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Title 14—Aeronautics and Space

CHAPTER I—FEDERAL AVIATION ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

(Docket Nos. 10494 and 15378; Amdt. 21-47, 36-10, and 91-153)

CIVIL SUPERSONIC AIRPLANES

Noise and Sonic Boom Requirements

AGENCY: Federal Aviation Administration (FAA), Department of Transportation.

ACTION: Final rule.

SUMMARY: These final rules (1) require all civil supersonic airplanes (SST's), except Concorde's with flight time before January 1, 1980 (presently expected to include 16 Concorde's), to comply with the noise limits of Part 36 of Title 14 of the Code of Federal Regulations ("part 36") that were originally applied to subsonic airplanes, in order to operate in the United States; (2) prohibit the issuance of U.S. standard airworthiness certificates to Concorde's that do not have flight time before January 1, 1980, and that do not comply with part 36; (3) prohibit the operation in the United States of the excepted Concorde airplanes if they have been modified in a manner that increases their noise; (4) prohibit scheduled operations of the excepted Concorde airplanes at U.S. airports between 10 p.m. and 7 a.m., and (5) prohibit SST's that are outside the United States from causing sonic booms in the United States when flying to or from U.S. airports. These provisions respond to the public need for the control of sonic boom and SST noise in accordance with §611 of the Federal Aviation Act of 1958, as amended by the Noise Control Act of 1972. The rules do not establish certification noise limits for future design SST's, since the technological feasibility of such standards is at present unknown. The FAA's goal is not to certify, or permit to operate in the United States, any future design SST that does not meet standards then applicable to subsonic airplanes. This rule is issued following close coordination with the U.S. Environmental Protection Agency (EPA). A detailed discussion of FAA's disposition of EPA's proposals concerning SST noise is contained in a separate notice of decision published in this issue of the FEDERAL REGISTER.

EFFECTIVE DATE: July 31, 1978.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION:

I. SYNOPSIS

A detailed section-by-section analysis of these rules is furnished at the conclusion of this preamble. Briefly, these rules are substantively the same as those proposed in notice No. 77-23 on October 13, 1977, and have the following effects:

A. SST OPERATIONS IN THE UNITED STATES

Except for the 16 Concorde's which are expected to have flight time before January 1, 1980, all SST's are required by these rules to comply with the noise limits of part 36 in effect on January 1, 1977 ("stage 2 noise limits"), in order to operate in the United States. These are the same noise limits that were originally applicable to subsonic airplanes by part 36. It is the FAA's goal not to certify or permit to operate in the United States any future design SST that does not meet standards then applicable to new design subsonic airplanes. Accordingly, consistent with technological developments, the noise limits in this rule are expected to be made more stringent before a future design SST is either type certificated or permitted to operate in the U.S.

B. THE FIRST 16 CONCORDES

The first 16 Concorde's, which is the maximum number that Britain and France are expected to manufacture before January 1, 1980, are excepted from compliance with the stage 2 noise limits of part 36. There is presently no expiration date on this exception. However, under these rules, the excepted Concorde's may not be operated on flights scheduled, or otherwise planned, for takeoff or landing at U.S. airports after 10 p.m. and before 7 a.m. local time. Moreover, these rules subject the excepted Concorde's that operate in the United States to an "acoustical change" requirement identical to that applied to U.S. type-certificated subsonic airplanes that have not been shown to comply with stage 2 noise limits. Like those subsonic airplanes (which are called "stage 1 airplanes" in part 36), the noncomplying Concorde's may not be operated in the United States if their design is changed in a way that increases their noise levels.

C. LATER CONCORDES: "NEW PRODUCTION" RULE

Although it is expected that Concorde's will not be produced beyond January 1, 1980, such production is possible. Accordingly, for any Concorde that does not have flight time

before January 1, 1980, this rule prohibits the issuance of a U.S. standard airworthiness certificate unless the airplane complies with at least the stage 2 noise limits of part 36.

D. CONCORDE TYPE CERTIFICATION: NOISE LIMITS

The British-French Concorde is the only SST for which application has been made for a U.S. type certificate. A U.S. type certificate constitutes FAA approval of the safety and environmental aspects of an airplane type and is necessary for American air carriers to operate the airplane. Because there is no presently known technology which would reduce Concorde noise levels, the maximum noise limits (for approach, takeoff, and sideline) authorized at this time by these rules for the purposes of a U.S. type certificate are the current noise levels of that airplane.

E. CONCORDE TYPE CERTIFICATION: TEST PROCEDURES

These rules, broaden the detailed noise measurement and evaluation procedures of part 36 to cover supersonic (as well as subsonic) civil airplanes. In addition, various flight test provisions unique to the Concorde are included because of the special takeoff and approach testing considerations posed by the delta wing of that airplane.

F. AIRPORT PROPRIETORS' "LOCAL OPTION": NO CHANGE

These rules do not in any way affect the existing legal authority of airport proprietors, acting as proprietors, to exercise their "local option" to limit the use of their airports in a manner that is not unjustly discriminatory, and does not unduly burden interstate and foreign commerce. As stated in §36.5 of part 36, an FAA determination of compliance or noncompliance with part 36 does not bind an airport proprietor in its determination whether an airplane is acceptable or unacceptable for operation at its airport.

G. SONIC BOOM

These rules prohibit SST's from producing sonic booms in the United States while they are going to or from U.S. airports, even if the airplane is outside the United States at the time. Prior to these rules, supersonic flight was prohibited only while the airplane itself was in U.S. airspace.

H. CONTINUED OPERATIONS OF CONCORDE

Consistent with the provisions of these rules, FAA amendments to operations specifications of air carriers that operate Concorde may be issued without additional environmental analysis up to the numbers of total Concorde operations specified for each

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airport analyzed in the final environmental impact statement (EIS) for these rules. Federal issuance or amendment of operations specifications has no bearing on local airport proprietor approval of Concorde operations.

By the terms of the FAA operations specifications issued to the British Airways and Air France in April 1976, the 16-month demonstration period at Dulles Airport ended September 24, 1977. After Secretary of Transportation Brock Adams announced his decision on September 23, 1977, to issue notice No. 77-23, the two carriers were issued amendments to their operations specifications to permit the number of Concorde operations that were originally approved on February 4, 1976 (one flight per day per carrier), to continue until the issuance of these rules. After the effective date of these rules, upon application by an air carrier, Concorde operations will be authorized at Dulles International Airport up to the numbers specified in the EIS for these rules.

The 16-month demonstration period at John F. Kennedy International Airport ("J. F. K."), for which two Concorde flights per day for each carrier were authorized, began on November 22, 1977. However, the issuance of these rules supersedes that authorization. Authorization of Concorde operations up to the number studied in the EIS will not require further environmental analysis.

I. CONSISTENCY WITH SAFETY

These rules regulate only the noise of SST's. They do not dispose of airworthiness issues concerning the Concorde that are currently being evaluated under applicable airworthiness regulations. These rules are consistent with the highest degree of safety in air commerce.

J. FUTURE SST'S: PROGRESSIVE NOISE REDUCTION

With the issuance of these rules, the FAA takes the first step toward ensuring that future SST's are subject to the same noise levels as subsonic aircraft, and are made as fully compatible with future airport environments as possible. It is anticipated that no future SST design will be type certified without the issuance by the FAA, after full public participation, of noise regulations that are environmentally effective and consistent with the economic and technological considerations in §611 of the Federal Aviation Act of 1958.

II. PRIOR HISTORY

These rules conclude a process that began formally with an advance notice of proposed rulemaking in 1970, and has since involved three notices of pro-

posed rulemaking ("NPRM"), numerous public hearings, demonstration of the Concorde at Dulles and J. F. K. Airports, the preparation of two comprehensive environmental impact statements, and the consideration of over 11,300 comments from airport neighbors and other concerned citizens, airport proprietors, aircraft operators, aircraft manufacturers, and Federal, State, and local governmental agencies. These comments have greatly assisted the effort to develop requirements that are balanced in their responsiveness to divergent public concerns, and are effective in terms of public relief from the noise of civil supersonic air transportation. These rules were developed over the course of 1 year in close consultation between Secretary of Transportation Brock Adams and FAA Administrator Langhorne Bond. The rules reflect the Secretary's responsibility for overall national transportation policy and his concern that these final rules properly take into account all aspects of that policy—including environmental, economic, and international aviation considerations. The history of this regulatory action is described more fully in notice 77-23, which is the most recent NPRM preceding these rules, 42 FR 55176 (October 13, 1977). The major events are as follows:

A. Notice No. 70-33. On August 4, 1970, the FAA issued advance notice of proposed rulemaking No. 70-33, published in the FEDERAL REGISTER (35 FR 12555) on August 6, 1970. That notice initiated the public process of determining the nature and scope of the factors that must be considered in the development of noise ceilings for SST's.

Notice No. 70-33 requested public comment on a number of issues and stated FAA's intent to ensure that SST's, like subsonic airplanes, are subject to type certification standards that require the application of all economically reasonable noise reduction technology. Many public comments were received in response to this early invitation to public participation in the FAA's rulemaking on this matter and were considered in the adoption of these rules.

B. Notice No. 75-15. On February 27, 1975, EPA transmitted to FAA proposed regulations for the control and abatement of SST noise. These proposals were developed and submitted pursuant to section 611(c)(1) of the Federal Aviation Act of 1958, as amended, which provides that EPA shall submit to the FAA proposed regulations to provide such control and abatement of aircraft noise and sonic boom as EPA determines is necessary to protect the public health and welfare, and that the FAA "shall consider such proposed regulations submitted by EPA and shall within thirty days of

its submission to the FAA publish the proposed regulations in a notice of proposed rulemaking."

In accordance with this requirement, the FAA issued notice No. 75-15 on March 25, 1975 (published in the FEDERAL REGISTER (40 FR 14093), on March 28, 1975) containing the EPA proposals. The FAA conducted public hearings on these EPA proposals in accordance with section 611(c)(1) in Los Angeles on May 16, 1975, and in Washington, D.C., on May 22, 1975.

The 1975 EPA proposal would have required: (1) Future design SST's to meet noise standards applicable to new type subsonic airplanes; (2) existing types of supersonic airplanes (the Concorde and Russian TU-144) upon which "substantive productive effort" had not commenced before the date of the EPA notice to meet the stage 2 requirements of part 36; and (3) SST's already under production (at least 9, possibly 16, Concordes and an unknown number of TU-144's) to be treated separately. Public comments in response to this notice, including hearing transcripts, have been reviewed and considered in the process of developing these rules. Insofar as certain aspects of the EPA proposals and options contained in notice 75-15 are not adopted herein, the reasons for not adopting them are discussed in the "Notice of Decision Concerning EPA Proposals" published in this issue of the FEDERAL REGISTER.

C. Notice No. 76-1. On January 19, 1976, EPA submitted additional proposed regulatory language to FAA, which was published by the FAA as notice No. 76-1 (41 FR 6070) on February 12, 1976. A public hearing was held by FAA on the proposal on April 5, 1976, in Washington, D.C. The additional EPA proposal would have prohibited any SST that does not have flight time before December 31, 1974, from operating to or from an airport in the United States unless it complies with the stage 2 noise limits of part 36. In issuing these rules, the FAA has considered public comments, including hearing transcripts, submitted in response to notice 76-1.

D. Concorde demonstration flights. On application of British Airways and Air France to operate the Concorde into the United States, former Secretary of Transportation William T. Coleman, Jr., issued a decision on February 4, 1976, establishing 12-month demonstration periods for the Concorde at Dulles and J. F. K. Airports, each followed by a 4-month evaluation period.

This decision was made following analysis of comments and testimony presented at a public hearing in Washington, D.C., on January 5, 1976. Public hearings were also held by FAA in Washington, D.C., on April 14 and 15, 1975, in New York City on April 18,

19, and 24, 1975, and in Sterling Park, Va., on April 21, 1975, concerning the draft environmental impact statement prepared prior to the decision. This decision was reaffirmed in 1977 by Secretary of Transportation Brock Adams.

A comprehensive monitoring effort was undertaken which included the measurement of noise and emissions at Dulles and J. F. K. and in the surrounding communities; possible sonic booms along the east coast of the United States near the planned Concorde flight tracks; low-frequency, noise-induced structural vibration of buildings near Dulles and J. F. K.; and local community response to the Concorde. The monitoring reports concerning Concorde operations at Dulles and J. F. K. have been made available to the public, and were considered in resolving the issues presented in relation to these rules.

E. Notice No. 77-23. This notice was issued on October 13, 1977, following: (1) review of public comments concerning notice Nos. 70-33, 75-15, and 76-1; (2) review of testimony and statements presented in public hearings; (3) review of environmental impact statement data concerning noise, emissions, fuel usage, and other impacts; (4) review of 12 months of comprehensive monitoring reports concerning Concorde operations at Dulles; and (5) consultation with the EPA and other Federal agencies. The proposals in this notice were substantially similar to these rules.

Following the issuance of notice No. 77-23, three additional public hearings were held to encourage public review of these proposals in relation to the EPA proposals in notices 75-15 and 76-1 and to assist the Secretary and the Administrator in making the final determination. For this latter purpose, the comment periods of those earlier notices were reopened.

The first of these additional public hearings was held in Washington, D.C., on December 15, 1977. Additional public hearings were held in Honolulu, on January 11, 1978, and in Los Angeles, on February 27, 1978.

III. CONSIDERATION OF PUBLIC COMMENTS

Notice 77-23 outlined, for public comment, seven factors to be considered in the decisionmaking process to ensure a well-founded regulatory response to the problem of SST noise. These factors are:

1. The potential environmental impacts of the Concorde, including its air quality, climatic, ozone layer, noise and vibration, and energy consumption impacts.

2. The need to maintain, to maximum extent possible, the trend of reduced noise exposure around the Nation's airports.

3. The economic and technical considerations that determine whether the proposed regulatory measures would produce discriminatory or other unfair burdens on international aviation.

