Air Pollution

Exposing Airports' Poison Circles

by Sharon Ruth Skolnick-Earth Island Journal:Winter 2000-2001
(Article not in entirety;printed with permission)
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If you live within 6 miles of an airport, you are at heightened risk of dying prematurely from environmentally induced cancer. The culprit is the pollution spewing from jet aircraft, ground vehicles and airport maintenance operations.

The situation is about to get worse. On April 5, President Clinton signed into law the Airports Expansion Act (AIR-21), which gave the green light to build new airports and add or extend runways at some 2,000 existing US airports, including more than 500 airfields in major metropolitan areas. AIR-21 budgets $40 billion for airport construction, expansion and improvements - a 33% increase - over the next three years.

Jack Saporito, President of the US Citizens Aviation Watch Association (CAW) - a coalition of concerned municipalities, environmental and grassroots groups, aligned with 27 like-organizations around the world - points to studies that have linked airport pollution to cancer, asthma, liver damage, lung disease, lymphoma, depression, myeloid leukemia and tumors. According to CAW, the impacts of airport pollution can effect people "living and working at distances greater than 30 miles from the facility." Today, 70% of US residents of US residents live within 20 miles of a major airport.

Airport critics are frustrated by the lack of official concern. "We have the sources; we have the pollutants in great amounts; we have the sick and dead people," says Saporito. "We just haven't linked it all together yet in an epidemiological study." But a mounting number of studies clearly suggest that airport pollutants have become chemical grim reapers, gradually sickening and killing nearby residents... In August, a study by Environ International Corp. detected 219 volatile compounds in the air around Chicago's O'Hare International Airport (78 of them "increased levels") and estimated the resulting cancer risk for people living near the airport as five times higher than the regional average. As Joe Karaganis, an attorney for concerned airport neighbors put it, the Environ study proves that O'Hare "is the number-one toxic polluter in the state of Illinois."

Cancer in the Air

The American Cancer Society predicts that in the US, one out of every two men and one out of every three women will eventually be diagnosed with cancer. In July, the New England Journal of Medicine reported that environmental factors - mainly radiation and chemical pollution - are roughly twice as likely as genetic factors to contribute to cancer cases. Aviation is responsible for emissions of nitrogen oxide, hydrocarbons, sulfur dioxide, naphthalene, benzene (a known carcinogen), formaldehyde (a suspected carcinogen), and dust particles that harm human health and contribute to global warming.

The poison circle from a single runway can extend 6 miles from its hub and run 20 miles downwind. The cancer rate for people living on the perimeter of Chicago's O'Hare airport is 70% higher than the rate for the average Chicagoan, according to CAW. A University of Illinois School of Public Medicine study estimates that pollution from O'Hare's seven runways could be affecting the health of five million individuals. Dioxins from spilled jet fuel, di-ethelyne glycol from de-icing fluids, leaked engine oil and dissolved jet exhaust particulates commonly flood the tarmac and seep into the ground, streams, and creeks bordering O'Hare. The run-off ultimately flows into the Des Planes River, endangering the health of downstream communities.

A 1993 EPA health risk assessment concluded that aircraft engines are responsible for approximately 10.5% of the cancer cases within a 16-square-mile area surrounding Chicago's Midway Airport. The National Resources Defense Council warns that "the same conclusion might apply to people living immediately adjacent to airports all over the country."

Environmental Bomb

Jet planes pollute much more on the ground than in the air. Up to 90% of aircraft hydrocarbon and carbon monoxide emissions occur when planes idle and taxi. The EOC urged severe reductions of hazardous airport emissions as part of Denmark's compliance with global-warming-gas reduction under the Kyoto Agreement. Among the EOC's recommendations: Outlaw the worst aircraft (the older TU 135B is 88 times more polluting than a newer B777-300 jet); reduce the number of aircraft awaiting take-off (it is common practice for 10-20 aircraft to idle 20-40 minutes at full power); improve per-capita seating and forbidding near-empty flights, and hold aviation accountable for its fair share of Kyoto greenhouse gas reduction.

In the US, a pollution-reduction study for Sea-Tac estimated that taxiing on two engines instead of four would reduce hydrocarbon emissions by 80% and carbon monoxide emissions by nearly 70%. Emissions could be cut further by towing aircraft to and from terminals. Fuel vapor recovery also can reduce aircraft hydrocarbon emissions, and fuel modifications can reduce nitrogen oxide particulate emissions by 30%.

Sacred Cows and Human Sacrifices

The 1990 Clean Air Act requires the EPA to control emissions of hazardous air pollutants from major sources "such as factories, refineries, and mobile sources." Although airfields are among the largest single-source emitters of pollutants, air pollution assessments are rarely conducted for US airports. Because of the revenue large airports generate, local municipalities have been in no hurry to stem the flow of toxins.

