Exemption No. 8590

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056

In the matter of the petition of

THE BOEING COMPANY

for an exemption from §§ 25.807(c) and 25.857(e) of Title 14, Code of Federal Regulations

Regulatory Docket No. FAA-2004-18657

GRANT OF EXEMPTION

By letter dated September 13, 2004, D. B. Marcrander, Manager, Everett Airplane Certification, Production and Technical Services, The Boeing Company, PO Box 3707, Seattle, Washington, petitioned for an exemption from §§ 25.807(c) and 25.857(e) of Title 14, Code of Federal Regulations (14 CFR). The proposed exemption, if granted, would permit carriage of 20 non-crewmembers (commonly referred to as supernumeraries) located aft of the flightdeck on Boeing Model 747-400 airplanes, which have been converted from a passenger to a freighter configuration. By letters dated December 3, 2004, and March 3, 2005, T. P. Dowling, Manager, Everett Airplane Certification, Production and Technical Services, The Boeing Company, PO Box 3707, Seattle, Washington, provided additional clarification to the Boeing petition concerning the total number of supernumeraries on the airplane, determined to be 20, and the intent not to require a flight attendant for the operations of these airplanes.

ANM-04-673-E

The petitioner requests relief from the following regulations:

Section 25.807(c), at Amendment 25-55, requires, in pertinent part, that for passenger seating capacity of 20 through 39, the airplane be equipped with two pairs of exits. One pair must be at least the size of a Type II exit and the other pair must be at least the size of a Type III exit.

Section 25.857(e), at Amendment 25-93 requires, in pertinent part, that when a Class E cargo compartment is installed on the airplane, the airplane is used for carriage of cargo only.

Related sections of the regulations:

Section 121.583(a) contains, in pertinent part, a listing of categories of persons who may be carried aboard an airplane in part 121 service without complying with all the requirements of part 121 pertaining to carriage of passengers.

The petitioner's supportive information is as follows:

As provided in 14 CFR 11.61, Boeing hereby petitions for exemption from §§ 25.807(c), Amendment 25-55, and 25.857(e), Amendment 25-93, and to allow operators of the Boeing Model 747-400 passenger airplanes converted into freighter airplanes to carry up to 20 supernumeraries in addition to the 4 flightcrew members (2 on-duty flightcrew members and 2 off-duty flightcrew members). Exemption from § 25.807(c) is necessary because, when the upper deck of the 747-400 passenger airplane is converted into a freighter airplane, the upper deck retains the existing pair of Type A sized doors with dual lane escape slides from the 747-400 passenger airplane. For passenger seating configurations with between 20 and 39 seats, § 25.807(c) requires one Type II and one Type III exit on each side of the fuselage. Exemption from § 25.857(e) is necessary because the regulation precludes the carriage of persons other than crewmembers on airplanes with a Class E cargo compartment. The exemption will allow for the accommodation of supernumeraries on the upper deck of the airplane, while maintaining the Class E cargo compartment on the main deck of the airplane.

The Airplane Flight Manual (AFM) will limit the carriage of supernumeraries to persons as defined in § 121.583(a)(1) through (7). The AFM will be revised to permit carriage of supernumeraries on the upper deck as defined in § 121.583(a)(1) through (7). This limitation shall include the requirement for the operator to ensure that the requirements of § 121.583(b) through (d) are met.

<u>"Petitioner Interest</u>

"The interest of the petitioner is in providing a level of safety for the airplane and its cargo such that cargo operators are not constrained from transporting cargoes that require additional personnel for on-site cargo management and care. Also, that cargo operators do not incur additional costs associated with having cargo

handling and management personnel taking separate commercial flights to reach a cargo destination. The surest, most cost-effective way to transport such personnel is aboard the particular cargo flight they are to support.

"Justification for Request:

"A. Rationale

"Section 121.583 allows for carriage of persons who are not classified as passengers (e.g., supernumeraries), and allows for relief from other Part 121 regulations associated with carriage of passengers. Section 121.583 clearly identifies the need and rationale for carriage of such persons, as related to duties associated with management of certain type or categories of cargo. Approval for supernumerary carriage will ensure that operators of the 747-400 passenger airplanes converted to freighter airplanes realize greater flexibility and utility with the ability to carry cargo that requires the presence of the supernumeraries.

