POSITION PAPER - DRAFT VERSION

on the proposal for a directive of the European Commission to the European Parliament concerning Urban wastewater treatment (UWWTD recast), Article 18 – Risk assessment and management and respective implications on Article 7 – Tertiary treatment and Article 8 – Quaternary treatment

Framework

The Water Framework Directive (Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000) promotes a holistic and integrated approach by establishing a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater. In its article 10, describes that Member States shall ensure that discharges into surface waters, including the ones set out in the Council Directive 91/271/EEC, are controlled according a combined approach through the establishment and/or implementation of relevant emission limit values (ELV).

In addition, the EU Action Plan: "Towards Zero Pollution for Air, Water and Soil"[1] determines that "*first of all, pollution should be prevented at the source. Where fully preventing pollution from the outset is not (yet) possible, pollution should be minimized*".

In 2017, the European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) developed the project "Integrated Water Approach" that clearly identified that the compliance of standardized and uniform ELV, without taking into account the characteristics and uses of water bodies may not be enough to ensure the achievement of WFD goals in terms of Potential/Good Status[2]. The results from the new phases of the project, 2019 and 2020, also illustrates that the compliance of ELV for the treated urban wastewater discharges linked with WFD goals lead to a higher transition for a circular model when compared with the simple compliance of uniform values, since allows the promotion of natural values with consumption of less resources[3].

On recital (11) of the UWWTD recast proposal, is mentioned that *Member States should be required to demonstrate the absence of risks to the environment or to public health on the basis of a standardised risk assessment*. Indeed, the use of risk assessment is a feasible, reliable and robust approach to define ELV for discharges that requires more stringent treatment than secondary. This approach also allows the design of balanced, more sustainable and effective solutions, avoiding adverse environmental impacts resulting from any over-treatment, namely consumption of energy and chemical reagents and increase in the production of sludge.

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[1] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Pathway to a Healthy Planet for All EU Action Plan: 'Towards Zero Pollution for Air, Water and Soil'. COM(2021) 400 final.

[2] IMPEL Project Integrated Water Approach, 2018. Report No.: 2017/10 (Industrial Water Management guidelines, ISBN 978-2-931225-24-0). Available at https://www.impel.eu/en/projects/wastewater-in-natural-environment-wi-ne.

[3] IMPEL Project Wastewater in Natural Environment (WiNE), 2019-2020. Reports No.: 2019/10 and 2020/13 (Report on good practices to promote the transition to circular economy in urban and industrial water management: A new water circularity index and Addendum, ISBN 978-2-931225-27-1 and 978-2-931225-28-8). Available at https://www.impel.eu/en/projects/wastewater-in-natural-environment-wi-ne.

Proposal Rational

Portugal considers that the scope of the risk assessment and management described in Article 18 should be enlarged to ensure that the UWWTD recast effectively contributes to the goals of the WFD and the Zero Pollution ambition. In this sense, Portugal supports the requirement to demonstrate "the absence" of risks to the environment or to public health on the basis of a standardized risk assessment.

The imposition of tertiary and quaternary treatments taking into account that a certain load has a sufficient condition to demonstrate the occurrence of risk, despite the increasing of costs, namely for families, may also result in low or negative benefits for environment, since it does not include the overall trade-offs and synergies assessment between the administrative decision supported on load *versus* the differences among the multiple receiving water bodies (e.g. Oceanic coastal areas *versus* natural closed lakes or high industrial loads into urban systems *versus* more-like domestic urban wastewaters).

In line with the objectives set out by the WFD, the Communication on Zero Pollution and the overall goals of the European Green Deal, Portugal believes that solutions privileging pollution control at source, rather than the imposition of treatment to control pollution, which being exclusively according to load seem to encourage end-of-pipe solutions.

Only through the use a holistic and integrated approach, in the same sense of the WFD, will be possible to ensure the protection of water bodies against discharges of treated urban wastewaters. Through this process it would be possible to define more appropriate ELV for tertiary and quaternary treatment. Therefore, in a similar way to the one proposed in the Regulation (EU) 2020/741 for water reuse, **the proposed values in the UWWTD recast (for nitrogen, phosphorous and micro-pollutants) could remain as minimum requirements, but less stringent values could be admissible depending on the result of a risk assessment process according article 18, as long the environmental objectives and the protection of public health are guaranteed. This risk assessment should also be linked to what needs to be done to comply with the DWD.**

In order to ensure compliance assessment, a table of quality grades[4] could be defined according to the risk value. In the annex to this Position Paper Portugal provides an example of how tables 2 and 3 from Annex II of the proposed recast of UWWT could be developed.

To ensure a common and standardized approach for the risk assessment, a similar process as the one used for the Regulation (EU) 2020/741, could be foreseen, i.e., the European Commission could develop the mandatory key-risk factors to be applied. These factors could be supported on the development of technical guidelines by the Joint Research Center, with the participation of Member States.

