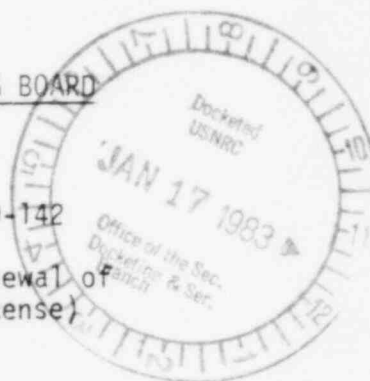


UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of  
THE REGENTS OF THE UNIVERSITY  
OF CALIFORNIA  
(UCLA Research Reactor

Docket No. 50-142  
(Proposed Renewal of  
Facility License)



DECLARATION OF DR. JAN BEYEA

I, Jan Beyea, do declare as follows:

1. I received my Doctorate in Nuclear Physics from Columbia University. From 1970 to 1976 I worked as an Assistant Professor of physics at Holy Cross College in Worcester, Massachusetts; from 1976 to 1980 I worked as a member of the research staff of the Center for Energy and Environmental Studies at Princeton University, since 1980 I have been working as Senior Energy Scientist for the National Audubon Society.

I have prepared papers on consequences of hypothetical accidents at specific nuclear facilities for a number of government bodies: for the President's Council on Environmental Quality (TMI reactor), for the Swedish Energy Commission (Barsebeck reactor), for the state of Lower Saxony in West Germany (Gorleben waste disposal site); and for the N.Y. State Attorney General (Indian Point reactor.)

I participated in the international exercise on consequence modelling (Benchmark Study) coordinated by the Organization for Economic Cooperation Development (O.E.C.D.). (In this study, scientists and engineers from fourteen countries around the world calculated radiation doses following hypothetical "benchmark" releases using their own consequence models.)

I served as a consultant from the environment community to the N.R.C. in connection with their development of "Safety Goals for Nuclear Power Plants." I have prepared risk studies covering sulfur emissions from coal-burning energy facilities.

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A complete resume is attached.

2. At the request of the Committee to Bridge the Gap, I have considered the magnitude of thyroid doses that might be received at various distances following the puff release at the reactor of 600 curies of Iodine 131 (and a proportionate quantity of other radioiodines). As is well known in the radiological health community, radioiodine causes unusually large doses to be delivered to the thyroid gland. This result occurs because the thyroid gland scavenges radio-iodine from the blood, thereby concentrating and storing the radioactivity in one organ.

3. I have examined the calculations of Steven Aftergood concerning projections of thyroid doses using NRC Regulatory Guide 1.145 (Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants). He appears to have correctly followed the prescription given in the guide and properly projected downwind radioactivity concentrations for a puff release of 600 curies under weather conditions corresponding to atmospheric stability class, F, and wind speed of one meter per second.\*

In addition, Mr. Aftergood has followed a reasonable procedure for converting downwind concentrations to thyroid exposure by relying on Table 4 of "Analysis of Credible Accidents for Argonaut Reactors."\*\* In this way he has estimated thyroid doses of 107, 37, 11.5 and 5 rem doses at distances of 1, 3, 10, and 23 kilometers, respectively.

However, it should be noted that the Regulatory Guide Method neglects plume depletion, radioactive decay, and changes in stability class. Accounting for these factors could significantly reduce the doses calculated by Aftergood beyond 20 kilometers.

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\*Should the release occur over a period longer than one hour, calculated doses should be reduced (scaled inversely as the one-third power of the release duration).

\*\*Hawley, Kathren, and Robbin, NUREG/CR-2079.

4. I have not carefully investigated the probability of the weather conditions used in Aftergood's calculations, but I presume such conditions would occur with a probability less than 10 percent. It is also of interest to examine doses for weather conditions that might have a high probability of occurring at the time of an accident: Using, as an example, the average wind speed of 2.5 meters per second and D atmospheric Stability Class, projected thyroid doses would drop off more quickly with distance than calculated in Aftergood's example. However, according to calculations I made some time ago for a general site, even under these conditions a 1.5 rem thyroid dose would be projected at 8 kilometers for the release magnitude under discussion. I presume an 8 km or greater cutoff distance would be characteristic of meteorological conditions that would occur with, say, a 50 percent probability.

