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LILCO, April 18, 1987

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, Unit 1)	)	
	)	

LILCO'S MOTION TO STRIKE
TESTIMONY OF STEPHEN COLE, ET AL.

LILCO hereby moves to strike the following portions of the written "Testimony of Stephen Cole, Susan C. Saegert, James H. Johnson, Jr., David Harris, Martin Mayer, Gregory C. Minor and Steven C. Sholly," dated April 13, 1987 (hereinafter "CSJHMMS").

The basis for striking most of this testimony is that it is outside the admitted issues in this proceeding. It is outside the admitted issues because it addresses issues that have already been litigated before, in the original emergency planning hearings in 1983-84. Moreover, it is duplicative of testimony filed in the exercise proceeding (50-322-OL-5) that is now in progress.

Most of the Suffolk County testimony that LILCO seeks to strike is related to the so-called "shadow phenomenon." What we are calling the "shadow phenomenon" issue here is basically the hypothesis that people will not follow emergency advisories (EBS messages, principally). The two reasons why people will not follow advisories, Intervenors claim, are pre-existing fear of radiation and low "credibility" of the message-giver. A related behavioral issue is that people will allegedly experience anxiety and exhibit aggressive behavior.

The "shadow phenomenon" is a generic issue (indeed it is an issue at all only because of what happened at Three Mile Island, not at Shoreham), and it has been litigated many times, both in other proceedings and in this one.

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I. THE "SHADOW PHENOMENON" IS A GENERIC ISSUE

In the first place, the so-called "shadow phenomenon" (overreaction) is not something that is peculiar to nuclear emergencies, as the record in this proceeding shows. Cordaro et al., ff. Tr. 1470, at 17-18. In any kind of emergency (for example, floods or hurricanes) some people may evacuate without being told to (and some people may stay put when told to leave).

In the second place, this so-called "phenomenon," treated as a "phenomenon," is in a sense a fabrication. See Tr. 1996-99 (Dynes). The "phenomenon" is people evacuating outside the area in which they were instructed to evacuate. For the Three Mile Island accident, the "shadow" has been defined to exist outside a five- or ten-mile zone, the zones in which protective actions were recommended by the governor. But at the time of the Three Mile Island accident, public officials were publicly discussing a number of such "zones." Some people were discussing five miles, some ten miles, and some twenty miles.[1/]

In the third place, this so-called "phenomenon" has been litigated in several proceedings, including the Three Mile Island proceeding, which is, if anything, the most appropriate place. See Louisiana Power & Light Co. (Waterford Steam Elec. Station, Unit 3), LBP-82-100, 16 NRC 1550, 1562 (1982); Pacific Gas & Elec. Co. (Diablo Canyon Nuclear Power Plant, Units 1 & 2), LBP-82-70, 16 NRC 756, 778-80 (1982)[2/]; Metropolitan

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1/ At 12:30 p.m. on March 30, 1979, the governor of Pennsylvania advised pregnant women and preschool children within a five-mile radius to leave the area. At 2:45 p.m. on March 31 NRC Chairman Hendrie held a press conference in Bethesda in which he disclosed the possibility of evacuation up to 20 miles out. Staff Report to the President's Commission on the Accident at Three Mile Island (Kemeny Commission), Report of the Public's Right to Information Task Force 26, 27 (Oct. 1979).

2/ After hearing Suffolk County's witnesses Johnson and Erikson, the Diablo Canyon Board was "not convinced that a social survey would offer useful improvement in public information planning . . . ." LBP-82-70, 16 NRC at 778, 823-24.

Edison Co. (Three Mile Island Nuclear Station, Unit No. 1), LBP-81-59, 14 NRC 1211, 1568-69 (1981).[3/]

II. PREVIOUS LITIGATION IN THE SHOREHAM PROCEEDING

More important for present purposes, the shadow phenomenon has been exhaustedly litigated in the Shoreham proceeding already.

Suffolk County's first opportunity to litigate it was during the "Phase I" onsite portion of this proceeding. Both LILCO and Suffolk County submitted Phase I written testimony on the "shadow phenomenon." See Direct Testimony of Dr. James H. Johnson, Jr. on Behalf of Suffolk County Regarding Contentions EP 2B and EP 5B (Oct. 12, 1982); Direct Testimony of Dr. Stephen Cole, on Behalf of Suffolk County Regarding Contentions EP 2B and EP 5B (Oct. 12, 1982); Direct Testimony of Dr. Kai T. Erikson on Behalf of Suffolk County Regarding Contentions EP 2B and EP 5B (Oct. 12, 1982). The County's written testimony relied on opinion polls to predict that the shadow phenomenon in a Shoreham emergency would be large. However, this testimony was never heard because Suffolk County defaulted on the Phase I issues.

Suffolk County's second opportunity to litigate the "shadow phenomenon" came in late 1983 and 1984, when the subject was litigated at great length in the original emergency planning hearings.[4/] See Long Island Lighting Co. (Shoreham Nuclear Power

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3/ Citing Dr. Johnson, the Intervenors in the Vogtle case alleged that the applicants should be prepared for the displacement of a significant number of people outside the EPZ. The Board, having reviewed the Nuclear Safety article by Dr. Johnson, found in it no support for a consideration that any spontaneous evacuation of residents of the Augusta area (about 26 miles from the plant) might be expected to impede the evacuation of the Vogtle 10-mile EPZ. The Board denied admission of the contention. Georgia Power Company (Vogtle Electric Generating Plant, Units 1 and 2), August 12, 1985, slip op. at 35-36.

In the Seabrook case the Board rejected a contention that "behavioral variations" among members of the public should be analyzed. (Apparently this referred to the possibility of panic.) Public Service Co. of New Hampshire (Seabrook Station, Units 182), slip op. at 87-90 (Apr. 29, 1986) (unpublished).

4/ In addition to litigating it under EP Contentions 23 (Evacuation Shadow Phenomenon) and 65 (Evacuation Time Estimates), another opportunity to litigate essentially

(footnote continued)

Station, Unit 1), LBP-85-12, 21 NRC 644, 655-71, 972-74 (1985) (hereinafter "PID"). The Licensing Board heard testimony from eleven witnesses on several aspects of this issue, including public reaction to non-nuclear emergencies and to the accidents at TMI and Ginna, PID, 21 NRC at 657-60; the ability to predict future response from opinion polls, 21 NRC at 663-67; the effect of pre-emergency fears of radiation on response during an emergency, 21 NRC at 658-59, 667-68, 670; the effect of emergency information on response, 21 NRC at 660-63; and the credibility of various information sources during an emergency, 21 NRC at 687-91. The Board concluded that:

> On the basis of the preponderance of evidence on Contention 23 [the "shadow phenomenon" contention, set out at 21 NRC 972-74], the Board finds that LILCO has sustained its burden of proof. . . .[T]he Board agrees with Suffolk County (as does LILCO) that some evacuation shadown phenomenon would likely occur in the event of a serious radiological emergency at Shoreham. The conclusion of the County that the overresponse would be so great as to preclude adequate protection of public health and safety in a radiological emergency is, however, based on flawed interpretation of research evidence. LILCO has adequately demonstrated that a rational public will behave predominantly in accordance with public information that is disseminated at the time an emergency happens. It will not react by following some predetermined tendency that urges a shadow evacuation. The Board finds further that, contrary to the contention and based on the entire record, LILCO has given adequate consideration to the evacuation shadow phenomenon in its emergency planning process.

PID, 21 NRC at 670. This decision was affirmed. Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), ALAB-832, 23 NRC 135 (1986), petition for review granted on other grounds, Order, Docket No. 50-332-OL-3 (Sept. 19, 1986) (unpublished). Insofar as this agency is concerned, it is final. And it is binding on the parties under the doctrine of res judicata.

(footnote continued)

the same issue came under the "Credibility" issue, Contention 15. Here again the Intervenors contended people would not follow emergency advisories, but here the Intervenors focused on "credibility" as the cause, in addition to fear of radiation.

A third opportunity to litigate the "shadow phenomenon" may occur if the Appeal Board's decision on EPZ boundaries in ALAB-832 is affirmed by the Commission. In ALAB-832 the Appeal Board ordered that Suffolk County should have another opportunity to litigate the "shadow phenomenon," but under a different contention as to whether minor adjustments to the ten-mile EPZ should be ordered. 23 NRC at 148-49. This decision is under review by the Commission.

The fourth opportunity for Suffolk County to litigate the "shadow phenomenon" may come in the -05 proceeding on the emergency planning exercise, in which the County is again presenting testimony on the "shadow phenomenon." Some of this -05 testimony was stricken by the -05 Board on April 16, 1987.[5/] In fact, a large amount of the testimony in CSJHMMS is word-for-word the same as that stricken in Suffolk County's testimony on Contention EX 38 and 39 in the -05 proceeding. See "Testimony of Philip Evans, Ford Rowan, Stephen Cole, Susan C. Saegert, Elizabeth F. Loftus, David Harris and Martin Mayer," dated March 13, 1987. Attached to this motion as Attachment 1 is a comparison of the CSJHMMS testimony in this -03 proceeding with the passages from the County's -05 testimony on Contentions EX 38 and 39.[6/]

The fifth opportunity will come in this reception center remand proceeding, unless the County's testimony is stricken. As we shall show, the issue is the same, the witnesses are the same, and the evidence is the same as in 1983-84.

III. THE ISSUE ADMITTED IN THIS RECEPTION CENTER PROCEEDING

It is true that the Appeal Board has ordered a "shadow phenomenon" issue admitted into this reception center proceeding. But the admitted issue is limited. In the Appeal Board's words, the remand was for the following issue:

5/ The written Memorandum and Order to this effect was issued April 17, 1987.

6/ Approximately 24 of the 57 pages in the -03 CSJHMMS testimony are copied word-for-word or with only minor variations from the -05 testimony.

> Dr. Johnson's testimony deals with the evacuation shadow phenomenon. See supra p. 146. While that matter has already been extensively litigated, it was not done in the context of the Coliseum and any problems its location vis-a-vis the Shoreham facility might create.

ALAB-832, 23 NRC 135, 162 (1986). The Appeal Board's statement of the admitted issue refers back to the "Direct Testimony of James H. Johnson, Jr. on Behalf of Suffolk County Regarding LILCO's Proffered Evidence of January 11, 1985," which was served on February 19, 1985. The crux of Dr. Johnson's 1985 testimony about the location of the reception center is the following:

> [T]here will be a perception among many people in the area between the plant and the refuge (i.e., the 0-40 mile region) that that area (or much of it) is unsafe, because the safe refuge center (the Nassau Coliseum) is still further from the source of the emergency.

Id. at 4. This issue was admitted for litigation in this proceeding.

Also, on page five of the 1985 Johnson testimony, in response to a question as to whether he had "other concerns about LILCO's proposal to use the Nassau Coliseum," Dr. Johnson testified that LILCO's proposal is likely to cause "a great deal of congestion around the Nassau Coliseum." Id. at 5. Dr. Johnson's concern was this:

> With the Nassau Coliseum now designated to host people who may be contaminated by radioactive materials, and with decontamination taking place both inside and outside the structure, the number of people in the surrounding communities perceiving a threat to their health (and that of their families) is likely to increase, thus increasing the number who will attempt to evacuate. Likewise, the area immediately surrounding the Coliseum is characterized by substantial commercial development, including a number of private and government office buildings. Workers in these buildings are also likely to sense that the area is not safe and will attempt to leave the area -- in many cases using roads and crossing intersections over which evacuees attempting to reach the Coliseum will travel.
>
> The outflow of Nassau County residents and workers and the influx of evacuees from Suffolk County, processes which could very well occur simultaneously, could create major traffic problems within the vicinity of the Coliseum.