4. The need to assure that U.S. regulatory measures affecting foreign air carriers and airplanes are equitable in light of the treatment that has been afforded by foreign governments to U.S. air carriers and airplanes manufactured in the United States.

5. The benefits that will result from SST's with respect to improved international travel and communication, technological advances in aviation, and improved international relations.

6. The need to assure that domestic and foreign airplanes are treated equally by the United States, and the need to assure that the same type of treatment that has been afforded by the United States to subsonic airplanes is afforded to SST's.

7. The need to develop regulatory measures that do not infringe upon the existing legal authority of airport proprietors to regulate noise at their airports in a nondiscriminatory manner that does not impose an undue burden on interstate or foreign commerce.

Virtually all of the commenters, including the advocates of SST operations, supported the noise abatement objectives of the EPA and FAA proposals in the three notices. This was also the pattern at the public hearings. The bulk of the discussion centered around the best means of weighing this noise abatement objective against the potential technological, economic, and other impacts of regulating SST development and operations. The following discussion addresses the major issues and arguments raised by the commenters.

A. NOISE IMPACTS

By far the greatest number of comments, numbered in the thousands, concerned the noise and other environmental impacts of SST operations. Many private citizens, local citizen organizations, and national organizations concerned with environmental questions testified at the hearings and commented on the far-reaching impacts of aircraft noise on family life, on the conduct of businesses, the operation of schools and hospitals, the overall quality of life in airport neighborhoods, and the value of property around airports.

Many comments contained the urgent request that any further increases in airport noise be prohibited, including those that would result from Concorde operations. They suggested methods of doing so, ranging from a total ban to bonus payments for further noise reduction or economic penalties for operators of noisy aircraft.

Several commenters urged that economic considerations be divorced from decisions concerning control of SST noise. Other commenters suggested that limited service at some airports might be permissible if strict operational restrictions were established and made mandatory at each airport. Some commenters strongly supported the night curfew as a reasonable means of permitting SST operations to exist while also preventing the most serious intrusions of SST noise into the environments of neighboring communities.

The deep public concern regarding the potential noise impacts of the Concorde and other SST's was, in many comments, a reflection of years of annoyance and interruption of normal living patterns by the noise of subsonic aircraft.

In addition to the written comments submitted to the docket, the public hearings provided direct contact with persons who feared the noise exposure from SST's would exacerbate the many years of subsonic aircraft noise annoyance.

The recent steady reduction in the noise levels of subsonic aircraft was cited by many persons as a reason for requiring the same kind of progress for supersonic aircraft and not permitting an increase of noise by permitting SST operations. It was urged that it is not reasonable to regard SST's as a separate class for noise abatement purposes and that SST's should all be required to meet rules identical with those applied to subsonic aircraft.

Other commenters argued that, since subsonic aircraft are required to reduce their noise levels to comply with part 36 noise limits by 1985 (subpart E of 14 CFR Part 91) the exemption of the Concorde from part 36 noise limits is contrary to the purposes of the Noise Control Act of 1972 to reduce noise and will make the noise of that airplane more obvious and troublesome as the noisiest jets are phased out of operation.

A considerable number of comments stated that the Concorde will benefit far fewer persons than it will adversely impact. An additional aspect of many of these comments was the great concern that introduction of the Concorde would reduce property values in communities surrounding airports.

In an effort to assemble the best possible environmental information base and to assure that regulatory decisions fully respond to these public comments concerning SST noise, the FAA has prepared a comprehensive final environmental impact statement (EIS) addressing the potentially significant environmental impacts of the introduction of civil supersonic air transportation. The noise data in this EIS include the result of extensive monitoring of Concorde operations at

Dulles and JFK Airports. As the EIS indicates, the recorded noise levels of the Concorde are consistent with the predicted levels set out in the Concorde Supersonic Transport Final Environmental Impact Statement issued in November 1975 ("1975 EIS") which was used in the decision to permit temporary commercial operations at JFK and Dulles. The monitoring also confirmed that, compared to the loudest jet subsonic transports, the Concorde is twice as noisy on takeoff and approximately as loud on approach.

The following technical information is explained and analyzed in far greater detail in the EIS and in the 1975 EIS, both of which were considered in this rulemaking. They are available without charge from FAA headquarters and all regional offices.

On departures from Dulles the average effective perceived noise level in decibels (EPNdB) as measured for Concorde at a point under the flight path at 3.5 miles from the start of takeoff roll was 119.4 EPNdB. On approach, the average noise level as measured under the flight path for Concorde flights at 1 mile from runway threshold was 116.5 EPNdB.

The greatest increment in the impact of the Concorde compared to subsonic transports is its single-event noise, that is, the impact of individual flyovers. The EIS indicates that the introduction of Concorde service will extend the area within a "contour" on the ground within which the noise is 100 EPNdB or more from one individual flyover ("100 EPNdB single event contour") into areas which either have not experienced significant aircraft noise before or have not experienced this level of aircraft noise. The 100 EPNdB contour from a Concorde departure may extend 20 miles or more from the start of takeoff roll. In terms of practical effects, outdoor communication at a distance of 2 feet could require shouting for those persons within the 100 EPNdB single-event contour. This impact would last for the duration of the noise at this level, not more than 30 seconds per operation. Assuming normal indoor attenuation from a structure, the 100 EPNdB single-event contour indicates the areas within which there is likely to be speech interference indoors as well as outdoors. Thus, assuming average attenuation from the structure, indoor communication at 2 feet could require a raised voice for up to 30 seconds during a Concorde flyover as far as 20 miles away from airports served by the Concorde.

The single-event noise contours for Concorde may vary significantly in the regions beyond roughly 10 miles from the airport. Data gathered during the Concorde demonstration period at Dulles have shown that high sound levels occur at locations beneath the

Concorde flight path at the time of climb power reapplication, usually when the aircraft is between 7,000 to 10,000 feet above ground level. The exact magnitude and location of this noise impact will vary from airport to airport with the flight path, the time of climb power reapplication, and the climb profile to the point of climb power reapplication.

Based on study of these departure contours, it can be expected that noise impact resulting in annoyance may occur in "spot areas" up to 25 miles from the airport. These single-event contours for the Concorde cover significantly more area than those of subsonic aircraft. These larger noise contours for the Concorde clearly distinguish it from even the loudest subsonic airplanes and are in large part the basis for the distinctive regulatory treatment afforded to the Concorde by these rules.

For each airport analyzed in the EIS, the cumulative energy noise contours, as distinguished from the single-event noise contours, are also included in the EIS and are graphically displayed as NEF (Noise Exposure Forecast) contours on maps showing land use areas with proposed flight tracks of the Concorde superimposed for illustration. In addition, these maps are available for inspection at the FAA Regional offices.

In practical terms, in assessing community reaction to aircraft noise exposure, the following interpretations of NEF values are often used:

- Less than NEF 30—Essentially no complaints expected; noise may interfere with community activities.
- NEF 30 to NEF 40—Individuals may complain; group action possible.
- Greater than NEF 40—Repeated vigorous complaints expected; group action probable.

The impact at each airport is calculated in terms of the number of people and the land area contained within the NEF and NEF 40 contours. The NEF 30 and NEF 40 contours have been computed and their results tabulated in the EIS in the specific analysis for each airport. Each airport-specific analysis shows the noise impact with and without Concorde operations. In view of the current aircraft noise regulation, it was assumed that all subsonic aircraft will meet the stage 2 noise limits of part 36 in 1987. Other important fleet compliance assumptions are set forth in the EIS.

The EIS data considered in the adoption of these rules include data showing the specific impact of Concorde operation on kinds of land use, such as residential, parks and recreation, commercial, and industrial land users.

The EIS contains comprehensive noise data for 13 airports considered for potential Concorde operations

through 1987. At three of these airports (Miami, Houston, and Anchorage), the population within the NEF 30 and 40 contours will be essentially the same in 1987 as in 1978, with or without Concorde operations, even though all subsonic aircraft will be required to meet stage 2 noise limits by 1985, because of the forecast trends of increasing traffic demand and population density near the airport. At the other 10 airports studied, the forecast shrinkage in the NEF 30 and 40 contours would, without the Concorde, cause a reduction in the population within these contours by 1987. Addition of the Concorde to meet its forecast traffic demand would not reverse this reduction, but would retard the rate at which the population encompassed by high NEF contours would be reduced.

The EIS also contains a detailed discussion of human response to aircraft noise. The conclusion reached by the FAA based on review of this data, in relation to the limited Concorde operations permitted by these rules, is that Concorde will not subject people to prolonged or sustained exposure to intense noise levels. In addition, there is no indication that the Concorde produces significant physiological effect. However, short of physiological effects, the noise levels generated by Concorde will have definite impact. The principal effect is expected to be increased annoyance within the NEF 30 contour. This annoyance will not merely be the result of the Concorde's noise level considered in the abstract, but will be a function of the various elements including the attitudes, judgments, and beliefs of individuals. The increased annoyance will be caused primarily by interruption of normal communications.

Regulatory Conclusion. Thorough analysis of the extensive noise impact data developed for the Concorde indicates that the Concorde's perceived loudness under the takeoff flight path is approximately double that of a B707, four times as loud as a B747, and eight times as loud as a DC-10. These comparisons confirm the need for distinctive regulatory treatment of the Concorde.

After extensive environmental analysis and monitoring and careful review of the many public comments, the FAA has determined that the impact of Concorde operations will be substantial relative to even the noisiest subsonic aircraft, and therefore that the unrestricted introduction of Concorde operations cannot be justified. Consequently, the effective limitation on numbers of Concordes that may operate in the United States, the prohibition against operation of Concordes in the United States if they are modified in a manner that increases their noise, and the Federal prohibition of

night operations, are reasonable and essential aspect of these rules even though these restrictions are not applicable to other aircraft types.

B. IMPACTS ON AIR QUALITY

Public comments submitted to the docket expressed concern regarding the potential impact of SST emissions on air quality. As the EIS indicates, at each airport considered, the emissions associated with SST operations will have an insignificant impact on air quality. The air quality impact analysis also shows that regional impacts resulting from SST operations are expected to be very minor, even at airports where relatively large changes in airport emissions are forecast.

The percentage changes in local emissions projected for 1987 at each airport as a result of permitting Concorde flights are reflected in detail in the EIS for these rules. Forecast impacts of Concorde on air quality at the airports are based on the same aircraft fleet forecasts that were used in the noise analysis. At each airport, the aircraft emissions (carbon monoxide, hydrocarbons, and nitrogen oxides), have been calculated for the projected 1987 fleet mix for two alternate cases: (1) The fleet mix if Concorde flights are prohibited; and (2) the fleet mix if the maximum number of Concorde flights addressed in the EIS are permitted. The calculations of aircraft emissions assumed that current aircraft emissions factors remained unchanged.

During the Concorde test period at Dulles Airport there was an air quality monitoring program to determine the effect of Concorde emissions upon air quality locations at and near the airport. The pollution background was measured upwind and downwind of the airport to detect any possible effect of airport (and Concorde) emissions on a nearby community of Sterling Park, which is approximately 1 mile north of the airport boundary. Conventional background measurement equipment was used, and pollutant concentrations were averaged over periods of 1 hour. To identify emissions from a single aircraft, there were also measurements locations close to the aircraft involved, and measurements were recorded over the short time it takes for the emission plume to be transported by the wind over the monitoring stations.

Measurements of Concorde and other aircraft exhaust emissions at Dulles and nearby established that:

- (1) Concorde emissions at Dulles dilute to background levels within 2,000 feet of the aircraft.
- (2) Emissions measured on the airport property could not be detected at Sterling Park even when Sterling Park was downwind from the airport.
- (3) Actual Concorde operations were less polluting than had been indicated in the 1975 EIS.

Pertinent results of a recent EPA survey regarding the attainment status of each State in relation to national ambient air quality standards (43 FR 8962, March 2, 1978) are reflected in the EIS in relation to airport impacts. Most of the airports are in regions that are not presently meeting all of the national ambient air quality standards. In most cases the exceeded standard is the one for oxidants (which is influenced by the hydrocarbon and nitrogen oxide in the region's atmosphere), and in a few cases the standard for carbon monoxide is violated. Considering the attainment status of each region and the changes in regional air quality due to Concorde operations, it is clear that the maximum number of Concorde flights proposed in the EIS will not have a significant impact with respect to air quality. In fact, in the Dulles case, where predicted and measured emission levels could be compared, the impacts actually monitored were less than even the negligible impacts that were predicted for that area.

Regulatory Conclusion. With respect to public comments concerned with the emissions of SST's, FAA's monitoring and analysis indicate that, while under the "worst case," addition of a large number of Concorde operations at an airport could produce some increase in carbon monoxide and hydrocarbons, the changes would be small relative to total emissions in the air quality control region. Considering the SST in relation to other emission sources affecting the air quality regions, and based on the detailed assessment of the probable absolute contribution of the SST to these other sources, the FAA concludes that the limited Concorde operations permitted under these rules will have no significant impact on air quality.

C. HIGH ALTITUDE IMPACTS

The potential impact of SST's on stratospheric ozone was cited as a potential problem in public comments in response to all regulatory proposals issued by the FAA since notice 70-33. This issue has concerned the public and the governments of several nations for many years. The long history of governmental concern and study of this issue is outlined in the EIS.

Concern over the impact of the Concorde's emissions on the stratosphere centers of two issues: (1) The possible reduction of the amount of atmospheric ozone and the likelihood of a resulting increase in the incidence of skin cancer (due to increased ultraviolet radiation brought about by reduced ozone); and (2) the possible effect on the Earth's climate.

1. Ozone Reduction. With respect to the probability of ozone reduction by SST's, the latest and best available data indicate that data derived from

earlier programs substantially overestimated this effect, and that it is questionable whether SST operations would reduce ozone at all. It is equally doubtful, therefore, that SST operations would have any effect whatsoever on the incidence of skin cancer. The FAA study of upper atmosphere effects of SST operations is continuing to further substantiate these current findings in the EIS.

