

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
**Office of Land and Emergency Management**

Revisions to Standards for the Open Burning/ )  
Open Detonation of Waste Explosives; ) *Submitted via regulations.gov*  
Proposed Rule ) June 20, 2024  
EPA-HQ-OLEM-2021-0397 )

**COMMENTS OF CALIFORNIA COMMUNITIES AGAINST TOXICS; CEASE FIRE  
CAMPAIGN; CENTRAL LOUISIANA COALITION FOR A CLEAN & HEALTHY  
ENVIRONMENT; CITIZENS FOR ARSENAL ACCOUNTABILITY; CITIZENS FOR  
SAFE WATER AROUND BADGER; CONCERNED CITIZENS FOR NUCLEAR  
SAFETY; KENTUCKY ENVIRONMENTAL FOUNDATION; PRUTEHI LITEKYAN:  
SAVE RITIDIAN; AND EARTHJUSTICE**

The above-named community and environmental organizations submit these comments on the United States Environmental Protection Agency’s (“EPA”) proposed revisions to the regulatory standards for the open burning/open detonation (“OB/OD”) of waste explosives.

Communities across the country and in U.S. territories that exist in the dark, suffocating shadows of OB/OD operations have long awaited EPA action on these archaic hazardous waste practices. Commenters appreciate EPA’s recognition that the existing regulations governing OB/OD are outdated, problematic, and in need of revision. While the proposed rule is in some ways a step forward, it falls far short of what is needed to protect human health and the environment as required by the Resource Conservation and Recovery Act (“RCRA”). It is high time for EPA to close the exception to the prohibition on OB/OD and require the practice to end once and for all. Instead, EPA’s proposal allows OB/OD to continue and does not even include necessary minimum requirements and limitations. Making matters worse, the proposal introduces new threats of hazardous waste mismanagement and toxic pollution. As proposed, EPA’s rule includes revisions that are contrary to law, arbitrary and capricious, and counter to this Administration’s repeated commitment to environmental justice.

As discussed in detail below, allowing OB/OD to continue is flatly incompatible with RCRA’s core mandate to protect human health and the environment, and EPA has not provided adequate justification for the broad exception it proposes. If EPA will not close the OB/OD exception as is necessary, it must at the very least move swiftly to strengthen and promulgate improvements to the status quo. This includes revisions that, among other things: ensure comprehensive and recurring alternatives evaluations; expand the list of hazardous wastes prohibited from OB/OD; establish clear, prescriptive minimum requirements limiting OB/OD, assuring complete clean-up of resulting contamination, enhancing oversight, and guarding against abuse; and provide for increased opportunities for meaningful public participation. EPA also must eliminate all new toxic threats in the proposal that would inexplicably weaken protections for communities and the environment, such as the unlawful and arbitrary “de minimis exemption,” allowances for evading proper clean-up

of contamination, and deregulation of hazardous waste incinerators. EPA's proposal for permitting mobile treatment units also contains significant shortcomings and must be strengthened. In promulgating this rule, EPA must prioritize protection of human health and the environment, without exception.

## TABLE OF CONTENTS

	Page
<b>I. Commenters</b> .....	6
<b>II. Background</b> .....	7
<b>a. EPA’s Regulation of OB/OD</b> .....	7
<b>b. Emergence of Alternative Technologies</b> .....	8
<b>III. OB/OD Presents Serious Threats to Human Health and the Environment</b> .....	9
<b>a. OB/OD Releases Uncontrolled Toxic Pollutants into the Environment</b> .....	9
<b>i. Nitramine Explosives (RDX, HMX)</b> .....	10
<b>ii. Other Nitrosated Explosives (TNT, Nitroglycerine)</b> .....	12
<b>iii. Elemental Metals (Aluminum, Arsenic, Cadmium, Chromium, Copper, Cobalt, Iron, Lead, Magnesium, Mercury, Silver, Zinc)</b> .....	13
<b>iv. Volatile and Semi-volatile Organics (2,4-dinitrotoluene, 1,3-butadiene, benzene, methylene chloride, phthalates)</b> .....	15
<b>v. Polycyclic Aromatic Hydrocarbons (products of incomplete combustion, e.g., benzo[a]pyrene, benzo[a]anthracene)</b> .....	16
<b>vi. Chlorinated Dioxins and Furans</b> .....	16
<b>vii. Perchlorate</b> .....	17
<b>viii. PFAS</b> .....	18
<b>b. OB/OD Facilities Have a Long History of Violating Environmental Laws</b> .....	19
<b>c. OB/OD Facilities and Regulators Have Consistently Failed to Adhere to Existing Limitations on OB/OD and Require Implementation of Alternatives</b> .....	22
<b>d. Health Impacts from Overseas Burn Pits are Well Known</b> .....	23
<b>IV. EPA Must Strengthen Regulations Governing OB/OD to Protect Human Health and the Environment</b> .....	24
<b>a. EPA Must Eliminate the Exception from the Prohibition on OB/OD</b> .....	24
<b>b. The Proposed Rule Fails to Protect Human Health and the Environment and is Arbitrary and Capricious</b> .....	25

<b>i.</b> EPA’s Reliance on Permitting Authorities and OB/OD Facilities to Comply with the Proposed Restrictions is Unjustified .....	25
<b>ii.</b> EPA Must Include Additional Restrictions on Any Continued OB/OD and Eliminate Proposed Loopholes .....	26
<b>1.</b> EPA’s Proposed Exception is Unjustifiably Broad.....	26
<b>2.</b> EPA Must Require Immediate Implementation of Alternatives .....	27
<b>3.</b> EPA Must Expand the List of Hazardous Wastes for which OB/OD is Prohibited.....	28
<b>a.</b> PFAS.....	29
<b>b.</b> Elemental Metals .....	31
<b>c.</b> Chlorinated Compounds .....	31
<b>d.</b> Emerging Contaminants of Concern .....	31
<b>e.</b> Depleted Uranium.....	32
<b>f.</b> Other Wastes.....	32
<b>4.</b> EPA Must Strengthen Requirements Applicable to OB/OD Units ..	34
<b>a.</b> Permit Terms and Alternatives Evaluations .....	34
<b>b.</b> Minimum Pollution Standards.....	35
<b>c.</b> Monitoring, Sampling, and Reporting .....	35
<b>d.</b> Closure and Post-closure .....	36
<b>e.</b> Minimum Distance Requirements .....	37
<b>f.</b> Emergency Provisions.....	38
<b>5.</b> EPA Must Ensure Opportunities for Meaningful Public Engagement .....	40
<b>6.</b> EPA Cannot Allow a “De Minimis Exemption” .....	41
<b>7.</b> EPA Cannot Allow Delayed Closure for OB/OD Units.....	43
<b>8.</b> EPA Cannot Allow Continued OB/OD at Interim Status Sites .....	43
<b>V.</b> EPA’s Proposal Concerning Approaches to Permitting Thermal Treatment Units is Inconsistent with RCRA and the Clean Air Act, and Arbitrary and Capricious .....	44

<b>a.</b> EPA’s New Statements Concerning the Regulatory Definition of “Hazardous Waste Incinerator” are Arbitrary and Capricious .....	44
<b>b.</b> EPA’s New Statements Concerning the Regulatory Definition of “Hazardous Waste Incinerator” Contravene RCRA and the Clean Air Act.....	47
<b>c.</b> Designating the Thermal Treatment Units Creates Inconsistency and is Counter to this Administration’s Commitment to Environmental Justice .....	47
<b>VI.</b> EPA Must Strengthen its Proposed Requirements for Mobile Treatment Units.....	48
<b>a.</b> EPA’s Proposed Regulation of MTUs as “Miscellaneous Units” Fails to Protect Human Health and the Environment and is Arbitrary and Capricious .....	49
<b>b.</b> EPA Must Provide Additional Requirements to Ensure Meaningful Public Participation in the MTU Permitting Process.....	50
<b>i.</b> Public Notice, Outreach, and Reporting .....	50
<b>ii.</b> Appeals of National Conditional Approvals.....	51
<b>iii.</b> MTU Permit Modifications.....	52
<b>VII.</b> Conclusion .....	52

## I. Commenters

Commenters are community and environmental groups representing citizens across the nation, including the territorial U.S., who live, work, and recreate near government and private facilities that engage in OB/OD of hazardous waste explosives and release unabated toxic pollution into surrounding communities. These communities have experienced first-hand the significant problems and health and environmental risks associated with EPA's current rules for OB/OD, and they have long advocated for OB/OD to end.

Commenters include the Central Louisiana Coalition for a Clean & Healthy Environment—a community organization comprised mainly of residents of Colfax and The Rock who are deeply concerned about harmful pollution and impacts from OB/OD operations at the Clean Harbors Colfax facility. Community members have experienced plumes of black smoke billowing from the facility, heard loud explosions that rattle their homes, and smelled chemical odors during OB/OD operations. The Coalition has long advocated for an end to the OB/OD of hazardous wastes at Clean Harbors to protect its members' health and welfare from the associated risks and environmental injustice these operations impose on the surrounding communities.

Citizens for Arsenal Accountability is a community-based, environmental justice organization in the New River Valley, Virginia. Citizens for Arsenal Accountability is comprised of concerned community members, students, and families that advocate to stop the open burning of hazardous waste and eliminate pollution produced by the Radford Army Ammunition Plant to ensure clean air, water, and soil for the New River Valley.

Citizens for Safe Water Around Badger ("CSWAB") was organized in 1990 by rural families near Wisconsin's Badger Army Ammunition Plant whose groundwater and drinking water supplies were contaminated with toxic chemicals resulting from the open air burning of hazardous munitions wastes. CSWAB's advocacy has resulted in, among other things, gaining the Army's withdrawal of a proposal to incinerate 1,000,000 pounds of waste munitions, blocking a proposal to open burn 2,500 pounds per day of hazardous waste, and obtaining comprehensive water testing for neighbors living near the Badger plant. Armed with the lessons learned at Badger, CSWAB co-founded the Cease Fire Campaign.

The Cease Fire Campaign is a national coalition of 70 social justice, environmental health, tribal, veterans, and conservation groups working together to protect human health and the environment by calling for the immediate deployment of safer alternatives to open air burning, detonation, and incineration of toxic military munitions in communities across the U.S. and its territories.

Concerned Citizens for Nuclear Safety ("CCNS") is a community-based organization comprised of individuals and communities located downwind and downstream of Los Alamos National Laboratory ("LANL"), a Department of Energy facility in New Mexico. LANL is the only U.S. site where the plutonium triggers for nuclear weapons are fabricated. OB/OD operations at LANL have been ongoing since they first began in 1943. Many community members experience the OB/OD operations daily around noontime when they hear the explosions, smell the emissions, and taste the

metals in their mouths. For over two decades, CCNS has worked in coalition with land-based and Native women-led organizations to stop OB/OD operations and require cleanup. For over a decade, the “cleanup” of a small burn tray at TA-16-399 has been underway. But every time LANL declares it is done, new contamination is found downwind and downstream. CCNS’s mission is to protect all living beings and the environment from the effects of radioactive and other hazardous materials now and in the future. CCNS implements its mission through public education, providing information about how to get involved by providing talking points and sample public comments, producing a weekly broadcast and social media posts, attending public meetings at the local, state and national levels, and keeping in contact with elected officials and representatives.

Kentucky Environmental Foundation (“KEF”) is a local organization involved in many environmental issues in the Central Kentucky region. KEF has been engaged for forty years in ensuring the chemical weapons stored at the Blue Grass Army Depot (“BGAD”) are destroyed, with the highest priority being given to protecting the workforce, public, and environment. KEF has also worked on hazardous waste issues and workforce retention at BGAD. KEF is dedicated to connecting the lines between our environment, health, and economy, creating a sustainable system that incorporates advocating for policies to ensure a livable future for Kentucky and beyond.

Prutehi Litekyan: Save Ritidian (“PLSR”) is a community-based organization in Guam/Guåhan. PLSR’s mission is to protect natural and cultural resources in Guam for the well-being of the people and future generations of the island. PLSR seeks to prevent environmental degradation and destruction of sacred and native lands and is dedicated to the return of ancestral lands to their original owners. PLSR engages with the community in Guam to promote the protection of the island’s sole-source aquifer, sacred sites and ancestral remains, and access to family and ancestral lands. PLSR also advocates for the protection of environmental and cultural resources, including, but not limited to, endangered species, traditional fishing sites, and sites for cultivating and gathering traditional medicines. PLSR’s mission includes protection of these resources from adverse impacts resulting from Department of Defense (“DoD”) activities and operations, such as live-fire training and open detonation of waste explosives. PLSR conducts research and carries out public education efforts on these issues to help the community become better informed to participate in local and national processes regarding DoD activities and operations that may be harmful to Guam.

## **II. Background**

### **a. EPA’s Regulation of OB/OD**

In 1980, when promulgating the first set of hazardous waste rules under RCRA, EPA included regulations concerning the OB/OD of hazardous wastes. Even at that time—forty-four years ago—EPA acknowledged that the “potential human health hazards associated with the practice dictate that open burning be ended now” and banned the practice, explaining that the “ban on open burning resulted from a common-sense analysis of the potential air emissions associated with simple lighting of ignitable hazardous waste,” and that “common sense leads one to conclude...that open

burning of anything cannot be environmentally sound and many of these explosive materials contain very exotic chemicals, some of which are probably toxic.”<sup>1</sup>

EPA created a single narrow and limited exception to the prohibition on OB/OD, only for explosive wastes for which, at the time, there were no alternative modes of treatment. The sole basis of this exception was the U.S. military’s claims of a “need to dispose of explosives in the open,” and that such practices were then “the only alternatives for disposal of most munitions.”<sup>2</sup> EPA therefore allowed the exception, but it was never meant to exist indefinitely.

In the last four decades, it has become clear that EPA’s rationale for the existing exception—which is still used by at least 67 facilities to burn significant amounts of hazardous wastes into the open environment—is not grounded in today’s reality, and that EPA’s exception poses grave human health and environmental risks.<sup>3</sup>

### **b. Emergence of Alternative Technologies**

In 2019, the National Academies of Sciences, Engineering, and Medicine (“NASEM”) published a study on alternative technologies suitable for replacing OB/OD.<sup>4</sup> NASEM evaluated dozens of technologies, finding that “[v]iable alternative technologies exist within the demilitarization enterprise, either stand-alone or as part of a treatment train, for almost all munitions currently being treated within the DoD conventional munitions demilitarization stockpile via OB/OD.”<sup>5</sup> Compared to OB/OD, each alternative studied by NASEM “would have lower emissions and less of an environmental and public health impact, would be monitorable, and would likely be more acceptable to the public.”<sup>6</sup> NASEM stated that “most of the alternative technologies that could replace OB/OD are mature and many have already been permitted,” adding that “[t]here are no significant technical, safety, or regulatory barriers to the full-scale deployment of alternative technologies for the demilitarization of the vast majority of the conventional waste munitions, bulk energetics, and associated wastes.”<sup>7</sup>

Later in 2019, EPA published its own report on alternative technologies for OB/OD, echoing NASEM’s findings.<sup>8</sup> EPA’s report acknowledged that, today, “there is a wide range of available alternative treatment technologies that can be, and have been used successfully, in place of

---

<sup>1</sup> Standards Applicable to Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, 45 Fed. Reg. 33,154, 33,217 (May 19, 1980, final and interim rules) [hereinafter 1980 Haz. Waste Standards]; EPA, *Final Background Document: 40 CFR Part 265 Subpart P* at 50-51 (Apr. 1980) (Doc. ID EPA-HQ-OLEM-2021-0397-0041).

<sup>2</sup> 1980 Haz. Waste Standards, 45 Fed. Reg. at 33,217.

<sup>3</sup> Revisions to Standards of OB/OD of Waste Explosives, 89 Fed. Reg. 19,952, 19,955 (proposed Mar. 20, 2024) [hereinafter Proposed Rule].

<sup>4</sup> NASEM, *Alternatives for the Demilitarization of Conventional Munitions* (2019), <https://doi.org/10.17226/25140> (Doc. ID EPA-HQ-OLEM-2021-0397-0007) (Attachment 1) [hereinafter NASEM Alternatives Report].

<sup>5</sup> *Id.* at 2.

<sup>6</sup> *Id.* at 4.

<sup>7</sup> *Id.* at 4.

<sup>8</sup> EPA, *Alternative Treatment Technologies to Open Burning and Open Detonation of Energetic Hazardous Wastes: Final Report* (Dec. 2019) (Doc. ID EPA-HQ-OLEM-2021-0397-0035), [www.epa.gov/sites/default/files/2019-12/documents/final\\_obod\\_alttechreport\\_for\\_publication\\_dec2019\\_508\\_v2.pdf](http://www.epa.gov/sites/default/files/2019-12/documents/final_obod_alttechreport_for_publication_dec2019_508_v2.pdf) (Attachment 2) [hereinafter EPA Alternatives Report].



OB/OD.”<sup>9</sup> Together, the EPA and NASEM reports “identify available technologies that can safely treat most, if not all, wastes that are currently being open burned and many wastes that are being open detonated.”<sup>10</sup>

In addition, EPA recently released a Compendium of Alternative Technologies to OB/OD identifying alternative technologies that have been used for particular waste streams at various sites across the country.<sup>11</sup>

### **III. OB/OD Presents Serious Threats to Human Health and the Environment.**

OB/OD of hazardous wastes is fundamentally dangerous to human health and the environment. EPA’s proposed rule fails to fully address the threats these practices pose to communities, facility personnel (including service members), and the environment, and neglects to assess the full range of associated environmental and health costs.

#### **a. OB/OD Releases Uncontrolled Toxic Pollutants into the Environment.**

OB/OD facilities are associated with significant pollution problems that have resulted in severe contamination of surrounding air, lands, and waters. This is unsurprising as OB/OD, by definition, is the practice of burning or detonating hazardous wastes directly into the open air, without any pollution controls. This process results in a wide variety of toxic chemicals being spewed directly into the environment and surrounding communities. Many of those toxic chemicals are known to cause serious health problems, including cancers and neurological and reproductive problems.

NASEM has explained that “by definition . . . by-products of the burning or detonation are released directly into the environment—plumes of smoke and particulate matter are often quite visible during and following OB/OD operations. . . . Energetic compounds are commonly ejected and other contaminants, including heavy metals, are commonly released to the surrounding media (air, soil, water) during OB/OD events.”<sup>12</sup> Further, the air emissions from OB/OD “include inhalable size particles that can remain airborne for large travel distances.”<sup>13</sup> Figure 1 below illustrates a conceptual site model for the type of releases and contaminant pathways that occur at OB/OD sites.

