

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

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In the Matter of )  
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LONG ISLAND LIGHTING COMPANY )

(Shoreham Nuclear Power Station, )  
Unit 1) )  
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\_\_\_\_\_ )

Docket No. 50-322-OL-3  
(Emergency Planning)

REVISED TESTIMONY OF GREGORY C. MINOR  
ON BEHALF OF SUFFOLK COUNTY  
REGARDING CONTENTIONS 85 AND 88

Q. Please state your name, address, and position.

A. My name is Gregory C. Minor. I am a founder and Vice-President of MHE Technical Associates, 1723 Hamilton Avenue, San Jose, California, and am a principal consultant for the firm. A summary of my experience and professional qualifications is appended to this testimony as Attachment 1.

Q. What is the purpose of this testimony?

A. The purpose of this testimony is to address Emergency Planning Contentions 85 and 88 regarding off-site recovery and reentry. Specifically, this testimony addresses the adequacy of the LILCO Plan with respect to recovery and reentry of the area surrounding the Shoreham Nuclear Power Station ("Shoreham") following a radiological emergency.

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Q. Please state Contentions 85 and 88.

A. Contention 85 and proposed Contention 88, as modified to reflect Revision 4 of the LILCO Plan, and their preamble read as follows:

Preamble to Contentions 84-91. The LILCO Plan proposes that short-term and long-term recovery and reentry operations will be performed by LILCO personnel following a radiological emergency at Shoreham (Plan, at 3.10-1 and 3.10-2; OPIP 3.10.1). For the reasons specified in Contentions 84-91, Intervenor contend that contrary to the emergency planning standards of 10 CFR Section 50.47(b)(13) and NUREG 0654, Section II.M, the LILCO Plan fails to include general plans for recovery and reentry, including the development of necessary procedures and methods that are capable of being implemented.

Contention 85. The LILCO Plan at 3.10-1 states that after site conditions are controlled, the Director of Local Response will appoint a Recovery Action Committee which will "plan and implement actions for the restoration of the affected areas to their pre-emergency conditions." (*Id.*) The LILCO Plan thus provides merely that planning for recovery and reentry will commence after the appointment of the Recovery Action Committee; at this time, no such plan exists. This is contrary to the requirement of 10 CFR Section 50.47(b)(13) that "[g]eneral plans for recovery and reentry are developed," (emphasis added), and NUREG 0654, Section II.M.

Contention 88. The LILCO Plan fails to state the dose criteria that will provide the basis for a determination that it is safe for the public to reenter previously evacuated areas. Thus, the Plan fails to comply with 10 CFR Section 50.47(b)(13) and NUREG 0654, Section II.M.

Q. Do you agree with Contention 85 and proposed Contention 88, as modified to reflect Revision 4 of the LILCO Plan?

A. Yes, I do.

Q. Where does LILCO describe its proposals related to recovery and reentry?

A. Recovery and reentry are discussed in Section 3.10 of the LILCO Plan, at 3.10-1 and 3.10-2. The implementing procedures for recovery and reentry are contained in OPIP 3.10.1, "Recovery/Reentry," which refers to Attachment 1 of OPIP 3.6.6, "Ingestion Pathway Protective Actions." I used Revision 4 of the LILCO Plan as the basis for this testimony.

Q. Why is the provision of the LILCO Plan referenced in Contention 85 contrary to the requirements of NUREG 0654, Section II.M, as stated in that Contention?

A. Criterion 1 of Section II.M states that the responsible organization (in this case, LILCO), "shall develop general plans and procedures for reentry and recovery and describe the means by which decisions to relax protective measures . . . are reached," considering both existing and potential conditions. The LILCO Plan, however, does not include even a general plan for recovery and reentry.

First, the Plan states that "a Recovery Action Committee will be appointed . . . " and that the Committee

"will . . . plan and implement actions for the restoration of the affected areas to their pre-emergency conditions." Plan, at 3.10-1. This does not constitute a plan for recovery; it is merely a plan for the creation of a committee whose charter will presumably include planning for and implementing recovery actions.