The National Academy of Sciences recently submitted a report to the Congress entitled "Response to the Ozone Protection Sections of the Clean Air Act Amendments of 1977: An Interim Report," by the National Research Council Committee on the Impacts of Stratospheric Change. This report supports these recent FAA findings. The report states that "the estimated impact of NOx (nitrogen oxides) from the exhausts of SST's and other high-flying aircraft on stratospheric ozone is now quite small, almost certainly not a matter of immediate concern." Ample time exists for additional tests and measurements and to continue the FAA-sponsored High Altitude Pollution program to reduce the remaining uncertainties and further analyze these new findings.

2. Climate. The second concern regarding SST impacts on the upper atmosphere involved the potential changes in the Earth's climate. The theory supporting atmosphere temperature changes from SST operations is outlined in the EIS. Although simultaneous injection of sulfur dioxide, water vapor, and nitrogen oxides into the upper atmosphere might affect atmospheric temperatures, it is concluded in the EIS that the possible effect of the Concorde on the mean surface temperature is insignificant. Estimates on the likely changes in associated climatic variables, such as rainfall are not possible at the present time, but these correlative effects are also believed to be insignificant.

Regulatory Conclusion. The FAA believes that research should be continued into the possible impacts of SST operation on high altitude ozone, incidence of cancer, mean surface temperature, and climatic changes. However, based on the studies accomplished to date, it is concluded that the SST operations permitted by these rules will have no significant upper atmosphere effects. No reason for delaying the adoption of the amendment can be validly attributable to upper atmospheric impacts.

D. FUEL USE

Many public comments submitted to the docket and in public hearings expressed concern that the Concorde, and possibly other SST's, would be a relatively inefficient consumer of precious petroleum fuels.

The Concorde uses approximately two to three times as much fuel per seat mile as subsonic airplanes. Although it is expected that future design SST's will be more fuel-efficient than current SST's, fuel efficiency is generally inversely proportional to speed, and SST's will always require more fuel per seat-mile or ton-mile than subsonic aircraft of comparable size.

The national interest in petroleum conservation is of great concern. This is true not only because of the need for petroleum products, but also because aviation fuel, which is the lifeblood of the national air transportation system, is exclusively petroleum based. Petroleum is the only fuel which will be used in aviation for the foreseeable future. The various modes of transportation use approximately 60 percent of the total petroleum consumed in the United States, of which approximately 10 percent is consumed by all aviation users.

A comprehensive national regulatory framework exists for the purpose of fuel allocation. The Department of Energy regulates the allocation of Petroleum among all users, not merely transportation. 10 CFR Part 211, entitled "Mandatory Petroleum Allocation Regulations" contains a broad framework for apportioning fuel not only among aviation users and all other users, but also among aviation users. Those regulations specifically address and provide for the quantity of fuel allocations. Fuel used for supersonic as well as subsonic aircraft is covered by those rules.

Regulatory Conclusion. The best available information indicates that SST's may use several times the fuel of subsonic jets per seat-mile or ton-mile. However, the FAA does not have authority to prohibit SST operations for that reason alone.

E. LOW FREQUENCY NOISE/VIBRATION

As noted by several commenters, another aspect of the noise generated by Concorde operation is that the low frequency content of an airplane noise signature is important because these frequencies may induce vibrations in structures near the flight path. Some comments suggested that Concorde operations would increase the vibration impact on residences that are now experiencing some vibration from subsonic aircraft operations.

The low frequency content of the Concorde's engines generates more energy in the low frequency band than do subsonic jet aircraft engines. The EIS concludes that a greater amount of sound energy at low frequencies in the Concorde's noise spectrum could induce correspondingly greater amounts of vibration in nearby structures than is the case for subsonic airplanes. However, the analytical studies

used for the Concorde EIS and verified by NASA studies during the Dulles and JFK monitoring programs show that structures near airports are not endangered by noise-induced vibrations from Concorde.

More particularly, the following conclusions enumerated in the EIS are based on vibration response measurements at Dulles and JFK International Airports.

(1) The vibration response of windows, walls, and floors is directly proportional to the sound pressure level of the aircraft noise and virtually independent of aircraft type.

(2) Concorde operations resulted in higher noise levels and, consequently, higher vibration levels than subsonic jet aircraft.

(3) Certain normal household events such as door and window closing resulted in vibration levels equal to or higher than those associated with Concorde operations.

(4) Comparison of the response levels with structural damage criteria shows the measured vibration levels to be less than those expected to cause damage such as cracked plaster or broken windows.

(5) All measurements were below the International Standard Organization's threshold of perception.

(6) Most measurements were close to or below the International Standard Organization's proposed "minimum complaint level."

Regulatory Conclusion. The difference in vibration impact between Concorde and subsonic aircraft is not considered to be significant. Low frequency vibration effects are therefore not forecast to be significantly greater for SST operations at given airports than the vibration effects caused by subsonic airplanes at those airports.

F. SONIC BOOM

1. **Extension of Current Rule.** The amendment of the sonic boom rule was not the subject of much comment. These rules extend the current sonic boom rule (§ 91.55) to civil aircraft outside United States airspace but operating to or from an airport in the United States. This extends the scope of sonic boom protective policies previously established by the FAA in 1973.

The problem addressed by these rules is that the shock wave generated by supersonic flight can extend for many miles from the airplane. The monitoring of sonic booms from Concordes operating to and from Dulles and the results of that effort, are described more fully in notice 77-23 and in the monitoring reports contained in the docket. No pattern of sonic boom was experienced. However, as stated in the notice, one sonic boom (with no reported community reaction) was recorded by the Shark River station. It is estimated that the arriving airplane

was 19 miles from the New Jersey coast. Since the airplane was not in the United States, no violation of § 91.55 was involved. The operator, however, changed its flight procedures for future flights to insure that supersonic speed is not attained or maintained closer than 25 miles from the coast. If the number of supersonic operators requesting approval to operate from U.S. airports increases, there will be a need for positive requirements to prevent a repetition of the Shark River sonic boom. These rules accomplish this result.

One comment suggested that these rules be further expanded to cover the flight of SST's that do not enter the United States. The FAA recognizes that there is a potential that an SST, traveling close to the United States, may create a sonic boom in the United States but believes that the problem is best addressed, initially, by the International Civil Aviation Organization (ICAO). In this regard, the ICAO Air Navigation Commission on November 21, 1974, recommended the following amendment to be added to ICAO Annex 2, *Rules of the Air*:

3.1.9—Sonic Boom. An aircraft when operating over the high seas adjacent to the territory of a State which has decided and duly published its decision to protect its territory from adverse effects of sonic boom shall not be flown in a manner that will cause such adverse effects.

Although ICAO has not yet completed final approval of its proposed amendment, the proposal shows recognition of the problem and the importance of publishing a clear decision to protect U.S. territory from civil sonic booms wherever generated. Consistent with the ICAO proposed amendment, these rules constitute and duly publish the decision of the United States to protect its territory from the adverse effects of sonic boom from SST's operating outside the United States.

2. **Secondary Effects of Sonic Boom.** Since the issuance of notice 77-23, sonic boom monitoring has detected very low energy, long-rise-time pressure events that sound much like the faint, muffled rumble of distant thunder but do not have the startling effects of sonic booms. These events, while they have on occasion been called "secondary sonic booms", are not considered to be sonic booms, since they do not have the rapid pressure rise and sharp audible characteristics of the sonic boom pressure signature. Moreover, these secondary effects have none of the potential that a sonic boom has for adversely affecting the environment. This secondary pressure phenomenon appears to reach the surface, with very low energy, after being refracted (bent) by the atmosphere, possibly over distances much greater than the distance that a sonic boom travels to reach the surface. The FAA

is continuing its monitoring to determine whether SST flight path adjustment can avoid even this impact.

G. IMPACTS ON PASSENGERS

The decision to adopt these rules involved an analysis of potential environmental impacts associated with the effects on passengers of the speed and high cruising altitude of SST's. The detailed analysis in the EIS is summarized here.

1. *Jet Lag.* "Jet lag" refers to the effect upon passengers who cross several time zones quickly. Since SST's travel more than twice as fast as subsonic transports, more time zones can be traversed in a given period of time and jet lag effects may be increased. On the other hand, this high speed also reduces travel fatigue, which is related to the length of the flight time. Since SST's reduce flight times by approximately 50 percent, the travel fatigue will be greatly diminished for SST passengers. The net result of increased jet lag and decreased travel fatigue appears to be that there will be no overall adverse effects on passengers.

2. *Transmission of Diseases.* Disinfection rules to prevent the transmission of disease by planes have been developed by the World Health Organization for international air transportation. These rules are implemented by ICAO.

The reduced flight time of SST's is concluded not to create a problem for health authorities in the detection of passenger-borne diseases. The varying incubation times of passenger-borne diseases have not presented a problem on Concorde flights to date, nor on subsonic international flights ranging from less than one hour flying time to more than 15 hours flying time.

3. *Cosmic Radiation.* As discussed in more detail in the EIS, cosmic radiation is always present in the atmosphere and is encountered in subsonic and supersonic flight. Cosmic radiation rates vary with altitude. At the cruise altitudes of SST's, the rates were found to be approximately double those at subsonic aircraft cruise altitudes. However, since SST flight times are approximately half of those of subsonic aircraft, the total dose per flight is about the same for SST passengers and subsonic aircraft passengers. The total dose is the significant factor in determining the impact on passengers. This dose is approximately the same as the impact on subsonic passengers traveling the same distance and is concluded, as for subsonic passengers, not to be harmful.

4. *Solar Flares.* A potential radiation hazard at SST altitudes is caused by solar flare radiation. On rare, unpredictable occasions—there have been three since 1956—the radiation at SST

altitudes from a solar flare may reach levels considered sufficiently high to warrant reducing the flight altitude in order to increase shielding by the atmosphere. It is expected that SST's will carry radiation monitoring devices that measure the radiation rate and warn the pilot during a solar proton event which precedes a solar radiation increase from a solar flare, although such devices are not presently required. When this warning occurs, the pilot can descend to flight levels that assure safety.

Regulatory Conclusion. Based on a review of public comments and other data, potential impacts on SST passengers are not sufficient to warrant modification of the terms of these rules.

H. ECONOMIC AND TECHNOLOGICAL CONSIDERATIONS

As discussed above, the major portion of the comments presented at the public hearings and submitted to the rules docket concerned the issue of whether SST's, particularly the first-generation Concorde, should be required to comply with the noise limits of part 36 that were originally applied to new subsonic turbojet designs in 1969. (Those noise limits are also referred to as "stage 2"). The environmental desirability of this objective was agreed to by virtually all who commented, including the manufacturers and operators of the Concorde. Considering only the noise abatement result of such a restriction, EPA and the FAA also agree that the regulatory response would be simple: All SST's would be banned unless they meet part 36.

However, as pointed out in notice 77-23, section 611(d)(4) of the Federal Aviation Act requires that the FAA, in prescribing and amending standards and regulations under section 611, shall

Consider whether any proposed standard or regulation is economically reasonable, technologically practicable, and appropriate for the particular type of aircraft, aircraft engine, appliance, or certificate to which it will apply.

The FAA is thus specifically required, by its primary noise abatement authority, to consider the economic and technological consequences of noise regulations as they are related to particular aircraft types. This requisite balancing of environmental, technological and economic values is also part of the National Environmental Policy Act of 1969 ("NEPA"). NEPA, while requiring awareness of the environmental consequences of major actions (section 102 (2)(C)), states that those factors are to be given appropriate consideration "along with economic and technological considerations" (section 102(2)(B)). The Declaration of National Environmental

Policy (section 101) points out the need to maintain the "conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans". The FAA believes that these statutes contemplate a reasoned consideration and balancing of environmental, economic and technological factors in decisionmaking.

The FAA has reviewed the voluminous technological and economic data submitted in response to notices 70-33, 75-15, 76-1 and 77-23, in relation to the noise abatement objectives of those proposals. The FAA, after consultation with the Secretary of Transportation and EPA, is convinced that, of all the proposals and options studied to date, these rules provide the most appropriate result in terms of balancing all of the myriad of factors.

In order to outline the economic and technological relationship between SST noise and SST airframe and engine design and operations, the discussion is in two parts: Concorde design factors and future SST designs.

1. *Concorde Design.* Extensive and detailed comments were submitted concerning the impact of the several EPA and FAA regulatory proposals on the Concorde. Based upon this information, it is apparent that a part 36 stage 2 noise limit on the Concorde would be tantamount to a ban of the Concorde from the United States.

The most effective use of technology to achieve maximum noise control occurs in the design and development of new aircraft types. Application of basic design principles and acoustical treatment for the control of noise can be most effectively planned when they are integrated into the total engine-airframe design from the beginning. From a time-sequencing point of view, the Concorde type design, as a total engineering concept, was "frozen" several years before the FAA received its first authority to control the design of aircraft for noise purposes (Pub. L. 90-411, 82 Stat. 389, July 21, 1968).

In accordance with U.S. type certification procedures, engine selection, a vital determinant of performance and, of course, noise, was made prior to the application for a U.S. type certificate. The application for a U.S. type certificate was made in 1965. Construction of two prototype Concordes began in February, 1965. The first of these, Concorde 001, was rolled out in December 1967, underwent engine tests in early 1968, and had its first flight on March 2, 1969.

In view of this chronology, the question facing the FAA with respect to Concorde noise is not how to incorporate acoustically effective features into the basic Concorde design, but whether refinements in the final design might be effective. Review of

Concorde manufacturing data indicates that modifications to the airframe and engines might achieve noise reductions, but not nearly sufficient to comply with FAR part 36 stage 2 standards. Airframe changes, such as enlarging the wing tips and improving the lift-to-drag ratio by altering the drooped leading edges along the whole wing span, do not produce significant noise reduction. Replacing the present engine with a turbofan power plant would generally increase the mass airflow and decrease the exhaust gas velocity, which would reduce perceived noise; however, it would also change performance characteristics in relation to the basic aircraft design. In short, replacing the present engine of the aircraft would constitute a major aircraft design change. Additionally, there is no existing engine technology which would provide supersonic flight capability and concurrently reduce noise.

