



# Tackling environmental crime and harm by large industrial facilities: lessons learned based on two Dutch case studies <sup>(59)</sup>

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## Abstract

How is it possible that some large industrial facilities cause pollution for decades while enforcement of environmental laws and regulations stays largely ineffective? In this contribution, this question is answered by analysing the historical development of environmental law enforcement in the Netherlands, drawing on evaluation reports and an explorative case study of two industrial facilities in the Netherlands that are currently in the public eye because of their impact on the environment and public health: Hoogovens/Tata Steel in IJmuiden and Chemours in Dordrecht. Three elements emerge as key challenges in tackling environmental crime by large industrial facilities: fragmented enforcement of environmental laws and regulations, the information asymmetry between businesses and government, and the interconnectedness of legitimate and illegitimate business activities. Although these conclusions are drawn based on Dutch evaluations of environmental law enforcement practice and illustrated using Dutch cases, they are more broadly relevant to how Europe deals with industrial pollution.

**Keywords:** environmental crime, pollution, environmental enforcement, industry, PFAS.

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## Introduction

On 22 September 2023, the Dutch National Institute for Public Health and the Environment concluded that the residents of the IJmond region are particularly likely to become ill due to the contemporary emissions of the Hoogovens/Tata Steel site' (Geelen, 2023). For the first time in Dutch history, the health authority concluded that there was a direct relationship between emissions from industrial activity and health risks for residents and the environment. A few days after the report was published, on 27 September 2023, the District Court of Rotterdam rendered a similarly historic ruling in a civil case brought by the municipalities of Dordrecht, Papendrecht, Sliedrecht and Molenlanden against the company DuPont de Nemours/Chemours. In this intermediate ruling, the district court found that Chemours and its legal predecessor, DuPont de Nemours, were liable for the damage they caused between 1984 and 1998<sup>(61)</sup> by emitting perfluorooctanoic acid (PFOA)<sup>(62)</sup>, one type of the more than 10 000 Per- and polyfluoralkyl substances (PFAS), which are chemical compounds based on a chain of fluorine and carbon atoms, infamously known as 'forever chemicals' due to their high persistence in the environment and human body<sup>(63)</sup>. The judge ruled that the company acted unlawfully because it had not sufficiently informed the licensing authority and municipalities during this period about the possible risks of PFOA pollution and about internal concerns about PFOA, and did not reduce emissions<sup>(64)</sup>. Moreover, the district court ruled that both companies were liable for the consequences of the PFAS contamination, even if they had permits to emit PFAS.

Hoogovens/Tata Steel and DuPont de Nemours/Chemours are Dutch examples of large industrial facilities that have been polluting the environment and have caused public concern for decades, but which have presented very challenging cases in terms of environmental law enforcement. In the case of Hoogovens/Tata Steel, the first concerns about the public health consequences of its coal-fired steel mill date back to 1918, two years before the construction of the first furnace of Koninklijke Hoogovens, the original name of the company, which literally translates to Royal Blast Furnaces (Van Wingerde, 2022). The various lawsuits surrounding the production of PFOA both in the United States and in the Netherlands show that the chemical industry – in this case PFOA producer 3M and user DuPont – had already raised concerns about its toxicity as far back as the 1960s. (Arenson 1961; Gaber et al. 2023.). In the Netherlands, the use of PFOA started in 1967, five years after the opening of the Dordrecht Works site. In a 1984 US corporate document, DuPont's executives discussed the potential phasing out of the chemical compound and stated that they were liable for the past 32 years of emissions<sup>(65)</sup>. Nevertheless, the production of Teflon based on PFOA continued in Dordrecht until 2012, and the factory in Dordrecht was the second largest user of PFOA in the world<sup>(66)</sup><sup>(67)</sup>.

In recent years, health and environmental concerns about both industrial facilities have risen to the top of the Dutch political and societal agenda following more and better knowledge about the harmfulness of emissions, increased media attention and heightened societal concern. Large class action lawsuits have now been filed against both

<sup>(61)</sup> For the period from 1 March 1998 to 2012 (PFOA phaseout), the civil proceedings were to continue and to be part of the final verdict. No final verdict has been rendered at the moment of writing (October 2025).

<sup>(62)</sup> Also known as ammonium perfluorooctanoate, C8 or FC-143.

<sup>(63)</sup> <https://www.niehs.nih.gov/health/topics/agents/pfc>.

