UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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II-A-826

SUBJECT: Defining a Major Source of Noise

FROM: R. M. Marrazzo, Scientific Assistant
to the Deputy Assistant Administrator

TO: DAA and Senior Staff

The purpose of this memorandum is to respond to a rather important issue that has been brought to my attention in recent months. At times it has been professed within ONAC that we do not have a clear and absolute definition of what constitutes a "major source of noise," and that such a formal definition is mandated under Section 5(b)(1) of the Noise Control Act of 1972. It has further been asserted by some that the absence of such a definition has impeded program planning within ONAC, prevented sensible identification and prioritization of products for noise control, and has generally impeded noise control efforts allegedly because national objectives remain undefined.

The matter of defining a major source of noise had been previously addressed in early 1977 in the Federal Register 5(b)(1) identifications for lawnmowers, and pavement breakers and rock drills. From the scientific (health and welfare) perspective, without any regard whatsoever to costs, feasibility, practicality, or policy/political considerations, the definition of a major source of noise as published in the 5(b)(1) notices is transcribed below. Note that the definition consists of several criteria.

"An abbreviated summary of the levels of noise requisite to protect public health and welfare is given in Table 1.

TABLE 1.--Noise levels protective of health and welfare

(in decibels)

Human response	L_{eq}	L_{dn}
Hearing loss (8 h)----------	75--------	
Hearing loss (24 h)---------	70--------	
Outdoor interference and annoyance----		55
Indoor interference and annoyance-----		45

Ken- Just what you were looking for!

EPA FORM 1320-6 (REV. 3-76)

BASIS FOR THE IDENTIFICATION OF MAJOR NOISE SOURCES

"In determining whether a product (or class of products) is a major noise source for regulation under section 6 of the Act, the Administrator considers primarily the following factors:

1. The intensity, character and/or duration of the noise emitted by the product (or class of products) and the number of people impacted by the noise;

2. Whether the product, alone or in combination with other products, causes noise exposure in defined areas under various conditions, which exceed the levels requisite to protect the public health and welfare with an adequate margin of safety;

3. Whether the spectral content or temporal characteristics, or both, of the noise make it irritating or intrusive, even though the noise level may not otherwise be excessive;

4. Whether the noise emitted by the product causes intermittent single event exposure leading to annoyance or activity interference."

The most salient part of the definition of a major source of noise is the second factor above--to be so classified either a product or a system of products (i.e., surface transportation, airport/aircraft, construction, etc.) must emit noise at levels exceeding those identified by EPA as protective of public health and welfare. This, for most practical purposes, will cover almost all of the products with which we should be concerned. Thus, for example, considering surface transportation noise, heavy duty trucks, both alone and as part of an overall transportation system, produce community noise in excess of L_{dn} = 55 dB wich has been identified by EPA as protective of public health and welfare. While buses or motorcycles alone may not meet this identified criterion level, they are important components of an overall system that does exceed the criterion and, that being the case, impacts the public. Accordingly, these sources should be (and have been) identified as major sources of noise.

There may occur, however, a few instances where products may not meet the criterion of factor number 2 above, but may still be considered acoustically unacceptable from a public point of view. For example, recreational vehicles operated in pristine areas may not emit noise that exceeds identified levels, but may still be objectionable to those people unnecessarily

exposed to the noise. In cases such as these, factors 1, 3 and 4 as cited above apply. Thus, taking into consideration how many and who are impacted, the presence of certain characteristics which make the source particularly aversive or intrusive, or the degree of interference with human activities that can be expected, such products could be identified as major sources of noise. Admittedly, these criteria are less precise, and represent more of a judgmental call. We simply have not established degrees of intrusiveness or activity interference that are deemed absolutely unacceptable. Nor have we learned to mathematically rate intrusiveness or gauge the more "qualitative" characteristics of some noise sources. Some studies are underway at the present but more research is urgently needed in these areas. We have to draw whatever conclusions that our existing knowledge supports (for the most part that will be in a non-quantitative fashion) on an individual product basis in these special cases. We do, however, have some tools at our disposal in these cases to aid in determinations of major sources of noise. Such measures include complaint files, community survey data, information from community coalitions and action groups, and litigation histories. Again, most products of interest may be identified through factor number 2 above. In practice, the less clear cut cases should be few and far between.