The conclusion drawn from these data is that it is neither technologically practicable nor economically reasonable to require that the Concorde be altered to comply with the stage 2 noise limits of part 36 at this time.

Another question under section §11(b)(2) is whether additional noise reduction might be achieved during type certification. That section provides that the Administrator of the FAA—

... shall not issue an original type certificate ... for any aircraft for which substantial noise abatement can be achieved by prescribing standards and regulations in accordance with this section, unless he shall have prescribed standards and regulations in accordance with this section which apply to such aircraft and which protect the public from aircraft noise and sonic boom consistent with the considerations listed in subsection (d).

The Concorde cannot now comply with the current noise limits for subsonic aircraft. The above-cited section requires an investigation of the noise reduction potential of the Concorde consistent with the considerations in section §11(d)(4). The economic and technological considerations prescribed by section §11(d)(4) are in terms of a standard that is "appropriate for the particular type of aircraft ... to which it will apply." These rules require a determination during type certification of the Concorde that its noise levels are "reduced to the lowest levels that are economically reasonable, technologically practicable, and appropriate for the Concorde type design."

It is a fundamental requirement of aircraft engine design that the velocity of the exhaust gas exiting the engine must be much higher than the forward speed of the aircraft. This requirement makes turbojet engines generally more suitable for airplanes

like the Concorde than generally quieter turbofan engines because of the lower exhaust gas velocity in turbofan engines. Since the Concorde SST is designed to fly at between two and three times the speed of subsonic jet aircraft, the existing technology does not support the use of turbofan engines. Thus, for the same reason that the original Concorde design could not be made quieter, the FAA concludes that the initial Concorde design cannot now be modified to further reduce noise levels.

As the Concorde development program progressed, some design changes with a potential to reduce noise were studied. These included:

(a) The use of partial displacement of the thrust reverser buckets to minimize sideline noise;

(b) The use of retractable spade silencers to minimize flyover noise; and

(c) The development of an engine control system to permit the largest practical nozzle area for the takeoff and landing conditions to minimize exhaust gas velocity.

In March and July 1973, noise flight tests were conducted using a Concorde equipped with these devices. The results were disappointing in that no appreciable in-flight noise reduction was provided by either method (a) or (b). The development of the propulsive nozzle control system, however, was effective both in the reduced power takeoff flyover and, to a greater extent, in the approach flyover. Following these tests, the spade silencers and use of the partial deflection of the thrust reverser buckets were deleted from the production Concorde but the nozzle area control schedule was modified to the operationally acceptable standard and incorporated on the production Concorde.

In addition to these design efforts, considerable work was carried out to obtain the best aircraft operation techniques to minimize the noise impact. The techniques which result in reduced noise levels include power cutback after takeoff, decelerating approach, and adjustment of ground track over less populated areas. All three of these techniques produce a significant noise reduction and are being utilized.

Regulatory Conclusion. As demonstrated during operations at Dulles and JFK Airports, power reduction on takeoff, decelerated approach techniques, and ground track adjustment can reduce the noise impact. In terms of design noise reduction measures, the regulatory conclusion under section §11(b)(2) of the act is that no further substantial noise reductions can presently be achieved for the initial Concorde design by the adoption of specific standards. The noise levels currently generated by the Concorde will be the type certification noise

levels for that airplane under the general, qualitative provision of §36.301(b), drawn from the corresponding language of section §11(d)(4) of the act.

2. Future Design SST's. These rules require all SST's operating in the United States, other than Concordes with flight time before January 1, 1980, to comply with the stage 2 noise limits of part 36 in order to operate in the United States. This decision is based upon a review of the economic and technological implications of this requirement over the long term, weighed against the potentially serious long term environmental impacts of an indefinite postponement of such a requirement.

With regard to the expected noise levels of future design SST's, NASA has sponsored extensive work to define technological improvements that would be required to create an economically viable and environmentally acceptable advanced design SST. These theoretical studies have been based on aerodynamics, propulsion, structures, controls, and noise suppression technologies which, while not yet established or demonstrated, are assumed to be available within the next 5 to 10 years. Aircraft employing these technologies would not be expected to enter commercial service in less than 15 to 20 years.

Preliminary studies in both the United States and Europe indicate that the payload capacity could be significantly improved for a second generation SST by the use of advanced technology and design, and choice of optimum powerplant. Operating costs could also be greatly improved over the first-generation SST. Unless noise reduction features are incorporated into an SST design from the initial stages, it may be necessary to add equipment or sound absorbing material for noise control purposes which could reduce the payload, increase operating costs, and affect the commercial viability of the airplane. Thus, noise must be a major design constraint from the beginning, in order to be effectively controlled during certification.

A further constraint on the evolution of a satisfactory second-generation SST will be the retention of a proper balance between the subsonic and supersonic capabilities of the design so that mission flexibility within a route structure is not compromised.

Future SST's must meet flexible performance requirements and maintain environmental acceptability. These, in turn, create major problems for the propulsion system which must accommodate two distinct modes of operation: (1) A high airflow, low exhaust gas velocity turbofan-like mode for low noise takeoff and efficient subsonic

ic cruise; and (2) a high exhaust gas velocity turbojet-like mode for supersonic cruise.

The environmental requirements of future supersonic engines accommodating two distinct modes of operation have led to the technological innovation called multi- or variable-cycle engines (VCE). The variable cycle engine concepts show an inherent noise attenuation in small-scale static tests.

However, an ideal engine configuration for subsonic operation would reduce performance at supersonic cruise. A compromise design may therefore be considered, that is not optimum for either subsonic or supersonic flight. The rationale for the VCE, then, is its potential ability to provide a better performance match at the various operating conditions while also satisfying environmental constraints.

There are other concepts for dual-mode (subsonic/supersonic) engines that are under consideration for advanced SST's. However, none of the dual-mode concepts has been developed and tested. Recent study results indicate that noise levels at least as low as or even a few decibels lower than stage 2 noise limits of part 36 may become technically achievable by advanced technology SST's. FAA recognizes that, as performance specifications are made more demanding (such as larger payloads and expanded range), reduced noise levels become more difficult to attain.

FAA recognizes that, in the absence of a regulatory noise limit, there is a concern that noise attenuation goals may be relaxed in order to meet performance objectives. Balancing considerations of economic reasonableness and technological practicability and the need to protect the public health and welfare under section 611 of the Federal Aviation Act, the FAA has concluded that the stage 2 noise limits should be applied to the operation of future SST types, in order to provide a firm limit on the escalation of SST noise while research defines the potential for applying still further noise reductions at the type certification stage. The FAA, however, fully expects to promulgate stricter standards before such future SST types may enter into service.

Several comments requested that these rules require future SST types to meet the same noise rules, at any given point in time, as are applied to subsonic aircraft at that time. The FAA's goal is not to certificate or permit to operate in the United States any future design SST that does not meet standards then applicable to subsonic airplanes. If it is technologically infeasible to produce such an airplane, the FAA will consider setting a less stringent standard but in no event will that standard be less stringent than the noise levels of stage 2. However,

the FAA does not believe that it would be appropriate to establish at this time a permanent future linkage between supersonic and subsonic noise levels below the stage 2 noise limits. Such a policy might ignore the unique economic and technological factors affecting supersonic flight. Permanent linkage might also retard the future noise reduction progress of the total air transportation fleet to that reasonably attainable by SST's.

As stated in the Notice of Decision accompanying these rules, the FAA is currently addressing the long-term application on subsonic noise standards to supersonic aircraft in its evaluation of EPA proposals in notice No. 76-22, published in the FEDERAL REGISTER (41 FR 47358) on October 28, 1976. In the meantime, future SST's will be held to at least stage 2 noise limits by the operating provisions of these rules (see §91.311). American carriers could not operate such airplanes in any event until a certification noise rule is promulgated.

With regard to requiring achievement of levels more stringent than stage 2, conceptual designs that theoretically may achieve lower noise levels have not yet been demonstrated. An ICAO Working Group is assessing the current status of SST noise control technology and should identify the availability of that technology for derived versions, newly-manufactured and future SST airplanes. Using data on available technology, the SST design studies currently in progress will identify technically achievable noise levels for the time periods 1980-1985 and beyond 1985. These technical studies will identify projected SST noise levels for incorporation in the proposed standards and in the associated test and measurement techniques for type certification. The studies will contribute to an economic assessment of proposed standards which will also be assessed for consistency with the protection of the health and welfare of airport neighbors.

Regulatory Conclusion. In view of the above, the FAA has concluded that it does not have adequate technical information at this time to use as a basis for establishing type certification noise standards for future design SST's. There is no known active program to construct a second-generation SST. The FAA intends to monitor ongoing research closely and will propose appropriately lower standards as soon as there is sufficient technological information to support an informed consideration of economic and technological factors under section 611(d)(4) of the act. Operationally, however, a firm commitment to noise limits for future design SST's at least as quiet as the stage 2 limits is justified while this research continues.

1. NONDISCRIMINATORY TREATMENT OF CONCORDE

Many of the comments related to whether the rules are discriminatory in their treatment of SST's as compared with subsonic transports. One of the major concerns is that the SST noise rules not be unjustly discriminatory, be consistent with basic principles of fairness, and be in agreement with the international obligations of the United States under the Chicago Convention and the bilateral civil aviation agreements. This requires that unjust discrimination in the treatment afforded by the noise rules to SST's in comparison with subsonic airplanes be avoided.

Comments submitted in response to notice 77-23 stated that these rules would discriminate against the Concorde, while other comments state that the Rules would discriminate in favor of the Concorde. Before addressing these comments, it is necessary to set forth two elements of the analytical framework which is used to determine whether unjust discrimination will result.

First, a prohibition against unjust discrimination is not a prohibition against any and all differences in treatment; it is a prohibition against any difference in treatment for which there is no rational and reasonable basis. Indeed, a blanket requirement of identical treatment for all airplanes in all situations would in itself be arbitrary and discriminatory because it fails to consider differences in airplane types—i.e., jet airplanes are different from airplanes with reciprocating engines, big airplanes are different from small airplanes, and SST's different from subsonic airplanes. Thus, the principle that unjust discrimination be avoided has been applied in this rule-making by assuring that differences in treatment between SST's and subsonic airplanes are rationally and reasonably related to the differences between SST's and subsonic airplanes.

Second, as advances in technology have led to quieter airplanes, the reasonable expectations of the public concerning airplane noise have moved in the direction of demanding quieter airplanes. These expectations have, in turn, helped to force further advances in technology to produce quieter airplanes. Within this ever-changing context, it is not possible to establish permanent airplane noise limits. For this reason, the FAA has promulgated increasingly stringent airplane noise standards. Consequently, remedies considered to be adequate in relation to a given level of noise years ago are considered less acceptable today. This does not mean that today's airplanes are being discriminated against because today's remedies are farther reaching than the remedies of years ago; it merely reflects the develop-

ment of technology and growing demand of the public for quieter airplanes and for a quieter airport environment.

The public comments from supporters of the Concorde were largely to the effect that the noise rules would discriminate against SST's generally, and therefore against the Concorde in particular.

Some of the commenters stated that the FAA is imposing a "manufacturing cutoff date" which is both arbitrary and irrational because a Concorde manufactured in 1981 may be quieter than a Concorde manufactured in 1979. These comments assert that the more sensible method of limiting Concorde noise is the imposition of a limit on the number of Concorde operations in the United States.

While it is true that an earlier Concorde might be louder than a later Concorde, it is not true that the 1980 date established by these rules is a manufacturing cutoff date, nor is that date arbitrary or irrational. Although a limit on the number of Concorde operations in the United States would help to control the noise impact of Concorde, the use of a date after which subsequently manufactured Concordes must meet stage 2 noise limits in order to operate in the United States avoids several major problems inherent in the use of an operations limit.

First, a limit on the number of Concorde operations in the United States would have to be applied either as a national total or as an airport-by-airport limit within the national total. The creation of a regulatory framework which would require the FAA to parcel out Concorde operations among particular airports and carriers would interfere with the effectiveness of the airport proprietor's local option authority to establish nondiscriminatory noise measures which do not unduly burden commerce. This would also put the FAA in the business of deciding airport levels of service, which is a matter reserved to local airport authorities. Moreover, the establishment of airport-by-airport limits would be contrary to the principles of open competition in air transportation that this Administration has espoused, both for domestic and foreign commercial aviation. A national limit, on the other hand, would allow Concorde operators to concentrate all of their operations at one or two U.S. airports, to the disproportionate detriment of the neighbors of those airports, to a far greater extent than if only the first 16 Concordes were allowed to operate in the United States. Moreover, as the number of Concorde operations approached the national limit, it might be necessary to revert to an airport-by-airport allocation, with all of its attendant pitfalls. A limit based on when

the airplane was manufactured keeps the FAA out of the position of having to interfere in either the operational decisions of airport proprietors or in the management decisions of individual air carriers.

Second, adopting an operations number limit could place the United States in a position that is contrary to its international obligations. When the number of Concorde operations reached the limit, the FAA would either have to prorate the operations within the total or deny further applications. Proration would be contrary to the well-known U.S. opposition to quotas or frequency or capacity controls on international operations. On the other hand, limitation to the first Concorde operators which seek to operate in the United States might be contrary to our Chicago Convention obligation to apply U.S. laws and regulations uniformly without distinction as to nationality and with our obligation under bilateral agreements not to restrict unilaterally the frequency or capacity of foreign air carrier operations into the United States.

Third, a limit on the number of operations would not provide the well-defined economic incentive to the manufacturer to create quieter airplanes, but would weaken the finality and clarity that is established by the cutoff date.

Some of the commenters stated that no nation should unilaterally impose a noise standard on airplanes in international commerce. The United States has consistently agreed with this position and is currently working through ICAO to develop a uniform international approach to the problem of SST noise. However, until such international agreement is reached, the FAA has an obligation to protect U.S. citizens from the uniquely severe noise impacts of the Concorde, as discussed in more detail above and in the EIS.

