Summary report

UWWTD Conference – Sensitive Areas, Eutrophication and Micropollutants

26. – 27. November 2020

1. Introduction

The Urban Waste Water Treatment Directive 91/271/EEC is currently under revision by the European Commission. Beyond the technical assessment, the European Commission is currently checking in depth several technical areas for the future design of the Directive.

An area of concern for the future is inter alia the adjustment for the minimum requirements on nutrient substances in connection with the need to designate sensitive areas and the alignment with the requirements of the Water Framework Directive. Furthermore, micropollutants were identified as a topic of concern and due to the lately available technologies to remove these contaminants, the approach to deal with them in the revised UWWTD should be discussed.

Thursday, 26. November 2020

2. Nutrient restrictions / Sensitive areas

2.1. Keynote – Regina Dube, German Federal Ministry of Environment

RD highlighted that the UWWTD is a fundamental cornerstone of the WFD and now needs to set new stimuli for the wastewater treatment sector. RD pointed to the most important issues for the German Presidency:

(1) Climate action, which remains on top of the agenda and involves the water sector through mitigation and adaptation measures;
(2) biodiversity conservation and the Biodiversity Strategy;
(3) The Circular Economy Action Plan, through which the UWWTD could have further incentives to focus more on a producer pays approach / Extended Producer Responsibility (EPR) adapted to the waste water sector; and
(4) Digitalisation to boost sustainability.

RD concluded by pointing out the tremendous new challenges the water sector is facing due to aging infrastructure and therefore the need for wise new infrastructure investments.

2.2. Scene setting: the UWWTD & the Green Deal – Veronica Manfredi, European Commission, ENV C

VM set the scene by describing the UWWTD as an important part of Europe's water management and by highlighting various newly adopted initiatives under the Green Deal, which have relevance to water legislation and ecosystems. These initiatives include

(1) the Circular Economy Action Plan, which promotes water efficiency and water reuse;
(2) the Strategy on Energy System Integration, which assessed the ability of the waste water sector to become more energy efficient;
(3) the EU Strategy to reduce methane emissions to which the wastewater sector contributes;

(4) the Farm2Fork Strategy, which announced that nutrient losses need to be reduced by at least 50 % by 2030, providing an incentive to consider recovering nutrients from sludge;
(5) the Zero Pollution Action Plan, which aims to reduce air, soil and water pollutants and
(6) the Chemicals Strategy, which could lead to upstream reduction of pollutants.

VM acknowledged that the revision of the UWWTD will come at a cost but emphasized that the EU will support the implementation, for example through the new Multiannual Financial Framework (MFF), which mobilized 1.85 trillion Euros, one of the largest amounts ever at EU level.

2.3. State of eutrophication – Stéphane Isoard, European Environment Agency

SI illustrated how the UWWTD in combination with other Directives has had positive impacts on the state of freshwater ecosystems. Examples include increasing oxygen availability within rivers since the beginning of the 90s, which has positive consequences for biodiversity, and improving bathing water quality. However, there is still a lot to do as 60 % of waters in Europe are in unknown status with regard to phosphorus and there is a mixed picture in marine waters. While phosphorus has decreased, problem areas still exist, especially in the Baltic Sea and coastal North Sea.

SI showed that there is generally a high level of urban waste water treatment in Europe but that there is work left to do as some waste waters are not treated to secondary level, and there is pressure on the environment from diffuse pollution, such as non-connected dwellings. Waste water treatment makes up about 1 % of Europe's electricity use and is thus is one of the highest energy users among public industries. More stringent rules for wastewater treatment are likely to increase energy demand, but less energy-intensive treatment which nevertheless can deliver good quality effluent is possible. The latter may be achieved through nature-based solutions, such as constructed wetlands, which can be a good solution for small-scale treatment (< 5 000 p.e.). Other important aspects to consider in the future are sludge management, as valuable resources may be recovered from sludge, and the reuse of wastewater, which can help alleviate increasing water stress across Europe.

2.4. Introduction to the UWWTD Impact Assessment with focus on nutrients and sensitive areas – Silvia Bartolini, Nele Rosenstock, European Commission ENV C2

SB and NR introduced the UWWTD Impact Assessment (IA). SB reported the main takeaways from the Directive's evaluation, which show that the Directive is simple and effective. Compliance with the Directive is high, but can still be improved. SB emphasized that the present conference is part of the stakeholder consultation of the IA. The IA will further include preparation, methodology, data collection, analysis and drafting. The IA will cover a large range of topics. SB further presented ongoing and upcoming work, for example models used by the JRC to assess costs and effects, and the work conducted by the JRC and DG SANTE on the role of using waste water surveillance for the tracking of COVID19. For the IA stakeholders can make their voices heard by participating in the upcoming stakeholder consultation activities planned in Q1 and Q2 of 2021.

NR introduced the topic of sensitive areas and nutrients for the IA, highlighting the incoherence within the EU with respect to sensitive area designation, and questioned whether Annex 2 is clear

enough to define eutrophication. Half of the 28 088 WWTPs in Europe have some form of nutrient removal in place and acknowledged the big role agriculture plays alongside waste water with regard to eutrophication. There are some important general considerations for the IA, which include well-balancing solving problems at source compared to take "end-of pipe" action, whether to use a risk-based approach or EU targets, the need for the Directive to be fit for the future (e.g. 2040-2050), the polluter pays principle and investing where it makes sense, and administrative burden vs timely provision of relevant data. The policy options for nutrient management include a) stricter N & P thresholds in general, b) more stringent thresholds for N & P for all large WWTPs and/or c) a risk-based approach. Policy options for defining sensitive areas include a) aligning the definition of sensitive areas with the Nitrates Directive, b) establishing EU thresholds defining eutrophication, c) specific reporting requirements to better understand why sensitive areas are designated, and / or d) abandoning criterion b and c of Annex II, to be dealt with by other Directives, whilst setting generally stricter N & P thresholds under the UWWTD.

