Air quality Study and Associated health Risks

This summary presents an assessment of potential air quality and associated health risks impacts associated with the operation of Whiteman Airport (Airport) owned operated by the County of Los Angeles located in the community of Pacoima.

Overview

Under the Federal Clean Air Act (CAA) (42 U.S.C. § 7401-7671q), the United States Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO2), nitrogen dioxide (NO2), particulate matter (PM10 and PM2.5), ozone, and lead. There are no federal standards for aviation-related GHG emissions. Air quality and the emissions associated with aircraft operations, specifically lead, were a comment topic of concern from both the Community Advisory Committee (CAC) and community. Updates on the air quality work were given throughout the CAC process. During the CAC process the majority of comments from the community were centered on lead.

Air Quality and Emissions

Air quality and the emissions associated with aircraft operations, specifically lead, were a common topic of concern from both the CAC and community. In 2016, Pacoima Beautiful received a grant through the Community Action for a Renewed Environment (CARE) program to identify sources of toxic substances and their health risks in the community by organizing ideas, concepts, reports and community knowledge into a cohesive set of risks, which could then be prioritized for future action. Under the guidance of the USEPA, the report identified the Airport as a high-risk source of pollution. Other high-risk sources included diesel, small point sources, highway and major arterials.

The South Coast Air Quality Management District (SCAQMD) sets federal and state air pollution regulations. Environmental reviews conducted by the County determined that the current Airport operations do not violate of the State or regional air quality standards as established by SCAQMD.

Air Quality Monitoring

As part of the re-envisioning process, three air quality monitors were placed around the Airport in order to capture the most accurate readings possible for emissions, as well as to ensure the continuity and security of the monitors themselves. While the air quality monitors were placed to

best capture readings from aircraft emissions but there is no way to eliminate other sources of emissions from the Airport or the community.

By understanding the sources of emission on the airport, (i.e., which aircraft are based there, the number of aircraft operations, fueling, generators, etc.), air quality monitors were placed at three locations with the highest likelihood of capturing emissions from aircraft. The sampling included passive measurements and time averaged samples which contained particulate matter 10 (PM 10), TO-13A, TO-11A, and volatile organic compounds (VOCs). The samples collected from the monitors were sent to an accredited laboratory for testing. The PM10 samples were also analyzed and found to contain select metals, including lead, via x-ray spectroscopy. The results are consistent with emissions from general aviation aircraft.

Lead

Throughout the re-envisioning process, lead was a frequent concern from both the CAC and the community. Lead is a poison harmful to human health. There is no safe level of lead in the blood. Lead exposure is associated with harm to the nervous, cardiovascular, immune, and reproductive systems. Lead exposure can cause anemia, high blood pressure, an increased risk of cancer, and, at high levels, death. Children are particularly susceptible to harm from low-level lead exposure, which can affect growth and cause behavioral problems and learning deficits. Lead was phased out of automotive fuels in the 1970s but is still used in aviation gasoline primarily to meet higher octane requirements and prevent engine failure in piston-engine aircraft. The burning of leaded aviation gasoline accounts for an estimated 70% of airborne lead emissions in the U.S. There are an estimated 170,000 piston-engine aircraft nationwide, operating out of an estimated 13,117 airports.

The aircraft using Whiteman Airport are primarily piston-engine and use leaded fuel. The air quality monitoring conducted at Whiteman Airport found lead levels at a range of 0.021 to 0.06 $\mu g/m^3$ of lead.

Between July and September 2022, South Coast Air Quality Management District (AQMD) conducted a short study to better understand lead levels at the Airport and in the surrounding communities using a variety of different monitoring techniques including 24-hour samples, continuous sampling, and mobile monitoring. The study reported that the lead levels were within the typical range measured during Multiple Air Toxics Exposure Study V and (MATES V) and more than 10 times lower than the EPA national standard for lead.

In January 2015, the US EPA published a study[1] titled "Airport Lead Monitoring" which provided lead concentration data measured at 17 airports across the United States, including nearby Van Nuys Airport. The lead measured at the 17 airports ranged from 0.01 to 0.33 $\mu g/m^3$. While

[1] USEPA, *Airport Lead Monitoring*, *January 2015*, accessed January 18, 2023.

Whiteman Airport was not included in this study, the results at Van Nuys Airport are comparable with the results of the Whiteman Airport study.

