

“Integrated Water Management - revised lists of surface and groundwater pollutants” - Considerations from Chemours

In October 2022 the Commission adopted a [proposal](#) to revise the list of priority substances in surface water and groundwater. The proposal includes a quality standard for a new group entry for 24 per and polyfluoroalkyl substances (PFASs) - a large group of chemicals with widely different physical, chemical and toxicological properties¹.

If the proposal is agreed by the Council and the European Parliament, Member States will be required to monitor these substances in surface and groundwater and will be legally obliged to take measures to achieve the proposed quality standards, where they are exceeded². The appropriateness and reliability of the proposed quality standard for PFASs is, however, heavily debated based on scientific uncertainties, procedural irregularities, implementation difficulties and proportionality considerations, all of which are elaborated below.

For example, in March 2023, the Senate of the Czech Republic concluded that the implementation of the PFAS quality standard will depend on analytical methods that have yet to be developed and sufficient laboratory capacity, making the proposal “very ambitious and difficult to achieve”.³ Implementation is further complicated by the fact that the list of PFAS substances diverges from the recently revised Drinking Water Directive, and the proposed thresholds are far more stringent, making it inconsistent and a significant financial burden, as recently highlighted by some Member States’ authorities.

In addition, the European Commission’s own Regulatory Scrutiny Board [highlighted](#) various deficiencies in the impact assessment accompanying the proposal, including a failure to assess the impact on individual Member States or to estimate the order of magnitude of the expected impacts. A simple, ‘best-case’ assessment of likely compliance with the proposed surface water quality standard, based on available monitoring data, reveals that widespread failure of the quality standard is likely throughout the EU, with resulting the legal consequences of upgrading WWTWs (waste water treatment works) with quaternary treatment to remove PFASs from effluents estimated to cost **at least €300 billion** over the next 20 years, with no guarantee that quality standards will be met. At the same time, in terms of comparison, the COM IA quantified the benefits from the measures on PFAS ranging from €12.7 million to €41.4 million annually in the European Economic Area countries.

¹ https://environment.ec.europa.eu/publications/proposal-amending-water-directives_en

² Articles 16(1) and (8) of Directive 2000/60/EC (“WFD”)

³ [CZ SENATE CONT1-COM\(2022\)0540_EN.pdf \(europa.eu\)](#) accessed on 2023-04-27

In the meantime, a proposal for a REACH restriction of PFAS is being considered by the European Chemicals Agency (ECHA), which would prohibit the use of PFASs in non-essential uses ‘at source’⁴. As highlighted in recent EU parliament discussions on the revised water directives, controls at source should be prioritized prior to the implementation of end-of-pipe measures, such as quality standards⁵.

We strongly believe that water quality targets must be based on sound science as well as predictable and proportionate requirements to enable authorities and industry to practically measure and achieve outcomes protective of the environment.

- **The following paper provides Chemours considerations on the proposed quality standard for PFASs and explores the link between the proposal and other relevant regulatory processes, such as the ongoing ‘universal’ restriction of PFAS under REACH. Chemours is suggesting either of the two alternative regulatory options presented as a more proportionate and legally coherent approach to regulate the presence of PFASs in surface water and groundwater.**

In summary, we call for either:

- **Proposal a) remove the group of PFAS from the revised EQS and groundwater directives and, instead, add them to the water framework directive ‘watch list’ (the appropriate destination for substances where scientific uncertainties remain)**
- **OR Proposal b) align the list of substances in the proposal with the existing list of PFAS in the Drinking Water Directive and implement a quality standard for the sum of listed PFAS of 0.2 µg/l based on the principles established in the EQS guidance.**

Chemours indeed considers that any of the two alternative regulatory options presented above are more proportionate and legally coherent approach to regulate the presence of PFASs in surface water and groundwater.

⁴ [ANNEX XV RESTRICTION REPORT PROPOSAL FOR A RESTRICTION for PFAS](#)

⁵ [Draft report amending Directive 2000/60/EC establishing a framework for Community action in the field of water policy, Directive 2006/118/EC on the protection of groundwater against pollution and deterioration and Directive 2008/105/EC on environmental quality standards in the field of water policy](#)

About us

Chemours' chemistry makes an essential contribution to improving the lives of people everywhere, but our duty to the world we all share drives us to meet essential needs in the most responsible way possible.

Sustainable production is in Chemours' DNA. As part of our 2030 Corporate Responsibility Commitment Goals, Chemours has committed to reduce emissions of fluorinated organic substances by 99% by 2030 from our production. This commitment is not just words: based on actions taken to date we already expect to reduce the emissions from our site in The Netherlands by 80% by January 2024 and plans further reduction as defined in our CRC goals.

Sound science-based, predictable, and proportionate environmental legislation is critical to enable companies like ours to plan and implement such endeavours. We stand ready to support EU legislation which sets ambitious, realistic, and proportionate requirements that are protective of the environment and human health and sufficiently robust to be legally certain and enforceable by the authorities. Standards should avoid unintended impacts such as regrettable substitution and result in overall benefits for society.

