REGULATION No. 13
on the Conditions and Requirements Towards the Construction and Operation of Waste Landfills
Dated 6 November 1998

Chapter One
GENERAL PROVISIONS

Article 1

(1) This Regulation shall set forth the requirements towards the construction and operation of landfills for storage of domestic, construction, industrial and hazardous waste within the meaning of the Limitation of the Harmful Impact of Waste upon the Environment Act (LHIWEA), henceforth referred to as "landfills".

(2) Waste landfills shall be grouped under the following classes:

1. hazardous waste landfills;

2. non-hazardous waste landfills;

3. inert waste landfills.

(3) This Regulation shall not be binding for:

1. drying beds for sludge discharged from waste water treatment plants, sludge from dredging operations and sludge used for soil amelioration;

2. embankments and other ground construction facilities using inert waste;

3. returning of sludge from dredging operation to the beds of small water bodies, from which the sludge was originally removed;

4. disposal of non-contaminated soils.

Article 2

This Regulation aims to establish the measures, procedures and requirements towards the prevention or limitation to the highest possible extend of the negative impact of landfills on the environment, in particular on the ground- and surface water in particular, and of the human health-related risks.

Article 3

(1) There shall be disallowed the landfilling of:

1. liquid waste;

2. waste emitting an unpleasant odor;

3. incompatible waste;

4. waste which upon being disposed in the landfill have explosive, corrosive, oxidizing, fire-risk, inflammable or combustible properties within the meaning of Order No. RD-322 of August 10th, 1998 of the Minister for the Environment and Water and the Minister for Health on the Classification of Waste (SG, issue 120/1998);

5. hospital and other clinic waste from health establishments and veterinary services defined as infectious within the meaning of Order No.RD-323 of August 10th, 1998 of the Minister for the Environment and Water and the Minister for Health on the Classification of Waste;

6. hazardous waste which does not match the parameters, listed in Annex No.1, Table 1.

(2) The competent environmental and water authorities may chose not to impose the restrictions under paragraph 1 subparagraph 1 for:

1. inert waste;

2. industrial waste deposited in tailings ponds, sludge ponds and ash heaps;

(3) The hazardous waste referred to in paragraph 1 subparagraph 6 may be disposed in landfills on condition that it has been packaged, labeled and stored in vessels, which allow its disposal without hazard to human health and the environment.

Article 4

Landfills shall be constructed and operated in compliance with all international agreements to which the Republic of Bulgaria is a party, where such treaties place additional requirements on domestic waste disposal facilities and installations.

Article 5

(1) Landfill construction permits issued in pursuance of Article 37 paragraph 2 of the Limitation of the Harmful Impact of Waste upon the Environment Act (LHIWEA) shall empower the landfill operators to construct such landfills.

(2) The permits under paragraph 1 shall not revoke the requirement regarding the issuance of a decision on the environmental impact assessment (EIA).

(3) Where the final EIA report is supplemented with the documents under Article 40 LHIWEA, the permit under Article 37 LHIWEA shall be issued concurrently with the EIA decision.

(4) The permits under Article 37 LHIWEA shall not revoke the requirement for obtaining a permit enabling the use of the construction, issued under the terms and conditions of Regulation No.6 on the State Approval and Permission for Use of Constructions in the Republic of Bulgaria (promulgated, SG, issue 28/1993; amended, issue 73/1993).

(5) Enclosed to the mandatory papers for the issuance of the permit under paragraph 4 for waste landfills shall be the permit under Article 37 paragraph 2 LHIWEA and the construction works oversight results, prescribed by the design. The state commission for approval of landfills shall by all means incorporate the authority having issued the permit under Article 37 LHIWEA or a proxy thereof, which shall submit a written opinion regarding the compliance with the clauses of the decision.

Article 6

(1) Waste shall be accepted in the various classes of landfills described in Article 1 paragraph 2 in observance of the following requirements:

1 only hazardous waste may be disposed in hazardous waste landfills;

2 non-hazardous waste landfills shall be used to dispose:

a) domestic waste;

b) non-hazardous manufacturing waste;

3 inert waste landfills shall accept inert waste only.

(2) The competent environmental and water authorities may demand that waste is subjected to pre-treatment.

(3) Diluting or mixing of industrial waste and hazardous waste with other waste or substances with view to customising the former for acceptance by the given landfill shall be prohibited.

Article 7

Holders of permits for landfill construction and holders of permits for waste disposal shall be obliged to meet the requirements towards the operation thereof, and in addition, the requirements towards the:

1 management of the waste disposal operations;

2 occupational safety and health;

3 qualification upgrading and training of the landfill operating personnel.

Article 8

(1) The landfill operator shall be accountable for the operations constituting waste disposal via landfilling.

(2) The management of the waste landfilling operations shall be based on the following principles:

1 not to pose an immediate hazard to the human health and the surrounding environment;

2 rational utilization of the available natural resources;

3 integrated waste management;

4 assumption of full material liability by the environmental polluters;

5 public participation.

(3) Waste landfilling operations shall be managed under a waste activities management program, adopted by the operators of facilities and installations.

(4) The operator-adopted waste activities management program shall match the goals and tasks of the corresponding municipal program and national waste management program in observance of the requirements of LHIWEA.

(5) Where landfills are located within the territory of and/or service more than one municipality, their waste activities management program shall be coordinated with all municipalities involved.

(6) Waste activities management programs shall set forth the terms and conditions for waste control pursuant to the requirements of Attachment No. 1, including entry point control, disposal equipment control, control over the pollution of the environmental components during its operation and after closure of the waste disposal operations, and control over the closure of the waste disposal facilities and systems.

Chapter Two
GENERAL REQUIREMENTS TOWARDS LANDFILL CONSTRUCTION

Article 9

Landfill sites shall be allocated, designated and constructed in compliance with the requirements of Regulation No.12 of 1998 on the Requirements Towards the Waste Treatment Facilities Sites.

