GET THE LEAD OUT: AN ARGUMENT FOR REGULATING PISTON-ENGINE AIRCRAFT

*Kennedy Sattler**

INTRODUCTION

Miguel Alarcon lived across the street from Reid-Hillview Airport in East San Jose, California from 2014 to 2017.[1] His car was "always dirty from the pollution," during this time.[2] Layers of grey film collected on his car as a result of exhaust from leaded aviation gas (avgas) used in the airplanes that flew in and out of Reid-Hillview Airport daily.[3] Mr. Alarcon also developed respiratory issues while living near the airport.[4] His doctor proscribed antibiotics to help with his coughing and sneezing, but when Mr. Alarcon saw no changes, his doctor suggested moving "far from the airport."[5] Mr. Alarcon was then presented with another hardship—finding affordable housing.[6] Mr. Alarcon, a working-class roof contractor, lived near the airport because it is one of the few areas in San Jose that offers affordable housing.[7] He was now faced with a choice: his health or affordable rent.[8] Unlike many in the area, Mr. Alarcon was, fortunately, able to move away from the airport, but with a cost.[9] His monthly rent jumped from $800 to $1,700 upon moving away from the airport.[10]

Mr. Alarcon is just one of thousands of individuals that live near airports that operate piston-engine aircraft. The Environmental Pro-

* George Mason University Antonin Scalia Law School J.D. expected, 2023.

1 Leticia Miranda & Cyrus Farviar, *Leaded Gas Was Phased Out 25 Years Ago. Why Are These Planes Still Using Toxic Fuel?*, NBC NEWS (Apr. 22, 2021), https://www.nbcnews.com/business/business-news/leaded-gas-was-phased-out-25-years-ago-why-are-n1264970.

2 *Id.*

3 *Id.*

4 *Id.*

5 *Id.*

6 *Id.*

7 Miranda & Farviar, *supra* note 1.

8 *Id.*

9 *See id.*

10 *Id.*

tection Agency (EPA) has long recognized the negative health effects of lead reaching the bloodstream.[11] In fact, the EPA contends that "any level of lead in the blood leads to adverse health effects."[12] Lead exposure can cause "anemia, increased blood pressure, and an increased risk of cancer;" and—at high levels—even death.[13] Lead especially harms children, even at low levels of exposure.[14] It can decrease growth and cause neurodevelopment issues, behavior problems, and learning deficits.[15]

The EPA has combatted negative health and environmental effects of leaded gas through its endangerment finding authority under the Clean Air Act (CAA), which is the authority to determine that an air pollutant harms public health or human welfare.[16] In 1996, the EPA banned the use of leaded gas in automobiles.[17] Additionally, in 2016, the EPA issued an endangerment finding on the negative health effects of greenhouse gas (GHG) emissions from larger aircraft.[18] Most recently, in October 2022, the EPA proposed to issue an endangerment finding for avgas.[19] Up until this point, the EPA had yet to rule on one of the largest polluters of the modern-era.[20] More than 222,600 piston-engine aircraft across 20,000 domestic airports still

---

11 *See* Jessie Stolark, *Fact Sheet — A Brief History of Octane Gasoline: From Lead to Ethanol*, ENV'T & ENERGY STUDY INST. (Mar. 30, 2016), https://www.eesi.org/papers/view/fact-sheet-a-brief-history-of-octane.

12 A Cmty. Voice v. U.S. Env't Prot. Agency, 997 F.3d 983, 986 (9th Cir. 2021).

13 E-mail from Jonathan J. Smith & Kelly E. Lester, EarthJustice; et al., to Michael Regan, Env't Protec. Agency Adm'r (Aug. 24, 2021) (https://news.sccgov.org/sites/g/files/exjcpb956/files/documents/2021.08.23_-_leaded_avgas_petition_final_with_exhibits.pdf). *See also ToxFAQs,*™ AGENCY FOR TOXIC SUBSTANCES & DISEASE REGISTRY (Aug. 07, 2020) https://www.atsdr.cdc.gov/toxfaqs/tfacts13.pdf.

14 *See* Stolark, *supra* note 11; *ToxFAQs,*™, *supra* note 13.

15 *See* Stolark, *supra* note 11; *ToxFAQs,*™, *supra* note 13.

16 42 U.S.C. § 7571(a)(2)(A) (1996).

17 *Gasoline Explained: Gasoline and the Environment*, U.S. ENERGY INFO. ADMIN. (Dec. 13, 2021), https://www.eia.gov/energyexplained/gasoline/gasoline-and-the-environment-leaded-gasoline.php (last visited Nov. 25, 2021).

18 Christie St. Clair, *EPA Takes First Steps to Address GHG Emissions from Aircraft Engines*, U.S. ENV'T PROT. AGENCY (June 10, 2015), https://nepis.epa.gov/Exe/ZyPDF.cgi/P100MLPU.PDF?Dockey=P100MLPU.PDF (last visited Nov. 26, 2022).

19 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) (to be codified at 40 CFR pts. 87, 1031, and 1068).

20 *See Fact Sheet – Leaded Aviation Fuel and the Environment*, U.S. FED. AVIATION ADMIN. (Nov. 30, 2019), https://www.faa.gov/newsroom/leaded-aviation-fuel-and-environment (last visited Nov. 26, 2022) [hereinafter "Fact Sheet"].

use leaded avgas.[21] Piston-engine aircraft are used as personal planes as well as for agriculture, firefighting, and law enforcement purposes.[22]

While this Comment applauds the EPA's most recent efforts to regulate avgas, the endangerment finding is long overdue. The EPA has been aware of the extreme negative health effects created by lead pollution for many years.[23] In fact, the EPA has issued endangerment findings in instances where the health effects were not as extreme as the conditions created in San Jose.[24] Further, the EPA has also issued endangerment findings that have completely altered the operation of major U.S. industries, including the automobile industry.[25] Lastly, the EPA does not need to wait for proper technology to develop a replacement for aviation gas before issuing an endangerment finding.[26] Therefore, the EPA's most recent endangerment finding is not only proper, but could have been issued at least a decade ago—preventing unnecessary lead pollution and harm to communities throughout the country.

This Comment explores the validity of the EPA's October 2022 endangerment finding for avgas used in piston-engine aircraft while also illustrating the faults of the EPA's endangerment finding authority. The Background will first introduce avgas and the impact it has on the environment and public health, the EPA's authority to issue an endangerment finding under the CAA, modern efforts to reduce lead pollution from avgas, and the 2022 proposed endangerment finding for avgas. Then, the Analysis will highlight potential points of litigation under the proposed endangerment finding and suggest changes

21 *About Aviation Gasoline*, U.S. FED. AVIATION ADMIN., https://www.faa.gov/about/initiatives/avgas/, (last visited Nov. 26, 2022) [hereinafter "About Aviation"]. *See also Fact Sheet*, *supra* note 20; Advance Notice of Proposed Rulemaking on Lead Admissions from Piston-Engine Aircraft Using Leaded Aviation Gasoline, 75 Fed. Reg. 22,440, 22,442-43 (Apr. 28, 2010) (to be codified at 40 CFR pt. 87).

22 *Fact Sheet*, *supra* note 20.

23 *See* Stolark, *supra* note 11 (noting that the first studies indicating the dangers of lead pollution were conducted in the 1960s and the Clean Air Act was passed with the intention for the EPA to remove lead from automotive gasoline).

24 *See* Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496, 66,496–97 (Dec. 15, 2009) (to be codified at 40 C.F.R. Ch. 1).

25 *Id.* at 66,499-500.

26 *See* Katherine A. Bechina et al., *The EPA's Endangerment Finding on Aircraft Greenhouse Gas Emissions: A Preliminary Analysis*, 82 J. AIR L. & COM. 471, 483-84 (2017) (the core principles the article discusses has nothing to do with industry impact and everything to do with scientific data).

the EPA should make to the final endangerment finding to ensure that future regulations are effective in minimizing emissions from piston-engine aircraft. Finally, the Conclusion will briefly summarize the key findings of this Comment.

BACKGROUND

I. AVIATION GAS—AVIATION'S BIGGEST POLLUTER

Avgas is the only type of transportation fuel that still contains lead, which is highly pollutive, making piston-engine aircraft one of the biggest modern-day polluters.[27] Although the use of lead in avgas may be necessary for safety reasons, the health impacts and environmental justice concerns within the communities surrounding these airports are extensive.

A. *What is Aviation Gas?*

Avgas is a leaded gas used in small aircraft, such as piston-engine aircraft.[28] More than 222,600 piston-engine aircraft operate today using avgas.[29] Piston-engine aircraft fly "relatively short missions," often travelling 300 to 400 miles and operating out of small general aviation airports.[30] Additionally, there are a variety of models of piston-engine aircraft manufactured by major aircraft manufacturers such as Beechcraft, Cessna, Cirrus, Diamond, Mooney, Piper, and Tecnam.[31] Further, piston-engine aircraft are used for "personal travel, instructional flying, aerial surveys, agriculture, firefighting, law enforcement, medical emergencies, and express freight."[32]

Avgas is a "complex mixture of hydrocarbons" that are balanced to create reliable and safe engine performance.[33] Leaded avgas contains octane, which is important for safe operation of piston-engine aircraft.[34] The octane in avgas "prevents damaging engine knock, or

---

27 *About Aviation*, *supra* note 21.

28 *See id.*

29 *Id.*

30 *Piston-Engine Aircraft*, National Business Aviation Association (last visited Dec. 27, 2022), https://nbaa.org/business-aviation/business-aircraft/piston-engine-aircraft/.

31 *Id.*

32 *Fact Sheet*, *supra* note 20.

33 *Id.*

34 *Id.*

detonation, that can result in a sudden engine failure"[35] and "prevents subsequent valve seat recession and subsequent loss of compression for engines without hardened valves."[36] Avgas differs from jet fuel, which is used by large commercial aircraft, because avgas contains tetra-ethyl lead (TEL) additives that boost octane levels and lubricate the engines of small aircraft.[37]

Lead emissions from avgas consist of half of the nation's lead emissions.[38] From 2011 to 2020, the Federal Aviation Administration (FAA) estimated 196 million gallons of avgas was consumed annually, and forecasts that 179 million gallons of avgas will be consumed annually until 2026.[39] The lead in avgas can create lead pollution in many ways, including evaporative emissions from the use of piston-engines, distribution of avgas, refueling piston-engine aircraft, completing preflight fuel checks, spilling fuel, and venting fuel tanks.[40] Additionally, lead can remain in the atmosphere for many days.[41] Lead pollution through evaporative emissions begins when lead in the atmosphere is oxidized and reacts with hydroxyl compounds allowing it to remain in the atmosphere anywhere from a few hours to days.[42] Lead emissions can then be removed from the atmosphere and deposited into the soil.[43] The lead then forms phase compounds and mixes with organic matter in the soil.[44]

Aviation is heavily regulated within the United States. In general, aviation is regulated through the Department of Transportation

35 *See About Aviation*, *supra* note 21.

