

in final selection of awards under the program.

(d) Experimental Program to Stimulate Competitive Research

The purpose of the DOE Experimental Program to Stimulate Competitive Research is to enhance the capabilities of the eligible designated states to develop science and engineering manpower in energy-related areas and to conduct nationally competitive energy-related research. Planning committees within eligible states may apply for planning, implementation and/or training efforts (list of eligible states and activities to be supported in any given year as well as cost-sharing requirements are available from the program office). Separate applications for planning/implementation and graduate traineeships are required. Planning/implementation applications must contain information that details development of a state-wide improvement plan for energy-related research and human resources, while training grant applications must detail the need for energy-related specific and technical educational disciplines.

(e) Nuclear Engineering Research

The objective of this program is to support research efforts aimed at strengthening University-based nuclear engineering programs. Specific areas of basic and applied research of interest include, but are not limited to: (1) Material behavior in a radiation environment typical of advanced nuclear power plants; (2) real-time instrumentation that identifies and applies innovative measurements technologies in nuclear-related fields; (3) advanced nuclear reactor concepts; (4) applied nuclear sciences that address improvements in the applications of radiation and the understanding of the interaction of radiation with matter; (5) engineering science research applicable to advanced nuclear reactor concepts, industry safety and reliability concerns; (6) neutronics that address improvements in reactor computational methodologies and knowledge of the basic fission processes; and (7) nuclear thermal hydraulics that address improvements of models and analysis of thermal hydraulic behavior in an advanced nuclear reactor system.

(f) Used Energy-Related Laboratory Equipment (ERLE) Program

In accordance with DOE's responsibility to encourage research and development in the energy area, grants of used energy-related laboratory equipment for use in energy-oriented educational programs in the life,

physical and environmental sciences, and engineering are available to universities, colleges and other non-profit educational institutions of higher learning in the United States. An institution is not required to have a current DOE grant or contract in order to participate in this program. The program office should be contacted for specific information on how to access the list of equipment eligible for grant. The cost of care and handling incident to the grant must be borne by the institution.

9. The Office of Program Analysis

The Office of Program Analysis conducts assessments to identify research opportunities in specific areas of interest to DOE programs.

[FR Doc. 92-14626 Filed 6-22-92; 9:46 am]

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 21 and 36

[Docket No. 26910; Notice No. 92-71]

RIN 2120-AE50

Alternative Noise Certification Procedure for Normal, Transport, and Restricted Category of Helicopters not Exceeding 6,000 Pounds Maximum Takeoff Weight

AGENCY: Federal Aviation Administration, (DOT).

ACTION: Notice of Proposed Rulemaking (NPRM).

SUMMARY: This document proposes to add a new appendix to the noise standard regulations. The proposed appendix provides for an alternative noise certification procedure for normal, transport, and restricted category helicopters not exceeding 6,000 pounds maximum takeoff weight. The proposal complements existing helicopter noise requirements and is not an additional regulatory requirement. Applicants for certification may demonstrate compliance with the noise standards of either appendix H or the less costly but more stringent appendix J.

DATES: Comments must be submitted on or before July 6, 1992.

ADDRESSES: Send comments on this proposal to: Federal Aviation Administration, Office of the Chief Counsel, Attn: Rules Docket (AGC-10), Docket No. 800 Independence Avenue, SW, room 915G, Washington, DC 20591 or deliver comments in triplicate to: FAA Rules Docket, room 915G, 800

Independence Avenue, SW, Washington, DC 20591. Comments may be inspected in room 915G between 8:30 a.m. and 5 p.m., weekdays, except Federal holidays.

FOR FURTHER INFORMATION CONTACT:

Mr. Kenneth E. Jones, Research and Engineering Branch (AEE-110), Technology Division, Office of Environment and Energy, FAA, 800 Independence Avenue, SW., Washington, DC 20591; telephone (202) 267-3554, facsimile (202) 267-5594.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested persons are invited to participate in this rulemaking by submitting written data, views, or arguments and by commenting on the possible environmental, energy, or economic impacts of this proposal. Comments should identify the regulatory docket or notice number and be submitted in triplicate to the address above. All comments received, as well as a report summarizing any substantive public contact with Federal Aviation Administration (FAA) personnel on this rulemaking will be filed in the docket, and will be considered by the Administrator before taking action on this proposed rulemaking. The docket is available for public inspection both before and after the closing date for comments. The FAA will acknowledge the receipt of a comment if the commenter includes a self-addressed, stamped postcard on which the following statement is made: "Comments to Docket No. 26910." When the comment is received by the FAA, the postcard will be dated, time stamped, and returned to the commenter.

Availability of the NPRM

Any person may obtain a copy of this notice of proposed rulemaking (NPRM) by submitting a request to the Federal Aviation Administration, Office of Public Affairs, Attention: Public Information Center, APA-230, 800 Independence Avenue, SW, Washington, DC 20591, or by calling (202) 267-3474. Requests should be identified by the docket number of this proposed rule. Persons interested in being placed on a mailing list for future notices of proposed rulemaking should also request a copy of Advisory Circular No. 11-2, Notice of Proposed Rulemaking Distribution System, which describes the application procedure.

Background

Helicopter Noise Standards Development: FAA

On July 9, 1979, the FAA first addressed helicopter noise certification requirements with a notice of proposed rulemaking (NPRM), Notice No. 79-13 (44 FR 42410). After further consideration of the economic impact of the proposed rule, this NPRM was withdrawn (46 FR 61486, December 17, 1981). Because of advances in helicopter noise abatement technology, the FAA again initiated rulemaking action with NPRM No. 86-3 (51 FR 7878, March 6, 1986), which resulted in the present helicopter noise certification standards, part 36, appendix H (53 FR 3534, February 5, 1988). Appendix H was effective upon publication.

Data submitted recently to the International Civil Aviation Organization (ICAO) by various helicopter manufacturers indicates that the cost of an appendix H noise test for a light helicopter can range from \$121,000 to \$239,000. These figures do not include the substantial non-recurring costs for equipment and training. In addition, because the current rule requires that an applicant for a Supplemental Type Certificate (STC) either demonstrate that the modified helicopter is no noisier than the original helicopter, or perform a noise test, the costs associated with helicopter STC's have had an adverse effect on the development of helicopter modifications.

In the 1980's, the United States (with appendix H) and other interested countries adopted a complex and comprehensive helicopter noise test procedure that was previously developed with the support of ICAO. During the development of the ICAO-recommended procedure for the original helicopter noise certification requirements, the relative cost and complexity of the proposed testing procedures were debated as a potential problem for manufacturers of small, low-cost helicopters. Because the majority of civil helicopters produced in the United States are exported, the unilateral adoption by the United States of an additional simplified noise certification procedure for light helicopters would have little practical benefits for the U.S.-manufacturers without the adoption of a similar procedure by foreign countries that would make U.S. manufactured helicopters acceptable to importing nations. Therefore, the United States and other interested countries addressed this issue by participating in the research and development of a

simplified noise certification procedure with the support of ICAO. In this document, the FAA is proposing a similar version to provide immediate regulatory relief to U.S. light helicopter manufacturers and modifiers in anticipation of the formal adoption of the standards proposed by ICAO.

Helicopter Standards Development: ICAO

The current ICAO helicopter noise standards (chapter 8, annex 16) parallel those of the United States. When ICAO adopted its helicopter noise standards in 1985, it recognized that a simple flight test procedure was needed for lighter helicopters. Accordingly, the ICAO committee responsible for formulating noise certification standards, the Committee on Aviation Environmental Protection (CAEP), formed a working group and charged it with the development of a new standard applicable to light helicopters. The product of the working group's efforts, an alternative noise certification procedure for piston-powered helicopters, was amended at the request of the United States during the most recent CAEP meeting (December 1991) to include turbine-powered helicopters and to establish the maximum weight at 6,000 pounds. Compared to the current ICAO standard (chapter 8), the new ICAO chapter 11 standard will: (1) Change the noise metric from Effective Perceived Noise Level (EPNL) to Sound Exposure Level (SEL); (2) reduce the required microphone locations from three to one; (3) require only a level flyover test instead of level flyover, approach, and takeoff tests; and (4) reduce the complexity of the data corrections procedures. However, these changes make it impossible to set a limit that is equally stringent for all helicopters. For this reason, it was undesirable to attempt to develop a replacement standard for the existing ICAO chapter 8 standard. Thus, the CAEP decided to develop an alternative standard (ICAO chapter 11) that is simpler to perform, but that has an SEL limit that is more stringent (by two decibels) than the current ICAO chapter 8 EPNL limit. After an extensive analysis of existing data, the CAEP set the chapter 11 SEL limit such that it is unlikely that an applicant would pass the newly recommended ICAO chapter 11 standard and yet fail a full ICAO chapter 8 test if the chapter 8 were also performed.

