UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

HOUSTON LIGHTING & POWER COMPANY)
)
) Docket No. 50-466
(Allens Creek Nuclear Generating)
Station, Unit No. 1))
)
)
)

AFFIDAVIT OF JOHN F. SCHARDT

State of California
County of Santa Clara

I, John F. Schardt, Senior Licensing Engineer, within the Safety and Licensing Operation of the General Electric Company, of lawful age, being duly sworn, upon my oath certify that the statements contained in the attached pages and accompanying exhibits are true and correct to the best of my knowledge and belief.

Executed at San Jose, California,
July 29, 1980.

John F Schardt

Subscribed and sworn to before me this 29th day of July, 1980.

Ruthe M. Kinnamon
NOTARY PUBLIC IN AND FOR SAID
COUNTY AND STATE

My commission expires March 28, 1981.

OFFICIAL SEAL
RUTHE M. KINNAMON
NOTARY PUBLIC - CALIFORNIA
SANTA CLARA COUNTY
My comm. expires MAR 28, 1981

175 Cutner Ave., San Jose, CA 95125

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(Allens Creek Nuclear Generating Station, Unit No. 1)	§	

Affidavit of John F. Schardt

My name is John F. Schardt. I am employed at General Electric Company as a mechanical engineer. I have been so employed for 10 years. A statement of my experience and qualifications is set out in Attachment 1.

This affidavit addresses Mr. Doherty's Contention No. 15 which alleges that the computer code used by the General Electric Company to predict SCRAM reactivity following a Power Excursion Accident (PEA) is not conservative.[1/] Mr. Doherty cites as a basis for this contention the Special Power Excursion Tests (SPERT) performed by the Idaho Nuclear Experimental Laboratories (in particular those test results reported as

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1/ The PEA referred to in the contention, for which the 280 calories/gram energy deposition is mentioned as a safety limit, is the rod drop accident. This accident is not analyzed by the General Electric equivalent to the WIGLE code. The computer code which is used for the Rod Drop accident accounts for neutron population changes in three space dimensions. It has been shown to be conservative by recent studies performed at Brookhaven National Laboratory reported in "Effect of Thermal Hydraulic Feedback on the BWR Rod Drop Accident," H. S. Ching and D. J. Diamonds, authors, Transactions of the American Nuclear Society, Vol. 33, November, 1979.

No. IN-1370) which allegedly show that a code (the WIGLE code) which produces results similar to those derived by General Electric is not conservative in calculating SCRAM reactivity.

I. Calculating SCRAM Reactivity

SCRAM reactivity is a measure of the amount of negative reactivity produced by rapidly inserting the control rods, which shuts down the reactor, and is used as an input to the analysis of abnormal transients such as turbine trip, generator load rejection, and main steam isolation valve closure. General Electric uses a one-dimensional time/space code to predict the value of SCRAM reactivity for various abnormal transients over core life. The code models axial changes in the core which occur throughout the transient. A one-dimensional model has been shown to be appropriate by detailed reactor transient tests performed at Peach Bottom 2, where the data from the heavily instrumented core revealed the flux response to be one-dimensional.[2/] This code is used to calculate SCRAM reactivity in the core as a function of time following the initiation of the abnormal transient.

General Electric has been very conservative in its evaluation of SCRAM reactivity. The values used for SCRAM reactivity in calculating the severity of the abnormal transient are at least 20 percent less than those calculated by the one-dimensional space/time code. In addition, the

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2/ L. A. Carmichael and R. O. Niemi, "Transient and Stability Tests at Peach Bottom Atomic Power Station Unit No. 2 at End of Cycle 2," EPRI NP-564 (June, 1978).

control rods are assumed to move at their technical specification speeds, whereas plant measurements have demonstrated the actual performance to be much faster. The overall conservatism employed in the transient calculations is demonstrated by comparisons with actual plant data generated in numerous plant start-ups, as reported in "Analytical Methods of Plant Transient Evaluation for the GE BWR," NEDO-10802, Vols. 1 and 2 (April, 1973).

II. The SPERT Tests

Mr. Doherty's reliance on IN-1370 as a basis for disputing the conservatism in General Electric's one-dimensional time/space code is misplaced. The SPERT project referred to in the contention tested the ability of the WIGLE code to calculate the time behavior of a pulse of neutrons deposited in a long thin multiplying assembly. The experiment, performed in a test reactor which bears no resemblance to a BWR core, showed that the WIGLE code underpredicted the response to a positive insertion of reactivity. No control rods were inserted, so the test did not measure the effects of SCRAM reactivity. One could argue that since it underpredicted the response to positive reactivity insertion, it would also underpredict the negative reactivity response caused by control rod insertion, thus indicating the WIGLE code to be conservative for SCRAM reactivity. However, it is my assessment that the SPERT

experiment is so far removed from prototypical BWR SCRAM conditions that it cannot be used for the assessment of the conservatism of the WIGLE code or General Electric's one-dimensional code for SCRAM calculations.

In summary, although General Electric's one-dimensional code may in some circumstances--for the specific purpose of predicting SCRAM reactivity--produce results similar to results obtained from the WIGLE code, the criteria contained in the SPERT report (IN-1370) are irrelevant to SCRAM reactivity calculations, whether performed by WIGLE or General Electric's model.

ATTACHMENT I

PROFESSIONAL QUALIFICATIONS OF JOHN F. SCHARDT

POSITION: Senior Licensing Engineer

EDUCATION:

B.S. - Mechanical Engineering, 1968, Univ. of California, Davis

M.S. - Mechanical Engineering, 1970, Univ. of California, Davis

General Electric Advanced Engineering Program, 1972

ADDITIONAL BACKGROUND:

Professional Engineer in Mechanical Engineering

Completed numerous General Electric BWR Technical Courses

EXPERIENCE:

1970 - 1972 - Program Engineer, General Electric Company.

Responsible for design, analysis, and testing of BWR components, particularly for seismic and flow-induced vibration.

1972 - 1974 - Supervisor, Engineering Training Program, General Electric Co.

Responsible for supervising the hiring and training of new technical college graduates for General Electric's BWR Engineering Training Program.

1975 - 1976 - Engineer, General Electric Company.

Responsible for design and analysis of BWR fuel components.

1976 - 1979 - Senior Engineer, General Electric Company.

Responsible for performing Flow-Induced Vibration (FIV) analyses and tests for BWR components. In addition, managed a Department of Energy - funded four year development program designed to further the state-of-the-art FIV technology for light water reactors.

1980 - Present - Senior Licensing Engineer, General Electric Company.

Responsible for achieving the resolution of safety and licensing concerns pertaining to BWR behavior during transient events, insuring that the NRC regulations are correctly interpreted and satisfied.