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FEB - 8 2008

BDCO-08-00494

Mr. Phillip L. Forde
Acting Manager, ANM-100S
Department of Transportation
Federal Aviation Administration
Seattle Aircraft Certification Office
1601 Lind Avenue SW
Renton, WA 98057-3356



Dear Mr. Forde:

Subject: Petition for Exemption from 14 CFR Sections 25.807(c)(1), 25.807(c)(5), 25.807(d)(1), 25.809(f)(1), 25.813(b), 25.785(d) and 25.1447(c)(1), at Amendment 25-67 and from 14 CFR 25.857(e) at Amendment 25-117, to Allow Carriage of up to 6 Supernumeraries and Access into the Main Deck Cargo Compartment during Flight of the 747-8 Freighter Airplane While Maintaining a Class E Cargo Compartment 747-8F

Model: 747-8F

BDCO Project No.: PS05-0212

EASA Project No.: P.EASA.IM.A.164

EASA Level: N/A

Branch/Panel No.: ANM-150S & ANM-113

Branch/Panel Name: Cabin Safety & TAD

Response Due: May 30, 2008

Reference(s): Exemptions No. 4808A, 5717, 5993A, 7469, 7965, 8057, 8136, 8248, 8258, 8335A, 8350A, 8536, 8536A, 8587, and 8625

Special Instructions: N/A

(X) Petition for an Exemption

Boeing requests FAA-OMT to submit the enclosed petition for exemption to the federal docket for approval.

This letter is being sent for:

(X) Regulatory Review/Approval/Coordination

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Mr. Forde
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Please contact this office or the following individuals if you have further questions:

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Very truly yours,

A handwritten signature in cursive script, appearing to read 'D. B. Marcrande For'.

D. B. Marcrande
Lead Project Administrator, Puget Sound
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cc

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By BDCO FY

BCA Sign Off Sheet	
BDCO-08-00494	File No.: N/A
Subject: Petition for Exemption from 14 CFR Sections 25.807(c)(1), 25.807(c)(5), 25.807(d)(1), 25.809(f)(1), 25.813(b), 25.785(d) and 25.1447(c)(1), at Amendment 25-67 and from 14 CFR 25.857(e) at Amendment 25-117, to Allow Carriage of up to 6 Supernumeraries...	A/P Model (s): 747-8F
	8100-9/8110-3s Enclosed: No
	ITAR/EAR No
	Response Due: May 30, 2008
	BDCO Project No.: PS05-0212
	EASA Project No.: P.EASA.IM.A.164
	Branch/Panel No.: ANM-150S & ANM-113
	Branch/Panel Name: Cabin Safety & TAD
	Project Administrator (PA): Dan Lynch
	TS Project No.: N/A
	C/S Reference(s): E-MDGP-08-001
	C/S Date: 1/30/08
	C/S Rev'd Date: 1/30/08
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Date Rtnd to Cert	Previous Date Stamp	Revision Record

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Approved By	Signature /Date	Approved By	Signature /Date
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Petition for Exemption from 14 CFR Sections 25.807(c)(1), 25.807(c)(5), 25.807(d)(1), 25.809(f)(1), 25.813(b), 25.785(d) and 25.1447(c)(1), at Amendment 25-67 and from 14 CFR 25.857(e) at Amendment 25-117, to Allow Carriage of up to 6 Supernumeraries and Access into the Main Deck Cargo Compartment during Flight of the 747-8 Freighter Airplane While Maintaining a Class E Cargo Compartment

As provided for in 14 CFR 11.61(b), Boeing hereby petitions for exemption from 14 CFR 25.807(c)(1), 25.807(c)(5), 25.807(d)(1), 25.809(f)(1), 25.813(b), 25.785(d) and 25.1447(c)(1), at Amendment 25-67 and from 14 CFR 25.857(e) at Amendment 25-117. A grant of exemption will allow operators of the 747-8F to carry up to six (6) non-crew members, commonly referred to as supernumeraries, and to allow them access into the main deck cargo compartment during flight for the purpose of caring for, and/or inspecting cargo.

