DECISION OF THE GOVERNMENT
OF THE REPUBLIC OF ARMENIA

No 689-N of 15 June 2017

ON ESTABLISHING THE PROCEDURE FOR CLASSIFICATION OF SUBSOIL WASTE AND FACILITIES OF SUBSOIL WASTE ACCORDING TO THE DEGREE OF HAZARD

Pursuant to point 16 of part 2 of Article 15 of the Subsoil Code of the Republic of Armenia, the Government of the Republic of Armenia ***decides to***:

1. Establish:

   (1) the order of classification of subsoil waste according to the degree of hazard, pursuant to Annex No 1;

   (2) the order of classification of facilities of subsoil waste according to the degree of hazard, pursuant to Annex No 2;

2. This Decision shall enter into force on the tenth day following the day of its official promulgation.

Prime Minister **K. Karapetyan**
of the Republic of Armenia

23 June 2017

Yerevan

Annex No 1

to Decision of the Government

of the Republic of Armenia

No 689-N of 15 June 2017

PROCEDURE

FOR CLASSIFICATION OF SUBSOIL WASTE ACCORDING TO THE DEGREE OF HAZARD

1. The class of the degree of hazard of subsoil waste (hereinafter referred to as "the waste") shall be determined by the degree of their possible hazardous impact on the environment, in case of indirect or direct impact of the waste, pursuant to the following standards:

NN i/s	Degree of hazardous impact of waste on the environment	Standards of classifying waste as hazardous for the environment	Class of the degree of hazard for the environment
1.	VERY HIGH	The ecological system is irrevocably disturbed. The recovery period is missing.	CLASS I EXTREMELY HAZARDOUS
2.	HIGH	The ecological system is severely disturbed. The recovery period shall not be less than 30 years after the complete elimination of the source of hazardous impact.	CLASS II HIGH DEGREE OF HAZARD
3.	MEDIUM	The ecological system is disturbed. The recovery period is not less than 10 years after the hazardous impact from the existing source has abated.	CLASS III MODERATELY HAZARDOUS
4.	LOW	The ecological system is disturbed. The self-recovery period is not less than 3 years.	CLASS IV LESS HAZARDOUS
5.	VERY LOW	The ecological system is not practically disturbed.	CLASS V PRACTICALLY UNSAFE

2. Classification of waste under the class of environmental hazard shall be carried out by the calculation method.

3. Classification of waste under the class of environmental hazard by calculation method shall be carried out on the basis of the indicator (K) characterising the degree of hazard of the waste in the event of its impact on the environment, which shall be calculated by the sum of the environmental hazard indicators of the materials that make up the waste (hereinafter referred to as "the Waste components") for the environment (Ki).

4. The list of waste components and their quantitative content shall be approved according to the content of the raw materials and the technological processes of processing thereof or the results of chemical quantitative analysis.

5. Degree of hazard of the waste component (Ki) shall be calculated as the ratio of the concentrations of the waste components (Ci) and its factor of the degree of hazard for the environment (Wi).

6. The coefficient of the degree of hazard of the waste component for the environment is a conventional indicator, which is equal to the amount of the waste component, where in case of a value below it the waste does not have a negative impact on the environment. The unit of measurement of the hazard ratio of the waste component for the environment shall be conditionally accepted as mg/kg.

7. For the determination of the coefficient of the degree of hazard of waste component for the environment, according to each component of the waste, the following degrees of the hazard thereof to the environment in different natural environments shall be established:

NN i/s	Primary hazard indicators of a waste component	Degree of hazard of the waste component to the environment according to each component			
		1	2	3	4
1.	MPCn1 (APC2), mg/kg	<1	1-10	10.1-100	>100
2.	Hazard class in soil	1	2	3	not confirmed
3.	MPCw (APL, ASEL) mg/l	<0.01	0.01-0.1	0.11-1	>1

NN i/s	Primary hazard indicators of a waste component	Degree of hazard of the waste component to the environment according to each component			
		1	2	3	4
4.	Class of hazard in economic - drinking water	1	2	3	4
5.	MPC f.e. (ASEL), mg/l	<0.001	0.001-0.1	0.011-0.1	>0.1
6.	Hazard class in water used for fish farming	1	2	3	4
7.	MPC a.a. (MPC m.s., ASEL), mg/m3	<0.01	0.01-0.1	0.11-1	>1
8.	Class of hazard in atmospheric air	1	2	3	4
9.	MPC food (MPL, MPC), mg/kg	<0.01	0.01-1	1.1-10	>10
10.	Ig (S, mg/l/MPCw, mg.l)3	>5	5-2	1.9-1	<1
11.	Ig (C saturating, mg/m3/MPCw.z.)	>5	5-2	1.9-1	<1
12.	Ig (C saturating, mg/m3/MPCa.a. or MPC m.s.)	>7	7-3.9	3.8-1.6	<1.6
13.	Ig Kow (octanol/water)	>4	4-2	1.9-0	<0
14.	LD50 mg/kg	<15	15-150	151-5000	>5000
15.	LC50 mg/m3	<500	500-5000	5001-50000	>50000
16.	LC50 water, mg/l/96h.	<1	1-5	5.1-100	>100
17.	BD=BOD5/COD 100%	<0.1	0.01-1.0	1.0-10	>10
18.	Sustainability (the transformation in the environment)	the emergence of more toxic products, including those with new properties or far-reaching effects	the emergence of products with the most pronounced impact by other standards of the level of hazard	the formation of a product toxicity whereof is close to that of the starting material	formation of less toxic products
19.	Biomass (behaviour in the food chain)	pronounced accumulation in all units	accumulation in several units	accumulation in one of the units	accumulation does not occur
	Score	1	2	3	4

