Exemption No. 7469

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

In the matter of the petition of

Boeing Airplane Services

For an exemption from §§ 25.783(h), 25.807(d)(1),25.807(e)(1), 25.810(a)(1), 25.812(e), 25.813(b), 25.857(e), 25.1445(a)(2), and 25.1447(c)(1) of Title 14, Code of Federal Regulations

Regulatory Docket No. FAA-2000-8508

PARTIAL GRANT OF EXEMPTION

By letter 3-J702-AC-00-066, Revision 4, dated December 13, 2000, Jon D. Wickell, Coordination Engineer, and Fred T. DeWinkler, DAS-501269-CE Administrator, Boeing Airplane Services, P.O. Box 7730, Wichita, Kansas 67277-7730, petitioned the Federal Aviation Administration on behalf of Boeing Airplane Services, for an exemption from the following sections of Title 14, Code of Federal Regulations (14 CFR):

- § 25.783(h),
- § 25.807(d)(1),
- § 25.807(e)(1),
- § 25.810(a)(1),
- § 25.812(e),
- § 25.813(b),
- § 25.857(e),
- § 25.1445(a)(2), and
- § 25.1447(c)(1).

ANM-01-093-E The requested exemption, if granted, would permit relief from the requirements of these regulations for the Boeing Model 757-200 series

passenger aircraft converted special freighters, to allow the carriage of up to three persons in addition to two crewmembers in the flight compartment of the airplane.

The petitioner requests relief from the following regulations:

Section 25.783(h), Amendment 25-54, requires that each passenger entry door in the side of a fuselage must qualify as a Type A, Type I, or Type II passenger emergency exit.

Section 25.807(d)(1), Amendment 25-72, requires that airplanes having passenger seating capacity of from 1 to 9 passengers, inclusive, be fitted with an emergency exit having at least the dimensions of a Type IV emergency exit on each side of the fuselage.

Section 25.807(e)(1), Amendment 25-72, requires that airplanes having passenger seating capacity of from 1 to 9 passengers, inclusive, that are certified for ditching must have at least one Type IV in either side of the fuselage above the ditching water line.

Section 25.810(a)(1), Amendment 25-72, requires that each non-overwing emergency exit more than 6 feet from the ground must have an approved means to assist occupants in descending to the ground. For passenger exits, this must be a self-supporting, automatically deployed and erected slide at each applicable exit.

Section 25.812(e), Amendment 25-58, requires floor proximity emergency egress lighting in passenger areas; and paragraph (h)(1) requires that each passenger exit requiring assist means include a means to illuminate the expected evacuee alighting zone.

Section 25.813(b), Amendment 25-72, requires that each emergency exit addressed by §25.810 (a) must have adjacent assist space.

Section 25.857(e), Amendment 25-60, limits Class E cargo compartments to all-cargo airplanes.

Section 25.1445(a)(2), Amendment 25-00, requires that passenger oxygen shutoff means be provided to preserve emergency oxygen essential for flight crew use.

Section 25.1447(c)(1), Amendment 25-00, requires that passenger oxygen masks be automatically presented upon cabin depressurization.

The petitioner provided the following supportive information:

> *"Boeing Airplane Services is converting 34 Boeing Model 757-200 Series Passenger airplanes into Special Freighters under FAA Project ST2448WI-T. Part of the conversion involves replacing the left hand, single-occupant flight deck*

observer seat with a double-occupant seat identical to the seat used on the 757-200 Package Freighter. This will change the flight deck occupancy from a maximum of four persons to a maximum of five persons. As the Special Freighter modification removes most of the passenger carriage and egress capabilities of the airplane, exemption from certain regulations regarding these capabilities must be sought in order to preserve both the economic advantages of the freighter configuration and the essential safety provisions for the airplane occupants.

"This revised petition is presented for exemption from the following sections of CFR 14 Part 25, as appropriate to the conversion of these airplanes into dedicated side cargo door freighters. Please note that this petition is identical to the previous revision, except for the deletion of the request for proprietary handling which had been included on the last page. In response to item (e) of the reference (2) FAA letter, please note that certain amendment levels cited below are more recent than those in the 757-200 Type Certification Data Sheet (TCDS A2NM), but are consistent with amendment levels contained in the proposed certification basis for this modification project, per the reference (3) Program Notification letter.

"§25.783 (h), Amendment 25-54, requires that each passenger entry door in the side of a fuselage must qualify as a Type A, Type I, or Type II passenger emergency exit.

"§25.807 (d)(1), Amendment 25-72, requires that airplanes having passenger seating capacity of from 1 to 9 passengers, inclusive, be fitted with an emergency exit having at least the dimensions of a Type IV emergency exit on each side of the fuselage.

