October 31, 1991

Mr. David Bodlak
Director of Flight Operations
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P.O. Box 19064
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Dear Mr. Bodlak:

Thank you for your letter of July 3, 1990, which was forwarded to our office for a response by Mr. Timothy Titus, Assistant Chief Counsel, Kansas City, Missouri. In your letter you request an interpretation of Section 135.157 of the Federal Aviation Regulations (FAR). We apologize for the delay in answering your request. Your question is set forth below and is followed by pertinent parts of the FAR and our interpretation.

Question:

> I would like to request interpretations of FAR 135.157, pertaining to the quantity of oxygen required for flight in a pressurized aircraft (see attached). The interpretation is requested due to the multi-facility operation conducted by the Elliott organization. With FAR 135 Flight Operations based in Illinois, Iowa, Minnesota, and Nebraska; inconsistent methods of application used by local Flight Standards District offices creates concern about consistency of FAA interpretation and application of this regulation.

Pertinent Parts of the FAR:

Section 135.157 states, in pertinent part, that

> (b) Pressurized aircraft. No person may operate a pressurized aircraft-
>
> (1) At altitudes above 25,000 feet MSL, unless at least a 10-minute supply of supplemental oxygen is available for each occupant of the aircraft, other than the pilots, for use when a descent is necessary due to loss of cabin pressurization; and
>
> (2) Unless it is equipped with enough oxygen dispensers and oxygen to comply with paragraph (a) of this section whenever the cabin pressure altitude exceeds 10,000 feet MSL and, if the cabin pressurization fails, to comply with § 135.89(a) or to provide a 2-hour supply for each pilot, whichever is greater, and to supply when flying-
>
> (i) At altitudes above 10,000 feet through 15,000 feet MSL, oxygen to at least 10 percent of the occupants of the

aircraft, other than the pilots, for that part of the flight at those altitudes that is of more than 30 minutes duration; and

(ii) Above 15,000 feet MSL, oxygen to each occupant of the aircraft, other than the pilots, for one hour unless, at all times during flight above that altitude, the aircraft can safely descend to 15,000 feet MSL within four minutes, in which case only a 30-minute supply is required.

Assumptions:

The examples, which were submitted with your letter, have common elements. We will discuss those pertinent elements in general terms along with the legislative history to explain the provisions of the rule. The common elements of your examples are: 1) the aircraft are operated below 25,000 feet mean sea level (MSL) (except for "Example 4"), 2) while the pressurization system is operating the cabin pressure altitude is maintained below 10,000 feet, and 3) after the pressurization system fails, the aircraft descends to 10,000 feet MSL or below (the examples vary in the amount of time used to make the descent to 10,000 feet or below). We make the following assumptions regarding your examples: 1) that the aircraft is certificated to maintain a cabin pressure altitude of 10,000 feet or below at the altitudes given in your examples, 2) that the descent to 10,000 feet or below is made in accordance with the emergency procedures specified in the Airplane Flight Manual without exceeding the operating limitations of the aircraft, 3) that terrain and operating limitations allow the descent to and continued flight at 10,000 feet or below, and 4) that a successful termination of the flight does not require a flight altitude higher than 10,000 MSL.

Pertinent Preamble Language and Civil Aeronautics Manual (CAM) Interpretations:

The oxygen requirements in Section 135.157 began with Parts 42 and 42a. Amendment 42-2 to Part 42 of the CAR, which was effective October 21, 1949, was published in 14 Federal Register (F.R.) 5310, dated August 26, 1949. The preamble language to Amendment 42-2 stated, in pertinent part, that

> This amendment is designed to require a more adequate supply of oxygen to be provided for both flight crew and passengers . . . [and] to make provisions for oxygen supply in pressurized cabin airplanes in the event of pressure failure.
>
> It should be noted that the amendment permits a degree of flexibility in required passenger oxygen supply at altitudes above 14,000 feet to and including 15,000 feet. This flexibility is provided to permit an air carrier to operate older-type aircraft at such altitudes for the short periods of time necessary to clear terrain in certain areas of the country or to fly over localized weather or traffic conditions along the route without imposing the economic penalty that strict compliance with these regulations would require and which flight experience in the past several years would not indicate to be necessary. It will continue to be the Primary responsibility of the air carrier to carry sufficient supply of oxygen for passenger safety and comfort at any altitude flown including altitudes above 14,000 to and including 15,000 feet. (Emphasis added)

