January 17, 2023

Administrator Michael S. Regan
United States Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Submitted via Regulations.gov

Re: Comments on Proposed Finding that Lead Emissions from Aircraft Engines that Operate on Leaded Fuel Cause or Contribute to Air Pollution that May Reasonably Be Anticipated to Endanger Public Health and Welfare; Docket No. EPA-HQ-OAR-2022-0389

Dear Administrator Regan:

Please accept these comments submitted on behalf of Alaska Community Action on Toxics, Center for Environmental Health, Friends of the Earth, and Oregon Aviation Watch (collectively, "Petitioners")[1] in support of EPA's proposed finding that lead emissions from aircraft engines that operate on leaded aviation gasoline ("avgas") cause or contribute to lead air pollution that may reasonably be anticipated to endanger the public health and welfare (the "Proposed Endangerment Finding").[2]

Petitioners support EPA's Proposed Endangerment Finding and appreciate that EPA is finally moving forward to address this significant source of lead exposure. Lead emissions from the approximately 167,000 piston-engine aircraft that still use leaded avgas account for the most significant source of lead released in the United States' atmosphere. EPA has known about the dangers of leaded gasoline since at least the 1970s, when it first acted to get leaded gasoline out of the country's cars, and it has known for over a decade that any amount of lead in people's bodies is linked to serious health effects. Research demonstrates that lead emitted by piston-engine aircraft using leaded avgas is linked to higher blood lead levels in children living near airports where these aircraft operate. The science is clear: Lead emissions from piston-engine aircraft endanger the public health and welfare.

For far too long, millions of individuals living, working, and going to school near general aviation airports where piston-engine aircraft are flown have been exposed to toxic lead emissions, all while EPA has known that lead exposure at any level can have devastating health

[1] Petitioners and others petitioned EPA in the Fall of 2021 to make an endangerment finding for leaded aviation gasoline. In its response to that petition, EPA expressed its intent to conduct the instant rulemaking process for an endangerment finding.

[2] Proposed Finding That Lead Emissions from Aircraft Engines That Operate on Leaded Fuel Cause or Contribute to Air Pollution That May Reasonably be Anticipated to Endanger Public Health and Welfare, 87 Fed. Reg. 62,753 (proposed Oct. 17, 2022).

effects. Moreover, much of the lead emissions from leaded avgas occurs in communities of color—in which the highest-emitting general aviation airports are disproportionately located—and these emissions contribute to the higher lead exposure and blood lead levels faced by Black children. Similarly, the emissions from leaded avgas contribute to the disproportionately high exposures to lead from other sources faced by individuals living in low-wealth communities. Low-wealth communities are at a higher risk of harm from these exposures too: Individuals with low incomes are at risk for inadequate intake of vitamins and minerals, and nearly a third of households with incomes below the federal poverty line are food insecure. Due to the way lead is absorbed in the body, people facing food insecurity and consuming inadequate amounts of certain nutrients are more susceptible to the detrimental effects of lead exposure. In the recent *EPA Strategy to Reduce Lead Exposures and Disparities in U.S. Communities* ("Lead Strategy"), EPA recognized that "[c]hildren living in communities overburdened by pollution and other health and social stressors, often communities of color and lower socioeconomic status, are at greater risk" from the toxic effects of lead.[3] If EPA takes seriously its commitment to advancing environmental justice and creating a safer, more equitable environment where all individuals can reach their full potential, "regardless of the color of their skin, money in their pocket, or the community they live in,"[4] it must act swiftly to finalize the Proposed Endangerment Finding. Further, the Biden-Harris Administration must finish the important work that it started and finalize a ban on leaded avgas and the resulting emissions before the end of President Biden's first term.

BACKGROUND

I. Petitioners and Procedural History

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 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. ACAT serves individuals around Alaska, where the vast majority of communities are not accessible by roads and where piston-engine aircraft are used for vital transportation of goods and services. Alaska has hundreds of airports, and over 10,000 planes—approximately 96% of the commercial fleet—registered in Alaska are piston-engine aircraft that use leaded avgas.[5] Many of ACAT's constituents are Alaska Natives, who EPA found make up nearly half the population living within 500 meters of one of the hundreds

[3] EPA, 540R22006, *EPA Strategy to Reduce Lead Exposures and Disparities in U.S. Communities* 11 (Oct. 2022), https://www.epa.gov/system/files/documents/2022-11/Lead%20Strategy_1.pdf. ("Lead Strategy").

[4] *Id.* at 3.

[5] Elwood Brehmer, *Industry Offers Avgas Alternatives, FAA Targets 2018 Use*, Alaska J. of Comm. (July 16, 2014), https://www.alaskajournal.com/business-and-finance/2014-07-16/industry-offers-avgas-alternatives-faa-targets-2018-use.

of Alaska airports, despite constituting only 15% of the state population. ACAT has a strong interest in protecting its constituents by eliminating exposures to lead from piston-engine aircraft emissions. In addition to exposures from piston-engine aircraft emissions, Alaska Natives and other Alaska residents may also be exposed to multiple sources of lead including large-scale metals mining, consumption of subsistence animals hunted with lead ammunition, fish contaminated with leaded fishing weights, lead from paint in older homes, and drinking water sources. These additional exposures to lead add to the cumulative adverse effects of lead exposure from avgas experienced by Alaska Natives and other Alaska residents.

Petitioner Center for Environmental Health ("CEH") is a 501(c)(3) non-profit, national public interest organization with headquarters in Oakland, California. For 26 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. CEH has long advocated for stronger protections for communities facing lead exposure, including from emissions from piston-engine aircraft. For example, in 2011, CEH sued fixed base operators offering leaded avgas for sale at airports in California for their failure to warn people living near airports about the potential for lead exposure. In connection with that litigation, CEH entered into a 2014 settlement with thirty of the companies that sold or distributed leaded avgas in California, pursuant to which the companies were required to: (1) offer the avgas with the lowest level of lead that is available in California for sale at the airports where they operate; and (2) post warnings about the danger of lead exposures at certain airports. The required warning states: "The area within one kilometer of this airport contains lead, a chemical known to the State of California to cause cancer, birth defects or other reproductive harm. . . . People living, working, or traveling near this location will be exposed to lead as aircraft take off and land."[6] While this kind of warning can sometimes be helpful, many people cannot avoid being at or near airports where leaded avgas is used, making the elimination of leaded avgas all the more important. CEH remains engaged in enforcing the settlement agreement. Just last month, CEH sent notice of violation letters to fourteen settling defendants for failing to offer commercially available unleaded avgas. Other recent CEH efforts focused on reducing and eliminating exposures to lead have included reaching legal agreements with manufacturers of brass-instrument mouthpieces, vinyl faux-leather fashion accessories, and canned sweet potatoes to reformulate their products, and a legal agreement with a Southern California lead-acid battery recycler with historical lead air emissions to disseminate warnings to the surrounding community and pay a sum of money into a community fund to be used for exposure reduction and toxics education efforts as defined by affected residents.