8. The abbreviations used in point 7 of this Procedure are presented in Table No 1.

Table No 1

List of abbreviations

MPC_s (mg/kg)	Maximum permissible concentration of the substance in soil
APC	Approximate permissible concentration
MPC_w (mg/l)	Maximum permissible concentration of the substance in water of water objects for economic-drinking and communal living use
APL	Approximate permissible level
ASEL	Approximate safe impact level
$MPC_{f.e.}$ (mg/l)	Maximum permissible concentration of the substance in the water of water objects of fish-economic importance
$MPC_{a.a.}$ (mg/m^3)	Daily average of maximum permissible concentration of the substance in the atmospheric air of settlements
$MPC_{m.s.}$ (mg/m^3)	Single maximum permissible concentration of the substance in the atmospheric air of settlements
$MPC_{w.z.}$ (mg/m^3)	Single maximum permissible concentration of the substance in the air of working zone
MPC	Maximum permissible content
MPC	Maximum permissible level
S (mg/l)	Solubility of a waste component (substance) in water at 20^{0}C
$C_{saturating}$ (mg/m^3)	The saturating concentration of substance in the air at 20^{0}C and under normal pressure
Kow	Partition coefficient in octanol/water system at 20^{0}C
LD_{50} (mg/kg)	Mean lethal dose of the component, expressed in milligrams of active substance per 1 kg of live weight, which shall cause the death of 50% of the test animals after a single intraoral injection
$LD^{skin}{}_{50}$ (mg/kg)	Mean lethal dose of the component, expressed in milligrams of active substance per 1 kg of live weight, which shall cause the death of 50% of the test animals when applied to the skin once, under unified conditions
LC_{50} (mg/m^3)	Median lethal concentration of a substance that causes death in 50% of test animals in case of penetration by way of inhalation under unified conditions
BD=BOD5/COD	Biological breakdown (dissimilation)
$LC5^{water}{}_{50}$ (mg/l/96h)	The median lethal concentration of a substance in water that causes the death of 50% of test aquatic animals (for example) the fish after 96 hours
BOD5	Biological oxygen demand
COD	Chemical oxygen demand
MPC_{food} (mg/kg)	Maximum permissible concentration of the substance in food

9. Indicator of information provision shall be included in the list of indicators used for Wi calculation for the purpose of record-registering the lack of information on the primary indicator of the degree of hazard of waste components for the environment.

10. The indicator of information provision shall be calculated by dividing the number of established indicators (n) by 12 (N is the number of the most important, primary hazard indicators of waste components for the environment).

11. The scores shall be represented by the following domains of change in information provision:

Domains of change of information provision (n/N)	Score 1 2 3 4
<0.5 (n<6) 0.5-0.7 (n=6-8) 0.71-0.9 (n=9-10) >0.9 (n>11)	

12. According to the degrees of hazard of the waste components for the environment, the indicator of relative hazard in different natural environments ((X_i) for the environment) shall be calculated as the ratio of the sum scores of all parameters and the quantity of those parameters.

13. The Wi coefficient shall be calculated using one of the following formulas:

$$\text{Lg } W_i = \begin{cases} 4 - 4 / Z_i ; & 1 < Z_i < 2 \text{ number} \\ Z_i ; & 2 < Z_i < 4 \text{ number} \\ 2 + 4 / (6 - Z_i) & 4 < Z_i < 5 \text{ number} \end{cases}$$

Where: $Z_i = 4\ X_i/3$ — 1/3

14. The W_i coefficients for the most common hazardous waste components are presented in Table No 2.

Table No 2

The coefficient of the degree of environmental hazard of a waste component for individual waste components

