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Actions to Mitigate Aircraft Noise At Minneapolis-St. Paul International Airport

Statement by
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Before the
Local and Urban Government Committee
Minnesota Senate

Mr. Chairman and Members of the Committee:

We appreciate the opportunity to testify on aircraft noise and efforts to mitigate its effects. While our statement draws on work we have performed over the past 2 years on the issue of aircraft noise, it is based primarily on our September 1989 report[1] to Chairman James L. Oberstar and Representative Bruce F. Vento. Preparing that report entailed discussion and review of documentation at eight airports: Baltimore-Washington (Baltimore), Philadelphia, Atlanta, Memphis, Chicago O'Hare, Minneapolis-St. Paul (Minneapolis), Los Angeles, and San Francisco.

Today, we will compare Minneapolis with the other seven airports by focusing on their noise abatement programs and their concerns regarding federal assistance. Our testimony will address the following three points:

-- The number of people affected by noise depends on aircraft activity, geography, and population density of surrounding areas. While Minneapolis had the highest number of complaints at the eight airports in our study, it ranked fifth in the number of persons affected by aircraft noise. An upsurge in complaints at that airport occurred during a test which placed more flights over St. Paul.

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[1]Aircraft Noise: Eight Airports' Efforts to Mitigate Noise (GAO/RCED-89-189, September 14, 1989)

-- Like most of the other airports in our study, Minneapolis has implemented a wide range of noise mitigation actions, including using specific runways and flight routes to move noise away from more populated areas. In addition, Minneapolis is one of the few cities nationwide which has implemented a form of "noise budget" which allocates noise to individual airlines based on market share[2].

-- Several airports questioned the quality of technical assistance FAA provided for developing noise compatibility programs. At Minneapolis and several other airports, officials were dissatisfied with how long it took FAA to approve airport noise compatibility programs.

BACKGROUND

Controversy over aircraft noise often arises because many people that are annoyed by the noise do not perceive direct benefits from air transportation activities. This affects the airports' relationships with surrounding communities and often results in complaints about airport noise. Buffering aircraft noise by acquiring surrounding land is not easily accomplished. Except for Baltimore, where the state is involved in the control of adjacent land, the communities surrounding the airport--not the airports--control adjacent land.

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[2]Two other large airports--Boston's Logan and Denver's Stapleton--that we did not visit also have noise budgets, as do at least four other medium and small airports.

Individual perceptions of and reactions to aircraft noise vary widely; therefore, to objectively measure aircraft noise, the Federal Aviation Administration (FAA) employs a noise measure called Ldn. Ldn measures cumulative sound over a 24-hour period to determine an average annual noise level at a specific location. Connecting locations on a map with the same Ldn levels produces lines called "noise contours," much like a weather map shows isotherm lines of the same temperature. Research has shown that within the 65 Ldn contour around an airport, people are annoyed because the noise interferes significantly with their routine daily activities. Sixty-five Ldn also is the threshold above which federal agencies consider land incompatible for residential use. However, as we stated in our report on FAA's Expanded East Coast Plan[3], although Ldn is widely used and correlates well with other noise measures, it is often criticized. One common criticism is that the averaging process, an essential element in deriving Ldn, dilutes high levels of intermittent noise that may be experienced at various times during a 24-hour period.

AIRCRAFT NOISE IMPACTS LARGE NUMBERS OF PEOPLE

An important indicator of an airport's noise problem is the number of people affected by aircraft operations. On the basis of computer models used by FAA and our estimates, the eight airports in our study exposed a total of about 475,000 people to aircraft

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[3]Aircraft Noise: Implementation of FAA's Expanded East Coast Plan (GAO/RCED-88-143, August 1988)

noise levels in excess of 65 Ldn. Among these airports, Minneapolis ranked fifth with 18,544 persons within the 65 Ldn contour (see attachment I). Only operations at Baltimore, San Francisco, and Philadelphia exposed fewer people to noise levels of 65 Ldn or more. Chicago ranked first, with operations that affected 210,000 persons.

The extent of aircraft noise is directly related to the number of operations--take-offs and landings--handled by an airport. In fiscal year 1987, operations ranged from about 802,000 in Atlanta to 291,000 in Baltimore. Minneapolis ranked seventh with 383,000 operations (see attachment II). However, the number of operations is not the only factor in determining the severity of an airport's noise problem. Geography around the airports, land use, and population density and distribution play major roles. Although operations at Minneapolis affect fewer persons than at six of the other airports, satisfying different community concerns is still a major challenge. Minneapolis has several communities adjacent to it, such as the densely populated cities of Minneapolis, St. Paul, Richfield, and Bloomington and the growing communities of Eagan and Mendota Heights. Chicago and Memphis also are surrounded by densely populated or growing communities, and noise from operations at Atlanta affects nine local jurisdictions.

