage can be obtained only by referring to the local conditions. This requires a demonstration of the suitability of the strata for establishing a storage, i.e. an assessment of the risks to containment, taking into account the overall system of the waste, engineered structures and cavities and the host rock body.

The site specific risk assessment of the installation must be carried out for both the operational and post-operational phases. From these assessments, the required control and safety measures can be derived and the acceptance criteria can be developed.

An integrated performance assessment analysis shall be prepared obligatory, including the following components:

1. geological assessment;
2. geomechanical assessment;
3. hydrogeological assessment;
4. geochemical assessment;
5. biosphere impact assessment;
6. risk assessment of the operational phase;
- 7 long-term assessment of the operational phase;
8. assessment of the impact of all the surface facilities at the underground storage.

1.2.1. Geological assessment

A thorough investigation or knowledge of the geological setting of a groundwater storage site is required. This includes investigations and analyses of kind of rocks, soils and the topography.

The geological assessment should demonstrate the suitability of the site for underground storage. The location, frequency and structure of any faulting or fracturing in surrounding geological strata and the potential impact of seismic activity on these groundwater structures should be included.

Alternative site locations should be considered.

1.2.2. Geomechanical assessment

The stability of the cavities must be demonstrated by appropriate investigations and predictions. The deposited waste must be part of this assessment. The processes should be analyzed and documented in a systematic way.

The following should be demonstrated:

- a). that during and after the formation of the cavities, no major deformation is to be expected either in the cavity itself or at the earth surface which could impair the operability of the underground storage or provide a path way to the biosphere;
- b). that the load-bearing capacity of the cavity is sufficient to prevent its collapse during operation;
- c). that the deposited material must have the necessary stability compatible with the geo-mechanical properties of the host roc

1.2.3. Hydrogeological assessment

A thorough investigation of the hydraulic properties is required to assess the groundwater flow pattern in the surrounding strata based on information on the hydraulic conductivity of the rock mass, fractures and the hydraulic gradients.

1.2.4. Geochemical assessment

A thorough investigation of the rock and the groundwater composition is required to assess the present groundwater composition and its potential evolution over time, the nature and abundance of fracture filling minerals, as well as a quantitative mineralogical description of the host rock. The impact of variability on the geochemical system should be assessed.

1.2.5. Biosphere impact assessment

An investigation of the biosphere that could be impacted by the underground storage is required. Baseline studies should be performed to define local natural background levels of relevant substances.

1.2.6. Assessment of the operational phase

For the operational phase, the analysis should demonstrate the following:

1. the stability of the cavities as in section 1.2.2;
2. no unacceptable risk of a pathway developing between the wastes and the biosphere;
3. no unacceptable risks affecting the operation of the facility.

When demonstrating operational safety, a systematic analysis of the operation of the facility must be made on the basis of specific data on the waste inventory, facility management and the scheme of operation. It is to be shown that the waste will not react with the rock in any chemical or physical way, which could impair the strength and tightness of the rock and endanger the storage itself. For these reasons, in addition to wastes that are banned by Article 14 (1) of this Regulation, wastes that are liable to spontaneous combustion under the storage conditions (temperature, humidity), gaseous products, volatile wastes, wastes coming from collections in the form of unidentified mixtures should not be accepted.

With the assessment of the operational phase particular incidents that might lead to the development of a pathway between the wastes and the biosphere in the operational phase should be identified. The different types of potential operational risks should be summarized in specific categories. Their possible effects should be evaluated. It should be shown that there is no unacceptable risk that the containment of the operation will be breached. Contingency measures should be provided.

1.2.7. Long-term assessment

In order to comply with the objectives of sustainable landfilling, risk assessment should cover the long-term. It must be ascertained that no pathways to the biosphere will be generated during the long-term post-operation of the underground storage.

The barriers of the underground storage site (e.g. the waste quality, engineered structures, back filling and sealing of shafts and drillings), the performance of the host rock, the surrounding strata and the overburden should be quantitatively assessed over the long-term and evaluated on the basis of site-specific data or sufficiently conservative assumptions. The geochemical and geo-hydrological conditions such as groundwater flow (see sections 1.2.3 and 1.2.4), barrier efficiency, natural attenuation as well as leaching of the deposited wastes should be taken into consideration.

The long-term safety of an underground storage should be demonstrated by a safety assessment comprising a description of the initial status at a specified time (e.g. time of closure) followed by a scenario outlining important changes that are expected over geological time. Finally, the consequences of the release of relevant substances from the underground storage should be assessed for different scenarios reflecting the possible long-term evolution of the biosphere, geosphere and the underground storage.

Containers and cavity lining should not be taken into account when assessing the long-term risks of waste deposits because of their limited lifetime.

1.2.8. Impact assessment of the surface reception facilities

Although the wastes taken at the site may be destined for subsurface disposal, wastes will be unloaded, tested and possibly stored on the surface, before reaching their final destination. The reception facilities must be designed and operated in a manner that will prevent harm to human health and the local environment. They must fulfil the same requirements as any other waste reception facility.

1.2.9. Assessment of other risks

In accordance with the concrete conditions and situation of the underground storage the assessment of the other potential risks have to be made.