Exemption from 14 CFR 25.857(e) is necessary because the regulation precludes the carriage of persons other than crew on airplanes with a Class E cargo compartment. Exemption from 14 CFR 25.807(c)(1) and 25.807(d)(1) is necessary because a pair of passenger emergency exits is not being provided in the sides of the fuselage. Exemption from 14 CFR 25.807(c)(5) is necessary because the overhead emergency hatch on the flight deck does not meet the minimum dimensions for a Type III emergency exit. Exemption from 14 CFR 25.809(f)(1) is necessary because the inertia reel descent devices being provided for supernumerary use out the crew service door do not satisfy the requirements for passenger-use assist means. Exemption from 14 CFR 25.813(b) is necessary because a flight attendant assist space is not being provided at the crew service door. Exemption from 14 CFR 25.785(d) is necessary because firm handholds are not available inside the main deck cargo compartment. Lastly, exemption from 14 CFR 25.1447(c)(1) is necessary because automatically dispensing oxygen units are not available inside the main deck cargo compartment.

The exemption, if granted, will allow for carriage of supernumeraries and access into the main deck cargo compartment during flight. Access is necessary for safe transportation of certain live animals such as horses and is also required for inspection of other cargos such as hazardous materials (ref. 14 CFR 175.75(d)).

The types of persons allowed to be carried on the 747-8F will be limited by the Airplane Flight Manual (AFM) to those defined in 14 CFR 121.583(a)(1) through (a)(7).

Boeing requests relief from the following regulations:

Section 25.857(e), at Amendment 25-117, limits a Class E cargo compartment to airplanes used only for the carriage of cargo. Exemption from 14 CFR 25.857(e) is necessary because supernumerary carriage is being requested on an airplane with a Class E cargo compartment. It should be noted that exemption from the requirements of sections 25.857(e)(2) through (e)(5) is not being requested.

Section 25.807(c)(1), at Amendment 25-67, requires that a pair of passenger emergency exits be provided in the sides of the fuselage for passenger seating configurations of between one (1) and nine (9) passengers, inclusive. The overhead hatch on the flight deck is not

considered to be in the side of the fuselage nor does it meet the necessary standards to qualify as a passenger emergency exit.

Section 25.807(c)(5), at Amendment 25-67, requires that at least a pair of Type III emergency exits be provided if Type IV exits are specified and they cannot be located over the wing. The flight deck overhead hatch does not meet the minimum dimensional requirements of a Type III exit.

Section 25.807(d)(1), at Amendment 25-67, requires that a pair of ditching emergency exits be provided above the waterline in the sides of the fuselage for passenger seating configurations of nine (9) seats or less, excluding pilots seats. The overhead hatch on the flight deck is not considered to be in the side of the fuselage nor does it meet the minimum dimensions of a Type IV exit.

Section 25.809(f)(1), at Amendment 25-67, requires that a self-supporting escape slide or equivalent be provided as the assist means at passenger emergency exits that are more than six (6) feet from the ground with all landing gear extended. Inertia reel descent devices are provided for supernumerary use out of the crew service door. Descent devices do not meet the standards for passenger use.

At customer option, some 747-8F airplanes will be equipped with a crew service door escape slide. As such, there are certain other requirements contained in 14 CFR 25.809(f)(1) from which relief is also being requested, namely, automatic deployment of the escape slide and usability under certain landing gear collapse conditions. (These same requirements for the crew service door escape slide are exempted on the Model 747-400F by Exemption No.1870E.)

Section 25.813(b), at Amendment 25-67, requires that an assist space be provided for each passenger emergency exit covered by 14 CFR 25.809(f), which includes the crew service door. Exemption from 14 CFR 25.813(b) is necessary because an assist space is not being provided based on the limited number of supernumeraries being carried, on the level of training the supernumeraries receive being greater than that passengers receive and on the ratio of crewmembers to supernumeraries (2:6) being much greater than that of passenger airplanes (minimum 1:50).

