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April 26, 2018

Dr. William A. Burke, Chairman
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765
(via US mail and email to mwpatrick@aqmd.gov)

RE: Proposed Rule 1410 Regarding Hydrogen Fluoride Use by Refineries

Dear Chairman Burke,

The California Attorney General's Office has been monitoring the South Coast Air Quality Management District's (SCAQMD) rule development process for Proposed Rule 1410, which will regulate the use of hydrogen fluoride (HF) at refineries.[1] HF is a highly toxic chemical that when suddenly released can form a ground-hugging aerosol cloud. A sudden release of HF from a refinery could have catastrophic impacts on both refinery workers and tens of thousands of residents in nearby communities.

Only two refineries in California use HF in their alkylation processes and both are located in the South Coast basin: the Torrance Refinery in Torrance, owned by the Torrance Refining Company and the Valero Refinery in Wilmington. Both refineries are adjacent to disadvantaged communities that bear a disproportionate pollution burden and that have residents who are especially vulnerable to pollution. It is these communities that would suffer the most severe impacts from an HF release.

We agree that the use of HF by refineries presents an extraordinary hazard that requires robust and meaningful regulation. It is within SCAQMD's authority to adopt a rule to prevent releases of HF from refineries.[2] Accordingly, the Attorney General urges SCAQMD to craft

[1] This letter uses "HF" to denote both anhydrous hydrogen fluoride and modified hydrogen fluoride, except when discussing modified hydrogen fluoride specifically.

[2] *Ultramar, Inc. v. South Coast Air Quality Management Dist*., (1993) 17 Cal.App.4th 689, 706-12.

Proposed Rule 1410 in a manner that provides the neighboring environmental justice communities the maximum protection possible.[3]

**Environmental Justice Considerations**

Refineries emit numerous chemicals that add substantially to the pollution burden on the communities adjacent to them, commonly low-income communities and communities of color.[4] Both the Torrance and Valero Refineries are adjacent to disadvantaged communities that already bear a disproportionate pollution burden and have residents who are especially vulnerable to pollution. The Torrance Refinery is adjacent to the Harbor Gateway South neighborhood, which is among the most pollution-burdened communities in the state. CalEnviroScreen ranks the Harbor Gateway South neighborhood in the 95th percentile for combined pollution and vulnerability and the 99th percentile when considering the pollution burdens alone.[5] The community faces extraordinarily high housing costs and unemployment. Furthermore, the community is overwhelmingly made up of people of color, with more than 83% being Hispanic, African American, or Asian American. Just to the east of Harbor Gateway South and downwind of the Torrance Refinery is the City of Carson, which has similar CalEnviroScreen rankings. Carson's population is 76% minority according to the 2010 U.S. Census, but several Carson census tracts closest to the Torrance Refinery range between 89-92% people of color.

The Valero Refinery is in a Wilmington neighborhood and is adjacent to the City of Long Beach. The neighborhoods surrounding the Valero refinery are also among the most burdened in the state; they rank in the 90th percentile or higher for overall pollution burden. These communities' proximity to the port and major freeways expose them to among the very highest diesel particulate matter levels in the state. Wilmington is nearly 90% Hispanic and upward of 90% of the population are considered impoverished. Wilmington residents have heart attack rates that are higher than 79% of the rest of the state, which indicates a high cardiovascular disease rate in that community. According to OEHHA, people with cardiopulmonary disease

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[3] The Attorney General provides these comments pursuant to his independent power and duty to protect the natural resources of the State from pollution, impairment, or destruction in furtherance of the public interest. Cal. Const., art. V, § 13; Cal. Govt. Code, §§ 12600-12; *D'Amico v. Board of Medical Examiners,* (1974) 11 Cal.3d 1, 14-15. These comments are made on behalf of the Attorney General and not on behalf of any other California agency or office.

[4] A pending report by the Office of Environmental Health Hazard Analysis (OEHHA) finds that refineries typically discharge into the air almost two hundred chemicals with potential adverse health impacts. OEHHA, Analysis of Refinery Chemical Emissions and Health Effect, (Draft, September 2017) pp. iii-iv (hereafter OEHHA Refinery Report), https://oehha.ca.gov/media/downloads/faqs/refinerychemicalsreport092717.pdf.

[5] CalEnviroScreen is a screening tool created by OEHHA to rank communities in the state by their pollution burden and their overall vulnerability to the effects of pollution.

may be more susceptible to negative health consequences of HF exposure.[6] Further, in Long Beach, the neighborhoods closest to the refinery have high concentrations of people of color.