As Saporito sees it, the problem is that "there is no health agency watching airports. Most emissions are exempt" from reporting and those that are regulated are "self-reported and grossly under-reported.""It's pretty much an unregulated industry," says CAW's Saporito. The Federal Aviation Association (FAA), which is supposed to regulate the airline industry, also works to promote the industry. (Saporito recalls invoking the name of the FAA during a meeting with one major airline senior executive. "FAA?" the latter responded dismissively, "We are the FAA.")

Airport Air Pollution

Citizens Aviation Watch Association has posted cancer and non-cancer illness maps under the category "studies". Go to www.us-caw.org for more information.

Commercial jets spew hundreds of millions of pounds of pollutants into the air every year

(Sources:MSNBC Research, FAA, BTS, EPA - July, 2001)

Here's a lookat where the pollution occurs and the types of emissions involved.

At the gate: Engines usually shut down at the gate, but a small army of service vehicles, from baggage loaders to catering trucks, which all emit fumes and particulates, service them.

Taxiing: Jets must operate their engines while waiting for takeoff - an average of 15 minutes or more at most major airports.

Takeoff: Jets need enormous amounts of power - and enormous amounts of fuel - to lift off. The number of takeoffs and landings is growing and at many airports has already exceeded projections for 2010.

Mixing zones: The more crowded the skies become, the more time jets spend in low-altitude airspace - the first 4,000 feet or so above sea level. Because of air patterns, all pollution in this "mixing zone" can affect ground-level air quality.

Cruising altitude: Though jets operate using less power and fuel as they cruise, the hours of operation release tons of pollutants. U.S. airlines alone burn almost 20 billion gallons of fuel per year, an average of over 2,200 gallons per flight.

Approach and landing: Landing delays increase the amount of time jets spend in the mixing zone. As jets land, they use thrust reversers to help slow the plane, requiring the engines to thrust up again. After landing, planes must spend several minutes on the ground taxiing to the gate with their engines idling down.

Carbon dioxide: A naturally occurring greenhouse gas - it contributes to global warming.

Particulates: TIny bits of soot left over when fuel doesn't completely burn. The more fuel an engine consumes, the more particulates it produces.

Water vapor: The water released by engines can, under the correct conditions, crystallize into jet vapor trails, or contrails. The contrails lead to the formation of cirrus clouds, which also serve as a factor in warming.

Nitrogen oxides: Gases produced by the burning of fossil fuels, they can contribute to acid rain and ozone production, and thus are linked to global warming. It is released in highest amounts during takeoff.

Sulfur dioxide: Compounds such as sulfur dioxide are used in the production of sulfuric acid, in addition to being found in small amounts in emissions.

Hydrocarbons: Volatile organic compounds are naturally occurring gases, such as butane or ethylene, which can cause pollution. They contribute to the production of ozone when they react to sunlight, and can travel hundreds of miles from their source.

Testing air for toxic substances

Seattle is part of EPA program checking presence of chemicals
(Partial article from Seattle Post-Intelligencer Reporter - Larry Lange-11/12/01)

Federal money is paying for the year-long air monitoring program that began in February at six Puget Sound area sites. It's part of a national push that the Environmental Protection Agency is mounting to more closely watch and regulate toxic substances in the air from a variety of sources. The subject is a group of chemicals and compounds used in industry and produced in vehicles and airplanes; most have been linked to cancers in sufficient concentrations and all can cause health effects ranging from eye and skin irritation to organ damage."This is the first time we've done anything when you're monitoring a large metropolitan area for a period of a year or more and looking for a wide variety of toxic compounds,"said Keith Rose, the EPA's regional air program manager. It's also "the first time, I think, we've embarked on a major project for a period of time in cities across the country."

In the past, the agency has limited its monitoring and regulation of airborne toxins to pollutants such as sulfur, nitrogen oxides and ozone, mostly produced by vehicles. It was authorized to take on additional toxins when the federal Clean Air Act was amended in 1990 and is now in the middle of its work, taking advantage of advanced measuring techniques. The monitoring will gather air samples and test them for 18 of the most frequently found chemicals, ranging from arsenic to vinyl chloride. They're from a national EPA list of "the dirty 30", thought to be the most prevalent and dangerous, and include benzene, a substance produced in car, truck and aircraft engines that is listed by the EPA as a known cancer-causing substance.