"§25.807 (e)(1), Amendment 25-72, requires that airplanes having passenger seating capacity of from 1 to 9 passengers, inclusive, that are certified for ditching must have at least one Type IV in either side of the fuselage above the ditching water line.

"§25.810 (a)(1), Amendment 25-72, requires that each non-overwing emergency exit more than 6 feet from the ground must have an approved means to assist occupants in descending to the ground. For passenger exits, this must be a self-supporting, automatically deployed and erected slide at each applicable exit.

"§25.812 (e), Amendment 25-58, requires floor proximity emergency egress lighting in passenger areas; and paragraph (h)(1) requires that each passenger exit requiring assist means include a means to illuminate the expected evacuee alighting zone.

"§25.813 (b), Amendment 25-72, requires that each emergency exit addressed by §25.810 (a) must have adjacent assist space.

"§25.857 (e), Amendment 25-60, limits Class E cargo compartments to all-cargo airplanes.

"§25.1445 (a)(2), Amendment 25-00, requires that passenger oxygen shutoff means be provided to preserve emergency oxygen essential for flight crew use.

"§25.1447 (c)(1), Amendment 25-00, requires that passenger oxygen masks be automatically presented upon cabin depressurization.

"The following sections of 14 CFR Part 121 are related to the above requirements-

"§121.583 contains a listing of the categories of people who may be carried aboard an airplane in Part 121 service without complying with all the passenger-carrying airplane requirements of Part 121.

"§121.329 (b)(1) and §121.333 (b) contain operational oxygen requirements for revenue operators.

"This revised petition differs from previously presented revisions in that the Flight Deck windows no longer constitute the only available emergency exits. A distension analysis recently completed by the cargo barrier net vendor indicates sufficient clearance will exist between the distended net and the opening path of Door 1 Right to permit the door to be used as the primary emergency exit. As the required clearance is dependent upon the removal of the escape slide and slide bustle, the area immediately forward of the door will be outfitted with inertia reel descent devices and harnesses. With the availability of the right hand door to serve as an emergency exit in all emergency situations, the right hand cockpit window no longer is required to serve as a right hand exit. Accordingly, this petition addresses the use of the right-hand door and left-hand flight deck window as emergency exits.

"Information to Support Grant of Exemption

"1. The Special Freighter airplane will be equipped with a cargo barrier net installed immediately aft of Door 1 Left. In the event of an emergency landing involving high forward g loading, the cargo barrier net will distend forward, preventing the occupants from using Door 1 Left to exit the airplane. Door 1 Left will be converted into a service door only, while Door 1 Right will be modified to allow its use in emergency situations, including replacement of the installed passenger slide/raft with inertia reel descent devices.

"2. The flight deck of the Model 757-200 Special Freighter is equipped with openable No. 2 left and right flight deck windows previously certified as flight crew emergency exits. The left hand window will be modified to add capability to be opened from outside the airplane, and its means of opening will be marked on the

left hand exterior airplane fuselage. The ropes / lanyards installed at the windows will be retained as the emergency egress assist means for these exits.

"3. The airplanes will be modified to include exterior lights on either side of the lower forward fuselage. The left hand light is identical to the 757-200PF emergency exit light used for the emergency exit door of Package Freighter, but is installed to illuminate the ground under the Special Freighter left hand window only. The right hand light is an opposite installation to that on the left hand side, for illuminating the ground under the right hand window and Door 1 Right.

"4. The occupancy of the 757-200 Special Freighter is limited to a total of 5 persons, three of whom may be "supernumerary" occupants as defined by §121.583 (a)(1) through (a)(7). Limitations will be imposed on the aircraft operator to find that all occupants are physically able to use the escape means provided. ***Attachment 1*** *to this letter shows the occupied area of the airplane in relation to the available exits, the inertia reel descent devices, and the cargo area aft of the barrier net.*

"5. In the small spaces of the occupied portions of the airplane, the crew will easily be able to provide any instructions or assistance needed by the supernumerary occupants. Additionally there are no flight attendants to require assist space. Therefore the lack of assist space adjacent to the emergency exits will not lower the level of safety in an emergency egress situation.

"6. It is the intent of the operator to use the supernumerary capability of the airplane to ferry up to three non-crew occupants. When supernumerary occupants are carried, they will be briefed prior to each flight as to the location and use of the emergency egress assist means and procedures.

"7. The oxygen system on the 757-200 Special Freighter will be the same as the previously certified 757-200 PF system, and will serve the two flight crewmembers and the three non-operating occupants. This system has a demonstrated capacity sufficient to meet or exceed the requirements defined by §25.1439(b)(5), §121.329(b)(1), and §121.333(b) for all five occupants.