<sup>(64)</sup> [www.rechtspraak.nl/Organisatie-en-contact/Organisatie/Rechtbanken/Rechtbank-Rotterdam/Nieuws/Paginas/Chemours-handelde-onrechtmatig-met-uitstoot-van-PFOA.aspx](http://www.rechtspraak.nl/Organisatie-en-contact/Organisatie/Rechtbanken/Rechtbank-Rotterdam/Nieuws/Paginas/Chemours-handelde-onrechtmatig-met-uitstoot-van-PFOA.aspx).

<sup>(65)</sup> [https://static.ewg.org/files/duPont\\_elim\\_PFOA\\_1984.pdf?\\_gl=1\\*1oapee8\\*\\_gcl\\_au\\*MjExMTU2MTc5LjE2OTU4MTQ3MTk\\_\\*\\_ga\\*NDg0ODQ5Njk1LjE2OTU4MTQ3MTk\\_\\*\\_ga\\_CS21GC49KT\\*MTY5NzAwODIwNi4yLjEuMTY5NzAwODQ5MC4wLjAuMA..&\\_ga=2.144866742.365754225.1697008207-484849695.1695814719](https://static.ewg.org/files/duPont_elim_PFOA_1984.pdf?_gl=1*1oapee8*_gcl_au*MjExMTU2MTc5LjE2OTU4MTQ3MTk_*_ga*NDg0ODQ5Njk1LjE2OTU4MTQ3MTk_*_ga_CS21GC49KT*MTY5NzAwODIwNi4yLjEuMTY5NzAwODQ5MC4wLjAuMA..&_ga=2.144866742.365754225.1697008207-484849695.1695814719).

<sup>(66)</sup> <https://resolver.kb.nl/resolve?urn=KBNRC01:000034663:mpeg21:a0176>.

<sup>(67)</sup> [www.ftm.nl/artikelen/pfas-onzekerheid-regeert](http://www.ftm.nl/artikelen/pfas-onzekerheid-regeert).

companies, and criminal investigations are being conducted into whether the companies and their executives have criminally endangered public health <sup>(68)</sup> <sup>(69)</sup>.

The problems related to harmful pollution by the chemical and steel industries are not limited to the Netherlands. A cross-border collective of investigative journalists found 23 000 sites of PFAS pollution in Europe <sup>(70)</sup>. These problems are not bound by contamination sites: for instance, a Belgian company caused high concentrations of PFAS in the French rivers Arias and Avène <sup>(71)</sup>. In Italy, from the 1990s onwards, several epidemiological studies have found a link between the steel factory Arcelor Mittal Italia – formerly named Ilva – and environmental damage and public health problems (WHO, 2023). What these and other cases have in common is that these large industrial facilities continued to cause pollution for decades despite (public) awareness of the harmful impact and while environmental law enforcement stayed largely ineffective. By analysing the historical development of environmental law enforcement in the EU and specifically the Netherlands, this article aims to discuss the key challenges in the enforcement of environmental laws and regulations. While illustrating our arguments with cases from the Netherlands, the relevance of these challenges goes beyond national borders. The next section provides a rudimentary history of the Dutch approach to environmental crime and harm by large industrial facilities. It draws on evaluation reports (both government-commissioned and independent evaluations) that focus on Dutch environmental law enforcement. After that, three key challenges in tackling environmental crime are discussed: the fragmentation of supervision, the lack of balance in information provided by companies and government, and the interconnectedness of pollution and legal business activities. These challenges are illustrated based on concrete examples of environmental crime from the past and present, based on our two case studies. The conclusion discusses a couple of future implications of these Dutch cases, which are more broadly relevant to how Europe deals with industrial pollution.

## Historical development of environmental law enforcement in the Netherlands

For a long time, attention to the environment was largely limited to ‘urban hygiene’ topics such as odour nuisance, risk of contamination, contaminated drinking water and fire safety (Siraa et al., 1995, p. 231). From the late 1960s onwards, it gradually became clear that post-war economic growth, expanding industrial activity and technological progress were bringing serious risks to the environment and public health. In 1972, this realisation was reinforced when the Club of Rome published its report *The Limits to Growth* (Meadows et al., 1972), concluding that the planetary boundaries would be reached within a hundred years unless we changed our behaviour. The report coincided with a number of incidents that affected the environment. In July 1976, a reactor of a chemical company near Seveso, Italy, exploded. The explosion caused a dioxin cloud that immediately killed many animals, and people in the wider area suffered permanent health damage. On 16 March 1978, the Liberian oil tanker Amoco Cadiz ran aground off the French coast. More than 200 000 tonnes of crude oil spread over the sea and the French coastline. That same year, a truck loaded with liquefied gas exploded at the Spanish campsite Los Alfaques, as a result of which 216 people died. In 1978, both in the Netherlands (Lekkerkerk) and the United States (Love Canal), people were shocked by the discovery of residential areas that were built on chemical waste.