Id. at 5-6 (footnote omitted). Thus the issues raised by Dr. Johnson's testimony, and accepted derivatively by the Appeal Board, are limited to (1) the notion that the location of the reception centers will affect people's perception of the risk and (2) the notion that people who live in the immediate vicinity of the reception centers will run away when the centers are used for monitoring and decontamination. LILCO is not moving to strike the portions of the Intervenors' April 13, 1986 testimony that address these issues. But no other "shadow phenomenon" issues are admitted.

Also admitted in this proceeding are issues about "transportation and traffic problems," "whether the distance of the [centers] from the plume EPZ would increase exposure to radiation," and the "adequacy of the evacuation routes." The Intervenors attempt to bring in the "shadow phenomenon" under these issues, claiming that huge numbers of "shadow evacuees" will clog the highways. But, as LILCO discusses in its accompanying Motion to Strike Testimony of David T. Hartgen and Robert C. Millspaugh, this argument is in effect an attempt to expand the EPZ to 40 miles, rather than the 10 miles called for by the regulations, and is therefore an improper challenge to the regulations.

IV. SPECIFIC TESTIMONY THAT SHOULD BE STRICKEN

What the County's written testimony attempts is nothing less than a reprise of the theories that the County litigated in 1983-84. As noted above, the Intervenors' argument is that people will not follow emergency advisories and will be anxious and aggressive. This argument breaks down into six propositions:

1. Polls predict generally how many people will overreact in an emergency.
2. People on Long Island fear radiation.
3. Fear of radiation makes people overreact.
4. People at TMI overreacted.

5. Anxiety during a radiological emergency causes (a) hostility and (b) impaired ability to process information.

6. People will also overreact because of LILCO's low credibility.

These issues are the same now as they were earlier in this proceeding. For example, Issue 5, about stress making it hard to "process new information" or "perform unfamiliar tasks" has not changed. In 1984 Intervenors argued that stress would make people unable to drive their cars along evacuation routes. See Saegert, ff. Tr. 2259, at 3,4,6. Now they argue that stress will make people unable to drive to reception centers.

In some cases the Intervenors have made the same old arguments but cited a newer document. For example, some years having passed since his previous testimony, Dr. Johnson now cites a 1986 article by himself as well as a 1981 one (CSJHMMS p. 27 n.16). But if the Intervenors think they have new evidence on an old issue, they must move to reopen the record and meet the stringent standards for doing that. See 10 C.F.R. § 2.734, 51 Fed. Reg. 19,535, 19,539 (May 30, 1986).

In some cases LILCO is moving to strike Intervenor testimony because it relitigates old issues even though the Intervenor testimony attempts to rebut portions of LILCO's written testimony filed March 30, 1987. There is nothing incongruous about this. As indicated in the cover letter to the March 30 LILCO testimony, LILCO believes that some portions of its own written testimony go beyond the scope of the admitted issues. From depositions of the Intervenors' witnesses it appeared that those witnesses intended to testify once again about already-litigated matters like shadow phenomenon, hostile behavior by drivers, fear of radiation, and so forth. LILCO therefore addressed these subjects to some extent as a precaution against the possibility (however remote) that the Board might reopen the record on some of the already-litigated matters. The fact that a topic is addressed in LILCO's written testimony, therefore, cannot be taken as LILCO's view on what the proper scope of the admitted issues is.

A. CSJHMMS pp. 1-10 -- LILCO does not object to these pages.

B. CSJHMMS p. 11 (all) and first three lines of p. 12 -- LILCO moves to strike these lines because they merely recite the witnesses' conclusions based on their views about fear of radiation, the usefulness of opinion polls, and overreaction. Since those views should be stricken as redundant of earlier testimony (see below), the conclusions on pp. 11-12 should be stricken on the same ground.

C. CSJHMMS p. 12 (from subhead III on) through p. 19 (10th line, right above subhead 2) -- LILCO moves to strike these pages because they simply repeat Suffolk County's oft-repeated claim that Dr. Cole's opinion polls show that there would be a large overreaction in a radiological emergency. These excerpts give the flavor:

April 13, 1987 CSJHMMS
(Planning Basis) Testimony

At 12:

> A. (Cole) Yes. I recently conducted a survey which, among other things, was aimed at determining how Long Island residents both inside and outside of the EPZ would respond to a LILCO advisory to seek monitoring at reception centers.

At 16-17:

> The data obtained from the responses to this question are set forth at p. 26 of Exhibit 8. Fifty percent of all Long Island households said that they would go to the specific center, 32% said that they would have their radiation level checked somewhere else, 13% said that they would not bother to have their level checked, and 5% were unable to answer this question. Fifty percent of the population of Long Island represents more than 1.3 million people.

At 17-18 n.12:

> In a real accident, depending upon the seriousness of the accident and other variables, the number of people seeking monitoring might be somewhat larger or smaller than that found in the survey; but I am sure that in any serious accident, such as that postulated in the February 13, 1986 Exercise, there would be an extremely large number of people seeking monitoring at the reception centers -- many times

more than LILCO assumes -- in response to an advisory to do so.

Compare the above passages with earlier Suffolk County testimony:

Cole (Oct. 12, 1982, at 3 (never heard)

Social Data Analysts, under my direction, conducted in May and June, 1982, a large random sample survey of Long Island residents. Its purpose was to find out how Long Island residents would respond to a nuclear accident at the Shoreham Nuclear Power Plant, and to determine if their response would evidence the evacuation shadow phenomenon.

Johnson (Oct. 12, 1982), at 7 (never heard)

In light of the actual human response to the TMI accident, my colleagues and I conducted a survey of the residents of Long Island for the purpose of eliciting from these residents an expression of how they intended to respond to an accident at Shoreham.

At 13:

In the survey results for all three scenarios, the evacuation shadow phenomenon is evident and is highly significant in planning for a radiological emergency at Shoreham.

Cole, ff. Tr. 2792

At 3:

The surveys I have conducted reveal that in the event of an accident at Shoreham, many thousands of people from both inside and outside the EPZ will seek to evacuate, even though they will not have been advised to do so. Indeed, they may seek to evacuate even though they have been advised not to evacuate. These findings confirm the existence of the evacuation shadow phenomenon, and raise questions about whether LILCO's plan will be effective in protecting the health and safety of Suffolk County residents in case of a radiological emergency at Shoreham.

At 4:

In April 1982, I was retained by Suffolk County to conduct a social survey that would evaluate how people would react to a possible radiological emergency at the Shoreham Nuclear Power Plant.

At 10:

> The purpose of this survey, I might point out, was not to measure precisely whether 30 percent, 31 percent or 32 percent of the people would evacuate if there were a Shoreham emergency. Rather, the purpose of this survey was to obtain some general estimates of the size of the group that would evacuate.

At 14:

> Based upon the survey, I would expect that in the event of a Shoreham emergency, a large amount of voluntary evacuation must be expected. The precise amount of voluntary evacuation varies depending upon the perceived severity of the event, except that in all cases (i.e., even the least severe event) a significant number of departures is predicted.

In particular, passages at CSJHMMS p. 17 attempt to repeat or supplement the County's earlier testimony that polls are a good way to predict actual emergency behavior. For example:

April 13, 1987
CSJHMMS (Planning Basis)
Testimony

At 17:

> Surveys are useful, however, to estimate the approximate magnitude of the public's response to a monitoring advisory. Here, the data show that many times more people will arrive at LILCO's reception centers than LILCO assumes. (Footnote omitted.)

At 17 n.12:

> The point made in this testimony is not that a particular number of individuals, or individuals from a particular location, would seek monitoring or that they would do so at a particular time, but rather that LILCO's 30% planning basis is a gross underestimation of the number of people who could be expected to arrive at the reception centers. Thus, as noted above, no one suggests that the survey is a precise instrument which accurately predicts precisely how many, or which, people would actually seek monitoring. But, the survey is the best tool that we have; it gives us a rough idea of the magnitude of monitoring-seeking behavior. LILCO's witness, Dr. Lindell, has used his previous surveys to draw conclusions about future behavior, just as we have.

Compare the earlier testimony:

Johnson (Oct. 12, 1982), at 15 (never heard)

> For planning purposes, and given the actual experience at TMI, I believe it is reasonable to take people's expressed intended behavior as their actual anticipated behavior. In the event of an actual evacuation notification to people within ten miles of the plant, therefore, at least 432,000 families will be on the roads in Long Island.

Cole (Oct. 12, 1982), at 14 (never heard)

> In general, however, surveys are highly reliable predictors. The fact that millions of dollars are spent every week in the United States on survey research shows that business, the government, the media, and academia all have faith in this method.

Erikson (Oct. 12, 1982), at 3 (never heard)

> Yes, I believe that the survey responses are a reliable indicator of what Long Island residents are likely to do in the event of a radiological emergency at Shoreham. On the whole, surveys do a good job of predicting behavior.

Cole, ff. Tr. 2792, at 25

> In my opinion, surveys provide important data that should be used by emergency planners in developing and evaluating the workability of an emergency plan.

See also Cole, ff. Tr. 2792, at 30-32, 64.

CSJHMMS pages 18-19 (down to subhead 2) simply give the conclusions drawn from the premise that there will be a huge number of people overreacting: many people will come to the reception centers and many people will clog (unspecified) roads. This passage should be stricken as an attempt to relitigate the shadow phenomenon.

CSJHMMS p. 19 (starting with subhead 2) through p. 25 responds to LILCO's criticisms of the County's opinion polls and of the hypothesis that emergency behavior can be predicted by polls. Once again, this is a relitigation of the shadow phenomenon issue.[7/] It is no answer to say that LILCO itself submitted testimony on these subjects;

7/ LILCO is aware that the Appeal Board remanded one small portion of the "role conflict" issue (bus driver availability) in ALAB-832, 23 NRC 135, 152-54. The remand

(footnote continued)

as noted above, LILCO admittedly filed testimony on already-litigated issues in some instances.

Five public opinion polls were considered by the Licensing Board in ruling on shadow phenomenon. PID, 21 NRC at 663. Suffolk County argued that polls taken before an emergency have value in predicting actual response during an emergency. PID, 21 NRC at 657. The Board rejected this notion:

> The Board lists the numerical findings of the County survey to illustrate the general magnitude of the responses and not because we believe that they accurately reflect future evacuation behavior of large populations. . . .
>
> . . . .
>
> The polls did not and could not supply respondents with urgent tone and situation-specific information that would be publicly available in a real emergency . . . .
>
> . . . .
>
> The poll results have no literal predictive validity because the residents of Suffolk and Nassau Counties do not now have that additional information that respondents would need to determine their actions in an emergency. We give little weight to the predictive findings of the public opinion polls.

PID, 21 NRC at 664, 666, 667.[8/] The County should not be allowed to reopen this issue now; its testimony should be stricken.

(footnote continued)

was for admission, at minimum, of a particular survey of volunteer firemen. The intervenors argue that this means that all their surveys are admissible. The truth is, however, that, at least with respect to polls of members of the public, the Appeal Board did not disturb the Licensing Board's finding that "poll results have no literal predictive validity," 21 NRC at 667. That finding has now passed the time for Commission review and is final.

