NB: Unofficial translation; legally binding texts are those in Finnish and Swedish

Ministry of the Environment, Finland

No. 282
GOVERNMENT DECISION
ON THE USE OF SEWAGE SLUDGE IN AGRICULTURE

April 14, 1994

Section 1
Purpose

The purpose of this Decision is to regulate the use of sewage sludge in agriculture in order to prevent harmful impacts on the environment and health while promoting the appropriate use of sludge.

Section 2
Scope of application and status with regard to other legislation

This Decision shall apply to the agricultural use of sludge generated in municipal sewage treatment plants, other sludge of comparable quality and sludge mixtures prepared from these.

The provisions laid down in or under the Water Act (264/1961) and [the Public Health Act (469/1965)]* concerning the processing, transport and use of sludge or sludge mixtures shall also apply.

This Decision shall not apply to fertilizer products prepared from sludge, the preparation, quality and delivery of which are provided for in or under the Fertilizer Act (232/1993).

*the Public Health Administration Act (763/1994)

Section 3
Definitions

For the purposes of this Decision:

1) *use* shall mean any activity the purpose of which is to recover substances contained in sludge;

2) *digestion* shall mean treatment of sludge for several weeks under anaerobic conditions at a minimum temperature of 33-35°C;

3) *lime stabilization* shall mean mixing lime evenly into the entire sludge mass in order to raise its initial pH value above 12; and

4) *a sludge mixture* shall mean a product obtained by mixing sludge with high-quality admixtures such as peat, lime or pure raw soil but not the fertilizer products referred to in section 2, paragraph 3.

Section 4
Treatment of sludge

Sludge shall be treated before agricultural use with digestion or lime stabilization or with some other method capable of significantly reducing its pathogen content and odours and harm to health or the environment arising from the use of sludge.

Section 5
Metal concentrations in sludge

Only sludge containing less than the maximum concentrations of heavy metals specified in Table 1 of Annex 1 may be used in agriculture.

Sludge used as raw material in a sludge mixture shall not contain heavy metals in excess of the maximum concentrations specified in Table 2 of Annex 1.

Section 6
Uses of sludge

Sludge may be used only on soil on which grain, sugar beet, oil-bearing crops or crops not used for human food or animal feed are cultivated. Sludge may be spread on grassland only when the grass and nurse crops are sown together and sludge is ploughed in carefully. Potatoes, root crops and vegetables may not be cultivated on arable land until at least five years have passed after sludge was used on it.

Sludge may be used only on cultivated soil the heavy metal concentrations of which specified in Table 3 of Annex 1.

Sludge may be used only on cultivated soil with a pH value above 5.8. If lime-stabilized sludge is used, the pH value of the soil shall be above 5.5.

Section 7
Quantity of sludge used

The quantity of sludge used shall be determined on the basis of soil quality and the nutrient needs of the crops cultivated. The average annual heavy metal load arising from the use of sludge shall not exceed the maximum loads specified in Table 4 of Annex 1.

Section 8
Sludge and soil analysis

The sludge shall be analysed as provided in Annex 2 and the soil on which the sludge is to be used shall be analysed, if necessary, as provided in Annex 3.

Section 9
*Providing information to user*s

In conjunction with the delivery of sludge, the holder of a sewage treatment plant shall provide the users of the sludge with the information referred to in Annex 2 concerning the quality of the sludge and any other relevant information on its origin and treatment and instructions for use.

Section 10
Keeping of records and reporting

The holder of a sewage treatment plant shall keep a record of:
1) the quantity of sludge produced and delivered for agricultural use;
2) the properties indicating sludge quality referred to in Annex 2;
3) treatment of the sludge; and
4) the consignees and users of the sludge and the locations in which it has been or is to be used.

The holder of a sewage treatment plant shall annually prepare a summary of the information referred to in subparagraphs 1, 2 and 3. The summary shall be submitted to [the municipal environmental protection committee][1], and a copy thereof shall be given, for information, to [the municipal health committee][2] and [the water and environment district][3] responsible for the area in which the sewage treatment plant is located or in which the sludge has been used during the relevant period.

Copies of the analytical findings on soil and sludge quality and of any contracts concluded with farmers shall be kept at the sewage treatment plant for at least five years.

Section 11
Provisions on sludge mixtures

The provisions of section 1; section 5, paragraph 1; and sections 6-10 shall also apply to sludge mixtures.

Section 12
Entry into force

This Decision comes into force on May 1, 1994.

Annex 1

MAXIMUM PERMISSIBLE CONCENTRATIONS OF HEAVY METALS IN SLUDGE, SLUDGE MIXTURES AND CULTIVATED SOIL AND RESTRICTIONS ON HEAVY METAL LOADS

Table 1. Maximum permissible concentrations of heavy metals in sludge and sludge mixtures used in agriculture*. Efforts should be made to reach the concentrations in parentheses by the beginning of 1998.

	mg/kg of dry matter	
Cadmium	3.0	(1.5)
Chromium	300	
Copper	600**	
Mercury	2.0	(1.0)
Nickel	100	
Lead	150	(100)
Zinc	1500**	

*) The restrictions on the cadmium concentration in sludge and sludge mixtures may be exceeded temporarily by no more than 20 per cent. The restrictions on concentrations of other heavy metals may be exceeded temporarily, but the significance of the excess must be assessed separately in each case.

