

January 11, 1985

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before The Atomic Safety and Licensing Appeal Board

In the Matter of)
)
METROPLITAN EDISON COMPANY, ET AL.) Docket No. 50-289-OLA
) (Steam Generator Repair)
(Three Mile Island Nuclear Station,)
Unit No. 1))

AFFIDAVIT OF BRANCH D. ELAM, JR.

BRANCH D. ELAM, JR., being duly sworn according to law,
deposes and states as follows:

1. My name is Branch D. Elam, Jr. I am employed by the GPU Nuclear Corporation as Manager, Mechanical Components Section, Engineering and Design Department. A statement of my educational and professional qualifications and training is attached and incorporated herein by reference.

2. As Manager of the Mechanical Components Section, I performed technical reviews of certain facets of the steam generator repair project, which included responsibility for the development of the design criteria employed by the contractors in their detailed design efforts related to kinetic expansion and plugging. I was also responsible for reviewing and

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approving contractor qualification programs for expansion and plugging.

3. The purpose of this affidavit is to address the TMIA Motion to Reopen the Record on the Basis of New Information, dated December 13, 1984, with respect to the results of plug testing on the once-through steam generator ("OTSG") tubes.

4. In July, 1984, following plant hot functional testing, seven rolled plugs were identified as missing from their installed positions. Four of the plugs were from the bottom tube sheet of OTSG "A", two were from the bottom tubesheet of OTSG "B", and one was from the upper tube sheet of OTSG "A".

5. A comprehensive field and laboratory test program was conducted to test the integrity of the installed plugs, to determine the cause of the dislodged plugs, and to develop a repair program to assure the design integrity of the installed plugs.

6. All of the installed plugs were tested in the steam generators by application of a mechanical pull load and measurement of any plug movement. Pull test tooling was developed and the proper means for application were verified in the field. As a result of the testing, 25 plugs were pulled out of their tubes and approximately 130 exhibited some movement. (A preliminary review of test data identified 253 suspect plugs. A more rigorous review of the test data reduced the total to approximately 130.)

7. An investigation was performed to determine the cause of the plug movement, which included laboratory examination of the removed plugs and testing to determine the effects of potential variations in installation parameters and procedures. This cause was determined to be improper installation. This was confirmed by laboratory examination of removed plugs, which showed wall thinning less than that required for proper installation. The plugs are installed with a mechanical roller which expands the rolled plugs within the tube end to establish the joint. The roller is driven by an air motor. The most likely installation deficiencies were identified as inadequate tool air supply or variations in the tool angle or side load.

8. As I stated in my affidavit of February 23, 1984, the physical parameters and configurations were such that the kinetic expansion repair process could not have "weakened" the tubes to cause an inadequate seal. Moreover, plug movement did not occur more frequently in the upper tube sheets, where the kinetic expansion took place, than it did in the lower tube sheets.

9. Re-rolling was selected as the plug repair method. The re-rolling process was qualified by a laboratory test program demonstrating that the plug integrity would be re-established to the original design requirements for any deficient plugs. Properly installed plugs were shown to not be adversely affected by re-roll. Improved tooling and field procedures were developed for the plug re-rolling. Successful

repair of the plugs was further confirmed by completion of drip and bubble testing on the steam generators, with no leaking rolled plugs found.

Branch D. Elam Jr
BRANCH D. ELAM, JR.

Subscribed and sworn to before me this 11th day of JANUARY, 1985.

Branch D. Elam Jr
NOTARY PUBLIC

My Commission Expires: _____

RESUME

BRANCH D. ELAM JR.

SUMMARY OF QUALIFICATIONS

Mechanical engineer with experience in power plant design, particularly nuclear, and project management. Broad knowledge of pressurized water and boiling water reactor, balance of plant, and turbine plant systems. Interface experience with utility and architect engineer organizations. B.S. and M.S. degrees in Mechanical Engineering. Pennsylvania professional registration.

GENERAL PUBLIC UTILITIES, Parsippany, N.J.

Manager, Mechanical Components (12/83 to Present)
(06/81 to 12/82)

Manager, Mechanical Systems (12/82 to 12/83)

Technical cognizance of all mechanical systems and components in Oyster Creek and TMI-1 plants. Technical support in solution of operating and maintenance problems. Development of design criteria for plant modifications. Review of plant operating procedures.

Supervisor, Technical Support and TMI-2 Plant Engineering
Director (4/79 to 6/81).

Temporary assignment to TMI-2 accident recovery organization after the March 1979 accident. Provided on-site engineering support to plant operations.

Engineering Manager, Seward 7 Project (6/78 to 4/79).

Project management for new fossil fired power plant.

WESTINGHOUSE ELECTRIC CORP., Pittsburgh, Pa. (8/69 to 6/78)

Various positions of increasing responsibility within the Westinghouse commercial nuclear power plant organization including project engineering, reactor and balance-of-plant systems and components engineering, and piping analysis.

COMBUSTION ENGINEERING, INC., Windsor, Conn. (3/66 to 8/69)

ALLIS-CHALMERS MFG. CO., Washington, D.C. (6/59 to 3/66)

Nuclear power plant systems and component design and testing.

EDUCATION

M. S. Degree in Mechanical Engineering, Stanford University
(1965)

B. S. Degree in Mechanical Engineering, and A. B. Degree,
Lehigh University (1958)