<sup>(68)</sup> <https://nos.nl/artikel/2487766-massaclaim-tegen-tata-steel-omwonenden-willen-schadevergoeding>.

<sup>(69)</sup> <https://nos.nl/artikel/2494623-omwonenden-chemours-blij-met-onderzoek-van-om-enige-juiste-om-te-doen>.

<sup>(70)</sup> <https://foreverpollution.eu/>.

<sup>(71)</sup> [https://www.europarl.europa.eu/doceo/document/E-9-2024-000485\\_EN.html](https://www.europarl.europa.eu/doceo/document/E-9-2024-000485_EN.html).

As a consequence, several (international) environmental laws and regulations were drafted and ratified, such as the first environment action programme by the European Commission. In the 1980s, more than 200 legislative measures were passed by the European Commission regarding environmental protection. However, the effectiveness of the implementation of these laws by Member States was questioned, leading to a shift from public to private actors in the enforcement of environmental legislation (Abbot and Lee, 2015; Macrory, 1992; Orlando, 2014).

In the Netherlands, enforcement of these laws and regulations only started in the 1980s. Dutch evaluations of environmental law enforcement characterised it as reactive and coincidental (Aalders, 1984, p. 301) and as lacking coordination, and found that sanctions were hardly ever imposed (e.g. Blomberg and Michiels, 1997; Committee on Administrative and Private Law Enforcement, 1998; Committee for the Revision of the Enforcement System for the Environment, Spatial Planning and the Environment Regulations, 2008; Van den Anker and Hoogenboom, 1996; Van Vugt and Boet, 1994; Van den Berg, 1995a,b). In February 1982, the lack of environmental compliance became obvious when the District Court of Breda sentenced three former directors and several employees of Uniser Holding BV to unconditional prison sentences ranging from seven months to two-and-a-half years for, among other things, the illegal discharge of hazardous waste. The Uniser case was the Netherlands' first encounter with serious environmental crime. Several similar large-scale and long-lasting corporate environmental crimes followed, with Booy Clean, Kemp and Zegwaard and Tank Cleaning Rotterdam (TCR). Each company illegally discharged or dumped hazardous (waste) substances and led clients and enforcement authorities to believe they had properly treated them. Moreover, each of these companies had a long history of non-compliance. For example, between 1985 and 1994, enforcement authorities carried out 408 inspection visits to TCR under the Surface Water Pollution Control Act, resulting in 55 official reports about 134 violations (Court of Audit, 1996, p. 66–67). Sanctions were regularly imposed, yet the enforcement authority was ineffective in making the companies compliant. These cases instigated important developments in environmental law enforcement. The fact that these companies made large profits at the expense of the environment led to considerable public outcry, as well as several follow-up investigations into the companies (Court of Audit, 1996; Eshuis and Van den Berg, 1996; Gosewehr and Maas, 1984; Ten Heuvelhof et al., 1996; Uniser Committee, 1983).

In the early 1990s, as a consequence of these cases, the concept of 'environmental crime' came into vogue, and various studies followed about the nature and scale of, and explanations for, this phenomenon (e.g. Van den Anker and Hoogenboom (1997); Van den Berg (1995a,b)). Moreover, there was growing awareness about environmental law enforcement being in the public interest. Several evaluations showed serious environmental law enforcement deficits, and a myriad of environmental enforcement projects, programmes and policy adjustments followed at the national (Blomberg and Michiels, 1997; Committee for the Review of Law Enforcement Instruments, 1995; Committee on Administrative and Private Enforcement, 1998) and international levels (OECD, 2002, 2014, 2018). The role of European legislation increased: in 2003, 80 % of Dutch environmental legislation was either directly or indirectly imposed by the EU (Wesselink and van Wijk, 2003). In the EU itself, international cooperation became more important as well. It took a leading role in a number of multilateral agreements, such as the 1989 Basel Convention and the 1997 Kyoto Protocol on climate change (Orlando, 2014). Within the EU itself, two directives were adopted, the ECD in 2008 and the environmental liability directive in 2004, showing a shift in priorities from 'the internal market to more genuine environmental concerns' (Orlando, 2014, p. 19).

