Lead in Aviation Gasoline

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Topics

- Background
- Impacts of lead from aviation gasoline (avgas)
- Petition on leaded avgas
- Intersection with the Lead NAAQS

Health Effects of Lead (Pb)

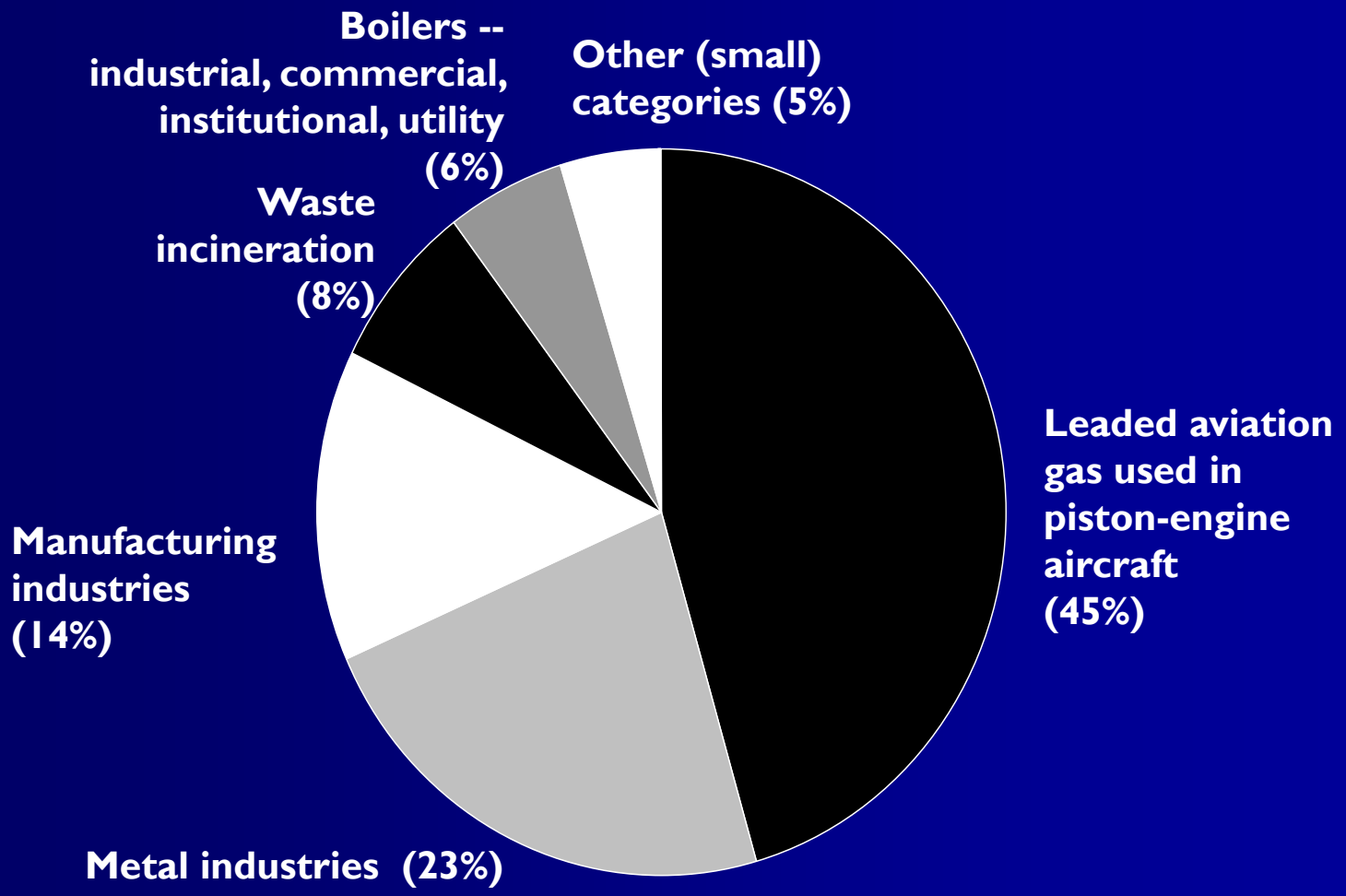
- In October 2008, EPA finalized a new Pb NAAQS
  - Since 1978, the Pb NAAQS was 1.5 µg/m^3 (1,500 ng/m^3)
  - The new Pb NAAQS is 150 ng/m^3
- Serious health effects occur at much lower levels of lead in blood than previously identified
  - Early-life exposure to low levels linked to IQ loss, learning, memory, and behavior effects
  - Adults experience adverse effects of lead exposure
- Alkyl-Pb
  - A priority Persistent, Bioaccumulative, & Toxic (PBT) pollutant

