**Before the Environmental Protection Agency**
WASHINGTON, D.C. 20240

**In Re: Ban on Hydrofluoric Acid in Refineries**

*To the Administrator of the Environmental Protection Agency:*

**Petition for Rulemaking**

Timothy Whitehouse
Executive Director
Public Employees for Environmental Responsibility (PEER)
962 Wayne Ave, Suite 610
Silver Spring, MD 20910
Tele: 202-265-7337

August 7, 2019

## TABLE OF CONTENTS



## SUMMARY

This Petition, filed by Public Employees for Environmental Responsibility ("PEER"), requests that the Environmental Protection Agency ("EPA") promulgate regulations prohibiting the use of hydrofluoric acid in oil refineries. Specifically this petition seeks the following regulations.

(a) Oil refineries be prohibited from using hydrofluoric acid in their manufacturing processes.

(b) Oil refineries be required to phase out the use of hydrofluoric acid within two years.

Two federal environmental statutes, the Toxic Substances Control Act ("TSCA"), 15 U.S.C. § 2601(b)(3), and the Clean Air Act ("CAA"), 42 U.S.C. § 7412(r), regulate hydrofluoric acid and provide the statutory authority to issue a regulation prohibiting the use of hydrofluoric acid in oil refineries. Additionally, such regulations are necessary to ensure that the highly toxic substance is no longer used in oil refineries, given its inherently dangerous nature, the occurrence of "near miss" accidents, the availability of safer alternatives, and the potential for terrorist attacks targeting chemical plants.

Under TSCA, the EPA possesses the power to promulgate rules banning chemicals that pose an unreasonable risk to human health. The Administrator of the EPA may prohibit or otherwise restrict "the manufacture, processing, or distribution in commerce of such substance or mixture for (i) a particular use…" 15 U.S.C. § 2605(a)(2)(A). That power applies if the Administrator determines the "manufacture, processing, distribution in commerce, use, or disposal of a chemical substance…presents an unreasonable risk of injury to health or the environment." 15 U.S.C. § 2605(a). Therefore, the Administrator could ban the use of hydrofluoric acid in refineries if the Administrator found that its use in that context presented an unreasonable risk to health or the environment. The use of hydrofluoric acid presents such a risk.

Under the CAA, 42 U.S.C. § 7412(r)(1), known as the General Duty Clause, establishes an objective of the CAA to prevent accidental releases and minimize the consequences of such releases of hazardous air pollutants. 42 U.S.C. § 7412(r)(1); (3). Further, § 7412(r)(7)(A) provides that the Administrator is authorized to promulgate release prevention, detection, and correction requirements. Section 7412(r)(7) also provides that the Administrator "*shall* require the owner or operator" of the sources to create a risk management plan which includes a program

for preventing accidental releases of regulated substances, including safety precautions and maintenance, monitoring and employee training measures. 42 U.S.C. § 7412(r)(7)(B)(ii)(II) (emphasis added).

Hydrofluoric acid is considered "immediately dangerous to life or health" at 30 parts per million. National Institute of Health – Toxicology Data Network, *Hydrogen Fluoride* (last visited Jun. 24, 2019), *available at* http://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+hsdb:@term+@DOCNO+546. It can cause skin burns, deep tissue burns, and eye damage. Purvis, Meghan & Herman, Margaret, *Needless Risk: Oil Refineries and Hazard Reduction*, U.S. PIRG EDUC. FUND 8 (2005), *available at* https://uspirg.org/sites/pirg/files/reports/Needless_Risk_USPIRG.pdf. Moreover, if "inhaled, the acid can cause irritation of the nose, throat, and lungs, causing coughing and dyspnea, or shortness of breath." *Id.* Severe exposure can cause cyanosis and pulmonary edema, and even death. *Id.*; Soo Bin Park, *Alert over South Korea toxic leaks*, Nature (Feb. 6, 2013) http://www.nature.com/news/alert-over-south-korea-toxic-leaks-1.12369. Releases of hydrofluoric acid can create aerosol clouds containing lethal concentrations up to five miles from the release point. *Needless Risk: Oil Refineries and Hazard Reduction*, at 10.