General Framework

We welcome the Commission's Proposal for amending Directive 2000/60/EC establishing a framework for Community action in the field of water policy ("WFD"), Directive 2006/118/EC on the protection of groundwater against pollution and deterioration ("GWD") and Directive 2008/105/EC on environmental quality standards in the field of water policy ("EQSD"), referred hereinafter as "the Proposal". We fully support the improvement of the prioritization process, including a more transparent and efficient setting of environmental quality standards, reflecting the best available scientific data.

Coherence with other ongoing regulatory processes

It is clear that measures to control emissions under the Water Directives⁶, which constitute environmental release legislation, should have strong coherence with upstream source focused legislation, most notably REACH⁷ and the Industrial Emissions Directive⁸, especially since Article 16(6) of the Water Framework Directive obliges the European Commission to set proportionate levels for quality standards considering appropriate combination of product and process controls. The European Parliament has

⁶ Directive 2000/60/EC establishing a framework for Community action in the field of water policy ("WFD"), Directive 2006/118/EC on the protection of groundwater against pollution and deterioration ("GWD") and Directive 2008/105/EC on environmental quality standards in the field of water policy ("EQSD")

⁷ Regulation (EC) N° 1907/2006 of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), OJ L 396, 30.12.2006

⁸ [Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions \(integrated pollution prevention and control\)](#)

proposed to reinforce this coherence through various amendments to the revised directive prioritising **source control** over end-of-pipe measures⁹.

In this regard, it should be noted that a proposal to restrict PFAS under REACH has recently been submitted by four Member States and Norway to ECHA, where it is undergoing scientific scrutiny in ECHA's committees for risk assessment (RAC) and socioeconomic analysis (SEAC). It is expected – for the time being – that the restriction will become effective in 2026.

The REACH restriction may allow the continued use of PFASs where a ban is concluded to be disproportionate or may require continued use for applications where risks are considered to be adequately controlled (e.g., under responsible manufacturing conditions). Indeed, the proposal includes numerous permanent and time-limited derogations (up to 13.5 years after entry into force)¹⁰, which are associated with some releases. Additional derogations may be adopted prior to the restriction entering into force. In this context, it is inappropriate to anticipate the results of the REACH process, which should be allowed to proceed to its conclusion. To cover the concerns raised by PFAS in the meantime, whilst avoiding disproportionate impacts, we believe these substances should be placed on the WFD watch list until then. As a matter of fact, the proposed EQS would effectively set unachievable conditions in contradiction to potential derogations, identified by SEAC and the Member States to be critical for society

To the contrary, it appears that the values set in this Proposal will oblige Member States to achieve the set EQS by means of additional measures of their choice, which they deem appropriate. These potential measures will likely affect the manufacture, placing on the market and use of the fluoropolymers that are allowed to continue under the conditions of the REACH restriction.

Implementation of the proposed EQS for PFASs would amount to a *de facto* restriction, on the manufacture, placing on the market and use of the 24 PFASs included in the Proposal.¹¹ Also, such a ban would apply ahead of the entry into force of the PFAS restriction and it would therefore be premature as it would not consider the measures the REACH restriction might determine to minimize risks deriving from PFAS.

In addition, the Proposal fails to consider whether existing Best Available Technique ("BATs") would allow the 24 PFAS threshold to be achieved. As of today, with the current technologies, it is not possible to achieve such limits. Our recommendation is to develop Best Available Techniques to minimize emissions from industrial plants, in line with the Industrial Emissions Directive, before integrating such substances and limits into the PHS list. Article 16(6) of the WFD in fact determines that "Where appropriate, action at Community level for process controls may be established on a sector-by-sector basis". It

⁹ [Draft report amending Directive 2000/60/EC establishing a framework for Community action in the field of water policy, Directive 2006/118/EC on the protection of groundwater against pollution and deterioration and Directive 2008/105/EC on environmental quality standards in the field of water policy](#)

¹⁰ [ANNEX XV RESTRICTION REPORT PROPOSAL FOR A RESTRICTION for PFAS](#), p.4, Column 2, paragraphs 4, 5 and 6

¹¹ REACH Regulation, article 68

seems evident that this issue would be better approached on a sector level, through emissions control.

From our perspective, this failure to address and review the BATs runs counter the general objectives of the amended Water Directives.¹² In that regard, we believe that BATs should be reviewed under the Industrial Emissions Directive and related Best Available Technique Reference documents (“BREFS”) to be agreed within the Joint Research Centre (JRC) and a reasonable value agreed, in line with the conclusions of the Scientific Committee on Health, Environmental and Emerging Risks (“SCHEER”).

Our two proposals are presented below.

¹² Dir 2006/60/EC article 10(2)(a); ¹² Dir 2008/105/EC articles 3(3b) and 4(3)(b)

Our proposals on the current revision

Proposal A: Address the significant scientific and regulatory uncertainty by moving PFASs to the Watchlist.

