Navigating the Unknown: Novel Technologies in Finnish Environmental Adjudication*

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Abstract

The Industrial Emissions Directive (IED) has had a limited impact on technological advancements and contributed only modestly to emissions reduction. Against this background it is posited that the adoption of multiple flexible legal instruments is imperative to stimulate the use of novel technologies across firms and sectors. Through a review of court rulings, this study seeks to elucidate the evaluative role undertaken by the Finnish Supreme Administrative Court (SAC) in enhancing the legal standing of novel technologies. An inquiry is made into whether there exist legal prerequisites that could guide the courts towards adopting a more flexible stance concerning environmental quality norms, with the potential to elevate the legal status of novel technologies in the assessment of the legal grounds for the granting of environmental permits. Furthermore, the study scrutinizes the role of the precautionary principle, addressing local environmental risks and scientific uncertainties in the legal interpretation of the SAC. The findings underscore the limited discretion of the SAC of Finland, confined to legality reviews pertaining solely to local environmental impacts. This constraint necessitates the exploration of alternative processes aimed at mitigating uncertainty related to novel technologies.

Keywords: Industrial Emissions Directive; novel technologies; Best Available Technique; precautionary principle; Finnish Supreme Administrative Court

1. Introduction

The European Industrial Strategies propose that the adoption of novel industrial technologies can catalyse a transition of European industry towards a sustainable, greener, and more efficient economy, with a heightened digital dimension.[1] This transformation is envisioned to enhance Europe's industrial competitiveness in global markets, aligning with the objectives of the European Green Deal.[2] The Industrial Emission Directive (IED)[3], as part of the European Union's secondary environmental law, regulates over 52,000 high-emission installations engaged in highly polluting industrial activities,

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[1] Communication from the Commission, COM(2020) 102 final, 'A New Industrial Strategy for Europe', (2020), pp. 4–3, 7, 15; Communication from the Commission, COM(2021) 350 final, 'Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery', pp. 17, 19; Communication from the Commission, A Green Deal Industrial Plan for the Net-Zero Age, COM(2023) 62 final, pp. 1–4, 6.

[2] COM(2020) 102 final, p. 2, 6–10, 12–14; COM(2021) 350 final, pp. 2, 5, 16–20.

[3] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control), OJ L 334, 17.12.2010, pp. 17–119. (IED)

encompassing power plants, refineries, waste treatment and incineration, metal production, cement manufacturing, glass production, chemical processing, pulp and paper production, food and drink processing, as well as the intensive rearing of pigs and poultry.[4] Furthermore, an installation subject to the IED may engage in multiple IED activities simultaneously, such as both cement production and waste co-incineration.[5]

The IED establishes a comprehensive permitting and control framework across Member States, targeting on-site reduction in air, water, and soil pollution, with the overall goal of safeguarding human health and the environment.[6] However, with regard to greenhouse gas emissions, when emissions of a greenhouse gas from an installation are specified within the European emission trading scheme[7] for an activity conducted in that installation, the permit shall abstain from specifying an emission limit value for direct emissions of that gas, unless it is necessary to prevent significant local pollution.[8] Moreover, the permit shall refrain from imposing obligations related to energy efficiency for units emitting carbon dioxide on the site.[9]

Given the substantial role that novel technologies play in the industrial green transformation as per EU policy, the Best Available Technique (BAT) conclusions, governed by the EU's IED have fallen short of optimal effectiveness in facilitating the adoption of novel technologies within industrial facilities.[10] The BAT conclusions encompass a range of achievable emission levels associated with the application of the best available techniques (BAT-AELs).[11] The defined range of emission level values (ELVs) in the basis of BAT-AELs are used by national environmental permit authorities to make binding determinations of ELVs for individual industrial installations. Industrial operators are required to achieve the determined ELVs when operating an installation that requires an environmental permit under the IED.[12] Article 21 of the IED, implemented in Section 80 of the Finnish Environmental Protection Act, rules that when new or updated BAT conclusions are approved for an industry sector, the permit conditions of previously issued environmental permits must be reviewed within four years if they do not align with the current BAT conclusions.[13] Emerging or novel technologies can only be incorporated into the BAT conclusions when the conclusions are revised by initiating a new European Integrated Pollution Prevention and Control Bureau

[4] COM(2022) 156 final/3, 2022/0104 (COD), Proposal for a Directive of the European Parliament and of the Council amending Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) and Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste, p. 3.

[5] Ibid.

[6] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control), OJ L 334, 17.12.2010, 17–119. (IED) (2010/75/EU), preamble (2), (3) and (29), article 1 (Subject matter).

[7] Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, OJ L 275, 25.10.2003, pp. 32–46, Annex I.

[8] IED (2010/75/EU), art. 9(1).

[9] Ibid. art. 9(2).

[10] COM(2022) 156 final/2, 2022/0104 (COD), p. 28, preamble (24); Commission Staff Working Document SWD(2022,) 'on reporting of environmental data from industrial installations and establishing an Industrial Emissions Portal', (2022) 111 final PART 1/5, 5 April 2022, p. 11.

[11] IED (2010/75/EU), art. 3(13) defines BAT-AELs as "*[…] the range of emission levels obtained under normal operating conditions using a best available technique or a combination of best available techniques, as described in BAT conclusions, expressed as an average over a given period of time, under specified reference conditions*."

[12] IED (2010/17/EU), recital 12, art. 3(5) and art. 30.

[13] See, Stepanoff, Maaret, 'BAT-päätelmien sitovuus uuden ympäristönsuojelulain mukaisesti – Katsaus' Ympäristöpolitiikan ja –oikeuden vuosikirja 2016, p. 291.

in Seville (Sevilla process), which constitutes an exchange of information among EU Member States, environmental NGOs, the European Commission, and representatives of European industry. In the Sevilla process, the stakeholders form Technical working Groups and aim to define new BATs and their incorporation into the reference documents on Best Available Techniques (BREFs).[14]

The inadequacy of incentives within the IED to promote the adoption of novel technologies within existing industrial sites arises primarily from the infrequent updates to the BAT conclusions.[15] The situation tends to encourage the persistent utilisation of existing technological practices, proven through practical implementation on industrial sites, for an extended period of up to a decade, rather than fostering the adoption of novel technologies.[16] In addition, the legislative process for creating BAT conclusions (Sevilla process) prioritises the implementation of existing cost-effective solutions over incentivising the adoption of novel technologies (which are not yet cost-efficient), and thus BAT-AELs are not predicated on factors such as national emission targets or the collective operational range of all current installations.[17]

The identification of BAT methods and levels is predominantly established at the EU level, but the permitting authority retains the discretion to refine specifications at the local level and, ultimately, verify that the BAT level outlined in BAT conclusions aligns with the permit conditions for the activity in question.[18] The legal uncertainty surrounding the use of the novel technologies at industrial sites arises when the environmental authority or administrative court seeks to evaluate the adequacy of the technology in light of the BAT conclusions, but the conclusions are not directly applicable to the proposed novel technology. In such cases, the absence of robust standards complicates the assessment of the environmental impacts of novel technologies.[19][20] In the context of environmental permit procedures, an additional complicating factor is the obligation for operators to furnish supporting evidence that substantiates the adequacy of their proposed technological solutions, aligning with all relevant environmental norms applicable in the specific case.[21] Such evidence stands as a prerequisite for permit issuance, necessitating proactive environmental impact assessment.[22]

This can be a time and resource-intensive process. In addition, even if a novel technology were in use in one industrial sector, its application in a different sector requires extensive data analysis to assess potential risks (to the local environment).[23] Such analysis can be complex, further burdening operators and potentially hindering the adoption of innovative solutions.[24]

Although the BAT conclusions serve as a guide for selecting technology, in environmental permitting the focus of the procedure lies primarily on the environmental impacts of the

[14] European Industrial Production Information Exchange, The Sevilla Process <https://eipie.eu/the-sevilla-process/>; See also, IED (2010/17/EU), art. 13 (BAT reference documents and exchange of information).
[15] SWD, 111 final PART 1/5, p. 11.
[16] Ibid.
[17] IED (2010/17/EU), art. 1(10) and (14).
[18] Stepanoff 2016, p. 291.
[19] Dellise, Marie et al., 'Challenges in Assessing Best Available Techniques (BATs) Compliance in the Absence of Industrial Sectoral Reference' 263 Journal of cleaner production 121474 (2020), p. 3–4, 7–8; Cikankowitz, A., 'Using BAT Performance as an Evaluation Method of Techniques' (2013) 42 Journal of cleaner production 141, pp. 143–145.
[20] Giner-Santonja et al. (2020), p. 837.
[21] Ibid.
[22] Act on the Environmental Impact Assessment Procedure, Section 3, 14 and Chapter 4 (Taking environmental impact assessment into account in the permit procedure and permit).
[23] See, Section 2.2 of this article about Petrol Station cases.
[24] Ibid.

