

AIR POLLUTION-CHICAGO O'HARE INTERNATIONAL AIRPORT

by

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Chicago O'Hare Airport produces thousands of tons of carbon monoxide, sulfur oxides, nitrogen oxides, VOC's, and hundreds of tons of particulates, as well as numerous chemicals designated by the EPA as hazardous air pollutants (HAP'S), every year.

Carbon monoxide causes decreased oxygenation in the blood, which poses a hazard to babies, the elderly, and everyone with heart, lung, and blood diseases. It has been associated with low birth weight and higher infant death rates. In the past, CO was said to be a minor problem at airports compared to the amount produced by cars. However, data from other airports found that CO concentrations near the airport were much higher than previously thought, enough to produce higher concentrations than the current standard<sup>1</sup>. At least 10,000 tons are produced at O'Hare annually, based on emissions per engine and the aircraft mix in operation there<sup>2,3</sup>.

Sulfur dioxide narrows airways, causing a significant impact on asthmatics, as well as people with other lung diseases. Nitrogen oxides (NOx) damage lungs and airways directly. In addition, nitrogen oxides are major contributors to of ground-level ozone, which medical studies have proven to cause patients with heart, lung, and other chronic diseases an increased risk of hospitalization and death<sup>4</sup>. Some newer aircraft engines, which burn less fuel than older engines, actually produce *more* NOx than before, because the engines burn hotter than the old engines<sup>5</sup>.

Volatile organic compounds (VOC's) are hydrocarbons produced by burned, as well as unburned, jet fuel, which is sometimes dumped directly into the air<sup>6</sup>. VOC's may be in gaseous or particulate form. VOC's are the major raw materials for photochemical smog. They are also major contributors to ground-level ozone. Ozone alerts do NOT take into effect the higher concentrations near major sources (like airports); persons living or working at airports are not notified when near-airport ozone levels are at or above the "alert" levels used for the general Chicago area. On ozone alert days many children, elderly, and chronically ill people must be confined to their homes or risk hospitalization<sup>7</sup>; if they live near a major airport their risk of heavy ozone exposure is even higher.

Particulates produced at airports are smoke, soot, and hydrocarbons. The emissions and dispersions modeling system (EDMS), which was jointly developed by the FAA and USAF, predicts air pollution emissions from airport operations. At Sea-Tac airport, in Seattle-Tacoma, Washington, which has between half and a third as many flights as O'Hare, particulate concentrations in neighborhoods near the airport were estimated by the EDMS to peak at 800 micrograms per cubic meter<sup>8</sup>; this is more than five times the allowable 24-hour standard (150 Micrograms) for 10 Microgram particulates<sup>9</sup>. This is especially significant because the majority of particulates produced by aircraft are smaller than 10 mcg;

smaller particulates are not included in the model or in current Clean Air Act standards. Smaller particulate standards are being considered by the US EPA due to ample medical evidence that smaller particulates cause serious harm to human health<sup>10,11</sup>.

As an example of how severe the total problem is, a B-747 climbing produces 512 kgs of NOx per hour, (128 kg/hr/per engine X 4 engines) according to the EPA Mobile Sources Inventory. Picture what residents living under any one of several dozen takeoff paths and seven landing paths breathe in when a 747 flies over them once a minute for several hours at a time, several days a week, every week of the year. This is a common occurrence in the communities bordering O'Hare. The shortest interval measured by citizens' groups timing overflights was 22 seconds in between planes<sup>12</sup>. Now consider that approximately 2600 planes depart from Chicago's O'Hare PER DAY; there are just short of a million landings and takeoffs per year over the heads of millions of residents.

Particulates, along with NOx and VOC's, are responsible for the "brown marshmallow" appearance of the air which hangs over O'Hare on most summer days. This effect is readily observable to travellers flying in or out of O'Hare.

Even more worrisome are the HAP's (hazardous air pollutants per the US EPA), because airports and airlines have not been included in the Toxic Release Inventory reporting system. Hundreds of tons of these pollutants have been pumped into our air yearly, completely unregulated. Some of the compounds of most concern are benzene, formaldehyde, benzo(a)pyrene, and butadienes<sup>5</sup>. Benzene is a toxic hydrocarbon which is proven to cause increased risks of leukemia, birth defects, lymphomas, and a variety of disorders of blood cell production<sup>13</sup>. Based on EPA data, at least 25 tons of benzene are estimated as produced from O'Hare airport operations yearly<sup>14,15</sup>.

Approximately 140 tons of formaldehyde is produced annually by aircraft at O'Hare, based on EPA data<sup>14,15</sup>. Formaldehyde causes serious irritation of the eyes, lungs, sinuses, and skin. It has been proven to cause respiratory, skin and brain cancers with chronic exposure<sup>7</sup>.

About 25 tons of benzo(a)pyrene and 30 tons of butadienes are estimated to be generated annually at Chicago O'Hare<sup>14,16</sup>. Both these hydrocarbons have been linked to a number of different kinds of cancers.

What is even more distressing is that ground operations, from baggage vehicles, to car rental operations, to maintenance hangars, and especially fueling operations, contribute additional huge amounts of these air-polluting chemicals, over and above those produced by the planes<sup>5,14</sup>.

