Baltic Marine Environment Protection Commission

Third Meeting of the Working Group on Reduction of Pressures from the Baltic Sea Catchment Area
Copenhagen, Denmark, 7-9 October 2015

PRESSURE 3-2015

Document title	Draft HELCOM Recommendation on Sewage Sludge Handling
Code	4-1
Category	DEC
Agenda Item	4 – HELCOM Recommendation on sewage sludge handling
Submission date	21.9.2015
Submitted by	Secretariat
Reference	Outcome of PRESSURE 2-2015, para 3.44

Background

PRESSURE 2-2015 agreed in general on the renewed structure of the draft HELCOM Recommendation on sewage sludge handling and approved the working plan of its elaboration, striving to submit the draft document for endorsement to HOD 49-2015 to be held in December 2015 (Outcome of PRESSURE 2-2015, para 3.44).

According to the working plan the draft document was circulated for the first commenting round in the beginning of June 2015. Comments on the draft Recommendation from Estonia, Finland, Germany, Russia and EurEau were received by the due date.

The second commenting round was launched in August 2015. By the deadline (September 2015) replies from Estonia, European Union, Russia and EurEau were received.

This document contains the comments received during the second commenting round and open questions which were not resolved during either of the commenting rounds. The suggestions received during the first commenting round, mainly of editorial character, which the Contracting Parties did not object during the second round, were considered as agreed and integrated into the present draft version of the document.

The document also includes the position of EurEau regarding specific points of the draft Recommendation (see the Attachment).

Action required

The Meeting is invited to consider thoroughly all the comments on the daft Recommendation and elaborate compromise solutions regarding all the open question left in the document, striving to develop an agreed draft of the document for submission to HOD 49-2015.

Draft HELCOM Recommendation on Sewage Sludge Handling

[HELCOM Recommendation x/yy]

[Adopted XXXXX],

having regard to Article 20, Paragraph 1 b) of the Helsinki Convention

SEWAGE SLUDGE HANDLING

THE COMMISSION,

RECALLING Paragraph 1 of Article 6 of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992 (Helsinki Convention), in which the Contracting Parties undertake to prevent and eliminate pollution of the Baltic Sea Area from land-based sources,

HAVING REGARD also to Article 3 of the Helsinki Convention, in which the Contracting Parties shall individually or jointly take all appropriate legislative, administrative or other relevant measures to prevent and abate pollution in order to promote the ecological restoration of the Baltic Sea Area,

RECALLING Article 5 of the Helsinki Convention, in which the Contracting Parties undertake to prevent and eliminate pollution of the marine environment of the Baltic Sea caused by harmful substances,

RECALLING ALSO the Baltic Sea Action Plan (BSAP) adopted at the HELCOM Ministerial Meeting 2007 (Krakow) that calls for urgent actions to reduce the discharges of nutrients and hazardous substances to the Baltic Sea Area,

RECALLING FURTHER that the HELCOM Ministerial Meeting in 2010 (Moscow) and the high-level segment of the Helsinki Commission meeting in 2011 highlighted the need to improve resource efficiency and recycling of nutrients through utilization of sewage sludge,

RECALLING AS WELL that the 2013 HELCOM Ministerial Meeting called for sustainable use of nutrients, enhancement of phosphorus recycling (especially in agriculture and waste water treatment) and promoting development of appropriate methodologies.