Additionally, there have been a number of "near-miss" chemical accidents involving hydrofluoric acid. For example, on February 18, 2015, an explosion occurred at the ExxonMobil refinery in Torrance, CA, near the heart of downtown Los Angeles. The blast shook Torrance with the force of a 1.7 magnitude earthquake, which launched large projectiles weighing up to 40 tons on top of the scaffolding around two settler tanks, each containing hydrofluoric acid. *See* Jie Jenny Zou, *The ExxonMobil near-disaster you probably haven't heard of*, THE CENTER FOR

PUBLIC INTEGRITY (Feb. 10, 2017) https://publicintegrity.org/environment/the-exxonmobil-near-disaster-you-probably-havent-heard-of/.

Most recently, on June 21, 2019, Philadelphia Energy Solution refinery, the largest on the Eastern Seaboard, experienced an explosion in a butane tank near the refinery's HF storage area. Had HF been implicated, nearly 300,000 surrounding residents and workers would have been placed in jeopardy.

As of 2013, hydrofluoric acid was being used at over one-third of the 148 operating oil refineries. United Steelworkers, *A Risk Too Great, Hydrofluoric Acid in U.S. Refineries* 4 (2013), *available at* http://assets.usw.org/resources/hse/pdf/A-Risk-Too-Great.pdf. Of those one-third of refineries using the acid, 19 are located in or near eight major metropolitan areas - Philadelphia, Chicago, New Orleans, Texas City, Minneapolis, Salt Lake City, Canton, and Memphis - putting more than 22 million people at risk. *Id*. at C-1.

In a letter dated April 23, 2019, the U.S. Chemical Safety and Hazard Investigation Board asked EPA to use its existing authority to assess the risks of "catastrophic releases" of HF and consider ordering reliance upon "inherently safer" technologies.

In spite of the legal authority present to enact a ban on hydrofluoric acid paired with the dangerous propensities of the substance, the EPA has chosen to continue to allow its use in oil refineries.

## PETITION FOR RULEMAKING

Public Employees for Environmental Responsibility ("PEER"), pursuant to the Administrative Procedure Act ("APA") (5 U.S.C. § 553(e)), Toxic Substances Control Act ("TSCA") Section 21 (15 U.S.C. § 2020), and the Clean Air Act ("CAA") (42 U.S.C. § 7412(r)), hereby petitions EPA to promulgate regulations pursuant to TSCA section 6(a) as well as other provisions in the U.S. Code as applicable prohibiting oil refineries from using hydrofluoric acid in their manufacturing processes, and requiring oil refineries to phase out the use of hydrofluoric acid within two years.

*Standing to File.* PEER is an IRS 501(c)(3) non-profit organization incorporated under the laws of the District of Columbia and headquartered in Silver Spring, Maryland. Under the Administrative Procedure Act, any "interested person" has the right to petition an agency for the "issuance, amendment, or repeal of a rule." 5 U.S.C. § 553(e). A "person," under the APA, means an individual, partnership, corporation, association, or public or private organization. 5 U.S.C. § 551(2). Therefore, under the APA, PEER is a "person" with standing to petition the EPA Administrator to initiate a proceeding for the promulgation of a rule prohibiting the use of hydrofluoric acid in oil refineries.

Additionally, under TSCA, "any person may petition the Administrator to initiate a proceeding for the issuance…of a rule under section…2605[.]" 15 U.S.C. § 2620(a).

## ARGUMENTS IN SUPPORT OF PETITION

### I. CONGRESS AUTHORIZED THE ADMINISTRATOR OF THE EPA TO REGULATE THE USE OF HYDROFLUORIC ACID UNDER TSCA AND THE CAA

#### A. Hydrofluoric Acid is a "Chemical Substance" under TSCA

If a "chemical substance" is listed on the "TSCA Inventory," it is regulated under TSCA. U.S. ENV. PROT. AGENCY, *About the TSCA Chemical Substance Inventory* (last visited June 24, 2019), *available at* https://www.epa.gov/tsca-inventory/about-tsca-chemical-substance-inventory#chemicalsubstancedefined. Hydrofluoric acid is a "chemical substance" listed on the Inventory List and is therefore regulated under TSCA. U.S. ENV. PROT. AGENCY, *Substance Details – Hydrofluoric Acid* (last visited June 24, 2019), *available at* https://iaspub.epa.gov/sor_internet/registry/substreg/substance/details.do?displayPopup=displayPopup&id=87730.