Article 10

Landfills shall be constructed in pursuance of the above Regulation and the established national:

1 norms on the design of the foundation and installation systems;

2 fire-safety construction and technical norms (FSCTN);

3 environmental protection norms;

4 hygiene and sanitary norms;

5 rules regarding the control and approval of the construction of land facilities, bases and foundations of facilities and protective insulation layers and liners.

Article 11

(1) The requirements towards the qualities of the input materials for landfills construction of and the ways of determining and attesting them shall be set by the quality design which is an inseparable part of the landfill design.

(2) The quality design shall contain:

1 requirements towards the parameters of the input construction materials and goods, related to the safety requirements, including those pertaining to the environment protection;

2 a management, supervision and quality control system applied during the performance of the construction and landfill operations, which shall determine:

a) the scope and responsibilities in quality control enforcement;

b) the ways and methods applied to determine the quality of the input materials and Article s in their manufacturing or extraction and in the process of their application to the construction works in pursuance of the Regulation on Assessing the Compliance of Products with the Safety Requirements (SG issue 43/1997), the corresponding legal provisions for construction norms and rules, and standardisation papers;

c) the type and scope of the tests and observations made as part of the quality control enforcement;

d) the records kept for the measures taken for quality assurance, including the results from tests and observations.

(3) A section named Soil Design shall be prepared as a part of the quality design, containing information in pursuance of paragraph 2, on the foundation and materials used for constructing the top and bottom insulation liners.

Article 12

(1) Landfill designs shall be co-ordinated and approved under the terms and conditions of Chapter Five of the Rules on the Implementation of the Territorial and Urban Planning, while construction permits shall be co-ordinated and approved under the terms and conditions of Chapter Six of the said Rules.

(2) A condition for approval of the quality designs and the issuance of landfill construction permits is the availability of a permission issued under Article 37 paragraph 2 of the LHIWEA.

Article 13

The approval and commissioning of landfills shall be carried out under the terms and conditions of Regulation No.6 on the State Approval and Permission for Use of Constructions in the Republic of Bulgaria.

Chapter Three
REQUIREMENTS TOWARDS LANDFILL CONSTRUCTION

Article 14

(1) Landfills shall be designed for waste deposition.

(2) Non-hazardous waste landfills shall permit the mixed disposal of domestic waste and other non-hazardous waste only where this operation is not performed as a way to ensure the stability and steadiness of the body of waste.

Article 15

Where possible, landfills shall be designed to meet the regional principle of servicing more than one settlement or more than one municipality.

Article 16

The type of landfill and the landfilling technology shall depend on the conditions which the landfill site presents (relief, climatic conditions, etc.), the results of the geologic, hydrogeologic and other engineering surveys, as well as on the type, composition and quantity of the disposed waste.

Article 17

(1) The area and volume of the waste landfill shall be determined on the basis of data on:

1 the relief, geological, engineering-geologic, hydro-geologic and hydrologic conditions of the designated site;

2 the type, amount and composition of the waste disposed.

(2) The amount of domestic waste shall be found as a norm established on the base of surveys on the annual domestic waste generation rate (DWGR) per inhabitant for the corresponding service area, under the following formula:

$B = b.M$

where

B is the annual amount of domestic waste in m^3 or tons

b is the annual domestic waste generation rate in m^3 or tons ;

M is the number inhabitants in the territory serviced by the landfill

(3) In the case of mixed disposal of domestic waste with other non-hazardous waste, when determining the volume and area of the landfill, considerations shall also be made for the expected amounts of the remaining types of non-hazardous waste.

(4) In the cases under paragraph 2 where no concrete studies for establishing the domestic waste generation rate for settlements have been conducted, the averaged rate given in Table 1 can be applied.

TABLICA 1

Article 18

(1) The auxiliary and service buildings, facilities and systems enabling the operation of the landfill shall be allocated on the basis of the size of the landfill and the adopted landfilling technology.

(2) On-site the landfill there may also be envisaged other waste treatment operations (composting, separation, etc.).

Article 19

(1) The requirements towards the landfill bed design have been laid out in Annex 2.

(2) With view to ensuring the reliable landfill operations and environmental protection, there shall be envisaged:

1 auxiliary facilities and systems ensuring reliable environmental protection, not lower than that of the bottom insulation liner and meeting the requirements for:

a) soil protection against contamination in pursuance of Regulation No.3 on the Norms for the Allowable Content of Harmful Substances in the Soil (promulgated, SG issue 36/1979; amended, issue 5/1996);

b) protection of the geologic base in accordance to Regulation No.1 on Geoprotective Activities (SG, issue 12/1994), Regulation No. 1 on Designing Flat Foundations (published, Bulgarian Business Association, issue 10/1996) and the Norms for Designing Buildings and Facilities in Seismic-prone Areas (published by the Committee for Territorial and Urban Planning, 1987; amended, SG issue 6/1989);

c) protection of the surface- and groundwater according to Regulation No.7 on the Indices and Norms for Determining the Quality of Running Surface Water (SG, issue 96/1986), Regulation No.8 on the Parameters and Norms for Determining the Quality of Coastal Marine Water (SG, issue 2/1987), Regulation No.6 on Conducting Waste Water Containing Harmful Substances Beneath the Earth's Surface (SG, issue 87/1981) and Regulation No.2 on Sanitary Protection Zones Surrounding Water Sources for Potable and Household Water Supply (SG, issue 68/1989).

2 devices for point emission of gases from the landfill body of waste which meet the requirements of Article 11 paragraph 2 of the Clean Air Act.

(3) In order to ensure healthy and safe working conditions the service buildings, premises and facilities for the personnel shall meet the requirements of the Norms for Designing Administrative Buildings (published in the BBA, issue 8/1991; amended issue 3-4/1984, issue 3-4/1985 and issue 6/1986), and of the Norms for Designing Service Buildings and Premises within Industrial Enterprises (published BBA, issue 7/1982).