installation rather than the specific technologies employed.[25] In this regard, article 18 of the IED anticipates a connection with ambient environmental quality standards, e.g. those established under the Water Framework Directive (WFD)[26], and explicitly mandates that "additional measures shall be included in the permit" when adherence to an environmental quality standard requires locally stricter conditions than those attainable through the use of BAT techniques. The European Commission's evaluation of IED's efficiency has revealed challenges faced by permitting authorities in applying Article 18 of the IED to impose more stringent ELVs than those required by BAT conclusions to meet environmental quality standards that stem from other environmental norms.[27] This is due to the lack of clarity regarding the definition of 'stricter conditions' beyond those attainable through BAT conclusions, including the specification of 'additional measures' required for permits to adhere to environmental quality standards.[28] This ambiguity has resulted in divergent interpretations when establishing permit conditions in Member States.[29]

The integration of the EU's IED into Finnish national law occurred as part of a comprehensive amendment of environmental legislation, with a crucial aspect being the transformation of BAT conclusions into a legally binding component.[30] In order to understand how the BAT conclusions affect the introduction of novel technologies when permitting new industrial installations, one needs to consider how the BAT conclusions are interpreted around technologies whose adequacy cannot be assessed in the light of BAT conclusions. This article studies the role of the Supreme Administrative Court of Finland (SAC) in establishing legal clarity in permitting procedures regarding the use of new technologies in industrial sites. Thus, it will delve into how the Finnish SAC has interpreted the role of novel technologies when there has been a risk of violation of other environmental quality standards, necessitating the inclusion of additional measures in the permit.

Against this background, the article will aim to answer the following question:

1. Could the prevailing interpretation practices of the Finnish Supreme Administrative Court concerning precaution, substantial pollution (indicative of other environmental quality standards), and Best Available Technique conclusions have a positive impact on fostering the adoption of novel technologies within industrial sites?

The following sets the scene for a complex interplay of the strict interpretation of the precautionary principle, together with other environmental norms, and the promotion of the use of novel technologies in industrial processes.

[25] See, Environmental Protection Act (527/2014) (EPA), Section 27 (General permit requirement) and Section 49 (Conditions for granting a permit).

[26] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, OJ L 327, 22.12.2000, pp. 1–73.

[27] SWD(2022) 111 final, PART 2/5, pp. 175–176.

[28] Ibid.

[29] Ibid.

[30] Government Proposal to the Parliament for the Environmental Protection Act and Amendments to Certain Related Laws, HE 214/2013 vp., p. 1; Puheloinen, Eeva-Maija et al., Teollisuuden päästödirektiivin (IED) voimaansaattaminen ja muita ympäristönsuojelulain kehittämisajatuksia, Ympäristöministeriön raportteja 6/2011, pp. 33–35.

2. Novel Technologies in Finnish Environmental Adjudication – Case Study

In the context of Finnish jurisprudence, the courts have an extensive range of information regarding the varied impacts of an industrial project at their disposal. Particularly in cases pertaining to the Finnish Environmental Protection Act (527/2014) (EPA) or the Water Act (587/2011), the composition of the court chamber encompasses not solely judges versed in legal matters, but also judges with specialised expertise.[31] These expert judges are distinct from their legal counterparts and possess technical or scientific qualifications rather than formal legal training.[32] In light of this, one may consider whether expert judges could provide more explicit evaluations of technologies with innovative potential in the courts, establishing legal references for specific novel technologies instead of relying solely on technological development on the basis of BAT conclusions.

Rather than assessing the potential innovation effects of the chosen technology, the legal evaluation focuses on addressing uncertainties in the context of environmental risks. The precautionary principle guides the interpretation of courts and enables the evaluation of environmental and human health risks that are prohibited under environmental regulations, along with the associated scientific uncertainty regarding their materialisation.[33] In other words, the principle empowers the court to assess these risks and uncertainties for the environment and human health effectively. The precautionary principle is particularly applicable in areas where scientific evidence is inconclusive or contested by experts, and a preliminary and objective scientific risk assessment raises justifiable concern that a substance, production process, or product may pose a threat to human health or the environment.[34]

The precautionary principle and the due care principle are featured prominently in the Finnish EPA, Section 20, being foundational principles of Finnish Environmental Law that guide the assessment and granting of permits. In accordance with these principles, activities with the potential to cause environmental contamination are required to be conducted with due care and precaution. This entails considering factors such as the probability of pollution, the risk of accidents, and the measures available for accident prevention and mitigation. In the Finnish tradition, the precautionary principle has been pivotal in the most complex cases, particularly when dealing with significant uncertainties related to long-term and cumulative impacts of major industrial sites, where the SAC has relied explicitly on the precautionary principle in conjunction with relevant legal norms.[35] The most famous environmental law case from Finland, the Finnpulp case, represents one of these complex cases, based on a skillful intertwining of factual examination with the legal aspects of

[31] Paloniitty, Tiina et al., 'Scientific and Legal Mechanisms for Addressing Model Uncertainties: Negotiating the Right Balance in Finnish Judicial Review?' Journal of Environmental Law, Volume 33, Issue 2, (2021), p. 293.

[32] Ibid.; See also, Paloniitty, Tiina et al., 'Securing Scientific Understanding: Expert Judges in Finnish Environmental Administrative Judicial Review' 27(4) EEELR 125 (2018), pp. 1–5.

[33] See, Jalava, Kimmo et al., 'The precautionary principle and management of uncertainties in EIAs–analysis of waste incineration cases in Finland: Impact Assessment and Project Appraisal' 31(4) (2013), p. 281.

[34] Communication from the Commission, 'on the precautionary principle', COM(2000) 1 final, pp. 3, 17–20; European Political Strategy Centre (Strategic Notes) 'Towards an Innovation Principle Endorsed by Better Regulation', Issue 14 (2016), p. 3.

[35] Paloniitty, Tiina et al., 'The EU Nature Conservation Law in Finnish Judicial Review: Various Avenues, Coalescing Case Law?' In M. Eliantonio, E. Lees, & T. Paloniitty (Eds.),'EU Environmental Principles and Scientific Uncertainty before National Courts – The Case of the Habitats Directive' Hart publishing (2023), pp. 223–224.

the precautionary principle and the crucial notion of 'significant pollution',[36] interpreted together with more specific environmental quality norms.[37]

The cases addressed in this chapter have in common that the operators, in their permit applications, had asserted that the technologies they employed could prevent the manifestation of environmental impacts prohibited by environmental standards. Environmental legal cases commonly share the characteristic that the facts under consideration are oriented towards the future (ex post evaluations), as the evidentiary basis for assessing risk relies heavily on scientific knowledge, used to predict the prospective environmental impacts of activities. The subsequent analysis explores how the SAC of Finland has interpreted scientific uncertainty in cases where operators have sought to minimise risk by implementing new technical solutions.

2.1 Decoding the Finnpulp Case

In the Finnpulp case, Finnpulp Oy was refused an environmental permit by the SAC due to the potential for wastewater discharges from the bioproduct mill to cause significant pollution, as prohibited under Section 49 of the EPA.[38] The SAC determined that the key issue to be resolved was whether the conditions for granting an environmental permit, especially concerning the water impacts of the operation, had been fulfilled. The legal essence of the decision hinged on the ecological status of the water body, compliance with EU legal obligations, the application of the precautionary principle, and a comprehensive assessment of the operation's entire lifetime, including the associated risk of pollution.[39] Notably, the SAC observed that, as established in the Weser case by the European Court of Justice (CJEU),[40] the EU's WFD has become legally binding for individual installations and projects, making it a source of normativity for industrial operators.[41]

In the Finnpulp case, the SAC emphasized that in assessing compliance with the obligations derived from the EU's WFD, the norms established in the Weser case must be considered. These norms relate to non-deterioration and the achievement of a good status for water bodies.[42] In the Weser case, the interpretation of Article 4(1)(a)(i) of the WFD was elucidated. Under the article, Member States are obligated to undertake measures to prevent the deterioration of the status of all bodies of surface water, in the implementation of the programmes of measures outlined in river basin management plans for surface waters.[43] One of the questions in the Weser case was whether the term 'deterioration of the status' in Article 4(1)(a)(i) of WFD should be construed as encompassing solely adverse alterations leading to the reclassification of the body of surface water into a lower class according to Annex V to the directive (the status classes theory).[44] In answering the question, the CJEU's interpretation was that the 'deterioration of the status' of a body of surface water occurs immediately when the condition of at least one quali-

[36] EPA (527/2014), Section 49 (Conditions for granting a permit).
[37] Paloniitty, Tiina et al. (2021), pp. 301–302.
[38] (SAC:2019:166), Finnpulp case, under heading 2.3 The framing of the question and the starting points for permit consideration and 2.4 Legal assessment and outcome; See also, Belinskij, Antti et al., 'KHO:n Finnpulp-päätös (KHO 2019:166) ohjaa sopeutuvampaan lupien muuttamiseen ja yhteisvaikutusten hallintaan'. Edilex 2020, p. 1.
[39] (SAC:2019:166), under heading 2.3 and 2.4.
[40] CJEU (C-461/13), Bund für Umwelt und Naturschutz Deutschland e.V. v. Federal Republic of Germany; the Weser judgment) delivered by the Court of Justice of the European Union on 1 July 2015.
[41] Paloniitty et al. (2021), pp. 302–303.
[42] Ibid., pp. 291–292, 302.
[43] CJEU (C-461/13), n 52.
[44] Ibid.

tative factor specified in Annex V of the WFD worsens by one class. Importantly, this deterioration triggers the criterion even if it does not result in an overall reduction in the class of the entire body of surface water.[45] Therefore, national authorities could not grant a permit for an activity that would cause significant deterioration in the quality of surface water under the WFD: this interpretation was followed by the SAC in the Finnpulp case.[46] In line with the CJEU's interpretation, the SAC ruled that, according to Section 49(2) of the EPA, significant pollution or the risk of it is considered to be a substantial additional load in a water body that results in an overall impact leading to the deterioration of the state or any qualitative factor of the body of surface water.