The new ICAO chapter 11 standard was approved by the CAEP during the December 1991 meeting in Montreal, Canada. The CAEP approval was the major hurdle facing the new ICAO

standard. Before formal adoption, the CAEP recommendations must be submitted to the ICAO Council, which in turn will send them to ICAO member States for comment. If member States unanimously concur, the Council will issue the recommended standard. If member States do not concur, the Council will refer the issue to the ICAO Air Navigation Commission (ANC) along with member States's comments. The ANC will review the CAEP recommendations and member States' comments, and make recommendations to the Council, which in turn will send the revisions back to the member States for approval. The ICAO staff estimates that the new ICAO chapter 11 would be formally adopted in November 1993.

Synopsis of the Proposal

Part 36 of the Federal Aviation Regulations (14 CFR) contains noise standards for aircraft type and airworthiness certification. Subpart H and the related appendix H of part 36 prescribe noise levels and test procedures for civil helicopters certificated in the normal, transport, or restricted category, including rules governing the issuance of original, amended, or supplemental type certificates for helicopters for which application is made on or after March 6, 1986.

This proposal would add and reserve a new appendix I, and add a new appendix J to part 36. It would also amend subpart H of part 36 to incorporate the requirements of the new appendix J. The proposed amendments to subpart H and the new requirements of appendix J would not represent additional regulatory requirements, but rather would provide an alternative helicopter noise verification procedure for light helicopters (the term "light helicopters" as used in this preamble refers to helicopters in the normal, transport, or restricted category not exceeding 6,000 pounds maximum certificated takeoff weight) that complements the existing helicopter noise test requirements of appendix H. Compared to the existing appendix H requirements, the procedures under the proposed appendix J are simpler and less costly, but more stringent relative to the existing noise limits under appendix H. An applicant would have the option of certifying a light helicopter under appendix H or the new, less costly but more stringent appendix J. The noise limits prescribed under the proposed appendix J are, on the average, two decibels more stringent than the noise limits prescribed under appendix H. If an applicant fails the more stringent

limits prescribed under appendix J, the applicant would be able to apply for certification under the existing requirements prescribed under appendix H.

The need for this optional certification standard is based on the unanticipated and disproportionate costs to small helicopter manufacturers that are associated with the testing requirements of appendix H.

The following is a section-by-section discussion of the proposed rule.

Section 21.115 Applicable Requirements

This section sets forth the airworthiness, noise, and fuel venting and exhaust emissions requirements that must be met by each applicant for a supplemental type certificate. Section 21.115(a) would be amended to reinstate a reference to the noise requirements of 14 CFR part 36. This reference was inadvertently removed in recent rulemaking.

Appendix J to Part 36

Part 36 would be amended by adding the proposed appendix J. Appendix J provides an alternative noise certification procedure for certain civil helicopters certificated in the normal, transport, or restricted category.

The proposed appendix J follows the general outline and all applicable definitions, technical specifications, reference conditions, reference flight procedures, and the specific language of the existing appendix H on a section-by-section basis. If adopted, appendix J would be expected to provide a high degree of commonality between U.S. standards and those expected to be adopted by ICAO and other ICAO member countries. However, subsequent to development of the specifications for the ICAO chapter 11 standard, three technical issues of significance have been identified by the FAA which has led to differences between proposed appendix J and the presently proposed ICAO chapter 11. Chapter 11 does not provide for a correction of off-reference atmospheric attenuation, and does not provide for a correction of off-reference conditions (in particular, ambient temperature) regarding source noise. Also of concern is the chapter 11 provision allowing the use of a strip chart recorder and an "estimation" equation to determine SEL from the duration and the maximum A-weighted level of the noise trace. After review of these three issues, the FAA found the potential errors associated with these three issues to be excessive and contrary to the agency's expectations

regarding the accuracy and integrity of the aircraft noise certification process.

The differences embodied in Appendix J offer significant enhancements to ICAO chapter 11 without altering the intent or character of chapter 11. The changes made to alleviate these problems are consistent with the basic philosophy underlying the original requirement for a simplified noise certification procedure for light helicopters, fits within the present framework of chapter 11, and substantially improves the accuracy of the procedures.

The FAA's reads ICAO chapter 11, section 5.2.1 ("adjustments may be limited to the effects of differences in spherical spreading * * *" and "No adjustment for * * * atmospheric attenuation * * * need be applied") as making adjustments for off-reference atmospheric attenuation and off-reference condition regarding source noise optional. If approved by the certificating authority, these adjustments may be performed by the applicant. The FAA's solution in appendix J is to make these corrections mandatory. Appendix J will provide simple procedures for performing such corrections.

The FAA's solution to the source noise problem caused by off-reference temperature is to require an adjustment to the reference airspeed such that the helicopter is flown at the reference advancing blade tip mach number. Such a calculated adjustment to the reference airspeed will be made just prior to the actual flight test and will account for the ambient temperature at the time of the test. This is the procedure proposed by the International Coordinating Council of the Aerospace Industries Associations in their working paper WP/48 presented at the recent CAEP meeting in Montreal (December 1991). A copy of working paper WP/48 is included in the docket.

The FAA's solution to the problem of off-reference atmospheric attenuation is to provide the applicant with a representative one-third octave spectrum which can be used to calculate the appropriate correction. The FAA's analysis of spectra from a wide variety of light helicopter configurations demonstrates that a single averaged spectrum is representative of the spectral shape of light helicopters in general, especially in the spectral bands that are critical is assessing the effects of atmospheric attenuation. Such a representative spectrum is provided in appendix J, or when available, an actual spectrum from prior FAA research efforts may be provided by the FAA to the applicant. The FAA reserves

approval authority over the absorption correction procedure as well as the spectrum used in the correction procedure whether the spectrum used in the procedure is the composite specified in appendix J, a spectrum provided by the FAA from historical data, a historical spectrum provided by the applicant, or actual spectra measured by the applicant during the appendix J noise test. The composite spectrum directly provided in appendix J is derived entirely from light turbine-powered helicopters. If data currently under analysis by the FAA, in conjunction with information provided during the comment period, demonstrates that a typical acoustic spectrum from piston-powered helicopters is significantly different (for purposes of correction for off-reference absorption), the FAA would include in the final rule to include a second composite spectrum for piston helicopters in the specifications provided in appendix J.

Appendix J does not permit the use of a strip chart recorder and an "estimation" equation as an optional method of calculating SEL from maximum level and duration readings taken from the strip chart trace. This method can only be requested by an applicant as an "equivalent procedure" subject to approval of the FAA. Since the FAA's data indicate the error from this measurement method works against the applicant, the FAA will advise all applicants wishing to use such a procedure of the possible errors involved, and will suggest that the applicant choose one of the other readily available SEL-measurement methods specified under appendix J.

The three previously described issues are discussed in detail by letter from the FAA's Office of Environment and Energy to selected CAEP officials. A copy of the letter in question is included in the docket for this rulemaking action.

Appendix J does not retain the appendix H provisions that allow less stringent limits, i.e., Stage 2 + 2 EPNdB, for acoustical changes for Stage 1 helicopters under § 36.11 and section H36.305(a)(1), and that allows similar less stringent limits for the first civil version of a military helicopter under § 36.805(c) and section H38.305(a)(1)(ii). This was done in the interest of harmonization of the United States and ICAO helicopter noise certification regulations. The practical effect of eliminating these provisions is that certain older helicopters will not have the benefit of the more liberal noise limits allowed under appendix H.