8/ The Board found that opinion poll results confirm what it concluded from other evidence about the fear of radiation harbored by the population. PID, 21 NRC at 666. Indeed, the Board noted that LILCO and Suffolk County agreed that many people fear radiation. Id. In light of these findings, there is no justification for taking additional survey evidence to further confirm something about which there is no real issue.

Most of this testimony is duplicative of the prefiled testimony submitted by Suffolk County on Contentions EX 38 and 39 in the -05 proceeding. See Attachment 1. The testimony was not stricken by the -05 Board. Thus, it should be stricken here as duplicative of testimony being litigated elsewhere.

D. CSJHMMS p. 26 -- LILCO moves to strike this page because it relitigates the issue of whether pre-existing fear of radiation determines overresponse. Here is the testimony:

April 13, 1987 SJHMMS (Planning Basis) Testimony, at 26

> Q. What factors will cause the response you anticipate to a monitoring advisory, which is many times greater than what LILCO assumes?
>
> A. (Saegert, Johnson) The most important factor is the pre-existing concern about radiation which exists in the public and in particular among residents of Long Island. Research has shown that they are very concerned about being exposed to dangerous levels of radiation in the event of an accident at Shoreham and that they are likely to act on those concerns. In particular, they are likely to take measures to determine whether they have been exposed to radiation. Unlike most other hazards, they cannot make this determination for themselves. Thus, they will seek out facilities which will enable them to make that determination. It is simply unrealistic to assume that this response will be restricted to 30% of the EPZ population.
>
> The public's strong concerns about radiation are well-chronicled in the literature. For instance, much research by Slovic and his colleagues has demonstrated that the public perceives radiation to be one of the most dreaded hazards short of warfare.15/
>
> 15/ See, e.g., P. Slovic, B. Fischoff, and S. Lichtenstein, "Rating the Risks," Environment Vol. 21, 14-39 (April, 1979).

Compare earlier versions:

Saegert, ff. Tr. 2259, at 6

> The public's fear of radiation has been amply demonstrated by studies conducted by Slovic, Lichtenstein and Fischoff which found that people fear a nuclear power plant accident more than any other disaster agent except warfare and terrorism.

(Footnote omitted.)

Zeigler & Johnson
ff. Tr. 2789, at
23

> Slovic, Fischhoff, and Lichtenstein (1979)[7/] have found that radiation is the disaster agent most dreaded by the public except for terrorism and warfare. Radiation is imperceptible to the human senses. One is therefore unable to determine when one is in its presence.
>
> 7/ P. Slovic, B. Fischoff, and S. Lichtenstein, "Rating the Risks," Environment 21, 14-39 (April, 1979).

See also, for example, Tr. 1740 (Sorensen).

Thus, the new testimony either repeats or attempts to supplement earlier testimony. Moreover, it directly contradicts the PID. The Board has already accepted that people fear radiation. PID, 21 NRC at 666. (Indeed, it would not be rational for them not to fear it.) But the Board also found that pre-accident fear is not a direct cause of evacuation in an emergency:

> Instead, this fear helps shape how people use information and perceive the threat during an accident.
>
> We adopt this finding from LILCO's testimony because of its reasonableness and because we do not accept the notion that people caught in an emergency situation simply abandon reason and respond blindly to pre-existing fear. The Board can hardly imagine that anyone would evacuate in a radiological emergency unless fear of radiation pre-existed as part of the common knowledge. However, we conclude that reasonable people need and will seek information on which to base their actions, particularly in the urgent conditions of an emergency. If the information is inadequate or conflicting, they may act inappropriately. If it is complete and consistent, they will accept it and use it as intended.

PID, 21 NRC at 662; see also id. at 658-59. In light of this holding, further testimony discussing the effect of pre-existing fear on the shadow phenomenon is barred.

The -05 Board struck duplicative testimony in Suffolk County's prefiled testimony on Contentions EX 38 and 39 on April 16, 1987. See Attachment 1.

E. CSJHMMS p. 27 (1st 5 lines) -- LILCO moves to strike this answer (sponsored by Dr. Johnson) on the ground that it relitigates the "shadow phenomenon/fear of radiation" issue.

April 13, 1987
CSJHMMS (Planning
Basis) Testimony, at 27

> (Johnson) Likewise, my studies of evacuation behavior at TMI demonstrated that fear of radiation was one of the prime causes for the overresponse which led over 140,000 people to evacuate, although only a small fraction of that number (about 3,500) were advised to do so.

(Footnote omitted.) The Board will recall litigating the effect of fear on TMI residents at extraordinary length in early 1984. Compare earlier testimony:

Zeigler & Johnson, ff. Tr.
2789, at 35

> However, there is no basis on which to conclude that such [EBS] messages will be the determining factor in human response to a radiological emergency. Our TMI study found that fear of impending harm, not conflicting information, was the overriding factor in triggering evacuation.

Cole & Tyree, ff. Tr. 3907,
at 9

> In fact, the Sorensen and Richardson analysis supports the opposite conclusion that pre-accident fear is an important cause in evacuation behavior.
>
> At 14:
>
> These data lead us to conclude that actual distance from the plant and two questions measuring the respondent's concern with radiation from nuclear plants, EMITB and CONCERN, are the primary influences on what the LILCO witnesses have called the situationally perceived threat.

(Emphasis in original.)

At 15:

> However, the data presented in the Sorensen and Richardson model show that fear of emissions from nuclear plants and concern with the nuclear plant are more important influences on a situationally perceived threat than are the respondents' perceptions of information available to them.
>
> . . . .
>
> Fear of radiation from nuclear plants is widespread among the residents of Long Island. This is shown by both the County's survey and the survey conducted for LILCO by Yankelovich, Skelly and White.

See also the lengthy cross-examination at Tr. 1836-70.

F. CSJHMMS p. 27 (Saegert and Johnson answer) -- LILCO moves to strike this as a relitigation of the shadow phenomenon issue, for the same reasons given in section E immediately above. For example:

> April 13, 1987
> CSJHMMS (Planning
> Basis) Testimony, at 27
>
> Thus, they concluded, it is pre-existing attitudes toward a hazard -- in this case, radiation released during an accident -- that is the most important cause of overresponse or evacuation shadow.

The -05 Board struck duplicative testimony in Suffolk County's prefiled testimony on Contentions EX 38 and 39 on April 16, 1987. See Attachment 1.

G. CSJHMMS p. 28 (all) - p. 29 (1st 6 lines) -- LILCO moves to strike this testimony. It seeks to relitigate the issue of the colorless, odorless nature of radiation[9/] making it special. Much testimony on this subject has already been heard, for example:

9/ See also Pacific Gas & Elec. Co. (Diablo Canyon Nuclear Power Plant, Units 1 & 2), LBP-82-70, 16 NRC 756, 824 (1982) (summary of Dr. Erikson's views that people do not know what radioactive substances look like or feel like or how far they can reach into the countryside).

Cole, ff. Tr. 2792,
at 26-27

> Radiological emergencies are very different. Virtually nobody who would be exposed to a radiological emergency, were an accident to occur at Shoreham, has ever experienced one before. The fear that people have of a radiological emergency is substantially greater than fear of a natural disaster such as a hurricane. Radiation cannot be seen, felt, or heard and is therefore considerably more frightening to most people than natural disasters.

See also some of the testimony quoted in section D above; Tr. 2017-19 (Mileti).

The second paragraph, about AIDS, is simply an attempt to supplement earlier testimony about the colorless, odorless nature of radiation with an alleged analogy. It should be stricken (1) because it is an attempt to relitigate old issues and (2) because AIDS has such tenuous relevance, if any, to reception centers that testimony about AIDS is not "relevant, material, and reliable." 10 C.F.R. § 2.743(c) (1986).

The -05 Board struck duplicative testimony in Suffolk County's prefiled testimony on Contentions EX 38 and 39 on April 16, 1987. See Attachment 1.

H. CSJHMMS p. 29 (starting at line 7) - p. 30 (1st paragraph) -- LILCO moves to strike this passage because it seeks to reopen the issue of fear of radiation and its relation to overreaction. For example:

April 13, 1987 CSJHMMS
(Planning Basis) Testimony
at 29

> (Cole) The recent survey I conducted, as well as many I have conducted in the past, measured the public's fear of radiation as opposed to other hazards. All of the surveys I have conducted on the issue demonstrate a fear of radiation among the general public and a strong correlation between that fear and response to protective action recommendations.

The -05 Board struck duplicative testimony in Suffolk County's prefiled testimony on Contentions EX 38 and 39 on April 16, 1987. See Attachment 1.

I. CSJHMMS p. 30 (2d paragraph, starting line 16) to p. 36 (1st 3 lines) -- LILCO moves to strike this testimony because it attempts to reopen the issue of fear of radiation and its effect on overreaction. For example:

April 13, 1987 CSJHMMS
(Planning Basis) Testimony
at 31

> Perhaps one of the most important conclusions to be drawn from an analysis of the transcripts of the focus groups is that Long Island residents have a deep-seated fear of being exposed to radiation released during an accident at Shoreham. This fear is held by a significant segment of the Long Island population.

Here the County has created new evidence (focus group interviews) of fear of radiation. However, the point the County is trying to make is the same: people fear radiation, and this fear will tend to make them overreact. Just as surveys cannot be used to predict future emergency response, neither can lengthy statements of opinion by individuals conjecturing on their likely future behavior in response to an emergency at Shoreham. Moreover, focus group evidence could have been created for the earlier shadow phenomenon litigation but was not. If the County wants to present it now it should move to reopen the record.

The -05 Board struck duplicative testimony in Suffolk County's prefiled testimony on Contentions EX 38 and 39 on April 16, 1987. See Attachment 1.

J. CSJHMMS Section III.4 (pp. 36-41) -- LILCO moves to strike this testimony on three grounds. First, the testimony seeks to reopen the "shadow phenomenon" issue that was litigated in 1983-84. The testimony says that the accident at Chernobyl has increased pre-existing fear of radiation:

April 13, 1987
CSJHMMS (Planning
Basis) Testimony,
at 41

> In summary, the pre-existing fears which Long Islanders have of radiation, which the above excerpts demonstrate have been exacerbated by Chernobyl, will result in a massive number of people converging on LILCO's reception centers for the purpose of being monitored in the event of an accident at Shoreham.

Chernobyl is new evidence that the County wants to present on an old issue (pre-existing fear of radiation). It is required to reopen the record first. Recently the -05 Board declined to admit a similar contention about the effect of Chernobyl on people's response to a Shoreham accident. Memorandum and Order (Ruling on Intervenors' Motion to Admit Contentions), Oct 28, 1986, slip op. at 5. One of the reasons for the ruling was that the contention was redundant of the "shadow phenomenon" contentions, the Board's decision as to which had become final. Id.

The -05 Board struck testimony in Suffolk County's prefiled testimony on Contentions EX 38 and 39 on April 16, 1987, which is almost identical, word-for-word, with Suffolk County's testimony on Chernobyl discussed here. See Attachment 1.

K. CSJHMMS Section III.5 (pp. 41-47) -- LILCO moves to strike this entire section. It is an attempt to reopen the shadow phenomenon issue and particularly to rebut LILCO's 1983-84 testimony that emergency response is primarily determined by situational perception of risk, which in turn is shaped by emergency information.

Also, the second paragraph, starting on page 42 (beginning with "Second") and running through the first four lines on page 43, attempts to reopen the record on whether the stress of a radiological accident would make people have trouble "comprehending and processing spatial information":

April 13, 1987
CSJHMMS (Planning
Basis) Testimony, at 43

This is because some people under stress, as Long Island residents surely would be during an accident, often have trouble comprehending and processing spatial information.