2.4.1. Q&A

Participants were asked how big of an issue eutrophication is in the stakeholders' respective countries.[1] The results show that out of 91 respondents, 38 consider it a very big issue, 36 consider it somewhat of an issue while 11 considered it a minor issue and only one did not consider it an issue at all.

During the Q&A session, the questions raised were (1) what data is available on GHG emissions in the wastewater sector and (2) how MS will be consulted during the review. The EEA replied to (1) by acknowledging that it is difficult to quantify emissions and that the EEA is now exploring this area. The European Commission added that it will explore using the IPCC methodology for such an assessment. The EC responded to (2) by highlighting the various stakeholder engagement events, including today's conference, stakeholder speed dates recently conducted, ongoing expert group work on chemicals and treatment technologies and the public consultation to be launched at the beginning of next year.

3. Sensitive areas

3.1. Sensitive areas in Austria – Heide Mueller-Rechberger, Bundesministerium für Landwirtschaft, Regionen und Tourismus

HMR introduced the history of waste water treatment in AT, which pre-dates joining the EU. AT does not designate sensitive areas but considers itself the catchment of a sensitive area, thereby applying Art 5.4 and 5.8 and more stringent treatments by removing at least 75 % of N and P. For AT, a territory-wide approach proved to be the best choice, arguing that Art. 5.4 gives more flexibility than Art. 5(2-3). Therefore, there is no need for criterion b or c in Annex II for AT.

Similarly, AT applies the approach to have a level playing field across its territory to the Nitrates Directive (ND), which means they do not designate vulnerable zones. In contrast, the Water

[1] The polls carried out during this conference are not representative.

Framework Directive (WFD) uses a risk-based approach. This is in line with AT's philosophy to use a principle of equality with regard to emissions but a risk-based approach for imissions.

AT also responded to the sensitive areas policy options presented by the EC by highlighting that a) the definition of sensitive areas was irrelevant to AT as they use a territory-wide approach. AT agreed with option b) defining EU thresholds for eutrophication as long as large-scale eutrophication problems were tackled including eutrophication in international river basins and in the seas. With regard to option c), AT voiced that it believes that this policy option rather postpones the problem than solving it. Option d) abandoning criteria b and c while having stricter N & P thresholds for all large WWTPs is not particularly relevant to AT as they prefer a level playing field rather than a risk-based approach to emissions and have therefore never used these criteria.

3.2. Sensitive areas in Ireland – David Flynn (DF), Department of Housing, Local Government and Heritage

DF presented IE's approach to designate nutrient sensitive areas and showed that currently around half of the freshwater ecosystems are in good status. Where ecosystems are not in good status, it is mostly driven by nutrients, to which waste water (including domestic and urban waste water) is the second biggest contributor after agriculture. While IE uses a whole territory approach for the ND, it designates sensitive areas under the UWWTD on an individual basis due to the complex geology and varied climate in the country. To do so, IE identifies agglomerations of over 10 000 p.e., applies ANNEX II criteria to identify eutrophication to downstream water bodies and conducts a risk assessment of trends based on which the EPA then makes a recommendation. The methodology used has similar elements as the WFD. In concluding, IE highlighted the need for coordination between Directives and specified that common definitions with the WFD would be appreciated. While IE welcomed managing the impact from smaller agglomerations and individual systems on water bodies, it pointed out that it would not make a difference to IE as individual certifications and appropriate treatment are required anyway under Irish law. Further, it is necessary to prepare for climate change and changing rainfall patters.

3.3. Sensitive areas and transboundary waters – Adam Kovacs, International Commission for the Protection of the Danube River

AK introduced the International Commission for the Protection of the Danube River (ICPDR), which manages the most international river basin in the world: the Danube River Basin. The last assessment in 2015 showed that 70 % of the river basin are in good chemical status but only 25 % are in good ecological status, with nutrient pollution representing a significant pressure on the river basin. The regional perspective of the ICPDR shows a transboundary sensitive area designation approach over the river basin. Since the Black Sea coastal area was designated as sensitive area in 2005, significant progress has been in the area as it has become a sensitive catchment area.

Between 2005 and 2016 ca. 2/3 of the N & P emissions were removed and there has been a shift to more enhanced technologies, resulting in tertiary treatment being in place for ca. 50 mio p.e.. However, there are still development needs, including the need for basic infrastructure development for 21 Mio p.e. and nutrient removal for 13 Mio p.e. to protect the Black Sea. While old MS can focus on maintenance, new MS need to implement investment projects and build

capacity at administration and utility level. AK stressed that wastewater was only responsible for 15 % of N and 30 % of P emissions at the basin-wide level and the agriculture sector is also a major contributor to nutrient loads in the area. Both sectors thus need to implement further measures to cut nutrient emissions. According to the ICPDR, the policies regulating water quality should be better aligned. Rural areas are important contributors due to their many scattered agglomerations. Clearly defined IAS and nature-based solutions could be considered here. AK concluded that the UWWTD should keep its ambition but help new accession countries by allowing a more realistic transition period and fostering capacity building. A good approach could be to have minimum standards everywhere in sensitive area catchments with strict provisions at hot-spots.

3.3.1. Q&A

Stakeholders were asked if it is useful to keep the requirement to designate sensitive areas under the UWWTD, which was confirmed by a large majority of the participants.