### B. TSCA Provides Clear Statutory Authority for a Prohibition of the Use of Hydrofluoric Acid in Oil Refineries

Under TSCA, if the Administrator "determines" that the "manufacture, processing, distribution in commerce, use, or disposal of a chemical substance or mixture … presents an unreasonable risk of injury to health or the environment, the Administrator *shall by rule* … apply one or more of the following requirements to such substance…to the extent necessary so that the chemical substance … *no longer presents such a risk*." 15 U.S.C. § 2605(a)(emphasis added). Such requirements include "prohibiting or otherwise restricting" the distribution in commerce of the chemical for a particular use. *See* 15 U.S.C. § 2605(a)(1); s*ee also* 15 U.S.C. § 2605(a)(5) ("A requirement prohibiting or otherwise regulating any manner or method of commercial use of such substance or mixture.") Prohibiting the use of hydrofluoric acid in refineries would fulfill this requirement by eliminating the risk of injury to health or the environment stemming from a release of hydrofluoric acid into the environment following a chemical plant explosion or other accident.

### C. Hydrofluoric Acid is a "Hazardous Pollutant" under the CAA

Hydrofluoric acid is included as a hazardous air pollutant under the CAA, 42 U.S.C. § 7412(b)(1), and is therefore subject to regulation under the CAA.

### D. The CAA Provides Clear Statutory Authority for a Prohibition of the Use Of Hydrofluoric Acid In Oil Refineries

The CAA states at 42 § U.S.C. 7412(r)(1) that the "objective of the [42 § U.S.C. 7412(r)] regulations and programs…[is] to prevent the accidental release and to minimize the consequences of any such release of [hazardous air pollutants such as hydrofluoric acid]." *See also* 42 § U.S.C. 7412(r)(3). Further, § 7412(r)(1) provides that owners and operators storing hazardous air pollutants "have a general duty…to identify hazards which may result from such releases using appropriate hazard assessment techniques, to design and maintain a safe facility taking such steps as are necessary to prevent releases, and to minimize the consequences of accidental releases which do occur."

Prohibiting the use of hydrofluoric acid would implement these provisions of the CAA by creating safer facility conditions by eliminating the presence of a highly toxic substance and preventing its release.

In addition to § 7412(r)(1), § 7412(r)(7) also provides authority for EPA to promulgate regulations requiring a ban of hydrofluoric acid in oil refineries. § 7412(r)(7) states that "[i]n order to prevent accidental releases of regulated substances, the Administrator is authorized to promulgate release prevention, detection, and correction requirements which may include monitoring, record-keeping, training, vapor recovery, secondary containment, and other design, equipment, work practice, and operational requirements." 42 U.S.C. § 7412(r)(7)(A). Further, regulations promulgated under § 7412(r)(7) "may make distinctions between various…kinds of facilities…taking into consideration factors including…potency of substances."

Additionally, § 7412(r)(7)(B)(ii) provides that "owners or operators of stationary sources…be require[d] to prepare and implement a risk management plan to detect and prevent or minimize accidental releases of such substances from the stationary source." Such plans shall include "(II) a program for preventing accidental releases of regulated substances, including safety precautions and maintenance, monitoring and employee training measures to be used at the source." 42 U.S.C. § 7412(r)(7)(B)(ii)(II).

Prohibiting the use of hydrofluoric acid would fall within the authority of EPA to promulgate release prevention requirements. Preventing an accidental release of a regulated substance, hydrofluoric acid, would be achieved by a regulation requiring the use of a safer alternative. Additionally, a prohibition of use of a regulated substance at a specific type of facility, in this case oil refineries, may be promulgated pursuant to the Administrator's authority to make distinctions between types of facilities and the potency of substances used.

### E. EPA has Published CAA Guidance Documents and Public Statements Supporting its Authority to Ban Hydrofluoric Acid

In addition to the clear CAA statutory language, the EPA has published guidance regarding the implementation of the general duty clause of 42 U.S.C. § 7412(r)(1). U.S. ENV. PROT. AGENCY, *Guidance For Implementation Of The General Duty Clause Clean Air Act Section 112(r)(1)* EPA 550-B00-002 (2000), *available at* https://www.epa.gov/sites/production/files/2013-10/documents/gdcregionalguidance.pdf. The 2000 guidance document states the general duty clause "has been in effect and enforceable since November 15, 1990…[and] EPA believes that owners and operators who have [hazardous substances] must adhere, at a minimum, to recognized industry standards and practices (as well as any government regulations) in order to be in compliance with the general duty clause." *Id.*, at 2.