Compare earlier testimony:

Saegert, ff. Tr. 2259, at 4

People, unable to escape congested situations, will feel increased stress, reduced ability to comprehend the environment and make rational decisions, and aggression.

If LILCO's traffic guides attempt to enforce or overtly encourage conformance with the prescribed routes, the resulting confrontation could lead to conflict and aggression between drivers and traffic guides.

At 6:

People experiencing high levels of stress have reduced ability to process new information, particularly if it does not relate to their preconceived goals and intentions. This may have a particularly important effect on traffic flow. For instance drivers, may have trouble noticing and interpreting important information such as signs, road cues, and the behavior of other drivers.

At 12:

Further, the stress generated by the emergency will reduce their ability to recall the routes. Even mild stress, such as that people experience when shopping in a crowded supermarket, leads people to forget where things are located. The problem can be expected to be more serious in a more complex topography and under conditions of greater stress.

(Footnote omitted.)

At 17:

As stated earlier, high levels of stress reduce information processing capacity. Such capacity is necessary to make the numerous decisions that influence rate of speed and safety (for example, the gauging of distance between cars, determining proper speed, choosing routes, etc.) Drivers will be responsible for making moment-to-moment decisions in a situation that will tax their mental capacities and go against psychologically likely ways of perceiving, remembering and behaving. In addition, the driver will have to respond to the

> unexpected enforcement of traffic controls and the unexpected behavior of other drivers.

(Footnote omitted.) For further comparison, see the Intervenors' 1984 proposed findings on "The Effect of Stress" (Attachment 2 to this motion).

Also, the paragraph beginning "Third" (lines 5-9) on page 43 reopens the issue of whether people will follow emergency advisories:

April 13, 1987
CSJHMMS (Planning
Basis) Testimony,
at 43

> Third, even people who understand correctly the contents of the message but were not residents of the named zones, may nonetheless seek monitoring because, assuming people know their own zone, they may not know which zones they have gone through, or travelled near, during their trips out of the EPZ.

Likewise, the last paragraph on page 43 (lines 10-20) reopens the matter of radiation not stopping at geographic boundaries, fear of radiation, people's lack of understanding of the effects of radiation, and people's not following emergency advisories, all of which were litigated already:

April 13, 1987
CSJHMMS
(Planning Basis)
Testimony, at 43

> Fourth, large numbers of people are likely to discount LILCO's zone concept in its EBS messages altogether. People know that radiation in the air does not stop at precise geographic boundaries. Thus, some people would consider the idea of zones -- some safe, some not -- as counterfactual, and would, accordingly, ignore any implication or statement in the message that only residents of certain zones had been endangered. Individuals' fear of radiation, combined with their lack of understanding of its effects (a lack of understanding which LILCO's EBS messages do nothing to alleviate) would make it likely that they would seek monitoring.

Compare earlier testimony:

Saegert, ff. Tr. 2259, at 3

> However, because of concern for personal safety and the safety of families, drivers will seek the "safest" route out of the EPZ. It can be expected that in many cases a driver's perception of the safest route will not coincide with the routes that LILCO has assigned to him or her. . . . Under stress, the ability to process information may be reduced significantly.

Zeigler & Johnson, ff. Tr. 2789, at 31

> In short, people are not likely to believe that harmful radiation will stop at the dividing line for a LILCO subzone.

(Footnote omitted.)

CSJHMMS pp. 44-47 (down to subsection 6) should be stricken because they seek to reopen the "credibility" issue (EP Contention 15). For example:

April 13, 1987 SJHMMS (Planning Basis) Testimony, at 44

> Finally, LILCO's messages that people outside a particular zone would be safe are likely to be discounted by the public due to LILCO's low credibility.

Compare earlier testimony:

Zeigler and Johnson, ff. Tr. 2789, at 36-37

> Survey data reveal that LILCO is held in very low regard by the population of Long Island. As will be discussed in the Suffolk County testimony on Contention 15 (Credibility), it is therefore likely that many people will not heed LILCO's messages because they deem LILCO to be untrustworthy. Thus, even if LILCO's messages are assumed to be perfect, they may be ineffective.

Cole, ff. Tr. 10,727

At 5:

> Surveys conducted by Suffolk County and LILCO show that Long Island residents have a high level of concern and fear about the dangers associated with nuclear power. Given this high level of fear, if there were an accident at Shoreham many citizens, including people whom LILCO expects to play various roles implementing the LILCO Plan, would experience high levels of anxiety. Under these conditions, it is unlikely

that these people would believe messages telling them they were safe from harm, or that particular actions would protect them from harm, no matter who the messages came from.

. . . .

A substantial majority of Long Island residents do not trust LILCO to tell the truth. In the case of an actual nuclear accident, an event which LILCO has continually told the public is almost impossible, LILCO's credibility would most likely be even lower.

At 6:

If residents do not trust LILCO to tell the truth about a radiological emergency at Shoreham, then many of them are likely to disregard the information and advice that they are given, resulting in LILCO being unable to implement its Plan.

Saegert, ff. Tr. 2259, at 3

The health-threatening conditions that will exist or may be perceived to exist during a radiological emergency will produce stress and anxiety among the population which will, among other things, affect the behavior and performance of drivers seeking to leave the EPZ. I believe that the level of stress and anxiety will be particularly great for a Shoreham emergency because of the public's extreme fear of radiation and LILCO's perceived lack of credibility as an organization able to command and control the emergency response.

Purcell, et al., ff. Tr. 10,727,
at 45

In summary, the public distrusts information provided by nuclear utilities. Beyond this, LILCO's credibility on Long Island is low and is exacerbated by the public perception of both potential conflicts of interest involved in the LILCO Plan and LILCO management incompetence. For all these reasons, we believe that the public will not view LILCO as a credible source of information or direction during a Shoreham emergency.

At 46:

LILCO's lack of credibility will cause the public to question the accuracy and adequacy of notice that an emergency exists, to doubt that the full dimensions of the emergency are being coveyed to them in a manner that accurately discloses the true nature of the emergency, and to question the propriety, accuracy and adequacy of the protective actions recommended by LILCO.

At 47:

> The public similarly is likely to disbelieve statements made by officers and employees of the company that is responsible for the emergency, and will not believe that those employees are acting in the best interests of the public's health and safety rather than LILCO's own corporate welfare. Thus, information provided by LILCO employees prior to or during an emergency would be ignored by many people, and in any event, is likely to be interpreted in a variety of ways not anticipated or intended by LILCO. Thus, reassurances that no real danger exists, that danger is minimal, or that particular actions will protect, would be viewed skeptically and could increase some people's fears that the situation was serious and that LILCO was covering it up.

At 65:

> The public will not obey the LILCO employees designated to act as traffic guides and security personnel assigned to perform security functions at various locations such as the EPZ perimeter and relocation centers, for several reasons related to LILCO's lack of credibility.

The same CSJHMMS testimony on page 45 and in footnote 26 on pp. 45-46 relies once again on the focus group interviews. In addition to the reasons given above,[10/] this focus group testimony should be stricken because selected quotes from individuals are not "relevant, material, and reliable" evidence.[11/] 10 C.F.R. § 2.743(c).

Pages 46-47 (down to subhead 6) should be stricken because, once again, they attempt to reopen the issue, already litigated, of credibility and people's compliance with emergency advisories.

10/ The same witness, Dr. Cole, testified in 1984 about other focus group interviews he had conducted and what they told him about LILCO's credibility. Cole, ff. Tr. 10,727, at 16; Tr. 10,823-27 (Cole). The reception center testimony is just an attempt to reopen and supplement the earlier record.

11/ At some point the Intervenors will argue that LILCO offered evidence of group interviews in 1984 in the form of testimony by anthropologist Steve Barnett. See Barnett et al., ff. Tr. 9689, at 45-46. Dr. Barnett's interviews and Dr. Cole's are not comparable. See, e.g., Tr. 9733-34, 9741 (Barnett). And LILCO has never claimed for Dr. Barnett's interviews the type of predictive validity claimed by the Intervenors for Dr. Cole's. See, e.g., Tr. 9756 (Barnett).

The -05 Board struck duplicative testimony in Suffolk County's prefiled testimony on Contentions EX 38 and 39 on April 16, 1987. See Attachment 1.

L. CSJHMMS Section III.6 (pp. 47-51) -- LILCO does not move to strike this section, except as follows:

The citation to caselaw in footnote 28 is inadmissible.

The sentence in lines 6-8 on page 50 ("of course, as stated earlier . . . actually arrive") should be stricken for the same reasons as the earlier testimony on which it relies.

The paragraph on pages 50-51 (beginning "Finally" and ending "a Shoreham license") should be stricken as not "relevant, material, and reliable." 10 C.F.R. § 2.743(c). It is speculation about FEMA's motives and irrelevant to the substantive merits of the Krimm guidance memorandum.

M. CSJHMMS Section III.7, p. 54

LILCO moves to strike the passage at the bottom of page 54 beginning "LILCO's Environmental Report" on line 15 and ending with "during an accident" at the very end of the page. This testimony discusses the likelihood of wind shifts. The likelihood of wind shifts was litigated in 1984 under Contention EP 64, which alleged that wind conditions on Long Island required LILCO to evacuate the population within at least a radius of five to seven miles from the plant if any evacuation was called for. See Cordaro et al., ff. Tr. 8760, at 42-43; Tr. 8957 (Cordaro). The record on wind variability has already been made.

Note that LILCO does not move to strike the conclusions the County witnesses draw (top of page 55) from their impression of site meteorology. But as to the meteorology itself (that is, the likelihood of wind shift), the Intervenors had a full opportunity to present evidence under Contention 64; their interest there was the same as here,

namely to show a high likelihood of wind shift. Hence the fact that a different issue about the implications of wind shift is now being litigated does not mean that the Intervenors are entitled to a second chance to litigate the likelihood of wind shift itself.

N. CSJHMMS Section IV ("Conclusions")

LILCO moves to strike page 56 through line 6 on page 57, which seeks to reopen the "shadow phenomenon" issue, as discussed above.

O. Exhibit 8

LILCO moves to strike Exhibit 8, the report of the opinion poll on which much of the inadmissible testimony depends.

Respectfully submitted,

James N. Christman

James N. Christman
Mary Jo Leugers
Stephen W. Miller

Hunton & Williams
707 East Main Street
P.O. Box 1535
Richmond, Virginia 23212

DATED: April 18, 1987

ATTACHMENT 1

Testimony Stricken By -05 Board
That Is Duplicated In -03 Testimony of Suffolk County

I. Survey of Public's Response To LILCO Instruction to Seek Monitoring (pages 12-19)

A. Description of Survey (pages 12-16)

April 13, 1987
CSJHMMS (Planning Basis) Testimony (-03)

March 13, 1987
Suffolk County Testimony
On Contentions EX 38 and 39 (-05)

[In both the -03 and the -05 proceedings, Suffolk County relies on the same surveys conducted by Dr. Cole to predict how people will react in the event of an actual radiological emergency at Shoreham. The testimony in the two proceedings describe the methods used to conduct the surveys in nearly identical language, though not always in the some order. The following are samples of the duplicative language.]

at page 13:

The purpose of this survey was not to measure precisely what percent of Long Island households would seek monitoring. Rather, the purpose was to obtain some general estimates of the size of the group that would attempt to travel to LILCO's reception centers for monitoring.

at page 153 [duplicative but not stricken]:

The purpose of this survey, I might point out, was not to measure precisely whether 50 percent or 55 percent of Long Island households would evacuate after hearing the first EBS message. Rather, the purpose of this survey was to obtain some general estimates of the size of the group

April 13, 1987
CSJHMMS (Planning
Basis) Testimony (-03)

* * *

A. (Cole) This was a telephone survey in which we interviewed 1,500 Long Island residents.

at pages 14-15:

Upon completion of the questionnaire, the survey was administered to a stratified random sample of households residing in Nassau and Suffolk Counties. The sample was stratified based upon three geographical areas; we interviewed a random sample of 379 residents living in the EPZ, a random sample of 629 residents living in Suffolk

March 13, 1987
Suffolk County Testimony
On Contentions EX 38 and 39 (-05)

that would evacuate, in response to the actual messages -- including their tone and situation-specific information -- which LILCO showed during the Exercise it would use to respond to a real Shoreham accident.

