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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

In the Matter of DUKE POWER COMPANY, ET AL. (Catawba Nuclear Station, Units 1 and 2)	Docket Nos. 50-413 414 December 10, 1984

INTERVENORS' APPLICATION FOR A STAY PENDING ADMINISTRATIVE AND JUDICIAL REVIEW

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INTERVENORS' APPLICATION FOR A STAY PENDING ADMINISTRATIVE AND JUDICIAL REVIEW

Pursuant to 10 CFR §2.788, Palmetto Alliance and Carolina Environmental Study Group hereby make written application for a stay of the effectiveness of decisions by the Licensing Board authorizing initial criticality and operation of the Catawba Nuclear Station pending the orderly administrative and judicial review of those decisions now pending before this Appeal Board and on Petition for Review before the United States Court of Appeals for the District of Columbia Circuit.

I. SUMMARY OF THE DECISIONS TO BE STAYED.

The decisions of which review is sought and whose effectiveness should be stayed are (1) the June 22, 1984 Partial Initial Decision; (2) the September 18, 1984 Supplemental Partial Initial Decision on Emergency Planning; and (3) the November 27, 1984, Partial Initial Decision Resolving Foreman Override Concerns and Authorizing Issuance of Operating License.

Attached hereto and incorporated herein by reference are the December 7, 1984 letter from Applicants to the Court of Appeals delaying criticality by 30 days, the Declaration of Robert Guild, and the Affidavits of Dr. Michio Kaku; David A. Schlissel and Wells Eddleman, Exhibits 1, 2, 3, 4, and 5 respectively, in support of this Application. As reflected in the Declaration these Affidavits are submitted, now, unsigned due to time limitations. Signed copies will be submitted as soon as practicable.

II. GROUNDS FOR THE STAY

As recognized by the Commission Rules of Practice 10 CFR §2.788(e), the stay should be granted, here, where (a) the movant has made a strong showing that it is likely to prevail on the merits; (b) the movant will be irreparably harmed unless the stay is granted; (c) the grant of a stay would do little or no harm to other parties; and (d) the public interest supports the stay. Virginia Petroleum Jobbers Association v. FPC, 259 F.2d 921 (D.C. Circ. 1958); Washington Metropolitan Transit Commission v. Holiday Tours, Inc., 559 F.2d 841 (1971).

A. THERE IS A STRONG LIKLIHOOD THAT INTERVENORS WILL PREVAIL ON THE MERITS OF THEIR APPEALS.

The Licensing Boards which have rendered the Partial Initial Decisions appealed from have committed reversible error in authorizing operating licenses for the Catawba facility in the face of evidence precluding a "reasonable assurance" that the facility will operate without endangering the public health and safety, 10 CFR 50.57(a); and having deprived Intervenors of an opportunity to be heard on serious safety and environmental claims, in violation of the Atomic Energy Act's hearing provision, §189(a) and in contravention of the National Environmental Policy Act.

1. Serious Violations of the Commission's Quality Assurance Regulations and the Existence of Known Yet Uncorrected Workmanship Deficiences Preclude the Mandatory Safety Finding Required for an Operating License.

The history of construction at Catawba is replete with evidence of violations of the 10 CFR Part 50, Appendix B, Quality Assurance Criteria in the organization and implementation of the mandatory quality assurance program at the facility. Compliance with these regulations is a condition precedent for the grant of an operating license. 10 CFR §50.57(a)(1).

In the first and last comparative analysis of utility performance by the Commission in 1981, Catawba was rated in the lowest category, "below average" among the seven notoriously troubled plants including the now-cancelled Midland and Zimmer plants. All safety construction was halted at Zimmer due to widespread quality assurance deficiences. Cincinnati Gas & Electric Co. (William H. Zimmer Nuclear Power Station) CLI-82-83, ___ NRC ___ (November 12, 1983). Comparable evidence of quality assurance deficiences is reflected in the Catawba record. The 1981 Systematic Assessment of Licensee Performance (SALP) Report for Catawba found:

> The Catawba facility displayed evidence of weakness in the area of quality assurance, including management and training.
>
> Quality assurance weaknesses were characterized by instances of inadequate design reviews, procedures not issued, specifications and commitments not translated into procedures, and audit programs not established. There were numerous items of noncompliance involving failure to follow procedures for activities involving welding, concrete placement, design, quality control inspections, records control, and electrical equipment installation.
>
> Catawba received a relatively large number of items of noncompliance when compared with other power reactor facilities under construction. Most of these items of noncompliance were attributed to weaknesses in the licensee's quality assurance and management process.

Appendix B-1. This breakdown in the Quality Assurance (QA) program at Catawba has continued unabated until the present.

The Licensing Board has failed to apply this Board's decisional instructions in Union Electric Co. (Calloway Plant), ALAB-740, 18 NRC 343 (1983); in authorizing licensing for Catawba in the face of widespread violations of the 10 CFR Part 50, Appendix B regulations (See, e.g. June 22, 1984 PID pp. 125-135), management condoning harassment of Quality Control (QC) inspectors (See, e.g. June 22, 1984 PID pp. 162-181); and management retaliation and

discrimination against QC inspectors for "strict adherence to QA procedures and expression of safety concerns" (June 22, 1984 PID p. 159) in an effort by Duke's QA management to "bring about an informal relaxation of inspection procedures . . . (which) might have undermined the QA program at Catawba by diminishing the efforts of inspectors." (June 22, 1984 PID p. 161)

The Licensing Board erred in excusing the widespread Appendix B violations although identified only by the QC inspectors who were themselves the victims of unlawful retaliation for raising these concerns. It erred in limiting its response to Duke's harassment of QC inspectors to a requirement that Duke "revise its harassment policy" within the following 6 months where Catawba is now on the verge of operations (June 22, 1984 PID p. 181); and it not only erred but itself condoned serious misconduct in refusing to take any action for the proven retaliation against QC supervisor "Beau" Ross at the hands of Duke Corporate QA Manager George Grier and Catawba Project QA Manager Larry R. Davison. The Board trusts instead, simply, that "the airing of this matter in public hearing and in this decision will have a salutory effect on the company's handling of similar matters in the future." June 22, 1984 PID p. 161.

The Licensing Board refused to look further at the QA program at Catawba in the face of such strong evidence of a pattern of widespread breakdown in the QA system. It refused Palmetto Alliance's efforts to extend discovery on its QA contention beyond the less than five month period it originally authorized, Memorandum and Order (Ruling on Palmetto Alliance Motion for Further Discovery) June 13, 1983, providing Palmetto only 25 additional days for depositions to ascertain all underlying facts regarding

the Catawba QC inspection concerns which it acknowledged "if substantiated, could compromise the safety of the Catawba facility." Id. p. 6. The Board refused a subsequent request by Palmetto to extend QA discovery which was founded upon a critical "Construction Project Evaluation" for Catawba, In Camera Transcript 948-954. It also denied Palmetto discovery regarding new concerns raised by former Catawba workers who testified as in camera Board witnesses, for the oft-cited reason that such relief might "prejudice the Board's ability to decide the safety issue prior to the fuel load." Tr. 11, 217-18. See, e.g., Memorandum and Order (Denying Motion for Reconsideration or Referral and Establishing Schedule) February 2, 1983, ("the Commission's 'Statement of Policy on Conduct of Licensing Proceedings,' 13 NRC 452 (1981) ... includes a clear policy to seek to conclude operating license cases like this one prior to the completion of construction ...." Id. p. 7). The Licensing Board erred in its blind deference to the Applicants' construction schedule to the derogation of Intervenors' hearing rights and the development of a sound record on the QA issue.

