

DATE: February 1, 1988

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSIONBefore the Atomic Safety and Licensing Board

In the Matter of  
LONG ISLAND LIGHTING COMPANY  
(Shoreham Nuclear Power Station,  
Unit 1)

Docket No. 50-322-OL-3  
(Emergency Planning)AFFIDAVIT OF DAVID T. HARTGEN, Ph.D., P.E.  
CONCERNING IMMATERIALITYSTATE OF NEW YORK;  
COUNTY OF ALBANY ) SS:David T. Hartgen, Ph.D., P.E., being duly sworn, hereby  
states as follows:

1. I am currently employed as a Principal Transportation Analyst for the New York State Department of Transportation. In that job, I have developed extensive experience with traffic planning matters, including traffic time estimates and the data and methods for computing such estimates in an accurate manner. A statement of my qualifications can be found in the OL-3 record as an attachment to New York State Exhibit 5 to the 1987 reception centers proceeding.

2. I am familiar with the evidence and testimony in the record concerning evacuation time estimates. My familiarity with

the Shoreham licensing proceeding is based on my participation as an expert witness in the 1984 emergency planning hearings and the 1987 reception center hearings. I have previously been found to be an expert qualified to testify on matters related to evacuation time estimates.

3. I also am familiar with LILCO's Motion for Summary Disposition of Contentions 1, 2, and 9 - Immateriality (December 18, 1987) (hereafter "LILCO's Motion"). LILCO's Motion claims that it is immaterial whether LILCO has traffic control capabilities because evacuation time estimates allege that there is just a 35-minute difference between a "controlled" and an "uncontrolled" evacuation.

4. A sound analysis of the evacuation time estimates discussed in LILCO's Motion and Mr. Lieberman's affidavit would require, at a minimum, the following information:

- a. The computer inputs and outputs from which the revised evacuation time estimates were derived;
- b. Information on why LILCO's time estimates have become more sensitive to non-compliance;
- c. Information clarifying the apparent contradiction between OPIP 3.6.1. at 2 and LILCO's Motion at 13-14 concerning whether evacuation time estimates are sensitive to roadway accidents;
- d. Information on the criteria used to select additional roads for addition to the network in Zone Q;

- e. Information on the assumed capacities of these roads;
- f. Information on where these roads now tie into the original network, and to the additional centroids;
- g. Information on the assumptions made and data used to create additional centroids in Zone Q;
- h. Information on the basis for why 1310 additional cars, as opposed to a different number, were added to the network in Zone Q;
- i. Information on why other Zones were not provided with additional origin centroids;
- j. Information on why the network was not detailed in Zones other than Q;
- k. Information on how the traffic leaving Zone Q was assigned to the additional origin centroids;
- l. Information on how changes made to Zone Q could affect traffic in Zone F;
- m. Information on exactly what changes were made to Zone F's traffic; and
- n. Information on how "spill-over" of traffic into Zone Q was accounted for.

5. Without such information, it is not possible to determine what factors brought about the reduction in uncontrolled evacuation times, whether that reduction is based on valid methodology, how the assumption about the number of Zone Q automobiles traveling on the revised route were derived, how traffic in Zone F was reassigned, why Zones Q and F were singled out for special treatment, and why the estimates are now sensitive to non-compliance.

6. Mr. Lieberman states in paragraph 7 of his affidavit that, "[T]he difference in evacuation time estimates from the presence of Traffic Guides ... is now 35 minutes instead of the prior 95 minutes." However, review of the table in paragraph 7 of his affidavit shows that for 50% non-compliance, the difference is 60 minutes, not 35. Further, the difference in evacuation times for the 0% non-compliance, controlled scenario and the 50% non-compliance, uncontrolled scenario is 80 minutes, not 35. See the following table, which is a combination of the two tables presented in Mr. Lieberman's affidavit.

Comparison of Evacuation Time Estimates

Percent Non-Compliance	Controlled/ Uncontrolled	Evac. Times Bay. 3	Evac. Times Bay. 5	Difference in Evac. Times (Minutes)
1. 0%	Controlled	4:55	5:05	+ 10
	(Difference)	(95)	(35)	
2. 0%	Uncontrolled	6:30	5:40	- 40
3. 25%	Controlled	4:55	5:25	+ 30
	(Difference)	(95)	(35)	
4. 25%	Uncontrolled	6:30	6:00	- 30
5. 50%	Controlled	5:30	5:25	- 5
	(Difference)	(60)	(60)	
6. 50%	Uncontrolled	6:30	6:25	- 5
Difference between scenario 1 and 6:		(95)	(80)	

The differences made evident by the above table cannot be assessed adequately until the information identified above, at a minimum, is provided.

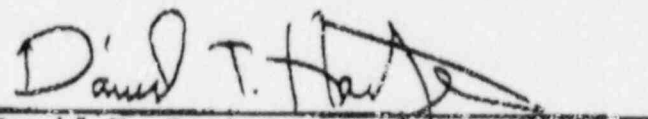
7. As another example, the discussion on page 3 of Mr. Lieberman's affidavit indicates that an additional 1,310 vehicles are added to the augmented network. This is an increase of only about 2% of the 58,000 vehicles in the EPZ, yet this slight increase in traffic causes a reduction in evacuation time of 40 minutes, or about 10%, for the uncontrolled, 0% non-compliance scenario (5:40 vs. 6:30). See the above comparison table. These results appear to be counterintuitive, since normally, an increase in traffic would increase congestion and therefore increase evacuation time. Here, an increase in traffic results in a reduction in evacuation time. Without information on zone partitioning and other changes made to the network, it is not possible to assess LILCO's evacuation time estimates.

8. On page 13 of LILCO's Motion, LILCO states "Since the 35-minute difference between the evacuation time estimates for controlled and uncontrolled evacuations is of essentially the same magnitude as the uncertainty of the controlled evacuation time estimate standing alone, it follows that the provision of traffic guides and special traffic control treatments is not a material element for the emergency plan at Shoreham and does not have a significant effect on time reduction." This statement appears to assume that error ranges in model outputs necessarily set the lower limits on the differences between model results. Such an assumption, however, would be incorrect. It is a common practice in transportation modeling to vary the inputs and


compare the differences in outputs, even when those differences in outputs are much smaller than the error range of the model itself. Comparison of differences is possible despite the fact that they fall within the range of error.

9. Until additional information, including at a minimum, that described above, is provided, it is not possible to assess the evacuation time estimates discussed in LILCO's Motion and Mr. Lieberman's affidavit.

10. The above facts are true and accurate to the best of my knowledge and belief. I am competent to testify to such facts and would so testify in any formal proceeding on this matter.

  
David T. Hartgen, Ph.D., P.E.

Sworn to and subscribed before me this 1st day of February, 1988.

  
Notary Public

RICHARD J. ZAHNLEUTER  
Notary Public, State of New York  
Qualified in Albany County Saratoga County  
No. 4766948  
Commission Expires March 30, 1991  
N.Y. 30 1988