* * *

A. (Cole) This was a telephone survey in which we interviewed 1,500 Long Island residents.

at pages 155-57 [duplicative but not stricken]:

A. (Cole) The survey was administered to a stratified random sample of households residing in Nassau and Suffolk Counties. The sample was stratified based upon three geographical areas. We interviewed a random sample of 379 residents living in the EPZ, a random sample of 629 residents living in Suffolk County but outside of the

April 13, 1987
CSJHMMS (Planning
Basis) Testimony (-03)

County but outside of the EPZ, and a random sample of 492 residents of Nassau County. Telephone numbers were randomly generated by computer according to the method set forth in the Technical Appendix. See Exhibit 8, at 37-39.

Q. Can the results of such a random sample survey be used to generalize to all individuals on Long Island?

A. (Cole) The survey was designed to be a random sample of all Long Island households with telephones (more than 97% of households on Long Island have telephones). Within households, we utilized either the male or female head of

March 13, 1987
Suffolk County Testimony
On Contentions EX 38 and 39 (-05)

EPZ, and a random sample of 492 residents of Nassau County.

* * *

(Cole) Telephone numbers were randomly generated by computer according to the method set forth in the Technical Appendix. See Attachment 14, p. 37-30.

* * *

Q. Can the results of this survey be used to generalize to all individuals on Long Island?

A. (Cole) The survey was designed to be a random sample of all Long Island households with telephones. (More than 97% of households on Long Island have telephones.) Within households, we utilized either the male or female head of

April 13, 1987
CSJHMMS (Planning
Basis) Testimony (-03)

household as an informant on what the household would do. Thus, the results can be used to generalize to all Long Island households.

For this survey, the sampling error for the entire sample is plus or minus three percentage points.10/ This means that in theory if this survey were to be repeated 100 times using the same techniques, in 95 out of the 100 times the results obtained for a particular question would be within 3 percentage points of the results which would have been obtained by interviewing members of every Long Island household.

10/ The sampling error for the EPZ is plus or minus five percentage points. The sampling error for Nassau County and Suffolk County outside the EPZ is plus or minus four percentage points.

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household as an informant on what the household would do. Thus, the results can be used to generalize to all Long Island households.

* * *

For this survey, the sampling error for the entire sample is plus or minus three percentage points; the sampling error for Nassau County and Suffolk County outside the EPZ is plus or minus four percentage points. The sampling error for the EPZ is plus or minus five percentage point. This means that in theory if this survey were to be repeated 100 times using the same techniques, in 95 out of the 100 time the results obtained for a particular question would be within 3 percentage points of the results which would have been obtained by interviewing members of every Long Island household.

April 13, 1987
CSJHMMS (Planning
Basis) Testimony (-03)

March 13, 1987
Suffolk County Testimony
On Contentions EX 38 and 39 (-05)

B. Surveys Indicate That a "Shadow" Will Occur (pages 16-19)

at pages 16-17:

Q. Please describe the results of the survey regarding the demands likely to be placed on LILCO's reception centers.

A. (Cole) In the survey, we asked the 1,500 respondents how they would respond to a series of EBS messages actually used by LILCO during its February 1986 Exercise to "inform" the public of the escalating nature of an accident at Shoreham and the protective actions which they should take. One of the questions asked was the following:

> If at 1:45 p.m. you heard on the radio a LILCO representative say that certain people living within ten miles of Shoreham may have been exposed to radiation during their trip out of the evacuation zone and should go to a specific location in Nassau County to be monitoried for possible radioactive

at page 276:

Q. In your opinion, why is there no basis for that assumption?

A. (Cole) My opinion is based upon my knowledge of the great fear that Long Island resident have of being exposed to radiation (see the portion of this testimony relating to Contention Ex 22 subpart F) and on a question in the recent survey I conducted for Suffolk County. In that survey we asked the 1,500 respondents the following question:

> If at 1:45 p.m. you heard on the radio a LILCO representative say that certain people living within ten miles of Shoreham may have been exposed to radiation during their trip out of the evacuation zone and should go to a specific location in Nassau County to be monitoried for possible radioactive

April 13, 1987
CSJHMMS (Planning
Basis) Testimony (-03)

> contamination, would you: (1) go to the specific location in Nassau to see if you have been contaminated with radiation; or (2) go somewhere else to have your radiation level checked; or (3) would not bother to have your radiation level checked?

Exhibit 8, at 56. The data obtained from the responses to this question are set forth at p. 26 of Exhibit 8. Fifty percent of all Long Island households said that they would go to the specific center, 32% said that they would have their radiation level checked somewhere else, 13% said that they would not bother to have their level checked, and 5% were unable to answer this question. Fifty percent of the population of Long Island represents more than 1.3 million people.

March 13, 1987
Suffolk County Testimony
On Contentions EX 38 and 39 (-05)

> contamination, would you: go to the specific location in Nassau to see if you have been contaminated with radiation, or go somewhere else to have your radiation level checked, or would not bother to have your radiation level checked?

The resulting data enable us to estimate that about 50 percent of all Long Island households would attempt to go to the location in Nassau County to be checked for radiation. Fifty percent said that they would go to the specific center, 32 percent said that they would have their radiation level checked somewhere else, 13 percent said that they would not bother to have their level checked, and 5 percent were unable to answer this question. Fifty percent of the population of Long Island represents more than 1.3 million people.

April 13, 1987
CSJHMMS (Planning Basis) Testimony (-03)

March 13, 1987
Suffolk County Testimony
On Contentions EX 38 and 39 (-05)

C. Surveys are Valid Predictors of Future Behavior (pages 17-18)

at pages 17-18, footnote 12:

Q. LILCO witnesses argue (LILCO testimony at 13-17) that your survey is not a reliable means to predict what people would do during a real radiological emergency. Why should the Board accept as valid the survey results you have described which support your allegation that many times more than the numbers of people LILCO presumes will actually arrive at LILCO's reception centers?

A. (Cole) While it is true that surveys are not perfect tools for predicting exactly how individual people will respond to a future event, they do provide very useful evidence. The point made in this testimony is not that a particular number of individuals, or individuals from a

at pages 166-67 [duplicative but not stricken]:

Q. In the past, LILCO witnesses have argued that surveys are not a reliable means to predict what people would do during a real radiological emergency. Why should the Board accept as valid the survey results you have described which support the allegations in Contention Ex 22.F?

A. (Cole) While it is certainly true that surveys are not perfect tools for predicting exactly how individual people will respond to a future event, they do provide very useful evidence, . . . Thus, the point made in Contention Ex. 22.F and the related contentions, is not that

April 13, 1987
CSJHMMS (Planning
Basis) Testimony (-03)

particular location, would seek monitoring or that they would do so at a particular time, but rather that LILCO's 30% planning basis is a gross underestimation of the number of people whould could be expected to arrive at the reception centers. Thus, as noted above, no one suggests that the survey is a precise instrument which accurately predicts precisely how many, or which, people would actually seek monitoring. But, the survey is the best tool that we have; it gives us a rough idea of the magnitude of monitoring-seeking behavior. LILCO's witness, Dr. Lindell, has used his previous surveys to draw conclusions about future behavior, just as we have.

March 13, 1987
Suffolk County Testimony
On Contentions EX 38 and 39 (-05)

a particular number of individuals, or individuals from a particular location, would voluntarily evacuate, or that they would do so at a particular time, but rather that LILCO's assumption during the Exercise that there would be no voluntary evacuation, and the FEMA evaluator's identical assumption. . . . Thus, no one suggests that the survey is a precise instrument which accurately predicts precisely how many, or which people would actually attempt to evacuate, or more precisely when, were a real accident such as that depicted in the Exercise to occur at Shoreham and LILCO were to disseminate the instructions it used during the Exercise. But, the survey is the best tool that we have; it gives us a rough idea of the size of the evacuation shadow in response to the specific information contained in LILCO's Exercise EBS messages.

April 13, 1987
CSJHMMS (Planning
Basis) Testimony (-03)

In a real accident, depending upon the seriousness of the accident and other variables, the number of people seeking monitoring might be somewhat larger or smaller than that found in the survey; but I am sure that in any serious accident, such as that postulated in the February 13, 1986 Exercise, there would be an extremely large number of people seeking monitoring at the reception centers -- many times more than LILCO assumes -- in response to an advisory to do so.

March 13, 1987
Suffolk County Testimony
On Contentions EX 38 and 39 (-05)

In a real accident, depending upon the seriousness of the accident and other variables, the evacuation shadow might be somewhat larger or smaller than that found in the survey; but I am sure that in any serious accident such as that postulated in the Exercise scenario, there would be a large voluntary evacuation in response to LILCO's demonstrated advisories to the public.

II. Perceptions of Risk and Pre-Existing Fears (pages 26-41)

A. Pre-Existing Fears Measured by Surveys and Focus Groups (pages 26-36)

at page 26:

Q. What factors will cause the response you

at pages 168-69:

Q. In your opinion, why would so many

April 13, 1987
CSJHMMS (Planning
Basis) Testimony (-03)

anticipate to a monitoring advisory, which is many times greater than what LILCO assumes?

A. (Saegert, Johnson) The most important factor is the pre-existing concern about radiation which exists in the public and in particular among residents of Long Island. Research has shown that they are very concerned about being exposed to dangerous levels of radiation in the event of an accident at Shoreham and that they are likely to act on those concerns.

* * *

at page 27:

[Question same as on page 26 listed above]

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Suffolk County Testimony
On Contentions EX 38 and 39 (-05)

people attempt to leave immediately in response to LILCO's EBS No. 1, rather than waiting to see how the accident developed or waiting for an instruction to evacuate?

A. (Cole, Saegert, Loftus) We discuss several reasons related to the specific tone and content of EBS No. 1 in Section 4 below. But, the most basic reason, as stated in subpart F of Contention Ex 22, is the pre-existing fears and perceptions of Long Island residents. Research has shown that they are very afraid of being exposed to dangerous levels of radiation in the event of an accident at Shoreham.

at pages 183-85:

Q. Do any other data support the allegation in Contention Ex 22.F we have been discussing

April 13, 1987
CSJHMMS (Planning
Basis) Testimony (-03)

(Saegert, Johnson) The public's fear of radiation, and the behavioral consequences of that fear, are also described in Dr. Lindell's Nuclear Safety article. While the behavior he and his colleague were investigating was evacuation, rather than monitoring-seeking, the two behaviors have some similar roots.

