

RELATED CORRESPONDENCE

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

02 MAY 26 1982

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In the Matter of)

CONSOLIDATED EDISON COMPANY OF NEW YORK)
(Indian Point Unit 2))

Docket Nos. 50-247 SP
50-286 SP

POWER AUTHORITY OF THE STATE OF NEW YORK)
(Indian Point Unit 3))

May 21, 1982

UCS/NYPIRG'S ANSWERS TO NRC STAFF'S INTERROGATORIES

The Union of Concerned Scientists and the New York Public Interest
Research Group, Inc. answer the NRC Staff's interrogatories as follows:

1. Identify all documentary or other material that you intend to use during this proceeding to support Contentions 3.1, 3.2, 3.3, 3.6, 4.1, 4.2, and 4.4, 4.5 and 4.6 and that you may offer as exhibits on these contentions or refer to during your cross-examination of witnesses presented by Consolidated Edison Company of New York Inc., Power Authority of the State of New York, or the NRC Staff.

NUREG-0396

NUREG-0654, Rev. 1

WASH-1400, including all Appendices

NUREG/CR-1311

NUREG/CR-0603

NUREG-0348

NUREG/CR-0388

Emergency Planning Zones for Serious Nuclear Power Plant Accidents

State of California Office of Emergency Services, Alex R.

Cunningham, Director, November 1980.

Regulatory Guide 1.101, Rev.2

Regulatory Guide 1.97, Rev.2

Regulatory Guide 1.47

NUREG-0742

NUREG/CR-0400

"Evacuation from a Nuclear Technological Disaster" Geog. Review

Vol. 71, no. 1, January 1981, Donald Ziegler, Stanley D. Brunn,
and James H. Johnson, Jr.

Emergency Planning in the TMI Accident, prepared for FEMA by Human
Sciences Research, Inc., 1980.

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Evacuation Risks--An Evaluation, Joseph M. Hans and Thomas C. Sell,
U.S. Environmental Protection Agency, 1974.

SECY-80-552, "The Use of Probabalistic Risk Assessment in the
Licensing Process," December 30, 1980.

UCLA-ENG-7775, Post-Accident Filtration as a Means of Improving
Containment Effectiveness, B. Gosset, et. al., December, 1977,
UCLA School of Engineering and Applied Science

NUREG-0850

Doses Received While Crossing a Plume of Radioactive Material
Released During an Accident at a Nuclear Power Plant, R.I.

Scherpelz and A.E. Desrosiers, Pacific Northwest Laboratory,
October 1981 (PNL-SA-9383)

SAND78-009, A Model of Public Evacuation for Atmospheric Radiolog-
ical Releases, D.C. Aldrich, et. al., Sandia Laboratories,
June, 1978.

NUREG/CR-1433

NUREG-0606

All other references are in responses to interrogatories.

2. a) Upon what person or persons do you rely to substantiate in whole or in part your case on Contentions 3.1, 3.2, 3.3, 3.6, 4.1, 4.2 and 4.4, 4.5 and 4.6?

b) Provide the addresses and education and professional qualifications of any persons named in your response to 2a. above.

c) Identify which of the above persons or any other persons you may call as witnesses on the contentions referenced in 2a. above.

a) UCS/NYPIRG relies on those persons authoring the above-listed documents. In addition, UCS/NYPIRG relies on Dr. Jan Beyea, Brian Palenik, and Kai Erikson.

b) This material is provided for Dr. Jan Beyea, Brian Palenik, and Kai Erikson in Appendices A and B. Additionally, material which these individuals may rely on to substantiate UCS/NYPIRG contentions has been included in these appendices.

c) Dr. Jan Beyea, Brian Palenik and Kai Erikson. The names of any other witnesses obtained after this date will be submitted as they are determined.