---

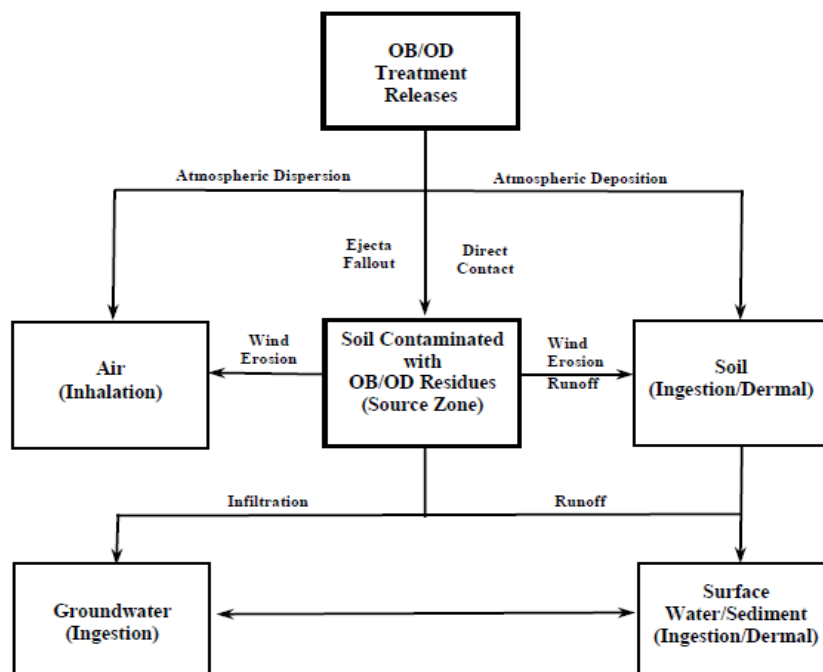
<sup>9</sup> *Id.* at 12.

<sup>10</sup> EPA, Mem. on Open Burning and Open Detonation (OB/OD) of Waste Explosives Under the Resource Conservation and Recovery Act (RCRA) at 3 (June 7, 2022) (Doc. ID EPA-HQ-OLEM-2021-0397-0010) (Attachment 3) [hereinafter 2022 EPA OB/OD Memo].

<sup>11</sup> EPA, No. EPA-530-R-23-027, *Compendium of Alternative Technologies to Open Burning/ Open Detonation of Energetic Hazardous Wastes* (Sept. 2023), [https://www.epa.gov/system/files/documents/2023-12/alt\\_tech\\_compendium\\_2023.pdf](https://www.epa.gov/system/files/documents/2023-12/alt_tech_compendium_2023.pdf) [<https://perma.cc/N23W-U33L>].

<sup>12</sup> NASEM Alternatives Report, *supra* note 4, at 7 (attach. 1).

<sup>13</sup> EPA Region 3 (prepared by Tetra Tech), *Draft Final Open Burning/ Open Detonation Permitting Guidelines* at 2-15 (Feb. 2002), [https://www.epa.gov/sites/default/files/2016-03/documents/rcra\\_openburnopendet\\_guide.pdf](https://www.epa.gov/sites/default/files/2016-03/documents/rcra_openburnopendet_guide.pdf) (Attachment 4).



**Figure 1: Potential environmental transport pathways of concern at OB/OD Units.**<sup>14</sup>

In the proposed rule, EPA acknowledges that toxic pollutants, including heavy metals, perchlorate, particulate matter, per- and polyfluoroalkyl substances (“PFAS”), polychlorinated biphenyls (“PCBs”), dioxins/furans, and others are associated with the OB/OD of waste explosives.<sup>15</sup> “EPA has documented specific contaminants that exceed action levels in environmental media at OB/OD units that have undergone RCRA closure.”<sup>16</sup> The agency is aware of these pollution risks.<sup>17</sup>

According to NASEM, there are several main classes of substances associated with OB/OD that are a concern for public health and the environment.<sup>18</sup>

#### **i. Nitramine Explosives (RDX, HMX)**

RDX (also known as Royal Demolition Explosive) is the most common explosive compound at demolition ranges because it is the main component of C4—the explosive charge used to initiate detonations.<sup>19</sup> RDX is not significantly retained by most soils because it biodegrades slowly and,

<sup>14</sup> *Id.* at 2-21, fig.2-6.

<sup>15</sup> Proposed Rule, 89 Fed. Reg. at 19,954.

<sup>16</sup> *Id.*

<sup>17</sup> *Id.* See also EPA, *Background on Potential Environmental Impacts and Health Effects of Contaminants released during OB/OD* (Apr. 19, 2024) (Doc. ID EPA-HQ-OLEM-2021-0397-0178).

<sup>18</sup> NASEM Alternatives Report, *supra* note 4, at 30–31 (attach. 1).

<sup>19</sup> John Pichtel, *Distribution and Fate of Military Explosives and Propellants in Soil: A Review*, *Applied and Env’t Soil Sci.*, Art. ID 617236 at 15 (2012) (Attachment 5).

thus, “[e]asily migrates to groundwater.”<sup>20</sup> RDX and HMX have been found in groundwater below several military ranges.<sup>21</sup> In an EPA Region 4 presentation titled “Issues with Open Burning and Open Detonation,” it was noted that RDX has been detected at five thousand times the groundwater protection standard.<sup>22</sup> RDX “can be carried considerable distances” if it reaches the underlying aquifer and “has the potential to affect drinking water.”<sup>23</sup> RDX in the environment is also concerning because “it is a xenobiotic chemical known to be toxic to various terrestrial and aquatic organisms.”<sup>24</sup> RDX can also bioaccumulate in plants, and, thus, plant-eating animals could be exposed.<sup>25</sup> Figure 2 below displays a conceptual model of the dispersion and transportation of RDX at a typical open demolition site. RDX is classified as a possible human carcinogen that can damage the nervous system and cause seizures, and vomiting.<sup>26</sup> Factory employees in Europe and the U.S. who were exposed to RDX “suffered convulsions, unconsciousness, vertigo, and vomiting.”<sup>27</sup> The effects of long-term exposure to low levels of RDX are not known.

---

<sup>20</sup> EPA, No. EPA 505-F-17-008, *Technical Fact Sheet - RDX* at 1 (Nov. 2017), [https://19january2021snapshot.epa.gov/sites/static/files/2017-10/documents/ffrro\\_ecfactsheet\\_rdx\\_9-15-17\\_508.pdf](https://19january2021snapshot.epa.gov/sites/static/files/2017-10/documents/ffrro_ecfactsheet_rdx_9-15-17_508.pdf) (Attachment 6).

<sup>21</sup> Pichtel, *supra* note 19, at 16 (attach. 5).

<sup>22</sup> EPA Region 4, Presentation at Env’t Show of the South, *Issues with Open Burning and Open Detonation* at 16 (2016), <https://cswab.org/wp-content/uploads/2015/10/EPA-Region-4-Issues-with-OB-OD-PPT-April-2016-.pdf> (Attachment 7).

<sup>23</sup> Marie-Claude Lapointe et al., *A Conceptual Model of Fate and Transport Processes for RDX Deposited to Surface Soils of North American Active Demolition Sites*, 46 J. of Env’t Quality 1444, 1445 (2017) (Attachment 8).

<sup>24</sup> *Id.*

<sup>25</sup> EPA, *Technical Fact Sheet - RDX*, *supra* note 20, at 2 (attach. 6).

<sup>26</sup> *Id.*

<sup>27</sup> Pichtel, *supra* note 19, at 1 (attach. 5).

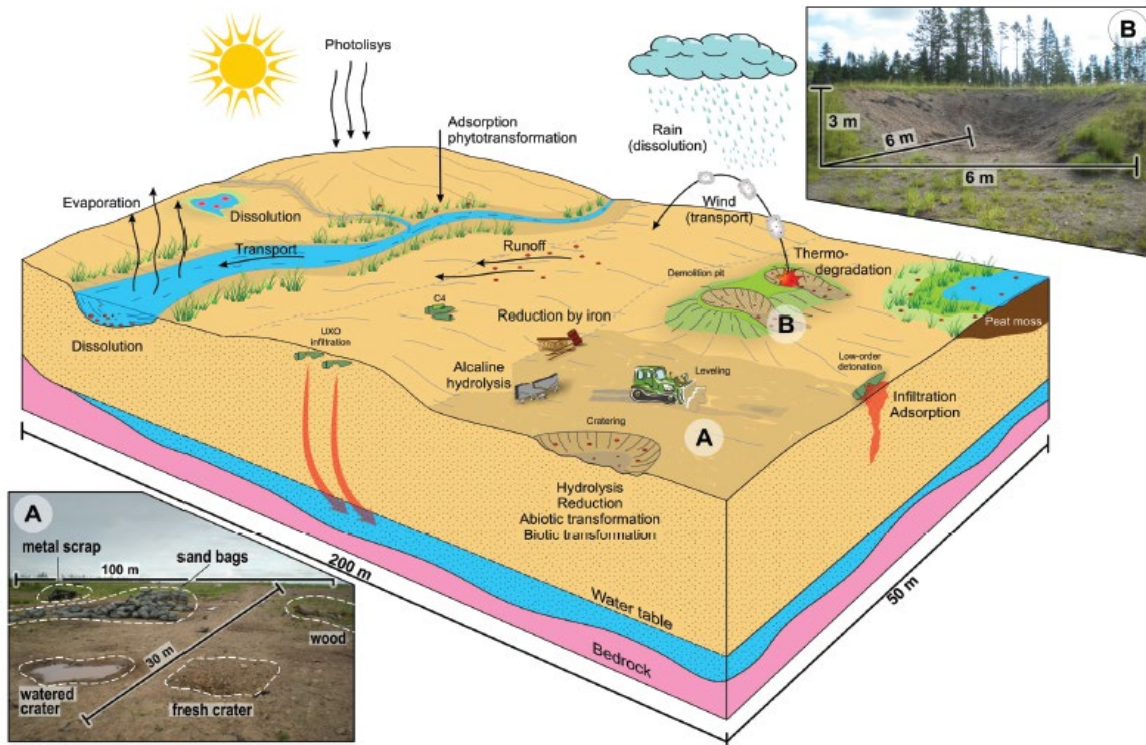


Fig. 1. Conceptual model of a typical military demolition site in North America showing the dispersion and transportation of energetic materials (hexahydro-1,3,5-trinitro-1,3,5-triazine [RDX] in this case): (A) Canadian open demolition site; (B) Canadian demolition bay.

**Figure 2: Conceptual Model of RDX Fate and Transport.<sup>28</sup>**

HMX (also known as High Melting Explosive) is used in explosives, chargers, and rocket fuels because it “explodes violently at high temperatures.”<sup>29</sup> Similar to RDX, HMX also moves from soil into groundwater.<sup>30</sup> HMX in dust particles can also be carried by the wind for long distances.<sup>31</sup> There is limited information regarding the health effects of HMX but animal studies have shown that it is harmful to the liver and central nervous system.<sup>32</sup>

**ii. Other Nitrosated Explosives (TNT, Nitroglycerine)**

TNT (2,4,6-Trinitrotoluene) is another compound that is used extensively in the manufacture of munitions—such as shells, bombs, and grenades—and thus “accounts for a large portion of the explosives-related contamination at active and former U.S. military installations.”<sup>33</sup> TNT can migrate

<sup>28</sup> Lapointe et al., *supra* note 23, at 1446, fig.1 (attach. 8).  
<sup>29</sup> Agency for Toxic Substances and Disease Registry (“ATSDR”), *HMX - ToxFAQs* at 1 (Sept. 1997), <https://www.atsdr.cdc.gov/toxfaqs/tfacts98.pdf> (Attachment 9).  
<sup>30</sup> *Id.*  
<sup>31</sup> *Id.*  
<sup>32</sup> *Id.* at 2.  
<sup>33</sup> EPA, No. EPA 505-F-17-009, *Technical Fact Sheet – 2,4,6-TNT* at 1 (Nov. 2017), [https://19january2021snapshot.epa.gov/sites/static/files/2017-10/documents/ffrofactsheet\\_contaminants\\_tnt\\_9-15-17\\_508.pdf](https://19january2021snapshot.epa.gov/sites/static/files/2017-10/documents/ffrofactsheet_contaminants_tnt_9-15-17_508.pdf) (Attachment 10).

to groundwater but is mostly absorbed by soils.<sup>34</sup> TNT in the soil is taken up and metabolized by plants, thus putting plant-eating animals at risk.<sup>35</sup> In particular, male animals exposed to high amounts of TNT exhibit serious reproductive system impacts.<sup>36</sup> TNT has been detected in surface water at twenty times the EPA standard.<sup>37</sup> When TNT is released to surface water, it breaks down into a number of compounds, including primarily 1,3,5-Trinitrobenzene (“1,3,5-TNB”).<sup>38</sup> 1,3,5-TNB can impact the ability of the blood to carry oxygen and can cause anemia, headaches, nausea, and dizziness in humans, while animal studies show behavioral changes and male reproductive system damage.<sup>39</sup> TNT is classified as a possible human carcinogen and can damage the liver and blood systems.<sup>40</sup> Long-term exposure can also lead to skin irritation and the development of cataracts.<sup>41</sup>

Nitroglycerine (“NG”), another compound used in explosives, can also cause a range of health issues including “headaches, nausea, convulsions, cyanosis, circulatory collapse, or death” from acute exposure.<sup>42</sup> Chronic exposure can lead to “severe headaches, hallucinations, and skin rashes.”<sup>43</sup> Many of these symptoms are due to the fact that NG interferes with the ability of the blood to carry oxygen.<sup>44</sup>

### **iii. Elemental Metals (Aluminum, Arsenic, Cadmium, Chromium, Copper, Cobalt, Iron, Lead, Magnesium, Mercury, Silver, Zinc)**

Elemental metals or heavy metals can have a range of negative health impacts depending on the dose (acute or chronic), route of exposure, and the health and age of the impacted person.<sup>45</sup> Long-term exposure to heavy metals can lead to “gradually progressing physical, muscular, and neurological degenerative processes that imitate diseases such as multiple sclerosis, Parkinson’s disease, Alzheimer’s disease, and muscular dystrophy.”<sup>46</sup> Elemental metals such as lead, arsenic, cadmium, and chromium are associated with OB/OD of waste munitions.<sup>47</sup>

---

<sup>34</sup> *Id.* at 2.

<sup>35</sup> *Id.* at 3.

<sup>36</sup> EPA, *Handbook on the Management of Munitions Response Actions* at 3-29 (May 2005, Interim Final), <https://www.epa.gov/sites/default/files/2015-05/documents/9530610.pdf> (Attachment 11).

<sup>37</sup> EPA Region 4, *Issues with Open Burning and Open Detonation*, *supra* note 22, at 16 (attach. 7).

<sup>38</sup> EPA, *Technical Fact Sheet – 2,4,6-TNT*, *supra* note 33, at 2, 3 (attach. 10).

<sup>39</sup> ATSDR, *1,3-Dinitrobenzene and 1,3,5-Trinitrobenzene – ToxFQAQs*, at 1–2 (Sept. 1996), <https://www.atsdr.cdc.gov/toxfaqs/tfacts74.pdf> (Attachment 12).

<sup>40</sup> EPA, *Technical Fact Sheet – 2,4,6-TNT*, *supra* note 33, at 2 (attach. 10).

<sup>41</sup> *Id.* at 3.

<sup>42</sup> Pichtel, *supra* note 19, at 1 (attach. 5).

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

<sup>44</sup> N.J. Dep’t of Health and Senior Servs., *Hazardous Substance Fact Sheet: Nitroglycerin* at 2 (revised July 2001), <https://nj.gov/health/eoh/rtkweb/documents/fs/1383.pdf> (Attachment 13).

<sup>45</sup> Univ. of Conn., Div. of Envtl. Health & Safety, Health & Safety, Toxic Metals – Standard Operating Procedures, at 1 (Mar. 13, 2024), <https://media.ehs.uconn.edu/Chemical/ToxicMetals-SafeWorkPractices.pdf> (Attachment 14).

<sup>46</sup> Monisha Jaishankar et al., *Toxicity, mechanism and health effects of some heavy metals*, 7 *Interdisciplinary Toxicology* 60, 66 (June 2014) (Attachment 15).

<sup>47</sup> NASEM Alternatives Report, *supra* note 4, at 30 (attach. 1).



Lead is a potent neurotoxin that accumulates in the body and is toxic to many bodily systems and organs, including the cardiovascular system, blood (causing conditions like anemia), kidneys, nervous system (producing symptoms such as headache, lethargy, muscle weakness, tremors, and paralysis), and reproductive system.<sup>48</sup> There is no safe level of exposure to lead, and even very low blood lead levels have been linked to neurological damage in children.<sup>49</sup> A drone monitoring study was conducted at the Radford Army Ammunition Plant (“RAAP”) in 2016, wherein a drone was flown through the smoke clouds emitted by open burning. This study clearly showed that the emission factor used to model lead emissions had greatly underestimated the amount of lead released into the air.<sup>50</sup> Lead contamination is a concern at all OB/OD sites, not just RAAP, because various types of munitions contain lead components and the release of this lead to the groundwater, air, and soil is not controlled. EPA has committed itself to reducing lead exposures and disparities in the U.S.<sup>51</sup>

Arsenic is classified as a known human carcinogen by the International Agency for Research on Cancer (“IARC”) and the National Toxicology Program.<sup>52</sup> Arsenic compounds can cause lung, bladder, skin, kidney, liver, and prostate cancers.<sup>53</sup> Arsenic is also known to be toxic to the cardiovascular system, blood, and nervous system.<sup>54</sup> Cadmium is classified as a human carcinogen by IARC and it can damage the kidneys, lungs, and bones.<sup>55</sup> Chromium is another human carcinogen that can harm the nose and skin, cause breathing problems, and result in irritation and ulceration of the stomach and intestines.<sup>56</sup>

---

<sup>48</sup> ATSDR, *Toxicological Profile for Lead* at 3–9 (Aug. 2020), <https://www.atsdr.cdc.gov/ToxProfiles/tp13.pdf> (Attachment 16); World Health Org., *Lead Poisoning* (Aug. 11, 2023), <https://www.who.int/news-room/fact-sheets/detail/lead-poisoning-and-health> (Attachment 17).

<sup>49</sup> See, e.g., ATSDR, *Tox. Profile for Lead*, *supra* note 48, at 3, 5 (attach. 16); Enrico Rossi, *Low Level Environmental Lead Exposure – A Continuing Challenge*, 29 *Clin. Biochem. Rev.* 63, 63-4 (May 2008) (Attachment 18) (meta-review of the literature regarding blood lead levels confirming the “adverse consequences of lead exposure have no discernible blood lead threshold”); Off. of Env’t Health Hazard Assm’t, Cal. EPA, *Development of Health Criteria for School Site Risk Assessment Pursuant to Health and Safety Code Section 901(g): Child-Specific Benchmark Change In Blood Lead Concentration For School Site Risk Assessment* at 3, 8 (Apr. 2007), <https://oehha.ca.gov/media/downloads/crn/pbhgv041307.pdf> (Attachment 19).

<sup>50</sup> Johanna Aurell & Brian Gullett, *Characterization of Air Emissions from Open Burning at the Radford Army Ammunition Plant* at 17, 18, tbl.3-4 (Aug. 23, 2017) (Doc. ID EPA-HQ-OLEM-2021-0397-0052).

<sup>51</sup> See, e.g., *Final Strategy to Reduce Lead Exposures and Disparities in U.S. Communities*, EPA, <https://www.epa.gov/lead/draft-strategy-reduce-lead-exposures-and-disparities-us-communities> (last updated May 13, 2024) (Attachment 20).

<sup>52</sup> *Arsenic and Cancer Risk*, Am. Cancer Soc’y, <https://www.cancer.org/cancer/cancer-causes/arsenic.html> (last updated June 1, 2023) (Attachment 21).

