EARTHJUSTICE

October 12, 2021

Sent via Email

Administrator Michael Regan
Environmental Protection Agency
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Washington, D.C. 20460
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Dear Administrator Regan:

The undersigned organizations hereby submit this updated petition to the U.S. Environmental Protection Agency ("EPA"), pursuant to the Administrative Procedure Act, 5 U.S.C. §§ 551-559, 701-706,[1] and the Clean Air Act ("CAA"), 42 U.S.C. §§ 7401–7671q, to make an endangerment finding under section 231 of the CAA that leaded aviation gasoline ("avgas") contributes to air pollution that harms public health and welfare.[2] Despite knowing for years that lead exposure at any level is harmful to human health, and notwithstanding research linking the use of leaded avgas to elevated blood lead levels, EPA has thus far declined to regulate the largest remaining source of lead emissions to the environment. The undersigned organizations ask EPA to make a long-overdue endangerment finding for leaded avgas and begin the process of regulating this source of harmful lead emissions. Doing so is an important step in fulfilling the Biden-Harris Administration's commitments to protect children's health and promote environmental justice.[3]

Petitioner Alaska Community Action on Toxics ("ACAT") is a 501(c)(3) non-profit public interest environmental health and justice research and advocacy organization, incorporated and headquartered in Anchorage, Alaska. ACAT is guided by the belief that everyone has the right to clean air, clean water, and toxic-free food. Upon request, ACAT assists individuals, tribes, and communities to implement effective strategies to prevent or reduce their exposures to toxic substances, protect the ecosystems that sustain them, and hold accountable those responsible for the contamination of their communities. Because existing remedies are so often inadequate to address Alaskans' concerns, ACAT also works to achieve systemic policy

[1] *See* 5 U.S.C. § 553(e) ("Each agency shall give an interested person the right to petition for the issuance, amendment, or repeal of a rule.").
[2] 42 U.S.C. § 7571(a)(2) ("The Administrator [of the EPA] shall . . . issue proposed emission standards applicable to the emission of any air pollutant from any class or classes of aircraft engines which in his judgment causes, or contributes to, air pollution which may reasonably be anticipated to endanger public health or welfare.").
[3] *See* Ariel Wittenberg, *EPA: Biden Team Vows 'New Era' For Protecting Children's Health*, E&E News (May 12, 2021), https://www.eenews.net/greenwire/2021/05/12/stories/1063732361 ("Until every child can safely drink water from the faucet; inhale a full, clean breath of fresh air; and play outdoors, without risk of environmental hazard or harm, our work continues." (quoting Administrator Regan)); Exec. Order No. 14,008, 86 Fed. Reg. 7619 (Jan. 27, 2021), https://www.govinfo.gov/content/pkg/FR-2021-02-01/pdf/2021-02177.pdf (explaining the Biden Administration's policy "to secure environmental justice . . . for disadvantaged communities that have been historically marginalized and overburdened by pollution and underinvestment in housing, transportation, water and wastewater infrastructure, and health care").

change at the marketplace, local, state, national, and international levels, including by advocating for, and engaging in, rulemaking efforts by EPA.

Petitioner Center for Environmental Health ("CEH") is a 501(c)(3) non-profit, national public interest organization with headquarters in Oakland, California. For 25 years, CEH has helped to lead the growing, nationwide effort to protect people from toxic chemicals that cause cancer, adverse reproductive effects, learning disabilities, and many other health problems, by working with communities, consumers, workers, government, and the private sector to demand and support business practices that are safe for public health and the environment. Leading with science and committed to inclusive, community-led solutions that address environmental injustices in communities of color and low-income communities, CEH uses a range of strategies to achieve this—from public education to legal action. CEH also works with state and federal policymakers to develop and protect laws and regulations that support safer chemicals and consumer products, and it fights to ensure that governments allocate sufficient resources to implement those laws and regulations in a health-protective manner.

Petitioner Friends of the Earth ("FoE") is a tax-exempt environmental advocacy organization founded in 1969 and incorporated in the District of Columbia, with offices there and in Berkeley, California and staff located around the country. As of August 2021, FoE had more than 280,000 members across all fifty states in the United States and more than 4.5 million activists. FoE is part of Friends of the Earth International, a federation of grassroots groups working in seventy-four countries on today's most urgent environmental and social issues. FoE's mission is to defend the environment and champion a healthy and just world. To this end, one of FoE's key programs is the promotion of policies and actions that prevent air pollution and that minimize the negative impacts of pollution on human health. FoE relies on sound science and uses the law to create and advocate for innovative strategies to conserve natural resources and protect public health and the environment. A core element of FoE's mission is work to reduce air and water pollution throughout the United States. To these ends, FoE actively engages in rulemaking efforts before EPA and other regulatory agencies relating to the regulation of industrial sources of air and water pollution and in litigation to support these efforts.

Petitioner Montgomery-Gibbs Environmental Coalition ("MGEC") is a 501(c)(3) nonprofit community watchdog organization based in San Diego, California. MGEC is dedicated to educating and informing the public about general aviation environmental issues. MGEC advocates for clean air, aviation safety and less noise, along with tighter security measures to improve and ensure the health and wellbeing of its communities. Its mission is to improve the environmental quality of its neighborhoods by working together to create a better world for future generations.

Petitioner Oregon Aviation Watch ("OAW") is dedicated to research, education, and advocacy on behalf of the public interest and public welfare regarding aviation issues. OAW seeks to enhance and protect the quality of life for Oregon residents by eliminating the adverse impacts of aviation activity, as well as achieve a transparent, accountable, and sustainable aviation system that neither disregards nor diminishes the environment, livability, health, or well-being of current and future generations of Oregon residents. OAW provides information on aviation policy in Oregon and nationally and shares its experiences dealing with these issues. OAW strives to reduce the sense of isolation and powerlessness people sometimes feel when confronted with the bureaucratic runaround and lack of democratic principles so often

encountered when dealing with aviation issues. To further these goals, OAW has gathered and written numerous articles on the subject of lead pollution from piston-engine aircraft and has filed requests and motions with local airports to install monitoring equipment to further show the effects and dangers of leaded avgas. OAW also provides regular email updates to a broad base of local supporters, elected officials, and environmental organizations to keep the public apprised of current aviation issues. OAW is active at the local level in ensuring that decision-makers take into account the health and well-being of residents and communities negatively impacted by Oregon's airports.

Petitioner County of Santa Clara, California, is one of the nation's most populous counties and home to approximately 1.9 million residents. The County owns and manages two general aviation airports—Reid-Hillview Airport, located in urban East San José, and San Martin Airport in more rural south Santa Clara County. Piston-engine aircraft also operate out of three additional airports in the county. Over 52,000 people reside within 1.5 miles of Reid-Hillview Airport, including nearly 13,000 children. There are also twenty-one schools and childcare centers in this radius. A County-commissioned study recently documented elevated blood lead levels among children residing or attending school or childcare facilities near this airport as a result of exposure to airborne lead emissions from piston-engine aircraft.[4] The County has invested significant resources in protecting members of its community from lead exposures, including by leading nearly twenty years of litigation against former manufacturers of lead paint to secure funds for a countywide lead paint abatement program. The County has a significant interest in protecting all residents from continuing lead exposures from general aviation operations and ensuring that access to important aeronautical resources is compatible with public health and safety.

Petitioner Town of Middleton is a town organized under Chapter 60, Wisconsin Statutes, located in the westerly part of Dane County, Wisconsin and is primarily a residential community. It is located adjacent to the City of Middleton's predominantly recreational municipal airport, Middleton Municipal Airport – Morey Field (also known as Morey Airport or C29). The area of the Town located in the vicinity of Morey Airport is primarily a relatively dense area of single-family residences. The Town of Middleton and City of Middleton are separate legal entities. According to Wisconsin Department of Natural Resources data, Dane County has the second highest level of airborne lead emissions in the State of Wisconsin, and Morey Airport operations annually produce a substantial percentage of all airborne lead emissions in Dane County. Areas around and in the immediate vicinity of Morey Airport in the Town and City of Middleton are highly developed with residences, schools, parks, and playgrounds that are impacted by airborne lead from Morey Airport operations. Conservatively, over 5,000 children spend time in residences and schools within three miles of Morey Airport boundaries in the Town and City of Middleton and other adjoining communities. Consistent with its duties to protect the public health and safety, the Town of Middleton has a significant interest in protecting all its residents, especially children, from the airborne lead exposure from general aviation operations. The Town of Middleton is investing significant resources in investigating the extent of airport-related lead emissions there.

[4] Mountain Data Group, *Leaded Aviation Gasoline Exposure Risk at Reid-Hillview Airport in Santa Clara County, California* 37–45 (2021), https://www.sccgov.org/sites/opa/newsroom/Documents/RHV-Airborne-Lead-Study-Report.pdf [hereinafter "RHV Lead Study"].

I. BACKGROUND

A. Lead, which is used in avgas, is harmful to human health at any level.

Airborne lead is harmful to human health;[5] as EPA has acknowledged, "any level of lead in the blood leads to adverse health effects."[6] For over forty years, EPA has recognized that lead exposure, even at low levels, is associated with adverse health effects across multiple bodily systems,[7] including harm to the nervous, cardiovascular, immune, and reproductive systems, as well as to the kidneys.[8] Lead exposure can cause anemia, increased blood pressure, an increased risk of cancer, and—at high levels—death.[9] Children are particularly susceptible to harm from low-level lead exposure which can decrease physical growth and cause neurodevelopmental harm, leading to behavioral problems and learning deficits.[10] And as exposure to lead increases, so does the range and severity of adverse effects.[11] There is evidence that many of these deleterious effects are irreversible.[12]

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[5] *See* EESI, *Fact Sheet | A Brief History of Octane in Gasoline: From Lead to Ethanol* (2016), https://www.eesi.org/files/FactSheet_Octane_History_2016.pdf [hereinafter "EESI Fact Sheet"] ("[In] the 1960s, following extensive health research . . . the devastating health impacts of low-level lead exposure were established.").

[6] *A Cmty. Voice v. EPA*, 997 F.3d 983, 986 (9th Cir. 2021); *see also* EPA, EPA100-R-19-003, *Implementation Status Report for EPA Actions Under the December 2018 Federal Action Plan to Reduce Childhood Lead Exposures and Associated Health Impacts* 4 (2019), https://www.epa.gov/sites/production/files/2019-04/documents/leadimplementationbooklet_april2019.pdf [hereinafter "2019 Status Report"] ("The Centers for Disease Control and Prevention (CDC) has stated that no safe blood lead level in children has been identified . . . .").

[7] *See* EPA, EPA-600/8-77-017, *Air Quality Criteria for Lead* 1-6 to -7 (1977), https://nepis.epa.gov/Exe/ZyPDF.cgi/20013GWR.PDF?Dockey=20013GWR.PDF; *see also Nat'l Res. Def. Council, Inc. v. Train*, 545 F.2d 320, 324 (2d Cir. 1976) ("The EPA concedes that lead . . . has an adverse effect on public health and welfare . . . .").

[8] Agency for Toxic Substances and Disease Registry, *Lead – ToxFAQs* (2020) https://www.atsdr.cdc.gov/toxfaqs/tfacts13.pdf [hereinafter "ToxFAQs"]; EPA, EPA/600/R-10/075F, *Integrated Science Assessment for Lead,* at lxxxii-vii, 1-14 to -37 (2013), https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=255721 (click PDF cover on right) [hereinafter "Lead ISA"].

[9] *See* ToxFAQs, *supra* note 8.

[10] *Id.*; *see also* EESI Fact Sheet, *supra* note 5 ("Children's developing bodies are particularly sensitive to low-level, ambient exposures to lead. The health impacts of lead exposure in children include anemia, behavioral disorders, low IQ, reading and learning disabilities, and nerve damage."); Lead ISA, *supra* note 8, at 1-15 tbl. 1-2 (explaining that there is "[c]lear evidence of cognitive function decrements . . . in young children . . . with mean or group blood [lead] levels measured at various lifestages and time periods between 2 and 8 µg/dL").

[11] *Lead Poisoning and Health*, WHO (Aug. 23, 2019), https://www.who.int/news-room/fact-sheets/detail/lead-poisoning-and-health#:~:text=Lead%20also%20causes%20long%2Dterm,birth%20and%20low%20birth%20weight. Lead also accumulates in the body, including in bones, where it is stored and can reenter the blood over time. *Id.*

[12] CDC, *CDC Response to Advisory Committee on Childhood Lead Poisoning Prevention Recommendations in "Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention"* 2 (2012), https://www.cdc.gov/nceh/lead/acclpp/cdc_response_lead_exposure_recs.pdf.

Though the use of leaded gasoline in most motor vehicles was banned twenty-five years ago, leaded fuel is still used in approximately 167,000 piston-engine aircraft across 20,000 domestic airports.[13] To date, EPA has failed to regulate this significant source of lead exposures, even though emissions from these aircraft collectively represent the single largest source of air emissions of lead in the United States, accounting for about 70% of lead released domestically into the atmosphere.[14]

EPA's own analysis estimates that there are over five million people—including more than 360,000 children aged five or younger—living in very close proximity to at least one of the airports where piston-engine aircraft operate across the United States.[15] Over 160,000 children attend schools near these airports.[16] As explained in Part II.B, *infra*, research shows that children who live in close proximity to airports where piston-engine aircraft operate have higher blood lead levels relative to those who do not, putting them at a greater risk of harm from the adverse health effects associated with lead exposure.

Addressing emissions from leaded avgas will also help the Biden-Harris Administration realize its commitment to environmental justice. The majority of general aviation airports with the highest lead emissions are located in communities of color.[17] Communities of color are already disproportionately burdened by chemical exposures and, in particular, by exposures to lead. Black children have body burdens of lead that are higher, on average, than their white counterparts, both *in utero* and after they are born.[18] Lead emissions from activity at these general aviation airports contribute to this disparity.

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[13] *See Fact Sheet – Leaded Aviation Fuel and the Environment*, FAA (Nov. 20, 2019), https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=14754; Advance Notice of Proposed Rulemaking on Lead Emissions from Piston-Engine Aircraft Using Leaded Aviation Gasoline, 75 Fed. Reg. 22,440, 22,442 (to be codified at 40 C.F.R. pt. 67) [hereinafter "2010 ANPR"].

