

**UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98057-3356**

In the matter of the petition of

THE BOEING COMPANY

for an exemption from §§ 25.785(j),
25.807(c), 25.857(e) and 25.1447(c)(1) of
Title 14, Code of Federal Regulations

Regulatory Docket No. FAA-2004-18657

PARTIAL GRANT OF EXEMPTION

By letter dated June 27, 2008, Mark N. Hamm, Manager, Puget Sound Certification Office, Technical Services, The Boeing Company, PO Box 3707, Seattle, Washington, 98124, petitioned for an amendment to Exemption 8590A, issued on May 1, 2008. That exemption granted The Boeing Company relief from Title 14, Code of Federal Regulations (14 CFR) 25.785(j), 25.807(c), 25.857(e) and 25.1447(c)(1). That exemption also allowed the non-crewmembers (commonly referred to as supernumeraries), carried aft of the flight deck on Boeing Model 747-400 airplanes converted from a passenger to a freighter configuration, access to the Class E cargo compartment during flight. The access was limited to three persons for cargo only (no live animal carriage) or up to twenty persons when carrying animals only (no other cargo). The petitioner now requests that the exemption be revised to allow the maximum number (twenty) of supernumeraries allowed on the aircraft also be allowed into the cargo compartment during flight, regardless of the type of cargo (animal only, cargo only or mixed cargo) in the compartment.

Boeing also submitted a letter dated July 30, 2008, that contained supplementary information. The purpose of the letter was to revise the verbiage in the original letter, dated June 27, 2008.

The petitioner has previously been granted relief from the following regulations:

Section 25.785(j), at Amendment 25-88, states, “If the seat backs do not provide a firm handhold, there must be a hand grip or rail along each aisle to enable occupants to steady themselves while using the aisles in moderately rough air.”

Section 25.807(c), at Amendment 25-55, requires, in 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 part, that when a Class E cargo compartment is installed on the airplane, the airplane is used for carriage of cargo only.

Section 25.1447(c)(1), at Amendment 25-87, requires, in part, that oxygen dispensing units must be automatically presented to the occupants before the cabin altitude exceeds 15,000 feet. The relief from this regulation is only granted for the occupants when they are in the cargo compartment.

Related section of 14 CFR

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 supports its request with the following information.

Only the pertinent parts of the petition and the supplemental information are quoted below. Boeing’s complete petition for an amended exemption and the supplemental information letter can be found under docket number FAA-2004-18657 at www.regulations.gov.

In order to better understand the existing jet cargo fleet operations from a mixed cargo perspective, Boeing conducted a survey of a number of freighter operators. The survey requested responses from a sample set of worldwide operators (inclusive of US operators), to better understand the nature of their cargo operations.

The summary of responses from the operators is as follows:

Mixed Cargo Flights are the Norm in the Industry

All airlines which accepted live animals for carriage on scheduled flights, advised us that they routinely carry large live animals requiring care/attention during flight in combination with other cargo. One operator reported that they have \approx 30 flights per month of this type. On some routes, such as into and out of Calgary, Alberta, Canada, 100% of the cargo flights for one operator are of the mixed type. One of the queried operators stated that "...100% of live animal flights have other cargo in the same compartment." Two other operators stated that "99% of cargo flights with live animals carry other cargo in the same compartment." Another operator advised that depending on the season, the frequency of carrying mixed cargo varies from "every flight" to "once every fourteen days." Clearly, cargo operators carry mixed cargo on a regular basis and such capability/flexibility is needed by the shippers of large, live animals.

Not allowing Access for Mixed Cargo on the 747-400BCF will Create a Hardship

All airlines which accepted live animals for carriage on scheduled flights responded that if mixed cargo access were not allowed it would create financial hardship for their operations. Most stated that it would effectively stop large, live animal shipment by air on scheduled flights. Two airlines stated that the cost of shipping horses by air would skyrocket if mixed cargo were not allowed because the horse shipper would, in effect, have to pay for the empty pallet positions not filled because mixed cargo access would not be allowed.

