UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket Nos. 50-443 OL
PUBLIC SERVICE COMPANY OF	)	50-444 OL
NEW HAMPSHIRE, et al.	)	Off-site Emergency Planning
	)	
(Seabrook Station, Units 1 and 2)	)	

TESTIMONY OF THOMAS J. McKENNA
CONCERNING NUREG-1210

Q1. Please state your name and by whom you are employed.

A1. My name is Thomas J. McKenna. I am the Section Leader of the Program Section of the Incident Response Branch, Division of Operational Assessment, Office for Analysis and Evaluation of Operational Data, U. S. Nuclear Regulatory Commission.

Q2. Please describe your current responsibilities.

A2. I have responsibility for the development and implementation of procedures to be utilized by NRC personnel who respond to severe reactor accidents in assessing the adequacy of protective action recommendations for the public. This includes the development of training materials, the development of technical tools and procedures, and providing training to a wide range of individuals and groups including the Commissioners of the Nuclear Regulatory Commission. In addition, I am responsible for the development of a standardized response training program to include training on severe accident assessment, response management, and coordination with other Federal agencies. I also manage the development

and implementation of the procedures for activation of the NRC response organization, the program to assure a consistent and adequate regional response program, and the exchange of response information within and outside the United States. I am also responsible for coordinating NRC Headquarters participation in emergency drills and exercises.

Q3. Are you familiar with a 5-volume document entitled "Pilot Program: NRC Severe Reactor Accident Incident Response Training Manual", NUREG-1210 (February 1987)?

A3. Yes. NUREG-1210 is a training manual, which essentially consists of a compilation of material that was developed for use in training NRC incident response personnel.

Q4. Please describe your past and present responsibilities with respect to the formulation and use of NUREG-1210.

A4. NUREG-1210 compiles the training material that was developed and presented by me and other NRC personnel in my section over the past few years. I served as project manager for the development of this document, and was one of its principal authors. NUREG-1210 refects our best understanding of severe reactor accidents as they relate to the NRC's responsibilities for protecting the public health and safety in the event that such an accident should occur. I have used or have supervised the use of this document in presenting numerous courses to a wide range of students. I have presented this material to the current and previous NRC Chairman, each of the other Commissioners, the NRC Regional

Administrators, Senior NRC Management, members of the NRC staff, other Federal agencies, as well as numerous State and local officals around the country. These manuals have also been the basis for NRC presentations and course material distributed at various FEMA courses on reactor accident assessment.

Q5. Please describe the basic philosophy of NUREG-1210.

A5. The basic premise inherent in NUREG-1210 is that in the unlikely event of a severe-core damaging event or conditions that predict such an event, uncertainies remain as to whether a release will occur, the size of any such release, the source term, the duration of the release, or its consequences. NUREG-1210 considers these uncertainties, and recognizes that sheltering in most structures close to a nuclear plant (i.e., within 2-3 miles), where plume concentration and dose consequences are likely to be highest, will not be effective in preventing early health effects given a major release. Accordingly, NUREG-1210 concludes that generally it is better to evacuate near the plant promptly rather than wait for such additional information which may become available upon the occurrence of a release. In general, early evacuation of the areas near a plant, commenced on the basis of in-plant information, provides the best assurance that early health effects will be prevented or minimized in the event of a severe reactor accident.

Q6. Please explain the following statement which appears on page 19 of NUREG-1210, Volume 4: "At most U.S. nuclear reactor sites, fewer than 300 people live within the first 2 to 3 miles around the plant."

A6. The basic, simple protective action scheme of evacuation close-in to a reactor in the event of a severe accident, was intended for use at all sites, including sites with high population density. From experience, however, the authors recognized that many emergency responders might have difficulty accepting a recommendation that there be a precautionary evacuation, before it is known whether a release will occur, even in the event of a severe-core damaging event. For this reason, the authors included this statement in NUREG-1210, to indicate that at most sites in the U.S. it should not be difficult to implement a precautionary evacuation. However, the statement was not intended to limit the basic protective action concepts in NUREG-1210 to only those sites which have a low population density in areas close to the plant. We attempted to make this clear by inserting the statement which follows this, at page 19 of volume 4: "It must always be remembered, though, that (1) for all sites, early evacuation of nearby areas would be most beneficial and (2) for the most severe accidents, early evacuation would be the only protective action available to achieve basic radiation protection objectives near the plant" (emphasis in original).

