SUBSONIC JET EMISSIONS REPORT

ENVIRONMENTAL PROTECTION AGENCY PA420-R-99-013 - Final Report "Evaluation of Air Pollutant Emissions from Subsonic Commercial Jet Aircraft", U.S. Environmental Protection Agency April 1999. Excerpts from this report are reprinted below:

"Public Health and Aircraft Emissions":

"Ultimately, EPA's principal concern in evaluating and controlling (jet fuel) emissions is the preservation of human health and, secondarily, the protection of public welfare (including protection against damage to crops, vegetation, animals, and buildings)...In particular, they have significant concerns regarding the effect of NOx on local and regional environments. Tropospheric NOx has multiple environmental quality impacts…contributing to ground-level O3 and PM, but also air toxic concentrations, excess nitrogen loads to sensitive water bodies, and acidification of sensitive ecosystems (EPA 1997a)." (PM = Particulate Matter)

"Table 1.1 Representative health effects of air pollutants." Jet Emission Pollutants:

'Ozone - Lung function impairment, effects on exercise performance, increased airway responsiveness, increased susceptibility to respiratory infection, increased hospital admissions and emergency room visits, and pulmonary inflammation, lung structure damage. (Examples of these effects are chronic inflammation and structural damage to lung tissue and accelerated decline in baseline lung function.)"

"Carbon Monoxide - Cardiovascular effects, especially in those persons with heart conditions…Similar health effects on animals as on humans."

"Nitrogen Oxides - Lung irrigation and lower resistance to respiratory infections. Premature mortality, aggravation of respiratory and cardiovascular disease, changes in lung function and increased respiratory symptoms, changes to lung tissues and structure, and altered respiratory defense mechanisms…" (Asthmatics are especially sensitive.)

"Volatile Organic Compounds - Eye and respiratory tract irritation, headaches, dizziness, visual disorders, and memory impairment."

"Table 1.2 Representative Environmental Effects:

Ozone - Crop damage, damage to trees and decreased resistance to disease for both crops and other plants. (Ground-level ozone interferes with the ability of plants to produce and store food so that growth, reproduction and overall plant health are compromised. By weakening trees and other plants, ozone can make plants more susceptible to disease, insect attacks, and harsh weather ...Ground level ozone can also kill or damage leaves so that they fall off the plants too soon or become spotted and brown...")

"Nitrogen Oxides - Acid rain, visibility degradation, particle formation, contribution towards ozone formation. NO2 is an important precursor to both ozone and acidic precipitation, which harms both terrestrial and aquatic ecosystems...NOx also plays a role in the formation of acid rain. Acid rain causes surface water acidification and damages trees...NOx contributes to the formation of particles in the atmosphere, with the resulting health and visibility effects...)"

"Particulate Matter - Visibility degradation and…safety effects for aircraft from reduced visibility. (PM is the generic term for a broad class of chemically and physically diverse substances that exist as discrete particles...over a wide range of sizes...PM may either be emitted directly or formed in the atmosphere by the transformations of gaseous emissions of compounds including NOx, VOCs, and sulfur oxides SOx...In addition to the evidence found for health effects associated with aggravation of asthma and increased respiratory illness, and that they may be chronic health effects associated with long-term exposure to high concentrations of coarse particles (FR, July 18, 1997)..."

"...the nature of the effects that have been reported to be associated with ambient PM, including premature mortality, aggravation of respiratory and cardiovascular disease…change in lung function and increased respiratory symptoms, changes to lung tissues and structure, and altered respiratory defense mechanisms;

and sensitive sub-populations that appear to be at greater risk to such effects, specifically individuals with respiratory disease, cardiovascular disease and the elderly...children, asthmatic children and adults..."

"Volatile Organic Compounds - Contribution towards ozone formation, odors, and some direct effect on buildings and plants." (...They can arise from evaporation or incomplete fuel combustion. As a class, VOCs react with NOx in the atmosphere to form ozone, but individual VOCs may have additional health effects. Some VOCs have little or no known direct health effect, while other VOCs, such as benzene, are carcinogens...Eye and respiratory tract irritation, headaches, dizziness, visual disorders, and memory impairment are among the immediate symptoms that some people have experienced soon after exposure to some organics...At high levels, VOCs can have a damaging effect on plants...VOCs that contain chlorine can also contribute to stratospheric ozone depletion.)..."

Intergovernmental Panel on Climate Change - IPCC Special Report - Aviation and the Global Atmosphere - Summary for Policymakers – 1999:

"2. **How Do Aircraft Affect Climate and Ozone?** Aircraft emit gases and particles directly into the upper troposphere and lower stratosphere where they have an impact on atmospheric composition. These gases and particles…trigger formation of condensation trails (contrails)…"

"4.6 **Cirrus Clouds**. Extensive cirrus clouds have been observed to develop after the formation of persistent contrails. Increases in cirrus cloud cover (beyond those identified as line-shaped contrails) are found to be positively correlated with aircraft emissions..."

*Note: The full report is available online at: http://www.epa.gov/oms/regs/nonroad/aviation/r99013.pdf or on the EPA Website.

ADDITIONAL QUESTIONS

1. If JP-4 or JP-8 Jet Fuel consists of a complex mixture of hydrocarbons, including poly aromatic hydrocarbons (PAHs), naphthalene and benzene (a known carcinogen), how will increasing jet fuel emissions impact public health?

2. When will our elected officials direct our local air pollution districts to start testing our air for barium (salts), aluminum (oxides), perchlorate, cadmium, manganese, magnesium, lead, iron, tungsten, and carcinogenic poly aromatic hydrocarbons like naphthalene and benzene?

3. Are fine particles of aluminum oxide and other highly refractive metals being released by jets over our state along with aluminum coated fiberglass (Chaff)?