EPA Lead Study Results

Airport, State	Lead Value, µg/m^3
Auburn Municipal Airport, WA	0.06
Brookhaven Airport, NY	0.03
Centennial Airport, CO	0.02
Deer Valley Airport, AZ	0.04
Gillespie Field, CA	0.07
Harvey Field, WA	0.02
McClellan-Palomar Airport, CA	0.17
Merrill Field, AK	0.07
Nantucket Memorial Airport, MA	0.01
Oakland County International Airport, MI	0.02
Palo Alto Airport, CA	0.12
Pryor Field Regional Airport, MI	0.01
Reid-Hillview Airport, CA	0.09
Republic Airport, NY	0.01
San Carlos Airport, CA	0.33
Stinson Municipal, TX	0.03
Van Nuys Airport, CA	0.06

Efforts are underway by the Federal Aviation Administration (FAA) and the aviation and energy industries to transition piston-engine aircraft to unleaded fuel through the recently formed Eliminate Aviation Gasoline Lead Emissions (EAGLE) initiative. Additional information is included below in Section 4.1.8.2.

The EPA proposed an endangerment finding on October 7, 2022[2], that, if adopted, would determine that lead emissions from aircraft that operate on leaded fuel cause or contribute to air pollution that may reasonably be anticipated to endanger public health and welfare. This endangerment finding is a fundamental step which will allow the EPA and FAA to regulate and ultimately eliminate the use of leaded aviation gasoline. It is supported by the FAA, aviation industry, and various organizations and public entities.

[2] Regulations for Lead Emissions from Aircraft | US EPA

On January 10, 2023, the Los Angeles County Board of Supervisors passed a motion to protect public health by supporting the United States Environmental Protection Agency's proposed regulation of leaded aviation gasoline.

Greenhouse Gases

Greenhouse gases (GHGs) trap heat in the earth's atmosphere. The main GHGs are carbon dioxide, methane, nitrous oxide, and fluorinated gases. In 2009, the EPA found that current and projected concentrations of the main GHGs in the atmosphere threaten the public health and welfare of current and future generations, and that combustion of fossil fuels contribute to the increase in CO*2* and other GHGs in the atmosphere.[3]

According to most international studies, aviation emissions comprise a small but potentially important percentage of human-made greenhouse gases and other emissions that contribute to global warming. The U.S. General Accounting Office (GAO) reports that aviation accounts "for about three percent of total U.S. greenhouse gas emissions from human sources" compared with other sources, including the remainder of the transportation sector (29 percent) and industry (22 percent).[4]

As part of the re-envisioning process, the greenhouse gas emissions from the Airport was modeled using industry standard assumptions and software. The analysis determined that the 2021 operations of Whiteman Airport resulted in a total of 2,275 tons of carbon dioxide produced. For comparison, a typical gas-based car emits 5 tons of carbon dioxide per year, the amount of greenhouse gas produced by Whiteman Airport in 2021 equates to the greenhouse gas produced by 455 cars.

Associated Health Risks

Certain specific air pollutants are defined by state and federal law as a risk to public health and welfare. This includes the following:

- Ozone (O_3)
- Reactive organic gases (ROGs) or volatile organic compounds (VOCs)
- Carbon monoxide (CO)
- Nitrogen dioxide (NO_2)
- Respirable particulate matter and fine particulate matter (PM_{10} and $PM_{2.5}$)
- Sulfur dioxide (SO_2)
- Lead (Pb)

[3] Endangerment and Cause or Contribute Findings for Greenhouse Gases under the Clean Air Act, 74 Fed Reg. 66495 et seq. (2009)
[4] USEPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2021*.

CARB and the Office of Environmental Health Hazard Assessment (OEHHA) have identified the following groups of individuals as the most likely to be affected by air pollution:

- the elderly over 65,
- children under 14,
- infants (including in utero in the third trimester of pregnancy), and
- persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis (CARB 2005, OEHHA 2015).

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved and are referred to as sensitive receptors. Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers.

Residential is the dominant land use in both Pacoima and within the 3-mile area extending outward from the Airport. The closest existing sensitive receptors to aircraft operations at the Airport are residences near Pierce Street and San Fernando Road and the San Fernando Gardens, approximately 65 feet northwest of the Airport boundary and approximately 850 feet northwest of the Runway 12 threshold. The closest school is the Pacoima Elementary School, approximately 2,500 feet northwest of the Runway 12 threshold. There are several day care centers within 1.5 miles of the Airport but no hospitals.