"8. All occupants in the 757-200 Special Freighter flight deck will have available the same quick-donning flight crew-type oxygen masks as those previously used and certified on the 757-200PF, which are not automatically presented. The location of the supernumeraries with the flight crew, and their high level of training, will allow the crew to easily command non-operating occupants to don the masks, and verify their proper usage. This provides a level of benefit commensurate with that generally expected from automatic mask presentation, the use of which in the 757-200SF flight deck will not enhance safety beyond that obtained by manual, quick-donning flight crew type masks.

"The lavatory and entry areas will each be outfitted with a Passenger Service Unit (PSU), which will automatically present two passenger-type masks into each area upon cabin depressurization or command from the pilot or copilot. These areas will not be utilized for takeoff or landing.

"9. Evacuation of all occupants through a flight deck window was demonstrated as described in a separate letter, dated January 14, 1987, to the FAA Seattle Aircraft Certification Office (ACO). The demonstration showed 2 women and 5 men of aged from 29 to 52 years and of varying physical stature able to evacuate the flight deck through a window assisted by a rope in 73 seconds. By comparison, the 757-200 Special Freighter will have a maximum occupancy of five persons.

"10. The flight deck window evacuation procedure, specifically a recommended body-positioning sequence, will be added to the Airplane Flight Manual Supplement of the airplane. Procedures for use of the inertia descent devices and harnesses will also be included in the AFMS, and will be posted near Door 1 Right, as well.

"Additional Supporting Information – Emergency Egress:

"The Special Freighter conversion includes deactivation of all passenger doors except Doors 1 Left and 1 Right. Blockage of Door 1 Left by the distended cargo barrier net and contained cargo will occur in event of a 9g emergency landing situation.

"Additionally, the cargo barrier net distension in a 9g landing would result in a hard cargo impact to a passenger slide installed on Door 1 Left, and would render the slide useless. The slide bustle on Door 1 Right would also likely be impacted, but the contained slide not damaged, as the door is several inches forward of Door 1 Left. However, the presence of the slide and bustle would prevent the door from being opened with the net distended.

"Door 1 Left will therefore be modified to be used as a service door only, the slide will be removed, and the interior door liner placarded to indicate slide removal. The Door 1 Right slide will be replaced with inertia reel descent devices, and the bustle with a flat liner. This door will serve as an exit in all landing cases. Interior and exterior markings / signage that indicate emergency exit use of the Right Hand door will be retained or installed as necessary.

"Developing and installing a new entry / exit door into the existing airframe that would be usable in all landing cases and provide economically viable cargo carriage capability would require a very substantial and cost-prohibitive effort. The 757-200PF left-hand door is designed for use with a rigid cargo barrier and cannot support operation with a cargo barrier net. Reconfiguring the proposed 757-200SF interior to relocate the barrier net in order to accommodate either the original passenger entry door fitted with an escape slide, or the 757-200PF service

door / emergency exit, for emergency use would necessitate reducing the airplane's cargo-carrying capability, thereby imposing a significant hardship on Boeing and airplane operators.

"None of the three available exits will be relocated, and are all above the waterline of the airplane in a ditching situation.

"It is Boeing's position that the combined presence of Door 1 Right and the two window exits, all equipped with assist means appropriate to their use, provides a level of safety for this airplane and its intended use that is equivalent to that provided for other airplanes and/or uses meeting the provisions of 25.807(d)(1) and (e)(1).

"Additional Supporting Information – Egress Assist Means:

"In Exemption 4808A for the 757-200 Package Freighter, the FAA concurred that safe evacuation of 2 crewmembers and 5 non-crewmembers could be effected using the exits and egress means provided aboard that airplane, which included one door of Type II size equipped with inertia descent devices, and one internally-operable window and one window operable both internally and externally, both equipped with ropes.

"The Special Freighter will similarly be equipped with inertia descent devices as assist means at Door 1 Right, which is a Type I door. Inertia reel descent devices at exit doors have been shown to be as safe and effective as automatically erected slides for evacuating small numbers of occupants. Demonstrations and actual emergencies in which slides have been used to rapidly evacuate airplanes typically have resulted in injuries to the evacuees. The use of reels with a small number of occupants has the potential to mitigate injury during evacuation. Also, the use of reels, or reels plus harnesses, is a simple, intuitively obvious process, is not strenuous, and does not require specific positioning or movements by the evacuees.

"The left-hand cockpit window will be modified to be externally operable, and the ropes/lanyards at both windows retained. The proximity of the ropes installed at the flight deck windows to the flight crew, who will be able to insure proper use by all occupants, provides a significant offsetting consideration in lieu of automatically erected means.

"Boeing will include a flight deck evacuation procedure in the Airplane Flight Manual Supplement for the use of ropes / lanyards when exiting the airplane through the flight deck windows. The Supplement will also include the requirements for the specific techniques for emergency egress to be briefed to non-crew occupants before each flight. Additionally, the Operations Manual will include limitations upon the Operator to find that all occupants are physically able to use the egress assist means provided.

