Baltic Marine Environment Protection Commission

Fifth Meeting of the Working Group on Reduction of Pressures from the Baltic Sea Catchment Area

PRESSURE 5-2016

Warsaw, Poland, 25-27 October 2016

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## Background

HOD 49-2015 agreed on a new HELCOM action on micropollutants in effluents from wastewater treatment plants to be included in the Pressure WG work plan (Outcome of HOD 49-2015, para 4.69). A section on micropollutants in effluents from wastewater treatment plants was included into the questionnaire on the pollutants of high concern in the Baltic Sea region.

PRESSURE 4-2016 discussed the results of the questionnaire noting that the collected information is a good starting point to identify the pollutants of high concern for the Baltic Sea region. The meeting discussed further ways to use the outcomes of the questionnaire and agreed to include a summary into PLC-6 report.

## Action requested

The Meeting is invited to:

- consider results of the section of the questionnaire dedicated to micropollutants and agree on the substances of high concern;
- discuss (*tour-de-table*) what may be reported by the Contracting Parties on identified priority substances (loads for areas or individual rivers, only screening studies, only concentrations, etc.);
- agree on the next practical steps and the timeframe.

ACTION: Micropollutants in effluents from wastewater treatment plants
(cf. 4.2.1., Annex 3, GEAR 13-2016 document 3-1 Rev 1)

***Background information:***

Micropollutants despite low (ng/L to µg/L) concentrations in environmental samples, due to their environmentally hazardous properties including for example high persistence, high toxicity to aquatic organisms, or endocrine disrupting properties, may pose risk to the environment. Depending on the level of treatment, WWTPs' effluents can be a significant pathway of micropollutants to the environment, in particular for those that originate from household products and -articles, or personal use. As knowledge of the environmental situation with regard to those pollutants can be improved, survey based on existing national data, screening studies and monitoring programs should be considered as a first step. The other activity should concentrate on knowledge on wastewater from treatment plans as sources of micropollutants in the environment and evaluation of existing and novel WWT techniques by compiling existing information on e.g. feasibility, costs, and good practice.

The Baltic Sea (and possible coordination with OSPAR).

***Proposed timetable****:* Start during 2016, until the end of 2017

***Possible steps for implementation:***

- Step 1: Compilation and assessment of available information and data on micropollutants of concern for Contracting Parties in the Baltic Sea – during 2016 (PRESSURE)
- Step 2: Compile information from CPs of treatment techniques and experiences– during 2016/7
- Step 3: Summary report on advanced treatment techniques, including consideration of feasibility, costs, good practice and management options – during 2017.

**Responsible HELCOM subsidiary body: Pressure Working Group in cooperation with State and Conservation Working Group in relation of concentrations of selected substances in the marine environment and a potential threat posed by these substances to marine biota.**

# Results from a questionnaire on micropollutants from WWTPs

## Background

This assessment originates from an information request from the HELCOM PRESSURE WG regarding the Contracting Parties concern on inputs of various persistent organic pollutants (POPs) and some other substances to the Baltic Sea. The request was extended to also include other micropollutants of concern in effluents from waste water treatment plants to identify the substances of high concern to the as prescribed in the step 1 of implementation of the action.

By "concern" in this context the interest is in substances that the Contracting Parties consider or believe to a significant degree are released to the Baltic Sea via WWTP's effluents.

The information will be used for the assessment of available data on micropollutants and in the revision of the HELCOM list of Priority hazardous substances.

## Results

The assessment is based on the information provided by the 8 Contracting Parties that answered the questionnaire (i.e. DE, DK, EE, FI, LT, LV, SE and RF). Unfortunately, some of the answers were not covering all subjects, probably due to lack of (time for) national coordination. This gives a somewhat unbalanced final results, but anyhow some general tendencies may be seen in the replies.

In an attempt to summaries the concern from the CPs on the various kinds of substances and groups of substances, a weighted approach was performed using a weight of 3 for major concern, 2 for intermediate, and 1 for little concern, whereas if the CP indicated lack of knowledge a value of 0 was applied and for substances that was indicated as not relevant a weight of -1 was used. The full overview of the replies on the survey related to micropolutants is given in Appendix 1.

For the micropollutants in WWTP effluents, the highest level of concern was expressed with regard of the endocrine disruptors as nonylphenols, and octylphenols, heavy metals and pharmaceutical substances. The respondents were also moderately anxious about presence of in effluents substances which belong to the group of perflouroethers (PFAS) and polyaromatic hydrocarbons (PAH). In addition, medium concern was found for different groups of pesticides, disinfectants, and endocrine disrupting substances in the WWTP effluents, whereas veterinary drug residues seem to be of low concern, although these substances are very closely related to the pharmaceutical residues (actually, in many cases the same kind of substances are used both for humans and for animals). If the lower concern for the veterinary drug residues originate from less knowledge, or from information that these substances are found to a lesser extent in WWTP effluents is not evident from the replies to these high-level questions.