The Finnpulp ruling marked a significant development, as it delved into intricate aspects of water models in a manner unprecedented in previous Finnish cases.[47] The inadequacy of the predictive capacities within environmental models are particularly apparent in cases where there exists a risk of non-compliance with the quality standards stipulated in the European Union's WFD.[48] Thus, one of the reasons that the SAC denied a permit in the Finnpulp case was lack of evidence on the environmental effects of the installation on the basis of the environmental models used.[49] The hydrodynamic and water quality model evaluating the plant's effects on the lake underwent thorough examination, with its appropriateness for inland lake conditions being challenged due to technical simplifications. Criticism was also directed at the oxygen modeling, which overestimated organic matter decomposition. Consequently, the Court's conclusion rested on the presence of uncertainties in water impact assessment, resulting in the withholding of approval.[50]

The strict interpretation of the WFD, guided by the precautionary principle, led to the dismissal of the permit for Finnpulp Oy, while the assessment of proposed technologies was based on BAT conclusions rather than their innovative potential. The SAC determined that the previously granted and contested permit included conditions established by the regional administrative authority and specified by the administrative court, allowing emission levels based on the BATs.[51] Therefore, the court did not address the potential of the technologies used, which the operator could develop further to obtain the environmental permit, but relied on the fact that BAT conclusions specified all cost-effective purification technologies available that were suitable for wastewater treatment in the bioproduct mill. Thus, even if emission-restricting permit conditions were designed to comply with the requirements of BAT, the permit was not granted because the emissions from the activity into the water bodies caused a risk of 'significant pollution'.[52]

2.1.1 Legislative Hurdles and Environmental Permitting Rigidity: The Impact of Repealing Section 71 of the Environmental Protection Act

Another reason for the lack of a flexible approach on permit granting in the Finnpulp case, by the majority of the SAC's judges, is a legislative amendment that had gone wrong in terms of streamlining the granting of environmental

[45] CJEU (C-461/13), n. 52, 55, 59.
[46] (SAC:2019:166), under heading 2.3.
[47] Paloniitty et al. (2021), p. 295; (SAC:2019:166), under heading 2.2. Evidence obtained in the matter.
[48] Paloniitty et al. (2021), pp. 290–293.
[49] (SAC:2019:166), under heading 2.4.
[50] Ibid.
[51] Ibid.
[52] (SAC:2019:166), under heading 2.3.

permits.[53] Within the context of environmental law in Finland, the trend has been towards streamlining regulations to avoid unnecessary regulatory costs and undue bureaucracy for businesses and citizens.[54] As a result, Section 71 of the EPA, according to which environmental permits could include provisions for the review of permit conditions at specified intervals, was repealed in 2015. In accordance with the now-repealed Section 71, environmental permits could have contained conditions for obligating a comprehensive re-evaluation of the entire operation's prerequisites, specifying the deadline for the operator to submit a review application to the permitting authority.[55] Before the amendment took place, the provision for revising a permit was predominantly applied to environmental permits granted by the state authority.[56]

The review procedure, previously governed by Section 71, has been replaced by Section 89 of the EPA. Under the new provision, the supervisory authority is tasked with monitoring the emergence of grounds for permit modification as part of routine and other supervision. Contrary to the former Section 71, the responsibility for permit review no longer falls upon the operator through permit conditions; instead, initiation is contingent on proposals from designated entities, subject to meeting the conditions stipulated in Section 89. According to Section 89, initiation of a permit review is possible only if proposed by the operator, supervisory authority, relevant public interest supervisory authority, affected party, or the registered association or foundation specified in Section 186 of the EPA.[57] Furthermore, to facilitate permit review, compliance with one of the specified conditions (1–5) in Section 89 is imperative. Among these conditions is the requirement that the permit authority shall amend the permit if "emissions may be substantially reduced without undue cost due to advances in best available techniques", indicating the cost-efficiency requirement for updates of existing permits under BAT conclusions.[58]

In the Finnpulp case, the Supreme Administrative Court referred precisely to the removal of Section 71 from the Environmental Protection Act in 2015. It contended that the current legislation does not adequately facilitate the modification of permit conditions even if these conditions would be subsequently found to be ineffective in preventing environmental contamination.[59] Thus, the amendment made it more difficult for permit authorities and courts to take a flexible approach to permit granting. In addition, the SAC evaluated in the Finnpulp case that Section 54 (Regulation concerning a specific account) of the EPA is restrictive: according to the section, an environmental permit may include a condition mandating that the operator provide a detailed assessment on environmental pollution or the risk thereof resulting from the operation, but only if detailed information on emissions, waste, or the effects of the operation could not be provided for the permit evaluation at the first place. Therefore, the obligation to provide information cannot be invoked if all the information to be investigated must be available to the permitting

[53] The amendment to the Environmental Protection Act (423/2015), which took effect on the 1st of May 2015, and the corresponding amendment to the Mining Act (424/2015), effective from the 1st of July 2015; Government Proposal to Parliament for the Amendment of the Environmental Protection Act (HE 257/2014 vp.), pp. 45–46.

[54] (HE 257/2014 vp.), pp. 13–27; Belinskij, Antti et al., (2020), pp. 2–4.

[55] (HE 257/2014 vp.), p. 45.

[56] Puska, Anne 'Ympäristölupamääräysten tarkistamisesta luopumisen vaikutukset – Viranomaishaastattelujen tulokset' Publications of the Ministry of Environment 2019:10, p. 9.

[57] Ibid.

[58] EPA (527/2014), Section 89(3).

[59] (SAC:2019:166), under heading 2.4.

authority for the consideration of granting the permit or for issuing key permit conditions.[60]

Finally, SAC noted that the provisions of Sections 89, 93, and 80 of the EPA concerning changes to the environmental permit, revocation of the environmental permit, and the impact of BAT conclusions on permit conditions are not sufficient to ensure that continued operation for decades does not result in significant pollution. Therefore, Finnpulp could potentially have obtained an environmental permit if the post-approval modification process within the Finnish EPA had been more flexible than the current approach.[61]

2.1.2 Debating Flexibility: Dissenting Views on the Interpretation

In contrast, the dissenting judges contended that a more flexible interpretation (which might have had a positive impact on the implementation of novel technologies) was also plausible considering the current provisions of the EPA, since permit conditions necessitating investigations and reevaluations were still possible. Notably, the voting statement of environmental expert Harri Koivusalo, supported by legal counselor Mika Seppälä, emphasised that environmental permit-required activities include continuous monitoring of the BATs.[62] The dissenting judgement would have amended the administrative court's decision by adding three permit conditions and amending one of them due to complaints, but otherwise would have largely dismissed the complaints.[63]

In the dissenting judge's perspective, firstly, it was argued that the Regional State Administrative Agency had, in its decision to grant the environmental permit, established emission limits adequately in accordance with the requirements of BAT conclusions. However, in the original permit decision, the emission limits had been specified as daily and monthly averages, whereas the European Commission had approved, through its implementing decision (2014/687/EU)[64], the BAT conclusions to produce pulp, paper, and board under IED, stating that emission limit values for pulp mills should be set as specific emission limit values in yearly average (kg/ADt).[65] That is why the dissenting judge, Koivusalo, would have adjusted the emission limit values to align with the implementing decision by adding permit condition 2a.[66]

Notably, the dissenting judgement highlighted that after the commencement of operations, it was still possible to further improve the environmental protection solutions and efficiency of the bioproduct mill, considering the process's unique characteristics and chosen technical solutions, which were not directly related to the conclusions on the BATs. Therefore, Koivusalo would have instilled greater confidence in the technologies employed by Finnpulp Oy and in the operator's capacity to mitigate the environmental pollution risk stemming from wastewater emissions through advancement in technologies. The development in emissions would have been monitored by technical-economic reports:

[60] Ibid.