<sup>53</sup> *Id.*

<sup>54</sup> *What are the Physiologic Effects of Arsenic Exposure?*, ATSDR, [https://www.atsdr.cdc.gov/csem/arsenic/physiologic\\_effects.html](https://www.atsdr.cdc.gov/csem/arsenic/physiologic_effects.html) (last reviewed May 19, 2023) (Attachment 22).

<sup>55</sup> ATSDR, *Cadmium – ToxFAQs* (Oct. 2012), <https://www.atsdr.cdc.gov/toxfaqs/tfacts5.pdf> (Attachment 23).

<sup>56</sup> ATSDR, *Chromium – ToxFAQs* at 1 (Oct. 2012), <https://www.atsdr.cdc.gov/toxfaqs/tfacts7.pdf> (Attachment 24).

**iv. Volatile and Semi-volatile Organics (2,4-dinitrotoluene, 1,3-butadiene, benzene, methylene chloride, phthalates)**

Volatile organic compounds (“VOCs”) and semi-volatile organic compounds (“SVOCs”) are certain compounds of carbon “which participate[] in atmospheric photochemical reactions.”<sup>57</sup> VOCs and SVOCs can cause a range of health issues depending on the specific compound and the level of exposure, but in general their health effects include “[e]ye, nose, and throat irritation[;] [h]eadaches, loss of coordination and nausea[;] [d]amage to liver, kidney and central nervous system[; and] [s]ome organics can cause cancer in animals, some are suspected or known to cause cancer in humans.”<sup>58</sup> For instance, benzene is a known carcinogen that can cause leukemia.<sup>59</sup> Benzene exposure can also negatively impact the immune system—leading to an increased chance of infection—and harm bone marrow—leading to a decrease in red blood cells that results in anemia.<sup>60</sup> Methylene chloride is classified by EPA as a probable-cancer causing chemical, and animal studies have shown an increased cancer risk from breathing methylene chloride for a long time.<sup>61</sup> Methylene chloride also damages the central nervous system and exposure can produce symptoms like dizziness, nausea, and tingling or numbness in fingers and toes.<sup>62</sup> 2,4-dinitrotoluene (“2,4-DNT”) is used in the production of TNT and is classified by EPA as a probable human carcinogen with studies of workers showing an increased risk of kidney and bladder cancer.<sup>63</sup> 2,4-DNT can also cause damage to the lungs, nervous system, male reproductive system, and the liver.<sup>64</sup> Toluene primarily targets the central nervous system, resulting in symptoms such as fatigue and headaches.<sup>65</sup> Toluene can also irritate the upper respiratory tract and the eyes and is linked to developmental effects, such as attention deficits and central nervous system dysfunction.<sup>66</sup>

---

<sup>57</sup> *Technical Overview of Volatile Organic Compounds*, EPA, <https://www.epa.gov/indoor-air-quality-iaq/technical-overview-volatile-organic-compounds> (last updated Mar. 5, 2024) (Attachment 25) (also noting that the difference between VOCs and SVOCs is related to how easily they are emitted – the higher the volatility, “the more likely the compound will be emitted from a product or surface into the air”).

<sup>58</sup> *Volatile Organic Compounds’ Impact on Indoor Air Quality*, EPA, <https://www.epa.gov/indoor-air-quality-iaq/volatile-organic-compounds-impact-indoor-air-quality> (last updated Aug. 15, 2023) (Attachment 26).

<sup>59</sup> ATSDR, *Benzene – ToxFQAQs* at 2 (Aug. 2007), <https://www.atsdr.cdc.gov/toxfaqs/tfacts3.pdf> (Attachment 27).

<sup>60</sup> *Id.* at 1.

<sup>61</sup> ATSDR, *Methylene Chloride – ToxFQAQs* at 1–2 (Feb. 2001), <https://www.atsdr.cdc.gov/toxfaqs/tfacts14.pdf> (Attachment 28).

<sup>62</sup> *Id.* at 1.

<sup>63</sup> ATSDR, *Dinitrotoluenes – ToxFQAQs* at 2 (Feb. 2016), <https://www.atsdr.cdc.gov/toxfaqs/tfacts109.pdf> (Attachment 29).

<sup>64</sup> *Id.* at 1.

<sup>65</sup> EPA, *Toluene* at 1 (last updated July 2012), <https://www.epa.gov/sites/production/files/2016-09/documents/toluene.pdf> (Attachment 30).

<sup>66</sup> *Id.*

**v. Polycyclic Aromatic Hydrocarbons (products of incomplete combustion, e.g., benzo[a]pyrene, benzo[a]anthracene)**

Polycyclic Aromatic Hydrocarbons (“PAHs”) are formed through incomplete combustion—the less efficient the burning process, the more PAHs are emitted.<sup>67</sup> Exposure to PAHs can cause cancer and animal studies have shown increased rates of skin, lung, bladder, liver, and stomach cancers.<sup>68</sup> Benzo[a]pyrene, benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenz[a,h]anthracene, and indeno[1,2,3-c,d]pyrene are all classified as probable human carcinogens by the EPA.<sup>69</sup> PAHs tend to stick to solid particles like soil but some move through soil to contaminate groundwater as well.<sup>70</sup>

**vi. Chlorinated Dioxins and Furans**

Dioxins and furans are formed as a result of combustion processes, such as open burning.<sup>71</sup> Dioxin and furan production can be minimized during combustion by following the “3-T Rule”:

High combustion Temperature to maximize waste destruction; Adequate combustion Time (usually two seconds) to maximize waste destruction; and High combustion Turbulence to distribute heat evenly and ensure complete waste destruction ... In an open burn, it is impossible to deploy conditions that minimize the formation of dioxins and furans because there is no way to control the residence time of the waste in the combustion zone, nor the turbulence of the waste material, or the cooling rate.<sup>72</sup>

Dioxins and furans bioaccumulate in the ecosystem and in the human body because of their chemical stability and the fact that they are absorbed by fat tissue.<sup>73</sup> Dioxins and furans are known as persistent organic pollutants (“POPs”) due to “their highly toxic potential” and impact on numerous organs and body systems.<sup>74</sup> Short-term exposure can result in skin lesions and liver damage; long-term exposure is “linked to impairment of the immune system, the developing nervous system, the

---

<sup>67</sup> ATSDR, *Polycyclic Aromatic Hydrocarbons (PAHs) – ToxFQAQs* at 1 (Sept. 1996), <https://www.atsdr.cdc.gov/toxfaqs/tfacts69.pdf> (Attachment 31).

<sup>68</sup> *What Health Effects Are Associated With PAH Exposure?*, ATSDR, [https://www.atsdr.cdc.gov/csem/polycyclic-aromatic-hydrocarbons/health\\_effects.html](https://www.atsdr.cdc.gov/csem/polycyclic-aromatic-hydrocarbons/health_effects.html) (last reviewed June 20, 2024) (Attachment 32).

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

<sup>70</sup> ATSDR, *Polycyclic Aromatic Hydrocarbons (PAHs)*, *supra* note 67, at 1 (attach. 31).

<sup>71</sup> *Learn About Dioxin*, EPA, <https://www.epa.gov/dioxin/learn-about-dioxin> (last updated Dec. 7, 2023) (Attachment 33).

<sup>72</sup> La. Progress Action, *An Open Letter Regarding the Proposed Open Burn at Camp Minden* at 3 (Jan. 26, 2015) <https://www.epa.gov/sites/default/files/2015-02/documents/actionjan26letteropenburn.pdf> (Attachment 34) (emphasis removed).

<sup>73</sup> World Health Org., *Dioxins*, (Nov. 29, 2023), <https://www.who.int/news-room/fact-sheets/detail/dioxins-and-their-effects-on-human-health> (Attachment 35).

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



endocrine system and reproductive functions.”<sup>75</sup> In addition, animal studies have shown that exposure to dioxins and furans can result in cancer.<sup>76</sup>

### vii. Perchlorate

Perchlorate is the main ingredient in propellant and has been used for decades in explosives and in the manufacture, testing, and firing of missiles and rockets. Perchlorate is “readily dissolved and transported in water and has been found in groundwater, surface water, drinking water, and soil across the country.”<sup>77</sup> Perchlorate accumulates in food crop leaves, and the Food and Drug Administration has detected it in food crops and milk.<sup>78</sup> The DoD has detected perchlorate in the groundwater, soil, sediment, and surface water at numerous OB/OD sites (see Table 1 below).

**Table 1: DoD OB/OD Installations with Perchlorate Detections**<sup>79</sup>

Former or Current OB/OD Facility	Media	Highest Detection (ppb)
Anniston Army Depot (AL)	Groundwater	31.2
Redstone Arsenal (AL)	Groundwater	2,600,000
	Soil	38
	Surface water	250
Pine Bluff Arsenal (AR)	Groundwater	500
Yuma Marine Corps Air Station (AZ)	Soil	786,000
China Lake Naval Air Weapons Station (CA)	Groundwater	720
Edwards Air Force Base (CA)	Groundwater	7,700
Vandenberg Air Force Base (CA)	Groundwater	337
	Surface water	65
Eglin Air Force Base (FL)	Groundwater	27
Crane Division Naval Surface Warfare Center (IN)	Groundwater	67
	Soil	470
	Surface water	356
Camp Edwards/Mass. Military Reservation (MA)	Groundwater	770
	Soil	8,060
Aberdeen Proving Ground (MD)	Groundwater	140
Indian Head Naval Surface Facility (MD)	Groundwater	276,000
	Sediment	230
	Soil	480,000

<sup>75</sup> *Id.*

<sup>76</sup> *Id.*

<sup>77</sup> U.S. Gov’t Accountability Off. (“GAO”), GAO-07-1042T, *Department of Defense Activities Related to Trichloroethylene, Perchlorate, and Other Emerging Contaminants* at 7 (July 2007), <https://www.gao.gov/new.items/d071042t.pdf> (Attachment 36).

<sup>78</sup> EPA, *Technical Fact Sheet – Perchlorate* at 3 (Jan. 2014),

[https://19january2017snapshot.epa.gov/sites/production/files/2014-03/documents/ffrofactsheet\\_contaminant\\_perchlorate\\_january2014\\_final.pdf](https://19january2017snapshot.epa.gov/sites/production/files/2014-03/documents/ffrofactsheet_contaminant_perchlorate_january2014_final.pdf) (Attachment 37).

<sup>79</sup> GAO, GAO-10-769, *Perchlorate: Occurrence Is Widespread but at Varying Levels; Federal Agencies Have Taken Some Actions to Respond to and Lessen Releases* at 44-46, app. III (Aug. 2010), <https://www.gao.gov/assets/310/308652.pdf> (Attachment 38).

	Surface water	190
	Wastewater	9,500
Holloman Air Force Base (NM)	Groundwater	190
Kirtland Air Force Base (NM)	Groundwater	16
McAlester Army Ammunition Plant (OK)	Groundwater	23
Beaufort Marine Corps Air Station (SC)	Groundwater	18.2
Milan Army Ammunition Plant (TN)	Groundwater	25.4
	Soil	1,400
Camp Bullis (TX)	Groundwater	174
Red River Army Depot (TX)	Groundwater	37.4
	Other	252
Hill Air Force Base (UT)	Groundwater	39.9
	Soil	86,000
Dahlgren Naval Surface Facility (VA)	Groundwater	2,700
	Sediment	120
	Soil	3,100
	Surface water	230
Radford Army Ammunition Plant (VA)	Groundwater	127

Perchlorate can impact the uptake of iodine in the thyroid gland, thus interfering with thyroid function and negatively impacting metabolism and fetal and infant brain development and growth.<sup>80</sup> Short-term exposure to high doses can cause eye and skin irritation, coughing, nausea, vomiting, and diarrhea.<sup>81</sup>

EPA itself is aware of the dangers of perchlorate and the relationship between OB/OD and perchlorate contamination. Specifically, the agency noted in its 2022 plan to address perchlorate contamination that perchlorate contamination “has been associated with the open burning and open detonation (OB/OD) of waste explosives, propellants, and fireworks.”<sup>82</sup>

### viii. PFAS

Per- and polyfluoroalkyl substances (“PFAS”) are also present at OB/OD sites across the country as these compounds are present in energetics and munitions and have the potential to release to the environment when open burned or open detonated.<sup>83</sup> PFAS are extremely toxic and have been shown to impair development, reproduction, thyroid function, the immune system, and increase risk of certain cancers at extremely low exposure levels.<sup>84</sup> PFAS are also highly persistent in the

<sup>80</sup> GAO, *DoD Activities Related to Trichloroethylene, Perchlorate, and Other Emerging Contaminants*, *supra* note 77, at 7 (attach. 36).

<sup>81</sup> EPA, *Technical Fact Sheet – Perchlorate*, *supra* note 78, at 1, 3 (attach. 37).

<sup>82</sup> EPA, *EPA’s Plan to Address Perchlorate Contamination* at 1 (March 2022), [https://www.epa.gov/system/files/documents/2022-03/epa-plan-to-address-perchlorate.final\\_.pdf](https://www.epa.gov/system/files/documents/2022-03/epa-plan-to-address-perchlorate.final_.pdf) (Attachment 39).

<sup>83</sup> *See, e.g.*, 2022 EPA OB/OD Memo, *supra* note 10, at 5 (attach. 3); Proposed Rule, 89 Fed. Reg. at 19,954.

<sup>84</sup> *See, e.g.*, EPA, *Technical Fact Sheet – PFOS and PFOA* at 3 (Nov. 2017), [https://19january2021snapshot.epa.gov/sites/static/files/2017-12/documents/ffrrofactsheet\\_contaminants\\_pfos\\_pfoa\\_11-20-17\\_508\\_0.pdf](https://19january2021snapshot.epa.gov/sites/static/files/2017-12/documents/ffrrofactsheet_contaminants_pfos_pfoa_11-20-17_508_0.pdf) (Attachment 40); Tasha Stoiber et al.,

environment and known to bioaccumulate in humans and wildlife.<sup>85</sup> Indeed, PFAS will often remain in the environment for decades, burdening generations to come.<sup>86</sup> There is no evidence that PFAS are destroyed during OB/OD rather than dispersed into the air and the surrounding environment.<sup>87</sup> The Kentucky Department for Environmental Protection has even prohibited the Blue Grass Army Depot from conducting OB/OD of “[m]unitions wastes that are a potential source of [PFAS]” due to the harms.<sup>88</sup> Numerous military sites that conduct OB/OD have detected elevated levels of PFAS in the groundwater, including, for instance, Naval Air Weapons Station China Lake (CA), Eglin Air Force Base (FL), and Edwards Air Force Base (CA).<sup>89</sup> Additionally, many OB/OD sites, including, for instance, NSWC Crane (IN) and Holloman Air Force Base (NM), have had to notify farmers located within a mile of their facility that elevated levels of PFAS were detected in the groundwater.<sup>90</sup>

#### **b. OB/OD Facilities Have a Long History of Violating Environmental Laws.**

Many of the facilities that engage in OB/OD have long track records of violations that result in harm to the environment and surrounding communities. Between 2017 to 2022 alone, active OB/OD facilities had a total of 105 informal enforcement actions and 39 formal enforcement actions. Those formal enforcement actions resulted in nearly \$2 million in penalties. Several OB/OD facilities have also been known by EPA as “Significant Noncompliers” of RCRA over the past twelve quarters.

Examples of these violations and penalties include:

- Alliant Techsystems (Keyser, WV): In 2021, the facility agreed to pay a \$350,000 penalty for alleged violations of hazardous waste regulations, including a failure to maintain and operate the open burning grounds “so as to minimize the possibility of unplanned sudden or non-sudden release of [hazardous waste] or [hazardous waste] constituents to soil or surface water which could threaten human health or the environment.”<sup>91</sup>

---

*Disposal of products and materials containing per- and polyfluoroalkyl substances (PFAS): A cyclical problem*, 260 *Chemosphere* (2020) (Attachment 41); ATSDR, *Toxicological Profile for Perfluoroalkyls*, at 7–21 (May 2021), <https://www.atsdr.cdc.gov/toxprofiles/tp200.pdf> [<https://perma.cc/EV27-95YU>].

<sup>85</sup> EPA, *Technical Fact Sheet – PFOS and PFOA*, *supra* note 84, at 3 (attach. 40).

<sup>86</sup> See, e.g., Ian T. Cousins et al., *Why is High Persistence Alone a Major Cause of Concern?*, 21 *Env’t Sci.: Processes & Impacts* 781 (2019) (Attachment 42).

<sup>87</sup> See, e.g., Stoiber et al., *supra* note 84 (attach. 41) (finding that incineration of PFAS results in the release of toxic air pollutants and greenhouse gases and that some PFAS remains in the ash). See also 2022 EPA OB/OD Memo, *supra* note 10, at n.13 (attach. 3).

<sup>88</sup> Blue Grass Army Depot, KY8-213-820-105, Hazardous Waste Facility Permit, OB/OD Section at 3-4, P.III.A.(3) (Nov. 2018), <https://cswab.org/wp-content/uploads/2020/12/Bluegrass-Army-Depot-OBOD-Final-Permit-PFAS-prohibition-Nov-2018.pdf> (Attachment 43) [hereinafter Blue Grass Permit].

<sup>89</sup> Env’t Working Grp., *Highest Levels of PFAS Contamination in Groundwater at U.S. Military Installations* at 1, 3, 4 (Oct. 2019), <https://www.ewg.org/sites/default/files/u352/Top%20100%20PFAS.pdf> (Attachment 44).

<sup>90</sup> DoD, *Status of Notifications to Agricultural Operations Pursuant to Section 335 of the Fiscal Year 2021 National Defense Authorization Act* at Appendix (July 2021), <https://www.denix.osd.mil/derp/featured-content/reports/operations-report/Agricultural%20Operations%20Notifications%20Report%20to%20Congress.pdf> (Attachment 45).

<sup>91</sup> EPA, ECHO, Civil Enforcement Case Report, Case No. 03-2021-0024, <https://echo.epa.gov/enforcement-case-report?id=03-2021-0024> (last updated May 17, 2021) (Attachment 46).

- Alliant Techsystems (Elkton, MD): In 2020, this facility paid a \$36,920 penalty to settle alleged violations of federal and state hazardous waste regulations. Specifically, EPA alleged that the facility failed “to comply with safeguards related to its onsite burn pad, storage buildings, and training requirements” and failed “to properly label, date and keep closed containers of hazardous and universal waste.”<sup>92</sup>
- Naval Air Weapons Station – China Lake (China Lake, CA): In 2019, the facility agreed to pay \$23,700 for violations of RCRA.<sup>93</sup>
- Naval Surface Warfare Center – Crane (Crane, IN): In 2018, the facility agreed to pay a \$2,072 cash penalty as well as fund a \$34,184 supplemental environmental project as a result of a RCRA violation that “caused worker and human exposure to un-containerized hazardous waste.”<sup>94</sup>
- Clean Harbors Colfax (Colfax, LA): In 2018, the facility was assessed a penalty of almost \$900,000 due to various violations, including burning unauthorized materials, discharging unauthorized pollutants, and exceeding the permitted five-minute time limit for burning/detonation.<sup>95</sup>
- Zambelli Fireworks Manufacturing Co. (Edinburg, PA): In 2017, the facility agreed to pay a penalty of \$223,448 for violations of its RCRA permit, including failure to operate the burn pit in accordance with the permit, failure to operate the facility “to minimize the possibility of a fire, explosion, or release of hazardous waste or hazardous waste constituents,” and a failure to train employees managing hazardous waste, among other violations.<sup>96</sup>
- Radford Army Ammunition Plant (Radford, VA): In 2017, EPA fined the facility \$203,200 for various violations, and the following year, the facility was assessed an additional penalty of \$279,700 for violations of RCRA, Emergency Planning and Community Right-to-Know Act, Clean Water Act, and Clean Air Act (“CAA”) requirements.<sup>97</sup>

---

<sup>92</sup> EPA, *Alliant Techsystems Operations settle hazardous waste violations at Elkton Maryland facility*, EPA Region 3 (Dec. 3, 2020), <https://www.epa.gov/newsreleases/epa-alliant-techsystems-operations-settle-hazardous-waste-violations-elkton-maryland> (Attachment 47).