Name of component:	Xi	Zi	Lg Wi	Wi
Aldrin	1,857	2,14	2,14	138
Benzo[a]pyrene	1,6	1,8	1,778	59,97
Benzole	2,125	2,5	2,5	316,2
Hexachlorobenzene	2,166	2,55	2,55	354
2-4 Dinitrophenol	1,5	1,66	1,66	39,8
Di(n)butylphthalate	2	2,33	2,33	215,44
Dioxins	1,4	1,533	1,391	24,6
Dichloropropene	2,2	2,66	2,66	398
Dimethyl phthalate	2,166	2,555	2,555	358,59
Dichlorophenol	1,5	1,66	1,66	39,8
Dichlorodiphenyltrichloroethane	2	2,33	2,33	213,8
Cadmium	1,42	1,56	1,43	26,9
Lindane	2,25	2,66	2,66	463,4
Manganese	2,30	2,37	2,73	537,0
Copper	2,17	2,56	2,56	358,9
Arsenic	1,58	1,77	1,74	55,0
Naphthalene	2,285	2,714	2,714	517,9
Nickel	1,83	2,11	2,11	128,8
N-nitrosodiphenylamine	2,8	3,4	3,4	2511,88
Pentachlorobiphenyls	1,6	1,8	1,778	59,98
Pentachlorophenol	1,66	1,88	1,88	75,85
Mercury	1,25	1,33	1,00	10,0
Strontium	2,86	3,47	3,47	2951
Silver	2,14	2,52	2,52	331,1
Lead	1,46	1,61	1,52	33,1
Tetrachloroethane	2,4	2,866	2,866	735,6
Toluene	2,5	3	3	1000
Trichlorobenzene	2,33	2,77	2,77	598,4

Name of component:	Xi	Zi	Lg Wi	Wi
Phenol	2	2,33	2,33	215,44
Furans	2,166	2,55	2,55	359
Chloroform	2	2,333	2,333	215,4
Chromium	1,75	2,00	2,00	100,0
Zinc	2,25	2,67	2,67	463,4
Ethylbenzene	2,286	2,714	2,714	517,9

15. The indicator of the degree of environmental hazard K_i of the waste component shall be calculated by the following formula:

$K_i = C_i / W_i$

where:

C_i — concentration of component "i" in hazardous waste (mg/kg of waste)

W_i — coefficient of the degree of hazard of "i" component of hazardous waste for the environment (mg/kg)

$K = K_1 + K_2 + ...+ Kn,$

where:

K — indicator of the degree of hazard of waste for the environment

K1 + K2 .....Kn — indicators of degrees of hazard of individual waste components for the environment.

16. Classifying the waste under the class of hazard by the calculation method, according to the indicator of the degree of hazard of waste for the environment, shall be carried out according to the following table:

Class of waste hazard	Degree of waste hazard for the environment (K)
I	$10^6 \geq K > 10^4$
II	$10^4 \geq K > 10^3$
III	$10^3 \geq K > 10^2$
IV	$10^2 \geq K > 10$
V	$K \leq 10$

Chief of Staff of the Government **V. Stepanyan**

of the Republic of Armenia

Annex No 2

to Decision of the Government
of the Republic of Armenia
No 689-N of 15 June 2017

PROCEDURE

FOR CLASSIFICATION OF SUBSOIL WASTE ACCORDING TO THE DEGREE OF HAZARD

I. GENERAL PROVISIONS

1. The facility of subsoil waste (hereinafter referred to as "the Waste") shall be classified as a facility of category "A", where the breakdown resulting from violation of its structural integrity or the consequences of operation carried out in violation of technical safety rules and norms (hereinafter referred to as "the Improper operation"), in short-term and long-term future, may lead to:

   (1) undeniable possibility of loss of life;

   (2) a serious risk to human health;

   (3) irreversible or severe violations of the ecological situation in the area of the waste facility.

2. A waste facility shall be classified under category "A" based on:

   (1) breakdown due to structural failure or improper operation;

   (2) content of hazardous waste;

   (3) content of hazardous substances.

3. When classifying the waste facility according to the hazard category, all three parameters mentioned in point 2 of this Procedure shall be considered.

4. Where the waste facility is considered to be that of "A" category, based on any of the parameters mentioned, the general classification of that waste facility shall be of category "A" and there shall be no necessity for considering the other two parameters.

5. Where none of the three parameters lead to classification of category "A", the general classification of the waste facility is not of category "A".

6. For facilities containing inert waste or uncontaminated soil, only the first parameter (breakdown due to structural integrity) shall be applicable.

7. For waste facilities that contain mainly hazardous waste, the second parameter may directly lead to classification of category "A".

8. The potential hazard posed by a waste facility may change in the period between operation and closure. Therefore, a classification review must be carried out at the end of the operation of the waste facility, if not earlier.

II. CLASSIFICATION BASED ON CONSEQUENCES OF BREAKDOWN RESULTING FROM VIOLATION OF STRUCTURAL INTEGRITY OR IMPROPER OPERATION

9. Where the breakdown having occurred as a result of violation of the structural integrity of the waste facility, regardless of the type of waste facility, may cause serious risks to human life or irreversible or severe violation of the ecological situation in the area of waste facility, the waste facility must be classified as a waste facility of "A" category.

