**BEFORE THE ADMINISTRATOR OF THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

**PETITION FOR RULEMAKING & COLLATERAL RELIEF**

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

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

**October 3, 2006**

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

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

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

## BACKGROUND

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

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

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

## PETITIONER

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

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

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

## STATEMENT OF LAW

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

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

## ARGUMENT

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

## I. LEAD EXPOSURE IS HAZARDOUS TO HUMAN HEALTH

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

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[6] *Id.* at 5.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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24 ATSDR Report at 17.

25 Muntner, P.; He, J.; Vupputuri, S.; Coresh, J.; Batuman, V. (2003) Blood lead and chronic kidney disease in the general United States population: results from NHANES III. Kidney Int. 63: 1044-1050.

26 ATSDR Report at 9.

27 Toxicological Profile at 9.

28 Toxicological Profile at 25.

29 Lanphear, B. P. (2005) Childhood lead poisoning prevention: too little, too late. JAMA J. Am. Med. Assoc. 293: 2274-2276.

30 ATSDR Report at 17.

31 PBT National Action Plan for Alkyl-Lead, U.S. EPA Persistent, Bioaccumulative, and Toxic Pollutants (PBT) Program (June 2002) [PBT Action Plan] at 13.

32 *Id.*

33 *Id.*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

## CONCLUSION

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

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

WHEREFORE, petitioners request that the Administrator:

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

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

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

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

Respectfully submitted,

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