36 Proposed Policy on Enabling the Use of Unleaded Aviation Gasoline in Piston-Engine Aircraft and Aircraft Engines Through the Fleet Authorization Process, 87 Fed. Reg. 62,758 (proposed Oct. 5, 2022) (to be codified at 40 C.F.R. pts. 87, 1301, 1068).

37 *Aviation Fuel vs. Gasoline*, MIDCONTINENT INSTRUMENTS + AVIONICS (Apr. 27, 2020), https://www.mcico.com/ jet-fuel-vs-gasoline, (last visited Dec.2, 2022).

38 Advance Notice of Proposed Rulemaking on Lead Admissions from Piston-Engine Aircraft Using Leaded Aviation Gasoline, 75 Fed. Reg. 22,440, 22,442 (Apr. 28, 2010) (to be codified at 40 CFR pt. 87).

39 Proposed Policy on Enabling the Use of Unleaded Aviation Gasoline in Piston-Engine Aircraft and Aircraft Engines Through the Fleet Authorization Process 87 Fed. Reg. at 62,758.

40 Thanikasalam Kumar et al., *Concerns Over Use of Leaded Aviation Gasoline (AVGAS) Fuel*, 63 CHEM. ENG'G. TRANSACTIONS 181, 183 (2018) https://www.semanticscholar.org/paper/Concerns-over-use-of-leaded-aviation-gasoline-fuel-Thanikasalam-Rahmat/e6a26649fdbf3d2d8aba776b092c9b029aa08a2f.

41 Proposed Policy on Enabling the Use of Unleaded Aviation Gasoline in Piston-Engine Aircraft and Aircraft Engines Through the Fleet Authorization Process, 87 Fed. Reg. at 62,765.

42 Kumar et al., *supra* note 39, at 183.

43 *Id.* at 184

44 *Id.*

(DOT).[45] The safety of airplanes, airports, and airspace is regulated by the FAA, Transportation Security Administration (TSA), and National Transportation Safety Board (NTSB).[46] The environmental impact of aircraft operations is regulated by the EPA.[47] Avgas emissions, however, are not yet regulated.[48] But there are encouraging signs that this will change within the next year.[49]

B. *Impacts of Lead Pollution*

Although lead emissions and lead concentration in the bloodstream have significantly decreased since 1970, when the EPA began its effort to phase out the use of lead, the negative impacts of lead are still a major issue of public concern.[50] The public is rightly concerned about the levels of lead still used today because lead exposure leads to irreversible health defects and terminal illnesses.[51] The EPA estimates that over five million people, including over 360,000 children under the age of five live within 500 meters of a runway used by piston-

---

[45] Jennifer Allison, *Regulation of the Aviation Industry*, HARV. L. SCH. LIBR. (last updated Nov. 1, 2022), https://guides.library.harvard.edu/aviation_regulation (last visited Dec. 2, 2022).

[46] *Id.*

[47] *Id.*

[48] *Environment and Airports*, U.S. FED. AVIATION ADMIN., https://www.faa.gov/about/initiatives/avgas/env_airports/ (last visited Oct. 26, 2022).

[49] *See EPA to Evaluate Whether Lead Emissions from Piston-Engine Aircraft Endanger Human Health and Welfare,* U.S. ENV'T PROT. AGENCY (Jan. 12, 2022), https://www.epa.gov/newsreleases/epa-evaluate-whether-lead-emissions-piston-engine-aircraft-endanger-human-health-and; 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. 2022-22223 (Oct. 17, 2022).

[50] *See* U.S. ENV'T PROT. AGENCY, 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 (2019) [hereinafter EPA STATUS REPORT]. In fact, lead emissions are one of the most extensively regulated air pollutants under the CAA. *Lead Regulations*, U.S. ENV'T PROT. AGENCY (last updated Aug. 26, 2022), https://www.epa.gov/lead/lead-regulations; Jack Lewis, *Lead Poisoning: A Historical Perspective*, 11 ENV'T PROT. AGENCY J. 15, 18 (May 1985). Since 1973, the EPA has restricted the level of lead emissions allowed under the CAA three times. Qian Meng, *Adding Fuel to the Flames: Why EPA's New Source Review Program Under the Clean Air Act Exacerbates Lead Pollution in Lead Nonattainment Areas*, 16 VT. J. ENV'T. L. 121, 127 (2014).

[51] E-mail from Jonathan J. Smith & Kelly E. Lester, EarthJustice; et al., to Michael Regan, Env't Protec. Agency Adm'r (Oct. 12, 2021) (https://earthjustice.org/sites/default/files/files/2021.10.12_leadedavgaspetition.pdf) [hereinafter EarthJustice Petition]. *See also* CTR. DISEASE CONTROL, C.D.C. RESPONSE TO ADVISORY COMMITTEE ON CHILDHOOD LEAD POISONING PREVENTION RECOMMENDATIONS IN "*Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention*" (2012) [hereinafter CDC REPORT].

engine aircraft.[52] Research shows that those who live in close proximity to these airports are at a higher risk of health effects from lead exposure.[53]

1. Health Impacts

"The effects of lead are the same whether it enters the body by breathing it in or eating it."[54] Additionally, "[l]ead can affect almost every organ and system in [the] body."[55] In 2013, the EPA published its most recent Integrated Science Assessment (2013 ISA) which evaluated peer-reviewed literature discussing the negative impacts stemming from lead pollution.[56] The 2013 ISA noted some of the adverse health impacts of lead exposure may include declining cognitive functions, such as visual functions and memory; high blood pressure; peripheral artery disease; asthma; impairment of the female reproductive system; and even cancer.[57] Ultimately, extreme exposure to lead will result in death.[58] Long exposure and exposure to high concentrations of lead, however, are not necessary to cause negative health impacts.[59] In fact, the EPA recognizes that "any level of lead in the blood leads to adverse health effects."[60]

---

52 EarthJustice Petition, *supra* note 51. *See also* U.S. ENV'T PROT. AGENCY, EPA-420-R-20-001, NATIONAL ANALYSIS OF THE POPULATIONS RESIDING NEAR OR ATTENDING SCHOOL NEAR U.S. AIRPORTS (2020).

53 EarthJustice Petition, *supra* note 51. *See also* Sammy Zaharan et al., *The Effect of Leaded Aviation Gasoline on Blood Lead in Children*, 4 J. ASS'N ENV'T & RES. ECON. 575, 578 (June 2017); *MIT Team Calculates Lead Emissions From AvGas Fuel in US Contribute to ~$1B in Annual Damages Due to IQ Losses*, GREEN CAR CONGRESS (Aug. 24, 2016), https://www.greencarcongress.com/2016/08/mit-team-calculates-lead-emissions-from-avgas-fuel-in-us-contribute-to-1b-in-annual-damages-due-to-i.html; Marie L. Miranda et al, *A Geospatial Analysis of the Effects of Aviation Gasoline on Childhood Blood Lead Levels*, 119 ENV'T HEALTH PERSP. 1513, 1513 (Oct. 2011).

54 ToxFAQs, U.S. CTRS. FOR DISEASE CONTROL AND PREVENTION (last updated Aug. 7, 2020), https://wwwn.cdc.gov/TSP/ToxFAQs/ToxFAQsDetails.aspx?faqid=93&toxid=22#:~:text=The%20effects%20of%20lead%20are,poisoning%20in%20children%20and%20adults.

55 *Learn About Lead*, U.S. ENV'T PROT. AGENCY (last updated Sept. 8, 2022), https://www.epa.gov/lead/learn-about-lead#effects (last visited Dec. 03, 2022).

56 *See generally* U.S. ENV'T PROT. AGENCY, EPA-600-R-10-075F, INTEGRATED SCIENCE ASSESSMENT FOR LEAD, (2013) [hereinafter 2013 ISA].

57 *Id.* at 1-17; 1-27; 1-31; 1-37; 1-38.

58 *Id.* at 4-368; EarthJustice Petition, *supra 51*.

59 EarthJustice Petition *supra* note 50; EPA STATUS REPORT, *supra* note 50.

60 *See* EPA STATUS REPORT, *supra* note 50.

Lead exposure is especially harmful to children.[61] The Centers for Disease Control and Prevention (CDC) has proclaimed: "No safe blood lead level in children has been identified."[62] Children appear to be impacted by lower concentration levels of lead than adults.[63] Studies consistently suggest that children face serious developmental impairments when exposed to lead.[64] For example, lead exposure has been found to impair learning, memory, and executive functions.[65] Specifically, lead exposure can decrease physical growth and cause neurodevelopment which then develops into behavioral problems and learning deficits.[66] What is especially concerning about lead exposure in children is that the effects are irreversible.[67]

2. Environmental Justice Concerns

The EPA has also discovered that "lead exposure is especially prevalent in many communities that represent the lowest income and most diverse populations with significant cumulative environmental risk from pollution."[68] Although the EPA's goal is to ensure a safe environment for all, it is especially protective of at-risk communities.[69] Studies have shown that individuals with a lower socioeconomic status are more likely to live near airports.[70] For example, in California, a majority of the general aviation airports operating piston-engine aircraft are located near communities of color and low socioeconomic status.[71] Similarly, a study conducted in North Carolina found that

---

61 *Id.*

62 *Id.*

63 2013 ISA, *supra* note 56, at 1-18.

64 *Id.* at 1-15.

65 *Id.*

66 EarthJustice Petition *supra* note 51, at 4.

67 CDC REPORT, *supra* note 51

68 EarthJustice Petition, *supra* note 50; EPA STATUS REPORT, *supra* note 50.

69 *Statement by Administrator Reagan on the President's FY 2022 Budget*, U.S. ENV'T PROT. AGENCY (last updated June 2, 2021), https://www.epa.gov/newsreleases/statement-administrator-regan-presidents-fy-2022-budget (last visited Dec. 02, 2021).

70 Zaharan et al., *supra* note 53, at 557 (noting the trend in Michigan). *See generally* U.S. ENV'T PROT. AGENCY, TECHNICAL SUPPORT DOCUMENT (TSD) FOR THE EPA'S PROPOSED FINDING THAT LEAD EMISSIONS FROM AIRCRAFT ENGINES THAT OPERATE ON 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, EPA-420-R-22-025 (Oct. 2022) [hereinafter TSD].

