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## The (PFAS)T and the Furious: Applying Hazardous Waste Management Frameworks to the Global Presence of PFAS

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**THE (PFAS)T AND THE FURIOUS: APPLYING  
HAZARDOUS WASTE MANAGEMENT FRAMEWORKS TO  
THE GLOBAL PRESENCE OF PFAS**

MAGGIE CLARK\*

ABSTRACT

International treaties governing transboundary hazardous waste are a result of the theory of sustainable development. These conventions have developed over several decades but still lack authority over one of the biggest waste exporters: the United States. As forever chemicals like GenX become a spotlight for future waste regulation, can these conventions project a framework to apply to the currently unregulated chemical that predominantly travels across the Atlantic Ocean between the Netherlands and the United States? This Article seeks to apply various transboundary waste international laws to the market for GenX, identify problems, and propose solutions.

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## I. INTRODUCTION

TRANSBOUNDARY HAZARDOUS WASTE transportation is reentering the public eye as Global South countries refuse to accept Global North waste. The colonialism of waste management historically has meant heavily industrialized western countries have shipped waste that is difficult to dispose to states in the Global South like Somalia and Paraguay. This leads to the introduction of emerging legacy contaminants in regions not producing such compounds, such as perfluorooctane sulfonic acid (PFOS), a contaminant predominantly created in the United States and shipped all over the world as a highly stable compound for use in water-resistant clothing, nonstick pans and wrappers, and fire retardant.

Hazardous waste is waste posing substantial or potential threats to public health and the environment, usually exhibiting one or more of the following properties: ignitability, corrosivity, reactivity, or toxicity.<sup>1</sup> Emerging legacy contaminants, types of persistent organic pollutants (POPs), are waste products and by-products that are recently receiving media attention. They are “legacy” because once they enter the environment, they break down slowly (if at all), and their chemical makeup allows them

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<sup>1</sup> U.N. Secretariat, Twenty Years of the Bamako Convention: A Time for More Effective Implementation, Note from the Secretariat, at 2, U.N. Doc. UNEP/BC/COP.2 (Jan. 15, 2018) [hereinafter Bamako Convention]. The Bamako Convention annexes the Basel Convention’s definition for hazardous waste and broadens its scope. See Daniel Jaffe, Comment, *The International Effort to Control the Transboundary Movement of Hazardous Waste: The Basel and Bamako Conventions*, 2 ILSA J. INT’L & COMPAR. L. 123, 131–32 (1995). The Bamako Convention’s understanding of hazardous waste is likely most useful in the application of the Conventions to PFOS compounds such as GenX.

to stay unchanged in the ground, water, or air.<sup>2</sup> With their newfound attention, they are dubbed “forever chemicals” in homage to their stability.<sup>3</sup> While emerging legacy contaminants generally do not fall under the first three properties of hazardous waste, there is evidence supporting a toxicity property, leading many countries to begin listing compounds under PFOS as hazardous and regulating their use and disposal.<sup>4</sup>

Transporting waste to a foreign nation for processing, recycling, or disposal is not uncommon.<sup>5</sup> In modern international trade, the system is a market. However, for many forever chemicals, they are unlisted as hazardous despite having potentially serious health effects. How does the international framework of the Basel Convention, created 30 years ago, apply to these chemicals in the way they are shipped, received, and treated?

This Article applies the framework of Basel to unlisted forever chemicals and analyzes other international regimes handling waste to determine the best legal approach for management. Part II reviews hazardous waste conventions; Part III looks at historic waste dumping cases; and Part IV establishes a legacy forever chemical case study, applies the frameworks created by international law, and determines potential future problems to regulating the forever chemical trade.

## II. LEGAL THEORY—SUSTAINABLE DEVELOPMENT AND THE EVOLUTION OF WASTE TRANSPORTATION REGULATION

Hazardous waste management is not new to international law, and agreements governing transboundary movement of waste date back to the 1950s.<sup>6</sup> There are two types of hazardous waste

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<sup>2</sup> *Primer: Legacy Pollutants*, FRONTLINE PBS (Apr. 21, 2009), <https://www.pbs.org/wgbh/pages/frontline/poisonedwaters/themes/legacy.html> [https://perma.cc/6YEE-ZMJY].

<sup>3</sup> See Annie Sneed, *Forever Chemicals Are Widespread in U.S. Drinking Water*, SCI. AM. (Jan. 22, 2021), <https://www.scientificamerican.com/article/forever-chemicals-are-widespread-in-u-s-drinking-water/> [https://perma.cc/HH8Y-UP5B].

<sup>4</sup> See, e.g., *Emerging Chemical Risks in Europe — ‘PFAS’*, EUR. ENV'T AGENCY (Mar. 2, 2022), <https://www.eea.europa.eu/publications/emerging-chemical-risks-in-europe> [https://perma.cc/M9T6-2UMN].

<sup>5</sup> See, e.g., David Thorpe, *The Global Waste Trade Has Created “Sacrifice Zones” for Health and the Environment*, FIFTH EST., <https://thefifthestate.com.au/columns/spinifex/the-global-waste-trade-has-created-sacrifice-zones-for-health-and-the-environment/> [ ]

<sup>6</sup> See Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal pmbl., Mar. 22, 1989, 1673 U.N.T.S. 126 [here-

movement: legal and illegal.<sup>7</sup> Legal transportation of hazardous waste requires the consent of the importing country.<sup>8</sup> Illegal transportation refers to unsanctioned transfer and dumping of a hazardous waste in a country that has not given consent to receive the materials.<sup>9</sup> On a macro-level, the agreements governing transboundary hazardous waste management and transportation developed under a theory of sustainable development. The theory of sustainable development operationalizes sustainability to protect ecological integrity, which is visible in the goals of the conventions and statutes discussed below.<sup>10</sup> In Klaus Bosselmann's work, *A Vulnerable Environment: Contextualizing Law with Sustainability*, he clarifies that while public perception of sustainability needs to change to address the property law's "right to pollute and exploit," environmental responsibility is integral to human rights and should be exercised as such.<sup>11</sup> Below, the international and domestic agreements lay out similar frameworks to protect the environment from pollution. These frameworks are then used to illustrate several historical examples of the aftermath of waste dumping.

#### A. THE BASEL CONVENTION ESTABLISHES AN INTERNATIONAL STANDARD FOR TRANSBOUNDARY HAZARDOUS WASTE

In March 1989, in response to the toxic waste trade, the international community created the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal.<sup>12</sup> The Basel Convention set the standard that hazardous waste is only acceptable if there is prior informed consent from every country involved in the waste's movement,

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inafter Basel Convention]. The Basel Convention builds on the Declaration of the United Nations Conference on the Human Environment (Stockholm 1972), the Cairo Guidelines and Principles for the Environmentally Sound Management of Hazardous Wastes (June 1987), and the Recommendations of the United Nations Committee of Experts on the Transport of Dangerous Goods (formulated in 1957, updated biennially).

<sup>7</sup> C. Russell H. Shearer, Article, *Comparative Analysis of the Basel and Bamako Conventions on Hazardous Waste*, 23 ENV'T L. 141, 144 (1993).

<sup>8</sup> *Id.*

<sup>9</sup> *Id.*

<sup>10</sup> See Klaus Bosselmann, *A Vulnerable Environment: Contextualising Law with Sustainability*, 2 J. HUM. RTS. & ENV'T 45, 51–56, 59 (2011).

<sup>11</sup> *Id.* at 61.

<sup>12</sup> Jennifer R. Kitt, *Waste Exports to the Developing World: A Global Response*, 7 GEO. INT'L ENV'T L. REV. 485, 486 (1995).

and the Convention made provisions for illegal transportation.<sup>13</sup> It also requires each party to implement the Basel Convention into national law.<sup>14</sup>

The Basel Convention sets standards for states engaging in the hazardous waste trade to follow, regulating transboundary movement between Convention parties and non-parties. First, the State of Export must notify the states involved in the movement of the waste of the planned export, and then wait until the State of Import responds in writing consenting to the movement.<sup>15</sup> Once consent is given by the State of Import and States of Transit, the generator may commence shipment of the waste.<sup>16</sup>

The Basel Convention establishes key features for the waste trade. First, it creates an international “cradle-to-grave” communication process while hazardous waste is transported between countries, meaning that each step is recorded and communicated to involved parties.<sup>17</sup> Second, the obligations do not ban waste trade totally, instead controlling movement through the communication system.<sup>18</sup> Third, the Basel Convention discourages, even prohibits, waste imports and exports involving a non-party.<sup>19</sup> Finally, the broad definition of “hazardous waste” set by the Convention covers waste that is defined as hazardous by either the importing, exporting, or transit country and meets certain other criteria.<sup>20</sup>

The Basel Convention creates a plan for illegal traffic of hazardous waste.<sup>21</sup> Illegal waste is waste made without notification; without consent; with consent obtained through fraud or a misrepresentation; or the result of deliberate disposal against the Convention.<sup>22</sup> This provision requires Convention parties to

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<sup>13</sup> Basel Convention, *supra* note 6, art. 6, ¶¶ 1–2, art. 9, ¶¶ 1–4; *see also* Message to the Senate Transmitting the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 1 PUB. PAPERS 523 (May 17, 1991).

<sup>14</sup> Basel Convention, *supra* note 6, art. 3 ¶ 1, art. 9, ¶¶ 5.

<sup>15</sup> *Id.* art. 6, ¶¶ 1–3.

<sup>16</sup> *Id.* art. 6, ¶¶ 3–4.

<sup>17</sup> *Id.* art. 6.

<sup>18</sup> Laura A. W. Pratt, *Decreasing Dirty Dumping? A Reevaluation of Toxic Waste Colonialism and the Global Management of Transboundary Hazardous Waste*, 41 TEX. ENV'T L.J. 147, 160 (2011).

<sup>19</sup> *Id.*

<sup>20</sup> Kitt, *supra* note 12, at 494–95.

<sup>21</sup> Basel Convention, *supra* note 6, art. 9.

<sup>22</sup> *Id.* art. 9, ¶ 1.

adopt national legislation governing illegal traffic of hazardous waste and ensures states that are importing or exporting hazardous waste take responsibility for citizens shipping and receiving such waste.<sup>23</sup>

However, the Basel Convention is not without flaws.<sup>24</sup> The Basel Convention allows several loopholes to operate unchecked, including concealment of fraudulent or illegal shipments, overly broad definitions, and regulatory differences between states.<sup>25</sup> It also opens the debate for a total ban.<sup>26</sup>

A total ban has two theories of impact on the Global South. The first theory assumes a positive outcome: it would protect countries with developing environmental-control systems from illegal practices.<sup>27</sup> The second theory suggests negative consequences on the Global South and legitimate waste-recycling practices by not allowing legitimate recycling practices to develop, stifling growth.<sup>28</sup> Most important to the case study discussed below, the United States has not ratified the Basel Convention, instead remaining as a signatory and utilizing bilateral and multilateral agreements to secure hazardous waste transportation.<sup>29</sup>

#### B. INTERNATIONAL CONVENTIONS BUILD ON THE BASEL CONVENTION FRAMEWORK

While Basel started the international regime for transboundary hazardous waste controls, several other conventions expanded on its foundation.<sup>30</sup> These conventions dealt with different aspects of Basel, particularly the Prior Informed Consent (PIC) model and POP management. Going into effect in 2004, both the Rotterdam Convention and the Stockholm Convention on Persistent Organic Pollutants served to set frameworks where the Basel Convention lacked guidance.

