U.S. Department
of Transportation
**Federal Aviation
Administration**

September 12, 2013

Ted W. Lieu
Chair, Senate Select Committee on Air Quality
District Office
2512 Artesia Blvd., Suite 320
Redondo Beach, CA 90278

Dear Senator Lieu:

Thank you for your August 16 inquiry regarding leaded aviation gasoline and your invitation to testify to the Select Committee on Air Quality on September 18th on this subject. The Federal Aviation Administration is unable to participate in the hearing directly, but we appreciate the invitation and we are instead submitting this overview of our many initiatives to help address the lead content in aviation gasoline (avgas). We recognize this is an important environmental concern and are working with the Environmental Protection Agency (EPA), industry, and academia to find a safe alternative to today's avgas. We have provided below a brief explanation regarding the aircraft using leaded avgas, followed by information regarding the challenges associated with developing an operationally safe replacement for leaded avgas and the initiatives underway to find a safe replacement.

Aircraft that operate on leaded avgas are used for many critical purposes, including business and personal travel, instructional flying, aerial surveys, agriculture, firefighting, law enforcement, medical emergencies, and express freight. Avgas is a specialized fuel used to power piston engine aircraft. The properties of avgas must be properly balanced to give reliable and safe engine performance over an extremely wide range of aircraft operating conditions.

Almost all avgas on the U.S. market today is low lead, 100 Motor Octane Number avgas, commonly known as "100LL." Tetraethyl lead (TEL) is an organic compound that contains lead and, in small quantities, is very effective in boosting octane. The ban of TEL in automotive gas was phased in over a number of years and was largely completed by 1986, resulting in significant reduction of lead to the environment. TEL has not yet been banned for use in avgas because no operationally safe alternative is currently available. The additive TEL is used in 100LL avgas, which contains a maximum of 2.13 grams of lead per gallon of avgas.

High compression, high displacement engines, such as those found in many piston engine aircraft, require high octane fuels so that engine damage does not occur to pistons and other components during aircraft operation at altitude. The TEL additive boosts the octane of avgas, thereby preventing the safety issue of early detonation of fuel in the engine combustion chamber.

The FAA is cognizant of the environmental concerns related to lead emissions from the combustion of avgas. As a result, the FAA has participated with the Coordinating Research Council and its industry and academic participants to find a lead-free replacement fuel for avgas. However, a drop-in replacement fuel that is operationally safe for the entire fleet of piston engine aircraft, and that does not present environmental hazards beyond those of conventional petroleum products such as automotive fuels, has not yet been identified. Although some piston powered aircraft have been certified to operate on fuels that do not contain lead, the small market and supply and distribution of avgas currently supports a single fuel (100LL) that is operationally safe for the entire fleet of piston engine aircraft. In practice, that single fuel is 100LL. Should replacement unleaded fuel(s) be considered within the current market, these fuels would have to be free of ethanol for operational safety, and separate delivery systems and procedures would have to be in place to ensure proper fueling for all aircraft. In addition, airport sponsors and aircraft operators would face the financial challenges of a second supply, storage and distribution requirement.

There are four initiatives underway to develop an operationally safe replacement for leaded avgas:

First, the FAA sponsored an Aviation Rulemaking Committee (ARC), which includes the Environmental Protection Agency and industry stakeholders to develop a process, cost estimate, and time line to replace existing leaded aviation fuels with an unleaded alternative. The final report and recommendations, known as the Unleaded Avgas Transition (UAT) Committee Final Report was published on February 17, 2012 and is available to the public at www.faa.gov/about/initiatives/avgas/archive. The report contains five key recommendations, and fourteen additional recommendations, to develop and deploy an unleaded avgas. The UAT plan calls for a cost-share effort between government and industry to identify an unleaded avgas fuel by 2018 that could be safely used by as much of the piston engine fleet of aircraft as possible.

Second, the FAA has established an Agency performance metric that states: "A replacement fuel for leaded aviation gasoline is available by 2018 that is useable by most general aviation aircraft." This performance metric will guide our investments and decisions for the coming years. To meet this goal, the FAA has developed a Solicitation Information Request (SIR) (https://www.fbo.gov/?s=opportunity&mode=form&id=b8aafcf6f495374b802977024e65690a&tab=core&_cview=0) to seek the development of candidate unleaded avgas formulations for testing and evaluation to identify the most viable replacements for 100LL avgas with the least impact on the existing fleet of piston engine aircraft. Through a two phase process, the FAA will assess the viability of candidate fuels in terms of their impact on the existing fleet, their production and distribution infrastructure requirements, their impact on the environment and toxicology, and economic considerations. Submission of data for candidate fuels for the phase one evaluation has been requested by July 2014.

Third, Section 910 of the 2012 FAA Modernization and Reform Act establishes an unleaded gasoline research and development (R&D) program with deliverable requirements for an R&D plan and report. The FAA has issued the Unleaded Avgas Transition (UAT) Action Plan (http://www.faa.gov/about/initiatives/avgas/archive/2012-10-05/) that will integrate the R&D activities into the selection of an unleaded replacement avgas.

The fourth initiative involves private sector companies that have applied for Supplemental Type Certificates for specific piston engine and airframe models to operate with new, unleaded aviation gasoline formulations.

The FAA's goal to identify a viable unleaded avgas by 2018 is the near term solution that will, ultimately, allow for the elimination of lead emissions from piston engine aircraft. Until such fuels can be brought to market, the FAA has been coordinating with airport and aircraft owners and operators to investigate and encourage options to reduce lead emissions at airports. Some of the measures that are being considered include the use of lower lead fuel options (where available), the use of unleaded automotive fuels for those aircraft certified to do so provided the automotive fuel does not contain ethanol, safely changing aircraft operations to avoid concentrated lead emissions at an airport, and the installation of vapor recovery systems on avgas fuel handling systems. These short term solutions have challenges associated with their supply logistics, operational safety, cost and impacts, but can be considered on an airport-by-airport basis.

In closing, the FAA appreciates the opportunity to address the Select Committee on the subject of leaded avgas. The FAA has and will continue to coordinate with the EPA, industry and academia to find an operationally safe unleaded replacement avgas with the least impact on the existing fleet of piston engine aircraft, and will continue efforts to identify and encourage airport sponsors to implement feasible short term solutions.

If I can be of further assistance, please contact me or Roderick D. Hall, Assistant Administrator for Government and Industry Affairs, at (202) 267-3277.

Sincerely,

for Julie Oettinger
Assistant Administrator for Policy,
International Affairs and Environment