Drafting proposal for Article 18

Based on the rational above mentioned, Portugal proposes to amend Article 18 as follows:

"*Article 18*

[4] The term "quality classes" should be avoided to minimize misunderstandings with the terminology used for water reuse (Regulation (EU) 2020/741 of the European Parliament and the Council of 25 May 2020 on minimum requirements for water reuse).

Risk assessment and management

1. By [xxxxxxx], Member States shall ~~identify~~ **assess** the risks caused by urban wastewater discharges to the environment and human health **and take into account** at least ~~those related to~~ **the following key elements of risk assessment and management:**

(a) the generated load in the agglomeration;

(**b**) ~~(a)~~ the quality of a water body used for the abstraction of water intended for human consumption as defined in Article 2, point (1), of Directive (EU) 2020/2184 **and the results for the risk assessment and risk management of the catchment areas for abstraction of these water as defined in Article 8, of the same directive;**

(**c**) ~~(b)~~ the quality of bathing water falling within the scope of Directive 2006/7/EC;

(d) ~~(c)~~ **the** ~~good ecological~~ status of a **surface** water body **and groundwater chemical status** ~~of a water body~~ **(whenever justified)** as defined in Article 2, points (22, **23 and 24**), of Directive 2000/60/EC;

(e) ~~(d)~~ the quality of a water body where aquaculture activities as defined in Article 4, point (25), of Regulation (EU) No 1380/2013 take place.

(f) the combined approach as defined in Article 10 of Directive 2000/60/EC, taking into account the presence or absence of pharmaceutical and/or cosmetic industry in the agglomeration;

(g) The measures in place to control and reduce pollution primarily at source;

(h) the hydrogeological and geomorphological characteristics, including the hydrodynamic of water bodies

2. Where an unacceptable level of risk has risks have been identified in accordance with paragraph 1, Member States shall adopt appropriate management measures to address them, which shall include where appropriate the following measures:
(a) establishing collecting systems in accordance with Article 3 for agglomerations with a p.e. equal or of less than **2000** ~~1 000~~**;**
(b) applying secondary treatment in accordance with Article 6 to discharges of urban wastewater from agglomerations with a p.e. equal or of less than **2 000** ~~1 000~~**;**
(c) applying tertiary treatment in accordance with Article 7 to discharges of urban wastewater from agglomerations with a p.e. equal or less than 100 000;
(d) applying quaternary treatment in accordance with Article 8 to discharges of urban wastewater from agglomerations with a p.e. equal or less than 100 000;
(e) establishing integrated urban wastewater management plans in accordance with Article 5 for agglomerations below 10 000 p.e. and adoption of measures referred to in Annex V;
(f) applying more stringent other requirements for the treatment of collected urban wastewaters than the requirements set out in Annex 1, part B (e.g. pathogen removal).

3. The ~~identification~~ **assessment** of the risks carried out in accordance with paragraph 1 of this article shall be reviewed every ~~5~~ **10 years.** A summary of the identified risks accompanied with a description of the **management** measures adopted in accordance with paragraph 2 of this Article shall be included in the national implementation programmes referred to in Article 23 and communicated to the Commission on request.

4. The risk assessment process should also take into account the results of nutrient uptake (nitrogen and/or phosphorous) by crops in projects that reuse water for irrigation purposes.

5. The Commission is empowered to adopt delegated acts in accordance with Article 27 amending this Directive in order to adapt to technical and scientific progress the key elements of risk assessment and management set out in paragraph 1.

Articles 7 and 8 should also be amended accordingly. *In paragraphs where additional treatment requirements are imposed to agglomerations within a certain load, in a certain deadline, it should be added "and according to the results of risk assessment and management as set out in Annex II".*

In conclusion, Portugal considers that a discharge assessment supported on a broader risk assessment would result in more appropriate ELV when more stringent treatment than secondary is needed, with higher benefits for the environment. Portugal believes this approach would contribute more effectively to the Zero pollution goals and to the transition to the circular economy, as efforts would be applicable only where, when and if needed and would also encourage measures to control primarily pollution at source. It will also allow to comply with the common goals by using, in each case, the most appropriate means to achieve them.

Annex: Technical arguments and bibliographic references supporting the Position Paper

Annex

Technical arguments and Bibliographic References

The application of an Emission Limit Value (ELV) from a simple administrative perspective is undeniably easy to propose, to monitor and to check compliance. However, as mentioned by Jirka *et al*., from an ecological perspective, a simple quality control based on ELV seems limited, as it does not consider the quality response of the water body itself and subsequently, does not hold the individual discharger responsible for the water body (Jirka *et al*., 2004).