Against this backdrop the Board confronted the startling and serious new evidence of the consequences of the historic QA breakdown at Catawba: the so-called "foreman override" practices. In less than one month the Licensing Board granted Palmetto's Motion for further proceedings on September 21, 1984, required that all discovery be completed involving the statements of over 217 Catawba workers and thousands of technical documents, and concluded hearings in the early morning hours of Saturday, October 13, 1984. All this was done to avoid impact on Duke's ever-slipping construction schedule. November 27, 1984 PID pp. 2-5. Foreman override, the practice of Catawba craft supervision pressuring

workers to cut corners and violate QA standards in order to meet cost or schedule requirements, represents the most serious willful challenge to the QA system since it involves intentional circumvention of quality standards and efforts to evade QC detection, not simply the sort of human error that a QA system is designed to identify and correct. See, e.g., November 27, 1984 PID pp. 19-24.

Foreman override was a concern raised initially by formerly in camera witness Sam Nunn, an ex-Catawba welder. Although rejected by the Applicant, Staff and Board as unsubstantiated, June 22, 1984 PID pp. 232-238, the NRC Staff corroborated Nunn's concern through the evidence from a confidential source, "Welder B." This welder related experiences with a foreman, Arlon Moore, who pressured his crew to weld safety related stainless steel pipe so quickly that maximum interpass temperature limits were violated causing sensitization of the metal to inter-granular stress corrosion cracking (IGSCC). The foreman, a known ex-felon, threatened violence against anyone who might report his conduct to the authorities. April 23, 1984 Inspection Report, NRC Staff Exhibit 31. Such conduct and its workmanship effects went undetected by Duke QA or the NRC for over four years.

The NRC Staff improperly delegated to Duke Power Company the investigation and correction of its own misconduct, with shocking results. Only at the very last minute in the extremely truncated discovery process made available did Palmetto uncover the field weld test data indicating the existence of substantial numbers of unacceptable sensitized welds in "critical" safety systems in the Catawba plant. Even the Licensing Board agreed with Palmetto that Duke had attempted to "suppress" this test information, November 27, 1984 PID p. 38, which had not been disclosed in its published report to the NRC, Board and parties. Such evidence

reflects a violation of Regulatory Guide 1.44, "Control of the Use of Sensitized Steel," Palmetto Exhibit 164, founded upon General Design Criteria 1 and 4 and committed to by Duke. The Regulatory Guide acknowledges that minimizing sensitization through such measures as interpass temperature control "is needed to diminish the numerous occurrences of stress corrosion cracking in sensitized stainless steel components in nuclear reactors." Id. As the Affidavit of David A. Schlissel reflects, "the history of IGSCC has been that the phenomenon has occurred in previously unanticipated locations through previously unanticipated pathways." Id. pp. 2-3. The Catawba Licensing Board erred in its rush to licensing by failing to call for further inspection and testing to determine the extent and seriousness of the weld sensitization problems at Catawba as well as the other workmanship consequences of the quality assurance breakdown and foreman override practices before licensing the facility.

2. The Licensing Board Has Wholly Deprived Intervenors of the Opportunity to be Heard on Important Safety and Environmental Claims Through an Impermissible Interpretation of Its Rules of Practice Regarding the Filing of Contentions for Litigation.

Through a process that can only be characterized as arcane legal maneuvering involving the impermissible application of the ruiles of practice regarding intervention and the filing of claims for litigation, 10 CFR §2.714, the Licensing Board has deprived Intervenors of the opportunity to be heard on important safety claims cognizable under the Atomic Energy Act, the Commission's substantive safety regulations, and important environmental claims under the National Environmental Policy Act.

By such maneuvering the Board has refused to hear Petitioners' claims regarding (1) acknowledged safety deficiencies in the critical emergency diesel generators required for safe shut-

down in the event of an accident; (2) the effectiveness of Catawba's hydrogen control measures to prevent a severe breach of containment accident; (3) failure to correct identified human engineering deficiencies in the Catawba control room design; (4) the lack of financial qualifications of Catawba's small municipal owners to safely operate and decommission the Catawba Nuclear Station; (5) the adverse environmental impacts of possible severe accidents involving failure of Catawba's hydrogen control measures; (6) the adverse considerations of the actual expected benefits of the facility as weighed against its costs and impact on the human environment; (7) the adverse environmental impact of Duke's plans to transship radioactive spent reactor fuel from its Oconee and McGuire nuclear plants for storage at Catawba including a consideration of need for such action, and the existence of less harmful alternatives.

As even the Licensing Board itself earlier acknowledged the impermissible erection of "late-filing" hurdles in to thwart consideration of cognizable safety and environmental claims of Intervenors would be

> . . . of very questionable legality not only under the Atomic Energy Act (as to safety issues) but also the National Environmental Policy Act (as to environmental issues).

Memorandum and Order (Reflecting Decisions Made Following Prehearing Conference) March 5, 1982. This Appeal Board agreed that such a "Catch-22" situation, depriving Intervenors of their hearing rights, was forbidden by the statutes and not authorized by Commission regulations. Catawba ALAB-687, August 19, 1982. Yet, such result has occurred, here; and such claims must be heard prior to licensing Catawba.

B. INTERVENORS WILL SUFFER IRREPARABLE INJURY IF A STAY IS NOT GRANTED.

Intervenors and the public will suffer irreparable harm if the stay is not granted including (1) a definite and significant risk to the public health and safety from the irreversible radioactive contamination of the facility with its danger to workers and the public from routine releases, exposures and accidents. See, Kaku Affidavit; Schlissel Affidavit; (2) an irretrievable commitment of resources which will prejudice the final agency decision in favor of licensing. Calvert Cliffs Coordinating Committee v. AEC 449 F.2d 1109 (D.C. Cir. 1971); (3) the deprivation of Intervenors' right to appeal where operation of the facility risks mooting any appeal since the status quo ante will be forever beyond reach. Public Utilities Commission of D.C. v. Capital Transit Co., 214 F.2d 242 (D.C. Cir. 1954); and (4) a a violation of the National Environmental Policy Act where a decision is made without taking into account the environmental impacts claimed by Intervenors. Massachusetts v. Watt, 716 F.2d 946 (1st Cir. 1983).

C. THE GRANT OF A STAY WILL DO NO HARM TO OTHERS.

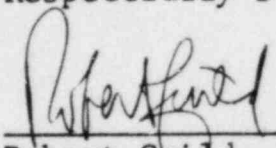
Applicants have asserted that financial harm will befall its customers should the operation of Catawba be stayed pending review. Intervenors dispute such claims. As the Affidavit of Wells Eddleman makes clear, Duke's claims of benefit to its customers from Catawba operation have no basis in fact. Catawba is unnecessary in the Duke system which is substantially overbuilt. Eddleman Affidavit pp. 2-4. Its production can only be sold to non-customers since system sales requirements will be met for at least 4 years without Catawba. Id. at p. 4. Catawba's operation can only

displace cheaper nuclear and coal units thus making its addition in the system uneconomical. Id.at pp. 5-6. Finally, Catawba's usefulness is limited to only a few of the hottest summer days--many months from now. Id. p. 7. Clearly no cognizable harm will result to others from the grant of the stay pending review.

D. THE PUBLIC INTEREST FAVORS GRANT OF THE STAY.

Where the single most important consideration in licensing is nuclear safety, Consumers Power Co. (Midland Nuclear Power Plant Units 1 and 2) ALAB 314 (1976), the public interest warrants an orderly review of the serious health and safety issues presented by this record prior to the irreversible occurrence of criticality, reactor system contamination and operation. As the Affidavit of David A. Schlissel reflects if further inspection and rework is required at Catawba "it is prudent to complete that inspection prior to initial criticality. Once the piping becomes radioactive, the inspection becomes more difficult, more time consuming, more expensive and constitutes more of a hazard to the individuals involved." Id. p. 3

Respectfully submitted,



Robert Guild
Counsel for Palmetto Alliance

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

In the Matter of)
)
DUKE POWER COMPANY, ET AL.)
)
(Catawba Nuclear Station,)
Units 1 and 2))

Docket Nos. 50-413
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CERTIFICATE OF SERVICE

I hereby certify that copies of the Application for Stay in the above-captioned proceeding have been served, on the following by deposit in the United States mail, first class this 11th day of December, 1984.