Petitioner Oregon Aviation Watch ("OAW") is an 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 achieving a transparent, accountable, and

[6] Consent Judgment at 5, *Ctr. for Env't Health v. Aerodynamic Aviation*, No. RG-11-600721 (Alameda Cnty. Cal. Super. Ct. Dec. 9, 2014), https://oag.ca.gov/system/files/prop65/judgments/2012-00204J2440.pdf.

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, as well as nationally, and shares its experiences dealing with these issues. OAW is particularly concerned about lead emissions from Hillsboro Airport, which is located in Hillsboro, Oregon, approximately fifteen miles from downtown Portland. Most flights into and out of Hillsboro are connected to flight training, an activity that tends to result in significant and highly localized lead emissions because the student pilots take off and land repeatedly and they tend to fly in a small area close to the airport, impacting the surrounding community. In addition, instructional training takes place over surrounding communities located ten to twenty miles away from the airport. To further OAW's goals, it 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 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 and has been pushing for EPA to make an endangerment finding for leaded avgas for nearly a decade.

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 225,000 members across all fifty states in the United States and more than 5 million activists. FoE is part of Friends of the Earth International, a federation of grassroots groups working in seventy-three 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, including by working to reduce air and water pollution throughout the United States. To achieve these goals, 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 related litigation.

For nearly twenty years, FoE has advocated for federal action to address lead emissions from the use of leaded avgas. At nearly every turn, EPA has responded to FoE's calls for action with delay or excuses for EPA's inaction. In 2003, FoE—through its division Bluewater Network—first requested that EPA make an endangerment finding for leaded avgas. EPA responded in 2005, claiming "we do not believe we currently have sufficient information that would enable us to make a determination whether aircraft lead emissions may reasonably be anticipated to endanger public health and welfare."[7] The following year, FoE formally petitioned EPA to make a finding under section 231(a)(2)(A) of the Clean Air Act ("CAA"), 42 U.S.C. § 7571, that leaded avgas harms human health or the environment and to regulate such emissions from general aviation aircraft.[8] In 2007, EPA requested comment on the issues raised in the 2006 petition, and in 2010, EPA issued an Advance Notice of Proposed Rulemaking ("ANPR") on the issue, in which it acknowledged that there is no identifiable safe level of lead

[7] EPA, EPA420-R-05-004, *Emission Standards and Test Procedures for Aircraft and Aircraft Engines* 43 (Nov. 2005), https://nepis.epa.gov/Exe/ZyPDF.cgi/P10023C0.PDF?Dockey=P10023C0.PDF.

[8] Petition for Rulemaking & Collateral Relief from Friends of the Earth, to EPA (Oct. 3, 2006), https://www.epa.gov/sites/production/files/2016-09/documents/foe-20060929.pdf.

exposure and that lead emitted from piston-engine aircraft operating on leaded avgas constituted about half of domestic lead emissions.[9]

Despite issuing this ANPR, however, EPA did not formally respond to FoE's 2006 petition, so FoE filed suit over EPA's unreasonable delay. Only then did EPA formally respond to FoE's petition, now claiming that it needed more time to gather information to determine whether emissions of leaded avgas cause or contribute to harmful air pollution.[10] In 2014, FoE, along with Physicians for Social Responsibility and OAW, 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 avgas emissions contribute to air pollution that endangers human health or welfare.[11] In its response to the petition for reconsideration, EPA stated that it planned to issue a proposed endangerment finding for public comment in 2017 and a final endangerment finding in 2018.[12] Once again, EPA delayed, and it took yet another petition for EPA to even propose action to begin the process of addressing the use of leaded avgas.

In August and October of 2021, Petitioners and other entities once again petitioned EPA to make an endangerment finding under section 231 of the CAA that the use of leaded avgas—the largest source of airborne lead emissions in the United States—contributes to air pollution that may reasonably be anticipated to endanger public health and welfare ("2021 Petition").[13] In January of 2022, EPA responded favorably to the 2021 Petition, stating that it "plan[ned] to issue

[9] Advance Notice of Proposed Rulemaking on Lead Emissions from Piston-Engine Aircraft Using Leaded Aviation Gasoline, 75 Fed. Reg. 22,440, 22,442 (proposed Apr. 28, 2010).

[10] Letter and Memorandum from Gina McCarthy, Assistant Adm'r, EPA, to Deborah Behles & Helen Kang, Env't L. & Just. Clinic, & Marianna Engelman Lado & Timothy Ballo, 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).

[11] Petition for Reconsideration of EPA's Denial, from Friends of the Earth, to EPA (Apr. 21, 2014).

[12] Letter from Gina McCarthy, Administrator, EPA, to Deborah Behles, Env't L. & Just. Clinic, & Marianna Engelman Lado, Earthjustice (Jan. 23, 2015), 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).

[13] Petition for Endangerment Finding from Earthjustice on behalf of Alaska Cmty. Action on Toxics, to EPA (Oct. 12, 2021), https://www.epa.gov/system/files/documents/2022-01/aviation-leaded-avgas-petition-exhibits-final-2021-10-12.pdf.

a proposed endangerment finding in 2022,"[14] and on October 17, 2022, EPA's Proposed Endangerment Finding was published in the Federal Register.[15]

II. Environmental Justice and Lead Pollution

The Biden-Harris Administration and EPA have repeatedly expressed a commitment to ensure environmental justice by directing action where it is needed most: in service of communities that historically have been inequitably burdened by environmental harms and underserved.[16] As EPA has acknowledged, communities of color and low-wealth communities often face disproportionately high exposures to lead.[17] Ending the use of leaded avgas is an important step in reducing the exposures to lead faced by these communities, many of whom are simultaneously exposed to lead from multiple sources and pathways.

Indeed, these disproportionate exposures translate to disproportionate body burdens of lead: Children of color have disproportionately high blood lead levels. 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] EPA's biomonitoring data shows that, when considering children of all incomes, Black non-Hispanic children have median blood lead levels that are higher than those of children of other races or ethnicities, and Mexican-American children have higher median

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[14] Letter from Michael S. Regan, Adm'r, EPA, to Jonathan J. Smith, Earthjustice (Jan. 12, 2022), https://www.epa.gov/system/files/documents/2022-01/ltr-response-aircraft-lead-petitions-aug-oct-2022-01-12.pdf.

[15] *See* 87 Fed. Reg. at 62,753. In its final endangerment finding, EPA should make clear that the record for all prior dockets relating to leaded avgas—including docket number EPA-HQ-OAR-2007-0294, and any other dockets pertaining to this matter—are incorporated into the instant administrative record, as these are materials the agency directly or indirectly relied on.

[16] Lead Strategy at 11.

[17] EPA, 100-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 (Apr. 2019), https://www.epa.gov/sites/default/files/2019-04/documents/leadimplementationbooklet_april2019.pdf ("Childhood lead exposure is especially prevalent in many communities that represent the lowest income and most diverse populations with significant cumulative environmental risk from pollution.").