**There is an Inherent Risk of Future Refinery Accidents.**

The possibility of chemical releases from petroleum refineries can never be completely eliminated. Most obviously, earthquakes are an omnipresent risk in Southern California. Moreover, because petroleum refineries are large complex chemical processing plants, the risk of accidents, including those that cause fires and explosions, can be reduced but not eradicated. It is well-understood that federal, state, and local accident prevention programs, such as risk management plans and the modelling of worst case scenarios, can at best minimize the risk of accidental releases.[7] For this reason, chemical safety experts recognize a hierarchy of controls to prevent chemical accidents, with inherent safety measures such as the use of less hazardous materials being the first choice.[8]

The history of HF releases and near-releases illustrates the unpredictability and difficulty of preventing future chemical accidents. The 1987 Texas City release of 40,000 pounds of HF occurred when refinery operators hoisted an unrelated piece of equipment above the HF storage tank, against refinery policy, and then accidentally dropped it.[9] Also in 1987, an explosion and small release of HF from the Torrance Refinery occurred in 1987 because "a series of controllers and alarms [were] inoperable" and failed to detect an excess flow of HF.[10] Most recently, a confluence of eight distinct operational errors caused the February 2015 explosion in the electrostatic precipitator unit at the Torrance Refinery.[11] That explosion, according to the U.S. Chemical Safety Board (U.S. CSB), came close to damaging the HF alkylation unit.

> As a result of this incident, *a near miss event occurred in the modified hydrofluoric acid (MHF) alkylation unit* when explosion debris nearly hit tanks in close proximity to the [electrostatic precipitator], each containing hydrofluoric acid (HF), water, hydrocarbons, and a chemical additive intended to reduce the amount of HF vaporized during a loss of containment event.[12]

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[6] OEHHA Refinery Report, at p. A-15.

[7] 40 C.F.R. §§ 68.25, 68.69.

[8] U.S. EPA, Chemical Safety Alert: Safer Technology and Alternatives (2015) pp. 2-3 (hereafter Safer Technology); California Interagency Working Group on Refinery Safety, Improving Public and Worker Safety at Oil Refineries, 28-29 (2014); Cal. Code Regs., tit. 19, §§ 2735.3, 2762.13.

[9] United States Environmental Protection Agency, Hydrogen Fluoride Study, (1993) p. 113 (hereafter Hydrogen Fluoride Study).

[10] *Id.*, at p. 114.

[11] U.S. CSB, Investigation Report, ExxonMobil Torrance Refinery, (May 2017) pp. 25-48 (hereafter CSB Investigation Report).

[12] *Id.* at p. 6 (footnotes and citations omitted) (emphasis added).

**HF is Highly Toxic and Prone to Drift in a Cloud.**

Even at low levels, HF gas can irritate the eyes, nose, and respiratory tract. It is easily absorbed through the skin and into body tissues, where it causes cell damage and malfunction.[13] At high levels of exposure, HF can cause death from an irregular heartbeat or from fluid buildup in the lungs.[14] In 1987, a release of approximately 40,000 pounds of HF from the Marathon Refinery in Texas City, Texas led to the evacuation of 85 square blocks and over 1,000 hospital visits.[15] Over two years later, some victims continued to have symptoms, particularly breathing and eye problems.[16]

The toxicity of HF is exacerbated by its propensity to concentrate in dense clouds of toxic vapor. A sudden release of HF may "form a cloud containing both HF vapor and HF aerosol [a suspension of fine droplets]. . . . [A]nd thus adds to the hazards posed to workers and to the public."[17]

> HF can travel significant distances downwind as a dense vapor and aerosol under certain accidental release conditions. Because HF can exist as an aerosol, the cloud can contain a substantially greater quantity of the chemical than otherwise would be the case. Thus, the potentially high concentration of HF in these dense vapor and aerosol clouds could pose a significant threat to the public, especially in those instances where HF is handled at facilities located in densely populated areas. [18]

Studies have found that HF clouds can migrate at least five miles at ground level, with lethal levels of HF extending as far as two miles away.[19]

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[13] *See* Centers for Disease Control and Prevention, *Hydrogen Fluoride,* https://emergency.cdc.gov/agent/hydrofluoricacid/basics/facts.asp.

[14] There are at least two known worker deaths from HF exposure. Hydrogen Fluoride Study, at p. 123.

