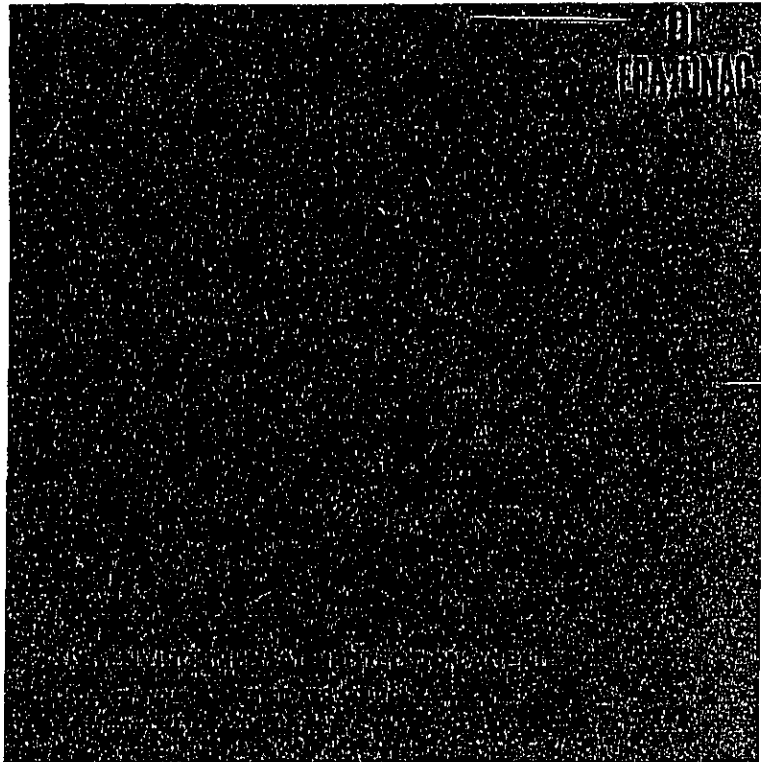


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# RAILROAD NOISE EMISSION STANDARD

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**Title 40—PROTECTION OF ENVIRONMENT**

**Chapter I — Environmental Protection Agency**

**Part 201 — Railroad Noise Emission Standards**

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**Title 40—Protection of Environment  
CHAPTER I—ENVIRONMENTAL  
PROTECTION AGENCY**

[FRL 469-3]

**PART 201—RAILROAD NOISE  
EMISSION STANDARDS**

On July 3, 1974, notice was published in the Federal Register (39 FR 24580) that the Environmental Protection Agency (EPA or Agency) was proposing noise emission standards for surface carriers engaged in interstate commerce by railroad.

The purpose of this notice is to establish final noise emission standards for surface carriers engaged in interstate commerce by railroad by establishing a new Part 201 of Title 40 of the Code of Federal Regulations. This final rulemaking is promulgated pursuant to section 17 of the Noise Control Act of 1972, 86 Stat. 1248, Pub. L. 92-574.

**INTRODUCTION**

In section 2 of the Noise Control Act, Congress expressed its judgment "that while primary responsibility for control of noise rests with State and local governments, Federal action is essential to deal with major noise sources in commerce, control of which require national uniformity of treatment." Congress also declared within section 2 of the Act, "that it is the policy of the United States to promote an environment for all Americans free from noise that jeopardizes their health or welfare." As a part of this essential Federal action, section 17 requires the Administrator to publish proposed noise emission regulations which "shall include noise emission standards, setting such limits on noise emissions resulting from operation of the equipment and facilities of surface carriers engaged in interstate commerce by railroad which reflect the degree of noise reduction achievable through the application of the best available technology, taking into account the cost of compliance." After the effective date of a regulation under section 17, applicable to noise emissions resulting from the operation of any equipment or facility of a surface carrier engaged in interstate commerce by railroad, no State or political subdivision thereof may adopt or enforce any standard applicable to noise emissions resulting from the operation of the same equipment or facility of such carrier unless such standard is identical to a standard applicable to noise emissions resulting from such operation prescribed by these regulations. The Administrator, after consultation

with the Secretary of Transportation may, however, determine that the State or local standard, control, license, regulation, or restriction is necessitated by special local conditions and is not in conflict with regulations promulgated under section 17. Procedures for State and local governments to apply under section 17(c)(2) of the Act will be published by this Agency shortly after promulgation of this regulation.

These sections of the Noise Control Act reflect the desire of Congress to protect both the environment and commerce through the establishment of uniform national noise emission regulations for the operation of interstate railroad equipment and facilities which require national uniformity of treatment in order to facilitate interstate commerce. Such treatment is requisite for those types of interstate railroad equipment and facilities whose operation would be burdened by conflicting State and local noise controls. Preemption under section 17 occurs only for State or local noise regulations on equipment and facilities on which Federal regulations are in effect. Where national uniformity of treatment is not needed, Congress recognizes the primary responsibility of State and local governments to protect the environment from noise. State and local regulations on noise emissions resulting from the operation of equipment and facilities of surface carriers engaged in interstate commerce by railroad, which are not preempted by applicable Federal regulations under section 17, are subject to the Commerce Clause of the U.S. Constitution. Under that Clause, any State or local regulations which constitute an undue burden on interstate commerce cannot stand.

The Act directs that Federal regulations on interstate railroad equipment and facilities under section 17 are to include noise emission standards setting such limits on noise emissions resulting from their operation which reflect the degree of noise reduction achievable through the application of the best available technology, taking into account the cost of compliance. Based upon the strict language of the Noise Control Act, its legislative history, and other relevant data, these requirements are further clarified as follows:

"Best available technology" is that noise abatement technology available for application to equipment and facilities of surface carriers engaged in interstate commerce by railroad which produces the greatest achievable reduction in the noise produced by such equipment and

facilities. "Available technology" is further defined to include:

1. Technology which has been demonstrated and is currently known to be feasible.

2. Technology for which there will be a production capacity to produce the estimated number of parts required in reasonable time to allow for distribution and installation prior to the effective date of the regulation.

3. Technology that is compatible with all safety regulations and takes into account operational considerations including maintenance, and other pollution control equipment.

"Cost of compliance" is the cost of identifying what action must be taken to meet the specified noise emission level, the cost of taking that action, and any additional cost of operation and maintenance caused by that action.

In preparing this final regulation the Administrator has given full consideration to cost of compliance and available technology and has consulted with the Secretary of Transportation to assure appropriate consideration for safety and for availability of technology.

Further, recognizing that the Noise Control Act was enacted to protect the public from adverse health and welfare effects due to noise, EPA has also considered the impact of railroad noise taking into account the levels of environmental noise requisite to protect the public health and welfare with an adequate margin of safety, as published by the EPA in March 1974 in accordance with section 5(a) (2) of the Act.

Accordingly, EPA has developed and is now implementing an interstate rail carrier noise control strategy based on section 17 of the Act that should prove to be effective in reducing environmental noise from railroads in many areas to the levels identified as protective of public health and welfare. The strategy calls for the reduction of the noise from railroad locomotives and rail cars to the lowest noise levels consistent with the noise abatement technology available, taking into account the cost of compliance.

Compliance regulations are to be developed and promulgated under separate rule making by the Department of Transportation as called for in section 17(b) of the Act.

The legal basis supporting promulgation of this regulation was set forth in substantial detail in the notice of proposed rulemaking published in the FEDERAL REGISTER on July 3, 1974 (39 FR 24580). In the same publication, notice was given of the availability of the

"Background Document and Environmental Explanation for the Proposed Interstate Rail Carrier Noise Emission Regulations," which provided the factual basis for the standards proposed, measurement methodology applicable thereto, costs of compliance with the proposed standards and the public health and welfare benefits expected. Public comment was solicited, with the comment period extending from July 3, 1974, to August 17, 1974.

To ensure that all issues involved in the proposed regulation and Background Document were fully addressed prior to promulgation of the final regulation, a public consultation meeting was announced in the FEDERAL REGISTER of August 6, 1974 (39 FR 28318) and was subsequently held on August 14, 1974, in Des Plaines, Illinois. The principal issues reviewed at this meeting related to the adequacy of the available technology to meet requirements in the proposed standards and the impact of Federal preemption on State and local noise regulations. The transcript of the meeting has been included as a portion of the total body of public comment received.

Public comments received during the public comment period are maintained at the EPA Headquarters, 401 M Street, SW., Washington, D.C. 20460, and are available for public inspection during normal working hours.

In the future the Agency may propose further regulations concerning railroad noise, as the need for and feasibility of such are demonstrated. Such regulations may be proposed as amendments to that part of the Code of Federal Regulations being established by this regulatory action, or may be proposed pursuant to the EPA's authority to set noise emission standards for new products specified in section 6 of the Act.

#### SUMMARY OF COMMENTS RECEIVED

While the EPA received and considered carefully a significant number of comments which were in agreement with the railroad noise regulation as proposed, other comments were received identifying matters which the Agency believes warrant further discussion.

(1) *The scope of railroad facilities and equipment regulated.* A significant number of comments brought into issue the general question of why the EPA decided, apart from considerations of available technology and cost of compliance, not to regulate all railroad facilities and equipment, and chose rather to regulate only certain equipment at this time.

This decision by the EPA was based

on its view that the uniform Federal regulation of the noise produced by certain railroad facilities and equipment is not necessary at this time since such noise sources can best be controlled by measures which do not now require national uniformity of treatment in order to facilitate interstate commerce as specified in section 2(a)(3) of the Act.