RECOGNISING that phosphorus is a limited resource and thus recycling of nutrients and energy from the sewage sludge at competitive price level is important,

RECOGNISING ALSO that some substances in the sewage sludge can be harmful for plants, animals and humans, and that reuse and disposal of sewage sludge shall not cause any harmful effects, including accumulation and interactions of harmful substances and its degradation products, on humans, animals, vegetation, soil and waters,

RECOGNISING FURTHER that addition of sewage sludge to agriculture often has a positive effect on microorganisms in the soil, and that treatment of sewage sludge has found to be necessary before it is used in agriculture,

RECOGNISING ALSO that improved quality of incoming wastewater to wastewater treatment plants is necessary in order to obtain the best possible quality of the sewage sludge,

NOTING that for the purpose of this Recommendation, the definition of sewage sludge should be the same as in the Council Directive 86/278/EEC of 12 June 1986 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture,

Commented [A1]: EU

Commented [A2]: EU Introduce strict limits on heavy metals, micro-pollutants etc. for reuse, especially for fields used for the food industry

Commented [A3]: EU. "Improved quality of waste water" is not clear, what does it mean? Higher concentrated water can actually be treated more efficiently. Is it meant in the way that industry compounds must be reduced ?

DESIRING not to lose the nutrients in the sludge, especially phosphorus, to make use of its valuable properties and energetic potential and to dispose of it safely, efficiently and sustainably,

NOTING that the waste management hierarchy set in the EU Waste Framework Directive 2008/98/EC contains the following steps: prevention; preparing for re-use; recycling; recovery (including energy recovery); and disposal.

RECOMMENDS to the Governments of the Contracting States to the Helsinki Convention to develop within [20…] Best Available Technology (BAT) and Best Environmental Practice (BEP) for sustainable and environmentally friendly procedure of sewage sludge handling in the Baltic Sea region based on the following principles:[1]

- Endeavour, when developing techniques and practices for sustainable handling of sewage sludge to ensure maximum recovery of phosphorus and other useful substances and compounds at competitive price level as well as utilization of its energetic potential and minimization of the negative impact on the environment;
- landfilling of sewage sludge should be avoided in the region if unpolluted; mono landfilling should be preferred to ensure that recovery of compounds is possible at a later stage.
- ensure that untreated sewage sludge is not applied at any kind of land which means that application of products of sewage sludge treatment are considered in the context of this recommendation;
- ensure also that leaching of the nutrients to the environment as well as emissions and leakages of substances polluting the environment are prevented when the sewage sludge handling procedure includes temporary storage of the sewage sludge or products of sewage sludge treatment;
- ensure that possible negative impacts from sewage sludge handling processes will not hinder the achievement of a good environmental/ecological/chemical status of the Baltic Sea, as agreed upon in the HELCOM BSAP and relevant national and international legislation;
- Reuse or recycling of nutrients, especially phosphorus, from the sewage sludge as well as utilisation of its energetic potential should be considered in the perspective of designing new facilities or reconstruction of waste water treatment plants (WWTP). However, waste water treatment, sludge treatment and recycling of sludge are entities which should be looked upon as a whole to avoid any harmful effect related to the new technology implemented.;
- improve, whenever possible, the quality of waste water released into the sewage system in order to prevent the unwanted substances to enter the WWTP based on national regulation *inter alia* ensure mandatory pre-treatment of the waste water released into the sewage system in case of presence of unwanted substances i.e. heavy metals, pharmaceuticals and POPs which ensure quality of sewage sludge and prevent releasing specific pollutants to the aquatic environment;
- ensure that treated sewage sludge is applied or disposed of with minimum negative impact on the environment according to national legislation;
- sewage sludge must be treated in a way to ensure avoiding negative impact of its pathogenic components on the environment or humans;
- an effective and transparent permitting and reporting system has to be established in the cases when the application of sewage sludge or products containing sewage sludge needs permits;
- facilitate international dialog, exchange of knowledge and transfer of the new environmentally friendly technologies through harmonization of national legislation and elimination of administrative barriers.

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Commented [A9]: EU: "Improved quality of waste water" is not clear, what does it mean? Higher concentrated water can actually be treated more efficiently. Is it meant in the way that industry compounds must be reduced ?