Not allowing access for mixed cargo operations would necessarily drive cargo operators to ship horses (and other large live animals) exclusively on dedicated/chartered flights. Such flights would have to be scheduled far in advance and they would likely be infrequent due to limited traffic, creating cost and schedule hardship to horse shippers due to the relative infrequent flights. Race horses are typically shipped by air and are shipped a day or two prior to their races because horses are prone to jet lag and their performance suffers as a result. Infrequent dedicated/chartered flights for horse carriage would be a hardship to the horse racing industry.

Not allowing mixed cargo access will very likely create an additional and extreme hardship to the US cargo fleet, one that places them at a competitive disadvantage to their foreign counterparts. Airlines not under US jurisdiction will most likely pursue certifying mixed cargo access through their own regulatory authorities. If they succeed, and most probably will, US carriers will be at a severe disadvantage. The foreign carriers will be able to economically ship smaller quantities of horses on a

particular flight while US carriers will not be able to do likewise. They will have no choice but to ship much larger quantities of horses much less frequently in order to fill their main deck cargo compartments.

Additional Supporting Information

Boeing requested that the following sentence be revised (shown in strikethrough) as follows:

~~“While Boeing agrees that the 747-400F was not certified for main deck access during flight as part of the airplane type design process, many 747-400F operators have implemented operational procedures and have installed additional emergency equipment to access main deck cargo requiring care/attention during flight. Therefore, in order to avoid a situation where the statement in the Partial Grant could cause an operator to lose such operational capabilities that are critical to their business model, Boeing requests that when the Exemption 8590A is revised to respond to this petition allowing main deck access during mixed cargo operations, that the FAA also delete the sentence or revise the statement in question to remove the “same effect as an AFM limitation prohibiting access” reference to the placard.”~~

With minor exception, all large live animals being shipped by air need persons (grooms/handlers) on board for their care/attention during flight and to also ensure that the animals will not compromise safe flight.

Large animals may need special attention in flight for their safety and well being. Handlers need to have the ability in flight to calm horses down so they will not try to jump and hurt themselves. Whales or other large marine animals need handlers capable of keeping them in a wet environment while in flight. Large animals in these categories represent a high value. From the shippers' side as well as from the airlines' perspective, having grooms/handlers on board and being able to attend to them during flight is a must. It is also imperative that a sufficient quantity of grooms be allowed inside the compartment at the same time. During flight these grooms assist in maintaining a safe environment and help to adequately protect the animal owners' investments.

The quantities of large animals (horses) typically being carried in mixed cargo operations varies from one or two stalls holding two to six horses all the way up to the main deck being almost completely full with these stalls. If the number of horse stalls does not completely fill the main deck compartment, other cargo is routinely loaded into the available pallet positions as long as the combination of large animals and other cargo is in accordance with IATA [International Air Transport Association] guidelines. Most respondents advised that they follow IATA guidelines for live animal carriage, meaning that they separate the live animals from

certain dangerous goods that may be harmful to the large animals (horses) if they were placed too close.

In order to safely transport large live animals by air, cargo airplane operators (in combination with the shippers) need the flexibility to determine for themselves the proper number of grooms/handlers to accompany the large animals without being unduly restricted by an AFM limitation that limits main deck access to a few individuals. Although a main deck compartment may not be fully loaded with large animals on a particular flight, it may be the decision of the carrier (in combination with the shipper) that the number of grooms that should accompany the large animals (horses) is the same as the maximum number of supernumeraries allowed to be carried on that model.

For Cargo Only, No Live Animals operations, it should be noted that all airlines queried, except one, agreed that three (3) is an acceptable limit for cargo only operation. The one dissenter argued that the maximum number of supernumeraries being carried on board a flight should be allowed inside the compartment at the same time because there could be an emergency inside the compartment that cannot be remedied by only three (3) supernumeraries. Their argument has merit and the FAA may want to consider it when deciding on the access limit for this type of cargo operation of the 747-400BCF. Based on that rationale, Boeing proposes that the maximum number allowed inside the compartment at the same time for Cargo Only, No Live Animals operations be the number of supernumeraries being carried on that flight.

With regard to mixed cargo operations of the Model 747-400BCF, based on the preceding information from jet cargo operators, Boeing proposes that the maximum number of supernumeraries allowed inside the compartment at the same time be the same as the maximum approved to be carried (20 supernumeraries). As stated above, the carrier and the shipper should decide on the quantity of grooms necessary for safe flight involving large live animals, and the carrier should not be restricted by an AFM limitation to a lesser number than that considered required by the shippers.