Section 25.785(d), at Amendment 25-67, requires that firm handholds be provided for non-seated airplane occupants to safely move about the cabin in moderately rough air. Exemption from 14 CFR 25.785(d) is necessary because such handholds are not available inside the main deck cargo compartment and access inside the compartment during flight is being requested.

Section 25.1447(c)(1), at Amendment 25-67, requires, in part, automatically dispensing oxygen units for each occupant in airplanes certified for operation above 30,000 feet. Exemption from 14 CFR 25.1447(c)(1) is necessary because automatically dispensing oxygen units are not provided inside the main deck cargo compartment and access inside the compartment during flight is being requested.

Related sections of the regulations:

14 CFR 121.583(a) contains, in pertinent part, a listing of categories of persons who may be carried onboard an airplane in 14 CFR Part 121 service without complying with all the passenger-carrying requirements of Part 121. Approval is being requested to carry those persons meeting the requirements of Section 121.583(a)(1) through (a)(7).

Supporting Information:

The Model 747-8F is a derivative aircraft based on the Model 747-400F. Relative to the 747-400F, the 747-8F is 220 inches longer and like the 747-400F, the 747-8F includes a Class E main deck cargo compartment and an upper deck seating area for supernumerary carriage. This exemption, if granted, will allow the carriage of up to six (6) supernumeraries on the 747-8F and will allow their access into the main deck cargo compartment during flight to care for and/or inspect certain cargos that require such care/inspection.

Relative to the carriage of supernumeraries, it should be noted that the 747-400F is approved by exemption to carry up to six (6) supernumeraries (ref. Exemption No. 1870E), the same carriage capability being requested in this petition for the 747-8F. The regulations listed above from which relief is being requested are essentially the same as that granted in No. 1870E, except that 14 CFR 25.857(e) was not included in Exemption 1870E because relief from this regulation was not recognized when the petition was submitted.

Relative to the 747-400F, the 747-8F emergency exits and escape means are identical except that the escape slide installation at the crew service door on the 747-8F will be a customer option. All 747-8F airplanes will include eight (8) inertia reel descent devices located on the flight deck, one for each airplane occupant to use from the crew service door or from the flight deck overhead hatch. It should be noted that the AFM will limit the airplane to eight (8) occupants, same as the 747-400F and its predecessors. Additionally, there are six (6) harnesses installed in the 747-8F supernumerary seating area (same as the 747-400F), one for each supernumerary to don and connect to their descent device before evacuating the airplane.

Petitioner Interest:

The petitioner strives to provide acceptable safety conditions such that 747-8F cargo operators can safely carry cargo requiring supernumerary personnel care and inspection. The surest, safest and most cost effective manner of transporting cargo that requires in-flight care and inspection is to also carry related personnel aboard the cargo flight. Accordingly, 747-8F operators can avoid the burden and additional cost of transporting its personnel separately (via commercial flights) to the cargo destination they are intended to support.

Rationale

14 CFR 121.583 lists the types of persons that can be carried without compliance with the passenger-carrying requirements of Part 121. Section 121.583 clearly identifies the need and rationale for carriage of such persons, as related to duties associated with management of

certain types or categories of cargo. A Grant of Exemption allowing supernumerary carriage and main deck access during flight will ensure that operators of 747-8F airplanes realize greater flexibility and utility with their ability to economically carry certain cargo types that require the presence and care of supernumeraries.

