THE MINISTRY OF ENVIRONMENTAL PROTECTION, PHYSICAL PLANNING AND CONSTRUCTION

1307

Pursuant to Article 104, paragraph 1, subparagraph 7, of the Waste Act (Official Gazette 178/04 and 111/06), the Minister of Environmental Protection, Physical Planning and Construction, hereby issues the

ORDINANCE

ON MANAGEMENT OF SEWAGE SLUDGE WHEN USED IN AGRICULTURE

Article 1

This Ordinance establishes the method for management of sewage sludge when used in agriculture.

Article 2

(1) The purpose of this Ordinance is to prescribe environmental protection measures in order to establish the management system for sewage sludge when used in agriculture in such a way as to prevent harmful effects on soil, vegetation, animals and man, thereby encouraging the proper use of such sludge.
(2) Sludge shall be used in such a way that the nutrient needs of plants are taken into account and that the quality of the soil is preserved (its physical and biological properties maintained or improved) while at the same time preserving the quality of the surface and ground water.

Article 3

The terms used in this Ordinance have the following meaning:

1. *Sludge* means:
– residual sludge from waste water treatment facilities treating domestic or urban waste waters and from other waste water treatment facilities treating waste waters of a composition similar to domestic and urban waste waters;
– residual sludge from septic tanks and other similar installations for the treatment of waste waters;
– residual sludge from other waste water treatment facilities other than those referred to in the first and second indent of this item.
2. *Treated sludge* means any sludge which has undergone biological, chemical or heat treatment, long-term storage or any other appropriate process so as to significantly reduce its fermentability and health hazards resulting from its use.
3. *Long-term storage* means any storage in duration of at least six months.
4. *Agriculture* is defined by a special regulation.
5. *Use of sludge* means spreading of sludge on soil or any other application of sludge on and in the soil.
6. *Sludge producer* means any legal or natural person who is the owner or holder of a waste water treatment facility.
7. *Sludge user* means any legal or natural person who uses sludge in agriculture.

Article 4

(1) Only treated sludge may be used in agriculture, which:
– contains heavy metals in concentrations not exceeding the limit values prescribed pursuant to Article 5 of this Ordinance,
– contains organic substances in concentrations not exceeding the limit values prescribed pursuant to Article 6 of this Ordinance,
– is stabilised in a way as to destroy any pathogen organisms, potential disease agents in the sludge.
(2) The use of treated sludge shall be prohibited on:
– grasslands and pastures used for grazing of livestock,
– areas where forage crops are cultivated for a period of at least two months preceding the harvest of crops,
– soil in which fruit and vegetable crops are growing, with the exception of fruit trees,
– soil intended for cultivation of fruit and vegetable crops which are normally in direct contact with the dirt and normally eaten raw, for a period of at least 10 months preceding the harvest of crops,
– soil where there is danger of sludge being washed out into surface waters,
– soil the pH of which is below 5,
– soil of karst fields, shallow or skeletal karst soil,
– soil saturated by water, covered by snow and on a frozen agricultural land,
– soil in coastal and water protected areas.

Article 5

Limit values for heavy-metal concentrations in treated sludge used in agriculture are:

Heavy metals	**Limit values for heavy metal concentrations expressed in mg/kg of dry matter in a representative sludge sample**

Cadmium	5
Copper	600
Nickel	80
Lead	500
Zinc	2000
Mercury	5
Chromium	500

Article 6

Limit values for organic substances in treated sludge used in agriculture are:

Organic substances in sludge	**Limit values for organic substances in sludge**
Polychlorinated biphenyls (PCB):	in mg/kg of sludge dry matter
2,4,4'-trichlorobiphenyl	0.2
2,2',5,5'-tetrachlorobiphenyl	0.2
2,2',4,5,5'-pentachlorobiphenyl	0.2
2,2',3,4,5,5'-hexachlorobiphenyl	0.2
2,2',3,4,4',5,5'-heptachlorobiphenyl	0.2
Polychlorinated dibenzodioxins/dibenzofurans (PCDD/PCDF)	100 ng of TCDD equivalent* per kg of sludge dry matter

**** TCDD equivalent*** *is the sum of the products of multiplication of the content of particular polychlorinated dibenzodioxins/dibenzofurans expressed in ng/kg and factors, and it is calculated according to the formula and table referred to in item 3 of Annex I of this Ordinance.*

Article 7

(1) Limit values for concentrations of heavy metals in soil where treated sludge is used in agriculture are:

Heavy metals	**Limit values for heavy metal concentrations expressed in mg/kg of dry matter in a representative soil sample**		
pH of soil in 1 M solution of KCl	5.0<pH<5.5	5.5<pH<6.5	pH>6.5
Cadmium	0.5	1	1.5
Copper	40	50	100
Nickel	30	50	70
Lead	50	70	100
Zinc	100	150	200
Mercury	0.2	0.5	1
Chromium	50	75	100

(2) The use of sludge which could cause limit values of heavy metals in soil referred to in paragraph 1 of this Article to be exceeded is prohibited.