"B. Public Interest

"The demand for shipment of goods by air cargo continues to grow worldwide. The 747-400 passenger airplane to freighter airplane modification is being done to support this increasing demand in a manner that is very economical to air cargo operators. The modified 747-400 configuration provides additional upper deck cabin seating for supernumeraries (who must meet the criteria defined in § 121.583(a)(1) through (a)(7)). Having necessary supernumeraries immediately available for cargo handling and management reduces operational costs by not having supernumeraries take separate commercial flights to the cargo destination, which also reduces the turn-around time for the cargo carrier. This services the overall public interest by virtue of the net cost savings for cargo shipment, resulting in lower costs for goods and material transported as air cargo, as ultimately reflected in lower consumer costs for goods transported as air cargo.

"C. Safety

"Safety is the primary concern associated with the overall conversion from the 747-400 passenger configuration to the freighter configuration. All safety requirements of the changes airplane will be complied with as defined in the airplane's Type Certificate Data Sheet (TCDS), A20WE, and as modified in accordance with the Changed Product Rule (via AC 21.101-1).

"D. Adverse Effects

"The exemption is to allow for the carriage of supernumeraries in a quantity necessary to monitor or attend to cargo where additional persons are necessary to ensure safe loading/unloading or other special handling. Because of the level of safety provided by 14 CFR part 25, and the requirements placed on the carriage on supernumeraries (non-passengers) by § 121.583, there are no apparent adverse effects.

"E. Equivalent Level of Safety

"All required safety systems and the design intent of the emergency systems of the converted airplane upper deck are unchanged from those on the upper deck of the 747-400 passenger airplane. The design of the converted airplane upper deck is such that the supernumerary area of the upper deck will have equivalent protection from hazardous quantities of smoke, flames, or noxious gases as the flightcrew compartment (as required by § 25.857(e)(4)), and will also meet the intent of Special Conditions 25-71-NW-3, Condition 3(a)(8). The intent of Condition 3(a)(8) is met on the converted airplane by virtue of the upper deck ladder enclosure in the upper cabin that incorporates seals and a sealed ladder access door. The ladder access door is completely closed during taxi, takeoff, flight, and landing (as will be also stipulated in the modified airplanes' AFM), and thus provides the means to retard the propagation of fire and the transmission of smoke from the main deck to the upper deck. The modified 747-400 airplane will comply with the requirements of § 25.857(e)(2), (3), and (4) with respect to cargo fire protection.

"Section 25.807(c)(1), Amendment 25-55, indicates the need for one Type II and one Type III emergency exit on each side of the fuselage for passenger seating configurations with between 20 and 39 passenger seats. The converted airplane upper deck will have a pair of Type A sized doors with dual lane escape slides that provide excess escape & evacuation means for 20 supernumeraries and up to 4 Flightcrew members. These existing Type A sized doors provide an equivalent level of safety by being significantly oversized (42" x 72") compared to the two much smaller Type II and Type III exits required by § 25.807(c)(1). Furthermore, the converted 747-400 airplane will maintain an upper deck configuration that also maintains compliance with Conditions 1, 2, 4, 5, and 6 of 747 Special Conditions 25-71-NW-3, 'Occupancy not to exceed 45 passengers on the upper deck of airplanes with straight segmented stairways' (and as later revised to increase the allowable upper deck passenger count to 110).

"Additional Equivalent Level of Safety Elements:

"1. Emergency Equipment

"All required upper deck emergency equipment is salvaged from the pre-modification passenger configuration.

"2. Emergency Egress

"Both existing Type A sized doors and escape slides are retained on the upper deck. For an upper deck that is configured for 20 supernumeraries, three 10-person life rafts, designed to be deployed from the upper deck, are installed in the upper deck cabin.

"3. Emergency Lighting System

"All required upper deck emergency lighting systems are retained. The floor-mounted escape path lighting is deleted, as allowed by § 121.583.

