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LILCO, February 4, 1987

RELATED CORRESPONDENCE

DOCKETED  
USNRC

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

'87 FEB -6 A10 :04

Before the Atomic Safety and Licensing Board

OFFICE OF SECRETARY  
DOCKETING & SERVICE  
BRANCH

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

LILCO'S RESPONSES AND OBJECTIONS TO INTERVENORS' FIRST  
SET OF INTERROGATORIES AND REQUEST FOR PRODUCTION OF  
DOCUMENTS REGARDING RECEPTION CENTER ISSUES DATED JANUARY 21, 1987

LILCO hereby responds to the "Suffolk County, State of New York and Town of Southampton's Interrogatories and Request for Production of Documents to LILCO Regarding Reception Center Issues," dated January 21, 1987.

I. GENERAL ANSWERS AND OBJECTIONS TO ALL INTERROGATORIES,  
DEFINITIONS AND INSTRUCTIONS

A. All documents referenced in these answers which are not enclosed will be provided within the 30-day production period (that is, by February 20, 1987) to the extent LILCO does not object to their production. In some instances, LILCO may make the documents available for inspection at LILCO's place of business within the 30-day production period.

B. LILCO continues to object to that portion of Suffolk County's definition V.(4) which seeks to include the "medical drill" held on February 9, 1986 in the exercise litigation, though the objection is not relevant to these responses.

C. LILCO continues to object to Paragraph L of Suffolk County's Definitions and Instructions on the ground that disclosure of such information would constitute an invasion of privacy of those individuals, which may subject them to harassment and intimidation.

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D. LILCO objects to the inclusion of attorneys in the definition of "LILCO" or "LILCO personnel" in paragraph H of Suffolk County's Definitions and Instructions because their inclusion is clearly calculated to discover information protected by the attorney-client privilege and the work product doctrine.

E. LILCO objects to all interrogatories, definitions and instructions insofar as they require the disclosure of any information subject to the attorney-client privilege or work product doctrine.

F. LILCO objects to all interrogatories insofar as they purport to require information outside the possession, custody or control of LILCO.

## II. ANSWERS AND OBJECTIONS TO INTERROGATORIES

### Intervenors' Interrogatory No. 1

Identify each person whom LILCO expects to call as an expert or non-expert witness during the reception center hearings and state the subject matter on which each such witness is expected to testify. For each expert witness identified, state the substance of the facts and opinions to which such witness is expected to testify, and a summary of the grounds for each such opinion.

Response: As of this date, LILCO plans to present a panel of five expert witnesses:

Charles A. Daverio  
Dale E. Donaldson  
Edward B. Lieberman  
Roger E. Linnemann  
Richard J. Watts

The following description of what these witnesses are expected to testify and the bases for their testimony is accurate as of this date, but of course the testimony may be refined, modified, and supplemented as trial preparation continues.

Charles A. Daverio -- Mr. Daverio will describe the monitoring and decontamination procedures and testify that they are workable and that the equipment is available and the personnel adequate to implement them. He may also address the need for approvals under state environmental laws, based on his knowledge of the practice at other nuclear plants. He may address the number of people likely to be monitored in an emergency.

Dale E. Donaldson -- Mr. Donaldson may testify as to the adequacy of the procedures, equipment, and staffing for monitoring and decontamination. He may also testify about the number of people likely to be monitored. Finally, he may be called upon to offer insight into the meaning of the guidance in NUREG-0654; these opinions will be based on his experience in the NRC, during which he participated in the drafting of NUREG-0654.

Edward B. Lieberman -- Mr. Lieberman will support LILCO's estimates of the number of vehicles that can be brought into the reception centers in about 12 hours and will testify that transportation and traffic problems would not make the reception centers unsuitable. His opinions will be based on his own analysis, as described in KLD Associates, Inc., Capacity Analysis of Highways in the Vicinity of Reception Centers for Evacuees from within the Shoreham Station Emergency Planning Zone (September 26, 1986), and the 1985 Highway Capacity Manual, Special Report 209 by the Transportation Research Board. (A copy of the Capacity Analysis document will be delivered to Suffolk County and New York State counsel on February 5, 1987.)

Roger E. Linnemann -- Dr. Linnemann is expected to testify about the medical aspects of radioactive contamination, particularly the expected public health and safety impact of traveling to the reception centers. He will base his testimony on his experience in radiological health and safety, as reflected in his resume.

Richard J. Watts -- Mr. Watts is expected to describe how LILCO plans to monitor and, if necessary, decontaminate members of the public at the reception centers. He is expected to testify about how washwater from the decontamination process would be contained; that the procedures, equipment, and staffing for monitoring and decontamination are adequate; that LILCO's proposal to transport evacuees traveling on buses to the Hicksville facility is workable; and that the proposal to send evacuees to LILCO parking lots could and would be implemented so as to protect the public health

and safety. He will base these opinions on his training as a health physicist and his experience in developing the LILCO plan, as well as his experience working as a health physicist for other nuclear power plant licensees.

It is possible that additional witnesses will be designated, particularly if the Intervenor raise issues that appear to call for additional witnesses. If so, LILCO will advise the Intervenor.

**Intervenor's Interrogatory No. 2**

Provide an up-to-date resume for each witness identified in response to Interrogatory No. 1.

**Response:** Resumes for Messrs. Daverio, Lieberman, and Watts were provided on November 10, 1986, in the -05 proceeding. Resumes for Mr. Donaldson and Dr. Linnemann are enclosed. Mr. Donaldson is now Manager of Radiological Engineering Services at Hydro Nuclear Services rather than Director, Radiological Services Division, as shown on his resume, but his duties are substantially the same as before.