Boeing proposes that considering the actual use of the aircraft as included above, significant confusion in procedures is introduced by delineating specific cargo "types" or categories for only the 747-400BCF aircraft. Prior exemptions for cargo operations and multiple aircraft types have not included such differentiation of cargo types. Implementation of distinctive operational procedures for a single aircraft type for airlines operating mixed cargo fleets will cause confusion and a decrease in safety for operations of those fleets.

Additionally, further hardship will be created in the industry and to the Boeing Company if these cargo categories and limitations on the number of supernumeraries allowed access to the cargo compartment are not aligned with the precedence of prior exemptions. The 747-400BCF currently maintains a larger market share for conversions of the 747-400 passenger aircraft type into a cargo configuration as compared to our major competitor. The limitations in Exemption 8590A will potentially create a large advantage for our competitor due to the difference in capabilities afforded to them by their previously granted exemption, which does not include either of these types of limitations. The potential market loss for Boeing would be in the hundreds of millions of dollars in revenue and the potential impact to the airlines would be significant due to the fact that they require cargo compartment access for all cargo types and would in fact be driven to a sole source provider without the capability to competitively bid the cost of their aircraft conversions. Boeing contends that competition in bidding cargo aircraft conversions reduces the overall cost to the industry and therefore it benefits the interests of the public overall.

Petition for Reconsideration of Amendment to Exemption No. 8590 as issued in Exemption 8590A:

Boeing is seeking the following revisions to the existing Exemption 8590A:

Elimination of "types of cargo operations":

Boeing requests revision to the FAA's analysis/summary to additionally recognize mixed cargo as a typical type of operation needed by airlines requiring access to the [C]lass E cargo compartment during flight. Boeing additionally and specifically requests revision to the "Conditions and Limitations" section 2 under the FAA's decision section of Exemption 8590A, that section 2(b) - be deleted. Additionally, Boeing requests revision to Section 6 "Placards" to delete the sub-bullet 3 paragraph referring to numerical limitations by type of cargo.

This change would eliminate the differentiation of types of cargo operations and the associated, specific, numerical limitations on the number of supernumeraries allowed access to the main deck for types of cargo operations. It is noted that the maximum number of supernumeraries accessing the main deck would be constrained by the requirements retained in Section 3 and 10 of the "Conditions and Limitations" section of Exemption 8590A.

Federal Register publication portion of Partial Grant of Exemption 8590A

(Additional Impact to 747-400F Operators):

The FAA states that the original 747-400F type design includes the installation of a placard on the access door to the main deck that reads as follows: “Door to remain closed during taxi, takeoff, flight and landing.” The partial grant goes on to state that the placard ... “has the same effect as an AFM limitation prohibiting access to the main deck cargo compartment during flight.”

~~While Boeing agrees that the 747-400F was not certified for main deck access during flight as part of the airplane type design process,~~ many 747-400F operators have implemented operational procedures and have installed additional emergency equipment to access main deck cargo requiring care/attention during flight. Therefore, in order to avoid a situation where the statement in the Partial Grant could cause an operator to lose such operational capabilities that are critical to their business model, Boeing requests that when Exemption 8590A is revised to respond to this petition allowing main deck access during mixed cargo operations, that the FAA also delete the sentence, or revise the statement in question to remove the “same effect as an AFM limitation prohibiting access” reference to the placard.

Based upon the responses of Boeing's customers/operators and the original request to provide an exemption for in-flight Main Deck access for mixed cargo operations, Boeing would like the FAA to consider their position on the following grounds:

- It is not economical to dispatch a cargo airplane with less than a full load. Operators of the 747-400BCF wish to routinely transport types of cargo that require care and/or inspection during flight (e.g., large live animals and/or hazardous materials). The effect of the current AFM limitations prohibiting supernumerary access into the main deck cargo compartment during flight limits the type of cargo that can be carried, creating hardships for these operators. If access is not allowed for mixed cargo operations, shipping rates would necessarily be higher due to the inefficiency of partially loaded cargo compartments.

