United States
Environmental Protection
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Office of Noise Abatement
and Control (ANR-490)
Washington, D.C. 20460

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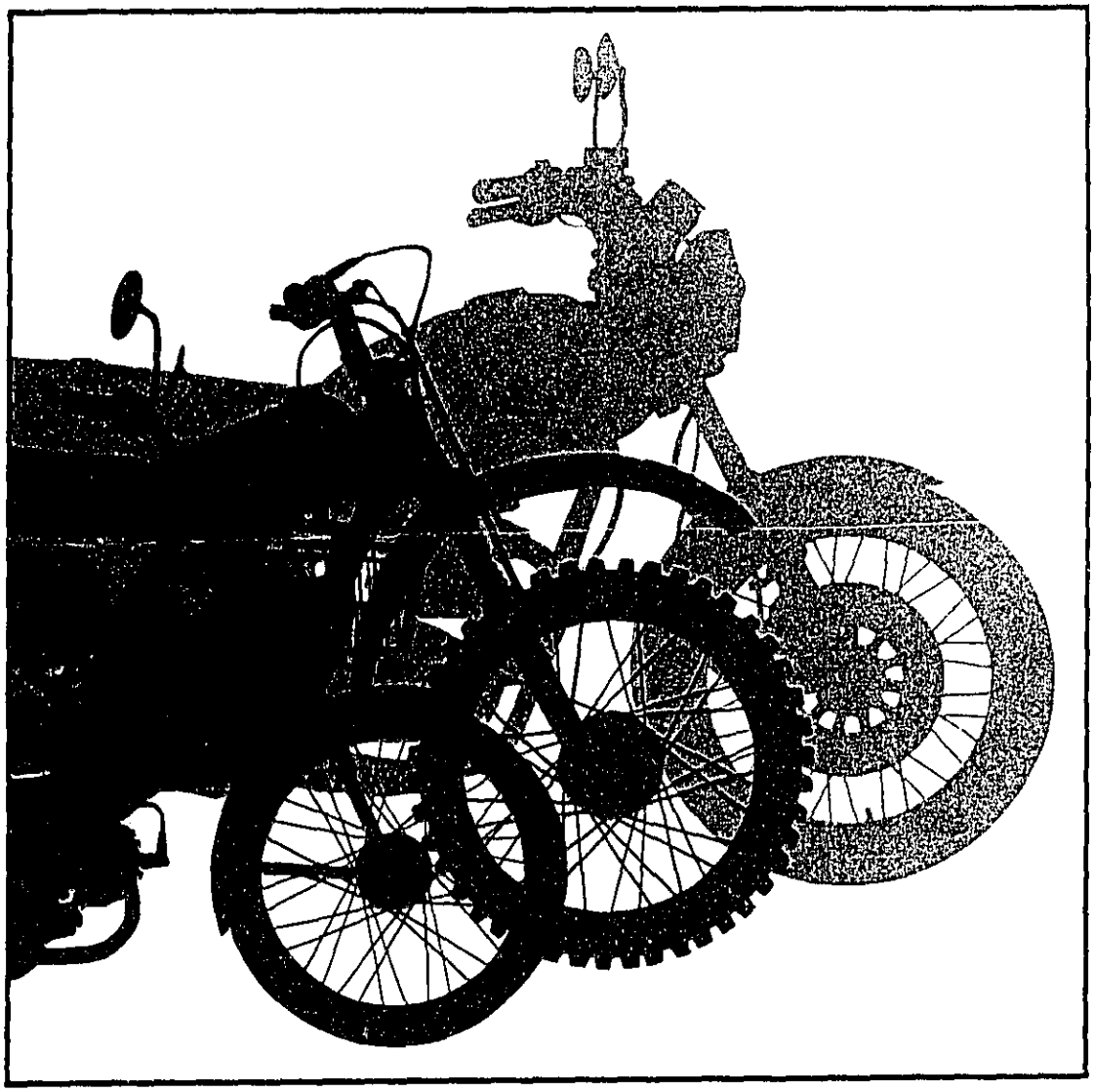
Noise

EPA

Environmental Impact Statement for the Noise Emission Regulations for Motorcycles and Motorcycle Exhaust Systems



U.S. ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL IMPACT STATEMENT

FOR THE

NOISE EMISSION REGULATIONS

FOR MOTORCYCLES AND MOTORCYCLE EXHAUST SYSTEMS

Prepared by
Office of Noise Abatement and Control
U.S. Environmental Protection Agency
Washington, D.C. 20460

Approved by

Charles L. Elkins
Deputy Assistant Administrator
for Noise Control Programs

December 1980

SUMMARY

FINAL

Agency: U.S. Environmental Protection Agency
Office of Noise Abatement and Control (EPA/ONAC)

Action: Noise Emission Regulations for Motorcycles and Motorcycle Exhaust Systems.