In addition to the "selected publications" listed on Mr. Lieberman's resume, Mr. Lieberman has written two papers that have not yet been published. Both were presented at a Transportation Research Board meeting in January 1987. One is about an enhancement of a freeway model dealing with traffic congestion, and the other deals with interactive computer graphics for use with a traffic model. LILCO will provide copies by February 20.

**Intervenor's Interrogatory No. 3**

Identify all studies, papers, articles, reports, books, and other such documents, published or unpublished, upon which each witness identified in response to Interrogatory No. 1 intends to rely in support of his or her testimony. Provide a copy of all items identified in response to this interrogatory, except that those items readily available in the public domain need not be provided.

**Response:** At present the documents on which LILCO foresees that it may rely on in its testimony are the following:

1. Figure 4.2.1 of the emergency plan (Rev. 8).
2. OPIP 4.2.3 (Rev. 8) or portions thereof.
3. Guidance memorandum on NUREG-0654/FEMA-REP-1 Evaluation Criterion J.12, from Richard W. Krimm, dated December 24, 1985, with attachments.
4. KLD Associates, Inc., Capacity Analysis of Highways in the Vicinity of Reception Centers for Evacuees from within the Shoreham Station Emergency Planning Zone (September 26, 1986).
5. Letters of August 29, 1983, and November 16, 1983 from Donald B. Davidoff of New York State's Radiological Emergency Preparedness Group to George Brower, Director, Disaster/Emergency Preparedness.
6. The information about locations of relocation centers attached to Stewart Glass's letter of February 12, 1985, to Michael S. Miller.
7. Proposed drafts of revisions to OPIP 3.9.2, 4.2.3, and/or 4.3.1 and proposed revisions of the relevant sections of the emergency plan.
8. NUREG-0396 and NUREG-0654.

Intervenors already have all these documents except no. 7. LILCO expects to provide draft revisions of procedures and plan to Intervenors by February 20, 1987.

Witnesses will also rely on the general body of literature in their fields and may also rely on the papers they have authored, as listed on their resumes. LILCO believes these papers are already available to Intervenors, except possibly for publication no. 30 on Dr. Linnemann's resume. LILCO expects to provide Intervenors a copy of that article by February 20, 1987.

#### **Intervenors' Interrogatory No. 4**

Identify by date, location and proceeding all prior testimony before any judicial, administrative, or legislative body, including deposition testimony, given by each of the witnesses identified in response to Interrogatory No. 1 concerning any aspect of emergency preparedness.

**Response:** Dr. Linnemann's prior testimony is listed on his resume, a copy of which is enclosed. Added to that list should be his testimony in the St. Lucie proceeding: Florida Power and Light Co. (St. Lucie Nuclear Power Project, Unit No. 2), Docket No. 50-389, in Stuart, Florida, in October 1974 and December 1976.

The locations of Dr. Linnemann's other testimony, to the best of his recollection, were Philadelphia (Limerick proceeding), Perryville, Ohio (Cleveland Electric Company proceeding), New York City (August 25, 1982 deposition in Shoreham case), Fulton, Missouri (Callaway proceeding), Berwick, Pennsylvania (Susquehanna proceeding), Granbury, Texas (Comanche Peak), Miami, Florida (Turkey Point), Anaheim, California (San Onofre), Hanover, Germany (Gorleben), Stony Brook, New York, (Shoreham 1971), Prince Frederick, Maryland (Calvert Cliffs), and New London and Waterbury, Connecticut (Millstone).

The third item of professional testimony on Dr. Linnemann's resume should refer to Duquesne Light Company instead of Pennsylvania Power Company. The testimony was presented, to the best of Dr. Linnemann's recollection, in the vicinity of the Beaver Valley nuclear plant.

Mr. Donaldson testified before the ASLB in the Three Mile Island restart proceeding in approximately February or March 1980. He was deposed for an investigation of the NRC's response to the TMI accident by the NRC Office of the Executive Legal Director in about July 1980.

Information about the previous testimony of Messrs. Watts, Daverio, and Lieberman has already been provided to the Intervenors in the -05 proceeding; in addition, those three people, as Intervenors know, were recently deposed in the -05 proceeding.

**Intervenors' Interrogatory No. 5**

Identify all articles, papers, and other documents authored or co-authored by each LILCO witness identified in response to Interrogatory No. 1 on the subject of reception centers, care of evacuees during emergencies, monitoring or decontamination of people or property, handling contaminated materials, traffic engineering or management, or the number of persons expected to arrive at LILCO's reception centers for monitoring. Provide a copy of each document identified in response to this interrogatory.

Response: This information has already been provided in the -05 proceeding for Messrs. Watts, Daverio, and Lieberman. Dr. Linnemann's and Mr. Donaldson's publications are listed on their resumes. In addition, Mr. Donaldson contributed to a Temporary Instruction document setting forth inspection techniques for the NRC's Emergency Preparedness Appraisal Program.

Of the publications listed on Dr. Linnemann's resume, nos. 3-6, 9-11, and 14-30 address monitoring or decontamination or handling of contaminated materials or related matters. No. 30 addresses reception centers and care of evacuees during emergencies.

Richard Watts has written a progress report, in the summer of 1986, regarding the available monitoring instruments and their pros and cons. This will be provided to Intervenor by February 20, 1987.

#### Intervenors' Interrogatory No. 6

Identify all documents concerning the use of LILCO's Hicksville, Bellmore, and Roslyn Operations Centers as reception centers. Provide a copy of each document identified in response to this interrogatory.

Response: Such documents are identified in response to Interrogatories 3, 5, 8, and 15. Also, the following documents are in the custody of Jeff Sobotka at LERIO's headquarters at 140 Hoffman Lane, Central Islip, New York 11722:

1. Construction specifications and commercial information about the monitoring/decontamination trailers and
2. Documents about storage tanks used to collect washwater.