Q7. Please explain the statements which appear on pages 19-20 of NUREG-1210, Volume 4, as follows:

> Early sheltering appears to be an appropriate protective action measure . . .

> 3. if severe entrapment problems are likely to occur if an evacuation is attempted, . . . or
>
> 5. where a large population density makes entrapment outside very likely.

A7. Unfortunately, these statements have caused some confusion due to a lack of clarity in the authors' intent. For a proper interpretation of these statements, it is important to put them in context. In Section 3.1, we attempted to make it clear that evacuation of the area close to the plant was the appropriate predetermined protective action for severe accidents, with one exception as stated at the top of page 19: "The only exception to this, as stated previously, is under severe entrapment conditions (e.g., a snow or ice storm because a car is not as good a shelter as a house)." Item 3, quoted here in Question 7, refers to conditions where it is not practical to move the people who are close to the plant. Here, we were attempting to remind the NRC response personnel that there may be "rare" conditions that prevent evacuation. However, as stated on page 19, "for the most severe accidents, early evacuation would be the only protective action available to achieve basic radiation protection objectives near the plant."

The reference to "a large population density" which "makes entrapment outside very likely," was intended to apply to the entire plume exposure pathway EPZ and not just the areas near a plant. The authors of this statement had in mind large cities beyond 2-3 miles from the plant with substantial buildings made of steel and concrete which would afford

relatively good sheltering. The authors' inclusion of this statement was only intended to indicate that for such areas, the combination of a large population density and the availability of good shelters might warrant a recommendation of early sheltering instead of early evacuation.

Finally, NUREG-1210 indicates that emergency responders should take such factors as high population density into consideration in recommending a protective action. For instance, where areas close to a plant are characterized by a high population density, it may be important to postpone evacuation of persons located further away from the plant in order to permit as prompt an evacuation as possible for persons at greater risk, close-in to the plant. For this reason, NUREG-1210 states "[t]he emergency planner (and responder) must recognize that evacuation would be more difficult at these latter (high population density) sites, and contingency plans must be prepared and decisions made accordingly in the planning process. It must always be remembered, though, that (1) for all sites, early evacuation of nearby areas would be most beneficial and (2) for the most severe accidents, early evacuation would be the only protective action available to achieve basic radiation protection objectives near the plant.

QE. Assuming that a site was characterized by high population density within 2-3 miles from a nuclear plant, with a potential for evacuation traffic congestion lasting many hours, would that constitute "entrapment" within the meaning of NUREG-1210?

A8. An argument can be made that the term "entrapment" embraces such a situation, although the authors of NUREG-1210 did not and do not consider that this type of situation warrants a departure from the basic philosophy that close-in areas should be evacuated early based upon in-plant conditions. In essence, only where an evacuation is impossible for as long as 12 - 24 hours (such as in a severe snow or ice storm, bridge outage, etc.), should shelter be considered as an alternative to evacuation for areas close to the plant. However, it should be noted that for very severe accidents, shelter is unlikely to prevent early health effects and, as pointed out on page 18 of volume 4, in those situations it is more important that "emergency personnel should monitor for ground contamination following a release, if any, and motivate people to leave any areas found to contain large amounts of contamination (i.e., hot spots)."

Finally, it should be recognized that planning which relies on sheltering as the protective action for populations close to a plant (i.e., 2-3 miles), would cause any evacuation of those persons to be delayed even for those accidents where an evacuation could be completed before a release. The fundamental problem with such an approach is that at the time an accident is first detected (based on plant conditions), it will be very difficult to predict whether or when a release will take place or to characterize correctly the characteristics of the release. Due to the large uncertainties which will exist during a core melt accident as to accident progression and the likelihood, nature and duration of a potential release, it is important that once severe accident

conditions are detected in the plant (e.g., core damage), action should be taken immediately to prevent or reduce early health effects; close to the plant, this warrants an evacuation.