

# TESTIMONY OF DR. STEPHEN HOCKADAY BEFORE THE SUBCOMMITTEE ON AVIATION OF THE HOUSE OF REPRESENTATIVES COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

March 18, 1996

## INTRODUCTION AND SUMMARY

My name is Stephen Hockaday. I am a Professor of Civil and Environmental Engineering at California Polytechnic State University. I received my Ph.D. in Air Transportation from the University of California, Berkeley, with a dissertation on the separation of landing aircraft in instrument weather conditions. I have been active in airport planning and air traffic control for twenty five years. I am a registered professional civil engineer, environmental engineer, and traffic engineer.

I believe that a third air carrier runway at Seattle-Tacoma International Airport ("Sea-Tac") is not a sensible part of the solution to the Puget Sound region's airport capacity needs, and in fact is harmful to the development of a good long-term solution. This belief derives from the following facts:

- The need for a new runway at Sea-Tac airport has been overstated significantly.
- The proposed third runway would have major operational problems which would constrain its effectiveness.
- The proposed third runway would be used only rarely.
- Approval of a third runway would undermine the search for a good long-term solution to regional air transportation capacity needs.

The Port of Seattle is proposing to spend a half billion dollars to construct a third dependent runway at Sea-Tac which it claims it will use approximately 15 percent of the time. When the extent of capacity-limiting weather conditions is accurately calculated and the benefits of existing technology are considered, it appears that there is no need for a third runway at Sea-Tac. Moreover, development of a third runway would undermine the search for a good solution to long-term regional needs for additional air transportation capacity. The search for a such a solution must give proper consideration to the full range of alternatives available (including other alternatives for development of Sea-Tac, use of existing regional airports, development of a small new regional airport, use of other modes of transportation, and system management). The use of scarce national and local resources on a poor short-term fix will harm the region and hurt the development of a good aviation system to serve the state and region in the twenty-first century.

## **I. THE CONSTRUCTION OF A THIRD RUNWAY AT SEA-TAC IS AN ILL-CONCEIVED AND COSTLY PROJECT**

### **A. The Port Has Failed to Demonstrate The Level of Demand That Requires The Construction of a Third Runway**

The Port of Seattle, supported by the FAA, is proposing to construct a third, dependent runway at Sea-Tac. The runway would be located 2,500 feet west of the most distant existing runway. The Port estimates that the runway would cost nearly a half billion dollars(1), which would make it the most expensive runway ever built in the United States.(2)

The Port states that a third runway would be used infrequently: only 12.1 percent of the aircraft arriving to the south and 3.3 percent of the aircraft arriving to the north would use the third runway(3), for a total use of 15.4 percent. The runway would not be used by 85 percent of aircraft operations at Sea-Tac, because pilots would, to the extent possible, avoid using the third runway with its long taxi times and required crossings of two active runways. A closer examination of the Port's assumptions reveals that the proposed new runway would be used for even less than 15.4 percent of aircraft operations.

The Port has stated that "poor weather" conditions occur at Sea-Tac 44 percent of the time(4), that such conditions presently cause significant delays to arriving aircraft;(5), and that projected future growth in the number of aircraft operations and enplaned passengers will cause delays to increase beyond all reasonable bounds.(6)

The Port's calculations of future capacity and projected delays at Sea-Tac in its present configuration are based upon its own definition of "poor weather" conditions which does not match the FAA's definition of capacity limiting weather conditions.(7) Visual flight rules ("VFR") conditions near an airport are defined by FAA to occur when the cloud ceiling is 1,000 feet or more and the visibility is 3 miles. Instrument flight rules ("IFR") conditions

---

1) See U. S. Dep't of Transp., Fed. Aviation Admin. and Port of Seattle, *Final Environmental Impact Statement for Proposed Master Plan Update Development Actions at Seattle-Tacoma International Airport* ("FEIS") at II-43 (Feb. 1996).

2) See Fed. Aviation Admin., *Aviation Capacity Enhancement Plan*, app. D (Nov. 1994).

3) See FEIS at C-48, Table C-20.

4) *Id.* at I-13.

5) *Id.* at I-15 to I-17.

6) *Id.* at I-16 and Tables I-4, I-5.

7) See P and D Aviation, *Airport Master Plan Update For Seattle-Tacoma International Airport, Technical Report No. 4* ("Technical Rep't No. 4") at 2-13, 2-15 (Oct. 1994).

[Page 2]

---

occur when the cloud ceiling is less than 1,000 feet and/or the visibility is less than 3 miles.(8) The Port misuses the term IFR by applying it to weather conditions with cloud ceilings of less than 2,500 feet.(9)

Since the purpose of a third runway is to provide additional arrival capacity in poor weather conditions, the question arises: How much of the time does poor weather occur?