Although Minneapolis ranked fifth in the number of persons affected by noise, in 1988 it had over 27,000 complaints--the highest of all airports in our study (see attachment III). The

number of complaints an airport receives does not always correlate well with the number of people within the 65 Ldn contour. For example, Chicago, with 210,000 people within the area of 65 Ldn or greater, received the equivalent of 1 complaint for every 17 people. In contrast, Minneapolis, with about 18,500 people within the 65 Ldn contour, received the equivalent of 1.5 complaints per person. We should caution here, however, that correlating complaints with population may not produce valid results because the source of a complaint is not always known and multiple complaints from the same individual could distort results. Furthermore, annoyance from aircraft noise is not limited to areas adjacent to the airport. In our work on FAA's Expanded East Coast Plan, we found that complaints about aircraft noise originated from locations as far away as 30 to 40 miles from Newark airport. Although experiencing noise significantly below the 65 Ldn threshold, residents of one community complained often about receiving more aircraft noise than before FAA's plan for improving airspace capacity on the east coast went into effect.

AIRPORTS HAVE IMPLEMENTED A WIDE RANGE OF NOISE CONTROL MEASURES

Minneapolis' program to mitigate noise includes as many or more actions as do programs of the other seven airports. All the airports, except Philadelphia, are implementing some of the four basic types of noise abatement actions, including changes in (1)

operational procedures, (2) the use of surrounding land, (3) the physical layout, and (4) programs for noise management.

Our study did not weigh the relative effectiveness of each airport's noise mitigation program. This is because measures implemented at the airports we visited reflect their different circumstancs and limitations in addressing such factors as increasing capacity, community desires, land use control, aviation safety, and infringement of interstate commerce. Therefore, what has worked at one airport may not be appropriate at another and it may not be fair to conclude that a noise abatement program is ineffective because it lacks certain measures. Moreover, the airports themselves rarely evaluate their individual measures because of the methodological problem of accurately attributing a given amount of noise reduction to a specific measure. Most airports, however, perform periodic evaluations of their overall programs.

Changes in Airport Operational Procedures

Generally, airports can, with FAA's involvement, implement changes in the way aircraft approach and depart the airport to reduce aircraft noise. Currently, the three most widely used operational procedures at the eight airports involve (1) runway use systems, (2) preferential flight tracks, and (3) restrictions on engine run-ups and ground equipment. Minneapolis has taken these

and five other actions to change its operational procedures (see attachment IV).

Of the eight airports in our study, only Minneapolis and San Francisco have implemented restrictions on airport use to curb noise. Minneapolis banned some small aircraft flight training which reduced the area exposed to noise. In addition, Minneapolis has recently completed a test to assess the impact of increasing the use of one runway, with the objective of redistributing aircraft noise in the surrounding communities. Also, among the eight airports in our study, Minneapolis is the only one to obtain negotiated agreements from air carriers that limit operations or substitute newer, quieter aircraft for older, noisier ones to reduce aircraft noise. Minneapolis had first considered obtaining these limits through a "noise budget" ordinance that would allocate noise to individual airlines based on market share, but the airport achieved faster implementation through voluntary compliance. San Francisco has used a phased approach that limits day-time operations of the noisiest aircraft and restricts them during nighttime hours.

Chicago, Los Angeles, and Memphis, on the other hand, have not restricted airport use either because of potential economic effects or because of unreasonable burdens on interstate commerce. Atlanta determined that a curfew would be illegal and that reducing general aviation activity would have little effect on aircraft noise. FAA and the Department of Transportation are currently formulating a

national transportation policy which could, if it includes a date for phasing out the noisiest jets in the fleet, have further ramifications on airports' decisions to restrict access to their facilities.

Land Use Controls

Generally, the airport operators lack control over the land surrounding them and depend on local community support and cooperation to implement control measures such as zoning for compatible land uses. In addition, measures such as land acquisition and soundproofing of buildings require substantial financial commitment. Therefore, airports differ in the number and type of measures implemented to control land use.

Atlanta has implemented five of the seven types of measures available to maintain or create compatible land uses around airports (see attachment IV). Baltimore has implemented four, and the other airports have implemented fewer than four each. Several key factors account for the activity at Atlanta and Baltimore. First, local jurisdictions surrounding both airports have been receptive to measures such as land acquisition. And at Baltimore, state legislation requires the airport operator to initiate land use restrictions around the airport. Second, land use compatibility is a high priority at Atlanta, demonstrated by the fact that the airport has committed its airport improvement grants to land acquisition and soundproofing. Finally, at both airports

local jurisdictions have enacted compatible land use zoning and building code provisions for sound insulation of buildings.