The EPA has studied the operations of carriers engaged in interstate commerce by rail and recognizes that such operations are imbedded into every corner of the nation at thousands of locations and along hundreds of thousands of miles of right-of-way. The nature and magnitude of the noises produced by the many types of facilities and equipment utilized in these operations differ greatly and their impact on the environment varies widely depending on whether they occur, for example, in a desert or adjacent to a residential area. The Agency concludes that the control of certain of these noise sources, such as fixed facilities, or equipment used infrequently or primarily in one location, is best handled by the State and local authorities, rather than the Federal government, since the State and local authorities are believed in this case to be better able than the Federal government to consider local circumstances in applying such measures as the addition of noise barriers or sound insulation to particular facilities, or the positioning of noisy equipment within these facilities as far as possible from noise-sensitive areas. Further, and more importantly, the EPA did not find during its analysis, and has not received from rail carriers, any information identifying situations where lack of uniform State and local laws with respect to these facilities and equipment has imposed any significant burden on interstate commerce.

In view therefore of the absence of evidence calling for the national regulation of all interstate rail carrier facilities and equipment in order to facilitate interstate commerce, the EPA believes that its limited regulatory action, as proposed in the notice of proposed rulemaking, to consider interstate rail operations, facilities, and equipment on an individual basis in determining the need for their uniform Federal regulation is appropriate.

a. *Horns, bells, whistles, and other warning devices.* A number of commenters, ranging from private citizens to both State and Federal administrative agencies, expressed both concern over and agreement with the EPA's decision not to regulate rail carrier acoustic

warning devices.

This broad response serves as an indication of the conspicuous nature of the noises produced by such warning devices, and that to many citizens they are one of the most noticeable and disagreeable examples of railroad noise.

Three State environmental agencies indicated that complaints from citizens about railroad warning device noise were not only large in number but comprised the major source of all complaints about railroad noise, and therefore contended that such warning devices should be regulated.

The Agency in analyzing the problem of acoustic warning device noise recognized a unique characteristic of such noise as opposed to other railroad noises. That is, it is a form of noise that is purposefully created and intended to be heard for safety reasons, instead of being an unwanted by-product of some other activity. As such, the EPA found that these warning devices and their use are regulated at both Federal and State levels; information as to the number and nature of such regulations are included in the Background Document. In addition, studies considered by the EPA, also included in the Background Document, show that such warning devices do not appear to be unrelated to highway and pedestrian safety, especially in emergency situations. The reduction or elimination of such warning devices through the authorities of the Noise Control Act does not therefore appear to be a reasonable consideration, as suggested by three commenters.

The EPA does recognize that a noise problem exists as to the use and extent of railroad warning devices, and that regulatory action may be appropriate for controlling same. However, the Agency believes that such regulation can best be considered and implemented by State and local authorities who are better able to evaluate the particular local circumstances with respect to the nature and extent of the noise problem and the requisite safety considerations involved. Any comprehensive Federal regulation in this area could be overly diverse and cumbersome. The EPA encourages in this regard the interaction between local and State governments and the railroads directly concerned in solving the particular local noise problems associated with the use of such warning devices. Such interaction has taken place, examples of which are included in the Background Document, and has apparently produced both safe and cost effective solutions to these local noise problems. However, if

local authorities, after having first sought solutions with the railroads involved, have still not been able to resolve their problems, they are encouraged to then direct their concerns to the EPA for possible further Federal action.

Two other State environmental agencies indicated that locomotive horns, bells, or whistles around railroad yards are unnecessarily overused by the railroads, and that such use should be limited by Federal regulation.

The EPA has determined that the use of such warning devices in and around railroad yards is not entirely out of place due to the often heavy intermingling of workers and mobile equipment with locomotives and rail cars. Such use may of course be beyond the extent necessary to ensure safety, not only in railroad yards but wherever else railroad horns, bells, and whistles are used. The term "over-used," however, is relative to the particular circumstances surrounding such use: Whether, for example, a railroad yard or rail-highway intersection is situated in a residential as opposed to an industrialized area. These situations are instances where the EPA's recommendation for railroad and community interaction is at this time the most appropriate means of achieving effective warning device noise abatement.

Another commenter stated that railroad acoustic warning signals are ineffective due to the often loud ambient noise levels that exist in motor vehicle interiors due to radios and other noise sources.

Acoustical analysis available to the Agency indicates that the effectiveness of acoustic warning signals as used on police and emergency vehicles as well as urban buses and trucks is not only a function of amplitude or loudness but also of tonal characteristics. That is, recognition is achieved by a particular fixed or variable frequency of a reasonable loudness that impinges itself upon whatever ambient noise may exist. This view is in accord with the study referenced above which indicates that railroad warning signals do appear to affect safety, especially in emergency situations.

One commenter indicated that roadway drop gates equipped with flasher units provide visual warning that is adequate without acoustic signals.

EPA encourages alternate solutions to the routine use of acoustic warning devices at rail and road crossings. For example, the elimination of public grade level railroad crossings would do away with the source of the problem, the in-

tersection of rail tracks and public thoroughfares. However, such a program on a national basis of elevating or depressing either the railroad line or the public thoroughfare at each crossing, solely for the purpose of the abatement of acoustic warning signal noise, is not considered appropriate. However, it should be seriously considered in future public thoroughfare or railroad line construction programs for both safety and environmental noise reasons.

Warning gates, too, as suggested, would appear to be an effective safety alternative to acoustic warning signals. Specifying their use on a national basis, however, would be prohibitively expensive considering that costs range from \$45,000 to \$90,000 per unit, and with the extensive use of grade level crossings in the United States, for example Illinois having approximately 15,000 crossings without drop gates, the cost would be \$675 million or more in that State alone.

Since acoustic warning devices do serve the interests of safety and, in the Agency's opinion, can best be regulated at the local and State level for the reasons indicated, EPA does not propose to regulate railroad acoustic warning devices at this time.

b. *Repair and maintenance shops, terminals, marshalling yards, humping yards, and specifically, rail car retarders.* Some commenters voiced objection to the exclusion of noise emission standards for fixed facility and area-type sources from the regulation, while others were explicit in their agreement not to include such standards.

A major national railroad association commented that the EPA should prescribe noise standards for area-type sources such as yards and terminals.

The facilities and equipment found within railroad yard and terminal areas, with the exception of locomotives, rail cars, and some mobile special purpose equipment, are permanent installations which are normally subject to the environmental noise regulations of only one jurisdiction.

The Agency has determined that such fixed facility railroad yard and terminal noise is best controlled at this time at the local level, employing measures which do not in themselves affect the movement of trains and therefore do not require national uniformity of treatment.

Local jurisdictions are familiar with the particular complexities of their community/railroad yard noise situation, and as such, are in a position to exhibit

greater sensitivity in prescribing practical and cost effective solutions to the local noise problem. Indeed, the same railroad association which has encouraged the establishment of Federal area noise standards for yards and terminals, specifically pointed out in its remarks that such facilities do vary in size, shape, and special characteristics, and that the noises produced there are diverse. The EPA recognizes that the communities which neighbor these yards and terminals are equally diverse, varying in land zoning and population density and distribution. As such, Federal regulation which successfully produces substantial population health and welfare benefit at one locality may produce little or no such benefit at another locality. For example, the regulation of a railroad yard facility which is enveloped by a residential community would not achieve similar population health and welfare benefit when equally applied to a similar railroad yard facility which exists within a large industrial park complex. This observed differential is directly attributable to the different land zoning and population density and distribution characteristics of the two communities.

Acknowledging both the single jurisdictional nature and the diversity which characterize railroad yards and terminals and their neighboring communities, and citing the virtual absence of evidence that non-uniform State and local regulation of railroad yard and terminal facilities in fact substantially burdens interstate commerce, the Agency at this time does not propose to establish standards for the regulation of railroad yard and terminal fixed facility noise.

Two commenters requested that the EPA impose property line standards on railroad noise using an L<sub>90</sub> noise level standard.

The use of property line noise standards is applicable primarily to the regulation of noise from fixed facility and area noise sources. In the regulation of railroad noise such sources include maintenance shops, marshalling yards, humping yards, and terminals. Since EPA has not covered these facilities in the regulation, the use of such area noise level standards in the regulation is not appropriate.

The Department of Transportation commented that the EPA should regulate retarder noise emissions. They indicated that active retarders should be regulated by October 1976 since established barrier technology makes it possible to meet that schedule. They further state that a plan

to convert to retractable inert retarders should be implemented by 1979.

The EPA recognizes that rail car retarding operations may produce individual peak noise levels of up to 120 dB(A) at 100 feet, and may be a problem noise source to the surrounding community. However, as with other fixed facilities, retarders are subject to the authority of only one jurisdiction, and as such can best be regulated at the local level by means which do not in themselves affect the movement of trains and therefore do not require national uniformity of treatment.

The Agency's study of railroad yard noise (inclusive of retarder noise) indicates that concern for noise from railroad yards is apparently limited to certain localities and is not a national concern. This is due in large part to the location of a number of yards in non-urban areas and the relatively few existing retarder systems, approximately 120 today. This local nature of the retarder noise problem further reduces the desirability of a Federally preemptive regulation. DOT's comment in support of a Federally preemptive retarder noise regulation which would utilize barrier technology does not consider the local characteristics of each community which is impacted by retarder noise. For example, in a situation where a retarder yard is bordered on one side by a residential area and on all other sides by an unpopulated wooded area, a barrier could be beneficial to public health and welfare only if erected on that side of the retarder which faces the residential area. Under such circumstances a community would receive insufficient health and welfare benefits to justify the costs incurred by a Federally preemptive regulation which mandates the installation of barrier walls on both sides of retarder mechanisms. At the currently estimated materials cost of \$70 to \$100 per linear foot for barriers, barrier costs would run from \$75 thousand to \$150 thousand per railroad yard and from \$0.5 to \$10.1 million for the entire railroad industry. Maintenance and replacement costs, yard down time, and track modification costs have not been fully identified. Expenditures should be assured of producing maximum benefits, and this may best be done through local regulation. Available space for installation of barriers, and safety hazards which might accrue thereto, have not been identified, and are peculiar to the particular characteristics of the individual railroad yards, and as such may be best accounted for through local regulation.