Article 8

It is permitted to use the maximum of 1.66 tonnes of sludge dry matter per hectare of agricultural land.

Article 9

(1) The sludge producer shall analyse sludge at least once every six months.
(2) Where larger changes occur in the characteristics of the waste water being treated and/or sludge quality, the frequency of the analyses must be increased.
(3) Before sampling, sludge from a waste water treatment facility may not be diluted with other substances (manure, soil, etc.).
(4) The analysis of sludge from a waste water treatment facility shall be performed in a laboratory authorised pursuant to a special regulation, in accordance with the instructions referred to in Annex I.
(5) The costs of sludge analysis shall be borne by the sludge producer.
(6) Prior to delivery, the sludge producer shall submit a copy of the Report on the results of sludge analysis to the sludge user.

Article 10

(1) The sludge producer shall keep a Register on the generation and flow of sludge in accordance with the special regulation regulating waste management.
(2) Reports on the results of sludge analysis shall form an integral part of the Register.

Article 11

(1) Sludge producer shall draft an annual report on:
– the quantity of produced sludge and the quantity of sludge supplied for use in agriculture,
– the composition and properties of sludge, according to the Reports on the results of sludge analysis,
– the method of sludge treatment,
– the names and addresses of sludge users and the locations where sludge will be used.
(2) The annual report referred to in paragraph 1 of this Article shall be submitted by the producer to the Croatian Environment Agency no later than 31 March of the current year for the previous calendar year on the GIPKM form – Annual report on the production and use of sludge.
(3) Constituent parts of the annual report referred to in paragraph 1 of this Article are: copies of the Reports on the results of sludge analysis.

Article 12

(1) Prior to the initial use of sludge, the sludge user shall ensure a soil analysis.
(2) The sludge user shall ensure a soil analysis at least once a year.
(3) The soil analysis shall be performed in a laboratory authorised pursuant to a special regulation, in accordance with the instructions referred to in Annex II.
(4) The costs of soil analysis shall be borne by the sludge user.

Article 13

(1) The sludge user shall keep a Register on the use of sludge on the OKM form – Register on the use of sludge.
(2) Constituent parts of the Register referred to in paragraph 1 of this Article are: copies of the Reports on the results of sludge analysis and the Reports on the results of soil analysis.

Article 14

(1) The sludge user shall draft the annual report on:
– the quantity of treated sludge used in agriculture,
– the composition and properties of the used sludge, according to the Reports on the results of sludge analysis,
– the composition and properties of soil, according to the Reports on the results of soil analysis,
– cadastre municipalities and land plots where the treated sludge was used.
(2) The annual report referred to in paragraph 1 of this Article shall be submitted by the producer to the Croatian Environment Agency no later than 31 March of the current year for the previous calendar year on the GIKMP form – Annual report on the use of sludge in agriculture for each location and each use of sludge.
(3) Constituent parts of the annual report referred to in paragraph 1 of this Article are: copies of the Reports on the results of soil analysis.

Article 15

Annexes I, II, Forms GIPKM, OKM and GIKMP shall be published along with this Ordinance and form an integral part thereof.

Article 16

This Ordinance shall enter into force on the eighth day after the day of its publication in the Official Gazette.

Class: 351-01/08-04/1
Reg. No.: 531-08-3-08-7
Zagreb, 31 March 2008

Minister
Marina Matulović Dropulić, m.p.

ANNEX I

INSTRUCTIONS FOR SLUDGE ANALYSIS

1. Sludge sampling

Sludge must be sampled after the last treatment, but before delivery to the user, and must be representative of the sludge production.