The IMPEL network, since 2017 has been studying the relations between wastewater discharges and waterbodies and already developed guidelines for wastewater permit writers to define appropriate ELV according the combined approach defined on the article 10 of WFD and developed an index to estimate the circularity in water cycle[5]. The application of this index to urban wastewater treatment plants (in several countries) allowed to confirm that discharges with ELV defined according the goals of Water Framework Directive (WFD) had a higher level of circularity (Rebelo *et al*, 2019; Farabegoli *et al*., 2018). Furthermore, other studies in Europe showed the importance of defining ELV on discharge permits to comply with WFD goals (Undeman *et al*., 2022).

It should be taken into consideration that many societal decisions and technological developments may have consequences both for health and environment, and subsequently for the long-term sustainability of social and economic systems. Thus, important trade-offs and synergies between these group decisions and technological developments might be overlooked due to their usual separate treatment (Hauschild *et al*., 2022).

Therefore, from the scientific review of several authors' studies and technical analysis of available data it is evident that the use of an integrated (dual) approach, with an assessment from "water body to emission" *versus* an evaluation from "emission to water body" may result in a more realistic benefit for water resources, compared with the use of linear assessments only supported on the dimension of the discharged loads.

The risk characterization procedure, when added the calculations of all environmental trade-offs (such as, increase of energy consumption, increase of sludge amounts, concentration of certain pollutant loads on sludge, the transference of compounds of emergent concern from wastewaters to a solid matrix, e.g., by the use of activated carbons, or the metabolites formation in advance oxidation processes in non-controlled reactions) may lead to an overall higher risk when compared with discharges with less stringent ELV. For instance, the IMPEL project Wastewater in Natural Environment (WiNE) concluded that apparently good environmental practices may result in real negative impacts when considering the sum of environmental trade-offs (Rebelo *et al*., 2019).

The Directive (EU) 2020/2184 on the quality of water intended for human consumption considers the need of developing a risk assessment for the catchment areas for abstraction of water intended for human consumption. In the same sense, to define the capacity of a water body to

[5] In installations within and out of the scope of the Industrial Emissions Directive (IED), i.e., in IED and in no-IED installations.

receive a certain discharge, the emission appraisal needs to consider all diffuse and point sources of pollution at catchment level (Farabegoli *et al*, 2018; Rebelo *et al*, 2018).

According to literature, several qualitative, semi-quantitative or quantitative methods could be applied for health risk assessment, but for water resources less attention has been paid. Thus, the most common methods for receiving water bodies are the quantitative structure-activity relationship ((Q)SAR) methods that allow to predict chemical, physical, and biological parameters for unknown compounds, particularly when there are no analytical standards or experimental tests are not feasible. These methods, usually are based on the assessment on the ratio between the predicted environmental concentrations (PEC) and the predicted no-effect concentration (PNEC) for water, sediment, and biota through the appraisal of pollutants fate and transport on environmental compartments. This type of methodologies typically uses standardized bioassays involving single species and unique substances, modelled pathways and other uncertainties by the extrapolation of data across doses, species, and life stages and also due to the lack of accurate data on dose-response relationships (Amiard *et al*., 2015; Rebelo *et al.*, 2022; Sanabria *et al*., 2023; Shakeri & Nazif, 2018).

However, for the support of decision-making process, the use of knowledge-based models already showed its feasibility and applicability with simple outputs that may provide support for environmental authorities. One of the most popular methods is the multi-criteria decision analysis, which allows to appraise available technical information and stakeholder values to support decisions in many areas, especially in the environmental field (Rebelo *et al*., 2022; Rebelo *et al*., 2014; Sanabria *et al*., 2023; Shakeri & Nazif, 2018; Topuz *et al*., 2011).

The multicriteria-analyses can be a useful tool for the assessment of risks caused by urban wastewater discharges to the environment and human health, as it should be taken into account the susceptibility of the water body to pollution, where several factors and its relationships should be evaluated, namely the quality and status of water bodies, its current and/or foreseen uses and its hydrogeological and geomorphological characteristics. Thus, for the risk assessment of urban wastewater discharges, the following key factors should be considered:

I. the generated load in the agglomeration;
II. the ecological/potential and chemical status of water bodies (surface and groundwaters[6]) as defined in the Directive 2000/60/EC;
III. the quality of a water body used for the abstraction of water intended for human consumption as defined in Article 2, point (1), of Directive (EU) 2020/2184 and the results for the risk assessment and risk management of the catchment areas for abstraction of these water as defined in Article 8, of the same directive;
IV. the quality of bathing water falling within the scope of Directive 2006/7/EC;
V. the quality of a water body where aquaculture activities as defined in Article 4, point (25), of Regulation (EU) No 1380/2013 take place;
VI. the other uses of water bodies, e.g., agriculture irrigation, other recreational uses, recreational fishing, etc.;
VII. the results of the combined approach as defined in Article 10 of Directive 2000/60/EC, taking into account, e.g., the presence or absence of pharmaceutical and/or cosmetic industry in the agglomeration;

[6] When justified. E.g., in streams with torrential regime or when natural aquifer recharge areas occur downstream.