Alan S. Rosenthal, Chairman
Administrative Judge
Atomic Safety and Licensing
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U.S. Nuclear Regulatory
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Washington, DC 20555

Thomas S. Moore
Administrative Judge
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EXHIBIT 1

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WRITER'S DIRECT DIAL

(202)

December 7, 1984

Honorable Robert A. Bonner
Chief Deputy Clerk
United States Court of Appeals
for the District of Columbia Circuit
Washiongton, D.C. 20001

Dear Mr. Bonner:

This is to update our letter of December 5, 1984. On Thursday, December 6, 1984, Duke Power Company, et al. received licensing authority from the Nuclear Regulatory Commission to permit the Catawba Nuclear Station Unit 1 to operate in a critical mode and conduct additional tests at up to 5% full power. Today the Company determined to delay criticality, scheduled for December 10, 1984 (as reported to you and the parties in phone conversations of yesterday), for a period of 30 days. This delay was occasioned by discovery by Westinghouse Electric Corporation that a component was incorrectly installed in the control rod drives in certain of its pressurized water reactors. Though Catawba Unit 1 falls within this class of reactor, it is not known whether such problem exists there. Nevertheless, the Company has determined it prudent at this stage to delay escalation to criticality until Catawba Unit 1 has been examined and if found to exist, the problem has been corrected.

During this delay we are of the view that Petitioners should be required to seek timely emergency relief from the Nuclear Regulatory Commission in accordance with its regulations (10 C.F.R. §2.788). Following that, Petitioners should be expected to seek relief in this Court, if necessary, in a timely fashion so as to avoid the eleventh hour rush that we all have experienced this week. In the event Petitioners do not seek relief from the NRC

we will strongly argue before this Court that such failure is fatal to the relief they seek. Further, if Petitioners do not pursue their remedy in a timely fashion with this Court we are of the view that under the circumstances this Court should not entertain the stay. We are informed that the NRC is of the same view with respect to actions to be taken by Petitioner during this 30 day delay.

We will keep the court and parties advised of any further scheduling developments.

Sincerely,

J. Michael McGarry, III

cc: Palmetto Alliance
Solicitor (NRC)

EXHIBIT 2

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

PALMETTO ALLIANCE and CAROLINA ENVIRONMENTAL STUDY GROUP,	)	
Petitioners,	)	No._____
v.	)	
UNITED STATES NUCLEAR REGULATORY COMMISSION and the UNITED STATES OF AMERICA	)	
Respondents	)	

DECLARATION OF ROBERT GUILD
IN SUPPORT OF EMERGENCY MOTION
FOR STAY PENDING REVIEW

I, Robert Guild, declare and say:

1. I am an attorney admitted to the practice of law before the Supreme Court of South Carolina and I am a member of the bar of this Honorable Court. I am the attorney for Petitioners in this action. This declaration is filed in support of the Petitioners' request for a stay of the actions of the Respondent, Nuclear Regulatory Commission authorizing operation of the Catawba nuclear station. Initial criticality and reactor operations at Catawba, with irreversible radioactive contamination of the nuclear fuel and reactor systems is now expected to occur Sunday, December 9, 1984. The Petitioners' Emergency Motion for Stay Pending Review with supporting authorities is currently in preparation and will be filed with

this court and hand served upon the Commission and Intervenors, Duke Power Company et. al. as soon as practicable.

2. Expedited consideration of this Motion is essential in order to prevent the irreparable harm that will result if the Commission's action is not stayed and operation of the nuclear facility is allowed to commence. The final Partial Initial Decision Resolving Foreman Override Concerns and Authorizing Issuance of Operating Licenses of the Commission's Atomic Safety and Licensing Board was served last Thursday, November 28, 1984. A stay of that decision was sought from that Board that day and was refused Friday afternoon November 29, 1984 after an on-the-record telephone conference of the parties. On Monday morning, December 3, 1984, Petitioners sought a stay from the Commission's Appeal Board. This stay request was refused late Monday afternoon following an on-the-record telephone conference of the parties. Since the issuance of an operating licence to the Intervenors, Duke Power Company, et. al., was to occur the next day with actual criticality and operations planned for Saturday December 8, 1984, Petitioners counsel orally informed Mr. Bonner of the Clerk's office of this Court, late in the afternoon of Monday December 3, 1984, of the need to seek emergency relief from this Court. Petitioners' counsel travelled to Washington that night and the Petition for Review and Exhibits were filed in this Court Tuesday, December 4, 1984 together with a written confirmation of the need for and timing of the

emergency relief required. These papers have been served upon the parties and they have been informed of Petitioners' actions in seeking emergency relief.

3. As provided for a Rule 18, Fed. R. App. P. and Rule 6(j) of the General Rules of this Court the Petitioners are filing and serving with this Declaration upon the parties concurrently, the Affidavits of Dr. Michio Kaku, David A. Schlissel and Wells Eddleman in support of petitioners request for relief. Because of the exigent circumstances these Affidavits are submitted unsigned. Each of the affiants has affirmed to me that his Affidavit represents his true and correct sworn statement and has authorized me to submit his Affidavit on his behalf. Signed copies of these Affidavits will be filed and served as soon as practicable.

4. The emergency intercession of this Court is urgently required in order to prevent imminent and irreparable harm to Petitioners and the public residing in proximity to the Catawba Nuclear Station. Serious, unlawful actions by the Nuclear Regulatory Commission, including its failure to require correction of known safety deficiencies in construction of the Catawba facility, tolerance of the breakdown in the Quality Assurance program required by Commission regulations for construction of the facility, and the failure by the Commission to consider Petitioners' claims of other significant safety and environmental

deficiencies support the likelihood that petitioners will prevail on the merits of this action for review. As reflected in the Affidavits of Dr. Kaku and Mr. Schlissel, serious and irreversible harm will occur on initial criticality and contamination of the Catawba reactor will endanger the work force and make much more difficult the identification and correction of safety defects such as welds on contaminated systems. As the Affidavit of Mr. Eddleman reflects, there is little likelihood of harm to Duke Power Company and no possible harm to Duke's customers should plant operation be stayed pending review since the Catawba facility will not be needed as an economical source of power for several years. Finally, the public interest in ensuring the safety of this nuclear power plant and protection of the environment as well as the interest in an orderly process of review strongly supports for the grant of relief.

5. Because of the exigent circumstances facing Petitioners

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and the imminence of the need for relief Petitioners respectfully seek an opportunity to be heard orally by the Court in support of this emergency request for a stay.

Executed this 6th day of December, 1984, at Washington DC.

I declare under of perjury that the foregoing declaration is true and correct.

ROBERT GUILD

EXHIBIT 3

IN THE UNITED STATES COURT OF APPEALS

FOR THE DISTRICT OF COLUMBIA CIRCUIT

PALMETTO ALLIANCE and CAROLINA ENVIRONMENTAL STUDY GROUP,	)	
Petitioners,	)	No._____
v.	)	
UNITED STATES NUCLEAR REGULATORY COMMISSION and the UNITED STATES OF AMERICA	)	
Respondents.	)	

AFFIDAVIT OF DR. MICHIO KAKU

DR. MICHIO KAKU, being duly sworn, deposes and says as follows:

1. I am a Professor of Nuclear Physics at the City University of New York Graduate Center and the City College of New York. I received a B.A. degree in physics from Harvard in 1968 and a Ph.D. in nuclear physics from the University of California at Berkeley (Lawrence Radiation Laboratory) in 1972. I taught on the faculty of Princeton University from 1972 to 1983. Since that time, I have been a professor of nuclear physics at the CU Graduate Center and CCNY in New York. I have published over 35 physics papers, contributed to five books, and co-authored a book on nuclear power. I have testified as an

expert in reactor physics at NRC licensing hearings for several nuclear facilities, including the Big Rock reactor in Michigan, V.C. Summer in South Carolina, Byron near Chicago, and the reasearch reactor at the University of California at Los Angeles, California. In addition, I appeared as an expert advisor to the Governor's Commission on the Shoreham Nuclear Power Plant in New York, and I have testified in civil suits involving the Commanche Peak reactor. I have submitted an Affidavit in support of a Motion to Stay Operation of the Diablo Canyon Nuclear Plant in this Court.A full statement of my qualifications is attached.