The Port asserts that "poor weather" conditions occur 44 percent of the time According to the Pores Master Plan Technical Report, however, IFR conditions occur only 9.4 percent of the year.(10) This 9.4 percent figure also overestimates the occurrence of IFR conditions, because it is based on 10 summers and 11 winters.(11) When this bias is removed, IFR conditions are found to occur **7.9 percent** of the year.(12) In peak demand periods, poor weather occurs as little as **3 percent** of the time. As a result, delays to aircraft at Sea-Tac are less than those shown in the FEIS.

#### **B. The Port Did not Take Advantage of an LDA Approach to Arrive at the Need for an Additional Runway to Increase Capacity**

Localizer Directional Aid ("LDA") approaches have been operational at Lambert-St. Louis and San Francisco International Airports for several years. Use of an LDA approach permits arrival streams to two runways at lower ceiling and visibility conditions. In St. Louis, the weather a required for such approaches have been set at a 1200 feet ceiling and at 4 miles visibility. The use of an LDA approach at Sea-Tac under similar weather conditions would reduce the amount of time that the Airport is limited to a single arrival stream from 44 percent, as indicated in the FEIS, to approximately 10 percent of the year (or, approximately 4 percent of the time during peak periods).

The Port and the FAA examined the potential for using an LDA approach in the FEIS, and have indicated that the an LDA approach might be used at Sea-Tac.(13) In a separate report, the FAA also stated that an LDA at Sea-Tac would only be used with a minimum ceiling of 2,500 feet, and that an LDA, therefore, would not reduce delays in poor weather

-----  
8) *See, e.g.*, 14 C.F.R. 91.155; U.S. Dep't of Transp., Fed. Aviation Admin., Advisory Circular 150/5060-5, Airport Capacity and Delay at 2 para. 1-3.d(1), (2) (Sept. 1983); Fed. Aviation Admin. Order 7110.65, *Air Traffic Control*.

9) Technical Rep't No. 4 at 2-13.

10) Technical Rep't No. 4 at 2-15.

11) *Id.* at 2-14.

12) Port of Seattle, Sea-Tac Airport Layout Plan (Feb. 1992).

13) *See* FEIS at R-53.

[Page 3]

---

conditions sufficiently to obviate the need for a third runway.(14) In fact use of an LDA approach with a 1,200-foot minimum ceiling -- in accordance with the practice used in St. Louis -- would further reduce delays at Sea-Tac. The adoption of such an approach would eliminate the need for a third runway, and defer the need for additional regional runway capacity to beyond 2020.(15)

## **II. - A THIRD RUNWAY WOULD HAVE MAJOR OPERATIONAL PROBLEMS WHICH WOULD CON STRAIN ITS EFFECTIVENESS**

The use of a third runway would be limited by (a) the constraints imposed on runways which are separated by only 2,500 feet, (b) problems caused by aircraft taxiing across active runways, (c) airspace conflicts with nearby King County International Airport (also known as Boeing Field), and (d) inability to accommodate long-term demand.

### **A. Aircraft Approaching Runways Separated by 2,500 Feet Are Dependent on Each Other**

Under existing FAA Air Traffic Control (ATC) rules, runways separated by less than 3,400 feet are dependent runways, meaning that they do not allow simultaneous arrival streams during IFR weather conditions. A third runway at Sea-Tac would not convey the full benefit of an additional runway because it would be located 2,500 feet from the furthest existing runway, thus requiring staggered arrivals in poor weather conditions -- the only time that the Port plans to use the third runway.

## **B. Aircraft Taxiing to and From the. New Runway Cause Congestion and Safety Problems**

Aircraft using a third runway would have to cross both of the existing runways taxiing to, or from, the terminal building. It is well recognized in the airport planning industry that crossing active runways is a cause of significant congestion and delay, and can result in inadvertent occupancy of active runways. Therefore, it is generally regarded as poor airport planning practice to design an airport in such a way as to require aircraft to cross two active runways.

-----

14) Sarah Dalton, Fed. Aviation Admin., *Delay Benefit Calculation for an LDA Procedure at Seattle-Tacoma International Airport* at 2 (Dec. 21, 1995); *Evaluation of "Implementation of an LDA/DME Approach to Runway 16R in Lieu of a Third Runway at Sea-Tac Airport"* at 3 (Dec. 20, 1995).

15) The Port estimates that approximately 40 percent of the cost of its proposed Sea-Tac expansion project would be financed by federal AIP funds and federally-authorized Passenger Facility Charges. *See P and D Aviation, Airport Master Plan Update For Seattle-Tacoma International Airport, Technical Report No. 8* at 6-10 (Jan. 1996). [Page 4]

---

## **C. Airspace Conflicts With Boeing Field Eliminate Most of the Benefit of a Third Runway**

Conflicts between aircraft using Boeing Field and Sea-Tac eliminate most of the potential benefits of a third runway. Aircraft using the proposed third runway at Sea-Tac in poor weather conditions would conflict with aircraft using Boeing Field and reduce the effectiveness of the new runway at Sea-Tac. Thus, the benefits of the proposed third runway are overstated significantly. - Details of the interaction between aircraft using Boeing Field and those which would use a third runway at Sea-Tac are set forth in a February 1993 letter from the FAA Planning and Capacity Office which accompanied "Impact of Boeing Field Interactions on the Benefits of a Proposed New Runway at Seattle-Tacoma International Airport," a final report prepared for the FAA. The FAA material shows that airspace interactions affecting north and south flow aircraft at Boeing Field and Sea-Tac in both good and poor weather would seriously compromise the effectiveness of any potential third runway.

