Exemption No. 2087B

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C. 20591

In the matter of the petition of	*	
	*	
Allison Gas Turbine Division	*	
of General Motors Corporation	*	Regulatory Docket No.
	*	26072 (13294)
for an exemption from Section 33.69	*	
of the Federal Aviation Regulations	*	

GRANT OF EXEMPTION

By letter dated November 6, 1989, Allison Gas Turbine Division (Allison), Post Office Box 420, Indianapolis, Indiana 46206-0420, petitioned for an amendment to Exemption No. 2087A, issued on September 14, 1981, to expand the installation eligibility of Allison Model 250 series turboshaft engines on Type Certificate (TC) E1GL to include Transport Category A rotorcraft certificated under either Part 29 of the Federal Aviation Regulations or Part 7 of the Civil Air Regulations.

Section of the FAR affected:

> Exemption No. 2087A granted Allison an exemption from Section 33.69 of Part 33 to the extent necessary to permit type certification of Model 250 series turboshaft engines without the engines having at least two igniters and two separate secondary electric ignition circuits. As specified in Note 12 of TC data sheet E1GL the exemption contains the limitation that the engines are not eligible for installation on Transport Category A rotorcraft certificated under Part 29 of the Federal Aviation Regulations or under Part 7 of the Civil Air Regulations. The petitioner is now requesting removal of this limitation to allow the engine to be eligible for use in rotorcraft certified in any category.

The petitioner supports its request with the following information:

> In over 20 years of flight experience in which over 51 million flight hours were accumulated there have been no recorded in-flight shutdowns as the result of failure of an ignition system component. The petitioner asserts that this service experience supports the contention that the granting of Exemption No. 2087A and Exemption No. 219A (an exemption similar to No. 2087A but applicable to Allison Model 250 series turboshaft engines on Type Certificate E4CE which

have CAR 13, not FAR 33, as the certification basis) has not adversely affected safety and was in the public interest.

The petitioner notes that the Model 250 series turboshaft engines are unique since they have a single combustion chamber with a single fuel nozzle, and therefore not subject to the flame propagation problems associated with multiple combustion chambers and nozzles. Consequently, the petitioner contends that a second igniter would not improve the airworthiness of the engine but would only add weight and complexity.

A summary of the petition was published in the Federal Register on September 20, 1991 (55 FR 38774), and two comments were received.

The Federal Aviation Administration's (FAA) analysis/summary is as follows:

The FAA acknowledges the long and satisfactory service experience of the Allison Model 250 series engines with single ignition. These engines have operated successfully for over 20 years under Exemption No. 2087A or Exemption No. 219A in many types of rotorcraft. The only question here is whether it is advisable to remove the prohibition against allowing the use of these engines in rotorcraft certificated as Category A under FAR 29 or CAR 7. Our analysis concludes that it is reasonable to authorize the requested amendment to Exemption No. 2087A. FAR 29 and CAR 7 require the following safety-enhancing characteristics in Category A rotorcraft: (1) the rotorcraft must be multiengine; (2) the design must be such that no single failure can cause the loss of more than one engine; and (3) the rotorcraft must be certificated at a weight which will assure a minimum climb capability in the event of an engine failure and with adequate surface area to assure a safe landing in the event an engine fails early in the takeoff run.

These characteristics of Transport Category A rotorcraft ensure a greater level of inherent safety compared to the rotorcraft which have already demonstrated satisfactory performance for many years and millions of flight hours with single ignition systems. Therefore, aviation safety will not be adversely affected by granting the requested amendment to Exemption No. 219A.

It is noteworthy that the original version of CAR 13.211 only required that an engine be equipped with an ignition system for starting the engine on the ground and in flight. The requirement that "an electric ignition system shall have at least two igniters and two separate secondary electric circuits" was added to CAR 13.211 (and eventually perpetuated by FAR 33.69) by Amendment 13-3, effective October 1, 1959. The preamble to that amendment justified

the requirement on the ground that it will "afford reliability similar to that obtained with reciprocating engines employing dual electric ignition systems." The aforementioned service experience clearly shows that Allison Model 250 turboshaft engines with single ignition satisfy the intent of the regulation.

The two commenters to the Rules Docket on the matter agreed with Allison's position and encouraged the FAA to grant the amendment to the exemption, citing the excellent safety record of the Model 250 series engine with the present ignition system. These commenters both envision using Allison Model 250 series engines with single ignition in their Transport Category A rotorcraft projects "because of its outstanding safety and maintenance record."

In consideration of the foregoing, I find that a grant of exemption would not adversely affect safety and would be in the public interest. Therefore, pursuant to the authority contained in Sections 313(a) and 601(c) of the Federal Aviation Act of 1958, delegated to me by the Administrator (14 CFR 11.53), Exemption No. 2087A is amended to grant Allison an exemption from Section 33.69 of the Federal Aviation Regulations to the extent necessary to permit the type certification of the Model 250 series turboshaft engines on Type Certificate E1GL with only one igniter and one secondary electric ignition circuit, for use in all rotorcraft, regardless of whether the rotorcraft is certificated under Part 6 or Part 7 of the CAR, or Part 27 or Part 29 of the FAR, and regardless of whether the rotorcraft is designated as Category A or Category B. Accordingly, the limitation contained in Note 12 of Type Certificate data sheet E1GL prohibiting the use of the engines with single ignition system in Category A rotorcraft will be removed.

Issued in Burlington, Massachusetts on December 10, 1991.

/s/ Jack A. Sain
Manager, Engine & Propeller Directorate
Aircraft Certification Service