[14] Transp. Rsch. Bd. et al., *Options for Reducing Lead Emissions from Piston-Engine Aircraft* 35 (2021), https://www.nap.edu/read/26050/chapter/5 [hereinafter "NAS Report"].

[15] In 2020, EPA estimated that over five million people live within 500 meters of a runway and fifty meters of a helipad. *See* EPA, *National Analysis of the Populations Residing Near or Attending School Near U.S. Airports* 13 (2020), https://nepis.epa.gov/Exe/ZyPDF.cgi/P100YG4A.PDF?Dockey=P100YG4A.PDF. In 2010, EPA estimated that sixteen million people live within one kilometer of these airports. *See* 2010 ANPR, 75 Fed. Reg. at 22,460.

[16] *Id.*

[17] We conducted a demographic analysis of the areas around the fifty highest lead-emitting general aviation airports, according to the 2017 National Emissions Inventory. It revealed that 60% or more of these airports had populations living within one mile that consisted of a higher percentage of people of color than the national average.

[18] *See, e.g.*, Robert L. Jones et al., *Trends in Blood Lead Levels and Blood Lead Testing Among US Children Aged 1 to 5 Years, 1988–2004*, 123 Pediatrics e376 (2009) (finding that blood lead levels were higher in non-Hispanic Black children than in Mexican American and non-Hispanic white children over the studied time periods); Andrea E. Cassidy-Bushrow, et al., *Burden of Higher Lead Exposure in African-Americans Starts* In Utero *and Persists into Childhood*, 108 Env't Int'l 221 (2017).

In certain areas, the populations more likely to reside near airports are those with less education and less wealth.[19] EPA has acknowledged that "[c]hildhood lead exposure is especially prevalent in many communities that represent the lowest income and most diverse populations with significant cumulative environmental risk from pollution."[20] Given that the severity of health effects increases as lead exposure increases, children who live near airports and are also experiencing poverty—a condition that may make children both more susceptible to lead absorption due to undernourishment and more exposed to lead by poor infrastructure and older homes—are at a particularly high risk of harm. Acknowledging that emissions from leaded avgas harms children is necessary to fulfill EPA's commitment to "protect the most vulnerable communities and members of society, especially children."[21]

B. EPA has thus far failed to make an endangerment finding on lead emissions from piston-engine aircraft, despite repeated opportunities to do so.

Notwithstanding the harm caused by emissions from piston-engine aircraft that use leaded avgas, EPA has not yet made an endangerment finding for lead air pollution from this source, despite repeated requests to do so. In 2006, FoE petitioned EPA to make a finding under section 231(a)(2)(A) of the CAA that leaded avgas harms human health or the environment and to regulate such emissions from general aviation aircraft.[22] In 2007, EPA requested comment on the issues raised in the petition, and in 2010, EPA issued an Advance Notice of Proposed Rulemaking ("ANPR") on the issue of regulating leaded avgas. In the ANPR, EPA acknowledged that there is no identifiable safe level of lead exposure and that lead emitted from piston-engine aircraft operating on leaded avgas constitutes "the largest single source category for emissions of lead to air, comprising approximately half of the national inventory."[23] Despite issuing this ANPR, EPA did not formally respond to the petition until 2012, after FoE filed suit over EPA's unreasonable delay in answering the petition.

In its 2012 response to the 2006 Petition, EPA claimed that it needed more time to gather information to determine whether emissions of leaded avgas cause or contribute to harmful air pollution, and it stated that it would continue to work on the process for reaching a determination.[24] FoE petitioned EPA to reconsider its decision not to make an endangerment finding, pointing out the ample evidence that had already been published confirming that leaded

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[19] *See, e.g.*, Sammy Zahran et al., *The Effect of Leaded Aviation Gasoline on Blood Lead in Children*, 4 J. Ass'n Env't & Res. Economists 577 (2017) ("In Michigan, populations of lower socioeconomic status are more likely to reside near airports. Compared to more distant neighborhoods . . . neighborhoods within 2 km of an airport have significantly higher percentages of households receiving public assistance . . . and lower levels of educational attainment among adults . . . .").

[20] 2019 Status Report, *supra* note 6, at 4.

[21] *Statement by Administrator Regan on the President's FY 2022 Budget*, EPA (June 2, 2021), https://www.epa.gov/newsreleases/statement-administrator-regan-presidents-fy-2022-budget.

[22] Friends of the Earth, Pet. for Rulemaking & Collateral Relief (Oct. 3, 2006), https://www.epa.gov/sites/production/files/2016-09/documents/foe-20060929.pdf (attached as Exhibit 1).

[23] 2010 ANPR, 75 Fed. Reg. at 22,442.

[24] Letter and Memorandum from Gina McCarthy, Assistant Administrator, EPA, to Deborah Behles & Helen Kang, Env't L. & Just. Clinic, & Marianna Engelman Lado et al., Earthjustice (July 18, 2012), https://19january2021snapshot.epa.gov/sites/static/files/2016-09/documents/ltr-response-av-ld-petition.pdf (responding to Pet. for Rulemaking & Collateral Relief).

avgas emissions contribute to air pollution that endangers human health or welfare.[25] In its response to the Petition for Reconsideration, EPA explained that it planned to issue a proposed endangerment finding for public comment in 2017 and a final endangerment finding in 2018.[26] While overall lead emissions have decreased in the decade since EPA issued the ANPR, leaded avgas' contribution to those emissions has increased, from 50% in 2005 to some 70% by 2017.[27] Despite the increased contribution of avgas to lead emissions, EPA has still not proposed that endangerment finding.

II. LEADED AVGAS MEETS THE CRITERIA FOR AN ENDANGERMENT FINDING.

The CAA requires EPA to issue proposed emission standards when it determines that aircraft emissions "cause[], or contribute[] to, air pollution which may reasonably be anticipated to endanger public health or welfare."[28] This determination—often referred to as an endangerment finding—thus requires two showings: first, that lead air pollution as a whole may reasonably be anticipated to endanger public health or welfare; and second, that emissions from the use of leaded avgas in piston-engine aircraft cause or contribute to this harmful air pollution.[29] In evaluating whether there is a sufficient showing of each factor, EPA must rely on scientific judgment of the risks posed by pollution emissions, not on policy rationales.[30]

As explained below, studies conducted over the last half century demonstrate conclusively that both prongs of the endangerment finding test have been met. In recognition of this large body of evidence, and to protect public health and welfare, EPA must find that emissions from the use of leaded avgas in piston-engine aircraft contribute to harmful air pollution and propose standards to address this harm.

A. Lead air pollution is reasonably anticipated to endanger public health or welfare.

As EPA has recognized, the first prong of the endangerment finding is met whenever the air pollution at issue is reasonably anticipated to endanger public health or welfare, regardless of

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[25] Friends of the Earth, Pet. for Reconsideration of EPA's Denial (Apr. 21, 2014) (attached as Exhibit 2).
[26] Letter from Gina McCarthy, Administrator, EPA, to Deborah Behles, Clinical Staff Attorney, Env't L. & Just. Clinic, & Marianna Engelman Lado, Managing Attorney, Earthjustice (Jan. 23, 2015) (on file with EPA), https://www.epa.gov/sites/default/files/2016-09/documents/ltr-response-av-ld-foe-psr-oaw-2015-1-23.pdf (responding to Pet. for Reconsideration).
[27] *See* 2010 ANPR, 75 Fed. Reg. at 22,452 ("Currently, lead emitted by piston-engine aircraft operating on leaded avgas is the largest source of lead to the air, contributing about 50% of the National Emission Inventory in 2005."); NAS Report, *supra* note 14, at 35 (noting that, in 2017, piston-engine general aviation aircraft accounted for "roughly 70 percent of total lead emissions to air in the United States").
[28] 42 U.S.C. § 7571(a)(2)(A).
[29] *See* 2010 ANPR, 75 Fed. Reg. at 22,444–45 (explaining the two parts of the endangerment finding test); *cf. Coal. for Responsible Regul., Inc. v. EPA*, 684 F.3d 102, 117 (D.C. Cir. 2012) (explaining that an analogous provision of the CAA, § 202(a)(1), "requires EPA to answer only two questions: whether particular 'air pollution' . . . 'may reasonably be anticipated to endanger public health or welfare', and whether motor-vehicle emissions 'cause, or contribute to' that endangerment"), *aff'd in part, rev'd in part sub nom. Util. Air Regul. Grp. v. EPA*, 573 U.S. 302 (2014).
[30] *See Coal. for Responsible Regul.*, 684 F.3d at 117–18; *Massachusetts v. EPA*, 549 U.S. 497, 533–34 (2007).

the source of that pollution.[31] EPA has already acknowledged—repeatedly—that lead air pollution has an adverse effect on public health or welfare,[32] and it has regulated lead emissions on this basis.[33] Because, as EPA has acknowledged, lead harms public health, it more than meets the more lenient standard of "*reasonably . . . anticipated* to endanger public health or welfare."[34] But even if EPA had not already acknowledged that lead pollution is reasonably anticipated to endanger public health or welfare, such a finding is warranted; research has long shown that there is a causal relationship between exposure to lead air pollution and adverse human health effects.[35]

Moreover, in making a determination as to whether a particular pollutant is reasonably anticipated to endanger public health or welfare, EPA has in the past considered whether "vulnerable subpopulations are especially at risk."[36] As noted above, children are generally more susceptible to adverse health effects from lead exposure, both because their bodies absorb lead much more easily than adults do[37] and because lead exposure affects the developmental processes they undergo.[38] Children also face increased exposures to lead that has been deposited on the ground from air emissions because of age-appropriate behaviors and activities, such as crawling and increased hand-to-mouth contact.[39] Though the well-established public-health harm from lead emissions, which is both severe and likely to occur, is sufficient for the purposes of satisfying the first prong of the endangerment-finding test, the fact that lead pollution affects

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[31] *See* Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496, 66,506 [hereinafter "GHG Endangerment Finding"] (interpreting parallel CAA provision relevant to motor vehicles to mean that "the Administrator is to consider the cumulative impact of [all] sources of a pollutant in assessing the risks from air pollution, and is not to look only at the risks attributable to a single source or class of sources"); *see also* 2010 ANPR, 75 Fed. Reg. at 22,444 (referring to recent EPA notices for greenhouse gases setting forth the analytical and legal framework for endangerment findings).

[32] *See* 2010 ANPR, 75 Fed. Reg. at 22,444 (explaining that, as part of the decision in 1976 to list lead as a criteria pollutant under the CAA, "EPA determined that lead was an air pollutant which, in the Administrator's judgment, has an adverse effect on public health or welfare").

[33] *See* 2010 ANPR, 75 Fed. Reg. at 22,445 ("EPA has long regulated emissions of lead air pollution due to their adverse impacts on public health . . . .").

[34] 42 U.S.C. § 7571(a)(2) (emphasis added).

[35] *See supra* Part I.A.; Lead ISA, *supra* note 8, at 1-15 to -19 (summarizing research showing causal relationships between lead exposure and negative nervous system, cardiovascular, hematologic, and reproductive and developmental effects and likely or suggestive causal relationships between lead exposure and renal and immune system effects and cancer).

[36] GHG Endangerment Finding, 74 Fed. Reg. at 66,506; Finding That Greenhouse Gas Emissions from Aircraft Cause or Contribute to Air Pollution That May Reasonably Be Anticipated To Endanger Health and Welfare, 81 Fed. Reg. 54,422, 54,435 (Aug. 15, 2016) (to be codified at 40 C.F.R. pts. 87, 1068) [hereinafter "Aircraft Cause or Contribute Finding"].

[37] *See Biomonitoring Summary, Lead*, CDC, https://www.cdc.gov/biomonitoring/Lead_BiomonitoringSummary.html (last updated Apr. 7, 2017) ("Absorption of ingested lead can be as much as five times greater in children than adults and even greater when intakes of dietary minerals are deficient.").

[38] *See* Lead ISA, *supra* note 8, at 4-127 ("[There is] well-characterized toxicological evidence for Pb exposure interfering with development of the brain and activity of neurochemical processes that mediate cognitive function . . . .").

[39] *See* Lead ISA, *supra* note 8, at 1-11, 1-78.

children—a group EPA has described as a vulnerable group—makes it all the more important that EPA regulate the largest source of this pollution.