For the the purpose of demonstrating "no acoustic change" under § 21.93(b), the demonstration must be consistent with the noise certification basis of the parent helicopter. Thus, if the parent helicopter is certified under part 36, appendix H, the "no acoustic change" analysis must consider all three flight configurations (flyover, approach, takeoff). If the parent is certificated under part 36, appendix J, the "no acoustic change" analysis may be limited to consideration of flyover noise levels. For purposes of demonstrating "no acoustic change" under § 21.93(b), the noise certification basis of Stage 1 parent helicopter is under appendix H. Subject to the approval of the FAA, the noise certification basis of a helicopter may be changed from appendix H to appendix J through an FAA-approved reanalysis of the original appendix H noise test data or by retesting under the requirements of appendix J. Helicopters that are noise certificated under appendix J can be converted to appendix H noise certification only by performing the noise tests prescribed under appendix H.

Sections 36.1, 36.6, 36.801, 36.805, and 36.1581 would also be amended to reference the alternative noise certification procedure contained in the proposed appendix J.

Regulatory Impact Evaluation

This section summarizes the draft regulatory evaluation prepared by the FAA on the proposed amendments to 14 CFR part 36—Noise Standards: Aircraft Type and Airworthiness Certification. This summary and the full regulatory evaluation quantify, so the extent practicable, estimated costs to manufacturers, modifiers, and Federal, State, and local governments, as well as anticipated benefits.

Executive Order 12291, February 17, 1981, directs federal agencies to promulgate new regulations or modify existing regulations only if potential benefits to society for each regulatory change outweigh potential costs. The Executive Order requires the preparation of a Regulatory Impact Analysis of all "major" rules except those responding to emergency situations or other narrowly defined exigencies. A "major" rule is one that is likely to result in an annual effect on the economy of \$100 million or more, a major increase in consumer costs, have a significant adverse effect on competition, or that is highly controversial.

The FAA has determined that this proposed rule is not "major" as defined in the Executive Order; therefore, a full regulatory analysis that includes the

identification and evaluation of cost-reducing alternatives to this proposed rule has not been prepared. Instead, the agency has prepared a more concise document termed a regulatory evaluation that analyzes only this proposed rule without identifying alternatives. In addition to a summary of the draft regulatory evaluation, this section also contains a Regulatory Flexibility Determination required by the Regulatory Flexibility Act of 1980 (5 U.S.C. 601 *et seq.*) and an International Trade Impact Assessment. If more detailed information is desired, the reader may examine the draft regulatory evaluation contained in the docket.

Under this proposed rule, an applicant seeking certification of a light helicopter would be permitted to choose between two noise certification procedures: Appendix H or proposed appendix J. The new proposed noise certification procedure, appendix J, would: (1) Reduce the required microphone locations from three to one; (2) require only a level flyover test rather than level flyover, approach, and takeoff tests as in appendix H; and (3) reduce the complexity of the data correction procedures. Compared to appendix H, each of these three factors would lower compliance costs.

Benefit Analysis

The FAA has determined that this proposed rule would accommodate the advancement of the helicopter manufacturing industry by reducing compliance costs and improving relationships among manufacturers, modifiers, and operators of helicopters, while providing for a reduced level of noise. The following is a discussion of the benefits that would accrue as a result of this proposed rule.

The proposed appendix J noise certification procedure would create a commonality with international standards. The International Civil Aviation Organization (ICAO), Committee on Aviation Environmental Protection, met in December of 1991 in Montreal, Canada, and recommended noise certification standards for light helicopters that are very similar to the U.S. certification procedures contained in this proposed rule.

In July 1991, the FAA conducted a series of acoustic flight tests of 12 helicopter configurations in order to supplement an existing light helicopter noise data base of seven helicopter models. An analysis of the 19 helicopter tests resulted in the establishment of a SEL-based limit under Appendix J that is, on average, 2.0 dB more stringent than the limit each of the 19 helicopters

would have to meet under appendix H.

The more stringent noise certification requirements may foster better relationships between the airports, heliports, local communities, and helicopter operators by providing for quieter helicopters. In some instances, local communities have opposed the establishment of nearby heliports. For example, a zoning request for a heliport to be located just outside of Washington, DC, was denied in the mid-to-late 1980's. Excessive noise was cited as one reason for not granting this request.

In recent years, the number of heliports, helistops, and helipads at airports has increased. In 1987, there were 3,325 heliports in the United States; by the end of 1990, that number had increased to 4,462. As the number of heliports has grown, so has the U.S. helicopter fleet. The FAA estimates that the new alternative procedure would encourage manufacturers to comply with the substantially less costly but more stringent appendix J requirements, and therefore may result in the manufacture of quieter light helicopters.

In addition to the benefits described above, the proposed provisions would result in a cost savings of about \$24 million over the next 15 years. These cost savings result from the difference in complying with proposed appendix J instead of appendix H. Compliance costs for these two appendices are discussed in more detail in the cost section.

Costs

This analysis examines the proposed provisions of part 36, appendix J, as if they were a single amendment affecting helicopter manufacturers and modifiers. Normally, each amendment would be considered separately and a distinct economic impact analysis would accompany ngle change: A new light helicopter noise certification procedure that is an alternative to appendix H for manufacturers and modifiers.

The FAA estimates that the manufacturers of light helicopters would have lower one-time noise certification procedure costs. These savings include those primarily associated with the noise abatement technology. The present value cost savings to helicopter manufacturers would be about \$5.43 million over the next 15 years.

A helicopter modifier may concentrate on a particular type of aircraft, and that entity may be in the business of continually developing, selling, and installing modification kits for a

particular type of aircraft. The present value cost savings to helicopter modifiers would be \$17.01 million over the next 15 years. The FAA has examined the impact that this proposed rule would have on helicopter operators, and concludes that there would be no impact on helicopter operators. In addition, the FAA estimates that the agency would have lower costs because less labor would be required to process and witness the new test. On a per-certificate basis, the annual cost savings to the FAA would be about \$12,300. The present value cost savings to the FAA is estimated to be \$1.78 million over the next 15 years.

International Trade Impact Analysis

The proposed rule would have little or no impact on trade for either U.S. firms doing business in foreign countries, or foreign firms doing business in the United States. In the U.S. market, foreign manufacturers would have the option of producing helicopters that satisfy the new standards and, therefore, would not be at a competitive disadvantage with U.S. manufacturers.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 requires agencies to review rules that have "a significant economic impact on substantial number of small entities". The FAA's criteria for "a substantial number" is a number that is not less than 11 and that is more than one-third of the small entities subject to this proposed rule.

According to FAA Order 2100.14A, "Regulatory Flexibility Criteria and Guidance," the definition of a small entity (aircraft and aircraft parts manufacturer) is one with 75 or fewer employees. There are no small U.S. helicopter manufacturers that are manufacturing helicopters for the U.S. market.

Although FAA Order 2100.14A does not specifically identify the aircraft modifiers affected by this rulemaking as an entity type in its lists of threshold criteria, an "aircraft repair facilities" entity is listed in the order. This entity would include repair stations certificated and rated under 14 CFR part 145 and shops employing persons who are holders of a mechanic or repairman certificate issued under 14 CFR part 65 that deal with helicopters. Mechanics employed by such entities may perform maintenance, preventative maintenance, and alteration work as prescribed by § 43.3 of 14 CFR part 43. The corresponding size threshold given in the order is 200 employees.

An aircraft modifier conducts engineering and supplemental type

certificate application activities, and typically performs the alteration work. A modifier also may separately offer repair or maintenance services. The nature of the work performed by a modifier is generally analogous to that of an aircraft repair facility, and the corresponding threshold levels given in the order are assumed to apply here. For the purpose of this regulatory flexibility determination, an aircraft modifier is considered a small entity if it has 200 or fewer employees.

The Order does not define a threshold value for significant annualized cost for the aircraft repair facilities entity. The FAA estimates that the annualized 1991 cost threshold is \$5,400.

Based upon information presented in the cost analysis, the one-time cost savings to a small modifier would be about \$155,290 per supplemental type certificate. Annualized at 10 percent over 10 years, the cost savings would be \$27,270. This is above the annualized cost threshold.

The total population of modifiers is about 200, and in recent years, about 75 of them have applied for supplemental type certificates which require a noise test under 14 CFR part 36. Typically, between 10 to 12 modifiers would initiate a change annually. Using the lower population estimate, about 16 percent ($12/75=0.16$) of the total population of rotocraft modifiers would be affected annually.

The FAA concludes that a substantial number of small entities (more than one third) would not be affected significantly by this proposed rule. Therefore, the proposed rule would not impose a significant economic impact on a substantial number of small entities, and thus, a regulatory flexibility analysis is not required.