2. The purpose of this affidavit is to address the potential for accident hazards and radioactive contamination of systems at the Catawba Nuclear Station from criticality and power ascension up to full (100%) power. There are, indeed, special site-specific considerations at Catawba which pose enhanced risk to the workforce and public residing near the plant. Specifically, Catawba with its thin-walled ice-condensor type containment is more susceptible than most reactors to the most serious severe accident scenarios involving large releases of radiation to the environment through the early failure of the thin containment from such possible causes as overpressurization, steam explosion or explosive hydrogen burning. Such a scenario dominates the severe accident analysis for such containment designs as Catawba's as acknowledged by the NRC's own studies.

E.g. Reactor Safety Study Methodology Application Program (RSSMAP) for Sequoyah Unit 1 (NUREG/CR-1659, Vol. 1). It should be noted that the ice condensor feature at Catawba has never been tested under simulated or actual accident conditions.

3. The 350,000 residents of the City of Charlotte, North Carolina, a mere 9.7 miles downwind from Catawba are at particular risk in the event of an accident at the facility. Even the NRC Staff projects 24,000 early fatalities in the Charlotte metropolitan area because of the unique combination of dominant wind frequencies blowing from the plant toward the City of Charlotte with its high concentrations of population. See Final Environmental Statement for Catawba. I understand that in recognition of these special risks a citizens' Emergency Planning Review Committee was organized by the City and the County governments which has recommended expansion of the Commission's mandated plume exposure pathway Emergency Planning Zone for Catawba to encompass the City of Charlotte in order to achieve enhanced emergency preparedness for the local population. Unfortunately, the NRC's Licensing Board in the Catawba case refused to require expansion of this EPZ which now stops just at the Charlotte City limits less than 10 miles downwind from Catawba.

4. The evidence of a Quality Assurance program breakdown at Catawba resulting in such safety defects as welds in

critical safety systems sensitized to intergranular stress corrosion cracking (IGSCC) provides specific justification for caution in licensing Catawba. It is just such weakened components which can result in either the unexpected escalation of an accident scenario into one of catastrophic proportions, or through the unanalyzed scenario of multiple minor component failures can itself represent an unexpected initiating event for a severe accident. The Commission is unable to predict the impact of such multiple failures since such analysis is beyond the capability of conventional computer models. Finally, the identification of the need for further inspection, testing and possible rework on known safety related piping systems strongly warrants deferring criticality which would result in inevitable radioactive contamination of such suspect systems. The necessary remedial work would be far less difficult, costly and hazardous if performed before criticality is achieved.

5. It will take approximately ten days for the Catawba plant to reach 5% power following initial criticality. This 5% level of power operation is authorized by the NRC Staff before the Commission reviews the case. I understand that Commission approval for ascension to 100% is expected very quickly and that Duke Power Company plans to ascend beyond 40% within 30 days. To the layperson, the jump from zero to 5% power may seem a small one, while that from 5% to 100 % power seems quite large. To a nuclear physicist, however, the transition between zero and 5%

power is important because it is a qualitative one. Because a reactor at zero power and a reactor operating at 5% power are entirely different in terms of radiation inventory, this is not an idle distinction. A reactor operating for only one to two months at 5% power has about half a billion curies stored inside, which is more than the entire radiation inventory of many reactors built in the early 1960s. Certain isotopes, like iodine, may approach their maximum inventory in a few days, while others, like xeron, may take a few weeks. Within one to two months, however, we expect most of the volatile fisison products to reach their maximum value.

6. Half a billion curies of radiation generated by the Catawba plant operating at 5% power is not only a source of radiactive contamination of the reactor and a hazard to plant workers, but it is an enormous amount of radiation from a health standpoint. For example, government documents such as WASH-740 (1957), which analyzed the serious consequences of a major reactor accident in areas hundreds of miles downwind from a reactor, were based on reactors that had no more radiation stored in them than the much larger 1145 megawatt Catawba reactor operating at 5% power.

I. CONTAMINATION

7. Once a reactor is turned on, from criticality on, several permanent changes occur in the plant. Contamination

caused by the accumulation of fission products, neutron activation products, and corrosion in the steam generators along with increased stress on pipes are irreversible.. First, the entire primary system, including the reactor vessel and the primary coolant loop, will become permanently contaminated, and the process of permanently creating radioactive reactor steel is begun. This is caused by "neutron activation," which means that the nuclei in the reactor steel have absorbed excess neutrons and have become radioactive. Cobalt-60 contamination in the steam generators, for example, is a permanent problem which will result from low power operation and continue to increase as operation continues. The half-lives of many of these neutron activation products are large enough to make the reactor quite radioactive even years after it has been brought back to zero power. Workers who must then do inspections, make repairs or perform decommissioning tasks are exposed to radiation from the permanently contaminated steel and corrossion products that accumulate in a sludge-like form in the reactor system. This radiation exposure is due to the presence of neutron activation products from plant operation at power levels from criticality to 100%, some of which were previously neglected by the NRC and only recently discovered by Professor Robert Pohl of Cornell University to have unusually long half-lives. This contamination increases the potential for worker exposure and escalated costs of decommissioning. Additionally, if decontamination processes were used to reduce worker exposures, large volumes of liquid

nuclear wastes would be produced. Moreover, the needless exposure of workers to radiation violates the As Low As Reasonabley Achievable (ALARA) principle embodied in the NRC's regulations. See e.g. 10 CFR 50.34a.

8. Second, in addition to irradiating the steel, there is the problem of radioactive fission products contiminating the primary cooling water. Small microleaks in the fuel rods of any reactor, for example, will allow gaseous radioactive fission products to be leaked into the cooling water. These are the "noncondensibles," like hydrogen or the nobel gases (krypton-85, xenon-133, etc.) which cannot be condensed back into the cooling loop. In addition, you will accumulate small amounts of water soluble fission products (e.g., iodine-131) which will be dissolved in the cooling water. Further, if there are any breaks in the thousands of tubules in the steam generators (which can be caused by any number of commonly occuring flaws), then this radioactive contamination will leak into the secondary system as well. Contamination in the secondary system can cause radiation to slowly leak throughout the plant, causing considerable complications for workers making routine repairs. Liquids and gases from the secondary coolant system are routinely released to the environment.

II. POTENTIAL ACCIDENTS AND CONSEQUENCES

9. A reactor operating at any level of power will, during its normal operation, be susceptible to a range of nuclear accidents. Small nuclear accidents are made possible by the presence of nuclear materials in the reactor. Fuel handling accidents, which can potentially create enormous radiation exposures to workers, can happen once the fuel rods have been loaded and irradiated. Radiation levels of thousands of rads per hour (when 600 will kill an average adult) can be generated by fuel rods that have been irradiated.

10. A reactor operating from 5% to 100% power also has the potential for larger accidents, known as Class VIII and Class IX accidents. Although less likely to happen than less severe accidents, they cannot be ruled out for a number of reasons. I will first discuss the consequences of a major off-site release and then consider how likely such a release may be. A fission product inventory of half a billion curies is quite large. (For the purpose of comparison, a hydrogen bomb has a radiation inventory after the first day about 50 times smaller than the inventory of a large reactor at 5% power. Of course, a reactor cannot explode, but the inventory produced even at low power levels is enough to cause the death of tens of thousands of individuals if the fission products were dispersed into the environment.) It is important to realize that a reactor

operating at as low as 5% power has enough energy to cause melting of nuclear fuel and ultimately breach of the reactor containment building. For example, the meltdown scenarios that have been postulated in WASH-740 and WASH-1400 are based on reactors that have been "scrammed" (i.e., control rods inserted). A scrammed reactor is sub-critical but its "decay heat," which is about 5% of the reactor's full-power value, is sufficient to raise temperatures to 5,000 degrees F., which is sufficient to cause the fuel to melt.