B. Lead emissions from piston-engine aircraft cause or contribute to harmful lead air pollution.

To meet the second prong of the endangerment finding, the Administrator "need not find that emissions from any one sector or group of sources are the sole or even the major part of an air pollution problem."[40] As EPA has explained, "Congress . . . authorized regulatory controls to address air pollution even if the air pollution problem results from a wide variety of sources."[41] There is no need for the contribution to be "significant" for EPA to find that it contributes to pollution that is reasonably anticipated to endanger public health or welfare;[42] indeed, EPA has determined that air pollution emissions amounting to 1.2% of the total inventory of emissions of that pollutant "contributed" to harmful air pollution within the meaning of the CAA.[43]

Where, as here, a source to be regulated contributes roughly 70% of the emissions of lead—a pollutant that is unsafe at any level—to the air, the source more than "contributes" to harmful air pollution.[44] This contribution is not just theoretical. Research shows that lead levels are higher in the areas surrounding airports servicing piston-engine aircraft.[45] And multiple studies have demonstrated that children living in close proximity to airports where leaded avgas is used have higher blood lead levels than children who do not.[46] This is true even after

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[40] GHG Endangerment Finding, 74 Fed. Reg. at 66,506; 2010 ANPR, 75 Fed. Reg. at 22,445.
[41] 2010 ANPR, 75 Fed. Reg. at 22,445.
[42] *See id.*; *Bluewater Network v. EPA*, 370 F.3d 1, 14 (D.C. Cir. 2004) (explaining that the fact that "contribute to" was not modified by the term "significantly" in one provision, as it was in other provisions in the CAA, "indicates that Congress did not intend to require a finding of 'significant contribution' for individual . . . categories").
[43] *See* 2010 ANPR, 75 Fed. Reg. at 22,445 (citing *Bluewater Network*, 370 F.3d at 15); *see also* Aircraft Cause or Contribute Finding, 81 Fed. Reg. at 54,472 (finding that "the collective GHG emissions from the classes of engines used in U.S. covered aircraft clearly contribute to endangering GHG pollution, whether the comparison is . . . to domestic GHG inventories . . . representing 2.8 percent of total U.S. emissions [or] to global GHG inventories . . . [representing] 0.4 percent of all global GHG emissions").
[44] Though EPA need not set "'a precise numerical value as part of' a contribution endangerment finding," nor "establish a minimum threshold of risk or harm before determining whether an air pollutant endangers," *Am. Lung Ass'n v. EPA*, 985 F.3d 914, 977 (D.C. Cir. 2021) (quoting *Coal. for Responsible Regul.*, 684 F.3d at 122–23), such a large proportion of pollution from one source counsels in favor of such a finding. *Cf. Am. Lung Ass'n*, 985 F.3d at 977 (upholding EPA's finding of *significant* contribution where a source category emitted one-third of relevant domestic emissions); *Massachusetts v. EPA*, 549 U.S. at 524–25 (2007) (noting that, even though the transportation sector represented less than a third of domestic carbon dioxide emissions, "[j]udged by any standard, U.S. motor-vehicle emissions make a meaningful contribution to greenhouse gas concentrations").
[45] *See* 2010 ANPR, 75 Fed. Reg. at 22,442; *see also* Letter and Memorandum from Gina McCarthy to Deborah Behles et al., *supra* note 24, at 7 ("For piston-engine aircraft using leaded avgas, our investigation to date indicates that the levels of lead in the air at and around general aviation airports increase with proximity to the airport.").
[46] *See* Marie Lynn Miranda et al., *A Geospatial Analysis of the Effects of Aviation Gasoline on Childhood Blood Lead Levels*, 119 Env't Health Persps. 1513 (2011) (examining the relationship between proximity to airports in North Carolina where leaded aviation gas is used and blood lead levels in children and

accounting for other sources of lead exposure, indicating that the use of leaded avgas causes elevated blood lead levels in children.[47] Indeed, one recent study showed that living downwind of Reid-Hillview Airport was associated with childhood blood lead level increases comparable to those from the Flint water crisis and that children living within half a mile of the airport during periods of maximum piston-engine aircraft traffic had blood lead level increases nearly twice the amount that occurred during the Flint crisis.[48]

Given that there is no safe level of lead, that lead is present in higher amounts surrounding airports using leaded avgas, and that studies show a causal relationship between the use of leaded avgas and elevated blood lead levels, there is ample evidence that leaded avgas contributes to harmful air pollution.

* * *

EPA has long recognized that lead is harmful to public health. And EPA's own analysis shows that the largest source of airborne lead emissions in the United States exposes millions of people across the country to a harmful pollutant for which there is no safe level of exposure. The research is clear—as it has been for years—that this exposure puts those who live, work, and attend school near airports where leaded avgas is used at a heightened risk of harm from one of the many adverse health effects associated with lead exposure. Lead emissions from piston-

finding that "children living within 500 m, 1,000 m, or 1,500 m of an airport had average blood lead levels that were 4.4, 3.8, or 2.1% higher, respectively, than other children"); Zahran et al., *supra* note 19, at 575–610 (examining the blood lead levels of children living within 2 kilometers of airports in Michigan and finding that "the odds that a child's [blood lead levels] will eclipse CDC thresholds for concern increases dose-responsively in proximity to airports, declines measurably in neighborhoods proximate to airports in the months following 9/11" when there was less air traffic, and "increases dose-responsively in the flow of [piston-engine aircraft] traffic"); RHV Lead Study, *supra* note 4, at 37–45 (explaining that "children proximate to [the general aviation airport] Reid-Hillview Airport present with systematically higher [blood lead levels], net of other measured sources of lead exposure risk, child demographic characteristics, and observed and unobserved neighborhood conditions," that children who live downwind of the airport had higher blood lead levels than those who did not, and that the blood lead levels "of sampled children increase with exposure to piston-engine aircraft operations at [the airport], net of all other factors" and ultimately "suggesting that child [blood lead levels] increase dose-responsively with [piston-engine aircraft] traffic"); *cf.* Won-Ju Park et al., *Blood Lead Level and Types of Aviation Fuel in Aircraft Maintenance Crew*, 84 Aviation, Space, & Env't Med. 1087 (2013) (analyzing the blood lead levels of aircraft-maintenance workers in the Republic of Korea, finding higher blood lead levels among maintenance workers that are based in airports that service propeller-driven aircraft and use leaded aviation gas relative to maintenance workers that are based in airports that service jets, which do not use leaded avgas, and concluding that leaded avgas emissions "could increase the [blood lead levels] of aircraft maintenance crews").

[47] *See* Miranda et al. *supra* note 46, at 1,515 (finding relationship persisted even after accounting for individual- and group-level confounders, including the proportion of Black and Hispanic residents in a relevant census block, the percent of census-block population receiving public assistance, median household income of census block, and the season during which an individual child was screened for blood lead); Zahran et al, *supra* note 19, at 581 (controlling for confounding factors including housing stock age, location of industrial point sources emitting lead, percentage of households receiving public-assistance income, percentage of adult population with a high school education or greater, median home prices in a neighborhood, and population density).

[48] *See* RHV Lead Study, *supra* note 4, at xv, xvi.

engine aircraft using leaded avgas therefore contribute to air pollution which may reasonably be anticipated to endanger public health or welfare. EPA must take long-overdue action to formally recognize this risk of harm and make an endangerment finding for leaded avgas, thereby beginning the process for regulating this source of dangerous air pollution.

Respectfully submitted,

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Exhibit 1

BEFORE THE ADMINISTRATOR OF THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PETITION FOR RULEMAKING & COLLATERAL RELIEF

FRIENDS OF THE EARTH
Petitioner
1717 Massachusetts Avenue, NW, 600
Washington, DC 20036-2002

PETITION FOR RULEMAKING SEEKING THE REGULATION OF LEAD EMISSIONS FROM GENERAL AVIATION AIRCRAFT UNDER § 231 OF THE CLEAN AIR ACT

October 3, 2006

Pursuant to the Right to Petition Government Clause contained in the First Amendment of the United States Constitution, the Administrative Procedure Act, and the Clean Air Act, petitioner files this petition for Rulemaking and Collateral Relief with the Administrator and respectfully requests him to undertake the following duties:

(1) Make a finding that lead emissions from general aviation aircraft endanger public health and welfare and issue a proposed emissions standard for lead from general aviation aircraft under § 231 (a) (2) (A) of the Clean Air Act; alternatively,

(2) If the Administrator believes that insufficient information exists to make such a finding, commence a study and investigation of the health and environmental impacts of lead emissions from general aviation aircraft, including impacts to humans, animals and ecosystems, under § 231 (a) (2) of the Clean Air Act, and issue a public report on the findings of the study and investigation.

BACKGROUND

On September 30, 2003, the Environmental Protection Agency ("EPA") published a Notice of Proposed Rulemaking (NPRM) for proposed amendments to existing emission standards for oxides of nitrogen (NOx) for newly certified commercial aircraft gas turbine engines with rated thrust greater than 26.7 kilonewtons (kN). 68 Fed. Reg. 56, 226. On December 12, 2003, on behalf of Bluewater Network, (currently a division of Friends of the Earth), the Golden Gate University Environmental Law and Justice Clinic commented on the proposed rule, as well as on the lack of regulation of lead emissions from general aviation aircraft. Regarding the latter issue, Bluewater argued that the combination of the lack of a threshold for safe lead exposure and the relatively high proportion of air lead pollution from general aviation aircraft should trigger the EPA's duties under Clean Air Act §231 to determine that lead emissions from this source endanger the public health and welfare.[1] Bluewater also noted that subpopulations living in the vicinity of general aviation airports, as well as aircraft workers and passengers, may be at particular risk for lead exposure.[2]

In November 2005, the EPA issued a response. The EPA claimed that there is insufficient information to enable the agency to determine that aircraft lead emissions may reasonably be anticipated to endanger public health and welfare.[3] The EPA further maintained that since a suitable, safe, unleaded aviation fuel has not been developed, regulating leaded aviation fuel would ground all general aviation aircraft, resulting in severe economic repercussions to the businesses that use the craft.[4]

Despite the volumes of studies pointing to the hazards of lead, the extent of the EPA's actions to address this problem have been to merely encourage the Federal Aviation Administration (FAA) to develop an unleaded aviation gasoline and to pursue voluntary initiatives to reduce the use of lead in aviation gasoline, while collecting information when possible.[5] The EPA is reluctant to take a more assertive stance on the problem of lead emissions from general aviation aircraft. Further reluctance is no longer appropriate, given the facts below.

PETITIONER

Petitioner FRIENDS OF THE EARTH is an environmental advocacy organization founded in 1969, with approximately 30,000 members across the nation. It's mission is to protect the planet from environmental degradation, including protecting clean air and healthy communities. BLUEWATER NETWORK is a non-profit organization founded in 1996 that works to protect air and water quality from harm caused by the transportation sector. Bluewater Network works to end environmental damage from cars, crafts, vessels, and to protect human

[1] Letter from Golden Gate University Environmental Law and Justice Clinic, on behalf of Bluewater Network, to the U.S. EPA (December 12, 2003).
[2] *Id*.
[3] Emission Standards and Test Procedures for Aircraft and Aircraft Engines: Summary and Analysis of Comments, US EPA (November 2005) [EPA Comments] at 45.
[4] *Id.* at 42.
[5] *Id.* at 43.

health and the planet by reducing dependence on fossil fuels. In March, 2005, Friends of the Earth merged with Bluewater Network. As a result of the merger, Bluewater Network is now a division of Friends.

STATEMENT OF LAW

On behalf of Friends of the Earth, the Environmental Law and Justice Clinic submits this petition to the EPA under the authority granted by the Administrative Procedure Act, 5 U.S.C. § 553.

In 1970, Congress gave the EPA authority through Section 231(a)(2)(A) of the Clean Air Act, 42 U.S.C. § 7571, to issue proposed emission standards when it determines that aircraft emissions from any class of aircraft engines "may reasonably be anticipated to endanger public health or welfare." Indeed, the EPA itself has confirmed that it has the authority to do so.[6] EPA must consult with the FAA regarding these standards. Section 231(a)(2)(B)(i). Pursuant to 49 U.S.C. § 44714, the FAA shall prescribe fuel standards to control or eliminate aircraft emissions that the EPA decides under section 231 endanger the public health or welfare. Only if the consultation determines that the proposed changes "would significantly increase noise and adversely affect safety," shall the changes not take effect. Section 231(a)(2)(B)(ii).

ARGUMENT

EPA action regarding lead in general aviation aircraft is long overdue. Studies increasingly show that lead in any quantity threatens the public welfare. Lead emissions from general aviation aircraft constitute a substantial proportion of all current lead air emissions. Congress gave EPA the authority through Section 231(a)(2)(A) to issue proposed emission standards when it determines that aircraft emissions "endanger public health or welfare." Based on the facts presented below, the petitioner contends that sufficient data exists to conclude that lead emissions from general aviation aircraft endanger the public heath and welfare, thus creating a duty for the EPA to propose emission standards. In the alternative, sufficient data regarding the dangers of airborne lead exist to commence a study concerning the extent of the health and environmental effects of general aviation lead emissions. Failure to do so in either instance would constitute arbitrary and capricious action under the APA, 5 U.S.C. § 706.

I. LEAD EXPOSURE IS HAZARDOUS TO HUMAN HEALTH

The EPA has repeatedly concluded that "lead is a very toxic element, causing a variety of effects at low dose levels."[7] Numerous federal agencies, including the EPA, the Occupational Safety and Health Administration, the Food and Drug Administration, and the Department of Health and Urban Development, have implemented regulations controlling lead content and use.[8]

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[6] *Id.* at 5.

[7] Lead Compounds Hazard Summary, U.S. EPA (April 1992, modified January 2000), available at http://www.epa.gov/ttn/atw/hlthef/lead.html

[8] Toxicological Profile for Lead, U.S. Department of Health and Human Services (September 2005) [Toxicological Profile] at 14-17, available at http://www.atsdr.cdc.gov/toxprofiles/tp13.pdf

Acute high lead exposure can cause grave physiological consequences, including death and brain damage.[9] The severity of lead exposure differs according to time and levels of exposure, and is usually measured by blood lead levels.[10] However, blood lead levels reflect only recent exposure to lead.[11] Of the lead that is retained in the human body, most is ultimately deposited in the bones.[12] The inert lead deposited in bones can later reenter the blood stream in periods of physiological stress, pregnancy, lactation, chronic disease, and old age.[13] This reentry is exacerbated by calcium deficiency, because lead can inhibit or mimic the actions of calcium. [14] Hence, lead can affect an organism long after initial exposure.

According to the Agency for Toxic Substances and Disease Registry (ATSDR), "lead could potentially affect any system or organs in the body."[15] Common targets for lead toxicity are the cardiovascular, renal, and nervous systems.[16] The most common cardiovascular effect is increased blood pressure.[17] At the same time, lead exposure may compromise the renal system, especially by depressing the kidneys' glomerular filtration rate.[18] However, the most sensitive target for lead toxicity is the nervous system, resulting in malaise, forgetfulness, irritability, weakness, headache, and impaired concentration.[19]

The pervasive and multi-faceted hazards of lead are well documented. Therefore, as the Agency for Toxic Substances states, it is important to interdict all lead exposures.[20]

II. STUDIES INCREASINGLY SHOW THAT NO LEVEL OF LEAD IS SAFE.

The health hazards of lead are especially worrisome because studies increasingly show that no exposure to lead is safe. The levels at which adverse health effects are believed to occur have been revised downward several times in recent regulatory history.[21] For example, in 1972, the blood level considered safe for children was 40 mcg/dL.[22] More recently, the EPA defined the blood level of 10 mcg/dL as the "concentration of concern," but emphasized that this standard is not a threshold below which safety may be assured since scientific studies do not indicate any clear toxicity threshold for lead.[23]

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[9] Lead Toxicity Environmental Alert, U.S. Agency for Toxic Substances and Disease Registry (October 1992, revised October 2000) [ATSDR Report] at 16, available at http://www.atsdr.cdc.gov/HEC/CSEM/lead/docs/lead.pdf
[10] *Id.*
[11] *Id.* at 14.
[12] *Id.*
[13] *Id.* at 15.
[14] *Id.*
[15] Toxicological Profile at 21.
[16] *Id.* at 8, 21.
[17] *Id.* at 27.
[18] *Id.* at 28.
[19] ATSDR Report at 17.
[20] *Id.*
[21] *Id.*
[22] Preventing Lead Poisoning in Young Children: A Statement by the Centers for Disease Control and Prevention (October 1991), available at http://www.cdc.gov/nceh/lead/publications/books/plpyc/contents.html.
[23] Identification of Dangerous Levels of Lead, Final Rule, U.S. EPA (January 5, 2001), 66 Fed. Reg. 1206.