Also, Brant Aidikoff has a file with reception center-related documents at LERIO headquarters. Documents from this file will be produced for the Intervenor by February 20 to the extent the Intervenor does not already have them and they are not covered by attorney-client or work product privilege.

**Intervenors' Interrogatory No. 7**

Identify the number of evacuees which LILCO estimates will arrive at LILCO's reception centers for monitoring in the event of a radiological emergency at Shoreham and state whether LILCO's Plan or procedures reflect this estimate as a planning basis.

**Response:** LILCO estimates that up to 20% of the population of the plume EPZ, or 32,000 people, might arrive at reception centers for monitoring. LILCO bases this estimate on FEMA guidance, namely the December 24, 1985 guidance memorandum from Richard W. Krimm. It is possible that more people might need monitoring, depending on the nature of the accident.

LILCO is prepared to monitor more than 20% if necessary. LILCO's current estimate is that LERO can monitor 30-35% of the plume EPZ population (monitoring all passengers in cars) in about 12 hours, using a procedure that will be produced for Intervenors, in draft, by February 20, 1987. By calling in additional resources from the Institute of Nuclear Power Operations this figure could be bettered. By using the monitoring method described in Revision 8 of the emergency plan the figure would be close to 100%.

**Intervenors' Interrogatory No. 8**

Describe how the estimate provided in response to Interrogatory No. 7 was derived and state all facts and opinions on which the estimate is based.

**Response:** As stated above, the 20% estimate is based on FEMA guidance. The 30-35% estimate is based on a summary of time trials for vehicle occupant monitoring, dated January 5, 1987, and prepared by Richard Watts (copy provided to Suffolk County and New York State with these answers), and on the information in Revision 8 of the emergency plan and procedures. The 100% is based on a calculation using the information in Revision 8 of the plan and procedures.

**Intervenors' Interrogatory No. 9**

Identify each factor that LILCO claims makes its reception centers suitable to serve as reception centers for EPZ evacuees.

**Response:** The factors that make the three reception centers suitable are that they comply with NRC and FEMA regulations and guidelines. In particular:

- a. "A range of protective actions have been developed for the plume exposure pathway EPZ for . . . the public. Guidelines for the choice of protective actions during an emergency, consistent with Federal guidance are developed and in place, . . ." as required by 10 C.F.R. § 50.47(b)(10) (1986).
- b. LILCO's plan includes "Relocation centers in host areas which are at least five miles, and preferably ten miles, beyond the boundaries of the plume exposure emergency planning zone," as suggested by NUREG-0654, Evaluation Criterion J.10.h.
- c. LILCO has described "the means for registering and demonitoring of evacuees at relocation centers in host areas" and "The personnel and equipment available [are] capable of monitoring within about a 12 hour period all residents and transients in the plume exposure EPZ arriving at relocation centers," as suggested in NUREG-0654 Evaluation Criterion J.12.
- d. LILCO's plan includes provisions at relocation centers in the form of trained personnel and equipment to monitor a minimum of 20 percent of the estimated population to be evacuated, as suggested by the December 24, 1986, guidance memorandum from Richard W. Krimm of FEMA.

As a more detailed list of factors that make the reception centers suitable, LILCO submits that each of the nine issues that have been admitted for litigation should be answered in LILCO's favor:

1. Transportation and traffic problems as a result of the reception centers' location and their distance from the plume EPZ would not make the centers unsuitable.
2. The reception centers' locations would not create problems in regard to the evacuation "shadow phenomenon" such as to make the centers unsuitable.
3. The proposed use of the reception centers for reception center purposes would not require authorization under state environmental law (and in any event state environmental laws would not interfere with the response to a real emergency).
4. The effect of the use of the reception centers on the water supply would not make them unsuitable.

5. The distance of the reception centers from the plume EPZ would not increase exposure to radiation as to make the centers unsuitable.
6. The evacuation routes to the three LILCO facilities proposed as reception centers are adequate, and the effects of traffic congestion on the way to and in the vicinity of the facilities and LILCO's proposal to employ traffic guides on Nassau County roadways would not render the facilities unsuitable.
7. Staffing for the reception centers is adequate.
8. LILCO's proposal to transport all evacuees traveling on buses to the parking lot next to its Hicksville facility, when that facility itself is also proposed by LILCO to be the LERO worker relocation center, does not render the centers unsuitable.
9. The proposal to send evacuees to LILCO parking lots could and would be implemented in a way to protect the public health and safety; LILCO could and would perform radiological monitoring of the public in a suitable fashion.

If this interrogatory asks for more, for example, a complete list of every advantage that LILCO believes one or more of the three reception centers possess, LILCO objects on the grounds that it is burdensome and seeks irrelevant information.

**Intervenors' Interrogatory No. 10**

Identify each factor which LILCO claims makes its Plan or procedures for operating the reception centers adequate.

**Response:** The factors that make the plan and procedures adequate are that the procedures and plan are implementable, the equipment necessary to implement them is available, and it is reasonable to expect that the procedures would achieve the desired outcome, namely the monitoring of up to 20 percent of the EPZ population within about 12 hours. Moreover, as indicated above, the plan and procedures are capable of exceeding this performance by a substantial margin.

**Intervenors' Interrogatory No. 11**

Identify all documents concerning LILCO's procedures for monitoring or decontaminating evacuees. Provide a copy of each document identified in response to this interrogatory.

**Response:** Already identified in response to other interrogatories.

**Intervenors' Interrogatory No. 12**

Identify all communications between LILCO and any governmental bodies concerning LILCO's use of the Hicksville, Bellmore, and Roslyn Operations Centers as reception centers. Provide all documents concerning such communications.

**Response:** Letters from the Towns of Hempstead and North Hempstead are already in the possession of the Intervenors; likewise a letter of January 8, 1987, from the Roslyn Water District Board of Commissioners. All correspondence with FEMA and the NRC, namely Revision 8 of the emergency plan and its cover letter, is also in the Intervenors' hands.