Public Interest

The public interest will be advanced by the grant of this petition since the marketability of cargo airplanes is enhanced by the allowance of Class E main deck cargo compartment access, and the sale of cargo airplanes contributes to the competitiveness of Boeing airplanes in the global market. Sales of airplanes contribute to the balance-of-trade, the gross domestic product and economic health of the United States. The level of safety is not compromised in comparison to similar existing freighter airplane designs, which are certified for main deck access to Class E main deck cargo compartments, and the airplane will not carry passengers. These are all in the public interest and the design proposed in combination with this petition maintains an acceptable level of safety.

The worldwide demand for shipment of goods by air cargo continues to grow. The configuration of the 747-8F is intended to help meet this demand as economically as possible while providing appropriate safety features. Having the required supernumeraries on board and available for cargo management will help operators control operational costs, avoiding the need to transport cargo management personnel separately via commercial flights. Additionally, the cargo operator can expect to reduce its airplane turn-around time, a feature which supports the public's interest by virtue of lower consumer costs for air cargo shipment.

In addition, supernumerary use of inertia reel descent devices as the primary assist means from the crew service door will also translate into operational cost savings. The primary means of savings is likely to be realized in reduced costs due to the avoidance of on-going maintenance costs associated with the escape slide, reduced airplane operating costs by virtue of the fuel savings associated with the avoided weight of the escape slide, and reduced maintenance costs associated with inadvertent escape slide deployments, which are costly and have been known to cause damage to aircraft and/or injury to personnel.

Safety:

All applicable safety requirements of the 747-8F will be complied with as defined in the airplane's Type Certification Data Sheet and as modified in accordance with the Changed Product Rule (ref AC 21.101-1) for a passenger airplane with nine (9) passengers or less. For the regulations from which relief is being requested, an acceptable level of safety is being provided as justified below.

Justification for Exemption:

As required by 14 CFR 11.81(e), justification for the exemption from the 14 CFR Part 25 paragraphs listed above is based on the passenger cabin configuration meeting all other

required emergency egress and safety requirements for a passenger airplane with nine (9) passenger seats or less:

The 747-8F is equipped with an upper deck floor-level passenger emergency exit on the RH side of the airplane meeting the minimum size requirements of a Type I exit (24" x 48"). Even though the interior configuration for the maximum number of persons being carried requires a pair of Type III-sized exits, the floor-level emergency exit being provided on the RH side of the airplane is over-sized and floor-level. The door can be opened from both the inside and outside of the airplane, and is identifiable from the exterior of the airplane as an emergency exit by its required contrasting door band.

The 747-8F is also equipped with an overhead hatch on the flight deck allowing egress down either the LH or the RH side of the airplane. The overhead hatch meets the requirements of 14 CFR 25.805 for a flight crew emergency exit. In addition, a total of eight (8) inertia reel descent devices are installed on the flight deck in compliance with the flight crew assist means requirements of 14 CFR 25.809(f)(2). Inertia reels have been demonstrated to be safely used by able-bodied individuals and have also been demonstrated to be very effective in safely lowering an incapacitated individual to the ground.

The crew service door escape slide that is installed on all 747-400F airplanes by exemption is the same escape slide that will be installed by customer option on some 747-8F airplanes. The escape slide does not automatically deploy and it is also not of sufficient length to be self-supporting on the ground when either airplane is resting back on its tail as a result of losing both body gear and when the airplane C.G. is aft of the wing gear. However, an acceptable level of safety is provided because the flight deck inertia reel descent devices are of sufficient length to provide safe evacuation to the ground in this extreme airplane attitude, from either the overhead hatch or from the crew service door. Exemption 1870E allows carriage of supernumeraries on the 747-400F in recognition of the fact that the crew service door escape slide does not automatically deploy and is not usable in this tail down airplane attitude. This petition requests the same relief for the (same) escape slide when installed on the 747-8F.