During the Q&A session, the questions raised centred on whether a more standardised approach would be beneficial, whether a risk-based approach does not just wait until the problem escalates and whether it is very time-consuming to check areas. The provided answers came from IE, AT and ICPDR, with IE and ICPDR agreeing that countries need flexibility and all three supporting the suggestion of a unified minimum standard with special rules for hotspots as an appropriate measure. While AT did think that a risk-based approach risks waiting until escalation, it highlighted that the Precautionary Principle should take account of this. IE added that it is necessary to ensure financial investments are justified by their environmental returns. Both ICPDR and AT highlighted the need to also focus on emerging pollutants, which can partially be taken care of by P & N removal technology. With regard to the time-consumption of checking areas, IE pointed to the importance of using models and acknowledged that agricultural nutrient loss is challenging to predict due to weather and soil dependencies, whereas AT replied that the combination of a WFD risk-based approach and the region-wide designation approach under the UWWTD work well together. Another question referred to countries that have both urban waste and industrial waste in the same discharge net, to which IE referred to laws that control this at source.

4. Nutrient thresholds

4.1. Setting the right threshold for phosphorus and nitrogen in Germany – Christof Mainz, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

CM introduced the German approach to setting threshold values for phosphorus by highlighting the requirements on European level and pointing out that while only 14 % of WWTPs would be covered by these requirements, it does cover the 73% population equivalent. Vice versa, 86% of

all plants treating 26,6% of the total p.e. are not covered by UWWTD. DE uses five size categories (< 1 000 p.e., 1 000 – 5 000 p.e., 5 000 – 10 000 p.e., 10 000 – 100 000 p.e., and > 100 000 p.e.) for its WWTPs and uses qualified random samples or 2h composite sample methods.

DE conducted a study which shows that the values measured in Germany are well below the thresholds set at European level, indicating that WWTPs operate well and are more than able to achieve the thresholds required. Therefore, setting stricter thresholds at European level would be feasible under current operational conditions, as the majority of German WWTPs would continue to fulfil requirements even if nutrient thresholds were cut (for N, P and Ammonia). In addition, even at temperatures somewhat below 12 degrees, the plants still meet the requirements, indicating that the footnote with "a substitute for the condition concerning the temperature (of 12°C), it is possible to apply a limited time of operation" is obsolete. To reach better levels of P, an optimization of operational procedures could be sufficient. This may be more difficult for N as more volume for the biological process would be required to reach lower thresholds. Also lowering thresholds here needs to be counter-checked with technical / structural design rules. CM concluded by referring to the UWWTD revision process and questioning whether it is time to adapt the requirements and whether the scope of the UWWTD is still state-of-the-art as it only covers plants with > 2000 p.e.

4.2. How to reach clean urban wastewater discharges in Denmark – Joannes Jorgen Gaard, Ministry of Environment and Food of Denmark

JJG presented on the Danish approach to reach clean urban wastew ater and highlighted that the whole country is considered a sensitive area since 1987. After introducing N & P thresholds in 1989, substantial decreases in nutrients were observed. Today, agriculture is by far the biggest source of N & P, while 6.3 % of N and 18.6 % of P come from WWTPs. Similarly to DE, Danish discharges of 4.79 mg/l N and 0.47 mg/l P are well below the thresholds of 8 mg/l N and 1.5 mg/l P. DK credits the technological possibilities and taxes on nutrient discharges to sea or freshwater for the low values achieved. JJG reported that the main focus in DK is currently the energy aspect as 1.6 % of energy consumption in DK is due to waste water treatment. DK's goal is to be net energy producing or at least climate neutral by 2030. Further DK wants to reuse 80 % of P by 2025 and would like to see stricter values on heavy metals in the Sludge Directive, which are much lower in DK than in the EU overall. DK agrees with DE that stricter nutrient thresholds should be considered.

4.3. Dealing with nitrogen and phosphorous removal over time – an operator's perspective from Sweden – Anders Finnson, Svenskt Vatten

AF provided an operators perspective. AF presented SE's strict nutrient requirements, which are related to the Baltic Sea condition. While there have been substantial decreases in waterborne total nutrient inputs to the Baltic Sea and there are signs of improvement of the water quality, the objectives are not met. Similarly, out of 26 000 waterbodies in SE, 9 % are eutrophic. Similar to the Baltic Sea, the high water retention time in lake systems adds to the eutrophication problem.

The main drivers behind the strict requirements in SE are the WFD and HELCOM, with some contribution by the UWWTD.

In SE 175 biggest plants take care of over 85 % of wastewater. Bigger plants have significantly lower operational costs and lower energy use per p.e.. AF highlighted the need for caution with regard to stricter requirements and suggested to focus requirements based on the need of the receiving water body. P thresholds below 0.4 – 0.6 mg P/L would require a filtration process and all N removal requires extra volumes for the nitrification step and N thresholds below 12 – 15 mg N/L would require an external carbon source for the denitrification, which also can give a higher carbon footprint. Svenskt Vatten's operator perspective is that we need to be sustainable and prioritise limited resources. More stringent discharge requirements regarding N may lead to negative environmental impacts due to a higher carbon footprint. AF highlighted opportunities, which lie in moving nutrients back to land, as well as challenges, which include the need for more energy use with better treatment and that the agriculture sector still needs to do more and reduce their leakage of nutrients. Benefits of high P and N removal include that microplastics will also be removed and longer activated sludge retention time will aid the removal of some less degradable substances. AF concluded by noting that while high P removal may be possible everywhere, high N removal is dependent on space and temperature and could therefore be very costly in the cold waters of Scandinavia.

4.3.1. Q&A

Stakeholders were asked whether in their country they have stricter values for waste water compared to the UWWTD and if they do, what the main factor for setting stricter values were. A majority of respondents (60 %) responded that they do have stricter requirements for N and P, with an additional 9 % stating that they have stricter requirement for P only. 32 % of stakeholder countries do not have stricter thresholds. The main factor driving stricter thresholds was environmental concern, which was reported by 83 % of respondents, followed by technological progress (15 %) and political pressure (6 %).