(4) The landfill's fence and control check-points as components of the physical protection system shall meet the requirements of Regulation No.7 on the Systems for Physical Protection of Constructions (promulgated, SG issue 70/1998; amended, issue 82/1998).

Article 20

In execution of the foundation, the ground base shall be controlled for its correspondence to the design plans and the geologic and hydrogeologic conditions established through engineering and geologic surveys. Where necessary the ground base shall be reinforced by replacing the faulty sections with a suitable bed, and should this not ensure compliance with the requirements towards the filtration coefficient, the bottom insulation liner shall be redesigned.

Article 21

(1) In execution of the landfill earth works, the removed humus layer shall be deposited separately in immediate proximity to the landfill so as to be subsequently used for recultivation.

(2) In the existence of superfluous earth masses the latter can be used as waste cover layer and landfill recultivation.

Article 22

(1) The qualities of the materials used for reinforcing the ground base of the landfill bottom and slopes and for constructing the mineral capping for the top and bottom insulation liners, shall be controlled throughout the construction works prior to their application in the construction.

(2) The bottom insulation liner and landfill bed settlement shall be monitored according to the requirements of Annex No. 3, Tables 1 and 2 in observance of the Instruction for Exploration of Deformations of Buildings and Facilities Based on Geodesic Methods.

(3) Control and monitoring shall be exercised over the top and bottom liner for:

1 base deformations caused by the useful load that must not endanger the integrity of the geomembrane and the liners as a whole;

2 the design content and quality of the materials to be used in the mineral capping;

3 the degree of compacting, the water content and homogeneity of the materials used in the mineral capping, by running a Proctor laboratory test once every 1000m^2;

4 compliance with the design elevations and slopes;

5 the thickness of the liners of input material at each 100 m2 of laid material;

6 the filtration coefficient of the included compacting agents, by running a laboratory or field test once every 2000 m^2 ;

Article 23

(1) In constructing the landfill liner precautions shall be taken against the formation of gaps in the place of seaming of the side and bottom insulation.

(2) Where necessary, the drainage system preventing soil water access to the liners shall be constructed prior to their placement.

(3) In landfills with a height plan of operation (dome landfills) the side insulation liners shall be made as a continuation of the bottom liners and shall encompass the internal sides of the side dikes.

Article 24

Landfill construction shall be performed in:

1 observance of the technical and legal provisions regarding the control and acceptance of construction works, including the Rules for Acceptance of Ground Bases and Foundations (published in BBA, issue 6/1985), and the Rules for Approval of Earth Works and Land Facilities (published, BBA, issue 6/1988);

2 execution of the individual types of construction and assembly works in accordance with the prospective operations under the approved designs;

3 supervision to ensure that construction materials and goods comply with the safety and quality requirements;

4 performance of the necessary single and comprehensive tests of individual construction and assembly works in the presence of the corresponding competent state control authorities, including the authorities for environmental and water protection;

5 performance of an independent construction supervision under the terms and conditions of Article 42 of the Territorial and Urban Planning Act and technical supervision in the construction of facilities of a higher degree of hazard in Order No.A-57 of March 16th 1994 on the Determining of Machine, Installation and Device Nomenclatures, issued by the Chairman of the Committee of Standardisation and Metrology (SG, issue 29/1994);

6 monitoring and control exercised by the operator during the landfill construction according to the monitoring system.

Chapter Four
REQUIREMENTS TOWARDS THE LANDFILL OPERATION

Section I
General Provisions

Article 25

In the operation of a landfill, control shall be exercised over:

1 the type and content of the waste coming in for disposal;

2 the disposal technology;

3 the condition of the available technology and reliability of the ground and building structures and facilities;

4 pollution of the air, water, soil and other environmental components on which a sizable impact is expected to be exercised in the course of the landfill operation.

Article 26

Disposal operations control shall be exercised in accordance with the requirements set forth in Annex No. 3.

Article 27

In case of a shipment of waste from trans-boundary import to the landfill, the operator shall reject acceptance thereof and shall promptly notify the environmental and water authorities.

Article 28

(1) During the operation of a landfill, its operator shall:

1 implement the control and monitoring program planned in the design, and the measures indicated in the permit for disposal operations;

2 inform the competent environmental and water authorities on all unfavorable impacts of the surrounding environment established in execution of the control and monitoring programs;

3 apply the prescription of the environmental and water authorities for eliminating of the negative impacts over the environment;

4 make sure that the entry points to the landfill are locked outside working hours and set up reliable security to restrict free access to the facility.

(2) At each calendar year-end the operator shall submit a report on the results of the monitoring as an addendum to the annual report under Regulation No.10 of 1998 on Procedure for Filling out of Report and Information Documents for the Waste Management Activities (SG, issue 191/1998) establishing the correspondence of the performed activities to the conditions laid out in the disposal activities permit.

Section II
Fire Protection

Article 29

In the course of a landfill's operation, fire protection shall be ensured in accordance with the requirements of Regulation No.2 on Fire Construction Technical Norms (published together with the FSCTN and the amendments thereof, in an official publication of the Ministry of Interior and the Ministry of Territorial and Regional Construction of 1994), where:

1. the executed construction and assembly works and the constructions as a whole shall comply with the requirements of the general FSCTN;

2. for their operations landfills shall be furnished with the necessary equipment and stock for fire protection according to the requirements of the specific FSCTN.

Section III
Ensuring Safe and Healthy Labor Conditions

Article 30

The labor setup and performance shall meet the requirements of Regulation No. 6 on the General Requirements and Obligations in Ensuring Safe Labor Conditions (SG, issue 75/1996), Regulation No. 4 on the Signs and Signals for Labor Safety and Fire Protection (SG, issue 77/1995), legal provisions on labor safety for various waste treatment operations, works and equipment, and the legal provisions on labor hygiene, fire protection and safe operation.

Article 31

(1) Employers and persons in charge and/or managing the labor processes shall undertake to secure and disseminate instructions on labor safety and hygiene and fire safety (LSHFS) for the individual types of work places according to the labor safety requirements established in legal provisions, standardisation documents and working equipment manuals.