<sup>93</sup> EPA, ECHO, Civil Enft Case Rep., Case No. 09-2019-0082, <https://echo.epa.gov/enforcement-case-report?id=09-2019-0082> (last updated Sept. 30, 2019) (Attachment 48).

<sup>94</sup> EPA, ECHO, Civil Enft Case Rep., Case No. 05-2018-9923, <https://echo.epa.gov/enforcement-case-report?id=05-2018-9923> (last updated Sept. 27, 2018) (Attachment 49).

<sup>95</sup> Jeff Matthews, *Clean Harbors Colfax penalized nearly \$900,000*, Town Talk (Dec. 8, 2018), <https://www.thetowntalk.com/story/news/local/2018/12/08/clean-harbors-colfax-penalized-nearly-900-000/2239887002/> (Attachment 50); EPA, ECHO, Civil Enft Case Rep., Case No. LA-MMP1800537, <https://echo.epa.gov/enforcement-case-report?id=LA-MMP1800537> (last updated Mar. 8, 2022) (Attachment 51).

<sup>96</sup> EPA, ECHO, Civil Enft Case Rep., Case No. 03-2017-0058, <https://echo.epa.gov/enforcement-case-report?id=03-2017-0058> (last updated Feb. 23, 2017) (Attachment 52).

<sup>97</sup> EPA, ECHO, Civil Enft Case Rep., Case No. 03-2017-0164, <https://echo.epa.gov/enforcement-case-report?id=03-2017-0164> (last updated Sept. 25, 2017) (Attachment 53); EPA, ECHO, Civil Enft Case Rep., Case No. 03-2018-0014, <https://echo.epa.gov/enforcement-case-report?id=03-2018-0014> (last updated Mar. 7, 2018) (Attachment 54).

These examples are only a snapshot of the violations and penalties imposed on active OB/OD sites. The true harms of OB/OD and the environmental and public health costs incurred are undoubtedly far greater than any of these penalties.

Moreover, EPA is aware that cleanups of environmental damage associated with OB/OD facilities have been significant, with figures reaching up to hundreds of millions of dollars (see Figure 3).

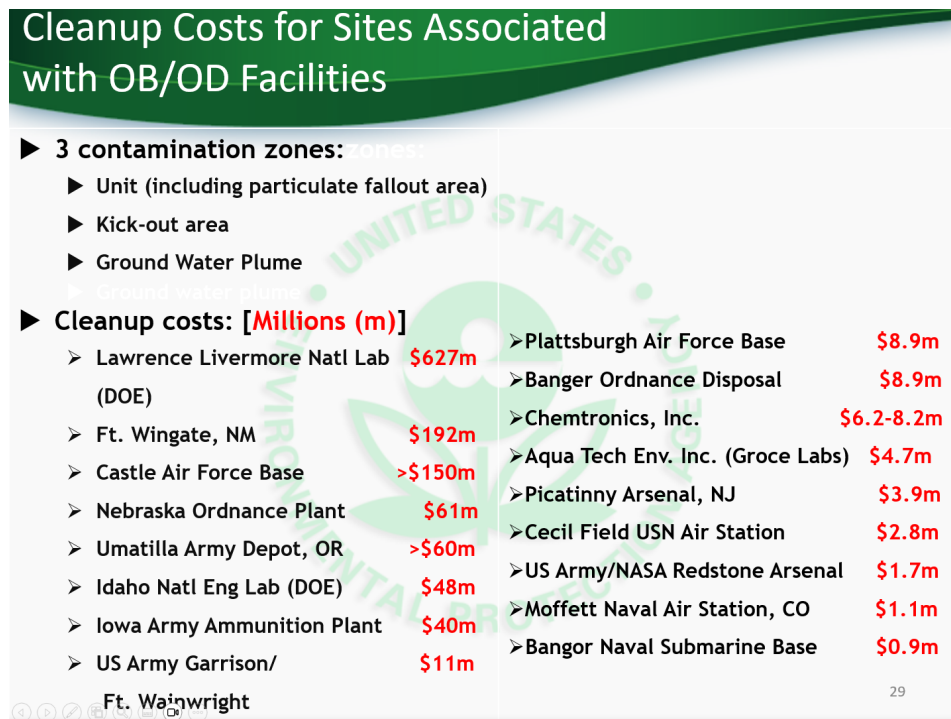


Figure 3: Cleanup Costs for Sites Associated with OB/OD Facilities.<sup>98</sup>

EPA has acknowledged that OB/OD results in extensive contamination, including for example, uncontrolled air emissions, soil contaminated with perchlorate exceeding EPA standards by 7,000 times, surface water contamination twenty times the EPA standard for TNT, and groundwater contamination exceeding the groundwater contamination standards for RDX by 5,000 times.<sup>99</sup> One Department of Energy facility is known to have resulted in cleanup/remediation costs upwards of \$447 million.<sup>100</sup>

<sup>98</sup> EPA Presentation to NASEM, *Alternatives for the Demilitarization of Conventional Munitions* at 29 (Aug. 22, 2017) (Attachment 55).

<sup>99</sup> EPA Region 4, *Issues with Open Burning and Open Detonation*, *supra* note 22, at 16 (attach. 7).

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

Appendix A presents additional cleanup cost information for certain former and active OB/OD military installations.<sup>101</sup> Appendix B is a non-exhaustive list of facilities that have previously conducted or currently conduct OB/OD and have been subject to Comprehensive Environmental Response, Compensation and Liability Act (“CERCLA”) Superfund or corrective action clean ups.

Notably, in its own attempt to study closure cases, EPA found that only 9 out of 150 OB/OD units that are in some stage of closure were far enough along in the process to provide meaningful information.<sup>102</sup> Even where sites are actively working on closure, due to the extent of contamination, it can take decades to complete closure activities. For instance, closure activities at the Fort Wingate Depot Activity in New Mexico began in 1995 and are still ongoing.<sup>103</sup> On top of this, records show a failure to fully remediate contamination. For example, at Kirtland Air Force Base in New Mexico, five constituents “were detected in groundwater slightly above their associated screening criteria” but the facility’s closure report “recommended no further monitoring of groundwater.”<sup>104</sup> At the US Army Garrison Fort Belvoir in Virginia, the facility received “clean closure” and “no further action” determinations, which were “undercut by the facts that the [OD unit] 1) was only superficially sampled and only partially cleaned up (not even to industrial risk standards); 2) was renamed ‘inactive landfill’ (i.e., with waste/contaminants left, not cleaned up); 3) has significant [land use controls], including digging and surface cover controls; 4) is in post-closure status, including annual inspections to 2046 (i.e., requires further actions); 5) did no digital geophysical mapping; and 6) did no surface water, sediments, nor groundwater monitoring.”<sup>105</sup>

**c. OB/OD Facilities and Regulators Have Consistently Failed to Adhere to Existing Limitations on OB/OD and Require Implementation of Alternatives.**

As EPA has explained, the existing exception allowing OB/OD has always been narrow and limited in its applicability, available only in cases where it has been demonstrated that there are no safe alternatives. However, that has not been the case in practice. Instead, permitting agencies and EPA itself have failed time and again for decades to properly implement and enforce the exception, thereby allowing facilities to illegally open burn and open detonate massive quantities of hazardous wastes in communities across the U.S. and its territories.

Indeed, EPA admits that, as of April 2023, *only 24 out of the known 67* OB/OD facilities have even evaluated alternative technologies, meaning that the majority (approximately 65%) of sites are

---

<sup>101</sup> See Appendix A, citing data gathered by ProPublica. Lena Groeger et al., *Bombs in Your Backyard*, ProPublica (updated Dec. 5, 2017), <https://projects.propublica.org/bombs/#> [<https://perma.cc/B943-ZED7>]. The cleanup costs detailed here are not specific to OB/OD operations or exhaustive of all OB/OD sites, and EPA has not provided any such data in support of its proposal. The costs here are clear evidence of the great extent of damage that is occurring at military installations and the significant costs and long timelines involved in remediation.

<sup>102</sup> EPA, *Open Burning/Open Detonation (OB/OD) RCRA Closure Case Studies* at iii (2023) (Doc. ID EPA-HQ-OLEM-2021-0397-0058).

<sup>103</sup> *Id.* at 29; *Fort Wingate Depot Activity Site*, N.M. Off. of Nat. Res., <https://onrt.env.nm.gov/blog/2023/12/15/fort-wingate-depot/> [<https://perma.cc/3EMA-LB38>] (last updated Feb. 6, 2024).

<sup>104</sup> EPA, *Open Burning/Open Detonation (OB/OD) RCRA Closure Case Studies*, *supra* note 102, at 70.

<sup>105</sup> *Id.* at 155.



engaged in OB/OD without complying with existing law by showing they are eligible for the exception at all.<sup>106</sup> Some facilities are known to have merely presented outdated and/or extremely cursory and unsupported statements dismissing alternatives.<sup>107</sup>

Other sites have obtained permits based on known erroneous interpretations of the law. For instance, in its recent decision to renew the OB/OD permit for the Radford Army Ammunition Plant, the Virginia Department of Environmental Quality incorrectly stated that the existing regulatory limitation does not even apply.<sup>108</sup> It is clear that communities cannot simply rely on the facilities or the regulators to comply with even the simplest limitations on OB/OD.

#### **d. Health Impacts from Overseas Burn Pits are Well Known.**

At military sites outside the United States, the military has long used open burn pits to dispose of waste, including munitions. The use of these burn pits is similar to OB/OD in that both practices occur in the open air without any emissions controls and, thus, emit pollutants that negatively impact human health and the environment. Many of the pollutants emitted by burn pits are the same pollutants that are known to be emitted from OB/OD, including, for instance, lead, particulate matter, PAHs, VOCs (like benzene and toluene), and dioxins and furans.<sup>109</sup> Also, similar to residents who live near OB/OD sites, military veterans have reported numerous health issues that may be linked to the burn pit emissions they were exposed to.<sup>110</sup> Recently, the government has labeled nine rare respiratory cancers as “presumptive” conditions, meaning that the government presumes these cancers are related to burn pit exposures.<sup>111</sup> Further, in 2022, Congress passed H.R. 3967, which grants presumptive status to additional conditions, including brain cancer, lung disease, and chronic bronchitis, among others.<sup>112</sup>

---

<sup>106</sup> Proposed Rule, 89 Fed. Reg. at 19,963.

<sup>107</sup> EPA excuses this serious non-compliance by citing EPA uncertainty associated with the existing regulation. But, as EPA also notes, the regulation has always, for more than four decades, clearly only allowed OB/OD in instances where there are no safe alternatives. The requirements have been subsequently reaffirmed, including in EPA’s 2022 memorandum, yet facilities and permitting authorities continue to evade compliance.

<sup>108</sup> Va. Dep’t of Env’t Quality, Response to Public Comments on the Approval of Reissuance of Hazardous Waste Management Permit for Radford Army Ammunition Plant, EPA ID No.VA1210020730 at 71 (Aug. 18, 2021) (Attachment 56).

<sup>109</sup> See, e.g., Burn Pits 360, *Toxic Exposure Table (In Reference to VA 10-03)* (Mar. 2021), [https://cdn.shopify.com/s/files/1/0677/1789/0335/files/Toxic-Exposure-Table-2020\\_V2.pdf?v=1683215483](https://cdn.shopify.com/s/files/1/0677/1789/0335/files/Toxic-Exposure-Table-2020_V2.pdf?v=1683215483) (Attachment 57); Dep’t of the Air Force, Mem. for 332 EAMDS/SGP regarding Burn Pit Health Hazards at Balad Air Base Iraq (Dec. 20, 2006), <https://cdn.shopify.com/s/files/1/0677/1789/0335/files/Balad-Air-Quality-Memo.pdf?v=1683215482> (Attachment 58) (listing possible contaminants and noting that the emissions from burn pits are “an acute health hazard for individuals” and there is “the possibility for chronic health hazards”).

<sup>110</sup> See, e.g., Julia Kane, *Twice Burned*, *Grist* (May 4, 2022), <https://grist.org/health/military-burn-pit-health-effects-veterans-overseas-domestic/> (Attachment 59).

<sup>111</sup> Presumptive Service Connection for Rare Respiratory Cancers Due to Exposure to Fine Particulate Matter, 88 Fed. Reg. 75,498 (Nov. 3, 2023). See also The White House, *Fact Sheet: Supporting Veterans Experiencing Financial Hardship and Addressing the Harmful Effects of Military Environmental Exposures* (Mar. 1, 2022), <https://www.whitehouse.gov/briefing-room/statements-releases/2022/03/01/fact-sheet-supporting-veterans-experiencing-financial-hardship-and-addressing-the-harmful-effects-of-military-environmental-exposures/> (Attachment 60).

<sup>112</sup> Honoring our PACT Act of 2022, H.R. 3967, 117<sup>th</sup> Cong. (2022) (enacted). See also *Exposure to burn pits and other specific environmental hazards*, U.S. Dep’t of Veterans Affairs, <https://www.va.gov/disability/eligibility/hazardous-materials-exposure/specific-environmental-hazards/> (last updated May 15, 2024) (Attachment 61).

#### **IV. EPA Must Strengthen Regulations Governing OB/OD to Protect Human Health and the Environment.**

As discussed below, given the serious human health and environmental risks and problems associated with OB/OD, EPA must ban the practice once and for all. To the extent EPA will nonetheless allow OB/OD to continue, the priority must be protection of human health and the environment. EPA must act swiftly to strengthen and finalize minimum requirements and abandon loopholes to ensure that OB/OD is permitted only in the most limited circumstances and subject to clear, prescriptive, and enforceable requirements. Any continued exception for OB/OD must ensure transparency and meaningful public engagement, and guard against abuse. EPA's proposed rule, while including important revisions clarifying the requirements for alternatives evaluations and ongoing obligations, falls short in many ways of what is needed to comply with law and protect communities, facility personnel, and the environment from the uncontrolled burning and detonation of hazardous wastes.

##### **a. EPA Must Eliminate the Exception from the Prohibition on OB/OD.**

RCRA is meant to “assur[e] that hazardous waste management practices are conducted in a manner which protects human health and the environment.”<sup>113</sup> To that end, Congress directed EPA to promulgate hazardous waste regulations “as may be necessary to protect human health and the environment.”<sup>114</sup> Given the clear and inherent risks and problems associated with OB/OD, EPA's proposal to allow the practice to continue is incompatible with RCRA's core statutory requirements.<sup>115</sup>

Indeed, EPA has repeatedly acknowledged the serious health and environmental risks of OB/OD, now and even decades ago.<sup>116</sup> As discussed above and acknowledged in EPA's proposal, the threats presented by OB/OD are undeniable given the sheer nature of these operations. Information concerning OB/OD, the facilities engaged in these operations, and the government's clear and collective failure to enforce and follow existing requirements underscore this fact.<sup>117</sup> To the extent there is any uncertainty concerning the toxic chemicals that are released during OB/OD operations, that uncertainty supports prohibiting the practice, not allowing it to continue. Without clear evidence that OB/OD is indeed protective of human health and the environment, which is plainly lacking, EPA cannot justify the exception allowing OB/OD.

Despite EPA's efforts to prolong the practice, there are simply no conditions or requirements that will make OB/OD protective of human health and the environment. EPA's continued reliance on an alternatives evaluation requirement and the proposed revisions are no exception. As discussed

---

<sup>113</sup> 42 U.S.C. § 6902(a)(4).

<sup>114</sup> *Id.* § 6924(a).

<sup>115</sup> *Id.* §§ 6902(a)(4), 6924(a).

<sup>116</sup> *See* 1980 Haz. Waste Standards, 45 Fed. Reg. at 33,217-2 (“[P]otential human health hazards associated with the practice dictate that open burning be ended now.”).

<sup>117</sup> *See supra* § III.



below, EPA has not shown that compliance with these requirements will indeed protect human health and the environment. Rather, EPA's basis for allowing OB/OD to continue is the general claim of a lack of alternative technologies, a claim that has been repeated for decades by facilities that benefit from EPA's regulatory exception for OB/OD. This general claim cannot upend EPA's primary statutory requirement to protect human health and the environment from the dangers associated with OB/OD. Regardless, evidence, including reports from the NASEM and EPA itself, demonstrate that mature and more environmentally-sound alternatives to OB/OD exist and are now available for use.<sup>118</sup> As discussed below, EPA has not shown that the broad exception it proposes for continued OB/OD is warranted.

The challenges EPA claims OB/OD facilities may face in securing alternatives, including potential costs, do not excuse EPA's exception. Indeed, it is well-established that EPA cannot consider costs in establishing hazardous waste regulations.<sup>119</sup> The only relevant standard here is protection of human health and the environment, and EPA has failed to meet it by allowing OB/OD to continue.

In any case, these excuses are unfounded. As EPA knows, these facilities have had decades to explore and implement viable alternatives to OB/OD. The EPA and NASEM reports are nearly five years old, and EPA's Memorandum reaffirming the need to limit OB/OD is now two years old. Still, most OB/OD facilities have not made any strides to evaluate and secure alternatives. Allowing OB/OD to continue will not lead to ending OB/OD. To the contrary, requiring OB/OD operations to end will provide much needed clarity and incentives to these facilities to find better solutions for managing their explosive hazardous waste streams and protect human health and the environment.

**b. The Proposed Rule Fails to Protect Human Health and the Environment and is Arbitrary and Capricious.**

If, despite the clear need to do so, EPA does not close the exception, it must at a bare minimum strengthen this proposed rule to limit the use of OB/OD and improve current conditions. While the proposed rule includes some important revisions, at present, it lacks critical protections and is arbitrary and capricious.

**i. EPA's Reliance on Permitting Authorities and OB/OD Facilities to Comply with the Proposed Restrictions is Unjustified.**

EPA's proposal relies heavily on the assumption that regulatory authorities and facilities will follow the new requirements to ensure OB/OD is conducted as EPA intends: only where there are no safe and available alternatives and in compliance with the proposed requirements. However, EPA's proposal lacks sufficiently clear, specific minimum requirements to ensure that outcome and protect human health and the environment. Instead, EPA's proposal leaves significant discretion to facilities

---

<sup>118</sup> See NASEM Alternatives Report, *supra* note 4 (attach. 1); EPA Alternatives Report, *supra* note 8 (attach. 2).