During the Q&A session, it became apparent that there was an interest in MS specific approaches. Questions directed at DE included what the average concentration of total P entering WWTPs was and what the removal rates for N and P were. DE answered that the average concentration entering WWTPs varied between 8 – 18 mg/L and that P removal rate was ~ 93 % whereas N removal rate was ~ 82 %. When questioned about the benefit of applying stricter rules, DE answered it was to meet WFD targets. Questions directed at SV included why SV reports ELV ranges and which technology it applies to P removal as well as what the inflow concentrations of P and N are. SV answered that ranges are reported as individual WWTPs have stricter values, which is due to historical reasons and the last years the driving force is the WFD, which gives stricter individual requirement depending on the needs in the receiving waters. The technology applied to P removal is pre- or simultaneous precipitation of both aluminium and iron salts, a filtration step with precipitation or a disc filter to capture particles. Nutrient inflow in SE is 5 – 6 mg P/L and 35 – 50 mg N/L. Questions directed at DK included whether DK also applies discharge tariffs to agriculture and how they calculate the P:N discharge ratio of different pollution sources. DK

answered that it does not have discharge tariffs for agriculture as it does for wastewater and that DK the ratio of P:N is based on a standard.

Questions directed at all presenters included how often MS reported their nutrient source data and whether WWTP benchmarking constitutes an additional policy option in the IA. DK produces a report on point sources every year and at least every 6 years a report on all sources. SV and DE stated that they produce a report every 2nd year and SV additionally prepares a more detailed report every 5 – 6 years. With regard to benchmarking as a policy option, Denmark confirmed it would like to see this considered, SV specified it believes adding energy, methane and Nitrogen dioxide to declarations in the future would be beneficial and DE agreed with SV on adding energy consumption.

Two points were raised with regard to Phosphorous removal / recovery. First, that more P removal would mean more sludge to manage and second, that in order to recovery phosphorous effectively, a market for phosphorous would need to be established. SV and DE both agreed that better P removal would lead to more sludge and that P may be a useful resource to recover. SV agreed that a market for recovered P would be necessary and suggested it may be used as mineral fertilizer.

The issue that the agricultural sector calls for improvements in nutrient discharges from the waste water sector was raised to which DE acknowledged that this is understandable but that the nutrient pressure from the agriculture sector is strongest. DK agreed with DE that agriculture is the biggest discharger but acknowledged that the agriculture sector has decreased its discharges by 50 % in the last 30 years whereas not much more has been done in the waste water sector since the 90s. One further question raised was whether the ability to have discharges with N and P concentration much below the thresholds was similar throughout the EU or whether this was only possible in countries that have more money to implement pro-active decisions. To this, SV answered that this is indeed often discussed in EurEau, the European association for water companies and that there are big differences. Therefore, it is not sustainable to have the same measures everywhere but that rather the conditions of the receiving waters should guide the decisions made.

5. Break-out sessions

There were six break-out sessions, which were guided by EC and DE representatives. The break-out sessions discussed topics from the following set of questions:

1.) How does your Member State designate sensitive areas?
2.) How effective do you think is this designation approach?
3.) How do you ensure coherence with the designation of areas under other EU legislation such as the Water Framework Directive and the Nitrates Directive?
4.) What is difficult when designating sensitive areas? What is helpful?
5.) Do you consider it useful to have “sensitive areas” under the UWWTD? Are they still relevant after the entering into force of the WFD?
6.) How do you deal with sensitive areas that concern transboundary waters?
7.) What can be achieved in terms of nitrogen and phosphorus reduction?

8.) What thresholds have been set under national legislation?

5.1. Presentation of findings / results of round-tables

Following the break-out sessions, the groups shared the conclusions from their round-tables.

Group 1 discussed that UWWTD requirements for nutrients provide a solid basis for the future but that we should go further and aim to close nutrient cycles. They reported that no one size fits all solutions and we should therefore focus on solutions rather than just use the technology because it is available. Accordingly, the approach to designate sensitive areas remains useful. Apart from nutrients, substances of emerging concern need to be considered and technology should be used to address this issue. Group 1 also pointed out that the UWWTD thresholds are not always sufficient to reach WFD objectives depending on the region and this should be covered by the Directive.

Group 2 reported that the most urgent matter is the coherence between different pieces of legislation on water (WFD, NiD, UWWTD). As the WFD will not be revised in the coming years, this should be kept in mind for the review of the UWWTD. Some provisions may enable this without altering the general approach used in the Directive. For example, a combined approach of minimum standards with the possibility of making standards more demanding depending on the requirements of the receiving water body as well as introducing standards for additional substances based on risk assessment procedures.

Group 3 also agreed that it is important to have coherence between policies, especially with the WFD, which is the foundation of the EU water acquis. The issue of transboundary waters was discussed. Further, the discussion centred on what is achievable from a technical point of view and from a cost-benefit point of view. Additionally, group 3 discussed how to identify the source of pollution.

Group 4 reported that the connection with the WFD was also highlighted in their discussion. Some MS have more stringent standards than asked for in the Directive whereas other do not. The group recognized that the Directive could be modernised and that it is important to keep the Directive simple, whereas the risk-based approach is complex. Further, the possibility to recover more P and N was discussed. There was not a lot of support for a system based on derogation, as a case-by-case basis derogation is very administratively costly.

Group 5 discussed whether it was useful to have sensitive areas under UWWTD given that this is covered by the WFD. The group agreed, that if the WFD was implemented in a correct and strict way, there would not be a need for defining sensitive areas under the UWWTD but recognized that this was a vision for the future and for now, it is important to cover sensitive areas in the UWWTD.

Group 6 discussed how to identify the source of pollution (e.g. agriculture vs. wastewater) and agreed that it needs to be taken of by the responsible sector. FR reported an example where local authorities can impose restrictions on small agglomerations if necessary for the health of the local waterbodies. There were calls for the evaluation of the ND but this Directive will not be reviewed in the near future as it was part of a fitness check in 2012, which found that it was fit for purpose.

Following the discussion, EurEau presented a slide which showed which MS have more stringent controls then the UWWTD.

5.2. Poll questions

The question "What is difficult when designating sensitive areas?" was answered by 28 participants and highlighted that the main issue is the coherence with the WFD. Further points mentioned included competences, pollution sources, prioritisation and not applying the same level of treatment everywhere.

The second question "What is your main take-away from today's meeting about nutrients and sensitive areas?" led to the following replies: WFD, different needs, no one size fits all, and coherence.

6. Summary – Discussion

Silvia Bartolini (European Commission) summarised the main conclusions of today's discussion: There is clearly room for reinforcing minimum requirements for N and P, but doing so will bring additional costs for some MS and should thus only be done where it makes sense. The cost element is important and will be analysed in the IA. The notion of sensitive area remains valid but could be improved – the need for coherence and the fact that one size does not fit all will have to guide the impact assessment. While urban nutrient sources remain, in nearly all MS agriculture presents the main source of N and P releases. Advanced nutrient retrieval techniques allow removal of e.g. micropollutants but this makes wastewater treatment more energy-intensive. SB concluded by saying that the message that coherence is important has been heard and it will be an important element of the IA. SB thanked everybody for their participation and recalled that there will be further important interactions with stakeholders during the UWWTD revision.

Friday, 27. November 2020

7. Micropollutants / Pharmaceuticals

7.1. Welcome – Thomas Stratenwerth, German Water Director

TS opened the day by acknowledging that the revision of the UWWTD is of particular importance as it forms a cornerstone of EU water legislation and requires updating. He highlighted that increasing numbers of chemicals lead to increased pressure on waterbodies. Especially the combined effects of these substances on ecosystems require further research. Therefore, pollution needs to be addressed in a coherent and systematic way. Further quality standards need to be developed and the best point of intervention along the whole chain needs to be identified taking into account that treatment in UWTP, although it certainly has an important role to play, is not necessarily the most effective solution for all groups of substances. The EC has taken up the challenge of micropollutants and pharmaceuticals through the Pharmaceuticals and Chemicals

Strategy among others, and is expected to do so in an integrated manner through the upcoming Zero Pollution Action Plan. As financing will be a major factor in how to address these issues, today's discussion will also focus on the Polluter Pays Principle.

7.2. Micropollutants in water bodies (& links to urban waste water) – Catherine Ganzleben, European Environment Agency

CG highlighted that UWWTD is the last step to prevent pollution before it is released into the environment and thus is complemented by the WFD, which sets environmental standards. However, a large number of Europe's water bodies fail good chemical status under the WFD, predominantly due to mercury. Biota in parts of the North East Atlantic, the Baltic Sea and the Mediterranean show moderate to high concentrations of Mercury, Cadmium, Lead, Benzo(a)pyrene, DDT, Lindane, Hexachlorobenzene and Polychlorinated biphenyls. While many of these substances are now restricted, they bioaccumulate in marine organisms highlighting the need to prevent pollution reaching the aquatic environment.

Urban waste water and storm water overflow are the most important point source pressures on surface water bodies. Emissions of hazardous substances reported under the E-PRTR from WWTPs have changed dramatically between 2007 and 2014, with some substances decreasing but many reported as increasing by significant amounts. A UK study showed that the majority of substances (e.g. pharmaceuticals, heavy metals) entering WWTPs come from domestic sources, with trade and runoff being the next most significant. Accordingly, the EEA welcomes the Chemical Strategy for Sustainability, which has the potential to deliver upstream controls on chemicals, thereby preventing chemical pollutants from reaching treatment plants.

While the UWWTD predominantly focuses on cleaning up water, there is an increasing focus on sludge quality and the fate of the included valuable nutrients, which needs to be balanced with the concern that sludge could be a source of diffuse pollution due to accumulated pollutants. The EEA acknowledged that WWTP infrastructure requires significant investment. Further efforts are needed to reduce chemical contamination of sewage, enable circularity, and reduce energy use and waste generation in the wastewater treatment.

7.3. Pharmaceuticals and other micropollutants in the environment & UWWTD policy options – Michel Sponar, European Commission ENV C2

MS highlighted the problem of pharmaceuticals in the environment, which is expected to further increase due to an ageing population. The EU is working towards a holistic approach to tackle the problem as much as possible 'at source' with various strategies (e.g. Chemicals Strategy, Pharmaceutical Strategy), whereas the UWWTD should be considered as the last resort to tackle the issue.

MS presented policy options for contaminants of emerging concern (CECs), which include EU fixed thresholds, requirements for WWTPs with > 100 000 p.e. discharging into vulnerable areas or WWTPs discharging into rivers with low dilution, and / or a risk-based approach. MS acknowledged that affordability and the sustainable financing of the sector in the future is important.

In this context, the EC will consider the Extended Producer Responsibility (EPR), which is already applied in the 'solid' waste sector. The feasibility of such a system to be designed in the new Directive will be further assessed with Member States putting control mechanisms in place, which industry would be obliged to follow and at the end, the WWTP operators would be paid per unit treated. The IA will consider the feasibility, the effects of EPR, the coherence with WFD, energy use, impact on sludge, additional treatments, 300 chemicals and analyse cost vs. benefits for all components.

7.4. Assessing micropollutants at EU level – Alberto Pistocchi, European Commission, Joint Research Centre

AP introduced two possible approaches to the management of micropollutants in wastewater. The "priority substances" approach usually rests on setting Environmental Quality Standards (EQS) for a set of substances, and defining appropriate emission limit values (ELVs) for wastewater discharges. ELVs could be defined as a "blanket" standard, or in a risk based way in order to focus efforts only where a WWTP is a relevant source of contamination for the receiving waters. One problem with this approach is that priority substances cannot be identified once and for all, because of changes in chemical use and knowledge of hazards. Therefore, it is necessary to foresee a mechanism to update their list on a regular basis.

The "indicator substances" approach, on the contrary, defines the treatment performance required to a WWTP in terms of removal of one or more substances. As an example of this approach, the JRC referred to the proposal contained in a position paper by Water Europe and Norman, which states that treatment should cover a broad spectrum of CECs while ensuring long-term flexibility, energy efficiency and resource recovery. The ELV could be set as a minimum % removal for one or more of a list of indicator substances depending on the treatment level appropriate for a plant in order to ensure the best possible removal of micropollutants is achieved at all treatment levels, instead of setting an ELV for all substances of concern. . The definition of an appropriate treatment level for WWTPs may be defined based on the plant's capacity and sensitivity of the receiving waters (e.g. in terms of dilution rates). AP highlighted that setting an appropriate level of treatment for a plant should factor in costs, energy requirements, GHG emissions and co-benefits. Due to the mentioned issues of evolving CECs, we should find a treatment level that is generic and not focused on specific chemicals.

7.4.1. Q&A

This session's poll question asked what the main difficulty of dealing with micropollutants in urban wastewater is. The majority of respondents highlighted the vast amount of different micropollutants and the financing of additional treatment as the main difficulties. This was followed by the costs and consequences for wastewater fees, the lack of clarity which micropollutants to deal with, the lack of acknowledgement of the problem and the lack of treatment technology.

During the Q&A session, participants asked the EC whether there is momentum to evaluate the pharmaceuticals authorisation to include the environmental impacts of medicinal products, to which the EC answered that this is a difficult topic, as the main objective of the pharmaceuticals

sector is public health but that environmental risk assessments are covered under the Pharmaceuticals Strategy. Further, the EC answered to how the traceability under an EPR could be ensured, that it is launching an in-depth study to check the feasibility of this. Whether the risk-based approach in the UWWTD would be different to the new Drinking Water Directive (DWD) was answered by the EC by saying that the approach could be inspired by the new DWD but in practice, the EC would like to have clear rules like ot is the case today in the existing directive on when and where to act.

Questions directed to the JRC included (1) whether monitoring costs are evaluated when different scenarios are implemented, (2) what the perfect removal strategy would look like, (3) whether the scenarios take into consideration the environmental footprint of the extra process steps implemented, (4) whether costs and benefits of additional treatments will be compared with mitigation measures at other life cycle stages, and (5) whether dilution rates should be evaluated under an emissions or imission directive, such as the WFD. The JRC answered to (1) that monitoring costs are taken into consideration implicitly at the stage of selecting appropriate indicators. The perfect removal strategy (2) should find a balance between making WWTPs as robust as possible against pollution and keeping costs under control. Treatment options should not be limited to industrial processes such as activated carbon and ozonation, but should also consider, for example, wetlands and other more "passive" methods to reduce energy and carbon footprints. The JRC clarified that the cost assessment will include non-monetary costs such as the environmental footprint of extra process steps (3) and that while there can be mitigation measures at other life cycle stages (4), we need to assume that some CECs will arrive in WWTPs and we can therefore not think of end-of-pipe wastewater treatment as an alternative to measures at the source. Lastly, the JRC explained that (5) in general we should require a more advanced treatment of effluents where a higher sensitivity of the receiving water bodies can be expected (e.g. based on the dilution rate), but there may still be a need of additional measures to achieve more site-specific objectives such as those of the WFD.

The EEA answered a question about where the high concentrations of heavy metals come from by referring to the past use of these metals, for example in pipes and drainages. One participant pointed out that it is important not to talk about WWTPs as pollution source in general.

7.5. German approach to micropollutants – Stephan Luther, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

SL introduced the German approach to micropollutants, which focuses on compounds from pharmaceuticals, plant protection products, biocides, detergents, personal care products and industrial chemicals. In 2015, the German conference of environmental ministers asked the federal ministry of environment (BMU) to develop a coordinated strategy on micropollutants. To develop that strategy on micropollutants, since 2016 25 stakeholders were invited to a two-stage dialogue where four broader topics were addressed: the identification of relevant micropollutants, source-related measures, use-related measures and end-of-pipe measures.

The results included 15 different measures, which target all four topic areas. The project is currently in its pilot phase and an evaluation will happen in spring 2021. Substances were assessed

and iopamidol, benzotriazole, diclofenac, tebuconazole, polybrominated diphenyl ethers (PDBe) and thiacloprid were identified as relevant. WWTP Framework was a systematic approach for the examination of improved wastewater treatment for micropollutant elimination. The strategy also included a campaign for the correct disposal of pharmaceuticals. SL concluded that reducing and preventing micropollutants in the water cycle requires a combination of different measures, along the life cycle of the substances. It needs to address different entry pathways, include voluntary and regulatory measures, improved assessment and monitoring. New approaches for European and national regulations have to be implemented to support these measures.

7.6. French approach to micropollutants in urban waste water – Emmanuel Morice, Ministère de la transition écologique et solidaire and Maxime Pomies, City of Strasbourg

EM presented the French approach on reducing discharges of hazardous substances in wastewater. While there is no obligation to treat micropollutants under the UWWTP, it is mandatory to monitor hazardous substances in plants with > 10 000 p.e. In FR, RSDE (Research and Reduction of Hazardous Substances in Water) Action is a programme, which was set up based on a Ministry order from 2015, and aims to monitor and reduce the discharge of hazardous substances. Both the UWWTD and WFD are the drivers of this action and the substances covered by RSDE Action are based on the WFD. Through this Action, substances are monitored up- and downstream of plants with > 10 000 p.e. This policy leaves the responsibility to implement measures to local authorities. EM concluded that FR agrees that micropollutants need to be covered better and the review of the UWWTD is a good opportunity to do so. However, FR prefers a focus on monitoring rather than setting more advanced treatment requirements. Advanced treatment should be implemented dependent on the need of local conditions and impact assessments.

MP introduced the Lumiaeu-stra project, which is a tool to handle environmental issues. The aims of the project are to improve knowledge about urban sources, develop prioritization methods, adapt a territorial approach and engage the people in Strasbourg. The project includes a Diagnosis tool with three modules: (1) the Emissions tool, which localizes micropolluters, (2) a tool to assess the hydraulics of the sewage network, and (3) a module to assess the capacity of the receiving waterbody. Through these, the tool helps to prioritize substances and areas to set up actions. The project also included a study on how to adapt solutions to small businesses and a sociological study to identify barriers and levers to practice change in the community. MP concluded that the project shows that knowledge about emissions and solutions needs to be improved, citizens need to be made more aware of their role, e.g. by linking this issue to other environmental topics, the development of new solutions should be promoted and local authorities should play a key role to propose tools to stakeholders on their territory.

7.7. Dutch chain approach to reduce pharmaceutical residues in water – Marc de Rooy, Ministerie Infrastructuur en Waterstaat

MdR introduced the Dutch approach towards tackling pharmaceutical residues in water. Research in NL showed that pharmaceutical residues are emitted into the water after treatment, 95 % of which is excreted by patients. Of this amount, only 10 % comes from hospitals whereas 90 % are excreted at home. NL started a chain approach, which connects all parties involved, sets ground

rules, creates an inventory of possible actions and narrows down the possible actions. First results of the Dutch approach show improved awareness, which caused a dramatic improvement in the collection of surplus medicines. A next step will be to tackle X-ray contrast media, improve sewage treatment at hotspots and conduct biological effect assays. The project has shown that while it is an intensive process, parties are willing to cooperate and the hotspot strategy for sewage treatment is the most cost effective. NL suggests to use monitoring methods, which have a broad view rather than monitoring each substance. Since the effects of many pharmaceuticals are unknown precisely, or substances are hard to monitor, NL is developing the biological effect monitoring. Improvements in WWTPs should be focused on hotspots.

7.8. Effective reduction of micropollutants in the Rhine and its tributaries- ICPR recommendations – Tabea Stoetter, International Commission for the Protection of the Rhine

TS introduced the International Commission for the Protection of the Rhine (ICPR), which was founded in 1950 and within which countries work together on water quality, floods and ecology. The Rhine is a drinking water supply for 30 Mio people but also Europe's most important navigation route, highlighting the need for the ICPR's work. The ICPR's work on micropollutants began in 2008 and a 2017 summary showed that all groups of hazardous substances are detectable in the Rhine, even though all members do take measures against pollutants.

The ICPR work on micropollutants focuses on three main areas, the municipal systems collecting and treating wastewater, agriculture, and trade and industry. Due to the large number of WWTPs in the Rhine catchment, not all can be addressed and priorities are therefore set to focus on areas with a high share of the pollution, on ecologically sensitive waters and where water is used for drinking water production. While the ICPR recommends measures at source, this is insufficient for pharmaceuticals. In contrast, X-Ray contrast agents are better controlled at source by discrete collection and separation. The ICPR's goal is to reduce micropollutants by 30 % by 2040 compared to 2016 – 2018 in all three areas concerned.

7.8.1. Q&A

This session's poll question asked what role the UWWTD should play in a holistic approach to micropollutants. The most common answer was that it needs to deal with any micropollutants that remain in the urban waste water, followed by the answer that it should mainly monitor so that action can be taken upstream.

The Q&A session was dominated by specific questions to MS and organisations. DE was asked whether it defines the share of release reduction each stakeholder has to contribute and when the results of the round table will start to initiate first measures. DE answered that it does not define the share each stakeholder has to reduce but that the evaluation of the pilot phase will assess whether there is an imbalance of the stakeholder contribution. With regard to the initiation of first measures, DE answered that this is not defined yet as it is work in progress.

FR was asked whether they find relationships between a substance in the effluent and its quantity in sludge to which FR replied that some substances do have a correlation. Lumieau-stra was asked

to what extent they regulate industrial discharge to municipal WWTPs and whether it is following the Industrial Emissions Directive (IED). To this, Lumieau-stra answered that industry does follow IED but that monitoring is done by water services in French states rather than local authorities. NL answered to a question whether they have experimented with bioassays that they want to make sure that everybody is using the same type of biomonitoring and that this will be combined in the future with data from water services. ICPR was questioned about how variable the list of substances shown by the Rhine group is. ICPR replied that all groups of substances are covered but that the list needs to be evaluated on a regular basis as substances relevant to the Rhine change over time. How to deal with the evaluation system is not decided yet.

8. Extended Producer Responsibility

8.1. Introduction to extended producer responsibility (EPR) - learning from the solid waste experience – Peter Börkey, Organisation of Economic Cooperation and Development

PB introduced the EPR as a policy approach in which producer's responsibility for a product is extended to the post-consumer stage of the product's life cycle. The adoption of EPR has steeply increased since the 1990s. EPRs are good at increasing recycling rates and generating financial flows, and are meant to generate change in product design to make products more recyclable. In the EU, EPRs have caused food packaging to become more light-weight (generating material savings) between 2000-2010 but few effects on recyclability have been observed so far.

The OECD considers four factors key to success: 1. Governance, which is central to the success of EPR – a coordinated and harmonised EPR system across the EU is necessary for success; 2. Competition, a competition impact assessment should be conducted prior to the set-up of EPR and fair and competitive tendering of services procured through producer responsibility organisations needs to be ensured; 3. EPR should create incentives for better product design by differentiating fees accordingly and by recovering the full cost of end-of-life treatment;. Some countries already use EPR to collect unused medicines from households, which has led to high collection rates in the respective countries. Some open questions remain, such as whether EPR can be applied to micropollutants, whether it could generate the necessary funding for wastewater treatment and whether EPR is the right policy tool to achieve these goals.

8.2. Lessons learnt from applying EPR on solid pharmaceutical waste – Thierry Moreau Defarges, Cyclamed

TMD introduced Cyclamed and gave an overview of the history of French regulations and EPR with regard to pharmaceutical waste. Cyclamed follows three stages: sort, collect, and energy recovery. In FR, households deposit medicines at pharmacies, the pharmacies collect these products, which are then collected by wholesalers and from there go to the providers.

In FR, 78 % of people declare that they return unused medicine to pharmacists. Cyclamed pointed out that wasted pharmaceuticals are not the biggest issue of micropollutants, as in FR the sale of drugs has been decreasing over the last 20 years. A bigger issue is likely excretion.

8.3. Study on applying extended producer responsibility to micropollutants / microplastics – Oliver Loebel, EurEau

OL presented a study by EurEau conducted on Extended Producer Responsibility on micropollutants and microplastics. The study results show that some Regulations, such as the Pharmaceuticals Regulation are well suited to implement EPR, whereas it is less easy but still feasible to implement EPR in UWWTD.

Rather than a stand-alone policy on EPR a life-cycle approach with a combination of EPR and other measures will be necessary. Including additional treatment at WWTP level can be done but needs to be complementary to control-at-source measures and should not be the main measure. EurEau stressed that the UWWTD must not replace the 'polluter pays principle' by the 'water consumer pays principle'.

8.3.1. Q&A

During this session, the poll question asked what other sector could be subject to extended producer responsibilities. The most commonly submitted answers included the Pesticide Industry, Textiles, Wet wipes and the Pharmaceutical Industry.

The discussion round was lively and included a large number of questions. A number of questions concerned possibilities and obstacles of applying EPR to micropollutants. The questions were (1) What is the main obstacle to apply EPR to micropollutants and why?; (2) Could a starting EPR model for advanced treatment in WWTPs be to couple EPR to those chemical substances regulated in the WFD and where EQS cannot be reached?; (3) Why is there scepticism towards EPR to pay environmental services? The OECD answered question 1 by pointing towards traceability and apportioning wastewater costs to consumers as the main obstacles. It voiced that if it is just about consumers not paying for the clean-up downstream, a tax may be more appropriate than EPR. EurEau agreed with the suggested approach in question 2. Both the OECD and EurEau replied to question 3, with the OECD highlighting that EPR is a complex construct and that this complexity is justified if a value chain can be structured and markets to be created, otherwise a tax may be an easier system to implement. EurEau would also create a new value chain, which would stimulate innovation and new jobs but it disagreed with the suggestion of a tax as it would be extremely difficult to set a tax on European level. In contrast, EPR is a widely used and accepted measure on government level.

A large number of questions was also targeted at specific presenters. Cyclamed was asked about the increase or decrease of pharmaceutical use as DE sees an increase in drug consumption due to a growing average age in the population and whether Cyclamed covers exclusively human or also veterinary products. Cyclamed replied that it is sure pharmaceutical consumption per inhabitant is decreasing, which can be clearly seen in FR and that it only covers human medicines. DE was asked whether the framework for choice of wastewater treatment technology addresses the occurrence of transformation products in the process, to which DE replied that it is not explicitly mentioned in the framework.

The JRC was questioned about whether other areas than listed in Annex II should be considered as sensitive areas and how these should be defined, to which the JRC replied that there is need for a discussion on this but that criteria should generally take into consideration how the effects on the ecosystem. NL was asked whether it could imagine to consider the experience from the emission trade system for biocides and whether it could elaborate on the criteria used to define hotspots. NL answered that an emission trade system would only be useful if you would release pollutants into the water system, which is exactly what we would not want. Regarding the second question, NL elaborated that it uses a set of criteria, for example whether it influences drinking water quality.

FR answered to a question about how often WWTPs have to monitor hazardous substances and whether both influent and effluent are monitored that WWTPs are monitored over one year every six years and that both influent and effluent are monitored. Two questions were not directed at a specific presenter. The first one asked whether MS had identified any other existing / promising methods other than ozone or activated carbon to tackle micropollutants in WWTPs. To this, DE responded that it believes these two technologies will be the main technologies used as operators have experience with it and NL replied that there are new technologies being developed which function purely on physico-chemical processes and do not use biology. The second question asked how the financing of WWTP upgrades will be organised in different countries, even if these projects are currently in pilot phases, to which NL replied that it finances the pilots through government financing.

9. Discussion and closure of the meeting

Michel Sponar (European Commission) thanked participants for the information provided. He summarised the conference findings by highlighting that is has become clear the we do need to act on micropollution in waste water and that while all stages need to be considered, priority should be given to preventative measures. Further, investment prioritisation is necessary and may be focused on where there is a problem for the environment in receiving water bodies. MS also acknowledged that the discussion has shown that an EPR will not be easy to implement but stated that a European based tax will not be a possible alternative as it required unanimity. He concluded by saying that the conference was a very encouraging start to the IA and that the EC will aim to have a very good Directive that will continue to be effective. He finished by thanking the chair, the presenters and the DE presidency and the main organisers for co-organising the event.