Description of Action:

1. The regulations are intended to complement existing noise emission standards for surface transportation equipment by reducing adverse health and welfare impacts resulting from that portion of traffic noise attributable to motorcycles.

2. The regulations are issued under the authority of Section 6 of the Noise Control Act of 1972 (42 U.S.C. 4905). Motorcycles were identified by EPA as a major source of noise on May 28, 1975, (40 FR 23105) under the authority of Section 5(b)(1) of the Noise Control Act. A Notice of Proposed Rulemaking (NPRM) was published on March 15, 1978, (43 FR 10822).

3. Effective January 1, 1983, all street and off-road motorcycles with an engine displacement of 170 cc and less manufactured after this date must not emit a noise level (A-weighted) in excess of 83 decibels (dB) when measured in the manner prescribed in the regulation; the not-to-exceed level is reduced to 80 decibels for vehicles manufactured after January 1, 1986. All off-road motorcycles with an engine displacement greater than 170 cc manufactured after January 1, 1983, must not emit a noise level in excess of 86 decibels; this not-to-exceed level is reduced to 82 decibels for vehicles manufactured after January 1, 1986. All moped-type street motorcycles manufactured after January 1, 1983, must not emit a noise level in excess of 70 decibels.

4. After the effective dates all original equipment and replacement exhaust systems designed to be installed on Federally regulated motorcycles must not cause those motorcycles to exceed the applicable noise standards.

5. Standards have not been set for competition motorcycles that are designed and marketed solely for use in closed-course competition events.

6. The compliance provisions of the regulations require manufacturers to submit Production Verification Reports to EPA which certify that all of their product configurations meet applicable standards, when tested according to the Federal test procedure. EPA has provided for Selective Enforcement Audits (SEA) which will allow the Agency to select products from the manufacturers' production lines and to test those products to

insure that they meet the noise emission standards. Also included are provisions for compliance labeling, maintenance instructions and anti-tampering warnings to consumers.

7. The regulations incorporate an Acoustical Assurance Period (AAP) which specifies that new Federally regulated motorcycles and motorcycle exhaust systems must be designed and built so that when properly maintained and used, they will not degrade or exceed the applicable standards for a specified period of time or use. For street motorcycles and street motorcycle exhaust systems the AAP is 1 year or 6,000 km (3730 mi.), whichever occurs first. The AAP for off-road motorcycles and off-road motorcycle exhaust systems is 1 year or 3,000 km (1865 mi.), whichever occurs first.

8. The motorcycle regulation specifies Low Noise Emission Product (LNEP) standards and applicable effective dates (discussed in the Summary of the Regulation). Motorcycles meeting LNEP standards are eligible under certain conditions for premium payment when purchased by the U.S. Government.

Benefits:

1. EPA anticipates the standards will, on the average, reduce the noise from new street motorcycles by 5 decibels (dB) and by 2 to 7 dB from new off-road motorcycles by 1986. The exhaust system regulation and the "anti-tampering" and labeling provisions of the motorcycle regulation, in combination with strong complementary State and local programs, should help reduce exhaust modified motorcycles to between one-half and one-fourth of their current numbers.

2. These motorcycle noise reductions are expected to result in a 55 to 75 percent reduction in interferences with human activities (including sleep and verbal communication), depending on the extent to which State and local governments are able to contribute to reducing the numbers of exhaust-modified motorcycles. A 7 to 11 percent reduction in the extent and severity of overall traffic noise impact is expected, again depending on complementary State and local programs.

3. In environments where off-road motorcycles are used, the people and land area exposed to motorcycle noise should be reduced 20 to 30 percent, depending on in-use enforcement.

4. EPA has identified a maximum average day-night sound level (Ldn) of 55 dB as requisite to the protection of public health and welfare. By the year 2000, with an expected national population of 285 million, the motorcycle regulations are expected to reduce the number of people exposed to noise above this level from 129 million people to between 113 and 117 million people.

Economic Effects:

1. Manufacturers will incur costs in complying with the regulations. These costs will vary depending on motorcycle type and size and will be reflected in increased purchase prices for motorcycles and replacement exhaust systems.

For street motorcycles, estimated purchase price increases will average 2% (or $36.00); for off-road motorcycles price increases will average 2% (or $21.00). For replacement exhaust systems, the estimated purchase price increase will average 25% (or $30.00). Since all mopeds that the Agency tested which are sold in the U.S. comply with the 70 dB level, no significant price increases are expected.

2. Most motorcycle manufacturers are expected to meet the standards with little difficulty. A substantial impact is expected on the replacement exhaust system industry. These manufacturers are highly dependent on price, styling, performance and tonal differences between their products and those of original equipment manufacture -- differences which may disappear with imposition of the standards.

3. Although, higher retail prices for motorcycles could result in some initial lost sales, total industry sales (in terms of both units and dollars) are projected to significantly expand in the next decade.