[61] Ibid.

[62] (SAC:2019:166), Voting statement, under heading 2.5. Permit conditions.

[63] Ibid. *In Koivusalo's opinion, the permit conditions shall be amended by including provisions 2 a, 49 a, and 49 b. In addition, permit provision 51 shall be amended*.

[64] Commission Implementing Decision of 26 September 2014 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for the production of pulp, paper and board (notified under document C(2014) 6750), OJ L 284, 30.9.2014, p. 95, Table 1 (BAT-associated emission levels for the direct waste water discharge to receiving waters from a bleached kraft pulp mill).

[65] (SAC:2019:166), Voting statement, under heading 2.5.

[66] Ibid.

Koivusalo would have added a permit condition requiring the permit holder to present a technical and economic report addressing the reduction of cooling water thermal load, enhancing water efficiency, and recycling, by January 1, 2024, with a follow-up in 2029, in addition to the technical and economic report on measures to reduce emissions specified in permit condition 2 by 30 percent, in which the calculations would have been based on the actual emissions from the operation. Such an interpretation would encourage the operator to adopt better technological solutions, but only within the bounds of cost-effectiveness.

Koivusalo's interpretation of WFD stipulated that the ecological quality objective for water bodies is to achieve at least a 'good' status. If the status of water bodies does not meet this objective, it is necessary, among other measures, to periodically review permits that affect the status of those waters. Koivusalo concluded that the provisions of the Finnish EPA were partly deficient in implementing the obligations of the WFD, because of the specific requirements for permit modifications set forth in Section 89.[67] Still, within the dissenting judgement, he argued, that Section 54 of the EPA – which is primarily intended for obtaining detailed additional information and should not be broadly used to review key provisions of the permit – could be interpreted such that, if necessary, it allows for significant restrictions on wastewater emissions to ensure that the goals of the WFD are met.[68] In this context, Koivusalo referred to the potential variation in the share of background and internal loading by the Finnpulp bioproduct mill affecting the ecological status of Kallavesi, which might deviate from the expected level at the time of permit issuance. Thus, Koivusalo recognized the scientific uncertainties associated with the case, aligning with the final decision, but he adopted a flexible interpretation of Section 54 of the EPA, diverging from the stance taken by the majority of the judges. Consequently, Koivusalo's interpretation of the case would rely on scientific evidence considering the development of technological solutions together with detailed permit conditions, allowing more flexibility and continuous learning in managing environmental risks.

Further, Koivusalo expressed concerns about the majority's perspective on the unreliability of environmental models and their suitability for predicting impacts on the water system, in accordance with the interpretation of the 'non-deterioration' established in the Weser case.[69] Koivusalo emphasised that while the models and impact assessments had limitations and uncertainties, a comparative analysis had been used to assess the impacts of the Finnpulp Oy's bioproduct mill's emissions against the existing state of the lake. Koivusalo further noted that the Finnish Environment Institute, acting as an expert authority, had issued an opinion to the Regional State Administrative Agency regarding the impacts of wastewater discharges from a bioproduct mill.[70] According to this opinion,

[67] Ibid.
[68] Ibid.

[69] Ibid. *Koivusalo further mentioned that the emission limit values set in the permit should be based on the best available techniques (BAT) as defined in the EU directive. He discussed the need to ensure that emission limits aligned with BAT and that the standards set in the permit did not exceed those established by the relevant directives.*

[70] Aluehallintovirasto Itä-Suomi 'Kuopion biotuotetehtaan ympäristölupa ja toiminnanaloittamislupa sekä vesitalouslupa ja valmistelulupa' Päätös nr. 14/2017/1, Dnr. ISAVI/1171/2016, p. 101 (284). *The impacts of wastewater were assessed using four well-established and purpose-appropriate models. Two of these models are tools for calculating the dispersion of the effluent plume and are utilised for the calculation of initial dilution in the immediate vicinity of the discharge point. Additionally, calculations of wastewater transport on the scale of the entire Kallavesi water system were conducted using two different models. The effects of the load*

the modeling presented in the application has been carried out using well-established and suitable modeling tools. Koivusalo's assessment of the models, water quality data, and potential impacts led him to the conclusion that the activities related to the Finnpulp bioproduct mill would not have caused 'significant pollution' as referred to in section 49 (2) of the EPA, or other adverse environmental effects prohibited by the EPA or the EU WFD.[71]

2.2 The Burdensome Burden of Proof of Environmental Impacts in Petrol Station cases

A series of the SAC's cases (between 2002 and 2021[72]) referred to here as the 'petrol station' cases, involved old petrol stations located in important groundwater areas.[73] What these cases had in common was that the court's evaluation focused on the adequacy of technical protective measures in relation to the prohibition of groundwater pollution as stipulated in Section 17 of the Finnish EPA.[74] The SAC has emphasised the importance of preventing fuel from entering the soil and groundwater from petrol stations located in a groundwater area, which is in some cases crucial for municipal water supply.

In 2002, the SAC noted that the aim is to prevent groundwater contamination by using the best available technology and most environmentally sound protective measures[75], and reinstated the permit conditions set out by the environmental board in the original permit, which the administrative court had revoked in its previous decision.[76] According to the conditions, in addition to the distribution area of the groundwater, a tight plastic film must be installed under the fuel tanks in a way that allows the resulting basin to be emptied (permit condition 5) and there must be a direct alarm connection from the fuel tank level monitoring system to a continuously manned control room (permit condition 6).[77] However, in 2010 the SAC no longer considered the BAT compliance of the technologies to be sufficient, if the risk and uncertainties of groundwater pollution, prohibited under section 17 of the EPA, were present. Consequently, nowadays adherence to the BAT conclusions does not

on the water system were computed for two three-year periods, one representing the average or 'normal' water situation (2007–2009) and the other depicting a dry water situation (2009–2011).

[71] (SAC:2019:166), Voting statement, under heading 2.4. Conditions for granting the permit.

[72] (SAC:2002:36); (SAC 11.02.2003/294); (SAC:2010:28); (SAC:2011:37); (SAC:2015:45); (SAC: 2020:13); (SAC:2021:34).

[73] *The delineation of groundwater areas involves defining boundaries and recharge areas. Exceptionally, a groundwater area can also be point-shaped. These areas are classified into categories for water abstraction purposes: as important for water supply (Class 1), suitable for other water abstraction (Class 2), and those groundwater areas where a surface water or land ecosystem, protected under nature conservation or other legislation, is directly dependent on the groundwater (Class E). If a Class 1 or 2 area is additionally associated with a surface water or land ecosystem directly dependent on the groundwater, an additional E designation is used (1E or 2E).* Britschgi, Ritva et al. 'Pohjavesialueet – opas määrittämiseen, luokitukseen ja suojelusuunnitelmien laadintaan' Ympäristöhallinnon ohjeita 3/2018, p. 127.

[74] Section 17 of the EPA: "*Substances or micro-organisms shall not be deposited at, or discharged to, or energy conducted to a site, or these shall not be handled in such a way, that: 1) in groundwater areas important to water supply or otherwise suitable for such use, a change in groundwater quality may cause hazard or harm to health or the environment or groundwater quality may otherwise materially deteriorate; 2) a change in the quality of groundwater on the property of another may cause hazard or harm to health or the environment, or the groundwater is rendered unfit for its intended use; or 3) the action may otherwise cause an infringement of the public or private interest by affecting the quality of groundwater (prohibition against groundwater pollution). Further provisions may be issued by government decree on substances hazardous to health and the environment referred to in subsection 1, where the direct or indirect release into groundwater is prohibited.*"

[75] (SAC:2002:36), under heading The judgment of the Supreme Administrative Court, the reasoning.

[76] (SAC:2002:36), under heading The judgement of the Administrative Court and The judgment of the Supreme Administrative Court.