[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), https://doi.org/10.1542/peds.2007-3608 (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), https://doi.org/10.1016/j.envint.2017.08.021.

blood lead levels than white non-Hispanic children.[19] Black children below the poverty line have higher median blood lead levels than children of any other ethnic or racial group, even those who are also below the poverty line.[20] Black children with the highest 5% of blood lead levels in their ethnic group have higher blood lead levels than the top 5% of children in any other ethnic group.[21]

Children in low-wealth communities also have higher blood lead levels than their peers who live in more economically secure households. Children living below the poverty line have median blood lead levels that are higher than those living above the poverty line, and the top 5% of blood lead levels of children living in poverty were higher than the top 5% of children not living in poverty.[22] Moreover, lead can have more deleterious effects on individuals who have low wealth and are facing food insecurity. Children with certain nutrient deficiencies absorb more lead than children with adequate calcium, iron, and zinc in their diets because stored lead may be mobilized in circumstances where calcium would normally be mobilized.[23]

Any additional lead exposure among groups that already face disproportionately high blood lead levels are unacceptable. Children of color and children living in low-wealth households and communities who have higher body burdens of lead face lead-related health harms that can prevent them from reaching their full potential and can perpetuate systemic poverty. Increases in blood lead levels are associated with lower educational attainment and lower lifetime earnings,[24] and lifetime earnings lost due to childhood lead exposure are estimated

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[19] *Lead in Children Ages 1 to 5 Years: Median Concentrations in Blood, by Race/Ethnicity and Family Income, 2015-2018 (Indicator B2),* Subsection in *Biomonitoring – Lead*, EPA, https://www.epa.gov/americaschildrenenvironment/biomonitoring-lead (last updated June 29, 2022).

[20] *Id.*

[21] *Id.*

[22] *Id.*

[23] *See*, *e.g.*, K. Bruening et al., *Dietary Calcium Intakes of Urban Children at Risk of Lead Poisoning*, 107 Env't Health Persps. 431 (1999), https://ehp.niehs.nih.gov/doi/epdf/10.1289/ehp.99107431; Sri Sofyani Syofyan et al., *The Effects of Calcium Supplementation on Blood Lead Levels and Short-term Memory of Chronically Exposed Children: A Clinical Trial Study*, 8 No. B Open Access Macedonian J. Med. Scis. 1144 (2020), https://oamjms.eu/index.php/mjms/article/view/3285; Wis. Dept. of Health Servs., P-00600, *Nutrition and Childhood Lead Poisoning* (Nov. 2014), https://www.dhs.wisconsin.gov/publications/p00660-9.pdf.

[24] Elise Gould, *Childhood Lead Poisoning: Conservative Estimates of the Social and Economic Benefits of Lead Hazard Control*, 117 Env't Health Persps. 1162, 1164 (2009), https://ehp.niehs.nih.gov/doi/epdf/10.1289/ehp.0800408.

to be 46–55% higher for Black children than for white or Hispanic children.[25] There is also an association between higher childhood blood lead levels and violent or anti-social behaviors resulting in entry into the criminal justice system later in life.[26]

This disparity means that the harms associated with lead emissions from piston-engine aircraft are not felt equally. Even if lead emissions from piston-engine aircraft were experienced equally among all demographics, those who have higher levels of lead in their bodies from other sources would still suffer more from the increased exposure to this cumulative toxin. But lead emissions from piston-engine aircraft do not reach everyone equally. In certain areas, the populations more likely to reside near airports are those with less education and less wealth.[27] And as EPA recognizes in its Proposed Endangerment Finding, "there is a greater prevalence of people of color and of low-income populations within 500 meters or one kilometer of some airports compared with people living more distant."[28] EPA's analysis also shows that in Alaska, where piston-engine aircraft are used extensively, the proportion of Alaska Natives that live within 500 meters of an airport is more than three times the proportion of Alaska Natives that make up the statewide population.[29] In each of these circumstances, environmental justice communities are being disproportionately harmed by their proximity to airports where leaded avgas is used. And proximity of such communities is not rare. According to an analysis of 2017 National Emissions Inventory data conducted in advance of the 2021 Petition, 60% or more of the fifty highest lead-emitting general aviation airports had populations within one mile that consisted of a higher percentage of people of color than the national average. And while EPA's 2020 report looking broadly at the populations surrounding general aviation airports—regardless of the amount of air traffic—did not find disparities in exposure to lead from avgas based on race or income, a recent analysis found evidence that neighborhoods that are situated directly

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[25] Joseph Boyle, et al., *Estimated IQ Points and Lifetime Earnings Lost to Early Childhood Blood Lead Levels in the United States*, 778 Sci. Total Env't Article No. 146307 (2021), https://doi.org/10.1016/j.scitotenv.2021.146307.

[26] *See* John Paul Wright et al., *Association of Prenatal and Childhood Blood Lead Concentrations with Criminal Arrests in Early Adulthood*, 5 PLoS Med. Article No. e101 (2008), https://doi.org/10.1371/journal.pmed.0050101; Howard W. Mielke & Sammy Zahran, *The Urban Rise and Fall of Air Lead (Pb) and the Latent Surge and Retreat of Societal Violence*, 43 Env't Int'l 48, 48–55 (2012), https://doi.org/10.1016/j.envint.2012.03.005.

[27] *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), https://doi.org/10.1086/691686 ("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 . . . .").

[28] 87 Fed. Reg. at 62,756.

[29] *Id.* at 62,769.

downwind of general aviation airports have "relatively higher percentages of minority inhabitants, lower median incomes, and a less educated populace."[30]

EPA has stated that it is committed to reducing lead in the environment and addressing the disproportionate lead exposure that communities face. Quickly finalizing an endangerment finding for leaded avgas and moving to ban this source of lead emissions is one way that EPA can honor that commitment.

EPA'S PROPOSED ENDANGERMENT FINDING

I. Legal Standards

The CAA requires EPA to issue proposed emission standards whenever it determines that aircraft emissions "cause[], or contribute[] to, air pollution which may reasonably be anticipated to endanger public health or welfare."[31] This determination—often referred to as an endangerment finding—requires two showings: first, that lead air pollution as a whole may reasonably be anticipated to endanger public health or welfare;[32] and second, that emissions from the use of leaded avgas in piston-engine aircraft cause or contribute to this harmful air pollution.[33] In evaluating whether there is a sufficient showing to satisfy each factor, EPA must rely on its scientific judgment of the risks posed by pollution emissions.[34]

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[30] Adam Theising, *What Information Makes Airborne Lead Pollution Salient to Homeowners and Who Does It Cost? Evidence from US Airports* 3 (July 2021) (unpublished paper), https://adamtheising.github.io/Papers/theising_avgas_7-21.pdf ("Being most frequently downwind of airports, residents in these block groups will bear the heaviest brunt of local pollution exposure. Results from this model are striking: block groups within 1km of an airport that receive heavy wind have 9% lower median incomes and have a roughly 3% higher black population than less wind-frequent block groups in the same distance category.").

[31] 42 U.S.C. § 7571(a)(2)(A).

[32] For the purposes of the CAA, "[a]ll language referring to effects on welfare includes, but is not limited to, effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being, whether caused by transformation, conversion, or combination with other air pollutants." 42 U.S.C. § 7602(h).

[33] *See* 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).

[34] *See Coal. for Responsible Regul.*, 684 F.3d at 117–18; *Massachusetts v. EPA*, 549 U.S. 497, 533–34 (2007).