Second, the Plan does not address necessary recovery activities which should be considered in an effort to reduce dose rates in contaminated areas, thereby permitting LILCO to lift as soon as possible any protective action(s) initiated as a result of an emergency at Shoreham. Of course, any decisions related to recovery actions or lifting of protective measures would presumably be based upon an evaluation that the actions would not result in undue risk to the public. In this regard, factors to be considered should include effectiveness of decontamination activities including radioactive waste disposal, security for contaminated areas, and the adequacy of food and water supplies. The LILCO Plan, however, does not specify how such factors would be taken into consideration and, if necessary, implemented by LILCO. As a result, the Plan provides no assurance that necessary recovery actions would be implemented.

Third, OPIP 3.10.1 states that the Manager of Local Response, as the chairman of the Recovery Action Committee (OPIP 3.10.1, at 2), is to "ensure[ ]" that surveys of contaminated areas are conducted "to determine the means of decontamination or other disposition." OPIP 3.10.1, at 6. OPIP 3.10.1, however, fails to describe any of the means of decontamination or disposition of contaminated materials which will be considered, or any criteria to be used in deciding between these alternatives.

Q. Please summarize your conclusions with regard to Contention 85.

A. I conclude that Contention 85 is valid. The LILCO Plan and implementing procedures fail to include several components of even a general plan for recovery and reentry, as required by 10 CFR 50.47(b)(13) and NUREG 0654, Section II.M.

Q. What is the basis for your agreement with Contention 88?

A. In my opinion, LILCO has failed to develop adequate means for deciding whether protective measures initiated as a result of an emergency at Shoreham should be relaxed or lifted. The reasons for my opinion in this regard are discussed above. In addition, LILCO's Plan fails to state the dose criteria that would provide the basis for a determination that it would be



safe for the public to reenter previously evacuated areas. Thus, it must be concluded that LILCO has failed to comply with the applicable NRC regulations and guidelines identified in Contention 88 governing reentry following a radiological emergency.

Revision 4 of the Plan includes a dose criteria of 500 mR as a threshold for designating areas as contaminated. See OPIP 3.10.1, at 3. However, the Plan fails to specify any dose level acceptable for reentry by the public. I am aware of the fact that Revision 4 of the Plan has added a new implementing procedure -- OPIP 3.10.2. However, OPIP 3.10.2, as written, does not provide an accurate means for calculating total population dose or dose to a given sector of the population. Further, if OPIP 3.10.2 is meant by LILCO to be used as a means for determining dose rates or projected dose in an area to be reentered, in my opinion it is neither accurate nor reliable for this purpose, since the procedure relies on inaccurate data sources for estimating the affected population of the EPZ or zones within the EPZ. In addition, OPIP 3.10.2 is not supported by other portions of the LILCO Plan, including other implementing procedures, and therefore the data needed to calculate total population dose may not even be available to LILCO.

Q. Does this conclude your testimony?

A. Yes, it does.

ATTACHMENT 1



PROFESSIONAL QUALIFICATIONS OF GREGORY C. MINOR

GREGORY C. MINOR  
MHB Technical Associates  
1723 Hamilton Avenue  
Suite K  
San Jose, California 95125  
(408) 266-2716

EXPERIENCE:

1976 to PRESENT

Vice-President - MHB Technical Associates, San Jose, California

Engineering and energy consultant to state, federal, and private organizations and individuals. Major activities include studies of safety and risk involved in energy generation, providing technical consulting to legislative, regulatory, public and private groups and expert witness in behalf of state organizations and citizens' groups. Was co-editor of a critique of the Reactor Safety Study (WASH-1400) for the Union of Concerned Scientists and co-author of a risk analysis of Swedish reactors for the Swedish Energy Commission. Served on the Peer Review Group of the NRC/TMI Special Inquiry Group (Logoviz Committee). Actively involved in the Nuclear Power Plant Standards Committee work for the Instrument Society of America (ISA).