[1] EurEau: The draft is proposing a recommendation to develop Best Available Technologies and Best Environmental Practices for sewage sludge handling in the Baltic Sea Region. On a general point of view, EurEau is not in favour of multiplication of BAT documents in different countries or group of countries in Europe as the JRC is in charge of designing these documents for the European Union. EurEau encourage HELCOM to follow or refer to these existing documents to avoid overregulation

RECOMMENDS ALSO to the Governments of the Contracting Parties to develop, apply and enforce BAT and BEP measures aiming at sustainable and environmentally friendly procedure of sewage sludge handling, based on the guidance, as contained in Annex 1 to this Recommendation.

RECOMMENDS ALSO that the Contracting Parties establish a programme for the implementation of this Recommendation and that provide the Helsinki Commission with information on the programme at the latest by 30 June 2017.

RECOMMENDS ALSO to the Governments of the Contracting Parties to promote research and development of the sustainable, more cost-effective and price competitive solutions for phosphorus recovery from the sewage sludge and products of its treatment.

Commented [A10]: Based on comment by EU

RECOMMENDS FURTHER that the Contracting States report to the Helsinki Commission every three years starting at the end of [2016] with data from [2015], according to Annex 3 and measured parameters as stated in Annex 1,

RECOMMENDS ALSO that the Contracting Parties re-evaluate the present Recommendation and reconsider it in [2021] taking into account new developments on national or international and EU level for Member States or earlier if it is needed.

Annex 1

Guidance for sustainable sewage sludge handling in the Baltic Sea region

The following document provides guidance to promote sustainable and ecologically sound techniques and handling practices for sewage sludge with the aim to ensure maximum use of valuable substances and energy potential while keeping in mind that the Baltic Sea is a vulnerable ecosystem which environmental status requires intensive efforts towards improvement. Furthermore, this guidance is supposed to enhance cooperation and provision of economic incentives while aiming at limiting potential environmental impacts of sewage sludge.

A. Overall recommendations regarding sewage sludge handling

1. In the case when sewage sludge is used for mixing with other raw materials (organic material of plant or animal origin or clay, sand, etc.) to produce fertilizing materials, the amount of unwanted substances in the mixed product should not exceed the limits established by national legislation.

2. Landfilling of sewage sludge should be avoided, mono landfilling should be preferred to ensure that recovery of compounds is possible at a later stage.

3. Waste water quality should be continuously improved at the origin to obtain better sludge quality.[2]

If unwanted substances are identified, sufficient source control measures should be established by polluters. Environmental authorities and waste water operators should establish a plan on how to prevent the unwanted substances to enter the sewage network.

4. Waste water and sewage sludge should be treated with the best available techniques in order to achieve the best possible sludge quality for the further usage of the sludge ensuring maximum recycling of nutrients and other valuable substances and components.

5. Gas contained in sewage sludge should be extracted and collected if possible. Gas produced via anaerobe sludge digestion should be used for energy production.

6. Emissions from techniques and practices of sewage sludge handling should prevent or minimize all kinds of emissions to the air, in accordance with national and international legislation, especially in case of thermal treatment.

B. Overall restrictions regarding handling of sewage sludge

1. Sewage sludge from other WWTPs than those for treatment of domestic waste water or waste water with a similarly low content of pollutants should not be applied on or used in soils.
2. Sewage sludge must not be applied on land during the cultivation of fruits and vegetables nor on land intended for cultivation of fruits and vegetables within one year before harvest.
3. Sewage sludge must not be applied on permanent grassland.
4. Sewage sludge application in forestry has to follow national legislation.
5. Sewage sludge must not be applied on agriculturally or horticulturally used soils in nature reserves, nature benchmarks, national parks, protected parts of the landscape and other areas of special interest, unless special permission from competent authorities is granted.

Commented [A11]: EU

Commented [A12]: EurEau suggests to delete as very general and self-evident

Commented [A13R12]: DE suggests to keep the point

Commented [A14R12]: RU consider as important point

Commented [A15]: RU

Commented [A16]: EurEau suggests to delete as it does not take into account that in many countries industrial waste waters are partly treated in municipal waste water treatment plants

[2] EE: It is important to give in this recommendation also measures how to improve wastewater quality at the origin to obtain better sludge quality. For instance, using the best available technology for industrial wastewater is certain measure for industrial sector, but if we have treatment plant serving only municipal wastewater, what kind of measures should be applied to improve waste water quality continuously?