In its Proposed Endangerment Finding, EPA explains that it "is using the same approach of applying a two-part test under section 231(a)(2)(A) as described in the [final greenhouse gas findings under section 231 of the CAA in 2016] and is relying on the same interpretations supporting that approach."[35] As EPA points out, this approach was used in the findings for greenhouse gases under section 202(a) of the CAA, "which [were] affirmed by the U.S. Court of Appeals for the D.C. Circuit in 2012."[36] Petitioners agree that this approach is the appropriate one to use in evaluating whether lead emissions from piston-engine aircraft cause or contribute to air pollution that may reasonably be anticipated to harm the public health or welfare within the meaning of section 231(a)(2)(A) of the CAA.

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 the source of that pollution.[37] In making a determination as to whether a particular pollutant is reasonably anticipated to endanger public health or welfare, EPA has articulated five principles to guide its analysis. The Administrator:

> (1) must consider both current and future risks of harm;
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> (2) "is to exercise judgment by weighing risks, assessing potential harms, and making reasonable projections of future trends and possibilities," which entails a balancing of the likelihood and severity of effects;[38]
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> (3) may make decisions while recognizing uncertainties or limitations of available data or information;
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> (4) is to consider the "cumulative impact" of sources of a pollutant in assessing the risks from air pollution rather than the risks attributable only to a single class or source of classes and is not to consider the effect of emissions reductions from standards that may result from the instant rulemaking;[39] and

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[35] 87 Fed. Reg. at 62,773.

[36] *Id.* (citing *Coal. for Responsible Regul.*, 684 F.3d 102).

[37] *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) (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* 75 Fed. Reg. at 22,444 (referring to recent EPA notices for greenhouse gases setting forth the analytical and legal framework for endangerment findings).

[38] Finding That Greenhouse Gas Emissions from Aircraft Cause or Contribute to Air Pollution That May Reasonably be Anticipated to Endanger Public Health and Welfare, 81 Fed. Reg. 54,422, 54,434 (Aug. 15, 2016); 74 Fed. Reg. at 66,505.

[39] 81 Fed. Reg. at 54,435; 74 Fed. Reg. 66,506.

(5) must consider the risks to all parts of the population, including those who are at greater risk due to, for example, increased susceptibility to adverse health and welfare effects and thus may take into account "vulnerable subpopulations" that are especially at risk.[40]

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."[41] 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."[42] Thus, a "cause or contribute" finding for a particular source of pollution "does not require 'significant' contribution" from that source.[43] Though not necessary for the finding, in this instance, the emissions from piston-engine aircraft do in fact significantly contribute to lead air pollution.

II. EPA's Proposed Endangerment Finding Is Based on Years of Research, and There Is Ample Evidence Supporting Both Prongs of the Endangerment Finding.

There is ample evidence to support both prongs of the section 231(a)(2)(A) endangerment finding for lead emissions from aircraft operating on leaded avgas: first, that lead air pollution may reasonably be anticipated to endanger the public health and welfare, and second, that lead emissions from engines of certain aircraft cause or contribute to this lead air pollution.[44] Indeed, EPA has long known that exposure to lead—including and especially airborne lead—is dangerous, and it has recognized for more than a decade that there is no safe level of lead and that any lead in the human body is dangerous. It is also clear that lead emissions from piston-engine aircraft contribute to lead air pollution; such lead emissions are responsible for approximately 70% of lead emitted domestically into the atmosphere each year. And recent

[40] 81 Fed. Reg. at 54,435; 74 Fed. Reg. 66,506; *see also* 87 Fed. Reg. 62,773–74.

[41] 74 Fed. Reg. at 66,506; 75 Fed. Reg. at 22,445.

[42] 75 Fed. Reg. at 22,445.

[43] 74 Fed. Reg. at 66,506 ("[T]he 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 a 'significant' contribution."); *see also Bluewater Network v. EPA*, 370 F.3d 1, 14 (D.C. Cir. 2004) (explaining that the CAA's use of the term "significant" to modify the contribution required in one provision but not another, "indicates that Congress did not intend to require a finding of 'significant contribution' for" vehicles covered by the latter provision); 81 Fed. Reg. at 54,435 ("The use of the term 'contribute' clearly indicates that such emissions need not be the sole or major cause of the pollution. In addition, the absence of the term 'significantly' or any other word that modifies 'contribute' shows that the EPA need not find that contributing emissions cross a minimum percentage- or mass-based threshold to be cognizable.").

[44] *See* 87 Fed. Reg. at 62,773 (explaining that EPA "is using the same approach of applying a two-part test under section 231(a)(2)(A) as described in the [final greenhouse gas findings in 2016] and is relying on the same interpretations supporting that approach").

research demonstrates that the lead emitted from piston-engine aircraft get into the blood of children living in proximity to airports where these aircraft operate, directly contributing to the harm faced by children with any level of lead in their blood.

A. Lead Air Pollution Endangers the Public Health and Welfare.

EPA proposes to find that lead air pollution may reasonably be anticipated to endanger the public health and welfare.[45] This conclusion is compelled by decades of EPA's findings and is supported by overwhelming scientific evidence. EPA must finalize this endangerment finding.

1. Public Health Effects

It is beyond dispute that lead is toxic,[46] and EPA recognizes that there is no known safe level of lead.[47] EPA has known for decades that lead harms human health:[48] Lead exposure, even at low levels, is associated with a range of serious health effects, including an increased risk of cancer; increased blood pressure; lower cognitive function; harm to the nervous, cardiovascular, immune, and reproductive systems; and anxiety and depression.[49] At the lowest

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[45] *See id.* at 62,777 ("The Administrator proposes to find, for purposes of CAA section 231(a)(2)(A), that lead air pollution may reasonably be anticipated to endanger the public health and welfare."). Petitioners agree that there is ample evidence to support the Administrator's conclusion that lead air pollution may be reasonably anticipated to endanger both the public health *and* welfare but note that the Administrator need only find that such air pollution may reasonably be anticipated to endanger public health *or* welfare. *See* 42 U.S.C. § 7571(a)(2)(A). That lead air pollution endangers both further supports the need to act promptly to finalize the finding.

[46] Even those representing the aircraft owners and pilots that use leaded avgas acknowledge that the additive tetraethyl lead is toxic. *See The Future of AVGAS 100LL and 100UL, Developments in the EU and the USA,* Int'l Council of Aircraft Owner & Pilot Ass'ns Eur.: Monthly Enews (July 2022), https://www.iaopa.eu/contentServlet/iaopa-europe-enews-july-2022 ("First of all, we would like to make it clear that AOPA is critical of the continued use of Avgas 100LL. There is no question that the additive tetraethyl lead (TEL) is toxic. It is not for nothing that it was banned as an additive in automotive fuels over 40 years ago.").

[47] *See* 87 Fed. Reg. at 62,755 ("[A]s the EPA has previously noted 'there is no evidence of a threshold below which there are no harmful effects on cognition from [lead] exposure.'" (alteration in original) (quoting EPA, EPA/600/R-10/075F, *Integrated Science Assessment for Lead* lxxxvii–lxxxviii (June 2013)); *see also id.* at 62,776.