A Federal regulation for conversion of inert retarders to retractable inert retarders would be subject to considerations similar to those discussed for the erection of barriers around active retarders, except that probable yard downtime and installation and materials costs would be considerably greater for conversion to inert retractable retarders than for the erection of barriers. The EPA estimates that conversion to retractable inert retarders would cost \$7.5 thousand for each retarder, not including labor, yard down time, or maintenance costs. Applying a gross estimate of 30 thousand such inert retarders nationally, estimated national conversion costs, exclusive of labor, down time, and operational costs, would be \$150 million.

Although the EPA does not currently propose to regulate retarder noise, it does recommend that local jurisdictions establish regulations which require railroads to utilize barrier technology where needed, and where both practical and feasible. Further consideration may be given by the EPA to possibly providing future regulations to require that new retarder installations be equipped with retractable inert retarders, computer control systems, retarder beam lubrication systems, or other available technical developments which result in significant noise reduction from retarders as the need for such regulations is demonstrated relative to the costs involved and the availability of technology.

DOT also commented that the EPA should promulgate a regulation which protects railroad workmen as well as the community from retarder noise.

For reasons outlined above, the EPA does not presently propose to regulate retarder noise from either the community health and welfare or the occupational health and safety point of view. The latter consideration is specifically under the purview of the Occupational Safety and Health Administration (OSHA) and is properly addressed by that Agency.

Currently, the Federal Railroad Administration (FRA) is proposing a regulation which would limit noise levels within railroad workmen's sleeping quarters. This proposal is in response to a petition from the Congress of Railway Unions (CRU) that the FRA institute rule making procedures to prohibit railroads from having or providing employee sleeping quarters less than one mile from its property or yards where switching or humping operations are performed. The FRA's proposed regulation does not regulate the distance of sleeping quarters

from the railroad yard; however, it does specify acceptable interior noise levels for sleeping quarters.

c. *Special purpose equipment.* A major national railroad association commented that the EPA should promptly establish noise limits applicable to the noise from special purpose equipment.

Examples of special purpose equipment which may be located on or operated from rail cars include: Ballast cribbing machines, ballast regulators, conditioners and scarifiers, bolt machines, brush cutters, compactors, concrete mixers, cranes and derricks, earth boring machines, electric welding machines, grinders, grouters, pile drivers, rail heaters, rail layers, sandblasters, snow plows, spike drivers, sprayers and other numerous types of maintenance-of-way equipment.

The Agency realizes that special purpose equipment such as that used for maintenance-of-way activities is essentially construction equipment, and as such may emit loud intermittent noise. Railroads may avoid noise problems by keeping routine maintenance activities to reasonable times, and local jurisdictions may easily regulate operation times for such equipment as long as exceptions are allowed for emergency use. For example, a community may wish to regulate the hours allowed for routine operation of spike driving equipment, but exception must be made for the operation of such equipment in the aftermath of a derailment, so that interstate commerce would not be unduly impeded.

The small numbers of such equipment, their infrequency of use, and the relative ease with which viable local regulations may be instituted, all tend to make a Federally preemptive regulation overly expensive relative to the benefits received.

Comments received by the Agency did not indicate that any cases currently exist where nonuniform local or state regulation of special purpose equipment has unduly burdened those railroads so regulated, and at this time the Agency does not believe that special purpose equipment requires national uniformity of treatment. However, the rail cars themselves on which such special purpose equipment is located are included under the standards for rail car operations. The Agency continues to solicit notice of specific cases where nonuniform local or state regulation of special purpose equipment has created a burden on interstate commerce. If in the future it appears that national uniformity of treatment of such equipment is appropri-



ate, noise emission standards may be proposed.

d. *Track and right of way.* Three commenters raised questions dealing with the absence of track and right-of-way standards in the proposed regulation. Two stated that in view of the fact that the EPA had preempted State and local authorities from regulating track and right-of-way in the notice of proposed rulemaking, it was in conflict with its mandate to issue noise emission standards reflecting "best available technology" since the regulation itself did not contain any track standard. The other was concerned that since a track standard was not included in the regulation, quiet rail cars might be penalized for wheel/rail noise caused by faulty track.

The EPA fully recognizes the need for track and right-of-way standards in any regulatory strategy that attempts to quiet the movement of rail cars.

The standard promulgated for rail cars applies to the total noise produced by the operation of trains on track. As such it is preemptive with respect to both rail cars and track. It reflects the noise level achievable by application of best maintenance practices to rail cars. Further reductions in noise levels are achievable through various track repairs and modifications. However, the EPA has not fully identified the available technology or the applicable costs associated with such practices. In the future, the EPA may propose standards which would require their application.

e. Rail cars equipped with auxiliary power equipment and mass transit systems.

Three commenters recommended that the regulation be revised so as to include noise standards for rail cars equipped with auxiliary power units, more specifically, mechanically refrigerated freight cars, and various auxiliary powered passenger-related cars.

The initial decision by the Agency was to regulate noise from all sources produced by rail cars while in motion only, and to leave to State and local authorities the regulation of whatever noise is produced from rail cars while stationary. This decision was made because these noises are a problem only when such cars are parked near noise-sensitive areas (such noises being indistinguishable from other railroad car noises while the cars are in motion), and because it was felt that such localized problems could best be controlled by measures such as the relocation of such cars to less noise-sensitive areas.

The Agency was and continues to be cognizant of the extent of the problem that can be caused in specific instances by the continuous operation of the diesel or gasoline engines which operate on such cars. Noise levels as high as 75 dB(A) at 15 meters (50 feet) are possible from refrigerator cars parked with their cooling systems running in marshalling yards and humping yards. Noise levels from such refrigerator cars can be even greater due to the fact that such cars are often parked coupled together in large numbers. Additional data acquired by and supplied to the Agency has shown that the problem exists not only with refrigerator cars but also with various passenger-related cars such as dining cars, lounge cars, cafe-type cars, and others equipped with self-contained power units; and that the abatement of such noise appears able to be and in certain instances is now being accomplished through the use of existing muffler designs. In this regard, the statements on pages 4-28 and 4-37 of the original Background Document have been corrected to reflect the use (although of undetermined adequacy) of mufflers on the auxiliary engines used in refrigerator cars.

The Agency therefore may consider the possible promulgation of a regulation dealing with the noise produced by mechanically refrigerated freight cars and passenger cars equipped with auxiliary power equipment so as to reduce the impact of such noise when these cars are parked near noise sensitive areas.

Considerations as to the costs to be incurred by the owners of such rail cars as may be affected by any future regulatory action would be fully and adequately addressed during the course of the regulatory process that would be conducted relative to such regulation.

It should be noted that in the regulation being promulgated herein the standard for rail car operations refers to the total noise generated, and that the setting of emission standards on any element of that noise is preempted, whether the rail car is in motion or stationary. This Federal regulatory action does not, however, interfere with the ability of State and local governments to enact or enforce noise emission regulations on railroad yards that require railroads to erect noise barriers. Nor does this regulation interfere with the ability of State and local governments to enact or enforce noise emission regulations which require the relocation of parked rail cars that generate noise so long as such regulation is reviewed and approved by EPA

pursuant to section 17(c)(2) of the Act.

One of the commenters asked for an extension of the period of time prior to promulgation of the final regulation so that refrigerator car noise emissions could be studied in relation to wheel/rail noise.

Studies and data considered by the EPA show that such noise can range from 72 dB(A) (Thermo King Corporation, a major manufacturer of refrigeration equipment, 1975) to 75 dB(A) (Wyle Laboratories, an acoustical consulting firm, 1973), and that it is indistinguishable from overall train noise while the train is moving. As such, and in the absence of a showing that the existing data is questionable, no extension has been granted.

One commenter suggested that the regulation be made applicable to the operation of and equipment used by intraurban mass transit systems.

The Agency has not intended and does not intend that intraurban mass transit systems be covered by the regulation being promulgated herein. It is the Agency's judgment that such systems are specifically excluded from regulation under section 17 of the Noise Control Act of 1972 by the definition of "carrier" cited in the Act which excludes "• • • street, suburban, and interurban electric railways unless operated as a part of a general railroad system of transportation." In addition such systems operate principally within one jurisdiction or in some cases throughout a small number of contiguous metropolitan jurisdictions under the purview of a single transit authority, and as such do not appear to require uniform Federal regulation in order to facilitate interstate commerce. However, the exclusion of such systems does not also exclude the operations and equipment associated with commuter rail services provided by a number of interstate rail carriers.

(2) *Standards for locomotive operation under stationary conditions.* A major locomotive manufacturer and a major national railroad association commented that the application of muffler technology alone would not be adequate to bring existing diesel-electric locomotives into compliance with the 67 dB(A) idle standard to be effective 4 years from the date of promulgation of the regulation. Because this regulation as proposed has been revised and does not now call for the modification of in-use locomotives, this becomes a question of new locomotive design.

Available data indicate that although

locomotive exhaust noise is often the dominant noise source at idle, structurally radiated noise may in some cases be dominant.

A major locomotive manufacturer presented the Agency with data which indicate that for certain idling locomotives, including models equipped with turbocharged and Roots blown engines, the octave bands representing the overall A-weighted locomotive sound levels at 100 feet are not totally dominated by exhaust noise, but are somewhat controlled by structurally radiated noise. These data further indicate that particular locomotives may emit overall locomotive idle noise levels of approximately 69 dB(A) at 100 feet. EPA data further indicate that some locomotives may emit idle noise levels in excess of 69 dB(A) which are also dominated by structurally radiated noise. Locomotives with such high levels of structurally radiated noise cannot be brought into compliance with the proposed level of 67 dB(A) through, for example, muffler application alone. Accordingly, the Agency has amended the locomotive idle noise standard, increasing the allowable noise emission level from 67 dB(A) to 73 dB(A) at 100 feet.

A major rail passenger corporation commented that diesel electric locomotives equipped with auxiliary power generators or twin traction engines, and gas turbine locomotives, may not be able to meet the idle standard, and that special standards should be promulgated for such equipment.