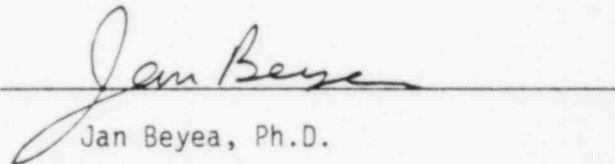
5. As Reg. Guide 1.145 does not include calculation methods for dispersion between 1 and 100 meters from the source, Mr. Aftergood utilized other methods for estimating concentrations and doses within 100 meters of the reactor room wall. I have not checked those calculations, but it is obvious that potential doses at this distance will be enormous because all of the radioactivity will be concentrated in the localized plume volume close to the leak point. In any case, since the thyroid gland is essentially completely destroyed by the time the dose reaches 10,000 rem, it is really not very important to know precisely how high the thyroid dose might rise above 10,000 rem. It is doses to other organs that become of major importance this close to the reactor. Although Aftergood has not considered doses other than to the thyroid, it should be noted that such doses could also be quite high.\*

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\*Even though the whole body dose might lie a factor of 200 or so below the estimated thyroid dose, the magnitude of the whole body dose could be of concern within a few hundred meters of the site for some weather conditions.

6. In conclusion: A 600 curie release of Iodine 131 (and the accompanying iodine 133 and 135) would cause doses with regulatory significance out to distances measured in many kilometers and under certain weather conditions out much farther.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

  
Jan Beyea, Ph.D.

Dated at New York City, New York, this 6th day of January, 1983.

Resume for Jan Beyea  
March 1982

EDUCATION:

Ph D., Columbia University, 1968 (Nuclear Physics)  
B. A., Amherst College, 1962

EMPLOYMENT HISTORY:

1980 to date, Senior Energy Scientist, National Audubon Society,  
950 Third Avenue, New York, New York 10022.  
1976 to 1980, Research Staff, Center for Energy and Environmental Studies,  
Princeton University.  
1970 to 1976, Assistant Professor of Physics, Holy Cross College.  
1968 to 1970, Research Associate, Columbia University Physics Department.

CONSULTING WORK:

Consultant on nuclear energy to the New Jersey Department of Environmental Protection; the Offices of the Attorney General in New York State and the Commonwealth of Massachusetts; the state of lower Saxony in West Germany; the Swedish Energy Commission; and various citizens' groups in the United States.

PUBLICATIONS CONCERNING ENERGY CONSERVATION AND ENERGY POLICY:

"Comments on Energy Forecasting," material submitted for the record at the Hearings before the Subcommittee on Investigations and Oversight of the Committee on Science and Technology, U. S. House of Representatives; Committee Print, June 1, 2, 1981 / No. 14 /.

"The Audubon Energy Plan Technical Report," Peterson, Beyea, Paulson and Cutler, National Audubon Society, April 1981.

"Locating and Eliminating Obscure but Major Energy Losses in Residential Housing," Harrje, Dutt and Beyea, ASHRAE Transactions, 85, Part II (1979). Winner of ASHRAE outstanding paper award.

"Attic Heat Loss and Conservation Policy," Dutt, Beyea, Sinden. ASME Technology and Society Division paper 78-TS-5, Houston, Texas, 1978.

"Comments on the proposed FTC trade regulation rule on labeling and advertising of thermal insulation," Jan Beyea and Gautam Dutt, testimony before the Federal Trade Commission, January 1978.

"Critical Significance of Attics and Basements in the Energy Balance of Twin Rivers Townhouses," Beyea, Dutt Woteki, Energy and Buildings, Volume I (1977), Page 261. Also Chapter 3 of Saving Energy in the Home, Ballinger, 1978.