Indeed, recent studies show that lead blood levels well below 10 mcg/dL are associated with increases in serious health effects in both children and adults.[24] For example, increases in chronic kidney disease have been observed in hypertensive adults at blood lead levels of between 2.5 to 3.8 μg/dL.[25]

Children have generally been shown to absorb a larger fraction than adults of both inhaled and ingested lead, [26] and are more sensitive to lead induced toxicity than adults, [27] especially in relation to the nervous system. At lower levels of exposure, lead may compromise cognitive development and cause learning disabilities and lower IQ levels.[28] For example, Lanphear et. al. estimated a decline of 6.2 points in full scale IQ for an increase in blood lead levels from <1 to 10 μg/dL.[29] Low-level exposure has also been associated with neurological effects such as hearing impairment and peripheral nerve dysfunction.[30]

New data increasingly shows that health effects occur in both children and adults at low levels of lead exposure. Therefore, to protect the health and welfare of the public, especially of children, the EPA should strive to eliminate every source of lead to which the public could be exposed.

III. LEAD EMISSIONS FROM GENERAL AVIATION AIRCRAFT POSE HUMAN HEALTH AND ECOLOGICAL CONCERNS.

The use of leaded aviation gasoline results in the emission of both organic and inorganic lead-containing compounds. Organic alkyl lead compounds such as tetraethyl lead ("TEL") are emitted into the air mostly from fueling operations. TEL decomposes fairly quickly to inorganic forms of lead once dispersed into the air, water, or soil. For example, the half-life of TEL in summer atmospheres is approximately 2 hours and is on the order of several days in winter atmospheres.[31]

Inorganic forms of lead enter the environment from the decomposition of organic alkyl lead compounds, and more significantly, as tailpipe emissions from the gasoline combustion process. Inorganic forms of lead are highly persistent in the environment. Wet or dry deposition removes lead particles from the atmosphere and deposits them on soil and water surfaces.[32] Lead emitted as particles may remain airborne for up to ten days and may thus be transported far from the original source.[33]

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[24] ATSDR Report at 17.
[25] Muntner, P.; He, J.; Vupputuri, S.; Coresh, J.; Batuman, V. (2003) Blood lead and chronic kidney disease in the general United States population: results from NHANES III. Kidney Int. 63: 1044-1050.
[26] ATSDR Report at 9.
[27] Toxicological Profile at 9.
[28] Toxicological Profile at 25.
[29] Lanphear, B. P. (2005) Childhood lead poisoning prevention: too little, too late. JAMA J. Am. Med. Assoc. 293: 2274-2276.
[30] ATSDR Report at 17.
[31] PBT National Action Plan for Alkyl-Lead, U.S. EPA Persistent, Bioaccumulative, and Toxic Pollutants (PBT) Program (June 2002) [PBT Action Plan] at 13.
[32] *Id.*
[33] *Id*.

As a result of the use of leaded aviation gasoline, humans and ecological receptors at or near general aviation airports may be exposed to elevated levels of lead. The main routes of human exposure to lead compounds at or near general aviation airports in urban areas include: (i) inhalation of airborne organic and inorganic lead, (ii) ingestion of lead-contaminated dusts formed via deposition of airborne lead, and (iii) ingestion of contaminated home-grown fruits and vegetables (also via particulate deposition). In farming areas, additional exposure could result from the contamination of food-animals via lead deposition onto soils, forage areas, and farm ponds.

Inhalation and ingestion exposures are likely to occur to workers, pilots, passengers and other individuals at general aviation airports. Inhalation, ingestion, garden-produce and other indirect exposures are likely to occur to residents and others located on the periphery of general aviation airports.

In addition, lead emissions from general aviation airports may also accumulate in local and regional surface waters:

> Transport of lead to surface waters can occur through direct deposition from the atmosphere, via industrial waste water discharge, or as runoff (e.g., lead associated with suspended solids in the erosional process) […] Inorganic lead may bioconcentrate in some aquatic animals, especially benthic organisms such as bottom feeding fish and shellfish such as mussels….[34]

In this way, lead from general aviation airports is likely to contaminate sources of drinking water and fishing resources, and could also cause various adverse ecological impacts.

While the greatest source of lead air emissions comes from stationary sources like lead smelters, general aviation is the one major mobile source, constituting at least 13% all lead air emissions.[35] Other mobile sources of airborne lead emissions are recreational marine vehicles and racing automobiles.[36] The latter of these lead sources is being phased out. The National Association of Stock Car Auto Racing (NASCAR) has announced that by 2008, NASCAR will switch to unleaded gasoline.[37] This is the result of the EPA's 2002 Persistent, Bioaccumulative, and Toxic Pollutants (PBT) Action Plan, in which it identified the removal of lead from NASCAR vehicle fuel as its key priority over the next five years.[38] The EPA has not made the removal of lead from general aviation fuel a similar priority even though, in 1996, U.S. refineries produced over 3,000 times as many gallons of aviation gasoline as NASCAR fuel used in 1998.[39]

EPA's concern with removing lead from NASCAR fuel indicates the importance of removing mobile source lead emissions, and yet EPA has not acted to address lead fuel use in general aviation fuel. General aviation constitutes a substantially higher percentage of lead air

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[34] *Id*.
[35] National Air Quality and Emission Trends Report, U.S. EPA (2003).
[36] PBT Action Plan at 7.
[37] Viv Bernstein, *NASCAR Plans to Switch to Unleaded Fuel in '08*, New York Times, January 20, 2006, at 2.
[38] PBT Action Plan at 3.
[39] *Id*. at 25.

emissions than auto racing. In 2002, general aviation comprised 125.5 annual tons, or about 88% of lead from all mobile sources.[40] This percentage will increase with NASCAR adopting unleaded fuel. Now that leaded gasoline use in NASCAR has been addressed, it is time for the EPA to focus on the more important task of removing lead from general aviation fuel.

IV. SAFE UNLEADED ALTERNATIVES TO AVIATION GASOLINE EXIST AND SHOULD BE BETTER UTILIZED.

As described below, contrary to the EPA's assertions,[41] safe unleaded alternatives to aviation gasoline do exist. Since 1999, the research and development process has produced unleaded fuels that have received approval from the FAA for current use. Tens of thousands of low-performance aircraft have received supplemental type certificates allowing them to run on unleaded automobile gasoline (commonly referred to as "mogas" in the aviation community). Additionally, a mogas alternative, 82UL, has been developed for use by some low-performance planes. The combination of these two fuels can be utilized by nearly seventy percent of all piston-driven aircraft. Additionally, the FAA allows a select number of planes to run on an ethanol based aviation fuel (AGE85); the remaining thirty percent of general aviation planes can potentially use this unleaded gasoline.

A. A LARGE PORTION OF GENERAL AVIATION AIRCRAFT CAN CURRENTLY USE UNLEADED AUTOMOBILE GASOLINE SAFELY ONCE ISSUED A SUPPLEMENTAL TYPE CERTIFICATE BY THE FAA.

Seventy percent of general aviation aircraft are capable of running on mogas upon being issued a supplemental type certificate (STC).[42]

To ensure the production of safe aircraft, the FAA puts all planes through a certification process. Once the FAA determines that an aircraft meets the prescribed safety standards, it shows its approval by issuing a "type certificate." 49 U.S.C.S. § 44704(a)(1). For alterations to an airplane or its engine, each applicant must show that the changes comply with the aforementioned safety standards. 14 C.F.R. § 21.115 (2006). When the FAA confirms compliance, they issue a "supplemental type certificate." 49 U.S.C.S. § 44704(b)(1). Since changes in fuel usage involve the plane's engine, approval to begin using automotive gasoline (mogas) rather than aviation gasoline (avgas) requires the applicant to obtain an STC. Indeed, the FAA has issued STCs for airplanes and engines using mogas since 1982,[43] including over 40,000 through the Experimental Aircraft Association (EAA).[44]

As long as pilots use mogas in accordance with their STC, safety is no more an issue than with avgas. The FAA first issued a STC approving the use of mogas twenty-four years ago.

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[40] National Emissions Inventory for Lead, U.S. EPA (2002).
[41] EPA Comments at p.42.
[42] Michael A. Dornheim, *100LL Demise Expected Over Next Decade*, Aviation Week & Space Technology, July 23, 2001, at 51.
[43] *Id.*
[44] Experimental Aircraft Association, http://www.eaa.org/education/fuel/index.html (last visited March 13, 2006).

Since then, the FAA has determined that aircraft using mogas are as safe as those running on avgas:

> Autogas[45] use has been extensively compared, tested, and analyzed. Autogas has been shown to be an acceptable alternative to avgas for airplanes and engines approved for such use. Airplanes and engines approved for autogas have met the FAA certification requirements for engine detonation, engine cooling, fuel flow, hot fuel testing, fuel system compatibility, vapor lock, and performance.…In summary, there are numerous studies and technical reports available comparing autogas to avgas for use in certified airplanes and engines. The service history for airplanes and engines using autogas has been good and is comparable to avgas.[46]

A plane's mogas STC specifies which grade of mogas it can use. Many of these STCs allow the use of regular grade unleaded mogas in place of Grade 80/87 avgas.[47] However, some allow premium grade mogas, usually for planes that would otherwise run on 91/96 or 100LL avgas.[48] Given these specifications, the FAA,[49] Experimental Aircraft Association,[50] and other aviation commentators[51] emphasize that pilots should strictly adhere to the terms of their STCs. Nonetheless, since STCs allow the use of a variety of grades of mogas to replace multiple grades of avgas, the number of general aviation aircraft able to run on mogas is greatly increased.

In 2000, the FAA Small Airplane and Engine and Propeller Directorate approved the use of another unleaded fuel, 82Unleaded (82UL) gasoline, as an alternative to mogas.[52] 82UL is a variation of mogas designed specifically for piston-driven aircraft, produced from the same fuel stocks but with fewer of the additives found in automobile gasoline.[53] Planes can use it with STCs that approve the use of mogas with an octane rating of 82 or less. While 82UL is not yet commercially available, it has already completed the FAA's rigorous approval process. Given its certification, 82UL could be phased into production if needed.

From a cost standpoint, increased utilization of mogas would lead to significant savings for general aviation pilots. Nationally, 100LL avgas averages $3.72 per gallon with the price exceeding six dollars in several areas.[54] By comparison, mogas pumped at airports averages just $2.77 per gallon with a high of four dollars in only one region.[55] Gasoline pumped from the neighborhood station costs even less: the national average is $2.36 per gallon with the price

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[45] In aviation circles, "Autogas" and "Mogas" are used interchangeably.
[46] Letter from Michael Gallagher, Manager of the FAA Small Airplane Directorate, to Earl Lawrence, Executive Director of the Experimental Aviation Association (June 4, 1998), *available at* http://www.eaa.org/education/fuel/letter.pdf
[47] FAA Revised Special Airworthiness Information Bulletin, April 5, 2000, available at http://www.faa.gov/aircraft/safety/alerts/saib/media/CE-00-19R1.htm (last visited March 15, 2006).
[48] *Id*.
[49] *Supra* note 46.
[50] *Supra* note 44.
[51] John Ruley, *Avgas vs. Autogas*, May 5, 2004, http://www.avweb.com/news/maint/187232-1.html.
[52] *Supra* note 47.
[53] *Id.*
[54] AirNav, http://www.airnav.com/fuel/report.html (last visited March 13, 2006).
[55] *Id*.

falling between $2.05 and $2.93.[56] Based on the average prices, a pilot would save ninety-five dollars for every one hundred gallons of fuel bought at the airport; the savings increases to $141.00 when purchased at a gas station.

Increasing the use of mogas in aircraft would prove highly beneficial to the public generally and to general aviation pilots specifically. If all seventy percent of those planes able to use mogas did so, it would result in a thirty percent reduction of overall avgas use.[57] Such a decrease would result in the removal of more than thirty-seven tons of lead emissions from the air and a significant overall diminution of lead exposure to the American people.[58] Similarly, less avgas use would reduce the more direct lead exposure experienced by residential communities adjacent to airports as well as pilots and airport personnel, in addition to reducing the cost of operating general aviation aircraft. With the FAA already deeming mogas use safe through its certification program, an exercise of the EPA's section 231 authority would prompt the FAA to expand a program already in existence. Increased issuance of mogas STCs would have a positive impact on the general aviation community and the public at large.

B. HIGH-PERFORMANCE AIRCRAFT WITH PROPER CERTIFICATION CAN SAFELY RUN ON ETHANOL BASED FUEL.

In April 1999, the FAA issued STCs for aircraft and engines to use Aviation Grade Ethanol 85 (AGE85).[59] AGE85 is an unleaded, "'high-performance, high-octane fuel -- just what newer, high-performance, high-compression aircraft engines need [--]'" designed specifically to replace 100LL fuel.[60]

While high-performance aircraft comprise only thirty percent of general aviation planes, they consume nearly seventy percent of the total avgas due to the increased energy needs of their 200+ horsepower engines. Though AGE85 is not widely available at present, current and continued expansion of commercial ethanol production facilities[61] could potentially cover the fuel needs of most high-performance engines, resulting in the removal of nearly eighty-eight tons

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[56] GasWatch, http://www.gaswatch.info/ (last visited March 13, 2006).

[57] *Supra* note 42. Generally speaking, approximately 70% of general aviation aircraft are considered "low-performance." According to 14 C.F.R. § 61.31(f) (2006), planes with engines of greater than 200 Horsepower are classified as "high-performance" and require additional pilot training. Only 30% of general aviation aircraft are high-performance; however they use nearly 70% of consumed avgas.

[58] 2002 National Emissions Inventory for Lead, U.S. EPA (General Aviation emitted 125.5 tons of lead in 2002).

