

proposal, but this term is in the existing AC 120-42A policy and has been applied successfully since issuance of the AC. Therefore, the FAA has tentatively chosen to retain the term "approximately" as used in the existing AC policy in this proposed rule.

We have added the qualifier "or less" to the proposed in-flight shutdown rate requirement. Without this term, the rule could be interpreted to mean that the in-flight shutdown rate "must" be the approximate value specified. We clearly do not intend that an applicant with an in-flight shutdown rate well below the requirement would not be in compliance with the rule. We have added this additional qualifier in order to clarify this intent.

The original ARAC recommendation for operations up to 120 minutes was written in the following manner: "with a required list of corrective actions that would result in continuing improvement toward an IFSD rate of 0.02 per 1000 fleet engine-hours." We have added "in the CMP document" in order to clarify where the list of corrective actions must be contained.

For the proposed requirements for both operations up to 180 minutes and operations greater than 180 minutes we have added a provision that considers the effect that existing or new CMP standards have on compliance with the required in-flight shutdown rate. In the past, we granted ETOPS approvals using a 180-minute CMP standard developed from the 120 minute ETOPS CMP documents. This has occurred when the applicant has substantiated, through service experience, additional requirements that would achieve the desired in-flight shutdown rate for those airplanes incorporating the additional requirements. The added provision proposed in this notice is a statement of existing practice for granting 180-minute ETOPS approval where the 120-minute standard had to be modified. This notice proposes to codify this existing practice into the rule as noted above.

II(a)(5) Airplane Flight Test Requirements

This paragraph would require a flight test to validate the adequacy of the airplane's flying qualities, performance, and the flight crew's ability to deal with engine inoperative and non-normal worst case system failure conditions expected to occur in service.

Explanation

This paragraph would codify the intent of paragraph 8(d)(3) of AC 120-42A. The original ARAC proposed paragraph stated that the proposed flight

test would validate "non-normal worst case probable system failure conditions." This proposed wording would not adequately reflect how the FAA has applied the AC paragraph being codified.

The term "probable" as used in the original ARAC proposal would have a specific meaning within the type certification community. As defined by Advisory Circular 25.1309-1A, probable failures are those anticipated to occur one or more times during the entire operational life of each airplane. Probable failures would most likely only include significant single failures, or more frequent double failures. However, we have required applicants for ETOPS type design approval under AC paragraph 8(d)(3) to demonstrate multiple failure conditions that are much less frequent in service, such as

- (i) the loss of all normal electrical power;
- (ii) flight controls powered by an emergency backup hydraulic source; and
- (iii) loss of normal flight instruments.

These types of failure conditions would be expected to occur during the life of a fleet of airplanes, but not necessarily on each airplane. We believe that ARAC may have intended to include these failure conditions by using the qualifying term "worst case" in their proposal, however, we are not confident that it would be interpreted correctly with the wording as ARAC proposed. We have deleted the word "probable" and replaced it with system failure conditions "expected to occur in service" in the proposed rule. This clarification more accurately reflects how the FAA has applied the paragraph 8(d)(3) of AC 120-42A.

II(b) Early ETOPS Method

This part of section II defines requirements that an applicant would have to comply with to certify an airplane for ETOPS without first accumulating the service experience that would be required in section II(a).

Explanation

This section would codify the early ETOPS process defined in the Boeing Model 777 ETOPS special conditions 25-ANM-84 for two engine airplanes. These special conditions defined requirements that allowed the FAA to approve the Boeing Model 777 airplane for ETOPS without the service experience normally expected under the policy in AC 120-42A. The intent of this proposed sub-section of Appendix L is to define requirements that would allow the FAA to grant ETOPS approval

concurrent with the original type certification of an airplane.

II(b)(1) Relevant Experience Assessment

The applicant would have to identify specific corrective actions taken on the airplane design to address relevant design, manufacturing, operational and maintenance problems experienced on previously certified part 25 airplanes manufactured by the applicant. Specific corrective actions would not be required if the nature of the problem is such that it would not have a significant impact on the safety or reliability of the system. The proposed rule would require that this assessment include the relevant experience of supplier provided ETOPS Group 1 significant systems and similar or identical equipment utilized on aircraft built by other manufacturers.

Explanation

This proposed rule would codify paragraph (c)(2) of the Boeing Model 777 ETOPS special conditions 25-ANM-84. The term "relevant experience" as used in the proposed rule means the design, manufacturing, operational or maintenance problems that have, or could have, resulted in the types of occurrences that would be included in propulsion system and airplane system assessments conducted in accordance with a service experience based ETOPS approval process proposed in section II(a).

The intent of this proposed requirement is to take advantage of service experience on other airplane types built by the applicant as much as is practical. This relevant experience assessment is in lieu of service experience on the actual airplane to be approved and is a major compensating factor for that direct service experience.

One of the five key elements of the early ETOPS process on the Boeing Model 777 was the "relevant experience assessment," or "lessons learned." Simply stated, the intent is for the applicant to review the failures on previous airplane/engine combinations, and assure that the causes of those failures are mitigated. While simple in concept, the execution of this assessment is significant in scope. One of the most significant aspects of this proposed rule is that an applicant with no previous transport category manufacturing experience would not be eligible to receive early ETOPS approval. The FAA considers the relevant experience assessment as elemental to the early ETOPS process. Without the ability to perform this assessment including lessons learned on manufacturing and engineering processes, the FAA could not