Regarding supernumerary use of inertia reels descent devices out of the crew service door, such devices have been satisfactorily demonstrated and have been FAA-approved to provide an equivalent level of safety as the primary assist means for the limited number and types of individuals to be carried. The evacuation capability and capacity of descent devices being used by supernumeraries through a floor-level exit was satisfactorily demonstrated during the Boeing 767-300F and 757-200PF programs. In both cases, the FAA approved carriage of up to seven (7) occupants using inertia reel descent devices at simplified forward entry doors. Exemptions No. 5993A and 4808B provide the regulatory approval for the Models 767-300F and 757-200PF, respectively.

Additionally, as discussed below, the FAA has approved several exemptions for other applicants allowing the removal of upper deck escape slides on 747 Freighter airplanes without reducing the number of supernumeraries allowed onboard. In these cases, the supernumeraries evacuate the airplane using inertia reel descent devices from floor level exits located on the 747 upper deck, as is being requested in this petition for the 747-8F. The

approvals being referenced currently allow up to twenty-two (22) supernumeraries in 747 Freighter airplanes with inertia reel descent devices as their primary assist means.

Under the requirements of Exemption 1870E, the individuals allowed onboard the 747-400F as supernumeraries must be those that have been found by the operator to have a demonstrated physical ability to use inertia reel descent devices. Such individuals also require instruction by the operator on a pre-flight basis in the use of inertia reel descent devices and other emergency equipment onboard the airplane. These same requirements will apply to the 747-8F as well.

The FAA has approved a number of exemptions for various applicants in which the escape slides were allowed to be removed on 747 Freighter airplanes without reducing the number of onboard supernumeraries. Of particular interest are Exemptions No. 8536 and 8536A, both granted to Evergreen International Airlines. In Exemption No. 8536, the FAA approved removal of the crew service door escape slide on Model 747-100 and -200 passenger airplanes converted to all-cargo airplanes, on Model 747-200C airplanes and on Model 747-200F airplanes when configured in an all-cargo main deck arrangement and when also configured with a single upper deck door. From the standpoint of emergency exits and assist means being provided, the configuration of the airplane models listed above is identical to that of the 747-8F.

Of further interest is the granting of Exemption No. 8536A, wherein the FAA extended approval of removing escape slides on in-service 747 Freighter airplanes to the removal of both escape slides of an upper deck exit pair. The significance of this Grant of Exemption relative to this request is that the FAA approved the removal of the upper deck escape slides for up to twenty-two (22) supernumeraries, in essence stating that inertia reel descent devices provide an equivalent level of safety as escape slides for up to twenty-two (22) supernumeraries. By comparison, Boeing is requesting approval for only six (6) supernumeraries on the 747-8F, a significantly lesser number.

In support of this request, Boeing quotes from the FAA analysis in Exemption No. 8536 in which the FAA states:

The FAA recognizes that supernumerary occupants, as opposed to passengers, may be selected and trained appropriately in the use of inertia reels and harnesses. For such occupants, both ambulatory and incapacitated, the FAA considers that inertia reels and harnesses offer an acceptable escape means of emergency egress. The FAA concludes, provided certain conditions defined below are observed, that inertia reels and harnesses for a limited application of this nature can provide an equivalent level of safety to that provided by escape slides.

Another exemption of interest providing further justification for approving this request is Exemption No. 8587, issued to Israel Aircraft Industries (IAI), Ltd. on November 3, 2005 for its 747-400 passenger airplane conversions to an all-cargo main deck configuration. This exemption allows carriage of up to eight (8) supernumeraries and, in part, also allows removal of both upper deck escape slides provided that eight (8) descent devices are installed for

supernumerary use out of the upper deck doors. Although the petitioner did not remove the escape slides at that time (to install descent devices in their place), the FAA, in granting the exemption gave the petitioner the flexibility to remove the escape slides at a later date. While other examples exist of FAA exemptions where inertia reels were approved in lieu of escape slides, those discussed herein have the greatest degree of applicability to Boeing's current request.