71 Yvette Cabrera, *The EPA May Finally Reckon with Aviation's Dirty Secret: Leaded Fuel*, SALON (Aug. 27, 2021, 8:15 AM), https://www.salon.com/2021/08/27/the-epa-may-finally-reckon-

children who lived within 1,000 meters of an airport using avgas experienced significant health effects from lead pollution, and of those children, a higher percentage were Black or Hispanic.[72] The study then found a negative correlation between household income and the concentration of lead in blood.[73] Further, the vulnerability to these low socioeconomic communities is heightened due to the lack of access to proper health care.[74]

In preparation for its most recent proposed endangerment finding, the EPA used U.S. Census data to identify what communities are most impacted by avgas pollution.[75] The EPA looked at Asian, Black, and Native American and Alaskan Native populations and compared the percentage of individuals living within 500 meters of an airport runway to the population as a whole.[76] The EPA found that there were three states where more Asians lived near airport runways, nine states where more Black individuals lived near airport runways, and five states where more Native American and Alaskan Natives lived near airport runways.[77]

II. THE ENDANGERMENT FINDING AUTHORITY

The EPA has broad authority to regulate air pollution under the CAA.[78] One tool the EPA has to ensure United States citizens have access to a clean and healthy environment is its authority to issue endangerment findings for various types of pollutants. Although the EPA has many avenues to regulate pollution under the CAA, the ability to issue an endangerment finding is often the starting point. Importantly, due to its breadth and purposive vagueness, as explained in the Supreme Court's holding in *Massachusetts v. EPA*,[79] the endan-

with-aviations-dirty-secret-leaded-fuel_partner-2/ (last visited Dec. 03, 2022) (discussing a story of a child with lead poisoning and the toxicology of the soil surrounding his house).

72 Miranda et al, *supra* note 5352, at 1515.

73 *Id.*

74 Kumar et al., *supra* note 40, at 184.

75 TSD, *supra* note 70. These considerations were made in conjunction with Executive Order 12898. *See* 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, 62755.

76 TSD, *supra* note 70, at 27-28.

77 *Id.*

78 *See* Massachusetts v. U.S. Env't Prot. Agency, 549 U.S. 497, 534 (2007).

79 *Id.*

germent finding provisions within the CAA have been subject to much debate.

A. *The Development of the Endangerment Finding Under the Clean Air Act*

The original CAA was passed in 1963 as a response to the growing concern about air pollution post-World War II.[80] When World War II ended, the United States population grew rapidly, cities became densely populated, and forms of media became more prevalent, causing the public to see first-hand the harsh impacts of air and water pollution.[81] Although the 1963 CAA was of historic importance, it did little to respond to the growing air pollution because it lacked effective enforcement mechanisms. Rather, it acted more as a guideline for states.[82] Thus, in 1970, Congress passed the CAA Amendments of 1970.[83] The 1970 amendments were viewed as a "drastic remedy to what was perceived as a serious and otherwise uncheckable problem of air pollution."[84] Within the same year, President Richard Nixon established the EPA to enforce the CAA.[85] Among many of the EPA's duties would be to establish and enforce "environmental protection standards consistent with national and environmental goals."[86]

---

80 Adam D. Orford, *The Clean Air Act of 1963: Postwar Environmental Politics and the Debate Over Federal Power*, 27 HASTINGS ENV'T L.J. 1, 3 (Summer 2021) ("[T]o improve, strengthen, and accelerate programs for the prevention and abatement of air pollution.") (quoting Clean Air Act of 1963, Pub. L. No. 88-206, 77 Stat. 392 (1963) (codified as amended at 42 U.S.C. § 7401 (2020)). *See also* William S. Eubanks II, *The Clean Air Act's New Source Review Program: Beneficial to Public Health or Merely a Smoke-and-Mirrors Scheme?*, 29 J. LAND RES. & ENV'T L. 361, 362 (2009).

81 Orford, *supra* note 80, at 10.

82 Lori C. Imsland, *How Much Would You Pay for Clean Air? The Role of Cost/Benefit Analysis in Setting NAAQS*, 9 MO. ENV'T. L. & POL'Y REV. 44, 45 (2002); Theodore L. Garret & Sonya D. Winner, A Clean Air Act Primer: Part I, 22 ENV'T. L. REP. 10159, 10161 (1992).

83 *Evolution of the Clean Air Act*, U.S. ENV'T PROT. AGENCY (last updated Nov 28, 2022), https://www.epa.gov/clean-air-act-overview/evolution-clean-air-act (last visited Dec. 3, 2022). It is also important to note the CAA was again amended in 1990. *Id.*

84 Union Elec. Co. v. U.S. Env't Prot. Agency, 427 U.S. 246, 256 (1976).

85 Bechina et al., *supra* note 26, at 473 (The EPA was created as an "autonomous regulatory body to oversee then enforcement of environmental policy.").

86 Reorganization Plan No. 3 of 1970, 35 Fed. Reg. 15,623 (to be codified at 5 U.S.C. app. §§ 1-7) (July 9, 1970).

The CAA drastically changed how the government regulates air pollution.[87] Importantly, the CAA authorized the EPA to establish National Ambient Air Quality Standards (NAAQS) with the purpose of "protect[ing] public health and public welfare and regulat[ing] emissions of hazardous pollutants."[88] This authorization allows the EPA to set minimum levels of air quality for six criteria of air pollutants, including emissions from automobiles and industrial facilities.[89] Section 112 of the CAA addresses this as a duty of the EPA.[90]

Congress left the EPA with a heavy amount of discretion to create regulations and set standards under the CAA.[91] One of those broad delegations consists of the EPA's ability to issue endangerment findings.[92] Section 231(a)(2)(A) of the CAA requires the EPA Administrator to "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 his judgment causes, or contributes to, air pollution which may reasonably be anticipated to endanger public health or welfare."[93] The CAA's definition of "air pollutant" is broad, encompassing "any air pollution agent . . . including any physical, chemical, biological, or radioactive . . . substance . . . emitted

87 Eubanks, *supra* note 80, at 362.

88 Bechina et al., *supra* note 26, at 476 (The CAA "regulates air emissions from stationary and mobile sources") (quoting *Laws & Regulations: Summary of the Clean Air Act*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/laws-regulations/summary-clean-air-act (last visited Nov. 25, 2022)).

89 Eubanks *supra* note 80, at 362-63. *See also* Adam Isen et al., *Every Breath You Take – Every Dollar You'll Make: The Long-Term Consequences of the Clean Air Act of 1970*, 125 J. POL. ECON. 848, 856 (2017).

90 Bechina et al., *supra* note 26, at 476-77 ("EPA must establish emission standards that require the maximum degree of reduction in emissions of hazardous air pollutants.") (quoting *Laws & Regulations*: *Summary of the Clean Air Act*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/laws-regulations/summary-clean-air-act (last visited Nov. 25, 2022)).

91 *See* Bechina et al., *supra* note 26, at 477.

92 *Id.*

93 42 U.S.C. § 7571(a)(2)(A) (1996). The counterpart of this section applying to motor vehicles that has also been subject to much litigation section is 202(a). 42 U.S.C. § 7521(a)(1) (1977). Further, the EPA has recognized because of the similarity of the two provisions, principles established for making endangerment findings for motor vehicles apply when making endangerment findings for aircraft engines. *See* 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. 62,773 (proposed Oct 17, 2022) (to be codified at 40 CFR pts. 187, 1031, and 1068).

into . . . the ambient air."[94] The EPA may make an endangerment finding after the Administrator reviews a "great body of scientific evidence" and weighs the scientific findings with the "severity and likelihood of possible harms."[95] In sum, there are five principles of the EPA's scientific judgment that work within the endangerment finding power:[96]

(1) The EPA must analyze current and future risks to the environment in order to protect the public's health;
(2) The EPA must evaluate the "likelihood and severity of the effects" of the air pollutant on a "sliding scale;"
(3) The EPA must make its decision based on available data, rather than speculation;
(4) The EPA must base its judgment on a culmination of multiple sources; and
(5) The EPA must consider the fact that "some subpopulations are more vulnerable to air pollution than others."[97]

Additionally, when the EPA issues an endangerment finding, it is typically issued with a set of regulations addressing the motor vehicle or aviation engine that emits the air pollutant the EPA deemed to endanger health and human welfare.[98]

B. Massachusetts v. EPA *and its Effects*

Massachusetts v. EPA, a seminal case in many regards, changed how the EPA's authority to issue endangerment findings is viewed.[99]

---

[94] Craig A. Moyer and Ted Wolff, *Addressing Climate Change Under the Clean Air Act*, *in* THE LEGAL IMPACT OF CLIMATE CHANGE: LEADING LAWYERS ON RESPONDING TO CLIMATE CHANGE DEVELOPMENTS AND COMPLYING WITH NEW REGULATIONS 1, 1 (Aspatore 2013).

[95] Allison B. Rumsey, *EPA's Proposed Endangerment Finding Serves as a Spur to Congressional Action*, 40 No. 5 ABA ENV'T, ENERGY, & RES. TRENDS 1, 9-10 (May/June 2009).

[96] Bechina et al., *supra* note 26, at 483.

[97] *Id.* at 483-84.

[98] *See id.* at 484.

[99] *See* Ben Levithan, *The Tenth Anniversary of Massachusetts v. EPA*, ENV'T DEF. FUND (Apr. 2, 2017) https://blogs.edf.org/climate411/2017/04/02/the-tenth-anniversary-of-massachusetts-v-epa/ ("As it turns ten, Massachusetts v. EPA is more relevant than ever. To carry out its responsibility to protect human health and the environment from dangerous climate pollution, EPA has established common sense limits on the pollution discharged from tailpipes, smokestacks, and oil and gas development activities. These actions are fundamental to our nation's response to climate change and provide enormous health, economic, and environmental benefits to the American people.").

The holding is derived from basic principles of administrative law and has resulted in two, or potentially three, uses of the endangerment finding authority in the transportation industry.

1. Pre-*Massachusetts v. EPA*

Prior to *Massachusetts v. EPA*, courts, in cases revolving around the EPA's refusal to issue an endangerment finding, focused on the principles of final agency action and agency inaction.[100] For example, in *Her Majesty the Queen in Right of Ontario v. EPA*, the D.C. Circuit held that the EPA's refusal to issue an endangerment finding was appropriate because a letter that the EPA sent to the Ontario petitioners was a final agency action.[101] The court considered whether the letter had direct and immediate effect and whether the EPA recognized agency inaction to support its conclusion.[102] Additionally, in *Ohio Public Interest Research Group, Inc. v. Whitman*, the Sixth Circuit found the petitioners' request that the EPA issue a "notice of deficiency" was unreviewable because the CAA gave no standards to judge non-enforcement.[103]

These cases illustrate that principles of administrative law make it extremely difficult for petitioners to attempt to compel the EPA to issue an endangerment finding. First, agency action is reviewable only if it is final, meaning that it marks the consummation of an agency decision and that decision must determine the rights or obligations of individuals.[104] Second, agency inaction and questions committed to agency discretion are presumptively unreviewable.[105]

2. The Holding of *Massachusetts v. EPA*

In 2007, the Supreme Court redefined and upheld the EPA's endangerment finding authority in *Massachusetts v. EPA*.[106] In that case, petitioners challenged the EPA's denial to make an endanger-

---

100 *See* Her Majesty the Queen v. U.S. Env't Prot. Agency, 912 F.2d 1525, 1531 (D.C. Cir. 1990).