Rationale for Regulation: Section 6 of the Noise Control Act of 1972 requires the Administrator of EPA to propose regulations for each product identified under Section 5(b)(1) as a major source of noise and for which noise emission standards are feasible. Motorcycles were identified as a major source of noise on May 28, 1975. The results of Agency studies, of best available noise control technology and the attendant costs of compliance, show the regulation to be feasible. No substantive evidence has been received to indicate that motorcycles are not a major source of noise. Based on the requirements of the Noise Control Act, the Administrator must issue a new-product noise emission regulation for motorcycles.

Dates of Availability: 1. The Draft EIS was made available to the public, November 1977.

2. The Final EIS was made available, December 31, 1980.

Address: 1. Additional copies of the EIS can be obtained by contacting:

Mr. Charles Mooney
EPA Public Information Center (PM-215)
U.S. Environmental Protection Agency
Washington, D.C 20460

Comments to the Draft EIS: 1. There was one comment addressing the draft EIS (see page 19 of this EIS).

2. This and all other comments that were submitted during the public comment period have been reviewed and discussed in the "Docket Analysis for the Noise Emission Regulations for Motorcycles and Motorcycle Exhaust Systems," EPA Document No. 550/9-80-220.

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ENVIRONMENTAL IMPACT STATEMENT
FOR THE
NOISE EMISSION REGULATIONS
FOR MOTORCYCLES AND MOTORCYCLE EXHAUST SYSTEMS

INTRODUCTION

The U.S. Environmental Protection Agency (EPA) has issued final noise emission regulations for newly manufactured motorcycles and motorcycle exhaust systems. These regulations should reduce the impact of motorcycle noise on streets, highways, and in off-road environments.

This Environmental Impact Statement (EIS), in summary form, addresses the impacts of motorcycle noise and the projected benefits to be gained from compliance with the regulations, and the potential economic impact.

REGULATORY ANALYSIS

In arriving at the not-to-exceed standards, the Agency considered the best available noise abatement technology, potential health and welfare benefits, the attendant costs and economic effects of compliance. EPA's decisions have been based on written comments submitted during the public comment period and testimonies presented during three public hearings in addition to information gathered and analyzed by EPA and its contractors from manufacturers, and published works. This information, including that which is presented in this EIS, has been compiled and analyzed by EPA and published in the form of a Regulatory Analysis. This document, entitled "Regulatory Analysis for the Noise Emission Regulations for Motorcycles and Motorcycle Exhaust Systems" (EPA 550/9-80-217), may be obtained upon request from:

Mr. Charles Mooney
EPA Public Information Center (PM-215)
U.S. Environmental Protection Agency
Washington, D.C. 20460

The public comments are discussed in the "Docket Analysis for the Noise Emission Regulations for Motorcycles and Motorcycle Exhaust Systems," (EPA 550/9-80-217), which also may be obtained from the above address.

For the sake of brevity and simplicity, the information in this EIS is presented in summary form only. Persons wishing more detailed explanation and discussion of the facts and issues pertinent to this rulemaking are encouraged to refer to the regulatory analysis and to the preamble of the regulation.

The regulations, as well as additional copies of this EIS, can also be obtained from the above address.

ADDITIONAL INFORMATION

For further technical information and specific questions related to the regulations, please contact:

Mr. Fred Newberry
Project Officer--Motorcycles
Office of Noise Abatement and Control (ANR-490)
U.S. Environmental Protection Agency
Washington, D.C. 20460

DESCRIPTION OF THE MOTORCYCLE NOISE PROBLEM

Traffic noise constitutes the single most pervasive source of noise pollution in the U.S. today. EPA estimates that approximately 93 million people are currently exposed to traffic noise levels equal to or greater than a day-night sound level (L_{dn})[1] of 55 dB[2]. Motorcycles are an

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1. The Environmental Protection Agency has identified a yearly Ldn of 55 dB as the environmental noise level requisite to protect the public health and welfare with an adequate margin of safety (Ldn being the

integral component of the total traffic flow and are the source of more annoyance and adverse community response than any other single traffic noise source.

The A-weighted noise levels of current newly manufactured street motorcycles range as high as 85 dB at fifty feet, although about half of current sales are no louder than 80 dB. The noise levels of off-road motorcycles average several decibels higher than those of street motorcycles. Studies and interviews with affected parties have indicated that noise from motorcycles used in off-road environments constitutes a major noise problem, not only in wilderness areas, but also in backyards, vacant lots and other near-residential areas. EPA recognizes that much of the current noise impact and negative community response from both street and off-road motorcycle operations is due to motorcycles with owner modified exhaust systems. This "modification" problem consists of two parts: owner alterations to original equipment exhaust systems (tampering); and the availability of replacement systems with poor muffling performance. Motorcycles which are modified by either method often exceed stock levels by ten to twenty decibels.