For reasons of protection of workers, wastes should be deposited only in an underground storage securely separated from mining activities.

Waste should not be accepted if it contains, or could generate, hazardous substances which might harm human health, e.g. pathogenic germs of communicable diseases.

2. Acceptance criteria for underground storage – all types

2.1. Excluded wastes

In the light of sections 1.2.1 to 1.2.8, wastes that may undergo undesired physical, chemical or biological transformation after they have been deposited must not be disposed of in underground storage. This includes the following:

(a) wastes listed in Article 14(1) of the Landfill Regulation;

(b) wastes and their containers which might react with water or with the host rock under the storage conditions and lead to:

- a change in the volume,
- generation of auto-flammable or toxic or explosive substances or gases, or
- any other reactions which could endanger the operational safety and/or the integrity of the barrier.

Wastes which might react with each other must be defined and classified in groups of compatibility; the different groups of compatibility must be physically separated in the storage;

(c) wastes that are biodegradable;

(d) wastes that have a pungent smell;

(e) wastes that can generate a gas-air mixture which is toxic or explosive as:

- cause toxic gas concentrations due to the partial pressures of their components,
- form concentrations when saturated within a container, which are higher than 10 % of the concentration which corresponds to the lower explosive limit;

(f) wastes with insufficient stability to correspond to the geomechanical conditions;

(g) wastes that are auto-flammable or liable to spontaneous combustion under the storage conditions, gaseous products, volatile wastes, wastes coming from collections in the form of unidentified mixtures;

(h) wastes that contain, or could generate, pathogenic germs of communicable diseases in accordance with Article 14(1) point 3 of this Regulation.

2.2. Lists of waste suitable for underground storage

Inert wastes, hazardous and non-hazardous wastes, not excluded by sections 2.1 and 2.2 may be suitable for underground storage.

The lists of wastes acceptable at underground storage facilities are determined in accordance with the classes given in Article 11(1) of this Regulation.

2.3. Site-specific risk assessment

Acceptance of waste at a specific site must be subject to site-specific risk assessment.

The site-specific assessments outlined in section 1.2 for the wastes to be accepted at an underground storage should demonstrate that the level of insulation from the biosphere is acceptable. The criteria have to be fulfilled under storage conditions.

2.4. Acceptance conditions

Wastes can be deposited only in an underground storage securely separated from mining activities.

Wastes that might react with each other must be defined and classified in groups of compatibility; the different groups of compatibility must be physically separated in the storage.

3. Additional considerations: salt mines

3.1. Importance of the geological barrier

In the safety philosophy for salt mines, the rock surrounding the waste has a two-fold role:

- it acts as host rock in which the wastes are encapsulated;
- together with the overlying and underlying impermeable rock strata (e.g. anhydrite), it acts as a geological barrier intended to prevent groundwater entering the landfill and, where necessary, effectively to stop liquids or gases escaping from the disposal area. Where this geological barrier is pierced by shafts and boreholes, these must be sealed during operation to secure against ingress of water, and must be hermetically closed after the underground landfill ceases to operate. If mineral extraction continues longer than the landfill operation, the disposal area must, after the landfill has ceased operating, be sealed with a hydraulically impermeable dam which is constructed in accordance with the calculated hydraulically operative pressure corresponding to the depth, so that water which may seep into the still operating mine cannot penetrate through to the landfill area;
 - in salt mines, the salt is considered to provide total containment. The wastes will only make contact with the biosphere in the case of an accident or an event in geological time such as earth movement or erosion (for example, associated with sea-level rise). The waste is unlikely to change in storage, and the consequences of such failure scenarios must be considered.

3.2. Long-term assessment

The demonstration of long-term safety of underground disposal in a salt rock should be principally undertaken by designating the salt rock as the barrier rock. Salt rock fulfils the requirement of being impermeable to gases and liquids, of being able to encase the waste because of its convergent behaviour and of confining it entirely at the end of the transformation process.

The convergent behaviour of the salt rock thus does not contradict the requirement to have stable cavities in the operation phase. (The stability is important, in order to guarantee the operational safety and in order to maintain the integrity of the geological barrier over unlimited time, so that there is continued protection of the biosphere.) The wastes should be isolated permanently from the biosphere. Controlled subsidence of the overburden or other defects over long time are acceptable only if it can be shown, that only rupture-free transformations will occur, the integrity of the geological barrier is maintained and no pathways are formed by which water would be able to contact the wastes or the wastes or components of the waste migrate to the biosphere.

4. Additional considerations: hard rock

Deep storage in hard rock is here defined as an underground storage at several hundred metres depth, where hard rock includes various igneous rocks, e.g. granite or gneiss, it may also include sedimentary rocks, e.g. limestone and sandstone.

4.1. Safety philosophy

4.1.1. A deep storage in hard rock is a feasible way to avoid burdening future generations with the responsibility of the wastes since it should be constructed to be passive and with no need for maintenance. Furthermore, the construction should not obstruct recovery of the wastes or the ability to undertake future corrective measures. It should also be designed to ensure that negative environmental effects or liabilities resulting from the activities of present generations do not fall upon future generations.