Amendment 42-15 to Part 42 of the CAR, which was effective September 1, 1958, was published in 23 F.R. 6748 dated August 30, 1958, created oxygen supply provisions for turbine-powered aircraft. The preamble language to that amendment stated, in pertinent part, that

> The particular characteristics of turbine-powered airplanes which dictate a need for somewhat different requirements relative to the use of supplemental oxygen than those applicable to piston-engine airplanes are higher operating altitudes at the time of a possible decompression combined with excessive fuel consumption by these turbine-powered airplanes at low altitudes which may require continued cruise at an altitude demanding sustaining oxygen to enable the airplane to reach a suitable landing field.
>
> On those flights wherein operations are conducted above 25,000 feet, the need for rapid action on the part of all occupants precludes waiting until an emergency occurs to instruct the passengers in the use of oxygen equipment. A provision, therefore, is being included to require briefing of the passengers prior to such operations.
>
> For all airplanes operating above 25,000 feet, oxygen and dispensing equipment must be provided for all passenger cabin occupants as well as the crew. Although a rapid descent of the airplane generally will be possible, it is felt that a 10-minute supply of oxygen would be the minimum

> amount that could be provided which would insure an adequate quantity for descent from higher altitudes in the event that circumstances prevent realization of the demonstrated descent rate. For purposes of computing a quantity of oxygen for descent, a uniform descent for the 10-minute period would be assumed.
>
> The requirements for airplanes with pressurized cabins shall be determined on the basis of cabin pressure altitude and upon the assumption that a cabin pressurization failure will occur at that altitude or point of flight which is most critical from the standpoint of oxygen need, and that, after such failure any descent to a flight altitude that will permit successful termination of the flight will not exceed the operating limitations of the airplane. (Emphasis added)

The Federal Aviation Agency, the predecessor to the FAA, published the Civil Aeronautics Manual (CAM). The CAM for Part 42a dated November 11, 1963, entitled "Certification and Operation Rules for Commercial Operators and Air Taxi Operators; Small Aircraft" contains FAA interpretations of the regulations in Part 42a. The interpretations contained in the CAM for Part 42a state, in pertinent part, that

> 42.27-2 Computation of supply for passengers in pressurized cabin aircraft (FAA policies which apply to sec. 42.27(b))
>
> (a) Cabin altitudes less than 10,000 feet. When a pressurized cabin aircraft is certificated to fly with a cabin pressure altitude no greater than 10,000 feet, only the supply of oxygen stipulated by section 42.26(b) need be provided for passengers. In determining this supply the following policies should be considered:
>
> (1) The altitude which should be used in computing the, supply of oxygen required by this section should be the altitude to which the aircraft would descend following a cabin pressurization failure. Considering terrain clearance and operation limitations. (Emphasis added)

Section 135.157(b)(1) was adopted as a new section in the October 10, 1978, revision of Part 135 (43 F.R. 46471). The preamble language regarding this section on page 46769 states only that "Section 135.157(b)(1) is adopted in this subpart instead of in §135.89 because it is a passenger oxygen equipment requirement." Additionally, the preamble language to §135.157 states, in pertinent part, that

> §135.157 Oxygen equipment requirements. (Proposed §135.129.)

Some commenters oppose combining the requirements for pressurized and un-pressurized aircraft. They urge retaining the current requirements. The commenters also state that if the rule is adopted, certain pressurized aircraft now in service would require costly modifications, which are not justified in the interest of safety. Inherent differences exist in operating characteristics between pressurized and un-pressurized aircraft. A distinction should be made between them. Current §135.77 contains requirements for pilot's use of oxygen and current §135.157 contains oxygen equipment requirements. Both have separate provisions for pressurized and un-pressurized aircraft. Section 135.157 is revised to carry forward this distinction.