It is imperative that measurements of hazardous air pollutants be gathered at PEAK locations near O'Hare. Local residents are

entitled to find out what they are inhaling daily. Actual amounts of these pollutants and real-life measurement of small and large particulates in the air over and near O'Hare must be carried out to protect public health. As the National Resources Defense Council noted, the air pollutants from major airports are carried up to 50 miles from the runways<sup>5</sup>.

A health-risk study was done for the area near Midway Airport in 1993 (ironically, not to examine the airport's contribution, but as part of the Robbins incinerator project). An excess cancer risk (in this area compared to a comparable area of the city not near an airport) due to man-made air pollutants was set at 2 cancers per 94,000 people. No health-risk study for the excess health risk due to airport operations at Chicago's O'Hare has been done or published, according to the author's search of the MEDLINE data base, FAA spokespersons, US EPA spokespersons<sup>16</sup>, and the Illinois EPA Air Quality Division spokespersons<sup>17</sup>.

The Illinois EPA, which has the charge of meeting Clean Air Act standards for the area including O'Hare, has no health risk data for airport operations and employs no health professionals, according to their director<sup>19</sup>. Nevertheless, millions of people risk their health by living in the heavily polluted area within 50 miles of Chicago O'Hare Airport; many of them also work at the airport, multiplying their health risks due to air pollution. On the author's most recent visit to O'Hare Airport, in June 1997, numerous workers were observed outdoors wearing no respiratory protection whatsoever.

It is mind-boggling that airport expansion has been pushed and the number of flights has been significantly increased over the last several years. The actual quantity of toxic pollutants (HAP's) and particulates, not to mention their health effects, have not yet been measured for the O'Hare area. "Newer engines" are the FAA's answer, as published in airline industry journals, but clearly this is a grossly inadequate solution when 980,000 takeoffs and landings occur yearly in a very small space and some newer engines make MORE NOx than the old ones.

Only a significant reduction in flight numbers will reduce the very serious air pollution produced daily at O'Hare. This could be accomplished promptly, without economic harm, by flying the same number of passengers on fewer planes. Clearly, this would require cooperation of airlines, the airport operator (Chicago), and the FAA. Public transportation exists around the airport, but over 85% of passengers originating or ending their trips in Chicago drove, by private or commercial car<sup>20</sup>. The airlines should be required to replace their most polluting planes; budgeting the total emissions and letting them figure out how to get there would give airlines flexibility to suit their own needs.

In addition, the IL EPA must consider O'Hare, AS A WHOLE, as a massive pollution source required to reduce emissions under the State Implementation Plan as required by Clean Air Act regulations, whereas currently air pollution permits are issued piece-meal to

each of dozens of sources<sup>17</sup>. Otherwise, the millions of people living anywhere near Chicago O'Hare have no hope of breathing clean air for decades to come. Those also working at O'Hare have even less hope for their own hearts and lungs.

- REFERENCES: 1. 1994 Draft Environmental Impact Statement for Sea-Tac Third Runway Project
- 2,3. Derived from EPA Mobile Source Inventory (emissions per engine); confirmed by total emissions for Sea-Tac of 3991 tons CO/yr, multiplied by conservative factor of 2.5 (lowest number of O'Hare flights divided by highest number Sea-Tac flights based on available most recent estimates).
4. American Lung Association vs. US EPA, 1993.
5. Flying Off Course, Natural Resources Defense Council, 1996.
6. Numerous Chicago area media reports of jet "emergencies" and fuel dumping
7. National Association of Physicians for the Environment, National Conference on Air Pollution Impacts on Body Organs and Systems, Sections A 3,4,5, 1993.
8. State of Washington Environmental Agency, Department of Ecology
9. National Ambient Air Quality Standards, Clean Air Act
10. Schwarz J. Air pollution and daily mortality: a meta-analysis. Environ Res 64:36-52, 1994
11. Dockery DW, Pope CA III, Xu X, Spengler J, Ware JH, Fay M, Ferris B. Spelzer FF. An Association between air pollution and mortality in six U.S. Cities. New Engl J Med 329: 1753-1759, 1993.
12. Jack Saporito, Alliance of Residents Concerning O'Hare
13. MEDLINE search of NLM data base by author, key words benzene, adverse effects, air pollution
14. US EPA National Inventory of Sources of Emissions for Five Candidate Title III Section 112(k) Hazardous Air Pollutants: Benzene, 1,3 Butadiene, Formaldehyde, Hexavalent Chromium and Polycyclic Organic Matter, External Review Draft, November 1996
15. US EPA Toxic Emissions From Aircraft Engines: A Search of Available Literature (booklet), 1993.
16. EPA, Estimation and Evaluation of Cancer Risks Attributable to Air Pollution in Southwest Chicago; 1,3 butadiene at Midway 7.6 tons/yr in 1993 X 4 (Conservative factor of O'Hare flight numbers and flight mix compared with Midway's)
17. Illinois EPA spokespersons, Public Hearing to consider American Airlines Air Emissions permit renewal, for air emissions from ground sources only, Dec 1996, Des Plaines, IL
18. Assistant to Carole Browner, U.S. EPA
19. Mary Gaede, personal conversation, as of November 1996.
20. Ref 5 above, page 111, as of 6/1/95.