

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
LONG ISLAND LIGHTING COMPANY)	Docket No. 50-322-OL-3
)	(Emergency Planning)
(Shoreham Nuclear Power Station,)	(Evacuation Time Estimates)
Unit 1))	

TESTIMONY OF DR. THOMAS URBANIK, II

Q.1 State your name, occupation, and address.

A.1 My name is Thomas Urbanik, II. I am a research engineer with the Texas Transportation Institute, at Texas A & M University, College Station, Texas. A copy of my professional qualifications was previously submitted as an attachment to my direct written testimony filed on April 13, 1987 in the reception center hearings.

Q.2 Briefly summarize your experience with emergency planning for nuclear facilities.

A.2 I was principal author of NUREG/CR-1745, "Analysis of Techniques for Estimating Evacuation Times for Emergency Planning Zones" (November 1980), which described the limitations of several methodologies and some alternatives for determining evacuation time estimates. Also, I provided input to the development of the current guidance for evacuation time estimate studies which appears in Appendix 4 to NUREG-0654, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans for Preparedness in Support of

Nuclear Power Plants" (NUREG-0654/FEMA-REP-1, Rev. 1, November 1980). In addition, I reviewed for the NRC the initial evacuation time estimate submittals of approximately 52 operating and near term nuclear facilities against the guidance of NUREG-0654/FEMA-REP-1, Revision 0, the results of which are published in NUREG/CR-1856. I am a coauthor of the CLEAR computer model which is published in NUREG/CR-2054. I also was a coauthor of an independent assessment of the Seabrook Nuclear Power Station Evacuation Times which is published in NUREG/CR-2903. I have appeared on behalf of the NRC Staff at a number of licensing hearings including Shoreham concerning evacuation time estimates.

Q.3 What is the purpose of this testimony?

A.3 The purpose of my testimony is to address the issue of the bases and accuracy of the hospital evacuation time estimates contained in Revision 9 to the LILCO emergency plan.

Q.4 When did you first become involved with reviewing hospital evacuation time estimates for the Shoreham Plant?

A.4 If we go all the way back to the original time estimate studies, hospital evacuation has been a continuing part of the evacuation time estimate process review. More recently, however, my involvement has been in the last three months.

Q.5 Do the hospital evacuation time estimates before the Licensing Board concern the St. Charles Hospital, the John T. Mather Hospital, and Central Suffolk Hospital on Long Island?

A.5 Yes.

Q.6 Is it your understanding that those hospitals are in or near the ten mile EPZ for the Shoreham nuclear power plant?

A.6 They are all very close to the EPZ boundary.

Q.7 Would you define what you mean when you talk about evacuation time estimates, or ETEs, for these hospitals?

A.7 ETEs for hospitals are, in a sense, a part of the overall evacuation time estimate process. But on the other hand, I would say it is at times confusing to some that, in fact, the estimates are largely separate from the issue of the general population evacuation times.

The guidance of NUREG-0654 anticipated the fact that hospitals and other special facilities were fundamentally different than the general population, and that the time to handle these facilities would in all likelihood be different. So the guidance essentially suggests that one has to go through a process of identifying those facilities and the resources and the time that would be involved in doing that evacuation.

In reality, the importance of hospital evacuation is the issue of, "Will it take us longer to evacuate hospitals?" This would be likely where there are long mobilization times, or perhaps inadequate resources to evacuate hospitals. When resources are constrained, one has to make some additional calculations based on fact whether multiple trips would be involved in order to evacuate the hospital. It is essentially a part of the bigger ETE process, but on the other hand it is done quite a bit different than ETEs for the general population.

Q.8 Have you done a review of the LILCO hospital evacuation time estimates in Revision 9, pages IV-172 to IV-187 of Appendix A to the LILCO Emergency Plan?

A.8 Yes. A review in the sense of reviewing the methodology, assumptions and the like. I have not done a review in the sense of making my own independent study of the times.

Q.9 Please describe your review.

A.9 Essentially, I looked at all of the components, and how the analysts laid out their approach to coming up with the time.

To do this requires, more importantly than anything else, a number of assumptions. Unfortunately, we don't have the answers to all of the questions, so we have to begin to assume some things, and one has to make a number of judgments as to whether one could essentially agree to the reasonableness of those assumptions. Then you have to make some judgment in terms of whether or not the overall numbers appear consistent with the methodology that was used. If the estimates appear unreasonable, then you would have to begin probing further to see whether or not some error was made in the process. In this case, I did review the estimates, but I did not feel that there was a need to independently verify all of the calculations as the estimates appear reasonable.

Q.10 Is the reasonableness of evacuation time estimates something you develop a knowledge about over the course of your professional career from experience?

A.10 Yes. I have seen just about all of them that have been done for nuclear power plants.

Q.11 Have you also seen the evacuation time estimates for special facilities for just about every emergency plan for a nuclear plant in this country?

A.11 Yes. I have been actively involved now for approaching nine years in looking at evacuation time estimate studies, and that involves both the general population and the special facility population. So I have seen most of them.

Q.12 Are special facility population ETEs typically treated separately in nuclear emergency plans in this country?

A.12 Yes. They are arrived at in a process that is essentially separate but compatible with the general population ETEs.

Q.13 What are the source of uncertainties in calculations like these?

A.13 Virtually every number that goes into this process has in a sense a probability distribution associated with it. At the beginning of the process, the actual numbers of people that are likely to be in any given hospital, and their characteristics, are going to be highly variable.

Then we have the estimate of the speeds on the roadways that are involved, and we cannot estimate those speeds with any certainty. The evacuation process takes a long period of time, and each one of the individual hospital evacuations is only taking place in a small component of that longer time frame, so we have a reasonable estimate of the overall

speed of the evacuation, but we don't know at any given time what those speeds would be with any degree of certainty. The purpose of this process is not so much the estimate, but identifying the resources, who requires transportation and where to take them.

And that is really what the estimate is all about. It is identifying who to evacuate, and where to take them, and come up with the best number that we can of how long it would take to do that. There is a number that we feel is our best estimate under all the assumed conditions, but there is no way that one would say that on any given day that that would be the time that it would take to do the job.

Q.14 Are the assumptions LILCO's analysts used in calculating the ETEs for hospitals included in the hospital evacuation time study?

A.14 Yes.

Q.15 Given the information in Rev. 9, which consists of such things as assumptions about how long it takes to load the vehicles, locations of the starting point and the ending point, and travel speeds, could you replicate these evacuation times given enough time?

A.15 Yes.

Q.16 Are LILCO's hospital ETE's calculated in accordance with the guidance provided in Appendix 4 of NUREC-0654?

A.16 Yes.