

Mr. Brian K. Grimes  
Assistant Director for Systems Engineering  
Office of Nuclear Reactor Regulations  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Grimes:

During the past few weeks a number of questions have been raised by the public regarding the interpretation of Appendix 3 of NUREG-0654/FEMA-REP-1 and its accompanying exhibit. These questions address the matter of siren system design as part of the means for providing a prompt notification to the population.

To begin, I believe that the basic objective of Appendix 3 is guidance on notification, not the setting of detailed system design criteria. As stated in the Exhibit, "Sirens are one of the acceptable means to satisfy the provisions for the prompt notification of the public." For this reason the benefit/cost of optional methods is up to the utility operator to determine providing basic objective is assured as verified by appropriate documentation.

As to the numerical values in the Exhibit used as illustrative guidance, there is a possibility of some misinterpretation if they are used without reference to the real-life context of the application. FEMA continues to believe that the acceptable design objective of a siren system for an application around commercial nuclear power stations is as stated in NUREG-0654/FEMA-REP-1, "That 10db above average daytime ambient background should be the target level for the design of an adequate siren system," as measured by the EPA method cited in CPG-1-17 (based on Bolt, Beranek and Newman, Inc. Report 4100 dated June 1979). In using this criterion, the following facts need to be kept in mind.

- 1) The 10db dissonant differential is a conservative use of the 9db differential which is discussed in FEMA document CPR-1-17. Research has shown that a person is capable of being alerted by such a differential above or below the background ambient in the case of a predominately narrow band 300 to 800 Hz emanated by large sirens. The achievement of a positive differential of 10 db has been a basic objective (although not always obtained) of a wide range civil defense systems.
- 2) In considering siren applications for nuclear power stations, the actual population density must be considered. The average population density around such stations is well below 2000 persons/mile. Therefore

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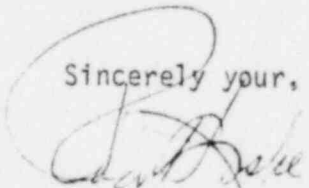
any use of weighed criteria such as Figure 1 of the cited referen is improper because of two reasons. First the actual population density is predominately low; and second, any limited areas of higher population are already covered by Civil Defense siren sytems which may be courted as part of the regional system around the nuclear facility.

- 3) It is true that 10db differential above average daytime ambient could lead to overdesign, if mechanistically applied to high population, urban areas, or even to dense suburban business areas. Since these areas are already included in siren systems or are outside of the 10 mile planning zones for nuclear stations, it was not the intent of the criterion to relate the entire system design to such areas. In any event, urban areas require special consideration of alternatives using field measurements of actual backgrounds rather than tabular values.

Therefore FEMA urges caution in the use of numerical criteria in CPG-1-17 for use in reactor power station applications. This FEMA document provides a basis for warning systems in densely populated areas averaging higher than 2000 persons/mi<sup>2</sup> and is cited principally for its research background. NUREG-0654/FEMA-REP-1 makes one reference on page 3-2 of Appendix 3 to 60db signal level from sirens. This was an illustrative reference and is not a criterion for acceptance. Those organizations applying the criteria should document the basis for their selection of appropriate values.

The principal objective of Appendix 3 remains as stated in the heading "Means for Providing a Prompt Notification to the Population." NRC's licensees are urged to cooperate with State and local governments in the use of cost effective combinations of systems, including those already in place, as a means of satisfying this objective.

Sincerely your,



Robert T. Jaske  
Radiological Emergency  
Preparedness Division