In addition to Chicago, Minneapolis has not gained the cooperation from its communities necessary to achieve land-use control. The city of Minneapolis has opposed modifying the existing zoning of fully developed residential areas because of the city's concern that such changes might be disruptive or decrease property values. Although the airport has not acquired land to control noise, its noise compatibility program, if approved by FAA, will allow such land acquisition projects, but only at the initiative of local jurisdictions.

Physical Changes to the Airport

Of the five types of physical modifications airports can make to their facilities, seven of the eight airports we visited have implemented at least one type (see attachment IV). Six airports, including Minneapolis, erected noise barriers or established specific locations for conducting engine run-ups. To decrease aircraft noise over heavily populated areas, Minneapolis also plans to increase its noise reduction effectiveness by extending a runway and moving a runway threshold--the point where the aircraft touch down--to enable aircraft to remain at a higher altitude as they approach the airport. None of the other airports have extended or plan to extend a runway specifically to reduce aircraft noise.

Noise Program Management

Noise program management measures generally focus on formal communications between the airport and surrounding communities and monitoring noise levels. Minneapolis has citizen complaint mechanisms and forums which allow community participation. In addition, Minneapolis conducts airfield and community noise monitoring to assess the effectiveness of its noise mitigation program. Such communications between the airport and its neighbors appeared beneficial to the overall noise mitigation effort.

SEVERAL AIRPORTS ARE CONCERNED ABOUT FAA ASSISTANCE

The primary role FAA plays in helping airports establish their noise mitigation programs is providing technical and financial assistance through the agency's "Part 150 program." The purpose of this program is to encourage airports first to prepare noise exposure maps showing areas of land where uses are incompatible with airport noise and then propose ways to reduce this incompatibility. In return, airports gain access to federal funding specifically earmarked for noise abatement purposes. Of the eight airports in our study, four--Los Angeles, San Francisco, Atlanta and Memphis--had received FAA approval of both their exposure maps and noise compatibility program.

. Between fiscal years 1982 and 1988, the federal airport improvement program provided $177 million for FAA-approved noise

reduction activities to seven of the eight airports in our study. Philadelphia was the only airport that did not receive funding during this period. Of this amount, Minneapolis received $116,000 to supplement the cost for planning a noise compatibility program. All of the airports, except Philadelphia, have received more funding than Minneapolis (see attachment V) because they planned and implemented expensive projects to make the use of land surrounding them more compatible with the aircraft noise they are responsible for. For example, Atlanta and Los Angeles have implemented land acquisition projects and soundproofing of buildings and have received over $116 million and $19 million respectively. Much of the funding was provided under the federal Airport Improvement Program, not through the Part 150 process. The Airport Improvement Program, which is generally used to make capital improvements to airport facilities, is another means by which airports and communities can secure federal assistance.

Several airports questioned the technical assistance they received from FAA as they developed their Part 150 program. Minneapolis officials believed that FAA should have provided better written guidance for developing the noise study by specifying an FAA-approved format, detailing what should be in the program submittal, and clarifying what operational measures were available to the airport for mitigating noise. Baltimore officials thought FAA could have been more actively involved in program development, and Chicago officials believed that FAA should have provided more specific guidance on what kinds of airport use restrictions would

be acceptable to FAA. In addition, officials from three airports were dissatisfied with the length of time--two years in one case--that FAA took to review the airports' proposed programs. Minneapolis, almost two years after submittal, still does not have an approved noise compatibility program. Since they do not have an approved Part 150 program, the airport officials said they do not have this source of funding available for their large-scale, off-airport sound insulation projects.

FAA is aware of these concerns. The agency is currently analyzing public comments it received on the effectiveness of its Part 150 program and expects to share these comments with the public in the near future and then begin determining what changes are appropriate to improve the program. Furthermore, FAA has recently issued internal guidance pertaining to the agency's review of airport-submitted noise compatibility programs. Regions now have primary responsibility for conducting preliminary reviews.