LILCO objects to the disclosure of oral communications with individual government officials or employees on the ground that disclosure might subject the individuals to harassment and intimidation and have a chilling effect on routine communications LILCO may need to make to ensure the safety of Shoreham or to conduct its ordinary business operations on Long Island. Disclosure would also interfere with LILCO's First Amendment rights to freedom of speech and to petition its government for redress of grievances.

**Intervenors' Interrogatory No. 13**

Identify by date and location any drills or exercises held at LILCO's reception centers to determine their adequacy or the adequacy of LILCO's procedures for monitoring and handling evacuees at the reception centers.

**Response:** None.

**Intervenors' Interrogatory No. 14**

Identify all communications between LILCO and the NRC or FEMA concerning the use of the Bellmore, Hicksville, and Roslyn Operations Centers as reception centers. Provide all documents concerning such communications.

**Response:** Revision 8 of the emergency plan and the cover letter thereto. See the objection in the response to Interrogatory No. 13 above.

**Intervenors' Interrogatory No. 15**

Identify any documents concerning the management or treatment of vehicle traffic in and around the reception centers. Provide all documents identified in response to this interrogatory.

**Response:** The principal document is "Capacity Analysis of Highways in the Vicinity of Reception Centers for Evacuees from within the Shoreham Station Emergency Planning Zone," by KLD Associates, Inc., dated September 26, 1986.

The following documents are in the custody of Edward Lieberman at KLD Associates, Inc.:

1. Correspondence between KLD and ATI, 15 Park Row, New York City, the company that collected traffic data for the KLD study identified above.
2. Documents containing information on traffic signal timing and sketches of key intersections and places on streets leading to the three reception centers.
3. Computer print-outs (perhaps 100 pages) showing traffic counts.
4. Memorandum from Jeff Sobotka of LERIO containing information about the flow of traffic within each reception center, including sketches for each reception center.
5. Hand calculations of traffic volumes (perhaps 300 pages).

These documents will be made available to Intervenors by February 20, 1987.

**III. PRIVILEGED DOCUMENTS**

The following documents are privileged under both the attorney-client privilege and the work product doctrine:

1. Memorandum of January 16, 1987 from LILCO counsel (James N. Christman) to LILCO emergency planning personnel and lawyers (Robinson, Daverio, Crocker, Aidikoff, McCaffrey, Weismantle, Irwin, and McCleskey) regarding preparation for hearing, witness identification, and issues for hearing.
2. Draft of LILCO's testimony questions on reception centers, dated January 23, 1987, prepared by counsel (Christman) after consultation with witnesses.
3. Memorandum of December 17, 1986 by members of LILCO Legal Department (Anthony F. Earley, Jr., and Warren S. Arthur) to Ira L. Freilicher, a LILCO vice president, about legal issues regarding the reception centers.

4. Memorandum of January 26, 1987, from LILCO's General Counsel (Anthony F. Earley, Jr.) to LILCO's Chairman of the Board regarding LILCO's response to inquiries regarding the three reception centers.

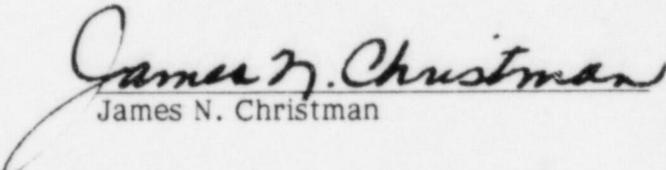
The following documents are privileged under the work product doctrine:

5. Report prepared by Richard Watts for Douglas Crocker, dated September 16, 1986, on capacities of relocation centers for plants other than Shoreham.
6. Memorandum of November 10, 1986, from Brant Aidikoff to legal counsel (Lee Zeugin) regarding monitoring capacities for plants other than Shoreham.
7. Undated memorandum by Brant Aidikoff on revised reception center planning basis, prepared for meeting with counsel. Copies in custody of Brant Aidikoff, Charles Daverio, Douglas Crocker, Richard Watts, and Lee Zeugin.

IV. OBJECTIONS STATED BY COUNSEL

All objections and references to objections are stated by counsel.

Respectfully submitted,

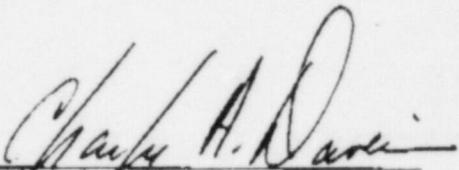
  
James N. Christman

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

DATED: February 4, 1987

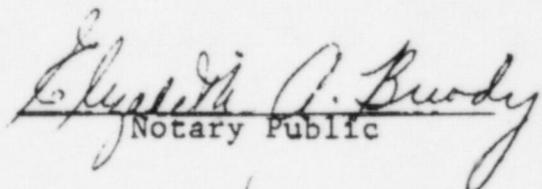
VERIFICATION

Charles A. Daverio, being first duly sworn on oath, deposes and says: that he is currently the Assistant Department Manager, Nuclear Operation Support Department, for Long Island Lighting Company; that he has personal knowledge of a portion of the subject matter of this litigation; that responsible corporate employees have provided him with additional facts necessary to provide the information contained in the foregoing Answers to Interrogatories; that he has read the answers, and knows the contents thereof; and that based upon such information of which he has personal knowledge and with which he has been provided, he is informed and believes the matters stated therein to be true, and on these grounds alleges that the matters stated therein are true and therefore verifies the foregoing on behalf of Long Island Lighting Company.