Answer:

A principle of statutory construction is that when any doubt arises in the enacted part of a statute (e.g., regulation), the preamble language may be used to help discover the intention of the drafters. The preamble language quoted in this document shows that the overall intent of the drafters of the original regulations regarding oxygen is to require an air carrier to plan for and provide enough oxygen to safely conduct operations in pressurized and un-pressurized aircraft at various altitudes. The preamble language discusses maintaining operational flexibility, maintaining the distinction between pressurized and un-pressurized aircraft through different oxygen supply requirements, and avoiding costly modifications on pressurized aircraft. The implication from this language is that the drafters realized the virtual impossibility of providing specific, definitive regulatory language that applies to all possible operational situations concerning oxygen supply. Therefore, the drafters clearly state in the preamble language, that their intent is to place the primary responsibility for carrying a sufficient supply of oxygen for passenger safety and comfort "at any altitude" on the air carrier. Although the drafters recite some specific factors, such as terrain and aircraft operating limitations, the result is that an air carrier must plan for and consider all factors that may affect passenger "safety and comfort at any altitude."

The preamble language reveals additional intentions of the drafters, which is summarized, in pertinent part, as follows: 1) to require certain minimum oxygen supply requirements for those pressurized aircraft that operate above 25,000 feet MSL; and 2) to compute the oxygen supply requirements for pressurized aircraft, which fly at an altitude of 25,000 feet MSL or below, based on the altitude that the aircraft descends to after a pressurization failure (assuming the aircraft is certificated to maintain a cabin pressure altitude of 10,000 feet or less before the pressurization failure).

We can apply the intentions of the drafters revealed by the preamble language to the language used in the current rule to determine the regulatory requirements contained in Section 135.157 as follows:

Section 135.157(b)(1)-

No person (e.g., an air carrier) may operate (e.g., conduct an operation) a pressurized aircraft at altitudes above 25,000 feet MSL, unless at least 10-minute supply of oxygen for each occupant of the aircraft "for use when a descent is necessary due to loss of cabin pressurization." The words "at least" combined with the preamble language "that a 10-minute supply of oxygen would be the minimum amount that could be provided which would insure an adequate quantity for descent from higher altitudes" makes that 10-minute supply a minimum requirement. Referring to the intent of the drafters in the preamble language, the air carrier has the responsibility to increase that minimum if "passenger safety and comfort" require additional amounts of oxygen.

Section 135.157(b)(2)-

The first part of the beginning sentence in this section states "Unless it is equipped with enough oxygen dispensers and oxygen to comply with paragraph (a) of this section whenever the cabin pressure altitude exceeds 10,000 feet MSL . . .." The preamble language and the CAM show that this language is a modification of the original language in Part 42a that provided, in pertinent part, "When a pressurized cabin aircraft is certificated to fly with cabin pressure altitude greater than 10,000 feet . . .." Since the drafters of the present language in Part 135 did not express a contrary intent, we are of the opinion that the drafter's intent remains unchanged and that the language refers to an aircraft with a pressurized cabin that is certificated to fly with a cabin pressure altitude greater than 10,000 feet. In this situation, those aircraft must meet the same oxygen supply requirements for passengers as un-pressurized aircraft in paragraph "(a)" of Section 135.157 (paragraph "(a)" also contains requirements to comply with the pilot oxygen requirements in Section 135.89(a)).

The remaining part of the beginning sentence in Section 135.157(b)(2) states that "and, if the cabin pressurization fails, to comply with § 135.89(a) or to provide a 2-hour supply for each pilot, whichever is greater, and to supply when flying- .." the oxygen supply requirements in Section 135.17(b) (2) (i) or Section 135.157 (b) (2) (ii) . If the

conjunction "and" is read literally, the result subjects an operator to both the requirements of Section 135.157(a) and the requirements in Sections 135.157(b)(2), including Section 135.157(b)(2)(i) or Section 135.157(b)(2)(ii). Because some of the oxygen supply requirements in Section 135.157(a) differ from some of the oxygen supply requirements in 135.157(b) (e.g., Section 135.157(a)(2) versus Section 135.157(b)(2)(ii)), an absurdity would result that makes the requirements inconsistent. A principle of statutory construction allows elimination or disregarding of a word where the inclusion of that word would lead to an absurdity, irrationality, or elimination is necessary to avoid inconsistencies and harmonize the provisions of a regulation. Our opinion is that the language used in this part of the sentence establishes separate oxygen supply requirements in the event of a pressurization failure. Therefore, these requirements are separate and not in addition to the requirements in the beginning of this sentence concerning aircraft with a pressurized cabin that is certificated to fly with a cabin pressure altitude greater than 10,000 feet.