The FAA materials demonstrate that potential benefits from a third runway have not been confirmed, and that further detailed airspace analysis is needed before it may be asserted with a sufficient degree of confidence that a third runway would produce any benefits. In fact, there is some indication that aircraft operations on a third runway actually could reduce the capacity of Sea-Tac in poor weather conditions.

## **D. A Third Runway Can Not Accommodate Long-Term Regional Demand**

The FEIS states that sometime after 2020, when aircraft operations at Sea-Tac are projected to reach

525,000, there would be arrival delays of more than 13 minutes, even with a new third runway.(16 ) In this situation, congestion and delay at Sea-Tac would exceed the level which the Port has indicated would be "acceptable,"(17) and the Airport would be unable to accommodate regional aviation demand.

Recent data prepared by the Port(18) show that there were 386,536 operations at Sea- Tac in 1995. This number of operations is significantly higher than was projected in the FEIS for 1995. According to the FEIS, this number of operations is not forecast to occur until 2002.(19) If operations at Sea-Tac were to increase at the present level of national aviation growth (i.e., 1.7 percent a year), then there would be 588,000 annual aircraft

-----  
16) FEIS at R-42.

17) U.S. Dep't of Transp., Fed. Aviation Admin. and Port of Seattle, *Draft Environmental Impact Statement for Proposed Master Plan Update Development Actions at Seattle-Tacoma International Airport* ("DEIS") at 11-5 (Apr. 1995).

18) See Port of Seattle, *Compliance Report Prepared for the Puget Sound Regional Council Expert Arbitration Panel on Noise and Demand/System Management in Response to the Preliminary Order on Phase 11 Noise Issues, December 18, 1995*) 1.0 at 3 (Jan. 30, 1996).

19) FEIS at 1-9, Exhibit I-4A.

[Page 5]

---

operations at Sea-Tac in 2020. (See Table I below).

The magnitude of delay at Sea-Tac with 588,000 operations would be significantly higher than the 13 minutes of delay projected in the FEIS and Sea-Tac would be completely unable to accommodate the regional demand, even with a third runway. Under these conditions. Sea-Tac would run out of capacity before 2020 -- prior to the completion of its proposed expansion project -- and the region would need additional runway capacity even with a third runway at Sea-Tac.

If the forecasts in the FEIS are correct, there is no urgency to build a third runway, because it is not needed. If, on the other hand, demand increases faster than forecast, the Puget Sound Region would need more runway capacity than Sea-Tac could provide with a third runway. Consequently, the region needs to move ahead quickly to determine how it plans to meet any additional need. A third runway at Sea-Tac would not be part of a reasonable long-term solution to regional air capacity needs.

TABLE 1

<b>Year/</b>	<b>FEIS Forecast/</b>	<b>Recent Port Data/</b>	<b>Possible Future Traffic Levels**</b>
1993	39,500		339,500
1995		386,000	386,000
2000	379,000		420,000
2010	405,800		497,000
2020	441,600		588,000

\*\* Based on 1.7% growth per year from 1995 (National average growth in 95) [Page 6]

### **III. APPROVAL OF A THIRD RUNWAY WOULD UNDERMINE THE SEARCH FOR A GOOD LONG-TERM SOLUTION TO POTENTIAL FUTURE NEED FOR INCREASED AIR TRANSPORTATION CAPACITY IN THE PUGET SOUND REGION**

The Port recognizes that a third runway is only a short-term fix, and that additional regional air transportation capacity would be needed in the future as demand continues to grow.

The search for a good long-term solution has not been completed, and it appears that involvement by the State of Washington will be required to assure that the needs and concerns of all of the region's residents are addressed. Neither the Port of Seattle, nor the four counties of the Puget Sound region, can be expected to respond to the needs of areas outside their jurisdiction, and to date none of these entities has been willing to address anything other than their own narrow and often short-term interests.

Use of scarce national and local resources on an ineffective, short-term fix will harm the region and undermine the development of a good aviation system to serve the state and region in the twenty-first century. The financial and political resources used to construct the third runway will reduce the availability of those resources to implement a meaningful, long-term regional solution to future air transportation needs. Other low cost alternatives (e.g. an LDA approach) could, if required, achieve most of the benefits of a third runway without using these resources.