Although the definition of a major source of noise discussed above is somewhat controversial, and disagreement from sectors outside EPA is inevitable, the definition is scientifically grounded on internationally approved criteria. It may be of some benefit at this point to explore further the role of "science" in the determination of acceptable risk from noise exposure. Restated, the question is how do we determine, in an absolute sense, how hazardous noise is? This type of question is a common enigma among all health and safety issues.

Science can measure risk (cause and effects relations) but not absolute community or individual acceptability. In some extreme cases, such as with noise, science can identify thresholds below which risk will be minimized. For example, we may say that "no one in the population shall be exposed above X dB." Accordingly, the criteria offered as to what constitutes a major source of noise states that no individual shall be exposed at levels exceeding those identified as protective. This definition is only oriented toward health-benefits, that is, free from constraints of costs, practicality, feasibility, or political considerations. If we wish to take account of these latter factors, then our definition will be formulated as "only Y% of the population may be exposed above X' dB" (where $X' > X$). Under such a definition, the determination of acceptability is a matter of personal or social values (policy) as opposed to an objective and exact pursuit. The Science Advisor cannot make such determinations alone. Because these judgments or determinations are more than scientific--political as well--we can approach the issues only through a concerted effort involving all of ONAC. The social decisions that we must eventually address--either directly or indirectly, a priori or after-the-fact--include how much should we pay for the benefits achieved, and if we should make the required commitment of resources. These are relative and judgmental considerations.

We should further realize that the definition of a major source of noise embraces an implicit inference of a threshold of effect. If there does in fact exist a threshold effect, the problem of determining safe doses or exposures is greatly simplified. Ideally, a threshold of effect is a point below which there is no or only minimal risk of adverse effects occurring upon exposure. Unfortunately, there is quite a bit of uncertainty regarding the threshold of noise effects. People's thresholds vary. Even at the levels which EPA has identified we are not absolutely free from risk. Establishing acoustic related threshold values for society has not been as yet precisley resolved.

Another concern is that the definition of a major source of noise may be misconstrued by some as an EPA regulatory goal (i.e., a misconception that all sources will be reduced to the levels identified). It is important that the concept of a major source of noise be presented to the public in a manner that does not erroneously imply that products will necessarily be regulated in the short term to levels identified by EPA. The purpose of the definition is to simply identify products or classes of products for further study.

It is the opinion of my staff that with the definition of a major source of noise as provided in this memorandum, we can in the interim proceed with all program planning and continue a prioritization of products or systems for noise control. We can easily begin to prioritize products, at least within classes, using the health and welfare models that we have on hand within ONAC (i.e., surface transportation model, construction site model, aircraft/airport model, and consumer products model). Unfortunately, we are not at the point yet where we are able to prioritize across product classes or systems. However, because we are continually acquiring an understanding of the effects of noise on people, we must expect to periodically re-prioritize and update our current strategies and plans. We can only start to improve on the environment from what we know today. Our questions and approaches will have to be formulated as our general knowledge of noise and its effects progresses.

In regard to strategies and plans, the Plans and Programs Staff have been provided health risk/benefit advice by my staff in developing the "sub-strategies" which are so desperately needed in ONAC to signal "where we are going" and what it will require to get there. The "sub-strategies" should not focus on health benefits alone but must put into perspective the social, political, technological, and economic factors necessary for generating goals, strategies and implementation plans for ONAC.

In summary, it is our responsibility to assure a quiet and acceptable environment for the American public. A definition of a major source of noise has been offered which will go as far as our knowledge and experience will allow. We should have no hesitation whatsoever to strongly encourage the control of noise from products or classes of products that meet the criteria of a major source in order to assure a livable environment for most Americans. We must now determine the most effective means by which to achieve the necessary noise reduction.