Leaded Avgas is Used Only in Piston-engine Aircraft

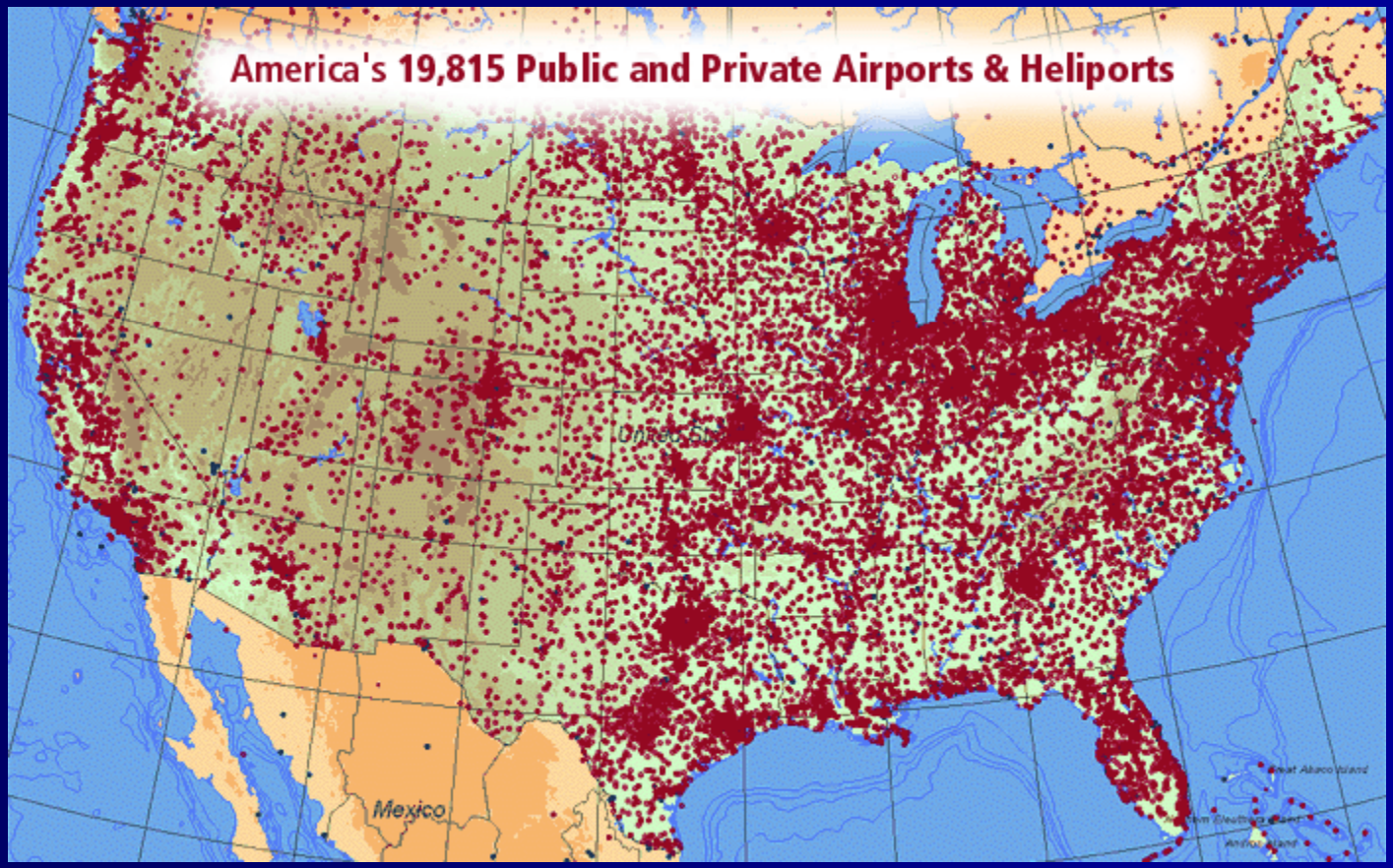
- Personal transportation, instructional, business/corporate, air taxi, other (e.g., aerial application, observation)
- Lead needed to prevent knock
- Single-engine aircraft can obtain certificates to run on unleaded
- Twin-engine aircraft require high octane provided by lead