This option has been developed in response to the following limitations of the Commission's Proposal, as elaborated below:

1. The derivation of the quality standard for the group of 24 PFASs is not scientifically robust and inconsistent with applicable Technical Guidance;
2. The proposed quality standard cannot be reliably implemented;
3. The criteria for PHS have not been demonstrated for the group of 24 PFASs;
4. Source control measures should be prioritised over end-of-pipe measures;
5. The costs of implementing the proposed quality standard would be disproportionate and would not guarantee compliance.

To address these shortcomings a quality standard for PFASs should not be proposed until the scientific and procedural uncertainties associated with it are resolved and the REACH PFAS restriction has been implemented. Until then, PFASs should be added to the WFD 'watch list'. PFASs have not previously been listed on the watch list and the knowledge gained from such an approach would help Member States and the Commission to develop a more fit-for-purpose and proportionate approach to regulating PFASs.

1) Derivation of the quality standard for the group of 24 PFAS is not scientifically robust and the resulting standard is not 'fit for purpose'

The threshold values for PFAS are derived from an EFSA tolerable weekly intake (TWI) for four PFAS (PFOA, PFNA, PFOS and PFHxS – based on reported effects on the immune system).¹³ The Commission applied a Relative Potency Factor (RPF) methodology (based on liver effects in rats) to extend the applicability 'read-across' the TWI from the four substances it was derived for (PFOA, PFNA, PFOS and PFHxS) to a further 20 PFAS in order to derive the EQS for the sum of 24 PFASs, expressed as PFOA equivalents.¹⁴

The methodology used to make this read-across is non-standard and does not meet minimum standards of scientific best practice. Therefore, it is not sufficiently reliable for regulatory use; especially in the context of the WFD where there are legal consequences of failing to meet the standard. In addition, the methodology is also not consistent with

¹³ EFSA CONTAM Panel (EFSA Panel on Contaminants in the Food Chain), Schrenk D, Bignami M, Bodin L, Chipman JK, del Mazo J, Grasl-Kraupp B, Hogstrand C, Hoogenboom LR, Leblanc J-C, Nebbia CS, Nielsen E, Ntzani E, Petersen A, Sand S, Vleminckx C, Wallace H, Barregard L, Ceccatelli S, Cravedi J-P, Halldorsson TI, Haug LS, Johansson N, Knutsen HK, Rose M, Roudot A-C, Van Loveren H, Vollmer G, Mackay K, Riolo F and Schwerdtle T, 2020. Scientific Opinion on the risk to human health related to the presence of perfluoroalkyl substances in food. EFSA Journal 2020;18(9):6223, 391, doi: 10.2903/j.efsa.2020.6223

¹⁴ SCHEER (Scientific Committee on Health, Environmental and Emerging Risks), Final Opinion on Draft Environmental Quality Standards for Priority Substances under the Water Framework Directive - PFAS, 18 August 2022 p. 10

the Commission's own EQS guidance¹⁵, which requires a common mode of action (in this case immunotoxicity) to be apparent, before a mixture based EQS is proposed, which has not been confirmed for the additional 20 PFASs.¹⁶

This uncertainty was explicitly acknowledged by the European Commission Scientific Committee on Health & Emerging Environmental Risks ("SCHEER") in their opinion on the proposed quality standard. Notably, the Committee indicated that it was *not in the position to assess whether the most critical EQSs (in terms of impact on environment/health) have been correctly identified*.¹⁷

In addition, the Commission's impact assessment for the proposal noted (on page 76) that the uncertainties associated with the RFP approach were considered too large to allow its use in legislation and that an approach analogous to the drinking water directive should be used instead; this assessment was ignored by the Commission in the Proposal. Specifically, on page 76 it says : *For PFAS, the use of a relative potency factor (RPF) approach was considered for setting a group EQS but the scientific justification for that is still too uncertain to be introduced in the legislation. Consequently, a sum of all PFAS approach analogous to the DWD (see Annex 7 for more information) seems a more appropriate way forward.*

From a procedural perspective, it should also be highlighted that the Commission failed to follow applicable technical guidance¹⁸ when using the non-standard methodology described above to derive the proposal quality standard. The Commission's EQS guidance unequivocally states that **when there is an existing standard for a substance under the EU Drinking Water Directive, as is the case for PFASs, this should be used as the basis to derive the applicable QS for the water directives (also taking into account the efficiency of drinking water treatment)**¹⁹. The methodology described in the Commission's guidance ensures regulatory consistency and coherence between the Drinking water and the Water Framework Directive. The implications of this failure to follow the technical guidance are elaborated in the description and supporting justification for the proposed Option B (please see below).