  
\_\_\_\_\_  
Charles A. Daverio

State of New York)      SS:

I, Elizabeth A. Briody a Notary Public in and for the jurisdiction aforesaid, hereby certify that Charles A. Daverio, whose name is signed to the foregoing Answers to Interrogatories, dated February 7, 1987, has personally sworn before me that the statements therein are true to the best of his knowledge and belief.

  
\_\_\_\_\_  
Notary Public

My Commission expires:

March 30, 1987

ELIZABETH A. BRIODY  
Notary Public, State of New York  
No. 30-4600123  
Qualified in Nassau County  
Commission Expires Mar. 30, 1987

DOCKETED  
USNRC

CERTIFICATE OF SERVICE

'87 FEB -6 A10:05

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

OFFICE OF THE  
DOCKETING

I hereby certify that copies of LILCO's Responses and Objections to Intervenor's First Set of Interrogatories and Request for Production of Documents Regarding Reception Center Issues Dated January 21, 1987 were served this date upon the following by telecopier as indicated by one asterisk, by Federal Express as indicated by two asterisks, or by first-class mail, postage prepaid.

Morton B. Margulies, Chairman  
Atomic Safety and Licensing  
Board  
U.S. Nuclear Regulatory Commission  
East-West Towers, Rm. 407  
4350 East-West Hwy.  
Bethesda, MD 20814

Dr. Jerry R. Kline  
Atomic Safety and Licensing  
Board  
U.S. Nuclear Regulatory Commission  
East-West Towers, Rm. 427  
4350 East-West Hwy.  
Bethesda, MD 20814

Mr. Frederick J. Shon  
Atomic Safety and Licensing  
Board  
U.S. Nuclear Regulatory Commission  
East-West Towers, Rm. 430  
4350 East-West Hwy.  
Bethesda, MD 20814

Secretary of the Commission  
Attention Docketing and Service  
Section  
U.S. Nuclear Regulatory Commission  
1717 H Street, N.W.  
Washington, D.C. 20555

Atomic Safety and Licensing  
Appeal Board Panel  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Atomic Safety and Licensing  
Board Panel  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Bernard M. Bordenick, Esq. \*\*  
Oreste Russ Pirfo, Esq.  
Edwin J. Reis, Esq.  
U.S. Nuclear Regulatory Commission  
7735 Old Georgetown Road  
(to mailroom)  
Bethesda, MD 20814

Herbert H. Brown, Esq. \*  
Lawrence Coe Lanpher, Esq.  
Karla J. Letsche, Esq.  
Kirkpatrick & Lockhart  
South Lobby - 9th Floor  
1800 M Street, N.W.  
Washington, D.C. 20036-5891

Fabian G. Palomino, Esq. \*  
Richard J. Zahnleuter, Esq.  
Special Counsel to the Governor  
Executive Chamber  
Room 229  
State Capitol  
Albany, New York 12224

Mary Gundrum, Esq.  
Assistant Attorney General  
120 Broadway  
Third Floor, Room 3-116  
New York, New York 10271

Spence W. Perry, Esq. \*\*  
William R. Cumming, Esq.  
Federal Emergency Management  
Agency  
500 C Street, S.W., Room 840  
Washington, D.C. 20472

Mr. Jay Dunkleberger  
New York State Energy Office  
Agency Building 2  
Empire State Plaza  
Albany, New York 12223

Stephen B. Latham, Esq. \*\*  
Twomey, Latham & Shea  
33 West Second Street  
P.O. Box 298  
Riverhead, New York 11901

Mr. Philip McIntire  
Federal Emergency Management  
Agency  
26 Federal Plaza  
New York, New York 10278

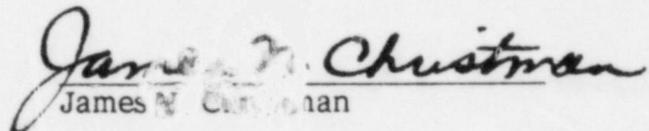
Jonathan D. Feinberg, Esq.  
New York State Department of  
Public Service, Staff Counsel  
Three Rockefeller Plaza  
Albany, New York 12223

Ms. Nora Bredes  
Executive Coordinator  
Shoreham Opponents' Coalition  
195 East Main Street  
Smithtown, New York 11787

Gerald C. Crotty, Esq.  
Counsel to the Governor  
Executive Chamber  
State Capitol  
Albany, New York 12224

Martin Bradley Ashare, Esq.  
Eugene R. Kelly, Esq.  
Suffolk County Attorney  
H. Lee Dennison Building  
Veterans Memorial Highway  
Hauppauge, New York 11787

Dr. Monroe Schneider  
North Shore Committee  
P.O. Box 231  
Wading River, NY 11792

  
James N. Chestman

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

DATED: February 4, 1987

January 5, 1987

cc. B. Aidekoff  
D. Dreikorn

To: D. Crocker

From: R. Watts *R Watts*

Subject: Summary of Time Trials for Vehicle Occupant  
Monitoring

This memo summarizes the time measurements performed today to determine how long it would require to monitor all vehicle occupants, considering different vehicle designs. Time trials were performed on the following vehicles:

- a. 1986 Chrysler LeBaron (4-door)
- b. 1985 Subaru GL 4WD (2-door)
- c. 1985 Dodge Caravan (2-door, with sliding side door)

TRIAL 1:

Vehicle type: Subaru, 2-door

Passenger Arrangement: 1 person in front, 1 person directly in back

Areas Monitored: Both feet, both knees, both hands

Activities Timed: Monitoring only

Total Time: 1:15 (Monitor A)  
1:16 (same repeated by Monitor B)

TRIAL 2:

Vehicle type: Subaru, 2-door

Passenger Arrangement: 1 person in front, 1 person directly in back

Areas Monitored: Both feet, both hands, sweep of shoulders, neck, head

Activities Timed: Monitoring only

Total Time: 1:00 (Monitor A)  
1:09 (same repeated by Monitor B)

TRIAL 3:

Vehicle type: Dodge Caravan, 2-door w/ sliding door

Passenger Arrangement: 1 passenger in front, 1 person in second back seat (driver side), 2 people in third back seat.