3. Identify the extent to which the EPZ should be expanded giving your reasons for such an expansion.

UCS/NYPIRG has not at present calculated the area for which the Plume Exposure Pathway EPZ should be expanded to provide adequate protection for the public health and safety. In general, a satisfactory methodology for doing so is set forth in "Emergency Planning Zones for Serious Nuclear Power Plant Accidents", State of California Office of Emergency Services, Alex R. Cunningham, Director, November 1980. That methodology can be successfully applied with the proviso that the probabilities calculated for different types of accidents and releases are unreliable. The report methodology does not limit the determination of the Plume EPZ primarily to prompt fatality limits, but also includes

latent fatalities, early radiation injuries, and impacts on the thyroid as bases for establishing the Plume EPZ boundary. The methodology also includes specific and explicit consideration of local and site-specific factors such as meteorology (including dominant trajectories, wind direction and persistence, precipitation, inversion frequency and persistence, and seasonal and diurnal variations in these parameters), population distribution, and characteristics of the local roadway network. This methodology is also based upon an explicit consideration of accidents which exceed the design basis.

The present generic 10-mile Plume Exposure Pathway is not sufficient to ensure adequate protection of the public health and safety for those accidents in which offsite protection response will most urgently be required. It is clear that emergency planning is principally directed at accidents beyond the design basis. The design basis accident which is most frequently cited as the one having the most serious offsite consequences is the DBA/LOCA. As the NRC Staff well knows, the means by which the consequences of the DBA/LOCA are calculated based on 10 CFR Part 100 lead to a considerable overestimation of the doses which could be expected in offsite areas.

However, the source term associated with the DBA/LOCA (as set forth in TID-14844) is equivalent to that from a meltdown with an intact containment (see Memorandum dated 2/22/79 from Frederic D. Anderson to the Commissioners, SUBJECT: "NRC Siting Policy and Practice and the PIRG Petition for Rule-Making on Population Characteristics (SECY-78-624)"; see also TID-14844, Calculation of Distance Factors for Power and Test Reactor Sites", March 23, 1962, page 8). The NRC Staff has already analyzed the impacts of such an accident and concluded that for 70% of all sites analyzed (111 sites) the doses to the public would not exceed the Protective Action Guides (PAGs) established by the EPA at distances beyond 10 miles. Such an accident would probably necessitate offsite protective response for area near the reactors (i.e. within the Low Population Zone) and could result in a response at greater distances as a precautionary measure. Since the maximum estimated year 2000 population within two miles of any of the 111 sites analyzed by the staff is 12,500 (at Indian Point), existing plans should be able to accommodate this accident.

As a practical matter, it would be prudent in our opinion to order an evacuation in the event of any core melt accident. This is true for two principal reasons. First, it is in precisely such an accident that the potential risk to the public is at its highest. Second, the state-of-the-art knowledge of events concurrent with and following a core melt is fraught with great uncertainties such that it cannot be assumed that the containment will hold. The prudent measure to take in such instances is to require evacuation.

In order to place bounds on the area for which evacuation may be required, it is necessary to examine which accidents contribute the most to the overall risk to the public. Upon such an examination, it is quite clear that core melt accidents with containment failure are dominant in establishing public risk. Accidents within the design basis contribute little to overall risk (see, for example, NUREG/CR-0603, "A Risk Assessment of a Pressurized-Water Reactor for Class 3-8 Accidents", October 1979, Brookhaven National Laboratory). Accidents beyond the design basis dominate risk and, in particular, accidents at the extreme limit of this class of accidents are risk-dominant.

It is clear that a 10-mile Plume EPZ provides insufficient protection for the public in such accidents. The staff's own analysis

in NUREG-0396 demonstrates this quite well. The staff concluded that 30% of all core melt accidents will result in doses in excess of the PAGs beyond 10 miles. The staff further concluded that in most cases prompt fatalities would be limited to within about 10 miles. On this basis the staff established the 10-mile Plume EPZ requirement. This basis is faulty on two general counts.

First, the 10-mile Plume EPZ presumes that prompt fatalities are the consequence of concern and that other consequences are less significant or can be dealt with by way of ad hoc response. Neither formulation is correct. Certainly emergency planning must have as one of its principal goals the avoidance of prompt fatalities. However, emergency planning for reactor accidents cannot ignore latent fatalities, early radiation injuries (for which medical treatment capabilities are limited), and non-fatal cancers.