The authors found that the results of their study are consistent with those conducted by Slovic et al. "in determining how negatively radiation hazard is viewed." Id., at 464. Thus, they concluded, it is pre-existing attitudes toward a hazard

March 13, 1987
Suffolk County Testimony
On Contentions EX 38 and 39 (-05)

(that voluntary evacuation would result from LILCO's Exercise EBS messages due to pre-existing fears)?

A. (Cole, Saegert, Loftus) Yes. One survey is described in a paper co-authored by LILCO witness, Michael K. Lindell. The paper, entitled "Protective Response to Technological Emergency: Risk Perception and Behavioral Intention," by M. K. Lindell and V. E. Barnes, was published in the October-December 1986 issue of the journal Nuclear Safety.

* * *

The authors conclude that the results of their study are consistent with those of risk perception studies such as those of Slovic et al. "in demonstrating how negatively radiation hazard is viewed."

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CSJHMMS (Planning
Basis) Testimony (-03)

-- in this case, radiation released during an accident -- that is the most important cause of overresponse or evacuation shadow. The same fear of radiation will also be the primary factor causing hundreds of thousands of people to attempt to be monitored in the event of a Shoreham accident.

at page 28-29:

(Harris, Mayer) Our experience in the public health field also demonstrates that in a Shoreham accident a substantial portion of the population would voluntarily report for testing, even if such persons had no scientific or objective basis for assuming they had been exposed to radiological particulates. Radiation is colorless and odorless. Therefore, it is impossible for

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Suffolk County Testimony
On Contentions EX 38 and 39 (-05)

* * *

Rather, their data lead them to believe that it is attitudes toward the hazard -- radiation released during an accident -- that is the most important cause of overresponse or evacuation shadow.

at pages 281-82:

(Harris, Mayer) Our experience in the public health field demonstrates that, given the events during the LILCO Exercise, a substantial portion of the population would voluntarily report for testing, even if such persons had no scientific or objective basis for assuming they had been exposed to radiological particulates. Radiation is colorless and odorless. Therefore, it is

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people to determine on their own whether they have been exposed to radiation. We also know that the public has a greater fear of radiation than of almost any other hazard. This fear, coupled with the fact that one cannot determine without monitoring whether one has come in contact with radiation, would result in people reporting to the reception center to seek testing even if they were instructed not to do so.

We are aware of many instances where people, who reasonably could not have believed they were exposed . . . .

[Next 16 lines are duplicative]

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impossible for people to determine on their own whether they have been exposed to radiation. We also know that the public has a greater fear of radiation than of almost any other hazard. This fear, coupled with the fact that one cannot determine without monitoring whether one has come in contact with radiation, would result in people reporting to the reception center to seek testing even if they were instructed not to do so.50/

50/ We are aware of many instances where people, who reasonably could not have believed they were exposed . . . .

[Next 16 lines are duplicative]

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at pages 29-31:

Q. Have you conducted research into the perceptions of local residents about radiation hazards?

* * *

[(Cole)] . . . As a social scientist, I have long believed in the importance of integrating quantitative and qualitative research methods. In order to prove a particular proposition, it is necessary to have quantitative data. Qualitative data adds a richness to quantitative data than can help us understand better what people will do. It can, therefore, provide important insight into the reasons behind some of our findings from systematic quantitative research.

In order to understand better the essentially quantitative answers given by the sample of

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at pages 171-72:

Q. Please explain [why there "would be voluntary evacuation in light of 'pre-existing preceptions and fears of Long Island residents concerning nuclear accidents.'"]

A. (Cole) As a social scientist, I have long believed in the importance of integrating quantitative and qualitative research methods. In order to prove a particular proposition, it is necessary to have quantitative data. Qualitative data adds a richness to quantitative data that can help us understand better what people will do. It can, therefore, provide important insight into the reasons behind some of our findings from systematic quantitative research.

So, in order to understand better the essentially quantitative answers given by the sample of

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Long Island residents who responded to the survey, I conducted some qualitative group interviews, sometimes called "focus groups." Perhaps one of the most important conclusions to be drawn from an analysis of the transcripts of the focus groups is that Long Island residents have a deep-seated fear of being exposed to radiation released during an accident at Shoreham. This fear is held by a significant segment of the Long Island population. Although it may be alleged that this fear may be based on misinformation, it is real nonetheless.

The transcripts of the focus groups suggest strongly that fear of radiation is the primary reason why so many people told us in our systematic survey that they would attempt to seek

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Long Island residents who responded to the survey, I conducted some qualitative group interviews, sometimes called "focus groups." Perhaps one of the most important conclusions to be drawn from an analysis of the transcripts of the focus groups is that the EBS messages prepared by LILCO and used during the Exercise bring out deep-seated fear of being exposed to radiation released during an accident at Shoreham, a fear which is held by a significant segment of the Long Island population. Although it may be alleged that this fear may be based on misinformation, it is real nonetheless. . . .

The transcripts of the focus groups suggest that fear of radiation may be the primary reason why so many people told us in our systematic survey that they would attempt to evacuate if the accident

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monitoring if there was a LILCO advisory that monitoring was necessary, even if such people were not within the scope of LILCO's advisory.

at pages 31-32:

Q. Could you please describe the procedures which were followed in conducting the focus groups?

A. (Cole) I conducted three focus groups with participants living both inside the EPZ and those living in Suffolk County but outside the EPZ.17/

When the participants arrived, they were escorted into a conference room where I greeted them. The respondents were first given a one-page questionnaire in which they were asked to give their opinion on Shoreham and a few demographic

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postulated in the Exercise were real and LILCO responded with the EBS messages it prepared for use during the Exercise.

at pages 72-74 [duplicative but not stricken]:

Q. Could you please describe the procedures which were following in conducting the focus groups?

A. (Cole) I conducted three focus groups with participants living both inside the EPZ and those living in Suffolk County but outside the EPZ. . . .

When the participants arrived, they were escorted into a conference room where I greeted them. The respondents were first given a one-page questionnaire in which they were asked to give their opinion on Shoreham and a few demographic

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characteristics. I told the respondents that we were interested in how they would react if the Shoreham nuclear plant was put on line and something was to happen at the plant. I explained that I would be playing a series of tape recorded messages and we would then be discussing them. I then played for them the full text of some of the EBS messages issued by LILCO during LILCO's February 13, 1986 exercise. Between each message, there were discussions regarding the participants' perceptions and attitudes about a Shoreham accident, and how they would react to the messages.

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characteristics. A tabulation of these results is presented in Attachment 16 hereto. I told the respondents that we were interested in how they would react if the Shoreham nuclear plant was put on line and something was to happen at the plant. I told them I would be playing a series of tape recorded messages and we would then be discussing them. I asked them to imagine that they were at home on a weekday morning and after getting up at 7:00 a.m. they turned on the radio and heard the following message. They were asked to assume that this was not a test but a real event. We then played a recording of the full test of the first EBS message prepared by LILCO, and simulated to be broadcast at 6:52 during the Exercise. After a discussion of that message, other EBS messages prepared during the Exercise (Nos. 2, 3, 4, 5, 6,

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at pages 31-32, footnote 17:

17/ The first group had a mixture of these people; the second had primarily persons living outside but not far from the EPZ; and the third had a majority who lived inside the EPZ, with some living outside but on the border. In order to recruit the members of the focus groups, we draw a random sample of telephone numbers from the exchanges in the EPZ and in Suffolk County bordering the EPZ. These telephone numbers were drawn in the same manner as were those utilized in the systematic survey. Experienced telephone

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7) were also played and discussed. The discussion of the three focus groups were tape recorded and then transcribed.

at pages 172-173 [duplicative but not stricken]:

The first group had a mixture of these people; the second had primarily persons living outside but not far from the EPZ; and the third had a majority who lived inside the EPZ, with some living outside but on the border. In order to recruit the members of the focus groups, we drew a random sample of telephone numbers from the exchanges in the EPZ and in Suffolk County bordering the EPZ. These telephone numbers were drawn in the same manner as were those utilitzed in the systematic survey. Experienced telephone interviewers were used to

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interviewers were used to recruit the participants.

at page 32, footnote 17 cont.:

* * *

Since the analysis of the survey data showed that attitudes toward Shoreham were a very significant determinant of how one would respond to a radiological emergency, we tried to have the composition of the focus groups represent the composition of the population of the areas from which they were drawn on this crucial question. Because in the area from which were drawing the group participants more than 70% of the population is opposed to the opening of the Shoreham plant, we made a special effort to recruit pro-Shoreham participants, turning down potential participants who

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recruit the participants. The interviewers followed a protocol which is Attachment 15.32/

at page 173, footnote 32 [duplicative but not stricken]:

32/ Since the analysis of the survey data showed that attitudes toward Shoreham were a very significant determinate of how one would respond to a radiological emergency, we tried to have the composition of the focus groups represent the composition of the population of the areas from which they were drawn on this crucial question. Because in the area from which we were drawing the group participants more than 70% of the population is opposed to the opening of the Shoreham plant, we made a special effort to recruit pro-Shoreham participants, turning down potential participants who

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were anti-Shoreham in order to find pro-Shoreham participants.

at pages 33-34:

Q. Have you analyzed the focus group transcripts?

A. (Cole, Saegert, Johnson) Yes, we have. They support our testimony that there is a deep-seated fear of radiation -- and the consequences of a Shoreham accident -- on Long Island which would result in a large number of people seeking monitoring even though not advised to do so.

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were anti-Shoreham in order to find pro-Shoreham participants.

at pages 174-75 [duplicative but not stricken]:

Q. Have you analyzed the focus group transcripts?

A. (Cole, Saegert, Loftus) Yes, we have. They provide additional support for the allegations in Contention Ex 22 subpart F, that there would be a substantial voluntary evacuation, in the event of a real Shoreham accident, in response to the EBS messages used by LILCO during that Exercise, as a result of the public's pre-existing perceptions and fears, the contents of the EBS messages, and LILCO's lack of credibility.

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Q. Please explain how the focus group data demonstrate that pre-existing perceptions and fears of Long Island residents concerning nuclear accidents would cause far more people to seek monitoring that LILCO assumes.

A. (Cole, Saegert, Johnson) The focus groups showed that some Long Islanders believe that if there is any accident at Shoreham, they will be exposed to radiation. In general, and consistent with the findings of LILCO's witness, Dr. Lindell, most Long Island residents would not base their assessment of risk on such objective factors as the amount of radiation they have been exposed to or the duration of that exposure. In their view, exposure from an accident at a nuclear

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Q. Please explain, first, how the focus group data support the Contention Ex 22.F allegation that "pre-existing perceptions and fears of Long Island residents concerning nuclear accidents" would cause voluntary evacuation if LILCO's response demonstrated during the Exercise were to occur with respect to a real Shoreham accident.

A. (Cole, Saegert, Loftus) The focus groups showed that some Long Islanders believe that if there is any accident at Shoreham, they will be exposed to radiation. In general as LILCO's former witness Barnett also found in his research, Long Island residents frequently do not base their assessment of risk on either the amount of radiation they have been exposed to or the duration of that exposure. In their view, exposure from an accident at a nuclear power plant to any

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power plant to any amount of radiation for any length of time is dangerous and potentially even lethal. Indeed, for many, the fact that there has been an accident means to them that they have already been exposed.

at page 34:

Below are some of the comments elicited from the focus group participants

* * *

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amount of radiation for any length of time is dangerous and potentially even lethal. One woman who lives in the shadow of the Shoreham plant, when asked what she would do after hearing the first EBS message used by LILCO during the Exercise, replied:

> I live a half a mile east of the plant and I think I would make a nice gin and tonic. I figure I have been exposed and I would just sit it out. Focus Group # 1, held on January 20, 1987.