101 *Id.*

102 *Id.* at 1532.

103 386 F.3d 792, 799 (6th Cir. 2004).

104 Bennett v. Spear, 520 U.S. 154, 177-78 (1997).

105 Heckler v. Chaney, 470 U.S. 821, 831 (1985); Webster v. Doe, 486 U.S. 592, 603 (1988).

106 *See* Massachusetts v. U.S. Env't Prot. Agency, 549 U.S. 497, 534 (2007). Note that this decision was made under section 202(a)(1) of the CAA. *Id.* at 532.

ment finding for "greenhouse gas emissions from new motor vehicles."[107] The petitioners alleged greenhouse gas emissions "have significantly accelerated climate change," "climate change will have serious adverse effects on human health and the environment," and the EPA "had already confirmed that it had the power to regulate carbon dioxide."[108] The EPA argued the CAA does not authorize it to issue mandatory regulations on climate change and even if it had said authority, it would "be unwise to do so at this time."[109]

The Court first held that the CAA authorizes the EPA to regulate GHG emissions based upon the broad definition of "air pollutant" within the CAA.[110] Specifically, the Court noted Congress may not have considered the possibility that GHG emissions could lead to global warming, but they did understand the EPA needed regulatory flexibility to remain consistent with scientific developments.[111] The Court then held that the EPA is required to make an endangerment finding when it forms a "judgment" that GHG emissions contribute to climate change unless it can provide a reasonable explanation for why it cannot exercise its discretion at that time.[112] The Court denied the EPA's list of reasons as to why it did not issue an endangerment finding, which included executive programs already effectively responding to global warming, impairments on the president's ability to negotiate with other nations to reduce emissions, and concerns that regulating emissions will not be effective in addressing climate change issues.[113] The Court, however, did not require the EPA to make an endangerment finding at the time because it was not at issue in the case.[114]

3. Post-*Massachusetts v. EPA*

Following *Massachusetts v. EPA*, the EPA issued an endangerment finding under section 202(a) of the CAA in 2009 regarding

---

107 *Id.* at 510.

108 *Id.*

109 *Id.* at 511.

110 *Id.* at 532.

111 *Id.*

112 Massachusetts v. U.S. Env't Prot. Agency, 549 U.S. 497, 532-33 (2007).

113 *Id.* at 533.

114 *Id.* at 534.

GHG emissions from motor vehicles.[115] The final action included two determinations.[116] First, the EPA found six "current and projected" GHG emissions threaten human health, including, carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.[117] The EPA determined that all six GHG emissions constituted "air pollution" under the CAA.[118] Second, the EPA found these GHG emissions from motor vehicles contribute to threatening human health and welfare.[119] When issuing this endangerment finding, EPA Administrator Stephen Johnson acknowledged that eight months of policy development and principal meetings enabled him to create "a prudent and cautious yet forward thinking plan" to address GHG emissions.[120]

In making the determination, the EPA carefully considered scientific information such as the U.S. Global Change Research Program's climate change assessment and public comment as the basis of its final determinations.[121] The EPA relied on substantial evidence that GHG emissions were causing climate change.[122] The record included evidence of past and future effects of global warming on public health, including changes in air quality and increases in weather events, pathogens, and temperature.[123] Additionally, the record established that GHG emissions impact food production, agriculture, forestry, energy, infrastructure, ecosystems, and wildlife.[124] While the EPA Administrator acknowledged that there was some uncertainty with future climate impact, the information on record was sufficient to

115 Bechina et al., *supra* note 26, at 477; Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496, 66,496–97 (Dec. 15, 2009) (to be codified at 40 C.F.R. Ch. 1).

116 U.S. ENV'T PROT. AGENCY, FREQUENTLY ASKED QUESTIONS ABOUT THE GREENHOUSE GAS ENDANGERMENT FINDING (2021).

117 Bechina et al., *supra* note 26, at 477.

118 U.S. ENV'T PROT. AGENCY, FREQUENTLY ASKED QUESTIONS ABOUT THE GREENHOUSE GAS ENDANGERMENT FINDING (2021).

119 Bechina et al., *supra* note 26, at 476.

120 Robert B. Moreno & Peter Zalzal, *Greenhouse Gas Dissonance: The History of EPA's Regulations and the Incongruity of Recent Legal Challenges*, 30 UCLA J. ENV'T. L. & POL'Y 121, 132–33 (2012).

121 U.S. ENV'T PROT. AGENCY, FREQUENTLY ASKED QUESTIONS ABOUT THE GREENHOUSE GAS ENDANGERMENT FINDING (2021).

122 Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. at 66,523.

123 *Id.* at 66,522, 66,525.

124 *Id.* at 66,523

make an endangerment finding.[125] Further, the EPA Administrator explained that the statutory language of the CAA does not require absolute certainty, just that air pollution in the Administrator's judgment "may reasonably be anticipated to harm human health and welfare," which allows the Administrator to use some form of discretion to prevent future harms.[126] Finally, the Administrator noted that emissions do not have to be the sole cause of air pollution to make an endangerment finding, but that the use of "contribute" in the CAA indicates it has to be only one of the problems.[127]

As the EPA began adopting this new approach to issue endangerment findings, the holding in *Massachusetts v. EPA* has remained supported in case law. In 2011, the Supreme Court reiterated the holding to find that the CAA preempts federal common law.[128] The Court also explained that the EPA's endangerment finding authority is discretionary due to the broad delegation of power from Congress.[129] In 2012, in *Coalition for Responsible Regulation, Inc. v. EPA*, the D.C. Circuit further interpreted the endangerment finding authority.[130] There, the court denied the petitioners' claims that the EPA's record for making an endangerment finding on GHG emissions was too uncertain to support its finding.[131] The court first noted the EPA's record was extensive and it established that GHG emissions had been causing global warming for decades.[132] The CAA allows the EPA to create new emission standards when it determines air pollution "may reasonably be anticipated to endanger public health or welfare."[133] The court found that this language was "forward-looking" and allows the EPA to make "precautionary and preventative" findings.[134] Additionally, this interpretation is "consistent with the CAA's precaution-

125 Rumsey, *supra* note 95, at 10.

126 *Id.*

127 *Id.*

128 Am. Elec. Power Co., Inc. v. Connecticut, 564 U.S. 410, 420 (2011).

129 *Id.* at 426 ("Congress delegated to EPA the decision whether and how to regulate carbon-dioxide emissions from powerplants . . . were EPA to decline to regulate carbon-dioxide emissions altogether . . . the federal courts would have no warrant to employee the federal common law of nuisance to upset the Agency's expert determination.").

130 684 F.3d 102, 121 (D.C. Cir. 2012), *aff'd in part, rev'd in part sub nom.* Util. Air Regul. Grp. v. E.P.A., 134 S. Ct. 2427, 2430 (2014), *amended sub nom.* Coal. for Responsible Regul., Inc. v. Env't Prot. Agency, 606 F. App'x 6 (D.C. Cir. 2015).

131 *Coal. For Responsible Regul.*, 684 F.3d at 121.

132 *Id.*

133 *Id.* at 122.

134 *Id.*

ary and preventative orientation."[135] In fact, if the EPA was only able to make an endangerment finding when the public health or welfare was already in harm, the purpose of the endangerment finding power would be irrelevant.[136]

While most case law post-*Massachusetts v. EPA* relates to section 202(a)(1) of the CAA, which addresses motor vehicle engines, the EPA has since recognized that the processes to make an endangerment finding for aircraft engines are the same.[137] This conclusion has not been questioned because the language for the two provisions are identical.[138] However, although the CAA appears to give the EPA "broad powers to set 'emissions standards' for aircraft engines," the EPA has traditionally used this power in a limited manner.[139]

The EPA has issued one endangerment finding relating to aircraft engines, which it did for aircraft GHG emissions in 2016.[140] In so doing, the EPA followed a two-step process similar to that which it used when issuing the 2009 endangerment finding.[141] First, the EPA found that six GHG emissions endanger public health and welfare.[142] Second, the EPA found these GHG are emitted from some aircraft engines and are therefore contributing to the endangerment.[143] The EPA based this finding on the fact that 12 percent of all transportation emissions come from aircraft, which accounts for three percent of all

---

135 Coal. for Responsible Regul., Inc. v. U.S. Env't Prot. Agency, 684 F.3d 102, 122 (D.C. Cir. 2012), *aff'd in part, rev'd in part sub nom.* Util. Air Regul. Grp. v. U.S. Env't Prot. Agency, 134 S. Ct. 2427, 2430 (2014), *amended sub nom.* Coal. for Responsible Regul., Inc. v. U.S. Env't Prot. Agency, 606 F. App'x 6 (D.C. Cir. 2015).

136 *See id.*

137 *See* 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. 55,422, 54,434 (Aug. 19, 2016) (to be codified at 40 CFR pts. 87 and 1068). *See also* Nathan Richardson, *Aviation, Carbon, and the Clean Air Act*, 38 COLUM. J. ENV'T. L. 67, 72 (2013).

138 *See* 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. at 54,422; Richardson, *supra* note 137. The only difference between the two provisions is that 231(a)(2)(A) replaces "motor vehicle engines" with "aircraft engines." *Compare* 42 U.S.C. § 7571 *with* 42 U.S.C. § 7521.

139 Richardson, *supra* note 137, at 72.

140 Bechina et al., *supra* note 26, at 480-81.

141 *Id.* at 481. *See also* 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. 54,421, 54,475 (Aug. 15, 2016) (to be codified at 40 C.F.R. pts. 87 and 1068).

142 Bechina et al., *supra* note 26, at 481.

143 *Id.*

GHG emissions in the United States.[144] Although these numbers may not seem significant, the EPA found that the United States contributes to nearly one-third of all aircraft emissions internationally.[145] In fact, when issuing the finding, the EPA proclaimed that "the single largest GHG-emitting transportation source [is] not yet subject to any GHG standards."[146] The endangerment finding rested heavily on the 2009 GHG emissions finding noting that there is a "common thread" between the two.[147]

Although the aircraft GHG emissions endangerment finding was largely successfully, it applied only to large commercial aircraft rather than personal piston-engine aircraft.[148] In fact, in *Friends of the Earth v. EPA*, the D.C. District Court struck down a request for an endangerment finding on piston-engine aircraft.[149] In 2006, Friends of the Earth filed a petition to compel the EPA to make a finding that lead emissions from avgas endangered public health or welfare and to then issue a regulation to limit the emission.[150] When the EPA did not respond to the petition, Friends of the Earth filed suit claiming that the EPA's failure to regulate lead emissions was an unreasonable delay in violation of the CAA and Administrative Procedure Act (APA).[151]

In its complaint, Friends of the Earth provided extensive information as to the negative health impacts on children, adults, and the environment, as well as information regarding the EPA's phasing out of using leaded automobile gasoline.[152] The EPA denied the request but stated it intended to initiate notice and comment for an endangerment finding for avgas.[153] The EPA explained that with the available

---

144 *Id.*

145 *Id.*

146 *Id.*

147 *Id.* at 482.