Federalism Implications

The regulations proposed herein would not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12812, it is determined that this proposed rule would not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Environmental Analysis

Pursuant to the Department of Transportation "Policies and Procedures for Considering Environmental Impacts" (FAA Order 1050.1D), a draft environmental analysis will be prepared and placed in the docket.

Conclusion

For the reasons stated above, I certify that the proposed rule: (1) is not a major rule under Executive Order 12291; (2) is not a significant rule under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); and (3) will not have a significant economic impact on a substantial number of small entities. In addition, this proposed rule would have little or no impact on trade opportunities for U.S. firms doing business overseas, or on foreign firms doing business in the United States.

List of Subjects

14 CFR Part 21

Aircraft, Helicopters, Noise Control.

14 CFR Part 36

Aircraft, Helicopters, Incorporation by reference, Noise control.

The Proposed Amendments

Accordingly, the Federal Aviation Administration proposes to amend 14 CFR parts 21 and 36 of the Federal Aviation Regulations as follows:

PART 21—CERTIFICATION PROCEDURES FOR PRODUCTS AND PARTS

1. The authority citation for part 21 continues to read as follows:

Authority: 49 U.S.C. 1344, 1348(c), 1352, 1354(a), 1355, 1421 through 1431, 1502, 1651(b)(2); 42 U.S.C. 7572; E.O. 11514; 49 U.S.C. 106(g).

2. Section 21.115(a) is revised to read as follows:

§ 21.115 Applicable requirements.

(a) Each applicant for a supplemental type certificate must show that the altered product meets applicable airworthiness requirements as specified in paragraphs (a) and (b) of § 21.101 and, in the case of an acoustical change describe in § 21.93(b), show compliance with the applicable noise requirements of part 36 of this chapter and, in the case of an emissions change described in § 21.93(c), show compliance with the applicable fuel venting and exhaust emissions requirements of part 34.

* * * * *

PART 36—NOISE STANDARDS: AIRCRAFT TYPE AND AIRWORTHINESS CERTIFICATION

3. The authority citation for part 36 continues to read as follows:

Authority: 49 U.S.C. 1344, 1348, 1354(a), 1355, 1421, 1423, 1424, 1425, 1428, 1429, 1430, 1431(b) 1651(b)(2), 2121 through 2125; 42

U.S.C. 4321, et seq.; Sec. 124 of Pub. L. 96-473; E.O. 11514, 49 U.S.C. 106(g).

4. Section 36.1 is amended by revising paragraph (h) to read as follows:

§ 36.1 Applicable and definitions.

(h) For the purpose of showing compliance with this part, for helicopters in the normal, transport, and restricted categories, the following terms have the specified meanings:

(1) A "Stage 1 noise level" means a takeoff, flyover, or approach noise level greater than the Stage 2 noise limits prescribed in section H36.305 of appendix H of this part, or a flyover noise level greater than the Stage 2 noise limits prescribed in section J36.305 of this part.

(2) A "Stage 1 helicopter" means a helicopter that has not been shown under this part to comply with the takeoff, flyover, and approach noise levels required for Stage 2 helicopters as prescribed in section H36.305 of appendix H of this part, or a helicopter that has not been shown under this part to comply with the flyover noise level required for Stage 2 helicopters as prescribed in section J36.305 of appendix J of this part.

(3) A "Stage 2 noise level" means a takeoff, flyover, or approach noise level at or below the Stage 2 noise limits prescribed in section H36.305 of appendix H of this part, or a flyover noise level at or below the Stage 2 limit prescribed in section J36.305 of appendix J of this part.

(4) A "Stage 2 helicopter" means a helicopter that has been shown under this part to comply with Stage 2 noise limits (including applicable tradeoffs) prescribed in section H36.305 of appendix H of this part, or a helicopter that has been shown under this part to comply with the Stage 2 noise limit prescribed in section J36.305 of appendix J of this part.

5. Section 36.6 is amended by adding a new paragraph (c)(1)(v) to read as follows:

§ 36.6 Incorporation by reference.

(c) * * *

(1) * * *

(v) IEC Publication No. 804, entitled "Integrating-/averaging Sound Level Meters," first edition, dated 1985.

6. Section 36.11 is revised to read as follows:

§ 36.11 Acoustical change: Helicopters.

This section applies to all helicopters in the normal, transport, and restricted categories for which an acoustical

change approval is applied for under § 21.93(b) of this chapter on or after March 6, 1986. Compliance with the requirements of this section must be demonstrated under appendix H of this part, or, for those helicopters no greater than 6,000 pounds maximum certificated takeoff weight, compliance with this section may be demonstrated under appendix J of this part.

(a) *General requirements.* Except as otherwise provided, for helicopters covered by this section, the acoustical change approval requirements are as follows:

(1) In showing compliance with the requirements of appendix H of this part, noise levels must be measured, evaluated, and calculated in accordance with the applicable procedures and conditions prescribed in parts B and C of appendix H of this part. For those helicopters no greater than 6,000 pounds maximum takeoff weight which alternatively demonstrate compliance under appendix J of this part, the flyover noise level must be measured, evaluated, and calculated in accordance with the applicable procedures and conditions prescribed in parts B and C of appendix J of this part.

(2) Compliance with the noise limits prescribed in section H36.305 of appendix H must be shown in accordance with the applicable provisions of part D of appendix H of this part. For those helicopters that demonstrate compliance with the requirements of appendix J of this part, compliance with the noise levels prescribed in section J36.305 of appendix J must be shown in accordance with the applicable provisions of part D of appendix J of this part.

(b) *Stage 1 helicopters.* Except as provided in § 36.805(c), for each Stage 1 helicopter prior to the change in type design, the helicopter noise levels may not, after the change in type design, exceed the noise levels specified in section H36.305(a)(1) where the demonstration of compliance is under appendix H of this part. The tradeoff provisions under section H36.305(b) may not be used to increase any Stage 1 noise level beyond these limits. If an applicant chooses to demonstrate compliance under appendix J of this part, for each Stage 1 helicopter prior to the change in type design, the helicopter noise levels may not, after the change in type design, exceed the noise levels specified in section J36.305(a) of this part.

(c) *Stage 2 helicopters.* For each Stage 2 helicopter prior to the change in type design, the helicopter must be a Stage 2 helicopter after the change in type design.

7. Section 36.801 is revised to read as follows:

§ 36.801 Noise measurement.

For normal, transport, or restricted category helicopters for which certification is sought under appendix H of this part, the noise generated by the helicopter must be measured at the noise measuring points and under the test conditions prescribed in part B of appendix H of this part or under an FAA-approved equivalent procedure. For those normal, transport, and restricted category helicopters with a maximum certificated takeoff weight of 6,000 pounds or less that choose to demonstrate compliance under appendix J, the noise generated by the helicopter must be measured at the noise measuring point and under the test conditions prescribed in part B of appendix J of this part or an FAA-approved equivalent procedure.

8. Section 36.803 is revised to read as follows:

§ 36.803 Noise evaluation and calculation.

The noise measurement data required by § 36.801 and obtained under appendix H of this part must be corrected to the reference conditions and evaluated under part C of appendix H of this part or an FAA-approved equivalent procedure. The noise measurement data required by § 36.801 and obtained under appendix J of this part must be corrected to the reference conditions and evaluated under part C of appendix J of this part or an FAA-approved equivalent procedure.

9. Section 36.805 is revised to read as follows:

§ 36.805 Noise limits.

(a) Compliance with the noise limits prescribed under part D of appendix H of this part, or under part D of appendix J of this part, must be shown for helicopters for which application for issuance of a type certificate in the normal, transport, or restricted category is made on or after March 6, 1986.

(b) For helicopters covered by this section, except as provided in paragraph (c), it must be shown either (1) for those helicopters demonstrating compliance under appendix H of this part, the noise levels of the helicopters are no greater than the applicable limits prescribed under section H36.305 of appendix H of this part, or (2) for helicopters demonstrating compliance under appendix J of this part, the noise levels of the helicopter are no greater than the applicable limits prescribed under section J36.305 of appendix J of this part.

(c) For helicopters for which application for issuance of an original type certificate in the normal, transport, or restricted category is made on or after March 6, 1986, and which the FAA finds to be the first civil version of a helicopter that was designed and constructed for, and accepted for operational use by, an Armed Force of the United States or the U.S. Coast Guard on or before March 6, 1986, it must be shown that the noise levels of the helicopter are no greater than the noise limits for a change in type design as specified in section H36.305(a)(1)(ii) for compliance demonstrated under appendix H of this part, or as specified in section J36.305 for compliance demonstrated under appendix J of this part. Subsequent civil versions of any such helicopter must meet the Stage 2 requirements.

