



qualifications and background are set forth in my curriculum vitae which was Attachment 3 to my testimony concerning Contention 61.

My name is Susan C. Saegert. I am an Associate Professor of Psychology and Environmental Psychology at the City University of New York Graduate School. My professional qualifications are described in my curriculum vitae, which was submitted and admitted into evidence as an attachment to my testimony on Contention 65. See Tr. 2259.

Q. What is the purpose of this testimony?

A. [Radford, Saegert] The purpose of this testimony is to address Contention 16.E which reads as follows:

Contention 16. LILCO has drafted a public education brochure entitled "Emergency Procedures: Shoreham Nuclear Power Station." The content of LILCO's public information brochure is misleading and incomplete and thus this aspect of the public information program fails to comply with 10 CFR Section 50.47(b)(7), 10 CFR Part 50, Appendix E, Section IV.D.2, and NUREG 0654, Sections II.G.1 and 2. In particular:

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E. The LILCO brochure's discussion of radiation effects is limited to natural sources and very low levels of radiation. It does not adequately address the magnitude of doses that the public might receive during a severe accident, such as one

requiring EPZ evacuation, nor the health-threatening consequences related to such releases. Such inadequate disclosure of essential facts renders the brochure incredible.

2. Do you agree with Contention 16.E?

A. [Radford, Saegert] Yes we do. LILCO's brochure is void of any meaningful discussion of the magnitude, and effects of exposure to, the levels of radiation that could be released into the environment during a serious accident at Shoreham. Rather, the brochure is replete with information about radiation exposure levels experienced in our everyday lives. Although such information is not in itself inaccurate, it is misleading in the context of a discussion of what could happen in the event of an accident at the Shoreham plant because the discussion of natural and very low levels of radiation does not contribute to an understanding of the need to protect one's self and family from the higher exposures which could result from an accident. Furthermore, the brochure contains a misleading illustration which misrepresents the dose savings likely to be achieved by sheltering.

The purpose of a brochure such as LILCO's is to inform the public of the nature of the risk should an accident occur requiring protective actions. Only if the public is informed

of the true nature of the risk is it reasonable to expect that people will attempt to take appropriate protective actions. Inaccurate and incomplete information such as that found in the LILCO brochure renders the brochure ineffective and inadequate as a method of informing the public about why planning for a radiological emergency is necessary.

Q. What does LILCO's brochure tell the readers about radiation?

A. [Radford, Saegert] LILCO's brochure at pages 14-15 describes a few interesting facts about radiation; however, in the context of a discussion of emergency planning, those facts are largely irrelevant and present a distorted and misleading picture to the public. Page 14 is entirely devoted to naturally-occurring levels of radiation. It notes, for example, that radiation is everywhere, that it is easily detected, and that someone living in New York would probably receive a total of about 200 millirems a year from natural sources (e.g., cosmic radiation, food and air) and manmade sources (e.g., medical x-rays and consumer goods). On page 15, the brochure goes on to explain that a person living near a nuclear power plant which is operating normally would receive "at most only 1 to 2 millirem a year."

It is only after more than a page of this sort of information that the LILCO brochure finally asks the relevant question, "What about radiation released as a result of a reactor accident?" The brochure's answer, however, is evasive and unresponsive and could lead the reader to question the relevance of the brochure to the event he is supposed to be receiving information about. The response to the question is that the 75 nuclear power plants operating around the country have never experienced an accident that exposed the public to a level of radiation above natural levels. A brief reference to the accident at Three Mile Island also tells the reader that the average dose to the public within five miles of that plant was about 1 millirem. The effects and possible exposures in the event of a serious accident at Shoreham, however, are completely ignored.

Q. Why is the information in the LILCO brochure inadequate?

A. [Radford, Saegert] The discussion of radiation and possible radiation exposures is inadequate because it does not tell the reader what doses would be possible during a radiological emergency at Shoreham and how taking appropriate protective actions could help to reduce those doses. Apparently LILCO considers the level of radiation one receives from a luminous



watch, a smoke detector or from living in Denver to be relevant to a discussion of planning for an emergency at Shoreham (see page 14). Even assuming for the sake of argument that such matters are relevant, they are certainly no more relevant than the potential consequences of the very incident the brochure is supposed to address - a radiological emergency at Shoreham requiring protective actions on the part of the public. Although information on the potential consequences of an accident exists and could be included in the brochure, LILCO has failed to include any such information.

Q. What additional information should be included in the brochure?

A. [Radford, Saegert] The information about radiation relating to a Shoreham accident which should be included in the brochure falls into two general categories. The first category is the range of potential radiological exposures which could occur as a result of a severe accident at Shoreham. The second category is the potential health consequences of such exposures.

[Radford] Information exists with respect to both subjects. See, for example, the Testimony of Fred C. Finlayson, Gregory C. Minor and Edward P. Radford on Behalf of Suffolk

County Regarding Contention 61, which sets forth the potential doses which could result from a severe Shoreham accident involving the release of radioactive material, the potential dose reductions that could be achieved through the use of various types of shelter in the EPZ, and the potential doses to the public who are in automobiles with no access to shelter. In addition, Science Applications Incorporated and Pickard, Lowe & Garrick have performed a probabilistic risk assessment and consequence analyses, respectively, concerning potential accidents at Shoreham, on behalf of LILCO. Thus, information concerning the range of potential exposures and the potential doses and health effects from such doses is available but has not been included, or even referenced in the LILCO brochure.