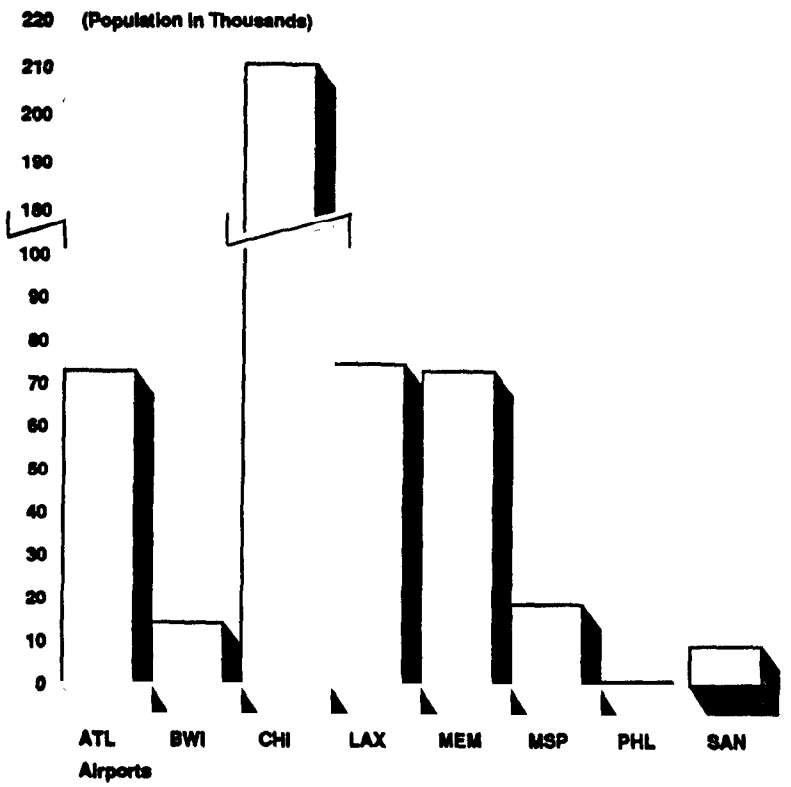
CONCLUSIONS

Minneapolis' noise problems are much like those of other airports, and the airport has taken numerous steps to deal with them. However, activity toward abating noise is not always the same as actually reducing noise or convincing the public that noise levels have fallen. Thus, the nationwide problem of aircraft noise is not likely to be resolved in the near future. Nevertheless, we believe that if successful implementation of noise mitigation

strategies is to occur, it will require a continuing dialogue between all concerned parties and must reflect a balance between the economic necessities of air transportation and the quality of the human environment around an airport.