**) Sludge and sludge mixtures may contain no more than twice this concentration of copper and zinc considered as a nutrient if the soil for which the sludge or sludge mixture is to be used is poor in the nutrient in question. This, however, must not result in higher concentrations in the soil than those specified in Table 3 of this Annex.

Table 2. Maximum permissible concentrations of heavy metals in sludge suitable for use as a raw material in sludge mixtures*). Efforts should be made to reach the concentrations in parentheses by the beginning of 1998.

	mg/kg of dry matter	
Cadmium	5.0	(3.0)
Chromium	1000	(300)
Copper	3000	(600)
Mercury	25	(2.0)
Nickel	500	(100)
Lead	1200	(150)
Zinc	5000	(1500)

*) The restrictions on the cadmium concentration in sludge and sludge mixtures may be exceeded temporarily by no more than 20 per cent. The restrictions on concentrations of other heavy metals may be exceeded temporarily, but the significance of the excess must be assessed separately in each case.

Table 3. Maximum permissible concentrations of heavy metals in cultivated soil on which sludge or sludge mixtures is used.

	mg/kg of dry matter
Cadmium	0.5
Chromium	200
Copper	100
Mercury	0.2
Nickel	60
Lead	60
Zinc	150

Table 4. Maximum permissible average annual heavy metal loads from the use of sludge or sludge mixtures in agriculture. Efforts should be made to reach the loads in parentheses by the beginning of 1998.

	g/ha per annum	
Cadmium	3.0	(1.5)
Chromium	300	
Copper	600***	
Mercury	2.0	(1.0)
Nickel	100	
Lead	150	(100)
Zinc	1500***	

***) Loads of copper and zinc considered as a nutrient shall not be more than twofold if the soil for which the sludge or sludge mixture is to be used is poor in the nutrient in question. This, however, must not result in higher concentrations in the soil than those specified in Table 3 of this Annex.

Annex 2

ANALYSIS OF SLUDGE AND SLUDGE MIXTURES

Sludge samples shall have the same properties as the sludge delivered to the user. Samples should represent the production of the relevant sewage treatment plant, and it is recommended that they should be taken as composite samples for a period of at least 3-5 days. The samples shall be taken in the presence of the competent authority if he so requests.

In order to monitor quality fluctuations, sludge samples shall initially be taken at short intervals. If there is little fluctuation in results during the first year, analysis frequency can be reduced. The frequency of analyses shall be determined by the size of the sewage treatment plant as follows:

Population equivalent	Frequency of analyses/year	
	First year	Later years
>100 000	≥ 12	≥ 4
40 000-100 000	≥ 6	≥ 3
5 000- 40 000	≥ 4	≥ 2
200- 5 000	≥ 1	≥ 1
< 200	≥ 1	at least once every two years

Whenever the quality of the incoming sewage is known to have altered significantly, the frequency of analyses shall be increased to at least the level required during the first year.

The quality of a *sludge mixture* must be analysed by taking at least one composite sample of every 5000 m^3 batch of sludge mixture produced. The composite sample shall be sufficiently representative.

The quality of *sludge used as raw material in a sludge mixture* must be analysed by the method required for sludge referred to above. The required frequency of analyses, however, is half of that required above.

The quality of the sludge and sludge mixtures shall be analysed by a reliable laboratory. At least the following parameters shall be determined (recommended method in parentheses):

-dry matter content and ignition residue (SFS 3008);
-pH (H2O) (SFS 3021);
-total nitrogen (Ntot) (SFS 5505);
-total phosphorus (Ptot) (SFS 3026);
-cadmium, chromium, copper, nickel, lead and zinc (SFS 3044, SFS 3047); and
-mercury (ISO 5666/1).

Determinations may also be made using some other method proved reliable by means of intercalibration. In heavy metal determinations, the detection limit shall be no higher than 10 per cent of the maximum permissible concentration of the metal in question. The determination method must always be specified.

Annex 3

ANALYSIS OF CULTIVATED SOIL

A composite sample shall be taken from the plough layer (0-25 cm) of cultivated soil in each field block in the manner usual in fertility surveys. At least five samples shall be taken from each hectare of a block for the composite block sample.

The soil samples shall be analysed by a reliable laboratory. At least the following parameters shall be determined (recommended method in parentheses):

-pH (H_2O) (SFS 3021);
-cadmium, chromium, copper, nickel, lead and zinc (SFS 3044, SFS 3047 or aqua regia extraction); and
-mercury (ISO 5666/1 or aqua regia extraction).

Other methods approved by [the municipal environmental protection committee][4] may also be used to determine concentrations of heavy metals. The reliability of the method should, however, be established by intercalibration. The method of determination must always be specified. In heavy metal determinations, the detection limit shall be no higher than 10 per cent of the maximum permissible concentration of the metal in question.

* the local environment authority