4.1.2. In the safety philosophy of underground disposal of wastes, the main concept is insulation of the waste from the biosphere, as well as natural attenuation of any pollutants leaking from the waste. For certain types of hazardous substances and waste, a need has been identified to protect the society and the environment against sustained exposure over extended periods of time. An extended period of time implies several thousands of years. Such levels of protection can be achieved by deep storage in hard rock. A deep storage for waste in hard rock can be located either in a former mine, where the mining activities have come to an end, or in a new storage facility.

4.1.3. In the case of hard-rock storage, total containment is not possible. In this case, an underground storage needs to be constructed so that natural attenuation of the surrounding strata mediates the effect of pollutants to the extent that they have no irreversible negative effects on the environment. This means that the capacity of the near environment to attenuate and degrade pollutants will determine the acceptability of a release from such a facility.

4.1.4. The requirements of the Water Law regarding the preservation of the water qualities can only be fulfilled by demonstrating the long-term safety of the underground storage (see section 1.2.7). The performance of a deep storage system must be assessed in a holistic way, accounting for the coherent function of different components of the system. In a deep storage in hard rock, the storage will reside below the groundwater table. The direct discharge of pollutants into groundwater is generally prohibited except in the cases, when it is accepted with the permit for water subject use. It is required to undertake measures to prevent the deterioration of the status of all bodies of groundwater. For a deep storage in the hard rock, this requirement is respected in that any discharges of hazardous substances from the storage will not reach the biosphere, including the upper parts of the groundwater system accessible for the biosphere, in amounts or concentrations that will cause adverse effects. Therefore the water flow paths to and in the biosphere should be evaluated. The impact of variability on the geohydraulic system should be assessed.

4.1.5. Gas formation may occur in deep storage in hard rock due to long-term deterioration of waste, packaging and engineered structures. Therefore, this must be considered in the design of premises for a deep storage in hard rock.

REQUIREMENTS TOWARDS THE LANDFILL BED DESIGN

Part I. General Requirements

1.1. The landfill bed as a major component of the overall facility shall ensure such disposal of waste that:

- a) does not threaten the health of the population and landfill personnel;
- b) does not cause risk for excessive contamination of the atmospheric air, surface and groundwater, and the soil, or of the flora and fauna;
- c) does not create conditions for excessive noise and for the emission of odours;
- d) does not create conditions for harmful implications on protected natural sites, immovable cultural monuments and the landscape.

1.2. The landfill bed shall be designed in observance of:

- a) Waste Management Act (WMA);
- b) Territorial Development Act (TDA);
- c) the legal provisions for the loads and impacts and for design of foundation and constructions, as well as nets and facilities from the technical infrastructure;
- d) FSCTS;
- e) Standards for admissible emission and for environment quality;
- f) Sanitary - hygienic standards;
- g) the geologic and hydrogeologic conditions of the landfill's ground base, determined through engineering-geologic surveys;
- h) the rules and norms placing requirements towards the design solutions for the individual landfill components in accordance with this Annex.

1.3. In the case of a height layout of landfill operation, planning shall be made for surrounding protection dikes made of suitable materials shielding surface water from contamination.

1.4. The materials and goods put in the landfill bed shall meet the safety requirements set out in legal provisions, technical specifications and the established methodologies towards their testing.

1.5. The landfill bed shall be checked for its overall steadiness in order to ensure the stability of the bed throughout the phases of the landfill operation - construction up to 1/3, 2/3 and the total maximum height of filling of the landfill. Design tests shall be run for the basic and special combination of loads, so as to ensure the stability of the landfill bed and its slopes.

1.5.1. Deformations (settlement under own weight, subsidence, etc.) shall be determined through design tests of prognostic nature. The results of the design tests on the deformations shall be confirmed or adjusted through measurements of the real

settlement in the course of the landfill operation by means of geodesic surveys with the help of benchmarks, placed at every 3ha of landfill area. The measurements shall verify the degree of compacting and the actual deformation modules of the material disposed in the landfill bed.

1.5.2. The average density of landfilled waste shall be determined through an analysis of sampling taken from test pits and bore holes and a calculation of the resistance properties, namely, the angle of internal friction and the cohesion, by correlation subjections.

Part 2. Geologic base

2.1. An appropriate ground base shall be selected for the landfill bed by considering the following main criteria:

- a) its carrying capacity and stability, preventing in the course of its loading any occurrence of settlement, as would lead to disturbance of the bottom liner and endanger the stability of the body of waste and landfill as a whole;
- b) its capacity of a natural geologic barrier against penetration and migration of pollution from the landfill's body of waste.

2.1.1. Where possible, the ground base shall consist of soils which are strong, bound and highly impervious, and shall constitute a homogeneous layer with a sufficient area distribution beyond the scope of the landfill bed, by meeting the following requirements, in accordance with Art. 19 (2) from the Regulation:

2.1.2. The ground base shall be formed by longitudinal and transverse slopes facilitating leachate run-off and promoting landfill bed stability.