11. Any number of mechanisms can eventually cause large amounts of hot, gaseous fission products (iodine-131, strontium-90, cesium-137) to be sprayed as steam into the environment. For example, an accident called Class IX, PWR 3, could cause the slow release of 20% of the iodines and 20% of the alkali metals (and probably 100% of the noble gases) into the atmosphere . Given the fact that the reactor contains half an billion curies of radiation having operated at only 5% power, then it is possible that as much as a hundred million curies may escape into the environment. Much of this will be in the form of water soluble fission products like iodine, cesium, and strontium as well as noble gases. The fission products will be dispersed as a fine, invisible mist into the air. Winds blowing moderately at 5 mph will create a 15-degree wedge of radioactive steam moving steadily downwind. Within two hours, the radioactive plume will have reached the boundry of the 10 mile evacuation

zone, in the case of Catawba the city limits of Charlotte.

12. The potential health risks in the surrounding environment associated with even a .1% to 1% release fraction may be considerable. Iodine-131, which concentrates in the thyroid gland, has a half-life of 8 days, so it is reasonable to assume that in 80 days (10 half-lives) the radioactivity will have been reduced down to acceptable levels. However, cesium-137 and strontium-90 have half-lives of around 30 years, and will contaminate the area for roughly 300 years. Since both cesium and strontium can occur in water soluble form, this means that the top soil surrounding the area will be unfit for agricultural uses for several centuries. An area containing several thousand square miles of land may eventually be quarantined, with the crops confiscated, the milk impounded, and the area sealed off.

13. There is some precedent for this scenario. In October 1957, the British had a nuclear accident several times more severe than that which occurred at TMI in 1979. They experienced a large uranium fire in the Windscale Pile #1, which sent roughly 50,000 curies of fision products (mainly strontium) into the surrounding area. This amount of contamination was sufficient to cause the contamination of several hundred square miles of land. Milk had to be impounded in a 200 square mile area, and cattle were slaughtered and their thyroid glands removed. Unfortunately, no adequate health records were kept, so

it is not known what the long-term effcts of this accident have been. This type of emergency, caused by the leakage of 50,000 curies, could be dwarfed by a major accident at Catawba at power levels as low as 5% to say nothing of full power operation.

14. Furthermore, areas even hundreds of miles away from the contaminated area may also experience a drop in business because of psychological reasons. In the past, even rumors of contamination of certain foods have adversely affected the market. For example, the rumored contamination of shellfish and oysters in the Chesapeake River caused a rather dramatic drop in consumption of these foods and a loss of tens of millions of dollars to business. Similarly, areas bordering on contaminated areas may also experience a sudden drop in sales.

15. The scenario presented above may be challenged because of the probability calculations in the Reactor Safety Study, WASH-1400, which estimates very low probabilities for Class IX accidents. The methodology used in WASH-1400 to calculate the probability of Class IX accidents is very much in dispute within the scientific community, and WASH-1400 by no means represents the final verdict on the issue. Its executive summary was even repudiated by the NRC itself in the so-called Lewis Report. The methodology of WASH-1400 has been challenged on several grounds. First, the analysis uses the "single event" (i.e., one pipe crack) and calculates its effects as this defect

propagates and creates more failures. This methodology essentially neglects the question of common and multiple mode failures, which are possible at Catawba. A common mode failure could be initiated by even a small earthquake or reactor transient with pressure and vibration stress causing, for example, several pipes to break simultaneously. Each pipe break could in turn cause a cascade of several smaller breaks particularly at a plant like Catawba with suspect weak welds. When these cascading trees of small accidents begin to overlap and influence each other, the capability of any computer on this planet to model the accident accurately is quickly exhausted. Even single mode failures push the limit of known computers; common mode failures for anything as complex as a nuclear reactor are beyond the known computer technology available at present. If working experience is any guide, single modes failures are simply too idealized to give us an accurate assessment of the probabilities of a Class IX accident.

16. Multiple mode failures are also a big problem. Almost all the major nuclear accidents of the past, including the Class IX accident at Three Mile Island (TMI), have been multiple mode failures. According to the utility's own Final Safety Analysis Report (FSAR), a Class VIII accident (e.g., loss of coolant accident (LOCA) may create a situation which will strain the emergency systems but will eventually be brought under control. But given the history of construction defects at

Catawba, it is possible that a Class VIII accident might slide into a Class IX accident (which by law must be analyzed in the FSAR) similar to the one considered in the FSAR for the reactor, and assuming an earthquake and faulty welding that causes a double-ended guillotine break in the "cold-leg" of the primary system, the highly pressurized cooling water could blast out of the vessel, completely uncovering the core within a matter of minutes. In the FSAR for Catawba it is postulated that the high pressure injection ("HPI") pumps will automatically activate, pouring cooling water on the core and terminating the accident. However, if the HPI pumps and pipes have been damaged during the earthquake because they were not installed correctly, a design basis Class VIII accident will slide into a "beyond design basis" Class IX accident.

17. Given a multiple mode failure, where a Class VIII accident is pushed into a Class IX accident by the failure of the HPI system because of problems peculiar to the Catawba reactor, it is possible to have fuel melting. There is enough energy at 5% power to cause temperatures to soar to 5,000 degrees F. The failure pressure for most PWR containments is roughly 100 pounds per square inch; however the thinner ice condensor containment at Catawba would fail at a much lower pressure. Containment failure can be achieved through a number of mechanisms: (a) steam explosions when molten fuel comes in contact with cold water (steam explosions can cause local over-pressures reaching several

thousands psi), (b) over-pressurization due to the generation of large amounts of steam and hydrogen (from oxidation of the zirconium; even WASH-1400 admits that overpressure beyond 100 psi can be generated by steam and hydrogen), or (c) simple leakage of radiation to the environment by failures in the isolation valves, the penetrations, etc. (this is the mode found at TMI). Once the containment has been breached, the Class IX scenario progresses like a full-scale accident. The 5% power level effects primarily the time scale over which the accident takes place. The potential magnitude of the accident is still quite severe, given the inventory of a half billion curies. (See WASH-740, Fig. 5-8, which estimates considerabale damage from releases of approximately .5 billion curies.)

18. The probabilities contained in WASH-1400 have been challenged on other grounds as well. First, WASH-1400 is based on a large amount of sheer guesswork. In using event tree analysis, one must know the probability of each failure within the tree. But it is impossible to estimate the failure rate of a given component if it has been on the open market for only a few years. Remarkably, WASH-1400 will estimate that, for example, a certain pump will fail in, say, 100 years of operation when it has only been tested for two years. At Catawba features such as the ice condensor and hydrogen igniter system have never been tested at all. Second, there are accident sequences that have not been included in WASH-1400 and cannot be quantified. For

example, the precise sequence found at TMI was never even mentioned in all the operating manuals of the industry. The nuclear industry never foresaw the scenario in which the control panel would read "full" yet the reactor vessel was actually "empty." How many more unforeseen accident sequences are there that have not yet been quantified by the industry? Third, there is always the question of human failure or sabotage. At TMI, for example, the HPI had a calculated failure rate that was astronomically small. They failed, however, because the operators simply turned them off in the first few hours of the accident.

III. CONCLUSION

19. The transition from zero to 5% power is a qualitative one. Certain of the major accidents that are postulated for a reactor operating at 100% full power can also occur within a longer time frame in a reactor operating at low power. This is because the radioactive inventory stored in a reactor operating at 5% is roughly half a billion curies, which is similar to the radiation inventory studies in WASH-740 and is 10,000 times the radiation released at Windscale in 1957. The probability calculations done in WASH-1400 have been largely undermined by other scientists. Quite frankly, no one knows how to calculate the probability of Class IX accidents correctly.

20. Consequently, I conclude that even the routine operation of the Catawba reactor at up to 5% power presents a significant safety hazard to the surrounding environment and to plant workers and poses a risk of the irreversible contamination of the reactors.