Finally, but of no less importance, we note that the proposed quality standard for PFASs, based on the sum of 24 individual PFAS, is not an appropriate approach to control risk. Specifically, whilst common 'arrowhead' PFAS substances are included in the list of 24 PFAS, such as PFOS, PFOA and PFHxS, the Commission's proposal ignores other substances (e.g., 'related' substances that can degrade in the environment or during wastewater treatment to form the arrowhead). As such, the proposed quality standards

¹⁵ European Commission (2018). Technical Guidance for Deriving Environmental Quality Standards. Guidance Document 27.

¹⁶ SCHEER (Scientific Committee on Health, Environmental and Emerging Risks), Final Opinion on Draft Environmental Quality Standards for Priority Substances under the Water Framework Directive - PFAS, 18 August 2022 . p. 11 as expressly confirmed by SCHEER

¹⁷ *Ibid.* p. 20, Sheer in its opinion noted that " *due to the different approaches used in deriving QSeco and QShh, as well as the identified gap in recent data on ecotoxicity and the incongruity between the existing AA-EQS and proposed AA-QS values for PFOS*" it was not possible to assess whether the most critical EQSs were correctly identified.

¹⁸ European Commission (2018). Technical Guidance for Deriving Environmental Quality Standards. Guidance Document 27. Section 3.7.

¹⁹ *Ibid*

for surface water and groundwater, whilst initially appearing protective of the environment and human health because of their stringency, could fail to address risks, where these are from precursors. Therefore, the proposed standard, irrespective of the scientific uncertainties surrounding their derivation, cannot be considered to be fit-for-purpose. Of note is that the EU Drinking Water Directive, acknowledging this issue, explicitly **includes a provision for a quality standard for drinking water based on 'Total PFAS'**²⁰. Failure of the Commission to harmonise their Proposal with existing regulatory approaches for PFASs, as required by the applicable technical guidance, highlights a fundamental misunderstanding of the PFAS issue and understanding of appropriate approaches to regulate them.

In summary, we raise a series of serious concerns in relation to the approach and methodology used to group the 24 PFAS and derive their quality standard. The standard should be reviewed before it is implemented.

2) The quality standards cannot currently be implemented

The analytical limit of Quantification (LOQ) for some of the 24 PFASs included in the group are not currently sensitive enough to establish with certainty if the EQS in biota and water has been passed or failed (see attached table). This prevents the reliable implementation of the proposed standards as, given the consequences for member states of failing a standard, there must be legal certainty as to whether a limit is passed or failed.

It is important to note that the European Commission is aware of these limitations and is already obliged to develop technical guidance on analytical methods for PFASs within the context of the drinking water directive by January 2024, thus acknowledging the difficulties associated with the reliable measurement of PFASs in drinking water. This technical guidance must be available, and extended to surface water and biota, **before any EQS is implemented**.

Of interest, is that the proposed EQS in surface water is a factor **of ten lower than the existing drinking water quality standard** emphasising that the analytical challenges for EQS will be ever greater than those acknowledged for drinking water. In any case, clear rules in data handling will be required to ensure that 'false positives' are avoided during compliance monitoring against any quality standard, particularly as it will be necessary to sum the concentration of the 24 PFASs; each of which are potentially below limits of quantification. We note that Environment Canada (2022²¹) propose to treat measurements reported as below limit of detection or below the limit of quantification as zero (rather than as ½ LOQ or LOQ) to avoid a scenario where a quality standard is failed simply as a consequence of summing the achievable quantification limits.

3) The criteria for PHS have not been demonstrated for the group of 24 PFASs

²⁰ DIRECTIVE (EU) 2020/2184 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2020 on the quality of water intended for human consumption, Annex I, part B

²¹ <https://www.canada.ca/en/health-canada/programs/consultation-draft-objective-per-polyfluoroalkyl-substances-canadian-drinking-water/overview.html>

First the 24 PFAS selected in the list are inherently different in terms of mode of action, hazard profiles and exposure. It is unclear what criteria were applied for grouping those specific PFAS.

Second, we also question whether PFAS meet the criteria for priority hazardous substance ("PHS") and whether this process followed proper standards of transparency and due process.

According to the existing article 2(30) of the WFD, hazardous substances are defined as "*substances or groups of substances that are toxic, persistent and liable to bio-accumulate, and other substances or groups of substances which give rise to an equivalent level of concern*".²² However, in the proposed amendment in article 2(30)(a) of the Proposal, these are defined as "*priority substances which are marked as 'hazardous' on the basis that they are recognised in scientific reports, in relevant Union legislation, or in relevant international agreements, as being toxic, persistent and liable to bio-accumulate or as giving rise to an equivalent level of concern, where this concern is relevant to the aquatic environment*".²³

In that regard, the impact assessment accompanying the proposal notes that for the identification of PHS, "*the following processes and legislations are relevant: substances of Very High Concern (SVHC) under REACH, Persistent Organic Pollutants (POPs) under the Stockholm Convention and substances identified as Persistent, Bio-accumulative and Toxic (PBTs) under Regulation (EEC) No.793/93*".²⁴

However, neither the old nor the new definitions of PHS (nor elsewhere in the text of the Water Directives) refers to assessments undertaken under REACH or the Stockholm Convention. Therefore, the basis upon which each of the substances are identified as PHS is unclear. Specifically, it is not clear which PFAS were considered PBT and which were included because of their SVHC properties or an assessment of equivalent concern to PBT substances. This corresponds to an incorrect interpretation of the law, lacking a legal basis and wrongly broadening the scope of the legal definitions.