[15] Hydrogen Fluoride Study, at p. 113.

[16] Daval, et al, *A Community-Based Epidemiologic Study of Health Sequelae of Exposure to Hydrofluoric Acid*, (1992) Ann. Epidemiol. 2: 214, 228-29.

[17] Hydrogen Fluoride Study, at p. 13.

[18] *Id.,* at p. *xiii.*

[19] George Stein, *Safeguards for Hydrofluoric Acid Tested*, L.A. Times, Sept. 22, 1988; Jim Morris & Chris Hamby, Use of Toxic Acid Puts Millions at Risk, (2011) (hereafter Public Integrity Report), https://www.publicintegrity.org/2011/02/24/2118/use-toxic-acid-puts-millions-risk.

**There is Substantial Uncertainty About the Safety of Modified Hydrogen Fluoride.**

Both the Valero and Torrance refineries have converted their processes to use modified hydrogen fluoride (MHF).[20] MHF includes an additive intended to reduce the volatility of the HF. There remains great uncertainty, however, whether a sudden release of MHF could cause aerosol formation and the migration of a toxic cloud. Significantly, SCAQMD staff concluded that "the testing/modeling information provided by [the Torrance Refining Company] did not sufficiently demonstrate MHF would not flash atomize and form [a] dense HF cloud."[21] Likewise, in litigation related to the 2015 explosion at the Torrance Refinery, the U.S. CSB reported that "modified hydrofluoric acid is not widely used in the industry and few scientific studies show whether modified hydrofluoric acid is actually safer."[22]

Compounding the scientific uncertainty about the release behavior of MHF is the continued failure of the Torrance Refinery operators to disclose full information about the consequences of a release of MHF. Specifically, after the 2015 explosion (when the refinery was owned by ExxonMobil), the U.S. CSB began an investigation into the cause of the explosion as well as the safety risks posed by the refinery's use of MHF. The U.S. CSB issued a set of subpoenas, including some seeking information about the safety of MHF. ExxonMobil, however, vigorously fought compliance with those subpoenas—even claiming that the U.S. CSB concocted "hyperbolic and frightening 'what if' scenarios"—rather than properly addressing the U.S. CSB's legitimate concerns about the possibility of catastrophic release had the debris damaged the tanks holding the MHF.[23] As the U.S. CSB stated in its investigation report, ExxonMobil "resisted CSB requests for safety information pertaining to the potential release of HF in the event the tanks were struck by explosion debris [and] continues to refuse to provide the CSB with information detailing safeguards to prevent or mitigate a release of HF.[24] And regarding MHF in particular, "CSB was not provided with documentation quantifying the resulting effect of the chemical additive on a potential HF release, and as such the CSB cannot comment on the effectiveness of this additive."[25]

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[20] Mobil Oil Company, which at the time owned the Torrance Refinery, agreed to the conversion in a judicial settlement with the City of Torrance. Ultramar, which still owned the Valero Refinery, agreed to the conversion in an agreement with SCAQMD.

[21] SCAQMD Presentation, PR 1410 Working Group Meeting # 4, Aug 2, 2017.

[22] Memorandum of Points and Authorities in Support of United States' Petition to Enforce Administrative Subpoenas Issued by U.S. Chemical Safety and Hazard Investigation Board at 5, *United States v. Exxon Mobil,* No. 17-mc-66 (C.D.Cal 2017) , ECF No. 11 (*Exxon Mobil)*, citing Declaration of Mark Wingard, *Exxon Mobil,* ECF No. 10, ¶ 23.

[23] Exxon Mobile Opposition to the United States' Petition to Enforce Administrative Subpoenas Issued by U.S. Chemical Safety and Hazard Investigation Board, 11-12, *Exxon Mobil,* ECF No. 19. The District Court granted ExxonMobil's petition to quash the HF-related subpoenas. The United States has appealed that decision. *Exxon Mobil,* ECF Nos. 33-34.

[24] CSB Investigation Report, at p. 6-7.

[25] *Id.*, at p. 6, n. 2.