EPA has determined the effects of motorcycle noise on the public's health and welfare by examining a number of anticipated noise effects. These include: (1) the general adverse response (measured in terms of annoyance) of persons in communities exposed to motorcycle noise as a component of the traffic stream; and (2) interferences with everyday activities (including sleep and conversation). These studies indicate that significant health and

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day-night sound level which is the A-weighted equivalent sound level for a 24-hour period with an additional 10 dB weighting imposed on the equivalent sound levels occurring during nighttime hours (10 p.m. to 7 a.m.)).

2. All noise levels are A-weighted decibels.

welfare benefits can be achieved both by reducing the current noise level of new motorcycles and by reducing the number of modified motorcycles.

STATUTORY BASIS FOR ACTION

EPA has issued noise emission standards for motorcycles and motorcycle exhaust systems under the authority of the Noise Control Act of 1972, as amended by the Quiet Communities Act of 1978. Section 5(b)(1) of the Act requires the Administrator of EPA to "identify products (or classes of products) which in his judgment are major sources of noise." Section 6 of the Act requires EPA to publish regulations for products which are major sources of noise, if, in the Administrator's judgment, noise standards are feasible. Such regulations are to include noise emission standards which are "requisite to protect the public health and welfare, taking into account the magnitude and conditions of use of such product (alone or in combination with other noise sources), the degree of noise reduction achievable through the application of best available technology, and the cost of compliance."

The Agency identified motorcycles as a major source of noise on May 28, 1975 (40 FR 23105). The identification of motorcycles was based on the contribution of current in-use motorcycles to the overall noise impact of motor vehicle activity. A Notice of Proposed Rulemaking (NPRM) to regulate noise emissions from motorcycles was published on March 15, 1978 (43 FR 10822). Public comment on the NPRM was solicited for 90 days and three public hearings were held (Anaheim, California, April 28 to May 1, 1978; St. Petersburg, Florida on May 5, 1978; and in Washington, D.C., May 9, 1978). The public comments were given careful review and consideration prior to the issuance of the final rule. The issues that were raised during the public comment period are discussed in the Docket Analysis.

Compliance with the final regulations is expected to reduce the noise impact caused by newly manufactured street and off-road motorcycles. In addition the standards for motorcycle exhaust systems are expected to cause significant reductions in motorcycle noise impact by controlling the availability of ineffective exhaust systems.

The regulations will also establish uniform national noise standards for motorcycles distributed in commerce, thereby preempting conflicting State and local noise standards that may impose an undue burden on the motorcycle manufacturing industry.

SUMMARY OF THE REGULATION

The regulation establishes noise emission standards for newly manufactured motorcycles and motorcycle exhaust systems. EPA evaluated several test procedures for measuring motorcycle noise and concluded that a test procedure developed by modifying the SAE J331a test is the most appropriate for the final rule. This test procedure measures noise emissions of motorcycles under full throttle acceleration at specified percentages of the motorcycle's maximum rated engine speed, and at a fixed point in relation to a microphone location. For a comprehensive description of the test procedures, refer to Appendix I of the regulation. A detailed technical discussion is in the Regulatory Analysis.

Effective on the dates listed, newly manufactured motorcycles must not produce noise levels in excess of those listed in Table 1 for a specified period, when tested and evaluated according to the methodology provided in Appendix I of Subpart D and E of the regulation.

After the above effective dates, original equipment and replacement exhaust systems designed and installed on Federally regulated motorcycles

Table 1

Motorcycle Standards and Effective Dates

Motorcycle Type	Not-to-Exceed A-Weighted Noise Level	Effective Date
1. Street Motorcycles	83 dB	January 1, 1983
	80 dB	January 1, 1986
2. Moped-Type Street Motorcycles	70 dB	January 1, 1983
3. Off-Road Motorcycles		
a. Displacement 170 cc and Below	83 dB	January 1, 1983
	80 dB	January 1, 1986
b. Displacement More Than 170 cc	86 dB	January 1, 1983
	82 dB	January 1, 1986

shall not cause those motorcycles to produce noise levels in excess of the new vehicle standards listed in Table 1.

To ensure lasting benefits from this regulation, the Agency requires that manufacturers design and build each product so that, when properly maintained and used, its noise level will not degrade (increase) above the applicable levels in Table 1 for a specified period of time or use, from the date of the product's sale to the ultimate purchaser. This period is called the Acoustical Assurance Period (AAP). For street motorcycles and street motorcycle exhaust systems the AAP is 1 year or 6,000 km (3,730 mi.), whichever occurs first. The AAP for off-road motorcycles and off-road motorcycle exhaust systems is 1 year or 3,000 km (1,865 mi.), whichever occurs first.

In §205.162-4 of Subpart D and §205.173-5 of Subpart E of the regulation, a manufacturer must establish records regarding the anticipated increase in the noise level of his product during the AAP. These records may consist of a statement of engineering judgment, the results of durability testing or other information which the manufacturer deems adequate to support the fact that his products comply with the standard for the AAP.