[77] (SAC:2002:36), preamble.

justify deviating from the absolute prohibition against groundwater pollution when conducting activities.[78] According to the SAC, the prohibition of groundwater contamination includes a prohibition on causing danger, and the activity does not have to cause concrete pollution to be in violation of the prohibition on groundwater contamination.[79] Thus, locating a fuel distribution station in a significant groundwater area is not possible without exceptional reasons under which the risk of groundwater contamination is sufficiently ruled out.[80]

Therefore, since 2010, the SAC has emphasized the importance of preventing any hydraulic connection between the station and groundwater. Since then, the permit applicants have supplemented their applications with more comprehensive investigations on the technologies used, but permits were still denied because the chosen locations were environmentally unsuitable.[81] For example, in 2011, an operating petrol station was located in a significant groundwater area without a prior environmental permit.[82] The case involved a new environmental permit assessment, treating the case as if it were the placement of a new petrol station in the area.[83] The SAC acknowledged that a sufficiently thick and impermeable clay layer above the groundwater level could support permit issuance. However, the pressure of the groundwater at approximately 2.5 meters below the surface increased the risk of contamination. Additionally, the thickness of the clay layer near the tank area was below two meters.[84] Given the soil and groundwater conditions, the permit application did not provide sufficiently effective protection techniques to prevent groundwater contamination in terms of the significance of the groundwater occurrence and the associated risk.[85]

In the petrol station cases, the SAC has emphasised the need to consider factors such as the risk of accidents and the sensitivity of the area affected by the operation to environmental pollution, following the requirements of the precautionary and due care principles.[86] In addition, from 2015 onwards, the risks posed by petrol stations located in groundwater areas began to be assessed in the light of legislative changes, specifically the environmental protection requirements for liquid fuel distribution stations, which came into force on June 1, 2010, through the Government Decree on Environmental Protection Requirements for Liquid Fuel Distribution Stations (decree 444/2010), as well as the updated standard SFS 3352 for the distribution of flammable liquids, which was confirmed on February 17, 2014.[87] Under Section 135 of the Act on the Safety of Handling Dangerous Chemicals and Explosives (3.6.2005/390), the Safety and Chemicals Agency (Tukes) publishes a list of standards (including SFS 3352) that, when followed, are considered to fulfil the requirements of sections issued under that law.

In the case of 2015, the distribution station

[78] (SAC:2010:28), under heading Legal Assessment. Cf., (SAC:2011:37), (SAC:2015:45), (SAC: 2020:13), (SAC:2021:34).
[79] Ibid.
[80] Ibid.
[81] (SAC:2010:28), (SAC:2011:37), (SAC:2015:45), (SAC: 2020:13).
[82] (SAC:2011:37), preamble.
[83] Ibid.
[84] (SAC:2011:37), under heading 2. Investigation Concerning the Fuel Distribution Station and Groundwater Area and 3.2. Granting Conditions for Environmental Permit.
[85] Ibid., under heading 3. Legal Assessment and 3.1. Applicant's Obligation to Provide Information.
[86] (SAC:2010:28), under heading 1.2. Conditions for Granting Environmental Permit; (SAC:2011:37), under heading 1. Applicable Legal Provisions and Legislative Proposals; (SAC:2020:13), under heading Applicable Legal Provisions; (SAC:2021:34), under heading Applicable Legal Provisions.
[87] (SAC:2015:45), preamble.

was situated on a significant Class I groundwater area, on the edge of the actual groundwater formation area, and approximately 650 meters from the groundwater extraction point.[88] In its resolution, the SAC noted that according to Section 5(2) of the decree (444/2010), devices and structural components intended for the handling and storage of liquid fuels must comply with the requirements of standard SFS 3352 for distribution stations and their equipment or other equivalent requirements. However, the decree (444/2010) does not aim to ease the conditions for granting a permit under the EPA, noting that, according to Section 4 of the decree, the distribution station must be located in accordance with the requirements set out in the EPA.[89] Notably, given current knowledge in the field of geotechnics, the SAC's evaluation was that compliance with the requirements of standard SFS 3352 or equivalent standards for protective solutions do not automatically eliminate the risk of groundwater contamination in a groundwater area, and adherence to the technology outlined in the standard does not guarantee that a distribution station can be located in a groundwater area under the EPA.[90] In the case, the risk of groundwater contamination was increased by the distribution station's location on the edge of the groundwater formation area and the soil's highly water-conductive quality. The exceptional situations, where fuel spills might travel outside the protected distribution station area, and the resulting risk of groundwater contamination, had not been adequately assessed with regard to the conditions of the location of the operation and its surroundings.[91] On these grounds, the SAC rejected the operator's complaint and did not grant an environmental permit for the petrol station.

Consequently, according to the SAC, when evaluating the risk of groundwater contamination caused by a petrol station situated in a groundwater area, attention must be paid to the adequacy of the technical protective measures of the petrol station and the corresponding risk assessment in light of all applicable environmental protection norms, indicating the location choice of the petrol station, besides the hydrogeological and other conditions of the groundwater area. The higher the risk for the groundwater area[92], the more advanced the monitoring and security technologies should be to be able to manage the risk.[93] Crucially, the SAC has consistently upheld that a violation of the restriction on groundwater pollution (EPA 17 §) can occur even if there is only an indirect risk to groundwater, rendering the technical efficacy irrelevant if the groundwater pollution prohibition is potentially breached.

The petrol station cases demonstrate the gradual development of decision-making over adequate monitoring technology and security measures concerning the risk of ground water pollution under the EPA. Despite repeated improvement in risk analysis and technical solutions, the lack of location-specific data concerning risks to the most vulnerable groundwater areas has led to permit refusal in all petrol station cases between the years 2003–2020. One of the major reasons for permit denial was the locations chosen, which were environmentally unsuitable under EPA, Section 11 (Site selection). According to Section 11, the environmental permit assessment shall consider the nature of the operation and the likelihood of pollution.

[88] Ibid.
[89] (SAC:2015:45), under heading Legal Assessment.
[90] Ibid.
[91] Ibid.
[92] See, Government Decree on Water Resources Management (the section is added 10.11.2016/929), 8 c § (Classification of the groundwater area to class E).
[93] See, (SAC 2021:34), 4.4 Conditions for Granting Environmental Permit.

The placement of petrol stations in groundwater areas requires, from this starting point, a case-specific legal evaluation.[94]

However, in 2021, the SAC changed the judgement of the first instance and granted a permit for a petrol station in an E1 groundwater area[95], noting that the current legislation had not been deemed to establish an absolute impediment to the placement of petrol stations in groundwater areas, but only an absolute prohibition against groundwater pollution.[96] The court considered the risk of groundwater contamination by assessing the station's location, groundwater flow direction, and soil conditions, which the operator had investigated thoroughly. The SAC explicitly assessed whether the technologies used were sufficient for granting a permit for a petrol station in an E1 ground water area. More specifically, the matter at hand revolved around whether the permit applicant had presented sufficient evidence to deem the risk of groundwater contamination so low that the conditions for granting an environmental permit for the distribution station had been met, considering the specified permit requirements.[97]

In 2021, the permit application by Neste Oy included a comprehensive, site-specific risk assessment which concluded that the local geological conditions (including the soil layer and groundwater depth) offered a significant buffer against groundwater pollution. Therefore, the assessment by the SAC concerning the proposed techniques was carried out, but only because the operator had demonstrated that the natural conditions of the station's location were in line with the requirements stipulated in the EPA's Section 11.[98] While acknowledging the potential risks, the court concluded that the proposed protective measures, including advanced technological solutions and monitoring reduced the risk to a very low level.[99] However, the SAC recognised that the soil had been previously contaminated with oil hydrocarbons, but the depth of the groundwater, about 22 meters below the surface, reduced the immediate risk of contamination. Since Neste Oy had provided comprehensive technical and structural measures for the protection of groundwater, which partly exceeded the levels of protection required by the distribution station standard SFS 3352, the SAC altered the decision of the Vaasa Administrative Court.[100] The SAC granted the permit and considered that, overall, the evidence supporting the environmental permit decision has been deemed sufficient.

All in all, the SAC's decisions have amplified the primacy of the absolute ban on groundwater pollution of important groundwater areas in uncertain circumstances, precisely the requirement set out in EPA 11 § and 17 §. In 2021, environmental permit was granted only after the location was found to be correct under EPA 11 § and the operator was able to provide a comprehensive on-site analysis on environmental

[94] (SAC:2011:37); under heading 3.2 Conditions for Granting Environmental Permit.

[95] About 1E classification, see footnote (142).

[96] (SAC:2021:34), under heading 4. Legal Assessment, 4.1 Assessment Foundations; See also (SAC 2010:28), (SAC:2011:37), and (SAC:2015:45) on placement of the installation.

[97] (SAC:2021:34), under heading 4.1; cf. (SAC:2010:28), (SAC:2011:37) and (SAC:2015:45).

[98] (SAC:2021:34), *The site of the petrol station, while being in a 1E-class groundwater area, is on the edge of the area. The groundwater flows from the station's site to the edge of the classified groundwater area, rather than to the core of the groundwater area. Moreover, the closest water intake plant is 3.4 km to the northwest and does not have a hydrological connection to the station*.

[99] SAC:2021:34, under heading 4.1, 4.2. Assessment of the Location and Hydrogeological Conditions of the Distribution Station Site and Area, 4.3. Assessment of the Technical Protective Measures and Accident Risk of the Distribution Station.

[100] SAC:2021:34, under heading 4.4 Conditions for Granting Environmental Permit.

conditions of the area and groundwater protection solutions, besides technological solutions to avoid accidents and to minimise the risk of unlawful pollution. However, in the 2021 case, the dissenting judge argued that based on the presented evidence, the risk of contamination of the groundwater formation area cannot be sufficiently minimized with the proposed measures under the existing hydrogeological conditions.[101] Hence, she would have invoked the precautionary principle, as in her opinion, the evidence presented did not provide assurance that the petrol station would not present a risk of groundwater contamination, as prohibited by Section 17 of the EPA.[102] Consequently, the dissenting judge would have continued the strict interpretation practise of the SAC regarding the inadequacy of technical solutions, despite the better location of the petrol station.

2.3 BAT Compliance and Future Prospects: Insights from the BASF Battery materials Finland Oy Case

In the BASF Oy case, the SAC of Finland assessed a complaint from BASF Battery Materials Finland Oy regarding an environmental permit for an electric vehicle battery material factory.[103] The court dismissed the company's request for an inspection and rejected the complaint. The case demonstrates the challenges of meeting the requirements of BAT conclusions regarding the best available techniques and the emission limits they entail, especially when the entire industrial sector is novel. The SAC, in its assessment of Battery Oy's permit application, analysed the installation's location regarding its impact on the groundwater area as it did in the Petrol Station cases. The geographical orientation of the project traversed the groundwater formation area, the transition zone, and the exterior of the groundwater area, necessitating a comprehensive evaluation of the hydrogeological implications. Legal frameworks such as the EPA (17 § and 49 §), Water Management and Marine Strategy Act[104], and Environmental Administration Guidelines[105] stipulate the boundary delineations and protective measures for groundwater areas, which are typically characterised by high permeability soil layers and bordered by robust geological structures. These delineations, which are not subject to arbitrary redefinition, were instrumental in forming the Court's assessment. The Court considered the extensive soil-drilling data, highlighting the presence of variable soil layers across the project site, notably permeable sandy silt layers which pose a risk of water infiltration into the groundwater.[106]

Besides groundwater pollution, SAC considered environmental risks due to the proposed sulfate-rich wastewater discharge into the Kokemäenjoki River. Despite BASF Oy's claims of low risks, the court, prioritising the precautionary principle, found the evidence insufficient.[107]

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[101] SAC:2021:34, Voting judgement.

[102] Ibid.

[103] (SAC:2022:T19), Environmental Permit Case for the Battery Material Factory.

[104] *According to section 10c of the Act on the Organization of Water Management and Marine Administration, the Centre for Economic Development, Transport and the Environment (ELY) must amend the delimitation or classification of groundwater areas if essential information requires it. Thus, the boundaries of groundwater areas cannot be assessed on a case-by-case basis contrary to the definition by the ELY Centre.*

[105] 'Groundwater Areas – Guide to Determination, Classification and Planning of Protection' Environmental Administration Guidelines 3/2018.

[106] Ibid. *According to the guidelines, the boundary of the groundwater formation area indicates a highly permeable part of the groundwater area where the permeability of the soil is at least equal to that of fine sand. The outer boundary or the groundwater area is determined on hydrogeological grounds at a point where the groundwater area either borders on rock or where there are sufficiently tight soil layers that protect the groundwater on top of groundwater-conducting soil layers. Such layers include, for example, clay or silt layers that are over three meters thick.*

[107] (SAC:2022:T19), under heading Legal Assessment.

SAC suggests that due to the significant uncertainties regarding the effects of discharging sulfate-containing wastewater into the receiving water, there were insufficient grounds to grant a permit for such discharge under the conditions specified in the environmental permit decision of the regional state administrative agency. Thus, the potential negative effects of sulfate on the river's ecosystem, including the freshwater pearl mussel, were deemed to carry significant uncertainties. Moreover, the proposed wastewater treatment methods were judged to lack effectiveness or efficiency.[108]

The interesting part of the case is that in assessing the compliance of the proposed technology by BASF Battery Materials Finland Oy's in light of the BAT conclusions, the SAC noted that there was no explicit description of battery material production within any of the conclusions or BAT reference documents under the IED (2010/75/EU). Nevertheless, the SAC found that the proposed technologies could fall under BAT conclusions for wastewater and waste gas treatment in the chemical industry, non-ferrous metal production, and inorganic chemical manufacturing. These conclusions include methods for treating sulfate-containing wastewater, though these are typically less effective at the higher concentrations caused by the battery material factory.[109]

In an attempt to demonstrate the BAT compliance of the technologies selected, BASF Oy commissioned a report (Niras A/S report) on the non-ferrous metal (NFM) conclusions, assessing technologies for removing sulfates from wastewater.[110] According to the report, only reverse osmosis had been reported to affect sulfates, but there was no information on the effectiveness of the method in treating wastewater generated by the company's operations within Battery Factory. Within the planned processes, the technology would have consumed a lot of energy and led to the risk of highly concentrated wastewater that required further treatment.[111] Any proposed BAT technology was not found to be cost-efficient. Thus, the Nitra A/S report stated that there was no information on the effectiveness of the techniques (in the relevant BAT reference document) which could be applied to battery material production, and that the techniques mentioned also had environmental impacts as harmful as those of the technique that they were planning to use.[112]

The SAC acknowledged that even though there were no effective sulphate wastewater treatment methods in the BAT conclusions for battery material production, a review of the BAT requirements for inorganic chemical manufacturing is likely as the battery materials sector grows, and it may eventually encompass these activities.[113] In this regard, the case illustrates the extensive expertise required from the permit applicant if there are no BAT conclusions ap-

[108] (SAC:2022:T19) under heading 2.2.4 Best Available Technique.

[109] Ibid.

[110] Ibid. *According to the expert opinion provided by the Finnish Environment Institute, the production of battery materials has not been unequivocally described in any BAT reference document issued under the Industrial Emissions Directive (2010/75/EU) or in the related BAT conclusions confirmed by the Commission. However, BASF Oy's operations can be subject to the BAT conclusions for Chemical Waste and Waste Gas Treatment (CWW) from the chemical industry, as applicable, and also, as indicative references, to BAT conclusions for Non-Ferrous Metals Production (NFM) and BAT reference documents for Large Volume Inorganic Chemicals – Sulfuric Acid and Sulfuric Acid Anhydride (LVIC-S and SIC BAT). Information on sulfate-containing wastewater treatment techniques, such as chemical precipitation, clarification, filtration, ultrafiltration, activated carbon filtration, flotation, reverse osmosis, ion exchange, and biological treatment methods, is available from the CWW and NFM reference documents.*

[111] Ibid.

[112] Ibid.

[113] Ibid., under heading Reference documents and BAT conclusions related to the operation.

plicable to the novel industrial sector. The case further highlights the difficulty of implementing BAT technologies from other industrial sectors in different kinds of industrial processes, in this case as part of a battery material factory. Overall, the case underlines the challenging nature of assessing the BATs in practice, particularly when essential information is lacking, and scientific uncertainty regarding environmental impacts prevails.

2.4 Biosampo Technology: BAT Analysis in Intensive Livestock Farming

The Biosampo case, which was about the extension of a pig farm and the related odour nuisance, further underlines the complexities involved in evaluating technologies assessed under BAT conclusions together with other environmental quality norms.[114] The permitting authority had deemed that the handling of slurry using the Biosampo equipment represents the best available technology concerning farm-specific manure processing, but the Vaasa Administrative Court concluded that the Biosampo equipment, while not yet widely adopted, lacked information on the frequency of potential malfunctions.[115] In addition, there was insufficient evidence concerning the impact of slurry pit cooling on odor and its effectiveness under different conditions.[116]

Therefore, in this case, the Biosampo technology could not be used as a basis for permit granting since the risk of illegal odour nuisance could not be adequately assessed in the light of current data.[117] Although Biosampo could not be considered a novel technology in the sense that it would not have been found in any of the BAT documents[118], the Vaasa Administrative Court, had to assess whether the reduction of odour nuisances enabled by Biosampo technology could lead to the conditions for granting a permit by assessing whether the BioSampo technology could also be BAT in this particular case in terms of manure storage, besides reducing odour emissions in the manure application area.