"Additional Supporting Information – Emergency Egress Lighting & Signage:

"The entry area emergency exit signage includes downward directed illumination of the floor just aft of the flight deck door, and at Doors 1 Left and Right. Emergency egress path marking lights will not be installed, as the proximity of the occupants to the flight deck windows and Door 1 Right provides a level of safety that would not be enhanced for 5 persons by installation of floor proximity emergency egress lighting.

"All signage, lights, and placards indicating other exits will be removed or permanently modified to delete such indication.

"Additional Supporting Information – Emergency Exterior Lighting:

"The external lights installed on the lower portion of the forward fuselage will illuminate expected evacuee alighting zone under Door 1 Right in compliance to §25.812 (h)(1) in all landing cases except those involving nose gear collapse. The zones under the windows will likewise be illuminated, but the zone on the opposite side of a single main gear collapse not accompanied with wing deflection will not be fully illuminated.

"The following table shows the attitude and illumination conditions resulting from gear failures.

Condition		***Final Attitude***	***Illumination (approx. % Area) vs. Sill Height (in)***					
No	***L. Gear Loss***	***Nose-***	***Door 1 RH***		***LH Window***		***RH Window***	
1	*none*	*Level*	*100*	*156.0*	*100*	*174.5*	*100*	*174.5*
2	*Nose*	*Down*	*100*	*65.6*	*30*	*74.7*	*30*	*74.7*
3	*LH & RH*	*Up*	*100*	*144.7*	*100*	*168.7*	*100*	*168.7*
4	*LH*	*Up*	*100*	*253.0*	*100*	*261.1*	*80*	*280.5*
5	*RH*	*Up*	*100*	*230.0*	*80*	*280.5*	*100*	*261.1*
6	*LH*	*Up*	*100*	*242.2*	*100*	*246.7*	*100*	*268.9*
7	*RH*	*Up*	*100*	*215.8*	*100*	*268.9*	*100*	*246.7*
8	*Nose & LH*	*Down*	*70*	*80.4*	*0*	*57.3*	*20*	*88.2*
9	*Nose & RH*	*Down*	*20*	*42.7*	*20*	*88.2*	*0*	*57.3*

Notes –

1- Cases 3, 6, & 7 were analyzed assuming deflection of the wing and gear structures upon which the airplane finally comes to rest.

2- *Cases 8 & 9 involve loss of the engine/nacelle on the lost LG side of the airplane. Airplane comes to rest on remaining main gear, opposite wing, and fwd fuselage..*

3- *Failure of all gear with no loss of the engines/nacelles would result in the same final attitude as that of case 3, which was analyzed assuming engines/nacelles stay intact.*

"14 CFR 25.810 (a)(1) requires emergency egress assist means for those exits more than six feet (72 inches) above the ground with the airplane in normal ground attitude, and 14 CFR 25.812 (h)(1) requires ground illumination for those exits. Although an airplane with failed landing gear will not come to rest in normal ground attitude, the data is compared against these requirements as a conservative approach.

"The table shows the illumination of the alighting area under the door exit meets the requirement of 14 CFR 25.812 (h)(1) in seven of the nine cases listed. In case 8, the outboard 70% of the alighting area is illuminated to the requirement. In case 9 the door sill height is below the minimum height for which assist means is required by 25.810, and ground lighting is therefore not required by 25.812. Thus in all gear failure cases but one, the assist and lighting requirements are met, and in the single noncompliant case the portion of the alighting zone which is most visible from the door will be illuminated at or above the level indicated in the requirements.

"A case involving the loss of all gear and both nacelles was not analyzed, as it is intuitively obvious that the lights would not be effective, but all exit sills would be lower than the minimum height for which ground illumination is required.

"Additional Supporting Information – Oxygen System and Capacity

"For purposes of evaluation of the reserve oxygen available with a common system for passenger and crew, all five occupants were considered to be crew.

"The minimal undiluted oxygen supply to the flight deck is sufficient for all five crew members during emergency descent in response to a rapid depressurization; or in a detection event, for smoke detection, descent phases, and 30 minutes of depressurized flight at 25,000 feet cabin altitude for the purpose of fire suppression.

"In comparison, the 757-200PF has been certified with a 110 cubic foot gaseous oxygen capacity, which provides sufficient oxygen for the above described situations for seven occupants. The Special Freighter will use the same oxygen system as the 757-200PF, retaining the same 110 cubic foot oxygen capacity, for only five persons.

"Each oxygen dispensing outlet to be used in the flight deck includes shutoff capability. The proximity of the non-operating occupants to the flight crew will allow the pilot and/or first officer to command shutoff of these outlets. Incorporation of additional capability to shut off the oxygen flow to non-operating

occupants in order to preserve supplies for the operating crew would not enhance safety aboard the 757-200SF beyond that afforded by the current system in use on 757-200PF airplanes.