10. Section 36.1581 is amended by revising paragraph (f) to read as follows:

§ 36.1581 Manuals, markings, and placards.

(f) For normal, transport, and restricted category helicopters, if the weight used in meeting the takeoff, flyover, or approach noise requirements of appendix H of this part or the weight used in meeting the flyover noise requirement of appendix J of this part is less than the certificated maximum takeoff weight, established under either §§ 27.25(a) or 29.25(a) of this chapter, that lesser weight must be furnished as an operating limitation in the operating limitations section of the Rotorcraft Flight Manual, in FAA-approved manual material, or on an FAA-approved placard.

11. A new appendix I is added in alphabetical order and reserved as follows:

Appendix I—[Reserved]

12. A new appendix J is added in alphabetical order to read as follows:

Appendix J—Alternative Noise Certification Procedure for Helicopters Under Subpart H Not Exceeding 6,000 Pounds Maximum Certificated Takeoff Weight

Part A—Reference Conditions

J36.1 *General*

J36.3 *Reference Test Conditions*

J36.5 *(Reserved)*

Part B—Noise Measurement Procedure Under § 36.801

J36.101 *Noise certification test and measurement conditions*

J36.103 *(Reserved)*

J36.105 *Flyover test conditions*

J36.107 *(Reserved)*

J36.109 *Measurement of helicopter noise received on the ground*

J36.111 *Atmospheric attenuation of sound*

Part C—Noise Evaluation and Calculation Under § 36.803

J36.201 *Noise evaluation in SEL*

J36.203 *Calculation of noise levels*

J36.205 *Detailed data correction procedures*

Part D—Noise Limits Procedure Under § 36.805

J36.301 *Noise measurement, evaluation, and calculation*

J36.303 *(Reserved)*

J36.305 *Noise limits*

Part A—Reference Conditions

Section J36.1 General.

This appendix prescribes the alternative noise certification requirements identified under § 36.1 and subpart H for helicopters in the normal, transport, and restricted categories no greater than 6,000 pounds maximum certificated takeoff weight including:

(a) The conditions under which an alternative noise certification test under Subpart H must be conducted and the alternative measurement procedure that must be used under § 36.801 to measure the helicopter noise during the test;

(b) The alternative procedures which must be used under § 36.803 to correct the measured data to the reference conditions and to calculate the noise evaluation quantity designated as Sound Exposure Level (SEL); and

(c) The noise limits for which compliance must be shown under § 36.805.

Sec. J36.3 Reference Test Conditions

(a) *Meteorological conditions.* The following are the noise certification reference atmospheric conditions which shall be assumed to exist from the surface to the helicopter altitude:

(1) Sea level pressure of 2116 pounds per square foot (76 centimeters mercury);

(2) Ambient temperature of 77 degrees Fahrenheit (25 degrees Celsius);

(3) Relative humidity of 70 percent; and

(4) Zero wind.

(b) *Reference test site.* The reference test site is flat and without line-of-sight obstructions across the flight path that encompasses the 10 dB down points of the A-weighted time history.

(c) *Level flyover reference profile.* The reference flyover profile is a level flight 492 feet (150 meters) above ground level as measured at the noise measuring station. The reference flyover profile has a linear flight track and passes directly over the noise monitoring station. Airspeed is stabilized at $0.9V_H$; $0.9V_{NE}$; $0.45V_H + 65$ kts ($0.45V_H + 120$ km/h); or $0.45V_{NE} + 65$ kts ($0.45V_{NE} + 120$ km/h), whichever speed is less. Rotor speed is stabilized at the maximum continuous RPM throughout the 10 dB down time period.

(1) For noise certification purposes, V_H is defined as the airspeed in level flight obtained using the minimum specified engine power corresponding to maximum continuous power available for sea level, 77 degree

Fahrenheit (25 degrees Celsius) ambient conditions at the relevant maximum certificated weight. The value of V_H thus defined must be listed in the Rotorcraft Flight Manual.

(2) V_{NE} is the never-exceed airspeed.

(d) The weight of the helicopter shall be the maximum takeoff weight (internal load) at which noise certification is requested.

Sec. J36.5 (Reserved)

Part B—Noise Measurement Procedure Under Section 36.801

Sec. J36.101/Noise certification test and measurement conditions

(a) *General.* This section prescribes the conditions under which helicopter noise certification tests must be conducted and the measurement procedures that must be used to measure helicopter noise during each test.

(b) *Test site requirements.* (1) The noise measuring station must be surrounded by terrain having no excessive sound absorption characteristics, such as might be caused by thick, matted, or tall grass, shrubs, or wooded areas.

(2) During the period when the flyover noise measurement is within 10 dB of the maximum A-weighted sound level, no obstruction that significantly influences the sound field from the helicopter may exist within a conical space above the noise measuring position (the point on the ground vertically below the microphone), the cone is defined by an axis normal to the ground and by half-angle 80 degrees from this axis.

(c) *Weather restrictions.* The tests must be conducted under the following atmospheric conditions:

(1) No rain or other precipitation;

(2) Ambient air temperature between 36 degrees and 95 degrees Fahrenheit (2 degrees and 35 degrees Celsius), inclusively;

(3) Relative humidity between 20 percent and 95 percent inclusively;

(4) Wind velocity that does not exceed 10 knots (19 km/h) and a crosswind component that does not exceed 5 knots (9 km/h). The wind shall be determined using a continuous averaging process of no-greater-than 30 seconds;

(5) Unless otherwise approved by the FAA, ambient temperature must be measured at the noise measuring station at a height above the ground of 33 feet (10 meters) and relative humidity, wind speed, and wind direction must be measured at the noise monitoring station at a height above the ground of 4 feet (1.2 meters);

(6) No anomalous wind conditions (including turbulence) which will significantly affect the noise level of the helicopter when the noise is recorded at the noise measuring station; and

(7) The location of the meteorological instruments must be approved by the FAA as representative of those atmospheric conditions existing near the surface over the geographical area where the helicopter noise measurements are made. In some cases, a fixed meteorological station (such as those found at airports or other facilities) may meet this requirement

(d) *Helicopter testing procedures.* (1) The helicopter testing procedures and noise measurements must be conducted and processed in a manner which yields the noise evaluation measure designated Sound Exposure Level (SEL) as defined in section J36.109(b) of this appendix.

(2) The helicopter height relative to the noise measurement point sufficient to make corrections required under section J36.205 of this appendix must be determined by an FAA-approved method that is independent of normal flight instrumentation, such as radar tracking, theodolite triangulation, laser trajectory, or photographic scaling techniques.

(3) When it is shown by the applicant that the design characteristics of the helicopter would prevent flight being conducted in accordance with the reference test conditions prescribed under section J36.3, the reference test conditions used under this appendix shall be permitted to depart from the standard reference test conditions, with the approval of the FAA, but only to the extent demanded by those design characteristics which make compliance with the reference test conditions impossible.

Section J36.103 (Reserved)

Section J36.105 Flyover test conditions

(a) This section prescribes the flight test conditions and allowable random deviations for flyover noise tests conducted under this appendix.

(b) A test series must consist of at least six flights (three with a headwind component, if appropriate and three with a tailwind component, if appropriate) over the noise measuring station:

(1) In level flight and in cruise configuration;

(2) At a height of 492 feet \pm 50 feet (150 \pm 15 meters) above the ground level at the noise measuring station; and

(3) Within \pm 10 degrees from the zenith.

(c) Each flyover noise test must be conducted:

(1) At the reference airspeed specified in Section J36.3(c), with such airspeed adjusted as necessary to produce the same advancing blade tip Mach number as associated with the reference conditions;

(i) Advancing blade tip mach number (M_{AT}) is defined as the ratio of the arithmetic sum of blade tip rotational speed (V_R) and the helicopter translational speed (V_T) over the speed of sound (c) at 77 degrees Fahrenheit (1135.6 ft/sec or 346.13 m/sec) such that $M_{AT} = (V_R + V_T)/c$; and

(ii) The airspeed shall not vary from the adjusted reference airspeed by more than ± 3 knots (± 5 km/hr) or an equivalent FAA-approved variation from the reference advancing blade tip mach number. The adjusted reference airspeed shall be maintained throughout the measured portion of the flyover.