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<sup>23</sup> Kitt, *supra* note 12, at 497 (first citing Basel Convention, *supra* note 6, art. 9 ¶ 5; then citing Basel Convention, *supra* note 6, art. 9 ¶¶ 2–3).

<sup>24</sup> Pratt, *supra* note 18, at 166.

<sup>25</sup> *Id.* at 167–70.

<sup>26</sup> *See id.* at 168–69.

<sup>27</sup> *See* Gonzalo Biggs, *Latin America and the Basel Convention on Hazardous Wastes*, 5 COLO. J. INT'L ENV'T L. & POL'Y 333, 340 (1994).

<sup>28</sup> *See* Pratt, *supra* note 18, at 169.

<sup>29</sup> *Id.* at 170.

<sup>30</sup> Min Liu & Yanhao Liu, *International Control on Trade in Chemicals*, 3 US-CHINA L. REV. 12, 19 (2006).



### 1. *The Rotterdam Convention*

To expand on the PIC model established in the Basel Convention, the international community created the Rotterdam Convention to address the voluntary nature of PIC and create a mandatory implementation system.<sup>31</sup> The Rotterdam Convention combats the pattern of heavily industrialized countries exporting chemicals deemed too dangerous for use within the country of origin to countries with less chemical regulation.<sup>32</sup> This led to high levels of DDT in Guatemala and Malaysia, and high levels of DBCP in banana-producing countries,<sup>33</sup> causing sterility in farm workers.<sup>34</sup> Thus, the Rotterdam Convention focuses on protecting civilians from exposure to pesticides and chemicals around the world by allowing importers to exclude specific chemicals they cannot safely manage.<sup>35</sup>

The Rotterdam Convention applies to three categories of waste: banned or severely restricted chemicals,<sup>36</sup> severely hazardous pesticides,<sup>37</sup> and never registered chemicals.<sup>38</sup> The Rotterdam Convention then applies notification standards (Annex I) and risk evaluations (Annex II) to listed, regulated chemicals (Annex III).<sup>39</sup> The Rotterdam Convention formalized the volun-

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<sup>31</sup> See Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, at 3, Sept. 11, 1998, 38 I.L.M. 1. [hereinafter Rotterdam Convention].

<sup>32</sup> Nancy S. Zahedi, *Implementing the Rotterdam Convention: The Challenges of Transforming Aspirational Goals into Effective Controls on Hazardous Pesticides Exports to Developing Countries*, 11 GEO. INT'L ENV'T L. REV. 707, 708 (1999).

<sup>33</sup> See *id.* DDT is the common name for dichloro-diphenyl-trichloroethane, an insecticide. *Id.* DBCP is short for dibromo-chloropropane and is used in agriculture. *Id.* Both chemicals are incredibly toxic to human health and the environment but are not the main focus of this paper.

<sup>34</sup> See *id.* at 708–09.

<sup>35</sup> Liu & Liu, *supra* note 30, at 16.

<sup>36</sup> Hazardous chemicals are “industrial chemicals and chemical pesticides that in small doses can cause significant harm to the environment or human health.” Paula Barrios, *The Rotterdam Convention on Hazardous Chemicals: A Meaningful Step Toward Environmental Protection?*, 16 GEO. INT'L ENV'T L. REV. 679, 683 (2004).

<sup>37</sup> A pesticide is a substance “intended to prevent, destroy or control pests, such as vectors of human or animal disease and unwanted species of plants or animals causing harm or interfering with the production, processing, storage or marketing of food, agricultural commodities, and wood.” *Id.* at 684–85.

<sup>38</sup> See generally Rotterdam Convention, *supra* note 31.

<sup>39</sup> *FRA Evaluation Toolkit: The Rotterdam Convention and the Chemical Review Committee*, UN ENV'T PROGRAMME: ROTTERDAM CONVENTION, <http://www.pic.int/Implementation/FinalRegulatoryActions/FRAEvaluationToolkit/RCCRCrequirements/tabid/5000/language/en-US/Default.aspx> [https://perma.cc/CZQ5-DPSB].

tary reporting mechanism used to list hazardous waste.<sup>40</sup> Under the Convention, transitioning economies can petition for chemicals causing health and environmental concerns to be listed under Annex III.<sup>41</sup> Once the chemical is prepared for export, Rotterdam requires all chemicals subject to PIC to have proper labeling that informs handlers of the risks to human health and the environment.<sup>42</sup>

Building off the Basel Convention, the Rotterdam Convention does not address the PIC issues that plagued Basel's implementation.<sup>43</sup> In particular, failing to acknowledge the logical flaw that information alone will result in safe management of hazardous chemicals ignores the reality that without technology, trade, and support, the Global South will always be vulnerable to the unsuccessful implementation of PIC.<sup>44</sup>

Furthermore, the Rotterdam Convention does not create a mechanism to prevent noncompliance. Instead, the treaty is a voluntary system that includes a provision for parties to create binding mechanisms later.<sup>45</sup> This framework fails to address broad industry action, rendering the entire Convention useless.<sup>46</sup>

## 2. *Stockholm Convention on Persistent Organic Pollutants*

In late 2000, the international community established the Stockholm Convention on Persistent Organic Pollutants as a framework for regulating toxic POPs and mitigating the health concerns from localized exposure and biomagnification.<sup>47</sup> This treaty extended Rotterdam's earlier agreement, with the understanding that international regulation requires cooperative decision-making and not outright banning of chemicals.<sup>48</sup> All three major international treaties on transboundary hazardous waste govern POPs to some extent, but the Stockholm Convention

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<sup>40</sup> Barrios, *supra* note 36, at 729.

<sup>41</sup> *Id.*

<sup>42</sup> *Id.* at 732.

<sup>43</sup> *Id.* at 682.

<sup>44</sup> *See id.*

<sup>45</sup> *Id.* at 734–35.

<sup>46</sup> *See id.* at 740.

<sup>47</sup> Stockholm Convention on Persistent Organic Pollutants, May 22, 2001, 40 I.L.M. 532–33 [hereinafter Stockholm Convention].

<sup>48</sup> Pep Fuller & Thomas O. McGarity, *Beyond the Dirty Dozen: The Bush Administration's Cautious Approach to Listing New Persistent Organic Pollutants and the Future of the Stockholm Convention*, 28 WM. & MARY ENV'T L. & POL'Y REV. 1, 5–6 (2003).

provides explicit instructions for their management and transportation.<sup>49</sup>

The Stockholm Convention focuses on three types of POPs: intentionally produced, intentionally produced and limited to disease vector control, and unintentionally produced and released.<sup>50</sup> It then provides a framework to identify the most dangerous POPs, remove them from use, find safer alternatives, and clean up existing contamination.<sup>51</sup>

The initial Convention only included twelve POPs. The list has since expanded to include sixteen more chemicals, including PFOS, which the Stockholm Convention listed in 2009.<sup>52</sup> The Convention organizes each POP into one of three categories: Annex A (Elimination), Annex B (Restriction), and Annex C (Unintentional Production).<sup>53</sup> Parties must actively take measures to eliminate the “production and use of the chemicals listed in Annex A.”<sup>54</sup> Under Annex B, parties must restrict certain chemical production and use, but may continue production for an “acceptable purpose.”<sup>55</sup> Each party must minimize unintentional releases of chemicals listed under Annex C and work to eliminate them long-term where feasible.<sup>56</sup> As of May 2019, the Stockholm Convention agreed to list perfluorooctanoic acid (PFOA) under Annex A for global elimination, requiring member states to begin the process of banning the chemical.<sup>57</sup>

Stockholm does account for certain uses of chemicals that may require an exemption or notification falling under Annex

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<sup>49</sup> See Liu & Liu, *supra* note 30, at 19.

<sup>50</sup> Julie B. Truelsen, *Developments in Toxics in 2004: The Ratification of the Stockholm Convention and the Rotterdam Convention*, 2004 COLO. J. INT'L ENV'T L. & POL'Y 217, 220 (2004).

<sup>51</sup> *Id.* at 222.

<sup>52</sup> *The 16 New POPs: An Introduction to the Chemicals Added to the Stockholm Convention as Persistent Organic Pollutants by the Conference of the Parties*, UN ENV'T PROGRAMME 9 (June 2017).

<sup>53</sup> Stockholm Convention, *supra* note 47, annexes A–C.

<sup>54</sup> *Id.* art. 3, ¶ 1.

<sup>55</sup> *Id.* art. 3, ¶ 6, annex B.

<sup>56</sup> *Id.* art. 5.

<sup>57</sup> Bryce Baschuk, *UN Chemical Regulators Approve PFOA Ban, With Exemptions*, BLOOMBERG ENV'T & ENERGY (May 3, 2019, 2:50 PM), <https://news.bloombergenvironment.com/environment-and-energy/un-chemical-regulators-approve-pfoa-ban-with-exemptions> [<https://perma.cc/HJQ3-P7K3>].

A or Annex B.<sup>58</sup> The method of registration is similar to that of Basel and Rotterdam: notify the Secretariat of the Convention.<sup>59</sup>

Like Basel and Rotterdam, the Stockholm Convention does not ban exports of chemicals to non-party states.<sup>60</sup> However, it requires ratifying parties “to prevent the contamination of foreign countries.”<sup>61</sup> Part of this duty requires certification with supporting documents from non-party states that the states are committed to protecting human health and the environment, and will take measures to minimize releases and comply with various Articles of the Stockholm Convention.<sup>62</sup>

### C. REGIONAL AGREEMENTS EXPAND ON THE CONVENTIONS’ APPLICATION

A key component of the international conventions is the national implementation strategy.<sup>63</sup> The Basel Convention requires all parties to codify the Convention requirements into national law to create binding enforcement obligations.<sup>64</sup> Because of this provision, many of the regions met to create regional agreements to support the development of national laws, promote information sharing, and unify the region to better implement Basel.

#### 1. *The Bamako Convention*

Because of the fears that the Basel Convention would negatively affect the Global South and fail to protect lesser developed countries, the Organization of African Unity (OAU) created the “Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of

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<sup>58</sup> *Specific Exemptions and Acceptable Purposes*, UN ENV’T PROGRAMME: STOCKHOLM CONVENTION, <http://www.pops.int/Procedures/Exemptionsandacceptablepurposes/tabid/4646/Default.aspx> [<https://perma.cc/8QRQ-P27P>]. PFOS has several interesting “acceptable uses,” including aviation hydraulic fluids, insect bait for leaf-cutting ants, and photo-imaging.

<sup>59</sup> *Id.*

<sup>60</sup> Stockholm Convention, *supra* note 47, art. 3, ¶ 2(b)–(c).

<sup>61</sup> Matt Cohen, *U.S. Shipbreaking Exports: Balancing Safe Disposal with Economic Realities*, 28 ENVIRONS: ENV’T L. & POL’Y J. 237, 255–256 (2005).

<sup>62</sup> *Export to a Non-Party State*, UN ENV’T PROGRAMME: STOCKHOLM CONVENTION, <http://www.pops.int/Procedures/ExporttoanonPartyState/tabid/3349/Default.aspx> [<https://perma.cc/64X4-Y2T6>].

<sup>63</sup> Masa Nagai, *National Implementation of the International Prior Informed Consent Procedures Concerning Hazardous Chemicals and Wastes*, 4 SUSTAINABLE DEV. L. & POL’Y 29, 31–32 (2004).

<sup>64</sup> Basel Convention, *supra* note 14, art. 4, ¶ 4.

Hazardous Wastes within Africa” (the Bamako Convention).<sup>65</sup> The Bamako Convention establishes four obligations for participating parties: (1) ban importing hazardous waste, (2) ban dumping hazardous waste at sea and in internal waters, (3) apply strict liability to African waste generators to ensure proper reporting and disposal facilities are in place, and (4) enforce the Convention while still maintaining state sovereignty.<sup>66</sup>

Bamako differs from the Basel Convention by totally banning waste imports for final disposal or recycling in Africa.<sup>67</sup> After the passage of Bamako, only waste originating in Africa may cross over borders, thus ensuring no waste from other continents enters.<sup>68</sup> This allows the OAU to treat non-party imports as criminal, as all non-party actors would be from other continents.<sup>69</sup> The Bamako Convention also explicitly forbids dumping or incinerating waste at sea or within an internal water body, extending criminal liability beyond land to promote a healthy environment and continue to discourage Africa from being used as a dumping ground.<sup>70</sup> The Bamako Convention creates unlimited joint and several liability for hazardous waste generators to ensure parties recover the costs of environmental degradation and subsequent clean-up, encouraging enforcement of the Convention and discouraging illegal dumping.<sup>71</sup>

A key theory of the Bamako Convention is the precautionary principle of preventing environmental degradation when an industry or process is harmful or potentially harmful.<sup>72</sup> This approach requires parties to take preventative measures to ensure

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<sup>65</sup> Kitt, *supra* note 12, at 500–01.

<sup>66</sup> Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes Within Africa, art. 4, ¶¶ 1–4, Jan. 29, 1991, 30 I.L.M. 773 [hereinafter Bamako Convention].

<sup>67</sup> Kitt, *supra* note 12, at 501.

<sup>68</sup> *See id.* at 503.

<sup>69</sup> *Id.* at 501.

<sup>70</sup> Bamako Convention, *supra* note 66, art. 4, ¶ 2. Both Basel and Bamako served to address tragic waste dumping in Africa that led to sickness and death. Most famously, the 1988 Koko case, in which Italian businessmen dumped hazardous waste in Nigeria while paying a farmer \$100 a month “rent” triggered the Basel Convention. *See Bamako Convention: Preventing Africa from Becoming a Dumping Ground for Toxic Wastes*, UN ENV'T PROGRAMME (Jan. 30, 2018), <https://www.unep.org/news-and-stories/press-release/bamako-convention-preventing-africa-becoming-dumping-ground-toxic> [<https://perma.cc/6QAN-X7YH>]. Other examples are discussed later in this Article. *See discussion infra* Part III.

<sup>71</sup> Kitt, *supra* note 12, at 502.

<sup>72</sup> *See id.* at 502–03.

Africa does not become a toxic waste dump for the Global North.<sup>73</sup> By imposing stricter controls on hazardous waste entering the continent, the OAU protects its party states from outsourced industries that would take advantage of and degrade the environment.<sup>74</sup>

Despite these precautionary measures, the Bamako Convention did not prevent the toxic waste dump of 2006 in Abidjan, Côte d'Ivoire.<sup>75</sup> As the Convention continued its legacy, it was reconvened in 2018 for the African Union (formerly OAU) to review and renew the Bamako commitments towards a pollution-free Africa.<sup>76</sup> The Convention met for a third time in Brazzaville, Congo, in 2020.<sup>77</sup>

## 2. The Organization for Economic Cooperation and Development

Despite not ratifying the Basel Convention, the United States is a participant in the Organization for Economic Cooperation and Development (OECD).<sup>78</sup> The Organization issued an OECD decision in the 1990s after the Basel Convention's adoption to provide a uniform approach to transboundary hazardous waste.<sup>79</sup> Then, in a 2001 decision, the OECD created guidelines for waste destined for recovery operations between two member states, and redefined waste to meet the destination location's definition of waste.<sup>80</sup>

In 1995, the Basel Convention added an amendment, the OECD/Non-OECD Ban, taking into account OECD members

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<sup>73</sup> *Id.* at 503.

<sup>74</sup> *Id.*

<sup>75</sup> Rebecca Bratspies, *Corrupt at Its Core: How Law Failed the Victims of Waste Dumping in Côte d'Ivoire*, 43 COLUM. J. ENV'T L. 417, 418 (2018). This event is discussed in detail under the "Historical Applications" Section. See discussion *infra* Section III.A.

<sup>76</sup> Conference of the Parties to the Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes Within Africa, *Decision 2/1: The Bamako Convention: A Platform for a Pollution-Free Africa*, UNEP/BC/COP .2/1 (Apr. 25, 2018).

<sup>77</sup> See Conference of the Parties to the Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes Within Africa, *Decision 2/3: Dates and Venues of the Third Meeting and the First Extraordinary Meeting of the Conference of the Parties*, UNEP/BC/COP .2/3 (Apr. 25, 2018).

<sup>78</sup> See, e.g., Soizick de Tilly, *Guidance Manual for the Control of Transboundary Movements of Recoverable Wastes*, ORG. FOR ECON. COOP. & DEV. [OECD] 2 (2009).

<sup>79</sup> *Id.* at 9.

<sup>80</sup> *Id.* at 10–11.

and trade agreements.<sup>81</sup> To combat the weaknesses of the Basel Convention in addressing waste dumping in the Global South, this amendment bans OECD countries from exporting hazardous waste to non-members.<sup>82</sup> Although the amendment has not entered into force, many states have ratified it, showing strong international support.<sup>83</sup> Although the United States remains a party of the OECD without ratifying the Basel Convention, future interconnectedness in waste trade would direct the United States to ratify the Convention.<sup>84</sup>

### 3. *Economic Commission for Latin America and the Caribbean*

Similar to the OAU's creation of Bamako in response to Basel, the Economic Commission for Latin America and the Caribbean (ECLAC) held a convention in 1993 to establish a regional agreement on transboundary hazardous waste.<sup>85</sup> ECLAC approved a draft protocol supplementing a previous treaty on controlling the "transborder movement and elimination of hazardous wastes in the South East Pacific."<sup>86</sup>

ECLAC identified a number of issues that promoted the region to waste traffickers, including ignorance of the problem, extensive territorial space, scarcity of resources, corruption, instability, and lack of proper training.<sup>87</sup> To combat waste entering the region, ECLAC sought to establish an information-exchange network for states to communicate about hazardous waste, a data bank to keep track of proposals to introduce dangerous waste, improved technical training, and regional assistance in building infrastructure to prevent illegal dumping.<sup>88</sup>

ECLAC's 1993 meeting was ambitious; at the time, only ten regional states were parties to the Basel Convention.<sup>89</sup> After im-

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<sup>81</sup> Tseming Yang & C. Scott Fulton, *The Case for U.S. Ratification of the Basel Convention on Hazardous Wastes*, 25 N.Y.U. ENV'T L.J. 52, 68 (2017) .

<sup>82</sup> *Id.*

<sup>83</sup> *See id.* at 69.

<sup>84</sup> *See id.* at 56.

<sup>85</sup> Biggs, *supra* note 27, at 333.

<sup>86</sup> *Id.* at 362. The previous treaty was the Lima Convention, but it is not necessary to delve into the details since it was replaced by the draft protocol. *See id.*

<sup>87</sup> Edgardo Araneda, *Hazardous Products and Wastes: Impact of Transboundary Movement Towards the Latin American and Caribbean Region and Possibilities for Preventing and Controlling It*, ECON. COMM'N FOR LAT. AM. & THE CARIBBEAN [ECLAC] LC/R. 1303, at 4 (Oct. 28, 1993), [https://repositorio.cepal.org/bitstream/handle/11362/19121/S9391188\\_en.pdf?sequence=2](https://repositorio.cepal.org/bitstream/handle/11362/19121/S9391188_en.pdf?sequence=2) [<https://perma.cc/V9CH-MLM4>].

<sup>88</sup> *Id.* at 15–16.

<sup>89</sup> *See id.* at 7.

plementation of its goals, the region began to see a decline in waste importing.<sup>90</sup> Instead, traffickers shifted their focus to Asia, which had not yet created a regional agreement.

#### 4. *Asian Network for Prevention of Illegal Transboundary Movement of Hazardous Waste*

After almost a decade of Bamako and ECLAC working to prevent regional transboundary hazardous waste dumping from the Global North, Japan proposed an informal regional agreement for North, East, and Southeast Asia called the Asian Network for Prevention of Illegal Transboundary Movement of Hazardous Waste (Asian Network).<sup>91</sup> The Asian Network created an information system that allowed participating countries to create a common understanding of how to handle illegal transboundary hazardous waste, and to take national action to prevent future illegal waste.<sup>92</sup>

It was not until 2012 that the region established a formal enforcement network, the Regional Enforcement Network for Chemicals and Waste (Project REN).<sup>93</sup> Project REN created a coordinated regional network for law enforcement agencies to combat continued illegal trade and encourage legal chemical and waste trade.<sup>94</sup> It expands beyond Basel, Rotterdam, and Stockholm to include the Montreal Protocol's regulation of pollutants affecting the ozone layer.<sup>95</sup>

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<sup>90</sup> See Jennifer Clapp, *The Toxic Waste Trade with Less-Industrialised Countries: Economic Linkages and Political Alliances*, 15 *THIRD WORLD Q.* 505, 513–15 (1994).

<sup>91</sup> *Fact Sheet: Asian Network for Prevention of Illegal Transboundary Movement of Hazardous Waste*, UN ENV'T PROGRAMME: BASEL CONVENTION, <http://www.basel.int/Implementation/CountryLedInitiative/History/Combatingillegaltrafficomoreeffectively/EnforcementNetworks/AsianNetwork/tabid/2936/Default.aspx> [<https://perma.cc/B9H2-WJSU>].

<sup>92</sup> *Id.*

<sup>93</sup> See *Fact Sheet: Regional Enforcement Network for Chemicals and Waste (Project REN)*, UN ENV'T PROGRAMME: BASEL CONVENTION, <http://www.basel.int/Implementation/CountryLedInitiative/History/Combatingillegaltrafficomoreeffectively/EnforcementNetworks/ProjectREN/tabid/2921/Default.aspx> [<https://perma.cc/WF9V-9JCK>].

<sup>94</sup> *Id.*

<sup>95</sup> See *id.*



D. DOMESTIC LAWS IN THE UNITED STATES CODIFY  
INTERNATIONAL CONVENTIONS WITHOUT RATIFYING  
THEM

Although the United States failed to ratify many of the international treaties involving waste export, the United States is a leader in domestic waste management and regulation.<sup>96</sup> Many conventions are based on U.S. domestic laws—two of which, RCRA and TSCA, are discussed below—and are written to mimic the laws on an international stage.<sup>97</sup> However, despite the strength of its regulations, the United States is still one of the largest exporters of hazardous waste, much of which is shipped to the Global South.<sup>98</sup>

1. *Resource Conservation and Recovery Act*

The United States has domestic laws that parallel the Basel Convention, such as the Resource Conservation and Recovery Act (RCRA), which provides for PIC and waste tracking systems during export.<sup>99</sup> In fact, RCRA served as a foundation for future international transboundary waste regulations, including the Basel Convention, despite not providing consideration for states that lack capacity to receive hazardous waste.<sup>100</sup> In particular, RCRA formalized the “cradle-to-grave” procedure that the Basel Convention adopted.<sup>101</sup> This procedure requires hazardous waste to be tracked from generator to disposal via every handler that transports the waste.<sup>102</sup>

RCRA’s PIC requirement was eventually formalized in the Rotterdam Convention, another convention the United States has not ratified.<sup>103</sup>

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<sup>96</sup> Pratt, *supra* note 18, at 156–57.

<sup>97</sup> *Id.*

<sup>98</sup> *See id.* at 170.

<sup>99</sup> *Id.* at 156.

<sup>100</sup> *Id.*

<sup>101</sup> *See Summary of the Resource Conservation and Recovery Act*, EPA, <https://www.epa.gov/laws-regulations/summary-resource-conservation-and-recovery-act> [<https://perma.cc/4VY7-ZNT2>] (Sept. 28, 2021).

<sup>102</sup> *Id.*

<sup>103</sup> *See* Memorandum from Scott Hajost, Acting Assoc. Adm’r to the Adm’r of the EPA, Information on International Developments on Prior Informed Consent for Pesticides and Toxic Substances for the Briefing on Thursday, October 14, 1988 at 3:00 (Oct. 12, 1988); *Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade*, DEP’T OF STATE: OFF. OF ENV’T QUALITY, <https://www.state.gov/key-topics-office-of-environmental-quality-and-transboundary-issues/rotterdam-convention-on-the-prior>

## 2. Toxic Substances Control Act

Passed in 1976, the Toxic Substances Control Act (TSCA) restricts potentially hazardous chemicals.<sup>104</sup> While its primary goal was to control polychlorinated biphenyls (PCBs), TSCA grants power to the U.S. Environmental Protection Agency (EPA) to set reporting standards and testing requirements, and to restrict certain chemicals.<sup>105</sup> While TSCA mimics procedures set in Stockholm, it is primarily focused on domestic development and usage of chemicals, with the exception of Sections 12(b) and 13.<sup>106</sup> Under these Sections, TSCA requires both the import and export of chemicals to have proper certification and that requirements be set by the EPA.<sup>107</sup>

## 3. Frank R. Lautenberg Chemical Safety for the 21st Century Act

In 2016, Congress passed the Frank R. Lautenberg Chemical Safety for the 21st Century Act (LCSA), updating the federal regulatory framework to manage toxic chemicals.<sup>108</sup> Because TSCA already regulates some POPs,<sup>109</sup> LCSA mirrors some of the logic of the Stockholm Convention. Namely, LCSA attempts to move the United States into a precautionary market by “requiring manufacturers to provide data before chemicals go to market.”<sup>110</sup>

LCSA creates a prioritization standard that makes the EPA establish an assessment hierarchy when reviewing chemicals.<sup>111</sup> The Act also enables the EPA to require more substantiation from companies as they create new chemicals and claim confi-

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informed-consent-procedure-for-certain-hazardous-chemicals-and-pesticides-in-international-trade/ [https://perma.cc/DY7X-8R9J].

<sup>104</sup> Cohen, *supra* note 61, at 250.

<sup>105</sup> See *Summary of the Toxic Substances Control Act*, EPA, <https://www.epa.gov/laws-regulations/summary-toxic-substances-control-act> [https://perma.cc/GZR9-FCZC] (Oct. 22, 2021).

<sup>106</sup> *Id.*

<sup>107</sup> Basic Information on TSCA Import-Export Requirements, EPA, <https://www.epa.gov/tsca-import-export-requirements/basic-information-tsca-import-export-requirements#tsca> [https://perma.cc/W8FL-ALF7] (Feb. 9, 2022).

<sup>108</sup> See Valerie J. Watnick, *The Lautenberg Chemical Safety Act Of 2016: Cancer, Industry Pressure, and a Proactive Approach*, 43 HARV. ENV'T L. REV. 373, 373 (2019).

<sup>109</sup> See CONG. RSCH. SERV., RS22379, PERSISTENT ORGANIC POLLUTANTS (POPs): FACT SHEET ON THREE INTERNATIONAL AGREEMENTS 1–2 (2013).

<sup>110</sup> *Id.* at 409.

<sup>111</sup> *Highlights of Key Provisions in the Frank R. Lautenberg Chemical Safety for the 21st Century Act*, EPA, <https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/highlights-key-provisions-frank-r-lautenberg-chemical> [https://perma.cc/6GLA-QHKQ] (Feb. 12, 2020).

dential business information status.<sup>112</sup> The program allows the EPA to have more oversight over chemical manufacturers as they continue producing persistent, bioaccumulative, and toxic chemicals.<sup>113</sup>

#### 4. *Comprehensive Environmental Response, Compensation, and Liability Act*

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), passed in 1980 and known as Superfund, provides a mechanism for the federal government to directly respond to hazardous waste releases.<sup>114</sup> The Act authorizes a tax on chemical and petroleum industries to create a pot of money, from which the federal government can cover the costs for cleaning contaminated sites.<sup>115</sup> It creates liability for potentially responsible parties that release hazardous waste so that the government can recoup some of the losses from federal cleanup projects.<sup>116</sup>

Unlike the other acts, CERCLA is not yet mimicked in the major international transboundary hazardous waste conventions.<sup>117</sup> Because the conventions largely operate on a voluntary basis and require payment only if a country violates the treaties and is creating contamination,<sup>118</sup> the treaties will need to be updated to have more enforcement power before CERCLA can require states to pay a “tax” into a funding pot.<sup>119</sup> The obstacles posed by state sovereignty are likely insurmountable in this scenario.<sup>120</sup>

### III. HISTORICAL APPLICATION—LOOPHOLES AND FAILURES OF MAJOR ENVIRONMENTAL CONVENTIONS

The Basel Convention was created in response to two major hazardous waste incidents: (1) the *Khian Sea* incident and (2)

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<sup>112</sup> *See id.*

<sup>113</sup> *Id.*

<sup>114</sup> *Superfund: CERCLA Overview*, EPA, <https://www.epa.gov/superfund/superfund-cercla-overview> [<https://perma.cc/3YUY-CQMK>] (Feb. 14, 2022).

<sup>115</sup> *Id.*

<sup>116</sup> *Id.*

<sup>117</sup> Robert V. Percival, Katherine H. Cooper & Matthew M. Gravens, *CERCLA in a Global Context*, 41 Sw. L. REV. 727, 727 (2012).

<sup>118</sup> *See* Barrios, *supra* note 36, at 729; *supra* note 40 and accompanying text.

<sup>119</sup> Percival, *supra* note 117, at 733.

<sup>120</sup> *See id.* at 734.

the Koko dumping incident.<sup>121</sup> The *Khian Sea* was a ship that dumped approximately 22 million pounds of toxic waste in the ocean.<sup>122</sup> The ship was bound for Haiti, misrepresenting its cargo as “fertilizer ash” for disposal.<sup>123</sup> After the Haitian government caught wind of the fraud, the ship was forced back to sea, where it sailed for over a year, changed its identification several times, then reappeared—cargo hold empty.<sup>124</sup>

The second incident in Koko, Nigeria, ignited an international furor when leaders discovered that an Italian company was dumping toxic waste into the city.<sup>125</sup> These events caused the international community to rally, forming the initial Basel Convention, then the OAU’s Bamako Convention.<sup>126</sup> The following events summarize major environmental transportation crises that led to the harming of human health, the environment, or both to better understand why these conventions exist and to understand their contextual implementation. Information is sparse around illegal incidents, highlighting a need for better tracking and management of waste import and export.

#### A. CÔTE D’IVOIRE (2006) HIGHLIGHTS THE CONVENTIONS’ INABILITIES TO PREVENT CORRUPTION

In the middle of the night, a black sludge appeared in Abidjan, Côte d’Ivoire.<sup>127</sup> Over the next few days, residents of the city were admitted to the hospital or the mortuary as the mixture of “wash”—really a combination of caustic soda, mercaptans, and hydrogen sulfide—permeated the community.<sup>128</sup> The residue caused an unprecedented public health and safety crisis.<sup>129</sup>

The material, while appearing overnight, did not originate in Abidjan.<sup>130</sup> Instead, it was a result of the transboundary hazard-

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<sup>121</sup> See Hao-Nhien Q. Vu, *The Law of Treaties and the Export of Hazardous Waste*, 12 UCLA J. ENV’T L. & POL’Y 389, 389–90 (1994).

<sup>122</sup> *Id.*

<sup>123</sup> *Id.* at 389.

<sup>124</sup> *Id.* at 389–90.

<sup>125</sup> *Id.* at 390.

<sup>126</sup> *Id.* at 390–92.

<sup>127</sup> Lydia Polgreen & Marlise Simons, *Global Sludge Ends in Tragedy for Ivory Coast*, N.Y. TIMES (Oct. 2, 2006), <https://www.nytimes.com/2006/10/02/world/africa/02ivory.html> [<https://perma.cc/VNW2-QCHS>].

<sup>128</sup> *Id.*

<sup>129</sup> *See id.*

<sup>130</sup> *Id.*

ous waste market and the company Trafigura.<sup>131</sup> Trafigura leased a large tanker called the *Probo Koala* to transport the waste to Amsterdam, where a waste-processing company began unloading the waste until it realized the waste was not what Trafigura claimed.<sup>132</sup> When the waste-processing company refused to complete the contract, the *Probo Koala* went back to sea, where it eventually made its way to Abidjan and unloaded the waste into the city.<sup>133</sup>

Trafigura continues to maintain its innocence, citing the numerous countries through which it is divested, claiming that it notified Abidjan port authorities of the special handling required by its cargo, and emphasizing port authorities recommended several local companies and that Trafigura hired one of them: Compagnie Tommy.<sup>134</sup> Compagnie Tommy quoted Trafigura a mere fraction of what the Amsterdam company quoted Trafigura, and evidence suggests that Trafigura requested that Tommy create a false invoice for a higher charge after the dump occurred.<sup>135</sup>

In the Abidjan spill, two local actors were sent to prison for their role in brokering the deal with Trafigura and poisoning civilians, but Trafigura leadership largely escaped criminal liability.<sup>136</sup> Instead, Trafigura paid \$198 million to Côte d'Ivoire in a settlement.<sup>137</sup> Côte d'Ivoire then released two members of Trafigura's management from prison, and they have not faced further criminal charges.<sup>138</sup>

Although the Basel and Bamako Conventions sought to prevent this exact type of situation,<sup>139</sup> they failed here. Rebecca Bratspies writes, "Corruption unquestionably undermines environmental protection."<sup>140</sup> Because of the corruption at the heart

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<sup>131</sup> *Id.*

<sup>132</sup> *Id.*

<sup>133</sup> *Id.*

<sup>134</sup> *Id.*

<sup>135</sup> *Trafigura: A Toxic Journey*, AMNESTY INT'L (2012), <https://www.amnesty.org/en/latest/news/2016/04/trafigura-a-toxic-journey/> [https://perma.cc/PVA9-WVUK].

<sup>136</sup> *Id.*

<sup>137</sup> Peter Murphy, *Trafigura Execs Released After Ivory Coast Deal*, REUTERS (Feb. 14, 2007 2:09 PM), <https://www.reuters.com/article/us-ivorycoast-toxic-release/trafigura-execs-released-after-ivory-coast-deal-idUSL1461558720070214> [https://perma.cc/6LBG-8ZEP].

<sup>138</sup> *Id.*

<sup>139</sup> See Bratspies, *supra* note 75, at 421.

<sup>140</sup> *Id.* at 423.

of the Trafigura scandal, innocent people were hurt. Bratspies argues that the legal framework created by the Basel Convention—allowing multilateral and bilateral lending policies to exploit developing countries entering the global market by encouraging, almost requiring, them to produce raw goods for export—allows the countries to be taken advantage of through illegal shipment and dumping of waste.<sup>141</sup> To correct the issue, accountability for transnational corporations, instead of only local actors, is necessary to balance the scales.<sup>142</sup>

#### B. THE ITALIAN MAFIA WASTE DISPOSAL RING CREATES INTERNATIONAL TOXIC ZONES THROUGH THE BROKER LOOPHOLE

Illegal waste trade also roots itself with crime syndicates like the ‘Ndrangheta and the Camorra family.<sup>143</sup> While many illegal dumps occurred inside the borders of Italy, there are also fewer reported cases of intentional sinking in the Mediterranean and transportation to Somalia.<sup>144</sup> The waste is not all domestic; much of the toxic chemicals that are dumped come from other European countries and beyond.<sup>145</sup>

In 2009, a ‘Ndrangheta boss indicated that radioactive and hazardous waste were routinely sunk in the Mediterranean Sea.<sup>146</sup> Inspectors found evidence of forty-two cargo ships carrying waste drums, some suspected to be nuclear waste and toxic aluminum waste.<sup>147</sup> While limited information is known on the location of all ships that have sunk under mysterious circumstances, there is evidence of scuttling—the deliberate sinking of a ship—in the Mediterranean where the crew abandoned the ship prior to it sinking.<sup>148</sup> Suspiciously, the number of ships dis-

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<sup>141</sup> See *id.* at 436.

<sup>142</sup> See *id.* at 435.

<sup>143</sup> Jason A. Slaybaugh, *Garbage Day: Will Italy Finally Take Out Its Trash in the Land of Fires?*, 26 WASH. INT’L L.J. 179, 187 n.60 (2017).

<sup>144</sup> John Hooper, *Shipwreck May Hold Radioactive Waste Sunk by Mafia off Italian Coast*, GUARDIAN (Sept. 16, 2009), <https://www.theguardian.com/world/2009/sep/16/shipwreck-waste-mafia-italy> [<https://perma.cc/8N7C-X2QQ>].

<sup>145</sup> *Id.*

<sup>146</sup> *Id.*

<sup>147</sup> *Id.*; see also *Establishment Hit by Fresh Accusations in Toxic Waste Scandal*, HERALD (Sept. 19, 2009), <https://www.heraldscotland.com/news/12613554.establishment-hit-by-fresh-accusations-in-toxic-waste-scandal/> [<https://perma.cc/GS7M-U8UL>] (explaining that investigators were told about toxic aluminum and radioactive waste dumping).

<sup>148</sup> Madhusree Mukerjee, *Poisoned Shipments: Are Strange, Illicit Sinkings Making the Mediterranean Toxic?*, SCI. AM. (Feb. 1, 2010), <https://www.scientificamerican.com>.

appearing under strange circumstances dramatically increased after the 1995 OECD/non-OECD ban amendment was added to the Basel Convention, going from two per year to an average of nine wrecks per year.<sup>149</sup>

Most famously, Italian mafia waste dumping in Somalia led to the murder of an investigative TV journalist, Ilaria Alpi.<sup>150</sup> Because Somalia was in the middle of a civil war, clan warlords “demanded [payment in] guns and ammunition to allow the dumping to continue.”<sup>151</sup> Alpi likely gained evidence of the trade.<sup>152</sup> Former clan members reported that she had observed mafia efforts to unload waste in the east African country, and a hit was placed on her.<sup>153</sup> The murder was not uncovered until more than a decade later, when a judge ordered investigators to look further into Alpi’s supposed murder-kidnapping.<sup>154</sup> During a tsunami in 2004, large metal containers washed up on the Somali coast, supporting the theory that waste was dumped on Somali land.<sup>155</sup> The United Nations (UN) linked the waste to local deaths and injuries, indicating the hazardous nature of the material.<sup>156</sup> The Somali dumpings stemmed from the regional instability created by a war-torn, famine-stricken country with no faction in control of the government.<sup>157</sup>

The Basel Convention applies standards for illegal waste dumping, but Italy ratified the Convention in 1994, years after many of the purported dumpings.<sup>158</sup> Somalia did not ratify the Convention until July 2010,<sup>159</sup> but under Basel, the illegal expor-

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com/article/poisoned-shipments-criminal-waste-disposal/ [https://perma.cc/99V4-423A].

<sup>149</sup> *Id.*

<sup>150</sup> See HERALD, *supra* note 147.

<sup>151</sup> Chris Milton, *Somalia Used as Toxic Dumping Ground*, ECOLOGIST (Mar. 1, 2009), <https://theecologist.org/2009/mar/01/somalia-used-toxic-dumping-ground> [https://perma.cc/473T-9RWE].

<sup>152</sup> *Id.*

<sup>153</sup> Hooper, *supra* note 144.

<sup>154</sup> See HERALD, *supra* note 147.

<sup>155</sup> UN ENV’T PROGRAMME: ASIAN TSUNAMI TASK FORCE, AFTER THE TSUNAMI: RAPID ENVIRONMENTAL ASSESSMENT 120, 134–35 (2005), [http://wedocs.unep.org/bitstream/handle/20.500.11822/8372/-After%20the%20Tsunami\\_%20Rapid%20Environmental%20Assessment-20053636.pdf?sequence=3&isAllowed=y](http://wedocs.unep.org/bitstream/handle/20.500.11822/8372/-After%20the%20Tsunami_%20Rapid%20Environmental%20Assessment-20053636.pdf?sequence=3&isAllowed=y) [https://perma.cc/9T6T-YKM5].

<sup>156</sup> See *id.* at 11; Mukerjee, *supra* note 148.

<sup>157</sup> Vu, *supra* note 121, at 390.

<sup>158</sup> *Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal*, UN ENV’T PROGRAMME: BASEL CONVENTION, <http://www.basel.int/?tabid=4499> [https://perma.cc/MLK2-WX9H].

<sup>159</sup> *Id.*

tation of hazardous chemicals from Italy to Somalia highlights a loophole that allows businesses to exploit vulnerable parties into illegally accepting harmful waste.<sup>160</sup>

This example also shines a light on another glaring failure of the Basel Convention. The Italian mafia is not generating the dumped waste.<sup>161</sup> Instead, the criminal organization is acting as an intermediary between legitimate businesses and states to set up contracts for hazardous waste.<sup>162</sup> As a broker, the mafia should have kept documentation of transportation, but due to the mafia's insidious intentions, there are no records and limited figures on just how much waste was transported and dumped off the coast of Somalia.<sup>163</sup> Some suggestions posed to combat this loophole include having the broker's country of origin listed as a transit country or expanding the definition of waste exporter to include contract brokers.

C. TRANSNATIONAL MOVEMENT CROSSES MANY BORDERS,  
MAKING IT DIFFICULT TO IDENTIFY AND PREVENT  
HAZARDOUS WASTE DUMPS IN CHINA

In more recent news, the Chinese government has cracked down on the illicit dumping of hazardous waste, following in the spirit of Basel.<sup>164</sup> In 2017, the state announced a ban on more than twenty imports, with a plan to eventually implement a total ban.<sup>165</sup> China has regulated waste transportation since the 1990s, when the government attempted to implement the Basel Convention within state law.<sup>166</sup>

For example, China utilized the Basel Convention's framework to criminally prosecute William Ping Chen, a Chinese-American, after he fraudulently smuggled municipal waste

<sup>160</sup> Vu, *supra* note 121, at 431.

<sup>161</sup> See HERALD, *supra* note 147.

<sup>162</sup> See *id.*

<sup>163</sup> Vu, *supra* note 121, at 432. Granted, I never expected the mafia to actually keep track of their illegal nuclear waste. They are, after all, a criminal organization. It just would have been nice of them to follow the law in this instance.

<sup>164</sup> See David Stanway, *China Plans to End Illegal Hazardous Chemical Dumping by 2025*, REUTERS (Oct. 21, 2019, 12:26 AM), <https://www.reuters.com/article/us-china-environment-chemicals/china-plans-to-end-illegal-hazardous-chemical-dumping-by-2025-idUSKBNIX00E4> [<https://perma.cc/5KHM-SAM8>].

<sup>165</sup> Aya Yoshida, *China's Ban of Imported Recyclable Waste and Its Impact on the Waste Plastic Recycling Industry in China and Taiwan*, 24 J. MATERIAL CYCLES & WASTE MGMT. 73, 73 (2021).

<sup>166</sup> *Id.* at 74.



across the border.<sup>167</sup> He falsely claimed that the waste was waste-paper or mixed paper, bringing 238 tons of garbage instead.<sup>168</sup> Despite working with a legitimate waste-recycling group, the Shanghai United Paper Industries Company, Limited, Chen ignored the company's objections to importing the waste.<sup>169</sup> This case marked the start of a new era in Chinese waste management, with a surge of 202 court cases involving illegal waste traffic between 1997 and 2002, up from the approximately 20 cases that had been heard prior to 1997.<sup>170</sup>

China famously has been the United States' e-waste dumping grounds, with towns such as Guiyu taking a substantial amount of the industrialized world's obsolete technology.<sup>171</sup> This caused massive environmental degradation of the former rice village, making the water undrinkable and the land unlivable.<sup>172</sup> Residents have experienced serious health effects, including dangerous levels of dioxin and lead poisoning, and children have 50% higher blood lead levels than children living in neighboring towns that did not handle end-of-life e-waste.<sup>173</sup> While much of the contamination came from general electronic dumping, what caused the crisis was environmentally unsound management practices used to dismantle the electronics.<sup>174</sup> This reflects the other side of Basel, which requires party states to use envi-

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<sup>167</sup> See Janice Wingo, *The Garbage Smuggling Case: Judgment of Division One of the Shanghai Municipal Intermediate Level People's Court January 13, 1997*, 6 PAC. RIM L. & POL'Y J. 607, 607–11 (1997).

<sup>168</sup> *Id.* at 611.

<sup>169</sup> See *id.* at 610.

<sup>170</sup> Ying Xia, *China's Environmental Campaign: How China's "War on Pollution" Is Transforming the International Trade in Waste*, 51 N.Y.U. J. INT'L L. & POL. 1101, 1128 (2019).

<sup>171</sup> See Hannah G. Elisha, Comment, *Addressing the E-Waste Crisis: The Need for Comprehensive Federal E-Waste Regulation Within the United States*, 14 CHAP. L. REV. 195, 204 (2010).

<sup>172</sup> *Id.* at 204, 204 n.62 (first citing Nicola J. Templeton, *The Dark Side of Recycling and Reusing Electronics: Is Washington's E-Cycle Program Adequate?*, 7 SEATTLE J. FOR SOC. JUST. 763, 773–74 (2008); then citing *Following the Trail of Toxic E-Waste*, CBS NEWS: 60 MINUTES <https://www.cbsnews.com/news/following-the-trail-of-toxic-e-waste/> [<https://perma.cc/83B3-LPEX>] (Aug. 27, 2009)).

<sup>173</sup> *Id.* at 204.

<sup>174</sup> *Id.* at 195, 203–04. The conditions in Guiyu parallel the conditions of the Agbogbloshie area in Ghana, another e-waste dumping site. See Peter Yeung, *The Toxic Effects of Electronic Waste in Accra, Ghana*, BLOOMBERG (May 29, 2019, 2:20 PM), <https://www.bloomberg.com/news/articles/2019-05-29/the-rich-world-s-electronic-waste-dumped-in-ghana> [<https://perma.cc/25EK-ZHKR>].

ronmentally sound practices when recycling hazardous material.<sup>175</sup>

The Chinese waste trade is insidious. The trade runs largely underground, exchanging hands in different states, going from Japan to Hong Kong to North Korea, then back to Northern China, before reaching its final destination.<sup>176</sup> This makes tracking illegal waste in violation of the Basel Convention difficult, if not impossible.<sup>177</sup> However, the Basel Convention does provide guidance for handling illegal waste under Article 9, which assigns liability to the state of the party with illegal conduct.<sup>178</sup> If the liable party is indeterminable, all parties involved are expected to cooperate in the environmentally sound disposal of the contaminant.<sup>179</sup>

Unfortunately, the e-waste trade illustrates the recycling loophole in Basel.<sup>180</sup> Exporters can claim that hazardous waste is recoverable or recyclable, as in the case of e-waste traveling to Guiyu, and can exploit the Convention to indiscriminately move hazardous waste to regions that lack the methods needed to treat the waste.<sup>181</sup> This causes areas overwhelmed by waste to resort to environmentally unsound methods of disposal,<sup>182</sup> evidenced by Guiyu's use of open burning to recover precious metals.<sup>183</sup>

#### D. GLOBAL NORTH GOVERNMENTS AND COMPANIES TAKE ADVANTAGE OF FREE MARKET INCENTIVES TO IMPORT WASTE INTO PARAGUAY (1998), WITH LITTLE RECOURSE<sup>184</sup>

With the introduction of the Southern Cone Market (MERCOSUR) in 1991, Central and South American economies began to accelerate the removal of customs barriers, duties, and tariffs.<sup>185</sup> By 1998, Greenpeace, an environmental watchdog,

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<sup>175</sup> Elisha, *supra* note 171, at 218.

<sup>176</sup> Xia, *supra* note 170, at 1130.

<sup>177</sup> *See id.*

<sup>178</sup> Basel Convention, *supra* note 6, art. 9.

<sup>179</sup> *Id.*

<sup>180</sup> *See* Biggs, *supra* note 27, at 348.

<sup>181</sup> *Id.*

<sup>182</sup> *Id.*

<sup>183</sup> *See* Elisha, *supra* note 171, at 204.

<sup>184</sup> Although Paraguay had not signed or ratified Basel when ECLAC first met, it became a party in 1995. *See* UN ENV'T PROGRAMME: BASEL CONVENTION, *supra* note 158.

<sup>185</sup> Biggs, *supra* note 27, at 355.

warned that plans from the United States cited movement of hazardous waste, and 1,100 mysterious containers of haphazardly labelled material ended up in a warehouse in Asuncion, Paraguay.<sup>186</sup>

A second dumping occurred at the end of 1998 when America-based Delta & Pine Land Company, a cottonseed producer, dumped 660 tons of expired cottonseed in a rural community of Paraguay.<sup>187</sup> The cottonseed was contaminated with toxic pesticides, and the dump resulted in acute pesticide poisoning in the local community.<sup>188</sup> Although the event clearly caused health effects, the Paraguayan government refused to step in and provide support while the town struggled to recover from the effects of the toxin.<sup>189</sup>

Interestingly, the Delta & Pine Land Company's importation of the cottonseed into Paraguay did not start out illegal; in fact, it was authorized by the Ministry of Agriculture and Livestock in 1997.<sup>190</sup> Because Paraguay is a member of ECLAC and a party to the Basel Convention, the state codified criminal charges against individuals partaking in illegal dumping. Thus, Paraguay pursued criminal charges against the facilitators and accomplices of the waste dumps of 1998.<sup>191</sup> Unfortunately, the only facilitators punished were from the Global South, nullifying any attempt to make the Global North and the Global South equally responsible.<sup>192</sup>

#### IV. ARGUMENT

After several decades of international regimes focused on preventing illegal transboundary hazardous waste and providing

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<sup>186</sup> Dario Montero, *Environment: MERCOSUR a Toxic Waste Dump?*, INTER PRESS SERV. (Feb. 1, 1998), <http://www.ipsnews.net/1998/02/environment-mercosur-a-toxic-waste-dump/> [<https://perma.cc/4FHA-W99D>].

<sup>187</sup> *Court Victory in Paraguay: Delta & Pine Corporation Guilty of Crimes Against the Environment*, IUF (Aug. 25, 2004), [http://www.iuf.org/cgi-bin/dbman/db.cgi?db=Default&uid=default&ID=2316&view\\_records=1&ww=1&en=1](http://www.iuf.org/cgi-bin/dbman/db.cgi?db=Default&uid=default&ID=2316&view_records=1&ww=1&en=1) [<https://perma.cc/HTM2-Y88C>].

<sup>188</sup> *Id.*

<sup>189</sup> *Id.*

<sup>190</sup> *IUF Calls on Delta and Pine Land to Clean Up Toxic Disaster in Paraguay*, SEED-QUEST (June 25, 1999, 4:47 PM), <https://seedquest.com/News/releases/usa/DeltaPine/N1935.htm> [<https://perma.cc/8A3Z-QWXF>].

<sup>191</sup> IUF, *supra* note 187.

<sup>192</sup> *See id.* While the results were heralded as landmark for Latin America, the Delta & Pine Paraguay chief fled the country and became "a fugitive from justice"; none of the other top leadership were imprisoned. *Id.*

regulations for the legal market, the international community is faced with the threat of significant levels of POPs around the world.<sup>193</sup> The focus of this argument is to look at the transportation of GenX and apply the framework of international conventions. Despite the United States failing to ratify Basel, Rotterdam, or Stockholm, the Conventions provide guidelines for how the international community may treat GenX and similar substances in the near future.

#### A. INTRODUCTION TO PFAS

Per- and polyfluoroalkyl substances (PFAS) are a class of emerging contaminants with various health effects.<sup>194</sup> Existing since the 1940s, PFAS compounds are in everything: what we wear, what we eat, and even what we drink.<sup>195</sup> Because of their chemical makeup—a long chain of carbon and fluorine atoms—the compounds cannot naturally degrade, and there is not yet a calculable half-life.<sup>196</sup> These chemicals are both hydrophobic and lipophobic, making them insoluble in water or fats and lending the persistent characteristic that makes PFAS so difficult to dispose of.<sup>197</sup> These compounds are man-made byproducts of manufactured chemicals and do not occur in the natural environment.<sup>198</sup> Despite some recognition of their toxicity, there is little knowledge of PFAS generally, and the existing research predominantly focuses on PFOA and PFOS.<sup>199</sup>

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<sup>193</sup> See, e.g., *Basic Information on PFAS*, EPA, [https://19january2021snapshot.epa.gov/pfas/basic-information-pfas\\_.html](https://19january2021snapshot.epa.gov/pfas/basic-information-pfas_.html) [<https://perma.cc/4CSL-WC8B>] (Jan. 14, 2021).

<sup>194</sup> *Id.*

<sup>195</sup> *Id.*

<sup>196</sup> *Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)*, NAT'L INST. OF ENV'T HEALTH SCIS., <https://www.niehs.nih.gov/health/topics/agents/pfc/index.cfm> [<https://perma.cc/ML43-8GVA>]. There are also short-chain PFAS compounds, which presumably degrade at a faster rate than long-chain compounds. In one study published in *Environmental Health Perspectives*, researchers found that serum PFAS concentrations did decline in human subjects with long-chain PFAS lasting years longer in the body than their short-chain counterparts. Wendee Nicole, *Breaking It Down: Estimating Short-Chain PFAS Half-Lives in a Human Population*, 128 ENV'T HEALTH PERSPS. 1, 1–2 (2020).

<sup>197</sup> Robert C. Buck, James Franklin, Urs Berger, Jason M. Conder, Ian T. Cousins, Pim de Voogt, Allan Astrup Jensen, Kurunthachalam Kannan, Scott A. Mabury & Stefan PJ van Leeuwen, *Perfluoroalkyl and Polyfluoroalkyl Substances in the Environment: Terminology, Classification, and Origins*, 7 INTEGRATED ENV'T ASSESSMENT & MGMT. 513, 513 (2011).

<sup>198</sup> EPA, *supra* note 193.

<sup>199</sup> *Id.*

Humans are easily exposed to PFAS compounds due to their global usage in products with many opportunities for exposure.<sup>200</sup> When even the EPA says potential PFAS exposure occurs when “drinking water” or “inhaling air,” the magnitude of the issue becomes visible.<sup>201</sup> Their prevalence in the environment causes humans to intake more than they excrete the compounds, leading to bioaccumulation.<sup>202</sup> Although the extent of long-term effects is not completely understood, research indicates that PFAS affects metabolism, fertility, fetal growth, immune system strength, and risk of obesity.<sup>203</sup>

While there are some breakthroughs in PFAS degradation—namely, microbial degradation via extracted wetland bacterium—a solution to the PFAS problem is not yet commercially available.<sup>204</sup> PFOA and PFOS are regulated internationally to some extent, but they are narrow products of a broad category of chemicals.<sup>205</sup> This means the Conventions must develop further regulations to prevent PFAS contamination until science can catch up to the decontamination needs.

PFAS litigation is entering the forefront of U.S. international law. In *Mooney v. E.I. Du Pont de Nemours & Co.*, the plaintiff accused DuPont of creating Chemours, the chemical company at issue in the case, to insulate DuPont from further litigation and environmental liability.<sup>206</sup> The accusation arises from DuPont’s former production of PFOA and resulting class action lawsuit because of PFOA exposure resulting in increased risk of cancer.<sup>207</sup> That class action was settled out of court with DuPont and

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<sup>200</sup> *Id.*

<sup>201</sup> EPA, FACT SHEET: DRAFT TOXICITY ASSESSMENTS FOR GENX CHEMICALS AND PFBS 2 (2018), [https://www.epa.gov/sites/production/files/2018-11/documents/factsheet\\_pfbs-genx-toxicity\\_values\\_11.14.2018.pdf](https://www.epa.gov/sites/production/files/2018-11/documents/factsheet_pfbs-genx-toxicity_values_11.14.2018.pdf) [<https://perma.cc/BVR5-2B6G>].

<sup>202</sup> NAT’L INST. OF ENV’T HEALTH SCIS., *supra* note 196.

<sup>203</sup> *Id.*

<sup>204</sup> See Janet Pelley, *Wetland Microbe Detoxifies PFAS Contaminants*, CHEM. & ENG’G NEWS (Sept. 20, 2019), <https://cen.acs.org/environment/persistent-pollutants/Wetland-microbe-detoxifies-PFAS-contaminants/97/web/2019/09> [<https://perma.cc/B44K-2SUG>].

<sup>205</sup> UN ENV’T PROGRAMME, BASEL CONVENTION: TECHNICAL GUIDELINES ON THE ENVIRONMENTALLY SOUND MANAGEMENT OF WASTES CONSISTING OF, CONTAINING OR CONTAMINATED WITH PERFLUOROOCTANE SULFONIC ACID, ITS SALTS AND PERFLUOROOCTANE SULFONYL FLUORIDE 10–14.

<sup>206</sup> *Mooney v. E.I. Du Pont de Nemours & Co.*, No. N17C-01-374 AML, 2017 WL 5713308, at \*1 (Del. Super. Ct. Nov. 28, 2017), *aff’d*, 192 A.3d 557 (Del. 2018).

<sup>207</sup> *Id.* at \*2; see also *Leach v. E.I. Du Pont de Nemours & Co.*, No. 01-C-608, 2002 WL 1270121, at \*17 (W. Va. Cir. Ct. Apr. 10, 2002).

Chemours paying \$671 million to injured individuals.<sup>208</sup> Members of the class action brought individual suits against the companies as well, with the court issuing verdicts against DuPont and juries ordering DuPont to pay millions of dollars in punitive damages.<sup>209</sup> Despite the Delaware court in *Mooney* dismissing the claims against the DuPont spin-off Chemours,<sup>210</sup> the plaintiff's fears were not unfounded based on the outcome of earlier DuPont litigation and the emergence of the case study below.