2. Sludge analysis

Sludge analysis includes the following parameters:
– mass content of dry matter, expressed in %;
– mass content of total organic carbon in sludge dry matter, expressed in %;
– pH value of sludge;
– mass content of total nitrogen in sludge dry matter, expressed in %;
– mass content of total phosphorus in sludge dry matter, expressed in %;
– heavy metal content in sludge dry matter: cadmium, copper, nickel, lead, zinc, chromium and mercury, expressed in mg/kg,

- content of the following polychlorinated biphenyls in sludge dry matter, expressed in mg/kg:
2,4,4’-trichlorobiphenyl,
2,2’,5,5’-tetrachlorobiphenyl,
2,2’,4,5,5’-pentachlorobiphenyl,
2,2’,3,4,5,5’-hexachlorobiphenyl,
2,2’,3,4,4’,5,5’-heptachlorobiphenyl.
– the content of polychlorinated dibenzodioxins / dibenzofurans in sludge dry matter expressed in ng/kg of TCDD equivalent.

3. Analysis methods

– Analysis for determining the heavy metal content must be carried out following strong acid digestion. The reference method of heavy metal analysis must be that of atomic absorption spectrometry. The limit of determination for heavy metals in the method used should be no greater than 10 % of its limit detection.
– The reference method of determining the content of polychlorinated biphenyls and polychlorinated dibenzodioxins / dibenzofurans must be that of gas chromatography.

Polychlorinated dibenzodioxins / dibenzofurans (PCDD/PCDF) mass contents which are being determined and the associated factors

POLYCHLORINATED DIBENZODIOXINS	FACTOR	POLYCHLORINATED DIBENZOFURANS	FACTOR
2,3,7,8-tetraCDD	1.0	2,3,7,8-tetraCDF	0.1
1,2,3,7,8-pentaCDD	0.5	1,2,3,7,8-pentaCDF	0.05
1,2,3,4,7,8-hexaCDD	0.1	2,3,4,7,8-pentaCDF	0.5
1,2,3,6,7,8-hexaCDD	0.1	1,2,3,4,7,8-hexaCDF	0.1
1,2,3,7,8,9-hexaCDD	0.1	1,2,3,6,7,8-hexaCDF	0.1
1,2,3,4,6,7,8-heptaCDD	0.01	1,2,3,7,8,9-hexaCDF	0.1
octaCDD	0.001	2,3,4,6,7,8-hexaCDF	0.1
		1,2,3,4,6,7,8-heptaCDF	0.01
		1,2,3,4,7,8,9-heptaCDF	0.01
		octaCDF	0.001

– The formula for the calculation of TCDD equivalent is:
TCDD equivalent = Σ (Ai*Fi) + Σ (Bi*Fj)
where:
TCDD equivalent in ng/kg of sludge dry matter,
Ai mean mass content value of a particular PCDD calculated as the arithmetic mean value of amounts received from at least two measurements in ng/kg of sludge dry matter,
Fi the factor of a particular PCDD given in the table,
Bi mean mass content value of a particular PCDF calculated as the arithmetic mean value of amounts received from at least two measurements in ng/kg of sludge dry matter,
Fj the factor of a particular PCDF given in the table.

ANNEX II

INSTRUCTIONS FOR SOIL ANALYSIS

1. Soil sampling

The representative soil samples for analysis should normally be made up by mixing together 25 core soil samples of equal mass. The soil samples must be taken over an area not exceeding 5 hectares which is farmed for the same purpose. The depth of soil sampling must

be at least 10 cm but not more than 25 cm. The soil sampling points should be evenly distributed over the whole surface area intended for the use of sludge.

2. Soil analysis

The analysis of soil on which sludge will be used includes the following parameters:
– pH value potentiometrically measured in 1 M solution of KCl,
– heavy metal content in soil dry matter: cadmium, copper, nickel, lead, zinc, chromium and mercury, expressed in mg/kg.
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3. Analysis methods

Analysis for determining the heavy metal content must be carried out following strong acid digestion. The reference method of heavy metal analysis must be that of atomic absorption spectrometry. The limit of determination for heavy metals in the method used must not be greater than 10 % of its limit detection.

GIPKM

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ANNUAL REPORT ON THE PRODUCTION AND USE OF SLUDGE

NAME: _____ ADDRESS: _____
PHONE: _____ FAX: _____
E-MAIL: _____
LOCATION OF THE FACILITY/PLANT:_____
Sludge treatment method:
□ Aerobic stabilisation (for ___days)
□ Anaerobic stabilisation (for ___days)
□ Thermal stabilisation (for ___hrs on ___ °C)
□ Other _____
□ Long-term storage (for___months)
□ Chemical treatment with _____
□ Composting/biological treatment (for ___days)
□ Drying to _____% of water

Annual quantity of produced sludge: _____ tonnes of sludge dry matter, which corresponds to _____ m³ of sludge.
Annual quantity of treated sludge supplied for use in agriculture: _____ tonnes of dry matter, which corresponds to _____ m³ of treated sludge.