VIII. the hydrogeological and geomorphological characteristics, including the hydrodynamic of water bodies.

Therefore, to ensure a cost-effective approach for urban wastewater discharges that results in real and positive impacts for water bodies, is important to combine the administrative formulation for discharges to prevent harmful impacts on the aquatic environment and associated uses with the physical aspects of hydrodynamic mixing processes that determine the fate and distribution of the effluent from the discharge location (Jirka *et al*., 2004).

Consequently, the limit values for nitrogen and phosphorus defined for the tertiary treatment and the removal rate for quaternary treatment should be defined by a risk assessment as previous described, ensuring that environmental and human health objectives are effectively achieved with the needed effort.

To ensure a common approach and overcome possible burdens from compliance assessment, in a similar approach to the one used for the Regulation (EU) 2020/741 on minimum requirements for water reuse, the Joint Research Center could develop a technical guidance for the application of risk assessment key factors and a multi-criteria analysis (e.g., with the use of weighting or importance factors to allow simple outputs).

Finally, the proposed values in the current recast proposal for the Directive (for nitrogen and phosphorous and micro-pollutants) could remain as minimum values to comply whenever risk assessment results in an unacceptable level. In this way, tables 2 and 3 from Annex II of the Directive could be amended to integrate quality grades according the results of risk assessment.

Example:

*“**Table 2:** Requirements for tertiary treatment of discharges from urban wastewater treatment plants referred to in Article 7(1) and (3)*

One or both parameters may be applied depending on the local situation. The values for concentration or for the percentage of reduction shall apply.

Risk Level	*Quality grade*	*Parameter*	*Concentration*	*Minimum percentage of reduction*	*Reference method of measurement*
Very high (unacceptable)	*1*	*Total phosphorus*	*0,5 mg/L*	*90%*	*Molecular absorption spectrophotometry*
		Total nitrogen	*6 mg/L*	*85%*	*Molecular absorption spectrophotometry*
High	*2*	*Total phosphorus*	*1 mg/L*	*80%*	*Molecular absorption spectrophotometry*
		Total nitrogen	*10 mg/L*	*70-80%*	*Molecular absorption spectrophotometry*
Medium	*3*	*Total phosphorus*	*2 mg/L*	*80%*	*Molecular absorption spectrophotometry*
		Total nitrogen	*15 mg/L*	*70-80%*	*Molecular absorption spectrophotometry*
Low	*4*	*Total phosphorus*	*No need for ELV*		---
		Total nitrogen	*No need for ELV*		---

Table 3: *Requirements for quaternary treatment of discharges from urban wastewater treatment plants referred to in Article 8(1) and (3)*

Risk Level	*Quality grade*	*Indicators*	*Minimum percentage of removal*
High (unacceptable)	*1*	*Substances that can pollute water even at low concentrations (see Note 1)*	*80 % (see Note 2)*
High	*2*		*50 % (see Note 2)*
Medium	*3*		*No need for removal rate*
Low	*4*		*No need for removal rate*

Note 1: The concentration of the organic substances referred to in points (a) and (b) shall be measured.

(a) Category 1 (substances that can be very easily treated):

(i) Amisulprid (CAS No 71675-85-9),
(ii) Carbamazepine (CAS No 298-46-4),
(iii) Citalopram (CAS No 59729-33-8),
(iv) Clarithromycin (CAS No 81103-11-9),
(v) Diclofenac (CAS No 15307-86-5),
(vi)— Hydrochlorothiazide (CAS No 58-93-5),
(vii) Metoprolol (CAS No 37350-58-6),
(viii)— Venlafaxine (CAS No 93413-69-5);

(b) Category 2 (substances that can be easily disposed of):

(i) Benzotriazole (CAS No 95-14-7),
(ii) Candesartan (CAS No 139481-59-7),
(iii) Irbesartan (CAS No 138402-11-6),
(iv) mixture of 4-Methylbenzotriazole (CAS No 29878-31-7) and 6-methyl- benzotriazole (CAS No 136-85-6).

Note 2: The percentage of removal shall be calculated for at least six substances. The number of substances in category 1 shall be twice the number of substances in category 2. If less than six substances can be measured in sufficient concentration, the competent authority shall designate other substances to calculate the minimum percentage of removal when it is necessary. The average of the percentages of removal of all substances used in the calculation shall be used in order to assess whether the required 80 % minimum percentage of removal has been reached.

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