* * *

at page 177 [duplicative but not stricken]:

After hearing EBS No. 2, a participant stated:

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I think today that we don't live in any area that is isolated from others, and we don't have buffer zones. We may be injured by a nuclear power plant in Wisconsin or Ohio, and to just base a decision on whether we live near LILCO or not may not be the wisest thing to do. I have to agree with this gentleman that when I heard the second report [EBS message # 2] I would already believe that I was affected by it and I am never going to outrun the winds that will take this radiation away.

* * *

I feel that if I didn't die in the next six months, I would definitely die of it in the next five years.

* * *

One of my worries would be that perhaps I had already lost my life and just didn't know it. There is a certain time delay between this release of radiation by the time all consultations were made and got out to all the radio stations, I may have already been exposed to radioactivity. We may in fact be walking dead already. I just don't know.

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I think today that we don't live in any area that is isolated from others, and we don't have buffer zones. We may be injured by a nuclear power plant in Wisconsin or Ohio, and to just base a decision on whether we live near LILCO or not may not be the wisest thing to do. I have to agree with this gentleman that when I heard the second report [EBS # 2] I would already believe that I was affected by it and I am never going to outrun the winds that will take this radiation away. (# 2)

In another focus group after hearing the second EBS message, a respondent said:

I feel that if I didn't die in the next six months, I would definitely die of it in the next five years. (# 2)

Another said:

One of my worries would be that perhaps I had already lost my life and just didn't know it. There is a certain time delay between this release of radiation by the time all consultations were made and got out to all the radio stations, I may have already been exposed to radioactivity. We may in fact be walking dead already. I just don't know. (# 2)

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at pages 35-36:

These statements and many others in the transcripts illustrate well the attitudes of many Long Island residents who participated in the focus groups and, we believe, who answered the larger survey. Once an accident has occurred at Shoreham, and especially if any radiation has been released, they will believe that their lives are in grave danger.20/ Acting in accordance with their fears and beliefs, they will seek monitoring to determine whether they have been exposed to radiation.

at page 35, footnote 20:

20/ Q. Did all the participants in the focus groups have a deep fear of exposure to radiation from an accident at Shoreham?

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at page 177 [duplicative but not stricken]:

These statements illustrate well the attitudes of many Long Island residents who participated in the focus groups and, we imagine, who answered the larger survey. Once an accident has occurred at Shoreham and some (any) radiation has been released, they believe that their lives are in grave danger.

at pages 178-180:

Q. Did all the participants in the focus groups have a fear of exposure to radiation from an accident at Shoreham?

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A. (Cole, Saegert, Johnson) No. Some of the participants expressed the opinion that the amount of radiation being released from Shoreham during the hypothetical accident might not be so great as to kill and that indeed they might be able to protect themselves by sheltering. So, not all of the respondents had a strong fear of radiation; but a majority did. And insofar as we can tell from studies such as that conducted by Slovic, et al., this is true in the general population.

at pages 34-35:

Below are some of the comments elicited from the focus group participants after hearing various of the LILCO EBS messages which ranged from simply advising the public of an accident at the Shoreham plant, to advising evacuation and monitoring for people in specific EPZ subzones.

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A. (Cole, Saegert, Loftus) No. Some of the participants expressed the opinion that the amount of radiation being released from Shoreham during the hypothetical accident might not be so great as to kill and that indeed they might be able to protect themselves by sheltering. So, not all of the respondents had a strong fear of radiation; but a majority did. And insofar as we can tell from studies such as that conducted by Slovic, et al., this is true in the general population.

at page 283:

Here are some additional examples of statements from focus groups respondents, expressing their fears over the long term effects of a Shoreham accident, which would in our opinion, lead them to seek monitoring:

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* * *

With nuclear power, we are dealing with an entity that we don't know that much about. As far as the damages from radiation, and so on. My cousin when she was little was exposed to radiation and twenty years later she had cancer of the thyroid.
You don't have to worry about shopping because they wouldn't let you out with any food. No matter what it was. If it is within the evacuation area, it is contaminated. Where is this reception center? Who is going to welcome you with open arms?
I always think about the long term effects. The water supply, the animals, the grass, the potatoes, all of it. I do not know if

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With nuclear power, we are dealing with an entity that we don't know that much about. As far as the damages from radiation, and so on. My cousin when she was little was exposed to radiation and twenty years later she had cancer of the thyroid. (# 3)
You don't have to worry about shopping because they wouldn't let you out with any food. No matter what it was. If it is within the evacuation area, it is contaminated. Where is this reception center? Who is going to welcome you with open arms? (# 1)
I always think about the long term effects. The water supply, the animals, the grass, the potatoes, all of it. I do not know if

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it happened if I would ever come back.

Even if you were able to would you be happy coming back? I wouldn't. Look at Three Mile Island and that was a minor situation. Chernobyl is going to be closed for 1500 years. Something on that style.

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it happened if I would ever come back. (# 1)

Even if you were able to would you be happy coming back? I wouldn't. Look at Three Mile Island and that was a minor situation. Chernobyl is going to be closed for 1500 years. Something on that style. (# 1)

B. Effects of Chernobyl on Pre-Existing Fears (pages 36-41)

at page 36:

A. (Saegert, Johnson) Without a doubt. In the event of a real emergency, people now have the example of Chernobyl to intensify their fears. The Chernobyl incident -- and its after effects -- were widely publicized.21/ People know that far more than the area 10 miles from the Chernobyl

at pages 283-84:

In the event of a real emergency, people now would also have the example of Chernobyl to intensify their fears. As we discussed in the section of our testimony relating to matters raised in Contention Ex 22.F, the Chernobyl incident -- and its after-effects -- were widely publicized.

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plant was contaminated. In fact, the incident was made public by the Soviet Union only after increased radiation levels were detected by scientists in Sweden. Radiation from Chernobyl affected crops and animals as far away as Scotland, Lapland and Turkey. The example of Chernobyl would give people far outside the EPZ -- as well as people in the EPZ who had not been advised to so do -- a basis for determining that they should seek monitoring.

at pages 36-37, footnote 21:

21/ Headlines such as "Chernobyl Doses Across Continent" and maps have appeared in magazines and newspapers showing half of Europe as contaminated. Subsequent to the Chernobyl accident, newspapers have carried predictions and vivid descriptions of potential cancers resulting from exposure. A year after the Chernobyl accident, one headline read

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People know that far more than the area 10 miles from the Chernobyl plant was contaminated. In fact, the incident was made public by the Soviet Union only after increased radiation levels were detected by scientists in Sweden. Radiation from Chernobyl affected crops and animals as far away as Scotland, Lapland and Turkey. The example of Chernobyl would give people far outside the EPZ -- as well as people in the EPZ who had not been advised to so do -- a rational basis for determining to seek monitoring.

at page 284, footnote 52:

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52 Headlines such as "Chernobyl Doses Across Continent" and maps have appeared in magazines and newspapers showing half of Europe as contaminated. Subsequent to the Chernobyl accident, newspapers have carried predictions and gruesome descriptions of potential cancers resulting from exposure. A year after the Chernobyl accident, one headline

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"After Chernobyl, Birth Defects Low but Retardation High." Pictures in Life magazine of the victims create terrifying and vivid images. Hohenemser, C., Deicher, M., Ernst, A., Hofsass, H., Linder, G., Recknagel, R. (1986) Chernobyl: An early report, Environment 28(5), Washington, D.C.: Heldref Publications, 6-30.

at pages 37-39:

Q. Does the public believe that an accident such as that which occurred at Chernobyl could happen at Shoreham?

A. (Cole) Yes. The first evidence comes from a survey conducted for Newsday in September of 1986. The Newsday survey asked the following question:

> Several months ago there was a serious accident at the Chernobyl nuclear power plant in the Soviet Union. Do you think that a serious accident like this could happen in the United States?

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read "After Chernobyl, Birth Defects Low but Retardation High." Pictures in Life magazine of the victims create terrifying and vivid images. Hohenemser, C., Deicher, M., Ernst, A., Hofsass, H., Linder, G., Recknagel, R. (1986). Chernobyl: An early report. Environment. 28(5), Washington, D.C.: Heldref Publications, 6-30.

at pages 265-67:

Q. Does the public believe that an accident such as that which occurred at Chernobyl could happen at Shoreham?

A. (Cole) The answer is an unequivocal yes. The first evidence comes from the survey conducted for Newsday in September of 1986. The Newsday survey asked the following question:

> Several months ago there was a serious accident at the Chernobyl nuclear power plant in the Soviet Union. Do you think that a serious accident like this could happen in the United States?

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Eighty-two percent of the sample of Long Island residents said. . . .

* * *

[next 42 lines are duplicative]

. . . as a result of fear generated by the accident at the Chernobyl nuclear plant in the Soviet Union.22/ Likewise, this greater concern is likely to cause an increase in the number of people who would seek monitoring in the event of a Shoreham emergency.

at page 39, footnote 22:

22/ When I cross-tabulated the responses to the question on whether they thought an accident like Chernobyl could happen here with behavioral intentions, I found that. . . .

[rest of footnote is duplicative]

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Fully 82 percent of the sample of Long Island residents said. . . .

* * *

[next 41 lines are duplicative]

. . . as a result of fear generated by the accident at the Chernobyl nuclear plant in the Soviet Union.47/

at page 267, footnote 47:

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47 When I cross tabulated the responses to the question on whether they thought an accident like Chernobyl could happen here with behavioral intentions, I found that. . . .

[rest of footnote is duplicative]

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at pages 39-41:

The most recent survey I conducted for Suffolk County also contained questions concerning the Chernobyl accident. The great majority of Long Island residents were familiar with that accident at Chernobyl. All respondents were asked the following question:

* * *

[next 47 lines are duplicative]

at page 41:

In summary, the pre-existing fears which Long Islanders have of radiation, which the above excerpts demonstrate have been exacerbated by Chernobyl, will result in a massive number of people converging on LILCO's reception centers for the purpose of being monitored in the event of an accident at Shoreham.

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at pages 267-70:

The most recent survey I conducted for Suffolk County also contained a few questions concerning the Chernobyl accident. The great majority of Long Island residents were familiar with that accident at Chernobyl. . . . All respondents were asked the following question:

* * *

[next 47 lines are duplicative]

at page 270:

The pre-existing fears which Long Islanders have of radiation, which fears have been exacerbated by Chernobyl, would further increase the tendency for Long islanders to evacuate in response to LILCo's demonstrated EBS messages.48/

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III. The Effects of Emergency Information (pages 41-47)

A. EBS Messages (pages 41-44)

at page 42:

[Concerning the "Effect of Emergency Information"]

(Saegart, Johnson) No. First, as we have discussed above, people have a strong fear of radiation. We have examined the EBS messages in LILCO's Plan and those "broadcast" by LILCO during the February 13 exercise. They do nothing to calm this fear, or to explain why only some people might have been contaminated. In fact, the contents of the EBS messages themselves would probably lead people to seek monitoring.23/

at page 42, footnote 23:

at page 277:

[Concerning Contention EX 49.C on the number of people who would seek monitoring although not so advised]

First, as we have discussed in the section of our testimony on Contention Ex 22.F (above), people have a tremendous fear of radiation. The EBS messages "broadcast" by LILCO during the Exercise do nothing to calm this fear, or to explain why only some people might have been contaminated. In fact, the contents of the EBS messages themselves would probably lead people to seek monitoring.

at pages 277-78:

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23/ For instance, in one such message used during the Exercise it is stated that a "major release of radiation into the air" occurred at 12:00, and then gives thyroid does rates as "percentages" -- 400%, 100% and 40% -- of EPA "evacuation guidelines." There is no attempt. . . .