In addition to all the above, we believe that the Commission failed to demonstrate why each of the 24 PFAS were identified as PHS.

In summary, the hazardousness of these individual substances to be qualified as PHS has not been demonstrated and data are not sufficient to justify their inclusion: more data need to be collected to substantiate such inclusion and sound analytical methods need to be developed to ensure that the legislation can be enforced

4) Source control measures should be prioritised over end-of-pipe measures

As specified in article 16 of the Water Framework Directive, for the priority substances, the Commission shall submit proposals of controls for:

- the progressive reduction of discharges, emissions and losses of the substances concerned, and, in particular
- the cessation or phasing-out of discharges, emissions and losses of the substances as identified in accordance with paragraph 3, including an appropriate timetable for doing

²² Dir 2006/60/EC article 2(30)

²³ Proposal, proposed amendment article 2(3)(a)

²⁴ Commission Staff Working document accompanying the Proposal, p. 159

so. The timetable shall not exceed 20 years after the adoption of these proposals by the European Parliament and the Council in accordance with the provisions of this Article. In doing so it shall identify the appropriate cost-effective and proportionate level and combination of product and process controls for both point and diffuse sources and take account of Community-wide uniform emission limit values for process controls. It is therefore evident that the accent should be placed on emissions limits at source (manufacturing sites, waste management plants etc, such as in the Industrial Emissions Directive implementing measures (BREFs, BATs)), instead of determining end-of-pipe obligations.

5) The costs of implementing the proposed quality standard would be disproportionate and would not guarantee compliance

As already noted by the Commission's regulatory scrutiny board, Czech Senate and the European Parliament²⁵, the Commission's impact assessment for the proposal fails to appropriately assess the costs that individual Member States would bear for implementing the proposed quality standards. Without such an assessment it is not possible for the Commission to conclude that the proposal is proportionate.

This is a significant deficiency as, based on the estimated costs for similar initiatives in the past, it can readily be concluded that these costs will be extremely high.

It is possible to estimate the likely costs for Member States and for the UK of implementing the proposed PFAS standard. In that regard, whilst the UK has now left the EU, it remains a representative example of likely impacts in the EU. Especially, a 2019 Environment Agency (England and Wales) study on PFOS²⁶ in the aquatic environment can be used to estimate 'best case' compliance with the new PFAS EQS. These data indicate that ~50% of waterbodies below wastewater treatment works would fail the proposal PFAS EQS, solely on the basis of the reported PFOS concentration. Similarly, from the same study, **all** freshwater, estuarine and coastal sites where concentrations of PFOS were monitored in fish (73 waterbodies monitored in total) would fail the new PFAS EQS, again, solely on the basis of the reported PFOS concentration alone. This is a 'best case' estimate as the concentration of other PFASs were not taken into account.

Hence, this would imply that a minimum of 50% of wastewater treatment works in England and Wales would need to implement advanced treatment if they were required to comply with the proposed EQS for PFASs. Based on estimates for the costs of upgrading wastewater treatment works in the UK to remove steroid oestrogens (specifically EE2) from wastewater effluents, this upgrade would now cost in the order of **at least £80 billion (€90 billion) 20 years**²⁷ and would only likely ensure that the

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[https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/740239/EPRS_BRI\(2023\)740239_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/740239/EPRS_BRI(2023)740239_EN.pdf)

²⁶ PFOS is included in the group of 24 PFASs proposed PFAS EQS (with an RPF 2) but was previously listed as a PHS. Hence monitoring data is available.

²⁷ The UK impact assessment for the previous priority substances proposal (2012) estimates that the costs of upgrading ~1,360 WWTW in England and Wales (~20% of the total number) would cost £27 to

EQS for PFAS in surface water was achieved. This level of treatment would not ensure that the PFAS EQS would be achieved in biota. It is important to note that the proposed EQS for EE2 was not implemented, presumably because of proportionality concerns and that no upgrade of WWTWs occurred.

Nevertheless, similar data are available for EU member states. Recent WFD monitoring data available for the Netherlands (from EIONET) reveals that 26% of surface water samples would exceed the new PFASs EQS based on PFOS alone.

Similarly, data from Wallonie and Flanders (from EIONET) reveals that 100% of mussel samples from Flanders would exceed the new PFAS EQS based on PFOS alone, whilst 66% of surface water samples in Wallonie would exceed the PFAS EQS based on PFOS alone.