In proposing this regulation the Agency intended to provide Federal preemption for all locomotive noise sources excepting acoustical warning devices, thus providing national uniformity of treatment to protect these mobile noise sources. Accordingly, State and local regulation of noise emissions from such locomotives equipped with auxiliary generators used to power electrical units on passenger cars, including the noise from such auxiliary generators per se, should be Federally preempted.

On this basis, the Agency has determined that Federally preemptive regulation of noise from auxiliary power units is appropriate. However, the noise from such sources was not specifically addressed by the Agency during rule making, and the standard as proposed considered only idle setting noise emissions from the primary propulsion engines of the stationary locomotives.

Because passenger locomotives do spend considerable time in a stationary disposition with auxiliary power units

operating at the same time that the primary diesel engines are idling, the Agency foresees circumstances where the auxiliary unit noise may dominate other noise emissions from the idling locomotive, and thus be appropriate for regulatory action. After further consideration of this matter the Agency may address noise standards for such auxiliary units in a separate rule making. However, because the intent of the Act was to provide national uniformity of treatment where non-uniform State and local ordinances could likely impose a burden on interstate commerce, and because the locomotive as a whole is subject to this regulation, the Agency believes that its regulatory action relative to locomotive noise emissions is also preemptive with respect to State and local ordinances relative to noise emissions from the auxiliary power units which are an integral part of many such locomotives.

The Agency has received no data which would demonstrate that twin diesel electric locomotives are in fact incapable of compliance with the idle standard. Since the Agency has no data which would demonstrate that twin diesel engines are inherently louder than larger single diesel engines, and since twin-engined locomotives utilize the same basic diesel-electric technology as the more common single engine locomotives, separate standards for twin-engined diesel-electric locomotives are not included in this regulation. The standards as promulgated are therefore applicable to these locomotives.

While the Agency has sufficient data to confidently assess the ability of gas turbine-powered locomotives to meet the moving condition standard, the Agency has not been able to acquire sufficient data on the idle setting or stationary runup noise levels of gas turbine locomotives. Due to the virtual unavailability of such stationary noise data, the regulation as proposed has been revised, and the idle setting and stationary runup noise standards are no longer applicable to gas turbine locomotives. However, this regulation is preemptive with respect to State and local regulation of all turbine locomotive noise excepting that from acoustical warning devices, including regulation when such locomotives are stationary at idle. After the Agency has compiled a sufficient data base, idle setting and stationary runup noise standards for gas turbine locomotives may be established as a revision to these regulations.

Considerable comment was received concerning the full throttle stationary

standard. DOT questioned the acoustical acceptability of the typical load cell test sites and the validity of self loading due to the unaccounted for influence of noise emissions from the dynamic brake grid fans. Also cited was the possible obstruction of routine railroad operations due to local enforcement of the stationary standards.

DOT indicated that areas near railroad load cells are not far enough from reflective surfaces to be effective test sites. They also indicated that if load cells are to be used for enforcement the EPA should prescribe correction factors to account for the acoustical variability of actual load cell test sites.

In answering the above claim that load cells are unsuitable for locomotive noise measurement because they are situated too close to reflective areas, the EPA cites the fact that a number of load cells are portable and are readily available on a rental basis. These portable load cells may be transported to an acoustically acceptable site for locomotive noise testing. At such sites, accurate and meaningful noise measurements may be obtained without the use of site correction factors.

Additional DOT response indicated that the self-loading test is not valid because the cooling fans on the dynamic brake grids operate during self-loading, while in actual operations grid fans are never operated. They stated that the inherently high level of noise attributable to cooling fan operation (both engine and dynamic brake grid fans) during self load would interfere with the accurate and meaningful measurement of exhaust noise.

The EPA has considered the above comment and believes that objections to the self loading test are valid. Therefore, considering the difficulties involved in obtaining accurate measurements due to the interference of dynamic brake grid fan noise, and citing the availability of portable rented load cells, the Agency has decided to delete the self loading test as a recommended stationary testing procedure, while simultaneously endorsing the use of portable load cells, when necessary.

DOT indicated concern that enforcement of stationary standards could result in significant obstruction of routine railroad operation and hence interfere with the flow of interstate commerce. That is, any enforcement official could order any one or any number of locomotives to be moved to a load cell or self load area for testing, regardless of the maintenance work schedule at the load cell or the need for the subject locomotives to be engaged

in interstate commerce.

Such potential difficulties have been considered by EPA, and the Agency believes that their effects may be minimized through proper structuring of the DOT compliance regulations which may specify responsible enforcement procedures.

(3) *Standards for locomotive operation under moving conditions.* The DOT favors a moving locomotive standard as a substitute for a stationary standard, but stated that EPA's definition of wayside surface conditions should be improved.

The EPA strongly believes that a stationary as well as a moving locomotive standard is necessary in order to account for the varying nature of locomotive noise. Utilization of both stationary and moving standards also facilitates adequate and accurate enforcement. The additional measurement criteria which are being incorporated by the EPA as part of the final regulation specify wayside surface conditions in greater detail.

A major railway passenger corporation indicated that the moving locomotive standard should be speed related as is the case with the rail car standard. They further stated that gear noise, traction motor noise, and noise from locomotive appurtenances are speed related.

EPA data indicates that while diesel-electric locomotive noise does not appear to be speed related, electric freight, electric high speed passenger, and turbine high speed passenger noise levels do exhibit some speed-related correlations. However, the high speed noise emission levels exhibited by these locomotives appear to fall within the EPA's 90 dB(A) standard, and should pose no special compliance problem.

(4) *Standards for rail car operations.* DOT indicated that it is appropriate to limit any car regulation to at least two degree or wider turns as with the locomotive standard.

The EPA concurs with that statement and has made the appropriate changes in the Rail Car Standard.

One private car owner was concerned that the EPA Rail Car Noise Standards would require greater maintenance than that prescribed by the FRA (1974) Railroad Freight Car Safety Standards already in effect.

The EPA Rail Car Noise Emission Standards are based on those noise levels achievable through best maintenance practice. As such, the data used to determine the noise level standards was obtained from noise measurements of typical rail cars which were subject to

maintenance requirements no more restrictive than those currently prescribed by the FRA Railroad Freight Car Safety Standards.

Since the data which were used to determine the Rail Car Noise Emission Standards were based on current maintenance requirements, compliance with the noise regulations is not anticipated to cause any additional maintenance burden.

A private car owner stated that the Federal standards on rail car noise should not apply to privately owned cars because private owners do not have the ability to service cars engaged in interstate commerce.

The Agency replies that while ultimate responsibility and liability for rail car maintenance lies with rail car owners, immediate responsibility and liability is assumed by the rail carrier who is moving the car in interstate commerce, and who does possess the ability to service rail cars.

(5) *Best maintenance practice locomotive standards.* DOT stated that the 365 day standards provide a disincentive to rebuild old locomotives into compliance or to specify new locomotives be delivered with the mufflers needed to achieve compliance.

Since the Agency has elected to delete the retrofit requirement due to disparities in current cost and technological data, only the second part of the above comment requires consideration. The Agency intends the 365 day standard to be a "best maintenance practice" standard which precludes further deterioration of locomotive noise levels, while allowing adequate time for application of the available technology prior to the effective date of the more restrictive newly manufactured locomotive standards.

(6) *Retrofit standards for in-use locomotives.* A major railroad association and a major locomotive manufacturer both indicated their support of newly manufactured locomotive regulations, and one exhaust equipment manufacturer stated that the technical and production capabilities do exist for new locomotive muffler applications. Having received no appreciable comment in opposition to the regulation of newly manufactured locomotives, the Agency is promulgating best technology noise emission standards applicable to locomotives which are manufactured after December 31, 1979.

However, there were no such concurrences regarding the regulation of noise emissions from existing locomotives, a

proposal most widely known as "retrofit" because it largely involves the phased addition of mufflers to the existing locomotive fleet. Several docket entries contained economic and technological data which conflict significantly with the EPA data which appears in the Background Document. The principal areas of conflict involve disparities in determination of the "best available technology" as it exists today and the resultant costs of its application. There exists a further complicating factor in that the available space configurations existing within many locomotives have been altered over the years due to the addition and modification of various locomotive components such as dynamic braking systems and spark arresters. As a result of this practice there exist today numerous and diverse locomotive configurations, each possessing its own specific peculiarities which must be accounted for in a retrofit program. The implications of this diversity of locomotive configurations and the accompanying disagreement concerning available technology and the cost of its application (i.e. labor rates, capital costs of new facilities, etc.) have given rise to cost of compliance figures which range from the EPA's original estimates of \$80 to \$100 million to industry estimates approximating \$400 to \$800 million. Although the generation of additional information concerning the availability of technology may allow the Agency to reconcile these widely varying retrofit cost estimates, the collection of such data would be a costly and time consuming process which may produce a retrofit cost estimate which remains substantially high relative to the public health and welfare benefits which would result, especially in view of the fact that railroad noise has not been identified as one of the major sources of noise in the environment. For these reasons the Agency has decided to remove the retrofit requirement from the regulation being promulgated herein. Acknowledging the uncertainties which currently accompany the retrofit provision, the Agency may reconsider the retrofit issue and may promulgate a retrofit requirement should further information indicate that the technology is available and that retrofit compliance costs are reasonable, relative to the health and welfare benefits to be accrued.

(7) *Cost and technology of locomotive noise reduction.* A major national railroad association and two other commenters indicated concern for the im-

pact of the railroad noise regulation on the bankrupt and marginal railroads.

The Agency has endeavored to anticipate and account for all costs which the bankrupt railroads specifically, and all railroads generally, may incur as the result of this regulatory action. Best and worst case estimates for the sum of equivalent annual manufacturing costs and equivalent annual fuel costs over 25 years, vary from \$4.59 million to \$4.76 million for the entire railroad industry. The fractional impact of these costs on the marginal and bankrupt railroads is expected to be approximately 28 percent of the total cost to the entire railroad industry, with such costs not seen as being significant in comparison to other costs regularly incurred by such railroads.