In the 2019 European Green Deal, the European Commission stated: 'In addition to launching new initiatives, the Commission will work with the Member States to step up the EU's efforts to ensure that current legislation and policies relevant to the Green Deal are enforced and effectively implemented' <sup>(72)</sup>. Yet the recent mid-term review of the eighth environment action programme by the EU concluded that effective enforcement of EU environmental legislation and policies by Member States remains a concern (European Commission, 2024). Recent Dutch evaluation reports with telling titles such as *The Time Is Ripe* (Committee for the Revision of the Enforcement System for the Environment, Spatial Planning and the Environment Regulations, 2008), *The Market in Charge* (CCV, 2019), *An Invisible Problem* (Court of Audit, 2021a) and *Enforcement in the Dark* (Court of Audit, 2021b) have drawn attention to several recurring challenges in the enforcement of environmental laws and regulations: fragmented law enforcement, information asymmetry between government and industries, and the interconnectedness of legitimate and harmful activities. In what follows, these three challenges are explained and illustrated based on the cases of Hoogovens/Tata Steel in IJmuiden and DuPont de Nemours/Chemours in Dordrecht.

## Fragmentation of environmental law enforcement

The environmental law enforcement deficit is often attributed to a high degree of fragmentation in the supervision and enforcement of environmental laws and regulations. Many different legal authorities – both administrative and criminal – are involved, and each focuses on a specific part of the environmental domain. Cooperation and exchange of information between these organisations have regularly proven to be inadequate. One of the first observations of these inadequacies was made in the 1998 report *Qualitative Enforcement (Handhaving op niveau)* of the Committee on Administrative and Private Law Enforcement. This so-called Michiels Committee concluded that administrative enforcement needed to be professionalised across the board, making several recommendations for improvement (p. 59 *et seq.*). In line with earlier reports, the committee recommended separating the functions of permit granting and enforcement, improving task division between administrative and judicial enforcement authorities, improving cooperation and information exchange between enforcement agencies and creating distance between environmental authorities and local politics by creating regional (instead of local) environmental services (pp. 96–97). The recommendations resulted in several programmes aimed at developing best practices to stimulate compliance with environmental regulations. Despite the efforts invested in improving environmental enforcement, a 2008 evaluation report concluded that the changes were insufficient. A major bottleneck remained the high degree of fragmentation between over 500 environmental agencies, whose 'enforcement strategies in many cases did not meet the requirements of being effective, efficient, and least burdensome for citizens and businesses' (Committee for the Revision of the Enforcement System for the Environment, Spatial Planning and the Environment, 2008, pp. 6–7, translated from Dutch). This so-called Mans Committee report resulted in the creation of (then) 29 regional environmental authorities responsible for issuing permits and enforcement across various municipalities and provinces in their region <sup>(73)</sup>. The idea was that a larger working area would allow for specialist knowledge building and improved interagency cooperation (pp. 41–48). Although this improved the structure of the so-called permit, oversight and enforcement (vergunningverlening, toezicht en handhaving (VTH)) system, major concerns remained about its effectiveness. In 2021, the Van Aartsen Committee – set up by the Secretary of State for Infrastructure and Water Management to improve the VTH system – concluded that it had observed the performance of the VTH system with 'increasing surprise and concern' (VTH Advisory Committee, 2021, p. 50, translated from Dutch). It deemed environmental authorities ineffective due to their fragmentation, small-scale organisational structures, insufficient information exchange and knowledge development, and insufficient

<sup>(72)</sup> [https://environment.ec.europa.eu/law-and-governance/legal-enforcement\\_en](https://environment.ec.europa.eu/law-and-governance/legal-enforcement_en).

<sup>(73)</sup> <https://www.omgevingsdienst.nl>.



professional distance from local government administrators. Yet another programme – the intergovernmental programme strengthening VTH – followed. Its December 2023 intermediate report mentioned noticeable yet slow improvements in organisational structure, reconfirmed insufficient information exchange and fragmentation of expertise and knowledge, and added that criminal enforcement should be used more frequently than is currently happening in cases of repeat and/or severe non-compliance (IBP VTH, 2023).