As a further example, Rijkswaterstaat, the Dutch agency tasked with the protection of national water bodies, has been monitoring PFAS concentrations since 2008. Last year, a study by Dr Chiel Jonker²⁸ was [published](#), in which the 2008-2020 monitoring data are analyzed. While the report signals a trend of **decreasing concentrations** of PFAS in Dutch waters, it can be concluded from the data that the proposed EQS would be exceeded in most, if not all, locations. Furthermore, the data for the entry points into the Netherlands of the three major rivers (Rhine, Meuse and Scheldt rivers), suggest that the proposed EQS would be substantially exceeded, at least as far as these river basins are concerned, in Germany, Belgium and possibly France.

Other studies seem to indicate the same. For instance, a 2016 study Lindim et al²⁹ reports that both the predicted concentrations for PFOS and PFOA exceed the EQS in several major European river basins. Similar findings were reported in Sweden³⁰ and elsewhere^{31,32,33}. While several of these studies indicate a trend of decreasing concentrations of monitored PFASs, the proposed EQS will continue to be exceeded.

The failure to achieve EQS will result in legal consequences for Member States who will be obliged to take actions in order to attempt to meet the EQS. The Czech Senate already

£31 billion over 20 years. (£20 to £23 million per WWTW). Simple extrapolation of this estimate to upgrade 50% (3,400) of WWTW in England and Wales (would correspond to costs of ~£70 billion over 20 years (67.5 to 77.5 billion). Accounting for UK inflation from 2012 to 2022 (average annual inflation of 2.4% reported by the Bank of England) results in an estimate in 2022 prices of ~£90 billion over 20 years (~€110 billion over 20 years based on average 2022 £:€ exchange rate of 1.17 reported by the European Central Bank). This corresponds to ~€32 million per WWTW upgrade over 20 years. Approximate (rounded) values only are presented above because of the gross uncertainties inherent in the estimations. There are additional uncertainties associated with these estimates, including whether the treatment proposed to remove EE2 from wastewater effluents (and associated costs) would be appropriate to be installed for PFASs - although it not considered that treatment of PFAS would be technically easier than EE2.

²⁸ [Poly- en perfluoralkylstoffen \(PFAS\) in de Rijkswateren, 2021](#)

²⁹ <https://pubmed.ncbi.nlm.nih.gov/27448037/>

³⁰ <https://pubs.acs.org/doi/full/10.1021/acs.est.7b05718>

³¹ <https://www.sciencedirect.com/science/article/pii/S030438942101325X>

³² <https://pubs.acs.org/doi/10.1021/acs.est.2c02765>

³³ <https://www.sciencedirect.com/science/article/pii/S0048969721066134>

flagged that the costs to achieve the targets will be significantly higher than assumed in the submitted impact assessment.

In this framework, we also question whether the Commission has considered the impact such measures would have on water treatment companies and taken on board their inputs on what is technically measurable, what limits are concretely achievable, and at what cost.

There are approximately 18,000 WWTW in the EU³⁴. If the best-case assumption from the UK that a minimum of 50% (9,000) of WWTW will need to be upgraded is applied to the EU this would correspond to costs of at least €300 billion over the next 20 years in the EU³⁵, with no certainty that the EQS will be achieved.

Conclusion

The proposed quality standards for PFASs in surface water (EQS) and groundwater (GWQS) are not scientifically robust, implementable, or proportionate. Their implementation would result in extensive societal impacts (i.e. costs) without reliable environmental or human health benefits. ECHA is currently evaluating a proposal for a restriction on the use and placing on the market of PFASs in the EU/EEA under REACH. Until the REACH restriction process is concluded it would be premature to implement the proposed quality standards. Concretely, until appropriate 'product control' measures, such as the REACH restriction, are implemented it cannot be concluded that end-of-pipe (process) measures (such as GWQS) would be proportionate; particularly recognizing the legal consequences for Member States of non-compliance.

As a consequence, we recommend ***that the EQS and GWQS for PFASs in the respective Annexes to the Directive 2006/118/EC and Directive 2008/105/EC, are removed and, instead, PFAS are added to the WFD Watch List until the uncertainties associated with the derivation of an appropriate EQS/GWQS and its implementation are resolved, and the REACH restriction (source control) process is concluded***

³⁴ <https://www.waterworld.com/wastewater/article/16201111/analysis-europes-waterwastewater-in-numbers>

³⁵ ~€32 million over 20 years multiplied by 9,000 WWTW = ~€300 billion over 20 years

Proposal B: Align substances with the Drinking Water Directive and determine limit values following the principles in the EQS guidance

Any proposed EQS should be aligned with the existing provisions of the Drinking Water Directive both in terms of scope and limit values, in accordance with existing Commission guidance documents, in order to ensure effective and consistent implementation and enforcement. There is currently a lack of alignment of the proposed EQS with the Drinking Water Directive.