_____
Michio Kaku

SUBSCRIBED AND SWORN to before me this _____ day of December, 1984.

_____
Notary Public for New York
My Commission Expires:

BIOGRAPHY OF DR. MICHIO KAKU

Dr. Michio Kaku is a Full Professor of Nuclear Physics and holds a dual appointment at the Graduate Center of the City University of New York (CUNY) and the City College of New York.

Education and Professional Background:

B.S. in Physics, Harvard University, 1968, Phi Beta Kappa, Summa Cum Laude.

Ph.D. in Nuclear Physics, University of California at Berkeley (Lawrence Radiation Laboratory), 1972.

Lecturer, Princeton University, 1972 to 1973.

Professor, CUNY Graduate Center and CCNY, 1973 to present.

Fellow, American Physical Society.

Publications:

35 articles published in various physics journals (see attached); contributed to five books in nuclear and theoretical physics.

Co-author of book on commercial nuclear power entitled Nuclear Power: Both Sides (W.W. Norton) with Jennifer Trainer.

Research Areas:

Research and published articles in principal areas:

a. unified field theories (supergravity, superconformational gravity, quantum gravity)
b. high energy physics (relativistic string models for hadronic physics, lattice gauge theory)
c. nuclear physics (neutron transport theory)
d. reactor physics (computer modeling of reactor accidents).

Testimony:

Qualified as a reactor physicist by the Nuclear Regulatory Commission in various reactor hearings around the country (Big Rock in Michigan, V.C. Summer in South Carolina, UCLA, Byron

near Chicago); appeared as an expert advisor to Governor Cuomo's Commission on the Shoreham Power Plant, and testified in civil suits involving the Comanche Peak Reactor.

Lectures:

Numerous international conferences on theoretical and nuclear physics, including, for example, Moscow, as a guest of the Soviet Academy of Sciences, 1978 and Cambridge, England, as a lecturer in the Supergravity Conference, 1980.

Lectures at the following campuses: Harvard University, Yale University, UCLA, Amhearst, New York University, Columbia, University of Rochester, Syracuse University, University of Michigan at Ann Arbor, Michigan State University at Lansing, University of Chicago, University of Southern California, Massachusetts Institute of Technology, Princeton Unviersity, Rutgers University, George Washington University, Georgia Institute of Technology, Circle College (Chicago), Queens College, Brooklyn College, Hunter College, University of California at San Diego, University of California at Irvine, Cal State at Sacramento, University of Maryland, University of Georgia at Athens, University of Cincinnati, University of New Mexico, University of California at Berkeley, California Institute of Technology, Guilford College in North Carolina, Virginia Polytechnic Institute, Cambridge University in England, Ecole Normale Superieur in Paris, and many others.

Articles in Scientific Literature:

1. "Unitary Nonplanar Closed Loops" (with C.B. Thorn), Physical Review D1, 2860 (1970).

2. "Divergence of the Two-Loop Planar Graph in the Dual Resonance Model" (with J. Scherk), Physical Review D3, 430 (1971).

3. "The General Multi-loop Veneziano Amplitude" (with L.P. Yu), Physics Letters 33B, 166 (1970).

4. "Divergence of the N-loop Planar Graph in the Dual Resonance Model" (with J. Scherk), Physical Review D3, 2000 (1971).

5. "Unitarization of the Dual Resonance Amplitude I. Planar N-loop Amplitude" (with L.P. Yu), Physical Review D3, 2997 (1971).

6. "Unitarization of the Dual Resonance Amplitude II. The Non-planar N-Loop Amplitude" (with L.P. Yu), Physical Review D3, 3007 (1971).

7. "Unitarization of the Dual Resonance Amplitude III. General Rules for the Orientable and Non-orientable Multi-loop Amplitudes" (with L.P. Yu), Physical Review D3, 3020 (1971).

8. "Linear Depenences and the Multi-loop Veneziano Amplitude," Physical Review D3, 908 (1971).

9. "Functional Approach to Dual Models with Spin" (with M. Virasoro and M. Yoshimura), Nuclear Physics B33, 109 (1971).

10. "Dual Pion Model with Zero Intercept and Nine Dimensions," Physical Review D9, 2850 (1974).

11. "The Field Theory of Spinning Strings," Physical Review D10, 3943 (1974).

13. "The Field Theory of Relativistic Strings II: Loops and Pomerons" (with K. Kikkawa), Physical Review D10, 1923 (1974).

14. "Ghost-Free Formulation of Quantum Gravity in the Light Cone Gauge," Nuclear Physics B91, 99 (1975).

15. "Calculation of the Functional Measure in Quantum Gravity" (with P. Senjanovic), Physical Review.

16. "Soliton Dictionary for Massive Quantum Electrodynamics," Physical Review, D12, 2330 (1975).

17. "Time-Dependent Generalizations of 't Hooft-type Monopoles," Physical Review, 1975.

18. "SU(4) and a New Class of Exact, Time-dependent Classical Solutions to Gauge Theories," Physical Review D13, 2881 (1975).

19. "Gauge Theory of the Conformal and Superconformal Group" (with P.K. Townsend and P. van Nieuwenhuizen), Physics Letters 69B, 304 (1977).

20. "Superconformal Unified Field Theory" (with P.K. Townsend and P. van Nieuwenhuizen), Physical Review Letters 39, 1109 (1977).

21. "Unified Field Theories with U(N) Internal Symmetries: Gauging the Superconformal Group" (with S. Ferrara, P.K. Townsend and P. van Nieuwenhuizen), Nuclear Physics B12, 3179 (1978).

23. "Poincare Supergravity as Broken Superconformal Gravity" (with P.K. Townsend), Physics Letters 76B, 54 (1978).

24. "Unified Approach to Matter Coupling in Weyl and Einstein Supergravity" (with A. Das and P.K. Townsend), Physical Review Letters 40, 1215 (1978).

25. "Supersymmetry at High Temperatures" (with A. Das), Physical Review D18, 4540 (1978).

26. "Observations on the Gribov Ambiguity in General Relativity in the Coulomb Gauge" (with A. Das), Nuovo Cimento 50B, 303 (1979).

27. "Lattice Formulation of General Relativity" (with A. Das and P.K. Townsend), Physics Letters 81B, 11 (1979).

28. "Conformal Gravity in Hamiltonian: Another Approach to the Renormalization of Gravity," Nuclear Physics B203, 285 (1982).

29. "Strong Coupling Approach to Conformal Gravity," Physical Review D27, 2819 (1983).

30. "Superconformal Gravity in Hamiltonian Form," Physical Review D27, 2809 (1983).

31. "Effective Potentials in Differential Supergravities," Physics Letters 126B, 183 (1983).

32. "Gauge Theory on a Random Supersymmetric Lattice," Physical Review Letters, 1983.

33. "Super Lattice and Gauge Theory," submitted to Physical Review, 1983.

34. "Generally Covariant Lattices, the Random Calculus, and the Strong Coupling Expansion to Quantum Gravity," submitted to Nuclear Physics, 1983.

35. "The Fissioning Universe: A Kaluza-Klein solution to the Problem of Homogeneity and Isotropy," (with J. Lykken), in preparation.

36. "Dimensional Transmutation on the Lattice as the Origin of the Planck Length," in preparation.

Articles in Popular Press:

37. "Nuclear Power, and Incomplete Technology?" Technology Review, MIT, June-July 1980.

38. "Wasting Space," Progressive Magazine, July 1983.

39. "New Era in the Arms Race?" Op Ed article in Newsday, Oct. 3, 1983.

Contributions to Books:

40. "Strings and Quantum Gravity," and "Quantum Gravity in the Light Cone Gauge." Proceedings of the 2nd Latin American Conference on General Relatively, Caracas, 1976.

41. "Einstein's Unified Field Theory and Supergravity." Einstein Centennial Lecturers, St. George Campus of the University of Staten Island.

42. "Lattices and Supergravity." Superspace and Supergravity. S. Hawking and M. Rocek. Cambridge University Press, 1981.