"4. Flightdeck Communications

"The flightdeck public address system to the upper deck seating area is installed if no flightdeck door is installed. This is an identical configuration to that of the production 747-400F airplane. If a customer retains or desires a flightdeck door, the two-way flightdeck/cabin intercom system is retained from the original passenger cabin configuration.

"F. AFM

"The AFM will be revised to permit carriage of supernumeraries on the upper deck as defined in § 121.583(a)(1) through (7). This limitation shall include the requirement for the operator to ensure that the requirements of § 121.583(b) through (d) are met. The operator must instruct supernumeraries in the autonomous use of the cabin communications system and emergency equipment (e.g., oxygen, upper deck firefighting equipment, emergency lighting and escape & evacuation systems).

"G. FAA-Approved Training Plan

"The operator will be required to develop a FAA-approved training plan that satisfies the AFM requirements for carriage of supernumeraries.

"H. Requirement for Flight Attendants

"The 747-400 TCDS requires at least one flight attendant to occupy the upper deck cabin during taxi, takeoff, and landing, when passengers occupy the upper deck. Because the converted 747-400 airplane configuration will operate in compliance with § 121.583(a) (which excludes compliance with § 121.391), a flight attendant is not required in the upper deck cabin of the converted 747-400 airplane. In addition, Boeing notes at least one other granted exemption for carriage of supernumeraries on 747 freighter airplanes (Instone Air Services Exemption 7900, as approved by the FAA Transport Airplane Directorate in Renton, Washington) which not only has no requirements for flight attendant(s), but also allows a greater number of supernumeraries (up to 28) located in the aft area of the main deck of a 747 freighter airplane. In comparison with Exemption 7900, Boeing maintains that the Boeing converted 747-400 airplane configuration with fewer supernumeraries (20) located immediately aft of the flightdeck also demonstrates no requirement for carriage of flight attendant(s).

"If a customer of a converted 747-400 airplane requests provisions for a flight attendant in the upper deck cabin, Boeing will provide appropriate related accommodations and systems in addition to the baseline 747-400 conversion changes."

A summary of the petitioner's request for exemption was published in the Federal Register on November 22, 2004 (69 FR 68001). No comments were received.

The FAA's analysis/summary is as follows:

The FAA considers the petitioner's proposal to be in the public interest for the same reasons as those previously stated by the petitioner.

The certification regulations for transport category airplanes address airplane occupants as being either "crew" or "passengers." Due to differences in training, physical capabilities, and other factors (such as familiarity with the airplane), the means required by part 25 to address emergency evacuation and emergency equipment differ for passengers and crewmembers.

Because supernumeraries are not crewmembers, with respect to part 25, they must be considered "passengers" by default. However, supernumeraries do hold a special status because of their training and other factors. The FAA, therefore, has granted certain exemptions to allow the carriage of supernumeraries on cargo airplanes without compliance with all of the part 25 standards for passengers, provided that certain other conditions are met. Those conditions have varied depending on the airplane design, the nature of the proposal under consideration, and the number and location of persons to be carried.

The petitioner has requested relief from the requirements of § 25.857(e), which permits carriage of only cargo when a Class E cargo compartment is installed on the airplane. Class E cargo compartments are usually remote from the flightdeck and encompass the entire interior of the airplane. The means of controlling fires that might occur in the cargo compartment is to starve the fire of oxygen. This is accomplished by depressurizing the airplane and maintaining an altitude that will not support combustion. For this reason, only crewmembers are permitted on board such airplanes. The supernumeraries will be located just aft of the flightdeck.

The FAA has determined that, due to the way that fire in the cargo compartment is to be controlled, supernumeraries on board the airplane must have been found physically fit by the operator. The supernumeraries must also have been briefed on the use of emergency equipment. These limitations are consistent with previous approvals and will be included in this approval. Also, there must be suitable means of preventing smoke penetration into occupied areas. The petitioner's design accounts for this by providing a barrier, consisting of a smoke barrier for the supernumeraries located aft of the flightdeck, which must comply with the smoke penetration requirements.