Several commenters claimed that the introduction of mufflers to locomotives will cause numerous technical and environmental problems.

A major national railroad association and several other commenters warned that the use of mufflers, especially in combination with spark arresters, will cause increased backpressure, which will result in increased fuel consumption and increased atmospheric pollution.

Mufflers can be designed which are well within the manufacturer's warranty backpressure specifications for both Rootes blown and turbo-charged locomotives, for use both with or without spark arresters. Mufflers which are within these specifications should cause only insignificant increases in atmospheric pollutant emissions and a minimal increase in fuel consumption.

A major national railroad association indicated that carbon collection in the mufflers presents a potential fire hazard. Presently, there is no substantial indication that carbon collection in locomotive mufflers would present a potential fire hazard. Within spark arresters which are currently found on today's locomotives, carbon particles are gathered from the exhaust gases prior to the passage of those gases through the outlet section of the spark arrester for discharge through the exhaust pipes. While it could be postulated that hot carbon might conceivably collect within mufflers which are in tandem with or are integrated into spark arresters, it could also be postulated that such carbon collection might just as readily occur at the outlets of spark arresters or within exhaust pipes which are presently found on locomotives. However, no such fire hazard due to carbon collection has been

evidenced at spark arrester outlets or in exhaust pipes, and the Agency sees no indication that the installation of mufflers will substantially increase the potential for such a fire hazard.

A major railroad association indicated concern that increased railroad rates to cover compliance costs may cause diversion of traffic to more fuel intensive modes which also emit more atmospheric pollutants.

As stated previously, the cost impact of a regulation on newly manufactured locomotives should be, in itself, insufficient to necessitate the need for any major railroad rate increases. Thus, there does not appear to be any likelihood of diverting railroad traffic to more fuel and pollution intensive transport modes.

One commenter indicated that the application of mufflers will result in decreased reliability of the locomotives both with respect to failure of the mufflers themselves and to other components of the locomotives.

Mufflers could be made out of anti-corrosive, heat-resistant alloys for a long service life. Also an important consideration is the fact that the muffler would be within the carbody of the locomotive and would not be exposed to the elements, thus extending its expected useful life. Industrial mufflers have been designed for a useful life of over 20 years and it is expected that locomotive mufflers may be designed for a similarly long life span. Also, the design and utilization of mufflers which are within manufacturers' backpressure specifications, should preclude major adverse effects to other internal locomotive components.

(8) *Health and welfare impact.* Several commenters indicated that the EPA did not provide adequate information as to the number of people impacted by railroad noise, nor the number to be benefited by the regulation, or whether in fact such people were adversely affected from a health and welfare standpoint initially.

The Agency included in the Background Document studies and data which indicated that the number of people exposed to various noise levels by railroad traffic are significant. Such numbers are approximately 2.20 million people at or above an Ldn value of 55 dB(A). Exposure to such noise levels for extended periods of time has been determined to have an adverse effect on the health and welfare of those exposed, as indicated in an EPA report of March

1974 entitled "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety." In addition the EPA is establishing this regulation as part of a regulatory strategy that, according to Agency analysis, could eventually relieve approximately 520,000 people from railroad noise levels in excess of 55 dB(A), Ldn.

Four commenters contended that the health and welfare of people is not affected by railroad equipment which operates in sparsely populated or rural areas and that, therefore, the regulation of such equipment is not called for.

The Agency has determined that there is substantial mobility of the use of railroad equipment not only within particular railroad operating regions but across the nation as a whole, and that such mobility is an important facet of the manner in which railroad companies operate. This mobility is evidenced by the fact that rail cars and locomotives are transferred from one area to another in order to satisfy the fluctuations in required hauling capacity which take place, and by the practice whereby old line locomotives are retired by transferring them to railroad yards to act as switchers. It has been found that such mobility is increasing as evidenced by Railbox, a plan utilized by a growing number of railroads whereby rail cars are pooled so that their use may be shared anywhere within the operating regions of the participating railroads.

The Agency has determined, therefore, that the mobility of rail cars and locomotives requires that the standards be applied uniformly to all such pieces of equipment.

(9) *Effect on State and local noise control.* A major railroad industry association questioned whether the Agency has the authority to offer an opinion as to the preemptive effect of its regulations, and in particular, felt that, contrary to the Agency's stated position, the setting of Federal emission standards for locomotives and rail cars preempts every effort to control noise from that same equipment by local and State authorities, such as the required erection of noise barriers, or the regulation of overall railroad yard noise.

The EPA believes that the Noise Control Act of 1972 is clear in its contemplation that Federal and State governments work together in the control of noise. However, the Act also provides, in some cases, that the Federal authority be preemptive. The Agency therefore feels

that it is proper for it to explain the extent of its regulations and to indicate the point beyond which the States and local governments may act; and that it is not prohibited from assisting the State and local governments by indicating ways in which the Agency believes they may augment its regulatory efforts. In addition the EPA's analysis indicates that, based on legal precedents, subsections 17(c) (1) and (2) provide only for the preemption of State and local regulations which set standards on the noise emissions of Federally regulated equipment or facilities, or which have that effect by requiring the modification of such equipment or facilities, or the alteration of their use.

Another commenter indicated that State and local governments do not have the inclination or ability to determine the technical feasibility and cost of compliance of noise regulations and, therefore, the EPA is not acting in accordance with the instructions of Congress by encouraging such local initiative.

The Agency believes, as stated above, that the Congress did intend that the Federal and State authorities cooperate in the control of noise. Certain States, in particular California, and Illinois, have well established environmental agencies and have enacted and are enforcing comprehensive noise regulations. These States and others are clearly not devoid of technical and economic expertise. It appears to the Agency, therefore, that there is no fundamental reason why such States should not be permitted and encouraged to consider the technology available within relevant economic restraints to solve those noise problems peculiar to them that are not preempted by Federal regulatory action.

Numerous comments were received regarding special local conditions and the effects of Federal preemption on the relationship between State and local noise regulations and Federal noise regulations. Industry commenters felt strongly that there should be one uniform national standard that is totally preemptive. Some States and localities felt that "special local conditions" should be interpreted broadly, and some commenters felt that where stricter State and local standards were feasible they should not be preempted by Federal regulations.

Most of the comments received from local and State authorities asked that local regulation of noise be permitted to continue, and that they be allowed to attempt to control specialized noise problems such as night operations of trains which affect residential areas. Such local

regulations are not necessarily prohibited by this regulatory action. The Agency has explained the nature of the preemptive effect of this regulation in another section of the preamble and feels that such explanation should serve as a guide to the future status of such State and local regulatory efforts.

(10) *Measurement methodology and enforcement regulations.* There were a number of comments from State and Local governments, private citizens, and industry relating to measurement methodologies and compliance procedures. Several recommendations were offered indicating that a measurement methodology specifying information such as allowable measurement equipment, site conditions, tolerances and measurement techniques should be incorporated into the regulation. Comments were also received concerning the measurement procedures published in the Background Document to the proposed regulation.

The proposed regulation did not include a detailed measurement methodology since it was contemplated that such would be included as part of the compliance regulation to be promulgated by the Department of Transportation. Such measurement methodology, dealing with the enforcement aspects of railroad noise measurement, will still be developed by the Department of Transportation. The Agency, however, as a result of its own further analysis and after consideration of the questions and suggestions received during the public review process, has decided to incorporate additional measurement criteria into the standards as an added subpart of the final regulation being promulgated herein. Such measurement criteria contain specifications for ambient noise, wind noise, test site conditions, test equipment orientation, and other parameters necessary for the consistent and accurate measurement of the sound levels specified in the regulation.

This decision was made due to the complexity of the problem of accurately and fairly performing noise measurements of railroad equipment, and because the Agency felt it necessary to ensure that the standards within the regulation be fully and definitively specified so that there be no question as to the standards promulgated. The proper and complete definition of such standards is particularly critical with respect to railroad noise because there is no generally accepted measurement scheme in use nationally or throughout the affected industry unlike the situation in other industries subject to Federal noise regula-

tion.

The Agency feels that it is acting properly in including the criteria as part of this final rulemaking without proposing them separately because the methodology from which such criteria were taken was published in the Background Document to the proposed regulation and was commented on as a result of the public review process. In addition, that methodology has since undergone thorough review by concerned Agencies of the Federal government, including the Department of Commerce/National Bureau of Standards, and the Department of Transportation/Federal Railroad Administration, and been revised by the EPA in response thereto.

A comment period, with respect to the additional criteria in Subpart C only, if 30 days from the date of publication of this regulation will be provided for those who have suggestions or questions regarding their provisions. Information concerning the procedural details of such correspondence is provided in a later section of the Preamble, entitled Future Public Comment.

One commenter indicated that the C scale would be more appropriate for this regulation than the A scale.

It has been argued that the A-weighted sound level discriminates against low frequencies and, thus, should be replaced by the C-weighted sound level. However, the ear also discriminates against low frequencies so that at low frequencies the sound pressure level must be comparatively high before it can even be heard. Since the correlations between A-weighted sound level and human response are consistently better than that obtained with the C-weighted sound level, the EPA believes that the measurement procedures using the A scale on which these regulations are based are appropriate, and therefore, no change has been made.

Two commenters expressed concern over the 100 foot measuring distance and indicated that the specification of a 100 foot measuring distance in the standards is too far because such would require that too large an area be cleared for the necessary measurement site.

The Agency believes from the analyses used to develop the regulation and from its study associated with the development of additional measurement criteria that the 100 foot measuring distance does not appear to create significant problems with finding suitable sites for the measurement of the sound levels associated with any of the standards, and has

therefore not changed such distance.

The Department of Transportation requested more than 270 days to develop compliance regulations due to the complexity of the nature of railroad noise control and because existing experience and expertise in the field are so limited.