<sup>119</sup> See *generally* 2022 EPA OB/OD Memo, *supra* note 10, at 8, fn.25 (attach. 3).

to conduct their own evaluations and establish their own plans and to permitting authorities to approve and enforce them. EPA’s approach defies its core statutory obligation to “promulgate regulations establishing such performance standards . . . as may be necessary to protect human health and the environment.”<sup>120</sup>

Moreover, EPA’s assumption that facilities and permitting authorities will act as EPA expects is unsupported and arbitrary. As noted above and acknowledged by EPA, most permitting authorities and OB/OD facilities have failed to comply with even the simple terms of the existing rule, which have been in place for forty-four years. Even today, long after EPA guidance reaffirming and clarifying those longstanding requirements, the majority of facilities have not conducted alternatives evaluations and have failed to limit OB/OD operations. Many have consistently endangered human health and the environment, as evidenced by the long list of environmental law violations and costly, extensive cleanup actions associated with OB/OD facilities.<sup>121</sup> Citing irrelevant claims of costs, delays, and difficulties in securing alternatives, EPA already appears primed for such excuses and problems to continue under the proposed rule. Instead of relying on permitting authorities and facilities to limit OB/OD operations as EPA assumes, EPA must ensure that outcome and protect human health and the environment by promulgating clear, concrete, enforceable minimum requirements on any continued OB/OD.

**ii. EPA Must Include Additional Restrictions on Any Continued OB/OD and Eliminate Proposed Loopholes.**

While EPA’s proposed rule includes certain important minimum requirements and clarifications, including those for alternatives evaluations, waste characterization, reporting, and operating conditions, it is insufficient. The proposal lacks necessary and specific restrictions on OB/OD, perpetuates a loophole that is far too broad, and presents new threats to human health and the environment. EPA must at the very least address the following significant failures and flaws in its proposal.

**1. EPA’s Proposed Exception is Unjustifiably Broad.**

EPA repeatedly acknowledges that alternatives to OB/OD have been identified and utilized for many explosive hazardous waste streams. Without presenting detailed information or discussion, EPA posits that alternatives may not be viable for some unstable, potentially shock sensitive, and research, development, testing & evaluation (“RDT&E”) wastes. EPA does not specify precisely what wastes these are, where they are or might be, how much of the OB/OD waste stream they account for, and how many sites may manage them, let alone provide analyses supporting the assertion that they cannot be treated with alternatives. There is no excuse for EPA’s failure to provide clear and comprehensive information supporting the assumption that alternatives are not

---

<sup>120</sup> 42 U.S.C. § 6924(a).

<sup>121</sup> See *supra* § III.b.

available for certain waste streams, particularly when it is now decades after similar claims for the exception were made and numerous alternatives have surfaced, been assessed, and are in use.<sup>122</sup> EPA's general claims do not justify an exception from the prohibition on OB/OD.<sup>123</sup>

Even if EPA did provide support for excluding unstable, shock-sensitive, and RDT&E wastes from the ban on OB/OD, it would not support the broad exception EPA has proposed, which allows facilities to open burn and detonate many other kinds of explosive hazardous wastes as well. Indeed, if specific wastes cannot be treated with alternatives, it simply does not follow that EPA can sweep into the exception many other explosive hazardous wastes as well. EPA's broad exception would leave facilities and permitting authorities with opportunities to continue OB/OD of hazardous wastes for which alternatives are in fact available, thus endangering human health and the environment. The proposed exception also perpetuates the possibility of confusion, abuse, and the continuing threats communities will face even where safe alternatives can be utilized. The exception is arbitrary and inconsistent with RCRA's mandate to protect human health and the environment, as well as EPA's own rationale for the exception.

## **2. EPA Must Require Immediate Implementation of Alternatives.**

For the implementation of identified alternatives, EPA proposes to require facilities to prepare and submit an implementation schedule for approval by the permitting authority within 180 days of determining that a safe alternative is available.<sup>124</sup> This proposal fails to ensure alternatives are secured and implemented and OB/OD operations end as quickly as possible, thus prolonging the threats to human health and the environment in contravention of RCRA and without justification.

Indeed, EPA acknowledges that, without a regulatory deadline requirement, its proposal would allow for delays in the implementation of alternatives.<sup>125</sup> EPA offers no support for excusing such delays; it simply assumes that the problem will be addressed by fact that the schedule is to be approved by the permitting authority and would be enforceable. As explained, there is no reasonable basis for EPA to assume that permitting authorities will follow the new requirements and ensure expeditious implementation of alternatives, particularly without public engagement and clear, strict requirements to do so. It is EPA's statutory responsibility to set minimum requirements necessary to ensure timely implementation of alternatives to protect human health and the environment.

Instead of deferring to facilities and permitting authorities, EPA must adopt a strict regulatory deadline for immediate implementation of alternatives, similar to the second option discussed in the

---

<sup>122</sup> EPA cites the NASEM Alternatives Report, which identifies only two munitions as unsuitable for alternatives due to instability: the 105 mm rocket-assisted projectile (DoD ID C463, quantity of 240 tons) and the 8-inch rocket-assisted projectile (DoD ID D624, quantity of 744 tons). This is, as EPA notes, just 4% of the total demilitarization stockpile as of September 30, 2017. Proposed Rule, 89 Fed. Reg. at 19,967.

<sup>123</sup> EPA also cites alternative technology reviews submitted by two facilities generating RDT&E wastes. EPA says that both reviews are deficient and unacceptably dismissive of alternatives. Notably, however, even these faulty reviews acknowledged that alternatives could be used for most of their wastes. Proposed Rule, 89 Fed. Reg. at 19,967.

<sup>124</sup> Proposed Rule, 89 Fed. Reg. at 19,974.

<sup>125</sup> *Id.* at 19,975.

proposal but with greater protections and opportunities for public engagement.<sup>126</sup> Specifically, EPA should, by regulation, require facilities to submit an enforceable implementation schedule with interim milestones no more than 30 days after an alternative has been identified. The implementation schedule must be required by regulation to be submitted through the permitting and public notice and comment process. EPA should also require, by regulation, a compliance deadline requiring implementation of the alternative technology within one year from identification of the alternative. To the extent the one-year deadline is not attainable due to factors outside the facility's control, the regulation should allow for a one-time extension of the deadline not to exceed six months, made through a permit modification that is subject to full public notice and comment and approval by both the permitting authority and EPA.

These changes to the second option discussed in EPA's proposal are necessary for a more expedient and accountable process for implementing alternatives to provide communities with relief from OB/OD. EPA provides no basis, just generic excuses, for allowing any longer delays in procuring alternatives. Moreover, by allowing the implementation schedules to be effectuated by a Class 1 permit modification without public notice and comment opportunity, EPA's proposal inexcusably excludes the public from engaging in these critical decisions in contravention of RCRA's public participation directives.<sup>127</sup> Further, EPA approval of implementation schedules is necessary for oversight and assurance that the implementation of alternatives is not unjustifiably delayed.

It is also crucial that facilities are not permitted to open burn or open detonate while they obtain and bring alternatives into operation, unless they evaluate and demonstrate that there are no interim alternatives available, including the options of safe storage, safe transportation of the wastes for treatment by an alternative off-site, and not managing (e.g., generating or receiving) the hazardous wastes at all. To allow otherwise would incentivize delays and excuses in implementing alternatives and continuing OB/OD in contravention of RCRA and EPA's efforts in this rulemaking.

### **3. EPA Must Expand the List of Hazardous Wastes for which OB/OD is Prohibited.**

EPA proposes a list of "prohibited wastes" that cannot be permitted for OB/OD.<sup>128</sup> The basis for this list is that EPA is "particularly concerned about OB/OD treatment of waste streams that contain chemicals or explosive material that require very high temperatures for sustained periods of time to ensure adequate destruction and/or ensure that hazardous byproducts or products of incomplete combustion do not form."<sup>129</sup> EPA is also "concerned with OB/OD treatment of wastes that may release particularly toxic or dangerous contaminants that would threaten human health and the environment."<sup>130</sup> Based on these concerns, EPA proposes to specifically prohibit the non-emergency OB/OD of a handful of chemicals and explosives: chemical weapons, mixed wastes

---

<sup>126</sup> *Id.*

<sup>127</sup> *Id.*

<sup>128</sup> *Id.* at 19,983-86.

<sup>129</sup> *Id.* at 19,983.

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

containing more than trace amounts of depleted uranium, white and red phosphorus, improved conventional munitions (“ICMs”) and submunitions, Picatinny Arsenal Explosive-21 (“PAX-21”), and PCBs.<sup>131</sup>

EPA acknowledges and explains that the wastes it proposes to prohibit:

either adversely affect or pose a threat to human health and the environment. This is because many of these chemicals have high mobility in air, soil, and groundwater resulting in contamination of soil, water, plants, and food, as well as direct exposure to humans by inhalation, ingestion, or dermal contact. Also, some of these chemicals can transform into more toxic compounds, enhance the solubility and migration capacity of other contaminant metals, persist in the environment, and bioaccumulate in the food chain. Treatment of these wastes by OB/OD can cause the dispersal of these chemicals into the air and onto the ground, providing a pathway to enter the soil, waterways, livestock, and crops.<sup>132</sup>

While EPA identifies and discusses a very limited subset of wastes that meet these criteria, it inexplicitly ignores other significant toxic chemicals and contaminants that do as well. EPA must prohibit OB/OD of the chemicals and explosives on its proposed list but also must include others that raise similar serious concerns. It is arbitrary, capricious, and contrary to RCRA’s mandate to protect human health and the environment to exclude such other dangerous chemicals from the prohibited wastes lists.

Further, EPA notes that the “proposed wastes to prohibit will not apply in emergency response situations.”<sup>133</sup> There is no basis in EPA’s record or RCRA to allow OB/OD of the proposed wastes, or others that meet the same criteria (including those discussed below), in emergency situations. EPA does not (and cannot) explain how an emergency situation makes it so these wastes do not exhibit the characteristics EPA provided as reasons for why the wastes should be prohibited from OB/OD. Indeed, if OB/OD of the wastes under routine circumstances would be ineffective at destroying the toxic chemicals and instead would disperse them into the surrounding communities and environment, or would release toxic products and/or byproducts when combusted, OB/OD under emergency response situations would do the same.

#### *a. PFAS*

A glaring and significant omission from EPA’s list is the class of chemicals known as per- and polyfluoroalkyl substances (“PFAS”), which are known to be associated with OB/OD. PFAS present the same kinds of—and potentially more significant—serious risks to human health and the environment as the wastes EPA proposes to prohibit. EPA represented that it was considering

---

<sup>131</sup> *Id.* at 19,983-86.

<sup>132</sup> *Id.* at 19,983.

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

prohibiting PFAS during its December 2022 webinar on this rulemaking, yet the agency does not even mention it, let alone explain its decision not to do so, in the proposal.<sup>134</sup>

Due to their chemical structure, all PFAS are highly persistent—“indicat[ing] the potential for long-lasting environmental and human exposure to a chemical that is difficult to control and reverse”—and will often remain in the environment for decades.<sup>135</sup> Additionally, PFAS are often highly mobile and can spread quickly throughout the environment once released.<sup>136</sup>

The OB/OD of PFAS chemicals is also problematic because, as EPA itself notes, “[i]t is not well understood how effective high-temperature combustion is at completely destroying PFAS or whether the process can form fluorinated or mixed halogenated organic byproducts.”<sup>137</sup> EPA has also acknowledged that PFAS compounds are particularly “difficult to break down” via incineration.<sup>138</sup> This is especially concerning because “incomplete destruction of PFAS compounds can result in the formation of smaller PFAS products, or products of incomplete combustion (PICs), which may not have been researched and thus could be a potential chemical of concern.”<sup>139</sup> Additionally, the creation of PICs are “promoted by partial combustion caused by insufficient temperatures, time, and turbulence”—all factors which cannot be controlled when using OB/OD.<sup>140</sup>

Additionally, a July 2023 study by EPA found that PFAS breakdown and byproduct formation are highly temperature dependent, with notable performance declines below temperatures of 1000° C.<sup>141</sup> These results are especially worrisome given that this experiment was conducted using steady-state combustor operations—a condition that obviously cannot be met during OB/OD operations when the temperature fluctuates throughout the burn event.

EPA’s PFAS Interim Guidance notes that the agency will be able to make “a more informed recommendation on disposal of PFAS compounds and PFAS containing substances using incineration” after sufficient research has been completed.<sup>142</sup> But it is already clear, as detailed here, that OB/OD of PFAS chemicals poses serious threats to human health and the environment, and

---

<sup>134</sup> EPA, Public Webinar 2, *Revisions to Standards for the Open Burning/ Open Detonation of Explosive Wastes* at 31 (Dec. 5, 2022) (Doc. ID EPA-HQ-OLEM-2021-0397-0086).

<sup>135</sup> Cousins et al., *supra* note 86, at 781 (attach. 42). See also, e.g., EPA, *Technical Brief: Per- and Polyfluoroalkyl Substances (PFAS): Incineration to Manage PFAS Waste Streams* (Feb. 2020), [https://www.epa.gov/sites/default/files/2019-09/documents/technical\\_brief\\_pfas\\_incineration\\_ioaa\\_approved\\_final\\_july\\_2019.pdf](https://www.epa.gov/sites/default/files/2019-09/documents/technical_brief_pfas_incineration_ioaa_approved_final_july_2019.pdf) (Attachment 62).

<sup>136</sup> John A. Simon et al., *PFAS Experts Symposium: Statements on Regulatory Policy, Chemistry And Analytics, Toxicology, Transport/Fate, And Remediation For Per- And Polyfluoroalkyl Substances (PFAS) Contamination Issues*, 29 *Remediation: J. of Env’t Cleanup Costs, Tech., & Techniques* 31 (2019) (Attachment 63).

<sup>137</sup> EPA, *Interim Guidance on the Destruction and Disposal of Perfluoroalkyl and Polyfluoroalkyl Substances and Materials Containing Perfluoroalkyl and Polyfluoroalkyl Substances – Version 2* at 53 (Apr. 8, 2024), <https://www.epa.gov/system/files/documents/2024-04/2024-interim-guidance-on-pfas-destruction-and-disposal.pdf> (Attachment 64) [hereinafter PFAS Interim Guidance].

<sup>138</sup> EPA, *Technical Brief: Incineration to Manage PFAS Waste Streams*, *supra* note 135, at 1 (attach. 62).

<sup>139</sup> *Id.*

<sup>140</sup> PFAS Interim Guidance, *supra* note 137, at 43 (attach. 64); see also Decl. of Dr. Ranajit Sahu, ¶ 23 (June 18, 2024) (Attachment 65).

<sup>141</sup> Erin P. Shields et al., *Pilot-Scale Thermal Destruction of Per-and Polyfluoroalkyl Substances in a Legacy Aqueous Film Forming Foam*, 3 *Env’t Sci. & Tech Eng’g*. 1308-1317 (2023) (Attachment 66).

<sup>142</sup> PFAS Interim Guidance, *supra* note 137, at 60 (attach. 64).

EPA has not (and cannot) shown otherwise. Thus, allowing OB/OD of these dangerous chemicals is arbitrary, capricious, and in violation of RCRA's requirement to protect human health and the environment.

### ***b. Elemental Metals***

It is also arbitrary, capricious, and contrary to RCRA to exclude elemental metals, such as lead, mercury, chromium, and cadmium, from the list of prohibited wastes. Heavy metals, volatile metals, and semi-volatile metals when open burned or open detonated pose significant risks similar to those presented by the wastes EPA proposes to prohibit.<sup>143</sup> Complete oxidation of such metals is not assured through OB/OD, which instead threatens to disperse these metals and/or their hazardous by-products (such as toxic oxides and/or chloride forms of the metals) into the surrounding communities and environment.<sup>144</sup> EPA provides no evidence, and would be strained to do so, showing that OB/OD of these toxics is in fact protective of human health and the environment.

### ***c. Chlorinated Compounds***

For the same reasons EPA proposes to prohibit OB/OD of certain waste, EPA must also prohibit OB/OD of chlorinated compounds. OB/OD of wastes containing chlorinated compounds result in the formation and dispersal of highly toxic products and by-products (including acid gases and dioxins/furans) due to the inability to control residence time and temperature in OB/OD operations.<sup>145</sup> For example, EPA is well aware that significant perchlorate pollution posing serious dangers to human health and the environment “has been associated with the open burning and open detonation (OB/OD) of waste explosives, propellants, and fireworks.”<sup>146</sup> Consistent with the concerns stated in this proposal, EPA has explained that “perchlorate is highly soluble in water, and relatively stable and mobile in subsurface and aqueous systems” meaning that “perchlorate plumes in groundwater can be extensive.”<sup>147</sup> OB/OD of chlorinated compounds is thus an ineffective treatment method that releases toxic compounds into the environment, and it arbitrary, capricious, and in violation of RCRA not to prohibit chlorinated compounds from OB/OD.

### ***d. Emerging Contaminants of Concern***

EPA states it is “aware of emerging chemicals or contaminants of concern[], like certain insensitive high explosive (HE) formulations, for which treatment by OB/OD is ineffective or could pose significant risk to human health and the environment through dispersal of contaminants.”<sup>148</sup> EPA cites various technical fact sheets summarizing several contaminants of concern, like 1,2,3-Trichloropropane, 1,4-Dioxane, PBDEs, and PBBs, that the agency knows “present unique issues

---

<sup>143</sup> See Decl. of Dr. Ranajit Sahu, *supra* note 140, ¶ 25 (attach. 65); *supra* § III.a.iii.

<sup>144</sup> See Decl. of Dr. Ranajit Sahu, *supra* note 140, ¶ 25 (attach. 65).

<sup>145</sup> See *id.* ¶ 24.

<sup>146</sup> EPA, *EPA's Plan to Address Perchlorate Contamination*, *supra* note 82, at 1 (attach. 39).

<sup>147</sup> EPA, *Technical Fact Sheet – Perchlorate*, *supra* note 78, at 2 (attach. 37).

<sup>148</sup> Proposed Rule, 89 Fed. Reg. at 19,983.

and challenges to the environmental community and EPA at contaminated federal facility sites.”<sup>149</sup> Yet EPA says no more, and does not propose to prohibit any of these chemicals and contaminants. It is arbitrary, capricious, and contrary to RCRA for EPA to “aware of” the problem and allow it to persist. EPA must explicitly prohibit these wastes from being treated by OB/OD.