[59] STCs are available for the Cessna 180 and 182s as well as the O-470 and UTS engines. Additionally, dual-fuel STCs are available for the same aircraft and engines. STCs for the Lycoming IO-360 and Pratt and Whitney R-1340 are in progress. *See* http://www.age85.org/STCs.htm (last visited March 15, 2006).

[60] At Last, A Low-Cost Aviation Gasoline That Gets The Lead Out, Science Daily, July 20, 1999, available at http://www.sciencedaily.com/releases/1999/07/990720083151.htm (last visited March 15, 2006).

[61] At the end of 2005, construction of new refineries and ongoing expansions were expected to add as much as 1.5 billion gallons of annual ethanol production capacity in the United States. Since 2001, U.S. ethanol production has increased by 126%. Renewable Fuels Association, From Niche to Nation: Ethanol Industry Outlook 2006, at 2, available at http://www.ethanolrfa.org/objects/pdf/outlook/outlook_2006.pdf (last checked April 5, 2006). Also, Richard Branson, owner of Virgin Atlantic, recently announced plans to invest $400 million in ethanol fuel factories for use in his planes and trains; $30- $40 million of the initial investment will be made in the United States as soon as this year. Jason Niss, *Branson to put $400 million into making 'green' fuel*, London Independent, April 2, 2006, News at 1.

of lead emissions. Additionally, since dual-fuel STCs are also available,[62] blends of AGE85 with 100LL, while not as substantial as exclusive AGE85 use, could still result in significant lead emission decreases. As 100LL availability decreases and AGE85 availability increases, blending of the two offers a viable solution for a transition from one fuel to the other.

As with mogas, AGE85 offers significant cost-benefits to general aviation pilots. Nationally, 100LL avgas averages $3.72 per gallon.[63] When the FAA first approved AGE85 in 2000, pure ethanol cost $0.95 per gallon and AGE85 was expected to sell for $1.10 per gallon; a 16% increase over the initial price.[64] Today, ethanol averages $2.39 per gallon in the Midwest[65] and $2.45 nationally.[66] Calculating the price as a 16% increase over the averages, AGE85 would cost from $2.77 to $2.84. That amounts to a cost-savings of $88 to $95 for every one-hundred gallons of fuel.

Recently, a Brazilian aircraft company, Embraer, developed and received type certification (from the Brazilian equivalent of the FAA) for the ethanol fueled Ipanema cropduster. This plane is the first "series production aircraft in the world coming out of the factory certified for flying with ethanol."[67] In addition to running exclusively on ethanol fuel, the new engine provides a five percent boost in power, improving takeoff, climbing rate, speed, and maximum altitude.[68] The reception of the Ipanema has been overwhelmingly positive: Scientific American named it one of the top-50 worldwide inventions of 2005.[69]

While the Ipanema is not yet approved for use in the United States, it is important to note that the plane's engine is an altered version of the American made Lycoming motor,[70] suggesting that it would be either relatively easy to develop an American version or quickly adopt the Brazilian one for use in the United States. Furthermore, the French company Aero-Alcohol has developed a kit to convert non-ethanol Ipanema planes for ethanol use. This development has attracted the attention of the American Society for Testing and Materials (ASTM) which hopes to consolidate international ethanol standards using the Ipanema's specifications as a starting point.[71]

AGE85 has already received approval for use by the FAA as a safe and viable fuel even though it is not yet available nationwide. With aviation-related ethanol fuel research on the rise at the FAA Hughes Technical Center, in Brazil, and elsewhere, and with American ethanol

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[62] *Supra* note 59.
[63] *Supra* note 54.
[64] Perspectives: A newsletter covering the research, demonstration and education projects of the Iowa Energy Center, January/February 2000, available at http://www.energy.iastate.edu/news/newsletters/perspectives/JanFeb2000.pdf (last visited March 31, 2006).
[65] State average fuel ethanol rack prices, available at http://ethanolmarket.com/fuelethanol.html (last visited March 31, 2006).
[66] Fuel ethanol terminal market price history – 18 months, available at http://www.energy.ca.gov/gasoline/graphs/ethanol_18-month.html (last visited March 31, 2006).
[67] http://www.greencarcongress.com/2004/10/embraerrsquos_e.html (last visited March 15, 2006).
[68] *Id.*
[69] James E. Hardwick, *The Ethanol-Fueled, Brazilian-Built Ipanema Agricultural Aircraft*, Business & Commercial Aviation, February 1, 2006.
[70] E-mail from a Brazilian Diplomat (March 14, 2006) (on file with author).
[71] *Id.*

production increasing and President Bush's 2006 State of the Union address encouraging the industry's growth, use of AGE85 should increase in the near future. This will provide unleaded aviation fuel for high-performance aircraft of a similar quality to avgas.

Finally, European development of a diesel-cycle jet fuel general aviation engine offers yet another possible solution: jet fuel is unleaded and readily available at airports in Europe.[72]

CONCLUSION

As described above, nearly seventy percent of general aviation aircraft can safely use either standard unleaded automobile gas or 82UL gas. Switching to these alternatives would reduce lead emissions from general aviation aircraft by almost 38 tons. Likewise, the ethanol-based AGE85, which has received FAA approval, has the potential to be used by the remaining thirty percent of planes, eliminating an additional 87.85 tons of lead emissions.

These are just some of the current alternatives to leaded avgas. As energy independence becomes a more prevalent societal and economic issue, alternative fuel research is increasing and bound to produce even more choices. In such a dynamic environment, the EPA has the opportunity to adopt rules forcing this technology -- authority the EPA agrees it has under section 231.[73] Indeed, since mogas, 82UL, and AGE85, are already in existence and have the approval of the FAA, the EPA does not even need to force technology development: it only needs to encourage its present utilization.

WHEREFORE, petitioners request that the Administrator:

(1) Make a finding that lead emissions from general aviation aircraft endanger public health and welfare and issue a proposed emissions standard for lead from general aviation aircraft under § 231 (a) (2) (A) of the Clean Air Act; or, in the alternative,

(2) Commence a study and investigation of the health and environmental impacts of lead emissions from general aviation aircraft, including impacts to humans, animals and ecosystems, under § 231 (a) (2) of the Clean Air Act, and issue a public report on the findings of the study and investigation.

As required by law, the EPA is required to give this petition prompt consideration. Additionally, under the Administrative Procedure Act, agency action includes a failure to act. Therefore, petitioners request a substantive response to this petition within 180 calendar days.[74]

[72] Michael A. Taverna, *SMA Diesel Revs Up*, Aviation Week & Space Technology, May 24, 2004, at 68.
[73] *Supra* note 3 at 4 (EPA conclusion that section 231 does not preclude a technology forcing standard).
[74] 42 U.S.C. § 7604(a) (requiring notice of 180 days prior to commencing an action for unreasonable delay).

Respectfully submitted,

_____	_____
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STUDENT CLINICIANS FOR PETITIONER
FRIENDS OF THE EARTH

Exhibit 2

BEFORE THE ADMINISTRATOR OF THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PETITION FOR RECONSIDERATION

FRIENDS OF THE EARTH
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1100 15th St. NW, 11th Floor
Washington, DC 20005

PHYSICIANS FOR SOCIAL RESPONSIBILITY
Petitioner
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OREGON AVIATION WATCH
Petitioner
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PETITION FOR RECONSIDERATION OF EPA'S DENIAL OF FRIENDS OF THE EARTH'S OCTOBER 3, 2006 PETITION FOR RULEMAKING SEEKING THE REGULATION OF LEAD EMISSIONS FROM GENERAL AVIATION AIRCRAFT UNDER § 231 OF THE CLEAN AIR ACT AND PETITION FOR RULEMAKING SEEKING THE REGULATION OF LEAD EMISSIONS FROM GENERAL AVIATION AIRCRAFT UNDER § 231 OF THE CLEAN AIR

April 21, 2014

INTRODUCTION AND SUMMARY OF PETITION

On October 3, 2006, Friends of the Earth ("FoE") submitted a Petition for Rulemaking (the "Petition") with the Administrator of the U.S. Environmental Protection Agency ("EPA"). In the Petition, FoE asked EPA to find that lead emissions from aviation aircraft using leaded aviation gasoline ("avgas") contribute to lead air pollution that may endanger public health or welfare. On July 18, 2012, nearly six years after the Petition was filed, EPA denied FoE's

request for an endangerment finding.[1] This Petition seeks reconsideration of that denial and affirmatively requests that EPA make an endangerment finding.

The basis of this Petition is simple and straightforward. The only showing required for a finding of endangerment is that lead emissions from aircraft engines fueled by leaded aviation gasoline cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare. In this case, both prongs of that test have been met. By categorizing lead as a criteria pollutant and promulgating National Ambient Air Quality Standards ("NAAQS") for lead, EPA has already determined conclusively that lead is a pollutant that may reasonably be anticipated to endanger public health or welfare. EPA also has determined that lead emissions from aircraft engines fueled by leaded aviation gasoline constitute the largest single contributing source to overall airborne lead pollution. In so doing, EPA has established that emissions from aircraft using leaded aviation gasoline cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare. There is no need for further study. EPA has all of the evidence it needs to make an endangerment finding.[2]

PETITION

Pursuant to the Right to Petition Government Clause contained in the First Amendment of the United States Constitution, the Administrative Procedure Act, and the Clean Air Act ("CAA"), petitioners file this Petition for Reconsideration with the Administrator and respectfully request the following:

(1) That the Administrator reconsider the denial of FoE's October 3, 2006 Petition;

(2) That the Administrator find that lead emissions from general aviation aircraft cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare; and

(3) That after the Administrator makes an endangerment finding, the Administrator commence the rulemaking process and issue proposed emission standards for lead from general aviation aircraft under §231(a)(2)(A) of the CAA.

PETITIONERS

Friends of the Earth

Petitioner FoE is a tax-exempt environmental advocacy organization founded in 1969 and incorporated in the District of Columbia, with offices in Washington, DC and Berkeley,

[1] Memorandum from EPA Administrator in Response to Petition Regarding Lead Emissions from General Aviation Aircraft Piston-Engines (Jul. 18, 2012), *available at* http://www.epa.gov/otaq/regs/nonroad/aviation/ltr-response-av-ld-petition.pdf [hereinafter "EPA's Response"].

[2] As discussed below, after EPA finds endangerment, it should take immediate steps to start phasing out the use of leaded aviation gasoline.

California. As of April 2014, FoE had more than 23,600 members across all 50 states in the United States and more than 235,000 activists. FoE is part of Friends of the Earth International, a federation of grassroots groups working in 74 countries on today's most urgent environmental and social issues.

FoE's mission is to defend the environment and champion a healthy and just world. To this end, one of FoE's key programs is the promotion of policies and actions that prevent air pollution and that minimize the negative impacts of pollution on human health. FoE relies on sound science and uses the law to create and advocate for innovative strategies to conserve natural resources and protect public health and the environment. A core element of FoE's mission is work to reduce air and water pollution throughout the United States. To these ends, FoE actively engages in rulemaking efforts before EPA and other regulatory agencies relating to the regulation of industrial sources of air and water pollution and in litigation to support these efforts.

Physicians for Social Responsibility

Physicians for Social Responsibility ("PSR") is the largest physician-led nonprofit organization in the U.S. working to slow, stop and reverse global warming and toxic degradation of the environment. Founded in 1961, PSR has a national network of 50,000 health professionals and concerned citizen members and e-activists, twenty-five PSR chapters in nineteen states, and roughly thirty student PSR chapters at medical and public health schools. In 1992, recognizing that new dangers threaten our communities, PSR expanded its mission to include environmental health. Since then, PSR has brought the medical and public health perspective to protect today's and future generations from the health effects of global warming and toxic degradation of the environment. PSR strives to educate and activate the medical and broader health community, and the public, through research, analysis, collaboration, and targeted communications. PSR advocates for government and societal change at the local, state, and national level. PSR has been active in identifying and combating the effects of lead exposure, particularly the effects on children, through its research, advocacy, and educational activities. PSR played a key role in the passage of the National Housing Bill of 1992, which significantly reduced the amount of lead in drinking water in the United States. More recently PSR's Los Angeles chapter co-sponsored The Childhood Lead Poisoning Prevention Act of 2007, which sought to increase the number of children tested for lead poisoning by utilizing the state's immunization program.

Oregon Aviation Watch

Oregon Aviation Watch ("OAW") is a non-profit organization dedicated to research, education and advocacy on behalf of the public interest and public welfare regarding aviation issues. OAW seeks to enhance and protect the quality of life for Oregon residents by eliminating the adverse impacts of aviation activity, as well as achieve a transparent, accountable, and sustainable aviation system that neither disregards nor diminishes the environment, livability, health, or well-being of current and future generations of Oregon residents. OAW provides information on aviation policy in Oregon and nationally, and shares its experiences dealing with these issues. OAW strives to reduce the sense of isolation and powerlessness people sometimes feel when confronted with the bureaucratic runaround and lack of democratic principles so often

encountered when dealing with aviation issues. To further these goals OAW has gathered and written numerous articles on the subject of lead pollution from piston craft airplanes, and has filed requests and motions with local airports to install monitoring equipment to further show the effects and dangers of leaded avgas. OAW also provides regular email updates to a broad base of local supporters, elected officials and environmental organizations to keep the public apprised of current aviation issues. OAW is active at the local level in ensuring decision-makers take into account the health and well-being of communities who live near airports throughout Oregon.

PETITION HISTORY

Over ten years ago, FoE brought the issue of lead emissions from general aviation aircraft to the attention of EPA in a letter requesting that the Agency make an endangerment finding regarding such emissions.[3] Two years later EPA responded, stating that there was insufficient evidence for EPA to make a determination that aircraft lead emissions could be reasonably anticipated to endanger public health or welfare.[4]

On October 3, 2006, FoE submitted a Petition for Rulemaking with EPA (the "2006 Petition"). In the 2006 Petition, FoE again asked EPA to find that lead emissions from general aviation aircraft endanger public health or welfare. FoE also requested that EPA issue a proposed emissions standard for lead from general aviation aircraft. On November 16, 2007, EPA requested public comment on the 2006 Petition.[5] FoE submitted comments to EPA on March 18, 2008.