Some commenters also stated that no nation has ever imposed a noise standard upon subsonic airplanes for which compliance was not economically practicable and technologically feasible. The FAA believes that the higher noise levels of the Concorde are a valid basis for the noise-related limitations imposed by these rules. Moreover, these rules reflect the need to continue the trend towards quieter airport environments, the increasing technological capability to produce quieter airport environments, and the increasingly lower tolerance for airplane noise. Finally, to the extent the British and French have themselves forecast a need for only 16 Concordes, which these rules will allow, the weight of the argument that these rules impose practically unattainable requirements upon Concordes produced after January 1, 1980, diminishes substantially.

A few commenters stated that the United States has never imposed a nationwide curfew in relation to subsonic airplanes. This curfew is justified primarily on the basis of the significantly higher single-event noise impact of the Concorde as compared with subsonic transports, as discussed in detail in the EIS. In addition, the night curfew is an important condition upon the privilege of operating the Concorde in the United States while subsonic airplanes are being brought into compliance with part 36.

Some commenters stated that these rules prohibit modifications of the Concorde which would make it louder, while the manufacturers of subsonic transports are not prohibited from introducing advancements which increase the noise. In fact, so far as FAA approval of type design changes is concerned, while subsonic airplanes which meet stage 2 standards may be modified if the modified airplane continues to meet stage 2 standards, subsonic airplanes which have not been shown to meet stage 2 may not be made louder. Similarly, SST's which do not meet stage 2 noise standards may not be made louder. The FAA is, by these rules, effectively imposing the same acoustical change requirements upon the Concorde as are applicable to any subsonic airplane which has not been shown to meet stage 2 noise levels.

A few commenters stated that these rules fail to consider the unique aspects of the Concorde which could be used in operation to decrease the noise impact. In particular, the decelerating approach, which the Concorde can make, creates less noise than a constant speed approach, but only the constant speed approach is permitted under the closely controlled noise measurement provisions of part 36. These procedures of part 36 are intended to ensure that, for comparison purposes, all aircraft are flown the same way during certification. While the decelerating approach is used in Concorde operations, it is not part of the noise testing procedures of part 36. As noise measurement techniques and operational practices become increasingly sophisticated, differences in flight characteristics can more appropriately be taken into account; but until such sophistication becomes available, it is necessary to use the same part 36 measuring procedures for all airplanes.

Many commenters argued that the noise rule discriminates in favor of Concorde because operators of many subsonic transports are required to retrofit or replace their airplanes for noise compliance, while the initial Concordes are being allowed to operate in the United States at their current noise level, and are not now subject to the 1985 FAR 36 compliance date. This argument fails to recognize

that the FAA has chosen to implement its noise reduction program as a phased program. An examination of this phased program at any point in time prior to completion of the entire program leads to the appearance of unequal treatment because, by definition, the phasing causes the different aspects of the program to be at different stages of completion at any point in time. The part 36 requirements for subsonic airplanes of new design were imposed in 1969; in 1973 the requirements were extended to newly manufactured airplanes, irrespective of their date of application for a type certificate; and in 1976 the requirements were extended to certain subsonic airplanes, irrespective of the date of their manufacture or their date of application for a type certificate. An analysis of this process in 1971 could have led to the conclusion that the rule then discriminated in favor of airplanes for which type certification had been sought before the cutoff date, while such an analysis today would lead to the conclusion that the rule presently discriminates in favor of aircraft not manufactured after 1973. However, in 1985, after the phasing has been completed for subsonic airplanes, all subsonic airplanes will be subject to the same noise standards. Thus, it is apparent that a phased program should be viewed in its entirety for comparative purposes rather than at any point in time before the phasing has been completed. With respect to Concorde and SST's generally, these rules apply the same procedures and concepts as were applied to subsonics. These rules cannot be compared in their present stage to the later stages of the phasing in the subsonic noise rule.

Several commenters also stated that the rules discriminate in favor of the Concorde by permanently excepting those manufactured before January 1, 1980, while subsonic airplanes were only grandfathered temporarily. This assertion is incorrect because there is no commitment to grandfather the Concorde permanently. If operational compliance by the excepted Concordes later becomes technologically practicable and economically reasonable, they too, will be required to meet appropriate noise standards. However, just as the timing for the operational cutoff date was not specified for noncomplying subsonics when the manufacturing cutoff was imposed, for subsonic airplanes, it is not known at this time when an operational cutoff date will be appropriate for the excepted Concordes.

J. INTERNATIONAL FAIRNESS

Most of the public comments relating to the international obligations of the United States were from persons who questioned the fairness of these

rules as applied to international transportation.

Some of the commenters alleged that these rules are contrary to long-standing international agreements and that these rules stifle the introduction of new technology by another country and, by limiting its market, could limit the production of airplanes by another country, which is unprecedented.

With respect to the authority to promulgate these noise rules while international discussions continue, the preamble of notice 77-23 notes that the applicable international agreements which define the obligations of the United States in this respect are the Chicago Convention, and the bilateral air services agreements between the United States and Great Britain, and between the United States and France. These agreements, taken together, recognize the authority of the participating countries to establish uniform, nondiscriminatory noise rules if the failure to establish such rules would produce a result that is inconsistent with the need of the participating country to protect its environment. The discussion of public comments relating to the treatment of subsonic transports versus SST's demonstrates that these rules are nondiscriminatory. The discussion of the major policy underlying these rules indicates that these rules are necessary in order to produce a result that meets the need of the United States to protect its environment.

With respect to whether the promulgation of these rules is unprecedented, it is appropriate to compare the stated intention of the United States to promulgate subsonic transport noise operational standards if ICAO does not do so promptly. In this sense, the treatment of SST's and subsonic transports is quite similar, and the noise standards in these rules are not unknown to international air transportation. In addition, U.S. noise operating rules are applied to foreign subsonic transports. The noise abatement operating provisions of § 91.87 of 14 CFR part 91 are an example.

Some commenters stated that the United States should await the results of ICAO's efforts in promulgating SST noise standards, in order to assure international fairness and in order not to prejudice ICAO's efforts. More particularly, the comments refer to ICAO Resolution A22-12, which "urges States to refrain from unilateral measures that would be harmful to the development of international civil aviation." In response, it is noted that ICAO Resolution A22-14 specifically recognizes the possible need for unilateral treatment of SST's by urging all governments to use "noise levels applicable to subsonic jet aeroplanes . . . as the guiding principles for the acceptance of supersonic transport aero-

planes until such time as standards and recommended practices for the noise certification of supersonic civil aircraft have been adopted by ICAO" (emphasis added). In accordance with Resolution A22-14, the intent is stated in these rules to use the subsonic noise standards as the ultimate goal, the "guiding principles," for SST noise standards until ICAO adopts SST noise standards.

With respect to the urging in Resolution A22-12 against unilateral measures which " . . . would be harmful to the development of international civil aviation . . ." it is noted that these rules will allow the operation into the United States of the first 16 Concordes. Inasmuch as this is the total number of Concordes which the British and French are estimating they will manufacture, these rules do not harm the development of international civil aviation.

One commenter noted that these noise rules are inconsistent with Working Paper 54, submitted by the United States to ICAO, which seeks to encourage nations to work with other nations in establishing noise rules. This comment overlooks the fact that Working Paper 54, which was adopted as ICAO Resolution A22-15, relates to subsonic noise rules and reflects the urging of the United States that other nations join with the United States to establish through ICAO international subsonic noise standards for inservice subsonic airplanes in order to avoid the need for the United States to extend its 1985 domestic operating cutoff date to subsonic transports in international service.

Some commenters noted that even if the United States imposed subsonic noise standards on all Concordes (which, at this time, these rules do not) such an imposition would not be unfair because the British and French have been on notice at least since 1962 that ICAO expected the SST to meet subsonic noise standards, citing ICAO Resolution A14-7. In response, it is noted that in 1962 it could not have predicted that subsonic noise technology would have advanced as rapidly as it has in the last several years, or that supersonic noise technology would have encountered so many obstacles. In recognition of the technological infeasibility of applying subsonic noise standards to Concordes at this time, Resolution A14-7 was superseded by Resolution A22-14, which provides that subsonic noise standards will be used as "guiding principles" for SST noise standards until ICAO adopts SST standards.

Some commenters cited the fact that the British and French have an SST but the United States does not to support the argument that there would be no unfairness in banning the Concorde from the United States. For example,

the commenters stated that the United States should not exempt the first 16 Concorde because the British and French have never exempted any U.S. airplane from their noise rules; or that to the extent international fairness is a consideration, the result might even be to prohibit a U.S. SST while allowing the Concorde; or that it is not consistent to require foreign subsonic transports to satisfy part 36 stage 2 noise limits in order to operate in the United States after 1985 without also requiring the same of foreign SST's. The FAA has considered these arguments but rejects them because they do not take cognizance of the fact that the Concorde is the first of a kind, and is sufficiently different from subsonics in some respects, and new enough in comparison with most of the subsonics, that it cannot presently be thrown into the pool with the subsonics and treated identically. This point is developed more fully in this preamble in this discussion which compares the noise rules applicable to SST's and subsonic transports.

IV. RELATION TO "LOCAL OPTION"

Many comments concerned the authority of airport proprietors to exercise their "local option" to control SST operations at their airports.

At one extreme, the commenters requested the Federal Government to preempt airport proprietors totally with respect to noise related airport use restrictions. At the other extreme, the comments stated that all local governments, not only airport proprietors, should be permitted to take any action locally desired to exclude aircraft. It was argued that introduction of the Concorde would disrupt land use plans established in order to accommodate aircraft complying with part 36 noise limits, and that the Concorde should be limited only to runways where the takeoff is over water. Several comments suggested that the FAA use its airport certification authority to deny certificates for airports that have inadequate land use plans. This suggestion is currently being reviewed as part of FAA's consideration of a proposal by EPA concerning a possible airport noise regulation (see notice 76-24, published at 41 FR 51522 on November 22, 1976). A similar comment suggested that the FAA prohibit the introduction of Concorde service into a particular airport until that airport has established an adequate land use plan.

Several comments requested that these rules define clearly the role of the airport proprietor. The FAA agrees that a restatement of Federal policy concerning the "local option" authority might be helpful. Notice 77-23 contained a concise description of this authority. As stated there, those rules do not affect the existing legal

authority of local airport proprietors to issue noise related airport use restrictions that are not unjustly discriminatory or inconsistent with international obligations, and that do not impose an undue burden on air commerce.

Congress has the power under the Constitution to regulate the operations of airports for noise abatement purposes, but it has chosen not to do so. This congressional policy leaves airport proprietors responsible for the regulation of their airports for noise abatement purposes. The proprietors may issue noise-related airport use restrictions that are not unjustly discriminatory and do not impose an undue burden on interstate or foreign commerce. The Chicago Convention and bilateral air services agreements do not alter this basic feature of American aviation law.

This legal principle has most recently been affirmed by the United States Court of Appeals for the Second Circuit in *British Airways Board v. Port Authority*, 564 F. 2d 1002 (2d Cir. 1977). The court stated:

Our initial opinion in this case delineated the extremely limited role Congress had reserved for airport proprietors in our system of aviation management. Commonsense, of course, required that exclusive control of airspace allocation be concentrated at the national level, and communities were therefore preempted from attempting to regulate planes in flight. See *Allegheny Airlines v. Village of Cedarhurst*, 238 F. 2d 812 (2d Cir. 1958); *American Airlines v. Town of Hempstead*, 398 F. 2d 369 (2d Cir.), cert. denied, 393 U.S. 1017 (1969). The task of protecting the local population from airport noise, however, has fallen to the agency, usually of local government, that owns and operates the airfield. *Air Transport Assn. v. Crotti*, 389 F. Supp. 58 (N.D. Cal. 1975) (three-judge court); *National Aviation v. City of Hayward*, 418 F. Supp. 417 (N.D. Cal. 1976). It seemed fair to assume that the proprietor's intimate knowledge of local conditions, as well as his ability to acquire property and air easements and assure compatible land use, cf. *Griggs v. Allegheny County*, 369 U.S. 84 (1962), would result in a rational weighing of the costs and benefits of proposed service. Congress has consistently reaffirmed its commitment to this two-tiered scheme, and both the Supreme Court and executive branch have recognized the important role of the airport proprietor in developing noise abatement programs consonant with local conditions. 564 F. 2d at 1010, 11.

This recognition of the unique capacity and responsibility of the airport proprietor to effect a "rational weighing of the costs and benefits of proposed service" is the foundation of the "local option" policy underlying FAA noise abatement rulemaking since part 36 was originally issued in 1969. With respect to further refinement of this policy, as requested in public comments, the FAA is continuing to work closely with individual airport proprietors to assist them in the develop-

ment of airport use restrictions in accordance with the extensive and detailed guidelines concerning "local option" in the November 18, 1976, Aviation Noise Abatement Policy of the DOT/FAA.

These rules, accordingly, do not determine or affect the right of the operator of any Concorde or other SST to fly to a particular airport. American civil airports other than Dulles International and Washington National are operated by authorities other than the Federal Government. FAA consideration of authorization of Concorde flights to particular airports will include environmental assessments for each airport. However, for the Concorde operations covered in the EIS for these rules, further environmental assessment under NEPA should not be necessary.

Finally, the curfew provisions of these rules, while extending the scope of Federal action under section 611 of the act, for SST's, does not preempt in any way the authority of airport proprietors to take legitimate additional action to protect airport neighbors.

V. TYPE CERTIFICATION PROCEDURES

These rules, as proposed in notice 77-23, contain several provisions of a highly technical nature that were designed to fit the Concorde, a high-speed delta-wing aircraft, into the flight test and related noise measurement procedures used for the evaluation of subsonic aircraft in part 36. Comments from the Concorde manufacturers addressed these proposals.

A. FLIGHT PROCEDURES

One commenter recommended that the noise type certification procedures for SST's should measure the total noise contours of those aircraft and that this be done by adding a new set of measurement points outside the points currently prescribed. The FAA believes that this concept may have merit and is evaluating it for possible future application. However, such a revision would be beyond the scope of the proposals issued to date.