"The Two-Resistance Model for Attic Heat Flow: Implications for Conservation Policy," Woteki, Dutt, Beyea, Energy--the International Journal, 3, 657, (1978).

"Energy Conservation in an Old 3-Story Apartment Complex," Beyea, Harrje, Sinden, Energy Use Management, Fazzolare and Smith, Pergamon 1977, Volume I, Page 373.

"Load Shifting Techniques Using Home Appliances," Jan Beyea, Robert Weatherwax, Energy Use Management, Fazzolare and Smith, Pergamon 1978, Volume III/IV, Page 121.

PUBLICATIONS CONCERNING ENERGY RISKS (PREDOMINANTLY NUCLEAR POWER):

Articles:

"Containing a Nuclear Reactor Melt-Down" (with Frank von Hippel), Bulletin of the Atomic Scientists, to be published.

"Second Thoughts (about Nuclear Safety)," to appear in Nuclear Power: Both Sides, W. W. Norton and Co. (Publication date: October 1982.)

"Indoor Air Pollution," Commentary in the Bulletin of the Atomic Scientists, 37, Page 63, February 1981.

"Emergency Planning for Reactor Accidents," Bulletin of the Atomic Scientists, 36, Page 40, December 1980. (An earlier version of this article appeared in German as Chapter 3 in Im Ernstfall hilflos?, E. R. Koch, Fritz Vahrenholt, editors, Kiepenheuer & Witsch, Cologne, 1980.)

"Dispute at Indian Point," Bulletin of the Atomic Scientists, 36, Page 63, May 1980.

Published Debates:

The Crisis of Nuclear Energy, Subject No. 367 on William Buckley's Firing Line, P.B.S. Television. Transcript printed by Southern Educational Communications Association, 928 Woodrow Street, P. O. Box 5966, Columbia, South Carolina, 1979.

Nuclear Reactors: How Safe Are They?, panel discussion sponsored by the Academy Forum of The National Academy of Sciences, 2101 Constitution Avenue, Washington, D. C. 20418, May 5, 1980.

Reports:

"Some Long-Term Consequences of Hypothetical Major Releases of Radioactivity to the Atmosphere from Three Mile Island," Report to the President's Council on Environmental Quality, December 1980.

"Decontamination of Krypton 85 from Three Mile Island Nuclear Plant," (with Kendall, et.al.), Report of the Union of Concerned Scientists to the Governor of Pennsylvania, May 15, 1980.

"Some Comments on Consequences of Hypothetical Reactor Accidents at the Philippines Nuclear Power Plant" (with Gordon Thompson), National Audubon Society, Environmental Policy Department Report No. 3, April 1980.

"Nuclear Reactor Accidents: The Value of Improved Containment," (with Frank von Hippel), Center for Energy and Environmental Studies Report PU/CEES 94, Princeton University, January 1980.

"The Effects of Releases to the Atmosphere of Radioactivity from Hypothetical Large-Scale Accidents at the Proposed Gorleben Waste Treatment Facility," report to the Government of Lower Saxony, Federal Republic of Germany, as part of the "Gorleben International Review" February 1979.

"Reactor Safety Research at the Large Consequence End of the Risk Spectrum," presented to the Experts' Meeting on Reactor Safety Research in the Federal Republic of Germany, Bonn, September 1, 1978.

Published Debates (Cont'd.):

A Study of Some of the Consequences of Hypothetical Reactor Accidents at Barseback, report to the Swedish Energy Commission, Stockholm, DS I 1978:5, January 1978.

Testimony:

"In the Matter of Application of Orange and Rockland Counties, Inc. for Conversion to Coal of Lovett Units 4 and 5," testimony and cross-examination on the health impacts of eliminating scrubbers as a requirement for conversion to coal; Department of Environmental Resources, State of New York, November 5, 1981.

"Future Prospects for Commercial Nuclear Power in the United States," before the Subcommittee on Oversight and Investigations, Committee on Interior and Insular Affairs, U. S. House of Representatives, October 23, 1981.

