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. 50-414
	)	50-415
	)	
(Catawba Nuclear Station, Units 1 and 2)	)	

AFFIDAVIT OF WILLIAM H. RASIN

My name is William H. Rasin. I am employed by Duke Power Company as a Senior Engineer in the Design Engineering Department. I hold the position of Analysis Group Head. I have held that position since 1980. My professional qualifications are contained in an attachment to this affidavit.

I have a BS in Nuclear Engineering from the University of Virginia. I am a Registered Professional Engineer in the states of North Carolina and South Carolina. I am a member of the Nuclear Power Division Advisory Committee of the Electric Power Research Institute (EPRI), and am Chairman of the Safety Technology Task Force of that Committee. I also am a member of the Expert Review Group for Containment Analysis of the Industry Degraded Core Rulemaking Effort. As part of my job duties, I have either been personally involved with or monitored industry, NRC and Duke activities involving potential hydrogen generation and combustion in nuclear power plant containments resulting from severe accident. As a result, I am familiar with the various efforts in this regard.

The purpose of this affidavit is to address the assertion made by Palmetto Alliance and CESG that the Catawba containment is vulnerable to breach because of a hydrogen explosion in the event of certain accidents.

The nuclear industry in general and Duke specifically have devoted significant resources to the question of hydrogen generation and combustion in the containment of nuclear power plants (with emphasis on ice condenser containments such as at Catawba) in severe accident situations. I have been personally involved in these efforts since early 1980. These efforts were undertaken in response to the TMI accident during which a significant amount of hydrogen was generated in the nuclear core and subsequently burned in the containment building.

A large effort was undertaken to improve system design, operator training, and procedures to preclude the occurrence of severe accidents resulting in core damage. However, in keeping with the nuclear industry's long-standing philosophy of defense in depth, equally large efforts have been devoted to mitigating the effects of such severe accidents in the unlikely event that they did occur. In the spirit of defense in depth, and in consideration of regulatory concerns regarding combustible gas control in containments, Duke Power Company decided to install a Hydrogen Mitigation System in the containments of our McGuire and Catawba Nuclear Stations, which are sister plants, essentially identical in design. Various mitigation schemes were investigated in detail. These systems either suppressed

hydrogen burning or forced burning at the lowest possible concentration.

The system chosen as best for our application is a system of distributed thermal ignition sources which promotes hydrogen burning at low concentration. Forcing hydrogen burning at low concentrations prevents build up of significant concentrations of hydrogen with the risk of rapid combustion and results in modest increases in containment temperature and pressure that are well within the design capabilities of the containment systems and equipment.

Such Hydrogen Mitigation System was designed and installed in the McGuire Nuclear Station. Extensive analyses of a wide range of accident scenarios were performed to assess the efficacy of this system to prevent containment failure. Additionally, Duke Power Company, TVA, and American Electric Power Corporation (owners and operators of other ice condenser units) entered into an agreement with the Electric Power Research Institute on a comprehensive experimental program to verify the key criteria used in the design and analysis of the Hydrogen Mitigation System.

Through the detailed review of this system with the NRC Staff and with internationally recognized hydrogen experts retained by Duke, a few minor changes in the original design, involving the number and location of ignitors, and the system operating procedures were made. The NRC subsequently determined this system to be acceptable for McGuire.

The research program conducted through EPRI has now been completed. The results have shown that the key criteria for the Hydrogen Mitigation System design and analysis were indeed conservative. The results of research sponsored by NRC at national laboratories, particularly Sandia, have been closely monitored. None of the results of this research indicate a need for changes to our system.

A system essentially identical to the McGuire Hydrogen Mitigation System has been installed in Catawba Nuclear Station. Specific analyses have been performed to determine the response of the Catawba containment to a spectrum of severe accidents. For Catawba these analyses show that hydrogen burns will occur at low concentration and that the resulting temperatures and pressures are well within the design capabilities of the Catawba containment systems and equipment.

The Catawba Hydrogen Mitigation System design and analayses were reviewed by the NRC Staff and found acceptable (Catawba SER, Supp. 2).

Two specific points in the Affidavit of Dr. Michio Kaku deserve direct comment regarding risk of hydrogen to containment integrity. First, the Sequoyah RSSMAP (NUREG/CR-1659) did not consider hydrogen mitigation methods such as the distributed ignition sources now installed. Furthermore, the containment failure mechanisms indicated by Dr. Kaku would be experienced only after significant core melting had occurred. Secondly, Dr. Kaku's claim that the hydrogen ignitor

system has never been tested is erroneous. The industry and EPRI experimental program discussed above used ignitors of the exact design installed in Catawba and McGuire. These experiments showed conclusively that the ignitors reliably and consistently initiated hydrogen burning at concentrations even lower than those assumed for our analyses of Catawba and McGuire.

I, William H. Rasin, of lawful age, being duly sworn, state that I have reviewed the foregoing affidavit, and that the statements contained therein are true and correct to the best of my knowledge and belief.

William H. Rasin

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

My Commission Expires 7-12-88