On April 28, 2010, EPA issued an Advanced Notice of Proposed Rulemaking ("ANPR").[6] In the ANPR, EPA acknowledged the serious health effects associated with exposure to lead at much lower levels than previously identified.[7] The ANPR also confirmed that aircraft fueled by leaded aviation gasoline constitute "the largest single source category for emissions of lead to air, comprising approximately half of the national inventory."[8] The ANPR further noted that communities living near airports, children attending schools near airports, and airline pilots are all at risk of exposure to lead from these aircraft.[9] Nevertheless, the ANPR sought further public input regarding the 2006 Petition.[10]

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[3] Letter from Golden Gate Univ. to EPA Administrator (Dec. 12, 2003), *available at* http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2002-0030-0106 (In 2003, FoE was known as the Bluewater Network).

[4] EPA, Emissions Standards and Test Procedures for Aircraft and Aircraft Engines: Summary and Analysis of Comments 40-43 (Nov. 2005).

[5] Petition Requesting Rulemaking to Limit Lead Emissions from General Aviation Aircraft; Request for Comments, 72 Fed. Reg. 64,570 (proposed Nov. 16, 2007).

[6] Advance Notice of Proposed Rulemaking on Lead Emissions From Piston-Engine Aircraft Using Leaded Aviation Gasoline, 75 Fed. Reg. 22,439 (proposed Apr. 28, 2010) [hereinafter "ANPR"].

[7] *See id.* The ANPR also admitted that EPA's review of lead air quality standards in 2008 did not identify a safe level of lead emissions.

[8] *Id.* at 22,442.

[9] *Id.* at 22,459-463.

[10] *Id.* at 22,441.

On July 18, 2012, nearly six years after the 2006 Petition was filed, EPA issued its Memorandum in Response to Petition Regarding Lead Emissions from General Aviation Aircraft Piston-Engines denying FoE's request for an endangerment finding.[11] EPA suggested that more data regarding demographics and air lead levels at and around airports would allow EPA to make a judgment on whether lead emissions from aircraft fueled by leaded aviation gasoline are a danger to public health.[12] EPA also suggested that additional studies were necessary "since previous airport modeling studies had not focused on identifying near-field gradients in lead concentrations from piston-engine aircraft, or attempted to differentiate aircraft lead emissions from other sources of ambient air lead (e.g., roadways)."[13] EPA estimated that it would take up to three years in order to make a judgment on whether lead emission from general aviation aircraft piston engines cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare.[14]

FACTUAL BACKGROUND

1. EPA's Recognition of the Health Impacts of Airborne Lead.

More than forty years ago, in 1973, EPA concluded that airborne lead was a danger to public health including "a significant risk of harm to the health of urban population groups, especially in children" and required a phase out of lead used in motor vehicle gasoline.[15] Three years later, in 1976, EPA listed lead as a pollutant that "cause[s] or contribute[s] to air pollution which may reasonably be anticipated to endanger public health or welfare" and is emitted "from numerous or diverse mobile or stationary sources." [16]

In 1978, EPA stated that "it remains the Agency's belief that airborne lead directly and indirectly contributes to the risk of adverse health consequences and that sufficient clinical and epidemiological evidence is available to form a judgment as to the extent of this contribution."[17] EPA further found that an increase in airborne lead produces increases in blood lead levels that cause human health risks such as "permanent, severe, neurological damage or death."[18]

A few years later, in 1982, EPA restated that increased use of lead in gasoline should be avoided out of "concern over the impact of total environmental loadings of lead, including exposures that may result from contaminated soil, dust, water," and foodstuffs.[19] Then, in 1986, EPA revised its "Air Quality Criteria" for lead, recognizing that lead is more dangerous than

[11] *See* EPA's Response.

[12] *Id.*at 5.

[13] *Id.* at 8.

[14] *Id.* at 15.

[15] ANPR at 22,446.

[16] Addition of Lead to List of Air Pollutants, 41 Fed. Reg. 14,921, 14,921 (Apr. 8, 1976); 42 U.S.C. § 7408(a)(1)(A), (a)(1)(B).

[17] National Primary and Secondary Ambient Air Quality Standards for Lead, 43 Fed. Reg. 46,246, 46,250 (Oct. 5, 1978).

[18] *See id.* at 46,247.

[19] Regulation of Fuels and Fuel Additives, 47 Fed. Reg. 38,070, 38,076 (Aug. 27, 1982).

EPA had previously found.[20] EPA concluded that reducing lead air pollution would "result in significant widespread reductions in levels of lead in human blood."[21] EPA also again recognized that children have a greater risk for experiencing lead induced health effects.[22]

In 2001, EPA admitted that "there is no known threshold for lead."[23] Then, in 2008, EPA again tightened air quality standards for lead due to increased evidence that demonstrates adverse health effects occurring at lower lead levels than previously thought.[24] EPA further recognized that airborne lead emissions can continue to harm human health for years: "[o]nce deposited out of the air, [lead] can subsequently be resuspended into the ambient air and, because of the persistence of [lead], [lead] emissions contribute to media concentrations for some years into the future."[25] In 2010 and 2011, EPA designated many areas of the country as not meeting the air quality standards it set for airborne lead concentrations.[26]

EPA continued to find a wide array of serious negative health effects – due to lead exposure – at lower and lower levels in adults and especially in children.[27] EPA acknowledged that "the neurotoxic effects of Pb are not generally reversible."[28] As EPA also noted, more than 6,000 studies on lead's health effects have come out since 1990 showing that "[e]xposures to low levels of lead early in life have been linked to effects on IQ, learning, memory, and behavior."[29] EPA has also continued to acknowledge that the health effects from airborne lead exposure are known to occur at much lower levels than experts originally believed.[30] In particular, EPA has explicitly stated that, "the epidemiologic and toxicological study findings show that progressively lower blood [lead] levels or [lead] exposures are associated with cognitive deficits in children."[31]

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[20] *See* EPA, Air Quality Criteria for Lead 1-159 (June 1986), *available at* http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2007-0294-0178.

[21] *Id.*

[22] *Id.*; *see also* National Ambient Air Quality Standards for Lead, 73 Fed. Reg. 66,964, 66,968 (Nov. 12, 2008) (characterizing lead poisoning as the "number one environmental threat to the health of children in the United States").

[23] Lead: Identification of Dangerous Lead Levels, 66 Fed. Reg. 1206, 1215 (Jan. 5, 2001); *see also* National Ambient Air Quality Standards for Lead, 73 Fed. Reg. 66,964 at 66,968 (acknowledging that "there is now no recognized safe level of [lead] in children's blood").

[24] National Ambient Air Quality Standards for Lead, 73 Fed. Reg. 66,964.

[25] *Id.* at 66,971.

[26] *See* Air Quality Designations for the 2008 Lead (Pb) National Ambient Air Quality Standards, 75 Fed. Reg. 71,033 (Nov. 22, 2010) (codified at 40 C.F.R. Part 81); *see also* Air Quality Designations for 2008 Lead (Pb) National Ambient Air Quality Standards, 76 Fed. Reg. 72,097 (Nov. 22, 2011) (codified at 40 C.F.R. Part 81) (identifying additional areas that fail to meet national ambient air quality standards for lead).

[27] 73 Fed. Reg. at 66,975-76.

[28] EPA, Integrated Science Assessment for Lead 1-76 (June 2013).

[29] *See* EPA's Response at 11.

[30] *See* EPA, Integrated Science Assessment for Lead lxxi-lxxiv

[31] *Id.* at 1-73.

2. EPA's Longstanding Knowledge of Lead Emissions from Aircraft

The 1970 Clean Air Act required EPA to conduct a study about the impact that pollutants from aircraft emissions have on air quality.[32] In April 1972, EPA issued the study and recognized that general aviation aircraft emitted lead.[33] Modeling in the study indicated that lead pollutant concentrations would increase due to the use of leaded aviation gasoline.[34] In that report, EPA acknowledged that a switch to "low-lead or lead-free fuel" was required to address airborne lead emissions.[35]

In 2002, in the National Emissions Inventory ("NEI"), EPA found that lead emissions from avgas were the largest source category.[36]

In June 2002, EPA released an Action Plan to address the dangers to human health from exposure to alkyl-lead compounds including leaded avgas.[37] In the plan, EPA stated that "[r]esearch has clearly shown that exposure to alkyl-lead can cause serious toxic effects to the nervous system of humans, with the potential to cause neurological disorders."[38] EPA further explained that exposure to alkyl-lead "may still pose a threat to certain populations."[39] To address this threat, EPA says that it will continue to dialogue with the FAA on the use of leaded avgas "and the possibilities of reducing the lead content and/or replacing leaded gasoline with unleaded gasoline."[40]

In 2006 and 2007, EPA studied lead emissions from the Santa Monica Airport in California.[41] EPA reported that "ambient lead increased with increasing proximity to the airport."[42] The data from this study "suggest that piston-engine activity can increase ambient lead concentrations in downwind neighborhood sites, resulting in levels that are four to five times higher than background levels and maximum impact site concentrations that are up to 25 times higher than background lead levels."[43]

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[32] 42 U.S.C. §7571.

[33] EPA, Aircraft Emissions: Impact on Air Quality and Feasibility of Control 8 (Apr. 1972).

[34] *Id.* at 8, 32 (EPA modeling projecting that lead emissions from aircraft were expected to increase at five of the six airports within the study).

[35] *Id.* at 48 (Table 19 recommending engine modifications to control emissions).

[36] Petition Requesting Rulemaking to Limit Lead Emissions from General Aviation Aircraft; Request for Comments, 72 Fed. Reg. at 64,571.

[37] EPA, Persistent Bioaccumulative and Toxic Pollutants Program National Action Plan For Alkyl-lead 2 (June 2002), *available at* http://www.epa.gov/pbt/pubs/Alkyl_lead_action_plan_final.pdf (Alkyl-leads are man-made compounds commonly used as fuel additives "to reduce 'knock' in combustion engines" and "to help lubricate internal engine components").

[38] *Id.*

[39] *Id.* at 3.

[40] *Id.*at 4.

[41] ANPR at 22,458.

[42] *Id.*

[43] *Id.*

In the 2010 ANPR, EPA estimated that lead from general aviation aircraft engines is released at approximately 20,000 airports throughout the country.[44] EPA also estimated that there were 16 million people[45] and three million children residing and attending school in close proximity to airports that service general aviation aircraft operating on leaded avgas.[46] EPA further acknowledged that lead from aircraft was "the largest single source category for emissions of lead to air" and comprises "approximately half of the national inventory [of lead emissions]."[47] EPA then recognized that lead monitoring studies conducted near airports described in the ANPR "indicate that lead levels in ambient air on and near airports servicing piston-engine aircraft are higher than lead levels in areas not directly influenced by a lead source."[48]

In June 2013, EPA released some data from its air quality monitoring studies from airports around the country.[49] The data from two airports in California revealed exceedances of the NAAQS for lead.[50] The McClellan-Palomar Airport in San Diego[51] and the San Carlos Airport in San Carlos both exceeded the maximum three-month average standard for lead.[52]

Also in June 2013, EPA's Integrated Science Assessment again recognized that "[d]irect emissions of Pb into the atmosphere primarily come from piston-engine aircraft…"[53] EPA further admitted that higher emitting airports are likely to be closer to highly populated areas:

> Pb emissions from piston-engine aircraft operating on leaded fuel are estimated to occur at approximately 20,000 airports across the U.S. Many of the more active airports are more numerous in highly populated metropolitan regions, which suggests that emissions from piston-engine aircraft may be higher in these locations compared with rural areas.[54]

[44] *Id.* at 22,442.

[45] *Id.* at 22,460,

[46] *Id.* at 22,461.

[47] *Id.* at 22,442.

[48] *Id.*

[49] EPA, Program Update: Airport Lead Monitoring (June 2013), *available at* http://www.epa.gov/otaq/regs/nonroad/aviation/420f13032.pdf.

[50] *Id.* at 2.

[51] EPA, Monitoring The Air for Lead Near the McClellan-Palomar Airport and Gillespie Field 2 (June 2013), *available at* http://www.epa.gov/region9/air/airport-lead/sandiego-lead-factsheet.pdf.

[52] EPA, Monitoring the Air for Lead Near the San Carlos Airport 1 (June 2013), *available at* http://www.epa.gov/region9/air/airport-lead/sancarlos-lead-factsheet.pdf.

[53] EPA, Integrated Science Assessment For Lead 2-4 (June 2013), *available at* http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=255721#Download.

[54] *Id.* at 2-5.

BASIS OF PETITION FOR RECONSIDERATION

This Petition for Reconsideration is based on the following:

1. EPA improperly applied the law governing endangerment findings, and ignored its own prior interpretation of that law, by conflating the two prongs of the test for finding endangerment;

2. EPA has long known that lead air pollution presents serious risks to human health and that lead emissions from general aviation aircraft contribute to overall lead air pollution; and

3. Scientific developments that have occurred since the Petition was filed and since EPA's Response further emphasize the need for urgent action by EPA. Studies show that children in particular suffer irreversible neurological and cognitive damage as a result of exposure even to very small amounts of airborne lead, damage that continues to be inflicted as EPA fails to act.

SECTION 231 OF THE CLEAN AIR ACT AND EPA'S INTERPRETATION OF THE TWO-PART TEST FOR ENDANGERMENT FINDINGS

Section 231(a)(2)(A) of the CAA requires that the EPA Administrator "shall, from time to time, issue proposed emission standards applicable to the emission of any air pollutant from any class or classes of aircraft engines which in [her] judgment causes, or contributes to, air pollution which may reasonably be anticipated to endanger public health or welfare."[55] The exercise of the Administrator's judgment—commonly referred to as an endangerment and cause or contribute finding or simply an endangerment finding—entails a two-part inquiry:[56]

1. Whether the specific type air pollution at issue, when considered cumulatively, "may reasonably be anticipated to endanger public health or welfare;"[57] and, if so

2. Whether emissions of the pollutant from a class of aircraft engines cause or contribute to the cumulative air pollution.[58]

When both prongs are met, the Agency must issue proposed emission standards for the source category in question.

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[55] 42 U.S.C. § 7571(a)(2)(A).

[56] *See* Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act,-74 Fed. Reg. 18,886, 18,890 (Apr. 24, 2009).