B. TAKEOFF TEST SPEED

One comment indicated that it is too early in the development of the SST's to define a specific takeoff noise demonstration speed for those airplanes. The FAA does not concur with this comment as applied to the Concorde (which is the only airplane covered by the takeoff test speed proposal). The "minimum approved value of $V_1 + 35$ knots" and the "all-engines-operating speed at 35 feet" are readily ascertainable under the type certification regulations that define the airworthiness requirements for the Concorde. The use of these terms in § C36.7(f)(2) assures consistency with those airworthiness requirements.

C. ACOUSTICAL CHANGE

One comment objected to the application of the subsonic "acoustical change" rule to SST's without change. The "acoustical change" rule is intended to insure that airplanes are not modified in a way that makes them louder. The primary objection was that, unlike subsonic airplanes, SST's should be permitted to use reduced thrust in the takeoff noise compliance testing. The FAA believes that the use of power cutbacks permits real noise increases caused by design changes (such as larger engines) to be "masked" by the use of different thrust schedules before and after the type design change. For this reason, this provision (see § 36.7) is adopted as proposed.

D. OTHER NOISE TEST COMMENTS

Several comments were received concerning the method of testing SST's for noise. The FAA has reviewed these comments but has decided that their adoption would not materially improve, and could degrade, the current part 36 procedures as valid indicators of SST noise levels related to the levels of subsonic airplanes. These comments included a request that an entirely separate regulation, outside of part 36, be issued for SST's; the use of dBA rather than EPNdB as the unit of measure; additional noise measurement points to accommodate the noise characteristics of SST's; and the use of revised takeoff and approach test procedures to account for the different operating procedures that could be used in actual operation. One comment requested revisions of the tradeoff provisions of § 36.5(b), which allow, for example, the approach noise to exceed the prescribed limits by a limited amount if the noise levels at the other measuring points are below the limits for those points. The FAA believes that the current tradeoff provisions are necessary in order to account for minor variations in the noise signature of airplanes that are essentially identical in their overall noise impact.

VI. SECTION-BY-SECTION ANALYSIS

These rules amend provisions in three parts of the Federal Aviation regulations—part 21 (14 CFR part 21), which contains the procedural requirements for the certification of aeronautical products; part 36 (14 CFR part 36), which contains the substantive noise limits and related noise measurement and test procedures that must be complied with for the issuance of type certificates and airworthiness certificates; and part 91 (14 CFR part 91), which sets forth the flight and other requirements that apply to the operation of aircraft.

A. CHANGES TO PART 21 (14 CFR PART 21)

1. *Acoustical change: Certification.* Section 21.93(b) (1) and (2) are amended by deleting the word "subsonic." The effect of this amendment is to make the definition of the term "acoustical change" equally applicable to supersonic and subsonic airplanes. Under these procedures, for both supersonic and subsonic airplanes, an "acoustical change" exists whenever a voluntary change in the type design of airplane is applied for that might increase the noise levels of the airplane. Therefore, for both supersonic and subsonic airplanes, the acoustical change provisions of part 36 (§ 36.7) must be complied with prior to approval of that type design change (see also the discussion of the proposed change to § 36.7 and § 91.309(b)(1), below).

2. *SST "new production" rule.* Section 21.183(e)(1) is amended by deleting the word "subsonic." The effect, for supersonic as well as subsonic airplanes, is that a standard airworthiness certificate (which is the class of airworthiness certificate required for U.S. air carrier operation and similar operations) is not issued for airplanes that have not had flight time before the dates specified in part 36 (§ 36.1(d)), unless compliance with the applicable noise standards in part 36 is shown. (See also the discussion of the proposed revision of § 36.1(d).) This would extend, to SST's, the rules applied to subsonic airplanes in amendment 36-2—popularly called the "new production" rule published in the FEDERAL REGISTER (38 FR 29569) on October 26, 1973.

B. CHANGES TO PART 36 (14 CFR PART 36)

1. *Part 36 scope.* Section 36.1 is amended by adding a new subparagraph (a) (3) extending the applicability of part 36 to cover the issuance of a type certificate, and changes to that type certificate, and the issuance of standard airworthiness certificates, for the Concorde airplane. This brings Concordes within the overall scope of part 36.

2. *Airworthiness certificate.* Section 36.1(d) is amended by deleting the word "subsonic," in the lead-in, by adding the word "subsonic" to the current subparagraphs containing compliance dates, and by adding a new compliance date for Concorde airplanes. This requires Concordes without flight time before January 1, 1980, to comply with the stage 2 noise limits of part 36 in effect on the date of publication of notice 77-23 (October 13, 1977), in order to obtain an original standard airworthiness certificate. It is noted that the compliance dates in § 36.1(d) are related to "flight time." Part 1 of the Federal Aviation regulations (14 CFR Part 1) defines "flight time" as the time from the moment an airplane

first moves under its own power for the purpose of flight until the moment it comes to rest at the next point of landing.

3. *Definitions: "Subsonic" and "supersonic."* Section 36.1(f) is amended by adding new definitions of "subsonic airplane" and "supersonic airplane." The dividing line between these classes is Mach 1 in terms of the maximum operating limit speed, M_{mo} , as defined in FAR part 1. Note that these definitions apply wherever the terms "subsonic airplane" and "supersonic airplane" are used in part 36, and also where they are used in part 91 because of the change to § 91.301(d), discussed below.

4. *Retroactivity.* The amendment to paragraph (a) of § 36.2 is editorial in nature. It consolidates language. The purpose of that paragraph is to supersede § 21.17 of part 21, with respect to the designation of applicable type certification regulations, wherever part 36 imposes type certification requirements that apply to airplanes for which an application for a type certificate has already been submitted.

5. *Acoustical change.* Section 36.7 is amended by deleting the term "subsonic." The effect of this change (and of the deletion of the term "subsonic" from § 21.93, discussed above) is to apply to SST's the same acoustical change rules that currently apply to subsonic airplanes. Currently operating Concordes are "stage 1 airplanes" under § 36.7 since they have not been shown to comply with the noise limits for "stage 2 airplanes" or "stage 3 airplanes." The stage 1 acoustical change provisions of § 36.7(c) provide that an airplane, after a type design change, may not exceed the noise levels created prior to that change. These rules amend § 36.7 to include Concordes.

6. *SST noise measurement.* The changes to subpart B of part 36 make it clear that subpart B (which, beginning with § 36.101, requires transport category large airplanes and turbojet-powered airplanes to comply with Appendices A and B of part 36) covers supersonic as well as subsonic airplanes.

7. *Subpart C limited to subsonics.* The changes to subpart C, of part 36 make it clear that subpart C, as amended, applies only to subsonic airplanes.

8. *New subpart D: Supersonic airplanes.* A new subpart D, applying to SST's is added to part 36. In this new subpart, new § 36.301, "Noise limits: Concorde airplanes," is also added, containing requirements for Concorde corresponding to those for the first subsonic airplanes covered by current § 36.201 (the first Boeing 747, which was originally unable to comply with the noise limits in part 36). Like § 36.201, new § 36.301(a) provides that compliance with the applicable noise limits must be shown, for Concorde

airplanes, with noise levels measured and evaluated as prescribed in subpart B of part 36. This requires compliance with the detailed noise measurement requirements in appendix A of part 36 and the detailed requirements in appendix B concerning the evaluation of noise data received in accordance with appendix A. Compliance must be demonstrated at the same measuring points (i.e., takeoff, sideline, and approach) as are required under appendix C for subsonic airplanes.

9. *Concorde noise levels.* Paragraph (b) of new § 36.301 provides that, for the Concorde airplane, it must be shown in accordance with the provisions of part 36 in effect on the publication date of notice 77-23 (October 13, 1977), that the noise levels of that airplane are reduced to the lowest levels that are "economically reasonable, technologically practicable, and appropriate for the Concorde-type design." This standard corresponds to considerations prescribed by the Congress in section 611(d)(4) of the Federal Aviation Act of 1958, as amended by the Noise Control Act of 1972.

10. *Operating limitations.* The term "subsonic" is deleted from § 36.1581(c). The effect of this change is that, for both supersonic and subsonic airplanes, weights used in complying with the takeoff or landing noise limits of part 36, if less than the maximum weight or design landing weight, respectively, must be furnished as operating limitations.

11. *"Reference speed."* The changes to §§ C36.7 and C36.9 are intended to incorporate, for the Concorde noise test, the concept of "reference speed" which is the speed presently used, instead of stalling speed, in the takeoff and landing test requirements for that airplane. "Stalling speed" has relevance only for conventionally winged subsonic aircraft, not for delta winged supersonics like Concorde.

C. CHANGES TO PART 91 (14 CFR PART 91)

1. *Sonic boom.* The changes to §§ 91.1(b)(3) and 91.55 are intended to protect the coastal areas of the United States from sonic boom. The current rule prohibits the creation of sonic boom by civil airplanes that are in the United States by prohibiting flight in excess of Mach 1 while the airplane is within U.S. territorial limits. These rules extend the sonic boom protection to cover SST's that, while physically outside the United States, are going to or from airports in the United States.

This provision would require that information available to the flight crew include flight limitations that ensure that no sonic boom on the surface in U.S. territory will result from flights entering and leaving the United States. In order to operate to or from any U.S. airport, the SST operator is

required to comply with these limitations with other limitations issued to the operator in an authorization to exceed Mach 1 under appendix B of part 91. Those authorizations are issued in the rare cases specified in that appendix, for specific operations (such as flight testing of supersonic airplanes) in designated flight test areas.

2. *Scope of subpart E.* The amendment of § 91.301(a) reflects the expansion of subpart E of part 91 to include SST's. Subpart E—Operating Noise Limits, contains phased noise limits for certain subsonic turbojet airplanes, leading to final compliance with part 36 by January 1, 1985.

The revision of § 91.301(a) highlights the different scopes of each section in revised subpart E. Section 91.301(a)(1) makes it clear that current §§ 91.303 through 91.307 are limited to subsonic airplanes and to U.S.-registered airplanes. For consistency with this scope, § 91.307 is amended to limit the foreign air commerce provision to subsonic airplanes. No substantive change to §§ 91.303 through 91.307 is made by these rules.

3. *Parts 91, 121, 123, 129, and 135 covered.* Section 91.301(a)(2) provides that the newly proposed operating restrictions in §§ 91.309 and 91.311 (for SST's that do not comply with the stage 2 noise limits of part 36), apply to U.S.-registered airplanes having standard airworthiness certificates, and foreign registered airplanes that would be required to have standard airworthiness certificates, for the intended operations if they were registered in the United States. That provision covers operations under Parts 91, 121, 123, 129, and 135.

4. *Definitions: "Subsonic" and "supersonic."* Section 91.301 is amended to incorporate the new part 36 definitions of "subsonic airplane" and "supersonic airplane" in subpart E of part 91. See discussion, above, of new § 36.1(f) (7) and (8).

5. *Subsonic dates unchanged.* The revisions of §§ 91.303 and 91.305 make it clear that the current dates for phased and final compliance with part 36, ending on January 1, 1985, apply only to subsonic airplanes. See new § 91.311 for application of parts 36 to SST's.

6. *SST operating noise rules.* Section 91.309 is added, containing operating rules that apply to SST's that operate to or from a U.S. airport but have not been shown to comply with the stage 2 noise limits of part 36 in effect on the publication date of notice 77-23 (October 13, 1977). Note that use of the tradeoff provisions of part 36 is allowed. This section applies equally to U.S.-registered and foreign-registered supersonic airplanes.

New § 91.309(b) prescribes the operational restrictions intended to protect airport environments from the exces-

sive noise of SST's that do not comply with the "stage 2" noise limits of part 36. Section 91.309(b)(1) requires that no person in the United States may land or take off an airplane covered by the section if its noise has been increased (as measured under part 36) through modification of the type design of the airplane. This is the operational counterpart of the acoustical change provisions of § 36.7 of part 36 (see above discussion). The words "regardless of whether a type design change approval is applied for under part 21 of this chapter" extend the acoustical change type certification concept to the operation of airplanes not covered by U.S. type certification rules.

Section 91.309(b)(2) provides that no flight may be scheduled, or otherwise planned, for takeoff or landing at any U.S. airport after 10 p.m. and before 7 a.m., local time.

Section 91.311 provides that, except for Concorde airplanes having flight time before January 1, 1980, no SST may be operated in the United States that does not comply with the stage 2 noise limits of part 36 in effect on the publication date of notice No. 77-23 (October 13, 1977).

ADOPTION OF AMENDMENTS

Accordingly, Chapter I of Title 14 of the Code of Federal Regulations is amended, effective July 31, 1978, as follows:

PART 21—CERTIFICATION PROCEDURES FOR PRODUCTS AND PARTS

I. Part 21 of the Federal Aviation Regulations (14 CFR Part 21) is amended as follows:

§ 21.93 [Amended]

A. By amending § 21.93(b) (1) and (2), by deleting the word "subsonic" wherever it appears.

§ 21.183 Amended]

B. By amending § 21.183(e)(1) by deleting the word "subsonic" wherever it appears.

PART 36—NOISE STANDARDS: AIRCRAFT TYPE AND AIRWORTHINESS CERTIFICATION

II. Part 36 of the Federal Aviation Regulations (14 CFR Part 36) is amended as follows:

1. In § 36.1, paragraph (a)(3) is added, paragraph (d) is amended, and paragraphs (f)(7) and (f)(8) are added, all to read as follows:

§ 36.1 Applicability and definitions.

(a) . . .

(3) A type certificate and changes to that certificate, and standard airwor-

thiness certificates, for Concorde airplanes.

(d) Each person who applies for the original issue of a standard airworthiness certificate for a transport category large airplane or for a turbojet powered airplane under § 21.183 must, regardless of date of application, show compliance with the following provisions of this part (including appendix C):

(1) The provisions of this part in effect on December 1, 1969, for subsonic airplanes that have not had any flight time before—

(i) December 1, 1973, for airplanes with maximum weights greater than 75,000 pounds, except for airplanes that are powered by Pratt & Whitney Turbo Wasp JT3D series engines;

(ii) December 31, 1974, for airplanes with maximum weights greater than 75,000 pounds and that are powered by Pratt & Whitney Turbo Wasp JT3D series engines; and

(iii) December 31, 1974, for airplanes with maximum weights of 75,000 pounds and less.