148 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. at 54,461.

149 934 F. Supp. 2d 40, 55 (D.D.C. 2013).

150 *Id.* at 42.

151 *Id.* at 43.

152 Complaint at ¶¶ 8-13, 30; Friends of the Earth v. U.S. Env't Prot. Agency, No. 1:12-cv-00363 (D.D.C. Mar. 7, 2012).

153 Friends of the Earth, 934 F. Supp. 2d at 42-43.

data and EPA's limited resources on avgas's contribution to air pollution, an endangerment finding would be premature.[154]

The only question the District Court reviewed was if the EPA's failure to make an endangerment finding was an unreasonable delay.[155] Although the case mainly discussed the court's jurisdiction over the matter, it did lay out some key aspects of the endangerment finding authority.[156] The court first noted that the text of the CAA does not clearly define "mandatory duty."[157] The court then examined the text of the CAA, focusing on the language "shall" and "issue proposed emission standards."[158] Additionally, the court found that Congress did not clearly intend to establish the endangerment finding as a mandatory duty.[159] The court concluded that the finding or scientific judgment must come first before the rulemaking.[160] Thus, once an endangerment finding has been made, citizens can bring suit to compel the EPA to issue emission standards, but in *Friends of the Earth*, the EPA had not found that avgas contributed to air pollution due to a lack of resources.[161] Once the EPA determines that avgas is harmful under the CAA, then it is required to issue a rulemaking for emission standards.[162]

---

154 *Id. See also* 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, 62,772 (Oct. 17, 2022) (to be codified at 40 CFR pts. 87, 1031, and 1068) (describing the EPA's issuance of a notice of proposed rulemaking relating to leaded avgas and potential public health and welfare exposure issues, but receiving no new information constituting an endangerment finding).

155 Friends of the Earth v. U.S. Env't Prot. Agency, 934 F. Supp. 2d 40, 45 (D.D.C. 2013).

156 *See id* at 45-48.

157 *Id.* at 48.

158 *Id.* at 48–49.

159 *Id.* at 50.

160 *Id.* at 51.

161 Friends of the Earth v. U.S. Env't Prot. Agency, 934 F. Supp. 2d 40, 53 (D.D.C. 2013) ("Indeed, questions such as EPA's optimal allocation of resources, the amount of information that EPA needs in order to make the endangerment determination, and the amount of time that is reasonable for EPA to analyze the relevant data have all been specifically identified as factors the Court will be asked to consider if it reaches the question of whether the determination has been unreasonably delayed.").

162 *Id. See also EPA Not Required to Make Endangerment Determination for Lead Emissions from Aviation Gasoline*, 23 AIR POLLUTION CONSULTANT 3.1, 3.3 (2013) (hereinafter "*EPA Not Required to Make Endangerment Determination*").

C. *The EPA's Evolution Under Different Presidential Administrations*

The use of the EPA's endangerment finding authority has evolved during each of the four most recent presidential administrations. In the aftermath of *Massachusetts v. EPA*, the Bush EPA began the formal process of issuing an endangerment finding and concluded that there was enough scientific research to support a finding that GHG emissions endangered public welfare.[163] However, White House officials pushed the EPA to withdraw the finding.[164]

Once President Obama took office, he launched his mission to "save our planet from the ravages of climate change."[165] The Obama EPA launched a wide variety of initiatives and mandates that changed modern environmental policy to focus on environmental justice.[166] Surprisingly, the Obama EPA's initial regulations, such as the mandate to increase fuel economy vehicles, were vastly supported throughout industries.[167] The Obama EPA cranked out an endangerment finding for GHG emissions within months, began working with the National Highway Traffic Safety Agency (NHTSA) on fuel economy standards, announced even more stringent standards for future automobile models, and authorized states like California to regulate further if they desired to do so.[168] However, the expansiveness of the Obama EPA elicited controversy.[169] For example, a week after the EPA issued its proposed endangerment finding for GHG emissions, Senator James Inhofe began pushing for Congress to "pass a simple, narrowly-targeted bill" that would prohibit the EPA from regulating GHG emissions.[170] Then, once the endangerment finding was final-

---

163 *See* Nathan Richardson, *The Rise and Fall of Clean Air Act Climate Policy*, 10 MICH. J. ENV'T. & ADMIN. L. 69, 88 (2020).

164 *Id.*

165 Brigham Daniels, *Addressing Global Climate Change in an Age of Political Climate Change*, 2011 B.Y.U. L. Rev. 1899, 1910 (2011).

166 Richardson, *The Rise and Fall, supra* note 162, at 88; Uma Outka & Elizabeth Kronk Warner, *Reversing Course on Environmental Justice Under the Trump Administration*, 54 WAKE FOREST L. REV. 393, 395 (2019).

167 Daniels, *supra* note 165 at 1911.

168 Richardson, *The Rise and Fall, supra* note 162, at 90–93. *See also Climate Change and President Obama's Action* Plan, THE WHITE HOUSE, https://obamawhitehouse.archives.gov/president-obama-climate-action-plan (last visited Dec. 4 2022, 2:05 PM).

169 Daniels, *supra* note 165, at 1911; Outka & Warner, *supra* note 165, at 403.

170 Daniels, *supra* note 165, at 1925.

ized, Senator Lisa Murkowski argued Congress should overturn the endangerment finding.[171]

Despite the environmental justice initiatives that defined Obama's EPA, during the Trump Administration, the EPA experienced a major rollback.[172] Although the Trump EPA left the broader framework of the CAA intact, it began curtailing Obama EPA regulations and vowed not to further regulate any GHG emissions.[173] Instead, the Trump EPA imposed static interpretations of statutory text and increased its use of disaggregation of air pollution to find that further regulation was unwarranted, or a delay was justified.[174] Many argue that the Trump EPA relied on short-term private industry interests rather than the long-term environmental goals of the Obama EPA.[175]

The Biden Administration entered office with ambitious climate change and environmental justice policies, hoping to make the environment a top priority during President Biden's first term.[176] Notably, President Biden issued multiple executive orders catalyzing environmental policies that were stalled during the Trump Administration.[177] President Biden also issued an executive order implementing the Justice40 Initiative, which will ensure at least 40 percent of the benefits derived from federal programs will be directed at communities impacted by pollution.[178] The Biden EPA also immediately started taking action to tackle climate change, protect the health and safety of

---

171 *Id.*

172 Howard M. Crystal et al., *Returning to Clean Air Act Fundamentals: A Renewed Call to Regulate Greenhouse Gases Under the National Ambient Air Quality Standards (NAAQS) Program*, 31 GEO. ENV'T. L. REV. 233, 235 (2019).

173 *Id.*

174 Joseph Goffman & Laura Bloomer, *Disempowering the EPA: How Statutory Interpretation of the Clean Air Act Serves the Trump Administration's Deregulatory Agenda*, 70 CASE W. RES. L. REV. 929, 949-50 (2020).

175 *See, e.g.*, Dakota Freeze & Jennifer Carstens, *Driving Change: A Route to More Sensible Vehicle Emissions Regulation,* 21 VT. J. ENV'T. L. 113, 126 (2019).

176 Barry E. Hill, *Time Has Come Today for Environmental and Climate Justice Legislation*, 51 ENV'T. L. REP. (ELI) 10102, 10103 (2021).

177 *See* Amber Polk, *President Biden's Executive Orders on the Environment: Praiseworthy Policy, Political Red Herring, or. . . Both?*, 152 U. ILL. L. REV. 152, 152-53 (2021). *See also* Exec. Order No. 13,990, 86 Fed. Reg. 7037 (Jan. 20, 2021).

178 Justice40, THE WHITE HOUSE, https://www.whitehouse.gov/environmentaljustice/justice40/. Note that President Biden also issued an executive order implementing the initiative, which directs agencies to make achieving environmental justice essential to their missions and regulations. *See* Exec. Order No. 14,008, 86 Fed. Reg. 7619 (Feb. 1, 2021).

communities, and bring science back into the agency's work.[179] One of those policies is the Climate Adaptation Action Plan, which was published in October 2021.[180] The Climate Adaptation Action Plan will integrate climate impacts into EPA rulemaking and implement measures to protect critical infrastructure and other processes that pose a risk to climate change.[181]

These aggressive environmental goals gave environmentalists seeking to limit the use of avgas early hope.[182] In October 2021, the Biden EPA announced a draft lead strategy to strengthen public health protections by focusing on lead "hot spots," communicating with impacted communities, and revisiting lead standards related to lead-based paint.[183] Although environmental justice organizations suggested this was a good start for the Biden EPA, the strategy still failed to address avgas.[184] These concerns were addressed in January 2022, when the EPA announced it was going to evaluate whether lead emissions from avgas endangered human health and welfare.[185] When making the announcement, Administrator Michael Regan stated that the "EPA has been investigating the air quality impact of lead emissions from piston-engine aircraft near airports for years, and now

---

179 A Year of Accomplishments at EPA, U.S. ENV'T PROT. AGENCY (Jan. 20, 2022), https://www.epa.gov/news releases/year-accomplishments-epa.

180 *See* Polk, *supra* note 177 at 153; *EPA Publishes its 2021 Climate Adaptation Action Plan*, U.S. ENV'T PROT. AGENCY (Oct. 07, 2021), https://www.epa.gov/newsreleases/epa-publishes-its-2021-climate-adaptation-action-plan (last visited Dec. 04, 2022).

181 *IEPA Publishes its 2021 Climate Adaptation Action Plan*, U.S. ENV'T PROT. AGENCY (Oct. 07, 2021), https://www.epa.gov/newsreleases/epa-publishes-its-2021-climate-adaptation-action-plan (last visited Dec. 04, 2022).

182 Cabrera, *supra* note 71 ("It's not a matter of more studies, it's not a matter of the science of lead, it's not a matter of needed to assess anything . . . It's a matter of the political will to actually issue the regulation and know that the market will follow just as it did everywhere else.")

183 Alejandro Dávila, *EPA's Draft Lead Strategy is a Positive Start but Lacks Concrete Commitments*, EARTHJUSTICE (Oct. 28, 2021), https://earthjustice.org/news/press/2021/epas-draft-lead-strategy-is-a-positive-start-but-lacks-concrete-commitments (last visited Dec. 4, 2022); U.S. Env't Prot. Agency, Public Comment Draft: EPA Strategy to Reduce Lead Exposures and Disparities in U.S. Communities (Mar. 2022), https://earthjustice.org/sites/default/files/files/lead_strategy.pdf (last visited Dec. 04, 2022).