Areas Monitored: Both feet, both hands, sweep of shoulders, neck, head

Activities Timed: Monitoring only

Total Time: 2:12 (Monitor A, all 4 riders)  
1:36 (Monitor A, 3 back riders only)  
1:34 (Monitor A, 3 back riders only, using ruler to simulate HP-260)

TRIAL 4:

Vehicle type: Chrysler LeBaron, 4-door

Passenger Arrangement: 1 person in front, 1 person directly in back

Areas Monitored: Both feet, both hands, sweep of shoulders, neck, head

Activities Timed: Vehicle pulls up to cone, open door, perform monitoring in car, close door, car pulls away

Total Time: 1:22 (Monitor A)

TRIAL 5:

Vehicle type: Suburu, 2-door

Passenger Arrangement: 1 person in front, 1 person directly in back

Areas Monitored: Both feet, both hands, sweep of shoulders, neck, head

Activities Timed: Vehicle pulls up to cone, open door, have 2 people step out of one side, monitor 2 people, 2 people get back in, close door, car pulls away

Total Time: 1:29 (Monitor A)

CURRICULUM VITAE

ROGER E. LINNEMANN, M.D.

PRESIDENT

RADIATION MANAGEMENT CONSULTANTS

ASSOCIATE PROFESSOR OF CLINICAL RADIOLOGY

UNIVERSITY OF PENNSYLVANIA SCHOOL OF MEDICINE

CURRICULUM VITAE

June 9, 1986

ROGER E. LINNEMANN, M.D.

Home Address:

517 S. Providence Road  
Wallingford, PA 19086

Office Address:

Radiation Management Consultants  
5301 Tacony Street - Box D5  
Philadelphia, PA 19137

Date of Birth:

January 12, 1931

Place of Birth:

St. Cloud, Minnesota

Education:

- 1952 University of Minnesota, Minneapolis,  
MN; B.A. (Cum Laude)
- 1956 University of Minnesota, Minneapolis,  
MN; B.S., M.D.
- 1956 - 1957 Walter Reed Army Hospital, Washington,  
D.C.; INTERNSHIP
- 1962 - 1965 Walter Reed Army Hospital, Washington,  
D.C.; RESIDENCY (Radiology)
- 1963 - 1965 US Department of Agriculture Graduate  
School (Evening), Washington, D.C.,  
Russian Language

Professional Experience:

- 1986 - present President, Radiation Management Consultants
- 1969 - 1986 President/Chief Executive Officer, Radiation  
Management Corporation
- 1974 - present Clinical Associate Professor of Radiology,  
University of Pennsylvania School of Medicine
- 1977 - present Visiting Associate Professor, Clinical Radiology,  
Northwestern University Medical School
- 1969 - 1974 Assistant Professor, Clinical Radiology,  
University of Pennsylvania School of Medicine
- 1968 - 1969 Nuclear Medicine Consultant, Philadelphia  
Electric Company

Professional Experience (Con't.):

Jan - August 1968      Assistant Professor, Radiology, University of Minnesota School of Medicine (investigated use of radioisotopes in kidney function evaluation)

1957 - 1968              Medical officer in United States Army.....

1965 - 1968              Commanding Officer, Nuclear Medicine Research Detachment, Europe; Radiological Health Consultant, US Army-Europe (responsible for plans, procedures and training of military hospitals and personnel in the evaluation, evacuation and treatment of radiation casualties). In January, 1966 sent to Palomares, Spain for evaluation of medical and environmental aspects of the mid-air collision involving nuclear weapons)

1961 - 1962              Research Associate, Department of Radiobiology, Walter Reed Army Institute of Research, Washington, D.C. (investigated use of anti-radiation drugs in treatment of cancer)

1957 - 1961              General Medical Officer, Europe

Languages:              German, Russian

Professional Appointments:

1982 -                      American Medical Association Council on Scientific Affairs Subcommittee on the Management of Radiation Accident Victims

1979 - present              Health Physics Society Standards Committee

1978 - 1981              General Dynamics Electric Boat Division Radiological Health Consultant

1978 - 1980              Edison Electric Institute Utility Radiation Standards Group

1973 - present              University of Pennsylvania Radiation Safety Committee

1973 - 1983              The Atomic Industrial Forum, Inc. Public Affairs & Information Committee



Presentations:

- 1983 DWK (see 1978) Munich, Germany - Appeared before as international expert
- 1983 DWK (see 1978) Hanover, Germany - Presented seminar "Medical Significance of Radiation Exposure" at University of Regensburg for medical and chemistry grad students
- 1982 Health Physics Society (Annual Meeting, Las Vegas, Nevada) - Presented keynote speech "Medical & Public Health Consequences of an Off-Site Release of Radiation from Nuclear Power Facility"
- 1980 Korea Women's Association (Seoul, Korea) - Presented paper, "Energy: The Basis for Health in Developing and Developed Countries", at International Symposium on the Expulsion of Environmental Pollution
- 1980 Korean Association for Radiation Protection (Seoul, Korea) - Presented seminar on emergency management of radiation injuries
- 1980 Ministry of Health (Madrid, Spain) - Presented paper, "Definitive Treatment of Radiation Injuries", at First Seminar on Assistance to Those Wounded by Radioactive Elements and Ionizing Radiations
- 1979 Reinisch Westfalisches Elektrizitätswerk (Essen, Germany) - Presented paper, "Energy: The Basis for Health in Developing and Developed Countries", at The Seventh Energy Workshop
- 1978 The Swedish State Power Board (Vallingby, Sweden) - Presented seminar, "Management and Treatment of Radiation Injuries", and conducted radiation emergency medical exercise at the Ringhals Nuclear Power Plant
- 1978 Deutsche Gesellschaft für Wiederaufarbeitung (Hanover, Germany) - Appeared before the Prime Minister and Parliament of Lower Saxony as an International expert to testify on the safety of a reprocessing plant at Gorleben, Germany
- 1978 International Atomic Energy Agency (Vienna, Austria) - Presentation at Symposium on Late Effects of Ionizing Radiation