6. Sewage sludge must not be applied in wetlands, potential flooded areas, water protected zones or closer than 10 meters or according to national legislation from water bodies.[3]

C. Recommendations regarding agricultural and horticultural use

1. Before treated sewage sludge is applied for the first time the soil has to be analyzed on at least the following parameters:
   - Heavy metals: Cd, Cu, Ni, Pb, Zn, Hg, Cr, As.
   - Nutrients: P, N, K
   - Others: pH, type of the soil
2. Analysis of the soil should be repeated whenever necessary.
3. The application of treated sewage sludge on/in soil has to be critically considered if the soil analyses show that the content of the above listed parameters exceed at least one of the limit values established by national legislation or tentative values in Table 1, Annex 2, if national legislation does not identify the limit value.
4. Treated sewage sludge or its products should not be applied on soil if the phosphorus and nitrogen content in the soil is sufficient for crop cultivation.[4]
5. On arable land used for growing feed or sugar beet, insofar as the sugar beet foliage is used as feed, it shall only be allowed to apply treated sewage sludge before sowing and with subsequent deep-turn tillage. On arable land used for growing silo and green maize, the sewage sludge must be worked into the soil before sowing.
6. If the treated sewage sludge is to be used in agriculture or horticulture it has to be hygienized to assure that no problematic pathogens exist in the sludge which means that treated sewage sludge should fulfil the following hygiene criteria: *Salmonella*: Not found in a sample of 25 grams; *Escherichia coli:* Less than 1000 CFU/g.
7. Representative samples should be taken from each batch of treated sewage sludge or the product where sewage sludge is the main component that will be used on arable land and analysis of the sewage sludge should be made.[5]
8. The application of treated sewage sludge on/in soil has to be critically considered if the sludge analysis show that the content of the following parameters exceed at least one of the values in Table 2, Annex 2.
9. If treated sewage sludge is mixed with other organic compounds to create soil, it should be taken into account that the amount of unwanted substances in the mixed product should not exceed the limits established by the national legislation for the particular application of the mixed products or the tentative values in Table 2, Annex 2.
10. The quantity of treated sewage sludge should be regulated in such a way that the accumulation of unwanted substances are limited by one of the following parameters:
    - the average amount of five tons sewage sludge added per hectare in three years or according to national legislation;[6]

Commented [A17]: FI: For further discussion - COM recommendation recommends measuring the As concentration in the soil as a background measurement, but there isn't such obligation at the legislation either at EU or national level. But there is national legislation to As concentration in the sludge (and also in HELCOM rec.).

Commented [A18]: EU. Micropollutants ? Reference to the water quality regulations under the WFD ?

Commented [A19]: EurEau suggest to replace with the following 'Heavy metal content of the soil should not exceed the limit values established by national legislation'

Commented [A20]: EE. For further discussion - If there are established limits for the spreading of the N and P, the amounts of the sewage sludge or it's products separately or with other fertilizers applied on soil should not exceed these limits

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[3] EurEau does not support limitations which are only applicable for the use of sewage sludge but not for other fertilisers

[4] EurEau does not support limitations which are only applicable for the use of sewage sludge but not for other fertilisers.

[5] EurEau:The amount of analyses is typically regulated in national legislation. According to the Sewage Sludge Directive, the size of the waste water treatment plant regulates the amount of analyses

[6] EurEau: Sewage sludge should not be limited by tons per hectare. It is unclear if limitation refers to dry tons or wet tons.

- the limit values for the particular substances according to international, EU and national legislation, if they are established;
- the tentative limit values from the Table 3, Annex 2 if above-mentioned limits are not established;
- exemptions should be possible, if a lack of special nutrients e.g. copper is proven in the soil.