Due to the proximity of the Airport to sensitive receptors, there is a higher risk of exposure to air pollutants as defined by state and federal law as a risk to the health and welfare of the public than airports with a larger separation between the airport and sensitive receptors. These assumptions do not consider the impacts associated with other emission sources in the community.

New Technologies, Reduced Emissions

Within the aviation industry, there are several new technologies under development that are anticipated to reduce the emissions associated with aircraft.

Unleaded Fuel

Tetraethyl lead (lead) first saw use as a gasoline additive in the early 1920's when engineers working for General Motors discovered that when added to gasoline it helped to prevent engine knock in cars[5]. This allowed for the development of more reliable and efficient engines and leaded gasoline was used as the main automotive fuel for over 50 years. A growing understanding of the toxicity of lead caused the U.S. Environmental Protection Agency (EPA) to begin phasing it out of automotive fuels in the 1970s.

For a number of reasons, the general aviation piston aircraft fleet continues to rely on fuel with a lead additive, 100LL (low lead). Compared to cars, aircraft generally have higher performance

[5] https://www.eesi.org/papers/view/fact-sheet-a-brief-history-of-octane

engines with higher octane requirements, have a higher average age[6], are subjected to a wider fluctuation in environmental factors such as temperature, altitude, and pressure, and are at a much greater risk of a serious accident in the event of an engine failure.

100LL is now the only remaining lead-containing transportation fuel, and emissions from small-piston engine aircraft have become the largest contributor of lead emissions produced in the U.S, though total lead emissions are relatively low[7]. The Federal Aviation Administration (FAA) shares the EPA's concern over these emissions and they are committed to the removal of lead from aviation gasoline. In 2013 the FAA launched the Piston Aviation Fuels Initiative (PAFI) with the goal of working with fuel producers and aircraft manufacturers to develop an unleaded replacement to 100LL. The program invites fuel producers to submit new unleaded fuel formulations to the FAA for rigorous testing. The goal of the program is to develop an unleaded alternative to 100LL that will work with 100% of the general aviation piston fleet, which has turned out to be a more difficult task than anticipated. The original estimated completion date of 2018 has come and gone and the FAA has tested over 279 fuel formulations in an attempt to find a workable solution[8].

Recently, the FAA approved a new type of unleaded fuel that can be used in all piston engine aircraft, but it not yet in mass production. Public Works Department is making preparations at the five County airports to replace leaded fuel with the unleaded fuel alternative as soon as it becomes available in the next several years.

Electric Aircraft

Historically, general aviation aircraft are powered by gasoline. The FAA has certified general aviation electric aircraft. These aircraft are not yet widely in production, they run on an engine powered by a battery.

Advanced Air Mobility

According to the FAA, Advanced Air Mobility (AAM) is an umbrella term for aircraft that are electric and can be highly automated. These aircraft are often referred to as air taxis or electric Vertical and Take-off and Landing aircraft. This new type of aircraft that uses electric power to hover, take-off, and land vertically is being developed by several manufacturers. The eVTOL aircraft:

- Take off like a helicopter and fly forward like an airplane
- Like traditional aircraft, the FAA will certify the aircraft and manage flight routes
- Are designed to be relatively quiet
- Are anticipated to drive new jobs throughout the community

[6] https://www.documentcloud.org/documents/20475932-26050#document/p45/a2030254
[7] https://www.faa.gov/about/initiatives/avgas/
[8] https://www.faa.gov/about/initiatives/avgas/

The FAA's website states: "AAM is anticipated to help achieve a more efficient, sustainable, equitable transportation network what will create thousands of new jobs across the County. AAM aircraft could also be used to transport cargo and passengers, help with firefighting, and provide search and rescue operations. It also has the potential to connect underserved and rural communities."[9]

The City of Los Angeles has partnered with eVTOL manufacturer Archer to launch an urban air mobility (UAM) network in Los Angeles by 2024 to help address urban congestion. UAM is a planned on-demand ridesharing services within cities like Los Angeles.

[9] Advanced Air Mobility | Air Taxis | Federal Aviation Administration (faa.gov)