The petitioner has requested relief from the requirements of § 25.807(c), which requires, in pertinent part, that for passenger seating capacity of 20 through 39 the airplane be equipped with two pairs of exits. One pair must be at least the size of a Type II exit and the other pair must be at least the size of a Type III exit. The petition contends that consideration should be given to the exit size when determining allowable passenger seating capacities.

Although Boeing presented sound arguments in its petition regarding exit capacity, it did not account for the system redundancy, which is reflected in § 25.807(c)(1). The exit table in § 25.807(c)(1) prescribes a lower passenger credit for a single pair of exits than it does when that pair of exits is backed up by additional exits in the cabin. The reason is that if one side of the airplane was blocked by fire, there would only be a single escape exit on the other side. For example, one pair of Type III exits accommodates 19 passengers, but when there is more than one pair of exits per side, as going from 139 to 179 passengers, an additional pair of Type III exits may accommodate 40 passengers. In the past, when the exits are larger that the Type III exits, the FAA has granted greater passenger capacities for a single pair of exit configurations. For the airplane in question the exit is floor level and much wider and taller than Type III exits. Therefore, the FAA will grant that exemption as requested.

Boeing also requests relief from the 747-400 TCDS, which requires at least one flight attendant to occupy the upper deck cabin during taxi, takeoff, and landing, when passengers occupy the upper deck. The FAA does not agree with all of Boeing's arguments concerning the rationale for not requiring a flight attendant on the upper deck of the converted airplane. The FAA does not agree that

operating the airplane in compliance with § 121.583(a) takes precedence over the TCDS requirement for a flight attendant on the upper deck when passengers occupy that area. Also, the FAA does not agree with Boeing's assertion that because Exemption No. 7900 does not include a flight attendant requirement this exemption should not include a flight attendant requirement. Exemption No. 7900 is applicable to Boeing Model 747-100 and -200 series airplanes. This exemption is applicable to Boeing Model 747-400 series airplanes. Also, the airplane configurations are different. The Boeing Model 747-100 and -200 series airplanes have occupants located on the main deck and the door 3 overwing exits are deactivated. The TCDS only requires a flight attendant at each door 3 overwing exit when those exits are activated. Since these exits are deactivated flight attendants are not required. In contrast, the Boeing Model 747-400 series airplanes will have occupants on the upper deck. When passengers occupy the upper deck of a Boeing Model 747-400 series airplane the TCDS requires the presence of a flight attendant. The FAA does agree that trained supernumeraries provide for an equivalent level of safety.

In consideration of the foregoing, I find that a grant of exemption is in the public interest and will not affect the level of safety provided by the regulations. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 40113 and 44701, delegated to me by the Administrator, The Boeing Company, is hereby granted an exemption from §§ 25.807(c) Amendment 25-55, and 25.857(e) Amendment 25-93. The petition is granted to the extent required to permit type certification of Boeing Model 747-400 airplanes, which have been converted from a passenger to a freighter configuration, with provisions for the carriage of supernumeraries. The following limitations apply and these limitations must be documented in the Limitations Section of the AFM:

1. A maximum of 20 supernumeraries may occupy the area just aft of the flightdeck. The total maximum occupancy of the airplane is limited to 24 persons, including the flightcrew (2 on-duty flightcrew members and 2 off-duty flightcrew members).

2. Supernumeraries are limited to the categories specified in § 121.583(a)(1) through (a)(7).

3. Prior to each flight, a flightcrew member must brief each supernumerary on the use of the exits, including instructions to inspect the ground to determine whether a safe landing can be achieved before using an assist means and emergency equipment.

4. The operator must determine that each supernumerary is physically able to accomplish the necessary emergency procedures.

5. Supernumeraries are prohibited from being in the cargo area below the smoke barrier during taxi, takeoff, landing, and flight. The preflight briefing must inform supernumeraries of this requirement.

Issued in Renton, Washington, on July 27, 2005.

/S/ Ali Bahrami
Ali Bahrami
Manager, Transport Airplane Directorate
Aircraft Certification Service