- Evaluation of Public Interest

As stated above, cargo operators routinely carry all types of cargo including mixed cargo and approving main deck access for such operations of a 747-400BCF will improve cargo carrying efficiency. Additionally, common operating requirements and common FAA Exemption allowances for manufacturers will tend to reduce the Airlines operating and asset costs through market competition. This will tend to reduce overall airfreight rates, as competitive pricing structures among freight operators will be promoted; the public interest is served by lower freight rates and competitive pricing.

***Federal Register* publication**

A summary of the petition was published in the *Federal Register* on July 25, 2008 (73 FR 43483). No comments were received.

The FAA's analysis

Boeing submitted a letter dated July 30, 2008, which requested that the FAA revise its position that a placard has the same effect as an AFM limitation. This supplement to the original letter was based on Boeing's further review of the relevant 747 freighter exemption dockets. Boeing provided examples from the docket(s) that support its opinion that it did request cargo compartment access in flight. However, no discussion was provided regarding the placard installed on or near the cargo compartment access door of the 747-400F. This placard states, "Door to remain closed during taxi, take-off, flight and landing." The operator of an aircraft is required to comply with FAA required placards as noted in 14 CFR 91.9(a). This regulation states:

Except as provided in paragraph (d) of this section, no person may operate a civil aircraft without complying with the operating limitations specified in the approved Flight Manual, markings and placards or as otherwise prescribed by the certificating authority of the country of registry.

As noted in that regulation, the aircraft operator is required to comply with the operating limitations specified in the placards as well as in the AFM [airplane flight manual]. Therefore, the placard does have the same effect as an AFM limitation that prohibits access into the cargo compartment. In addition, any changes made to the 747-400F aircraft, by the operators, to allow in-flight access of the cargo compartment should have involved the operator's regulatory authority.

The FAA considers the petitioner's proposal to amend Exemption No. 8590A to be in the public interest for the following reasons:

- These supernumeraries are seen as a benefit to airplane safety and efficient operations of air cargo.
- A significant disruption of air commerce could occur if the petition was not granted.
- The FAA has granted several exemptions for the carriage of supernumeraries with access into the Class E cargo compartment in-flight to attend to cargo on freighter airplanes.

Exemption No. 8590A granted The Boeing Company relief from §§ 25.785(j), 25.807(c), 25.857(e) and 25.1447(c)(1). The exemption from those regulations still applies to the Boeing Model 747-400 airplanes converted from a passenger to a freighter configuration.

The original petition for exemption did not include a request to permit supernumerary access to the Class E cargo compartment. Therefore, that exemption was granted with a limitation stating that access to the Class E cargo compartment during taxi, take-off, landing, and flight was prohibited. The petitioner submitted additional information and proposed limitations to allow supernumerary access to attend to cargo in the Class E cargo compartment during flight. Supernumerary access to the Class E cargo compartment was granted upon approval of revision A to the exemption. The access was limited to two types of operation. They are:

- Operations for the carriage of live animals and material to support the safe transport of the animals, no other cargo. The maximum number of supernumeraries allowed in the cargo compartment in-flight is 20.
- Operations for cargo only, no live animal carriage. The maximum number of supernumeraries allowed in the cargo compartment in-flight is 3.

The FAA has previously granted exemptions for in-flight access of the Class E cargo compartment by supernumeraries, provided that certain other conditions are met. These conditions have varied, depending on the airplane design and the number of supernumeraries involved. We have been reviewing the operational need for access into the Class E cargo compartment in-flight and the number of persons needed in the cargo compartment for the type of operation. We have divided access into the cargo compartment into three different types of operations. They are:

1. Carriage of live animals requiring care/attention during flight and associated material only, no other cargo.
2. Cargo only, no live animal requiring care/attention during flight.
3. Carriage of live animals, requiring care/attention during flight, and cargo.

In the first type of operation we understand that the industry standard for the carriage of horses is one supernumerary for every three or four horses. Considering the size of the 747-400 airplane there could be several dozen horses in the main deck cargo compartment. As a result of the large number of horses or other large animals a large number of supernumeraries (groom/handler) would be needed. In the past, under certain conditions, we have granted exemptions for large numbers of supernumeraries with access into the main deck Class E cargo. These conditions have included limiting the permitted cargo to large live animals and associated cargo only. We have considered that live animals are less flammable than other cargo, therefore, we have allowed less restrictive access to the cargo compartment. Exemption 8590A allows a maximum of 20 supernumeraries access into the main deck Class E cargo compartment in-flight for the care/handling of live animals. This limitation remains the same.