Under the authority of Section 15 of the Act, §205.152 of this regulation specifies the levels for a product to qualify as a Low Noise Emission Product (LNEP). Effective January 1, 1982, the following LNEP levels are specified: 75 dB for off-road motorcycles with engine displacements greater than 170 cc; 73 dB for street motorcycles with engine displacements greater than 170 cc; 71 dB for street motorcycles and off-road motorcycles with engine displacements 170 cc and lower; and 60 dB for moped-type street motorcycles. Effective January 1, 1989, the LNEP level for street motorcycles with engine displacements greater than 170 cc is lowered to 71 dB.

The regulation also incorporates an enforcement program which includes production verification requirements, selective enforcement auditing, compliance labeling, provisions for maintenance instructions, and anti-tampering warnings to consumers.

STATE AND LOCAL PROGRAMS COMPLEMENTARY TO FEDERAL NOISE EMISSION STANDARDS FOR MOTORCYCLES

Although the primary responsibility for control of noise rests with State and local governments, the Agency plans to assist States and localities by effectively enforcing these regulations as to manufacturers of motorcycles and aftermarket exhaust systems, and providing them with strong support for adopting complementary programs.

The Agency believes, as discussed earlier, that a large part of the current motorcycle noise problem can be attributed to vehicles with modifed exhaust systems. To give the public relief from this noise problem, the Agency is issuing these regulations with provisions to control the number of modified motorcycles, in addition to setting noise limits on newly manufactured motorcycles. These provisions will assist States and localities in their efforts in reducing the number of modified motorcycles. The Agency is already directing, and will continue to direct, considerable efforts to working with States and localities under the Quiet Communities Act. EPA believes that, through such efforts, reductions in aftermarket exhaust system modifications will be possible and will result in significant health and welfare benefits.

Under subsection 6(e)(1) of the Noise Control Act, after the effective date of a Federal regulation limiting noise emissions from a new product, no

State or political subdivision may adopt or enforce any law or regulation which sets a limit on noise emissions from such new product, or components of such new product, which is not identical to the standard prescribed by the Federal regulation. Subsection 6(e)(2), however, provides that nothing in Section 6 precludes or denies the right of any State or political subdivision to establish and enforce control on environmental noise (or one or more sources thereof) through the licensing, regulation or restriction of the use, operation or movement of any product or combination of products.

The noise controls which are reserved to State and local authority by Section 6(e)(2) include, but are not limited to, the following:

1. Controls on the manner of operation of products.
2. Controls on the time of day or night in which products may be operated.
3. Controls on the places in which products may be operated.
4. Controls on the number of products which may be operated together.
5. Controls on noise emissions from the property on which products are used.
6. Controls on the licensing of products.
7. Controls on environmental noise level.

EPA strongly encourages State and local government authorities to adopt and enforce laws and ordinances which complement this Federal motorcycle noise rulemaking. The Agency specifically urges in-use noise regulations which are consistent with reasonable operation of Federally regulated vehicles. Restrictions on the registration of off-road motorcycles for highway operations are also encouraged, as are vehicle inspection programs which involve either stationary sound level testing or visual inspection of motorcycle exhaust systems.

RATIONALE FOR REGULATION

Section 6 of the Noise Control Act of 1972 requires the Administrator to issue regulations for each product which he has identified under Section 5(b)(1) of the Act as a major source of noise and for which noise emission standards are feasible. Motorcycles were identified as a major source of noise on May 28, 1975 (40 FR 23069).

After motorcycles were identified as a major source of noise, comprehensive studies were performed to evaluate motorcycle noise emission levels necessary to protect the public health and welfare, taking into account the magnitude and condition of use, the degree of noise reduction achievable through application of the best available technology and the attendant costs of compliance. The Agency investigated, in detail, noise measurement methodologies, available noise control technology, costs attendant to noise control methods, testing and administrative costs for compliance, potential economic impacts, and the potential environmental and health and welfare benefits associated with the application of various noise control measures. The results of these studies showed that the regulation and reduction of motorcycle noise is feasible.

On March 15, 1978, (43 FR 10822) a Notice of Proposed Rulemaking was issued to regulate noise emissions from motorcycles. Subsequently no significant evidence has been presented to the Agency in public comments or otherwise, to indicate that motorcycles are not a major noise source, or that the proposed standards are not feasible. Consequently, the Agency, as required by the Noise Control Act, has issued final noise emission regulations for motorcycles and motorcycle exhaust systems.

A detailed discussion of the various regulatory options that were considered during this rulemaking is provided in the Regulatory Analysis.

BENEFITS AND ENVIRONMENTAL IMPACTS OF THE REGULATION

Health and Welfare

Compliance with the standards is expected to result in an average 5 decibel reduction in noise levels of new street motorcycles and a 2 to 7 decibel reduction in noise levels of new off-road motorcycles by 1986. The exhaust system regulation and the anti-tampering and labeling provisions of the motorcycle regulation, in combination with strong complementary State and local programs, should help reduce exhaust modified motorcycles to between one-half and one-fourth their current numbers.