#### *e. Depleted Uranium*

EPA proposes to prohibit the OB/OD of depleted uranium (“DU”) but includes an unlawful and arbitrary allowance for “trace amounts” of DU.<sup>150</sup> EPA must eliminate this allowance. EPA offers no definition of “trace amounts,” leaving great room for abuse by OB/OD facilities to burn any amount of DU and seriously harm communities and the environment. Nor does EPA offer any evidence and explanation that OB/OD of whatever it considers to be “trace amounts” of DU would not threaten human health and the environment in the manner discussed in the proposal.<sup>151</sup> Indeed, EPA cites no valid justification for this allowance at all. Contrary to this proposed allowance for “trace amounts,” EPA in its June 2022 memorandum acknowledged that OB/OD of DU, with no exception relating to amounts, should not be allowed.<sup>152</sup> Further underscoring the inappropriateness of the allowance for “trace amounts” of DU is the fact that DU is already prohibited at certain facilities without exception.<sup>153</sup> A 2002 report prepared by Tetra Tech Inc. for EPA Region 3 also states that munitions with DU should be excluded from OB/OD without exception “because of the potential for extremely toxic releases or availability of alternative treatment technologies.”<sup>154</sup>

#### *f. Other Wastes*

As noted, many other waste streams, including but not limited to those detailed above, would meet EPA’s stated criteria and warrant an explicit prohibition, yet EPA has failed to even consider them. EPA must assess and prohibit a far broader set of wastes to meaningfully limit OB/OD operations and protect human health and the environment.<sup>155</sup>

For example, EPA states that “many chemicals or wastes that are difficult or impossible to destroy by OB/OD and/or would pose acute threats to human health and the environment such as chemical, nuclear, and biological agents, are already restricted or prohibited from treatment by OB/OD.”<sup>156</sup> To the extent this is the case and there are other authorities or practices that prohibit

---

<sup>149</sup> *Emerging Contaminants and Federal Facility Contaminants of Concern*, EPA, <https://19january2017snapshot.epa.gov/fedfac/emerging-contaminants-and-federal-facility-contaminants-concern.html> (accessed Jan. 19, 2017) (Attachment 67) (footnote 3 to the Proposed Rule).

<sup>150</sup> Proposed Rule, 89 Fed. Reg. at 19,984.

<sup>151</sup> *Id.*

<sup>152</sup> 2022 EPA OB/OD Memo, *supra* note 10, at 10 (attach. 3).

<sup>153</sup> *See, e.g.*, Blue Grass Permit, *supra* note 88, at 4 (attach. 43).

<sup>154</sup> EPA Region 3 (prepared by Tetra Tech), *Draft Final OB/OD Permitting Guidelines*, *supra* note 13, at 2-14 (attach. 4).

<sup>155</sup> EPA states that several of the wastes on its proposed list are not currently known to be treated using OB/OD. Proposed Rule, 89 Fed. Reg. at 19,983. Thus, prohibition of these wastes, while necessary and important, does not support EPA’s assumption that the proposal will reduce OB/OD operations or increase protection of human health and the environment.

<sup>156</sup> Proposed Rule, 89 Fed. Reg. at 19,983.



OB/OD of certain chemicals or wastes, EPA must add those chemicals or wastes to the list of prohibited wastes here to ensure consistency, avoid confusion and abuse, and protect human health and the environment. EPA already acknowledges the importance of doing this for chemical weapons and should do the same for others restricted or prohibited wastes.<sup>157</sup>

In addition, EPA acknowledges that permitting authorities may or do restrict treatment of certain other waste streams in permits. EPA should, but fails to, consider those permits as support for what kinds of waste streams can and should be prohibited. For example, the permit for Bluegrass Army Depot prohibits the OB/OD of munitions or wastes that contain any of thirty-five listed items and substances, including ammunition that is 0.50 caliber or smaller, pesticides, herbicides, ammonium perchlorates, dioxins and furans, colored smoke, napalm, riot control agents, naturally occurring radioactive materials, depleted uranium, and asbestos.<sup>158</sup>

Further, EPA must specifically prohibit *all* wastes for which it is now known that safe alternatives are available. It is well-established, including in EPA's own recent report, that alternatives that are more protective of human health and the environment exist today for the "vast majority" of hazardous wastes that are subject to OB/OD, particularly open burning.<sup>159</sup> At this point—to the extent there are any specific waste streams for which there are no alternatives (a showing EPA has not adequately made)—EPA, permitting authorities, and facilities should know exactly what they are. Yet EPA only vaguely mentions wastes that are unstable and potentially shock sensitive.<sup>160</sup> As noted, EPA has not provided any detailed information concerning this issue. However, even if it is correct that there are no alternatives for these wastes, there is no reason for EPA to provide a broader exception allowing the OB/OD of any other hazardous wastes. At a minimum, EPA must prohibit the following, which EPA has repeatedly stated can be treated with alternatives:

[c]ombustible wastes that are contaminated or potentially contaminated with explosives (e.g., solvents and other liquids; wood pallets; paper; personal protective equipment; cardboard; plastic items including plastic liners, mops, gloves)[;] . . . [b]ulky and non-combustible items contaminated or potentially contaminated by explosives (e.g., tanks, containers, pipes, demolition and construction debris, soils, concrete, masonry)[;] . . . [and] [s]mall arms ammunition (less than .50 caliber).<sup>161</sup>

There is no justification for excluding from the list of prohibited wastes such wastes that can be treated using alternatives, and doing so violates RCRA and is arbitrary.

---

<sup>157</sup> *Id.* at 19,984.

<sup>158</sup> Blue Grass Permit, *supra* note 88, at 3-4 (attach. 43).

<sup>159</sup> NASEM Alternatives Report, *supra* note 4, at 4 (attach. 1), 93; EPA Alternatives Report, *supra* note 8 (attach. 2).

<sup>160</sup> Proposed Rule, 89 Fed. Reg. at 19,967.

<sup>161</sup> 2022 EPA OB/OD Memo, *supra* note 10, at 10 (attach. 3).

#### **4. EPA Must Strengthen Requirements Applicable to OB/OD Units.**

To the extent EPA will allow OB/OD to continue despite the need to end the practice, EPA must at a bare minimum promptly promulgate requirements that will provide stronger protections by limiting the use of OB/OD and include additional, enforceable requirements that will reduce environmental and health exposures on-site and in surrounding communities.

##### ***a. Permit Terms and Alternatives Evaluations***

As a fundamental matter, EPA must significantly limit the permit terms for OB/OD sites. Allowing OB/OD facilities to obtain ten-year permits and evaluate alternatives only every five years, as proposed, is inconsistent with RCRA and arbitrary.<sup>162</sup> EPA provides no support for such extended permits and infrequent review of alternatives. Alternatives and information about their viability may become available far more often as more facilities conduct the requisite evaluations and utilize different technologies. To ensure that OB/OD is only used where there are no alternatives, as EPA intends, and that human health and the environment are protected, it is crucial for EPA to revise the regulations to provide for more frequent oversight opportunities for both permitting authorities and the public. At most, an OB/OD permit should not exceed three years, and the alternatives evaluation should be required annually.

EPA cannot reasonably rely on, as it does, permitting authorities to initiate more frequent permit modifications on their own or place the burden on the public to advocate for such changes. Again, EPA cannot assume facilities and permitting authorities will take action to limit OB/OD and require alternatives evaluations without clear and strict requirements to do so.<sup>163</sup>

In addition, the recurring alternatives evaluations, a key component of the proposal, must be subject to full and transparent public notice and comment processes applicable to permitting actions so that the public may meaningfully engage in the critical process of determining whether alternatives exist for their communities and ensuring compliance with applicable requirements. By leaving the public out of this process, EPA again defies RCRA's public participation directives and mandate to protect human health and the environment, as well as EPA's stated commitments to enhancing public engagement.

Furthermore, to protect human health and the environment, where more than one alternative is safe and available, it is important that EPA's revisions require use of the alternative (or combination of alternatives) that is subject to the most prescriptive regulations and would result in the least amount of pollution releases to the air, soil, and water.

---

<sup>162</sup> Proposed Rule, 89 Fed. Reg. at 19,973-74.

<sup>163</sup> See *supra* §§ III.c, IV.b.i.

### ***b. Minimum Pollution Standards***

EPA's proposal lacks minimum pollution standards limiting environmental releases from OB/OD operations. Without such limits, facilities may seek to open burn/open detonate any amount of non-prohibited wastes and release unlimited amounts of toxic pollutants into the air, waters, and soil. As discussed above, there are numerous toxic constituents and classes of chemicals associated with OB/OD, including highly toxic ones like lead, PFAS, chlorinated compounds, and dioxins/furans, for which limits may be set to protect human health and the environment. Yet EPA does not provide any explanation for omitting such standards from its proposal. EPA's failure to set any minimum limits on OB/OD pollutants is flatly inconsistent with its core statutory duty to establish requirements necessary to protect human health and the environment, and is arbitrary and capricious.

### ***c. Monitoring, Sampling, and Reporting***

As EPA acknowledges, monitoring is crucial for the protection of human health and the environment.<sup>164</sup> But once again, its proposal lacks clear and specific minimum monitoring requirements for soil, sediment, surface water, stormwater, groundwater, and air. Instead, EPA proposes general requirements and relies primarily on facilities to come up with their own plans for meeting them. EPA seems motivated to follow this discretionary approach in order to avoid potential burdens on facilities and permitting agencies. However, EPA does not explain how clearer, more prescriptive rules would be any more burdensome than requiring facilities and permitting authorities to design and enforce plans on a case-by-case basis. In any event, such considerations do not trump the need to promulgate comprehensive minimum requirements to protect human health and the environment.

At a bare minimum, EPA's rules must include specific monitoring requirements that ensure recurring state-of-the-art monitoring and sampling for all media and various toxic constituents that are related to OB/OD operations, including energetics, heavy metals, PFAS chemicals, PCBs, and dioxins/furans.<sup>165</sup> For air monitoring, in particular, EPA must require adherence to the Federal Reference Methods or, at a minimum, Federal Equivalent Methods for all such pollutants. EPA's rules must also require the use of multiple and moveable monitors to address the potential unpredictability of wind patterns and ensure the monitoring is continuously representative of the plumes resulting from the OB/OD operations. Given the unique, uncontrolled nature of OB/OD, the monitoring requirements must include use of aerial systems (such as drones) that collect air emissions data, which EPA notes have the advantage of being able to move into the plume and maintain position.<sup>166</sup> Moreover, the facilities must be required to, as part of their monitoring plans, demonstrate that the location of the monitors is indeed reflective of the maximum OB/OD

---

<sup>164</sup> Proposed Rule, 89 Fed. Reg. at 19,981.

<sup>165</sup> See *supra* § III.a.

<sup>166</sup> Proposed Rule, 89 Fed. Reg. at 19,964.

pollution. At a minimum, the rule should require screening dispersion modeling to aid the facility in determining where the monitors must be located to detect the maximum pollution.

EPA's rule must establish specific minimum action levels for each of the hazardous pollutants associated with OB/OD—levels that, if and when exceeded, would require facilities to immediately cease or curtail their OB/OD operations and initiate comprehensive corrective clean up actions. It is arbitrary and inconsistent with EPA's statutory duty to leave facilities to establish their own action levels without providing minimum baseline regulatory requirements necessary to protect human health and the environment.

Further, it is also crucial that results of all monitoring and sampling are fully accessible to the public. As discussed further below, in order to advance EPA's stated commitment to public participation and satisfy associated requirements, EPA should create a national, user-friendly database (or provide clear requirements for state and territorial permitting authorities to do so) for this, and other, important information concerning all OB/OD facilities and their operations.<sup>167</sup> Moreover, any proposed changes to a monitoring plan are changes to the facility's permit, and any changes that impact the substance, type, scope, or frequency of monitoring to be conducted must be subject to full public notice and comment processes.

Additional minimum reporting requirements are needed to protect human health and the environment, including requirements for facilities to: notify the public before each OB/OD event so that members of affected communities may take action to lessen their exposures; document the details of each OB/OD event, including information about the specific waste streams and amounts that were burned, the location, photographs of the OB/OD event, and any actions taken by the facility to limit environmental contamination and any resulting releases; and make monitoring data immediately available.

In no circumstance can a facility be allowed, as EPA proposes, to evade monitoring requirements simply by making an undefined demonstration that monitoring "is not necessary to protect human health and the environment."<sup>168</sup> This allowance, which incentivize facilities to mask their true emissions, creates a dangerous loophole in EPA's proposal that contravenes RCRA's core requirement to protect human health and the environment and is entirely illogical and unsupported. Indeed, monitoring is fundamentally essential to validate any assumption that every OB/OD event is conducted in a protective manner.<sup>169</sup>

#### *d. Closure and Post-closure*

EPA must promulgate strengthened standards and requirements for closure and post-closure to ensure that OB/OD facilities are promptly and comprehensively cleaned up after OB/OD operations cease. EPA is aware that closure of OB/OD sites has been a failure, and, given the

---

<sup>167</sup> See *infra* § IV.b.ii.5.

<sup>168</sup> Proposed Rule, 89 Fed. Reg. at 20,017.

<sup>169</sup> See, e.g., 42 U.S.C. § 6924(a)(2) (Standards for hazardous wastes treatment, storage, and disposal facilities "shall include, but need not be limited to, requirements respecting . . . satisfactory reporting, monitoring, and inspection . . .").

extensive contamination associated with these sites, that failure is unsurprising.<sup>170</sup> Clearly, the existing closure requirements upon which EPA continues to rely are inadequate for OB/OD and must be significantly strengthened to protect human health and the environment.

The failures with closure underscore the need to end OB/OD and protect human health and the environment and, at the very least, to abandon approaches—like those proposed—that leave discretion to facilities to plan and execute clean ups of contaminated sites and seek delay after delay. The longer facilities delay completion of closure activities, the longer that contamination is left in place, posing continuing threats to communities and the environment. Instead, EPA must provide for minimum, clear, and prescriptive closure and post-closure requirements tailored to OB/OD. Such requirements must effectively address identified issues at unsuccessful closure sites, kick-out, and residuals, and they must ensure comprehensive clean-up of the type and extent of contamination associated with OB/OD operations. These requirements must apply at all times to ensure clean-up of all OB/OD operations, including in routine, temporary, and emergency situations. As discussed further below, there is no justification for excusing limited or emergency OB/OD operations from such requirements to clean up the messes they leave behind.

EPA's proposal to require compliance with the landfill standards at 40 C.F.R. § 264.310 does not solve this significant problem.<sup>171</sup> Far from ensuring clean-up of contaminated sites, it effectively allows facilities to give up clean-up efforts and bury the contamination, perpetuating risks to those on-site and in surrounding communities indefinitely. Treating OB/OD sites as hazardous waste landfills cannot be an excuse for evading proper and necessary clean up and closure. Rather, it is a last resort after facilities have exhausted specific, tailored requirements that ensure elimination of all contamination—requirements that are much-needed here but that EPA has yet to promulgate.

#### *e. Minimum Distance Requirements*

EPA acknowledges that the distance requirements in the existing regulation are outdated, unsupported, and may not be protective of human health and the environment.<sup>172</sup> The agency explains these requirements were developed by DoD to address the fact that OB/OD may produce “debris” and “fragments”—not to address the dispersion and impacts of resulting pollution.<sup>173</sup> EPA must fix this significant unlawful and arbitrary flaw in the regulation.

Because, by definition, OB/OD releases uncontrolled pollution into the open environment, there is no distance requirement that can ensure protection of human health and the environment. Nonetheless, as EPA proposes to allow the practice to continue, it must at least revise the minimum distance requirements to account for not only the risk of flying debris and fragments, but also to protect human health and the environment against pollution risks. In doing so, EPA must consider various factors, including the kinds of hazardous wastes that are eligible for OB/OD (which must be, as discussed, at most a far narrower set of wastes than the proposal allows), the pollutants

---

<sup>170</sup> See Proposed Rule, 89 Fed. Reg. at 19,965; *supra* § III.b.

<sup>171</sup> Proposed Rule, 89 Fed. Reg. at 19,982.

<sup>172</sup> *Id.* at 19,987.

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

associated with OB/OD of those wastes, and how far those pollutants might travel beyond the site into surrounding communities and the environment. Certain harmful pollutants associated with OB/OD, like particulate matter, are known to travel long distances.<sup>174</sup> EPA must also consider risks to potential receptors of pollutants from OB/OD when setting minimum distances, including residential communities, sensitive populations (such as children and the elderly), and ecological and cultural resources. It is arbitrary and capricious for EPA to consider only flying debris and fragments and ignore the pollution risks to communities and the environment when setting minimum distances.

### *f. Emergency Provisions*

EPA proposes new minimum reporting requirements and clarifications for explosives or munitions emergency responses that provide necessary safeguards under the emergency provisions. In addition to those revisions, EPA must address deficiencies that are unsupported and fail to protect human health and the environment during and after responses to hazardous waste explosives, in contravention of RCRA.<sup>175</sup>

The emergency provisions present potential for abuse by facilities that claim emergencies even when they could reasonably anticipate and plan for their response needs and meet RCRA permit requirements without endangering response specialists or the public. EPA must ensure that use of the emergency provisions is prohibited in such situations and prevent facilities from improperly claiming an emergency for OB/OD treatment on an ongoing/routine basis and where safe alternatives are in fact available.<sup>176</sup> For example, EPA acknowledges there are many former training ranges with significant amounts of buried munitions and unexploded ordnance (“UXO”) that are known to exist but have yet to be addressed, where facilities could predetermine response needs based on “knowledge of the area and use” or “a geophysical investigation.”<sup>177</sup> There are other possible scenarios that can be planned for, including those where facilities can anticipate the kinds of wastes they will encounter during their responses based on experience (*e.g.*, military treatment of UXO found off-site<sup>178</sup> and responses to illegal fireworks/pyrotechnics) and where an on-site alternative may become unavailable (*e.g.*, during inspection or maintenance). These cases—where there is time and information allowing a facility to anticipate and plan ahead for a safe response action—are not emergencies. They are situations that can, and must be, accounted for in a regular

---

<sup>174</sup> *Health and Environmental Effects of Particulate Matter (PM)*, EPA, <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm> (last updated Aug. 23, 2023) (Attachment 68); *see also* EPA Region 3 (prepared by Tetra Tech), *Draft Final OB/OD Permitting Guidelines*, *supra* note 13, at 2-15 (attach. 4).

<sup>175</sup> EPA must ensure that deficiencies are addressed in the context of RCRA emergency responses and CERCLA clean-ups subject to RCRA requirements.

<sup>176</sup> *See, e.g.*, Proposed Rule, 89 Fed. Reg. at 19,990 (discussing examples of emergency permits used for wastes that are continuously found or generated at the same location and treated on an ongoing basis).

<sup>177</sup> *Id.* at 19,991.

<sup>178</sup> The Andersen Air Force Base in Guam is one such facility that routinely open detonates UXO found on the island. *See* Guam Legislature Media, *Roundtable Hearing – Senator Sabina F. Perez*, YouTube at 1:15:07 (Feb. 16, 2023), <https://www.youtube.com/watch?v=LjNGLTvJfX0> (reporting that Andersen Air Force Base treated 900 pounds of UXO under emergency provisions and 470 pounds under a RCRA permit in 2021, and 400 pounds of UXO under emergency provisions and 397 pounds under a RCRA permit in 2022).

RCRA permit requiring compliance with the full suite of requirements necessary to protect human health and the environment, including completion of a comprehensive alternatives evaluation.<sup>179</sup>

At a bare minimum, EPA must require facilities to complete a comprehensive alternatives evaluation before obtaining emergency permits for these predictable responses. There is no reason that facilities that routinely respond to specific kinds of situations involving particular hazardous waste explosives cannot complete a comprehensive alternatives evaluation for those waste streams well before an emergency permit is needed. As noted, these facilities have both time and information to fully evaluate alternatives to OB/OD, including safe, fully regulated off-site alternative treatment options. For the same reason, OB/OD should not be allowed to commence before an emergency permit is granted and it is determined that there are no available alternatives.