(2) At rotor speed stabilized at the normal operating rotor RPM (± 1 percent); and

(3) With the power stabilized during the period when the measured helicopter noise level is within 10 dB of the maximum A-weighted sound level (L_{AMAX}).

(d) The helicopter test weight for each flyover test must be within plus 5 percent or

minus 10 percent of the maximum takeoff weight for which certification under this part is requested. At least one flyover test in the flyover test series must be conducted at a test weight at or above the maximum takeoff weight for which certification under this part is requested.

(e) The requirements of paragraph (b)(2) of this section notwithstanding, flyovers at an FAA-approved lower height may be used and the results adjusted to the reference measurement point by an FAA-approved method if the ambient noise in the test area, measured in accordance with the requirements prescribed in section J36.109, is found to be within 15 dB(A) of the maximum A-weighted helicopter noise level (L_{AMAX}) measured at the noise measurement station in accordance with section J36.109.

Sec. J36.107 (Reserved)

Sec. J36.109 Measurement of helicopter noise received on the ground

(a) *General.* (1) The helicopter noise data measured under this appendix for noise certification purposes must be obtained with FAA-approved acoustical equipment and

(2) Paragraph (b) of this section identifies and prescribes the specifications for the noise evaluation measure required under this appendix. Paragraphs (c) and (d) prescribe the required acoustical equipment specifications. Paragraphs (e) and (f) prescribe the calibration and measurement procedures required under this appendix.

(d) *Noise unit definition.* (1) The value of sound exposure level (SEL), or as denoted by symbol, L_{AE} , is defined as the level, in decibels, of the time integral of squared 'A'-weighted sound pressure (P_A) over a given time period or event, with reference to the square of the standard reference sound pressure (P_0) of 20 micropascals and a reference duration of one second.

(2) This unit is defined by the expression:

$$L_{AE} = 10 \text{ Log}_{10} \frac{1}{T_0} \int_{t_1}^{t_2} \left(\frac{P_A(t)}{P_0} \right)^2 dt \text{ dB}$$

Where T_0 is the reference integration time of one second and $(t_2 - t_1)$ is the integration time interval.

(3) The integral equation of paragraph (b)(2) of this section can also be expressed as:

$$L_{AE} = 10 \text{ Log}_{10} \frac{1}{T_0} \int_{t_1}^{t_2} 10^{0.1 L_A(t)} dt \text{ dB}$$

Where $L_A(t)$ is the time varying A-weighted sound level.

(4) The integration time $(t_2 - t_1)$ in practice shall not be less than the time interval during which $L_A(t)$ first rises to within 10 dB(A) of its

maximum value (L_{AMAX}) and last falls below 10 dB(A) of its maximum value.

(c) *Measurement system.* The acoustical measurement system must consist of FAA-approved equipment equivalent to the following:

(1) A microphone system with frequency response that is compatible with the measurement and analysis system accuracy prescribed in paragraph (d) of this section;

(2) Tripods or similar microphone mountings that minimize interference with the sound energy being measured;

(3) Recording and reproducing equipment with characteristics, frequency response, and dynamic range that are compatible with the response and accuracy requirements of paragraph (d) of this section; and

(4) Calibrators using sine wave, or pink noise, of known levels. When pink noise (defined in section H36.109(e)(1)) is used, the signal must be described in terms of its root-mean-square (rms) value.

(d) *Sensing, recording, and reproducing equipment.* (1) The noise levels measured from helicopter flyovers under this appendix analysis:

(i) The SEL values from each flyover test may be directly determined from an integrating sound level meter complying with the Standards of the International Electrotechnical Commission (IEC) Publication No. 804, "Integrating and Averaging Sound Level Meters," incorporated by reference under § 36.6 of this part, for a Type 1 instrument set at "slow" response.

(ii) The acoustic signal from the helicopter, along with the calibration signals specified under paragraph (e) of this section and the background noise signal required under paragraph (f) of this section may be recorded on a magnetic tape recorder for subsequent analysis by an integrating sound level meter identified under paragraph (d)(1)(i) of this section. The record/playback system (including tape) of the tape recorder must conform to the requirements prescribed under section H36.109(c)(3) of appendix H of this part. The tape recorder shall comply with specifications of IEC Publication No. 561, "Electro-acoustical Measuring Equipment for Aircraft Noise Certification," dated 1976.

(iii) The characteristics of the complete system shall comply with the recommendations given in IEC Publication No. 651, "Sound Level Meters," with regard to the specifications concerning microphone, amplifier, and indicating instrument characteristics.

(iv) The response of the complete system to a sensibly plane progressive wave of constant amplitude shall lie within the tolerance limits specified in Table IV and Table V for Table 1 instruments in IEC Publication No. 651, for weighting curve "A" over the frequency range of 45 Hz to 11500 Hz.

(v) A windscreen must be used with the microphone during each measurement of the helicopter flyover noise. Correction for any insertion loss produced by the windscreen, as a function of the frequency of the acoustic calibration required under paragraphs (e) and (f) of this section, must be applied to the

measured data and any correction applied must be reported.

(e) *Calibrations.* (1) If the helicopter acoustic signal is tape recorded for subsequent analysis, the measuring system and components of the recording system must be calibrated as prescribed under section H36.109(e) of appendix H of this part.

(2) If the helicopter acoustic signal is directly measured by an integrating sound level meter:

(i) The overall sensitivity of the measuring system shall be checked before and after the series of flyover tests and at intervals (not exceeding one-hour duration) during the flyover tests using an acoustic calibrator generating a known sound pressure level at a known frequency.

(ii) The performance of equipment in the system will be considered satisfactory if, during each day's testing, the variation in the calibration value does not exceed 9.5 dB. The SEL data collected during the flyover tests shall be adjusted to account for any variation in the calibration value.

(iii) A performance calibration analysis of each piece of calibration equipment, including pistonphones, preference microphones, and voltage insertion devices, must have been made during the six calendar months proceeding the beginning of the helicopter flyover series. Each calibration shall be traceable to the National Institute of Standards and Technology.

(f) *Noise measurement procedures.* (1) The microphone shall be of the pressure-sensitive capacitive type designed for nearly uniform grazing incidence response. The microphone shall be mounted with the center of the sensing element 4 feet (1.2 meters) above the local ground surface and shall be oriented for grazing incidence such that the sensing element, the diaphragm, is substantially in the plane defined by nominal flight of the helicopter and the noise measurement station.

(2) Immediately prior to and after each test series, a recorded acoustic calibration of the system must be made in the field with an acoustic calibrator for the purposes of checking system sensitivity and providing an acoustic reference level for the analysis of the sound level data. If a tape recorder is used, the frequency response of the electrical system must be determined at a level within 10 dB of the full-scale reading used during the test, utilizing pink or pseudorandom noise.

(3) The ambient noise, including both acoustical background and electrical noise of the measurement systems shall be determined in the test area and the system gain set at levels which will be used for helicopter noise measurements. If helicopter sound levels do not exceed the background sound levels by at least 15 dB(A), flyovers at an FAA-approved lower height may be used and the results adjusted to the reference measurement point by an FAA-approved method.

(4) If an integrating sound level meter is used to measure the helicopter noise, the instrument operator shall monitor the continuous A-weighted (slow response) noise levels throughout each flyover to ensure that the SEL integration process includes, at minimum, all of the noise signal between the

maximum A-weighted sound level ($L_{A_{MAX}}$) and the 10 dB down points in the flyover time history. The instrument operator shall note the actual dB(A) levels at the start and stop of the SEL integration interval and document these levels along with the value of $L_{A_{MAX}}$ and the integration interval (in seconds) for inclusion in the noise data submitted as part of the reporting requirements under section J36.111(b).

Sec. J36.111/Reporting requirements

(a) *General.* Data representing physical measurements, and corrections to measured data, including corrections to measurements for equipment response deviations, must be recorded in permanent form and appended to the record. Each correction is subject to FAA approval.