[48] *See* EPA, EPA-600/8-77-017, *Air Quality Criteria for Lead* 1-6 to -7 (Dec. 1977) ("Air Quality Criteria"), https://nepis.epa.gov/Exe/ZyPDF.cgi/20013GWR.PDF?Dockey=20013GWR.PDF; *see also Nat. 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 . . . .").

[49] *See* Agency for Toxic Substances and Disease Registry, *Lead – ToxFAQs* (Aug. 2020) https://www.atsdr.cdc.gov/toxfaqs/tfacts13.pdf ("ToxFAQs"); EPA, EPA/600/R-10/075F,

levels of lead exposure, adults face increased risks of death from cardiovascular disease,[50] with a recent large-scale study finding that 400,000 deaths per year—including hundreds of thousands of cardiovascular disease-related deaths—in the U.S. are attributable to adult lead exposure.[51] And at the lowest levels of lead exposure, children can suffer neurodevelopmental harm with irreversible effects.

As explained above, lead pollution does not affect everyone equally. Communities of color and individuals living in low-wealth communities face higher exposures to lead and have more lead in their bodies. Multiple studies show that Black children have higher blood lead levels than children of other races,[52] and EPA's own data show that Mexican-American children have higher median blood lead levels than white non-Hispanic children.[53] EPA's data also show

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Integrated Science Assessment for Lead lxxxiii–lxxiv (June 2013) ("Lead ISA"), https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=255721; EPA, *Lead Compounds* (Sept. 2016), https://www.epa.gov/sites/default/files/2016-09/documents/lead-compounds.pdf ("EPA has considered lead to be a probable human carcinogen, and, under more recent assessment guidelines, it would likely be classified as likely to be carcinogenic to humans." (citations omitted)).

[50] Lead ISA at xciii, lxxxiv, 1-68; *see also* Rajiv Chowdhury et al., *Environmental Toxic Metal Contaminants and Risk of Cardiovascular Disease: Systematic Review and Meta-Analysis*, 362 BMJ Article No. k3310 (2018), https://doi.org/10.1136/bmj.k3310.

[51] *See* Bruce P. Lanphear et al., *Low-level Lead Exposure and Mortality in US Adults: A Population-based Cohort Study*, 3 Lancet Pub. Health e177 (2018), https://doi.org/10.1016/S2468-2667(18)30025-2; *see also* Lauren Brown et al., *Developing a Health Impact Model for Adult Lead Exposure and Cardiovascular Disease Mortality*, 128 Env't Health Persps. 097005-1 (2020), https://doi.org/10.1289/EHP6552 (modeling the data from four epidemiological studies evaluating the impact of lead exposure on the risk of mortality from cardiovascular disease and finding central estimates of avoided cardiovascular disease deaths in 2014 based on the change in blood lead levels from 1999 to 2014 to range from roughly 34,000 to almost 99,000).

[52] *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), https://doi.org/10.1542/peds.2007-3608 (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), https://doi.org/10.1016/j.envint.2017.08.021; *Lead in Children Ages 1 to 5 Years: Median Concentrations in Blood, by Race/Ethnicity and Family Income, 2015-2018 (Indicator B2),* Subsection in *Biomonitoring – Lead*, EPA, https://www.epa.gov/americaschildrenenvironment/biomonitoring-lead (last updated June 29, 2022).

[53] *Lead in Children Ages 1 to 5 Years: Median Concentrations in Blood, by Race/Ethnicity and Family Income, 2015-2018 (Indicator B2),* Subsection in *Biomonitoring – Lead*, EPA,

that children living below the poverty line have higher median blood lead levels than children living above the poverty line.[54] As a result of these inequitable exposures, historically overburdened groups face an increased risk of harm to their health from lead pollution.

In its Proposed Endangerment Finding, EPA recites many of the dangers of lead exposure, but it does not expressly consider how these dangers fit into the legal framework it is ostensibly applying. EPA explains that it is using the same approach as it used in its final greenhouse gas findings in 2016, but it does not explain how the facts it recites relate to any of the five principles it laid out in that rule with respect to endangerment and set forth above.[55] Petitioners agree that consideration of all five principles articulated in the 2016 final greenhouse gas emissions endangerment finding support the conclusion that lead air pollution is reasonably anticipated to harm the public health and welfare. In its final endangerment finding, however, EPA should be explicit in its consideration of the principles and should expressly discuss at least two of the principles that are most relevant here: (1) that "vulnerable subpopulations" such as children, who may suffer from neurodevelopmental harm even at very low blood lead levels, are especially at risk from lead air pollution;[56] and (2) that there are cumulative impacts of multiple sources of lead exposure.[57] Each of these points support a positive endangerment finding and swift action to ban the use of leaded avgas.

i. Vulnerable Subpopulations

While the Proposed Endangerment Finding recognizes the unique harms lead has on children's health, EPA should expressly consider children as well as pregnant and breastfeeding people as "vulnerable subpopulations" especially at risk of harm from lead exposure under the endangerment-finding framework. Children are uniquely susceptible to harm from low-level lead exposure due to various physiological and behavioral attributes. Exposure starts even before birth; the developing fetus can be exposed to lead in utero, as lead in a pregnant person's body—either from recent exposure or from bone stores of lead that are mobilized during pregnancy—can cross the placenta, and lead has been measured in the fetal brain as early as

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https://www.epa.gov/americaschildrenenvironment/biomonitoring-lead (last updated June 29, 2022).

[54] *Id.*

[55] *See* 87 Fed. Reg. at 62,773–74.

[56] EPA explains that its *Policy on Children's Health* applies and that it "considered lead exposure risks to children as part of this proposed endangerment finding under CAA section 231(a)(2)(A)." 87 Fed. Reg. at 62,781. However, EPA should be explicit that the exposure risks to children support the endangerment prong of its finding under the framework used in the 2009 and 2016 findings and approved by the D.C Circuit in *Coalition for Responsible Regulation, Inc. v. EPA*, 684 F.3d 102 (D.C. Cir. 2012).

[57] In this comment letter, Petitioners refer to the impacts resulting exposures to lead from various sources as "cumulative impacts," mirroring the language that EPA used in articulating the fourth principle, which directs the Administrator to "consider the cumulative impact of sources of a pollutant in assessing the risks from air pollution." 81 Fed. Reg. at 54,435.

thirteen weeks of gestation.[58] Prenatal lead exposure can affect a fetus's developing nervous system and result in decrements in mental development.[59] Neurotoxic effects of lead are generally not reversible, and effects stemming from prenatal exposures and early postnatal exposures can persist into adulthood.[60]

Children also may face more exposures: They engage in age-appropriate behaviors such as crawling and increased hand-to-mouth contact that put them in closer contact with deposited lead,[61] and they breathe at faster rates than adults do,[62] potentially exposing them to more airborne lead. Indeed, half of the children living in the United States under the age of six has detectable levels of lead in their blood.[63] Once lead enters a child's body, it is more easily absorbed because the gastrointestinal tracts of children absorb ingested lead much more easily than those of adults.[64] More of the lead that enters the body gains access to the brains of children than that of adults,[65] and lead exposure affects the developmental processes children undergo.[66]

No evidence of a threshold for the effects of lead on neurodevelopment has been reported, and there is evidence that the incremental harm associated with each unit increase in

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[58] CDC, *Guidelines for the Identification and Management of Lead Exposure in Pregnant and Lactating Women* 30 (Nov. 2010), https://www.cdc.gov/nceh/lead/publications/leadandpregnancy2010.pdf.