At the final 80 dB regulatory level for street motorcycles, the Agency estimates that the extent and severity of interference with human activities (including sleep and verbal communication), attributable to motorcycle noise, will be reduced from current levels by 55-75 percent. These figures assume that Federal regulation of replacement exhaust systems combined with complementary State and local in-use actions will reduce the numbers of exhaust-modified motorcycles from the currently estimated twelve percent of the street motorcycle population (nationwide) to between three and seven percent.

Motorcycles account for less than 2 percent of total vehicular traffic mileage. However, because they are presently among the noisiest vehicles in the traffic stream, reduction of overall traffic noise levels and associated reductions in the extent and severity of traffic noise impact due to Federal motorcycle noise regulation, are greater than what otherwise would be expected.

From current levels, with medium and heavy trucks regulated to 80 dB, this regulation is expected to reduce the impact from overall traffic noise by 7-11 percent. In the year 2000, with an expected U.S. population of 285 million, this represents a reduction in the numbers of persons exposed to an

average day-night level (L_{dn}) of traffic noise greater than 55 dB from 129 million persons to between 113 and 117 million persons.

At noise level standards of 82 dB and 80 dB for large and small off-road motorcycles, respectively, the estimated number of people exposed to off-road motorcycle noise will be reduced from 3.1 million to approximately 2.3 million persons. This figure assumes an 80 dB regulatory level for street motorcycles which are sometimes used off-road, and a reduction in the proportion of exhaust system modifications from a currently estimated 26% of the off-road population to between 8 and 16 percent. Furthermore, the reduction in the total area and the number of people exposed to off-road motorcycle noise above the detectability level will be approximately 20-30 percent, depending on in-use enforcement.

Air Quality

The noise regulations are not expected to make it more difficult to comply with street motorcycle air emission standards, or to significantly impact exhaust emissions from off-road motorcycles.

Land Use

The regulation is expected to have no adverse effect on land use. Some indirect benefits may result from in-use controls placed on motorcycles by State and local authorities.

Energy

Additional weight and increased backpressure due to noise suppression components are expected to negatively impact motorcycle fuel economy by an estimated 2 percent. The average fuel consumption of current street motorcycles is 47 mpg. Off-road motorcycles are estimated to currently have an average fuel consumption of 60 mpg. Based on 2300 miles per year for street

motorcycles, and 1200 miles per year for off-road motorcycles, an increased fuel consumption of about one gallon per year for street motorcycles and less than one gallon per year for off-road motorcycles is expected. By the year 2000, when the majority of motorcycles in-use will have been manufactured to comply with the 80 dB standard, the current population of motorcycles is projected to have more than doubled to approximately 16 million vehicles. The fuel penalty translates to about 15 million gallons of gasoline in the year 2000, or one-half million barrels of crude oil which would represent less than one-tenth of one percent of the total U.S. consumption of crude oil at that time.

Solid Waste Disposal Requirements

No change in the amount of solid waste is expected. The scrapping of old motorcycles should not increase as a result of the noise regulations. In fact, increased motorcycle prices and possible performance decrements should have, to a small degree, a reverse effect: users may be encouraged to retain old motorcycles longer.

Wildlife

Although it is difficult to quantify the detrimental impacts caused by motorcycles on wildlife, quieting motorcycles may have beneficial effects on wildlife and the extent of their habitats.

Raw Materials

In general, changes in the amount of raw materials used by motorcycle-related industries are not expected to be significant, although some slight increase in such use is foreseen.

Water Quality

No impacts on water quality are expected.

ECONOMIC EFFECTS OF THE REGULATION

Costs of applying noise reduction technology to meet the regulatory levels, and the associated increases in retail prices, vary according to the type and size of the specific motorcycle model. Expected unit purchase price increases at the 80 dB regulatory level range from 0.2 percent for street motorcycles with a displacement less than 100 cc, to 4 percent for medium size street motorcycles, to 2 percent for large street motorcycles (average retail price increase). Unit prices of large off-road motorcycles are projected to increase 2 percent at the 82 dB level, while unit price increases of small off-road motorcycles are projected to increase an average of less than one percent at the final-step 80 dB level.

The total annualized cost of the noise emission standards for street and off-road motorcycles is estimated to be approximately $95 million per year. This figure, projected through the year 2010, accounts for increases in retail prices and the increased cost of operating and maintaining the vehicle due to noise control regulation.