* * *

[next 19 lines are duplicative]

at pages 42-43:

Second, some people will focus only on the parts of EBS messages stating that the public will be monitored for possible radioactive decontamination, or may have been exposed to

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As we pointed out above, Exercise EBS Message No. 7, which purports to give information about dose rates, is unclear, full of unintelligible jargon, and fear inducing. The message states that a "major release of radiation into the air" occurred at 12:00, and then gives thyroid does rates as "percentages" -- 400%, 100% and 40% -- of EPA "evacuation guidelines." There is no attempt. . . .

* * *

[next 19 lines are duplicative]

at page 279 [duplicative but not stricken]:

Second, some people might focus just on the parts of EBS 8 and 8.1 stating that "the public" will be monitored for possible radioactive decontamination, or on the part of EBS 8.1

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radiation during their trip out of the EPZ, without focusing on the portion of the message intended to limit the size or location of the public which may have been exposed. This is because some people under stress, as Long Island residents surely would be during an accident, often have trouble comprehending and processing spatial information.

Third, even people who understand. . . .

* * *

[next 15 lines are duplicative]

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mentioning that "they may have been exposed to radiation during their trip out of the EPZ," without focusing on the portion of the message intended to limit the size or location of "the public" which may have been exposed.

Third, even people who understood. . . .

* * *

[next 15 lines are duplicative]

B. Credibility

at page 44:

Finally, LILCO's messages that people outside a particular zone would be safe are likely to be discounted by the public due to LILCO's low credibility. As LILCO's witness Dr. Lindell has stated:

at pages 249-50:

LILCO's own witness Michael Lindell has concluded that the allegation in Contention Ex 22.F which we are now discussing, is true. Thus, Lindell and Barnes conclude:

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> The gap between accurate information and the achievement of compliance with recommended actions should be recognized as a large one. Persons must attend to, comprehend, yield to, and retain information before they can act on it. The yielding is likely to occur only if the source of the information is considered credible.

Lindell and Barnes, at 466.

at page 44:

It is well known, and admitted by LILCO, that LILCO has a low degree of credibility in the Long Island community. We will not repeat at length here the evidence on that subject discussed in the prior litigation.24/ In addition, however, more recent surveys and other data have confirmed that fact. Between 1982 and December 1986, there has been little change in the credibility afforded by Long Island residents to LILCO.25/

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> . . . The gap between accurate information and the achievement of compliance with recommended actions should be recognized as a large one. Persons must attend to, comprehend, yield to, and retain information before they can act on it. The yielding is likely to occur only if the source of the information is considered credible.

at page 224:

A. (Cole) First, it is well known, and granted by LILCO, that LILCO does have low credibility in the Long Island community. We will not repeat at length here the evidence on that subject discussed in the prior litigation.39 In addition, however, more recent surveys and other data, referenced in Contention Ex 22.F, have confirmed that fact. Thus, between 1982 and December 1986, there has been little change in the credibility afforded by Long Island residents to LILCO.

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at page 44, footnote 24:

24/ In the 1982 survey conducted for Suffolk County, we found only 4 percent of the population of Long Island said that they would trust a LILCO official to tell the truth about an accident at Shoreham, 36 percent said that they would trust a LILCO official "somewhat," and 58 percent said that they would not trust a LILCO official at all (2 percent had no opinion).

at pages 44-45, footnote 25:

25/ (Cole) In my most recent survey, only eight percent of the respondents said that they would trust a LILCO official "a great deal" to tell the truth about an accident at Shoreham. Thirty-nine percent said "somewhat," and 50 percent said not at all. Two percent had no opinion.

When asked whether they would believe LILCO if its [sic] stated during an accident that all people more than 10 miles from the Shoreham plant

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at page 224, footnote 39:

39/ In the 1982 survey conducted for Suffolk County, we found only 4 percent of the population of Long Island said that they would trust a LILCO official to tell the truth about an accident at Shoreham, 36 percent said that they would trust a LILCO official "somewhat," and 58 percent said that they would not trust a LILCO official at all (2 percent had no opinion).

at pages 224-25:

In my most recent survey, eight percent of the respondents said they would trust a LILCO official "a great deal" to tell the truth about an accident at Shoreham. Thirty-nine percent said "somewhat," and 50 percent said not at all. Two percent had no opinion.

* * *

This survey question is based on LILCO's repeated statement in the EBS message prepared and used

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were safe, only 18 percent of the respondents said that they would believe LILCO on this crucial point; 77 percent said that they would not believe LILCO, and 6 percent said that they did not know whether they would believe LILCO.

at pages 45-46:

(Cole, Saegert, Johnson) The focus group data also support our testimony that people would not accept instructions from LILCO that only portions of the population had been endangered or exposed.26/

26/ "Did you believe [the] LILCO [EBS message] that if you were outside that zone that you weren't in any danger?"

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during the Exercise, that there was no need for people outside the 10 mile zone to take any action. Only 18 percent of the respondents said that they would believe LILCO on this crucial point; 77 percent said that they would not believe LILCO, and 6 percent said that they did not now [sic] whether they would believe LILCO.

at pages 280-81:

(Cole, Saegert, Loftus) Indeed, the focus group data support this analysis that people would not accept as valid instructions from LILCO that only portions of the population has been endangered or exposed:

"Did you believe [the] LILCO [EBS message] that if you were outside that zone that you weren't in any danger?"

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* * *

[next 28 lines are duplicative]

at page 46:

Q. If LILCO has such low credibility, why would people -- indeed more than advised to do so -- go to reception centers run by LILCO to be monitored?

A. (Cole, Saegert, Johnson) If LILCO were to tell Long Island residents during an accident at Shoreham that they are in no danger, LILCO would be saying something that, as the data show, the public would initially disbelieve. However, if LILCO were to tell members of the public that they should be monitored for radioactive contamination, it would be telling them something that

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* * *

[next 28 lines are duplicative]

at pages 284-85:

Q. If LILCO has such low credibility as you have discussed, why would people ignore LILCO's instructions concerning evacuation but listen to its instructions concerning monitoring for possible radioactive contamination?

A. (Cole, Saegert) If LILCO were to tell Long Island residents during an accident at Shoreham that they are in no danger, LILCO would be saying something that the public would initially disbelieve and which the public would believe is in LILCO's self-interest. If LILCO were to tell members of the public that they should be monitored for radioactive contamination, it would

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they would be likely to believe, because it would be consistent with their own beliefs. During a real Shoreham accident many members of the public would be frightened that they had been exposed to potentially harmful doses. Thus, they will attempt to be monitored -- in much higher numbers than LILCO assumes.

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be telling them something that they would be likely to believe, because it would be consistent with their own beliefs. During a real Shoreham accident many members of the public would be desperately frightened that they had been exposed to potentially harmful doses. If LILCO offered them a place to have that level checked, those who could get to that place would attempt to do so.

available roadway capacity has not been accurately portrayed. The buses will also be making frequent stops, in some cases on designated evacuation routes, blocking the lane for at least some time. Finally, in many cases buses and ambulances will be moving in directions contrary to the evacuating traffic, creating conflicting flow. Id.; Herr, ff. Tr. 2909, at 45-46.

558. Mr. Lieberman and Dr. Urbanik took the position that the presence of special vehicles would have an insignificant effect on evacuation times since their numbers are small relative to the numbers of private vehicles. Cordaro et al. (Contention 65), ff. Tr. 2337, at 91; Urbanik, ff. Tr. 3430, at 14. But this meets only part of the concern addressed by Contention 65.E. The special vehicles on the evacuation network will often be traveling in directions contrary to evacuation flows, thus causing delays and interruptions in those flows that have not been, but should be, reflected in LILCO's time estimates.

12. The Effect of Stress (Contention 65.F)

559. Contention 65.F asserts that LILCO's time estimates do not take into account the presence of stress in drivers that can impede their ability to operate, thus leading to increased evacuation times. Professor Saegert testified that during a radiological emergency, the health-threatening conditions that the public may perceive to exist will produce stress and anxiety that will, among other things, affect the behavior and performance of drivers seeking to evacuate. Stress levels are likely to be

significantly higher during a radiological emergency than in other types of emergencies because of the public's heightened fear of radiation.388/ Conditions on Long Island, where the EPZ covers much of the width of the island, where there cannot be a 360 degree dispersal of traffic, and where the roadway capacity is limited, are likely to increase stress and anxiety. Tr. 2328-29 (McGuire). Stress on the part of evacuees is also likely to be aggravated by mistrust of the warning messages and information disseminated by LILCO. Evacuees are likely not to believe LILCO's emergency information because of LILCO's low credibility with the public. Saegert, ff. Tr. 2259, at 8-9; see also findings on Contentions 15 (Section II.B) and 23 (Section I.A).

560. Drs. Mileti and Sorensen testified for LILCO that a radiological emergency will indeed increase stress and anxiety. But in their opinion, this may increase rather than decrease vigilance and therefore result in better driving skills.389/ Dr. Mileti acknowledged, however, that if driving skills and driver awareness decreased under stress, the consequence would be an increase in traffic accidents. Cordaro et al., ff. Tr. 1470, at 135.

388/ This has been amply demonstrated by studies conducted by Slovic, Lichtenstein and Fischoff and confirmed by the actual behavior at TMI and surveys taken on Long Island. Saegert, ff. Tr. 2259, at 3, 6-7; Tr. 2287-91 (Saegert); see also findings on Contention 23 (Section I.A).

389/ Dr. Mileti conducted a study of the TMI accident that failed to suggest an increased incidence of automobile accidents following the accident. Cordaro et al., ff. Tr. 1470, at 130-32. Professor Saegert testified, however, that Dr. Mileti's data were very weak. Tr. 2300 (Saegert).

561. We are unable to accept the opinions of LILCO's witnesses. Good driving on congested roads clearly requires concentration and attention to other drivers' speed, direction, and behavior. Drivers who are stressed and anxious will tend to focus on getting to their destinations and may ignore what other people are doing. Misjudgments may lead to wrong turns and accidents, thus causing delay. As Professors Herr and Saegert testified, studies of driver stress present clear empirical findings that stress, such as will result from a Shoreham emergency, reduces a driver's information processing capacity, which translates into reduced ability to operate an automobile efficiently. Herr, ff. Tr. 2909, at 47-48; Saegert, ff. Tr. 2259, at 17-18. We conclude that the delaying effects of the stress factor should have been included in LILCO's time estimates.390/

390/ Mr. Lieberman testified that he attempted to account for driver "uncertainty" by reducing roadway capacities in his model by 15%. Cordaro et al. (Contention 65), ff. Tr. 2337, at 63. It is clear, however, that the 15% capacity reduction does not reflect the effects of stress but rather the normal loss of capacity that accompanies congested conditions. It is apparent that LILCO has retroactively and inappropriately attempted to stretch the purpose of the 15% capacity reduction factor to cover the stressful conditions of evacuation. We agree with Professor Herr that Mr. Lieberman's 15% reduction factor is too heavily taxed since LILCO claims that it reflects reduced capacity from congestion, reduced capacity from driver uncertainty and anxiety, and reduced capacity from the confusion caused by directing traffic contrary to traffic signals. Tr. 3003-04 (Herr); see Plan, App. A, at III-14 through 15.