(2) LSHFS instructions shall cover:

1. the rights, obligations and responsibilities of the persons which manage or guide the labor processes;

2. the necessary capacity or qualification of the working staff;

3. the requirements under the LSHFS prior to the start, in the course, suspension, termination or completion of work;

4. the requirements under the LSHFS towards construction machines and other working equipment in operation;

5. the individual protection devices that have to be used;

6. other requirements as required from the concrete working conditions;

7. the conditions for emergency and accidental suspension of work, measures for prevention and elimination of breakdowns and rendering of first paramedic aid in the case of an accident, etc.;

8. the points for placing labor safety and fire protection signs, descriptions of the hand-given signals and of the verbal messages that have to be given when working with cranes and other lifting equipment.

Article 32

The managers shall be obliged to ensure safe and health labor conditions for all workers.

Article 33

(1) Labor contracts may only be entered into by individuals that meet the requirements of the Labor Code. Where the individuals are required to have a capacity or qualification for the corresponding work or work place, they ought to hold the relevant document.

(2) Individuals shall be prohibited from access to work where:

1. they have not been appointed in compliance with the requirements of paragraph 1;

2. they have not received proper LSHFS instructions and training;

3. they are not familiar with the elimination of breakdowns plan;

4. they are not equipped or do not use the requisite special working apparel, shoes, individual protection devices and safe instruments;

5. they have diseases adversely affected by their working conditions;

6. they have the capacity or proper qualification but have been relocated to another work place and have not been instructed on the conditions at their new work place;

7. they are not sober or are under the impact of other drug substances.

Article 34

Newly appointed individuals shall receive instructions on the LSHFS rules and shall be subjected to medical check-ups under Regulation No.3 on the Mandatory Preliminary and Regular Medical Check-ups (SG, issue 16/1987; amended, issue 65/1991 and issue 120/1994).

Article 35

Women-workers and administrative personnel shall be allowed to their work places in observance of Regulation No.7 on Harmful and Heavy-Duty Work Prohibited from Being Performed by Women (SG, issue 58/1993).

Article 36

Domestic waste disposal plants shall mandatorily set up functioning specialised bodies on labor safety under the terms and conditions of Regulation No.2 on the Functions and Tasks of the Specialised Labor Safety Bodies (SG, 34/1995).

Article 37

The employer is obliged to ensure special working apparel and individual protection devices in compliance with Regulation No.11 on the Special Apparel and Individual Protection Devices (SG, issue 66/1993).

Article 38

Where the female workers of the enterprise are more than 50, there shall be provided rooms for personal hygiene of women according to Regulation No.11 on the Personal Hygiene of Women and on the Recess of Pregnant Women (SG, issue 57/1987).

Chapter Five
REQUIREMENTS TOWARDS THE QUALIFICATION AND TRAINING OF PERSONNEL EMPLOYED IN LANDFILL OPERATIONS

Article 39

Personnel employed in the operation of landfills shall be subject to mandatory training and qualification:

1. on waste management;
2. on labor safety;

Article 40

(1) Personnel, employed in waste management operations shall be subject to training and regular qualification upgrading in compliance with the provisions of the waste management activities program.

(2) Training and qualification of the personnel under paragraph (2) shall be performed at the landfill operator’s expense.

(3) The program shall mandatorily include:

1. waste management;
2. organization of the waste treatment operations and the activities, related to environmental protection for each individual work place;
3. environmental protection-related obligations and responsibilities.

Article 41

Individuals, appointed at the landfill:

1. shall upgrade their qualification pursuant to Regulation No.8 on Training and Upgrading of the Labor and Fire Safety Qualification (SG, issue 51/1982);
2. shall be admitted to work after introductory instructions, and shall thenceforward be subject to further instructing in compliance with Regulation No.3 on Instructions to Workers and Administrative Personnel on Labor Safety and Hygiene and Fire Safety (SG, issue 44/1996).

Chapter Six
LANDFILL CLOSURE

Article 42

(1) The landfill or a section thereof shall commence a closure procedure where:

1. the permit conditions have been met;

2. an application has been filed by the operator, which subject to a written authorisation by the competent authorities, or,

3. upon a grounded decision of the competent authorities.

(2) The landfill or a section thereof shall be deemed as closed subject to the operator's written empowerment by the competent authorities on the grounds of an on-site examination and evaluation of the reports, submitted by the operator pursuant to Article 28 paragraph 2.

Article 43

(1) Landfill closure shall be performed under a preliminary plan, the phases of which have been described in the landfill design.

(2) The landfill closure plan shall include activities relating to:

1. disassembling of the durable facilities which are not related to the environmental protection or to the future functional designation of the terrain - instructions shall be given on the manner and procedure of conducting the disassembling operations and of the skills the experts and workers handling the disassembling should possess;

2. the surface insulation liner of the landfill which shall be executed in compliance with the design of the top insulation liner construction, also featuring the technical and biological recultivation, anti-erosion and anti-land slide operations.

Article 44

(1) The operator shall control and monitor the parameters for 30 years period after the landfill closure.

(2) The monitoring shall be performed in compliance with the monitoring system described in Annex No. 3.

Chapter Seven
EXISTING LANDFILLS

Article 45

Existing landfills shall be closed, whenever such landfills are still in operation upon this Regulation becoming effective, when the following conditions are not met:

1. within one year of enactment of this Regulation they have failed to erect a fence, provide security, mark off the landfill territory with signs and signals and set up waste entry-point control;

2. within two years of enactment of this Regulation the landfill operator has not prepared and submitted for approval by the competent environmental and water authorities a plan for complying the landfill with this Regulation, to which a landfill reconstruction design shall mandatorily be attached;

3. an EIA has not been commissioned for the landfill reconstruction design within the terms under subparagraph 2;

4. the steps in the plan under subparagraph 2 and the landfill reconstruction design have been phased for implementation up to 5 years of the entering into force of this Regulation.