2.1.3. Where the requirements under subparagraph 2.1.1. on the natural ground base have not been met by a terrain which is designated to become a landfill site on the basis of other substantial factors (requirements for health protection of the urban environment, legislative restrictions towards the alienation of agricultural and forest land, etc.), the design of the foundation for bottom insulation liner shall make provisions for appropriate technical operations ensuring protection against the harmful impact of the landfill body of waste, also including:

- a) consolidating of the ground base through compacting, replacement of the unstable ground base with bedding (introduction of layers of bound material with a clay particles content greater than 10%, compacted for reaching of a coefficient of compacting of ≥ 0.95), reinforcing of the unstable ground base, including slopes, embankments and other negative earth formations, by installing geotextile, substances and soil consolidation methods, etc.;
- b) inclusion in the bottom liner system of reinforced mineral capping, geomembrane, geomembrane protection layer and an intermediate layer.

2.1.4. The type, content and manner of installing of the bedding, in accordance with point 2.1.3., letter "a" shall depend on the results of the geologic and hydrogeologic surveys and the requirements towards the carrying capacity and landfill bed stability.

2.2. The average annual table of ground water into the ground base beneath the landfill bed shall be at a depth greater than 1 m below the foundation elevation.

2.2.1. In non-hazardous and hazardous waste landfills, for which the requirement by point 2.2. is not accomplished, before creation of the bottom liner, the measures for the restriction of groundwater access to the liner (drainage system, etc.) are foreseen.

2.2.2. . Inert material landfills may have a depth, in accordance with point 2.2 less than 1 m.

Part 3. Requirements to the bottom liner of the landfill

3.1. The bottom liner together with the geologic base shall serve as a reliable geotechnical barrier against the impact of the landfill's body of waste over the ground base and groundwater and ensure the overall stability of the landfill, in accordance with Art. 19 (2).

3.2. The bottom liner shall be designed as a system for lining the landfill bottom and slopes which shall principally include:

- a) mineral capping;
- b) insulation geomembrane;
- c) protective layer;
- d) drainage system;

3.2.1. The individual liner components shall be of a type and content depending on:

- a) the nature of the ground base in its capacity of a geologic barrier against the penetration of pollution caused by the landfill's body of waste;
- b) the adopted landfill technology;
- c) the geotechnical parameters of the disposed waste.

3.2.2. In landfills for non-hazardous and hazardous waste the bottom liner obligatory shall include insulation geomembrane and drainage system.

3.2.3. Individual elements of the liner can not be foreseen, as:

- a) mineral capping – when the geologic base shall satisfy the requirements in accordance with Art. 19 (2) from the Regulation;
- b) insulation geomembrane, protective layer and drainage system – for the landfill for inert waste.

3.3. The bottom liner together with the ground base and slopes, shall be designed with a carrying capacity and stability for a basic and a specific combination of loads.

3.3.1. The bottom liner installed along the slopes of excavations and embankments shall be designed for its overall stability against slipping (sliding), together with the geomembrane (foil) and its protective layer. The coefficient of reliability shall be determined for cases such as:

- a) slipping at the contact surface between the geomembrane foil and the clay mineral capping;
- b) slipping at the contact surface between the geomembrane and its protective layer;

The above design calculations shall be made for a basic combination of loads without taking seismic impact into consideration.

3.3.2. . In case of an unsatisfactory result of the design calculations under item 3.3.1. and depending on the type of anticipated fault, plans shall be made independently or in combination for the following technical measures aiming to meet the design value of the coefficient of reliability:

- a) reduction of the slope gradient;
- b) increasing of the friction coefficient by means of a selection of structured geomembranes (foil with one-side or two-side spikes, cross-shaped profiles or crosswise ribs, with course texture or a combination of different structures), which shall ensure the necessary friction coefficient;
- c) reinforcing of the mineral capping, protective layer or drainage system layer with a geonet, the parameters of which shall be based on calculations.

A. Mineral Capping

3.4. The mineral capping shall:

- a) provide protection against percolation and diffusion of harmful substances;
- b) be highly water impervious;
- c) be resistant to leaching;
- d) have a heavy metal-retention capacity;
- e) settle within the design limits and be capable of self-consolidation through a suitable selection of the materials for their plasticity and granulometric content;
- f) ensure that in the event of change of hydrogeologic conditions, deformations shall remain within the design limits.

3.5. The mineral capping shall have a thickness minimum of 0,5m. The capping shall be placed over the prepared ground base surface or over the bedding.

3.5.1. The mineral capping for hazardous and non-hazardous waste landfills shall consist of a natural homogeneous clay soil to cover the requirements according Art. 19 (2) of the Regulation.