"Stockpiling of Potassium Iodide for the General Public as a Condition for Restart of TMI Unit No. 1," direct testimony on behalf of the Anti-Nuclear Group Representing York, April 1981.

"Advice and Recommendations Concerning Changes in Reactor Design and Safety Analysis which should be Required in Light of the Accident at Three Mile Island," statement to the Nuclear Regulatory Commission concerning the proposed rulemaking hearing on degraded cores, December 29, 1980.

"Alternatives to the Indian Point Nuclear Reactors," Statement before the Environmental Protection Committee of the New York City Council, December 14, 1979. Also before the Committee, "The Impact on New York City of Reactor Accidents at Indian Point," June 11, 1979. Also "Consequences of a Catastrophic Reactor Accident," statement to the New York City Board of Health, August 12, 1976 (with Frank von Hippel).

"Emergency Planning for a Catastrophic Reactor Accident," Testimony before the California Energy Resources and Development Commission, Emergency Response and Evacuation Plans Hearings, November 4, 1978, Page 171.

"Short-Term Effects of Catastrophic Accidents on Communities Surrounding the Sundersert Nuclear Installation," testimony before the California Energy Resources and Development Commission, December 3, 1976.

"Consequences of Catastrophic Accidents at Jamesport." Testimony before the New York State Board on Electric Generation Siting and the Environment in the Matter of Long Island Lighting Company (Jamesport Nuclear Power Station, Units 1 and 2), May 1977.

Miscellaneous:

"Comments on WASH-1400," Statement to the Subcommittee on Energy and the Environment, Oversight Hearings on Reactor Safety, June 11, 1976, Serial No. 94-61, Page 210.

"Upper Limit Calculations of Deaths from Nuclear Reactors," Bull. Am. Phys. Soc. 21, 111 (1976).



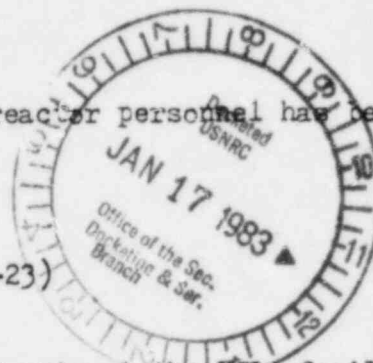
Contention IX

RESPONSE TO STAFF'S ASSERTED MATERIAL FACTS

1. "A calibration error made in 1975 by UCLA reactor personnel has been corrected and has not been repeated."

DISPUTED

(Foster, P 3-26; Cooperman, P3-5; Monosson, P21-23)



2. "Written procedures for calibration of instruments at the UCLA facility have been developed and reviewed by the Radiation Use Committee."

DISPUTED

(Letter, Wegst to Wenslawski, June 24, 1982--doesn't support the stated fact; Inspection Report 82-01; Cooperman, P3-5; Foster, P23; Monosson, P22)

3. "Appropriate actions have been taken by UCLA to correct all items of non-compliance."

DISPUTED

(Note again the citations refer to only a portion of the license period. CBG citations as for fact 4 of Contention III are applicable here as this is a restatement of that Staff fact.)

4. "Calibration errors at the UCLA reactor facility have not been significant to public health and safety."

DISPUTED

(Monosson, P21; Foster, P 3-26; Cooperman, P3-5; Lyon P4-20)

5. "The calibration of instruments and maintenance of equipment at the UCLA reactor facility has been inspected by NRC for many years."

NOT DISPUTED

6. "No risk to public health and safety has arisen from inadequate equipment maintenance at the UCLA reactor facility."

DISPUTED

(Cooperman P4; Plotkin as to XII, P20,22; Plotkin as to XVI, P5-7,9,11-16)



RESPONSE TO UCLA'S ASSERTED MATERIAL FACT

32. "None of the calibration errors or equipment malfunctions which have occurred at the UCLA reactor facility are of safety significance."

DISPUTED

(citations for Staff facts 4 and 5 above, plus Monosson 14-19; Plotkin as to III, P iv, 3-5,10,11,18,24-29)