1972-1976

Manager, Advanced Control and Instrumentation Engineering, General Electric Company, Nuclear Energy Division, San Jose, California

Managed a design and development group of thirty-four engineers and support personnel designing systems for use in the measurement, control and operation of nuclear reactors. Involved coordination with other reactor design organizations, the Nuclear Regulatory Commission, and customers, both overseas and domestic. Responsibilities included coordinating and managing and design and development of control systems, safety systems, and new control concepts for use on the next generation of reactors. The position included responsibility for standards applicable to control and instrumentation, as well as the design of short-term solutions to field problems. The disciplines involved included electrical and mechanical engineering, seismic design and process computer control/programming, and equipment qualification.

1970 - 1972

Manager, Reactor Control Systems Design, General Electric Company, Nuclear Energy Division, San Jose, California

Managed a group of seven engineers and two support personnel in the design and preparation of the detailed system drawings and control documents relating to safety and emergency systems for nuclear reactors. Responsibility required coordination with other design organizations and interaction with the customer's engineering personnel, as well as regulatory personnel.

1963 - 1970

Design Engineer, General Electric Company, Nuclear Energy Division, San Jose, California

Responsible for the design of specific control and instrumentation systems for nuclear reactors. Lead design responsibility for various subsystems of instrumentation used to measure neutron flux in the reactor during startup and intermediate power operation. Performed lead system design function in the design of a major system for measuring the power generated in nuclear reactors. Other responsibilities included on-site checkout and testing of a complete reactor control system at an experimental reactor in the Southwest. Received patent for Nuclear Power Monitoring System.

1960 - 1963

Advanced Engineering Program, General Electric Company; Assignments in Washington, California, and Arizona

Rotating assignments in a variety of disciplines:

- Engineer, reactor maintenance and instrument design, KE and D reactors, Hanford, Washington, circuit design and equipment maintenance coordination.
- Design engineer, Microwave Department, Palo Alto, California. Worked on design of cavity couplers for Microwave Traveling Wave Tubes (TWT).
- Design engineer, Computer Department, Phoenix, Arizona. Design of core driving circuitry.
- Design engineer, Atomic Power Equipment Department, San Jose, California. Circuit design and analysis.
- Design engineer, Space Systems Department, Santa Barbara, California. Prepared control portion of satellite proposal.

- Technical Staff - Technical Military Planning operation. (TEMPO), Santa Barbara, California. Prepare analyses of missile exchanges.

During this period, completed three-year General Electric program of extensive education in advanced engineering principles of higher mathematics, probability and analysis. Also completed courses in Kepner-Tregoe, Effective Presentation, Management Training Program, and various technical seminars.

#### EDUCATION

University of California at Berkeley, BSEE, 1960.

Advanced Course in Engineering - three-year curriculum, General Electric Company, 1963.

Stanford University, MSEE, 1966.

#### HONORS AND ASSOCIATIONS

- Tau Beta Pi Engineering Honorary Society
- Co-holder of U.S. Patent No. 3,565-760, "Nuclear Reactor Power Monitoring System," February, 1971.
- Member: American Association for Advance of Science.
- Member: Nuclear Power Plant Standards Committee, Instrument Society of America.

#### PERSONAL DATA

Born: June 7, 1937

Married, three children

Residence: San Jose, California

#### PUBLICATIONS AND TESTIMONY

1. G. C. Minor, S. E. Moore, "Control Rod Signal Multiplexing," IEEE Transactions on Nuclear Science, Vol. NS-19, February, 1972.
2. G. C. Minor, W. G. Milam, "An Integrated Control Room System for a Nuclear Power Plant," NEDO-10658, presented at International Nuclear Industries Fair and Technical Meetings, October, 1972, Basle, Switzerland.