(b) *Data reporting.* After the completion of the test the following data must be included in the test report furnished to the FAA:

(1) Measured and corrected sound levels obtained with equipment conforming to the standards prescribed in section J36.109 of this appendix;

(2) The type of equipment used for measurement and analysis of all acoustic, aircraft performance and flight path, and meteorological data;

(3) The atmospheric environmental data required to demonstrate compliance with this appendix, measured throughout the test period;

(4) Conditions of local topography, ground cover, or events which may interfere with the sound recording;

(5) The following helicopter information:
(i) Type, model, and serial numbers, if any, of helicopter, engine(s) and rotor(s).

(ii) Gross dimensions of helicopter, location of engines, rotors, and the helicopter acoustic reference point, and number of blades for each rotor,

(iii) Any modifications or non-standard equipment likely to affect the noise characteristics of the helicopter,

(iv) Maximum takeoff weight for which certification under this appendix is requested,

(v) Aircraft configuration, including landing gear positions,

(vi) V_H or V_{NE} (whichever is less) and the adjusted reference airspeed,

(vii) Aircraft gross weight for each test run,

(viii) Indicated and true airspeed for each test run,

(ix) Ground speed, if measured, for each run,

(x) Helicopter engine performance as determined from aircraft instruments and manufacturer's data, and

(xi) Aircraft flight path above ground level, referenced to the elevation of the noise measurement station, in feet, determined by an FAA-approved method which is independent of normal flight instrumentation, such as radar tracking, theodolite triangulation, laser trajectory, or photostereographic techniques.

(6) Helicopter speed, position, and engine performance must be recorded at an FAA-approved sampling rate.

Sec. J36.113 Atmospheric attenuation of sound

(a) Each SEL value measured in accordance with the requirements prescribed

in section J36.109 must conform, or be corrected to, the reference meteorological conditions prescribed under section J36.3(a). Such corrections must account for any differences in the atmospheric attenuation of sound between the test-day conditions and the reference day conditions along the sound propagation path between the helicopter when directly over the noise measuring station and the microphone.

(b) The atmospheric attenuation rates of sound with distance for each of the 24 contiguous one-third octave bands between the geometric mean frequencies of 50 Hz and 10,000 Hz inclusively, must be determined in accordance with the formulations and tabulations of SAE ARP 866A, entitled "Standard Values of Atmospheric Absorption as a Function of Frequency and Temperature for Use in Evaluation Aircraft Flyover Noise." The one-third octaves must conform to the recommendations of International Electrotechnical Commission (IEC) Publication No. 225, entitled "Octave, Half-Octave, and Third Octave Band Filters Intended for Analysis of Sounds and Vibrations."

(c) With the approval of the FAA, the relative A-weighted spectrum shape represented by the one-third octave sound levels shown as follows may be used as representative of the maximum A-weighted one-third octave spectrum of the test helicopter for purposes of performing the atmospheric attenuation corrections prescribed under section J36.205(c) of this appendix:

Band	Frequency	Level
17	50	34.7
18	63	34.0
19	80	38.4
20	100	40.5
21	125	48.2
22	160	59.6
23	200	54.7
24	250	61.2
25	315	64.4
26	400	63.2
27	500	63.0
28	630	63.0
29	800	60.9
30	1000	60.5
31	1250	59.6
32	1600	58.6
33	2000	58.1
34	2500	56.9
35	3150	54.7
36	4000	51.5
37	5000	48.0
38	6300	44.6
39	8000	39.3
40	10000	31.6

The preceding spectrum is corrected to 77 degrees Fahrenheit (25 degrees Celsius) and 70 percent relative humidity, and is valid for a propagation distance of 492 feet \pm 50 feet. The overall A-weighted sound level, $L_{A(O)}$, of the preceding corrected spectrum is 72.33 dB(A).

Part C—Noise Evaluation and Calculation Under Section 36.803

Sec. J36.201 Noise evaluation in SEL

The noise evaluation measure shall be the sound exposure level (SEL) in units of dB(A) as prescribed under section J36.109(b) of this appendix. The SEL value of each flyover may be directly determined by use of an integrating sound level meter. Specifications for the integrating sound level meter and requirements governing the use of such instrumentation are prescribed under section J36.109 of this appendix.

Sec. J36.203 Calculation of noise levels

(a) To demonstrate compliance with the noise level limits specified under section J36.305 of this appendix, the SEL noise levels from each valid flyover, corrected as necessary to reference conditions under section J36.205 of this appendix, must be arithmetically averaged to obtain a single SEL dB(A) mean value for the flyover series. No individual flyover run may be omitted from the averaging process, unless otherwise specified or approved by the FAA.

(b) The minimum sample size acceptable for the helicopter flyover certification measurements is six. The number of samples must be large enough to establish statistically a 90 percent confidence limit that does not exceed ± 1.5 dB(A).

(c) All data used and calculations performed under this section, including the calculated 90 percent confidence limits, must be documented and provided under the reporting requirements of section J36.111 of this appendix.

Sec. J36.205 Detailed data correction procedures

(a) When certification test conditions measured under part B of this appendix differ from the reference test conditions prescribed under section J36.3 of this appendix, appropriate adjustments shall be made to the measured noise data in accordance with the methods set out in paragraphs (b), (c), and (d) of this section. At minimum, appropriate adjustment shall be made for off-reference altitude and atmospheric attenuation, and for the difference between reference airspeed and adjusted reference airspeed.

(b) The adjustment for off-reference altitude may be approximated from:

$$\langle \delta \rangle J_1 = 12.5 \log_{10} (H_T/492) \text{ dB};$$

where $\langle \delta \rangle J_1$ is the quantity in decibels that must be algebraically added to the measured SEL noise level to correct for an off-reference flight path, H_T is the height, in feet, of the test helicopter when directly over the noise measurement point, and the constant (12.5) accounts for the effects on spherical spreading and duration from the off-reference altitude.

(c) Corrections prescribed under section J36.113 of the difference in atmospheric attenuation between reference and test meteorological conditions are made by the following calculation procedure, or may be made by an approved FAA equivalent procedure:

(1) If the reference spectrum specified in section J36.113(c) or an alternative reference spectrum is approved by the FAA as

representative of the test helicopter noise signature at reference conditions, the following calculation is required to effectively correct for the difference between reference and test day atmospheric attenuation:

$$\langle \delta \rangle J_2 = L_{A(am)} - L_{A(R)} \text{ dB};$$

where $\langle \delta \rangle J_2$ is the quantity, in decibels, must be algebraically added to the measured SEL noise level. $L_{A(R)}$ and $L_{A(am)}$ are defined respectively, in (c)(2) and (c)(3) of this paragraph.

(2) $L_{A(R)}$ is the reference A-weighted sound level resulting from the summation of the contiguous one-third octave A-weighted sound levels over the range of geometric mean frequencies of 50 Hz to 10,000 Hz (band nos. 17 through 40) of a relative helicopter noise spectrum approved by the FAA as representative of the flyover noise signature at the noise measurement station of the test helicopter operating at reference conditions of airspeed, altitude, temperature, and relative humidity. $L_{A(R)}$ is noise signature at the noise measurement station of the test helicopter operating at reference conditions of airspeed, altitude, temperature, and relative humidity. $L_{A(R)}$ is calculated by the equation:

$$L_{A(am)} = 10 \log_{10} \sum_{i=1}^{24} 10^{0.1L_{Ai(am)}} \text{ dB}$$

where L is the A-weighted sound level at reference conditions for the i (th) band of the 24 contiguous third-octave bands.

(3) $L_{A(R)}$ is the "as measured" A-weighted sound level resulting from the summation of the 24 contiguous one-third octave A-weighted sound levels over the range of geometric mean frequencies of 50 Hz to 10,000 Hz (band nos. 17 to 40) of the representative flyover noise signature at the noise measuring station of the test helicopter operating at reference conditions of airspeed and altitude, and operating under test day conditions of temperature and relative humidity. $L_{A(am)}$ is calculated from the equation:

$$L_{A(R)} = 10 \log_{10} \sum_{i=1}^{24} 10^{0.1L_{Ai(R)}} \text{ dB}$$

Where $L_{A(am)}$ is the "as measured" A-weighted sound level at test day conditions of temperature and relative humidity, for the i (th) band of the 24 contiguous one-third octave bands and is to be calculated from each of the reference one-third octave bands as follows:

$$L_{A(am)} = L_{A(R)} + 0.49(a_1 - a_{1R}) \text{ dB};$$

Humidity, a_{1R} is the atmospheric absorption rate in dB/1000 ft specified under section J36.113(b) for the i (th) one-third octave band at reference conditions of 77 degrees Fahrenheit (25 degrees Celsius) and 70 percent relative humidity, and the constant (0.49) is derived from the expression $H_T/1000$

(ft) where the value of H_T is the reference helicopter height of 492 feet over the noise measuring station.