[57] *Id.*

[58] *See* Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496, 66,506 (Dec. 15, 2009) [hereinafter "GHG Endangerment Finding"] (interpreting the parallel endangerment finding standard for motor vehicles, the EPA stated that "the Administrator is to consider the cumulative impact of sources of a pollutant in assessing the risks from air pollution, and is not to look only at the risks attributable to a single source or class of sources" and that the Administrator "need not find that emissions from any one sector or group of sources are the sole or even the major part of an air pollution problem").

EPA's Response states that the Agency intends to follow a general approach similar to that used to make an endangerment finding regarding greenhouse gas emissions from motor vehicles under CAA Section 202(a), which contains the same two-prong endangerment standard as Section 231.[59] In this case, however, the reasoning behind EPA's endangerment and cause or contribute findings for greenhouse gases, in particular the strong emphasis on the preventive or precautionary nature of the CAA and the predominate value of protecting public health,[60] argues for an immediate endangerment finding rather than for additional studies. Recognizing the two-part test of Section 202(a), former Administrator Jackson interpreted her obligations regarding endangerment findings as follows:

1. "[T]he Administrator is required to protect public health and welfare, but she is not asked to wait until harm has occurred."[61]

2. "[T]he Administrator is to exercise judgment by weighing risks, assessing potential harms, and making reasonable projections of future trends and possibilities."[62]

3. "[T]he Administrator is to consider the cumulative impact of sources of a pollutant in assessing the risks from air pollution, and is not to look only at the risks attributable to a single source or class of sources."[63]

4. "[T]he Administrator is to consider the risks to all parts of our population, including those who are at greater risk for reasons such as increased susceptibility to adverse health effects. If vulnerable subpopulations are especially at risk, the Administrator is entitled to take that point into account in deciding the question of endangerment."[64]

5. The Administrator "need not find that emissions from any one sector or group of sources are the sole or even the major part of an air pollution problem. The use of the term 'contribute' clearly indicates a lower threshold than the sole or major cause. Moreover, the statutory language in CAA section 202(a) does not contain a modifier on its use of the term contribute. Unlike other CAA provisions, it does not require 'significant' contribution."[65]

This articulation of the Administrator's responsibilities is consistent with the recent D.C. Circuit decision that held that EPA need not provide "rigorous step-by-step proof of cause and effect" to make an endangerment finding.[66] "'Awaiting certainty will often allow for only

[59] EPA's Response at 5.

[60] GHG Endangerment Finding at 66,506–07.

[61] *Id.* at 66,505.

[62] *Id.*

[63] *Id.* at 66,506.

[64] *Id.*

[65] *Id.*

[66] *Coal. for Responsible Regulation v. EPA*, 684 F.3d 102, 121 (D.C. Cir. 2012) (quoting *Ethyl Corp. v. EPA*, 541 F.2d 1, 28 (D.C. Cir. 1976)).

reactive, not preventive, regulation.'"[67] Rather, regulatory action may be taken before the threatened harm occurs; "indeed, the very existence of such precautionary legislation would seem to demand that regulatory action precede, and, optimally, prevent, the perceived threat." [68]

ARGUMENT

A. UNDER EPA'S OWN INTERPRETATION OF THE CAA, LEAD EMISSIONS FROM GENERAL AVIATION AIRCRAFT ENGINES CONTRIBUTE TO LEAD AIR POLLUTION WHICH MAY REASONABLY BE ANTICIPATED TO ENDANGER PUBLIC HEALTH OR WELFARE.

EPA has refused to find that lead emissions from general aviation aircraft engines "cause[], or contribute[] to, air pollution which may reasonably be anticipated to endanger public health or welfare."[69] However, under the standards followed by the EPA in its endangerment finding for greenhouse gases, there is no reasonable basis for this refusal. EPA cannot deny that airborne lead is a pollutant which may reasonably be anticipated to endanger public health or welfare—EPA has determined that fact conclusively. Nor is there a basis for denying that lead emissions from general aviation aircraft contribute to overall airborne lead pollution—EPA has already established that the largest single source of such pollution is aircraft engines fueled by leaded gasoline. The purported justifications given by EPA for denying an endangerment finding are simply an exercise in avoidance of these two facts, which are the only two facts EPA need consider before finding endangerment. EPA's contention that further study is required is simply incorrect.

1. Lead Air Pollution May Reasonably Be Anticipated to Endanger Public Health or Welfare.

Section 231 does not require a showing that lead emissions for avgas-fueled aircraft endanger public health, only that lead air pollution—on the whole—may be reasonably anticipated to endanger public health or welfare.[70] By focusing on whether exceedances of the NAAQS exist near general aviation airports that service planes fueled by leaded avgas, EPA improperly conflates the "reasonably anticipated to endanger" prong with the "causes or contributes to air pollution" prong.

EPA's Response failed to address the two parts of the endangerment test separately. Rather, it treated the issue as if the pertinent question is whether leaded avgas, by itself, causes harm to public health or welfare. EPA's own interpretation of the law, however, makes clear that the two prongs are separate inquiries. The first prong requires only a determination whether the specific type of air pollution at issue, when considered cumulatively, "may reasonably be anticipated to endanger public health or welfare." EPA need only have a *reasonable anticipation*

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[67] *Id.*

[68] *Ethyl Corp.*, 541 F.2d at 13.

[69] 42 U.S.C. § 7571(a)(2)(A).

[70] *Id.*; *see also* GHG Endangerment Finding at 66,506.

that the pollution in question will endanger public health or welfare in order to make an endangerment finding; it need not possess proof of actual harm.[71] Undeniably, "[a] statute allowing for regulation in the face of danger is, necessarily, a precautionary statute. Regulatory action may be taken before the threatened harm occurs; indeed, the very existence of such precautionary legislation would seem to demand that regulatory action precede, and, optimally, prevent, the perceived threat."[72]

EPA has recognized that no safe threshold for lead exists, and that lower and lower levels of lead exposure are associated with adverse health effects. As part of its most recent review of the NAAQS for lead, EPA acknowledged that with each successive assessment to-date, "the epidemiologic and toxicological study findings show that progressively lower blood Pb levels or Pb exposures are associated with cognitive deficits."[73] EPA has found a positive causal relationship between exposure to lead and negative effects to human health, including nervous system effects, cardiovascular effects, renal effects, immune system effects, reproductive and developmental effects, and effects on heme synthesis and red blood cell function, and considers a causal relationship between lead exposure and cancer likely.[74]

In reality, this is not a case where reasonable anticipation is even in question. As detailed above, as well as in FoE's notice letter and complaint, EPA has long possessed evidence of the severity of the effects of lead air pollution on human health.[75] Indeed, EPA already has determined conclusively that lead air pollution "may reasonably be anticipated to endanger public health or welfare."[76] Having made the determination that airborne lead is a pollutant that may reasonably be anticipated to endanger public health or welfare, EPA cannot now argue to the contrary. Thus, the first prong of the endangerment test is met as a matter of law.

2. Lead Emissions from General Aviation Aircraft Engines Contribute to Overall Lead Air Pollution.

Under Section 231, the Administrator "need not find that emissions from any one sector or group of sources are the sole or even the major part of an air pollution problem" in order to find a contribution to air pollution.[77] "[T]he cause or contribute test is designed to authorize

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[71] 42 U.S.C. § 7571(a)(2)(A); *see also Ethyl Corp.*, 541 F.2d at 13–20.

[72] *Ethyl Corp.*, 541 F.2d. at 13.

[73] EPA, Integrated Science Assessment for Lead 1-73

[74] *See id.* at lxxxii-lxxxviii.

[75] *See* ANPR at 22,449 ("Lead has been demonstrated to exert 'a broad array of deleterious effects on multiple organ systems via widely diverse mechanisms of action'" and "has been classified as a probable human carcinogen."); *see also Ethyl Corp.*, 541 F.2d at 19 ("Undoubtedly, the harm caused by lead poisoning is severe.").

[76] As of November 2011, EPA had identified 21 different areas of the United States where the revised NAAQS for airborne lead emissions were not being achieved. *See* Air Quality Designations for the 2008 Lead (Pb) National Ambient Air Quality Standards, 75 Fed. Reg. 71,033 (Nov. 22, 2010) (codified at 40 C.F.R. 81) (identifying 16 non-attainment areas). The increase of such nonattainment areas provides further evidence that lead air pollution may reasonably be anticipated to endanger public health or welfare. Moreover, every county that failed to meet NAAQS for airborne lead contains or is in close proximity to an airport where planes are fueled by leaded aviation gasoline.

[77] *See* ANPR at 22,445; *see also* GHG Endangerment Finding at 66,506 ("The use of the term 'contribute' clearly indicates a lower threshold than the sole or major cause. Moreover, the statutory language in CAA section 202(a)

EPA to identify and then address what may well be many different sectors or groups of sources that are each part of…the problem," and the contribution need not be deemed significant.[78] By way of contrast, other CAA provisions require "significant" contribution.[79] Indeed, EPA's position that it must complete monitoring at general aviation airports to determine whether NAAQS for lead are being exceeded appears more aligned with Section 213—CAA provisions governing emissions from non-road engines and vehicles—which calls for a determination of whether emissions of certain pollutants are "significant contributors" to pollution concentrations in nonattainment areas.[80]

As EPA readily admits, aircraft engines that burn leaded avgas constitute the largest single source category for airborne lead pollution in the nation.[81] These aircraft are responsible for approximately fifty percent of the lead emissions in the U.S.[82] For other pollution sources, EPA has found contribution for far smaller percentages.[83] For example, EPA's 2005 rule regulating nitrogen oxide ("NOx") emissions from aircraft was based on amounts that constituted only 0.7% of all NOx emissions in the country.[84] Similarly, EPA's endangerment finding for greenhouse gases was based on source categories responsible for about four percent of total global greenhouse gas emissions and for just over twenty-three percent of total U.S. greenhouse gas emissions.[85]

In defense of its refusal to make an endangerment finding and as justification for its proposal to conduct additional air modeling and monitoring, EPA claims a need to characterize the levels of lead in the ambient air at and around individual airports: "The levels of lead in the environment at and around airports is expected to vary significantly based on [a variety of factors]. In light of this, EPA faces a quite intensive investigation to understand the range of lead concentrations to which people are exposed from this source."[86] EPA's focus on whether emissions near airports cause lead NAAQS to be approached or exceeded is misplaced. Neither section 231 nor EPA's prior interpretation of the "endangerment and cause or contribute standard" requires the Agency to find emissions from or near a particular airport approach or

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does not contain a modifier on its use of the term contribute. Unlike other CAA provisions it does not require 'significant' contribution.").

[78] GHG Endangerment Finding at 66,506.

[79] *See, e.g.*, 45 U.S.C. § 7411(b); 45 U.S.C. §7547(a)(2), (4).

[80] *See* 42 U.S.C. § 7547(a)(2).

[81] ANPR at 22,442.

[82] *Id.*

[83] *Compare, e.g.*, 74 Fed. Reg. at 18,892 (noting that EPA found contribution for a source which was only 1.2 percent of the total inventory).

[84] Control of Air Pollution From Aircraft and Aircraft Engines; Emissions Standards and Test Procedures, 70 Fed. Reg. 69,664 at 69,668, 69,670 (Nov. 17, 2005) (codified at 40 C.F.R. 87)(EPA nonetheless (and correctly) justified the regulation because reducing 0.7% of all NOx emissions would "also help reduce levels of nitrogen dioxide (NO2), for which NAAQS have been established").

[85] *See* GHG Endangerment Finding at 66,537.

[86] EPA's Response at 5.

exceed the lead NAAQS in order for the EPA to make an endangerment finding.[87] Variation from airport to airport has no bearing on the basic fact that lead emissions from avgas contributes to airborne lead pollution. EPA's description of its investigation suggests an attempt to determine whether lead emissions specifically from avgas-fueled aircraft alone endanger human health, rather than whether they contribute to an overall pollution problem that the Agency already has determined may endanger health.

Moreover, as the "may reasonably be anticipated" language of section 231 affirms, the Clean Air Act is a precautionary statute under which proof of actual harm is not required. Congress directed that the regulatory action taken pursuant to an endangerment finding would be designed to "precede, and, optimally, prevent, the perceived threat."[88] EPA is not required to document "proof of actual harm" as a prerequisite to regulation; rather, EPA is supposed to act where there is "a significant risk of harm."[89] As the Court of Appeals for the District of Columbia emphasized:

> Sometimes, of course, relatively certain proof of danger or harm from such modifications can be readily found. But, more commonly, "reasonable medical concerns" and theory long precede certainty. Yet the statutes and common sense demand regulatory action to prevent harm, even if the regulator is less than certain that harm is otherwise inevitable.[90]

Simply put, further studies are not required and needlessly delay an endangerment finding that should be immediately issued.

3. Delaying an Endangerment Finding for Unnecessary Studies Is Causing Irreparable Harm to Children Now.

Children are a sub-population subject to disproportionate risks from airborne lead pollution. Airborne lead causes increased blood lead levels in children, which in turn causes cognitive impairment and IQ loss.[91] EPA concluded in 2006 that the latest evidence indicates adverse health effects, most notably among children, are occurring at much lower levels than previously considered.[92] EPA's current knowledge and the information available to it demand rapid action, not another round of studies. Federal policy requires EPA to prioritize the elimination of such hazards to children.[93] Rather than do so, EPA has chosen to conduct

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[87] Nevertheless, EPA's testing results for the Santa Monica Airport in 2008 showed raised air lead levels 900 meters downwind of runways and documented the potential for three-month averages that exceed the lead NAAQS.

[88] *Ethyl Corp.*, 541 F.2d 1, 13.

[89] *Id.* at 12-13.

[90] *Id.* at 25; *see also Massachusetts v. EPA*, 549 U.S. 497, 506 n. 7 (2007) (citing *Ethyl Corp*.).

[91] L.L. Brink, et al., *Do US Ambient Air Lead Levels Have a Significant Impact on Childhood Blood Levels: Results of a National Study*, J. Envtl. & Pub. Health (Aug. 2013), *available at* http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3747402/.

[92] ANPR, at 22,441.

[93] Exec. Order No. 13,045, 62 Fed. Reg. 19,885 (Apr. 21, 1997); *see also* EPA, Guide to Considering Children's Health When Developing EPA Actions: Implementing Executive Order 13045 and EPA's Policy on Evaluating Health Risks to Children 5 (Oct. 2006) [hereinafter "Children's Health"], *available at*

unnecessary studies while children and infants continue to be harmed by the largest single source of airborne lead pollution.