The challenges these reports identified and reiterated can be illustrated using the Hoogovens/Tata Steel and DuPont de Nemours/Chemours cases. In 2015, concerns about Chemours' PFAS contamination emerged in the Netherlands<sup>(74)</sup>. Fragmented supervision has led to a lack of coordination and citizens feeling overlooked (IJzermans et al., 2017). In a 2023 report by the Dutch Safety Board (OvV, 2023) that looked at three key industrial facilities in the Netherlands, the actors that are currently involved in the supervision of Chemours are listed (p. 87): the EU, the Ministry of Infrastructure and Water Management, the Environment and Transport Inspectorate, the National Institute for Public Health and the Environment, Public Works (Rijkswaterstaat), the province of South Holland's parliament and government, the Regional Environmental Authority, the South Holland South Environmental Authority, the South Holland South Health Authority, and the municipalities of Dordrecht, Slidrecht and Papendrecht. Given the long time frame in which the pollution occurred, the competent authorities changed over time. In 2017, for example, the implementation of the supervision of Seveso companies<sup>(75)</sup> was transferred from the local South Holland South Environmental Authority to the Regional Environmental Authority<sup>(76)</sup>. The fragmentation of supervision and responsibilities, therefore, also refers to fragmentation over time. Limited knowledge sharing and coordination resulted in insufficient insight into the full extent and multifaceted nature of PFAS pollution. Given the persistence and mobility of PFAS, such an overarching picture is essential: the exposure route of PFAS is not limited to direct pollution points. PFAS emissions in the air, groundwater and surface water find their way to citizens through, for instance, open water swimming, vegetable and dairy products, playground soil and drinking water. The case of DuPont de Nemours/Chemours, therefore, clearly shows the shortcomings of a fragmented VTH system. Due to the specialisation among and, in some cases, even within different regulatory bodies, an overall picture of environmental pollution and its associated health and environmental consequences was missing.

That same Dutch Safety Board report (OvV, 2023) concluded that supervision is similarly fragmentation in the Hoogovens/Tata Steel case (p. 44), with the following actors listed: the EU, the Ministry of Infrastructure and Water Management, the Environment and Transport Inspectorate, the National Institute for Public Health and the Environment, the Province of North Holland, the Regional Environmental Authority North Sea Channel, the Regional Environmental Authority IJmond, the Regional Health Authority Kennemerland, and the municipalities of Velsen, Heemskerk and Beverwijk. Although the various actors have increasingly sought cooperation since the graphite rains in 2018 and 2019, fragmentation continues to cause problems. For example, both the Province of North Holland and the Ministry of Infrastructure and Water Management continued to see each other as primarily responsible for taking action (p. 74). As a result, stricter emission standards were not included in Tata's permit, despite both parties having the authority to do so under the VTH system (pp. 75–76).

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<sup>(74)</sup> [www.ftm.nl/artikelen/hoer-dupont-met-teflon-een-ongekende-milieuramp-veroorzaakte](https://www.ftm.nl/artikelen/hoer-dupont-met-teflon-een-ongekende-milieuramp-veroorzaakte).

<sup>(75)</sup> Brzo is an acronym for Besluit Risico's Zware Ongevallen, which translates as 'major accident risks decree', the Dutch interpretation of the EU directive on occupational safety, external safety and disaster management. This refers to companies that work with large quantities of hazardous substances, so that these risks are mapped out in order to prevent and control major accidents.

<sup>(76)</sup> [www.zuid-holland.nl/@17503/wijziging/](https://www.zuid-holland.nl/@17503/wijziging/).

## The information asymmetry between businesses and governments

Countering fragmentation requires good information exchange between different actors responsible for supervision and enforcement; however, in practice, information exchange is often lacking. In its reports *An Invisible Problem* (2021a) and *Enforcement in the Dark* (2021b), the Court of Audit concluded that the lack of high-quality data on environmental crime causes environmental law enforcement to be deficient. Data turned out to be missing or incorrect, and it was not possible to identify individual companies in the absence of unique identifiers for legal entities (Court of Audit, 2021b). In addition, the severity of the punishment did not appear to take into account whether the company in question had previously committed the same offence. It shows that environmental enforcement authorities often have too limited insight into companies' (non-)compliance histories (Court of Audit, 2021b), which – if included in the decision-making process – could lead to faster enforcement. For example, a historical analysis of the problems surrounding Hoogovens/Tata Steel shows that the company was frequently reprimanded by regulators in the 1970s and 1990s for, among other things, the illegal discharge of zinc and lead into surface water (Van Wingerde, 2022). These problems with the registration of data and the lack of historical awareness of enforcement authorities are not new. In her PhD research on the supervision of Seveso companies, Kluin (2014) showed that inspectors are often unaware of the compliance and enforcement history of the companies they inspect, resulting in recidivism staying unnoticed.