(2) The provisions of this part in effect on October 13, 1977, including the stage 2 noise limits, for Concorde airplanes that have not had flight time before January 1, 1980.

(f) . . .

(7) A "subsonic airplane" means an airplane for which the maximum operating limit speed, M_{\max} , does not exceed a Mach number of 1.

(8) A "supersonic airplane" means an airplane for which the maximum operating limit speed, M_{\max} , exceeds a Mach number of 1.

2. By amending paragraph (a) of § 36.3 to read as follows:

§ 36.2 Special retroactive requirements.

(a) Notwithstanding § 21.17 of this chapter, and irrespective of the date of application, each person who applies for a type certificate for an airplane covered by this part must show compliance with the applicable provisions of this part.

§ 36.7 [Amended]

3. By amending the section heading and paragraph (a) of § 36.7 by deleting the word "subsonic" wherever it appears.

4. By amending the heading of subpart B to read as follows:

Subpart B—Noise Measurement and Evaluation for Transport Category Large Airplanes and Turbojet Powered Airplanes

§ 36.101 [Amended]

5. By amending § 36.101 by inserting the words "For transport category large airplanes and turbojet powered airplanes" before the words "the noise generated . . ."

§ 36.103 [Amended]

6. By amending § 36.103 by inserting the words "For transport category large airplanes and turbojet powered airplanes," before the words "noise measurement information . . ."

7. By amending the heading of subpart C to read as follows:

Subpart C—Noise Limits for Subsonic Transport Category Large Airplanes and Subsonic Turbojet Powered Airplanes

§ 36.201 [Amended]

8. By amending paragraph (a) of § 36.201 by inserting the words "For subsonic transport category large airplanes and subsonic turbojet powered airplanes" before the words "compliance with . . ."

9. By adding a new subpart D to read as follows:

Subpart D—Noise Limits for Supersonic Transport Category Airplanes

§ 36.301 Noise Limits: Concorde.

(a) *General.* For the Concorde airplane, compliance with this subpart must be shown with noise levels measured and evaluated as prescribed in subpart B of this part, and demonstrated at the measuring points prescribed in appendix C of this part.

(b) *Noise limits.* It must be shown, in accordance with the provisions of this part in effect on October 13, 1977, that the noise levels of the airplane are reduced to the lowest levels that are economically reasonable, technologically practicable, and appropriate for the Concorde type design.

§ 36.1581 [Amended]

10. By amending paragraph (c) of § 36.1581 by deleting the word "subsonic" before the words "transport category . . ."

Appendix C [Amended]

11. By amending appendix C as follows:

a. By amending the appendix heading by deleting the word "Subsonic" before the words "Transport Category."

b. By amending the introductory clause of § 36.7(f) to read as follows:

§ 36.7 Takeoff test conditions.

(1) For applications made for subsonic airplanes after September 17, 1971, and for Concorde airplanes, the following apply:

c. By amending § 36.7(f)(1) by inserting the words "For subsonic airplanes" before the words "the test day speeds", in the first sentence only.

d. By redesignating § 36.7(f)(2) as § 36.7(f)(3).

e. By adding a new § 36.7(f)(2) to read as follows:

§ 36.7 Takeoff test conditions.

(f) . . .

(2) For Concorde airplanes, the test day speeds and the acoustic day reference speed must be the minimum approved value of V_{\max} + 35 knots, or the all-engines-operating speed at 35 feet, whichever speed is greater as determined under the regulations constituting the type certification basis of the airplane, except that the reference speed may not exceed 250 knots. These tests must be conducted at the test day speeds ± 3 knots. Noise values measured at the test day speeds must be corrected to the acoustic day reference speed.

f. By amending the introductory clause of § 36.9(f) to read as follows:

§ 36.9 Approach test conditions.

(1) For applications made for subsonic airplanes after September 17, 1971, and for Concorde airplanes, the following apply:

g. By amending § 36.9(f)(1) by inserting the words "For subsonic airplanes" before the words "a steady."

h. By redesignating § 36.9(f)(2) as § 36.9(f)(3).

i. By adding a new § 36.9(f)(2) to read as follows:

§ 36.9 Approach test conditions.

(f) . . .

(2) For Concorde airplanes a steady approach speed, that is either the landing reference speed + 10 knots or the speed used in establishing the approved landing distance under the airworthiness regulations constituting the type certification basis of the airplane, whichever speed is greater, must be established and maintained over the approach measuring point.

PART 91—GENERAL OPERATING AND FLIGHT RULES

III Part 91 of the Federal Aviation Regulations (14 CFR Part 91) is amended as follows:

§ 91.1 [Amended]

1. By amending § 91.1(b)(3) by deleting the words "and § 91.55" and insert-

ing the word "and" between the word "§ 91.38" and the word "§ 91.43."

2. By amending § 91.55 by adding the words "in the United States" between the words "civil aircraft" and the words "at a", by designating the current text as paragraph (a) and by adding a new paragraph (b) to read as follows:

§ 91.55 Civil aircraft sonic boom.

(b) In addition, no person may operate a civil aircraft, for which the maximum operating limit speed M_{mo} exceeds a Mach number of 1, to or from an airport in the United States unless—

(1) Information available to the flight crew includes flight limitations that insure that flights entering or leaving the United States will not cause a sonic boom to reach the surface within the United States; and

(2) The operator complies with the flight limitations prescribed in paragraph (b)(1) of this section or complies with conditions and limitations in an authorization to exceed Mach 1 issued under appendix B of this part.

3. By amending paragraph (a) of § 91.301 to read as follows:

§ 91.301 Applicability; relation to part 36.

(a) This subpart prescribes operating noise limits and related requirements that apply, as follows, to the operation of civil aircraft in the United States:

(1) Sections 91.303, 91.305, and 91.307 apply to U.S. registered civil subsonic turbojet airplanes with maximum weights of more than 75,000 pounds and having standard airworthiness certificates. Those sections apply to operations under this part and under parts 121, 123, and 135 of this chapter, but do not apply to operations under part 129 of this chapter.

(2) Sections 91.309 and 91.311 apply to U.S. registered civil supersonic airplanes having standard airworthiness certificates, and to foreign registered civil supersonic airplanes that, if registered in the United States, would be required by this chapter to have a U.S. standard airworthiness certificate in order to conduct the operations intended for the airplane. Those sections apply to operations under this part and under parts 121, 123, 129, and 135 of this chapter.

§ 91.301 [Amended]

4. By adding the following new sentence at the end of paragraph (b) of § 91.301: "For the purpose of this subpart, the terms 'subsonic airplane' and 'supersonic airplane' have the meanings specified in part 36 of this chapter."

§ 91.303 [Amended]

5. By amending § 91.303 by amending the section heading to read "Final

compliance: subsonic airplanes" and by adding the word "subsonic" between the word "any" and the word "airplane."

§ 91.305 [Amended]

6. By amending § 91.305 by amending the section heading to read "Phased compliance under parts 121 and 135: subsonic airplanes", and by adding the word "subsonic", in paragraph (a), between the word "operating" and the word "airplanes."

§ 91.307 [Amended]

7. By amending § 91.307 by adding the word "subsonic" between the word "the" and the word "airplanes."

8. By adding a new § 91.309 to read as follows:

§ 91.309 Civil supersonic airplanes that do not comply with part 36.

(a) *Applicability.* This section applies to civil supersonic airplanes that have not been shown to comply with the stage 2 noise limits of part 36 in effect on October 13, 1977, using applicable tradeoff provisions, and that are operated in the United States after July 31, 1978.

(b) *Airport use.* Except in an emergency, the following apply to each person who operates a civil supersonic airplane to or from an airport in the United States:

(1) Regardless of whether a type design change approval is applied for under part 21 of this chapter, no person may land or take off an airplane, covered by this section, for which the type design is changed, after July 31, 1978, in a manner constituting an "acoustical change" under § 21.93, unless the acoustical change requirements of part 36 are complied with.

(2) No flight may be scheduled, or otherwise planned, for takeoff or landing after 10 p.m. and before 7 a.m. local time.

9. By adding a new § 91.311 to read as follows:

§ 91.311 Civil supersonic airplanes: noise limits.

Except for Concorde airplanes having flight time before January 1, 1980, no person may, after July 31, 1978, operate, in the United States, a civil supersonic airplane that does not comply with the stage 2 noise limits of part 36 in effect on October 13, 1977, using applicable trade-off provisions.

(Secs. 307, 313(a), 601(a), 603, 611, Federal Aviation Act of 1958, as amended (49 U.S.C. § 1348, 1354(a), 1421(a), 1423, and 1431); sec. 6(c), Department of Transportation Act (49 U.S.C. § 1655(c)); Title I, National Environmental Policy Act of 1969 (42 U.S.C. 4321 et

seq.); Executive Order 11514, March 5, 1970).

Issued on June 26, 1978.

LANGHORNE BOND,
Administrator.

[FR Doc. 78-18188 Filed 6-27-78; 8:45 am]

[4910-13]

[Docket Nos. 10494 and 15376]

CIVIL SUPERSONIC AIRPLANE NOISE

FAA Disposition of EPA Proposals;
Decision

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of decision concerning certain U.S. Environmental Protection Agency (EPA) noise regulatory proposals.

SUMMARY: This notice contains FAA's reasons for not adopting certain regulatory proposals submitted by EPA concerning the noise of civil supersonic airplanes (SST's). A final rule regulating SST's is also published in this issue of the FEDERAL REGISTER. It should be pointed out that many aspects of that final rule regulating SST's are consistent with the EPA proposals. This notice describes and explains the differences between the FAA regulation and the EPA proposals. FEDERAL REGISTER publication of this notice is required by § 611(c) of the Federal Aviation Act of 1958.

FOR FURTHER INFORMATION CONTACT:

Mr. Richard Tedrick, Program Management Branch (AEQ-220), Environmental Technical and Regulatory Division, Office of Environmental Quality, Federal Aviation Administration, 800 Independence Avenue SW., Washington, D.C. 20591, telephone 202-755-9027.

SUPPLEMENTARY INFORMATION: Under section 611(CX)(B) of the Act, if the FAA elects not to prescribe an amendment in response to an EPA regulatory proposal, it must publish in the FEDERAL REGISTER a notice of that decision and a detailed explanation. The following discussion constitutes FAA's notice that it is not prescribing certain regulatory provisions in response to EPA's proposals contained in notice 75-15 and notice 76-1, together with an analysis of the reasons therefor. The detailed history concerning the issuance of those notices is contained in the preamble to the amendments of the SST noise and sonic boom rules in this issue of the FEDERAL REGISTER. Those amendments

are referred to here as "the final rule".

THE EPA PROPOSALS

The first set of proposals submitted to the FAA by EPA were published as Notice 75-15 by the FAA in the FEDERAL REGISTER (40 FR 14093) on March 28, 1975.

NOTICE 75-15

The proposals in Notice 75-15 would have had the following-effects:

EPA PROPOSAL 1: NEW PRODUCTION

Each person who applies for a U.S. standard airworthiness certificate for an SST for which "substantive productive effort" was "commenced" after the date of notice 75-15 (March 28, 1975) would have been required to show compliance with the noise level limits of part 36 as they existed in 1969 (including appendix C of part 36); EPA defined "substantive productive effort commenced" as meaning that "parts have been fabricated or delivered or are on order (in a legally binding financial commitment) for the airplane in question equivalent in total value to 5 percent or more of the selling price of the airplane."

FAA DISPOSITION OF PROPOSAL 1

The final rule, by requiring compliance with the "stage 2" noise limits of part 36 for the issuance of a U.S. Standard Airworthiness Certificate for Concordes other than those having first flight time before January 1, 1980, accomplishes the intent of EPA proposal 1 with respect to those airplanes. However, unlike the EPA proposal, the new production aspect of the final rule applies only to the Concorde, not to all SST's, and excludes Concordes that do not have "flight time" before January 1, 1980, rather than "substantive productive effort" before March 28, 1975. The final rule incorporates "the stage 2 noise limits of part 36 in effect on October 13, 1977," rather than part 36 as effective on December 1, 1969, because of the clarifying and technically improved measurement standards of part 36 that became effective since 1969.

The decision to use the term "flight time" in the final rule, rather than the term "substantive productive effort", was made because "flight time" is a readily identifiable occurrence which is precisely defined in part 1 of the Federal Aviation Regulations (14 CFR Part 1). The term "substantive productive effort" on the other hand, is difficult to define, implement, enforce, or monitor because (1) the manufacturing, marketing and financial data needed to determine whether parts and materials orders "equivalent in total value to 5 percent or more of the selling price of the airplane" have

been made is often proprietary, and unavailable, and is subject to an unacceptably wide scope of interpretation; and (2) the EPA definition of the term "substantive productive effort" would place the FAA in the position of determining whether each order is a "legally binding financial commitment." This is a matter best left to the courts and the contracting parties.

With respect to EPA's proposal to permit the issuance of a U.S. standard airworthiness certificate for any SST for which parts and materials equivalent to at least 5 percent of the purchase value of the airplane were merely "on order" as of March 28, 1975, the FAA believes that such a rule could be broad enough to permit the issuance of standard airworthiness certificates to any Concorde airplane covered in the long term production commitments already established by the British and French manufacturers by that date, even if the particular airplane were not finally produced until after January 1, 1980. To establish a firm cutoff date and to avoid the essentially open-ended effect of the "on order" clause of the EPA proposal the final rule limits the exception to airplanes with "flight time" before a date certain.

The date selected is January 1, 1980, because it has been determined to be the earliest cutoff possible without causing unnecessarily severe adverse impacts, in view of the requirement in section 611(d) of the act that the FAA consider whether its noise rules are "economically reasonable" and "technologically practicable." An adverse impact on U.S. relations with Great Britain and France may also be expected to result from an earlier date.