Second, the 30% of core melt accidents estimated by the staff to cause doses in excess of PAGs beyond 10 miles are precisely those accidents for which emergency planning is most urgently needed. For such accidents, doses will likely be in excess of PAGs to such a large distance beyond 10 miles (i.e., to 20-50 miles) that the planning which has been done within 10 miles will become largely irrelevant to assuring that adequate protective measures can be taken beyond 10 miles.

Thus, if emergency planning for reactor accidents is to have a rational basis and provide for adequate protection of the public health and safety, such planning must account for core melt accidents with containment failure. Such accidents are accounted for in the California OES report and UCS/NYPIRG believes that the methodology set forth therein, if applied to Indian Point, will provide a more reasonable starting point for determining the area for which advance evacuation planning is required.

4. a) Identify what you mean by "adequate sheltering" in your Contention III(A)b. In your response to this Interrogatory give examples of "adequate sheltering."

b) Define what you mean by the term "degraded" with regard to the roadway network in your Contention III(A)c.

c) Define what is meant by the term "upgraded" and the words "made capable of being used" as these words are used in Contention 4.2 and your Contention III(A)e with regard to the roadway network.

a) Adequate sheltering capability would be sheltering capable of reducing radiation exposure during and following plume passage to an extent such that significant adverse health consequences do not occur. Such sheltering should be available for all residents of the area at risk, plus all transients in the area at risk at the time of the accident.

b) The term "degraded" as used in UCS/NYPIRG contention III(A)c means, in general, less than normal. As used in this contention, a degraded roadway network would occur in any of the following cases:

- (A) Accidents blocking one or more lanes of an evacuation route.
- (B) Highway repairs or other roadway construction or repair work which blocks one or more lanes of an evacuation route.
- (C) Weather-related conditions such as snow or icy roads which limit the speed of traffic on evacuation routes.
- (D) Excessive numbers of transients causing heavier than normal traffic to such an extent as to reduce the speed of traffic

- on evacuation routes.
- (E) Weather-related conditions such as rain or fog which limit visibility sufficiently to reduce the speed of traffic on evacuation routes.
 - (F) Flooding sufficient to restrict access to evacuation routes.
 - (G) Any combination of the above.

4c) It is the responsibility of emergency planners to determine the manner of upgrading the roadway network, i.e. the definition of "upgraded", which would permit successful evacuation of all residents in danger before the plume arrival time. "Made capable of being used" implies the ability to use the roadway network for such an evacuation.

5. Identify the "specific steps" (with reasons given for each step) that you believe must be taken by NRC, State, and local officials to promote "public awareness" as referenced in Contention 4.5.

Such specific steps would include a stepped-up public information program incorporating material which would promote such an awareness. The reasons for this are given in UCS/NYPIRG's Bases for Contention 1(B)7.

Affirmed this 21st day of May, 1982:

Amanda Potterfield 5/21/82
Amanda Potterfield
Amanda Potterfield, Esq.

Submitted by:

Amanda Potterfield
Amanda Potterfield
Counsel for NYPIRG
Box 384
Village Station
New York, New York 10014
212-227-0265

Joan Holt
Joan Holt
Project Director
NYPIRG
5 Beekman Street
New York, N.Y. 10038
212-349-6460

Jeffrey M. Blum
Jeffrey M. Blum
Counsel for UCS
423 Vanderbilt Hall
40 Washington Sq. South
New York, N.Y. 10012
212-598-3452

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DOCKETING & SERVICE
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(Indian Point Unit 3))

Certificate of Service

I hereby certify that copies of:

UCS/NYPIRG'S ANSWERS TO NRC STAFF'S INTERROGATORIES

have been served on the official minimum service list for the above
captioned proceeding by depositing in the United States mail, first class,

this ^{24th A.P.} 21st day of May, 1982.