Additionally, in an August 1, 2013 letter from then-EPA Assistant Administrator Mathy Stanislaus to then-Congressman Mike Pompeo, Assistant Administrator Stanislaus responded to a question regarding whether the EPA "believes it has the authority to mandate the use/and or consideration of Inherently Safer Technologies under Section 112(r) of the Clean Air Act." U.S. Env. Prot. Agency (Office of Solid Waste and Emergency Response), Letter to Rep. Mike Pompeo, *U.S. EPA Response to May 28, 2013, Letter from Congressman Pompeo*, (Aug. 1, 2013), at 3, *available at* http://op.bna.com.s3.amazonaws.com/env.nsf/r%3FOpen%3drlen-9bfmrz. The Assistant Administrator responded that 42 U.S.C. § 7412(r)(7)(A) and (B) provide the EPA "with broad authority to promulgate regulations for chemical accident prevention…the Act allows the agency to consider factors such as facility design, equipment, and quantity of substances handled (and other factors)."

In sum, under TSCA, the Administrator is required to promulgate regulations for substances that present an unreasonable risk to human health or the environment so that they no longer present such risks, including, when necessary, prohibiting certain uses of the chemical. In addition, there is clear statutory language in the CAA, and in agency guidance documents and public statements by high-ranking EPA officials interpreting that authority, indicating that the Administrator may promulgate regulations to prevent accidental releases of hazardous air pollutants such as hydrofluoric acid, and also may promulgate regulations to further the goal of accident prevention and mandate the use of inherently safer technologies.

## II. THE USE OF HYDROFLUORIC ACID AT OIL REFINERIES PRESENTS AN UNREASONABLE RISK TO HUMAN HEALTH AND THE ENVIRONMENT

Based on CAA and TSCA authority, the EPA Administrator should promulgate a regulation prohibiting the use of hydrofluoric acid in oil refineries due to its inherently dangerous

propensities, the occurrence of "near miss" explosions at chemical plants, the availability of safer alternatives, and the potential for terrorist attacks targeting chemical plants.

### A. Hydrofluoric Acid is Inherently Dangerous

According to the National Institute for Occupational Safety and Health, hydrofluoric acid is one of the most corrosive of the inorganic acids. U.S. Department of Health, Education, and Welfare - National Institute for Occupational Safety and Health, *Criteria for a recommended standard…Occupational Exposure to Hydrogen Fluoride* 35 (1976), *available at* https://www.cdc.gov/niosh/docs/76-143/default.html. Hydrofluoric acid is also a "fast-acting acid" which can cause "deep severe burns" through inhalation and skin contact, resulting in permanent damage to the eyes, skin, nose, throat, respiratory system and bones. *A Risk Too Great, Hydrofluoric Acid in U.S. Refineries*, at 2.

When hydrofluoric acid is inhaled, the fluoride ion can enter the body, potentially interfering with calcium metabolism, which can cause death by cardiac arrest. *A Risk Too Great, Hydrofluoric Acid in U.S. Refineries*, at 2. When a person is exposed, pain and tissue damage does not manifest immediately and can be delayed for several hours, which can cause workers to delay seeking first aid - an oversight that can exacerbate the damage caused by the exposure. *Criteria for a recommended standard…Occupational Exposure to Hydrogen Fluoride*, at 39-40. Even exposure at a lethal level can often go unnoticed —as little as 25 square inches of exposure can be fatal. *A Risk Too Great, Hydrofluoric Acid in U.S. Refineries*, at A-1.

Hydrofluoric acid is also dangerous because it can form a dense toxic aerosol cloud. *Needless Risk: Oil Refineries and Hazard Reduction*, at 10. In 1986, an industry sponsored study

involved the release of hydrofluoric acid in a remote area. The study found that the toxic aerosol cloud contained lethal concentrations of hydrofluoric acid up to 5 miles from the release points. *Id*.; *see also* Blewitt, D.N., J.F. Yohn, R.P. Koopman, and T.C. Brown, *Conduct of anhydrous hydrofluoric acid spill experiments*, Int. Conf. on Vapor Cloud Modeling (1987).