Article 46

Upon termination of the operation of landfills under the preceding Article, the operator shall apply the provisions of Chapter Six of this Regulation.

ADDITIONAL PROVISION

§1. Within the meaning of this Regulation:

1. "waste", "domestic waste", "industrial waste", "hazardous waste", "construction waste", "waste treatment", "disposal of waste" and "waste landfilling", are used within the meaning of §1, subparagraphs 1-8 and subparagraph 11 of the Additional Provisions of the Limitation of the Harmful Impact of Waste upon the Environment Act;

2. "landfill" shall mean a facility for waste disposal, situated on or beneath the ground, including facilities located on-site enterprises (landfills at which the waste generator disposes the waste in immediate proximity to the place of its generation). Landfills shall not include facilities for temporary waste storage and such where waste is reloaded or treated prior to its further processing or recycling. A waste landfill shall be a complex unit comprising:

a) an engineering structure, designed for organised storage of waste for more than six moths in a way as does not pose a hazard to the human health or the environment, and for which no subsequent waste treatment is planned;

b) auxiliary and service buildings, facilities and installations planned for the landfill in compliance with its specific nature, landfilling technology and type of the landfilled waste, including automatic weightbridge, disinfecting equipment washing the waste transporting vehicles, specialised laboratory, waste pre-treatment facilities (tipping, milling, separation etc.), service buildings and premises for the landfill personnel, garage for the machines and vehicles in operation, permanent and temporary roads, parking lots, infrastructure connecting the site to water supply, sewerage and power supply, landfill disposal treatment-related facilities (leachate treatment plants and harmful gas collection and removal systems, retention basins and systems for returning the leachate back into the landfill), a fence, and others;

3. "inert waste" shall mean such waste as is considered non-hazardous within the meaning of §1 subparagraph 4 of the Additional Provisions of LHIWEA, and shall also include "construction waste" which is given equal status within the meaning of §1 subparagraph 5 of the Additional Provisions of LHIWEA, and which:

a) under no circumstances and conditions of disposal it would undergo any physical, chemical and biological changes;

b) is not soluble, combustible or does not react in any way to external influence;

c) is not biodegradable and does not impact other substances in contact with it in a way that poses a threat to human health and the environment;

d) in case of release the content of harmful substances in the leachate is insignificant;

4. "existing waste landfill" shall mean a facility matching the definition under subparagraph 3 and being in operation or closed at the date of this Regulation becoming effective.

5. "operator" shall mean a legal or natural person holding a permit under Article 37 of LHIWEA which is accountable for the stewardship of a waste treatment site and for the waste management operations during the site's useful life and post-closure;

TRANSITIONAL AND CONCLUDING PROVISIONS

§2. This Regulation has been issued on the grounds of Article 15 of the Limitation of the Harmful Impact of Waste upon the Environment Act and shall become effective as of January 1st 1999.

§3. Instructions on the implementation of the Regulation shall be given by the Minister for Regional Development and Public Works in coordination with the Minister for Environment and Water and the Minister for Health.

For the Minister for Regional Development and Public Works:
E. Chachev

Minister for Environment and Water:
E. Maneva

Minister for Health:
P. Boyadjiev

Table 1

No.	Settlements, with population in thousands	Average Annual Domestic Waste Generation Rate				
		2000	2005	2010	2015	2020

No	Urban Areas with	Averaged Annual
Norm of	Accumulation of Household	

a Population in thous. Waste in m^3 per person per year

			2000	2005	2010	2015	2020
1.	Up to	1	0,56	0,64	0,73	0,81	0,87
2.	From - to	1-5	0,61	0,69	0,77	0,83	0,90
3.	From - to	5-10	0,98	1,08	1,17	1,25	1,32
4.	From - to	10-25	1,08	1,20	1,30	1,38	1,46
5.	From - to	25-50	1,12	1,27	1,35	1,42	1,50
6.	From - to	50-100	1,23	1,40	1,49	1,55	1,60
7.	From - to	100-150	1,32	1,48	1,57	1,64	1,67
8.	From - to	150-250	1,49	1,67	1,79	1,85	1,90
9.	From - to	250-300	1,65	1,83	1,95	2,02	2,05
10.	Above	300	1,81	1,98	2,05	2,10	2,13

Annex No. 1
to Article 3 paragraph 1, subparagraph 6,
Article 8 paragraph 6 and Article 26

Disposal Operations Control

1. Disposal operations control shall encompass:

a) waste management control performed by the Regional Inspectorates of Environment and Water pursuant to Article 58 of LHIWEA;

b) waste management control performed by the municipal mayors pursuant to Article 57 of LHIWEA;

c) internal company control exercised by the landfill operators pursuant to the requirements of this Annex;

2. Prior to or during the shipment of waste the operator shall inspect the latter for its preparedness to be accepted in the landfill based on the degree to which it meets the landfilling requirements in compliance with the requirements of this Regulation and the landfilling operation permit, by making the following entry-point control:

a) inspection of the waste documentation;

b) measuring the weight of the incoming waste;

c) visual inspection at the landfill entry point and at the landfilling location;

d) verification of the correspondence between the waste and its description in the documents, submitted by its supplier;

e) recording of the waste received by making an entry in the landfill record book;

3. Hazardous waste shall be accepted in the landfill by means of a "report card for hazardous waste delivery, transport and receipt".

4. Upon landfilling of hazardous waste the operator shall have to perform an identification analysis of a sample of the delivered waste and compare the sample results with the waste data declared by the supplier. The tested sample shall be stored for at least one month and the analysis results for at least 30 years.

5. The landfill operator shall keep and maintain a record book detailing the quantities and nature of the landfilled waste, its origin, date of delivery, identification of the waste's generator and supplier, and in the case of hazardous waste - precise location of waste in the landfill.