With regard to the second type of operation, we have limited access into the cargo compartment to a very small number of supernumeraries (three). During flight this number of supernumeraries should be capable of addressing the access needs for the hazardous materials and valuable or perishable goods. The petitioner queried a number of freighter operators and all but one agreed that three supernumeraries with access into the Class E cargo compartment was adequate for this type of operation. The one dissenter argued that the maximum number of supernumeraries being carried on board a flight should be allowed inside the compartment at the same time because there could be an emergency inside the compartment that cannot be remedied by only three supernumeraries. Therefore, the petitioner requested twenty supernumeraries be allowed to access the main deck Class E cargo compartment in-flight for the inspection of cargo. As noted above, all but one operator agreed that allowing three supernumeraries to access the cargo compartment would be sufficient. Exemption 8590A allows a maximum of three supernumeraries access into the main deck Class E cargo compartment in-flight for the care of cargo only. This limitation remains the same.

Concerning the third type of operation, live animals requiring care/attention during flight and cargo, we understand this is the most common operation used for transporting horses. The industry standard for carriage of horses is one supernumerary for every three or four horses. The petitioner has requested a maximum of twenty supernumeraries be allowed to access the Class E cargo compartment in-flight for the care/attention of live animals and/or inspection of cargo. We accept the proposal for a maximum of twenty supernumeraries to be allowed access into the main deck Class E cargo compartment in flight for the care/attention of live animals and to inspect the cargo with the following limitation:

The addition of cargo to a live animals carriage operation causes additional risk of exposure from the smoke and fumes of a fire. As the number of supernumeraries increases, and the duration of exposure increases, we must provide for a reasonable level of protection from smoke inhalation. Several factors are considered when making a determination of the acceptable level of safety in this case. Past industry practice, the number of supernumeraries with access, the airplane configuration, cargo compartment size, limited egress paths, potential cargo present, and the duration of exposure are all relevant factors. Considering the above factors, in the general case, if Class E cargo compartment access is approved for four or more supernumeraries for this mode of operation, a portable system (e.g., smoke hood or full face mask oxygen system) must be carried by each supernumerary.

However, in the case of the Model 747-400 freighter airplanes, because the petitioner has proposed to provide the same alert for both decompression and smoke/fire, a single system that affords protection from both hypoxia and smoke inhalation (e.g., a full face mask and oxygen unit) must be used instead of separate systems. This single system must be used in any of the three types of cargo operations and carried by every supernumerary who enters the Class E cargo compartment.

To comply with §§ 25.855(h)(2) and 25.857(e)(4), there must be suitable means of preventing smoke penetration into occupied areas. The petitioner's design accounts for this by providing a barrier, which must comply with the smoke penetration requirements for the flight deck and the supernumerary compartment. However, the petitioner indicated that configurations may be approved that will allow supernumeraries to enter the Class E cargo compartment. To gain access, the supernumeraries would open the smoke barrier between the cargo compartment and the supernumerary compartment. To provide an appropriate level of safety, the petitioner must install a placard indicating that the smoke barrier is to be secured (i.e., the door or curtain must be closed) except when entering or exiting the cargo compartment. The placard must be located in a conspicuous place, either on or next to the smoke barrier.

The FAA is concerned with the quantity of smoke that may enter the occupied areas in the event of a fire on the main deck. The amount of smoke that would enter the supernumerary compartment and flight deck when the smoke barrier is open during evacuation of the cargo compartment by the supernumeraries must not create a hazard to the occupants. This smoke source must be considered when demonstrating compliance with § 25.855(h)(2).

On previous certification programs, if access into the Class E cargo compartment was allowed, an aural or visual alert, or both, operated by a flightcrew member and recognized in the Class E cargo compartment was required to be installed. The alert immediately notified the supernumeraries in the compartment that there was smoke/fire in the compartment. The alert indicated that persons must return to their seats and secure the smoke barrier (i.e., close the door or curtain) if there was a fire. Appropriate procedures and limitations were required to ensure that a flightcrew member alerted the supernumeraries to return to their seats and secure the smoke barrier at the onset of a fire. The pre-flight briefing included an explanation of this alert to the supernumeraries.