43. "Conformal Supergravity." Supergravity, P. van Nieuwenhuizen, ed. 1980.

EXHIBIT 4

IN THE UNITED STATES COURT OF APPEALS

FOR THE DISTRICT OF COLUMBIA CIRCUIT

PALMETTO ALLIANCE and CAROLINA ENVIRONMENTAL STUDY GROUP, Petitioners, v. UNITED STATES NUCLEAR REGULATORY COMMISSION and the UNITED STATES OF AMERICA Respondents.	)	No._____

AFFIDAVIT OF DAVID A. SCHLISSEL

Personally appear before me, David A. Schlissel, who duly affirms, desposes, and says:

My name is David A. Schlissel. I am a consulting engineer with Schlissel Engineering Associates, 74 Chester Road, Belmont, Massachusetts 02178.

Since September 1973, I have been involved in regulatory procedings in New York State, Vermont and South Carolina, concerning intergranular stress corrosion cracking (IGSCC) of stainless steel piping in nuclear power plants. I have also studied IGSCC as part of course work at the Massachusetts Institute of Technology.

Three conditions must be present in order for IGSCC to occur: there must be a sensitized material; there must be tensile stress of that material; and there must be a corrosive environment.

The Atomic Safety and Licensing Board in its November 22, 1984, Partial Initial Decision Resolving Forman Override Concerns and Authorizing Issuance of Operating License found that a number of "critical" welds at the Catawba plant contained stainless steel material that was sensitized during welding, although the actual extent of that sensitization is not known because the sample of welds examined was very limited. Moreover, the Atomic Safety and Licensing Board has also found that the necessary stresses may also be present because the piping was not heat treated subsequent to the completion of the welding operations.

However, the Atomic Safety and Licensing Board concluded that IGSCC is not expected to occur in the Catawba plant's primary loop and, therefore, is not a problem for the facility. This conclusion is based on the belief that the coolant in the primary loop does not contain sufficient concentrations of the corrodent that must be present for IGSCC to occur. Although it is true that IGSCC has been less of a problem for pressurized water reactors than for boiling water reactors, the history of IGSCC has been that the phenomenon has occured in

previously unanticipated locations through previously unanticipated pathways. Thus, potential contaminants may, in fact, concentrate in areas that the Atomic Safety and Licensing Board now believes unlikely. Furthermore, welds in the primary loop of the Catawba plant are not the only reasonable location that one might look for IGSCC. There are also numerous small diameter piping systems, some of which connect to the primary loop piping, which, themselves, can be locations for the concentration of potential corrosive contaminants.

If an independent inspection of the welds in IGSCC susceptible piping lines at the Catawba Nuclear Station is to be conducted, it is prudent to complete that inspection prior to the initial criticality. Once the piping becomes radioactive, the inspection becomes more difficult, more time consuming, more expensive and constitutes more of a hazard to the individuals involved.

_____

David A. Schlissel

Subscribed and Sworn to before me this _____ day of December, 1984.

_____

Notary Public for Massachussets
My Commission Expires:

DAVID A. SCHLISSEL
74 CHESTER ROAD
BELMONT, MASSACHUSETTS 02178
(617) 489-2742

WORK EXPERIENCE

1979 - Present	PRIVATE PRACTICE Provide legal counsel, engineering testimony, and training on regulatory practice to elected officials, state government agencies and private organizations.
1975 - 1979	NEW YORK STATE CONSUMER PROTECTION BOARD Utility Intervenor Attorney: Represented the Board in rate, power plant siting, generation planning, and accident inquiry prcceedings. Developed and completed a series of special work projects.
1973 - 1975	GEORGIA POWER PROJECT Staff Attorney: Represented the Project in federal and state administrative proceedings and court litigation.

EDUCATION

1983-84	Special Graduate Student, Department of Nuclear Engineering, Massachusetts Institute of Technology
1973	Juris Doctor, Stanford University School of Law
1969	Master of Science in Astronautical Engineering, Stanford University
1968	Bachelor of Science in Astronautical Engineering, Massachusetts Institute of Technology

A List of Major Testimony Presented, Case Appearances and Special Projects for the Years 1975 - Present is Attached

ATTACHMENT A
Testimony, Case Appearances and Special Projects
1979 - Present

Testimony

Commission	Case No.	Date	Subject
South Carolina Public Service Commission	84-122-E	Aug. 1984	Prudence of Carolina Power & Light's response to pipe cracking at Brunswick 1 & 2
Vermont Public Service Board	4865	May 1984	Prudence of Green Mountain Power Company's response to pipe cracking at Vermont Yankee Nuclear Power Plant
New York State Public Service Commission	28347	Jan. 1984	Investigation of the causes and cost consequences of the 1982 - 1983 outage of the Nine Mile Point Unit No. 1 Generating Plant.
New York State Public Service Commission	28166	Feb. 1983 Feb. 1984	Investigation of the causes and cost consequences of the 1982 outage of the R.E. Ginna Generating Plant.
Nuclear Regulatory Commission	50-247SP	May 1983	Proceeding to determine need for and consequences of withdrawal of operating licenses for Indian Point Units No. 2 and No. 3

Case Appearances

Case Name or Number	Court or Commission	Subject
28059	New York State Public Service Commission	Proceeding to investigate the comparative economics of the completion of the Nine Mile Point Unit No. 2 Nuclear Power Project -
Burstein, et al., v P.S.C., et al.	Supreme Court, New York State	State Court appeal of Commission Opinion and Order in Case 28059 allowing completion of Nine Mile 2 Project
Hinchey v. P.S.C., et al.	Supreme Court, New York State	State Court appeal of Public Service Commission Order permitting continued participation of Central Hudson Gas & Electric Corp. in Nine Mile Point 2 Project
Burstein v. Gioia	Supreme Court, New York State	State Court appeal of refusal of Public Service Commission to grant access pursuant to Freedom of Information Law to documents in its possession
27869	New York State Public Service Commission	Investigation of the causes and cost consequences of the October 1980 outage of the Indian Point Unit No. 2 Generating Plant

Special Projects

* Testified before the New York City Public Utility Review Board on cost consequences of excess utility generating capacity

* Drafted an economic and engineering critique of the National Reliability Study conducted by the U.S. Department of Energy in 1980

* Taught a two-day regulatory law and economics training seminar for the staff of the Office of Consumer Services of the Attorney General of the State of Maine

ATTACHMENT B
Case Appearances and Special Projects
1975 - 1979

Case Appearances (All before the New York State Public Service Commission)

Case Number	Topic
27353	Proceeding on Consolidated Edison Company of New York's request for a $228 million electric rate increase
27137	Proceeding to investigate the operation and legality of automatic fuel adjustment clauses
80005	Proceeding on the siting of a Nuclear Power Station at Sterling, New York
27123	Proceeding to investigate the causes of the prolonged 1976 refueling outage of the Indian Point Unit No. 2 Generating Plant
26974	Proceeding to investigate the comparative economics of nuclear and coal generation of electricity
26978	Proceeding on utility proposal to establish Empire State Power Resources, Inc., a holding company to build and operate all new generation facilities in New York State
27154	Proceeding on the electric utilities long range capacity and energy plans
27029	Proceeding on the implementation of marginal cost based rates for industrial, commercial and residential customers
27013/27120	Proceeding to determine the prudence of Central Hudson Gas & Electric Corp.'s purchase of an ownership share in the Nine Mile Point Unit No. 2 Nuclear Power Project
27065	Proceeding to examine gas utility proposal to establish a revenue surcharge to raise capital for investment in natural gas exploration ventures

Special Projects

* Testified before the U.S. Federal Power Commission on the inclusion of Construction Works in Progress in utility rate bases

* Drafted a Petition for Consumer Rights for presentation to the New York State Public Service Commission

* Designed and taught a series of consumer training seminars on participation in the regulatory process

* Authored a brochure on Questions and Answers on Public Power.