3.5.2. The mineral capping materials shall guarantee content, physical properties and condition of the individual layers as follows:

- a) a stable granulometric curve as defined under Bulgarian State Standard (BDS) 2762 which would remain within the design range;
- b) content of clay particles with a grain size of $< 0,0002$ mm, not less than 20 % by weight;
- c) organic ingredients content under BDS 11302 not greater than 5 %wt, and of water soluble salts - not greater than 2%.
- d) content of floating gravel grains with a diameter of 2 - 10 mm, not greater than 10 %wt;
- e) water content, defined under BDS 3214, BDS 17146 or under the Mod. Proctor test, equal to the optimal, with an allowable deviation not greater than $\pm 2\%$;
- f) density of $\rho_n \geq D_{Pr} \cdot P_{d,s}$ where $P_{d,s}$ is the standard density established through laboratory tests under BDS 3214, BDS 17146 or through the Mod. Proctor test;

3.6. When the requirements in accordance with Article 19(2) can not be obtained with the natural materials using of the bentonit hydroinsulations (GCL's) in combination with mineral capping are accepted.

3.6.1. The bentonit hydroinsulations represent layer from bentonit (dust or granular), putting between two geotextils layers or between geotextil and geomembrane, which shall reply to the following requirements:

a) content of bentonit – determined in accordance with ASTM D 5261, ASTM D 5993 or other equivalent method by water content in bentonit ≤ 15 %. For the non-hazardous waste landfill the content of bentonit must be $\geq 4.5 \text{ kg/M}^2$, while for hazardous waste landfill - $\geq 5.0 \text{ kg/M}^2$. Acceptable deviation ± 10 %;

b) filtration coefficient - $\leq 5 \times 10^{-11} \text{ m/sec}$. Acceptable deviation ± 10 %;

c) unstuck strength - $\geq 60 \text{ N}$., determined in accordance with ASTM D 4632, ASTM D 6496 or other equivalent method. Acceptable deviation ± 10 %;

d) material must cover not later than a day after its putting.

3.7. Installation of the mineral capping shall be monitored and controlled for the quality parameters of the input materials.

3.8. Whenever slopes have a gradient greater than 1:2,5 their mineral capping shall be installed in horizontal layers, where the layer thickness measured under a 90 degrees angle to the slope plane is a minimum of 1,7 m.

B. Insulation Geomembrane

3.9. The insulation geomembrane must:

a) absorb deformations resulting from settlement of the mineral capping and ground base;

b) provide, together with the mineral capping and ground base, a protection of the geologic base and groundwater against leakage and percolation of the leachate generated from the waste body;

c) be chemically and biologically resistant to waste-generated leachate impact;

d) be resistant to impact of the ultra-violet (UV) rays.

3.10. The geomembrane shall be made by the synthetic material (high-density polyethylene, polypropylene, PVC and others) and have a smooth or coarse texture, as prescribed in the design;

a) at least 2 mm thick, Acceptable deviation ± 5 %;

b) at least 5 m wide;

c) force of strain by break - $\geq 25 \text{ MPa}$ in two directions (in length and in width). Acceptable deviation ± 10 %;

d) force of strain in the limit of flow - $\geq 15 \text{ MPa}$ in two directions (in length and in width). Acceptable deviation ± 10 %;

e) strain to breaking-points (prolongation) - $\geq 700\%$ in two directions (in length and in width). Acceptable deviation ± 10 %;

f) deformation by the limit of flow (prolongation) - $\geq 10\%$ in two directions (in length and in width). Acceptable deviation ± 10 %;

g) strength of pierce - $\geq 300, 400$ or 500 N for geomembranes with thickness 1.5 mm, 2.0 mm, 2,5 mm. Acceptable deviation ± 10 %;

h) content of soot – 2 to 3%. Acceptable deviation ± 10 %;

i) index of melting - $\leq 1 \text{ g/10min}$ for sample weight 2,16 kg or $\leq 3 \text{ g/10min}$ for sample weight 5 kg. Acceptable deviation ± 10 %;

j) time for beginning of oxidation - $\geq 100 \text{ min}$ by temperature 200°C in media of pure oxygen and pressure 1 atmosphere. Acceptable deviation ± 10 %;

k) resistance against cracks - $\geq 300 \text{ h}$. Acceptable deviation ± 10 %;

C. Protective Layer of the Insulation Geomembrane

3.11. Considerations shall be made for equipping the geomembrane with a protective layer. Where the presence of a protective layer is justified, the latter may be composed of non-woven geotextile of an adequate area mass, or another appropriate material.

3.11.1. The geotextile, used for geomembrane mechanical defence shall be made from polyethylene, polypropylene, polyamide or combination of them in accordance with BDS EN 13257 and following common requirements:

- a) surface masses - $\geq 300 \text{ g/m}^2$. Acceptable deviation $\pm 10 \%$;
- b) force of strain by break - $\geq 15 \text{ MPa}$ in two directions (in length and in width). Acceptable deviation $\pm 10 \%$;;
- c) strain to breaking-points (prolongation) - $\geq 50\%$ in two directions (in length and in width). Acceptable deviation $\pm 10 \%$;
- d) strength of static pierce (CBR) - ≥ 3000 . Acceptable deviation $\pm 10 \%$;
- e) strength of dynamic pierce $\leq 20 \text{ mm}$. Acceptable deviation $\pm 10 \%$;

3.11.2. The geotextil shall be covered in terms, pointed in BDS EN 13257 in dependance of the application of the geotextil and its resistance against the atmospheric conditions.

3.11.3. The covering of the geotextil shall be foreseen in the investment project, recording to the requirements, determined from geotextil producers.