184 Dávila, *supra* note 183.

185 *EPA to Evaluate Whether Lead Emissions from Piston-Engine Aircraft Endanger Human Health and Welfare*, U.S. ENV'T PROT. AGENCY (Jan 12, 2022), https://www.epa.gov/newsreleases/epa-evaluate-whether-lead-emissions-piston-engine-aircraft-endanger-human-health-and.

we're going to apply that information to determine whether this pollution endangers human health and welfare."[186]

III. MODERN EFFORTS TO DECREASE THE USE OF AVGAS

The FAA began working with fuel producers in 2013 to create sustainable replacements for avgas through the Piston Aviation Fuels Initiative (PAFI).[187] However, up until recently, not much progress has been made.[188] Additionally, the aviation industry is heavily concerned about finding a safe replacement for avgas.[189] While the FAA has recently announced that it is dedicated to making a complete transition to lead-free aviation fuel by 2030,[190] it has much work to do before that goal can be reached, and the transition will prove unlikely without an endangerment finding from the EPA.

A. *PAFI and Aviation Industry Concerns*

In 2014, the FAA began requesting candidate fuel producers to submit unleaded aviation fuels to the PAFI program for potential testing.[191] However, PAFI immediately started bringing to light serious safety concerns about the candidate fuels.[192] During Phase 1 and 2 of PAFI testing, some fuel developers discovered new issues that they thought needed to be further developed before moving forward with the PAFI program.[193] These concerns related to engine failure due to the lack of octane in the unleaded aviation fuel formulas.[194] As a result, PAFI flight testing was halted from December 2018 to mid-2020.[195] During this time, the FAA stated it was committed to working with the EPA to ensure a "smooth" transition away from leaded avgas that didn't disrupt the supply of avgas.[196]

---

186 *Id.*

187 *About Aviation*, *supra* note 21.

188 *See id.*

189 Nat'l Acad. Sci., Eng'g, & Med., *Options for Reducing Lead Emissions from Piston-Engine Aircraft*, 336 TRANSP. RSCH. BD. 1, 100-01 (2021).

190 *About Aviation*, *supra* note 21.

191 *Id.*

192 *Id.*

193 *Id.*

194 *See id.*

195 *About Aviation*, *supra* note 21

196 *Id.*

Despite concerns in the aviation community, the push to "get the lead out" has been growing in recent years.[197] The biggest proponents for the EPA to make an endangerment finding on the use of avgas have been EarthJustice and Friends of the Earth.[198] In 2006, Friends of the Earth petitioned the EPA to make an endangerment finding for the use of avgas, which ended in litigation in favor of the EPA's decision not to in *Friends of the Earth v. EPA*.[199] EarthJustice and Friends of the Earth have renewed their petition since this holding, with the most recent petition renewal being made in August 2021.[200] In this petition, EarthJustice and Friends of the Earth were joined by other public interest groups such as Alaska Community Action on Toxics, Center for Environmental Health, Montgomery-Gibbs Environmental Coalition, Oregon Aviation Watch, and County of Santa Clara.[201] The petition argues that the EPA has enough scientific research to initiate an endangerment finding for avgas, that the EPA has in the past had ample opportunity to make said endangerment finding, and that the current state of avgas fulfills the requirements of the endangerment finding in the CAA.[202] This push for avgas regulation has also been supported in Congress.[203] In 2012, California Representative Henry Waxman sent a letter to the FAA calling for the FAA to accelerate its efforts to reduce the use of leaded avgas.[204] In his letter, Representative Waxman noted that avgas has been left off of the EPA's docket for far too long when it has understood the serious health impacts of leaded pollution.[205]

---

197 *See, e.g.,* Rob Mark, *When Will We See Unleaded Avgas?,* FLYING (Aug. 5, 2019), https://www.flyingmag.com/when-will-we-see-unleaded-av-gas/; J. Mac McCellan, *Getting the Lead Out*, FLYING (Jul. 2, 2009), https://www.flyingmag.com/getting-lead-out/.

198 *See* EarthJustice Petition, *supra* note 51.

199 *Id. See also* Friends of the Earth v. U.S. Env't Prot. Agency, 934 F. Supp. 2d 40, 41 (D.D.C. 2013).

200 *See generally* EarthJustice Petition, *supra* note 51.

201 *Id.*

202 *Id.*

203 *See* Letter from Henry A. Waxman, U.S. House of Representatives, to Michael P. Huerta, Acting Fed. Aviation Admin. (Oct. 23, 2012) (accessible at https://wayback.archive-it.org/4949/20140821102545/http:/waxman.house.gov/sites/waxman.house.gov/files/documents/UploadedFiles/Letter%20to%20FAA%20on%20Leaded%20AvGas%2010-23-12.pdf).

204 *Id.*

205 *Id.*

B. *FAA Recognizes the Need for an Endangerment Finding*

In section 177 of the FAA Reauthorization Act of 2018, Congress required the Secretary of Transportation to arrange for studies to be conducted on developing alternatives to avgas, ambient lead concentrations near airports, and mitigation measures.[206] The most recent of those studies was published by the National Academy of Sciences, Engineering, and Medicine (NASEM) in 2021.[207] The study reiterated what the EPA has known for decades: there are no safe levels of lead exposure and lead has serious adverse effects on human health.[208] The study also highlighted, however, the challenges of creating a sustainable alternative to avgas, including safety and feasibility for the use of avgas.[209]

The most notable finding in the NASEM study is that further development of avgas replacements is hindered by the EPA's failure to make an endangerment finding.[210] The study discussed how the uncertainty surrounding an endangerment finding complicates the policy options available.[211] This is why the study did not consider any regulatory tools that may become available if the EPA were to make an endangerment finding under the CAA.[212] The study further suggested if the EPA were to make an endangerment finding, more regulatory tools would become available, creating more strategies to mitigate lead emissions.[213] The study then recommended that the FAA should continue to work with the aviation community to coordinate its efforts to reduce lead pollution, the FAA should encourage greater use of unleaded avgas, Congress should create incentives for pilots to use unleaded avgas, the FAA should establish a timeline to eliminate the use of avgas, and that further research efforts should be coordinated.[214]

---

206 *Options*, *supra* note 189 at vii.

207 *Id.*

208 *See id.* at 111-12.

209 *See id.* at 100-01.

210 *See id.* at 101.

211 *Id.* at 127.

212 *Options*, *supra* note 189 at 127.

213 *Id.*

214 *Id.* at 7-10.

C. *The FAA Increases its Involvement in 2022*

In 2022, the FAA began taking charge of the "get the lead out" movement.[215] After the EPA announced it would be considering an endangerment finding for avgas, the FAA developed an initiative to Eliminate Aviation Gasoline Lead Emissions (EAGLE).[216] The FAA claims EAGLE "will expand and accelerate the government and industry actions and investments as well as establish the necessary policies and activities to permit both new and existing general aviation aircraft to operate lead-free, without compromising aviation safety and the economic and broader public benefits of general aviation."[217] The first action EAGLE took was meeting with aviation and petroleum industry stakeholders in February 2022, where they conjunctively announced a goal of transitioning to lead-free aviation fuel by 2030.[218]

Additional stakeholder meetings were held in March and June of 2022.[219] One critical outcome of these stakeholder meetings has been the revamp and reintegration of the PAFI program into the EAGLE initiative.[220] In August 2022, the FAA identified two candidate unleaded aviation fuel developers, Afton/Phillips66 and Lyondell/VP Racing, that will continue testing and be entered into the PAFI program.[221] Another outcome of EAGLE has been a compilation of lessons learned and best practices from the PAFI program that EAGLE will use going forward.[222] For example, on the issue of engine detonation, the use of oxygenating compounds can result in reduced detonations at higher operating temperatures.[223] Additionally, material compatibility, engine durability, and ability to comingle with 100LL were identified as three critical criteria to develop an acceptable avgas

---

215 *About Aviation*, *supra* note 21.

216 *Id.*

217 *Id.*

218 *Id.*

219 *Id.*

220 *Piston Engine Aviation Fuels Initiative (PAFI) Background and Program Update*, U.S. FED. AVIATION ADMIN. (last updated Oct. 28, 2022), https://www.faa.gov/about/initiatives/avgas/piston-engine-aviation-fuels-initiative-pafi-background-and-program-update.

221 *Id.*

222 *Fuel Development & Testing: Lessons Learned 2014 Through 2022*, U.S. FED. AVIATION ADMIN. (last updated Oct. 28, 2022), https://www.faa.gov/about/initiatives/avgas/fuel-development-testing-lessons-learned.

223 *Id.*

replacement.[224] From these lessons learned and best practices, the FAA authorized the use G100UL, an unleaded aviation fuel, in September 2022 for a number of piston engine fleets.[225] FAA also issued a draft policy in October 2022 creating the necessary processes by which the FAA will authorize the use of unleaded aviation fuels through PAFI.[226] While the FAA is making great strides, they recognize that "2030 is an ambitious goal" and "if this was easy, it would have been done already."[227]

IV. THE PROPOSED 2022 ENDANGERMENT FINDING FOR AVGAS IN PISTON-ENGINE AIRCRAFT

Considering the steps the FAA and EPA have taken throughout 2022, it was hardly surprising that the EPA announced a proposed endangerment finding for avgas in October of that year.[228] This proposed endangerment finding will be subject to public notice and comment under the APA and, after evaluation, will be finalized in 2023.[229] Once the endangerment finding is finalized, the EPA will propose regulatory standards to reduce lead emissions from piston-engine aircraft.[230] This aspect of the proposed endangerment finding is not consistent with previous findings where the EPA issued an endangerment finding and proposed regulations simultaneously.[231] When the

224 *Id.*

225 Jill W. Tallman, *FAA Approves Unleaded Fuel for Piston Fleet, Aircraft Owners and Pilots Association*, AIRCRAFT OWNERS & PILOTS ASS'N (Sept. 1, 2022), https://www.aopa.org/news-and-media/all-news/2022/september/01/closer-to-an-unleaded-future#:~:text=the%20FAA%20signed%20on%20September,airframe%20powered%20by%20those%20engines.

226 Proposed Policy on Enabling the Use of Unleaded Aviation Gasoline in Piston Engine Aircraft and Aircraft Engines through the Fleet Authorization Process, 87 Fed. Reg. 60,430 (Oct. 5, 2022).

227 *Path to a Lead-Free Aviation System – Meeting Presentation*, U.S. FED. AVIATION ADMIN. (Mar. 16-17, 2022) (last updated Oct. 28, 2022), https://www.faa.gov/about/initiatives/avgas/stakeholder-meeting-march2022.

228 *See EPA Proposes Endangerment Finding for Lead Emissions from Aircraft Engines that Operate on Leaded Fuel*, U.S. ENV'T PROT. AGENCY (Oct. 7, 2022), https://www.epa.gov/newsreleases/epa-proposes-endangerment-finding-lead-emissions-aircraft-engines-operate-leaded-fuel.