Presentations (Continued):

- 1978 Asociacion de Medicina y Seguridad en el Trabajo de Unesa para la Industria Electrica (Madrid, Spain) - Presented one-day seminar entitled, "Primary Management of Radiation Injury"
- 1977 International Atomic Energy Agency (Vienna, Austria) - Presented paper, "Emergency Medical Assistance Programs for Nuclear Power Reactors", at Symposium on Handling of Radiation Accidents
- 1967 University of Freiburg Institute of Radiobiology (Freiburg, Germany) - Presented seminar on diagnosis and treatment of radiation injuries

Publications:

1. Linnemann, Roger E. "Berlin: The Young Old City". Senior Citizen (September 1961).
2. Linnemann, Roger E. "This Way to Berlin". The American Benedictine Review: 14, No. 4 (December 1963).
3. Linnemann, Roger E. "The Acute Radiation Syndrome and its Impact on the Chain of Evacuation". Medical Bulletin, U.S. Army Europe: 22, No. 12 (December 1965).
4. Linnemann, Roger E. and Robert T. Wangemann. "Medical Support of Nuclear Weapons Accidents". Medical Bulletin, U.S. Army Europe (November 1967).
5. Linnemann, Roger E. and O. Messerschmidt. "Erholungsvorgaenge bei Grosstieren nach Ganzkoerperbestrahlung", :dem 6. Jahrbuch von der vereinigung Deutscher Strahlenschutzaezte (1968).
6. Linnemann, Roger E. "Command Radiation Guidance". Military Medicine: 33, pp. 771-716 (September 1968).
7. Loken, Merle K., Linnemann, Roger E. and George S. Kush. "Evaluation of Renal Function Using a Scintillation Camera and Computer". Radiology: 93, No. 1, pp. 85-94 (July 1969).
8. Linnemann, Roger E., Loken, Merle K. and Colin Markland. "Computerized Compartmental Renograms to Study Kidney Function". Journal of Urology: 103, pp. 533-537 (May 1970).
9. Linnemann, Roger E. and J.W. Thiessen. "Regional Approach to the Management of Radiation Accidents". Journal of the American Public Health Association: 61, No. 6, pp. 1229-1235 (June 1971).

Publications (Continued):

10. Linnemann, Roger E. and Robert H. Holmes. "Nuclear Accidents and Their Management". Emergency Medical Care, pp. 281-292, Spitzer, Stanley and Wilbur W. Oaks (eds.) New York: Bruner and Stratton, Inc. (1971).
11. Linnemann, Roger E., Rasmussen, N.C. and F.K. Pittman. Nuclear Energy: Issues and Answers. Atomic Industrial Forum, Inc. in cooperation with Pennsylvania Power & Light Company (April 1973).
12. Linnemann, Roger E. "Accentuate the Positive" Trial: 10, No. 4, p. 13 (July/August 1974).
13. Linnemann, Roger E. "Accentuate the Positive". Congressional Record: 109, pp. 4964-4967. Washington, D.C. United States of America Proceedings and Debates of the 93rd Congress, Second Session (July 23, 1974).
14. Linnemann, Roger E. and J.W. Thiessen. Editorial, "In Defense of Radiation and Cells". The New York Times (May 23, 1974).
15. Linnemann, Roger E. Nuclear Radiation and Health. Springville, NY, Nuclear Fuel Services, Inc. (September 23, 1974).
16. Linnemann, Roger E. Editorial, "In Defense of Nuclear Power Plants", The Philadelphia Inquirer, p. 11A (March 6, 1975).
17. Linnemann, Roger E. "Nuclear Power Plants Pose Minimal Health Risks", Perspective. News Bureau of the University of Pennsylvania, Philadelphia, PA (February 1975).
18. Linnemann, Roger E. "Medical Aspects of Power Generation", Impulse. Massachusetts: Electrical Council of New England (June 1975).
19. Linnemann, Roger E. "Bugs in the Nuclear Fuel Cycle". Spectrum p. 59, Gadi Kaplan (ed.) Piscataway, NJ: The Institute of Electrical and Electronic Engineers, Inc. (September 1975).
20. Linnemann, Roger E. and Fred A. Mettler, Jr. "Emergency Medical Assistance Programs for Nuclear Power Reactors". International Atomic Energy Agency Symposium on the Handling of Radiation Accidents. IAEA-SM-215/22, Vienna, Austria (1977).
21. Linnemann, Roger E. "Why ALARA?" Transactions of 1979 American Nuclear Society Conference, Atlanta, GA (June 3-7, 1979), Vol. 32, TANS AO 32 1 832 ISSN 0003-018x (1979).
22. Linnemann, Roger E., Hackbarth, C.J. and Ray Crandall. "The Contaminated and Injured Patient". Proceedings of Twenty Fourth Annual Meeting of the Health Physics Society, Philadelphia, PA (July 9-13, 1979).