"The PSUs used in the lavatory and entry areas utilize separate oxygen generation canisters, and are not part of the gaseous system that serves the flight deck. Therefore, use of the automatically-deployed masks in the lavatory and entry areas will not affect the crew oxygen capacity.

"Additional Supporting Information – Instructions to Occupants:

"The Airplane Flight Manual Supplement (AFMS) will require the crew to brief non-operating occupants on the safe use of the provided escape means prior to each flight. Additionally, the limitation to a total occupancy of five persons, who meet the requirements of §121.583 (a)(1) through (a)(7), and who must have demonstrated the physical capability to use the provided means of escape will be included in the AFMS. The Operations Manual will contain illustrated sequences showing the recommended evacuation procedures for emergency egress through either the window exits or Door 1 Right using an inertia reel and harness, which will be required to be briefed to all non-crew occupants prior to each flight.

"Evaluation of Public Interest

"The presence of trained personnel when live or hazardous cargoes are carried aboard the aircraft will preserve proper flight safety, and is therefore in the public interest.

"The cargo carrying capacity allowed by the proximity of the distensible net to Door 1 Left constitutes a legitimate public interest for shipping customers, aircraft operators, and Boeing. The grant of this exemption will improve the utility of the airplane for the operator by ensuring needed cargo management personnel will be available inflight and at each flight destination. These capabilities will improve cargo carrying efficiency and will tend to reduce overall air freight rates, as competitive pricing structures among freight operators will be promoted; the public interest is served by lower freight rates and competitive pricing.

"As these and other 757-200 Passenger airplanes are moved into cargo service, operators will replace them with airplanes meeting newer safety requirements, which will tend to elevate safety levels across operating fleets. An overall elevation of safety is in the public interest.

"Petition for Exemption

"In consideration of the foregoing discussion, Boeing Airplane Services petitions for exemption from the following portions of 14 CFR Part 25 for 757-200 Passenger airplanes converted to Special Freighters by FAA Project ST2448WI-T:

"§25.783 (h), Amendment 25-54, as the airplane does not have a left hand door can be used in the event of a 9g landing;

"§25.807 (d)(1) and (e)(1), Amendment 25-72, as the airplane will not include a Type IV exit in both sides of the fuselage that is above the ditching waterline and equipped with automatically erected egress means usable in all emergency landing events;

"§25.810 (a)(1), Amendment 25-72, as the Door 1 Right slide will not be usable in a 9g landing event, and is being replaced with inertia descent devices;

"(§25.811 (f)(1)(2), request for exemption rescinded.)

"§25.812 (e), Amendment 25-58, as the flight deck configuration cannot accommodate floor proximity emergency escape path marking, and the proximity of occupant seating to the emergency exits allows for a degree of safety that would not be enhanced by path marking;

"§25.812 (h)(1), Amendment 25-58, as not all portions of the evacuee alighting zones have been shown to illuminated per requirements in cases of nose gear collapse;

"§25.813 (b), Amendment 25-72, as only one door will be available in a 9g landing, and the existing configuration does not allow for assist space near the emergency exits;

"§25.857 (e), Amendment 25-60, as one person in addition to the type certified flight deck crew may be carried to assist in cargo movement at the flight destination;

"§25.1445 (a)(2), Amendment 25-00, as all gaseous supplementary oxygen is to be provided through the flight crew system, which has been demonstrated to meet or exceed flight crew oxygen requirements while providing oxygen to the three other occupants, and includes standard individual outlet shutoff capability; and