6. The hazardous waste landfill operator shall envisage and demand written certificates for all wastes in the landfill.

7. Control over the landfilling technology shall be made through the operational plan. Landfilling shall be performed and controlled according to the established rules and operational requirements set forth in the operational plan and operational cards filled out for each operational section.

8. During a landfill's operation, its operator shall exercise control over the:

a) type of waste;

b) compliance with the waste disposal technology by means of monitoring prescribed by the design;

c) placing of intermediate lining (soil capping) on a daily basis, where such has been prescribed by the design;

d) partial recultivation of the filled-up cells;

e) operations on the waste pre-treatment prior to its landfilling;

f) invasion of animals or rodents and provision for surface waste treatment where necessary;

g) the environmental components parameters provided in the self-monitoring system.

9. Control over the insulation liners, drainage system and landfill bed shall cover:

a) control for compliance with the technology for installing the bottom and top insulation liners;

b) control to ensure that the drainage systems are functioning properly;

c) a biennial inspection of the earth-mechanical and resistance parameters of the body of waste and calculations for the stability of the landfill bed, where necessary.

10. Landfill operation by sections shall be enabled by the help of an information system (a cadaster) documenting the following data:

a) waste landfilled in the fields by type and quantity (sections of the operating horizon) occupying an area up to 1000m^2 and height of accumulation up to 2 m;

b) identification number of the field;

c) manner of disposal, also indicating the thickness and slope of the liners and the compacting machine types;

d) time record of the landfilling operations by dates;

e) deviation from the provisions of the operational plan and other specific data about the field.

11. Hazardous waste landfilling shall be prohibited where such waste fails to meet the requirements described in Table 1.

Table 1

No.	Parameters	Allowable Norms
1.	Resistance	
1.1.	Shearing strength	>25kN/m^2
1.2.	Axial deformation	<20%
1.3.	Resistance to one-axis compression	>50 kN/m^2
2.	Loss through calcination of the dry residue of the original substance	<10% of the weight
3.	Extractable lipophyle substance	<4 weight %
4.	Eluate criteria	
4.1.	pH value	4-3
4.2.	Conductivity	<100 000 mC/cm
4.3.	Organically combined carbon	
4.4.	Phenols	<100 mg/l
4.5.	Arsenic	<1 mg/l
4.6.	Lead	<2 mg/l
4.7.	Cadmium	<0,5 mg/l
4.8.	Chrome - VI	<0,5 mg/l
4.9.	Copper	<10 mg/l
4.10.	Nickel	<2 mg/l
4.11.	Mercury	<0,1 mg/l
4.12.	Zinc	<10 mg/l
4.13.	Fluoride	<50 mg/l

4.14.	Ammonia	<1 000 mg/l
4.15.	Chloride	<10 000 mg/l
4.16.	Cyanides, volatile	<1 mg/l
4.17.	Sulphates	<5 000 mg/l
4.18.	Nitrites	<30 mg/l
4.19.	Organic halogens able to be absorbed	<3 mg/l
4.20.	Water-soluble waste for underground landfilling	<10 mg/l

Annex No. 2
to Article 19 paragraph 1

REQUIREMENTS TOWARDS THE LANDFILL BED DESIGN

I. General Requirements

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

a) does not pose a threat to the health of the population and landfill personnel;

b) does not produce risk for excessive contamination of the atmospheric air, surface and ground water, and the soil, or of the flora and wildlife;

c) does not create conditions for excessive noise and for the emission of odors;

d) does not causes conditions for harmful implications on natural sites, immovable cultural monuments and the landscape.

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

a) LHIWEA;

b) Regulation No. 12 of 1998 on the Requirements that must be Met by Waste Treatment Facility Sites;

c) the legal provisions for the load and impacts and for design of foundation and constructions;

d) the geologic and hydrogeologic conditions of the landfill's ground base, determined through engineering-geologic surveys;

e) the rules and norms placing requirements towards the design solutions for the individual landfill components according to this Annex.

3. The landfill bed shall be checked for its overall steadiness so as 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.

3.1. Deformations (settlement under own weight, subsidence, etc.) shall be determined through design tests of a 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's 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.

3.2. The average density of landfilled waste shall be determined through an analysis of samples taken from test pits and bore holes and a calculation of the resistance properties, namely, the angle of internal friction □ and the cohesion *c*, by establishing their correlation.

3.3. 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.

4. The materials and goods put in the landfill bed shall meet the safety requirements set forth in legal provisions, standardisation documents and the established methodologies towards their testing.

II Requirements Towards the Landfill's Bottom Insulation Liner

5. The bottom liner 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.

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

a) bedding;

b) mineral capping;

c) insulation geomembrane;

d) protective layer;

e) drainage system;

f) intermediate layer.

6.1. 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.

6.2. The individual liner components (geomembrane, protective layer and bedding) may not to be envisaged.

7. 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.

7.1. 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.

7.2. In case of an unsatisfactory result of the design calculatons under item 7.1. 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. Ground Base

8. 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.

8.1. 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:

a) in hazardous waste landfills - a filtration coefficient of $<=1.10^{-9}$ m/sec and a thickness greater than 5 m;

b) in non-hazardous waste landfills - a filtration coefficient of $<= 1.10^{-9}$ m/sec and a thickness greater than 1 m ;

c) in inert waste landfills - a filtration coefficient of $<=1.10^{-7}$ m/sec and a thickness greater than1 m.

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

8.3. Where the requirements under subparagraph 8.1. on the natural ground base have not been met by a terrain which is designated to became 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.

9. 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.

9.1. Inert material landfills may have a higher table of ground water.

B. Bedding

10. Installation of a bedding within the bottom insulation liner system shall be planned for wherever there is a need to consolidate the ground base.

10.1. The type, content and manner of installing of the bedding shall depend on the results of the geologic and hydrogeologic surveys and the requirements towards the carrying capacity and landfill bed stability.