Since then, industry has introduced so-called modified hydrofluoric acid, containing additives designed to reduce vaporization and limit the spread of the gas in an actual accident. *A Risk Too Great, Hydrofluoric Acid in U.S. Refineries*, at 3. However, it is unclear how successful the additives are in reducing cloud formation. U.S. Chemical Safety and Hazard Investigation Board, *ExxonMobil Torrance Refinery Investigation Report* No. 2015-02-I-CA (Feb. 18, 2015), *available at* https://www.csb.gov/file.aspx?DocumentId=6023. Additionally, even if additives prove to be successful in somewhat reducing the size of cloud formation, dangerous concentrations of hydrofluoric acid would still persist miles away from the refinery, thus still threatening thousands of lives. Harpole, George, *HF and MHF – Equivalent Ground hugging Fog Hazards* (2016), *available at* https://traablog.files.wordpress.com/2018/10/hfandmhfequivalentgroundhuggingfoghazards.pdf. For example, in September 2012, a hydrogen fluoride leak in South Korea resulted in the hydrogen fluoride dissolving into hydrofluoric acid and forming droplets in the air, ultimately killing five and injuring at least 18. *Alert over South Korea toxic leaks*.

In addition to its dangerous propensities, containing a release of hydrofluoric acid is difficult because the acid has a tendency to form a stable, toxic aerosol cloud at ground level when exposed to the elements. *Id.* at 10; *see also Conduct of anhydrous hydrofluoric acid spill experiments*.

Because hydrofluoric acid is so inherently dangerous, if an alternative exists that is much safer, then HF's continued use constitutes an unreasonable risk and threat to human health.

### B. The Potential for Industrial Accidents Presents too Great a Risk

In addition to hydrofluoric acid being an inherently dangerous chemical substance, its use at oil refineries presents an additional risk when chemical plants accidents occur. For example, on February 18, 2015, an explosion occurred at the ExxonMobil refinery in Torrance, CA, near the heart of downtown Los Angeles. The blast shook Torrance with the force of a 1.7 magnitude earthquake, which launched large projectiles weighing up to 40 tons on top of the scaffolding around two settler tanks, each containing hydrofluoric acid. *See* Jie Jenny Zou, *The ExxonMobil near-disaster you probably haven't heard of*, The Center for Public Integrity (Feb. 10, 2017), *available at* https://www.publicintegrity.org/2017/02/10/20684/exxonmobil-near-disaster-you-probably-havent-heard; *see also ExxonMobil Torrance Refinery Investigation Report*, at 23.

Further, many of the refineries using hydrofluoric acid are located in or near major metropolitan areas. A report published by United Steelworkers found that there are 19 refineries located in or near eight major metropolitan areas - Philadelphia, Chicago, New Orleans, Texas City, Minneapolis, Salt Lake City, Canton, and Memphis – putting more than 22 million people at risk in a "worst case" scenario type of chemical plant accident. *A Risk Too Great, Hydrofluoric Acid in U.S. Refineries*, at C-1. In Torrance, for example, the release of hydrofluoric acid from a chemical plant would put more than 250,000 residents within a 3.2 mile radius at risk of exposure. *Interactive: Communities at Risk from Oil Refineries that Use Toxic Chemical*, The Center for Public Integrity (May 19, 2014), *available at* https://publicintegrity.org/workers-rights/communities-at-risk-from-oil-refineries-that-use-toxic-chemical/. Another refinery with a history of accidents, most recently in 2012, is the Chevron

refinery in Richmond, California. *See* U.S. Chemical Safety and Hazard Investigation Board, *Chevron Refinery Fire* (last visited June 24, 2019), *available at* http://www.csb.gov/chevron-refinery-fire/. If a chemical release were to occur at this refinery, over 190,000 citizens would be affected within a five mile radius. Free Map Tools, (last visited Nov. 6, 2017), *available at* https://www.freemaptools.com/find-population.htm.

"Near miss" incidents like Torrance and Philadelphia display the potential for high-magnitude catastrophes affecting millions of people. This type of incident is unavoidable if hydrofluoric acid continues to be used at oil refineries.