Commented [A26]: EurEau suggests to delete due to the reasons listed in the footnote 9.

D. Recommendations regarding use in forestry, green areas, landscaping and land reclamation[7]

1. Application of sewage sludge or mixed products containing sewage sludge at the lands used for forestry is a matter of competent authority.
2. The sewage sludge or mixed products containing sewage sludge can be used in construction and maintaining urban green areas, landscaping and land reclamation if concentration of unwanted substances in the applied materials do not exceed limit values established by national legislation for these types of land.
3. The treated sewage sludge or products containing treated sewage sludge can be used for fertilization of soil at the rail and road slopes as well as other elements of road infrastructure to prevent their erosion.
4. If the treated sewage sludge is to be used in landscaping, land reclamation and green areas it has to be hygienized to assure that no problematic pathogens exist in the product and it satisfies the same criteria as item C6.
5. Other recommendation regarding using treated sewage sludge or sewage sludge products green areas, landscaping and land reclamation is a matter of competent authority.

Commented [A27]: RU

E. Recommendations regarding incineration, construction and other applications

1. If sewage sludge is incinerated,
   - the produced energy has to be collected and used,
   - valuable substances, especially phosphorus, should be removed from the sewage sludge before incineration or from the ashes as soon as economically viable techniques are available if the content of phosphorus meets the requirements for application of these techniques.
   - If it is not possible to remove phosphorus from the sludge or ashes directly and the content of phosphorus is considerably high, the ashes should be stored temporarily in mono-landfills to remove phosphorus later when economically viable techniques are available. The use of best available techniques for mono-landfills should be applied.
2. If sewage sludge is used as a main part of construction material for industry, valuable substances, especially phosphorus, should be recovered from the sewage sludge before application when economically viable techniques are available, if the substances are not needed in the construction material and are lost for further reuse.

Commented [A28]: RU

[7] FI: Should this be extended to include the use of sewage sludge as a fertilizer product, which has been accepted by competent authority

Annex 2 [8]

Tentative limit values[9]

Table 1. Concentration of unwanted substances in soil[10]

Parameters	Concentration (mg/kg DS)
Cd	0.4
Cu	40
Ni	30
Pb	40
Zn	100
Hg	0.3
Cr	60

Table 2. Concentration of unwanted substances in treated sludge or sludge products for use in agriculture and horticulture (one of the two limits should be used mg/kg DS or mg/kg P)[11][12]

Parameter	Concentration (mg/ kg DS)	Concentration (mg/kg P)
Cd	1	40
Cu	900	21 400
Ni	50	1 400
Pb	100	1 600
Zn	2 500	800
Hg	1	40
Cr	300	2 100
Ag	5	180
As	18	-
Tl	1.5	-
U	-	50 mg Uran/ kg P2O5
B(a)P (Benzo(a)pyren)	1	-
PCB (Polychlorinated Biphenyls)	0.1	2

Commented [A29]: EE: We support FIN comment in subnote 12, in EE as well values of Ag, As, Tl, U, B(a)P (Benzo(a)pyren), PCB, PCDD/F for sewage sludge are'nt regulated. The expenses of following the recommendation and the scientific reasoning on which the concentration set in Table 2 bases are unclear

[8] EE: what kind of studies are made to set these tentative limits. The concentrations in sludge are so straight that even small wastewater treatment plant that treats only municipal wastewater does not achieve these limit values. Recommendation should turn more attention to the alternative solutions, like combustion, and compare the advantages and disadvantages of that.

[9] EurEau: All HELCOM countries have national limits for unwanted substances. Thus limit values in the recommendation would be useless. EurEau support limit values that have a sound scientific justification.

[10] FI: The concentrations are more strict than the national legislation in Finland, but if they are seen as alternative to national legislation, it is ok to Finland to keep the recommendation as such.