10.2. Where a bedding for the entire landfill is planned on the grounds of the results of geologic and hydrogeologic surveys and the requirements towards the carrying capacity and landfill bed stability, the said bedding shall have a thickness greater than 0,5 m.

C. Mineral Capping

11. 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.

12. The mineral capping shall have a thickness minimum of 0,5m for non-hazardous waste and minimum 0,75m for hazardous waste. The capping shall be placed over the prepared ground base surface or over the bedding.

12.1. The mineral capping for hazardous and non-hazardous waste landfills shall consist of a natural homogeneous clay soil with a filtration coefficient of <= 1.10^{-9} m/sec.

12.2. The mineral capping shall have a design longitudinal sloping at least 1% and a transverse sloping to the drain pipes for landfill waste water (leachate) collection at least 3%.

12.3. The installation of the mineral capping shall involve a construction technology at which the individual layers are compacted to a coefficient of compactness of >= 0,97.

13. 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, mot 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 +-2%;

f) density of $\square_n$ >= $D_{P\square}.Pd,s$ where *Pd,s* is the standard density established through laboratory tests under BDS 3214, BDS 17146 or through the Mod. Proctor test;

g) $D_{P\square}$ is the design compactness coefficient, not lower than 0,95 according to Regulation No.1 on Flat Foundation Design (published together with the Norms on Flat Foundation Design in BBA, issue 10/1996);

h) filtration coefficient <= 5.10^{-10} m/sec., obtained in laboratory conditions under BDS 8497.

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

15. 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.

D. Insulation Geomembrane

16. The insulation geomembrane shall be envisaged for hazardous and non-hazardous landfills.

16.1. 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 resistant to waste-generated leachate impact.

16.2. The geomembrane material shall be assessed for the following general performance standards (suitability and longevity):

a) the synthetic material (high-density polyethylene, polypropylene, PVC and others) shall be at least 2 mm thick, 4 m wide and have a smooth or coarse texture, as prescribed in the design;

b) have the following physical properties:

- tensile resistance at a temperature of 23º C >= 400 N;

- tensile resistance at a temperature of 70º C >= 0,25 of the tensile strength at a temperature of 23ºC;

- the capacity of stretching of a 50 mm wide strip, greater than 5%;

- resistance to point-source penetration: a maximum fall height without penetration of > 750mm at a point-source impulse load of 500g;

- welding strength of the separate strips greater than 90% of the material strength in the case of partially crystallised polymers and at least 60% in the case of amorphous polymers;

c) have the following chemical and physical properties:

- when exposed to leachate impact to lose no more than 15% of its weight and diminish no more than 25% of its physical properties;

- when exposed to impact of the gas generated by waste body to diminish no more than 20% of its physical properties;

- when exposed to micro-organism impact to lose no more than 5% of its weight and diminish no more than 15% of its physical properties;

- to resist root intrusion;

- to resist rodent intrusion (biting from the edge less than 50 mm, impeding bite-through)

E. Protective Layer of the Insulation Geomembrane

17. 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.

18. The function of a protective layer can also be performed by the blanket drainage layer.

F. Drainage System (Drainage Layer)

19. The drainage system 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.

20. The drainage system of the bottom insulation liner shall include:

a) blanket drainage having thickness greater than 0,50m of washed rubble with a filtration coefficient of >= 1.10^{-3} m/sec, capable of retaining its stability over long-term landfill operation. The granulometric content of the material shall range between 16-32mm and if deviations occur, the maximum pore fraction volume shall be of 16-32 mm. The calcium carbonate content of the drainage material shall not exceed 20%wt;

b) a horizontal pipe network for diverting leachate outside the landfill bed. Inspection shafts shall be installed at every horizontal pipe bend:

c) a pipeline for diverting leachate outside the landfill bed.

21. 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 1.10^{-3} m/sec;

b) not interact chemically and biologically with any leachate present in the landfill bed;

c) easy maintenance and inspection;

d) prevent clogging.

21.1. The drainage network shall be composed of pipes with a minimum diameter of 300 mm, two-thirds of the surface of which is punctured or has slits, at a minimal transverse and lateral slope of the pipeline track as prescribed in subparagraph 12.2. and a maximal distance in between the pipes of 30 m. Drainage pipes and their junctures should be capable to withstand the load and deformations of the overlying landfill bed and undergo high-pressure flushing.

21.2. 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.

21.3. A retention basin shall be considered as a temporary leachate storage site.

21.4. A waste water treatment plant shall be planned for, providing treatment to the degree matching the category of the water intake.

21.5. A facility for waste water discharge shall be planned for wherever the leachate content complies with the water intake's category.

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

III. Requirements Towards the Top Insulation Landfill Liner

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

a) leveling (adjusting) layer;

b) gas drainage (ventilation layer);

c) mineral capping;

d) insulation geomembrane;

e) protective layer;

f) drainage system;

g) recultivation layer

23. The type and composition of the individual elements of the surface lining system shall depend on the properties of the disposed waste and the prescriptions of the competent authorities.

24. 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) meet the aesthetic requirements towards the landfill;

d) comply with the legal requirements regarding impaired terrain recultivation;

e) comply with the conditions for use of the landfill's post-closure recultivated surface layer.

25. Landfill recultivation shall be performed in graduated steps, following the closure of each cell or separate landfill section.

26. 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 according to the Norms on Construction of Buildings and Facilities in Seismic Regions (published in "Design and Construction Norms" specialised publication of the Committee for Territorial and Regional Construction and the Bulgarian Academy of Sciences, 1987; amended and supplemented by SG issue 6/1989 and BBA, issue 1/1989).

27. 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.

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

29. The design crest and slope gradient shall be determined with view to the expected settlement, which shall remain within 2-5% after settlement has occurred. 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. Leveling (Adjusting) Layer

30. The leveling layer overlying the final design surface of the disposed waste shall provide:

a) protection of the environment during the landfill's operation by means of its permanent spreading (soil spreading) over the upper (last) layer of the body of waste;

b) the regular distribution of the loads from others elements of the surface lining system on the body of waste;

c) conducting (drainage) of the gas emitted by the body of waste.