The Agency is aware of the problems associated with the regulation of railroad noise and is concerned that adequate time be provided so that comprehensive and effective compliance regulations may be developed. While it has taken upon itself the development of detailed measurement criteria which are being incorporated as part of the final regulation, the Agency recognizes the need of the DOT for adequate time to develop the compliance regulation. Therefore in direct response to the request of the DOT, the effective date of the Best Maintenance Practice Standards has been changed from 270 days to 365 days from the date of promulgation.

The Agency realizes that unforeseen difficulties may occur and it will therefore attempt to work closely with the DOT in the development of the compliance regulations so that appropriate measures may be taken should such difficulties arise.

(11) *Background document data.* Specific questions were raised which dealt with the accuracy of facts and data presented in the Background Document to the proposed regulation.

A major locomotive manufacturer questioned the validity of the 6 dB(A) conversion factor for changing measurements made at 50 feet to an equivalent 100 foot value, due to the length of the locomotive.

Agency analysis indicates that any slight inaccuracy which may exist in the use of the 6 dB(A) conversion factor for the conversion of locomotive noise levels measured at 50 feet to 100 foot levels, is in fact a conservative error which understates the actual noise level as it would be recorded by a physical measurement at 100 feet. Accordingly, some of those locomotives whose noise levels have been measured in this manner, may emit actual noise levels at 100 feet which are in fact slightly lower than those levels described by EPA data which was converted from 50 feet. Such locomotives may in fact require less quieting than is suggested by the 50 foot data, and as such may be more easily brought in compliance with the noise standards. The Agency emphasizes that any inaccuracy inherent in using the conversion factor is slight and has minimal effects upon the



data so converted.

This same commenter stated that page 5.3 of the Background Document claims that mufflers will provide 6 dB(A) reduction of all locomotive noise levels. They further indicated that a 6 dB(A) reduction is not always possible, and that 87 dB(A) at 100 feet would be a better statement than a 6 dB(A) reduction.

The above comment appears to be due to an incorrect interpretation of the Background Document. The standards being promulgated by the EPA require an absolute noise level of 87 dB(A), not a net reduction of 6 dB(A). Specifically, the Background Document states: "Based on the considerations of available empirical data, an overall noise reduction of 6 dB(A) for the noisiest locomotives seems reasonable. Accordingly, the application of exhaust mufflers can be expected to permit all locomotives to achieve the following levels: Idle—67 dB(A) (now 70 dB(A)); Overall Maximum 87 dB(A)."

This same commenter further indicated that based on the magnitude of the one-third octave band levels, the measurements on p. 4-13, Figure 4-2, appear to have been made at closer to five feet than 55 feet as specified when measuring the noise emissions of an EMD GP40-2 locomotive.

An investigation of Figure 4-2 in the Background Document does indicate that the recorded noise levels are inordinately high. These high readings are attributable to the increased projection of fan and casing radiated noise due to open engine access doors during the testing. However, the intent of this figure and its supporting discussion was not to quantify the absolute noise levels due to fan noise, but to demonstrate that fan noise is in fact an appreciable noise source. To quote from page 4-13 of the Background Document: "Since it was necessary to open the engine access doors during the measurements, the recorded levels are somewhat higher than would be generated under normal operating conditions. However, there is little doubt that cooling-fan operation can contribute significantly to overall levels." Although Figure 4-2 does not purport to accurately quantify cooling-fan noise levels under normal operating conditions, it does succeed in its primary purpose which is to demonstrate the relative significance of cooling-fan noise.

#### REVISION OF THE PROPOSED REGULATION PRIOR TO PROMULGATION

The Interstate Rail Carrier Noise Emission Regulation which is now be-

ing promulgated incorporates several changes from the proposed regulation which was published on July 3, 1974. These changes are based upon the public comments received and upon the continuing study of rail carrier noise by the Agency. In all but four instances, such changes are not substantial; they are only intended to further clarify the intent of the regulation.

The first substantive change is that the more stringent longer range locomotive noise emission standards for both stationary and moving conditions will now apply only to those locomotives newly manufactured, effective December 31, 1979. These changes are reflected in §§ 201.11 and 201.12 of this regulation. These sections as originally proposed required the entire fleet of locomotives now in use to be in compliance with lower noise levels four years after promulgation of the final regulation. Because of the requirement for further identification of the applicability of "available technology," specifically as it applies to mufflers, and the reasonableness of such costs attendant to the application of that technology, the retrofit requirement for the existing locomotive fleet has been deleted. The Agency is continuing to assess the evolution of muffler technologies which may be applied to locomotives without incurring the significant restructuring costs required to install current muffler designs. At such time that the Agency determines that such muffler technology is available at reasonable cost, relative to the health and welfare benefits to be accrued, regulations requiring the retrofit of existing locomotives may be proposed.

The second substantive change to the regulation involves modifying the proposed locomotive idle standard by increasing allowable noise emissions from the proposed 87 dB(A) to 70 dB(A) at 100 feet. This change was made in order to accommodate new data which demonstrated that certain locomotive models appear to be incapable of compliance with a 87 dB(A) standard through the application of muffler technology alone, due to the dominant influence of structurally radiated noise during idle operation. The Agency has not been able to identify available technology to solve this problem in locomotives.

The third substantive change to the regulation is that the effective date of the initial standards has been changed from 270 days to 365 days from the date of promulgation in response to requests from the DOT.

The final substantive change to the regulation is the incorporation of additional measurement criteria into the standards as a separate Subpart C of the regulation. The noise emission standards specified in the Agency's regulations must be fully and definitively specified so that there is no question as to the EPA standard being promulgated. Accordingly, measurement criteria containing these conditions and parameters necessary for the consistent and accurate measurement of the sound levels specified have been included in the regulation being promulgated herein.

Those changes made to clarify the intent of the regulations and the reasons therefore, are as follows:

**Section 201.1 Definitions.** The definition of "sound level" was changed slightly to be consistent with the definition of that term as used in the document, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," issued by the Environmental Protection Agency in March 1974.

"Fast meter response" has been expanded for clarity.

"Interstate commerce" has been modified to insure that any questions as to its scope would be resolved by reference of Section 203(a) of the Interstate Commerce Act, consistent with the reference to that Act in section 17(b) of the Noise Control Act.

"Person" has been deleted since the word is no longer used in subpart B of the regulation.

"Sound pressure level" has been deleted since the words are no longer used in Subpart B of the regulation.

"Special track work" has been added in order to clarify the meaning of the term as used in the final regulation.

"Locomotive" has been expanded to include self-propelled rail passenger vehicles.

"Special purpose equipment" has been added in order to clarify the meaning of the term as used in the final regulation.

"Retarder" has been deleted since the word is no longer used in Subpart B of the regulation.

"Self load" has been deleted since the term is no longer used in Subpart B of the regulation.

"Idle" has been expanded in order to clarify the meaning of the term as used in the regulation.

"dBA" has been modified slightly to specify the reference pressure of 20 micropascals.

**Section 201.10 Applicability.** This section has been modified slightly to exclude the application of § 201.11 (a) and (b) to gas turbine powered locomotives and to any locomotive type which cannot be connected by any standard method to a load cell, and to more clearly specify the exclusion of intraurban mass transit systems in terms consistent with the definition of "carrier" cited in the Act. In addition the wording in the section has been modified to more clearly include the application of the standards to refrigeration and air conditioning units on locomotives and rail cars. Finally, the express exclusion of the applicability of the standards to railroad yards, shops, rights-of-way, or any other railroad equipment or facility not specified in the regulation has been deleted as unnecessary.

**Section 201.11 and 201.12 Standards for locomotive operation under stationary and moving conditions, respectively.** In addition to the applicability and effective date changes previously described, the reference to measurement site surface has been deleted and replaced by language referencing the measurement criteria in Subpart C of the regulation. Also the phrase "or the equivalent thereof" in reference to a load cell has been deleted.

**Section 201.13 Standard for rail car operations.** Track curvature requirements for measurement sites identical to those specified in § 201.12 for locomotives were incorporated into this section in addition to identical language referencing the measurement criteria of Subpart C as used in §§ 201.12 and 201.11 for locomotive test sites. Also, the language in the section was modified slightly so as to include for regulatory purposes the total sound emitted by rail cars while in motion, and to restrict compliance measurements to track free of special track work or bridges or trestles. The change in the effective date previously described also applies to this section.

#### PREEMPTION

Though the Noise Control Act speaks of preemption in unequivocal terms, the various sources of railroad noise are subject to such complex interrelationships that it is not possible to identify all regulations a priori as either preempted or not preempted. It is necessary to examine the regulation in question, the sources it purports to control, the activities to which it relates, and the reasonableness of the various alternative means of complying. As to those regulations that are subject to preemption,

the preemptive effect may be waived under Section 17(c) (2) if the Administrator determines that the regulation is necessitated by special local conditions and is not in conflict with EPA regulations. It is anticipated that all such determinations as to not only special local conditions, but also the preempt status of State and local regulations impacting railroads would be handled by EPA. The Agency is currently preparing guidelines which will specify procedures to be followed by State and local governments where questions of the preemptive effect of Federal rail carrier noise regulations are at issue.

In view of the many comments received in response to the proposed regulation, the following discussion of preemption is intended to clarify the Agency's interpretation of the preemptive effect of the regulation here promulgated.

State and local governments can deal with railroad noise problems in several different ways. The first, the method adopted by EPA in this regulation, is to set emission standards on railroad equipment to reduce the noise produced at the source. Second, they can set noise emission standards on facilities where rail operations occur. A variation of this approach is the use of property line standards, where measurements are taken at the railroad property boundaries. Third, they can impose affirmative requirements on railroad equipment or facilities ("design" or "equipment" standards), such as the installation of mufflers on locomotives, the elimination of wheel flats on rail cars, or the construction of noise barriers along rights of way. A fourth possibility is to regulate, license, control or restrict the use, operation or movement of any equipment or facility, for example, prohibiting idling of locomotives on sidings within communities or prohibiting railroad yard operations between the hours of 10:00 p.m. and 6:00 a.m. Fifth, a State or community may set receiving land use standards for property which is impacted by railroad noise, for example requiring that noise levels at the property line of residential property not exceed 55 dB(A) Ldn. Each of these methods presents special problems which affect the determination of the preemptive relationship of the EPA railroad noise regulation.