On this certification program the petitioner has proposed that smoke/fire and decompression events would have identical aural and visual alerts and that the response to the alerts would be the same. That is, the supernumeraries inside the Class E cargo compartment would immediately don their oxygen masks, initiate oxygen flow, and then return to their seats. We find this action acceptable, provided the portable oxygen equipment provided to the supernumeraries, in addition to meeting the requirements of § 25.1443(a) or (b), also meets the appropriate requirements of protective breathing equipment (PBE) in § 25.1439. The same aural/visual alerts, and procedures proposed for both a decompression and smoke/fire event are therefore acceptable. When operating above 25,000 feet, § 25.1447(c)(1) requires an "immediately available" supply of oxygen for each supernumerary. To provide an acceptable level of safety while in the Class E cargo compartment, each supernumerary must carry on his or her person a portable oxygen unit with a mask connected to it.

Section 25.1447(c)(1) also requires automatic presentation of the oxygen dispensing units. For seated passengers in typical passenger airplanes, the automatic presentation of

masks throughout the cabin indicates the need to don an oxygen mask. However, supernumeraries in the Class E cargo compartment would not have this indication. To provide an acceptable level of safety, an automatically activated aural decompression alert must be provided that is immediately recognizable throughout the accessible areas in the Class E cargo compartment. If there are two or more aural alerts that supernumeraries in the Class E cargo compartment are expected to react to differently (e.g., “don oxygen mask, initiate the flow of oxygen, return to seat” versus “return to seat immediately”) there must be an automatic visual alert in addition to the automatic aural alert for the decompression event. As a backup to the automated alert system, the flightcrew members must be able to manually initiate the alerts. However, as discussed above, on this program the petitioner has proposed to have both aural and visual alerts for decompression and smoke/fire with the supernumeraries responding in the same way for both events.

Supernumeraries must be trained regarding the location and use of the oxygen equipment and the alerts for its use. The oxygen units must be sized adequately for continuous and uninterrupted use during worst-case flight duration following decompression. Additionally, the portable oxygen device must meet the requirements for flightcrew member oxygen masks (§§ 25.1443(a) or (b)), or the equipment must be shown to protect the supernumerary from hypoxia at the activity level required to return to his or her seat following a rapid decompression to 25,000 feet cabin altitude. The oxygen units must also meet the intent of § 25.1449, which states that there must be a means for the crew to determine whether oxygen is being delivered to the dispensing units. The FAA has determined that it would be an acceptable means of compliance to train the supernumeraries in making this determination and to provide oxygen flow indication in the oxygen equipment. We have also determined that, due to the way that fire in the cargo compartment is to be controlled, supernumeraries (persons) on the airplane must have been found physically fit by the operator. These limitations on the occupants are consistent with previous approvals and are included in this approval.

The handholds requirement of § 25.785(j), at Amendment 25-88, is to ensure that occupants have a means to steady themselves in moderately rough air while traversing the main aisles of typical passenger airplanes. On the proposed airplane, we concur with the petitioner that an acceptable level of safety will be provided by the crew-operated visual alert system. This visual alert system enables the crew to indicate, at the onset of turbulence, that supernumeraries in the cargo compartment return to their seats. The visual alert must be recognized in accessible areas in the Class E cargo compartment, and indicate, during turbulence, that persons must return to their seats.

Configurations may be approved for carrying cargo that would not require supernumeraries to access the Class E cargo compartment. For these configurations, an aural decompression alert is not required to be recognized in the Class E compartment if an AFM limitation is established to prohibit supernumeraries from being in the Class E cargo compartment during flight. Placards and procedures must also be changed to be consistent with the AFM limitations.

The FAA is concerned with the removal of an incapacitated person from the cargo compartment since the access means to the main deck cargo compartment is a ladder. The Boeing Company should develop procedures for removing an incapacitated person from the cargo compartment and provide these procedures to the airplane operators. There is no need to combine this condition with any other failure condition (i.e., only normal flight conditions need to be considered). Note that this exemption does not provide relief, beyond that explicitly stated, from applicable airworthiness requirements. This exemption discusses specific regulations that must be met for approval of the proposed design but does not discuss all the applicable regulations.