[Radford, Saegert] The LILCO brochure includes, at page 16, a brief discussion of federal guidelines on acceptable exposure limits; however, it does not say anything about the relationship of such exposures to those that could occur during a Shoreham accident, or the health consequences of exposure to the levels of radiation that could occur during an accident at Shoreham, which could be far above the limits set forth on page 16.

Q. What should the brochure say about health effects?

A. [Radford, Saegert] In our opinion, the public should be given a brief and accurate description of the health effects -- both early and delayed -- that could result from the exposures that might be received from the wide range of possible accidents at Shoreham.

[Radford] The public should be told that the health effects of radiation can be divided into two basic categories -- "early" effects (sometimes called "acute" effects) and delayed effects; that early effects which may include fatalities or injuries, generally occur from within a few days to 60 to 90 days after exposure, and that delayed effects (sometimes called "latent" effects) may occur at any time throughout the normal lifetime of an individual after exposure. Latent periods of 10 years or more (during which no effects would be medically observed in an exposed individual) are common to most delayed effects.

With respect to early effects, the brochure should tell the reader that the threshold level at which early death occurs is about 200 rem, irrespective of treatment methods for exposed individuals and that given minimal standards of medical treatment after exposure, there is a 50 percent risk of death within



60 days from an exposure of 300 rem. The public should also be informed of the symptoms of radiation illness, which is characterized by vomiting and lethargy. The individual risks of early illness range from a 30 percent chance at 100 rem, to 80 percent chance at 300 rem to almost 100 percent at 400 rem; the chances of incurring early illnesses that might require treatment become negligible at doses of less than 50 rem. The public should also be told that detectable changes in blood cells is commonly associated with doses of 25 to 30 rem.

With respect to delayed effects, the brochure should inform the reader that delayed effects include cancers, teratogenic effects on the developing fetus, and genetic effects, and that cancer is the most common delayed effect. In order to put the risk of cancer from radiation exposure into perspective, the brochure should state that while the average person has about a 28 percent chance of contracting cancer (other than skin cancer) and about a 17 percent chance of dying from it, a dose of 30 rem will increase a person's chance of contracting cancer to about 34 percent. Finally, the public should be told that a 200 rem dose (aside from the early effects) will more than double the chance of contracting cancer -- from 28 percent to 60 percent, and that roughly half of all contracted cancers, except skin cancer, are fatal.

Q. Why should the type of information you have described concerning potential levels of exposure and the resulting health effects of such exposures be included in LILCO's brochure?

A. [Radford, Saegert] The public is generally not well informed about the health consequences of radiation. Radiation is simply not a commonly-confronted disaster agent. People know that if a person is swept into a flood and kept underwater for longer than he can hold his breath, he will probably die. Likewise, the public generally knows that if a person is caught unprotected in a tornado or hurricane, he could be thrown violently by the wind or struck by flying objects. In contrast, people do not generally know very much about the consequences of radiation exposure.

We believe all parties agree that a person's perception of the risk of exposure will certainly influence his actions during an emergency. (See LILCO and Suffolk County Testimony on Contention 23). Yet, the LILCO brochure does not provide adequate information to help the reader form an accurate perception of the risk that could exist during a radiological emergency. If a person believes that he will die from a 5 rem dose, he may try to evacuate no matter what protective action LILCO recommends. Likewise, one who thinks that exposure to

200 rem does not sound so bad, and that evacuation is not worth the security risk of abandoning his home, might reconsider if he knew that exposure to such a dose would almost certainly make him ill and would double his chances of cancer induction as well. Furthermore, without some basic factual information about radiation doses and their effect, the data in LILCO's proposed EBS messages concerning projected doses would be meaningless. In short, the additional information we have proposed is crucial to the public's understanding of the risk, which in turn will help them understand, and make informed judgments about their response to, the protective action recommendations to be made by LILCO.

Q. Do you have any other concerns with respect to the LILCO brochure's discussion of the magnitude of potential doses during an emergency or the health consequences of such exposures?

A. [Radford, Saegert] Yes. On page 7 of the brochure, LILCO has included a very misleading drawing which depicts a family sheltering inside its home. Radiation, represented by arrows, is shown to hit the house and bounce off like rubber balls. No radiation is shown as entering the house. Thus, the drawing strongly implies that, no matter what the radiation level is outside the home, one will suffer no exposure (and consequently

experience no adverse health effects) if one stays inside. This is grossly inadequate and misrepresents the value of sheltering, which lies in dose reduction, not dose elimination.

[Radford] By LILCO's own admission, the average shielding factor from a cloud dose for a residential home in the FPZ is .7. (OPIP 3.6.1 at 36). That means that even if one shelters at home, one will receive on an average about 70 percent of the dose one would receive if outside the home. Thus, to be accurate, the drawing should show at least some of the arrows representing radiation penetrating the house. The way the drawing stands now, however -- with radiation depicted as bouncing off one's house -- is very misleading.

[Radford, Saegert] Indeed, a person looking at the picture would say, "Why evacuate? My house offers complete protection." In cases where evacuation was required, this LILCO-induced misconception could threaten the health of the public. Certainly it makes LILCO's brochure inaccurate and thereby reduces the chance that the public will take appropriate protective actions. Likewise, a person with some knowledge about the efficacy of sheltering would recognize that the drawing is misleading and, as a consequence, might dismiss the entire brochure as inaccurate. Again, this would reduce the

chance that the public will take appropriate protective actions.

Q. Does this conclude your testimony?

A. [Radford, Saegert] Yes.





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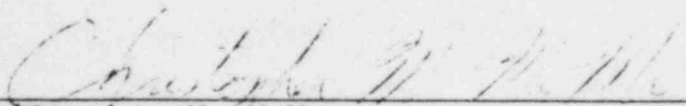
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