*Noise emission standards on railroad equipment.* The Noise Control Act provides that after the effective date of the standards here promulgated for locomotives and rail cars, no State or local subdivision may adopt or enforce any

noise emission standard on locomotives or rail cars unless it is identical to the Federal standard. They may adopt and enforce noise emission standards on other pieces of equipment not covered by EPA regulations, such as retarders and railroad construction equipment. They may also adopt standards for locomotives and rail cars if such standards are identical to the EPA standards.

Determining the preemptive effect of a noise emission standard is, however, complicated by the fact that a standard for total noise emissions from the operation of a piece of equipment may not differentiate between the elements which contribute to the noise. Where this is the case, the Administrator believes that where any given element of noise is either, (1) generated by a source that is an integral part of the federally regulated equipment, or, (2) is a component of the total noise generated by the federally regulated equipment, when operated under the conditions specified, the regulation of that element by State and local governments is subject to preemption. Specifically, these elements include the noise from refrigerator units on refrigerator cars, auxiliary power units on locomotives, and the noise caused by the condition of track. The noise caused by retarders, however, is a separate source of noise which will not be present during compliance measurement for the rail car standard, and as such is not subject to preemption.

*Noise emission standards on railroad facilities.* State and local governments may enact noise emission standards for facilities which EPA has not regulated. However, in the judgment of EPA, the preemptive purpose of Section 17 of the Noise Control Act requires that such regulations not be permitted to do indirectly what is specifically preempted. That is, State and local governments may not control the noise emissions of locomotives and rail cars by setting noise emission limits on yards where the noise limit is, in effect, a limit on locomotive and rail car noise. Noise emission standards may be adopted and enforced on facilities where rail cars and locomotives do not operate. Where federally regulated equipment is a noise contributor in a facility on which a State or local government proposes to set a noise emission standard, such as a marshalling yard, such regulation may or may not be preempted. If the only way compliance could reasonably be achieved were to take actions the requirement of which is preempted by Federal regulations, then such standard is preempted. Questions

concerning situations where alternative non-preempted means of compliance are available, as well as questions such as the availability and reasonableness of alternate means of compliance, will be dealt with by EPA under procedures now being developed to guide States and localities in dealing with railroad noise in light of Federal preemption.

**Design or equipment standards.** The Noise Control Act does not deal explicitly with regulations which require the installation of noise abatement devices or the application of specified maintenance or repair procedures. EPA believes that this is another area where the preemptive purpose of section 17 requires that the effect of State or local regulations on Federally regulated equipment or facilities be analyzed. The intended result of section 17(c) is that, except in cases where EPA has made a special determination, State noise regulations on locomotives or rail cars will not require that interstate rail carriers modify these Federally regulated pieces of equipment. Accordingly, EPA believes that design or equipment standards on federally regulated equipment—viz, locomotive and rail cars—are preempted. Design or equipment standards on other pieces of equipment, such as retarders or cribbing machines, are not preempted. Similarly, design standards on facilities not federally regulated are not preempted, even though locomotives and rail cars may operate there, because they do not require the modification of locomotives or rail cars. An example of this type of regulation would be a local ordinance requiring that noise barriers be installed along the rights of way running through that community.

**Use, operation or movement controls.** A reduction in community noise impact can be achieved if the manner, time or frequency of use of a noise source is controlled. Clearly, such controls may be adopted and enforced with respect to equipment that EPA has not regulated. However, with respect to Federally regulated equipment (locomotives and rail cars), such controls may not be imposed unless the Administrator has determined that such State or local regulation is necessitated by special local conditions and that it is not in conflict with EPA regulations. A use restriction on railroad facilities may be subject to such determination also, if in order to comply the railroad must control the use, operation or movement of federally regulated equipment within that facility. The determinations called for will be made by EPA in accordance with procedures

which are now being developed.

**Receiving land use standards.** Receiving land use standards are to be distinguished from property line standards on the basis that property line standards focus on the identity of the noise source, such as railroad yards or rights of way, whereas receiving land use standards focus on the identity of the property receiving the sound, such as schools, hospitals or residential property. Obviously, a community is not preempted from enacting such standards simply because it has a railroad within its jurisdiction. However, it is possible that a standard which says, for example, that no school may be exposed to exterior noise levels in excess of 55 dB(A), may require modification of locomotives or rail cars in a community where schools are close to the right of way of a railroad. Whether, or to what extent, such regulations are preempted, will be determined by EPA in accordance with procedures which are being developed.

#### COMPLIANCE PROCEDURES

Compliance regulations are to be developed and promulgated under separate rulemaking by the Department of Transportation.

#### BACKGROUND DOCUMENT

"Background Document and Environmental Explanation for the Proposed Interstate Rail Carrier Noise Regulation" was prepared prior to publication of the proposed regulation. This document has been revised and new data have been added. This new Document is quite lengthy, and it would be impractical to publish it in its entirety in the FEDERAL REGISTER. Copies may be obtained from the EPA Public Information Center, PM 215, Room 2104D, Waterside Mall, 4th and M Streets S.W., Washington, D.C. 20460. To the extent possible, the significant aspects of the material have been presented in summary form in the foregoing preamble. The topics contained in the Document are the following:

1. Statutory basis and regulatory procedure;
2. Data base for the regulations;
3. Background of the railroad industry;
4. Sources of railroad noise and consideration for Federal regulation;
5. General procedure to measure railroad noise;
6. Economic effects of a retrofit program;
7. Summary of what the regulation requires;
8. Environmental effects of the final regulation;

9. Economic effects of the final regulation;

10. Index of public comment on the proposed regulation; and

11. Appendices.

#### FUTURE PUBLIC COMMENT

As mentioned in the foregoing Agency responses to public comments, additional study may be required in a number of areas. EPA will evaluate the impact of these regulations after they become effective through monitoring and other activities, including evaluation of DOT and State enforcement data.

If as a result of government studies, or as the result of developments by industry or other institutions, it becomes evident to the Agency that more advanced technology is available at some reasonable cost within a prescribed compliance period, or that problems exist which curtail the effectiveness of the regulation, prompt revision of the regulation will be initiated. Accordingly, comments and recommendations are solicited from all interested persons as to new or advanced technology and its projected cost, the effectiveness of the regulation, or on any other topic relevant to these regulations or revisions thereof. Prior to actual formulation of any revision to these regulations, notice of proposed rulemaking will be published so that there may be maximum contribution to the rulemaking developmental process by interested parties. Written data or views may be submitted to the Director, Standards and Regulations Division, the Office of Noise Abatement and Control (AW-571), U.S. Environmental Protection Agency, Washington, D.C. 20460.

In addition, as also referenced in the foregoing Agency responses to public comments, any person(s) having comments regarding the measurement criteria included in this final regulation may submit such comments to the Director, Standards and Regulations Division, the Office of Noise Abatement and Control, (AW-471), Docket No. ONAC 75-18, U.S. Environmental Protection Agency, Washington, D.C. 20460.

This regulation is promulgated under the authority of 42 U.S.C. 4916(a), 86 Stat. 1248.

Dated: December 31, 1975.

JOHN QUANLES,  
Acting Administrator.

Subpart A—General Provisions

Sec.  
201.1 Definitions.

#### Subpart B—Interstate Rail Carrier Operations Standards

- 201.10 Applicability.
- 201.11 Standard for locomotive operation under stationary condition.
- 201.12 Standard for locomotive operation under moving condition.
- 201.13 Standard for rail car operations.

#### Subpart C—Measurement Criteria

- 201.20 Applicability and purpose.
- 201.21 Quantities measured.
- 201.22 Measurement instrumentation.
- 201.23 Acoustical environment, weather conditions and background noise.
- 201.24 Procedures for the measurement of locomotive and rail car noise.

Authority: Noise Control Act of 1972, sec. 17(a), 86 Stat. 1248 (42 U.S.C. 4916(a)).

#### Subpart A—General Provisions

##### § 201.1 Definitions.

As used in this part, all terms not defined herein shall have the meaning given them in the Act:

(a) "Act" means the Noise Control Act of 1972 (Pub. L. 92-574, 86 Stat. 1234).

(b) "Carrier" means a common carrier by railroad, or partly by railroad and partly by water, within the continental United States, subject to the Interstate Commerce Act, as amended, excluding street, suburban, and interurban electric railways unless operated as a part of a general railroad system of transportation.

(c) "dB(A)" is an abbreviation meaning A-weighted sound level in decibels, reference: 20 micropascals.

(d) "Fast meter response" means that the "fast" response of the sound level meter shall be used. The fast dynamic response shall comply with the meter dynamic characteristics in paragraph 5.3 of the American National Standard Specification for Sound Level Meters, ANSI S1.4-1971. These publications are available from the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018.

(e) "Interstate Commerce" means the commerce between any place in a State and any place in another state, or between places in the same State through another State, whether such commerce moves wholly by rail or partly by rail and partly by motor vehicle, express, or water. This definition of "interstate commerce" for purposes of this regulation is similar to the definition of "interstate commerce" in section 203(a) of the Interstate Commerce Act (49 U.S.C. 303(a)).

(f) "Load Cell" means a device external to the locomotive, of high electrical

resistance, used in locomotive testing to simulate engine loading while the locomotive is stationary. (Electrical energy produced by the diesel generator is dissipated in the load cell resistors instead of the traction motors.)

(g) "Locomotive" means, for the purpose of this regulation, a self-propelled vehicle designed for and used on railroad tracks in the transport of rail cars, including self-propelled rail passenger vehicles.

(h) "Rail Car" means a non-self-propelled vehicle designed for and used on railroad tracks.