Amanda Potterfield (by JH)

Amanda Potterfield, Esq.
P.O. Box 384
Village Station
New York, New York 10014

Joan Holt

Joan Holt
New York Public Interest Research Group, Inc.
5 Beekman Street
New York, New York 10038

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SERVICE LIST

Docketing and Service Branch
Office of the Secretary
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Louis J. Carter, Esq., Chairman
Administrative Judge
7300 City Line Avenue
Philadelphia, Pennsylvania 19151

Dr. Oscar H. Paris
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. Frederick J. Shon
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Janice Moore, Esq.
Counsel for NRC Staff
Office of the Executive
Legal Director
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Brent L. Brandenburg, Esq.
Assistant General Counsel
Consolidated Edison Co.
of New York, Inc.
4 Irving Place
New York, N.Y. 10003

Paul F. Colarulli, Esq.
Joseph J. Levin, Jr., Esq.
Pamela S. Horowitz, Esq.
Charles Morgan, Jr., Esq.
Morgan Associated, Chartered
1899 L Street, N.W.
Washington, D.C. 20036

Charles M. Pratt, Esq.
Thomas R. Frey, Esq.
Power Authority of the
State of New York
10 Columbus Circle
New York, N.Y. 10019

Ellyn R. Weiss, Esq.
William S. Jordan, III, Esq.
Harmon & Weiss
1725 I Street, N.W., Suite 506
Washington, D.C. 20006

Joan Holt, Project Director
Indian Point Project
New York Public Interest
Research Group
5 Beekman Street
New York, N.Y. 10038

John Gilroy, Westchester Coordinator
Indian Point Project
New York Public Interest
Research Group
240 Central Avenue
White Plains, New York 10606

Jeffrey M. Blum, Esq.
New York University Law School
423 Vanderbilt Hall
40 Washington Square South
New York, N.Y. 10012

Charles J. Maikish, Esq.
Litigation Division
The Port Authority of
New York and New Jersey
One World Trade Center
New York, N.Y. 10048

Ezra I. Bialik, Esq.
Steve Leipsiz, Esq.
Environmental Protection Bureau
New York State Attorney
General's Office
Two World Trade Center
New York, N.Y. 10047

Alfred B. Del Bello
Westchester County Executive
Westchester County
148 Martine Avenue
New York, N.Y. 10601

Andrew S. Roffe, Esq.
New York State Assembly
Albany, N.Y. 12248

Renee Schwartz, Esq.
Botein, Hays, Sklar & Herzberg
Attorneys for Metropolitan
Transportation Authority
200 Park Avenue
New York, N.Y. 10166

Stanley B. Klimberg
General Counsel
New York State Energy Office
2 Rockefeller State Plaza
Albany, New York 12223

Honorable Ruth Messinger
Member of the Council of the
City of New York
District #4
City Hall
New York, New York 10007

Eric Thorson, Esq.
Marc L. Parris, Esq.
County Attorney
County of Rockland
11 New Hemstead Road
New City, N.Y. 10010

Geoffrey Cobb Ryan
Conservation Committee
Chairman, Director
New York City Audubon Society
71 West 23rd Street, Suite 1828
New York, N.Y. 10010

Greater New York Council on Energy
c/o Dean R. Corren, Director
New York University
26 Stuyvesant Street
New York, N.Y. 10003

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

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

Honorable Richard L. Brodsky
Member of the County Legislature
Westchester County
County Office Building
White Plains, N.Y. 10601

Pat Posner, Spokesperson
Parents Concerned About
Indian Point
P.O. Box 125
Croton-on-Hudson, N.Y. 10520

Charles A. Scheiner, Co-Chairperson
Westchester People's Action
Coalition, Inc.
P.O. Box 488
White Plains, N.Y. 10602

Alan Latman, Esq.
44 Sunset Drive
Croton-on-Hudson, N.Y. 10520

Lorna Salzman
Mid-Atlantic Representative
Friends of the Earth, Inc.
208 West 13th Street
New York, N.Y. 10011

Zipporah S. Fleisher
West Branch Conservation
Association
443 Buena Vista Road
New City, N.Y. 10956

Mayor George V. Begany
Village of Buchanan
236 Tate Avenue
Buchanan, N.Y. 10511

Judith Kessler, Coordinator
Rockland Citizens for Safe Energy
300 New Hemstead Road
New City, N.Y. 10956

David H. Pikus, Esq.
Richard F. Czaja, Esq.
330 Madison Avenue
New York, N.Y. 10017

Ms. Amanda Potterfield, Esq.
P.O. Box 384
Village Station
New York, New York 10014

Mr. Donald L. Sapir, Esq.
60 East Mount Airy Road
RFD 1, Box 360
Croton-on-Hudson, New York 10520