Studies since EPA's 2006 ANPR continue to affirm the disproportionate impact of airborne lead on children. A recent 2013 study by the University of Pittsburgh determined that a significant relationship exists between ambient air lead and childhood blood lead levels in excess of 10 µg/dL.[94] That study determined that the proportion of children three years and younger with blood lead levels in excess of 10 µg/dL was 3.4 times higher in U.S. counties with the highest ambient lead levels than in those counties with low ambient air lead levels.[95] The study also stated that the percent change in the relative risk of total numbers of children with blood lead levels in excess of 10 µg/dL increases 36% for every 0.01 $\mu g/m^3$ increase in air lead value as established by EPA's National Air Toxics Assessment.[96]

Lead emissions from general aviation aircraft, in particular, have been associated with elevated blood lead levels in children, even in areas with lower levels of ambient air lead. A recent study by the Nicholas School of the Environment at Duke University ("the Miranda Study") examined the question of whether there is a relationship between aircraft lead emissions and the blood lead levels of children living in six counties in North Carolina.[97] The six counties contained a total of 66 general aviation airports with estimated lead emissions 2.634 tons per year collectively. None of the counties studied were in an area in which ambient air lead levels exceeded the NAAQS. None of the counties had an airport that required monitoring for lead under current EPA rules.

The Miranda Study determined that there is a significant association between potential exposure to lead emissions from avgas and blood levels in children.[98] The study concluded that children living within 1000 meters of an airport that served aircraft fueled by leaded aviation gasoline had elevated blood lead levels, with the largest impact evident on children living within 500 meters of such airports.[99]

It is increasingly clear that even slight elevations in blood lead levels do damage to children in the form of cognitive impairment and reduced IQ levels.[100] There is no "safe" level

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http://yosemite.epa.gov/ochp/ochpweb.nsf/content/ADPguide.htm/$File/EPA_ADP_Guide_508.pdf; *see generally* Devon Payne-Sturges & Debra Kemp, *Ten Years of Addressing Children's Health Through Regulatory Policy at the U.S. Environmental Protection Agency*, 116 Envtl. Health Perspectives 1720 (Dec. 2008); s*ee generally* U.S. Gen. Accounting Office, Environmental Health: EPA Has Made Substantial Progress but Could Improve Process for Considering Children's Health, 58-60 (Aug. 2013), *available at* http://www.gao.gov/assets/660/656922.pdf.

[94] Brink, et al., *supra,* at 6

[95] *Id.* at 7.

[96] *Id.* (noting also that "NATA lead estimates are known t be an underestimation of air lead levels").

[97] Marie Lynn Miranda,et al., *A Geospatial Analysis of the Effects of Aviation Gasoline on Childhood Blood Lead Levels*, 119 Envtl. Health Perpectives, 1513 (July 2011), *available at* http://ehp.niehs.nih.gov/1003231/.

[98] *Id.*

[99] *See id.*

[100] *See, e.g.*, Joel T. Nigg, et al., *Confirmation and Extension of Association of Blood Lead with Attention-Deficit/Hyperactivity Disorder (ADHD) and ADHD Symptom Domains at Population-Typical Exposure Levels*, The J. of Child Psychol. and Psychiatry, Jan. 2010 (linking ADHD to increases in blood lead levels).

of blood lead, or exposure to lead, especially for children.[101] The U.S. Center for Disease Control and Prevention ("CDC") and its predecessor agencies for many years have used blood lead level as a metric for identifying children at risk of adverse health effects and for specifying particular public health recommendations. The definition of "low level" lead exposure has been revised progressively downward as tools and study designs for evaluating neurodevelopment have evolved. Hints of health effects and intellectual impairment in children with blood lead levels below 10 µg/dL had already emerged by 1991, when CDC established 10 µg/dL as a level of concern.[102] A large body of recent research demonstrates negative health effects, including learning disabilities and behavioral disorders, associated with lead exposure levels well below the CDC action level.[103] Multiple studies suggest that early childhood blood lead levels as low as 2 µg/dL can have significant impacts on academic performance as measured by end-of-grade test scores.[104]

In June 2012 CDC concluded that it should eliminate the use of the term "blood lead level of concern" altogether, based on compelling evidence that even low blood lead levels are associated with IQ deficits, attention-related behaviors, and poor academic achievement.[105] The CDC concluded that because it could not identify a blood lead level that did not cause deleterious effects, combined with the evidence that these effects appear to be irreversible, it is critically important to prevent lead exposure rather than responding after the exposure has taken place.[106]

More recently, in 2013, EPA's monitoring at airports revealed that two airports in California were not meeting air quality standards for lead.[107] Both of these airports are located in urban areas, and thus expose those urban populations, which include children, to unsafe levels of lead.

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[101] 73 Fed. Reg. at 66,972.

[102] Steven G. Gilbert and Bernard Weiss, *A rationale for lowering the blood lead action level from 10 to 2 µg/dL,* Neurotoxicology, Sept. 2006, at 3, *available at* http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2212280/.

[103] Miranda, et al., *Geospatial Analysis supra*; *see* Marie Lynn Miranda et al., *Early Childhood Lead Exposure and Exceptionality Designations for Students*, Int'l J. of Child Health and Hum. Dev. (2010); Marie Lynn Miranda et al., *Environmental contributors to the achievement gap*, 30 Neurotoxicology 1019 (Nov. 2009); *see also* Marie Lynn Miranda, et al., *The Relationship between Early Childhood Blood Lead Levels and Performance on End-of-Grade* Tests, 115 Envtl. Health Persp. 1242 (2007) (available via *http://dx.doi.org/)*; *see also* Richard L. Canfield, et al., *Intellectual Impairment in Children with Blood Lead Concentrations below 10 µg per Deciliter*, 348 New Eng. J.Med. 1517 (2003).

[104] *See, e.g.*, Miranda,et al., *Geospatial Analysis, supra*; Miranda, et al., *Early Childhood Lead Exposure, supra*; Miranda, et al., *Environmental contributors, supra*; Miranda, et al., *The Relationship between Early Childhood Blood Lead Levels and Performance on End-of-Grade Tests, supra*.; *see also* Canfield, et al., *Intellectual Impairment, supra*.

[105] CDC, *CDC Response to Advisory Committee on Childhood Lead Poisoning Prevention Recommendations in Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention*, 1 June 2012.

[106] The CDC adopted a reference value based on the 97.5th percentile of the blood lead level distribution among children 1–5 years old in the United States (currently 5 µg/dL) to identify children with elevated BLLs. Approximately 450,000 children in the United States already have blood lead levels higher than this reference value. *See id.*

[107] EPA, Monitoring The Air for Lead Near the McClellan-Palomar Airport and Gillespie Field 1-2 (June 2013), *available at* http://www.epa.gov/region9/air/airport-lead/sandiego-lead-factsheet.pdf; EPA, Monitoring the Air for Lead Near the San Carlos Airport 1 (June 2013), *available at* http://www.epa.gov/region9/air/airport-lead/sancarlos-lead-factsheet.pdf.

EPA acknowledges that there is no 'safe' threshold" for lead.[108] EPA has acknowledged that "the current evidence indicates the need for a standard level that is substantially lower than the current level to provide increased public health protection, especially for at-risk groups, including most notably children."[109] EPA also acknowledges that "with each successive [assessment to-date], the epidemiologic and toxicological study findings show that progressively lower blood Pb levels or Pb exposures are associated with cognitive deficits and behavioral impairments."[110]

The evidence that children are disproportionately at risk for harm from airborne lead pollution is overwhelming. The evidence that piston engine aircraft using leaded fuel constitute the single largest source contributor to lead air pollution is indisputable. There is no need for further study in order to find endangerment. Despite this clear evidence, EPA has chosen to conduct additional unnecessary studies. While EPA has delayed, another generation of children has been exposed to increased risk of cognitive deficits and behavioral impairment. Further delay and further damage to children is unwarranted.

4. EPA's Development of Emission Standards Does Not Justify Refusal to Make an Endangerment Finding for Lead from Aircraft.

EPA also appears to have confused its role in determining endangerment with its later role in determining how to regulate lead emissions from aircraft. EPA's Response stated:

> It is important to emphasize that EPA's technical work has very significant potential future implications. The aviation enterprise is unique and very different from any other transportation source. In the U.S. alone, there are literally millions of piston-engine aircraft operations each year from air taxis and general aviation which fly passenger and cargo over routes of various lengths, at different altitudes and with various payloads. *Understanding piston-engine aircraft operations and how many of the flight-specific variables affects lead emissions through models and other investigations is essential to a successful national regulatory program*. . . . An understanding of how all of the various aircraft and aircraft engine design (for piston-engine aircraft), and aircraft fuel factors interact to affect general aviation performance and lead *emissions is essential to the development of a well constructed program that achieves the desired public health and environmental consequences.*[111]

Irrespective of the eventual utility of understanding aircraft operations, the Clean Air Act does not require an investigation of such operations as part of EPA's undertaking an endangerment finding. As EPA noted in the greenhouse gas matter, Congress explicitly

[108] 73 Fed. Reg. at 66,964, 66,972.

[109] *Id*. at 66,985.

[110] EPA, Integrated Science Assessment for Lead, *supra,* at 1-73.

[111] EPA's Response at 16 (emphasis added).

separated two different decisions to be made and provided different criteria for each. The first decision involves the questions whether the air pollution may reasonably be anticipated to endanger public health or welfare, and the contribution to the air pollution by the sources. If affirmative endangerment and contribution findings are made, the second decision involves regulating the sources to control the emissions.[112] EPA's judgment in making the endangerment and contribution findings is constrained by the statute.[113] "'The statutory question is whether sufficient information exists to make an endangerment finding.' The effectiveness of a potential future control strategy is not relevant to deciding whether air pollution levels in the atmosphere endanger."[114]

When the issue of endangerment is considered under these statutory constraints, and particularly when considered in light of the scientific evidence that has become available since the 2006 Petition was filed, the answer is clear. Lead emissions from general aviation aircraft engines using leaded aviation gasoline contribute to airborne lead pollution, a criteria pollutant that is found in excess of EPA's ambient air quality standards in 21 different regions in the United States and that may reasonably be anticipated to endanger human health.

B. AFTER EPA MAKES AN AFFIRMATIVE ENDANGERMENT FINDING, IT SHOULD COMMENCE THE RULEMAKING PROCESS IMMEDIATELY AND BEGIN TO PHASE OUT LEADED AVGAS.

In EPA's Response to the Petition, EPA confirmed that once an endangerment finding is made, EPA will commence the rulemaking process.[115] After finding endangerment, EPA should immediately begin the rulemaking process.

Once the Administrator proposes emission standards, the Clean Air Act establishes a discrete set of steps the Administrator must take before finalizing the standards:

> (B)(i) The Administrator shall consult with the Administrator of the Federal Aviation Administration on aircraft engine emission standards.
>
> (ii) The Administrator shall not change the aircraft engine emission standards if such change would significantly increase noise and adversely affect safety.
>
> (3) The Administrator shall hold public hearings with respect to such proposed standards. Such hearings shall, to the extent practicable, be held in air quality control regions which are most seriously affected by aircraft emissions. Within 90 days after the issuance of such proposed regulations, he shall issue such regulations with such modifications as he deems appropriate. Such regulations may be revised from time to time.[116]

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[112] 74 Fed. Reg. at 66,506-07.

[113] *Massachusetts v. EPA*, 549 U.S. at 532.

[114] 74 Fed. Reg. 66,508, *quoting Massachusetts v. EPA*, 549 U.S. at 534.

[115] *See* EPA's Response at 18 (If EPA does find endangerment, "EPA would pursue the development of standards and potentially other requirements regulating lead emissions from general aviation piston-engine aircraft").

[116] 42 U.S.C. § 7571(a)(2).

EPA appears to be delaying rulemaking based on issues related to the nature of the industry, fuel supply, noise, or fuel safety.[117] This delay is inappropriate. Pursuant to Section 231 of the Clean Air Act, EPA considers noise and safety concerns in consultation with the FAA *after* proposing regulations, not before.[118] However, it is worth noting that much work has been done to prepare the way for rulemaking. New unleaded fuels are in development,[119] and 75% to 80% of piston engine aircraft no longer require leaded fuel at all.[120] When it finds endangerment, EPA can and should encourage the immediate use of unleaded fuels to start reducing the lead emissions from aviation gasoline as soon as possible.

CONCLUSION

For the reasons discussed above, lead emissions from general aviation aircraft contribute to air pollution which may reasonably be anticipated to endanger public health or welfare. Therefore, EPA should reconsider its refusal to make an endangerment finding and should initiate rulemaking procedures to establish standards for the emission of lead from aircraft engines.

[117] *See* ANPR at 22,444 (noting that the comments EPA received in the last round of comments related mostly to fuel and industry issues and that no new information regarding health or exposure issues was supplied).

[118] 42 U.S.C. § 7571(a).

[119] As California House Representative Henry Waxman pointed out in a letter to FAA, "high octane unleaded auto and biodiesel fuels for piston engines have been safely and successfully used in Europe for many years, but adoption in the United States has been slow." Letter from Rep. Waxman Calls to Michael P. Huerta, Acting FAA Administrator (Oct. 23, 2012), *available at* http://waxman.house.gov/rep-waxman-calls-faa-reduce-lead-emissions-expanding-use-unleaded-fuel.Hjelmco's unleaded AVGAS 91/96 UL is approved for use by the major aircraft engine manufacturers Textron Lycoming, Teledyne Continental and Rotax. *See* Avgas 91/96 UL Overview, Hjelmco Oil, http://www.hjelmco.com/pages.asp?r_id=13395. Moreover, Shell Aviation has announced that it will be submitting its own unleaded avgas to FAA soon. *See* Press Release, Shell Aviation, Shell removes lead from light aircraft fuel(Dec. 3, 2013), *available at*, http://www.shell.com/global/products-services/solutions-for-businesses/aviation/news-and-library/press-releases/2013/press-release12032013.html.

[120] Rebecca Kessler, *Sunset for Leaded Aviation Gasoline?*, 121 Envtl. Health Persp. A54, A57 (Feb. 2013), *available at* http://ehp.niehs.nih.gov/pdf-files/2013/Feb/ehp.121-a54_508.pdf.

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