In its evaluation of odour nuisance, the Vaasa Administrative Court considered the nature and scope of the operation, local conditions, the number of residential areas nearby, and the short distances to the nearest sensitive targets.[119] In these regards, the proposed location did not meet the requirements for site selection specified in Section 11 of the EPA.[120] The court anticipated that the proposed operation, as extended according to the application, would result in a significant reduction of general well-being due to odour and an unreasonable burden on the nearby residents as defined in Section 49 of the Finnish EPA.[121]

As a final instance, the SAC held that there was insufficient evidence to support Biosampo's efficacy, and thus the SAC did not find grounds to amend the decision of the Vaasa Administrative Court, which had declined the permit.[122] Compared to the decision of the Vaasa Administrative Court, the SAC further highlighted the need to assess the joint impact of separate ac-

[114] Vaasa Administrative Court 25.6.2019 n. 19/0311/3 and (SAC 13.8.2020/3394), Application for leave to appeal and appeal in an environmental permit case (livestock shelter, Seinäjoki).
[115] Vaasa Administrative Court 25.6.2019 n. 19/0311/3, under heading Legal Assessment and Conclusions.
[116] Ibid.
[117] Ibid., under heading Information Obtained in the Case.
[118] *Biosampo technology can be found from*: Giner Santonja, Germán et al., 'Best Available Techniques (BAT) Reference Document for the Intensive Rearing of Poultry or Pigs' Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control), 2017.
[119] Vaasa Administrative Court 25.6.2019 n. 19/0311/3, under heading Legal Assessment and Conclusions.
[120] Ibid.
[121] Ibid.
[122] (SAC 13.8.2020/3394), Conditions for Granting the Environmental Permit.

tivities – namely other animal shelters – in the area which together constituted an unreasonable odour nuisance. Concerning the technical solutions, the court assessed that the technical solutions presented in the permit application could not be considered sufficient grounds for granting the permit, considering the challenging location of the expansion. The anticipated adverse effects of the planned operation could not be adequately prevented by the measures outlined in the application or the permit conditions.[123]

Consequently, the Biosampo technology was found unsuitable for solving the entire problem of odour nuisance caused by the expansion of the pig farm. Apart from the period when the sludge tanks were mixed, the pig farm would have caused as much odour nuisance as other animal shelters, since emptying the sludge shafts, in relation to manure storage, is the most odour-producing single operation that is repeated throughout the year. As in the Petrol Station cases, the location was a key factor in this case, as the planned pig farm did not meet the requirements for the choice of location provided in EPA 11 §. The Biosampo case is yet another example of how environmental impacts are the main focus of the administrative courts, while the technological means are evaluated individually in the light of BAT conclusions, but not in the light of their innovation potential.

3. The Need for Technology Testing Across Forums

3.1 Limited Discretion of the Supreme Administrative Court

Even though sustainable development is cited in Section 1 of the Finnish Environmental Protection Act, concerning the purpose of the Act, the court's discretion is limited to the fulfillment of the legal conditions for granting a permit, focusing on whether significant pollution, interpreted together with more specific environmental quality norms and environmental principles, is imminent. In other words, broader considerations like the overall sustainability effects of the operation or other values are excluded, and the prevention of significant pollution at the local level is a major determinant for how the issue of estimated environmental impacts and their uncertainty are interpreted in the courts.[124] Therefore, it is currently apparent that the discretionary powers conferred upon judges involve the examination of technological aspects in alignment with BAT conclusions, rather than including the assessment of emissions across the entire production chain. Thus, the evaluation of these technologies against their environmental impacts from the broader perspective of sustainable development is excluded. For this reason, we may well ask whether more flexible interpretation by the SAC could enhance the adaptation of technologies that are strategically important for the green transition.[125]

Nevertheless, the SAC's current interpretation aligns with the Finnish environmental quality norms, the current interpretation of the precautionary principle, and article 18 of the IED, suggesting that other adverse environmental or human health effects can be considered, and risk and uncertainties evaluated even though the technological choices of the installation would be in line with BAT conclusions.[126] Further, the cases that end up in the SAC are exceptionally complicated and require preliminary rulings that guide future legal interpretation in other authorities. A more flexible interpretation by the

[123] Ibid., under heading Legal Assessment.

[124] Paloniitty, Tiina et al., pp. 223–224.

[125] COM(2023) 62 final, p. 3.

[126] Commission Staff Working Document SWD(2020) 181 final 'Evaluation of the Industrial Emissions Directive (IED) Directive 2010/75/EU of the European Parliament and of the Council' Brussels (2020), p. 34.

SAC would provide guidance for the permit authorities and the administrative court of Vaasa, indicating that, in uncertain situations, even stringent environmental protection standards (such as the absolute ban on groundwater pollution) could be interpreted more flexibly to accommodate technological development.

Furthermore, it is noteworthy that expert judges may be constrained in exercising their expertise in circumstances characterised by substantial uncertainty due to the lack of comprehensive data for a thorough evaluation of local risks to the environment and human health. Therefore, it is justifiable, under the precautionary and due care principles, along with other environmental norms, not to grant a permit under inherently uncertain situations where the operator has not been able to provide all the data needed to assess the environmental risks and uncertainties therein effectively. It can be argued that the prevailing construal of the stance adopted by the SAC of Finland serves to genuinely endorse responsible novel technologies in relation to pollution at the local level. In this regard, it is imperative to recognise that pollution-prone industrial sites inherently entail risks and are frequently situated in proximity to valuable environmental resources, e.g., ground water areas, which are subject to legitimate protection under environmental regulations.

For these reasons, when scientific uncertainties are taken seriously, none of the installations represented in the cases should have received an environmental permit under current environmental legislation. However, examining the situation more broadly, the court's interpretation may appear to conflict with European industrial policy goals that aim for green and digital industrial transformation by enhancing innovation,[127] as the court cannot consider the "cradle to grave" life cycle impacts (encompassing raw material extraction, production, distribution, use, and end-of-life disposal or recycling) of industrial production and the innovation effects therein.[128] For instance, in the cases under scrutiny, the expansion of a pig farm, characterized by methane and ammonia emissions, and the life cycle emissions of a petrol station, as opposed to a battery material factory aimed at promoting electrification, may assume entirely different positions in a sustainability assessment that thoroughly integrates life cycle sustainability considerations.

3.2 Proposed Amendments to the Industrial Emissions Directive: Strategies for Minimizing Uncertainty associated with the use of Novel Technologies

Instead of promoting new technologies through the courts' flexible use of their power of interpretation, the uncertainty inherent to novel technologies could be minimised within (administrative) processes other than court procedures. In these procedures, the discretion can go beyond local environmental impacts. Unlike expert judges, the experts within the experimental procedures could conduct sustainability assessments beyond the assessment of local environmental impacts and incentivise the development of technologies to the technology readiness level (TRL)[129] which enables novel technologies to be incorporated into BAT conclusions, providing greater legal certainty in situations in which in-

[127] About EU's industrial policy plans, see footnote (1).

[128] See, Wulf, Christina et al., 'Review of Sustainability Assessment Approaches Based on Life Cycles' Sustainability 11(20), 5717, (2019), p. 1.

[129] *A novel technology can only become a candidate for BATs when it has gone through the path from research to deployment on the basis of the technology readiness level range, demanding a lot of testing. Before reaching high technology readiness, the legal status of the technologies remains highly uncertain*. See, Proposal for a Directive of the European Parliament and the Counsil (EC) 'amending Directive 2010/75/EU of the COM(2022) 156 final, 2022/0104 (COD), preamble (24).

dustrial projects would like to utilise those technologies.

In this regard, the Commission's proposal to amend the IED aims to implement tools for evaluating novel technologies. The proposal addressed the promotion of the testing and deployment of emerging techniques to improve their environmental performance by facilitating cooperation with researchers and industries in publicly funded research projects and establishing the Innovation Centre for Industrial Transformation and Emissions (INCITE).[130] INCITE would gather and analyse information on new approaches, particularly on emerging techniques relevant to IED activities, and characterise the TRL and environmental performance of the innovative technologies and techniques.[131] Additionally, the amendment of the Directive aims to encourage the adoption of innovative technologies and techniques by promptly revising BREFs when evidence indicates the availability of more effective innovative techniques.[132]

More generally, the amendment aims to accelerate the adoption of zero-pollution ambitions for a toxin-free environment, and support climate, energy, and circular economy policies, in line with the European Commission's zero pollution ambitions and industrial strategies.[133] Besides other objectives, these goals are meant to be met through expansion of the scope of the IED and enhanced permit effectiveness. The permit effectiveness is meant to be achieved by, e.g., ruling competent permit authorities to set emission limit values at the lowest end of the relevant BAT-AEL range, unless the operator can demonstrate that applying BAT as outlined in BAT conclusions only allows for meeting less strict limit values. In addition, according to the proposal, derogations should not be granted if they pose a risk to compliance with (other) environmental quality standards.[134] In this context, the proposal also underlines that Section 18 of the IED should be construed and implemented by the Member State laws such that the term 'environmental quality standards' encompasses the requirements specified in Union law, including EU legislation on air or water, which may require the permit to include specific additional measures besides BAT-based emission level values.[135]

Furthermore, there are several potentially highly polluting activities that do not currently fall within the scope of IED, including intensive farming (cattle farms, mixed livestock farms, and aquaculture), mining/quarrying industries,[136] upstream oil and gas industries (extraction),[137] and large-scale battery production (including industrial manufacturing of automotive, electric vehicle, and portable batteries).[138] The incorporation of the large-scale installations for the production of batteries into IED is primarily due to anticipation of a substantial increase in the amount of large-scale battery manufacturing for electric vehicles within the Union up to 2040, thereby augmenting the Union's share of global