Critically, the emergency provisions must be revised to require, at a minimum, protections, such as those for closure, that would ensure complete clean-up of any resulting contamination after the emergency is resolved. These requirements would not delay emergency response times or prolong immediate or imminent threats. They are especially crucial given the known challenges with cleaning up even fully permitted OB/OD sites and must be mandatory in all instances. EPA's failure to consider, let alone require, compliance with any such requirements that apply to protect nearby communities and the environment against pollution threats *after* the emergency treatment is complete is unlawful and arbitrary.

Moreover, notices of emergencies responses, whether permitted or not, must be made immediately accessible to the public through public alerts (*e.g.*, via email, television, radio, and/or social media) and posting on the permitting authorities' websites before the emergency action is taken. Given the instantaneous nature of certain methods of alerting the public in today's world, this requirement would not delay even an emergency response to an immediate threat. It would, however, provide the public meaningful notice of emergency activities that might endanger their health and environment and allow them to take actions to guard against those impacts. Relatedly, all documents and records concerning emergency responses must be made available to the public (accessible through an online database as discussed above) within at most 5 days of the emergency action and on an ongoing basis. Such a requirement is necessary to provide oversight and assurance that the emergency provisions are used only in true emergency situations where there are no safer options, rather than as loopholes to evade otherwise necessary requirements.

To further ensure against abuse and protect human health and the environment, EPA must be involved in determining whether any response qualifies for the emergency provisions. For example, EPA should establish a 24-hour hotline, staffed by expert EPA contacts, that is available to consult on emergencies as they arise. For immediate threats, this hotline would be a vital tool for quickly confirming whether there is an immediate threat warranting exemption from RCRA requirements. It

---

<sup>179</sup> Likewise, the existing provisions for temporary authorizations under 40 C.F.R. § 270.42(e) cannot be used to allow waste to be treated by OB/OD where an alternative technology is temporarily inoperable because facilities should be able to plan for these situations and have alternative methods of waste management available (*e.g.* temporary storage). Proposed Rule, 89 Fed. Reg. at 19,972.

would help ensure that the human health and environmental risks associated with using OB/OD to respond to an emergency are considered and mitigated to the greatest extent possible and that alternatives known to EPA are at least considered for immediate use. For emergency permits, mandatory EPA consultation is crucial to ensure the existence of a true imminent and substantial endangerment warranting use of the emergency permitting provisions, and that known safe alternatives are not available.

### **5. EPA Must Ensure Opportunities for Meaningful Public Engagement.**

Public participation in OB/OD decision making is critical to ensure compliance with the minimum requirements and to protect human health and the environment. RCRA specifies that public participation “shall be provided for, encouraged, and assisted by the Administrator and the States.”<sup>180</sup> EPA is to “assure that government action is as responsive as possible to public concerns,” “encourage public involvement in implementing environmental laws,” and “use all feasible means to create opportunities for public participation, and to stimulate and support participation,” among other things.<sup>181</sup> To these ends, EPA must ensure that the public has a meaningful opportunity to participate in all aspects of the OB/OD permitting process. This includes, but is not limited to, requirements ensuring full public notice and comment opportunities concerning: recurring alternatives evaluations; changes to sampling, monitoring, closure and post-closure plans; and decisions concerning implementation and operation of alternatives.

To ensure full and effective public notice, EPA must establish additional minimum public notice requirements. As a start, EPA should be guided by the National Environmental Justice Advisory Council’s recommendation: “[t]o ensure meaningful public participation, the public notice and outreach process must include direct communication in appropriate languages through telephone calls and mailings to [Environmental Justice] and [T]ribal communities, press releases, radio announcements, electronic and regular mail, website postings and the posting of signs.”<sup>182</sup> Website postings should be on a devoted webpage on the permitting authority’s and EPA’s websites, as well as all social media platforms utilized by the permitting authority and EPA. Notice by direct mail should be to all schools, daycares, elder care facilities, places of worship, and residents living within at least two miles of the hazardous waste facility at issue. For sites that affect indigenous peoples, EPA must require timely and prior consultation with Tribal and indigenous group leaders to discuss sacred sites, cultural significance, and other concerns. EPA must also actively consult with communities early on in its process to determine what additional means of notification are necessary to inform and meaningfully engage affected communities.<sup>183</sup>

---

<sup>180</sup> 42 U.S.C. § 6974(b)(1).

<sup>181</sup> 40 C.F.R. § 25.3(c)(3), (4), (7).

<sup>182</sup> Modernizing Public Notice for RCRA Hazardous Waste Permitting and Other Actions, 86 Fed. Reg. 71,482, 71,494 (Dec. 16, 2021).

<sup>183</sup> EPA acknowledges the importance of “tailor[ing] public participation approaches to reach out effectively to the specific populations in the community.” Proposed Rule, 89 Fed. Reg. at 19,981.



Further, transparency is key to the public's ability to understand and meaningfully engage in OB/OD decisions. The public must have access to information that concerns public health and the environment, including, for example, detailed physical and chemical waste analysis of the waste streams a facility seeks to open burn and/or detonate. EPA cannot allow facilities and permitting authorities to claim broad cloaks of confidentiality on such crucial information. To enhance public engagement consistent with RCRA's directives, EPA should establish or require permitting authorities (with clear minimum requirements) to establish a user-friendly electronic database containing all information and records (including but not limited to permit applications, permits, waste analyses and characterizations, alternatives evaluations, reports, monitoring and sampling data, and inspection-related information) pertaining to OB/OD operations.

## 6. EPA Cannot Allow a “De Minimis Exemption.”

EPA's proposal includes a new unlawful and arbitrary “de minimis” exemption for “generators generating up to 15,000 lbs NEW or less of waste explosives from the requirement to conduct a comprehensive alternative technology evaluation, provided they make a de minimis demonstration.”<sup>184</sup> The de minimis demonstration, which consists of various steps, is to be made by the owner/operator “to the satisfaction of the Director.”<sup>185</sup> In effect, this additional exemption within the exception is a new loophole that introduces a significant risk of abuse, non-compliance, and danger to human health and the environment whereby facilities can engage in OB/OD even where there are safe alternatives.

EPA claims that the de minimis exemption would be for OB/OD operations that “produce immaterial or negligible contamination or potential for exposure.”<sup>186</sup> RCRA does not allow for any deviation from the core, strict standard to protect human health and the environment, and the cases cited by EPA do not support the application of a de minimis standard here. OB/OD is a practice that, by its very definition, endangers human health and the environment. Given the inherently toxic nature of hazardous wastes that are open burned or open detonated, including heavy metals (such as lead) and PFAS chemicals, even small amounts of contamination and low exposures can pose serious threats. Thus, there is no amount or type of hazardous waste that should be exempt from the comprehensive alternatives evaluation requirement, which is central to EPA's exception for continued OB/OD.

Indeed, EPA's proposal in no way ensures that the effects of its de minimis exemption would in fact be “trivial.”<sup>187</sup> The proposal would broadly allow *any* generator generating up to 15,000 lbs net explosive weight (“NEW”) of *any* kind of unprohibited explosive hazardous waste to seek and use the de minimis exemption. EPA has not shown that OB/OD of this, or any, amount of hazardous waste will “contribute negligible contamination and potential for exposure.”<sup>188</sup> EPA does not even

---

<sup>184</sup> Proposed Rule, 89 Fed. Reg. at 19,957.

<sup>185</sup> *Id.*

<sup>186</sup> *Id.* at 19,958.

<sup>187</sup> *Id.*

<sup>188</sup> *Id.* at 20,013.

define what it means by “immaterial or negligible contamination” or explain why such an exemption is warranted at all. To the contrary, EPA acknowledges the “environmental and public health risks associated with even small quantities treated by OB/OD” and identifies (but does not prohibit) wastes and situations for which the exception to the general ban on OB/OD would not be appropriate due to the risks posed.<sup>189</sup>

Far from supporting the validity of the proposed de minimis exemption, EPA proposes a multi-step process that relies on facilities and permitting authorities to make the de minimis determination on a case-by-case basis. Once again, EPA gives unjustified and open-ended discretion to the permitting authorities and OB/OD facilities (the majority of which have failed to follow even the relatively straightforward existing requirements and limitations for OB/OD operations) to implement the exemption and baselessly assumes doing so will pose only “trivial” threats. In fact, EPA’s proposed exemption creates a dangerous incentive and loophole for facilities to evade full consideration and implementation of alternative technologies and continue OB/OD.

The proposed de minimis exemption counters EPA’s own rationale for the OB/OD exception, which is the notion that OB/OD should only be allowed where there are no safe alternatives. Indeed, under the proposal, facilities would not need to conduct the detailed evaluations EPA believes is necessary to make that determination, and instead would only need to “demonstrate” that there are no existing on-site alternatives, mobile treatment units (“MTU”), or safe available offsite alternatives.<sup>190</sup> This limited determination is no substitute for the core alternatives requirements, and improperly allows facilities to open burn and open detonate hazardous wastes even if there are safe and available alternatives that can be implemented on-site. EPA’s approach is not only inconsistent with its own findings and efforts to ensure OB/OD is only utilized where there are *no* alternatives, it improperly prioritizes costs to the facility—a factor that cannot be considered in establishing these hazardous waste rules—associated with building safe and available onsite alternatives over EPA’s primary purpose of protecting human health and the environment.

Moreover, EPA’s proposed de minimis exemption impairs public participation by allowing facilities to assert claims about the availability of certain alternatives and the potential risks of “de minimis” OB/OD without providing specific and comprehensive requirements detailing how those claims are to be made and assessed. Even if facilities provide these demonstrations during the permitting process (which would not be the case for interim status facilities) in accordance with the proposed requirements, the public will lack detailed and full information required for an alternatives evaluation and be strained to challenge the findings given the broad discretion left to the owners/operators and permitting authorities.

EPA’s proposed de minimis exemption is thus unlawful and arbitrary and must be abandoned.

---

<sup>189</sup> *Id.* at 19,958.

<sup>190</sup> *Id.* at 19,959.

## **7. EPA Cannot Allow Delayed Closure for OB/OD Units.**

EPA's proposal to allow OB/OD facilities to further and indefinitely delay closure is another deeply problematic exception that lacks support and defies RCRA.<sup>191</sup> As discussed, EPA is already aware of the serious issues, including extreme delays and extensive and expensive contamination, associated with closure of OB/OD sites under the existing regulations. EPA's proposal to authorize even more delays and excuses for cleaning up these sites is inexplicable, arbitrary, and incongruous with RCRA's mandate to protect human health and the environment.

In effect, EPA's proposal would allow facilities to avoid closure and clean-up of contamination resulting from their OB/OD operations simply because they, or a nearby site, will continue contaminating the area with other operations.<sup>192</sup> EPA's suggestion that it is acceptable for communities to suffer from OB/OD contamination indefinitely, simply because they will continue to face pollution, is shocking and inapposite of RCRA. The fact that the site may continue to be polluted by other operations does not excuse its obligation to promptly and comprehensively clean up contamination from OB/OD. Whether it may be "impractical" for a facility to close OB/OD sites while it or others continue to harm the environment and nearby communities is of no relevance to the fundamental requirement to protect human health and the environment.<sup>193</sup> EPA's proposal threatens a new loophole that will only exacerbate existing problems with closure of OB/OD sites and prolong, and even worsen, the threats to communities and the environment. EPA must abandon this arbitrary and unlawful proposal and, as discussed above, strengthen the existing closure and post-closure requirements to ensure prompt and comprehensive clean-up of OB/OD sites.

## **8. EPA Cannot Allow Continued OB/OD at Interim Status Sites.**

EPA cannot continue to allow interim status facilities to engage in OB/OD. These facilities are unpermitted, "operating without the protections and controls that a permit provides[.]" including those that are required in this rulemaking.<sup>194</sup> As such, these facilities evade oversight and accountability. Interim status facilities were not intended to exist indefinitely, decades after the hazardous waste program was established.<sup>195</sup> Allowing these facilities to continue to engage in OB/OD without complete permits, subject to public engagement, is especially egregious and in contravention of RCRA's mandate to protect human health and the environment, as well as EPA's assumptions that facilities will satisfy the proposed requirements. Indeed, because interim status sites lack permits with requirements necessary to protect human health and the environment, there can be no assurance that these facilities' operations comply with the law. It also defies RCRA's public participation directives by leaving the public in the dark in terms of knowing what these facilities are doing and having a comprehensive understanding of the potential threats they may face as a result,

---

<sup>191</sup> *Id.* at 19,986.

<sup>192</sup> *Id.*

<sup>193</sup> *Id.*

<sup>194</sup> *Id.* at 19,973.

<sup>195</sup> *See* 42 U.S.C. § 6925(e) (authorizing certain facilities to operate in "interim status" only until a decision on a permit application has been made).

as well as by denying key opportunities for engagement provided by permitting requirements. Allowing OB/OD to continue at interim status facilities is unlawful and arbitrary.

**V. EPA’s Proposal Concerning Approaches to Permitting Thermal Treatment Units is Inconsistent with RCRA and the Clean Air Act, and Arbitrary and Capricious.**

EPA recognizes that “this proposed rule is anticipated to increase the use of alternative treatment technologies, [] especially a variety of thermal units . . . .”<sup>196</sup> EPA thus has a critical opportunity and responsibility to ensure that these alternative technologies are regulated in a manner that avoids perpetuating the toxic threats that have long plagued communities and protects human health and the environment. Instead of rising to the moment and considering this important issue in separate dedicated rulemaking, EPA inexplicably opens the door here to classifying certain thermal treatment units as “miscellaneous units”<sup>197</sup>—an action that would effectively and improperly deregulate various technologies that meet the longstanding legal definition of “hazardous waste incinerator” and present new toxic threats to communities and the environment.

Specifically, although EPA never mentioned during its stakeholder meetings that it would do so, EPA now solicits comments on whether it should develop definitions for thermal treatment units like contained burn chambers, static detonation chambers, controlled detonation chambers, explosive destruction systems, and detonation of ammunition in a vacuum integrated chamber (“DAVINCH”).<sup>198</sup> To much concern, EPA states that, if it were to do this, it “would not define them as incinerators” but rather as miscellaneous units on the basis that “they do not use a controlled flame within the treatment chamber” and instead use an electronic ignition system or heat applied externally to the chamber to initiate treatment.<sup>199</sup> As explained below, these statements are not supported by the existing regulations concerning hazardous waste incinerators, are inconsistent with EPA’s prior interpretations, and contravene law and logic.

**a. EPA’s New Statements Concerning the Regulatory Definition of “Hazardous Waste Incinerator” are Arbitrary and Capricious.**

EPA’s new statements concerning the regulatory definition of “hazardous waste incinerator” are an unsupported and unexplained reversal of the existing definition and EPA’s prior statements and, thus, are arbitrary and capricious. The regulatory definition of “hazardous waste incinerator” does not require the hazardous waste to be ignited directly by a controlled flame inside the unit. The regulation states:

Hazardous waste incinerator means a device defined as an incinerator in § 260.10 of this chapter and that burns hazardous waste at any time. For purposes of this subpart,

---

<sup>196</sup> Proposed Rule, 89 Fed. Reg. at 19,979.

<sup>197</sup> *Id.*

<sup>198</sup> *Id.* at 19,977.

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

the hazardous waste incinerator includes all associated firing systems and air pollution control devices, as well as the combustion chamber equipment.<sup>200</sup>

In turn, section 260.10 defines “incinerator” to mean “any enclosed device that . . . [u]ses controlled flame combustion and neither meets the criteria for classification as a boiler, sludge dryer, or carbon regeneration unit, nor is listed as an industrial furnace . . . .”<sup>201</sup> A device therefore need only be enclosed and burn hazardous wastes using controlled flame combustion to be a “hazardous waste incinerator.” Nowhere does the regulatory text require the device to directly apply heat inside the combustion chamber via a controlled flame to combust the hazardous waste, as EPA now claims. EPA’s new statements regarding the regulatory definition of “hazardous waste incinerator” are thus not supported by the regulatory text.

EPA also has previously clarified that “[c]ontrolled flame combustion refers to a steady-state, or near steady-state, process wherein fuel and/or oxidizer feed rates are controlled.”<sup>202</sup> Nothing in this explanation suggests that “controlled flame combustion” refers only to using a controlled flame burner inside the treatment chamber to ignite the hazardous waste, rather than to the controlled combustion of the hazardous waste itself once ignited. To the contrary, EPA stated that “[a]n engineered burner is not necessarily needed in order for a combustion process to be considered controlled.”<sup>203</sup> A “controlled flame combustion” process can occur whether the waste is directly heated with a flame inside the chamber, electronically ignited, or indirectly heated by an external flame (or electrical heating).<sup>204</sup> EPA’s new statements that incinerators must use a controlled flame inside the treatment chamber to heat the waste are therefore inconsistent with its prior interpretations of “controlled flame combustion,” which are broad enough to include devices that ignite hazardous wastes using an electronic igniter or use a flame or electrical heating outside the chamber to supply the necessary heat for combustion of hazardous wastes.

To further illustrate EPA’s prior position that the term “hazardous waste incinerator” includes devices that use indirect heating, EPA has long acknowledged that fluidized bed oxidizers are hazardous waste incinerators that use “controlled flame combustion.” Such devices preheat a bed of sand using a burner, and once the sand is heated to the desired operating temperature, the burner is disengaged and hazardous waste is added.<sup>205</sup> The wastes combust when they come in contact and mix with the hot sand. EPA considers this a “specialized form of controlled flame combustion in which the flame is dispersed throughout a fluidized bed.”<sup>206</sup> This form of indirect heating operates much like devices that heat a treatment chamber using a flame on the outside, which brings the chamber to the desired operating temperature at which hazardous wastes inside the chamber will

---

<sup>200</sup> 40 C.F.R. § 63.1201.

<sup>201</sup> *Id.* § 260.10.

<sup>202</sup> EPA Off. of Solid Waste, Response to Questions from California Department of Toxic Substances Control, RO 14238 at 1 (1995), <https://rcrapublic.epa.gov/files/14238.pdf> (Attachment 69) [hereinafter EPA Response to DTSC].

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

<sup>204</sup> See Decl. of Dr. Ranajit Sahu, *supra* note 140, ¶¶ 5–12 (attach. 65).

<sup>205</sup> EPA Response to DTSC, *supra* note 202, at 2 (attach. 69); see also Decl. of Dr. Ranajit Sahu, *supra* note 140, ¶ 12 (attach. 65).

<sup>206</sup> EPA Response to DTSC, *supra* note 202, at 2 (attach. 69).

combust.<sup>207</sup> Accordingly, whether it is sand or the chamber itself that is heated to the desired operating temperature, the hazardous wastes treated in these types of devices go through a process of controlled flame combustion due to indirect heating.