3. The above article was also published in the German Technical Magazine, NT, March, 1973.
4. Testimony of G. C. Minor, D. G. Bridenbaugh, and R. B. Hubbard before the Joint Committee on Atomic Energy, Hearing held February 18, 1976, and published by the Union of Concerned Scientists, Cambridge, Massachusetts.
5. Testimony of G. C. Minor, D. G. Bridenbaugh, and R. B. Hubbard before the California State Assembly Committee on Resources, Land Use, and Energy, March 8, 1976.
6. Testimony of G. C. Minor and R. B. Hubbard before the California State Senate Committee on Public Utilities, Transit, and Energy, March 23, 1976.
7. Testimony of G. C. Minor regarding the Grafenrheinfeld Nuclear Plant, March 16-17, 1977, Wurzburg, Germany.
8. Testimony of G. C. Minor before the Cluff Lake Board of Inquiry, Regina, Saskatchewan, Canada, Department 21, 1977.
9. The Risks of Nuclear Power Reactors: A Review of the NRC Reactor Safety Study WASH-1400 (NUREG-75/0140), H. Kendall, et al, edited by G. C. Minor and R. B. Hubbard for the Union of Concerned Scientists, August, 1977.
10. Swedish Reactor Safety Study: Barseback Risk Assessment, MHB Technical Associates, January, 1978. (Published by Swedish Department of Industry as Document SdI 1978:1)
11. Testimony by G. C. Minor before the Wisconsin Public Service Commission, February 13, 1978, Loss of Coolant Accidents: Their Probability and Consequence.
12. Testimony by G. C. Minor before the California Legislature Assembly Committee on Resources, Land Use, and Energy, AB 3108, April 26, 1978, Sacramento, California.
13. Presentation by G. C. Minor before the Federal Ministry for Research and Technology (BMFT), Meeting on Reactor Safety Research, Man/Machine Interface in Nuclear Reactors, August 21, and September 1, 1978, Bonn, Germany.
14. Testimony of G. C. Minor, D. G. Bridenbaugh, and R. B. Hubbard, before the Atomic Safety and Licensing Board, September 25, 1978, in the matter of Black Fox Nuclear Power Station Construction Permit Hearings, Tulsa, Oklahoma.

15. Testimony of G. C. Minor, ASLB Hearings Related to TMI-2 Accident, Rancho Seco Power Plant, on behalf of Friends of the Earth, September 13, 1979.
16. Testimony of G. C. Minor before the Michigan State Legislature, Special Joint Committee on Nuclear Energy, Implications of Three Mile Island Accident for Nuclear Power Plants in Michigan, October 15, 1979.
17. A Critical View of Reactor Safety, by G. C. Minor, paper presented to the American Association for the Advancement of Science, Symposium on Nuclear Reactor Safety, January 7, 1980, San Francisco, California.
18. The Effects of Aging on Safety of Nuclear Power Plants, paper presented at Forum on Swedish Nuclear Referendum, Stockholm, Sweden, March 1, 1980.
19. Minnesota Nuclear Plants Gaseous Emissions Study, MHB Technical Associates, September, 1980, prepared for the Minnesota Pollution Control Agency, Roseville, MN.
20. Testimony of G. C. Minor and D. G. Bridenbaugh before the New York State Public Service Commission, Shoreham Nuclear Plant Construction Schedule, in the matter of Long Island Lighting Company Temporary Rate Case, September 22, 1980.
21. Testimony of G. C. Minor and D. G. Bridenbaugh before the New Jersey Board of Public Utilities, Oyster Creek 1980 Refueling Outage Investigation, in the matter of Jersey Central Power and Light Rate Case, February 19, 1981.
22. Systems Interaction and Single Failure Criterion, MHB Technical Associates, January, 1981, prepared for and available from the Swedish Nuclear Power Inspectorate, Stockholm, Sweden.
23. Systems Interaction and Single Failure Criterion: Phase II Report, MHB Technical Associates, February 1982, prepared for and available from the Swedish Nuclear Power Inspectorate, Stockholm, Sweden.
24. Testimony of G. C. Minor and D. G. Bridenbaugh on PORV's and Pressurizer Heaters. Diablo Canyon Operating License hearing before ASLB, January 11, 1982.
25. Testimony of G. C. Minor and R. B. Hubbard on Emergency Response Planning. Diablo Canyon Operating License hearing before ASLB, January 10, 1982.