[11] EE: We propose to make more comprehensive studies concerning sewage sludge reuse and evaluate the concentrations of unwanted substances in sludge. Our analyses show, for instance, Cd and Hg concentrations given in Table 2 are not met even in the waste water treatment plants which serves only domestic waste water. Therefore, these limit values need more detailed investigations and explanations, what would be the best solutions for sewage sludge reuse.

[12] FI: Finland disagrees including Ag, Tl, U, B(a)P, PCB and PCDD in the recommendation since proper analyzing methods for these substances doesn't exist and the methods that exists are expensive. Finland doesn't approve substances in the recommendation, which are not included in the national legislation.

PCDD/F (Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans)	30*	700*

*ng TEQ/kg TS alt ng TEQ/kg P

Table 3. Amount of unwanted substances which may be added to agricultural and horticultural land on a yearly average.

Parameter	**Concentration (g/ha and year)**
Cd	0.55
Cu	300
Ni	25
Pb	25
Zn	600
Hg	0.8
Cr	40

Annex 3

Reporting Format for HELCOM Recommendation x/y on Sewage Sludge Handling

REPORTING FORMAT FOR [HELCOM CONCERNING SEWAGE SLUDGE HANDLING			
Lead Country: Germany/ Sweden			
Country:			Year:
A. Waste water from origins			
1. Have actions been taken to improve the waste water quality from origins before it reach WWTP (source reduction)?	Yes	No	Unknown/ comments
2. Is improved waste water quality from origins a matter for the central, regional or local governments?	Yes	No	Unknown/ comments
B. Sewage sludge handling			
1. Generated sewage sludge, dry mass, t/a			
2. Usage of sewage sludge	Amount, dry mass, t/a		Number of installations
a) incineration, co-combustion			
b) incineration, mono			
c) landfilling			
d) landfilling, mono			
e) landscaping			
f) agriculture			
g) forestry			
h) other usages			
5. Have actions been taken to reduce the leakage of nutrients from sludge handling?	Yes	No	Unknown/ comments
6. Describe how the Recommendation concerning sewage sludge handling has been implemented; new legislation, amendment to existing legislation or other means.			
7. Do your country technically recycle phosphorus from a) waste water, b) sewage sludge or c) sewage sludge ashes?	Yes	No	Percentage of total amount

ATTACHMENT

Suggestions for wording to Annex 1 part E by EurEau during the first commenting round:

3. *If sewage sludge is incinerated,*
   - *the produced energy has to be collected and used,*
   - *valuable substances, especially phosphorus, should be removed from the sewage sludge before incineration or from the ashes as soon as economically viable techniques are available if the content of phosphorus meets the requirements for application of these techniques.*
   - *If it is not possible to remove phosphorus from the sludge or ashes directly and the content of phosphorus is considerably high, the ashes should be stored temporarily in mono-landfills to remove phosphorus later when economically viable techniques are available. The use of best available techniques for mono-landfills should be applied.*
4. *If sewage sludge is used as a substantial part of construction material for industry, valuable substances, especially phosphorus, should be recovered from the sewage sludge before application when economically viable techniques are available, if the substances are not needed in the construction material and are lost for further reuse.*

Commented [A30]: SECRETARIAT following the comments by EurEau

Commented [A31]: SECRETARIAT following the comments by EurEau

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Commented [A33]: SECRETARIAT following the comments by EurEau

Comments by EurEau during the second commenting round:

EurEau repeats its previous comment related to phosphorus recovery which is that targets (or requirements) for phosphorus recovery and monolandfills should not be set yet. Phosphorus recovery is discussed in detail in the EurEau Phosphorus position paper. We ask HELCOM recommendation to be developed taking into account EurEau position paper on Phosphorus.

If HELCOM at some point sets recommendations for phosphorus recovery it is reasonable to consider all potential waste materials, not only sewage sludge to have a complete evaluation of the potential recovered phosphorus market.