The FAA's decision

In consideration of the foregoing, I find that an amended partial grant of exemption is in the public interest for the reasons stated by the petitioner. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 40113 and 44701, delegated to me by the Administrator, The Boeing Company is granted an amended exemption from 14 CFR 25.785(j), 25.807(c), 25.857(e), and 25.1447(c)(1) to the extent necessary to allow type certification of Boeing Model 747-400 passenger airplanes converted to freighter airplanes, with provisions for the carriage of supernumeraries.

The original grant of exemption, Exemption No. 8590, was issued for airplanes that did not allow supernumerary access to the Class E cargo compartment. For amendment A of that exemption, the FAA considered the following two types of operations that would require a supernumerary to have in-flight access to the cargo compartment:

- Operations for carriage of live animals and material to support the safe transport of the animals, no other cargo. The maximum number of supernumeraries allowed in the cargo compartment in-flight is 20.
- Operations for cargo only, no live animal carriage. The maximum number of supernumeraries allowed in the cargo compartment in-flight is 3.

For this amended exemption, the FAA considers there are three types of operations that will occur in service:

- Operations for carriage of live animals requiring care/attention during flight and associated material only, no other cargo. The maximum number of supernumeraries allowed in the main deck Class E cargo compartment is 20.
- Operations for carriage of cargo only, no live animals requiring care/attention during flight. The maximum number of supernumeraries allowed in the main deck Class E cargo compartment is 3.

- Operations for carriage of live animals requiring care/attention during flight and other cargo. The maximum number of supernumeraries allowed in the main deck Class E cargo compartment is 20.

The following limitations and conditions apply and limitation numbers 1 - 2, 3d and 4 - 6 must be documented in the limitations section of the AFM:

1. Supernumeraries:

- a. A maximum of 20 supernumeraries may occupy the area just aft of the flight deck. The total maximum occupancy of the airplane is limited to 24 persons, including the flightcrew members (2 on-duty flightcrew members and 2 off-duty flightcrew members).
- b. The supernumeraries are limited to the categories specified in §§ 121.583(a)(1) through 121.583(a)(7).
- c. Prior to each flight, a flightcrew member must brief each supernumerary on the use of exits, including instructions to inspect the ground to determine whether a safe landing can be achieved before using an assist means and emergency equipment.
- d. The operator must determine that each supernumerary is physically able and trained to accomplish the necessary emergency procedures.

2. Main Deck Class E Cargo Compartment Access Limitations:

- a. Supernumeraries are prohibited from being in the cargo area during taxi, take-off, and landing. The pre-flight briefing must inform supernumeraries of this requirement. Access is limited to the main deck Class E cargo compartment.
- b. Access into the main deck Class E cargo compartment in flight is allowed for only three types of operation. They are:
 - Operations for carriage of live animals and material to support the safe transport of the animals, no other cargo. The maximum number of supernumeraries allowed in the cargo compartment in-flight is 20.
 - Operations for cargo only, no live animal carriage. The maximum number of supernumeraries allowed in the cargo compartment in flight is 3.
 - Operations for carriage of live animals requiring care/attention during flight and other cargo. The maximum number of supernumeraries allowed in the main deck Class E cargo compartment is 20.