Federal noise standards for replacement exhaust systems are expected to cause retail prices of current quiet systems (meeting California's 83 dB requirement) to rise to levels comparable to those predicted for stock replacement systems for 80 dB motorcycles, or approximately 25 percent more than the average price of current original equipment systems, a $30 price rise. Additionally, over time, a shrinkage of the total market for replacement systems is forecast, provided that such replacement exhaust system manufacturers fully comply with the standards established by these regulations, since styling and performance advantages of many current systems will largely disapper. The total annualized cost of the motorcycle replacement exhaust

system standards is estimated to be $3.4 million per year at the final 80 dB level.

Several economic impacts were studied by EPA to determine the possible effects of noise control regulations on the various segments of the motorcyle industry. These impacts are summarized as follows:

Impact on Motorcycle Manufacturers

A net reduction in motorcycle demand is expected as a result of the noise standards. Forecasting based on historical price-demand relationships indicates that the demand for street and off-road motorcycles combined would be about 2.1 percent below expected demand in the absence of noise regulations. It should be noted, however, that this demand forecast would have resulted in part even in the absence of these Federal rules because of the State motorcycle noise laws planned to take effect. Significant shifts in historic market shares due to Federal noise standards, however, are not expected to occur among the major Japanese motorcycle manufacturers. Their profitability is likewise not expected to be impacted to any large extent since cost increases due to noise control are expected to be passed on to consumers. Although higher retail prices will result in some lost sales, total industry sales in terms of both units and dollars are projected to significantly expand in the next decade.

For AMF/Harley-Davidson to achieve an 80 dB standard, major redesigning of its current large engine types incorporating current engine quieting techniques will be necessary. One attraction of Harley-Davidson motorcycles is a uniquely identifiable exhaust tone that must dominate other subsources to be heard. Engine redesign to meet 80 dB could change tonal characteristics and cause performance penalties that may reduce the demand

for Harley-Davidson motorcycles. AMF/Harley-Davidson motorcycles occupy a unique position in the U.S. motorcycle market with a devoted following, and are expected to be relatively insensitive to small price changes. Consequently, if engine designs acceptable to the consumer can be developed which meet the standards, the firm is expected to be able to sell the new designs at little sacrifice in profitability.

The other North American manufacturer of street motorcycles is Canada's Bombardier, Ltd., which manufactures high performance dual purpose motorcycles based on their off-road and competition models. The remaining street motorcycle manufacturers are predominantly European firms which export large displacement models on a limited scale to the United States, although several export a sizable portion of their production to this country. Most of these firms are considered capable of producing motorcycles at the 80 dB regulatory level.

Japanese manufacturers of off-road motorcycles are not expected to experience serious technical difficulty producing off-road motorcycles which comply with these noise standards since the quieting technology is well understood. Overcoming weight and horsepower penalties to produce high performance motorcycles, however, will be a challenge. The smaller, predominantly European manufacturers, which often rely on superior performance for marketing advantages, are expected to experience difficulty in maintaining their present market positions at these regulatory levels, due to the considerable impact to the performance of current models. The 82 dB regulatory level for large off-road motorcycles is considered to be technically achievable for almost all current manufacturers without requiring conversion to four-stroke engines. However, the performance and cost impacts of this level

may make it unprofitable for some of the smaller firms to remain in the U.S. market.

Moped-type street motorcycles will be required to meet a 70 dB standard. All mopeds that the Agency tested, which are sold in the U.S., comply with the 70 dB standard. The costs of compliance with this rule for these vehicles are the administrative costs of production verification testing, recordkeeping, and labeling, which are expected to be minimal as a result of the anticipated use of the carry-over provision by moped manufacturers.

Impact on Replacement Exhaust System Manufacturers

The regulations are expected to have a substantial impact on the replacement exhaust system industry. To meet the 80 dB standard, aftermarket replacement exhaust system manufacturers will need to incorporate relatively sophisticated noise attenuation techniques into the design of their mufflers and exhaust systems. Of the more than 150 firms currently in the market, most are small, low volume enterprises devoted exclusively to manufacturing motorcycle exhaust systems, with little or no capability for innovative product design or development. To produce complying systems for post-1980 (regulated) motorcycles, these firms are expected to copy the designs of other manufacturers, a common practice at present. The ten to twenty leading firms in the industry are expected to be able to design and produce their own complying systems, although at similar price and performance penalties associated with replacement systems sold by the original equipment manufacturer (OEM).

Based on discussions with aftermarket manufacturers, a 25% reduction in demand for aftermarket exhaust systems is forecast by the year 2000 when

regulated motorcycles at the 80 dB level will have replaced most unregulated motorcycles in use. The adverse impact of the regulations on aftermarket manufacturers will be gradual since the standards are phased in over a five year period and since firms can continue to produce systems for motorcycles manufactured prior to the applicability of each noise standard. However, in the longer term, as unregulated motorcycles are gradually scrapped, and as the demand for complying non-OEM systems falls, many of the small volume manufacturers are likely to switch to alternate product lines, or go out of business. While the revenues of the ten to twenty leading firms are expected to also decrease as a result of this regulation, these larger firms are expected to continue manufacturing replacement exhaust systems. In fact, although a net shrinkage in the replacement exhaust system industry is forecast, these larger firms may actually experience increased sales as other manufacturers exit from the market.