[59] Lead ISA at 1-75,

[60] *Id.* at 1-77.

[61] *See id.* at 1-11, 1-78.

[62] *Lead and Your Health*, Mich. Dept. of Health & Hum. Servs.: Mi Lead Safe, https://www.michigan.gov/mileadsafe/learn/lead-and-your-health (last visited Jan. 12, 2023) ("Children are most at risk [for lead exposure] because they . . . [b]reathe at faster rates when compared to adults.").

[63] *See* Marissa Hauptman et al., *Individual- and Community-Level Factors Associated with Detectable and Elevated Blood Lead Levels in U.S. Children: Results from a National Clinical Laboratory*, 175 JAMA Pediatrics 1252 (2021), https://jamanetwork.com/journals/jamapediatrics/fullarticle/2784260.

[64] See *Lead, Biomonitoring Summary*, 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."); Int'l Agency for Rsch. on Cancer, WHO, *Inorganic and Organic Lead Compounds*, 87 IARC Monographs on the Evaluation of Carcinogenic Risks to Humans 1, 302 (2006) ("Lead Monographs"), https://monographs.iarc.fr/ENG/Monographs/vol87/mono87.pdf ("[A] greater proportion of ingested lead is absorbed from the gastrointestinal tract of children than of adults.").

[65] *See* Lead Monographs at 302.

[66] See Lead ISA 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 . . . .").

blood lead levels is actually worse in those children with lower blood lead levels relative to children with higher levels.[67] EPA knows well the harm that lead poses to children—in its Proposed Endangerment Finding, it cites its prior determinations that, in children, there are causal or likely causal relationships between lead exposure and cognitive function, motor function, and auditory function decrements; attention problems; impulsivity; hyperactivity; conduct disorders; and internalizing behaviors, such as depression or anxiety symptoms and withdrawn behavior.[68] EPA should consider this harm as harm to a "vulnerable subpopulation[] [that is] especially at risk"[69] in its final endangerment finding.

EPA should also consider the harms from lead exposure that are faced by pregnant and breastfeeding people. During pregnancy and breastfeeding, lead may be mobilized and redistributed from skeletal tissue and cause acute increases in blood lead levels in the pregnant or breastfeeding person.[70] This mobilization poses a risk not only to the fetus or baby but also to the parent with elevated blood lead levels, who is at an increased risk of adverse health effects, such as hypertension, from the newly mobilized lead.[71]

ii. Cumulative Impact of Lead from Numerous Sources

Second, EPA should expressly "consider the cumulative impact of lead from numerous sources, not just the fuels" at issue here,[72] as well as the multiple exposures to lead that individuals face. While EPA is correct in concluding that lead air pollution endangers public health and welfare, in its final endangerment finding, it should explain how the cumulative impact of lead from multiple sources informs this conclusion (and thus clarify how it considered the fourth principle guiding its analysis).

Lead is a cumulative toxin, and "[a]s lead exposure increases, the range and severity of symptoms and effects also increase."[73] People are not only exposed to lead air pollution from emissions from piston-engine aircraft operating on leaded avgas—they may be exposed to lead in air from paint, from historical deposits in the environment, from food sources, and from

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

[68] 87 Fed. Reg. at 62,775–76 (citing Lead ISA at lxxxiii–lxxxvii).

[69] 74 Fed. Reg. at 66,506; 81 Fed. Reg. at 54,435.

[70] *See* Matthias L. Riess et al., *Lead Poisoning in an Adult: Lead Mobilization by Pregnancy?*, 22 J. Gen. Internal Med. 1212, 1213–14 (2007), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2305731/pdf/11606_2007_Article_253.pdf.

[71] *See id.*; Stephen J. Rothenberg et al., *Increases in Hypertension and Blood Pressure During Pregnancy with Increased Bone Lead Levels*, 156 Am. J. Epidemiology 1079 (2002), https://doi.org/10.1093/aje/kwf163.

[72] 81 Fed. Reg. at 54,436 (citing *Ethyl Corp. v. EPA*, 541 F.2d 1, 29–31 (D.C. Cir. 1976)).

[73] *Lead Poisoning*, WHO: Newsroom (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.

industrial facilities like battery recycling and metal processing facilities.[74] For example, and as explained above, ACAT's constituents face exposure to lead from subsistence foods contaminated with lead from lead ammunition and lead fishing weights, from large-scale metals mining, and from contaminated drinking water. CEH works to address other sources of cumulative exposure to lead through, for example, lead in consumer products and canned foods. People may also be exposed to lead stores in their own bodies, as lead accumulates in teeth and bones and may then be released into the blood at a later time.[75] Considering cumulative sources of lead exposure supports EPA's proposed conclusion that lead pollution may reasonably be anticipated to endanger public health and welfare, especially in light of the fact that adverse health effects increase in severity and number as exposure to lead increases.

2. Welfare Effects

These health effects alone would be sufficient to support an endangerment finding for lead air pollution, but as EPA correctly points out, lead air pollution is associated with a wide array of adverse welfare effects. In addition to the effects of lead on the terrestrial, freshwater, and saltwater environments that EPA reviews in its Proposed Endangerment Finding, lead also has a detrimental impact on welfare through the downstream consequences—including economic consequences—of its health effects.[76] One study conservatively estimated that reducing the blood lead levels of all children in a single cohort of 24 million children aged six years or under to 1 μg/dL or lower would result in a savings to society of $1.2 trillion through increased earnings, lower administrative costs for social safety-net programs, and lower social costs of crime.[77] The same study estimated that a reduction in blood lead levels of this magnitude would produce an additional 4.8 million quality-adjusted life years.[78] Another study calculated the nationwide annual costs of IQ losses from aircraft lead emissions and found that such emissions contributed an estimated $1.06 billion in 2006 USD from lifetime earnings reductions alone.[79] Similar research evaluating the effects of piston-engine aircraft traffic in Michigan conservatively estimated that reducing such traffic from the 50th percentile to the 10th percentile of operations would generate a benefit of about $120 million (measured as the net present value

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[74] *See* 87 Fed. Reg. at 62,762; Lead Strategy at 6, 30, 35.

[75] *Lead Poisoning*, WHO: Newsroom (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.

[76] *See* 42 U.S.C. § 7602(h) (stating that "language referring to effects on welfare includes" both effects on various parts of the environment as well as "effects on economic values and on personal comfort and well-being").

[77] *See* Peter Muennig, *The Social Costs of Childhood Lead Exposure in the Post–Lead Regulation Era*, 163 Archives Pediatrics & Adolescent Med. 844 (2009), https://jamanetwork.com/journals/jamapediatrics/fullarticle/382153.

[78] *Id.*

[79] *See* Philip J. Wolfe et al., *Costs of IQ Loss from Leaded Aviation Gasoline Emissions*, 50 Env't Sci. Tech. 9026 (2016), https://doi.org/10.1021/acs.est.6b02910.

of future earnings).[80] These economic effects only reinforce EPA's determination that lead air pollution may be reasonably anticipated to endanger public welfare, and EPA should consider these welfare effects in finalizing its finding.