In fact, the proposed European standards for the indicators added, for instance, to Annex I of the Groundwater Directive are much stricter than the values proposed by the expert hydrogeologists of the Common Implementation Strategy ("CIS") Working Group on Groundwater and the list of substances is not the same as the list for the Drinking Water Directive, same applies to the limits for surface water. This weakness has been also flagged by some competent authorities, with the suggestion to bring consistency to the list of PFAS in the GWD and the DWD.

It is also important to note that the European Commission is already obliged to develop technical guidance on analytical methods for PFASs within the context of the drinking water directive by January 2024, acknowledging the potential difficulties associated with the reliable measurement of PFASs in water. This technical guidance must be available, and extended to surface water and biota, **before any other EQS is implemented**. Some Member States are worried that the lack of thereof, and in addition the lack of appropriate laboratories in the member states will render the proposal as very ambitious and difficult to achieve.

Of interest, is that the proposed EQS in surface water is a factor **of ten lower than the existing drinking water quality standard** emphasising that the analytical challenges for EQS will be ever greater than those acknowledged for drinking water. In any case, clear rules in data handling will be required to ensure that false positives are avoided during monitoring against any EQS, particularly as it will be necessary to sum the concentration of the 24 PFASs, potentially below limits of quantification.

According to the Commission guidance for deriving EQS, where an existing drinking water quality standard is available, as is the case for PFASs, it shall be used as the basis for the EQS. This guidance was not followed for PFASs. In addition, the EQS guidance also states that the effectiveness of water treatment should be accounted for when deriving the EQS³⁶, which was also not applied by the Commission³⁷. A conservative assumption of treatment efficacy can be considered to be 50% effectiveness, which would result in a **EQS of 0.2 µg/l for the sum of 22 PFASs**. Such an EQS would align the WFD, EQS and GWQS with the drinking water legislation and create a harmonised and consistent basis for a legislation.

³⁶ European Commission (2018). Technical Guidance for Deriving Environmental Quality Standards. Guidance Document 27

³⁷ *ibid*

Conclusion

In conclusion, we propose to revise the **list of PFAS substances included in the EQS and make it consistent with the list of PFAS for drinking water and define a concentration list for the sum of listed PFASs of 0.2 µg/l based on the principles in EQS technical guidance that states that the treatability of raw water is considered when setting quality standards. Alignment of the EQS with the drinking water quality standard would provide clear direction to member states regarding the management of water resources. Specifically, measures associated with achieving EQS levels that are coherent with Drinking Water Directive standards would result in an integrated regulatory approach with resulting efficiency gains.**

Table of analytical detection limits for PFASs according to US-EPA methods – Shaded rows denote that current state of the art analytical limits of quantification for drinking water are higher than necessary for reliable implementation (LOQ < EQS/3)

Name	abbreviation	Carbon chain length	CAS	EC	DWD	ENV CANADA	WFD EQS	EQS RPF	US-EPA 533 MRL	US-EPA 533 DL	US-EPA 537.1 DL	Normalised min LOQ EQS _{aqua} (ng/L)	Normalised min LOQ EQS _{biota} (ng/kg)
Perfluorobutanoic acid (PFBA)	PFBA	4	375-22-4	206-786-3	Y	Y	Y	0.05	5	13	n/a	29.3	513.3
Perfluoropentanoic acid (PFPA)	PFP(e)A	5	2706-90-3	220-300-7	Y	Y	Y	0.03	3	3.9	n/a	48.9	855.6
Perfluorohexanoic acid (PFHxA)	PFHxA	6	307-24-4	206-196-6	Y	Y	Y	0.01	3	1.7	1	146.7	2566.7
Perfluoroheptanoic acid (PFHpA)	PFHpA	7	375-85-9	206-798-9	Y	Y	Y	0.505	3	0.7	n/a	2.9	50.8
Perfluorooctanoic acid (PFOA)	PFOA	8	335-67-1	206-397-9	Y	Y	Y	1	4	0.53	0.53	1.5	25.7
Perfluorononanoic acid (PFNA)	PFNA	9	375-95-1	206-801-3	Y	Y	Y	10	4	0.7	0.7	0.1	2.6
Perfluorodecanoic acid (PFDA)	PFDA	10	335-76-2	206-400-3	Y	Y	Y	7	3	1.6	1.6	0.2	3.7
Perfluoroundecanoic acid (PFUnDA)	PFUnDA	11	2058-94-8	218-165-4	Y	Y	Y	4	2	1.6	1.6	0.4	6.4
Perfluorododecanoic acid (PFDoDA)	PFDoDA	12	307-55-1	206-203-2	Y	Y	Y	3	3	1.2	1.2	0.5	8.6
Perfluorotridecanoic acid (PFTTrDA)	PFTTrDA	13	72629-94-8	276-745-2	Y	Y	Y	1.65	7	0.72	0.72	0.9	15.6
Perfluorobutane sulfonic acid (PFBS)	PFBS	4	375-73-5	206-793-1	Y	Y	Y	0.001	3		1.8	1466.7	25666.7
Perfluoropentane sulfonic acid (PFPS)	PFP(e)S	5	2706-91-4	220-301-2	Y	Y	Y	0.3005	4	6.3	n/a	4.9	85.4
Perfluorohexane sulfonic acid (PFHxS)	PFHxS	6	355-46-4	206-587-1	Y	Y	Y	0.6	3	1.4	1.4	2.4	42.8
Perfluoroheptane sulfonic acid (PFHpS)	PFHpS	7	375-92-8	206-800-8	Y	Y	Y	1.3	3	5.1	n/a	1.1	19.7
Perfluorooctane sulfonic acid (PFOS)	PFOS	8	1763-23-1	217-179-8	Y	Y	Y	2	4	1.1	1.1	0.7	12.8
Perfluorononane sulfonic acid (PFNS)	PFNS	9	6859-12-1		Y	N	N						
Perfluorodecane sulfonic acid (PFDS)	PFDS	10	335-77-3	206-401-9	Y	N	Y	2				0.7	12.8
Perfluoroundecane sulfonic acid		11	749786-16-1		Y	N	N						
Perfluorododecane sulfonic acid		12	797803-9-5		Y	N	N						
Perfluorotridecane sulfonic acid		13	791563-89-8		Y	N	N						
Perfluorotetradecanoic acid	PTFeDA	14	376-06-7	206-803-4	N	Y	Y	0.3	8	1.1	1.1	4.9	85.6