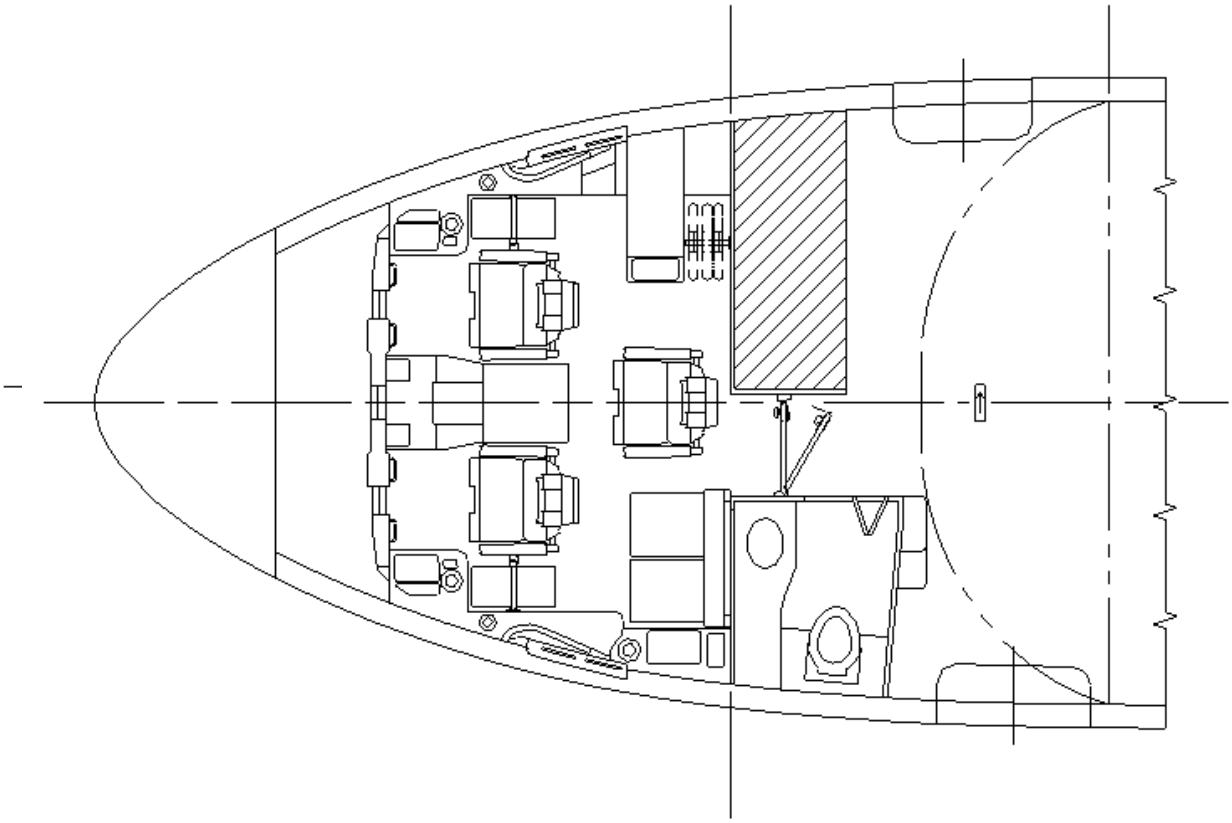
"§25.1447 (c)(1), Amendment 25-00, as quick-donning flight crew type masks will be utilized at seats certified for take off and landing. These seats are on the flight deck, affording direct command and oversight of all occupants by the flight crew.

"Boeing Airplane Services respectfully requests the FAA's consideration of the foregoing petition. Additionally, we ask that coordination necessary to obtain FAA concurrence and advisement for this petition be performed by the FAA Wichita ACO.

"Impact of Availability of Inertia Descent Devices on Application of Exemption

"In the event inertia reel descent devices are not available to support delivery of the initially modified airplane(s), the affected airplane(s) will be limited in total occupancy to the currently certified flight deck occupancy. Any grant of exemption will not be applicable to an airplane until all appropriate equipment and provisions to support the grant have been installed into the airplane. Upon installation of these equipment / provisions, the airplane occupancy placard will be revised to agree with the terms of the grant."

757 Special Freighter
Emergency Exit Arrangement



Attachment 1 to Petition Letter 3-J702-AC-00-066, Revisions 3 & 4:
Egress Provisions for 757-200 Special Freighter with
Five Person Maximum Occupancy

Notice and public procedure has been provided as follows:

On February 2, 2001 (66 FR8839), the FAA published a notice of the petition for exemption in the Federal Register and requested comments from the public. No comments were received in response to the notice.

The Federal Aviation Administration's analysis of the petition is as follows:

The aircraft certification regulations for transport category aircraft address airplane occupants as being either "crew" or "passengers." Due to differences in the training, physical capabilities, and other considerations relevant to crew members and passengers, the means required by part 25 to address emergency evacuation and emergency equipment requirements differ between requirements for passengers and those for crew members. Because supernumeraries are not crew members, they must be considered "passengers," by default, with respect to part 25. Nevertheless, it has been recognized that supernumeraries do hold a special status because of their unique training and other considerations. The FAA, therefore, has granted certain exemptions to allow the carriage of supernumeraries on cargo airplanes without compliance with all of the standards of part 25 for passengers, provided that certain other conditions were met. Those conditions have varied, depending on the airplane design, the nature of the proposals under consideration, and the number and location of persons to be carried.

The intent of **§ 25.783(h)** is to ensure that the door through which people enter an airplane is also useable as an emergency exit and meets the requirements of § 25.807 through § 25.813. The right-hand door will be used as the entry door for the special freighters and will comply with all of the requirements for an emergency exit, except for the sections of the regulations that are covered by this exemption.