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EPA has known for decades that lead exposure, even at low levels, is dangerous to human health and the environment.[81] Indeed, it "has long regulated emissions of lead air pollution due to their adverse impacts on public health."[82] EPA should heed the science it has reviewed in its Proposed Endangerment Finding and finalize its conclusion that lead air pollution may reasonably be anticipated to harm the public health or welfare.

B. Lead Emissions from Aircraft Contribute to Harmful Lead Air Pollution.

EPA proposes to find that lead emissions from "covered aircraft"—defined to mean all aircraft and ultralight vehicles equipped with "any aircraft engine that is capable of using leaded aviation gasoline,"[83] the vast majority of which are piston-engine powered[84]— cause or contribute to air pollution that is reasonably anticipated to harm public health and welfare. This conclusion is also supported by ample evidence, and it must be finalized.

Emissions from piston-engine aircraft contribute roughly 70% of lead released domestically into the atmosphere.[85] In prior endangerment findings, EPA has found that air pollution from a specific source "contribute[s]" to air pollution that may endanger public health or welfare at much lower relative contribution levels—at levels less than 3% of the total inventory of emissions.[86] Where, as here, emissions from aircraft operating on leaded avgas

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[80] *See* Sammy Zahran et al., *The Effect of Leaded Aviation Gasoline on Blood Lead in Children*, 4 J. Ass'n Env't & Res. Economists 575 (2017), https://doi.org/10.1086/691686.

[81] *See* Air Quality Criteria at 1-7; 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").

[82] 75 Fed. Reg. at 22,445.

[83] 87 Fed. Reg. at 62,754.

[84] *Id.* at 62,778 ("The vast majority of covered aircraft are piston-engine powered.").

[85] Transp. Rsch. Bd., Nat'l Acads. of Scis., Eng'g, & Med. et al., *Options for Reducing Lead Emissions from Piston-Engine Aircraft* 46 (2021), https://www.nap.edu/read/26050/chapter/5.

[86] *See* 75 Fed. Reg. at 22,445 ("EPA has found that air pollutant emissions that amount to 1.2 percent of the total inventory met the statutory test for contribution, triggering EPA's regulatory authority." (citing *Bluewater Network*, 370 F.3d at 15)); 81 Fed. Reg. at 54,461 (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").

make up the vast majority of domestic lead air pollution, it would be arbitrary and capricious for EPA not to finalize its "cause or contribute" finding.

Lead emissions from aircraft that use leaded avgas have direct and harmful effects on the communities surrounding the airports where these aircraft operate. Lead air pollution is higher in the areas surrounding general aviation airports where aircraft using leaded avgas operate; as EPA explains in its Proposed Endangerment Finding, "[a]ir quality monitoring and modeling studies for lead at and near airports have identified elevated concentrations of lead in air from piston-engine aircraft exhaust at, and downwind of, airports where these aircraft are active."[87] Indeed, a report submitted to the docket by the Town of Middleton, Wisconsin demonstrates this. Consultants hired by the Town measured ambient lead concentrations at locations surrounding a municipal airport where leaded avgas is used and compared these measurements to modeled lead concentrations based on certain assumptions regarding lead content of avgas, flight patterns, and airport activity. They found that ambient lead levels were elevated near the municipal airport—as was expected by the modeling study—and that the sampling and modeling data together supported the conclusion that the "local aircraft operations at the . . . airport are the dominant source of ambient lead in the area."[88]

Lead air pollution emitted by airplanes is particularly harmful compared to other sources of lead air pollution. Recent research—cited by EPA in its Proposed Endangerment Finding—shows that the piston-engine aircraft exhaust has lead-containing particles that are smaller in size than exhaust particles from automobiles burning leaded fuel.[89] As a result of their smaller size, aircraft-generated particles are expected to remain in the air for longer and to more easily penetrate mucosal barriers in the lungs and gain easier access to epithelial cells.[90] Lead from piston-engine aircraft is also particularly dangerous because of the possible sources of exposure. Not only do individuals who live or work near airports inhale airborne lead but lead particles may also fall to the ground or be deposited directly on the ground as a result of fuel dumping following pre-flight inspections and can remain there for long periods of time or run off to surface water.[91] People may be exposed by ingesting deposited lead in dusts, soil, food, and

[87] 87 Fed. Reg. at 62,762.

[88] Trinity Consultants, *Measurement of Ambient Lead Concentrations Around the Middleton Wisconsin Municipal Airport – Morey Field (C29)*, at 2-4 (Sept. 15, 2022), https://www.regulations.gov/comment/EPA-HQ-OAR-2022-0389-0178 (click "Download" for "Attachment 2").

[89] *See* Jack D. Griffith, *Electron Microscopic Characterization of Exhaust Particles Containing Lead Dibromide Beads Expelled from Aircraft Burning Leaded Gasoline*, 11 Atmospheric Pollution Rsch. 1481 (2020), https://www.regulations.gov/document/EPA-HQ-OAR-2022-0389-0018.

[90] *See id.*

[91] *See* 73 Fed. Reg. at 67,011, 67,027 (discussing deposition of lead from air sources and the potential for deposited lead to contribute to human exposures for extended time periods); 87 Fed. Reg. at 62,766 (discussing fuel dumping).

drinking water. Exposure through crop contamination—a pathway that EPA has recognized since at least the 1970s[92]—may occur by aerial application of pesticides by piston-engine aircraft, which comprise roughly one-fifth of the fleet of aircraft used for aerial pesticide application.[93]

Multiple studies support a causal link between lead emissions from piston-engine aircraft and increased blood lead levels in individuals who work in, and live around, general aviation airports. A 2013 study of aircraft-maintenance workers in the Republic of Korea found higher blood lead levels of maintenance workers based in airports that service propeller-driven aircraft and use leaded avgas than those of maintenance workers that are based in airports that service jets, which do not use leaded avgas; the authors concluded that leaded avgas emissions "could increase the [blood lead levels] of aircraft maintenance crews."[94] Other studies, including those cited in the Proposed Endangerment Finding, have shown that children living in close proximity to airports where leaded avgas is used have higher blood lead levels than children who do not.[95]

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[92] Air Quality Criteria at iv ("Secondary exposure [to airborne lead] may occur through ingestion of foods from crops contaminated by airborne lead . . . .").

[93] *Industry Facts*, Nat'l Agric. Aviation Ass'n, https://www.agaviation.org/industryfacts (last visited Jan. 13, 2023).

[94] Won-Ju Park et al., *Blood Lead Level and Types of Aviation Fuel in Aircraft Maintenance Crew*, 84 Aviation, Space, & Env't Med. 1087, 1089 (2013), https://doi.org/10.3357/ASEM.3647.2013.