3. Supernumeraries' Portable Oxygen:

- a. There must be at least one portable oxygen unit, with a mask connected to it, provided for each supernumerary allowed to enter the main deck Class E cargo compartment during flight. The unit must provide an indication to the user when oxygen is flowing.
- b. The portable oxygen unit must meet the performance requirements of §§ 25.1443(a) or 25.1443(b), or the equipment must be shown to protect the supernumerary from hypoxia at an activity level required to return to his or her seat following a rapid decompression to 25,000 feet cabin altitude.
- c. The portable units must be located outside the cargo compartment (e.g., in the common area).
- d. Each supernumerary must carry a portable oxygen unit whenever he or she is in the cargo compartment during flight.
- e. The supernumeraries must be trained in the use of the oxygen units. The supernumeraries must also be trained in making the determination whether oxygen is being delivered to the dispensing units.
- f. The oxygen units must be sized adequately for continuous and uninterrupted use during worst-case flight duration following decompression or must be of sufficient duration to allow the supernumerary to return to his or her seat where additional oxygen is readily accessible for the remainder of the decompression.
- g. Additionally, since the petitioner has decided to provide the same alert for both decompression and smoke/fire, the oxygen unit must meet the protective breathing equipment (PBE) requirements in §§ 25.1439(b)(1), (2), and (4), and the equipment and system must be designed to prevent any inward leakage to the inside of the device and prevent any outward leakage causing significant increase in the oxygen content of the local atmosphere (i.e., full face mask type.)

4. Decompression and Smoke/Fire Alert:

Based on the petitioner's proposal, an automatically activated aural and visual decompression and smoke/fire alert must be provided and immediately recognizable in accessible areas of the Class E cargo compartment to notify supernumeraries when to don the portable oxygen units, return to their seats and ensure that the smoke barrier is secured (i.e., the doors are closed). As a backup to the automated alert system, the flightcrew must be able to manually activate the alerts. The pre-flight briefing must include training in the sound of the alert, the meaning of the alert, and the response to the alert (i.e., procedures for donning the masks and activating the flow of oxygen).

5. Turbulence Alert:

Based on the petitioner's proposal, a flightcrew member operated visual alert, which is recognized in the supernumerary seating area and in accessible areas in the Class E cargo compartment, must be installed to indicate, during turbulence or predicted turbulence, that persons must return to their seats. The alert must be clearly distinguishable from the decompression/fire/smoke alert, so that supernumeraries do not waste time putting on the oxygen masks before returning to their seats. Appropriate procedures and limitations must be established to ensure that the flightcrew member alerts the supernumeraries to return to their seats at the onset of turbulence. The pre-flight briefing must explain this alert to the supernumeraries.

6. Placards:

Placards are to be located outside the cargo compartment in a conspicuous location, either on or adjacent to the smoke barrier door. The placards must indicate the following:

- Occupancy of the Class E cargo compartment is prohibited during taxi, take-off, and landing.
- Access is limited to the care and handling of animals and hazardous/perishable cargo only.
- Access is limited to a maximum of 3 persons unless transporting live animals and associated material. Access is limited to 20 persons when transporting live animals. Access is limited to 20 supernumeraries when transporting live animals and other cargo.
- The smoke barrier must be secured (i.e., the door or curtain must be closed) except when entering or leaving the cargo compartment.
- A portable oxygen unit (with full face mask attached) must be carried at all times when in the cargo compartment.
- Smoking is not allowed in the cargo compartment.
- The compartment must not be entered in case of fire/smoke being detected inside the Class E cargo compartment.

The pre-flight briefing must inform supernumeraries of these requirements.

7. Alerting Requirements:

- Must be distinctive and effective. The alert for turbulence must be clearly distinguishable from the alerts for decompression/fire/smoke.
- Visual alerts must be visible from all occupant locations and orientations, during all expected operational conditions including a rapid decompression where moisture in the air may condense.
- Aural alerts must be loud enough to be heard during all expected operational conditions including a rapid decompression where the ambient noise level will increase.

8. Supernumerary Emergency Exit:

For the exits designated for supernumerary use, emergency lighting must provide adequate illumination at the ground end of the assist means, where an evacuee would normally make first contact with the ground, with the airplane in each of the attitudes corresponding to the collapse of one or more legs of the landing gear. For airplanes that retain the passenger evacuation slides on the upper deck and associated emergency lighting systems, these systems are acceptable for this condition.

9. Public Address System:

A standard airplane public address (PA) system must be installed. It must be audible throughout the supernumeraries' seating area and must be capable of being activated either from the flight deck or from the supernumerary seating area.

10. Flight Tests:

Flight tests must be conducted to show compliance with the provisions of § 25.857 concerning the entry of hazardous quantities of smoke into compartments occupied by the crew or passengers. The amount of time that the smoke barrier is open, as a result of the supernumeraries evacuating the main deck cargo compartment, must be accounted for in the testing.

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Signed by Ali Bahrami

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