The emergency exit provided on the left side of the airplane -- the No. 2 left flight deck window -- does not meet the minimum size requirements for a Type IV exit as required by **§ 25.807(d)(1).** The Boeing Company has previously demonstrated the utility of the No. 2 right flight deck window, and the usability of that exit opening with the evacuation means provided for a maximum occupancy of seven people on the flight deck of the Model 757-200PF. The No. 2 left flight deck window on the petitioner's airplane is a mirror image of the No. 2 right flight deck window that was demonstrated for utility and usability. Also, the three non-crew members of the airplane will have a higher level of training than a typical passenger, and will be more physically capable of evacuating the airplane using the reduced exit opening size provided on the left side of the airplane than normal passengers.

The emergency exit provided on the left side of the airplane -- the No. 2 left flight deck window -- also does not meet the minimum size requirements for a Type IV exit as required by **§ 25.807(e)(1)** for a ditching exit. As discussed above, the utility of the No. 2 right flight deck window and usability of that exit opening with the evacuation means provided for a maximum occupancy of 7 persons on the flight deck of the Model 757-200PF. The No. 2 left flight deck window on the petitioner's airplane is a mirror image of the No. 2 right flight deck window that was demonstrated for utility and usability. This demonstration would also

apply to evacuating the airplane for ditching. When life rafts are installed, they will be of a design that can be launched out of the No. 2 left flight deck window. Also, the three-non crew members of the airplane will have a higher level of training than a typical passenger, and will be more physically capable of evacuating the airplane using the reduced exit opening size provided on the left side of the airplane than normal passengers.

As stated above, because the training, physical capabilities, and other considerations of flightcrew members are different from those of normal passengers, the means required by part 25 to enable flightcrew members to reach the ground differ from those required for passengers. As an example, ropes are allowed as the sole means of escape for flightcrew members, but slides or equivalent means are required for passengers. Although supernumeraries must be considered "passengers" by default (because they are not crew members) under part 25, the FAA does recognize that supernumeraries normally have unique training and other considerations to perform their roles on board an airplane. As indicated previously, the FAA previously has granted exemptions to allow the carriage of supernumeraries on cargo airplanes without compliance with all of the requirements of part 25 applicable to passengers.

The issue of whether an escape rope or inertia reels with harnesses for trained supernumeraries provide an acceptable alternative to the escape slides required by part 25 for passengers is discussed in some length in Exemption No. 4808 and 4808A. (The FAA granted those exemptions to the Boeing Commercial Airplane Group in 1987 and 1997, respectively.) Similarly, the issue of whether inertia reels and harnesses provide an acceptable alternative to the escape slide is discussed in more detail in Exemption No. 5993A, which the FAA was previously granted in 1995 to the Boeing Commercial Airplane Group for Boeing 767-300PF airplanes.

The FAA recognizes that supernumerary occupants, as opposed to passengers, may be selected and trained appropriately in the use of escape ropes and inertia reels and harnesses. For such incapacitated occupants, the FAA considers that inertia reels and harnesses offer an acceptable escape means of emergency egress. The FAA considers that the petitioner's proposed installation of inertia reels and harnesses at the entry door and escape rope at the No. 2 left flight deck window provides an adequate level of safety for the petitioner's airplane configuration.

The intent of **§ 25.812(e)**, Amendment 25-58, is to provide floor proximity emergency egress lighting in the passenger areas of the airplane. The seats that will be occupied by the supernumeraries are located immediately aft of the flightcrew's seats on the flight deck. The emergency exit located on the on the left side of the airplane is directly adjacent to the supernumeraries' seats. The exit on the right side of the airplane is located approximately six feet behind the supernumeraries' seats on the other side of the flight deck smoke barrier. Over the exit there is an exit sign that identifies the exit and provides illumination of the exit operation handle and the floor area adjacent to the exit. This exit is the door that is used as the entry door for the airplane. This configuration does not provide floor proximity lighting required by § 25.812(e); however, both of the exits are in close proximity to the supernumeraries and supernumeraries have a higher level of training and knowledge of the

airplane configuration than the normal passenger. Therefore, the FAA finds that the configuration provides an acceptable level of safety.

With respect to the lack of an assist space adjacent to each exit as required by **§ 25.813(b)**, Amendment 25-70, the FAA has determined that the three non-crew members will have a higher level of training than a typical passenger, and will, therefore, have less need for crew assistance. Additionally, in the relatively small confines of the flight deck, the flightcrew can easily provide instructions and some physical assistance to the non-crew members, if needed.

The petitioner has requested relief primarily from the requirements of **§ 25.857(e)**, which permit carriage of cargo only when a Class E cargo compartment is installed on the airplane. Class E cargo compartments are usually remote from the flight deck 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 crew members are permitted on board such airplanes. The three supernumerary occupants will be located on the flight deck directly behind the flightcrew seats. The FAA has previously granted exemptions for carriage of persons in addition to crew on freighter airplanes, provided that certain other conditions are met. These conditions have varied, depending on the airplane design and the number of persons involved.