Name	abbreviation	Carbon chain length	CAS	EC	DWD	ENV CANADA	WFD EQS	EQS RPF	US-EPA 533 MRL	US-EPA 533 DL	US-EPA 537.1 DL	Normalised min LOQ EQS _{aqua} (ng/L)	Normalised min LOQ EQS _{biota} (ng/kg)
Perfluorohexadecanoic acid	PFHxDA	16	67905-19-5,	267-638-1	N	N	Y	0.02				73.3	1283.3
Perfluorooctadecanoic acid	PFODA	18	16517-11-6	240-582-5	N	N	Y	0.02				73.3	1283.3
Ammonium perfluoro (2-methyl-3-oxahexanoate)	HFPD-DA or Gen X	6	62037-80-3		N	Y	Y	0.06	5	1.9	1.9	24.4	427.8
Propanoic Acid / Ammonium 2,2,3-trifluoro-3-(1,1,2,2,3,3-hexafluoro-3-(trifluoromethoxy)propoxy)propanoate	ADONA	7	958445-44-8		N	Y	Y	0.03	3	0.88	0.55	48.9	855.6
2- (Perfluorohexyl)ethyl alcohol	6:2 FTOH		647-42-7	211-477-1	N	N	Y	0.02				73.3	1283.3
2-(Perfluorooctyl)ethanol	8:2 FTOH		678-39-7	211-648-0	N	N	Y	0.04				36.7	641.7
Acetic acid / 2,2-difluoro-2-((2,2,4,5-tetrafluoro-5- (trifluoromethoxy)-1,3-dioxolan-4-yl)oxy)-	C604		1190931-41-9		N	N	Y	0.06				24.4	427.8
11-Chloroeicosafluoro-3- oxaundecane-1-sulfonic acid	11Cl-PF3OUdS	9	763051-92-9		N	Y	N		5	1.5	1.5		
9-Chlorohexadecafluoro-3- oxanonane-1-sulfonic acid	9Cl-PF3ONS	8	756426-58-1		N	Y	N		2	1.4	1.8		
Nonafluoro-3,6- dioxahexanoic acid	NFDHA	7	151772-58-6		N	Y	N		20	16	n/a		
1H,1H, 2H, 2H- Perfluorodecane sulfonic acid	8:2 FTS	8	39108-34-4		N	Y	N		5	9.1	n/a		
Perfluoro(2- ethoxyethane)sulfonic acid	PFEESA	4	113507-82-7		N	Y	N		3	2.6	n/a		
1H,1H, 2H, 2H- Perfluorohexane sulfonic acid	4:2FTS	4	757124-72-4		N	Y	N		3	4.7	n/a		
Perfluoro-3- methoxypropanoic acid	PFMPA	4	377-73-1		N	Y	N		4	3.8			
Perfluoro-4-methoxybutanoic acid	PFMBA	5	863090-89-5		N	Y	N		3	3.7			
1H,1H, 2H, 2H- Perfluorooctane sulfonic acid	6:2FTS	6	27619-97-2		N	Y	N		5	14			

Name	abbreviation	Carbon chain length	CAS	EC	DWD	ENV CANADA	WFD EQS	EQS RPF	US-EPA 533 MRL	US-EPA 533 DL	US-EPA 537.1 DL	Normalised min LOQ EQSaqua (ng/L)	Normalised min LOQ EQSbiota (ng/kg)
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA	8	2991-50-6		N	Y	N		5	2.8	2.8		
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA	8	2355-31-9		N	Y	N		6	2.4	2.4		