D. Drainage System (Drainage Layer)

3.12. The drainage system of the bottom liner shall be designed for collection and removal of leachate (waste water infiltration and leached particles) from the landfill bed. The drainage system shall consist of a blanket drainage and a drainage network.

a) blanket drainage having thickness greater than 0,50m of washed rubble with a filtration coefficient of $\geq 1 \cdot 10^{-3} \text{ m/sec}$, capable of retaining its stability over long-term landfill operation.

- b) a horizontal pipe network for diverting leachate outside the landfill bed;
- c) Inspection shafts shall be installed at every horizontal pipe bend;
- d) a pipeline for diverting leachate outside the landfill bed;
- e) a retention reservoirs;
- f) a pump station or other purification facilities;
- g) an irrigation system.

3.13. . The drainage collection network shall comply the following requirements:

- a) ensure the collection and removal of leachate from the landfill bed, including leached particles, at a velocity of $1 \cdot 10^{-3} \text{ m/sec}$;
- b) not interact chemically and biologically with any leachate present in the landfill bed;
- c) easy maintenance and inspection;
- e) prevent clogging.
- f) drainage pipes and their junctures should be capable to withstand the load and deformations of the overlying landfill bed and undergo high-pressure flushing.

3.13.1. The drainage network shall be composed of pipes, two-thirds of the surface of which is punctured or has slits.

3.14. The drainage inspection shafts shall be sized in consideration of the temporary loads exerted by compacting machines and the temperature impacts resulting from the irregular warming of the body of waste. Their settlement shall not differ from that of the landfill bed, when necessary constructive measures shall be taken. The shafts shall be built in the process of waste landfilling.

3.15. A retention basin shall be considered as a temporary leachate storage site (retention basin).

3.16. A waste water disposal plant shall be planned for, providing disposal to the degree matching the category of the water intake in accordance with the waste activities permit or the IPPC permit.

3.17. An irrigation system shall be planned for regular distribution of the leachate upon the waste body, at decision for its recirculation or in order to be ensured a complementary moistening of the waste.

3.18. A pump station shall be considered for transferring the leachate to the landfill bed or to a designated waste water intake.

Part 4. Requirements Towards the Top Insulation Landfill Liner

4.1. The top insulation liner shall be designed as a surface landfill lining which principally comprises:

- a) gas drainage (ventilation layer);
- b) mineral capping;
- c) insulation geomembrane;
- d) protective layer;
- e) drainage system;
- f) recultivation layer

4.2. The type and composition of the individual elements of the surface lining system shall depend on the class of the landfill, characteristics of the disposed waste and the prescriptions of the competent authorities that issued the waste activities permit or the IPPC permit.

4.3. The top (surface) insulation landfill liner shall:

- a) provide protection against penetration of surface water to the landfill's body of waste;
- b) provide protection of the atmospheric air and surface water against contamination by the body of waste;
- c) comply with the legal requirements regarding impaired terrain recultivation;
- d) comply with the conditions for use of the landfill's post-closure recultivated surface layer.

4.4. The top insulation liner shall be designed for a total stability as would ensure the external stability of the slopes against slipping and sliding and against deep circular-cylindrical slipping, once the recultivation layer has been laid. Calculation tests shall be made for the effective life of the landfill and after its closure, regarding the basic and specific combination of loads, also taking into account the seismic inertial forces.

4.5. The top insulation liner shall comply with a geometric arrangement of the surface of the fully filled landfill, depending on:

- a) the design landfill capacity;

- b) the projected settlement of the landfill bed;
- c) the aesthetic requirements towards its landscape harmonization.

4.6. The top insulation liner shall be laid down after filling with waste and after receiving of an approval by the competent authorities of each phase (cell) of the landfill.

4.7. The design crest and slope gradient shall be determined with view to the expected settlement and to non-admission of swamping, erosion, slippage. The slope gradient shall be worked out on the basis of calculations for total stability and sliding (slipping), at a maximum steepness of 1:2,5.

A. Gas Drainage System

4.8. A gas drainage system shall be planned for non-hazardous waste landfill, where biodegradable waste are deposited.

4.9. A gas drainage system shall comprise:

- a) a drainage layer;
- b) gas collection and removal pipes.

4.10. The materials employed in the gas drainage system construction shall be resistant to chemically and biologically aggressive substances contained in the gases emitted and shall enable the diversion of the gases emitted by the body of waste to the system for their capturing and removal outside the landfill bed.

B. Mineral Capping

4.11. A mineral capping for the top liner shall be planned for as protection of the landfill's body of waste against infiltration of surface water and a barrier against gas emissions.

4.12. The mineral capping shall meet the requirements of points 3.4, 3.5.1 and 3.5.2 and shall be sloped in accordance to point 4.7.

4.12.1. Bentonit hydroisolations (GCL's) in combination with the mineral layer of the upper liner are accepted to be used.

4.12.2. In case of using the bentonit hydroisolations as an element of the upper liner the requirements in accordance with point 3.6.1 shall be followed as the content of bentonit by landfill of non-hazardous waste must be $\geq 3.5 \text{ kg/m}^2$, and by landfill of hazardous waste – 4 kg/m^2 .

4.13. The mineral capping shall be protected against frosting and root intrusion, resulting from biological recultivation.

C. Insulation Geomembrane and Geomembrane Protective Layer

4.14. A geomembrane and a geomembrane protective layer shall be envisaged for landfills where the mineral capping is not sufficient to provide protection for the body of waste against infiltration of surface water and cannot serve as a barrier against gas emissions.

4.15. The geomembrane and the geomembrane protective layer shall comply with the requirements of points 3.9. and 3.10, and its protective layer shall also comply with points 3.11, 3.11.1, 3.11.2 and 3.11.3 at a thickness of the geomembrane not lower than 2 mm.

D. Drainage System

4.16. A drainage system for the top liner shall be considered for the purpose of protecting the landfill's body of waste against infiltration of surface water.

4.17. The drainage system shall be composed of:

- a) blanket drainage meeting the requirements towards the bottom liner drainage;
- b) a drain pipes system ensuring the collection and removal of surface water away from the recultivation layer.

4.17.1. The drainage system shall be capable of enduring the load and impact of the recultivation layer.

4.17.2. The drainage system shall be capable to:

- a) endure a surface runoff formed as a result of intense precipitation with a probability of exceedence of 10%;
- b) have flow stability;
- c) be wear resistant;
- d) ensure non-clogging of the channel and facilities;
- e) meet the requirements towards the winter operation regime of facilities;
- f) meet the requirements towards diverting the water to the water intake.

4.18. Security channels shall be constructed surrounding the landfill terrain and the roads for the waste delivering trucks, to serve for receiving the surface atmospheric water of the polluted territories (landfill bed and roads).

E. Recultivation Layer

4.19. The recultivation layer shall be designed to comply with the designated post-closure use of the landfill territory (for recreation, agriculture, forestry and others).

4.20. The recultivation design shall be prepared in compliance with the requirements by Art. 16 from the Agricultural Land Protected Act.

4.21. The technical and biologic recultivation must protect the crest and slopes against erosion by winds and rainfall.

Part 5. Gas Collection System

5.1. Where gas emissions have been detected the latter shall be captured by means of a gas collecting system. The gas emissions must be utilised or burned in a torch.

5.2. Gas collection system shall include:

- a) a gas collecting system , according the requirements of points 4.8, 4.9 and 4.10;
- b) a vertical gas conducting wells;
- c) control shafts;
- d) gas collecting system.

5.3. The landfill's gas collecting system and its emitting device shall be constructed by materials, meeting the requirements for safety and resistance against physical, chemical and biological impact against the gases emitted by the body of waste.

5.4. The vertical gas conducting wells of the gas collection system shall meet the following requirements:

a) they shall be constructed in parallel to the waste landfilling after the first operating horizon;

b) they shall be at a design distance from one another of 50 - 100 m.

5.5. In landfill design obligatory the facilities for burned in a torch or installations for gass emission recovery are foreseen.

Part 6. Ensuring Stability for the Landfill's Body of Waste

6.1. To ensure the stability of the body of waste of each specific landfill, a study shall be run on the wastes balance and a selection shall be made of the waste landfilling technology (depending on the waste's type and content, its location within the body of waste, the soil layering, compacting, etc.)

6.2. To ensure the internal stability of the body of waste, wastes with a low strength and failure properties shall be disposed at a safe distance from the design landfill surface to ensure non-admission of additional stress in the landfill liners resulting from differential settlement beyond the allowable stress limits.

6.3. To ensure the internal stability of the body of waste, waste of a higher strength and deformation properties shall be allocated to its periphery (slopes), thereby ensuring that initial and lateral deformations have been provoked in the bottom, and settlement has been provoked in the upper part of the slopes.

6.4. An information system (cadastre) shall be drawn for the landfills, reflecting the status of construction and the final location and shaping of the body of waste.

To Art. 3(2), point 3; Art. 12 (1), Art.13, Art.16, point 3, Art. 22 (4),
Art. 40 (1), point 1 and Art. 44 (2)

LANDFILL MONITORING SYSTEM

Part 1. General Requirements

1.1. The purpose of this Plan for control and monitoring is to provide the minimum requirements for monitoring to be carried out to check, that:

- a) waste has been accepted to disposal in accordance with the criteria set for the category of landfill in question,
- b) the processes within the landfill proceed as desired,
- c) the protection of the environment systems are functioning fully as intended,
- d) the permit conditions for the landfill are fulfilled.

1.2. The landfill monitoring plan shall be performed in compliance with Art. 40 (1), point 1 is realized:

- a) in the process of operation of the landfill (landfilling);
- b) post-closure of the landfill.

1.2.1. . Monitoring activities shall include the minimum set of procedures for observation and control regarding the waste disposal in compliance with the design requirements, including the requirements towards the protection of the environmental components through the top and bottom liners and the gas collection system in the cases where provisions for such exist.

1.2.2. The measurements and monitoring of the controlled indicators of the surrounding environment and its parameters shall be performed in compliance with the standardised or approved methodologies.