229 *Id.*

230 *Id.*

231 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, 62,773 (Oct. 17, 2022) (to be codified at 40 C.F.R. 87, 1031, 1068).

EPA announced the proposed endangerment finding, EPA Administrator Michael Regan emphasized, "[w]hen it comes to our children the science is clear, exposure to lead can cause irreversible and lifelong health effects."[232] Similar to the 2009 and 2016 endangerment findings, this proposed endangerment finding includes two anticipated determinations: the endangerment finding and the proposed cause or contribution finding.[233]

A. *The Proposed Endangerment Finding*

The proposed endangerment finding concluded that, under section 231(a)(2)(A) of the CAA, "lead pollution may reasonably be anticipated to endanger the public health and welfare."[234] Notably, the proposed endangerment finding claims it is based on scientific considerations "amassed over decades."[235] Specifically, the finding is largely based on the 2013 ISA.[236] The proposed endangerment finding first highlights that lead can be retained in soil for "extended periods" of time and humans can be exposed to lead that is emitted into the air through "multiple pathways."[237] The proposed endangerment finding then relies on the 2013 ISA to conclude that there is a "'causal relationship' between lead exposure during childhood (pre and postnatal) and a range of health effects," as well as a "'likely to be causal relationship' between lead exposure and both cognitive function decrements and psychopathological effects in adults."[238] Finally, the proposed endangerment finding, again using the 2013 ISA, determines that there is a "causal relationship" between lead exposure and repro-

---

232 *EPA Proposes Endangerment Finding for Lead Emissions from Aircraft Engines that Operate on Leaded Fuel*, U.S. ENV'T. PROT AGENCY (Oct. 7, 2022), https://www.epa.gov/newsreleases/epa-proposes-endangerment-finding-lead-emissions-aircraft-engines-operate-leaded-fuel.

233 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. at 62,772-73.

234 *Id.* at 62,777.

235 *Id.*

236 *Id.* at 62,757. *See id.* at 62,775-77.

237 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, 62,775 (Oct. 17, 2022) (to be codified at 40 C.F.R. 87, 1031, 1068).

238 *Id.* at 62,775-76 (quoting 2013 ISA, *supra* note 56).

ductive and developmental effects for vertebrates, invertebrates, and growth in plants in both terrestrial and freshwater environments.[239]

B. *The Proposed Cause or Contribution Finding*

The proposed cause or contribution finding concluded that "engine emissions of the lead air pollutant from covered aircraft cause or contribute to the lead air pollution that may reasonably be anticipated to endanger public health and welfare."[240] The EPA based this finding on three essential aspects of lead pollution.[241] First, lead emissions from piston-engine aircraft are "the largest single source of lead to air in the U.S."[242] In fact, over half of lead emissions since 2008 have been from piston-engine aircraft.[243] In 2008, 560 tons of lead were emitted by piston-engine aircraft and in 2017, 470 tons of lead were emitted by piston-engine aircraft.[244] Second, lead emissions from piston-engine aircraft have exceeded NAAQS in certain situations.[245] In 2020, lead concentrations at McClellan-Palomar and San Carlos airports violated the NAAQS, and the EPA estimates that other airports are also in violation.[246] Finally, while the predicted consumption of leaded avgas is forecasted to decrease from 2026 to 2041, that decrease will not happen uniformly.[247] The FAA predicts that some airports will increase consumption while others will decrease consumption.[248]

---

239 *Id.* at 62,777.

240 *Id.* at 62,779. "Covered aircraft" is how the proposed finding describes aircraft that use leaded avgas. *Id.* at 62,754.

241 *See id.* at 62,780.

242 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, 62,780 (Oct. 17, 2022) (to be codified at 40 C.F.R. 87, 1031, 1068).

243 *Id.*

244 *Id.*

245 *Id.*

246 *Id.*

247 *Id.*

248 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, 62,780 (Oct. 17, 2022) (to be codified at 40 C.F.R. 87, 1031, 1068).

C. *Environmental Justice Considerations*

The proposed endangerment finding was issued consistent with recent efforts from the Biden Administration to address environmental justice concerns.[249] The EPA defined "environmental justice" in the proposed finding as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[250] In the background sections of the proposed endangerment finding, the EPA explains the efforts it took to account for environmental justice implications of lead pollution from piston-engine aircraft. The EPA looked at how many people live in close proximity to airports where they may be exposed to lead pollution. The proposed finding explains that the EPA was considering these environmental justice impacts because studies since the early 2000s have found that "blood lead levels in children from low-income households remain higher than those of children in higher income households, and the most exposed Black children still have higher blood lead levels than the most exposed non-Hispanic White children."[251] The EPA evaluated people living within 500 meters of 20,000 airports and then completed demographic breakdowns based upon U.S. Census data.[252]

ANALYSIS

I. ANALYSIS AND CRITIQUE OF THE EPA'S PROPOSED ENDANGERMENT FINDING

The EPA's proposed endangerment finding for avgas is a major victory for sustainable fuel efforts, lead pollution, and environmental justice. However, the proposed endangerment finding is late in many respects, especially when the finding is largely based on data that has been available to the EPA since 2013. Thus, thousands of individuals have been exposed to lead pollution while the EPA and FAA have allowed piston-engine aircraft to continue to use avgas. Part A of this Analysis will evaluate the likelihood that the endangerment finding,

---

249 *See id.* at 62,756.
250 *Id.* at 62,767.
251 *Id.*
252 *Id.* at 62,767-68.

once finalized, will be upheld as a proper rulemaking under the APA. Part B will then contend that the EPA could have issued the endangerment finding sooner, and because they waited so long, some of the data they relied on from the 2013 ISA may be outdated.

A. *The Proposed Endangerment Finding Can Withstand Challenges Under the APA*

If the proposed endangerment finding for avgas were to be challenged as arbitrary and capricious under the APA, the EPA would likely prevail. There are three aspects of the proposed endangerment finding that challengers may try to attack. First, the two-step process used to make the endangerment finding. Second, the use of predictions and forecasts to support the endangerment finding and cause or contribution finding. Finally, the lack of proposed standards that are typically proposed with an endangerment finding.

1. The Two-Step Approach

The proposed endangerment finding for avgas follows the same two-step approach used by the EPA to make the 2009 and 2016 endangerment findings.[253] First, the EPA made a determination that lead pollution is reasonably anticipated to endanger public health or welfare.[254] Second, the EPA made a determination that emissions from piston-engine aircraft cause or contribute to lead pollution.[255] As established in *Massachusetts v. EPA*, if the EPA finds that either of these steps are satisfied, it must issue the endangerment finding.[256] The EPA is confident this approach fulfills the requirements of the CAA because the 2009 endangerment finding under section 202(a) of the CAA for motor vehicles was upheld by the D.C. Circuit in *Coali-*

253 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, 62,773 (Oct. 17, 2022) (to be codified at 40 C.F.R. 87, 1031, 1068).

254 *Id.*

255 *Id.*

256 *See* 549 U.S. 497, 533 (2007); 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, 62,773 (Oct. 17, 2022) (to be codified at 40 C.F.R. 87, 1031, 1068).

tion for Responsible Regulation Inc. v. EPA.[257] In that case, the D.C. Circuit reiterated that, when issuing an endangerment finding under section 202(a) of the CAA, the EPA is required to answer only the two questions laid out above.[258]

One concern may arise because this holding applies to section 202(a) of the CAA and this endangerment finding was made under section 231(a)(2)(A) of the CAA.[259] However, the language of section 202(a) and section 231(a)(2)(A) are nearly identical, with the only changes being to the subject of the provision.[260] Section 202(a) refers to motor vehicles, while section 231(a)(2)(A) refers to aircraft engines.[261] Under the prior construction canon of statutory interpretation, section 231(a)(2)(A) should be given the same meaning.[262] The prior construction canon explains that when a statute has a "settled meaning" another provision that "mirrors the existing statutory text" is presumed to have the same meaning.[263] Thus, if the D.C. Circuit found that the two-step approach adopted under section 202(a) was within the bounds of the CAA, then the same two-step approach would be upheld under section 231(a)(2)(A). Further, the EPA used the same approach with its 2016 endangerment finding under section 231(a)(2)(A), flagged the holding in *Coalition for Responsible Regulation*, noted the similarities in the statute, and the endangerment finding was not challenged as being arbitrary and capricious.[264] Therefore, a challenge to this aspect of the proposed endangerment finding would most likely fail.

---

257 684 F.3d 102, 117 (D.D.C. 2012); 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. at 62,773.

258 *Coal. For Responsible Regul.*, 684 F.3d at 117.

259 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. at 62,773.

260 *See id.* at 62,773.

261 *See id.*

262 Lightfoot v. Cendant Mortg. Corp., 580 U.S. 82, 92-93 (2017).

263 *Id.*

264 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. 62,573, 62,773 (Oct. 17, 2022) (to be codified at 40 C.F.R. 87, 1031, 1068).

2. The Use of Predictions and Forecasts

A controlling aspect of the EPA's determination that emissions from piston-engine aircraft cause or contribute to air pollution is that these emissions will contribute to lead pollution in the future if they are not controlled.[265] The proposed finding notes that the EPA estimates use of leaded avgas will overall decrease, but usage will increase at some airports while it decreases at others.[266] Those living near airports that increase usage will still be exposed to lead pollution.[267] The EPA explains its usage of future emissions by explaining the meaning of "may reasonably be anticipated to endanger public health or welfare."[268] Again, under *Coalition for Responsible Regulation*, the D.C. Circuit noted that the CAA requires a "precautionary forward-looking scientific judgment about the risks of a particular air pollutant, consistent with the CAA's precautionary and preventative orientation."[269] This illustration of the endangerment finding authority supports using future concerns to public health and welfare to issue an endangerment finding.[270]

Additionally, the holding in *Massachusetts v. EPA* supports using future predictions to issue an endangerment finding.[271] In *Massachusetts v. EPA*, a large factor driving the Court's decision was the understanding that it is difficult to show with exact scrutiny if an emission causes or contributes to air pollution.[272] Thus, the existence of "some residual uncertainty" could not excuse the EPA's refusal to issue an endangerment finding for GHG emissions.[273] Earlier cases within the D.C. Circuit support this conclusion. For instance, in *Ethyl Corp. v. EPA*, the court found the EPA did not need to provide "rigorous step-by-step proof of cause and effect" to issue an endangerment finding because that would "allow for only reactive, not preventative, regula-

265 *Id.* at 62,780.

266 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. at 62,780.

267 *See id.*

268 *See* 42 U.S.C. § 7521(a)(1).

269 *See* 684 F.3d at 122.

270 *See id.*

271 Massachusetts v. U.S. Env't Prot. Agency, 549 U.S. 497, 533 (2007).

272 *Id.* at 534.