Analysis code on the sludge analysis report		Date of delivery		Supplied quantity	_____ *tonnes of sludge dry matter*
Name of the sludge user:					
Address of the sludge user					
Location of the use of sludge	Cadastre municipality				
	Land plot				
	Surface area where sludge was used			_____*hectares*	

Analysis code on the sludge analysis report		Date of delivery		Supplied quantity	_____ *tonnes of sludge dry matter*
Name of the sludge user:					
Address of the sludge user					

Location of the use of sludge	Cadastre municipality		
	Land plot		
	Surface area where sludge was used	_____*hectares*	

Responsible person:

Stamp:

OKM

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REGISTER OF THE USE OF SLUDGE

NAME: _____ ADDRESS: _____
PHONE/FAX: _____ E-MAIL: _____

SOIL PARAMETERS	MEASURED VALUE		LIMIT VALUES		
	BEFORE THE INITIAL USE OF SLUDGE	IN THE _____ YEAR OF USING SLUDGE			
pH in 1 M solution of KCl			5.0<pH<5.5	5.5<pH<6.5	pH>6.5
Cd (mg/kg of sludge dry matter)			0.5	1	1.5
Cu (mg/kg of sludge dry matter)			40	50	100
Ni (mg/kg of sludge dry matter)			30	50	70
Pb (mg/kg of sludge dry matter)			50	70	100
Zn (mg/kg of sludge dry matter)			100	150	200
Cr (mg/kg of sludge dry matter)			50	75	100
Hg (mg/kg of sludge dry matter)			0.2	0.5	1

Delivery date of sludge:_____ Date of the use of sludge:_____
Name of the sludge producer:_____
Address of the sludge producer:_____

LOCATION OF THE USE OF SLUDGE The surface area where sludge was used amounts to: _____ha.
Cadastre municipality: _____ Land plot: _____
The producer has delivered _____ tonnes of sludge dry matter of the following characteristics:

SLUDGE PARAMETERS	MEASURED VALUES	LIMIT VALUES
Mass content of dry matter (%)		-
Mass content of total organic carbon in dry matter in %		-
pH in 1 M solution of KCl		-
Mass content of total nitrogen in dry matter in %		-
Mass content of total phosphorus in sludge dry matter in %		-
Cd (mg/kg of sludge dry matter)		5
Cu (mg/kg of sludge dry matter)		600
Ni (mg/kg of sludge dry matter)		80
Pb (mg/kg of sludge dry matter)		500
Zn (mg/kg of sludge dry matter)		2000
Cr (mg/kg of sludge dry matter)		500
Hg (mg/kg of sludge dry matter)		5
2,4,4'-trichlorobiphenyl (mg/kg of sludge dry matter)		0.2
2,2',5,5'-tetrachlorobiphenyl (mg/kg of sludge dry matter)		0.2
2,2',4,5,5'-pentachlorobiphenyl (mg/kg of sludge dry matter)		0.2
2,2',3,4,5,5'-hexachlorobiphenyl (mg/kg of sludge dry matter)		0.2
2,2',3,4,4',5,5'-heptachlorobiphenyl (mg/kg of sludge dry matter)		0.2
Polychlorinated dibenzodioxins/dibenzofurans (ng of TCDD equivalent in kg of sludge dry matter)		100

GIKMP

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ANNUAL REPORT ON THE USE OF SLUDGE IN AGRICULTURE

NAME: _____ ADDRESS: _____
PHONE/FAX: _____ E-MAIL: _____

Total annual quantity of treated sludge used in agriculture: _____ tonnes of sludge dry matter, which corresponds to _____ m³ of treated sludge.

Used quantity of treated sludge at the location amounts to:		_____*tonnes of sludge dry matter*	
Location of the use of sludge	Cadastre municipality		
	Land plot		
	Surface area where sludge was used		_____*hectares*
Date of the use of sludge			
Name and address of the sludge producer:			
Code of the Report on the results of sludge analysis			
Code of the Report on the results of soil analysis			