EXHIBIT 5

IN THE UNITED STATES COURT OF APPEALS

FOR THE DISTRICT OF COLUMBIA CIRCUIT

PALMETTO ALLIANCE and CAROLINA ENVIRONMENTAL STUDY GROUP, Petitioners, v. UNITED STATES NUCLEAR REGULATORY COMMISSION and the UNITED STATES OF AMERICA Respondents.	)	No._____

AFFIDAVIT OF WELLS EDDLEMAN

Personally appear before me, Wells Eddleman, who duly affirms, deposes, and says:

My name is Wells Eddleman. I am an independent energy and environmental consultant residing in Durham, North Carolina. I have a Bachelor of Science degree in Physical Sciences from the Massachusetts Institute of Technology where I pursued an inter-disciplinary course of study in fields including electrical engineering, computer science, management and physics. Since 1979, I have held the position of Staff Scientist for the North Carolina Public Interest Research Group. In 1980 became Director of NCPIRG's Utility Project. I have been qualified as a expert on energy systems and energy conservation. I have testified in numerous proceedings before the North Carolina Utilities

Commission on the subjects of electric utility load forecasting, and the financial and economic analysis of new electric power plants. I have testified as a expert in the last two electric utility load forecasting proceedings before the North Carolina Utilities Commission, Docket Nos. E-100 Sub 40, 1981, and E-100 Sub 46, 1983. I have also testified in the last four Duke Power Company general rate increase proceedings, Docket Nos. E-7, Sub 314, 338, 358 and 373. Finally, I am a stockholder of Duke Power Company.

On the basis of my experience as described above and my familiarity with the financial and operational reports of Duke Power Company to stockholders and to the North Carolina Utilities Commission, I have been asked to express my opinion regarding the potential for harm to Duke Power Company and its wholesale and retail customers and the public, should this court grant a stay of the operations of the Catawba Nuclear Station, pending the review of safety and environmental questions which have been raised regarding the facility.

1. The Catawba Nuclear Station is objectively unnecessary to the Duke system. Duke Power Company presently has at least a 33% normal weather reserve margin, including 997 MW from 12 coal-fired units placed in standby reserve in March, 1984, when Duke's McGuire Unit II was placed in commercial operation, and a 25% reserve margin without those units.

These reserves are substantially greater than the 20% reserve margin found appropriate by the North Carolina Utilities Commission in load forecast proceedings, Dockets E-100, Sub 32, 35, 40 and 46, from 1978 through 1983, in each of which proceedings Duke Power Company has been a party, and from which no appeal was taken by Duke regarding such a finding.

Further, the Commission's 20% reserve margin standard includes an allowance for the effect of abnormal weather, i.e., very hot summers or very cold winters, of about 5%. Therefore, an installed capacity of 20% above peak demand during normal weather periods, or, a 15% installed reserve margin above the peak demand which occurs during extraordinary summer or winter weather conditions (such as the 100-year record heat wave of Summer, 1983) should be entirely adequate. Further, the Duke system is fully-interconnected with neighboring utility systems, and therefore is able to receive up to 5,000 MW from outside sources in an emergency. Duke's summer 1984 peak was about 11,043 MW. The addition of a 20% reserve margin supports a capacity requirement of 13,252 MW. Alternatively, considering Duke's all-time system peak, occurring during the record heat wave of 1983 of 11,554 MW and the addition of a 15% reserve margin a system capacity requirement of 13, 287 MW is called for. Duke's present actual capacity without the standby coal or the Catawba units is 13,782 MW.

Including Dukes standby coal plants the available capacity is 14,779 MW. With Duke's own projected peak growth rate of approximately 2.5% per year, this capacity provides a 5 to 6 year growth allowance, still without either Catawba unit, before normal weather reserves would drop to 20%.

Thus, for purposes of meeting peak demand, the Catawba Nuclear Station is completely unnecessary at this time. Moreover, the North Carolina Utility Commission Public Staff concluded in their most recent load forecast that the Catawba Nuclear Station Units I & II should be deferred until 1996 and 1999, respectively. See, Analysis of Long-range Needs for Electric Generating Facilities in North Carolina, Public Staff Report (1983).

2. Kilowatt hour production of the Catawba Nuclear Station is not necessary to meet Duke Power Company's projected sales requirements for at least the next four years. Duke's sales have increased from 48,848 GWH in 1978 to approximately 55,000 GWH for the year ended October, 1984. That increase is equivalent to the output of a single McGuire Unit operated at only an approximate 65% capacity factor. Since 1978, however, Duke has added two McGuire units, and therefore, has in its existing plants the ability to meet its own estimated 3% or lower annual growth in sales for at least four more years without

Catawba production.

3. Can Duke save money for its consumers by operating the Catawba Nuclear Station instead of its other plants? The answer is definitely no.

Duke's 25% share of Catawba Nuclear Station Unit I will have a projected bus bar electric production cost of 9.91 cents per KWH, according to Duke's late-filed Exhibit No. 8 in the North Carolina Utility Commission Docket E-100 Sub 41A. The bus bar cost at both McGuire units is 6 cents per KWH acording to the testimony of the Duke Chairman in Docket E-7 Sub 373, 1984. Fuel and operating reports to the North Carolina Utility Commission by Duke (e.g. October 1984) reflect that the bus bar cost of electricity from Duke's Belews Creek Coal Station is less than 3 cents per KWH. The bus bar production costs of virtually every coal-fired unit which Duke owns are no more than 4 cents per KWH. Therefore, use of Duke's share of the Catawba Nuclear Station to displace its coal-fired sources would raise its consumers' costs by at least 5 cents per KWH.

As to the other joint owners of the remaining 75% of Catawba Unit I, they are now getting their entitlements supplied under the so-called McGuire Exchange Agreement at a cost of .6 cents per KWH, plus $1.60 per KW demand costs. Catawba units are unlikely to incur any lower production costs than those from

McGuire since Catawba fuel costs and operating and maintenance expenses are greater than or equal to those for McGuire. Therefore, the operation of the Catawba Nuclear Station Unit I will not result in any lower electricity costs to the owners of the Catawba facility.

4. What savings are realized to the Duke system from burning Catawba nuclear fuel instead of burning coal? Most probably, little net savings would be realized.

Duke Power Company already has a surplus of nuclear base load generation. Duke's Oconee and McGuire units comprise 4,960 MW MDC capacity under the most adverse cooling conditions, (such as extreme summer heat) and over 5,000 MW at other times. Duke must also maintain approximately 1,000 MW of coal-fired capacity in continuous operations to provide for meeting intermediate loads in both summer and winter, as well as for providing spinning reserves. This capacity simply cannot be replaced since this coal capacity requires the minimum running output in order to maintain these coal units as available for increased intermediate loads. Since Duke's baseload in fall and spring is less than 4,000 MW, any additional baseload capacity cannot be used. The only way to use the Catawba capacity during these periods is to take a lower cost nuclear unit out of service. During the summer, typical baseloads for Duke are approximately 60% of peak or about 6500 MW on the hottest summer

day. Even in these extreme conditions, only a portion of the capacity of a single Catawba unit could be used. Thus, Catawba's usefulness as a baseload plant for which it was designed would be limited to only a few days during peak summer periods.

For the reasons which have been discussed above reflecting the Duke system's over capacity and over supply condition, Duke Power Company is already actively marketing its surplus power to other systems. Ironically, one of Duke's best prospects for sale of excess capacity is apparently the Government's gaseous diffusion uranium enrichment plant at Oak Ridge, Tennessee.

The certain losers from a economic standpoint, from the decision to permit operation of the Catawba Nuclear Station will be Duke Power Company's retail electric customers. A projected 15-20 % increase in retail electric rates will be sought by Duke to provide a return on its unneeded Catawba investment, and to repurchase the unneeded capacity from its co-owners under their Buy Back Agreement.

It is clear that no harm will be realized by Duke customers from a stay of operations during the pendency of this review proceeding.

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Wells Eddelman

SUBSCRIBED AND AFFIRMED before me this _____ day of December, 1984.

_____
Notary Public for North Carolina
My Commission Expires: