



Institute for  
**Policy Integrity**  
NEW YORK UNIVERSITY SCHOOL OF LAW

October 31, 2022

VIA ELECTRONIC SUBMISSION

**To:** Deanne Grant and Veronica Southerland, Office of Emergency Management,  
U.S. Environmental Protection Agency

**Re:** Safer Communities by Chemical Accident Prevention (EPA–HQ–OLEM–2022–0174)

The Institute for Policy Integrity at New York University School of Law<sup>1</sup> (Policy Integrity) respectfully submits the following comments to the Environmental Protection Agency (EPA) regarding its proposed revisions to the Risk Management Program (RMP), under Section 112(r) of the Clean Air Act, that will better protect communities from chemical accidents (Proposed Rule).<sup>2</sup>

Chemical accidents<sup>3</sup> put more than 177 million people living in vulnerability zones<sup>4</sup>—more than half the U.S. population<sup>5</sup>—at risk of injury, suffering, and death. EPA’s data show that between 2004 to 2020, there were more than 2,400 accidents, amounting to billions of dollars in aggregate monetized costs<sup>6</sup>—and these numbers are a significant underestimate due to underreporting, delayed reporting, and unquantified benefits. Moreover, Clean Air Act Section 112(r) and the underlying regulatory program are intended to reduce worst-case catastrophes which could be orders of magnitude worse than the average monetized, costs of past accidents.

The likelihood and potential magnitude of future accidents are also increasing due to climate change so the past may not be an accurate baseline. The Government Accountability Office’s (GAO) recent analysis of federal data on flooding, storm surge, wildfire, and sea level rise—natural hazards that may be exacerbated by climate change—found that over 3,200 RMP

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<sup>1</sup> Policy Integrity is a non-partisan think tank dedicated to improving the quality of government decisionmaking through advocacy and scholarship in the fields of administrative law, economics, and public policy. These comments do not purport to represent the views, if any, of New York University School of Law.

<sup>2</sup> See Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act; Safer Communities by Chemical Accident Prevention, 87 Fed. Reg. 53,556 (Aug. 31, 2022) [hereinafter Proposed Rule].

<sup>3</sup> These comments use the terms “incident” and “accident” interchangeably, but by either terminology these events should be considered preventable.

<sup>4</sup> The worst-case scenario population exposure is not available to the public. EPA previously published the 177 million number. EPA, REGUL. IMPACT ANALYSIS: SAFER COMMUNITIES BY CHEMICAL ACCIDENT PREVENTION PROPOSED RULE 94 (Dec. 16, 2016) (Docket No. EPA-HQ-OEM-2015-0725-0734).

<sup>5</sup> The U.S. population as of July. 1, 2021, was 331,893,745. See U.S. Census Bureau QuickFacts (last visited Oct. 28, 2022), <https://www.census.gov/quickfacts/fact/table/US/PST045221>.

<sup>6</sup> See *infra* Appendix B; see also Proposed Rule RIA, *infra* note 8, at 9–10, 28, 32–33.

facilities, almost one-third of those analyzed, are located in areas exposed to these natural hazards.<sup>7</sup>

EPA is appropriately taking action to protect public health and the environment from ongoing accidents and the risk of future, catastrophic worst-case scenarios. These harms fall most heavily on communities of color and low-income communities, which are disproportionately located in the vulnerability zones surrounding these facilities.

Our comments largely focus on how EPA can strengthen its Regulatory Impact Analysis (RIA),<sup>8</sup> consistent with best economic practices and legal requirements, to improve its consideration of unquantified benefits and the distribution of benefits and costs between fence-line communities and facilities. We urge EPA to consider whether a stronger rule is warranted, based on more thorough accounting of the Proposed Rule's benefits and their distribution. EPA should also continue to evaluate whether the benefits of additional risk reduction measures for fence-line communities would justify further amendments to strengthen the regulatory program.

These comments make the following arguments:

1. **EPA provides a reasoned explanation for the Proposed Rule based on evidence in the record and properly rectifies prior, unsupported conclusions in the unlawful 2019 Reconsideration Rule.**<sup>9</sup> (Pertaining to EPA “Category 15. Other”)
2. **EPA’s decision to consider unquantified benefits is consistent with best economic practices and legal requirements. EPA should strengthen its analysis by improving its baseline estimation of the magnitude and frequency of chemical accidents and incorporating additional quantitative and qualitative information on the potential health and other consequences of chemical incidents.** EPA properly finds the Proposed Rule justified on the benefits already analyzed, but a fuller accounting of the scope of the Proposed Rule’s benefits would supplement that evidence. (Pertaining to EPA “Category 13. Regulatory Impact Analysis”)
3. **EPA properly conducts a breakeven analysis to justify its Proposed Rule.** Breakeven analysis is a well-established cost-benefit analysis method that agencies use when there are important unquantified benefits or costs, as is the case in this Proposed Rule. **EPA can strengthen its breakeven analysis by better considering how risk mitigation measures decrease the magnitude of accidents and avoid the most-costly accidents or catastrophes.** (Pertaining to EPA “Category 13. Regulatory Impact Analysis”)
4. **EPA appropriately chooses to consider the distribution of regulatory impacts in its decisionmaking, but it should consider strengthening its environmental justice**

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<sup>7</sup> See U.S. GOV'T ACCOUNTABILITY OFF., GAO-22-104494, CHEMICAL ACCIDENT PREVENTION: EPA SHOULD ENSURE REGULATED FACILITIES CONSIDER RISKS FROM CLIMATE CHANGE 19–20 (Feb. 2022) [hereinafter GAO Climate Report].

<sup>8</sup> EPA, REGUL. IMPACT ANALYSIS: SAFER COMMUNITIES BY CHEMICAL ACCIDENT PREVENTION PROPOSED RULE (Apr. 19, 2022) [hereinafter Proposed Rule RIA].

<sup>9</sup> 2019 Reconsideration Rule, *infra* note 14.

**analysis and better integrating this analysis into its selection of alternatives.**  
(Pertaining to EPA “Category 13. Regulatory Impact Analysis”)

5. **EPA should clarify its new language concerning climate-related hazards and provide complementary guidance to ensure robust consideration of climate-related hazards by RMP facilities.** (Pertaining to EPA “Category 1. Natural Hazards”)
  
6. **EPA should continue to consult with environmental justice groups and the most at-risk communities about strengthening regulatory protections. If, after revising its regulatory impact analysis to address the recommendations in this letter, EPA concludes that a more stringent alternative to the Proposed Rule would be more net beneficial and/or distributionally desirable than the Proposed Rule, EPA should finalize that more stringent alternative through the present or subsequent rulemakings. EPA should apply the same regulatory analysis improvements when considering provisions to require fence-line monitoring or add additional, hazardous chemicals to the list of substances regulated by the program.** (Pertaining to EPA “Category 15. Other”)

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**I. EPA has adequately justified its basis to issue the Proposed Rule and rectify errors in the unlawful 2019 Reconsideration Rule (Category 15. OTHER)**

EPA has appropriately issued the Proposed Rule to address the ongoing costs of chemical accidents and to rectify critical errors in its 2019 analysis. EPA has adequately justified its change in position.

In 2013, the continuing occurrence of chemical facility accidents indicated a need for stronger safeguards to protect public health and the environment. In response, President Obama issued Executive Order 13,650, “Improving Chemical Facility Safety and Security.”<sup>10</sup> Consistent with this Executive Order, EPA finalized a rule in January 2017 to strengthen its Risk Management Program under Section 112(r) of the Clean Air Act so as to better prevent the accidental release of hazardous pollution from chemical facilities (2017 Rule).<sup>11</sup>

Several months later, the Trump administration attempted to delay implementation of the 2017 Rule<sup>12</sup> through an action subsequently found to be unlawful by the D.C. Circuit.<sup>13</sup> The Trump administration later issued the unlawful 2019 Reconsideration Rule<sup>14</sup> which largely rescinded the 2017 Rule. As we explained in our comments on that rule, the 2019 Reconsideration Rule was unlawful because it failed to provide an adequate justification for rescinding the third-party audits, safer technology and alternatives analysis (STAA), root cause analysis, and other provisions of the 2017 Rule.<sup>15</sup> EPA’s analysis for the 2019 Reconsideration Rule was arbitrary and capricious due to its failure to consider the benefits forgone by repealing the 2017 Rule.<sup>16</sup>

Both the 2017 Rule and 2019 Reconsideration Rule were challenged in court and both suits are currently in abeyance.<sup>17</sup> In 2021, EPA held listening sessions and opened a docket to receive information relevant to revising the RMP program regulations.<sup>18</sup> The Biden administration has issued this Proposed Rule on the basis of this new information.<sup>19</sup>

The continued occurrence of chemical accidents that endanger communities and the new information in the 27,828 public comments received by EPA provide good reasons for the Proposed Rule. An agency is entitled to change its view when amending, suspending, or

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<sup>10</sup> Exec. Order 13,650, 78 Fed. Reg. 48,029 (Aug. 1, 2013).

<sup>11</sup> Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act, 82 Fed. Reg. 4594 (Jan. 13, 2017) [hereinafter 2017 Rule].

<sup>12</sup> Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act; Further Delay of Effective Date, 82 Fed. Reg. 27,133 (June 14, 2017).

<sup>13</sup> Air Alliance Houston v. EPA, 906 F.3d 1049 (D.C. Cir. 2018).

<sup>14</sup> Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act, 84 Fed. Reg. 69,834 (Dec. 19, 2019) [hereinafter 2019 Reconsideration Rule].

<sup>15</sup> Inst. for Pol’y Integrity, Comments on the Accidental Release Prevention Requirements, 2–7 (Aug. 21, 2018), [https://policyintegrity.org/documents/Policy\\_Integrity\\_Comments\\_-\\_Proposed\\_Rule\\_to\\_Revise\\_Chemical\\_Disaster\\_Rule.pdf](https://policyintegrity.org/documents/Policy_Integrity_Comments_-_Proposed_Rule_to_Revise_Chemical_Disaster_Rule.pdf) [hereinafter Policy Integrity Reconsideration Rule Comments].

<sup>16</sup> See *id.*

<sup>17</sup> Proposed Rule, *supra* note 2, at 53,563.

<sup>18</sup> Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act, 86 Fed. Reg. 28,828 (May 28, 2021).

<sup>19</sup> In the Proposed Rule, EPA explains that it received 27,828 public comments from the listening sessions and collection of written comments conducted in 2021, including 163 original, substantive comments, and that “[i]nformation collected through these comments has informed the review.” Proposed Rule, *supra* note 2, at 53,563.

repealing a rule, so long as it shows that “there are good reasons for the new policy” and provides a “detailed justification” for “factual findings that contradict those which underlay its prior policy.”<sup>20</sup> EPA has met that burden here. Even though the reversals in the 2019 Reconsideration Rule were not adequately justified,<sup>21</sup> in the Proposed Rule, EPA has nonetheless carefully considered its findings and provided a reasoned explanation in cases where it has decided to revise or reverse course. The reasonability of EPA’s decision is further established on the basis that the analysis underlying the 2019 Reconsideration Rule is flawed, rendering that previous rule arbitrary.<sup>22</sup>

Though EPA has provided a reasonable explanation that justifies the current proposal, that does not necessarily mean that it has adequately fulfilled its duties under 7412(r)(7)(B). EPA should provide further explanation regarding how it satisfies its requirements to issue regulations that provide for the prevention and detection of accidental releases “to the greatest extent practicable.”<sup>23</sup> EPA should explain whether it should take additional actions to meet its goals such as adding more facilities within the scope of the STAA provision or taking other measures to strengthen the regulatory protections provided by the program.

While EPA has offered adequate justification for each of the proposed precautionary provisions, we highlight the importance of the STAA justification in particular given the flaws in the 2019 Reconsideration Rule’s analysis.

### **Safer Technology Alternatives Analysis (STAA)**

The 2017 Rule finalized a STAA requirement for facilities with Program 3 processes in the paper manufacturing, petroleum and coal products manufacturing, or chemical manufacturing sector.<sup>24</sup> The 2019 Reconsideration Rule reversed this requirement, based on a poor analysis of similar state-level programs that suggested such requirements were ineffective at reducing accidents.<sup>25</sup> In the Proposed Rule, EPA properly revisits this analysis and identifies many flaws, including that: (1) the analysis had considered only a very small number of accidents with high intra-year variability, meaning it was unreasonable to draw conclusions about accident frequency; (2) reporting requirements in states with STAA-like requirements were more stringent, which could lead to more accidents being identified; and (3) it was inappropriate to try to extrapolate accident trends in a particular sector from overall accident trends.<sup>26</sup> Instead, EPA reasonably concludes that the expert knowledge of the Chemical Safety Board (CSB) and results from case studies should carry more weight than a low-quality calculation of accident rates.<sup>27</sup>

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<sup>20</sup> Fed. Comm’n Comm’n v. Fox Television Stations, Inc., 556 U.S. 502, 515 (2009).

<sup>21</sup> See Policy Integrity Reconsideration Rule Comments, *supra* note 15; See also Air All. Houston et al., Comments on the Accidental Release Prevention Requirements (Aug. 23, 2018) (Docket No. EPA-HQ-OEM-2015-0725), [https://earthjustice.org/sites/default/files/files/Comments%20%28final%29\\_08-23-2018.pdf](https://earthjustice.org/sites/default/files/files/Comments%20%28final%29_08-23-2018.pdf) [hereinafter Earthjustice Reconsideration Rule Comments].

<sup>22</sup> Policy Integrity Reconsideration Rule Comments, *supra* note 15.

<sup>23</sup> 42 U.S.C. § 7412(r)(7)(B).

<sup>24</sup> 2017 Rule, *supra* note 11, at 4629.

<sup>25</sup> 2019 Reconsideration Rule, *supra* note 14, at 69,852, 69,855.

<sup>26</sup> Proposed Rule, *supra* note 2, at 53,578–79.

<sup>27</sup> *Id.* at 53,579.

## **II. EPA appropriately considers unquantified benefits, but should improve its analysis to capture a fuller extent of the benefits and consider whether it overestimates costs (Category 13. Regulatory Impact Analysis)**

EPA has provided an adequate discussion of costs and benefits to justify its Proposed Rule, but this analysis could be further strengthened. EPA properly considers unquantified benefits in its analysis, a practice consistent with case law, executive order, agency guidance, and economic best practice. However, EPA likely underestimates the extent of these benefits. First, EPA may be underestimating the number of future accidents avoided by the Proposed Rule due to underreporting, delayed reporting, and failure to account for increasing risks from climate change. Second, EPA should more fully consider additional types of health benefits, cumulative effects, and the impacts of worst-case scenarios. In addition to underestimating benefits, EPA may be overestimating costs due to its assumptions in the regulatory analysis of third-party audits and safer technology analyses.

More thoroughly considering the benefits from avoided accidents would provide additional support for the Proposed Rule, and might justify the adoption of a more stringent alternative. Given that the regulatory analysis for the more stringent alternative in the Proposed Rule is estimated to be several times the cost of the preferred alternative, EPA could also consider whether components of the more stringent alternative would be justified under the improved analysis and, if so, adopt them in the final rule. Others have suggested additional ways for EPA to strengthen the RMP program to better protect the most at-risk communities.<sup>28</sup> EPA should also consider whether further strengthening the regulations to provide greater protection from chemical incidents—if analyzed in accordance with the recommendations in this letter—would yield greater net benefits, or a more desirable distribution of costs and benefits, than the Proposed Rule. If considering these potential improvements to regulatory analysis for future proposed amendments under the RMP program, EPA should consider the same recommendations for improved analysis to determine if net benefits, or a more desirable distribution of benefits, justify the costs of stronger protections.

### *A. EPA properly considers unquantified benefits*

Due to the challenges associated with quantifying precise outcomes for risk mitigation measures, EPA uses a breakeven analysis to assess whether the Proposed Rule's benefits will likely outweigh its costs.<sup>29</sup> As part of this analysis, EPA discusses certain monetized costs of past accidents as relevant data to ascertaining the unquantified benefits from avoided future disasters. In addition, EPA correctly identifies many benefits associated with avoided accidents that are challenging to quantify, such as reductions in lost productivity, responder costs, transaction costs, impacts on property values, environmental damages, and damages related to catastrophic releases.<sup>30</sup>

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<sup>28</sup> See e.g., Comments of Community In-Power et al., (July 29, 2021) (Docket No. EPA-HQ-OLEM-2021-0312), <https://www.regulations.gov/comment/EPA-HQ-OLEM-2021-0312-0170> [hereinafter Earthjustice 2021 Comments].

<sup>29</sup> See *infra* Section III (discussing appropriateness of using a breakeven analysis).

<sup>30</sup> Proposed Rule RIA, *supra* note 8, at 10.



EPA's use of unquantified benefits to justify the Proposed Rule is consistent with economic best practices, executive orders and associated guidance on regulatory analysis, long-standing agency practice, and case law. As a matter of economic best practice, it is well-established that a cost-benefit analysis should give "due consideration to factors that defy quantification but are thought to be important."<sup>31</sup> The mere fact that a benefit cannot *currently* be quantified says little about its magnitude. In fact, some of the most substantial categories of monetized benefits of environmental regulation were once considered unquantifiable.<sup>32</sup>

Recognizing the potential significance of unquantified effects, executive orders governing regulatory impact analysis explicitly instruct agencies to consider such effects when analyzing proposed rules.<sup>33</sup> *Circular A-4*, which provides further guidance on conducting regulatory analysis from the Office of Management & Budget, further cautions agencies against ignoring the potential magnitude of direct unquantified benefits, because the most efficient alternative may not have the "largest quantified and monetized . . . estimate."<sup>34</sup>

EPA internal guidance further affirms the consideration of unquantified benefits are an essential component to economic analysis.<sup>35</sup> For almost three decades, under administrations of both political parties, EPA has consistently recognized the importance of considering direct unquantified benefits. In response to criticism of its benzene regulations under Section 112, EPA under President George H.W. Bush "reject[ed] the position that only quantified information can be considered in the decisions."<sup>36</sup> EPA under President Clinton considered the "real, but unquantifiable benefits" of emissions standards for hazardous waste combustors.<sup>37</sup> EPA under President George W. Bush evaluated a rule restricting emissions from non-road diesel engines based on "consideration of all benefits and costs expected to result from the new standards, not just those benefits and costs which could be expressed here in dollar terms."<sup>38</sup>

Case law further corroborates that agencies have an *obligation* to consider reasonably foreseeable but difficult to quantify regulatory effects.<sup>39</sup> In recent years, courts have only continued to uphold actions that rely on unquantified benefits and have also struck down agency

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<sup>31</sup> KENNETH J. ARROW ET AL., BENEFIT-COST ANALYSIS IN ENVIRONMENTAL, HEALTH, AND SAFETY REGULATION: A STATEMENT OF PRINCIPLES 8 (1996).

<sup>32</sup> See, e.g., Richard L. Revesz, *Quantifying Environmental Benefits*, 102 CAL. L. REV. 1423, 1436 (2014).

<sup>33</sup> See Exec. Order No. 13,563 § 1, 76 Fed. Reg. 3821, 3821 (Jan. 18, 2011) (aff'ing Exec. Order No. 12,866); accord Exec. Order No. 12,866 § 1(a), 58 Fed. Reg. 51,735, 51,735 (Sept. 30, 1993) ("Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider.").

<sup>34</sup> See Off. Mgmt. & Budget, *Circular A-4* (2003), <https://perma.cc/E7VU-SXE8> [hereinafter *Circular A-4*].

<sup>35</sup> EPA, GUIDELINES FOR PREPARING ECONOMIC ANALYSIS, ch.7, 7–49 (Mar. 2016), <https://www.epa.gov/environmental-economics/guidelines-preparing-economic-analyses> [hereinafter EPA Economic Analysis Guidelines].

<sup>36</sup> National Emission Standards for Hazardous Air Pollutants, 55 Fed. Reg. 8292, 8302 (Mar. 7, 1990).

<sup>37</sup> NESHAPS: Final Standards for Hazardous Air Pollutants for Hazardous Waste Combustors, 64 Fed. Reg. 52,828, 53,023 (Sept. 30, 1999).

<sup>38</sup> Control of Emissions of Air Pollution from Nonroad Diesel Engines and Fuel, 69 Fed. Reg. 38,958, 39,138 (June 29, 2004).

<sup>39</sup> See, e.g., *Public Citizen v. Fed. Motor Carrier Safety Admin.*, 374 F.3d 1209, 1219 (D.C. Cir. 2004) ("The mere fact that the magnitude of [an effect] is uncertain is no justification for disregarding the effect entirely."); *Am. Trucking Ass'n v. EPA*, 175 F.3d 1027, 1052 (1999) (rejecting the idea that EPA could ignore health effects that are "difficult, if not impossible, to quantify reliably").

decisions for ignoring unquantified benefits.<sup>40</sup> Agencies are expected to weigh unquantified effects against monetized costs and benefits in accordance with their judgment and expertise.<sup>41</sup>

*B. EPA could further bolster its finding that the Proposed Rule is appropriate by better explaining why its current baseline underestimates the total number of accidents*

The baseline scenario in an economic analysis lays out “the best assessment of the world absent the proposed regulation or policy action.”<sup>42</sup> EPA’s estimates of the baseline number of accidents—which it uses in its breakeven analysis—is likely systematically underestimated. As EPA recognizes, the number of incidents throughout the sample period are likely underreported due to facilities leaving the RMP program before the end of the reporting period.<sup>43</sup> Second, the number of incidents in 2019 and 2020 are likely underestimated due to reporting delays. Third, absent regulatory action, climate change may increase the average number of incidents per year—and the damage associated with those incidents—relative to the status quo.

Because EPA is underestimating the total number of accidents likely to occur in the future, it is also underestimating the total benefits of avoided accidents. Further, because some of the most costly accidents may be omitted from reporting, EPA’s estimate of the average accident cost may also be biased downward. EPA should also acknowledge the sources of error stemming from ignoring changing climate conditions and better integrate its understanding of underreporting and delayed reporting into its estimates.

**Underreporting:**

EPA constructs its baseline for the number of accidents and cost per accident based on the period from 2016 to 2020.<sup>44</sup> However, as EPA acknowledges, these data are incomplete. As EPA notes in its RIA, in some cases, after a facility has a chemical incident, it may shut down altogether.<sup>45</sup> These facilities are then no longer RMP facilities, no longer have reporting obligations and, accordingly, may never report the incident.

This source of reporting error affects not only EPA’s estimates of the number of accidents, but also biases downward the average accident cost, as it is presumably the largest and most expensive accidents that lead a plant to close or file for bankruptcy. The omission of these incidents is not trivial. EPA highlights one such incident in its RIA—an explosion at Philadelphia Energy Solutions Refinery of an HF alkylation unit that resulted in the company filing for bankruptcy.<sup>46</sup> The CSB found that this accident led to \$750 million in property damage

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<sup>40</sup> See Richard L. Revesz, *Destabilizing Environmental Regulation: The Trump Administration Concerted Attack on Regulatory Analysis*, 47 *ECOLOGICAL L.Q.* 887, 899–901 (2020).

<sup>41</sup> See *Entergy Corp. v. Riverkeeper, Inc.*, 556 U.S. 208, 235 (2009) (Breyer, J., concurring in part and dissenting in part) (writing approvingly of EPA’s ability to “describe environmental benefits in non-monetized terms and to evaluate both costs and benefits in accordance with its expert judgment and scientific knowledge”).

<sup>42</sup> EPA Economic Analysis Guidelines, *supra* 35, at ch.5, 5–1.

<sup>43</sup> See Proposed Rule RIA, *supra* note 8, at 87.

<sup>44</sup> *Id.* at 26–27.

<sup>45</sup> *Id.* at 87.

<sup>46</sup> *Id.* at 26; U.S. CHEM. SAFETY & HAZARD INVESTIGATION BD., *FACTUAL UPDATE: FIRE AND EXPLOSIONS AT PHILADELPHIA ENERGY SOLUTIONS REFINERY HYDROFLUORIC ACID ALKYLATION UNIT 7* (Oct. 16, 2019), [https://www.csb.gov/assets/1/6/pes\\_factual\\_update\\_-\\_final.pdf](https://www.csb.gov/assets/1/6/pes_factual_update_-_final.pdf).

and released over 5,000 pounds of hydrofluoric acid.<sup>47</sup> *That is equal to roughly 30% of the accident costs that EPA evaluates for the entire 2016-2020 period,<sup>48</sup> and roughly equivalent to EPA's estimated compliance costs of the Proposed Rule for 10 years.*

To the extent it is possible to do so, EPA could consider estimating the magnitude of this underreporting and try to correct it. For example, EPA could consider identifying the facilities that reported to the RMP program in 2014 but not in 2019 and conducting follow-up to determine why the facilities left the sample. If the agency finds evidence of an accident preceding a closure or bankruptcy, it can add that accident to the dataset. At a minimum, EPA should better explain how severely it could be underestimating past accident costs due to the failure to include these accidents.

### **Delayed Reporting:**

In its RIA for the Reconsideration Rule, EPA recognized that although facilities are required to report incidents within six months, many facilities instead wait until the end of a five-year RMP reporting period.<sup>49</sup> Because RMP's first compliance deadline was in 1999, this has resulted in waves of heightened reporting at the end of each five-year period: 2004, 2009, 2014, and 2019.<sup>50</sup> Following this pattern, the next wave would be expected in 2024. Comparing incident estimates for the year 2016 between the 2019 Reconsideration Rule and the Proposed Rule RIA shows that this delayed reporting is significant. The 2019 Reconsideration Rule RIA estimated that 99 incidents occurred in 2016.<sup>51</sup> The Proposed Rule RIA estimated 127 incidents occurred in the same year—a 28%.<sup>52</sup> A similar rate of underreporting in 2019 and 2020 would mean that EPA's analysis omitted 45 accidents—9% of the total accidents currently in EPA's tally.<sup>53</sup>

### **Heightened Future Risk Due to Climate Change:**

The baseline scenario in an economic analysis lays out “the best assessment of the world absent the proposed regulation or policy action”<sup>54</sup> and EPA's guidance on economic analysis notes that certain “exogenous changes” may be relevant to include in a baseline.<sup>55</sup> Here, EPA's baseline assumes that future accidents will continue to occur at roughly the rate of current accidents, but this assumption systemically underestimates future risk. Climate change threatens to increase the

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<sup>47</sup> U.S. CHEM. SAFETY & HAZARD INVESTIGATION BD., INVESTIGATION REPORT: FIRE AND EXPLOSIONS AT PHILADELPHIA ENERGY SOLUTIONS REFINERY HYDROFLUORIC ACID ALKYLATION UNIT 6 (Oct. 11, 2022), [https://www.csb.gov/assets/1/6/pes\\_final\\_report\\_published\\_october\\_2022.pdf](https://www.csb.gov/assets/1/6/pes_final_report_published_october_2022.pdf).

<sup>48</sup> To arrive at this number, we divided \$750 million by \$2,358 million, which is EPA's estimated total cost of accidents over the 2016–2020 period.

<sup>49</sup> EPA, REGUL. IMPACT ANALYSIS: RECONSIDERATION OF THE 2017 AMENDMENTS TO THE ACCIDENTAL RELEASE PREVENTION REQUIREMENTS: RISK MANAGEMENT PROGRAMS UNDER THE CLEAN AIR ACT, SECTION 112(r)(7), at 38 & n.30 (Nov. 18, 2019) [hereinafter Reconsideration Rule RIA].

<sup>50</sup> *Id.*

<sup>51</sup> *Id.* See also Earthjustice 2021 Comments, *supra* note 28.

<sup>52</sup> Proposed Rule RIA, *supra* note 8, at 27.

<sup>53</sup> *Id.* at 7. To arrive at this figure, we did the following calculation: (28% undercounting of accidents\*(100 counted accidents in 2019 + 60 accidents in 2020)/488 total accidents in baseline period)

<sup>54</sup> EPA Economic Analysis Guidelines, *supra* note 35, at ch.5, 5–1.

<sup>55</sup> *Id.*

baseline level of chemical disaster risk by—among others—exacerbating severe weather and natural disasters, and accordingly, increasing the likelihood of power loss.<sup>56</sup>

Two reports—one compiled by GAO and the other by a team of non-governmental organizations—each independently estimated that nearly one-third of all RMP facilities are located in areas at risk of climate change impacts.<sup>57</sup> In the Proposed Rule, EPA explicitly recognizes that natural disasters and power loss are common drivers of accidents, and that these risks are increasing.<sup>58</sup>

In short, EPA’s current baseline assumes that, absent the Proposed Rule, tomorrow’s incident risk will look like today’s. In reality, however, absent further safeguards, tomorrow will likely be *more* risky than today. EPA should explain qualitatively in the RIA how climate change is increasing the risk of accidents and their potential severity and clarify how this increases the potential benefits of the Proposed Rule.

*C. EPA could bolster its finding that the Proposed Rule is appropriate by considering additional benefits and additional literature on benefits already considered*

EPA should consider incorporating additional important information on unquantified benefits into its analysis. First, EPA should consider more fully assessing health benefits—which currently focus only on reducing injuries—beyond treatment costs. Second, EPA should consider how accident damages combine with other cumulative impacts faced by fenceline communities, to result in higher costs for the affected population. Third, EPA should more carefully consider how the Proposed Rule could reduce the likelihood or magnitude of a future worst-case scenario.

**1. EPA should update its estimate of health benefits to consider avoided pain and suffering and long-term health costs from accidents**

In addition to tailoring estimates to reflect the community bearing the harms, EPA could strengthen its analysis of the health costs of accidents. EPA recognizes that the best estimation of the benefit of an avoided injury would be the willingness-to-pay to avoid injury, which includes: (1) averting costs, which involve the costs to reduce risk; (2) mitigating costs, which are the costs of treatment; (3) indirect costs, which include the opportunity cost of being unable to engage in other activities, such as work or leisure; and (4) “discomfort, anxiety, pain, and suffering.”<sup>59</sup> Despite this four-part structure, EPA estimates only direct treatment costs, due to limited data in the other areas. EPA should also consider more directly discussing long-term health effects, including mental health impacts.

EPA could strengthen its analysis by updating its literature on the health benefits of the Proposed Rule and, in particular, pain and suffering. Even if it not possible to quantify these benefits, EPA could contextualize the magnitude of these avoided costs by highlighting that certain case studies

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<sup>56</sup> Proposed Rule, *supra* note 2, at 53,570; *see also infra* Section V.

<sup>57</sup> *See id.* at 53,568, DAVID FLORES ET AL., PREVENTING “DOUBLE DISASTERS” (2021), <https://www.ucsusa.org/sites/default/files/2021-07/preventing-double-disasters%20FINAL.pdf>; GAO Climate Report, *supra* note 7, at 19–20.

<sup>58</sup> EPA has noted that, “the threat of power loss is increasing for utility customers” and that “an increase in extreme weather events has led to an increase in power outages in recent years.” Proposed Rule, *supra* note 2, at 53,570.

<sup>59</sup> Proposed Rule RIA, *supra* note 8, at 30.

suggest that they can be as large as treatment costs. For example, a study found that health care workers' willingness to pay to avoid sharps-related injuries were equal to the cost of medical treatment.<sup>60</sup> A study of the costs of asthma in South Korea found that direct costs (treatment) and indirect costs (increased mortality, reduced productivity) were approximately equal to one another, but that incorporating intangible costs (quality of life), *doubled* those costs—implying EPA's estimates would account for only one-fourth of total costs.<sup>61</sup> By considering only medical treatment, EPA is underestimating the costs of a chemical incident. While challenging to quantify, EPA could attempt to bound the costs using the medical literature as a guide.

In addition, EPA's current framework may undercount health costs because it only estimates medical treatment costs based on acute injuries such as burns or open wounds that result in medical treatment near the time of the accident.<sup>62</sup> This might omit important non-acute injury and sickness and ignores long-term effects of the harm. For example, after the 2012 Richmond Chevron Refinery fire, over 2000 plaintiffs sued Chevron for injuries.<sup>63</sup> In a court-ordered assessment five years after the incident, half of the randomly sampled plaintiffs were still suffering from respiratory symptoms either created by or worsened by the fire.<sup>64</sup> This type of long-term suffering is an important cost and EPA's current analysis does not include a framework that can account for it.

EPA's current focus on injury costs, in addition to ignoring long-term quality of life decreases, also elides the importance of mental health costs. A child forced to evacuate school because of a nearby chemical disaster nearby could face long-term effects from a reduced sense of safety and security at school. While these types of health costs may be more challenging to quantify, EPA should consider spending more time explaining their potential relevance.

## **2. EPA should consider how the costs of chemical accidents add to the cumulative burden on fenceline communities**

Risk is composed of both the probability a harm occurs and the magnitude of that harm. The vulnerability of the population exposed to that harm determines the full scope of that magnitude. The many negative environmental, socioeconomic, and health factors already affecting fenceline communities living near RMP facilities make these communities more vulnerable to chemical

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<sup>60</sup> David Fisman et al., *Willingness to Pay to Avoid Sharps-Related Injuries: A Study in Injured Health Care Workers*, 30 AMER. J. OF INFECTION CTRL. 283 (2002).

<sup>61</sup> Chang-Yup Kim et al., *The Financial Burden of Asthma: A Nationwide Comprehensive Survey Conducted in the Republic of Korea*, 3 ALLERGY ASTHMA IMMUNOLOGY RESEARCH 34 (2011). Consistent with these findings, another study found the direct costs of asthma were 50–80% of total costs, where “total costs” considered only direct costs (medical treatment) and indirect costs (increased mortality risk, lost productivity) but excluded intangible costs (pain and suffering, performance in school, limited movement). Giuliana Ferrante & Stefania La Grutta, *The Burden of Pediatric Asthma*, FRONTIERS IN PEDIATRICS (June 28, 2018), <https://www.frontiersin.org/articles/10.3389/fped.2018.00186/full>.

<sup>62</sup> Proposed Rule RIA, *supra* note 8, at 30.

<sup>63</sup> Linda L. Remy et al., *Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012*, ENV'T HEALTH (May 16, 2019), <https://ehjournal.biomedcentral.com/articles/10.1186/s12940-019-0484-4>

<sup>64</sup> *See id.*



facility accident risks than the average American.<sup>65</sup> For communities that carry high cumulative burdens, an additional burden has more impact than it would on a community that has little risk exposure. Consequently, removing a burden—in this case, reducing the risk of a chemical disaster—would have a larger positive benefit for an overburdened community than it would for your average community. EPA should recognize this, as it considers the benefits of the Proposed Rule.

EPA discusses in the RIA that 50% of the people living within 1-mile of an RMP population are members of a historically underserved race or ethnicity group and 42% are low-income.<sup>66</sup> People who live near RMP facilities that had an accident between 2004 and 2020 are even more likely to be people of color or low-income<sup>67</sup> and 16% of RMP facilities are located in areas with high or very high levels of social vulnerability.<sup>68</sup> Recent research has also shown that people living in fence-line communities in Harris County, Texas are more likely to have a disability, including vision loss, hearing loss, or mobility challenges, all of which may affect one's ability to evacuate.<sup>69</sup>

When estimating the costs associated with an accident, EPA should consider how such costs add to the cumulative burden of the affected population, rather than taking the U.S. median figures. For example, if the affected population already has high asthma rates due to other exposure factors—such as permitted pollution from the RMP facility—a toxic release could lead to a number of asthma attacks or, more generally, may exacerbate underlying conditions.<sup>70</sup> A lack of access to medical facilities—or an inability to take the necessary time off work to recover—could lead to delayed treatment or no treatment, which could mean a simple injury evolves into something worse. A lack of access to treatment could also mean that EPA's current methods of calculating harm—which rely on the number of injuries that received medical treatment—underestimate total harm.

Populations that have been made vulnerable through poverty may also face greater ripple effects from an accident. Missing a shift or a day of work due to an evacuation, shelter-at-home order, or injury could turn into a lost job or cause a household to fall behind on rent or other bills leading to late fees or interest.<sup>71</sup> Merely calculating time losses for evacuations or shelter-at-home orders may be insufficient to account for these pile-on effects.

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<sup>65</sup> See generally ENV'T JUSTICE HEALTH ALL. FOR CHEM. POL'Y REFORM ET AL., LIFE AT THE FENCELINE: UNDERSTANDING CUMULATIVE HEALTH HAZARDS IN ENVIRONMENTAL JUSTICE COMMUNITIES (2018), <https://ej4all.org/life-at-the-fenceline> [hereinafter LIFE AT THE FENCELINE].

<sup>66</sup> Proposed Rule RIA, *supra* note 8, at 85–86.

<sup>67</sup> *Id.* at 86 & ex. 9–1.

<sup>68</sup> See GAO Climate Report, *supra* note 7, at 10–11.

<sup>69</sup> Jayajit Chakraborty, *Proximity to Extremely Hazardous Substances for People with Disabilities: A Case Study in Houston, Texas*, 12 DISABILITY & HEALTH J. 121 (JAN. 2019).

<sup>70</sup> See, e.g., LIFE AT THE FENCELINE, *supra* note 65, at 11.

<sup>71</sup> See, e.g., Allard Dembe, *The Social Consequences of Occupational Injuries and Illnesses*, 40 AMER. J. INDUS. MEDICINE 403, 404 (2001) (discussing the interconnected challenges arising from workplace injury, including how missing work due to injury can lead to long-term reduced productivity and, in some cases, being laid off); Letter from Earl Ray Tomblin, Governor of West Virginia, to Elizabeth A. Zimmerman 3 (March 11, 2014) (explaining how the closure of restaurants and hotels after a chemical spill at a non-RMP facility led to low-wage workers losing income and being unable to pay utility bills absent the help of private donations).

While these more particularized effects may be challenging to estimate, it is not only acceptable, but necessary to a full accounting of the Proposed Rule’s benefits, for EPA to discuss these issues at least qualitatively.

### **3. EPA should more fully analyze the potential “catastrophes” or worst-case scenarios in its estimate of avoided accidents**

EPA notes that if the Proposed Rule were to prevent or substantially mitigate even one catastrophic disaster, it would lead to enormous benefits.<sup>72</sup> The RIA explains that Congress intended 112(r) to prevent “catastrophic accident[s]” like Bhopal, “which are extremely rare, but very high-consequence events.”<sup>73</sup> It notes that accidents in the United States have not approached that level of damage, but also that the largest U.S. chemical disaster caused over \$1.6 billion in harms in Pasadena, Texas in 1989.<sup>74</sup>

Examining the damage costs in EPA’s accident data from 2004 to 2020 reveals that a minority of accidents account for the majority of accident costs.<sup>75</sup> Every year between 2004 and 2019, the United States had chemical accidents that individually cost tens of millions of dollars. In most years, there was at least one accident that cost hundreds of millions of dollars. In most years, preventing or seriously mitigating the most costly disaster of the year would justify the Proposed Rule’s costs, often a few times over.<sup>76</sup> This is true even though, due to underreporting, some of the largest accidents may have never been reported to EPA.<sup>77</sup> The regular pattern of these large-scale accidents show the importance of preventing a few larger disasters and underscore a continued vulnerability to even larger catastrophic disasters. EPA should consider more fully analyzing the Proposed Rule’s value in preventing or mitigating accidents on the scale of the annually most costly accidents as well as catastrophic, worst-case scenarios, which are an intended target of 112(r). At a minimum, EPA could discuss how accidents costing hundreds of millions occur almost annually, rather than suggest the 1989 accident is a total outlier, and that the Proposed Rule could help avoid or reduce these largest accidents.

Based on Section 112(r)’s statutory purpose and RMP’s regulatory design, it would be appropriate for EPA to consider the benefits of avoiding worst-case scenarios. Section 112(r) is designed to help prevent worst-case scenarios: the Clean Air Act requires EPA to issue regulations that provide, “to the greatest extent practicable, for the prevention and detection of accidental releases . . . and for response to such releases.”<sup>78</sup> Congress meant to prevent the type of “catastrophic failure” and “tragedy, of unimaginable dimension” that occurred in Bhopal, India in 1984, which killed and injured thousands of people.<sup>79</sup> In line with these goals, EPA’s

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<sup>72</sup> Proposed Rule RIA, *supra* note 8, at 61.

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

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

<sup>75</sup> *See* Appendix B.

<sup>76</sup> To arrive at these figures, we analyzed the data included in the docket, *see* RMP Accidents 2004-2020 (Appendix A); Technical Background Document for Notice of Proposed Rulemaking: Risk Management Programs Under the Clean Air Act, Section 112(r)(7) Safer Communities by Chemical Accident Prevention (Aug. 31, 2022) (Docket No. EPA-HQ-OLEM-2022-0174) [hereinafter EPA Technical Appendix on RMP Accidents 2004-2020].

<sup>77</sup> *See supra* Section II.B.

<sup>78</sup> 42 U.S.C. § 7412(r)(7)(B).

<sup>79</sup> S. Rep. No. 101-228, at 134 (1989), reprinted in 1990 U.S.C.C.A.N. 3385, 3519 (additionally citing a catastrophic accidental release at Union Carbide in West Virginia that required hundreds of workers and local residents to seek

regulatory program specifically requires facilities to submit information on the offsite consequence of worst-case scenarios as part of their planning.<sup>80</sup> The growing risk of “double disasters”<sup>81</sup> makes this forward-looking, worst-case scenario planning all the more important in the no-analogue climate future.

Past accidents are no limit on the costs of future accidents. Professor Stephen Flynn, a national security expert with extensive federal government experience, has explained that a worst-case scenario for a terrorist attack on a refinery with hydrofluoric acid (HF) alkylation on the outskirts of Philadelphia during a nearby baseball game at Philadelphia’s Citizens Bank Park could plausibly result in thousands of deaths.<sup>82</sup> The CSB has cited earlier studies finding that “[s]even petroleum refineries using hydrofluoric acid reported toxic release ‘worst-case’ scenarios in which more than one million people could be affected,” and “15 refineries could place more than 500,000 people in harm’s way.”<sup>83</sup> Experts at EPA should assess the number of fatalities that could be caused by such an event, but for context an event that caused even 100 deaths, using the same value of a statistical life (VSL) as EPA applied in the RIA (\$9.3 million), would result in \$903 million in harm before considering property damage, injuries, or unquantified costs—and preventing these 100 deaths alone would exceed the estimated 10-year costs of the program.

Corroborating the real risk of a worst-case explosion described in Professor Flynn’s example originating from a chemical accident, the nearby 2019 Philadelphia Energy Solutions Refinery accident with HF alkylation unit released over 5000 pounds of HF. While causing \$750 million in property damage, that event fortunately did not lead to serious harm among local residents.<sup>84</sup> Experts confirm that a much worse outcome with community fatalities is still a concern and that such a near-miss should not create a sense of false security.<sup>85</sup> Test releases in the Nevada desert have shown that HF can form a dense, rolling cloud with dangerous concentrations several miles from the release site.<sup>86</sup> Without adequate mitigation, such a release poses a grave threat to the

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medical treatment). See Earthjustice 2021 Comments, *supra* note 28, at 28–29 for further legislative history discussion.

<sup>80</sup> 40 C.F.R. § 68.165 (providing specific requirements to consider worst-case release scenarios for different programs); EPA, Risk Management Program Guidance for Offsite Consequence Analysis (Apr. 15, 1999), <https://www.epa.gov/rmp/rmp-guidance-offsite-consequence-analysis>.

<sup>81</sup> See FLORES ET AL., *supra* note 57.

<sup>82</sup> Stephen Flynn, *The Next Attack*, WASH. MONTHLY (Mar. 1, 2007), <https://washingtonmonthly.com/2007/03/01/the-next-attack-2/>.

<sup>83</sup> U.S. CHEM. SAFETY & HAZARD INVESTIGATION BD., *supra* note 47 (citing MEGHAN PURVIS & MARGARET HERMAN, U.S. PUB. INT. RES. GRP. EDU. FUND, NEEDLESS RISK – OIL REFINERIES AND HAZARD REDUCTION 5 (2005), [https://pirg.org/wp-content/uploads/2013/05/Needless\\_Risk\\_USPIRG.pdf](https://pirg.org/wp-content/uploads/2013/05/Needless_Risk_USPIRG.pdf)).

<sup>84</sup> U.S. CHEM. SAFETY & HAZARD INVESTIGATION BD., *supra* note 47, at 6–7. .

<sup>85</sup> See, e.g., Susan Phillips, *Refinery Explosions Raise New Warnings About Deadly Chemical*, NPR (July 19, 2019), <https://www.npr.org/2019/07/19/742367382/refinery-explosions-raise-new-warnings-about-deadly-chemical> (discussing interviews with chemical safety experts); U.S. CHEM. SAFETY & HAZARD INVESTIGATION BD., *supra* note 47, at 24 n. a (“It is plausible that during the PES event, a different combination of weather and terrain conditions could have led to a hazardous offsite concentration of HF... results [from a 1995 study by Quest Consultants] indicate that significantly large off-site regions could be affected by HF releases from HF alkylation units.”).

<sup>86</sup> U.S. CHEM. SAFETY & HAZARD INVESTIGATION BD., *supra* note 87, at 24 n. a (“a 1995 study by Quest Consultants found that “the distances to ERPG-3 [an emergency response worst-case planning level] for HF range from 5.2 miles (8.3 km) to 2.2 miles (3.5 km) under worst-case conditions when various mitigation options and compositions are available [in the releases studied]”); *id.* at 51–52. See also UNITED STEELWORKERS, A RISK TOO



surrounding community. In 2012, a release of 17,000 pounds of hydrogen fluoride gas from a chemical plant in South Korea killed 5 workers, injured 18 workers, injured 12,000 people in the surround community, damaged 500 acres of farmland, affected 3,2000 livestock animals.<sup>87</sup> The South Korean government paid \$33.4 million in compensation.<sup>88</sup>

Moreover, the 2019 Philadelphia accident is not an isolated incident, but part of a longstanding, pervasive pattern of HF releases at refineries.<sup>89</sup> Dozens of facilities are located near major, metropolitan areas in the United States, putting tens of millions of people at risk of serious harm.<sup>90</sup>

Other agencies have routinely taken action to avoid high-risk, low probability events.<sup>91</sup> In risk mitigation programs, these agencies have considered the benefits of avoiding an average high-impact event targeted by the regulatory program rather than using an average of past, smaller accidents.<sup>92</sup> For example, counterterrorism regulatory requirements for airport imaging devices do not estimate the average size of an avoided disruption, including the many zero-benefit searches of individuals not planning to conduct terrorism. Instead, they focus on the costs of a low-probability, high-impact event of a terrorist attack that destroys an entire plane and kills everyone on board.<sup>93</sup>

Other agencies have also considered incidents outside of the United States in explaining the benefits of the regulation, rather than relying only on U.S. incidents. For example, in the Chemical Facilities Anti-Terrorism Standards (CFATS), which was aimed at improving security at chemical facilities, the Department of Homeland Security (DHS) discussed the threat of terrorist attacks; the need for increased security at high-risk facilities; why these facilities are attractive to terrorists; the 1984 Bhopal, India disaster; chemical releases at similar facilities abroad; and the qualitative benefits of the risk-based standards.<sup>94</sup> Another example is the Nuclear Regulatory Commission's (NRC) Mitigation of Beyond-Design-Basis Events, a nuclear power

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GREAT REPORT, at 2 (2013), <https://www.usw.org/workplaces/oil/oil-reports/A-Risk-Too-Great.pdf> (describing results of studies showing that dangerous concentrations formed 3-6 miles from the test release site).

<sup>87</sup> U.S. CHEM. SAFETY & HAZARD INVESTIGATION BD., *supra* note 47, at 57.

<sup>88</sup> *Id.*

<sup>89</sup> A RISK TOO GREAT REPORT, *supra* note 86, at A-3.

<sup>90</sup> *Id.* at 4.

<sup>91</sup> See generally *infra* Appendix A. See, e.g., Hazardous Materials: Security Requirements for Offerors and Transporters of Hazardous Materials, 68 Fed. Reg. 14,510, 14,518 (Mar. 25, 2003) (requiring shippers of hazardous waste to develop security plans in order to address the threat of terrorist attacks); Mitigation Strategies to Protect Food Against Intentional Adulteration, 81 Fed. Reg. 34,166, 34,174 (May 27, 2016) (concluding that the regulation was “prudent” even though “the likelihood of an incident is low” because “a successful intentional adulteration of food” would “cause wide scale public health harm”).

<sup>92</sup> See *infra* Appendix A.

<sup>93</sup> See regulatory impact analyses for some regulations in Appendix A. See, e.g., TSA, PASSENGER SCREENING USING ADVANCED IMAGING TECHNOLOGY: REGULATORY IMPACT ANALYSIS AND FINAL REGULATORY FLEXIBILITY ANALYSIS (Feb. 18, 2016), <https://www.regulations.gov/document/TSA-2013-0004-5583>.

<sup>94</sup> Chemical Facility Anti-Terrorism Standards, 72 Fed. Reg. 17,688, 17,722–23 (Apr. 9, 2007) (to be codified at 6 C.F.R. pt 27).

plant regulation aimed at preventing a nuclear disaster which was a reaction to the Fukushima Daiichi disaster.<sup>95</sup>

Nuclear safety regulations have contemplated preventing catastrophic nuclear disasters for decades. A tool the Nuclear Regulatory Commission (NRC) uses to inform its decisionmaking is expert elicitation, which is the formal, structured process of obtaining expert judgment.<sup>96</sup> This process involves putting together a panel of experts to give their informed opinion on a technical issue.<sup>97</sup> Typically, expert elicitation is used when existing data and models are insufficient to provide guidance on difficult regulatory challenges.<sup>98</sup> The output is “either (1) quantitative estimates of the frequency significance of technical issues, or (2) qualitative insights into the nature, scope, or significance of technical issues.”<sup>99</sup> The NRC has refined methods of expert elicitation of probabilities of risk for low-probability, high-impact events and published multiple reports detailing how to conduct an expert elicitation in various situations.<sup>100</sup> These reports and experiences may be informative to EPA’s continued work on risk-mitigation regulations. EPA has successfully used expert elicitations in the past and should consider doing so here.<sup>101</sup>

*D. EPA should consider whether it is overestimating the costs of the third-party audit and STAA provisions in the Proposed Rule.*

EPA may also be overestimating the costs of the Proposed Rule in critical ways, and EPA should consider providing information that contextualizes the costs to facilities as compared to their revenue. Historically, EPA and industry have often overestimated the costs of regulatory compliance. In 2020, EPA performed a retrospective analysis of its 2007 chemical facility anti-terrorism safety standards.<sup>102</sup> In this analysis, EPA found that it had overestimated the cost of these regulations by 83%—in part because it had to rely on industry estimates rather than past data.<sup>103</sup>

In the RIA for the Proposed Rule, EPA makes at least two assumptions that may lead it to overestimate costs. First, EPA’s cost estimates for third-party audits appear to assume that, absent the Proposed Rule, facilities would face no auditing costs when, in fact, facilities are

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<sup>95</sup> Mitigation of Beyond-Design-Basis Events, 84 Fed. Reg. 39,684, 39,684 (Aug. 9, 2019) (to be codified at 10 C.F.R. pts. 50 & 52).

<sup>96</sup> JING XING & STEPHANIE MORROW, U.S. NUCLEAR REGUL. COMM’N, WHITE PAPER: PRACTICAL INSIGHTS AND LESSONS LEARNED ON IMPLEMENTING EXPERT ELICITATION 1 (2016), <https://www.nrc.gov/docs/ML1628/ML16287A734.pdf>.

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

<sup>98</sup> *Id.*

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

<sup>100</sup> *See id.* at 2, 4–6 (listing instances where expert elicitation was used and documents that either provide recommendations for implementing expert elicitation or describe projects that used expert elicitation).

<sup>101</sup> *See, e.g.*, INDUS. ECON., INC., EXPANDED EXPERT JUDGMENT ASSESSMENT OF THE CONCENTRATION-RESPONSE RELATIONSHIP BETWEEN PM2.5 EXPOSURE AND MORTALITY (2006), [https://www3.epa.gov/ttnecas1/regdata/Uncertainty/pm\\_ee\\_report.pdf](https://www3.epa.gov/ttnecas1/regdata/Uncertainty/pm_ee_report.pdf); *Science Inventory: Expert Elicitation White Paper*, EPA (last visited Oct. 31, 2022), [https://cfpub.epa.gov/si/si\\_public\\_record\\_Report.cfm?Lab=OSA&dirEntryId=155023](https://cfpub.epa.gov/si/si_public_record_Report.cfm?Lab=OSA&dirEntryId=155023).

<sup>102</sup> Retrospective Analysis of the Chemical Facility Anti-Terrorism Standards, 85 Fed. Reg. 37,393 (June 22, 2020).

<sup>103</sup> *Id.* at 37,393.

already required to conduct self-audits.<sup>104</sup> EPA should not assume a baseline of zero cost. The correct unit cost would be the difference in cost between a self-audit (the baseline) and a third-party audit. Even if EPA cannot determine the exact magnitude of this cost, it should qualitatively acknowledge it.<sup>105</sup>

Second, EPA assumes a constant annual cost of the STAA provisions, even though it recognizes that a second-round STAA will be less expensive than the first round.<sup>106</sup> EPA should provide any evidence of the extent of this difference in cost or further discuss how it might be considerable. EPA attributes STAA costs entirely to worker hours and updating a prior analysis will almost certainly require many fewer worker hours than starting from a clean slate.

EPA should also consider collecting more information on the number of hours necessary to perform safer technology analyses and use those to help estimate costs rather than approximating costs based on a percentage of average projected costs for implementing a safer technology or alternative. Some state programs have required facilities to consider safer technologies for years, even decades,<sup>107</sup> and those experiences should be able to provide more concrete information on cost considerations.

EPA should also consider providing additional context for cost estimates of the Proposed Rule. Costs may seem larger in aggregate than when considered in the context of individual facility expenses and the revenue of those facilities. For example, EPA found that, for 96.9% of small entities affected by the Proposed Rule, the Proposed Rule's costs would be <1% of their revenue.<sup>108</sup> EPA could also consider the costs to larger entities as a percentage of their revenue to better indicate what the impact would of the Proposed Rule would be on these facilities.

### **III. EPA appropriately uses breakeven analysis, a well-accepted approach to regulatory analysis, and can further strengthen its finding by incorporating additional information (Category 13. Regulatory Impact Analysis)**

EPA appropriately uses breakeven analysis in its RIA to weigh the costs and benefits of the Proposed Rule because there are important benefits of the RMP program that cannot be quantified or monetized. Breakeven analysis is a well-accepted approach to regulatory analysis that is appropriately used instead of traditional cost-benefit analysis when important costs or benefits cannot be monetized.<sup>109</sup> Breakeven analysis “can provide insights when quantification is

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<sup>104</sup> 68 C.F.R. § 68.79; Proposed Rule RIA, *supra* note 8, at 46.

<sup>105</sup> EPA should make sure that it is analyzing costs and benefits from the same baseline to do an evenhanded analysis.

<sup>106</sup> Proposed Rule RIA, *supra* note 8, at 45.

<sup>107</sup> See Testimony of Laura Mirman-Heslin, Office of the New York State Attorney General, Public Listening Session on Review of EPA Risk Management Program (RMP) Regulation Revisions Completed Since 2017, Exhibit B (July 8, 2021), <https://cpr-assets.s3.amazonaws.com/documents/ny-ag-written-testimony-epa-rmp-improvements-exhibits.pdf> [hereinafter NY OAG Testimony].

<sup>108</sup> Proposed Rule RIA, *supra* note 8, at 80.

<sup>109</sup> See *Circular A-4*, *supra* note 34, at 2; EPA Economic Analysis Guidance, *supra* note 35, at ch.7, 7–50; GILES ATKINSON ET AL., COST-BENEFIT ANALYSIS AND THE ENVIRONMENT: FURTHER DEVELOPMENTS AND POLICY USE (2018), <https://www.oecd.org/env/cost-benefit-analysis-and-the-environment-9789264085169-en.htm>.

speculative or impossible”<sup>110</sup> by posing a more straightforward question: “How small could the value of the non-quantified benefits be . . . before the rule would yield [net] zero benefits?”<sup>111</sup> Breakeven analysis is appropriate in situations where policymakers must navigate decisionmaking that implicates significant costs and benefits in the face of uncertainty about their exact scope—the very circumstances that EPA is operating within when updating RMP requirements.

The Office of Management and Budget (OMB) has explicitly recognized breakeven analysis as an appropriate tool to justify a regulation when important costs or benefits cannot be quantified or monetized. In its *Circular A-4* guidance to agencies on conducting regulatory analysis, OMB recognizes that it “will not always be possible to express in monetary units all of the important benefits and costs,” and under those circumstances “the most efficient alternative will not necessarily be the one with the largest quantified and monetized net-benefit estimate.”<sup>112</sup> In such situations, if the agency determines that the non-quantified benefits or costs are important, OMB instructs agencies to carry out a threshold” or breakeven analysis to evaluate their significance and to “indicate, where possible, which non-quantified effects are most important and why.”<sup>113</sup> EPA’s internal guidance on cost-benefit analysis corroborates this approach, explaining that breakeven analysis, “can be used when either risk data or valuation are lacking.”<sup>114</sup>

In the RMP Proposed Rule, EPA is not able to identify, with certainty, how many accidents a particular risk management tool will divert, or by what degree of magnitude an accident will be lessened. This is an inherent challenge of risk mitigation programs, which are designed around avoiding particular bad outcomes based on applying measures that reduce the likelihood of that outcome, however, it is challenging to determine how much a given measure will reduce risk. For these types of questions, breakeven analysis is the best available tool and asks the agency to answer a simpler question: will the policy provide *at least* enough benefits that its costs will be justified? EPA appropriately used a breakeven framework to weigh the costs of its Proposed Rule against the breakeven scenario and concluded that the Proposed Rule is justified.

Breakeven analysis has been used across regulatory agencies in a variety of contexts,<sup>115</sup> including at least a half-dozen instances of risk mitigation regulations which provide precedent for the Proposed Rule.<sup>116</sup> Like the Proposed Rule, some of these prior risk mitigation regulations were designed, at least in part, to reduce the risk of low-probability but high-cost harms, such as airline security or baggage inspections to prevent terrorist attacks or supplying fire-suppression tools on Coast Guard vessels.<sup>117</sup> As discussed below, these examples provide a model that EPA

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<sup>110</sup> Off. Info. & Regul. Affairs, Regulatory Impact Analysis: A Primer 13 (Aug. 15, 2011), [https://www.reginfo.gov/public/jsp/Utilities/circular-a-4\\_regulatory-impact-analysis-a-primer.pdf](https://www.reginfo.gov/public/jsp/Utilities/circular-a-4_regulatory-impact-analysis-a-primer.pdf).

<sup>111</sup> *Circular A-4*, *supra* note 34, at 2.

<sup>112</sup> *Id.*

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

<sup>114</sup> EPA Economic Analysis Guidance, *supra* note 35, at ch.7, 7–50 (citing BOARDMAN ET AL., COST-BENEFIT ANALYSIS CONCEPTS AND PRACTICE (1996)).

<sup>115</sup> See Cass Sunstein, *The Limits of Quantification*, 102 CAL. L.R. 1306, 1406–13 (2014) (providing a list of breakeven analysis uses across 25 different rules).

<sup>116</sup> See *infra* Appendix A.

<sup>117</sup> *Id.*

could use to set an upper bound for its benefits estimate. EPA’s current breakeven analysis based on average accidents could still set a lower bound.

EPA’s breakeven analysis currently focuses on the number of averaged-sized accidents that would need to be avoided for costs to be justified. EPA may want to consider also applying alternative characterizations, such as the number of fatalities or injuries that would need to be avoided per year. Other risk mitigation regulations have used numbers of avoided injuries or fatalities for their breakeven analyses, including risk mitigation regulations that based a breakeven analysis off an average of past accidents, like EPA.<sup>118</sup>

*A. EPA could strengthen its analysis by better considering benefits from the reduced magnitude of future chemical disasters, rather than only the benefits from entirely avoided accidents*

EPA has concluded that, if adopted, this Proposed Rule “would result in a reduced frequency and magnitude of damages from releases.”<sup>119</sup> It includes as separate social benefit categories the “prevention” of future RMP accidents and the “mitigation” of future RMP accidents.<sup>120</sup> In its breakeven analysis, EPA clarifies “[t]he proposed rule would need to reduce, or mitigate, damages valued at approximately \$76 million over any number of future accidents to achieve breakeven.”<sup>121</sup> It explains that alternatively the proposed rule would need to prevent “fewer than approximately 15 accidents, each with average monetized damages of approximately \$5 million” to breakeven and “[t]he number fewer than 15 would depend on the value of the unquantified accident damages that would be avoided.”<sup>122</sup>

In characterizing what the \$76 million worth of harm prevention might look like, EPA should consider including a range of decreased magnitudes and decreased number of accidents, particularly given that a number of its provisions—such as improved community notification and emergency response procedures when incidents occur<sup>123</sup>—may reduce the magnitude of accidents, rather than prevent accidents entirely. For example, EPA could more explicitly explain that the number of fewer than 15 accidents is also attributable to reducing the severity of future accidents, not just avoiding accidents entirely.

EPA’s guidance on breakeven analysis explains that, while it may be challenging, if there are multiple unknowns in a breakeven analysis, the agency can “consider a ‘break-even frontier’ that allows the number of both effects to vary.”<sup>124</sup> We recommend that EPA instead gives full credit to a range of decreases in accident number and severity. For example, rather than reducing the number of annual accidents by 15, EPA might assess whether it could reduce the severity of 30 accidents (averaging \$5 million each in damages) by 50%, or achieve some combination of

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<sup>118</sup> The Federal Railroad Administration in its 2014 Rule on the Training, Qualification, and Oversight for Safety-Related Railroad Employees discusses an alternative breakeven point for the regulation of preventing one fatality and 86 injuries per year. *See infra* Appendix A.

<sup>119</sup> Proposed Rule, *supra* note 2, at 53,562.

<sup>120</sup> Proposed Rule RIA, *supra* note 8, at 59–60 (discussing how the benefits of “[s]everal proposed rule provisions would reduce the impacts or severity of accidents by promoting a more rapid and efficient response to these incidents.”).

<sup>121</sup> *Id.* at 59–60.

<sup>122</sup> *Id.* at 60.

<sup>123</sup> Proposed Rule, *supra* note 2, at 53,595.

<sup>124</sup> EPA Economic Analysis Guidance, *supra* note 35, at ch.7, 7–50.

reducing accident rates and severity. Alternatively, EPA could discuss the reduction in magnitude qualitatively, explaining that the benefits would justify the costs even if the number of avoided accidents were fewer than 15 due to reducing the magnitude of accidents—EPA already makes a similar statement with regard to other unquantified benefits.<sup>125</sup> In this way, EPA could give the Proposed Rule fuller credit for its ability to reduce accident severity, which will better inform its selection of a level of stringency that passes breakeven conditions.

*B. EPA should consider making additional, explicit breakeven findings based on high-cost past events or potential worst-case scenarios and offer further contextualization*

EPA assesses the breakeven point based on an average of past accidents. EPA should consider using its current breakeven analysis based on average past incidents as a lower bound and supplementing with a breakeven analysis for a low-probability, high-impact tail event as an upper bound estimate. As discussed above, given the statutory text, legislative purpose, and regulatory framework, it would be appropriate to consider the benefits of avoiding a worst-case scenario. Because facilities are required to submit worst-case scenarios as part of their risk management plans, EPA should be able to use these estimates to inform a cost for an average worst-case scenario for different types of facilities.

Alternatively, EPA could determine a middle bound breakeven point based on avoiding the largest historical accidents, rather than looking at the average of past accidents which includes many accidents with smaller monetized costs. This would make sense because the vast majority of the monetized costs considered in the Proposed Rule stem from the worst accidents. For example, the 5% most severe accidents from 2016-2020 account for 89.6% of damages, and between 2004-2020, in six years a single accident accounted for over half of the damages in a given year.<sup>126</sup> This data would very likely be even more heavily skewed if it incorporated large accidents that resulted in plant closures or bankruptcies, such as the 2019 Philadelphia Energy Solutions Refinery of an HF alkylation unit, which caused more than \$750 million in property damage, noted above.<sup>127</sup>

EPA's current breakeven analysis focuses on the size of the mean incident, but the distributional properties mean it is critical to reduce the higher moments—e.g., variance and skew—of the distribution as well. Accordingly, EPA's proposed measures—including the STAA requirement—are particularly valuable for how they reduce or mitigate very high-cost accidents. Avoiding an accident roughly the size of the 2019 Philadelphia Energy Solutions accident would alone justify the costs of the rule for ten years. The distribution suggests that EPA should include breakeven points based on worst-case scenarios and large historical accidents in its analysis.

Given 112(r)'s legislative purpose to prevent catastrophic events and the design of the regulatory regime to address worst-case scenarios, it would also make sense for EPA to analyze the benefits of avoiding these low-probability, high impact events. While avoiding smaller accidents is also relevant to EPA's regulatory goals, looking at only a lower bound that averages across these

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<sup>125</sup> See Proposed Rule RIA, *supra* note 8, at 60.

<sup>126</sup> See *infra* Appendix B.

<sup>127</sup> U.S. CHEM. SAFETY & HAZARD INVESTIGATION BD., *supra* note 47, at 6.

smaller accidents obscures the benefits of avoiding a few of the largest accidents which are a primary focus the legislation.

EPA can complement its middle or upper bound estimate with a qualitative discussion of how the Proposed Rule is well-situated to help avoid some of the worst accidents. For example, it can explain how the informational benefits of the safer technology analysis would contribute to behavioral change, and why it is reasonable to expect that a facility that becomes aware of a safer and equally inexpensive, or less expensive, option would rationally adopt the safer technology.<sup>128</sup>

Other agencies have conducted breakeven analysis focused on avoiding low-probability, high-impact events. Appendix A contains a list of seven finalized risk mitigation regulations relying on breakeven analysis and five of them focus on low-probability, high-impact events rather than an average of past accidents. These include several regulations that make the breakeven point avoiding a catastrophic terrorist attack rather than some historical average of smaller incidents the same mitigation measure might help prevent.<sup>129</sup>

EPA should consider using the worst-case scenario plans in RMPs and its expertise to determine the right number for a mid- or upper-bound breakeven point based on either historical events or future worst-case scenarios. In Table 1, we provide an example based on the property damages from the 2019 Philadelphia Energy Solutions Refinery accident as a historical example and a worst-case scenario based on a similar level of property damage plus 1000 casualties.<sup>130</sup> The breakeven points in Table 1 are meant to be illustrative and should be substituted with EPA's selected estimates based on its data.

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<sup>128</sup> See NY OAG Testimony, *supra* note 107, at Exhibit B (discussing examples of state programs requiring consideration of IST that led to adoption of IST). For example, this testimony explain that “[i]n Massachusetts’ experience, requiring companies to consider safer alternatives has generated real benefits for both the companies and the public. The full accounting of alternatives required by [the Toxics Use Reduction Act] often reveals sensible cost-saving opportunities that companies otherwise would have failed to recognize. This has led companies to implement voluntary changes that save money while reducing the risk of accidents. For instance, as documented in a 2009 assessment of the TURA program by the Massachusetts Toxics Use Reduction Institute, surveyed companies described many benefits associated with the identification and implementation of safer alternatives, including improved worker health and safety, reduced risk of accidents, financial savings, production efficiency improvements, improved product quality, and improved community relations. In short, safer alternatives can be smart business choices.”) *Id.* at Exhibit B, 4.

<sup>129</sup> See *supra* Section II.C.3.

<sup>130</sup> See *supra* discussion accompanying notes 84 to 90.

**Table 1: Illustrative Breakeven Points for Historical Tail Event or Worst-Case Scenarios**

Provision	Est. Annual Cost	Breakeven Point <sup>131</sup>	
		Historical Tail Event Accident (\$750 million in property damages)	Worst-Case Scenario (\$750 million in property damages + 1000 deaths with VSL of \$9.3 million)
Overall Proposed Rule	\$75,800,000 million	Prevent 1 event every 9.89 years	Prevent 1 event every 132.59 years

Given the STAA’s applicability to avoiding worst-case scenarios,<sup>132</sup> it may be most appropriate to use these larger incident breakeven points for its consideration and narratively contextualize this relevance. As discussed above, the release of hydrogen fluoride gas can cause extensive injuries, fatalities, and other damages. Switching from HF alkylation to a safer alternative could eliminate the risk of extensive community fatalities from a cloud of this toxic vapor engulfing the surrounding community. If the STAA provision prevented 1000 fatalities from a catastrophic release over roughly 180 years, the provision would breakeven on that basis alone.<sup>133</sup> The continued incidents involving significant releases of HF and near misses, indicate the value of eliminating this risk of off-site consequences.<sup>134</sup> As noted above, other regulations have used breakeven points based on avoided injuries and fatalities.

EPA may wish to consider other alternative contextualization such as avoided injuries or fatalities for other provisions that are intended to lessen the severity of damages or reduce off-site injuries and fatalities rather than prevent accidents.

For example, the Community Notification System that EPA proposes is estimated to cost about \$3.8 million/year.<sup>135</sup> Assuming a population of 177 million people living within vulnerability zones,<sup>136</sup> EPA could consider whether it thinks people would be willing to pay \$0.02/year for improved communication in the case of an incident. Alternately—or in addition—EPA could consider whether it thinks such a program would reduce the average accident severity by 0.7%.<sup>137</sup> Similarly, the Root Cause Analysis program would meet its breakeven costs if it prevented one average-sized incident every seven years or reduced the damages of a single

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<sup>131</sup> Calculation is computed by dividing total damages by annual costs.

<sup>132</sup> See the following section for a further contextualization of the implications for the STAA provision and worst-case scenarios. *See also* discussion of worst-case scenarios in Section II.C.3.

<sup>133</sup> Using EPA’s VSL of \$9.3 million for 1000 deaths. ( $\$9.3 \text{ million} * 1000 \text{ deaths}$ )/\$51.8 million annual costs of the STAA provision.

<sup>134</sup> *See infra* discussion in Section II.C.3.

<sup>135</sup> Proposed Rule RIA, *supra* note 8, at 9.

<sup>136</sup> *See* EPA, REGUL. IMPACT ANALYSIS: SAFER COMMUNITIES BY CHEMICAL ACCIDENT PREVENTION PROPOSED RULE 94 (Dec. 16, 2016) (Docket No. EPA-HQ-OEM-2015-0725-0734).

<sup>137</sup> EPA estimates the cost of the Community Notification System at \$3.8 million per year and the baseline chemical accident costs at \$477 million per year, so a reduction of accidents by 0.7% would pay for the program. Proposed Rule RIA, *supra* note 8, at 9–10.



average-sized accident by 14%, each year.<sup>138</sup> This tailored analysis would lend additional support to the relevant provisions of the Proposed Rule based on the types of damages likely to be mitigated.

### **Implications for STAA Provision:**

Using a breakeven based on worst-case scenarios or worst past accidents is particularly relevant for the STAA provision given that some of the largest accidents and worst-case scenarios involve refineries with HF alkylation and the Chemical Safety Board (CSB) has recommended the use of inherently safer technologies (IST) to prevent this type of accident.<sup>139</sup> Most recently, the CSB issued an October 2022 report on the Philadelphia Energy Solutions Refinery accident identifying IST as a recommended solution for such incidents.<sup>140</sup> The report summarized CSB's previous recommendations for IST solutions following other large incident investigations, the dangers posed by a large release of HF, and the availability of alternative safer alkylation technologies, before concluding that "EPA should require petroleum refineries to conduct a safer technology and alternatives analysis (STAA) as part of their PHA, and to evaluate the practicability of any inherently safer technology (IST) identified."<sup>141</sup>

The STAA provision of the Proposed Rule would help reduce the risk and scope of these accidents. In some cases, use of IST can entirely avoid the risk of these worst outcomes, as the risk itself has been removed.<sup>142</sup> Such benefits are not exclusive to HF alkylation. In the preamble, EPA cites to five accidents that likely would have been avoided had the facilities been required to adopt STAA.<sup>143</sup>

State programs have already demonstrated the effectiveness of considering inherently safer technology in leading to adoption.<sup>144</sup> For example, New Jersey began requiring facilities with extraordinarily hazardous substances to conduct an IST review in 2008.<sup>145</sup> Similar to the Proposed Rule, these regulations also do not mandate the implementation of any IST measures, but "New Jersey's review of the 85 initial IST reports showed that 45 facilities (53%) chose to

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<sup>138</sup> EPA estimates the costs of Root Cause Analysis at about \$700,000/year, and sets quantified per accident costs at \$4.9 million. *Id.* at 9–10. Therefore, to breakeven, Root Cause Analysis would need to reduce the cost of one accident by 14% each year or could eliminate one accident every 7.5 years.

<sup>139</sup> U.S. CHEM. SAFETY & HAZARD INVESTIGATION BD., *supra* note 47, at 75 ("Because alternative and safer alkylation technologies exist, as described in this report, the CSB determined that it is critical that petroleum refineries evaluate the applicability of these technologies for implementation in existing HF alkylation units. The CSB concludes that EPA should require petroleum refineries to conduct a safer technology and alternatives analysis (STAA) as part of their PHA, and to evaluate the practicability of any inherently safer technology (IST) identified. The CSB recommends to EPA to take such action.")

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

<sup>141</sup> *Id.*

<sup>142</sup> Paul Amyotte & Faisal Khan, *The Role of Inherently Safer Design in Process Safety*, 99 CANADIAN J. OF CHEM. ENG'RG. 853, 869 (Dec. 15, 2020).

<sup>143</sup> Proposed Rule, *supra* note 2, at 53,575; *see also* Jennifer Busick, *The Cost of Catastrophe: Is There a Business Case for Chemical Safety?*, EHS DAILY ADVISOR (May 15, 2017), <https://ehsdailyadvisor.blr.com/2017/05/cost-catastrophe-business-case-chemical-safety/>.

<sup>144</sup> *See* NY OAG Testimony, *supra* note 107, at Exhibit B.

<sup>145</sup> N.J. ADMIN. CODE 7:31-4.12(a), available at [https://www.nj.gov/dep/rules/rules/njac7\\_31.pdf](https://www.nj.gov/dep/rules/rules/njac7_31.pdf).

implement a total of 205 IST measures.”<sup>146</sup> Similarly, for decades, Massachusetts has required certain companies with large amounts of hazardous substances to document their good-faith efforts to consider feasible, safer technologies under the Toxics Use Reduction Act (TURA).<sup>147</sup> Massachusetts found that “[d]ata collected from 464 facilities in 2016 indicate that over three-quarters of the facilities subject to TURA had adopted measures that reduced the use and waste of their chemicals, and more than half had eliminated reportable uses of one or more chemicals.”<sup>148</sup> A cost-benefit analysis of the first seven years of the Massachusetts program found the monetized benefits of the program outweighed the costs, even before considering public health and environmental benefits.<sup>149</sup> The adoption of IST under the RMP program may be further supported by owners’ and operators’ obligations under the general duty clause to take the necessary steps to “prevent releases and minimize the consequences of accidental releases which do occur.”<sup>150</sup>

Returning to the refinery HF alkylation example, in line with these state trends, the STAA provision may prompt facilities to switch technologies because technologies that eliminate the risk of an HF release are now commercially feasible.<sup>151</sup> Indeed, alternative processes may even be more efficient; a Salt Lake City facility undertook a retrofit at commercial scale to employ a more efficient, safer alkylation process that can “meet[] the rising global demand for cleaner-burning fuels at a *lower cost* while simplifying complex handling requirements.”<sup>152</sup>

#### **IV. EPA should strengthen its consideration of distributional impacts and integrate those findings into its decisionmaking process for the final and future rules (Category 13. Regulatory Impact Analysis)**

Chemical incidents and catastrophic disasters put heavy costs on the communities surrounding RMP facilities and facility workers. These communities bear environmental, psychological, and health harms from these accidents. Emergency management and preparedness costs, site clean-

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<sup>146</sup> See NY OAG Testimony, *supra* note 107, Exhibit B, at 3 & n.14 (citing N.J. Dep’t Env’t Protection, Comments on Accidental Release Prevention Proposed Amendment (June 28, 2018) (Docket No. EPA-HQ-OEM-2015-0725-0973); N.J. Dep’t Env’t Protection, Inherently Safer Technology (IST) Implementation Summary (Jan. 15, 2010) (Docket No. EPA-HQ-OEM-2015-0725-0412).

<sup>147</sup> See MASS GEN. LAWS ch. 21I, § 11(A); 310 MASS. CODE REGS. 50.46, 50.46A.

<sup>148</sup> NY OAG Testimony, *supra* note 107, Exhibit B, at 4 (citing MASS. DEP’T ENV’T PROTECTION, ANNUAL REPORT, MASSACHUSETTS TOXICS USE REDUCTION PROGRAM, FISCAL YEAR 2018 (2018), <https://www.mass.gov/doc/fiscal-year-2018-progress-report-on-the-massachusetts-toxics-use-reduction-program-0/download>).

<sup>149</sup> MASS. TOXICS USE REDUCTION INST., BENEFIT-COST ANALYSIS OF THE MASSACHUSETTS TOXICS USE REDUCTION ACT 4–3 (1997), <https://p2infohouse.org/ref/34/33463.pdf>.

<sup>150</sup> 42 U.S.C. § 7412(Section 112(r)(1) (“The owners and operators of stationary sources producing, processing, handling or storing such substances have a general duty, in the same manner and to the same extent as section 654, title 29 of the United States Code, to identify hazards which may result from such releases using appropriate hazard assessment techniques, to design and maintain a safe facility taking such steps as are necessary to prevent releases, and to minimize the consequences of accidental releases which do occur.”). See EPA, *General Duty Clause Under the Clean Air Act Section 112(r)(1)*, EPA (last visited Oct. 31 2022), <https://www.epa.gov/rmp/general-duty-clause-under-clean-air-act-section-112r1> (“recognizing that owners and operators have a general duty and responsibility to prevent and mitigate the consequences of chemical accidents”)

<sup>151</sup> Earthjustice 2021 Comments, *supra* note 28, at 33 & n.132.

<sup>152</sup> Amanda Doyle, *Safer and More Efficient Alkylation Process Now at Commercial Scale*, CHEM. ENG’R (May 5, 2021), <https://www.thechemicalengineer.com/news/safer-and-more-efficient-alkylation-process-now-at-commercial-scale/> (emphasis added).

up costs, and other cascading effects on jobs and services from chemical accidents also fall on communities and different levels of government.<sup>153</sup> It is appropriate for EPA not only to consider the net benefits of the Proposed Rule, but to also disaggregate how the rule's costs and benefits are distributed. This Proposed Rule shifts the burden away from at-risk communities and governments and places costs, in the form of risk mitigation measures, on the entities that profit from these facilities and create the risk of harmful incidents to communities.

EPA proposed this rule with the intention “to further protect vulnerable communities from chemical accidents, especially those living near facilities with high accident rates” and “advance environmental justice for communities that have been disproportionately impacted by these facilities.”<sup>154</sup> Chemical plants subject to the RMP program are more likely to be located in low-income communities and communities of color,<sup>155</sup> and avoidable accidental releases of hazardous pollution from these facilities would increase these communities' already disproportionately high environmental burden.<sup>156</sup>

EPA's analysis found that the demographic composition of communities within 1 and 3 miles of RMP facilities have a higher percentage of low-income and historically underserved and overburdened race and ethnicity groups as compared to the national average.<sup>157</sup> EPA further found the percentage of the population falling within these groups is even higher in communities surrounding the subset of RMP facilities that had accidents between 2004-2020.<sup>158</sup> Lastly, EPA found the percentage of these overburdened populations is higher within the 1-mile radius than the 3-mile radius for the dataset of all facilities, and specifically among the subset of facilities that had accidents.<sup>159</sup>

EPA properly includes an environmental justice analysis in its RIA, and consistent with best practices, EPA considers the environmental benefits of the Proposed Rule as compared to the baseline scenario. As discussed below, EPA is fully authorized to weigh the distribution of benefits in its regulatory decisionmaking. Furthermore, to best determine the optimal level of protection, EPA should consider the distribution of costs and benefits alongside the net quantity of benefits.

Strengthening EPA's environmental justice analysis, as consistent with best analytical practices, could demonstrate even more pronounced distributional benefits for environmental justice

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<sup>153</sup> See, e.g., Letter from Earl Ray Tomblin, Governor of West Virginia, to Elizabeth A. Zimmerman (March 11, 2014) (appealing for aid from the federal government after a chemical spill at a non-RMP facility affected the water supply of 300,000 people, and cost millions of dollars in lost instruction time, temporarily closed businesses, and required hospitals to cancel elective and non-emergency services).

<sup>154</sup> EPA, Press Release: EPA Proposes Stronger Regulations to Protect Communities from Chemical Accidents (Aug. 19, 2022), <https://www.epa.gov/newsreleases/epa-proposes-stronger-regulations-protect-communities-chemical-accidents>.

<sup>155</sup> LIFE AT THE FENCELINE, *supra* note 65; ENV'T JUSTICE & HEALTH ALL. FOR CHEM. POL'Y REFORM, WHO'S IN DANGER: RACE, POVERTY, AND CHEMICAL DISASTER 8 (May 2014), <https://comingcleaninc.org/assets/media/images/Reports/Who%27s%20in%20Danger%20Report%20FINAL.pdf> [hereinafter WHO'S IN DANGER].

<sup>156</sup> See sources cited *id.* See also *supra* Section II.C.2 (discussing the burden of cumulative effects on fenceline communities).

<sup>157</sup> Proposed Rule RIA, *supra* note 8, at 85–86.

<sup>158</sup> *Id.*

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

communities. With an analysis showing even more pronounced distributional benefits, EPA could better support the current Proposed Rule. EPA could strengthen its analysis by considering the distributional benefits of different alternatives, examining data at a more granular level, and disaggregating socioeconomic data. All of these practices would be consistent with the federal government's instructions for regulatory decisionmaking. EPA has a long, well-supported history of fully integrating unquantified benefits into its analysis and decisionmaking; it can apply the same treatment to its consideration of distributional impacts to better justify the Proposed Rule. EPA can also apply these best practices to its regulatory analysis of a more stringent alternative, or an additional amendment to protect at-risk communities, and if the data supports such a conclusion is merited based on the net benefits and distribution of benefits, adopt such an amendment.

*A. EPA is required to consider distributional impacts in its decisionmaking*

EPA properly includes an environmental justice analysis to support its Proposed Rule and is fully authorized to strengthen this analysis and rely on the resulting findings in its decisionmaking regarding the stringency of its regulations. For over 25 years, Executive Orders and related guidance documents have directed EPA to consider distributional impacts in regulatory decisionmaking. Executive Order 12,866, issued by President Clinton in 1993, instructs agencies to incorporate equity considerations into their cost-benefit analyses and regulatory decisions.<sup>160</sup> It specifically recognizes that “distributive impacts” and “equity” are relevant to assessing net benefits.<sup>161</sup> *Circular A-4*—OMB’s principal guidance on cost-benefit analysis—further instructs agencies to “provide a separate description of distributional effects (i.e., how both benefits and costs are distributed among sub-populations of particular concern) so that decision makers can properly consider them along with the effects on economic efficiency,” and to describe distributional effects “quantitatively to the extent possible.”<sup>162</sup> In 2011, President Obama issued Executive Order 13,563, which reaffirmed Executive Order 12,866 and stated that agencies conducting cost-benefit analysis “may consider (and discuss qualitatively) values that are difficult or impossible to quantify, including equity, human dignity, fairness, and distributive impacts.”<sup>163</sup>

Separate from these directives on cost-benefit analysis, Executive Orders and associated guidance instruct EPA and other agencies to weigh environmental justice considerations in their decisionmaking. In 1994, President Clinton issued Executive Order 12,898, which requires agencies to identify and seek to address the adverse environmental and human-health impacts of all federal administrative programs (including regulations) on minority and low-income populations.<sup>164</sup> The White House Council on Environmental Quality<sup>165</sup> and later the Interagency

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<sup>160</sup> Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Oct. 4, 1993).

<sup>161</sup> *Id.* § 1(b)(5), 58 Fed. Reg. at 51,736.

<sup>162</sup> See *Circular A-4*, note 34, at 14.

<sup>163</sup> Exec. Order No. 13,563, § 1(c), 76 Fed. Reg. 3821, 3821 (Jan. 21, 2011).

<sup>164</sup> Exec. Order No. 12,898 § 1-101, 59 Fed. Reg. 7629, 7629 (Feb. 16, 1994) (“To the greatest extent practicable and permitted by law, . . . each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations . . .”).

<sup>165</sup> Council on Env’t Quality, *Environmental Justice: Guidance Under the National Environmental Policy Act* (Dec. 10, 1997), [https://www.epa.gov/sites/default/files/2015-02/documents/ej\\_guidance\\_nepa\\_ceq1297.pdf](https://www.epa.gov/sites/default/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf).

Working Group on Environmental Justice<sup>166</sup> provided subsequent guidance on identifying and assessing a broad range of potential disparate impacts in environmental justice analyses conducted under Executive Order 12,898.<sup>167</sup>

President Biden has repeatedly stated that advancing environmental justice is a priority for his administration.<sup>168</sup> On his first day in office, President Biden reaffirmed Executive Order 12,866 and called for OMB to develop “procedures that take into account the distributional consequences of regulations, including as part of any quantitative or qualitative analysis of the costs and benefits of regulations, to ensure that regulatory initiatives appropriately benefit and do not inappropriately burden disadvantaged, vulnerable, or marginalized communities.”<sup>169</sup>

It would be fully consistent with government best practices and priorities for regulatory decisionmaking for EPA to strengthen its environmental justice analysis and more heavily weigh the distribution of regulatory impacts in determining the stringency of the final rule or subsequent amendments to the RMP. Such a choice is reasonable and within EPA’s expert discretion when EPA can provide good reasons for its policy.<sup>170</sup> Nothing in the Clean Air Act prohibits this increased focus on distributional impacts.

*B. EPA should improve its distributional analysis by considering more granular data, further disaggregated data, and the distributional outcomes of alternatives.*

To improve its environmental justice analysis, EPA should look to recent scholarship, which has identified key features of meaningful distributional analysis.<sup>171</sup> Based on this literature, EPA should strengthen the consideration of distributional impacts in the Proposed Rule in four key ways: (1) consider more granular data; (2) disaggregate socioeconomic data in additional ways; (3) consider the distributional impacts of alternatives; and (4) fully integrate the results of its analysis into its final decision. These practices would be consistent with EPA’s Guidelines on Conducting Economic Analyses which clarify that “evaluating a program’s distributional effects is an important complement to benefit-cost analysis.”<sup>172</sup> By improving its distributional analysis,

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<sup>166</sup> Fed. Interagency Working Grp. on Env’t Just., *Promising Practices for EJ Methodologies in NEPA Reviews* (2016), [https://www.epa.gov/sites/default/files/2016-08/documents/nepa\\_promising\\_practices\\_document\\_2016.pdf](https://www.epa.gov/sites/default/files/2016-08/documents/nepa_promising_practices_document_2016.pdf).

<sup>167</sup> In its guidelines for conducting economic analysis, EPA also discusses executive orders related to the protection of childhood health and provision of services to populations with limited English proficiency. EPA Economic Analysis Guidelines, *supra* note 35, at ch.10, 10–2.

<sup>168</sup> See Exec. Order No. 13,990 § 1, 86 Fed. Reg. 7037, 7037 (Jan. 25, 2021) (stating that it is the policy of the new administration to “prioritize . . . environmental justice”); Exec. Order No. 14,008 § 219, 86 Fed. Reg. 7619, 7629 (Feb. 1, 2021) (stating that it is the administration’s policy to “secure environmental justice and spur economic opportunity for disadvantaged communities that have been historically marginalized and overburdened by pollution and underinvestment in housing, transportation, water and wastewater infrastructure, and health care”).

<sup>169</sup> Modernizing Regulatory Review: Memorandum for the Heads of Executive Departments and Agencies § 2(b)(ii), 86 Fed. Reg. 7223, 7223 (Jan. 26, 2021) (reporting the memorandum issued on January 20, 2021).

<sup>170</sup> See Fed. Comm’n Comm’n v. Fox Television Stations, Inc., 556 U.S. 502 (2009).

<sup>171</sup> See, e.g., JACK LIENKE ET AL., INST. FOR POL’Y INTEGRITY, MAKING REGULATIONS FAIR: HOW COST-BENEFIT ANALYSIS CAN PROMOTE EQUITY AND ADVANCE ENVIRONMENTAL JUSTICE (2021); Richard L. Revesz & Samantha P. Yi, *Distributional Consequences and Regulatory Analysis*, 52 ENV’T L. 53, 57 (2022); Richard L. Revesz, *Regulation and Distribution*, 93 N.Y.U. L. REV. 1489, 1492 (2018).

<sup>172</sup> EPA Economic Analysis Guidelines, *supra* note 35, at ch.10, 10–1.



EPA can improve its understanding of how to reduce harms to overburdened communities and fulfill its strategic goal to advance environmental justice.<sup>173</sup>

### 1. Consider more granular data

EPA should evaluate all relevant impacts of chemical incidents at the level of geographic granularity necessary to capture impacts on disproportionately affected communities. Assessing distributional consequences will necessarily require EPA to analyze regulatory impacts at a granular and disaggregated level.<sup>174</sup> In general, EPA should prefer smaller units (e.g., census blocks) to larger units (e.g., census tracts).<sup>175</sup>

Failing to select the appropriate unit of analysis can obscure important effects. For example, if the toxic emissions from an industrial plant caused harmful effects only within a 1000-foot radius, then using a one-mile radius or some other larger unit of analysis might mask an otherwise statistically significant disproportionate impact.<sup>176</sup>

Determining the appropriate scale of data requires understanding the geographic extent of the risk. The “vulnerability zone” for a worst-case release of one of the regulated chemicals is a circular area extending between 0.01 and 25 miles from the facility and the size of the zone is dependent on the quantity and characteristics of the particular chemical.<sup>177</sup> The size varies depending on both the type and amount of chemical stored at the facility, as some of the chemicals have more serious health endpoints at lower concentrations<sup>178</sup> and can travel further if released.<sup>179</sup> A 2014 study evaluated the demographic composition of the vulnerability zones of 3,433 RMP facilities (in select facility categories) with a collective population of over 134 million.<sup>180</sup> This study found that 34% of the facilities had vulnerability zones between 1.01-2.5 miles in radius and 82% of the facilities had vulnerability zone within five miles of the facilities.<sup>181</sup>

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<sup>173</sup> See, e.g., EPA, FY 2022–2026 EPA STRATEGIC PLAN 32–34 (2022),

<https://www.epa.gov/system/files/documents/2022-03/fy-2022-2026-epa-strategic-plan.pdf>.

<sup>174</sup> See LIENKE ET AL., *supra* note 171, at 6–7 (“Measuring impacts at aggregate scales can hinder [identification of who is being affected by a regulation and to what degree].”).

<sup>176</sup> See Revesz & Yi, *supra* note 171, at 83–84; see also LIENKE ET AL., *supra* note 171, at 6–7 (citing Janet Currie et al., *Environmental Health Risks and Housing Values: Evidence from 1,600 Toxic Plant Openings and Closings*, 105 AM. ECON. REV. 678 (2015)) (observing that, in this study, in which harmful effects were found to be confined to narrow areas around industrial plants, a relatively small unit of analysis such as a county would have nonetheless obscured the disproportionate impact found in the study).

<sup>176</sup> See Revesz & Yi, *supra* note 171, at 83–84; see also LIENKE ET AL., *supra* note 171, at 6–7 (citing Janet Currie et al., *Environmental Health Risks and Housing Values: Evidence from 1,600 Toxic Plant Openings and Closings*, 105 AM. ECON. REV. 678 (2015)) (observing that, in this study, in which harmful effects were found to be confined to narrow areas around industrial plants, a relatively small unit of analysis such as a county would have nonetheless obscured the disproportionate impact found in the study).

<sup>177</sup> WHO’S IN DANGER, *supra* note 155, at 8.

<sup>178</sup> See generally EPA, RISK MANAGEMENT PROGRAM GUIDANCE FOR OFFSITE CONSEQUENCE ANALYSIS (March 2009), <https://www.epa.gov/sites/default/files/2013-11/documents/oca-chps.pdf>.

<sup>179</sup> See 40 C.F.R. § 68, Appendix A Table of Toxic Endpoints.

<sup>180</sup> WHO’S IN DANGER, *supra* note 155.

<sup>181</sup> *Id.* at 8.

In its environmental justice analysis for this Proposed Rule, EPA considers both three-mile and one-mile radius units and finds a disproportionate effect on historically underserved and overburdened race and ethnicity groups.<sup>182</sup> Based on the average size of vulnerability zones, this supports EPA's decision to issue the Proposed Rule and strengthen the risk management program. However, while the actual impacts of a release may vary based on weather and wind direction, people living closest to these facilities bear the greatest risk from accidental releases because they may not have time to evacuate or be well-protected by sheltering in place. In its analysis, EPA should also consider the demographics of communities living closest to the fenceline to ensure it is capturing the full extent of the distributional impacts.

The 2014 study examined the demographics of the “fenceline communities” living in the one-tenth area of the vulnerability zones closest to the facility. The study found that the communities in the fenceline zones had even higher proportions of Black and Latino populations than the vulnerability zones as a whole.<sup>183</sup> It also found higher rates of poverty in the fenceline zones than the vulnerability zones as a whole.<sup>184</sup> EPA may wish to consider conducting additional studies of the demographics of fenceline communities, especially near facilities with accidents or facilities containing the most dangerous chemicals, to ensure it is fully capturing the extent of the distributional costs on already overburdened communities. For example, EPA could add a half mile radius category in addition to its one- and three-mile radius analysis. If EPA finds that the burdens of these accidents fall most heavily on those in the 0.5-mile zone and that these communities are even more disproportionately composed of historically underserved and overburdened race and ethnicity groups as well as low-income groups, that information is relevant to EPA's understanding of the benefits of the Proposed Rule, its alternatives, and other efforts to strengthen the regulations.

## **2. Consider disaggregated data that could reveal further disproportional impacts**

EPA should carefully consider whether and how to further disaggregate data in its analysis. As discussed, EPA analyzed the demographics of the population living one-mile and three-miles from any facility or from a facility that has had an accident between 2004 and 2020. Equipped with this information, or an even more granular assessment of the demographics, EPA could consider how the potential costs and benefits of the Proposed Rule fall on different demographic and economic groups. EPA could contextualize these impacts within the cumulative socioeconomic burdens faced by these communities and then “tally how those costs and benefits are distributed among discrete demographic groups.”<sup>185</sup> In its current assessment of benefits in the RIA, EPA briefly notes that it anticipates potential benefits to accrue to communities with environmental justice concerns.<sup>186</sup> EPA could build upon this acknowledgement to further integrate consideration of the disaggregated costs and benefits.

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<sup>182</sup> Proposed Rule RIA, *supra* note 8, at 86. *See also* the 2014 study similarly found that Black and Latino populations, as well as those living below the poverty line, were disproportionately represented in the vulnerability zones of these high-hazard chemical facilities. WHO'S IN DANGER, *supra* note 155, at 26.

<sup>183</sup> WHO'S IN DANGER, *supra* note 155, at 28.

<sup>184</sup> *Id.* at 29.

<sup>185</sup> LIENKE ET AL., *supra* note 171, at 10.

<sup>186</sup> Proposed Rule RIA, *supra* note 8, at 64.

When disaggregating costs and benefits, EPA may also wish to consider how taking an average of the demographics surrounding these facilities, may obscure even more pronounced effects at individual facilities. For example, if the demographics near facilities with relatively less dangerous chemicals skewed more heavily white and higher-income then that could obscure potentially greater distributional harms to communities of color or low-income living near the facilities most likely to seriously harm a fenceline community during an incident. When EPA is averaging data across thousands of facilities, it should consider how this may obscure heavier impacts for communities near specific facilities. For the purposes of conducting a thorough distributional analysis, it would be helpful for EPA to provide demographic data at the facility level with additional facility characteristic information such as the facility type, accident history, and chemicals on premises. This would help clarify whether the data was skewed in significant ways.

### **3. Analyze the distribution of impacts for alternatives and future actions**

To perform a meaningful analysis, EPA should analyze the distributional implications of its preferred approach *and* of each alternative—consistent with *Circular A-4*'s guidance that “‘an examination of alternative approaches’ [is] one of the three basic elements of ‘a good regulatory analysis.’”<sup>187</sup> EPA’s current analysis considers, at a general level, that the costs of chemical incidents fall disproportionately on environmental justice communities and that the proposed RMP amendments rule will reduce harms to these communities. EPA should additionally consider the distributional consequences of the alternatives it proposes. This analytical step is a natural extension of EPA’s existing analysis, which already assesses the costs and benefits of a more stringent alternative and less stringent alternative.<sup>188</sup>

By analyzing the distributional impacts of only the preferred alternative, EPA is able to draw the conclusion that the Proposed Rule will be advantageous to the disadvantaged communities disproportionately affected by chemical incidents only because the Proposed Rule will reduce the number and magnitude of such incidents.<sup>189</sup> However, if EPA also considered the distributional impacts of alternatives, EPA would be able to assess whether another option is *better* from a distributional perspective. For example, a more protective alternative might be worth additional cost if it has larger distributional benefits.

Expanding its analysis of distributional impacts to alternatives will allow EPA to better ensure that its programs do not “perpetuate systemic barriers to opportunities and agencies cannot benefits for people of color and other underserved groups,”<sup>190</sup> as identified as a priority of the Biden administration in Executive Order 13,985.<sup>191</sup>

Accidents happen at a greater rate in low-income communities and communities of color and communities of color are concentrated even more heavily in the areas closest to these facilities, where they are more likely to be harmed by an incident. Given these realities, EPA should consider whether the benefits of certain alternatives to the Proposed Rule—or potential future

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<sup>187</sup> Revesz & Yi, *supra* note 171, at 64 (quoting *Circular A-4*, *supra* note 34, at 2).

<sup>188</sup> Proposed Rule RIA, *supra* note 8, at 67–71.

<sup>189</sup> For a critique of the limits of this approach, please refer to Revesz & Yi, *supra* note 171, at 67–68.

<sup>190</sup> Exec. Order No. 13,985 § 1, 86 Fed. Reg. 7009, 7009 (Jan. 25, 2021).

<sup>191</sup> See LIENKE ET AL., *supra* note 171, at i; Revesz & Yi, *supra* note 171, at 68.



amendments—that include strengthened mitigation measures may result in more desirable distributional consequences, by increasing the health and safety of already unfairly overburdened communities. For example, EPA has noted that it is considering expanding fenceline monitoring for a future RMP Rule.<sup>192</sup> Continuous fenceline monitoring tied to a real-time alert system may most heavily benefit these high-concentration minority communities living closest to the fenceline, as commenters have previously suggested.<sup>193</sup> Similarly, clearer rules regarding multilingual resources may greatly improve the efficacy of evacuations for populations with limited-English proficiency, have desirable distributional outcomes, and be accomplished at low-cost.<sup>194</sup>

By improving its alternatives analysis to incorporate distributional impacts, EPA will be better able to weigh, not only the net benefits, but also the distribution of costs and benefits when comparing alternatives. If the distribution of impacts under one alternative is desirable enough that may justify selecting that alternative over one with greater net benefits but a less desirable distribution of impacts. When considering additional amendments to the RMP program, EPA should also consider the data it has on the characteristics of the facilities in low-income communities and communities of color experiencing accidents at a greater rate, as discussed above. EPA could use this information to identify which additional mitigation measures would be most effective and use that information to determine how to further strengthen the rule to maximize net welfare in light of distributional consequences.

#### **4. Treat distributional impacts as unquantified benefits**

Generally, EPA can treat any desirable (or undesirable) distributional effects as an unquantified benefit (or cost) that it compares alongside other costs and benefits.<sup>195</sup> EPA has a long history of considering similarly unquantified effects, including in this Proposed Rule, where EPA has explained that many benefits were unable to be quantified.<sup>196</sup> EPA guidance is also clear that EPA should consider unquantified costs and benefits in its analysis.<sup>197</sup> It is entirely possible to consider these distributional consequences in the context of a breakeven analysis. For example, if multiple scenarios meet the breakeven threshold, EPA could consider and discuss whether one alternative has more desirable distributional impacts.

Additionally, EPA should coordinate internally and externally with other agencies and with OMB to conduct its distributional analysis for this rule in a manner that contributes to achieving a standardized approach to distributional analysis across the federal government.<sup>198</sup> Through standardization, the government can ensure distributional impacts are fully valued at all agencies

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<sup>192</sup> Proposed Rule, *supra* note 2, at 53,607.

<sup>193</sup> Earthjustice 2021 comments, *supra* note 28, at 50–51 (discussing justification for fenceline monitoring). *See also* Proposed Rule, *supra* note 2, at 53,607 (asking for comments on fenceline monitoring).

<sup>194</sup> Proposed Rule, *supra* note 2, at 53,597. Service provision to communities with limited English proficiency has long been a White House priority. *See* Exec. Order 13,166, 65 Fed. Reg. 50,121 (Aug. 11, 2000).

<sup>195</sup> *See* Revesz & Yi, *supra* note 171, at 96–97 (discussing why this approach should be preferred).

<sup>196</sup> Proposed Rule RIA, *supra* note 8, at 10, 60.

<sup>197</sup> EPA Economic Analysis Guidelines, *supra* note 35, at ch.7, 7–49.

<sup>198</sup> For ideas on how federal agencies could standardize their distributional analyses, see LIENKE ET AL., *supra* note 171.

and ensure that distributional impacts will not matter differently for different agencies merely because a harm or benefit falls under a particular agency's purview.

**V. EPA should clarify that natural hazards “exacerbated” by climate change be included in the process hazard analysis and provide further guidance (Category 1. Natural Hazards)**

EPA sensibly proposes to improve the natural hazard analysis by clarifying the obligation to consider climate change impacts. Given the overwhelming evidence that future climate change events will put chemical infrastructure at greater risk of accident,<sup>199</sup> including this information in the hazards assessment is necessary to ensure adequate preparation. An accurate assessment of climate risks is essential to understanding the costs and benefits of potential mitigation measures, enabling selection of welfare-maximizing choices that adequately account for externalities on the environment and public health.

EPA should amend the language in the Proposed Rule to ensure the need to consider climate-related natural hazards is even more clear. In its proposed revision to Section 68.50, EPA states that a hazard review should include: “[e]xternal events such as natural hazards, including those *caused* by climate change or other triggering events that could lead to an accidental release.”<sup>200</sup> In many cases, it may be difficult to prove that a given hazard event is *caused* by climate change because in many cases climate change exacerbates hazard events, making them more extreme or likely, rather than causing them independently.<sup>201</sup> For this reason we suggest that EPA add the words “or exacerbated” such that Section 68.50 reads: “[e]xternal events such as natural hazards, including those *caused or exacerbated* by climate change or other triggering events that could lead to an accidental release.”

EPA should develop additional guidance or regulations to instruct facilities on appropriate resources for climate change data, the availability of such data, and what constitutes an adequate review of climate change caused or exacerbated hazards. In the context of environmental reviews conducted under the National Environmental Policy Act, considerations of climate hazards have not been done regularly or robustly.<sup>202</sup> Without sufficient guidance on what constitutes an adequate climate hazard review, some of these environmental reviews have merely discussed national or even global climate trends and then stated that local and regional climate data was not

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<sup>199</sup> See generally GAO Climate Report, *supra* note 7; FLORES ET AL., *supra* note 57; NY OAG Testimony, *supra* note 107, Exhibit A.

<sup>200</sup> Proposed Rule, *supra* note 2, at 53,612 (emphasis added).

<sup>201</sup> See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2021: THE PHYSICAL SCIENCE BASIS, Box T.S.10 Event Attribution (2021), [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_FullReport.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport.pdf) [hereinafter IPCC Report 6] (explaining the challenges of event attribution, but the clear evidence that climate change exacerbates certain natural hazards). The climate change attribution literature has been growing. For relevant contributions to the literature, see Sabin Center for Climate Change Law, Extreme Event Attribution Database (last visited Oct. 31, 2022), <https://climateattribution.org/attribution/extreme-event/>.

<sup>202</sup> ROMANY M. WEBB ET AL., ENV. DEFENSE FUND & SABIN CTR. FOR CLIMATE CHANGE L., EVALUATING CLIMATE RISK IN NEPA REVIEWS: CURRENT PRACTICES AND RECOMMENDATIONS FOR REFORM (2022), <https://blogs.edf.org/climate411/files/2022/02/Evaluating-Climate-Risk-in-NEPA-Reviews-Full-Report.pdf>.

available.<sup>203</sup> The science of considering local and regional climate projections has advanced significantly in recent years<sup>204</sup> and such excuses should not be deemed sufficient.

To mitigate these challenges, EPA can identify appropriate datasets to consult that are consistently updated to reflect the latest science and offer instruction on what constitutes an adequate review. For example, the federal government recently released a new resource “Climate Mapping for Resilience and Adaptation” based on National Climate Assessment data.<sup>205</sup> As recommended by GAO, EPA should also train inspectors and provide guidance to inspectors on what constitutes adequate climate-related hazard assessment.<sup>206</sup>

EPA solicits comment on whether to “specify areas most at risk from climate or other natural events by adopting the list of areas exposed to heightened risk of wildfire, flooding, storm surge, or coastal flooding identified in the “Preventing Double Disasters” Report. If EPA were to adopt such a list, it should be sure to clarify that it serves as a floor rather than a ceiling. In other words, such a list should identify facilities with known climate hazards, but facilities not on the list should still be required to do an analysis based on the latest science to determine if they also face climate hazards. The datasets underlying “Preventing Double Disasters” and other best available science will be updated over time with new information. Regardless of whether EPA designates certain facilities to be at heightened climate risk, EPA should require all facilities to use the best available, most up-to-date science to determine their climate risk. EPA should designate, regularly-updated data resources that use the best available science, as those it prefers facilities to use, regardless of whether or not it uses this additional listing category.