[130] COM(2022) 156 final/3, 2022/0104 (COD) pp. 13, 15, 16, 30, 43, 55, 57, 59, 64. See INCITE ibid., pp. 56, 60, 67 and New Chapter II on 'promoting innovation', Article 27(a).
[131] Ibid., p. 28.
[132] Ibid., p. 4.
[133] SWD(2022) 111 final PART 2/5, Strasbourg, 5.4.2022, pp. 71–72.
[134] COM(2022) 156 final/3, 2022/0104 (COD), p. 18.
[135] Ibid., p. 19.
[136] *These are currently regulated by Directive 2006/21/EC on the management of waste from the extractive industries and within the scope of the E-PRTR Regulation (European Commission) No 166/2006 (activity 3a).*
[137] *These are currently subject to BAT Guidance Document on upstream hydrocarbon exploration and production which is voluntary to follow.*
[138] Scarbrough, Tim et al., 'Assessment of options for the revision of the Industrial Emissions Directive – Final Report', European Commission publication, Ref: ED 13995, Issue number 1.8, December 2021, pp. 27–28.

battery production.[139] The inclusion is expected to improve the overall sustainability of batteries and minimise their environmental impact throughout their life cycle.[140] Therefore, besides large-scale battery production, the amendments to Annex I entail the inclusion of the extraction of industrial and metallic minerals, necessary for the manufacturing of certain novel technologies, within the scope of the IED.[141]

3.3 Navigating Trade-Offs: The European Commission's Proposal for the Net-Zero Industry Act and Critical Raw Material Act

In contrast to the stricter environmental requirements stipulated by the IED amendment, the European Commission has also proposed regulation amendments which indicate trade-offs between local environmental protection and climate change adaptation through technological progress. Therefore, the rapid growth in demand for batteries has created tension between local environmental protection norms (environmental quality norms) and the need for new industrial installations that promote the electrification of societies and the transition away from a fossil-based economy. In response, the Commission has proposed a Net-Zero Industry Act[142] aimed at establishing a simplified regulatory framework for the production capacity of crucial climate-neutral technologies like batteries, wind turbines, heat pumps, solar panels, electrolysers, and carbon capture and storage technologies.[143] The aim of the proposed Net-Zero Industry Act is to ensure that the production capacity of the strategic net-zero technologies listed in the Annex will have reached or almost reached the reference value by 2030. This reference value shows that the production of technologies in the EU should be at least 40 percent of the annual deployment needs of the corresponding technologies needed to achieve the Union's climate and energy goals for the year 2030.[144]

In line with its Net-Zero Industry Act ambitions, the Commission has proposed an Act to ensure the EU's access to a secure and sustainable supply of critical raw materials (Critical Raw Material Act)[145], designed to enhance Europe's resilience and preparedness by mitigating vulnerabilities within the supply chain of critical raw materials needed for the manufacturing of strategic Net-Zero technologies and Chips.[146] Regarding the supply chain vulnerabilities thus identified, the submissions received have underscored several structural deficiencies that impede the progress of extractive industries in undertaking projects within the European Union.[147]

One of the main means to achieve the goals of the presented regulation amendments is the simplification of permit requirements for 'stra-

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[139] COM(2022) 156 final/3, 2022/0104 (COD), preamble (5). *It is acknowledged that battery compound production (i.e., chemicals) is already covered within the IED's present scope, along with battery disposal and recovery*.

[140] Ibid.

[141] Ibid. pp. 20–21, 34. *According to the proposal 'industrial minerals' means minerals used in industry for the production of semi-finished or finished products, with the exception of metalliferous ores, energy minerals, construction minerals and precious stones*.

[142] Proposal for a Regulation of the European Parliament and of the Council on 'establishing a framework of measures for strengthening Europe's net-zero technology products manufacturing ecosystem (Net Zero Industry Act)', COM(2023) 161 final, 2023/0081 (COD), Brussels, 16.3.2023.

[143] COM(2023) 62 final, p. 3.

[144] COM(2023) 161 final, 2023/0081 (COD), art. 1(2) and Annex.

[145] Proposal for a Regulation of the European Parliament and of the Council on 'establishing a framework for ensuring a secure and sustainable supply of critical raw materials and amending Regulations (EU) 168/2013, (EU) 2018/858, 2018/1724 and (EU) 2019/1020' COM(2023) 160 final, 2023/0079 (COD), Brussels, 16.3.2023.

[146] Ibid., pp. 7, 9. *The Act guarantees that manufacturers of pivotal technologies endorsed in the Chips Act, or the Net-Zero Industry Act can depend on a stable and sustainable provision of critical raw materials*.

[147] Ibid., p. 9.

tegic projects', which are promoting the manufacturing of strategic net-zero technologies or (more sustainable) access to the critical raw materials. Despite the overall goal of not compromising the level of environmental protection, both regulation proposals encompass binding time limits for permit processes[148] and the intent to enable the application of the exception provisions of some directives in pursuit of the public interest,[149] including exceptions articles in the WFD (art. 4(7)), Habitats Directive (Articles 6(4) and 16(1))[150], and Directive on Conservation of wild birds (Article 9(1)(a))[151], and a reassessment of their applicability.[152] This includes expanding the definition of "public interest" to incorporate net-zero technologies and the extraction of critical raw materials.[153] Consequently, the proposals indicate that in a detailed evaluation of individual cases, a responsible permitting authority may determine that the project's contribution to the public interest outweighs concerns related to nature and environmental protection when all of the requirements of the introduced exception articles are met.[154]

The proposals may indeed alter the position of the strategic projects in relation to local environmental impacts in the environmental permit evaluation, with the hope of promoting the adoption of these technologies. This serves as a prominent illustration of the trade-offs that have been made in pursuit of the enhancement of novel technologies in the service of the electrification of European energy production.[155] However, the exception articles of the above-mentioned directives are formulated strictly, and they only allow deviations from quality norms in precisely defined situations.

4. Conclusions

The Finnish Supreme Administrative Court's discretion is limited to a legality review focused on local environmental impacts, excluding broader considerations of sustainability and innovation effects. Considering the limited discretion, based on Best Available Technique conclusions for technologies and various environmental quality standards for environmental impacts, along with the prohibition of "significant pollution" under the Environmental Protection Act, it is challenging to argue that interpretation within these confines could promote novel technologies in industrial sites.

Nevertheless, the flexible interpretation of environmental norms is not the sole means to promote industrial innovations; alongside this, various experimental processes tailored to industrial entities have emerged. In these processes, such as INCITE's identification of emerging technologies, technological innovations can be developed collaboratively with regulatory authorities. It is crucial to advance various technologies to the highest readiness level possible before initiating the permitting process. Otherwise, scientific uncertainty regarding the impacts of the technology may remain too significant, potentially leading to the denial of the permit.

148 COM(2023) 161 final, 2023/0081 (COD), art. 6, art. 13; COM(2023) 160 final, 2023/0079 (COD) art. 10, art. 11.
149 COM(2023) 161 final, 2023/0081 (COD) (Proposal for Net-Zero Industry Act), preamble 51, art. 12(3); COM(2023) 160 final, 2023/0079 (COD) (Critical Raw Material Act), preamble 19, art. 7.
150 Council Directive 92/43/EEC Of 21 May 1992 on the Conservation of Natural Habitats and Of Wild Fauna and Flora (OJ L 206, 22.7.1992, p. 7–50).
151 Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p. 7–25).
152 Proposal for Net-Zero Industry Act, preamble 51, art. 12(3); Proposal for Critical Raw Material Act, preamble 19, art. 7.
153 Proposal for Net-Zero Industry Act, art. 12(3); Proposal Critical Raw Material Act, art. 7.
154 Ibid.
155 Ibid.

In considering incentives for the adoption of new industrial technologies, it is crucial to focus on the bigger picture and contemplate how to strike a balance between local environmental protection and the adoption of technologies with sustainability benefits. The introduction of these technologies still involves numerous scientific uncertainties that need to be addressed. The role of environmental permitting authorities or the courts does not encompass assessing the sustainability benefits of the novel technology (including the benefits in terms of combating climate change) in relation to local environmental impacts, but instead focus specifically on local environmental impacts alone. Nevertheless, the European Commission has proposed regulations for strategic projects concerning the extraction of critical raw materials and the manufacturing of net-zero technologies. This may, in the future, facilitate and expedite the permitting of these industrial projects, thereby promoting the scalability of specific industrial innovations with sustainability benefits.

However, it is crucial to acknowledge that the existing legal framework offers insufficient incentives for existing polluting industries to invest in advancing their operations to facilitate the industrial green transition. This limitation arises from the restricted opportunities to amend outdated permits to align with all environmental quality standards, beyond those based solely on BAT conclusions, in a cost-efficient manner. Simultaneously, first-time permit applicants are obligated to adhere to more rigorous requirements in accordance with all existing environmental quality standards emanating from various environmental legislations. In the context of a sustainable transition that emphasizes local environmental hazards under the precautionary principle, it is imperative to explore avenues that ensure that existing industrial facilities persist in effectively mitigating their on-site environmental impacts.