In all cases, there must be suitable means of preventing smoke penetration into areas that are occupied. In addition, due to the nature with which the fire is controlled, it is necessary to limit persons on board the airplane to those that have been found physically fit by the operator and have been briefed on the use of emergency equipment. The petitioner's design accounts for these considerations by:

- providing a smoke barrier that is part of the original airplane flight deck bulkhead that will be modified and tested to demonstrate compliance with the smoke penetration requirements for the flight deck, and
- proposing limitations on the occupants.

These are consistent with previous FAA approvals.

The petitioner has requested relief from the requirements of **§ 25.1445(a)(2)**, Amendment 25-00, which requires that, when a single source of oxygen is provided for the flightcrew and passengers, a means must be provided to shut off the passenger oxygen system in order to preserve emergency oxygen that is essential for use by the flightcrew. Each oxygen outlet to be used in the flight deck includes the capability to shut off the oxygen flow to individual outlets. The proximity of the non-operating occupants to the flightcrew allows the pilot and/or first officer to command the shutoff of these outlets. The petitioner has proposed a design of the system that is intended to provide oxygen to all five of the occupants as if they were all required flightcrew members. The quantity of oxygen that is available would be sufficient for all five occupants during emergency descent in response to

a rapid depressurization; or, in a fire detection event, during the descent phase and depressurized flight at 25,000 feet cabin altitude for the purpose of fire suppression.

In the petitioner's proposed configuration, the supernumeraries, upon command from the flightcrew, would shut off the oxygen flow to their own oxygen masks. The FAA does not find this to be equivalent to the flightcrew directly shutting off the oxygen flow to these outlets. However, the concept that the petitioner has proposed to supply all five occupants as if they were all flight crew on duty on the flight deck would not require an exemption from the requirements, because direct compliance with the requirements could be found. However, the amount of oxygen must be sufficient for operational requirements for the airplane mission. Advisory Circular 120-42A, "Extended Range Operation with Two-Engine Airplanes (ETOPS)" provides guidance material for the fire protection requirements. For class E cargo compartments the fire protection means is depressurized flight at 25,000 feet cabin altitude. This altitude would need to be maintained for the maximum diversion time for the airplane mission and would, therefore, require sufficient oxygen for that condition. Therefore, 30 minutes of depressurized flight at 25,000 feet cabin altitude for the purpose of fire suppression may not comply with the operational requirements of the airplane or the airplane mission.

The FAA considers that supernumeraries should have a supplemental oxygen system that is comparable to the automatically-presented mask system that is required for passengers. However, taking into account the extra knowledge and training that supernumeraries will have, the FAA does not consider that an equivalent system needs to be provided. The petitioner's proposal provides for masks that are installed in a readily accessible location and visible to all occupants, and that are of the "quick-donning" variety, which requires only a single motion to unstow the masks and put them on. The supernumeraries are located in close proximity to the flightcrew, and the donning of the oxygen masks by the flightcrew would be an indication for the supernumeraries to don their own oxygen masks. Also, the flightcrew would be able to instruct the supernumeraries how or when to put on the oxygen masks because they will be in close confines with the supernumeraries. Because the supernumeraries will be briefed on the location and donning procedures of these masks, as well as the signals to require the use of masks, the FAA finds that the difference in this system from a system that automatically presents masks provided to passengers in accordance with the requirements of **§ 25.1447(c)(1),** is acceptable. For the lavatory, the petitioner is noted to be proposing the installation of the two masks that will be automatically presented.

The Partial Grant of Exemption

In consideration of the foregoing, I find that a partial 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, Boeing Airplane Services is hereby granted an exemption, as explained below, from the following sections of 14 CFR:

Section	Amendment Level
§ 25.783(h)	Amendment 25-54
§ 25.807(d)(1)	Amendment 25-72
§ 25.807(e)(1)	Amendment 25-72
§ 25.810(a)(1)	Amendment 25-72
§ 25.812(e)	Amendment 25-58
§ 25.813(b)	Amendment 25-72
§ 25.857(e)	Amendment 25-60
§ 25.1447(c)(1)	Amendment 25-00

The exemption from these regulations allows the carriage of up to three persons, in addition to two crewmembers, in the flight compartment of the Boeing Model 757-200 series airplane converted from a passenger version to a Special Freighter under FAA Project ST2448WI-T. The following limitations apply:

1. The Airplane Flight Manual (AFM) must contain a limitation that occupancy of the flight deck is restricted to a maximum of five persons.

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

3. Each occupant must be briefed by a flightcrew member on the use of the exits and emergency equipment prior to each flight.

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

5. For the purpose of determining the amount of oxygen required on the airplane for airplane dispatch, all occupants on the flight deck must be considered as a member of the flight crew on flight deck duty.

Issued in Renton, Washington, on March 22, 2001.

/original signed by/
D. L. Riggin, Acting Manager
Transport Airplane Directorate
Aircraft Certification Service