While in the supernumerary seating area, each supernumerary will be provided with an automatically presenting oxygen unit similar to those being provided to passengers on a passenger airplane. To provide an acceptable level of safety for supernumeraries performing their duties inside the main deck compartment during flight, a portable oxygen bottle with integral mask will be provided for each person that can be inside the compartment at the same time. Procedures will require that each supernumerary take a portable oxygen unit with them when accessing the main deck cargo compartment. Additionally, an aural and visual alerting system will be provided inside the compartment. The alerts will be audible and visible to persons throughout the length of the compartment. The alerting systems will indicate to the supernumeraries inside the compartment the need to immediately don their oxygen mask and return to their seat, or, in the case of air turbulence, to immediately return to their seat.

The aural and visual alerts will both activate automatically upon the following two scenarios: (1) a cabin loss of pressure event or (2), a smoke/fire event inside the Class E main deck cargo compartment. The procedure to be followed for these two scenarios are identical; the person(s) inside the compartment will immediately don their oxygen mask, initiate flow to it, and immediately return to their seat. Such instruction will be included in the required pre-flight briefing to the supernumeraries.

In the event of air turbulence, the visual portion of the alerting system will be manually activated by a flight deck crewmember. The procedure to be followed for this scenario will be the person(s) inside the compartment will immediately return to their seat. Such instruction will also be included in the required pre-flight briefing to the supernumeraries.

Access from the upper deck supernumerary seating area to the main deck cargo compartment is gained through the door leading to the main deck. A placard will be conspicuously located on the seating area side of the door that states:

Access to be used only to inspect/care for cargo
Carry portable oxygen bottle with mask when entering compartment
No smoking in the cargo compartment
Keep door closed except during entrance and egress
In the event of smoke or cargo fire, do not enter cargo compartment

Handhold provisions will be provided in the supernumerary seating area, however, installation of handholds inside the main deck cargo compartment is impractical. An acceptable level of safety will be provided by virtue of the crew-operated visual alerting system's ability to indicate to persons in the cargo compartment, at the onset or anticipation of turbulence, to return to their seats.

The Airplane Flight Manual (AFM) will require that the flight crew brief the supernumeraries before each flight relative to emergency egress, emergency equipment use, and procedures regarding egress from the Class E main deck cargo compartment. Operators of the 747-8F will be responsible for developing an FAA-approved training plan that satisfies the AFM requirements for carriage of supernumeraries.

Request for Waiver of Publication

The foundation of this request is based on numerous FAA Grants of Exemption that allow carriage of supernumeraries on board freighter aircraft. The most pertinent is No. 1870, which was originally granted for the Model 747-200F airplane in 1973 and has since been amended to cover all Boeing-production 747 Freighter airplanes, including the Model 747-400F. The 747-8F is a derivative model of the 747-400F. Although 220" longer, the 747-8F is identical to the 747-400F from a standpoint of the number and types of persons that can be carried, and the emergency exits and assist means provided when the crew service door escape slide is installed. Therefore the reasons Boeing presented justifying the approval of Exemption 1870E are directly applicable to the 747-8F and have been presented above.

The reasons presented above for approving main deck access during flight on the 747-8F are identical to those for which a number of exemptions have already been granted by the FAA for other aircraft types. [See Exemption Numbers 7965, 8057, 8136, 8248, 8258, 8350A, 8587, 8625, and 8335A.]

Additionally, the reasons presented above for approving supernumerary use of inertia reel descent devices as the primary assist means on the 747-8F are identical to those for which a number of exemptions have already been granted by the FAA for other aircraft types as well. [See Exemption Numbers 5717, 5993A, 4808A, 7469, 8258, 8350A, 8536 and 8536A.]

Therefore, this request will not set a precedent and accordingly, Boeing requests a waiver for the publication and public comment period of this exemption, similar to those granted to other applicants for the same operational capability. Boeing believes that good cause exists to waive the publication and comment requirements of 14 CFR 11.85, 11.87 and 11.89. In particular, we feel that the main purpose of this petition and the reasons presented in it are identical to those for exemptions previously granted by the FAA.