Where EPA proposed to apply its new production rule to all SST types, the corresponding provision of the final rule is limited to the Concorde, since, except for the Concorde, there has been no application for certification, and no submittal of type design data upon which the FAA has been able to assess economic and technological impact as required by section 611(d)(4) in relation to its duty to insure that noise standards achieve the "highest degree of safety" (section 611(d)(3)). Unlike the subsonic "new production" rule, which was based on a substantial history of application of noise standards to specific subsonic airplane type designs, there is very little information concerning the impact of noise standards on potential SST types other than the Concorde.

A second reason for limiting the "new production" rule to Concordes is that the FAA, in consultation with EPA, is continuing its efforts ultimately to require future SST types to comply with noise levels more stringent than the "stage 2" noise limits of part 36. The FAA hopes to require

"new production" subsonic airplanes to meet the lower "stage 3" noise limits of part 36, and is studying economic and technological data to determine how soon this might be done. As noted below in conjunction with EPA proposal 2 concerning type certification, these technological and economic considerations are currently being reviewed in response to detailed noise reduction proposals submitted by EPA and published in the FEDERAL REGISTER, as notice 76-22, on October 28, 1976 (41 FR 47358). The FAA therefore believes it would be inappropriate, at this time, to determine that future SST's should be allowed to obtain U.S. standard airworthiness certificates by complying with the "stage 2" noise limits of part 36, or determine that still lower noise levels, such as "stage 3" noise limits, can be applied to SST's consistent with the economic and technological considerations in section 611. A commitment to "stage 2" at this time would appear to encourage potential manufacturers of SST's to invest extensively in technologies limited to "stage 2" noise reduction capability. In the certification area, the FAA believes that the proper approach to assuring maximum noise reduction potential of future SST's is to encourage the research needed to support reduced noise limits, and then issue those lower limits based on an accurate appraisal of that noise reduction potential. In the meantime, growth of noise levels higher than the stage 2 limit is effectively capped, for further SST types, by the operating prohibition in section 91.311. This is consistent with the EPA recommendation that "new production" of current design SST's be required to meet noise standards now applicable to current design subsonic airplanes. This creates a maximum degree of flexibility by laying a sound foundation for lowering the noise limits for the type certification of future SST types, while assuring that no SST's other than the first group of Concordes is permitted to operate in the United States unless they meet at least the stage 2 noise limits of Part 36.

EPA PROPOSAL 2: TYPE CERTIFICATION

Each person who applied after August 6, 1970, for a U.S. type certificate for any SST, except for "those airplane types that have flown before December 31, 1974," would have been required to show compliance with the noise level limits of part 36. EPA has indicated that the intent of their proposal is to establish a commitment to apply all future reductions in subsonic noise limits to supersonic aircraft for which applications for type certification are made after those lower limits become effective.

DISPOSITION OF PROPOSAL 2

There are two fundamental differences between the EPA proposal and

the final rule. First, EPA's proposal, by excepting SST types for which application for a type certificate was made before August 6, 1970, and which have flown before December 31, 1974, would not apply any of the provisions of part 36 to the Concorde, whereas the type certification provisions of the final rule applies the noise measurement procedures to Concordes with flight time before January 1, 1980, under a "quiet as practicable" standard. Second, the EPA proposal is intended to apply all future reductions in subsonic noise limits to SST's, whereas the type certification provision in the final rule is limited to the Concorde and leaves open the question of what future noise limit reductions should be applied to future SST types.

With respect to the first difference, it should be noted that both EPA and FAA agree that the Concorde cannot reasonably be required to comply with the numerical noise limits of appendix C to part 36. However, the FAA has determined the Concorde should not be completely excepted from the other provisions of part 36 (as would be the case under EPA's proposed revision of § 36.201(c) in notice 75-15). The application of part 36 to the Concorde in the final rule, while it does not apply stage 2 noise levels to that airplane, accomplishes the following: It requires identification of accurate noise levels obtained under the detailed noise measurement and evaluation procedures of appendices A and B; and it requires that these numbers be put in the Airplane Flight Manual. Once these noise levels are established, they define the "parent" design for the purpose of preventing possible increases in noise by future modification of the airplane (such as changes in weight or thrust), known as "acoustical changes." By specifying a standard in terms of the lowest noise levels that are "economically reasonable, technologically practicable, and appropriate to the particular type design", type certification of the Concorde, under the final rule, constitutes an FAA determination, based on the specific details of the Concorde type design, that further substantial noise reductions cannot be obtained, prior to the issuance of the type certificate, by the issuance of regulations (consistent with the economic and technological considerations required by section 611(d) of the act).

The FAA's reason for not adopting a general rule applying all future subsonic noise reductions to future SST types is the same as the reason for not including future SST types in the provisions of the final rule concerning the issuance of standard airworthiness certificates as stated above in response to EPA's proposal 1, namely, that these precise issues are the subject of subsequent detailed noise reduction proposals submitted to FAA by EPA which

are being reviewed, in depth by the FAA. Subsequent to the issuance of notice 75-15, EPA submitted these lower noise levels, known as "stage 3", "stage 4", and "stage 5" noise levels, and proposed that they apply equally to subsonic and supersonic aircraft, through the 1985 time period. These proposals were published as notice 76-22, on October 28, 1976 (41 FR 47358). A public hearing on these proposals was held in Washington, D.C. on December 15, 1976. The FAA is currently reviewing public comments submitted to the docket (Docket No. 16231), the hearing transcript, and economic and technological data to determine, in depth, the appropriate response to these detailed EPA proposals. Accordingly, the FAA believes that it would be premature, at this time, to decide whether or not SST's should or should not be subject to all future noise reductions imposed on subsonic aircraft. Nothing in the final rule conditions the FAA's ultimate response to the EPA proposals in notice 76-22 as applied to SST's. As stated in the preamble to the final rule, the FAA agrees with EPA that every possible effort should be made to achieve the goal of full future compliance, by SST's, with the same noise levels that are applied to subsonic aircraft.

EPA PROPOSAL 3: OPERATION

All SST operations to or from airports in the United States would have been prohibited, unless the airplane to be operated complies with the noise requirements for supersonic airplanes of part 36, "taking into account the date on which substantive productive effort (as defined in the EPA type certification proposal) was commenced on the airplane."

DISPOSITION OF PROPOSAL 3

The concept of this EPA proposal is adopted in the final rule for SST's other than Concordes that had flight time before January 1, 1980. However, the "flight time" cutoff is preferred over the "substantive production effort" cutoff for the reasons stated above in response to proposal 1.

NOTICE 76-1

In addition to these proposals, EPA submitted a further operating proposal intended to supplement its proposed operating rule contained in notice 75-15. This additional EPA proposal was published as notice 76-1 by the FAA in the FEDERAL REGISTER (41 FR 6270) on February 12, 1976. It would have had the following effect:

EPA PROPOSAL 4: OPERATION

All SST operations to or from airports in the United States would have been prohibited unless the airplane complies with "the noise level require-

ments for subsonic transport category airplanes of part 36 of this chapter", and unless the airplane had flight time before December 31, 1974.

DISPOSITION OF PROPOSAL 4

The final rule contains a flight time cutoff date of January 1, 1980, rather than December 31, 1974, and excludes only Concordes (but no other SST) having flight time before that date. Unlike the EPA proposal, the final rule contains a night curfew, and an acoustical change requirement, for all SST's that do not comply with part 36 noise limits (expected to be the first 16 Concordes only).

An operational cutoff of December 31, 1974, by permitting only the first two prototype Concordes to operate in the United States would be tantamount to a ban on U.S. operations of virtually all of the planned production Concordes. Such a ban is not employed in the final rule, as noted in the response to proposal 1.

Considering the limit on the total number of noncomplying Concordes to those having flight time before January 1, 1980, the 10 p.m. to 7 a.m. curfew, and the prohibition against modifications of those few airplanes in a way that increases their noise levels, the FAA believes that the total ban of Concorde operations inherent in the December 31, 1974, date would be unduly harsh in relation to the limited environmental impact posed by these 16 Concordes.

EPA OPTIONS CONSIDERED

As discussed above, notice 75-15, in addition to containing the specific regulatory proposals discussed above included a discussion of 8 possible regulatory options. EPA has advised the FAA that its proposal in notice 76-1 (treated above as EPA proposal 4) was intended to supersede its earlier discussion of these options in notice 75-15. However, these options were considered in the public hearing conducted in connection with notice 75-15, as well as the hearings conducted under notice 76-1 and 77-23, and were assessed during the development of the final rule. Public discussion of this FAA review is therefore appropriate.

THE EIGHT OPTIONS

The eight options listed by EPA in the preamble of NPRM 75-15 included the following:

EPA Option 1: Outright ban. Prohibit all SST operations in the United States.

Response. Public comments from many sectors strongly supported a total ban on all SST's. FAA's careful review of all of these comments and other available data indicates that a total ban on SST's as an option, cannot be reasonably supported.

Such a ban would disregard those economic and technological considerations that go to the heart of reasonable rule making effecting aircraft design and operations. Further, because there is no noise or environmental impact level specified under this option, no degree of quieting or other improvement would lift the ban. The FAA believes that this kind of a noise abatement regulation cannot be justified as a matter of basic fairness.

EPA Option 2. Imposition of part 36 requirements. This would prohibit the operation of all SST's that do not meet the noise limits of part 36.

Response. Except for the Concorde airplanes with flight time before January 1, 1980, the approach taken in the final rule is that all SST's are required to meet part 36 noise standards in order to operate in the United States. The exception for these Concordes is concluded to be reasonable, considering the probable environmental impact of those airplanes as compared with the impact of an outright ban.

EPA Option 3. Allow SST operation at designated airports with restrictions. Under this option, current SST operations would be permitted at federally designated airports, subject to certain operating restrictions.

Response. The FAA believes that the authority of the airport proprietor is of major importance in determining whether an aircraft should be admitted. In addition, the air transportation market is more appropriate than a federal designation, as a means of determining which airports should receive SST service.

EPA Option 4. Impose restrictions on SST operators at SST airports. This option is the same as option 3, except that market forces would be allowed to determine the airports at which SST operations would be introduced.

Response. Insofar as this option permits market forces and local noise abatement policies and incentives to determine the classes of air transportation service by specific airports, the FAA agrees with its objectives. However, the FAA believes that the Federal Government should not substitute its judgment for that of the State or local Governments who own and operate nearly all of our Nation's airports.

Moreover, although specific operating procedures at specific airports are an essential aspect of an overall noise abatement program, detailed require-

ments for each airport are better handled on an airport-by-airport basis rather than as a general requirement such as that in the final rule. Finally, air traffic control procedures and other nonregulatory procedures to minimize noise impact offer a more flexible approach to localized airport noise problems, while also assuring the highest degree of safety in the consistently changing flight management judgments that must be made by pilots and air traffic controllers.

EPA Option 5. Impose restrictions on all operators at SST airports. This is a variant of option 4 under which new operations of all aircraft (not only SST's) must comply with noise abatement operating restrictions.

Response. This option is similar in its objectives to the overall noise abatement program of the FAA, except that the kinds of operating restrictions imposed by the FAA (such as the noise abatement preferential runway and arrival and departure procedures of §91.87 of part 91) are not limited to new operations and are not limited to SST airports only. As stated in response to EPA option 4, nonregulatory procedures directed at air traffic controllers and advisory information for pilots are, in many cases, the most effective means of achieving noise abatement objectives consistent with the need for those pilots and air traffic controllers to adapt rapidly and effectively to changing operational circumstances. The FAA has developed, and is consistently improving a wide range of nonregulatory approaches to aircraft noise abatement which apply to all operations at all airports.

EPA Option 6. Increasingly stringent restrictions on SST source noise. Under this option, manufacturers of SST's would be required to show compliance with currently projected (or "best effort") levels for the first 20 airplanes, 6 db below this for the second 20 airplanes, 10 db below "first production" for the third 20 airplanes, and appendix C of part 36 for all subsequent airplanes.

Response. This option would be unnecessarily lenient and would unnecessarily broaden the class of noncomplying SST's. The FAA believes that SST's other than Concordes having flight time before January 1, 1980, should be required at the outset to conform to at least the stage 2 noise

limits of part 36 in order to operate in the United States.

EPA Option 7. No regulation. Under this option, no regulatory action would be taken with respect to the noise of current or future SST's.

Response. FAA and EPA have agreed that the total exclusion of an aircraft from all noise abatement type certification, airworthiness certification, and operating rules, merely because it is supersonic, would not adequately discharge the FAA's duty, under § 611 of the Act, to protect the public health and welfare from aircraft noise.

EPA Option 8. Airport noise regulation. Under this option, an SST regulation would be delayed until an airport noise regulation is adopted. Such a regulation would "provide the ground rules and procedures for cooperative decisions and actions by local communities, employing land use controls, and airport management, with the collaborative support of the FAA."

Response. The issue of inclusion of SST noise abatement rules in an overall airport noise regulation is best resolved in connection with FAA's processing of EPA's proposed airport noise regulation under section 611 of the Act. In response to this EPA proposal, the FAA issued notice 76-24, which was published at 41 FR 51522 on November 22, 1976. A public hearing was held in Washington, D.C. on January 17, 1977. The potential operating and related noise abatement concepts in that NPRM exceed the scope of NPRMs leading to the final rule. In addition, delaying the provisions of the final rule until disposition of EPA's specific regulatory proposals in notice 76-24 would unnecessarily delay the early realization of the noise abatement benefits of the final rule including the night curfew, the acoustical change rule, and the imposition of Part 36 noise limits on future SST types operating in the United States.

(Secs. 307, 313(a), 601(a), 603, and 611, Federal Aviation Act of 1958, as amended (49 U.S.C. 1348, 1354(a), 1421(a), 1423, and 1431); sec. 6(c), Department of Transportation Act (49 U.S.C. 1655(c)).)

Issued on June 26, 1978.

LANGHORNE BOND,
Administrator.

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