EPA officials say the study will help then set up a system to regularly measure toxins in the air and help improve methods for estimating air pollution. It could also lead to new or more stringent limitations on toxic substances in the air, officials say, though they can't yet describe those. Pollutant measurements have been taken at industrial plants in the past but "what they don't measure is you walking around town with air that has fumes from all the many cars and trucks,"said Dan Klushman of the American Lung Association. He says the current study "will help determine the presence and effects" of toxins and will likely reinforce the desirability of mass transit, car-pooling and bicycling.

And people living near Sea-Tac Airport hope the study might provide clues about whether clusters of brain cancers and respiratory ailments in their neighborhoods are caused by air pollutants. A state department of health study found elevated levels of some cancers and hospitalizations for respiratory problems but could not pinpoint the causes. The agency, its funding limited, never did the follow-up work. Officials familiar with the study say it won't provide immediate answers about the airport but should show concentrations of toxins in that area. This, in turn, could be used as a springboard for more-detailed studies of the airport itself, a source of a mix of contaminants from cars, runway vehicles and airplanes.

Experts contacted about the averaged levels of pollutants measured so far are reluctant to discuss what they might mean. Sally Liu, assistant professor of environmental health at the University of Washington, said exposure levels will vary from site to site. Implications of the study could include more air-pollution regulations, perhaps on vehicles and on wood burning. Liu said the high Seattle readings fro formaldehyde and acetaldehyde may be due to use of oxygenated gasoline, which limits production of ozone but produces the other two chemicals. Vehicle engines produce benzene, 1,3 butadiene, formaldehyde and acetaldehyde, and the latter two also are found in wood smoke, officials said. Monitoring shows benzene and butadiene heavily concentrated in Georgetown and on Beacon Hill. Dennis McLerran of the Puget Sound Clean Air Agency said this likely reflects more driving and more traffic congestion - and the greater amount of benzene fuels sold here. Besides Seattle, the major cities in the study are Detroit, Providence, R.I., and Tampa, Fla.

Studies also are being done in six smaller cities: Cedar Rapids, Iowa,; Charleston, W.Va.; Grand Junction, Colo; Rio Rancho, N.M.; San Jacinto, Calif.; and San Juan, Puerto Rico.

The first part of the study is expected to end early next year based on sampling done this year. The second, intended to start next year, will look at a second group of toxins, called polycyclic aromatic hydrocarbons - highly condensed compounds produced by combustion that attach themselves to tiny particles that can be absorbed by the lungs. The Seattle part of the study will cost $500,000, part of $3 million being spent nationally. EPA officials said Seattle was picked partly to provide geographic and climatic balance for the national study. The greater Seattle area also has plenty of sources for toxic pollutants: cars, trucks, and planes moving people, steel fabricators, an airplane manufacturer, cement plants, pulp mills and a closed copper smelter that is now a Superfund site.

Some of the hazards

Among the chemicals considered toxic in sufficient concentrations and exposures being monitored in an EPA-sponsored air study in Puget Sound region. List includes short and long term health effects and cancer risk:

BENZENE: known human carcinogen; linked to leukemia. Source: car, truck and jet engine exhaust. Also known as benzol. Short term exposure effects: drowsiness, dizziness, headaches and unconsciousness. Long term effects: reduced blood cells and ability to produce them.

CARBON TETRACHLORIDE: probable human carcinogen. Source: dry cleaning and industrial cleaning. Short term effects: nervous system depression, headaches, weakness, lethargy, nausea, vomiting, liver and kidney damage. Long term: liver and kidney damage.

CHLOROFORM: probable human carcinogen. Once used as an anesthetic. Source: addition of chlorine to drinking water. Also known as trichloromethane. Short term: dizziness, headaches, tiredness, central nervous system depression. Long term: hepatitis, jaundice, depression, irritability.

VINYL CHLORIDE: known human carcinogen. Sources: production of plastic pipe, wire, cable and auto upholstery, and by breakdown in quantities of TCE. Also known as chloroethene and chloroethylene. Short term: dizziness, headaches, giddiness. Long term: liver damage.

ACETALDEHYDE: probable human carcinogen. Sources: car, truck, and jet engine exhaust and wood smoke. Short term: eye, skin and respiratory tract irritation, swelling of skin and mucous membranes, coughing, fluid in lungs, tissue death. Long term: none listed for humans.

FORMALDEHYDE: probable human carcinogen. Source: exhaust from car, truck and jet engines and in wood smoke. Also known as formol and methylene oxide. Short term: eyes, nose, throat irritation and respiratory symptoms. Long term: menstrual disorders and pregnancy problems.

ARSENIC: known human carcinogen. Sources: wood preserving, copper smelting. Short term effects: red blood cell breakdown, central nervous system disorders. Long term: skin and mucous membrane irritation, gastrointestinal effects, anemia, skin lesions, kidney or liver damage and motor and sense nerve disorders.