273 *Id.*

tion."[274] Similarly, in *Lead Indus. Ass'n, Inc. v. EPA*, the court found that the CAA grants enough discretion to permit the EPA "to act in the face of uncertainty."[275]

These cases support the EPA's use of future impacts from lead pollution. However, even if the EPA's use of predictions was unfounded, the endangerment finding would still be upheld. First, the determination that lead pollution endangers health and human welfare was exclusively based on data collected over the past several decades, including the 2013 ISA.[276] Second, the determination that emissions from piston-engine aircraft cause or contribute to lead pollution, along with future predictions, was based on past data.[277] This includes data suggesting that over half of lead emissions since 2008 come from piston-engine aircraft and airports in the past and currently violate NAAQS for lead emissions.[278] These two facts alone could establish that piston-engine aircraft cause or contribute to lead pollution.[279] Instead, the use of future predictions only bolsters the EPA's argument.

3. The Lack of Proposed Regulation

Finally, one disappointing, but realistic aspect of the EPA's endangerment finding for avgas is that no proposed standards were issued with the proposed endangerment finding.[280] Typically, when the EPA proposes to make an endangerment finding, they simultaneously propose regulations to create standards for that air pollutant.[281] This allows the EPA to conduct one notice and comment regarding the air pollutant, the polluter, and reasonable standards.[282] However,

---

274 541 F.2d 1, 25, 28 (D.C. Cir. 1976).

275 647 F.2d 1130, 1155 (D.C. Cir. 1980).

276 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, 62,775-77 (Oct. 17, 2022) (to be codified at 40 C.F.R. 87, 1031, 1068).

277 *See id.* at 62,780.

278 *Id.*

279 *See Ethyl Corp.*, 541 F.2d at 28 (noting that the EPA does not need to provide a "rigorous step-by-step proof of cause and effect).

280 *See* 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. at 62,773.

281 *Id.*

282 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

considering that a sustainable fuel replacement for avgas has not been developed, tested, and approved, it would make little sense for the EPA to set standards for lead pollution from avgas without supplying those who own and operate piston-engine aircraft with a reasonable solution.

The EPA notes that the CAA does not require the EPA to propose standards at the same time it proposes an endangerment finding, and that it has done so in the past for convenience purposes.[283] Additionally, the purpose of the endangerment finding is to serve as the first step of regulation, not an immediate proposal of regulation. In fact, when the EPA issued an endangerment finding for GHG emissions from aircraft engines in 2016, it did not immediately propose standards.[284] There has been no litigation over this specific aspect of the endangerment finding, but in *Friends of the Earth*, the D.C. District Court did explain that at least an endangerment finding needs to be issued before regulation is proposed.[285] Thus, it is not arbitrary and capricious for the EPA to propose an endangerment finding first, wait for the FAA to develop a safe sustainable replacement, and then issue necessary standards.

B. *The EPA Could Have Proposed an Endangerment Finding for Avgas Used in Piston-Engine Aircraft a Decade Ago*

The EPA could have issued an endangerment finding for avgas used in piston-engine aircraft in 2013. While the background of the proposed endangerment finding highlights recent studies conducted to support its findings, the proposed endangerment finding is largely based on knowledge about lead pollution beginning in the 1970s, the 2013 ISA, and airport data starting in 2008.[286] Instead of promptly acting, the EPA waited almost ten years to issue an endangerment finding, leaving thousands of Americans to be exposed to lead pollution.[287] The reason behind the EPA's delay is most likely the changing

Public Health and Welfare, 87 Fed. Reg. 62,753, 62,773 (Oct. 17, 2022) (to be codified at 40 C.F.R. 87, 1031, 1068).

283 *Id.*

284 *Id.*

285 Friends of the Earth v. U.S. Env't Prot. Agency, 934 F. Supp. 2d 40, 50 (D.D.C. 2013).

286 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. at 62,773.

287 *See id.* at 62,753.

goals of the administrative state from presidency to presidency, but the delay is nonetheless problematic because the data the EPA uses to make its proposed endangerment finding is likely outdated, which may result in future proposed standards for avgas to be ineffective.

1. The Problem: Outdated Information

In the proposed endangerment finding, the EPA extensively relies on the 2013 ISA.[288] In fact, the EPA relies almost exclusively on the 2013 ISA to make its determination that lead pollution endangers health and human welfare.[289] As described, the 2013 ISA is a peer-reviewed compilation of studies gathered by the EPA related to the adverse health and environmental impacts of lead.[290] Granted, the 2013 ISA is the "most recent assessment" of the impacts of lead pollution completed by the EPA, and it is very thorough.[291] But a majority of the studies evaluated in the 2013 ISA were conducted in the early 2000s.[292] Additionally, in making the determination that avgas causes or contributes to lead pollution, the EPA relies heavily on the fact that piston-engine aircraft have been the largest lead polluter beginning in 2008 and then supports that point with data from 2020 regarding airports exceeding lead NAAQS.[293] This illustration of a history of knowledge of the dangers of lead pollution and their effects over the past two decades further suggests that the EPA could have issued this proposed endangerment finding sooner.

However, in the background section of the proposed endangerment finding, the EPA supports its finding with recent studies and data collected in preparation for issuing this proposed endangerment finding. For example, the EPA mentions a study published in 2022, which found higher mortality rates of adults over 65 living downwind

288 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, 62,775-77 (Oct. 17, 2022) (to be codified at 40 C.F.R. 87, 1031, 1068).

289 *See id.*

290 2013 ISA, *supra* note 56, at ii.

291 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. at 63,757.

292 2013 ISA, *supra* note 56, at 6-317–6-356.

293 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. at 62,780.

of airports that operate piston-engine aircraft.[294] Additionally, the EPA conducted its own studies in preparation for this proposed endangerment finding, including a collection of U.S. Census data, a technical support document, and an estimate of airborne lead concentrations.[295] But the EPA uses those studies only to support what it already knew from the 2013 ISA. In fact, only after explaining the importance of the 2013 ISA does the EPA mention that other more recent studies also support its finding.[296] If the EPA wants to bolster its final endangerment finding and ensure that future regulation is based on 2022 data rather than 2013 data, it should include more recent studies in its endangerment finding—*not* as an afterthought.

2. The Source of the Problem: The Structure of the Administrative State

It is no secret that the administrative state changes significantly with each presidential administration. As a new president enters office, he or she has new goals, appoints new officers, and makes changes from the previous administration's goals. This process has clearly impacted the use of endangerment findings. Under the Obama Administration, the EPA took major strides forward by initiating the use of the endangerment finding power and pushing for its continued use as an efficient vehicle for achieving environmental goals.[297] The Trump Administration, however, sought to roll back much of the environmental achievements the Obama Administration had made to align with President Trump's industry-focused goals.[298] The Trump EPA limited the use of the endangerment finding power, which hindered any possibility for an endangerment finding on avgas.[299]

---

294 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, 62,758 (Oct. 17, 2022) (to be codified at 40 C.F.R. 87, 1031, 1068). *See also* Heather Klemick et al., *Cardiovascular Mortality and Leaded Aviation Fuel: Evidence from Piston-Engine Air Traffic in North Carolina*, 19 INT'L J. ENV'T. RES. AND PUB. HEALTH *4 (2022).

295 Proposed Finding That Lead Emissions From Aircraft Engines That Operate on Leaded Fuel Cause or Contribute to Air Pollution, 87 Fed. Reg. at 62,762-65.

296 *See id.* at 62,760.

297 Richardson, *The Rise and Fall*, *supra* note 163, at 88; Outka & Warner *supra* note 166, at 395.

298 Crystal et al., *supra* note 172, at 235.

299 *See* Dakota Freeze, Jennifer Carstens, *Driving Change: A Route to More Sensible Vehicle Emissions Regulation,* 21 VT. J. ENV'T. L. 113, 126 (2019).

The Trump Administration's rollback on environmental policy seriously stunted the growth of the endangerment finding power. The Trump Administration prioritized relationships with industries, such as aviation, over the environmental harms those industries were causing.[300] Although many may think that these policy choices can easily be undone by the next administration, the Biden Administration is currently facing many hurdles to getting environmental policy back on track.[301] It is likely that if not for the Trump EPA, more steps in scientific development would have been completed and an endangerment finding for avgas may have already been made. Instead, many individuals living near airports operating piston-engine aircraft have been left to deal with the health impacts of lead pollution. The EPA cannot simply be expected to reset with each administration, especially when dealing with the large environmental issues that have defined the 21st century.

3. The Solution: Adjusting the Final Endangerment Finding and the Right to Compel

The Biden EPA is now in a race to issue standards for avgas before the next election. Fortunately, the Biden EPA and environmental petitioners can safeguard its endangerment finding for avgas. First, the Biden EPA can include more recent data in the endangerment finding, rather than in background sections. This will ensure the next EPA cannot rely on the 2013 ISA or older data to issue standards for avgas. While the 2013 ISA is impactful, science is constantly changing and the impact of lead pollution from avgas is only growing. Thus, data the EPA collected in 2020 and 2022 will be much more reliable when making an accurate endangerment finding.

Second, in the event that the presidency switches parties in the next election or the FAA fails to develop a sustainable replacement for avgas, the fact that the EPA is issuing this endangerment finding is a huge win for environmental petitioners because they can now compel the EPA to issue standards for avgas. As established in *Friends of the Earth*, petitioners cannot compel the EPA to issue and endanger-

---

300 *Id.* at 126-27.

301 *See* Elizabeth Bomberg, *The Environmental Legacy of President Trump*, 42 POL'Y STUD. 628, 632, 635 (2021) (explaining the challenges facing the Biden Administration in reversing many of the Trump Administration's environmental actions, including conservative judicial appointments and bipartisan gridlock).

ment finding, however, they can compel the EPA to act once an endangerment finding has been made.[302] Thus, if the EPA does not propose timely standards for avgas, petitioners have a clear cause of action to hold the EPA responsible.

CONCLUSION

The EPA's recent proposed endangerment finding for avgas used in piston-engine aircraft is critical to ensure that individuals living near airports are no longer exposed to lead pollution. Not only will the endangerment finding result in standards for avgas, it also serves as a tool for petitioners to require that the EPA issue those standards. The EPA should be applauded for its effort, but the endangerment finding is long overdue. The proposed endangerment finding relies on extensive scientific data supporting the connection between avgas, lead pollution, and its impact on the environment and public health. Thus, if challenged, the EPA will most likely be successful in defending the proposed endangerment finding. However, the proposed endangerment finding heavily relies on old data. To better ensure that standards implemented under the endangerment finding are effective in preventing lead pollution, the EPA should amend the final endangerment finding to clearly rely on the most recent data.

302 Friends of the Earth v. U.S. Env't Prot. Agency, 934 F. Supp. 2d 40, 51, 53 (D.D.C. 2013).