Table 1. Weighted summary of the concern by CPS on the various kinds of substances and groups of substances in air and atmospheric deposition, and in rivers and WWTP effluents. The weighing process is described in the main text.

| **Substance (group)** | **WWTP** |
|---|---|
| Dioxins (PCDD, PCDF, dioxin-like PCBs) | 3 |
| Other PCBs (other than dioxin-like) | 5 |
| Organotin compounds (TBT, TPhT, etc) | 6 |
| PBDEs (pentaBDE, octaBDE, decaBDE) | 4 |
| PFAS (PFOS, PFOA) | 8 |
| HBCDD | 4 |
| Nonylphenols (NP, NPE) | 12 |
| Octylphenols (OP, OPE) | 12 |
| Short-chain chlorinated paraffins (C10-13) | 5 |
| Medium-chain chlorin. paraffins (C14-17) | 3 |
| Endosulfan | 2 |
| DDTs (sum-DDT, DDE, etc) | 2 |
| PAHs (incl. metabolites) | 8 |
| BFRs (PBDEs etc) | 5 |
| HCHs ( alpha, beta, gamma) | 4 |
| Heptachlor | 4 |
| Heavy metals | 14 |
| Pharmaceutical residues | 12 |
| Herbicides (except listed above) | 6 |
| Fungicides (except listed above) | 5 |
| Insecticides (except listed above) | 5 |
| Endocrine disrupting substances (EDS, except listed above) | 9 |
| Animal/veterinary drug residues (except listed above) | 2 |
| Disinfectants (except listed above) | 5 |

# APPENDIX 1 Overview over replies from CPs to the questionnaire on POPs and other substances effluents from waste water treatment plants

## Micropollutants in WWTP effluents

The replies to the questionnaire are given in the table below. The numbers given are the number of CPs that have expressed their concern at the respective degrees of concern, that they do not have the knowledge o that they consider the substance or group of substances not to be relevant for this matrix. The summarised replies for the respective category are illustrated by intensity of the colour for the category.

| Substance (group) | Major | Inter-mediate | Little | Do not know | Not relevant |
|---|---|---|---|---|---|
| Dioxins (PCDD, PCDF, dioxin-like PCBs) | | 2 | 1 | 1 | 2 |
| Other PCBs (other than dioxin-like) | | 2 | 2 | 1 | 1 |
| Organotin compounds (TBT, TPhT, etc) | 1 | 1 | 2 | 1 | 1 |
| PBDEs (pentaBDE, octaBDE, decaBDE) | 1 | 1 | 1 | 1 | 2 |
| PFAS (PFOS, PFOA) | 2 | 1 | | 3 | |
| HBCDD | 1 | 1 | | 3 | 1 |
| Nonylphenols (NP, NPE) | 2 | 3 | | 1 | |
| Octylphenols (OP, OPE) | 2 | 3 | | 1 | |
| Short-chain chlorinated paraffins (C10-13) | 1 | 2 | | 1 | 2 |
| Medium-chain chlorin. paraffins (C14-17) | | 2 | 1 | 1 | 2 |
| Endosulfan | | 1 | 2 | 1 | 2 |
| DDTs (sum-DDT, DDE, etc) | | 1 | 2 | 1 | 2 |
| PAHs (incl. metabolites) | 2 | 1 | 1 | 1 | 1 |
| BFRs (PBDEs etc) | 1 | 1 | 1 | 2 | 1 |
| HCHs ( alpha, beta, gamma) | | 1 | 3 | 1 | 1 |
| Heptachlor | 1 | 1 | 1 | 1 | 2 |
| Heavy metals | 3 | 2 | 1 | | |
| Pharmaceutical residues | 2 | 2 | 2 | 1 | |
| Herbicides (except listed above) | 1 | 1 | 2 | 1 | 1 |
| Fungicides (except listed above) | | 2 | 2 | 1 | 1 |
| Insecticides (except listed above) | | 2 | 2 | 1 | 1 |
| Endocrine disrupting substances (EDS, except listed above) | 2 | 1 | 1 | 2 | |
| Animal/veterinary drug residues (except listed above) | | 1 | 1 | 3 | 1 |
| Disinfectants (except listed above) | 1 | | 2 | 3 | |

## Additional information given as supplementary text in the questionnaire

Germany pointed out the WFD priority substances list, as well as the watch list as central for their WWTP monitoring. Estonia also monitor phenols, C10-C40 hydrocarbons, and phthalates (DEHP). Also Finland are including DEHP, as well as Bisphenol a (BPA). Denmark informs that there is focus on pharmaceutical residues and the remedial treatments of these substances on WWTP.

Russia informed that Vodokanal of St.Petersburg implemented monitoring of HELCOM priority substances in effluents in 2009-2012 within cooperation with HELCOM. Including: 1. Dioxins (PCDD), furans (PCDF) & dioxin-like polychlorinated biphenyls; 3a. Pentabromodiphenyl ether (pentaBDE); 3b. Octabromodiphenyl, ether (octaBDE); 3c. Decabromodiphenyl ether (decaBDE); 4b. Perfluorooctanoic acid (PFOA); 5. Hexabromocyclododecane (HBCDD); 6a. Nonylphenols (NP); 6b. Nonylphenol ethoxylates (NPE); 7a.

Octylphenols (OP); 7b. Octylphenol ethoxylates (OPE); 8a. Short-chain chlorinated paraffins (SCCP or chloroalkanes, C10-13); 8b. Medium-chain chlorinated paraffins (MCCP or chloroalkanes, C14-17); and 9. Endosulfan. However, due to the fact that all concentrations of all these substances in effluents were below detection limit it was decided to stop monitoring activities.

Lithuania noted that regarding the Riverine and WWTP monitoring the POPs are marked "Intermediate" , meaning that based on legal acts and studies, these substances are regarded as concerning, but for most of them, they do not have sufficient monitoring data to know exactly how much of an impact they have on the environment.