26. Testimony of G. C. Minor, R. B. Hubbard, M. W. Goldsmith, S. J. Harwood on behalf of Suffolk County, before the Atomic Safety and Licensing Board, in the matter of Long Island Lighting Company, Shoreham Nuclear Power Station, Unit 1, regarding Contention 7B, Safety Classification and Systems Interaction, April 13, 1982.
27. Testimony of G. C. Minor and D. G. Bridenbaugh on behalf of Suffolk County, before the Atomic Safety and Licensing Board, in the matter of Long Island Lighting company, -Shoreham Nuclear Power Station, Unit 1, regarding Suffolk County Contention 11, Passive Mechanical Valve Failure, April 13, 1982.
28. Testimony of G. C. Minor and R. B. Hubbard on behalf of Suffolk County, before the Atomic Safety and Licensing Board, in the matter of Long Island Lighting Company, Shoreham Nuclear Power Station, Unit 1, regarding Suffolk County Contention 27 and SOC Contention 3, Post-Accident Monitoring, May 25, 1982.
29. Testimony of G. C. Minor and D. G. Bridenbaugh on behalf of Suffolk County, before the Atomic Safety and Licensing Board, in the matter of Long Island Lighting Company, Shoreham Nuclear Power Station, Unit 1, regarding Suffolk County Contention 22, SRV Test Program, May 25, 1982.
30. Testimony of G. C. Minor and D. G. Bridenbaugh on behalf of Suffolk County, before the Atomic Safety and Licensing Board, in the matter of Long Island Lighting Company, Shoreham Nuclear Power Station, Unit 1, regarding Suffolk County Contention 28(a)(vi) and SOC Contention 7A(6), Reduction of SRV Challenges, June 14, 1982.
31. Testimony of G. C. Minor on behalf of Suffolk County, before the Atomic Safety and Licensing Board, in the matter of Long Island Lighting Company, Shoreham Nuclear Power Station Unit 1, regarding Environmental Qualification, January 18, 1983.
32. Testimony of G. C. Minor and D. G. Bridenbaugh before the Pennsylvania Public Utility Commission, on behalf of the Office of Consumer Advocate, Regarding the Cost of Constructing the Susquehanna Steam Electric Station, Unit I, Re: Pennsylvania Power and Light, March 18, 1983.
33. Supplemental testimony of G. C. Minor, R. B. Hubbard, and M. W. Goldsmith on behalf of Suffolk County, before the Atomic Safety and Licensing Board, in the matter of Long Island Lighting Company, Shoreham Nuclear Power Station, Unit 1, regarding Suffolk County Contention 7B, Safety Classification and Systems Interaction, March 23, 1983.



34. Testimony before the District Court Judge in the case of Sierra Club et al. vs. DOE regarding the Clean-up of Uranium Mill Tailings. June 20, 1983.
35. Systems Interaction and Single Failure Criterion: Phase 3 Report, MHB Technical Associates, June, 1983, prepared for and available from the Swedish Nuclear Power Inspectorate, Stockholm, Sweden.
36. Systematic Evaluation Program: Status Report and Initial Evaluation, MHB Technical Associates, June, 1983, prepared for and available from the Swedish Nuclear Power Inspectorate, Stockholm, Sweden.

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Docket No. 50-322-OL-3  
(Emergency Planning)

CERTIFICATE OF SERVICE

I hereby certify that copies of (1) Suffolk County's Motion to Admit Proposed Modified Emergency Planning Contention 88 and Suffolk County's Revised Testimony on Emergency Planning Contentions 85 and 88 and (2) Revised Testimony of Gregory C. Minor on Behalf of Suffolk County Regarding Contentions 85 and 88 have been served to the following this 1st day of August, 1984 by U.S. mail, first class, except as otherwise noted.

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Dated: August 1, 1984

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\* By Hand

\*\* By Federal Express