B. Gas Drainage System

31. When projecting or determining gas emissions, a gas drainage system shall be planned for, of a thickness not lower than 0,5m.

32. A gas drainage system shall comprise:

a) a drainage layer;

b) gas collection and removal pipes.

33. 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.

C. Mineral Capping

34. 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.

35. The mineral capping shall meet the requirements of subparagraphs 11 and 13 and shall be sloped in accordance to subparagraph 29.

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

D. Insulation Geomembrane and Geomembrane Protective Layer

37. 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.

38. The geomembrane and the geomembrane protective layer shall comply with the requirements of subparagraphs 16.1. and 16.2, and its protective layer shall also comply with subparagraphs 17 and 18 at a thickness of the geomembrane not lower than 2 mm.

E. Drainage System

39. 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.

40. 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.

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

40.2. 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.

41. 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).

F. Recultivation Layer

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

43. The recultivation design shall be prepared in compliance with Regulation No.26 on the Recultivation of Impaired Terrains, Amelioration of Low-Yielding Land, Removal and Utlisation of the Humus Layer (SG, issue 89/1996).

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

***IV*. Gas Collection System**

45. Preliminary studies shall be conducted to establish the presence of gas emissions from the body of waste of non-hazardous waste landfills.

46. 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.

47. The height of the emitting devices of the landfill's gas collecting system shall be determined under the Clean Air Act.

48.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.

49. 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 have a design diameter of 0,8- 1,0 m of washed drainage material with a grain size of 30 to 100 mm;

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

50. The commissioning of the gas collection system shall be planned not later than 6 months after the landfill has started operating.

V. Ensuring Stability for the Landfill's Body of Waste

51. 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.)

52. 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.

53. 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.

54. 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.

Annex No.3
to Article 25 paragraph 2 and
Article 43 paragraph 2

LANDFILL MONITORING SYSTEM

General Requirements

1. The landfill monitoring system shall be performed in compliance with the waste activities management program:

a) in the course of preparation of the landfill base;

b) in the process of operation of the landfill (landfilling);

c) post-closure of the landfill.

1.1. 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. 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.

2. The monitoring system shall comprise:

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

No.	Parameters	During landfill operation	After landfill closure
1.	Rainfall amount	daily	daily, accumulated to the monthly amounts
2.	Temperature (minimal and maximal at 14h)	daily	monthly average
3.	Wind direction and speed	daily	not required
4.	Evaporation	daily	daily, accumulated to the monthly amounts
5.	Athmospheric humidity	daily	monthly average

2.2. Control over surface water, leachate and gas emissions from the body of waste shall be exercised under Table 2, whereby:

a) at least two surface water monitoring points are designated, one upstream and the other downstream;

b) the gas monitoring must be representative for each phase (part, section, trench and others) of construction of the landfill.

Table 2

No.	Parameters	During landfill operation	After landfill closure

1.	Leachate volume	daily[1,3]	once every 6 months
2.	Leachate content[2]	quarterly[3]	once every 6 months
3.	Surface water volume and content[7]	quarterly[3]	once every 6 months
4.	Potential gas emissions and atmospheric pressure (CH_4, CO_2, O_2, H_2S, H_2 etc.)[4]	monthly[3,5]	once every 6 months

Notes:

1) The frequency of the monthly sample-taking made to determine the leachate volume and content 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 laid out in Table 1, Annex No.1.

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

4) The measurements under item 4 shall be run primarily to determine the content organic compounds of waste.

5) CH_4, CO_2, O_2 - 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 environmental and water protection authorities, monitoring of surface water volume and content maynot have be performed wherever the latter is not exposed to a substantial impact by the waste landfill.

2.3. Monitoring for ground water protection shall be performed in a way as would provide information on the ground water in peril of contamination as a result of improper storage of the waste under Table 3, by making measurements by at least one monitoring point upstream of the landfill and two downstream the landfill in the direction of the natural groundwater flow.

2.3.1. The number of monitoring points may be increased if necessary, based on hydrogeologic surveys or for the needs of forecasting the leachate discharge in the groundwater.

2.3.2. Sample-taking shall be performed at least at three points prior to the filling up of the landfill to establish the most appropriate points for sample-taking once the landfill has been closed;

2.3.3. Sample-taking and leachate and groundwater analysis shall be made in application of the indices for the anticipated contamination, that are important for the early detection of changes in the ground-water quality.

2.3.4. When the analysis of ground water samples shows substantial changes in the water quality, the constant ground water table shall be determined by taking in mind the engineering-geologic and hydrogeologic research made to determine the specific geologic structure of the landfill region and the groundwater quality.

2.3.5. The constant groundwater table shall be determined by drawing of level control charts for each monitored well through local measurements run to determine the groundwater quality.

Table 3

No.	Parameters	During landfill operation	After landfill closure
1.	Groundwater table	once every 6 months[1]	once every 6 months
2.	Groundwater content	The frequency depends on the location and is site-specific [2,3]	The frequency depends on the location and is site-specific [2,3]

Notes:

1) Where the groundwater table is marked by pronounced fluctuations, measurements should be taken at shorter intervals.

2) The frequency of sample-taking shall depend on the groundwater flow speed.

3) Upon reaching of a maximum groundwater table, inspections shall be made through repeated sample-taking and where there is an established water table, monitoring shall be conducted as provided in the program under the Article 28 paragraph 1 of this Regulation.

2.4. Monitoring of the condition of the landfill bed (landfill topography) shall be made in compliance with Table 4.

Table 4

No.	Parameters	During landfill operation	After landfill closure
1.	Structure and content of the body of waste[1]	Annually	---
2.	Behavior (settlement) of the surface of the landfill bed	Annually	Annually, by noting the occurred changes

Note:

The wastes state indices include: area occupied by waste, waste volume and content, landfilling technology, timing and duration of landfill and unused landfill capacity.