## B. CASE STUDY

GenX is a perfluorinated substance that has high persistence and high mobility.<sup>211</sup> It is classified as a PFAS compound, which includes PFOA and PFOS.<sup>212</sup> GenX is a chemical produced in Fayetteville, North Carolina, by Chemours, a subsidiary of DuPont Chemical.<sup>213</sup> Over the course of several decades, GenX has drained into the Cape Fear River and the Wilmington, North Carolina, municipal water supply as an unintended byproduct from a Chemours product.<sup>214</sup>

Once Chemours discovered the byproduct, it developed the chemical as a replacement to perfluorooctanoic acid (PFOA or C8).<sup>215</sup> PFOA, a compound used to make Teflon for decades, was phased out of production after public outcry that the compound caused significant health effects.<sup>216</sup> There is no evidence that GenX reduces the risk of PFOA, and communities located

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<sup>208</sup> Arathy S. Nair, *DuPont Settles Lawsuits over Leak of Chemical Used to Make Teflon*, REUTERS (Feb. 13, 2017, 5:49 AM), <https://www.reuters.com/article/us-du-pont-lawsuit-west-virginia/dupont-settles-lawsuits-over-leak-of-chemical-used-to-make-teflon-idUSKBN15S18U> [<https://perma.cc/T7G9-KLMC>].

<sup>209</sup> *Id.*

<sup>210</sup> *Mooney*, 2017 WL 5713308, at \*8.

<sup>211</sup> T. de Kort, M. Beekman & J. Ng-A-Tham, *GenX in the Environment and Waste Streams in the Netherlands 2013–2018*, 3 ENV'T EPIDEMIOLOGY 91, 91 (2019) (explaining that high persistence means the compound is stable and does not easily, readily, or naturally degrade, and that high mobility means that it can survive in multiple environments: water, air, or earth).

<sup>212</sup> EPA, *supra* note 201, at 1.

<sup>213</sup> *N.C. Drinking Water Tainted with Chemical Byproduct for Decades?*, CBS NEWS (June 26, 2017, 7:47 AM), <https://www.cbsnews.com/news/wilmington-nc-cape-fear-river-water-tainted-genx-dupont-chemours/> [<https://perma.cc/E6V6-HEQK>].

<sup>214</sup> *Toxic Tap Water*, WILMINGTON STARNEWS, <https://gatehousenews.com/genx/home/site/starnews.com> [<https://perma.cc/4PUM-JE4U>].

<sup>215</sup> *See id.*

<sup>216</sup> *See Fact Sheet: 2010/2015 PFOA Stewardship Program*, EPA, <https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/fact-sheet-20102015-pfoa-stewardship-program> [<https://perma.cc/Y22D-ZLC7>] (Apr. 26, 2022).

near the Cape Fear wastewater discharges have reported higher rates of childhood cancer and other health impacts.<sup>217</sup> Because GenX is the same kind of chemical compound as PFOA, GenX is likely not any better for human health and the environment, but this could mean that the implementation of PFOA regulation is possible against all PFAS.<sup>218</sup>

GenX is now used to make high-performance fluoropolymers.<sup>219</sup> These are then used to make nonstick coatings without the use of PFOA.<sup>220</sup> The chemical is shipped to the Netherlands for use and then shipped back to the United States.<sup>221</sup> Chemours claims to ship GenX back to the United States for recycling, but why would the company spend the money to transport it back to North Carolina if it could simply recycle it in the Netherlands? The answer to this question lies in the international conventions analyzed above: GenX is listed as a hazardous waste abroad but is unregulated in the United States.<sup>222</sup>

In early 2018, the North Carolina Department of Environmental Quality discovered that Chemours, located in Dordrecht, Netherlands, was exporting GenX to Fayetteville, North Carolina.<sup>223</sup> The compound was found in recycled wastewater mixed with other materials.<sup>224</sup> Once alerted, the EPA issued a letter of objection, asking Chemours to clarify if it was shipping one or

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<sup>217</sup> CBS NEWS, *supra* note 213.

<sup>218</sup> See EPA, *supra* note 201, at 1.

<sup>219</sup> *Id.*

<sup>220</sup> *Id.*

<sup>221</sup> Travis Fain, *Chemours 'Re-Importing' GenX Waste from Netherlands*, WRAL, <https://www.wral.com/chemours-re-importing-genx-waste-from-netherlands/18148032/> [<https://perma.cc/76FT-UG9A>] (Jan. 26, 2019, 5:45 PM).

<sup>222</sup> See *id.*

<sup>223</sup> Lisa Sorg, *DEQ Discovered GenX Waste Imports from Netherlands to Fayetteville, Asked EPA for Details*, NC POL'Y WATCH (Jan. 25, 2019), <http://pulse.ncpolicywatch.org/2019/01/25/deq-knew-of-genx-waste-imports-from-netherlands-to-fayetteville-asked-epa-for-details/> [<https://perma.cc/YV3A-2CYR>]; see also Lisa Sorg, *BREAKING: Chemours in the Netherlands Exporting GenX Waste to Fayetteville Works, Says EPA Letter*, NC POL'Y WATCH (Jan. 25, 2019), <http://pulse.ncpolicywatch.org/2019/01/25/breaking-chemours-in-the-netherlands-exporting-genx-waste-to-fayetteville-works-says-epa-letter/> [<https://perma.cc/2S6U-2SAP>] [hereinafter *BREAKING*]; Greg Barnes, *Environmentalists Bemoan Regulators' Lack of Transparency on Imported Shipments of GenX Wastewater*, N.C. HEALTH NEWS (Feb. 14, 2019), <https://www.northcarolinahealthnews.org/2019/02/14/environmentalists-bemoan-regulators-lack-of-transparency-on-imported-shipments-of-genx-wastewater/> [<https://perma.cc/9XTT-ZZV6>].

<sup>224</sup> See *BREAKING*, *supra* note 223.

two types of waste streams and to clarify the record.<sup>225</sup> There is a lack of information on the subject—much of the information is redacted or classified as Chemours’s confidential business information—but the letters from EPA and Chemours seem to suggest that there is minimal information and certification regarding importation.<sup>226</sup>

Regardless of the legality of Chemours’ importing wastewater for reclamation, GenX and its parent compound must be regulated by the international community. These compounds are dangerous to human health and the environment, correlating to higher rates of liver damage and kidney damage.<sup>227</sup> If GenX and its parent compound are allowed to be transported unchecked, the international community risks losing everything the Basel Convention and other international agreements have worked towards to create a pollution-free environment.

### C. APPLICATION OF CONVENTION FRAMEWORKS

As the global market continues to develop, new chemicals will enter the product stream as old chemicals phase out. This causes unique challenges to regulators, who are constantly trying to protect humans from unhealthy exposure. Because PFAS encompasses a category of substances that number in the thousands,<sup>228</sup> Convention parties must update existing frameworks to incorporate regulations for the broader category instead of the two narrow, but more common, chemical types.

#### 1. The Basel Convention

As stated above, the United States is only a signatory to the Basel Convention.<sup>229</sup> However, the lessons learned in the Basel framework can help the international regime understand how to regulate PFOS as it emerges as a serious threat in the near future. The international community has not yet revised the Basel Convention to include GenX, but under the current regime, the framework may still apply to transportation and trade efforts.<sup>230</sup> In particular, waste listed under Annex I might contain PFOS, including waste from surface treatment of metals and

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<sup>225</sup> *Id.*

<sup>226</sup> See Barnes, *supra* note 223.

<sup>227</sup> EPA, *supra* note 201, at 2.

<sup>228</sup> *PFAS Explained*, EPA, <https://www.epa.gov/pfas/pfas-explained> [<https://perma.cc/KX99-2E5X>] (Apr. 28, 2022).

<sup>229</sup> See *supra* notes 29, 78 and accompanying text.

<sup>230</sup> See UN ENV’T PROGRAMME, *supra* note 205, at 11–12, 19.



plastics and waste from the production, formulation, and use of biocides/phytopharmaceuticals.<sup>231</sup>

The Basel Convention released technical guidelines on PFOS treatment and environmentally sound management of contaminated waste.<sup>232</sup> Because PFOS is prevalent in all areas of consumerism, including food packaging, electronics, and apparel, the Basel Convention document found that PFOS may already be in regulated materials.<sup>233</sup> This allows the Basel Convention to assert authority despite not explicitly regulating PFAS yet.

A key component of the Basel definition of hazardous waste is that if the waste does not fit under a Basel classification, but is listed as hazardous by one of the parties, then the Convention applies.<sup>234</sup> Because the Netherlands classifies PFAS/GenX as hazardous, then PFAS should be treated as such on the international stage when trading with the Netherlands.<sup>235</sup> This treatment would require the United States to ratify the treaty but could be used to decrease international trade of PFAS compounds.

Basel can also apply to GenX trade via the toxicity argument.<sup>236</sup> While it is not explicitly listed under Annex I yet,<sup>237</sup> as more is revealed about GenX's effects on human health and the environment, the more likely the international community will list it under Annex I. Because GenX already meets the Annex III characteristics of toxicity,<sup>238</sup> Basel can quickly go into effect for setting management requirements when shipping the compound.

While Basel has many uses, the Convention is not enough to prevent further PFAS contamination. The loose definition fails to capture the various types of PFAS compounds, including GenX. Instead, the frameworks of other conventions are necessary to formulate a solution.

## 2. *The Stockholm Convention*

Even though GenX is not yet regulated under any of the international conventions, PFOS, a similar substance, is regulated by

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<sup>231</sup> *See id.* at 11–12.

<sup>232</sup> *Id.* at 5.

<sup>233</sup> *See id.* at 8–9.

<sup>234</sup> Basel Convention, *supra* note 6, art. 3.

<sup>235</sup> *See id.* at Annex A; Fain, *supra* note 221.

<sup>236</sup> *See* Basel Convention, *supra* note 6, Annex III.

<sup>237</sup> *See id.* at Annex I.

<sup>238</sup> *See id.* at Annex III.

Basel and Stockholm.<sup>239</sup> These regulations could easily be extended to PFAS generally, including GenX, since the compound is widely used in industrial production.<sup>240</sup> PFOS is treated as an Annex B chemical under Stockholm, which means it is still legal to produce and use but should be restricted and subject to certification.<sup>241</sup> This treatment should be extended to the other transboundary hazardous waste treaties, recognizing PFOS and other perfluorinated sulfonate compounds' toxicity to the health of humans and the environment, and ultimately upgraded to Annex A as alternative, less harmful compounds are discovered.<sup>242</sup>

The recent addition of PFOA to Annex A of the Stockholm Convention further supports a widespread elimination, or at least restriction, of the overall category of PFAS.<sup>243</sup> Continued international support to remove these chemicals from production brings the international community towards a safer, cleaner environment. However, without the United States' cooperation as one of the primary PFAS producers, contamination will not diminish. There is broad bipartisan support for PFAS regulation in the United States, and Congress and the EPA are working to restrict the compound and list it as a hazardous chemical so federal cleanup efforts may begin.<sup>244</sup>

### 3. *The Rotterdam Convention*

Once PFAS generally is added to the Stockholm Convention, the Rotterdam Convention should make PIC requirements for reporting PFAS transport. At a minimum, risk of exposure to the compound and its environmental persistence should become labeling requirements. As of October 2019, discussions among UN experts in support of both stricter regulations and binding requirements for information sharing involving PFOA trade have begun.<sup>245</sup> Because Rotterdam strengthens the relationship between importers refusing to accept some chemicals

<sup>239</sup> UN ENV'T PROGRAMME, *supra* note 52.

<sup>240</sup> *See id.*; *supra* note 233 and accompanying text.