**An Inspection by U.S. EPA Found that the Torrance Refinery Lacks an Adequate Worst-Case Scenario Analysis**

In November 2016, the U.S. Environmental Protection Agency (U.S. EPA) inspected the Torrance Refinery (under its current ownership) for compliance with section 112(r) of the Clean Air Act, which requires refineries and other users of large amounts of "extremely hazardous substances" to enact "risk management programs" to minimize the risk of accidental releases of hazardous compounds. 42 U.S.C. § 7412(r). U.S. EPA's resulting inspection report indicates that the Torrance facility was out of compliance with a number of process safety and offsite consequence analysis requirements.[26] Notably, the refinery operators did not properly identify and analyze the potential "worst-case scenario" for an accidental release of HF.[27] Although worst case scenarios are based on a "highly unlikely chain[] of events," U.S. EPA acknowledges that "such events may and indeed can happen."[28] U.S. EPA's inspection found the refinery had underestimated the volume of HF in the acid settling tanks and improperly classified the pumping of MHF into the alkylation process as a "passive mitigation measure."[29]

Most disturbingly, U.S. EPA's inspection also concluded that Torrance Refining Company had no "clear basis" for its selection of 3.2 miles as maximum distance from the release where HF concentrations could exceed levels set based on the health effects the chemical could cause. Without an adequate worst-case analysis, SCAQMD and the neighboring disadvantaged communities cannot know the full extent of the potential harm that could be caused by a catastrophic event.[30]

In the face of these uncertainties, SCAQMD should adopt the most protective regulation possible to safeguard the public from the sudden release of this extremely hazardous chemical compound.

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[26] U.S. EPA, Inspection Report, at p. 11-16.

[27] *Id.*, at p. 12-14.

[28] U.S. EPA, Chemical Safety in Your Community: EPA's New Risk Management Program, (1999) p. 6.

[29] U.S. EPA, Inspection Report, at 12-13. As mentioned above, chemical safety experts recognize a hierarchy of controls to prevent chemical accidents. Passive measures, those that provide a risk reduction benefit with no action required by personnel, are preferred to active measures because in an emergency, unpredictable circumstances may prevent refinery operators from taking action. Safer Technology, at pp. 2-3; California Interagency Working Group on Refinery Safety, Improving Public and Worker Safety at Oil Refineries, (2014) 28-29 (2014); Cal. Code Regs., tit. 19, §§ 2735.3, 2762.13. Inherent safety measures—using less hazardous chemicals—is the first choice. *Ibid.*

[30] *See also* Accidental Release Prevention Requirements: Risk Management Programs Under Clean Air Act Section 112(r)(7), 61 Fed. Reg. 31668, 31670 (Jun. 20, 1996) ("For example, today's rule requires covered sources to provide information about possible worst-case scenarios. EPA intends that officials and the public use this information to understand the chemical hazards in the community and then engage in a dialogue with industry to reduce risk.")

**SCAQMD Should Take Strong Action to Protect the Neighboring EJ Communities from Releases of HF.**

HF use by refineries presents an extraordinary hazard that demands special consideration. A large sudden release of HF could cause a ground-hugging toxic cloud to drift over neighboring disadvantaged communities, potentially injuring thousands, if not tens of thousands of residents. While the devastation that could follow a sudden release of HF is not something any community should experience, it is particularly unfair to put that risk on communities that already bear disproportionate pollution burdens compared to the rest of the state. The residents of these communities are entitled to SCAQMD's continued effort to do everything possible to protect them from the devastation that could follow a sudden release of HF.

The lack of full information about the hazards of MHF and the potential impacts of a sudden release of MHF compounds the need for strong, protective regulation. As described above, the U.S. EPA stated in a March 2017 inspection report that the Torrance Refining Company had not prepared a proper worst case scenario analysis as required by section 112 of the Clean Air Act. Further, following the 2015 explosion at the Torrance Refinery, ExxonMobil (the former owner) did not comply with certain subpoenas issued by the U.S. CSB regarding the potential hazards of MHF. The lack of a clear understanding of the actual risks posed by the use of MHF by refineries warrants strong regulation by SCAQMD to ensure the communities' safety.

We commend SCAQMD for its continued attention to the hazard posed by refinery usage of HF and urge SCAQMD to craft Rule 1410 to provide the workers and neighbors of the Torrance and Valero refineries with the maximum protection possible. We look forward to seeing a proposed rule that takes these considerations into account.

Sincerely,

JAMES R. POTTER
Deputy Attorney General
CHRISTIE VOSBURG
Special Assistant, Environmental Justice Bureau

For XAVIER BECERRA
Attorney General

cc: Members of the SCAQMD Refinery Committee (via email to Cristina Lopez)
Wayne Nastri, SCAQMD Executive Officer (via email)
Heather Farr, SCAQMD Program Supervisor (via email)

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