In addition to inadequate internal and longitudinal information management, information exchange between agencies, for example between criminal and administrative law authorities, also proved to be insufficient (Court of Audit, 2021b), both between government agencies and within government agencies. For example, until 2017, the South Holland South Environmental Authority was responsible for regulating DuPont/Chemours' air, surface water and soil pollution. However, there was limited communication between the inspectors responsible for these different domains, which meant that the cumulative nature of the pollution came into focus too late.

In addition to limited information exchange between government agencies, the Dutch Safety Board (OvV, 2023) also mentions the lack of information sharing between industry and government. Due to budget cuts and decentralisation, the latter has fallen behind in terms of capacity, resources and knowledge. This has created an imbalance in the information about business processes, causing the government to become dependent on the industry itself (OvV, 2023). The case of DuPont/Chemours shows the problematic consequences of this position of dependence. Previous studies have analysed how US parent company DuPont de Nemours maintained an information monopoly and situation of 'selective ignorance' by not sharing internal studies on the health effects of PFOA (Richter et al. 2021; Shapira and Zingales, 2017). As a result, the responsible public authorities could not adequately address the risks posed by this chemical pollution (Richter et al., 2021). In the Dutch case, a similar backlog of information contributed to the continuation of PFOA contamination until 2012, while most uses of the substance in the United States had been phased out in the mid-2000s (Bisschop, 2023). The issue of information asymmetry between business and government brings us to a final challenge: the interconnectedness of environmental pollution and legitimate business activities.

## Interconnectedness of pollution and legitimate business activities

The most frequently mentioned criticism of environmental law enforcement is the long-term failure to take action against – or tolerance of – environmental violations by companies that have a permit for certain business activities.

In the case of Uniser, it is clear that, despite complaints and reports about suspected contamination of surface water, abnormal fish mortality and tar-like substances on the water dating back to the 1980s, there was no oversight of Uniser's activities (Uniser Committee, 1983, p. 52). In the case of Booy Clean, dozens of violations were identified over 10 years, but no sanctions were imposed (Gosewehr and Maas, 1984, pp. 25–27). In addition, despite clear indications that TCR was systematically violating environmental regulations, there was insufficient supervision and hardly any enforcement action, by neither administrative nor criminal law authorities (Court of Audit, 1996, pp. 16–23). This limited application of criminal law, even for companies with multiple violations, is also reflected in the Court of Audit's more recent report, *Enforcement in the Dark* (2021b). In the cases involving Hoogovens/Tata Steel and DuPont/Chemours, we also see – as described above – that there had been signs of exceedances of the permit for illegal discharges of hazardous substances for a long time, but that, until recently, little or no action was taken against them.

In the scientific literature, these situations are largely attributed to the interconnectedness of environmental pollution and legal activity. Environmental crime is not so much the result of isolated illegal acts but takes place in the context of legal and licensed business activities. This means, first and foremost, that environmental non-compliance is often not called environmental *crime*. After all, these are often business activities that are, in principle, permitted and might exceed certain thresholds. This implies that it often takes a long time to understand the seriousness of the situation, especially when threshold values are adjusted based on new information about health risks. Therefore, the entirety of the environmental problem comes into focus too late.

In addition, this interconnectedness with legal activity means that the public interest in a healthy environment must also be weighed against other public interests, such as employment, the stability and continuity of the processing of hazardous substances and the competitive position of national economies. History teaches us that, especially when it comes to large industrial companies, these economic interests regularly take precedence over human and environmental health. When the Uniser, Booy Clean and TCR cases happened, the Dutch government struggled with a major (hazardous) waste problem and was heavily dependent on these companies for the continuity of waste disposal (Houtsma and van der Schot, 1992; Knoop, 1991). As a result, the government also had (economic) interests in maintaining the – de facto illegal – situation. The reports of the Dutch Safety Board about the fire at Chemie-Pack in Moerdijk (OvV, 2012a), the safety situation around Odfjell in the port of Rotterdam (OvV, 2012b) and gas extraction in Groningen (OvV, 2015) also showed that years of safety concerns did not result in regulatory enforcement, because other interests prevailed. This is most evident in the history surrounding Hoogovens/Tata Steel. Koninklijke Hoogovens was founded in the aftermath of World War I. Driven by the conviction that the Netherlands needed a strong industry to recover and by the quest for a destination for coal, a coal-fired steel mill seemed ideal. However, according to some, Hoogovens has never been a profitable company (Schoorl and Kreling, 2021): after World War II, the company received financial aid from the Marshall Plan; after a failed merger in the 1970s, it received massive state funding to stay afloat; and a few years ago Indian owner Tata Steel put the plant up for sale because making a 100-year-old coal-fired steel mill more sustainable would be too expensive. Despite the long-standing public concern about a safe living environment, the steel market was deemed too important for the Dutch economy; Hoogovens – later Corus and now Hoogovens/Tata Steel – was deemed too important an employer; and locally produced steel was deemed to make the Netherlands less dependent on other countries (Van Wingerde, 2022).



For DuPont/Chemours, economic interests prevailed internally over judicial and health interests, as evident from a 1984 (Schmid, 1984) meeting at the DuPont headquarters, which is also at the heart of the civil lawsuit in the Netherlands. During this meeting, the company discussed the future of PFOA, which, from a legal and medical point of view, would be its 'total elimination', but, from a business perspective, was about reducing it as much as possible 'in a way that does not hurt economically' (p. 2). However, economic and environmental interests are not only weighed by the company but also by the Dutch government. In the 1980s, it granted subsidies to DuPont to make additional investments in the Dordrecht plant more attractive (Dalmijn, 1981). As a result, non-economic public interests were insufficiently safeguarded. The Dutch Safety Board concluded (OvV, 2023) that the VTH system does not take sufficient account of public health concerns. The Dutch environmental authorities have stressed that this framework currently impedes them from tightening permits (Environmental Service Nijmegen Region, Environmental Service North Sea Canal Area and DCMR Environmental Service Rijnmond, 2023). In short, the strong interconnectedness with economic and political interests means that it is not always possible to take effective action against environmental crime. Indeed, as Caelesta Braun (2022, p. 4, translated from Dutch) argued: 'The (inter)national public administration seems to be blind and deaf to a broad spectrum of social interests and at the same time irresponsibly open to a narrow part of them.'

## Conclusion

This article has speeded through the history of environmental law enforcement in the Netherlands, a history characterised by continuous concerns about its effectiveness due to fragmented supervision, poor coordination and cooperation, an inadequate information position and the interconnectedness of pollution and legal business activities. This rather gloomy picture allows us to draw a couple of conclusions about future approaches to environmental crime and harm by large industrial facilities. Although this contribution focused mainly on the developments of environmental law enforcement in the Netherlands, industrial activity takes place on an international playing field, and many of the industrial polluters work within several countries. Regulatory authorities can learn from other countries' experiences in regulating – or failing to regulate – these companies. Although these conclusions are drawn from Dutch evaluations of historical environmental law enforcement practice and are illustrated using longstanding Dutch cases of industrial pollution, they are more broadly relevant to how Europe deals with industrial pollution.

Firstly, looking at the past 40 years of reports and analyses on the state of environmental law enforcement, a key challenge is how to give environmental harm and victimisation a more independent stake in the enforcement of environmental legislation. In 2008, the EU adopted Directive 2008/99/EC: the ECD. Although this directive was considered to be a progressive step in promoting the role of criminal law in the enforcement of environmental legislation, it lacked regard to the rights of victims (Cardwell et al., 2011). An evaluation in 2020 concluded that due to inconsistencies in the material definitions of environmental crimes, the absence of legal violations prohibited the prosecution of 'substantive ecological damage' <sup>(77)</sup>. Thus, the aforementioned problems of interconnectedness of legitimate activities and environmental pollution and an inherent lack of regard to victims and harms prevented opportunities for criminal prosecutions. This is particularly important when economic and political interests coincide in causing harm. In many cases, governments were not only aware of what was going on but also facilitated these activities for a long time out of concern for their economy and innovation potential by applying more lenient standards for emissions or safety margins or by failing to act altogether. In the literature on state corporate crime, it

<sup>(77)</sup> [https://commission.europa.eu/news/evaluation-environmental-crime-directive-2020-11-05\\_en](https://commission.europa.eu/news/evaluation-environmental-crime-directive-2020-11-05_en).

has been pointed out for a long time that it is precisely where economic and political interests align that it is much more complicated to characterise the behaviour of companies as crime (Michalowksi and Kramer, 2007). Focusing on environmental harm and victimisation can break that pattern. This would also allow us to consider other harms faced by non-human victims. Since pollution affects the health of other living organisms, maybe nature could be given a more prominent legal position in environmental policy enforcement. In 2023, the European Council and European Parliament agreed to replace the ECD, creating the foundation for an autonomous environmental offence. This would imply that the ‘permit defence’ no longer stands in court in cases like that of DuPont/Chemours, where a company was aware of the harmful impact of their legally permitted pollution. Moreover, the new directive also emphasises the importance of preventing that the tightening of environmental regulation and enforcement for industrial facilities in Europe leads to displacement effects to other regions. It is therefore important to align the regulations internationally as much as possible, as well as to regulate the entire supply chain to avoid a waterbed effect. A sole focus on improving national environmental law enforcement risks exporting the environmental and health harm to other regions while preventing environmental harm in our own backyard.

Secondly, these issues show the importance of including societal actors in the decision-making processes in environmental governance. For example, the PFAS issue is regulated mainly at the European and international levels by REACH – a European regulation on the registration, evaluation, authorisation and restriction of chemicals – and, in the case of specific PFAS such as PFOA and perfluorooctanesulfonic acid, by the Stockholm Convention <sup>(78)</sup> <sup>(79)</sup>. Together with Denmark, Germany, Sweden and Norway, the Netherlands submitted a universal restriction proposal for all PFAS compounds to the European Chemicals Agency <sup>(80)</sup>. During the public consultation phase, no fewer than 4 400 organisations, companies and individuals commented on the proposal. One of the OECD guiding principles of regulatory enforcement and inspections is the theory of responsive regulation, introduced by Ayres and Braithwaite (1992). In *Responsive Regulation*, Ayres and Braithwaite proposed the idea of ‘tripartism’. In regulating corporations and industries, governments should be responsive not only to business behaviour but also to the needs and views of societal actors, including citizens and interest groups. While the public consultation phase, in theory, provides a table for these three parties to meet, 68.5 % of comments are made by either companies or other industry representatives. Furthermore, only those comments that are not indicated as ‘confidential’ are published and accessible by the public <sup>(81)</sup>. Tripartism would require an equal seat at the table and equal access to information. However, the consultation on the PFAS ban shows that the interaction between these three parties is hard to balance. At the time of writing, the European Chemicals Agency’s scientific committees are considering these submitted comments to advise the European Commission <sup>(82)</sup>. It is, therefore, still uncertain whether the European Commission will implement the restriction proposal and how environmental, health and economic interests will be weighed. Of course, any constructive dialogue between government, businesses and civil society in the cases of Hoogovens/Tata Steel and Chemours is at present stymied by a legal dispute that is likely to continue for years. Nonetheless, including civil society in the environmental governance of industrial activities early on can prevent environmental harm in the future. Initiatives to develop new ammonia terminals near residential areas could provide an interesting test case. As ammonia is necessary for the energy transition, many companies across Europe plan to increase their facilities to store ammonia. However, exposure to ammonia

<sup>(78)</sup> <https://echa.europa.eu/regulations/reach/understanding-reach>.

<sup>(79)</sup> <https://echa.europa.eu/hot-topics/perfluoroalkyl-chemicals-pfas>.

<sup>(80)</sup> [www.rivm.nl/en/news/proposed-european-pfas-ban-officially-submitted](http://www.rivm.nl/en/news/proposed-european-pfas-ban-officially-submitted).

<sup>(81)</sup> <https://echa.europa.eu/-/echa-receives-5-600-comments-on-pfas-restriction-proposal>.

<sup>(82)</sup> <https://echa.europa.eu/-/echa-receives-5-600-comments-on-pfas-restriction-proposal>.

can cause severe health problems. Including civil society early on in the decision-making about these terminals could prevent environmental and health harm in the future.

Lastly, these case studies show the importance of reflexivity in the relationship between governments and companies. Responsive regulation inherently focuses on the short and medium term, not on the long term (Braithwaite, 2020, 2022; Van Wingerde, 2022). It thereby forgets to consider the political, economic and historical context and long-term trends of harmful behaviour. This is even more important when it comes to environmental harm, where there is a temporal gap between behaviour and consequences. As responsive regulation looks at recent behaviour by a company, it does not take into account the historical trends in the regulation of the company. In the case of enforcement of environmental law in the Netherlands, Kluin (2014) concluded that inspection agencies did not sufficiently look at their own records on company behaviour to incorporate past violations and recidivism into their sanctioning. For example, the case of Hoogovens/Tata Steel shows a long history of a lenient stance by the government in response to environmental violations. In this case, it leads to the question of what the regulatory responses to violations would have looked like if they had included past behaviour in the decision-making process. The historical analysis in this article shows the importance of such reflexivity. It invites other scholars and practitioners to include historical perspectives in their understanding of, and thereby effective response to, cases of industrial pollution.

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