## **VI. EPA should consider whether the results of improved analysis support further strengthening the RMP regulatory program and consult with environmental justice communities (Category 15. OTHER)**

EPA acknowledges that it is evaluating whether it should further strengthen the RMP program by creating fenceline monitoring requirements and by adding new chemicals to the list of hazardous RMP-regulated substances.<sup>207</sup> As it determines how to strengthen the RMP program, EPA should consult with the environmental justice communities most impacted by the costs of chemical accidents. Environmental justice advocates have already identified a number of promising suggestions to improve the program and reduce fatalities, injuries, and psychological suffering.<sup>208</sup> These comments have also shown that the benefits of risk reduction measures are likely being undervalued. Accordingly, if EPA improves its analysis and finds greater net benefits or a more desirable distribution of benefits, EPA should then consider if that finding justifies fenceline monitoring and other recommendations of environmental justice advocates. To

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<sup>203</sup> DENA ADLER & MAX SARINSKY, INST. FOR POL’Y INTEGRITY, ENSURING ROBUST CONSIDERATION OF CLIMATE CHANGE UNDER NEPA (2022), [https://policyintegrity.org/files/publications/GHG\\_Policy\\_Brief\\_vF.pdf](https://policyintegrity.org/files/publications/GHG_Policy_Brief_vF.pdf).

<sup>204</sup> See, e.g., IPCC Report 6, Ch. 10; IPCC, Interactive Atlas (last visited Oct. 31, 2022), <https://interactive-atlas.ipcc.ch/>.

<sup>205</sup> Climate Mapping for Resilience and Adaptation, CMRA (last visited Oct. 28, 2022), <https://resilience.climate.gov/#open-data>.

<sup>206</sup> GAO Climate Report, *supra* note 7, at 40–41.

<sup>207</sup> Proposed Rule, *supra* note 2, at 53,607.

<sup>208</sup> See e.g., Earthjustice 2021 Comments, *supra* note 28.

ensure the accuracy of its analysis, EPA should take steps to improve reporting, information collection, and integration of relevant information into any updated analysis.

**Integrate Additional Information into Any New Analysis:**

EPA is also likely to receive more information on the costs and benefits of fenceline monitoring and other strengthening provisions during the comment process which it can incorporate into its analysis. Additionally, EPA should consider that the Inflation Reduction Act has allocated millions of dollars to improve air quality monitoring which may defray the costs of a RMP fenceline monitoring requirement for facilities,<sup>209</sup> and that the synergistic benefits of real-time continuous air monitoring combined with other provisions, such as a multi-lingual community alert system could be greater than the individual components because together they can help those living in the vulnerability zones learn they need to evacuate much more quickly in the event of a chemical accident. EPA should integrate this additional information into any new and improved analysis to determine if the benefits justify real-time, continuous fenceline monitoring and other recommendations of environmental justice advocates.

**Improve Reporting and Information Collection:**

We further urge EPA to consider taking the necessary measures to better ensure its dataset more accurately reflects the information necessary to consider the full scope of benefits of the regulatory program. EPA should consider amending Section 68.215 so Title V air permits assure full RMP compliance including regular electronic reporting on compliance.<sup>210</sup> EPA should ensure it is capturing the costs of accidents that are not reported in its dataset because the facilities closed before the reporting deadline.<sup>211</sup> While EPA has explained its security concerns with providing certain data online, it could provide a dataset that includes more information on selected, non-sensitive facility characteristics and summarizes the RMP plans to improve external analysis of what common features put facilities at greatest risk of accidents. Such analysis could help explain the connection between the risk mitigation measures and avoided accidents. Taking measures to improve the quality of the data underlying EPA's analysis will allow EPA to make sure it is more fully considering the costs and benefits of further strengthening the RMP.

Respectfully,

Dena Adler, Attorney  
Hiroshi Matsushima, Economic Fellow  
Bridget Pals, Legal Fellow  
Tyler Szeto, Legal Fellow

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<sup>209</sup> Inflation Reduction Act, Pub. L. No. 117–169, available at <https://www.congress.gov/bill/117th-congress/house-bill/5376/text>.

<sup>210</sup> See Earthjustice 2021 Comments, *supra* note 28.

<sup>211</sup> See *supra* Section II.B.

## APPENDIX A: Risk Mitigation Regulations Using Breakeven Analysis

Rule Name	Agency	Subject Matter	Cost of Rule	Break-even Point
Passenger Screening Using Advanced Imaging Technology (2016) <sup>212</sup>	Transportation Security Administration (TSA), DHA	Counter-terrorism/national security	The agency found the 10-year undiscounted cost to be \$2.15 billion, annualized to \$204.57 million/year at a 7% discount rate and \$210.47 at a 3% discount rate. The cost does not account for possible macroeconomic consequences of terrorist attacks.	Prevent one low-probability, high-impact terrorist attack once every 5.25 to 23.52 years (depending on size of plane used in attack).
Aircraft Repair Station Security (2014) <sup>213</sup>	TSA, DHS	Counter-terrorism/national security	The agency found the 10-year undiscounted cost to be \$23.22 million, annualized to \$2.3 million/year at a 7% discount rate.	Prevent one low-probability, high-impact terrorist attack every 9,460 years.
Proposed Ammonium Nitrate Security Program (2011) <sup>214</sup>	DHS	Counter-terrorism/national security	The agency found the 10-year undiscounted cost to be, annualized to \$95.5 million/year at a 7% discount rate and \$95.4 million at a 3% discount rate.	Prevent one low-probability, high impact terrorist attack the size of the Oklahoma City (OKC) bombing of the Murrah Federal Building every 14 years.

<sup>212</sup> 81 Fed. Reg. 11,363 (Mar. 3, 2016); TRANSP. SEC. ADMIN., PASSENGER SCREENING USING ADVANCED IMAGING TECHNOLOGY, FINAL RULE, REGULATORY IMPACT ANALYSIS AND FINAL REGULATORY FLEXIBILITY ANALYSIS (2016) (Docket No. TSA-2013-0004), <https://www.regulations.gov/document/TSA-2013-0004-5583>.

<sup>213</sup> 79 Fed. Reg. 2119 (Jan. 13, 2014); TRANSP. SEC. ADMIN., AIRCRAFT REPAIR STATION SECURITY REGULATORY IMPACT ANALYSIS, FINAL REGULATORY FLEXIBILITY ANALYSIS, PAPERWORK REDUCTION ACT, INTERNATIONAL TRADE IMPACT ASSESSMENT, AND UNFUNDED MANDATES ASSESSMENT (2013) (Docket No. TSA-2004-17131), <https://www.regulations.gov/document/TSA-2004-17131-0228>.

<sup>214</sup> 76 Fed. Reg. 46,908 (Aug. 3, 2011). This rule was not finalized. *See also* U.S. DEP'T HOMELAND SEC., REGULATORY ASSESSMENT: THE AMMONIUM NITRATE SECURITY PROGRAM NOTICE OF PROPOSED RULEMAKING (2011) (Docket No. DHS-2008-0076), <https://www.regulations.gov/document/DHS-2008-0076-0047>.

Air Cargo Screening (2011) <sup>215</sup>	TSA, DHS	Counter-terrorism/national security	The agency found the 10-year undiscounted cost to be \$1.8 billion, annualized to \$178.1 million/year at a 7% discount rate and \$180.1 million at a 3% discount rate.	Prevent one low-probability, high impact terrorist attack every 4.1 to 29.6 years
Training, Qualification, and Oversight for Safety-Related Railroad Employees (2014) <sup>216</sup>	Federal Railroad Administration (FRA)	Railroad-related injuries and deaths	The agency found the 20-year undiscounted cost to be \$389.9 million, annualized to \$36.8 million/year at a 7% discount rate and \$26.2 million/year at a 3% discount rate.	20-year total reduction in relevant railroad accidents and incidents of 4.59% for both 3% and 7% discount rates, which corresponds to roughly 118 accidents and incidents per year for 20 years.  In the alternative, prevent one fatality and 86 injuries per year.
Transportation Worker Identification Credential (TWIC) —Reader	Coast Guard, DHS	Maritime security	Coast Guard used a 10-year period to estimate the cost of the rule. The agency found the 10-year undiscounted cost to be \$192.4 million, annualized to \$21.9 million/year at a 7% discount rate	Prevent one low-probability, high-impact terrorist attack with consequence equal to the average every 229 years; equivalent of 0.4% reduction in risk.

<sup>215</sup> 76 Fed. Reg. 51,848 (Aug. 18, 2011); TRANSP. SEC. ADMIN., AIR CARGO SCREENING FINAL RULE, REGULATORY EVALUATION, REGULATORY FLEXIBILITY DISCUSSION, TRADE IMPACT ASSESSMENT, AND UNFUNDED MANDATES ASSESSMENT (2011) (Docket No. TSA-2009-0018), <https://www.regulations.gov/document/TSA-2009-0018-0040>.

<sup>216</sup> 79 Fed. Reg. 66,460 (Nov. 7, 2014); U.S. DEPT' TRANSP., FED'L RAILROAD ADMIN., TRAINING STANDARDS, REGULATORY IMPACT ANALYSIS 2014) (Docket No. FRA-2009-0033), <https://www.regulations.gov/document/FRA-2009-0033-0025>.

Requirements (2016) <sup>217</sup>			and \$20.4 million/year at a 3% discount rate.	
National Highway-Rail Crossing Inventory Reporting Requirements (2016) <sup>218</sup>	FRA	Railroad crossing incidents	For the 20-year period analyzed, the estimated quantified cost that will be imposed on railroads totals \$2.8 million with a present value of \$2 million using a 7% discount rate.	Prevent 0.015 of a statistical life (or the equivalent number of injuries) every year over a 20-year period
Carbon Dioxide Fire Suppression Systems on Commercial Vessels (2012) <sup>219</sup>	Coast Guard, DHS	Marine safety and maritime mobility	Coast Guard used a 10-year period to estimate the cost of the rule. The agency found the 10-year cost at a 7% discount rate to be \$2.3 million, annualized to \$233,000 at a 7% discount rate.	Prevent 0.037 fatalities/year or about one fatality every 27 years; analysis did not include the value of potential non-fatal injuries and secondary impacts

<sup>217</sup> 81 Fed. Reg. 57,652 (Aug. 23, 2016); U.S. DEP'T HOMELAND SEC., U.S. COAST GUARD, TRANSPORTATION WORKER IDENTIFICATION CREDENTIAL (TWIC) – READER REQUIREMENTS, FINAL RULE, REGULATORY ANALYSIS AND FINAL REGULATORY FLEXIBILITY ANALYSIS (2016) (Docket No. USCG-2007-28915-0231), <https://www.regulations.gov/document/USCG-2007-28915-0231>.

<sup>218</sup> 81 Fed. Reg. 37,521 (June 10, 2016); U.S. DEP'T TRANSP., FED'L RAILROAD ADMIN, CROSSING INVENTORY: NATIONAL HIGHWAY-RAIL CROSSING INVENTORY REPORTING REQUIREMENTS, FINAL RULE, REGULATORY EVALUATION (2015) (Docket No. FRA-2011-0007), <https://www.regulations.gov/document/FRA-2011-0007-0041>.

<sup>219</sup> 77 Fed. Reg. 33,860 (June 7, 2012); U.S. DEP'T HOMELAND SEC., U.S. COAST GUARD, CARBON DIOXIDE FIRE SUPPRESSION SYSTEM ON COMMERCIAL VESSELS, NOTICE OF PROPOSED RULEMAKING, PRELIMINARY REGULATORY ANALYSIS AND INITIAL REGULATORY FLEXIBILITY ANALYSIS (2010) (Docket No. USCG-2006-24797-0002), <https://www.regulations.gov/document/USCG-2006-24797-0002> (While this is the initial Regulatory Impact Analysis, no updated analysis was included in the docket).

**APPENDIX B: Table of RMP Facility Most Severe Accident Costs (2004-2020)**

Year	Total Damage (Million \$)	Total Incident Count	The Most Severe		Top 5% Severe			Top 10% Severe			Count of Incidents $\geq$ 50% of Damage
			Damage (Million \$)	Share of Costs	Incident Count	Damage (Million \$)	Share of Costs	Incident Count	Damage (Million \$)	Share of Costs	
2004	460.3	202	127.4	27.7%	11	373.5	81.1%	21	420.3	91.3%	3
2005	732.3	160	412.7	56.4%	8	682.5	93.2%	16	708.9	96.8%	1
2006	538.2	145	392.1	72.8%	8	506.9	94.2%	15	522.5	97.1%	1
2007	608.6	208	237.2	39.0%	11	523.1	86.0%	21	582.4	95.7%	2
2008	702.0	177	463.0	66.0%	9	651.5	92.8%	18	682.2	97.2%	1
2009	572.1	162	249.7	43.7%	9	522.4	91.3%	17	553.5	96.8%	2
2010	254.9	138	102.2	40.1%	7	194.0	76.1%	14	226.4	88.8%	2
2011	173.3	158	51.0	29.5%	8	137.3	79.2%	16	160.4	92.6%	3
2012	159.1	144	56.5	35.5%	8	136.8	86.0%	15	148.7	93.5%	2
2013	397.0	164	149.3	37.6%	9	352.0	88.7%	17	383.3	96.5%	2
2014	206.0	143	63.5	30.8%	8	182.0	88.4%	15	194.4	94.4%	2
2015	496.6	147	178.8	36.0%	8	380.1	76.5%	15	448.9	90.4%	3
2016	509.8	127	305.5	59.9%	7	455.7	89.4%	13	488.8	95.9%	1
2017	342.7	109	78.1	22.8%	6	264.5	77.2%	11	317.7	92.7%	3
2018	799.1	92	568.3	71.1%	5	740.8	92.7%	10	788.1	98.6%	1
2019	743.3	100	629.7	84.7%	5	702.9	94.6%	10	724.5	97.5%	1
2020	51.0	60	9.5	18.6%	3	26.4	51.7%	6	42.0	82.3%	3
2016-2020	2,446.0	488	629.7	25.7%	25	2,191.5	89.6%	49	2,359.9	96.5%	3
2004-2020	7,746.3	2436	629.7	8.1%	122	6,833.6	88.2%	244	7,421.5	95.8%	13



**Description of Table:** In the docket for the Proposed Rule, EPA included its dataset on RMP-reportable accidents between 2004-2020 based on data available on August 1, 2021.<sup>220</sup> As discussed in EPA’s Regulatory Impacts Analysis and our comments, this dataset is a significant underestimate of past accidents costs because it does not include considerable unquantified costs and the data is incomplete because of delayed and incomplete reporting. The above table sums the damages in the EPA technical appendix for each accident, including the listed property damage, deaths, injuries, hospitalizations, medical treatment, evacuation, and sheltering-in-place costs. The non-property damage costs were monetized based on the unit values provided by EPA in the regulatory impact analysis: \$9.3 million per death, \$0.05 million per injury, \$0.045 million per hospitalization, \$0.001 million per medical treatment, and \$300 per evacuation and sheltering. The table displays what share of total incident costs comes from the most expensive, top 5% most expensive, and top 10% most expensive incidents.

Note that the total five-year monetized damages number in the table is near, but not identical to EPA’s number in the RIA. These differences may come from our estimation of \$300 per evacuation, while EPA uses an unspecified lower number that rounds up to \$300, other rounding differences in these underlying cost estimations, and EPA’s choice of price index for dollar value conversion. The calculations underlying this table used the Consumer Price Index for All Urban Consumers retrieved from the Bureau of Labor Statistics. The table still provides a useful gauge on the distribution of accident costs.

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<sup>220</sup> EPA Technical Appendix on RMP Accidents 2004-2020, *supra* note 76; Technical Background Document for Notice of Proposed Rulemaking: Risk Management Programs Under the Clean Air Act, Section 112(r)(7) Safer Communities by Chemical Accident Prevention 2–3 (Aug. 31, 2022) (Docket No. EPA-HQ-OLEM-2022-0174).