(i) "Railroad" means all the roads in use by any common carrier operating a railroad, whether owned or operated under a contract, agreement, or lease.

(j) "Idle" means that condition where all engines capable of providing motive power to the locomotive are set at the lowest operating throttle position; and where all auxiliary non-motive power engines are not operating.

(k) "Special Purpose Equipment" means maintenance of way equipment which may be located on or operated from rail cars including: Ballast cribbing machines, ballast regulators, conditioners and scarifiers, bolt machines, brush cutters, compactors, concrete mixers, cranes and derricks, earth boring machines, electric welding machines, grinders, grouters, pile drivers, rail heaters, rail layers, sandblasters, snow plows, spike drivers, sprayers and other types of such maintenance of way equipment.

(1) "Sound level" means the quality in decibels measured by a sound level meter satisfying the requirements of American National Standards Specification for Sound Level Meters S1.4-1971.

This publication is available from the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018.

(m) "Warning device" means sound emitting devices used to alert and warn people of the presence of railroad equipment.

(n) "Special track work" means track other than normal tie and ballast bolted or welded rail or containing devices such as retarders or switching mechanisms.

#### Subpart B—Interstate Rail Carrier Operations Standards

##### § 201.10 Applicability.

The provisions of this subpart apply to all rail cars and all locomotives, except steam locomotives, operated or controlled by carriers as defined in Subpart

A of this part, except that § 201.11 (a) and (b) do not apply to gas turbine-powered locomotives and to any locomotive type which cannot be connected by any standard method to a load cell. They apply to the total sound level emitted by rail cars and locomotives operated under the conditions specified, including the sound produced by refrigeration and air conditioning units which are an integral element of such equipment. These provisions do not apply to the sound emitted by a warning device, such as a horn, whistle or bell when operated for the purpose of safety. They do not apply to special purpose equipment which may be located on or operated from railcars; they do not apply to street, suburban or interurban electric railways unless operated as a part of a general railroad system of transportation.

##### § 201.11 Standard for locomotive operation under stationary condition.

(a) Commencing December 31, 1976, no carrier subject to this regulation shall operate any locomotive to which this regulation is applicable and of which manufacture is completed on or before December 31, 1970, which produces sound levels in excess of 93 dB(A) at any throttle setting except idle, and 73 dB(A) at idle, when operated singly, connected to a load cell, and when measured in accordance with the criteria specified in Subpart C of this part with fast meter response at 30 meters (100 feet) from the geometric center of the locomotive and perpendicular to the centerline of the track.

(b) No carrier subject to this regulation shall operate any locomotive to which this regulation is applicable and of which manufacture is completed after December 31, 1970, which produces sound levels in excess of 87 dB(A) at any throttle setting except idle, and 70 dB(A) at idle, when operated singly, connected to a load cell, and when measured in accordance with the criteria specified in Subpart C of this part with fast meter response at 30 meters (100 feet) from the geometric center of the locomotive and perpendicular to the centerline of the track.

##### § 201.12 Standard for locomotive operation under moving condition.

(a) Commencing December 31, 1976, no carrier subject to this regulation shall operate any locomotive or combination of locomotives to which this regulation is applicable and of which manufacture is completed on or before December 31, 1970, which produces sound levels in ex-

cess of 80 dB(A) when moving at any time or under any condition of grade, load, acceleration, or deceleration, when measured in accordance with the criteria specified in Subpart C of this regulation with fast meter response at 30 meters (100 feet) from the centerline of any section of track which exhibits less than a two (2) degree curve (or a radius of curvature greater than 873 meters (2,865 feet)).

(b) No carrier subject to this regulation shall operate any locomotive or combination of locomotives to which this regulation is applicable and of which manufacture is completed after December 31, 1976, which produce sound levels in excess of 80 dB(A) when moving at any time or under any condition of grade, load, acceleration, or deceleration, when measured in accordance with the criteria as specified in Subpart C of this part with fast meter response at 30 meters (100 feet) from the centerline of any section of track which exhibits less than a two (2) degree curve (or a radius of curvature greater than 873 meters (2,865 feet)).

**§ 201.13 Standard for rail car operations.**

Effective December 31, 1976, no carrier subject to this regulation shall operate any rail car or combination of rail cars which while in motion produce sound levels in excess of (1) 80 dB(A) at rail car speeds up to and including 72 km/hr (45 mph); or (2) 83 dB(A) at rail car speeds greater than 72 km/hr (45 mph); when measured in accordance with the criteria specified in Subpart C of this part with fast meter response at 30 meters (100 feet) from the centerline of any section of track which is free of special track work or bridges or trestles and which exhibits less than a two (2) degree curve (or a radius of curvature greater than 873 meters (2,865 feet)).

**Subpart C—Measurement Criteria**

**§ 201.20 Applicability and purpose.**

The following criteria are applicable to and contain the necessary parameters and procedures for the measurement of the noise emission levels prescribed in the standards of Subpart B of this part. These criteria are specified in order to further clarify and define such standards.

**§ 201.21 Quantities measured.**

The quantities to be measured under the test conditions described below, are the A-weighted sound levels for fast meter response as defined in the Ameri-

can National Standard S1.4-1971.

**§ 201.22 Measurement instrumentation.**

(a) A sound level meter or alternate sound level measurement system that meets, as a minimum, all the requirements of American National Standard S1.4-1971 for a Type II instrument shall be used with the "fast" meter response characteristic.

(b) In conducting the sound level measurements, the general requirements and procedures of American National Standard S1.13-1971 shall be followed. This publication is available from the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018.

(c) A microphone wind-screen recommended by the manufacturer of the sound level meter or microphone of an alternate sound level measurement system shall be used.

**§ 201.23 Acoustical environment, weather conditions and background noise.**

(a) The standard test site shall be such that the locomotive or train radiates sound into a free field over the ground plane. This condition may be considered fulfilled if the test site consists of an open space free of large, sound reflecting objects, such as barriers, hills, signboards, parked vehicles, locomotives or rail cars on adjacent tracks, bridges or buildings within the boundaries described by Figure 1, as well as conforms to the other requirements of this § 201.23.

(b) Within the complete test site, the top of at least one rail upon which the locomotive or train is located shall be visible (line of sight) from a position 4 feet above the ground at the microphone location, except as provided in paragraph (c) of this section.

(c) Ground cover such as vegetation, fenceposts, small trees, telephone poles, etc., shall be limited within the area in the test site between the vehicle under test and the measuring microphone such that 80 percent of the top of at least one rail along the entire test section of track be visible from a position 4 feet above the ground at the microphone location; except that no single obstruction shall account for more than 5 percent of the total allowable obstruction.

(d) The ground elevation at the microphone location shall be within plus 5 feet or minus 10 feet of the elevation of the top of the rail at the location in-line with the microphone.

(e) Within the test site, the track shall

exhibit less than a 2 degree curve or a radius of curvature greater than 2,865 feet (873 meters). This paragraph shall not apply during a stationary test. The track shall be tie and ballast, free of special track work and bridges or trestles.

(f) Measurements shall not be made during precipitation.

(g) The maximum A-weighted fast response sound level observed at the test site immediately before and after the test shall be at least 10 dB(A) below the level measured during the test. For the locomotive and rail car pass-by tests this requirement applies before and after the train containing the rolling stock to be tested has passed. This background sound level measurement shall include the contribution from the operation of the load cell, if any, including contribution during test.

(h) Noise measurements may only be made if the measured wind velocity is 12 mph (19.3 kph) or less. Gust wind measurements of up to 20 mph (32.3 kph) are allowed.

**§ 201.24 Procedures for the measurement of locomotive and rail car noise.**

(a) *Microphone positions.* (1) The microphone shall be located within the test site according to the specifications given in the test procedures of paragraphs (b), (c) and (d) of this section, and shall be positioned 4 feet above the ground. It shall be oriented with respect to the source in accordance with the manufacturer's recommendations.

(2) The observer shall not stand between the microphone and the source whose sound level is being measured.

(b) *Locomotive stationary test (load cell test).* (1) For stationary locomotive tests, the microphone shall be positioned on a line perpendicular to the track at a point 100 feet from the track centerline at the longitudinal midpoint of the locomotive.

(2) The sound level meter shall be observed for thirty seconds after the test throttle setting is established to assure operating stability. The maximum sound level observed during that time shall be utilized for compliance purposes.

(3) Measurement of locomotive noise shall be made with all cooling fans operating.

(c) *Rail car pass-by test.* (1) For rail car pass-by tests, the microphone shall be positioned on a line perpendicular to the track 100 feet from the track centerline.

(2) Rail car noise measurements shall be made when the locomotives have

passed a distance of 500 feet or 10 rail cars beyond the point at the intersection of the track and the line which extends perpendicularly from the track to the microphone location, providing any other locomotives are also at least 500 feet or 10 rail car lengths away from the measuring point. The maximum sound level observed in this manner which exceeds the noise levels specified in § 201.13 shall be utilized for compliance purposes.

(3) Measurements shall be taken on reasonably well maintained tracks.

(4) Noise levels shall not be recorded if brake squeal is present during the test measurement.

(d) *Locomotive pass-by test.* (1) For locomotive pass-by tests, the microphone shall be positioned on a line perpendicular to the track at a point 100 feet from the track center line.

(2) The noise level shall be measured as the locomotive approaches and passes by the microphone location. The maximum noise level observed during this period shall be utilized for compliance purposes.

(3) Measurements shall be taken on reasonably well maintained tracks.

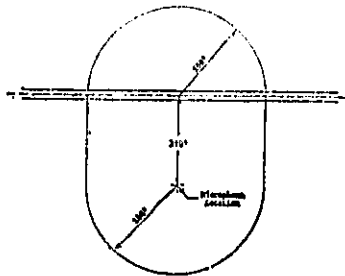


Figure 2. Test Site Diagram Subelement A-11  
Locomotive Stationary, Locomotive  
Pass-by, and Rail Car Pass-by Tests

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