UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

In the Matter of

DUKE POWER COMPANY, ET AL.

Docket Nos. 50-413 50-414

(Catawba Nuclear Station, Units 1 and 2)

AFFIDAVIT OF DR. JACQUES READ

I, Dr. Jacques Read, being duly sworn, state as follows:

1. I am Senior Physical Scientist in the Accident Evaluation Branch, Division of System's Integration, Office of Nuclear Reactor Regulation of the U.S. Nuclear Regulatory Commission. I received an A.B. degree in physical chemistry from Princeton in 1957, and M.S. and Ph.D. degrees from Yale in chemistry and nuclear physics in 1958 and 1962, respectively. A statement of my professional qualifications is attached. I testified before the Atomic Safety and Licensing Board in the matter of Catawba Nuclear Station, Units 1 and 2, in regard to the radiological consequence calculations of design basis and severe accidents.

2. The purpose of this affidavit is to summarize the assessment of risks to the public from severe accidents postulated to occur at Catawba Nuclear Station. This assessment is discussed in Section 5.9.4 and Appendices E and F of "Final Environmental Statement related to the operation of Catawba Nuclear Station, Units 1 and 2" (FES), NUREG-0921, January 1983.

8412310199 841221 PDR ADOCK 05000413 3. To assess severe accident risks at Catawba, four accident scenarios were chosen as representative of all accidents involving core melt and failure of the containment building. These four accident scenarios are described in terms of failure sequences in Appendix E of the FES, and the fractions of core inventory assumed to be released into the atmosphere by each are listed in Table 5.10, page 5-80 of the FES. The maximum possible core inventory (5.7 billion curies of 54 risk-dominant isotopes) is listed in Table 5.9 of the FES. With the exception of the isotopes of a few elements having volatile chemical forms, the majority of this inventory would remain within the plant following a severe accident. All four accidents would be considered "beyond design basis" events, and, contrary to implications contained in paragraphs 15 and 16 of the Kaku affidavit, each requires multiple failures to occur.

4. The estimated consequences and risks of the releases are summarized in Tables 5.11 through 5.13, pages 5-81 and 82 of the FES. Contrary to the statement in paragraph 3 of the Kaku affidavit, comparison of Tables 5.10 and 5.12 shows clearly that the most likely consequences of a severe accident at Catawba were estimated to include no early fatalities. Assuming the expected emergency response to occur following a severe accident, the likelihood of 470 early fatalities was computed to be once in 100 million reactor years. The individual risk of radiation exposure, computed as a function of distance from the plant, is shown in Figure 5.8, page 5-65 of the FES, indicating that this risk is substantially less outside the emergency planning zone (EPZ) than within.

- 2 -

As discussed in Appendix F of the FES, in order to demonstrate 5. the importance of the assumptions in the Staff's consequence models, early fatalities were also computed assuming no attempt at relocation of the population outside the EPZ for one day following the accident, and again, further assuming that supportive medical treatment was denied to the exposed population. Under these very pessimistic assumptions, early fatalities could be increased 40- and 50-fold, respectively, at the once in 100 million reactor year level. Even with these assumptions, the computed risks of early fatality from severe accidents at Catawba are very small compared to the pre-existing risk of accidental death in the surrounding population.

Subscribed and sworn to before me this 20th day of December, 1984

expires: 7/1/86

My commission expires:

STATEMENT OF PROFESSIONAL QUALIFICATIONS

JACQUES B. J. READ

Accident Evaluation Branch Division of Systems Integration U. S. Nuclear Regulatory Commission

As acting leader of the Radiological Analysis Section of the Accident Evaluation Branch, I am responsible for supervision of the evaluation for and preparation of the radiological accident consequences portion of environmental statements and review of the radiological implications of certain operating reactor license amendments. Environmental statements produced under my supervision are those for the Limerick, Pennsylvania and Braidwood, Illinois sites.

Before assuming my present position in August, 1983, I was Senior Physical Scientist in the Systems Analysis section of the Accident Evaluation Branch. In that position my duties included the performance of technical reviews, analyses, and evaluation of fission product behavior and of chemical phenomena involved in the safety of nuclear reactors. In performing these duties I have studied available information concerning diverse physical and chemical processes which govern the release and transport of fission products and actinides from reactor fuel, within plant buildings, and into the environment. Prior to the creation of the Accident Evaluation Branch in 1980, I was a member of the Accident Analysis Branch. Within that branch my duties included the identification and evaluation of hazards to the safe operation of nuclear power plants due to accidents external to those plants, and aspects of other risk evaluations susceptable to stochastic methods. Risk evaluations from such external hazards in which I have participated include munitions rail traffic near Braidwood, Illinois, tanker traffic near Waterford, Mississippi and Salem, New Jersey, and military aviation near Seabrook, Massachusetts, Boardman, Oregon, Douglas Point, Maryland and Palo Verde, Arizona. I was responsible for assessing the risks to proposed nuclear power plants from explosives. flammable gases, aircraft, and other missile impacts. I have represented the Nuclear Regulatory Commission in discussions of flammable gas hazards amongst member nations of the Organization of Economic Cooperation and Development.

I was born in Maywood, New Jersey, in 1935, and received an A.B. from Princeton in 1957 (physical chemistry), an M.S. from Yale in 1958 (statistical mechanics), and a Ph.D. from Yale in 1962 (chemistry and physics). I was employed at Oak Ridge National Laboratory during the summers of 1956 and 1957, and held post-doctoral appointments at Columbia University and the Nevis Synchrocyclotron Laboratory between 1961 and early-1964. I taught several courses in chemistry at Fairleigh Dickinson University, part-time during 1962 and 1963 and full-time during 1964. From late-1964 to 1974, I was employed by the Lawrence Livermore Laboratory, in the Radiochemistry Division prior to 1971 and in Special Projects Division thereafter. From 1966 to 1974 I held an appointment as Lecturer in the Department of Applied Science, Graduate School of Engineering, University of California. During 1973 and 1974 I was on detached assignment to the U.S. Atomic Energy Commission headquarters, under a contract between the Commission and the Regents. I resigned from the Laboratory and the Department on November 4, 1974, to assume my present position.

My baccalaureate thesis was a study of high temperature electrochemistry. At Yale, I studied optical rotation of polarized light by molecules. My eventual doctoral thesis was a study of the mechanisms of the nuclear reactions of heavy ions, and my post-doctoral studies concerned proton-induced nuclear spallation reactions, and the creation of computer programs to calculate the probabilities of rare nuclear interactions. While at the University of California's Lawrence Livermore Laboratory, I studied deuteron-induced nuclear reactions, and was involved in research in nuclear fission and fusion devices. My duties included supervision of radiochemical analysis and responsibility for the radiochemical diagnostics of certain prototype weapons. I wrote the Monte Carlo code used to reduce the data from the Gnome "neutron wheel" experiment, and performed the search for neutron-rich silicon isotopes on the Hutch Event. I was, for several years, a participant in the U. S. - U. K. Joint Working Group in Radiochemistry.

I am a member of the American Chemical Society and Sigma Xi. I have served on the Board of Abstractors, in French and English, of the American Chemical Society, and have in the past held memberships in the American Physical Society and the American Association of University Professors. I have authored or co-authored articles in <u>Physical Review</u> and <u>Journal of Inorganic and Nuclear Chemistry</u>, papers presented before the American Nuclear Society, the American Chemical Society, and the International Union of Pure and Applied Chemistry, and numerous technical reports.