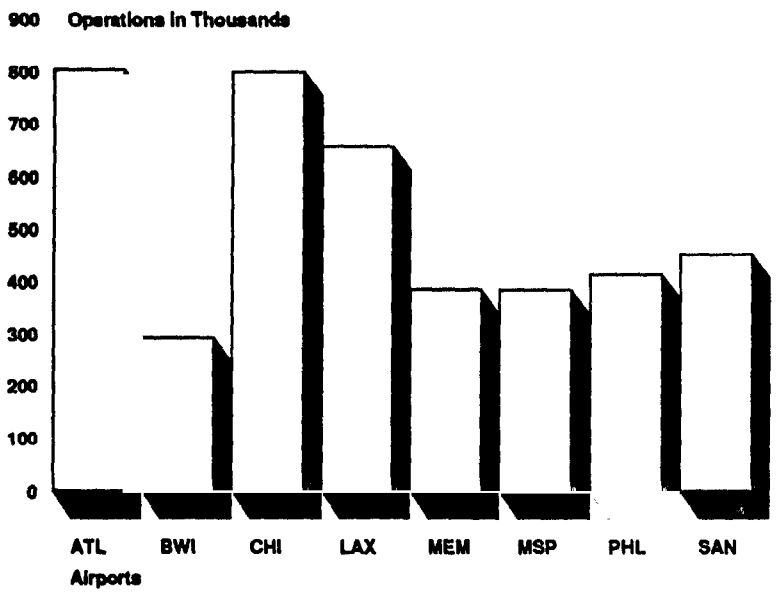
ATTACHMENT I

Population Located in 65 Ldn and Above at Eight Airports



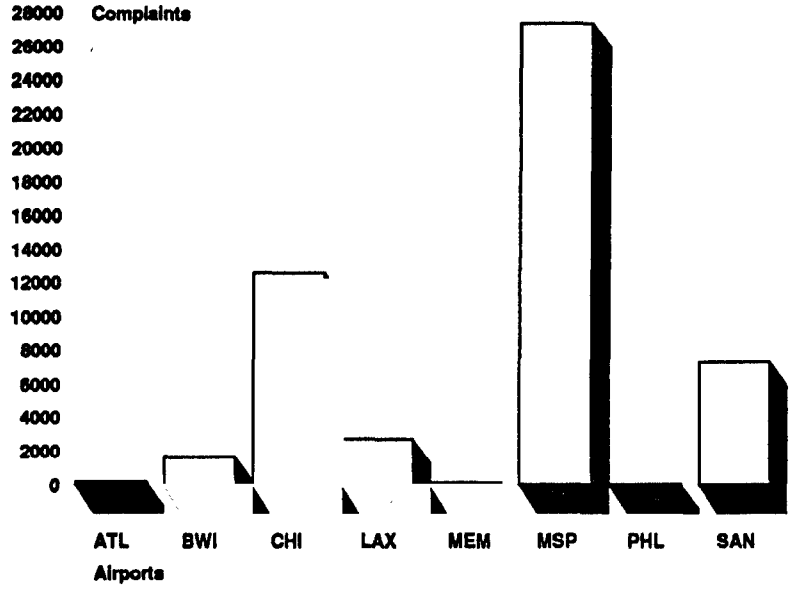
ATTACHMENT II

1987 Total Aircraft Operations for Eight Airports



ATTACHMENT III

Noise Complaints for 1988 at Eight Airports



Note: ALT and MEM received 177 and 112 noise complaints respectively. PHL received less than 25.

ATTACHMENT IV

NOISE MITIGATION ACTIONS IMPLEMENTED (I) OR PLANNED (P) BY EIGHT AIRPORTS

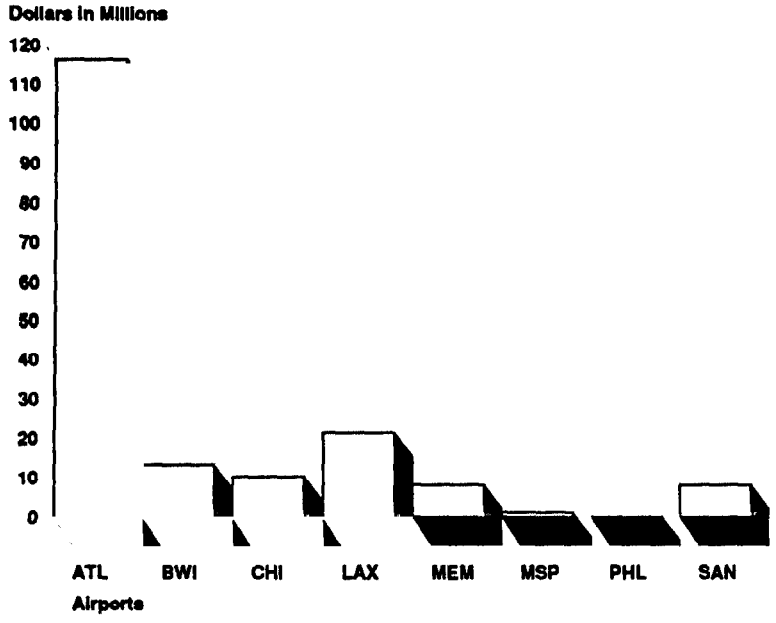
Noise mitigation measure	Airport ATL	BWI	CHI	LAX	MEM	MSP	PHL	SAN
Operational Procedures								
Runway use system	I	I	I	I	I	I	I	I
Preferential flight track	I	I	I	I	I	I	I	I
Restricting ground movement		I		I		I		
Restrictions on engine runups and ground equipment	I	I	I	I	I	I	I	I
Limits on operations/aircraft				I		I		I
Airport use restrictions						I		I
Raise glide slope angle or intercept		I				I	I	
Power/flap management	I	I	I		I	I	I	
Limit use of reverse thrust								
Land Use Controls								
Land or easement acquisition	I	I	P	I	I	P		
Joint airport development								
Compatible use zoning	I	I		I[a]		I[a]		
Building code provisions	I					I[b]		
Sound insulation of buildings	I	I	I	I		I		I
Real property noise notices	I							
Purchase assurance		I				P		
Physical Changes								
Runway alterations						P		
Displaced thresholds						P		I
High speed exit taxiways								
Relocated terminals								
Isolate engine run-ups, noise barriers	I	I	I	I	I	I		
Noise Program Management								
Noise related landing fees								
Noise monitoring		I	I	I		I	P	I
Establish citizen complaint mechanism	I	I	I	I	I	I	P	I
Establish community participation program		I	I	I	I	I	P	I

[a]The communities surrounding these airports have not achieved full compatible use zoning. Some communities have changed zoning laws to recognize the effects of airport noise while others have not.

[b]Three of six communities surrounding the airport have adopted land use plans which address noise related building codes and the other three are developing or considering such plans.

ATTACHMENT V

FAA Airport Improvement Program Funding Obligations for Fiscal Years 1982 Through 1988



Note: MSP received $116,000 and PHL did not receive set-aside funds.