10. Where the improper operation of the waste facility may cause, in short-term or long-term future, serious hazards for human life or irreversible or severe violation of the ecological status in the area of the waste facility, the waste facility must be classified as waste facility of "A" category.

11. In the event of violating the structural integrity of dams of tailings human lives shall be considered to be at risk when water or slurry is 0.7 m or more above the ground and has a velocity of 0.5 m/s or more. When assessing the possibility of loss of human life and serious harm to human health, the following factors must be taken into account:

(1) dimensions of the waste facility;

(2) type and volume of waste in the waste facility;

(3) topography, including wetting properties, such as lakes;

(4) period when the flood reaches residential areas;

(5) level of water or slurry;

(6) rate of rise in the levels of water or slurry;

7) any site-specific factor that may have an impact on the possibility of loss of life or risk to human health.

12. A moving pile of waste can endanger human lives if people live in the zone of movement of the waste mass. An assessment of the possibility of loss of human life must include the following factors:

(1) dimensions of the waste facility;

(2) volume and type of waste in the waste facility;

(3) the angle of inclination of the pile;

(4) the possibility of internal groundwater collection inside the pile;

(5) mountain-geological stability of the rocks forming the area of the pile;

(6) topography;

(7) distance from residential and public buildings, constructions, structures of drinking water supply systems, cemeteries;

(8) mining works.

13. The process of classification related to the structural integrity shall consider the direct effects of any substances transported outside the waste facility as a consequence of breakdown (tailing slurry, rocks, contaminated and/or uncontaminated water) and the resulting short-term, mid-term and long-term impacts (soil and water contamination, loss of fauna, destruction of natural environment, etc.).

14. The possibility of a serious ecological consequence as a result of a violation of structural integrity or a breakdown caused by improper operation shall be considered to be low, where:

(1) the power of the source of potential pollution decreases over time;

(2) the affected environment can be restored through limited cleaning and restoration efforts;

(3) where no permanent or long-term damage has been caused to the environment.

15. Examples of permanent or long-term damages to the environment shall include:

(1) residual soil contamination leading to restrictions of land use, human health and ecological risks;

(2) long-term (more than 10 years) use of surface or underground water resources;

(3) toxic concentrations of pollutants in surface waters for a long-term period;

(4) highly toxic concentrations of pollutants in surface waters for a short-term period, where there is a risk of irreversible damage to the affected ecosystem.

16. The assessment of pollutant release from improper operation must take into account both short-term effects and long-term pollutant release and must be carried out for two time periods:

(1) the period of operation of the waste facility; and

(2) the long-term period following the closure.

17. To determine the possibility of loss of life or serious risk to human health and the environment, specific estimates of the magnitude of potential effects must be considered in the context of the source-pathway-receptor chain. If there is no path between the source and the receptor, the waste facility cannot be classified as a waste facility of category "A" due to violations of structural integrity or improper operation.

III. CLASSIFICATION ACCORDING TO THE COMPOSITION OF HAZARDOUS WASTE

18. The waste facility shall be classified as a waste facility of "A" category, if it contains hazardous waste the amount whereof exceeds certain percentage.

19. The limit value must be determined by the ratio of mass and dry substance:

(1) all the waste existing in the waste facility at the end of the operation planned and classified as hazardous;

(2) the expected waste remaining in the waste facility at the end of the operation planned.

20. Where the ratio mentioned in point 19 of this Procedure exceeds 50 percent, the waste facility must be classified as waste facility of category "A". In case the ratio is 5-50 percent, the waste facility may be classified as an waste facility of category "A". However, the waste facility may not be classified as a waste facility of "A" category, if it is substantiated by the risk assessment typical of the site,

which has paid special attention to the impact of hazardous waste and has been implemented as a part of the classification based on violation of structural integrity or consequences of breakdown due to improper operation and indicating that the waste facility should not be classified as a waste facility of category "A" based on the content of hazardous waste.

21. In the case where the mentioned ratio is less than 5 percent, the waste facility must not be classified as a waste facility of category "A" based on the content of hazardous waste.

IV. CLASSIFICATION BASED ON THE COMPOSITION OF HAZARDOUS SUBSTANCES OR PREPARATIONS

22. Waste facility shall be classified as a waste facility of "A" category, where it contains substances or preparations (additives or reagents) sufficient to be classified as hazardous.

23. For operating waste facilities (tailing ponds), classification may be based on direct chemical analysis of the water (and solids) contained in the waste facility to determine whether the aqueous layer and the content thereof may be considered a hazardous preparation. If yes, the waste facility must be classified as a waste facility of "A" category.

Chief of Staff of the Government of the Republic of Armenia **V. Stepanyan**