[95] *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, 1516 (2011), https://doi.org/10.1289/ehp.1003231 (examining the relationship between proximity to airports in North Carolina where leaded aviation gas is used and blood lead levels in children and 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 80, at 575–610 (examining the blood lead levels of children living within two 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"); Mountain Data Grp., *Leaded Aviation Gasoline Exposure Risk at Reid-Hillview Airport in Santa Clara County, California* 37–45 (Aug. 2021) ("RHV Lead Study") (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"); Sammy Zahran et al. *Leaded Aviation Gasoline Exposure Risk and Child Blood Lead Levels*, 2 PNAS

This is true even after accounting for other sources of lead exposure, indicating that the use of leaded avgas causes elevated blood lead levels in children.[96] Indeed, a recent study showed that living downwind of Reid-Hillview Airport in California 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.[97]

This research is particularly troubling given that EPA's own analysis estimates that there are more than 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.[98] More than 160,000 children attend schools near these airports.[99] Millions of people are thus at risk for increased blood lead levels simply because of the location of their homes and schools.

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Decades of research make clear that lead air pollution is harmful to human health and the environment and that it endangers public health and welfare. Lead emissions from piston-engine aircraft—the largest remaining source of atmospheric lead emissions in the United States—contribute to this harmful air pollution. EPA must finalize its Proposed Endangerment Finding

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Nexus Article No. pgac285 (2022), https://doi.org/10.1093/pnasnexus/pgac285 (analyzing RHV Lead Study data and finding "consistent evidence that exposure to avgas increases child BLLs").

[96] *See* Miranda et al. *supra* note 95, 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 80, 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).

[97] *See* RHV Lead Study at xv, xvi.

[98] In 2020, EPA estimated that over five million people live within 500 meters of a runway and fifty meters of a helipad. *See* EPA, EPA-420-R-20-001, *National Analysis of the Populations Residing Near or Attending School Near U.S. Airports* 13 (Feb. 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* 75 Fed. Reg. at 22,460.

[99] EPA, EPA-420-R-20-001, *National Analysis of the Populations Residing Near or Attending School Near U.S. Airports* 15 (Feb. 2020).

and move on to the next step of regulating these emissions and eliminating this source of toxic pollution.[100]

III. EPA Should Quickly Finalize the Proposed Endangerment Finding, and the Biden-Harris Administration Should Finalize a Ban on Leaded Avgas Before the End of President Biden's First Term.

EPA must promptly finalize its endangerment finding and move on to regulating emissions from leaded avgas. The need for swift action flows directly from the overwhelming evidence that lead air pollution endangers the public health and welfare with widespread and serious consequences: Every day that planes continue to operate on leaded avgas is another day that individuals breathe in this polluted air and are put at risk of a wide array of adverse health effects, many of which are believed to be irreversible. These emissions have a disproportionate impact on people of color and individuals living in low-wealth communities, who already bear the brunt of disproportionate exposures to lead pollution. EPA must make good on its stated commitments to environmental justice and achieve the aims of its Lead Strategy by swiftly finalizing its Proposed Endangerment Finding and moving to the next stage of regulating leaded avgas.

Once EPA finalizes its endangerment finding, it must work with FAA to quickly get this source of lead out of the environment. There is broad agreement that leaded avgas must be banned; as a branch of the International Council of Aircraft Owner and Pilots Association recently wrote, "[f]or health reasons and also for economic reasons, Avgas 100LL must indeed disappear."[101] The Biden-Harris Administration should finish the work that it started after decades of inaction by prior administrations and finalize emissions and fuel standards for piston-engine aircraft before the end of President Biden's first term. Such standards should eliminate this unnecessary and dangerous source of lead pollution, and they should do so by the end of 2025, when industry leaders expect to be able to deploy fleetwide drop-in fuels.[102]

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[100] Arguments related to potential costs of compliance that could result from some hypothetical future regulations are irrelevant at this stage, at which EPA's mission is solely to consider whether it has a scientific basis for its finding. *See Coal. for Responsible Regul.*, 684 F.3d 102. EPA would not be complying with the Clean Air Act if it considered such arguments in determining whether it should finalize its endangerment finding.

[101] *The Future of AVGAS 100LL and 100UL, Developments in the EU and the USA,* Int'l Council of Aircraft Owner & Pilot Ass'ns Eur.: Monthly Enews (July 2022), https://www.iaopa.eu/contentServlet/iaopa-europe-enews-july-2022.

[102] The Biden-Harris Administration should ban the use of leaded avgas well before the current 2030 target date set by the FAA's Eliminate Aviation Gasoline Lead Emissions ("EAGLE") program—a transition timeline that has been called "a worst-case scenario." Mark Baker, AOPA President and CEO, *Unleaded Fuel You've Got Questions*, Midwest Flyer (Sept. 28, 2022), https://midwestflyer.com/?p=15833 ("While the industry-government partnership is calling for a

The availability of alternative fuels means that a ban on leaded avgas is now possible. An unleaded 94-octane fuel has been on the market and available for years, and this fuel can be used in approximately two-thirds of all piston-engine aircraft.[103] The remaining third of aircraft that rely on higher-octane fuel also have an alternative fuel: The FAA recently granted approval to a high-octane unleaded avgas, G100UL, that can be used in all aircraft in the fleet. The manufacturer, General Aviation Modifications, Inc., recently said that it will be able to start delivering the fuel this year and will be able to deliver it fleetwide within three years. A competitor, Swift Fuels, expects to be able to bring its 100-octane unleaded fuel to market in the middle of 2023 and expects it to be price competitive with existing fuels. And as Robert Olislagers from FAA's EAGLE partnership program recently explained, two additional unleaded fuels are in development.[104] EPA should ensure that this progress continues and use its regulatory powers to expedite the transition away from leaded avgas that is already happening. Given the rapid development of alternatives to leaded avgas, and in order to fulfill its directive to protect public health and welfare, this Administration must move forward with a ban.

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For decades, the federal government has allowed individuals around the country—including hundreds of thousands of children—to be exposed to a toxic pollutant for which there is no safe level. Petitioners thank EPA for finally commencing rulemaking to put an end to these exposures and urge EPA to expeditiously finalize its Proposed Endangerment Finding. Petitioners further request EPA and the FAA to work together quickly to propose a ban on lead emissions from piston-engine aircraft and on lead in aviation gasoline and to finalize such a ban before the end of President Biden's first term.

Respectfully submitted,

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full transition by 2030, I believe that is a worst-case scenario and I expect this to be achieved before then.").

[103] Transp. Rsch. Bd., Nat'l Acads. of Scis, Eng'g, & Med., *Options for Reducing Lead Emissions from Piston-Engine Aircraft* 3, 93 (2021), https://nap.nationalacademies.org/read/26050/chapter/1.

[104] *See* Presentation of Robert Olislager, *Accelerating the Transition to Lead-free Skies* at 1:52:33–44 (Dec. 15, 2023), *in Quiet Communities Presents the "Quest for Quiet" Lunchtime Conference Series,* Quiet Communities, https://quietcommunities.org/lunchtime-conferences/accelerating-the-transition-to-lead-free-skies/ (last visited Jan. 17, 2023) ("We have three other fuels that are in the hopper as well, with . . . the Swift fuel likely having their STC coming up . . . in 2023."); *cf.* Baker, *supra* note 102 ("The FAA also continues its testing and evaluation program known as the Piston Aviation Fuel Initiative (PAFI), and two fuel candidates are going through that process.").

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