The words "when flying" are used at the end of the sentence in Section 135.157(b)(2). The CAM to Part 42a explained that the oxygen supply requirements for pressurized aircraft that is certificated to fly with a cabin pressure altitude no greater than 10,000 feet is based on the altitude that the aircraft descends to after a pressurization failure. Therefore, our opinion is that the oxygen supply requirements in Sections 135.157(b)(2)(i) and 135.157(b)(2)(ii) are applicable to an aircraft with a pressurized cabin that experiences a pressurization system failure and, after the pressurization failure, because of operational factors (e.g., terrain) must continue to fly above 10,000 feet MSL.

If an aircraft with a pressurized cabin is flying at an altitude of 25,000 feet MSL or below and the pressurization system fails and the flight continues to fly at an altitude "above 10,000 feet through 15,000 feet MSL, oxygen to <u>at least</u> 10 percent of the occupants of the aircraft, other than the pilots, for that part of the flight of more than 30 minutes duration" must be provided under Section 135.157(b)(2)(1) (emphasis added). If an aircraft with a pressurized cabin is flying at an altitude of 25,000 feet MSL or below and the pressurization system fails and the flight continues to fly at an altitude "above 15,000 feet MSL, oxygen to each occupant of the aircraft, other than the pilots, for one hour unless, at all times during the flight above that altitude, the aircraft can safely descend to 15,000 feet MSL within four minutes, in which case only a 30-minute supply is required" under Section 135.157(b)(2)(ii).

If an aircraft with a pressurized cabin is flying at an altitude of 25,000 feet MSL or below and the pressurization system fails, neither Section 135.157(b)(2)(i) nor Section 135.157(b)(2)(ii) require a supply of oxygen for passengers if the aircraft descends to and continues to fly at 10,000 feet MSL or below. However, we must again consider the intent of the drafters which stated in the preamble language that "It will continue to be the primary responsibility of the air carrier to carry sufficient supply of oxygen for passenger safety and comfort at any altitude flown." Therefore, the air carrier must carry sufficient oxygen for passenger safety and comfort while descending from "25,000 feet MSL or below" to "10,000 feet MSL or below."

We emphasize the responsibility placed on the air carrier to carry sufficient oxygen and that oxygen amounts should be calculated based on "the assumption that a cabin pressurization failure will occur at that altitude or point of flight which is most critical from the standpoint of oxygen need." We point out that if an operator does not carry sufficient oxygen aboard a flight, such insufficient oxygen quantity "may endanger the life or property of others" and would constitute a violation of Section 91.13 of the FAR. Section 91.13(a) provides that "No person may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another." Furthermore, the endangerment need not be actual, and a violation exists if the insufficient oxygen quantity subjects life or property to potential endangerment.

Regarding calculating the time of the descent after a pressurization system failure, the intent of the drafters from the preamble language is to require the pilots of a pressurized aircraft that experiences a pressurization failure to descend in accordance with the emergency procedures specified in the Airplane Flight Manual without exceeding its operating limitations to a flight altitude that will permit successful termination of the flight.

We have sent a copy of your letter to the Commuter/Air Taxi Branch of the Flight Standards Service to conduct appropriate calculations in order to answer your specific examples in accordance with the guidance given in this interpretation.

This interpretation was prepared by David Metzbower, Staff Attorney, Operations Law Branch; Richard C. Beitel, Manager. This interpretation has been coordinated with the Air Transportation Division of the Flight Standards Service.

We hope this satisfactorily answers your inquiry.

Sincerely,

Donald P. Byrne
Assistant Chief Counsel
Regulations and Enforcement Division