### C. Hydrofluoric Acid Presents a Risk of Terrorism

In addition to the risk of an industrial accident, hydrofluoric acid also presents a potential target to terrorists. Security experts recognize that terrorists are aware of the chemical properties of hydrofluoric acid, and therefore may target petroleum facilities. *Needless Risk: Oil Refineries and Hazard Reduction*, at 11. In the U.S., security at chemical plants is inadequate. For example, a Pennsylvania reporter was able to walk or drive right up to more than 30 chemical facilities, coming in close proximity to tanks, pipes, and control rooms. *Id.* Additionally, national security experts have predicted that due to the relative difficulty in constructing a viable biological, chemical, or radiological weapon, poorly defended chemical facilities could be a more likely target for an attack. *Id.* at 12.

Therefore, prohibiting the use of hydrofluoric acid at oil refineries could either reduce the appeal to terrorists of targeting chemical plants because they contain hydrofluoric acid or mitigate the damage from such an attack.

## III. THERE ARE SAFER ALTERNATIVES TO HYDROFLUORIC ACID

In addition to the safety concerns associated with hydrofluoric acid presented above, a prohibition is warranted because there are alternative substances that can be readily substituted. These approaches are called "Inherently Safer Technologies." One alternative process is solid acid catalyst alkylation. Solid acid catalyst alkylation is safer than hydrofluoric acid because it is neither corrosive nor hazardous to people or the environment. *Needless Risk: Oil Refineries and Hazard Reduction*, at 16. Additional benefits include reduced waste disposal costs and hazards, a potential to incur lower capital costs, and reduced corrosion of the equipment, thus lowering maintenance costs. *Id*.

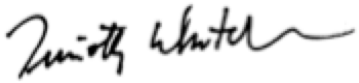
Finally, studies such as one conducted by an engineering company for the South Coast Air Quality Management District in Orange County, CA, concluded that solid acid alkylation "ha[s] shown enough commercial development to support the conversion of an existing HF Alkylation Unit." Norton Engineering, *Alkylation Technology Study FINAL REPORT* 38 (2016), *available at* http://www.aqmd.gov/docs/default-source/permitting/alkylation-technology-study-final-report.pdf.

Another process that is considered safer than hydrofluoric acid alkylation is ionic liquid alkylation. *A Risk Too Great*, at 8. This type of alkylation has been implemented sparingly across the country; however, one example is at a Chevron refinery in Salt Lake City, Utah where an existing 4,500-b/d hydrofluoric acid alkylation unit is being converted and planned for startup in 2020. Robert Brelsford, *Chevron's Salt Lake City refinery plans alkylation unit revamp*, Oil & Gas Journal (Oct. 4, 2016), *available at* http://www.ogj.com/articles/2016/10/chevron-s-salt-lake-city-refinery-plans-alkylation-unit-revamp.html.

## CONCLUSION

As discussed above, catastrophic consequences could result from a release of hydrofluoric acid into the atmosphere following a chemical accident or terrorist attack. The EPA Administrator is empowered to promulgate regulations prohibiting hydrofluoric acid in oil refineries under both TSCA and the CAA. The Administrator should prohibit the use of hydrofluoric acid in oil refineries due its highly toxic and hazardous properties, the occurrence of "near miss" accidents at oil refineries, the availability of safer alternatives, and the security threats associated with potential terror attacks targeting chemical plants.

For the reasons we have given, we petition that the EPA promulgate a rule prohibiting the use of hydrofluoric acid in oil refineries.



Timothy Whitehouse, Executive Director
Public Employees for Environmental Responsibility
962 Wayne Ave, Suite 610
Silver Spring, MD 20910
Tele: (202) 265-7337

## Appendix – Proposed Rule Text

U.S. Environmental Protection Agency ("EPA")
___ CFR Part ____
Ban of HF in Oil Refineries

AGENCY: Environmental Protection Agency

ACTION: Proposed Rule

---

We propose to promulgate the regulation set forth below:

Add to the appropriate section of ___ CFR part ____ language to read as follows:

(a) Oil refineries are prohibited from using hydrofluoric acid in their manufacturing processes.
(b) Oil refineries are required to phase out hydrofluoric acid within two years.