23. Linnemann, Roger E. "The Three Mile Island Incident in 1979: The Utility Response". The Medical Basis for Radiation Accident Preparedness, K.F. Hubner and S.A. Fry (eds.), Elsevier/North-Holland, pp. 501-509 (1980).
24. Linnemann, Roger E. "Initial Management of Radiation Injuries". Journal of Radiation Protection, 2, No. 1, pp. 11-25 (December 1980).
25. Linnemann, Roger E., Kim, Stephen M. and Frazier L. Bronson. "Three Mile Island: Medical and Public Health Aspects of a Radiation Accident". Journal of Radiation Protection, 6, No. 1, pp. 45-52 (October 1981).
26. Linnemann, Roger E. "Facilities for Handling the Contaminated Patient". Radiation Accident Preparedness: Medical and Managerial Aspects, Science-Thru-Media Company: New York (1982).
27. Linnemann, Roger E. "A Systems Approach to the Initial Management of Radiation Injuries". Systems Approach to Emergency Medical Care, Appleton-Century-Crofts: New York (1983).
28. Linnemann, Roger E. "Radiation Injuries". Current Emergency Therapy. Editors: Richard Edlich and Daniel Spyer; and Aspen Publication by Aspen Systems Corporation, Rockville, MD (1983).
29. Linnemann, Roger E. "National Emergency Medical Assistance Program for Commercial Nuclear Power Plants". Presented at the September 1986 American Nuclear Society Topical Meeting on "Radiological Accidents: Perspectives and Emergency Preparedness".
30. Linnemann, Roger E. "Soviet Medical Response to Chernobyl." Submitted for publication by the Journal of the American Medical Association (JAMA), January, 1987.

PROFESSIONAL TESTIMONY

1984 Limerick Nuclear Generating Station Emergency Planning Hearings

1985 Cleveland Electric Illuminating Company Emergency Planning Hearings

In progress John Benek vs. Pennsylvania Power Company et al. #99 of 1977 Eminent Domain

1984 Long Island Lighting Company Emergency Planning Hearings for the Shoreham Nuclear Power Station

1983 Union Electric Company Emergency Planning/Licensing Hearings for Callaway Nuclear Power Plant

1983 Pennsylvania Power & Light Company Susquehanna Steam Electric Operating License Hearings

1982 Texas Utilities Generating Company Emergency Planning Hearings for the Comanche Peak Steam Electric Station

1981 Florida Power & Light Company Turkey Point Steam Generator Repair Hearings

1981 Southern California Edison Company Emergency Planning Hearings for the San Onofre Nuclear Generating Station

1979 Gorleben Nuclear Fuels Reprocessing Plant Hearings before the Prime Minister and Parliament of Lower Saxony, Hanover, Germany

1979 Florida Power & Light Company Turkey Point Nuclear Station Operating License Hearings

1971 Long Island Lighting Company Shoreham Nuclear Power Station Operating License Hearings

1970 Baltimore Gas & Electric Company Calvert Cliffs Nuclear Power Plant Operating License Hearings

1970 Northeast Utilities Service Company Millstone Nuclear Power Station Operating License Hearings

DALE E. DONALDSON  
Director, Radiological Services Division

EDUCATION

B.S., Ohio State University

SUMMARY OF EXPERIENCE

Mr. Donaldson is an expert in the planning, scheduling, implementation, and evaluation of emergency preparedness and radiation protection programs for nuclear facilities. Mr. Donaldson gained invaluable experience as a member of the NRC investigation team for the accident at Three Mile Island. He was also involved with nuclear incident assessment and control and radiation protection activities while working for the U.S. Army and Nuclear Regulatory Commission. His most recent work has involved the evaluation, planning, scheduling, and related management of the implementation of the Health Physics Program at the Limerick Generating Station and Shoreham Station in preparation for licensing.

- 1985 - Present      Director, Radiological Services Division, Hydro Nuclear Services. Provides overall Divisional executive management, direction and coordination for all professional consulting aspects of HNS operations. Responsible for all routine and special RSD projects, regulatory affairs, project planning and development, quality control of RSD operations and executive liaison functions both internally within HNS and with respect to client executive management.
- 1982 - 1985      Senior Radiological Engineer and Director of East Coast operation, Radiological Services Division, Hydro Nuclear Services. Provided senior level consulting services in the areas of Health Physics, Radioactive Waste Management, Reactor Chemistry, and Emergency Preparedness. Performed program evaluation and provides management services to power reactors relative to the planning, scheduling, and implementation of these programs.
- Senior Engineer, Engineering Services Division, TERA Corporation. Provided professional consulting services in all phases of Radiation Protection and Emergency Preparedness.
- 1975 - 1982      Health Physicist, U.S. Nuclear Regulatory Commission, Region I Office of Inspection and Enforcement. Was responsible for inspecting emergency planning, radiation protection and environmental monitoring programs at nuclear power reactors, nuclear fuel facilities and test and research reactors; developing and maintaining a

DALE E. DONALDSON

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Regional Incident Response Plan; serving as co-chairman of three Federal Regional Advisory Committees and the Federal Field Assistance Cadre for assistance to states in radiological emergency response planning; member of the NRC Office of Inspection and Enforcement Investigation Team for the accident at Three Mile Island; contributing author of NUREG-0654 and the NRC health physics and emergency preparedness appraisal programs; member of a Nuclear Regulatory Commission Health Physics Appraisal Team, and Team Leader of a Nuclear Regulatory Commission Emergency Preparedness Appraisal Team.

1969 - 1975

Chemical, Biological and Radiological Officer, U.S. Army. Various titles with Supervisory responsibility and instructor duties involving: Radiation safety, nuclear accident/incident assessment and control; civil and military emergency preparedness; nuclear weapons effects; project management for the research, development, test and evaluation of radiological items of equipment and radiological safety policies and procedures.

#### PUBLICATIONS

NRC Health Physics Appraisal Program, U.S. Nuclear Regulatory Commission, May 1980.

Investigation Into the March 28, 1979 Three Mile Island Accident by Office of Inspection and Enforcement, NUREG-0600, U.S. Nuclear Regulatory Commission, August 1979.

Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, U.S. Nuclear Regulatory Commission and Federal Emergency Management Agency, January 1980.