<sup>241</sup> *See* UN ENV'T PROGRAMME, *supra* note 52.

<sup>242</sup> *See id.*; *supra* note 233 and accompanying text.

<sup>243</sup> Baschuk, *supra* note 57.

<sup>244</sup> *See PFAS Federal Legislation in the 116th Congress*, NYU SCH. L.: STATE ENERGY & ENV'T IMPACT CTR., <https://www.law.nyu.edu/centers/state-impact/press-publications/research/pfas-federal-legislation-116th-congress> [https://perma.cc/3L8M-NYP9] (Jan. 19, 2021).

<sup>245</sup> *Stricter Trade Measures Recommended for Hazardous Industrial Chemical PFOA*, UN ENV'T PROGRAMME (Oct. 10, 2019), <http://pic.int/Implementation/Publications>

and exporters respecting their decision, the Convention should allow for an even playing field in reducing PFAS exposure to civilians.<sup>246</sup>

#### 4. *The Bamako Convention*

While the Basel definition of hazardous waste could likely apply to PFAS under the state-waste condition, the Bamako Convention's definition of hazardous waste makes a stronger case for regulating PFAS as a hazardous material. Bamako established the rule that if the compound has the potential to do harm, it should be banned (or otherwise disposed of in accordance with the Convention).<sup>247</sup> This definition should be rolled out internationally, replacing the narrower Basel Convention, because GenX and PFAS have been shown to contribute to kidney problems and certain cancers.<sup>248</sup>

#### 5. *Information Sharing Agreements*

Although the Bamako Convention is the best developed convention for handling illegal imports of hazardous waste, OECD, ECLAC, and Project REN's dedication to information sharing provides a much-needed threshold for GenX regulation.<sup>249</sup> Because so little is known about the substance, organizations like the OECD need to develop communication strategies that go with the import and export of the chemical.

### D. POTENTIAL PROBLEMS

Issue 1: Ratify Basel. The easiest solution to regulating forever chemicals predominantly produced in the United States is having the United States join the community at large instead of re-

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cAwareness/PressReleases/StrictertrademeasuresforPFOA/tabid/8170/language/en-US/Default.aspx [https://perma.cc/59ZF-KGMZ].

<sup>246</sup> See Liu & Liu, *supra* note 30, at 21–22.

<sup>247</sup> See Kitt, *supra* note 12, at 501–02.

<sup>248</sup> See N.C. DEP'T OF HEALTH AND HUM. SERVS., SUMMARY OF SELECTED CANCER RATES FOR BLADEN, BRUNSWICK, NEW HANOVER AND PENDER COUNTIES, 1996–2015, AND COMPARISON TO STATEWIDE RATES 2 (2017), [https://gallery.mailchimp.com/58ec19aaea4630b1baad0e5e4/files/68d17212-4ce0-442f-863d-1c4cd99d0d6f/Summary\\_of\\_Selected\\_Cancer\\_Rates\\_FINAL\\_6\\_29.pdf](https://gallery.mailchimp.com/58ec19aaea4630b1baad0e5e4/files/68d17212-4ce0-442f-863d-1c4cd99d0d6f/Summary_of_Selected_Cancer_Rates_FINAL_6_29.pdf) [https://perma.cc/JH2G-222M] (finding testicular cancer rates in New Hanover County (in Wilmington, North Carolina) were higher over a twenty-year period than any other place in the state, and that there were higher rates of liver cancers over a five-year period in New Hanover County than the average state rate).

<sup>249</sup> Araneda, *supra* note 87, at 15.

lying on individual trade agreements with other states.<sup>250</sup> This solution is unlikely based on the United States' history of failing to ratify international treaties and conventions.<sup>251</sup> Instead, to combat this issue, the Basel Convention may need an update that calls for parties to refuse imports and exports regardless of party status. This would protect the population by proxy since the United States would be unable to import GenX wastewater for reclamation from a party state or export GenX to party states.

Issue 2: Ratify Stockholm and Rotterdam. The United States should also ratify Stockholm and Rotterdam. There is bipartisan support for both treaties, and despite domestic regulations in place, the United States has limited international sway in managing transboundary hazardous waste regulations unless it becomes a party to the major treaties.<sup>252</sup> Since other world powers are parties to the Conventions (e.g., China), the United States risks losing bargaining power in the Global South.

Issue 3: Burden shifting. Burden shifting, the practice of pushing the consequences of a decision onto another state that does not enjoy the same benefits, will continue to be an issue if the current international economy continues without any policy change.<sup>253</sup> The environmental crises discussed in Part III highlight classic cases of burden shifting, especially in places such as Italy, where companies and the state paid the mafia to broker waste transportation from Italy to unstable Somalia.<sup>254</sup>

Issue 4: Only Regional Agreements as Protection. Because of the widespread proliferation of PFAS chemicals such as GenX, regional agreements and bilateral treaties are unlikely to prevent PFAS from ending up in areas that restrict its use.<sup>255</sup> Because the compound is already showing up in locations that should never have had exposure, there is no guarantee that anything short of total international cooperation will successfully reduce PFAS introduction in the future.

Issue 5: Limited Remediation Technology. Another issue facing PFAS transportation is the limited ways (and expenses neces-

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<sup>250</sup> See Yang & Fulton, *supra* note 81, at 56–57.

<sup>251</sup> See Pratt, *supra* note 18, at 170–71.

<sup>252</sup> *Id.* at 171; Ronald Fein, *Should the EPA Regulate Under TSCA and FIFRA to Protect Foreign Environments from Chemicals Used in the United States?*, 55 STAN. L. REV. 2153, 2177 (2003).

<sup>253</sup> See Pratt, *supra* note 18, at 175.

<sup>254</sup> See discussion *supra* Part III.

<sup>255</sup> Biggs, *supra* note 27, at 334.

sary) to remediate after contamination occurs.<sup>256</sup> The known cleanup methods are expensive, time-consuming, and ineffective.<sup>257</sup> The persistence of the chemicals and their ability to reject both water and fatty substances will require new technology if any meaningful cleanup will occur.

Issue 6: Increased Illegal Waste to the Global South. Finally, documentation proves that increased regulation in industrialized states leads to increased exports to states without the infrastructure or regulatory framework to manage hazardous waste.<sup>258</sup> This theory applies to the Côte d'Ivoire dumping and the movement of illegal waste from Central and South America to Asia. The problems that the Conventions face are based on the unequal implementation of the Conventions around the world. Even though global politics cause shifting political climates in each individual state, the international community must have every state that participates in the global economy to not only ratify the Conventions, but actively implement them. Otherwise, illegal dumping will increase as states implement regulations on legal environmental management.

#### E. PROPOSED SOLUTIONS

The most effective solution to PFAS regulation and cleanup is a mandatory technology transfer.<sup>259</sup> While this suggestion poses intellectual property rights questions, the only way to make the Global North and Global South negotiate equally is through sharing technology that the Global South does not have. This would allow the hazardous waste trade to continue without an increase in illegal dumping cases since regulations would be more evenly applied around the world. This also encourages greater research and development because all states can pool their resources to find a solution to best breakdown PFAS.

For technology transfers to occur, the Basel, Rotterdam, and Stockholm Conventions must be ratified by all signatory states and have a more binding role on states. Greater international support should be available for states that have not yet created

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<sup>256</sup> See Barnes, *supra* note 223.

<sup>257</sup> *Id.*

<sup>258</sup> Biggs, *supra* note 27, at 337.

<sup>259</sup> See, e.g., Sumudu Atapattu, *The Significance of International Environmental Law Principles in Reinforcing or Dismantling the North-South Divide*, in *INT'L ENV'T L. & THE GLOB. S.* 74, 83-84 (Shawkat Alam, Sumudu Atapattu, Carmen G. Gonzalez & Jona Razzaque eds., 2015).

national legislation to codify the Conventions.<sup>260</sup> Because the primary weaknesses of the Conventions lie in the varied national implementation, better guidelines and proposals for how to implement regulations would be useful for future legislation.

Another legal theory that may provide balance in the way waste is managed is the “common heritage principle.”<sup>261</sup> While Sumudu Atapattu notes that this principle was unsuccessful in the 1982 UN Law of the Sea governing deep-seabed mining,<sup>262</sup> the development of waste regulation may provide a better foundation for this principle. Because the principle is made up of five components—“[i]nternational management; use for peaceful purposes; benefit-sharing, non-appropriation; and preservation for future generations”<sup>263</sup>—these tactics could better support international waste transportation since it is necessary to trade resources in order to dispose of waste. In particular, the footage of waste dumps elicit an emotional response that may not have the same impact as deep-seabed mining.<sup>264</sup>

## V. CONCLUSION

GenX regulation requires the existing legal framework to adapt to emerging technology. While this may be as simple as expanding Basel or Stockholm regulations on PFOA and PFOS to include PFAS compounds generally, it will likely require an international shift in our general understanding of hazardous material. This development will need to encourage regulatory thoughts and expectations that holistically approach the unequal divide between the Global North and Global South.

The increasingly globalized world has allowed marvelous things, but the hazardous waste trade remains a stark reminder of inequality and greed. While the historic trade does mark numerous illegal dumping scenarios and vast environmental cleanup, the worst is yet to come as we begin to understand the effects of supposedly harmless chemicals that cannot naturally degrade and accumulate within our bodies. The future of envi-

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<sup>260</sup> See Biggs, *supra* note 27, at 341.

<sup>261</sup> See Atapattu, *supra* note 259, at 74, 83–84.

<sup>262</sup> *Id.* at 84.

<sup>263</sup> *Id.*

<sup>264</sup> For example, you can view drone footage of the Agbogbloshie, Accra, Ghana e-waste dump. It had me almost in tears. See For 91 Days Travel Blog, *Drone Footage of the E-Waste Mega Dump of Agbogbloshie, Accra – Ghana – Rough Edit*, YOUTUBE (Sept. 15, 2019), <https://www.youtube.com/watch?v=BDPGO6sfc3c> [<https://perma.cc/J8AP-6PRL>].

ronmental management and waste trade will depend on how the international community chooses to properly regulate PFAS and the many chemicals that fall under the category.

Thankfully, the world is seeing some movement towards cooperation for regulating PFAS chemicals. The newly introduced ban on PFOA, along with the PFOS ban in the late 2000s, showcases a global market willing to take in new information regarding a harmful product despite its usefulness. However, we need to do more. The impacts of PFAS on the global environment could be devastating, and we are not currently equipped to remediate contamination.

Unless the international community forms a united front and the United States becomes a party to the regulating bodies, PFAS will continue to pollute heavily populated and remote regions of the world, regardless of product use. This is a sustainable-development issue affecting everyone, especially the Global South. Industrialized countries must step forward and promise to stop exporting difficult-to-manage waste to countries without the infrastructure to process it properly.<sup>265</sup>

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<sup>265</sup> At the time of this Article's publication, the EPA released a new health advisory for GenX and perfluorobutane sulfonic acid (PFBS) and lowered the health advisories for PFOA and PFOS to advance the agency's mission to curb PFAS contamination within the United States. While these advisories are not enforceable, the agency is moving forward this year with drinking-water regulations to address PFAS contamination. See *EPA Announces New Drinking Water Health Advisories for PFAS Chemicals, \$1 Billion in Bipartisan Infrastructure Law Funding to Strengthen Health Protections*, EPA, <https://www.epa.gov/newsreleases/epa-announces-new-drinking-water-health-advisories-pfas-chemicals-1-billion-bipartisan> [<https://perma.cc/AT5V-NMMV>] (June 15, 2022).