Avgas Lead is Roughly Half the National inventory

Source Sectors of Lead Emissions in the U.S. 2002



Public and Private Airports Servicing Piston-engine Aircraft

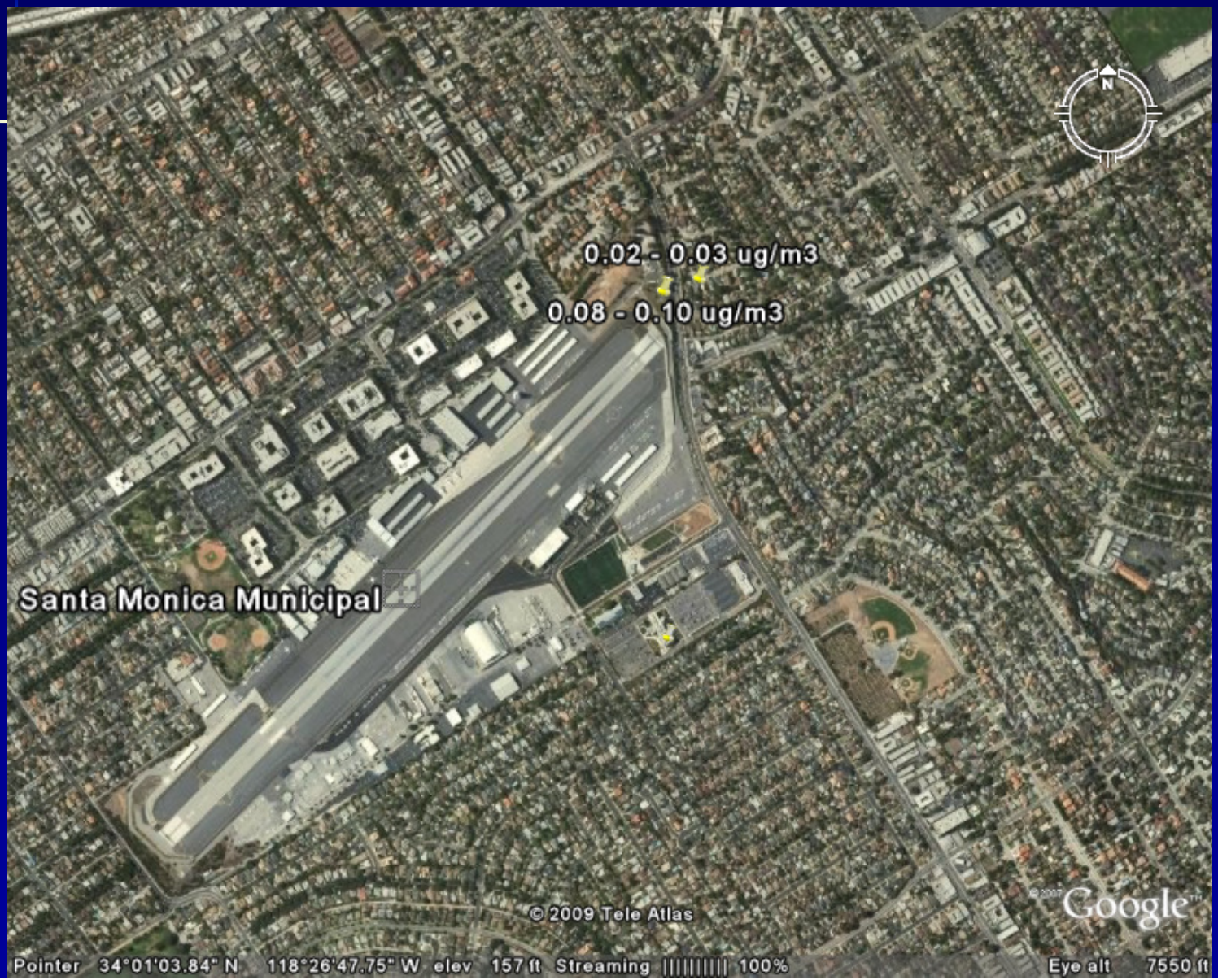


From Aircraft Owners and Pilots Association www.gaservingamerica.com

Potentially Impacted Population

- About 2 million people live within 1 km of the 20,000 airports
  - More than 200 airparks/fly-in communities
- About 3 million children attend schools that are located within 1 km of these airports
  - Includes more than 8,000 schools
- Over 600,000 pilots
- Over 145 million passengers

Santa Monica Municipal Airport, CA



Pb Measurements at Airports

Study	Airport	Sampling Duration	Pb conc, ng/m3	Pb emissions estimates, tons
SCAQMD	Van Nuys	3 mo. avgs	6 – 26 >100 m 4 – 8 bckgrnd	1.4
SCAQMD	Santa Monica	3 mo. avgs	77 – 96 max impact 4 – 8 bckgrnd	0.4
State of Illinois	O'Hare	5 days	16 upwind 30 downwind	0.7
Environment Canada	Buttonville	10 days	<d.l. – 300 avg 30 7 bckgrnd	0.7

Pb NAAQS is 150 ng/m^3 quarterly average max

Santa Monica Airport Pb Study

- Enhance our air quality model (AERMOD)
- States will be able to use the model
  - To evaluate the maximum impact area for monitor placement
  - To estimate avgas Pb contribution to the local environment
- Provide data to evaluate air-soil-dust linkage and potential role of avgas Pb
  - Monitoring will finish in 2009; data available in 2010

Petition on Leaded Avgas

- Friends of the Earth
  - If sufficient information exists, make a finding of the endangerment to public health and welfare
    - If finding is positive, propose a lead emission standard for general aviation aircraft
  - If insufficient information exists to make a finding, commence a study

Regulations Governing Lead Emissions from Aircraft

- EPA can set exhaust emissions standards under CAA section 231
  - States are preempted under CAA
- EPA does not have authority under CAA section 211 to regulate fuels solely used in aircraft engines
  - FAA has exclusive authority to regulate aircraft fuels
- A positive finding of endangerment puts EPA and FAA under a duty to exercise their respective regulatory authority to limit lead emissions

Responding to the Petition on Leaded Avgas

- Gathering and analyzing available information and collecting new data
  - Initiated Pb study at Santa Monica Airport in 2008
- Published petition in Federal Register in Nov 2007
  - We asked a series of questions seeking information
- Pb NAAQS final rulemaking and implementation greatly inform the potential for endangerment

Pb NAAQS Key Implementation Dates

- Monitoring
  - State Plans July 2009 & July 2010
  - Network Implementation Jan 2010 & Jan 2011
- Designations
  - State Recommendations Oct 2009
  - Final Designations Oct 2010 & Oct 2011
- State Implementation Plans
  - July 2012 & 2013
- Attainment deadline
  - Jan 2016 & 2017

Airports that Require Pb Monitors

- 5 Airports need Pb monitors (≥ 1 ton)
- Monitor at max concentration site, downwind of take-off zone

Van Nuys, CA
Deer Valley, AZ
Centennial, CO
Orlando Sanford, FL
Daytona, FL

Evaluating Avgas Pb Contributions

- 220 Airports in counties with Pb exceeding 150 ng/m^3
- We need State Pb inventories for point sources as they are updated for Pb monitoring plans
  - Source type, lat/lons, emissions
- Airport inventories:
  - 2008 National Emissions Inventory will have all 20,000 airports
  - Pb Piston-engine aircraft emission factor = 7 g/LTO

Questions?

- www.epa.gov/otaq/aviation.htm
  - Provides Airport-specific Pb Estimates
  - Technical Support Document
    - Describes inventory method
    - Lists information States could obtain to improve airport inventories
  - Airport facilities for MSAs > 500,000
  - Petition on avgas Pb and FR notice
- My contact information
  - Hoyer.marion@epa.gov
  - 734-214-4513

State Data to Improve Airport-specific Pb Inventories

- The general aviation and air taxi activity conducted by piston-engine aircraft versus turboprop or turbine powered aircraft
- Local data for fuel consumption rates by single- and twin-engine piston-powered aircraft
- Local authorities could apply airport-specific times in modes to estimate lead for individual airports, based on locally developed and documented studies.
- Measurement of the lead concentration in avgas


0.02 - 0.03 ug/m3
0.08 - 0.10 ug/m3
N
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Google
Pointer 34°01'12.94" N 118°26'43.90" W elev 176 ft Streaming 100%
Eye alt 1431 ft