(4) If the reference spectrum specified under section J36.113(c) is approved for use by the FAA, the value of 72.33 dB for the variable $L_{A(R)}$ is used in the equation for $\langle \delta \rangle J_2$ under (c)(1) of this paragraph, and the reference one-third octave values specified under section J36.113(c) must be used in the equation for $L_{A(am)}$ under (c)(3) of this paragraph.

(5) If a reference spectrum other than the spectrum specified under section J36.113(c) is required or approved for use by the FAA, the value for $L_{A(R)}$ for the alternative spectrum must be calculated by the equation specified under paragraph (c)(2) of this section, and the alternative reference values of $L_{A(R)}$ must be used in the calculation specified under paragraph (c)(3) of this section.

(d) The adjustment for the difference between reference airspeed and adjusted reference airspeed calculated from:

$$\langle \delta \rangle J_3 = 10 \log_{10} (V_{RA}/V_R) \text{ dB};$$

Where $\langle \delta \rangle J_3$ is the quantity in decibels that must be algebraically added to the measured SEL noise level to correct for the influence of the adjustment of the reference airspeed on the duration of the measured flyover event as perceived at the noise measurement station, V_R is the reference airspeed as prescribed under section J36.3(c) of this appendix, and V_{RA} is the adjusted reference airspeed as prescribed under section J36.105(c) of this appendix.

(e) No correction for source noise during the flyover other than the variation of source noise accounted for by the adjustment of the reference airspeed prescribed for under section J36.105(c) need be applied.

(f) No correction for the difference between the reference ground speed and the actual ground speed need be applied.

(g) The net value for all adjustments for differences between test and flight procedures shall not exceed ± 2.0 dB(A) unless another net value is approved by the FAA.

(h) All data used and calculations performed under this section must be documented and provided under the reporting requirements specified under section J36.111 of this appendix.

Part D—Noise Limits Procedure Under Section 36.805

Sec. J36.301/Noise measurement, evaluation, and calculation

Compliance with this part of this appendix must be shown with noise levels measured, evaluated, and calculated as prescribed under parts B and C of this appendix.

Sec. J36.303/(Reserved)

Sec. J36.305/Noise limits

For compliance with this appendix, the calculated noise levels of the helicopter, at the measuring point described in section J36.101 of this appendix, must be shown to not exceed the following (with appropriate interpolation between weights):

(a) Stage 1 noise limits for acoustical changes for helicopters are the same limits as

prescribed for *Stage 2* limits under paragraph (b) of this section.

(b) For normal, transport, and restricted category helicopters no greater than 6,000 pounds maximum certificated takeoff weight and noise tested under this appendix, the *Stage 2* noise limit is 82 decibels SEL for helicopters with maximum certificated takeoff weight at which the noise certification is requested, of up to 1,764 pounds and increasing at a rate of 3.01 decibels per doubling of weight thereafter. The limit may be calculated by the equation: $SEL_{LIM} = 49.535 + 10 \log_{10}(MTOW)$ where MTOW is the maximum takeoff weight, in pounds, for which certification under this appendix is requested.

(c) The procedure shall be done in accordance with the International Electrotechnical Commission IEC Publication No. 804, entitled "Integrating/Averaging Sound Levels Meters," First Edition, dated 1985. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from the Bureau Central de la Commission Electrotechnique Internationale, 1, rue de Varembe, Geneva, Switzerland or the American National Standard Institute, 1430 Broadway, New York City, New York 10018, and can be inspected at the Office of the Federal Register, 1100 L Street, NW., room 8401, Washington, DC.

Issued in Washington, DC on June 18, 1992.

Robert B. Hixson,

Acting Director, Office of Environment and Energy.

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DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Part 1915

[Docket No. S-050]

RIN 1218-AA91

Explosive and Other Dangerous Atmospheres in Vessels and Vessel Sections

AGENCY: Occupational Safety and Health Administration (OSHA), Department of Labor.

ACTION: Proposed rule; reopening of record for advisory committee recommendations and public comments.

SUMMARY: On November 29, 1988, OSHA published a proposed rule that would revise its shipyard employment safety standards for explosive and dangerous atmospheres in vessels and vessel sections (subpart B, 53 FR 48092). The proposed standards addressed safe entry into and work to be carried on in confined spaces on board vessels and

vessel sections in shipyards. Although over 40 comments were received in response to the proposal, none of the commenters made a request for a hearing. Subsequently, after the closing date for comments on this proposed shipyard rule, OSHA also proposed new rules for confined spaces in general industry (§ 1910.146) [54 FR 24080, June 5, 1989], which elicited almost 300 comments. The general industry proposal covered land-side (that is, other than shipboard or pier-side) confined spaces in shipyards, including all operations and work areas such as fabricating shops, machine shops, and staging areas.

A short time after the November 1988 publication of the proposed rule on confined spaces in vessels and vessel sections, the Shipyard Employment Standards Advisory Committee (SESAC), which was established to provide OSHA with guidance in consolidating its shipyard standards with its general industry standards and updating the standards applicable to shipyards, held its first meeting. The Committee was asked to consider both sets of proposed confined space rules with a view to application in shipyards. SESAC discussed the proposed rules and formed a working subgroup to consider the issue. The subgroup recommended and the full committee agreed that the scope of the proposed subpart B should be expanded to cover all land-side confined space situations in the shipyard. SESAC also recommended adding proposed regulatory language to subpart B to address training, rescue, and the duty to other employers (Tr. 101, 4/25/90).

In light of various comments submitted to the docket concerning the general industry confined spaces proposal, and in order for OSHA to insert SESAC's recommendations into the rulemaking record and to clarify additional issues, the Agency is reopening for comment the record on proposed subpart B. This additional period will allow further public comment and serve to augment the record that has been established for the November 1988 proposal.

DATES: *Comments.* Interested persons are invited to submit written data, views and arguments on the issues raised in this document in quadruplicate to the address listed below. Comments must be postmarked by September 22, 1992.

ADDRESSES: *Comments.* Comments on the issues raised in this notice must be submitted in quadruplicate to the Docket Officer, Docket S-050, U.S. Department of Labor, Occupational Safety and Health Administration, room N-2625,

200 Constitution Avenue NW., Washington, DC 20210.

FOR FURTHER INFORMATION CONTACT: Mr. James F. Foster, U.S. Department of Labor, Occupational Safety and Health Administration, room N-3647, 200 Constitution Avenue NW., Washington, DC 20210; telephone: (202) 523-8151.

SUPPLEMENTARY INFORMATION:

I. Background

On November 29, 1988, OSHA published a proposed rule in the *Federal Register* (53 FR 48092) that would revise its existing standards on Explosive and Other Dangerous Atmospheres in vessels and Vessel Sections, which are codified in subpart B of 29 CFR part 1915. The proposed standards addressed safe entry into and work to be carried on in confined spaces on board vessels and vessel sections in shipyards. The provisions in the November 1988 (subpart B) proposal addressed the following: Increasing the oxygen content required for unprotected confined space entry from 16.5 percent by volume to 19.5 percent by volume; changing the sequence of testing to reflect actual practice so that oxygen, flammability, and toxicity are tested in that order requiring skilled personnel to test the ship's compartments prior to human occupancy and starting work; delineating the conditions for safely performing hot work in confined spaces; and eliminating duplicative paperwork requirements. Interested persons were given until February 27, 1989, to submit comments with respect to the proposal, to file objections, and to request a hearing. OSHA received over 40 comments in response to the proposed rulemaking. There were no hearing requests.

A short time after the shipyard proposed rule (subpart B) was published, the Shipyard Employment Standards Advisory Committee (SESAC) was established to provide OSHA with guidance in revising its shipyard standards and developing a vertical standard for the shipyard industry. At several SESAC meetings, the proposed rules in subpart B were on the agenda.

Subsequently, several months after the comment period closed for the proposed rule on 29 CFR part 1915, subpart B, OSHA published the proposed rule for confined spaces (that is, permit spaces) in general industry (54 FR 24080, June 5, 1989), which was also to apply to land-side (that is, other than shipboard or pier-side) operations within shipyards, including all operations and work areas such as