EPA's new statements regarding the regulatory definition of "hazardous waste incinerator" are also arbitrary and capricious because EPA does not explain why it matters, for the hazardous waste incinerator standards to apply, that the hazardous waste is ignited using a controlled flame inside the treatment chamber. As explained, regardless of whether hazardous wastes are combusted via indirect heating, electronic ignition, or a directly applied flame, hazardous wastes are burning in a "controlled flame combustion" process and releasing the same types of hazardous air pollutants inside the treatment chamber.<sup>208</sup>

Additionally, as quickly as EPA materialized its new statements regarding the regulatory definition of "hazardous waste incinerator," it contradicts itself when discussing flash furnaces. Specifically, EPA states:

Because of the very small amount of explosives potentially present, EPA believes that application of subpart X standards is the appropriate choice for [flash furnaces] despite the use of a controlled flame in the treatment chamber, as subpart X allows for the development of permit conditions that are more fitting and implementable for this technology application.<sup>209</sup>

As explained, a controlled flame in the treatment chamber is not required under the current regulatory definition for "hazardous waste incinerator." Further, the amount of explosives present in a waste is irrelevant to whether the device uses "controlled flame combustion" and is therefore irrelevant to the classification of a flash furnace as an incinerator.<sup>210</sup> There is no exemption under the regulations governing hazardous waste incinerators based on the amount of explosives in the waste to be treated, and EPA cannot create one without conducting notice and comment rulemaking specifically for such an exemption. EPA's statements that flash furnaces should be regulated under Subpart X is thus contrary to law and arbitrary and capricious.<sup>211</sup>

---

<sup>207</sup> See Decl. of Dr. Ranajit Sahu, *supra* note 140, ¶ 12 (attach. 65).

<sup>208</sup> See *id.* ¶ 9.

<sup>209</sup> Proposed Rule, 89 Fed. Reg. at 19,978.

<sup>210</sup> See Decl. of Dr. Ranajit Sahu, *supra* note 140, ¶¶ 16–17 (attach. 65).

<sup>211</sup> As part of its discussion of certain thermal treatment units, EPA also notes that "a straight application of subpart O/CAA subpart EEE standards could make the facility's compliance complex and difficult because certain standards may not be practically applicable when a unit does not meet the definition of incinerator." Proposed Rule, 89 Fed. Reg. at 19,977. As explained, EPA's new interpretation of "hazardous waste incinerator" is contrary to law and arbitrary and capricious. To the extent it would "not be practically applicable" for any units that meet the current definition of "hazardous waste incinerator" to comply with the MACT EEE Standards, then those units simply would not be allowed to operate under RCRA and the CAA. It would not warrant less stringent regulation under Subpart X.

**b. EPA’s New Statements Concerning the Regulatory Definition of “Hazardous Waste Incinerator” Contravene RCRA and the Clean Air Act.**

The standards at 40 C.F.R. part 264, subpart O and 40 C.F.R., part 63, subpart EEE (“MACT EEE Standards”) are intended “to ensure that hazardous waste combustion is conducted in a manner adequately protective of human health and the environment,” pursuant to EPA’s obligations under RCRA and the Clean Air Act (“CAA”).<sup>212</sup> These standards for hazardous waste incinerators are thus the minimum necessary to protect human health and the environment. While Subpart X provides that permits for miscellaneous units must include Subpart O and MACT EEE Standards that are “appropriate for the unit being permitted[,]” designating these thermal treatment units as miscellaneous units would fail to guarantee the minimum hazardous waste incinerator standards and thus fail to protect human health and the environment, in violation of RCRA’s core mandate.<sup>213</sup> That permit writers have the authority to pick and choose which standards they view as “appropriate” does not alter the deregulatory nature of the enormous change EPA is contemplating. To make this change would mean allowing hazardous waste burning units that currently fall within the definition of “hazardous waste incinerator” to avoid meeting requirements EPA has already determined are the bare minimum necessary to protect human health and the environment.

Moreover, EPA’s new statements concerning the definition of “hazardous waste incinerator” would also have significant implications for CAA protections from major sources of hazardous air pollutants. Section 112 of the Clean Air Act requires EPA to establish national emissions standards for major sources of hazardous air pollutants (“NESHAP”).<sup>214</sup> EPA adopted the MACT EEE Standards to fulfill its obligations under Section 112.<sup>215</sup> But EPA’s new statements concerning the regulatory definition of “hazardous waste incinerator” threatens to create a loophole that would exclude some hazardous waste incinerators (*i.e.*, the thermal treatment units discussed) from the MACT EEE Standards, even though they do the same thing as other hazardous waste incinerators (burn hazardous waste) and release the same types of hazardous air pollutants. Further, no separate NESHAPs currently exist for these incinerators. The loophole therefore risks excluding thermal treatment units that would be major sources of hazardous air pollutants from complying with *any* NESHAPs, in direct violation of the CAA section 112 and creating a gap in protections for communities and the environment from significant amounts of toxic pollution.

**c. Designating the Thermal Treatment Units as Miscellaneous Units Creates Inconsistency and is Counter to this Administration’s Commitment to Environmental Justice.**

In addition, regulating these thermal treatment units under Subpart X would frustrate, not further, EPA’s purported goal of reducing permitting inconsistencies. Subpart X provides environmental

---

<sup>212</sup> NESHAPS: Final Standards for Hazardous Air Pollutants for Hazardous Waste Combustors, 64 Fed. Reg. 52,828, 52,832 (Sept. 30, 1999).

<sup>213</sup> 40 C.F.R. § 264.601.

<sup>214</sup> 42 U.S.C. § 7412(c).

<sup>215</sup> NESHAPS: Final Standards for Hazardous Air Pollutants for Hazardous Waste Combustors, 64 Fed. Reg. at 52,832.

performance standards that permitting authorities have discretion to set based on certain guidelines.<sup>216</sup> This discretion results in an inconsistent range of standards across permitting authorities for similar or the same types of units. As EPA itself acknowledged, some permitting authorities have taken a piecemeal approach of applying hazardous waste incinerator standards through Subpart X, whereas others have rightfully classified the thermal treatment units discussed as hazardous waste incinerators and consistently applied the full suite of Subpart O and MACT EEE Standards.<sup>217</sup> Properly classifying these units as hazardous waste incinerators would ensure uniformity across permitting authorities by requiring them all to comply with hazardous waste incinerator standards at a minimum. The inconsistency problem EPA describes thus lies with permitting authorities incorrectly classifying thermal treatment units as miscellaneous units instead of hazardous waste incinerators. Such a problem would be exacerbated, not fixed, by defining these units as miscellaneous units.

Designating the thermal treatment units discussed in this rulemaking as miscellaneous units would also run against this Administration's commitment to environmental justice. EPA acknowledges that OB/OD is an environmental justice issue impacting low-income communities, communities of color, and Tribes, and anticipates that this proposed rule will increase the use of thermal treatment units to replace OB/OD in those communities.<sup>218</sup> Designating these thermal treatment units as miscellaneous units would thus deprive environmental justice communities of the necessary protections they currently have under the MACT EEE Standards and subject them to toxic pollution.

## **VI. EPA Must Strengthen its Proposed Requirements for Mobile Treatment Units.**

It is incumbent upon EPA to ensure that its proposed new permitting scheme for mobile treatment units ("MTU"), if finalized, not only decreases the use of OB/OD as EPA expects but also provides necessary and required protections for human health and the environment from these sources without presenting new threats allowing facilities to evade otherwise mandatory requirements. Communities cannot be forced to trade one toxic risk for another, and necessary protections cannot be sacrificed for quick deployment. As proposed, the MTU permitting scheme has several serious flaws and presents a risky loophole from existing requirements. These deficiencies contravene RCRA and are arbitrary and capricious. The proposed scheme must be revised to ensure and strengthen protection of human health and the environment. At a minimum: EPA must require that MTU permits are protective of human health and the environment; EPA cannot exempt MTUs from otherwise mandatory requirements under 40 C.F.R. part 264, including those for hazardous waste incinerators; and EPA must provide additional guarantees for meaningful public participation in the MTU permitting process.

---

<sup>216</sup> See 40 C.F.R. § 264.601.

<sup>217</sup> Proposed Rule, 89 Fed. Reg. at 19,977.

<sup>218</sup> *Id.* at 20,010.



**a. EPA’s Proposed Regulation of MTUs as “Miscellaneous Units” Fails to Protect Human Health and the Environment and is Arbitrary and Capricious.**

EPA proposes to regulate all MTUs as “miscellaneous units” under RCRA Subpart X.<sup>219</sup> However, MTUs cannot not be governed by Subpart X if they would otherwise be subject to other part 264 standards. Specific design and operation standards currently exist under part 264 for different methods of managing hazardous waste and were adopted to protect human health and the environment from the particular risks associated with those categories.<sup>220</sup> This includes, for example, prescriptive standards for hazardous waste combustors, including incinerators, at 40 C.F.R. part 264, subpart O and 40 C.F.R. part 63, subpart EEE. Subpart X, on the other hand, which imposes environmental performance standards, was adopted to “close the gaps in the RCRA regulations and to cover unregulated hazardous waste management units,” deemed “miscellaneous units.”<sup>221</sup> As EPA itself has proclaimed, “Subpart X will no[t] supersede or replace any specific restriction on activities contained in another subpart of the regulations, nor provide a vehicle for escaping from these restrictions.”<sup>222</sup> EPA’s proposal to have Subpart X supersede all other part 264 standards (including Subpart O for incinerators) by regulating all MTUs under Subpart X would unlawfully and arbitrarily allow facilities to circumvent otherwise applicable mandatory requirements.

To illustrate, EPA anticipates that many MTUs will be “thermal treatment units” but claims that Subpart X would be appropriate, rather than regulation as a hazardous waste incinerator, “because it is unlikely that an MTU would utilize a controlled flame in the treatment chamber” and “in the event it would, EPA can still apply the incinerator standards via the subpart X standards.”<sup>223</sup> This reasoning is flawed, unlawful, and arbitrary. First, as discussed in detail above, a controlled flame in the treatment chamber, as EPA describes it, is not necessary to be considered a “hazardous waste incinerator.”<sup>224</sup> Thus, more MTUs are likely to meet the definition of hazardous waste incinerator than EPA anticipates and require compliance with the applicable Subpart O and MACT EEE Standards. Moreover, EPA cannot simply assume, as it does, that most MTUs will not meet the definition of hazardous waste incinerator to justify exempting all of them from the Subpart O and MACT EEE Standards. Indeed, even if some MTUs might not meet the definition (a showing that has not yet been made), there is no basis for EPA’s proposal to prospectively exempt all MTUs from the incinerator standards. By doing so, EPA would also exempt all future and current MTUs that EPA is not currently considering that would fall under the regulatory definition of “hazardous waste incinerator” and thus allow these units to evade critical pollution requirements, including

---

<sup>219</sup> *Id.* at 20,002.

<sup>220</sup> *See* 1980 Haz. Waste Standards, 45 Fed. Reg. at 33,156 (explaining EPA’s phased adoption of technical standards for different types of facilities in order to ensure they are protective of human health and the environment).

<sup>221</sup> Hazardous Waste Miscellaneous Units; Standard; Applicable to Owners and Operators, 52 Fed. Reg. 46,946, 46,947 (Dec. 10, 1987).

<sup>222</sup> Letter from EPA Off. of Solid Waste to Region VIII regarding Morton Thiokol Thermal Treatment Units, RO 13184 at 1–2 (May 18, 1988) (EPA-HQ-OLEM-2021-0397-0003).

<sup>223</sup> Proposed Rule, 89 Fed. Reg. at 20,002.

<sup>224</sup> *See supra* § V.a.

compliance with critical emissions limits designed and necessary to protect human health and the environment.

Further, that incinerator standards can be applied via Subpart X is not an adequate substitute for the Subpart O and MACT EEE Standards. As explained, Subpart X leaves discretion to permitting authorities to pick and choose which standards apply, thus failing to guarantee the full suite of hazardous waste incinerators standards—the minimum standards necessary to protect human health and the environment from incinerators.<sup>225</sup> Subpart X is deeply problematic as compared to the more specific requirements in part 264 as it presents opportunities for facilities to evade crucial minimum requirements and results in inconsistent regulation and protection for communities and the environment.

In addition, EPA fails to ensure proper protections from MTUs used in emergency situations under the RCRA emergency provisions,<sup>226</sup> which EPA says would supersede the proposed MTU permit requirements. Even in cases where the emergency provisions would apply, there is no reason that the MTU should not be required to comply with certain minimum standards that are necessary to protect human health and the environment and that the MTU should already be designed to meet, long before it is used. For instance, in the case of a hazardous waste incinerator MTU, the MTU must be designed to meet all MACT EEE emissions standards and operate accordingly, regardless of whether it is in response to an emergency. Nor is there any reason that MTUs should not be required to obtain financial assurance that would cover incidents wherever they operate before they are put into use, or to conduct closure and ensure complete clean up after the emergency is resolved. EPA's failure to require MTUs to meet such minimum requirements that would not interfere with emergency responses is unlawful and arbitrary.

#### **b. EPA Must Provide Additional Requirements to Ensure Meaningful Public Participation in the MTU Permitting Process.**

As discussed above, public participation is a core element of RCRA and integral to ensuring good governance and protection of communities and the environment. For hazardous waste incinerators, in particular, EPA has realized the need for enhanced public participation requirements.<sup>227</sup> EPA's mandate to provide for meaningful public participation does not stop when it comes to MTUs. EPA must establish robust minimum public participation requirements, including those that ensure that public notice concerning a MTU permitting process adequately reach and inform communities near OB/OD facilities, require robust and accessible reporting of MTU operations, allow for challenges to national conditional approvals, and provide for public participation in MTU permit modifications.

##### **i. Public Notice, Outreach, and Reporting**

At the national conditional approval stage, EPA must require all steps necessary to ensure that communities where an applicant is expected to seek a location-specific permit to operate its MTU

---

<sup>225</sup> NESHAPS: Final Standards for Hazardous Air Pollutants for Hazardous Waste Combustors, 64 Fed. Reg. at 52,832.

<sup>226</sup> 40 C.F.R. §§ 264.1(g)(8)(i)(D), 265.1(c)(11)(i)(D), 270.1(c)(3)(i)(D), 270.61.

<sup>227</sup> RCRA Expanded Public Participation, 60 Fed. Reg. 63,417 (Dec. 11, 1995); 40 C.F.R. § 270.62(b)(6).

are adequately notified of the application for a national conditional approval. EPA anticipates that applicants will already have such locational information at this stage, yet EPA only encourages, and does not require, applicants to notify communities. Anything short of a requirement is insufficient and would fail to ensure meaningful engagement by communities at this crucial stage.

EPA also states that it will maintain a list of interested entities and expects it would include environmental and community groups, Tribes, Federal and State regulators, and industry representatives. To provide for public participation as required by RCRA, such a list must be required by regulation to ensure that it will be created and maintained. Further, EPA must clearly provide for how this list will be developed and how interested entities can join it.

EPA must also go beyond publishing notice in local newspapers and broadcasting over radio stations and adopt the requirements discussed above in Part IV.b.ii.5 to notify the public of a permitting process. As noted, EPA has acknowledged the importance of tailoring public participation approaches to effectively reach specific populations, including by using translation interpretation services, providing information in multiple languages, partnering with community groups and leaders, and using non-traditional media outlets for outreach.<sup>228</sup> It is crucial for EPA to adopt additional public notice requirements and tailor public notice and outreach for national conditional approvals and location-specific permitting to effectively reach specific populations.

In addition to notices, EPA must require more robust, specific reporting requirements for all MTUs, including those that are used in emergency situations. For example, and at a minimum, all MTUs should be required to publicly report (for instance, on an accessible database discussed above) detailed information about their operations, including compliance with applicable requirements, any environmental releases, and clean-up activities.

## **ii. Appeals of National Conditional Approvals**

A right to administrative appeal and judicial review of national conditional approvals is necessary to ensure meaningful public participation. Communities near OB/OD facilities clearly have a strong interest in participating at the national conditional approval stage, where EPA notes key determinations about applicable standards and the bulk of the conditions that would later be integrated into a MTU's location-specific permit would be developed.<sup>229</sup> Yet EPA's proposal dilutes community voices and isolates them from this significant decision-making process. Providing communities only a chance to submit comments on a proposed national conditional approval without providing for a right to administrative appeal and judicial review at this stage, as EPA proposes, is not meaningful public participation, as it deprives communities of the opportunity to fully engage in, affect, and ensure EPA's decision is consistent with law. EPA's proposal to allow MTU applicants to challenge denials of national conditional approval applications without providing communities the same right to challenge approvals is also fundamentally unfair and unjustly

---

<sup>228</sup> Proposed Rule, 89 Fed. Reg. at 19,981.

<sup>229</sup> EPA said in this proposal that the "[a]gency would gain valuable experience and information from review of MTU permit applications that may affect future OB/OD or MTU rulemakings." Proposed Rule, 89 Fed. Reg. 20,008. Such logic also applies to future national conditional approvals and location-specific permitting.

prioritizes industry over community interests. Contrary to EPA's suggestion, a right to appeal and judicial review at the location-specific permitting stage only, after early decisions that form the foundation of the local permit have already been made, is not an adequate substitute for full engagement in this decision-making process at the first stage. EPA's proposal is thus inconsistent with RCRA's directives and arbitrary.<sup>230</sup>

### iii. MTU Permit Modifications

EPA's proposal to require only Class 1 permit modification procedures for all MTU permit modifications is also unlawful and arbitrary. Unlike Class 2 and 3 permit modification procedures, Class 1 procedures—which apply to only minor, administrative changes—do not provide the public an opportunity to comment on the modification.<sup>231</sup> EPA's proposal would thus shut the public out of commenting on significant modifications, such as changes in unit design and operation that typically fall under Class 2 and 3,<sup>232</sup> and could have serious impacts to the surrounding community and environment. EPA acknowledges as much but offers no rationale for changing the permit modification procedure for MTUs or assuming that the Class 1 procedure is appropriate for all changes. EPA states only that it would be at the agency's discretion to require more robust Class 2 or 3 permit modification procedures for significant changes. However, this discretionary and variable approach fails to achieve and, in fact, runs directly counter to EPA's mandate to provide meaningful public participation in implementing RCRA.<sup>233</sup>

## VII. Conclusion

As explained above, given the serious human health and environmental risks associated with OB/OD, which have been known for at least forty-four years, and the availability of safer alternatives for treating waste explosives, it is long overdue for EPA to ban OB/OD once and for all. At a bare minimum, if EPA does not close the exception for OB/OD despite the clear need to do so, EPA must promptly promulgate strengthened requirements to limit OB/OD and abandon loopholes in order to protect human health and the environment. Communities have suffered from the toxic threat of OB/OD that EPA has allowed to continue for far too long. EPA must act now.

Commenters appreciate EPA's time and consideration of these comments. We welcome the opportunity to provide any additional information that may be useful as EPA works to finalize critical improvements to the status quo. If you have any questions or would like additional information regarding these comments, please contact Thien Chau, Earthjustice, [tchau@earthjustice.org](mailto:tchau@earthjustice.org).

---

<sup>230</sup> Providing the right to challenge national conditional approvals would also further EPA's goal of efficient deployment of MTUs to reduce the use of OB/OD because it would allow fundamental issues to be resolved earlier in the process and allow challenges at the location-specific permitting stage to focus on site-specific considerations.

<sup>231</sup> See 40 C.F.R. § 270.42(a).

<sup>232</sup> See generally *id.* § 270.42(b), (c), app. I.

<sup>233</sup> See 42 U.S.C. § 6974(b)(1).