Part 2. Meteorological data

2.1. The meteorological data and the frequency of their measurement serving to determine leachate volumes on the basis of the landfill's water balance shall be conducted in accordance to Table 1 in cases when such data are collected through own field monitoring and measurements or through the hydro-meteorological organizations.

Table 1

№	Indicator	During the operation period	After landfill closure
1	Precipitation quantity	Daily	Daily and monthly
2	Temperature – minimum, maximum 14 h. CET) ⁽¹⁾	Daily	Mean monthly
3	Wind duration and power	Daily	Not required
4	Transpiration	Daily	Daily and monthly
5	Humidity (14 h. CET)	Daily	Mean monthly

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Note: The measurements of the characteristics is made in 14 h Central European Time (CET)

Part 3. Emission data: water control, leachate and gas control

3.1. The emission and immision control of the surface water and of emission of leachate and gas from the waste body is going in accordance with Table 2 as:

a) the places for surface and waste waters monitoring, the indicators and emission restriction are determined in the permit for use of water object. The measurements are made at least in one point upper the landfill against the flow and - in one point after the landfill, along the surface flow;

b) the gas monitoring must be representative for every section or cell of the landfill;

c) taking the samples and the determination of the leachate volume and composition has to made separately for every place of the landfill, where the leachate is separated. Taking the sample can make in accordance with the general guidelines on sampling technology, ISO 5667-2 (1991);

d) representative sample for determination of average chemical composition of the leachate and waters.

Table 2

No	Indicator	During the operation period	After landfill closure
1	Leachate volume	Monthly	Every 6 months
2	Leachate composition	Every 3 months	Every 6 months
3	Volume and composition of surface waters	Every 3 months	Every 6 months
4	Potential gas emission and atmospheric pleasure (CH ₄ , CO ₂ , O ₂ , H ₂ S H ₂ etc.) ⁴	Monthly	Every 6 months

Note:

1. The frequency of the monthly sample-taking made to determine the leachate volume and contend shall comply with the waste type and content;

2. The parameters and substances to be measured, and the substances to be analyzed shall depend on the waste content and the indicators in accordance with Part 2 of the Annex 1.

3. Where the volume and content of surface water is relatively constant, measurements may be taken at longer of time, but not less than ones per year.

4. These measurements in accordance with point 4 shall be run primarily to determine the content organic compounds of waste.

5. CH₄, CO₂, O₂ - permanently, and as for the other gases – where they have been found to affect the leachate.

6. The gas collection system shall be checked for its efficiency permanently.

7. By decision of the competent authority, monitoring of surface water volume and content may not be performed wherever the latter is not exposed to a substantial impact by the waste landfill.

8. The monitoring of the volume and the composition of the leachate is determined only when the leachate collection is required.

Part 4. Protection of groundwater

4.1. The measurements must be such as to provide information on groundwater likely to be affected by the discharging of waste, with at least one measuring point in the groundwater inflow region and two in the outflow region, along the underground waters in accordance with Table 3.

4.1.1. The number of monitoring points can be increased on the basis of a specific hydrogeological survey and the need for an early identification of accidental leachate release in the groundwater.

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

4.1.3. Sampling and analysis of leachate and underground waters is determined by means of indicators of expected pollution, which are necessary for early established changes of underground water quality.

Table 3

No	Indicators	During the operation period	After landfill closure
1	Groundwater level	Every 6 months	Every 6 months
2	Composition of groundwater	Frequency is determined in relation with the situation and specific of landfill. ³	Frequency is determined in relation with the situation and specific of landfill. ^{32,3}

Note:

1. If there are fluctuating groundwater levels, the frequency must be increased.
2. The frequency must be based on possibility for remedial actions between two samplings if a trigger level is reached i.e. the frequency must be determined on the basis of knowledge and the evaluation of the velocity of groundwater flow.
3. When a trigger level is reached (see C) verification is necessary by repeating the sampling. When the level has been confirmed a contingency plan (laid down in the permit, Art. 39 of WMA) must be followed.

4.1.4. Significant adverse environmental effects, as referred to in Articles 40, (1), point 2 and 44 (3) of this Regulation, should be considered to have occurred in the case of groundwater, when an analysis of a groundwater sample shows a significant change in water quality. A trigger level must be determined taking account of the specific hydrogeological formations in the location of the landfill in accordance with Article 135, point 2 of the Water Law.

4.1.5. The observations in accordance with the point 4.1.4. must be evaluated by means of control charts with established control rules and levels for each downgradient well. The control levels must be determined from local variations in groundwater quality.

Part 5. Topography of the site: data on the landfill body

5.1. The monitoring for the structure and composition of landfill body is determined in accordance with Table 4.

Table 4

No	Indicators	During the operation period	After landfill closure
1	Structure and composition of	Yearly	

	the waste body		
2	Behaviour (subsides) on the surface of landfill body	Yearly	Yearly with establishment of changes

Note:

1. Data for the status plan of the concerned landfill surface occupied by waste, volume and composition of waste, methods of depositing, time and duration of depositing, calculation of the remaining capacity still available at the landfill.