Impact on Foreign Trade

Since motorcycles comprise substantially less than 1 percent of total U.S. foreign trade with Europe and North America, the impact of a Federal motorcycle noise regulation on the balance of trade with these areas is expected to be negligible. Motorcycles currently account for some 15 percent of the approximately $10 billion in annual imports from Japan. EPA does not, however, anticipate any substantial changes in net revenue to Japanese motorcycle manufacturers resulting from these noise standards, and thus no appreciable change in the U.S.-Japan balance of trade is forecast.

Impact on Exports

The small percentage of AMF/Harley-Davidson's domestic motorcycle production that is currently exported is not expected to change significantly as a result of noise regulations.

Impact on Employment

If demand reduction forecasts based on historical relationships are applicable, eventual reductions in current U.S. motorcycle industry employment resulting from the final Federal noise standards could be approximately 1,760 positions from future levels in the absence of noise regulations. This impact would occur at least in part in the absence of Federal regulations because of the more stringent State regulations that would otherwise go into effect. However, projected growth in the industry is expected to more than compensate for any employment losses that do occur.

The aftermarket exhaust system industry is the only segment of the total industry predicted to experience an actual net decline in employment, possibly impacting some 500 positions, assuming compliance with these standards.

Impact on Gross National Product

The proposed regulations are not expected to have any consequential effect either directly or indirectly, on the U.S. Gross National Product (GNP).

RESPONSE TO DRAFT EIS COMMENTS

Comment:

During the public comment period one comment was made to the Draft EIS. Motorcycle Product News commented that "'wilderness' has an exact and important definition, in that all motor vehicles are excluded from designated wilderness areas regardless of sound level. To claim that the motorcycle regulation is required because of motorcycle operation in wilderness areas is to make a gross misrepresentation of the facts."

EPA Response:

The term 'wilderness' was used by the Agency in a general way to define a wooded or pristine environment where any man-made motorized sound is unwanted. EPA agrees that all motor vehicles are prohibited from operating in a "designated wilderness" area as defined in the Wilderness Act of 1964. The Wilderness Act defines such an area as one that is untraveled by man and where man is a visitor and does not stay.

In the Draft EIS, the Agency did not state that motorcycle regulations are required because of motorcycle operations in wilderness areas. The Agency believes that incompatible land use is the main problem of off-road motorcycle noise and that reducing noise emission levels will only reduce, not solve the problem.

CONCLUSIONS

The Agency has concluded that at this time the designated noise emission levels for motorcycles and attendant effective dates represent the best combination of public benefits, available noise control technology and cost.

The required noise control technology to achieve the designated levels has been demonstrated and the attendant effective dates have been established to allow manufacturers the lead time requisite to incorporate the necessary design and component changes without disruption to production or the market. Typical changes for some manufacturers may include increasing muffler volume, adding lining to the air intake system, or stiffening fins and webs of engine casing.

The cost of compliance and possible economic effects have been considered and are believed to be commensurate with the anticipated benefits.

EPA is pursuing a strategy through which major contributors to overall noise will be identified and subsequently controlled. This coordinated approach is necessary because a number of different noise sources may be operating at the same time, and the quieting of only one such source may not, in itself, be sufficient to reduce the environmental noise to a level the Agency believes is requisite to protect the public health and welfare, as the Act requires.

Surface transportation noise is considered by EPA as the major contributor, on a national basis, to current environmental noise levels. To further reduce this major national noise source, the Agency intends to continue its investigations pursuant to noise regulatory actions for other surface transportation vehicles. Consequently, the noise emission levels specified for motorcycles in the rulemaking are consistent with the Agency's objective of ultimately reducing the total noise emitted from all surface vehicles, including medium and heavy trucks, buses, and light duty vehicles.

EPA believes that the standards are necessary to protect the public health and welfare and are achievable through use of best available technology taking into account the cost of compliance. However, as technological advances occur, lower levels may be achievable. EPA will consider all new information and data which become available or are presented to it, and may subsequently revise the regulation.

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16. ABSTRACT

This document presents an assessment of the expected benefits and impacts of the final noise emission regulations for motorcycles and motorcycle exhaust systems. The information presented includes a description of the motorcycle and motorcycle exhaust noise problem, the statutory basis for action, a summary of the regulation, State and local programs complementary to Federal noise emission standards for motorcycles and motorcycle exhaust systems, the rationale for regulation, the expected benefits of the regulation, the potential economic effects of the regulation, public comments on the draft environmental impact statement, and conclusions.

17. KEY WORDS AND DOCUMENT ANALYSIS		
a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Street Motorcycles, mopeds, off-road motorcycles, motorcycle exhaust system, noise emission regulation, environmental benefits, health and welfare benefits, economic effects.		

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