UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
CLEVELAND ELECTRIC ILLUMINATING COMPANY, ET AL.	)	Docket No. 50-440 OL 50-441 OL
	)	
(Perry Nuclear Power Plant, Units 1 and 2)	)	

AFFIDAVIT OF PETER C. HEARN AND MICHAEL A. LAMASTRA
RESPONDING TO OHIO CITIZENS FOR RESPONSIBLE ENERGY
CONTENTION 15 CONCERNING STEAM EROSION

State of Maryland)

County of Montgomery)

I, Peter C. Hearn, being duly sworn, state as follows:

I, Michael A. Lamastra being duly sworn, stated as follows:

1. I, Peter C. Hearn, am employed by the U.S. Nuclear Regulatory Commission as a Senior Auxiliary Systems Engineer in the Auxiliary Systems Branch, Division of Systems Integration, Office of Nuclear Reactor Regulation. A copy of my professional qualifications is attached.

2. I, Michael A. Lamastra, am employed by the U.S. Nuclear Regulatory Commission as a Health Physicist in the Radiological Assessment Branch, Division of Systems Integration, Office of Nuclear Reactor Regulation. A copy of my professional qualifications is attached.

3. I, Peter C. Hearn, amresponsible for the technical analysis and evaluation of the public health and safety aspects of auxiliary systems. I am the author of the Safety Evaluation Report Supplement 5 Sections 3.6.1 and 10.3.4, which deal with steam erosion in pipes and main steam isolation valves. The purpose of this affidavit is to address the OCRE Contention 15 dealing with steam erosion.

4. Contention 15 alleges that the applicant has not demonstrated that it will prevent, discover, assess, and mitigate the effects of steam erosion on components in the Perry Nuclear Power Plant.

5. As stated in the Safety Evaluation Report Supplement No. 5 Section 3.6.1, the lines at the Perry Plant are designed with erosion allowances that exceed the minimum wall thickness by 50 to 400 percent. Therefore, piping failures due to steam erosion are not expected to occur at either Unit of the Perry Nuclear Power Plant. Since the steam lines are designed to prevent failures due to steam erosion, the replacement of these lines including the extraction steam piping, is not expected during the life of the plant.

6. As stated in the Safety Evaluation Report Sections 10.3.4, the staff has found no evidence that steam erosion is likely to damage the main steam isolation valve seat.

7. I, Michael A. Lamastra, have reviewed Perry's radiation protection/ ALARA program as documented in their FSAR Chapter 12. My review

included the applicant's ability to perform special maintenance procedures such as steam piping replacement in such a manner as to keep exposures ALARA in accordance with 10 CFR 20.1(c). 10 CFR 20.1(c) states, in part that licensee should in addition to complying with the requirements set forth in this part, make every reasonable effort to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted areas, as low as is reasonably achievable. The term "as low as is reasonably achievable" means as low as is reasonably achievable taking into account the state of Technology, and the economics of improvements in relation to benefits to the public health and safety, and other society and socioeconomic considerations, and in relation to the utilizations of atomic energy in the public interest. The acceptance criteria used by the staff are those stated in NUREG-0800, "Standard Review plan" (SRP) Section 12. The results of my review are stated in NUREG-0887, Perry's SER. Specifically, my responsibilities include assuring that occupational radiation doses are maintained within the limits of 10 CFR Part 20 and ALARA, (10 CFR 20.1(c)) by evaluating the applicant's conformance with the provisions of Regulatory Guide 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Station Will be as Low as is Reasonably Achievable." Special attention is given in the staff review to:

a. Management policy and organization;
b. Personnel qualification and training;
c. Plant ALARA design procedures;
d. The plant's proposed radiation control program, and procedures;
e. The availability of supporting equipment, instrumentation, and facilities for radiation safety.

8. It is my conclusion, as stated in Section 12 of Perry's SER that the plant's radiation protection/ALARA program meets the acceptance criteria stated in Section 12 or NUREG-0800 and accordingly the applicant will have the ability to perform steam piping repairs in accordance with the requirements of 10 CFR Part 20.1(c) including the steam extraction lines in the turbine generator building.

9. The staff concludes that the Perry Plant steam lines are properly designed to account for steam erosion effects and the applicant has performed an ALARA review of the steam line material to assure that the requirements of 10 CFR Part 20.1(c) are met.

The foregoing statements are true and correct to the best of my knowledge.

Peter C. Hearn

Peter C. Hearn

Michael A. Lamastra

Michael A. Lamastra

Subscribed and sworn to before me
this 21st day of February, 1985

Edythe L. Barker

Notary Public

Michael A. Lamastra

Professional Qualifications

Radiological Assessment Branch

Division of Systems Integration

I am a Health Physicist in the Radiological Assessment Branch, Division of Systems Integration, Office of Nuclear Reactor Regulation.

My formal education consists of an A.A. degree in Radiation Science from Montgomery Community College in 1972, a B.S. degree in Physics from Towson State College in 1974, and an M.S. degree in Radiological Health from the Univeristy of Pittsburgh in 1975.

Before joining NRC, I served three years as a part-time employee of the Radiation Protection Department of the National Institues of Health in Bethesda, Maryland. My duties included collecting air samples to determine the level of radioactivity for specific isotopes, radiation cntamination surveys of research labs, and advising research personnel in safety procedures involving the use of radioactive isotopes.

I joined the NRC in June 1976 as a helath physicist in the Radioisotopes Licensing Branch, Office of Nuclear Material Safety and Safeguards. My principal function was to review applications from medical and academic institutions for byproduct, source, and special nuclear material to determine the adequacy of their proposed radiation safety program and the related efforts

proposed to assure that occupational radiation exposure and release of radioactive material to the general public are as low as is reasonably achievable.

Since February 1981, I have served as a Health Physicist in the Radiation Protection Section of the Radiological Assessment Branch. My principal function is the review of power reactor applications, both at the construction permit and operating license state, to determine the adequacy of proposed occupational radiation protection programs and the related efforts proposed to assure that occupational radiation exposures will be maintained as low as is reasonably achievable.

I am a member of the health Physics Society and the Baltimore-Washington Local Chapter of the Health Physics Society.

PETER C. HEARN

PROFESSIONAL QUALIFICATIONS

I am a Senior Auxiliary Systems Engineer in the Auxiliary Systems Branch of the Nuclear Regulatory Commission. In this position, I am responsible for the technical analysis and evaluation of the public health and safety aspects of auxiliary systems.

From 1984 to present and from 1973 to 1979, I was assigned to the Auxiliary Systems Branch of the NRC/AEC. In these positions I was responsible for the evaluation of auxiliary systems such as the Main Steam Systems, the Feedwater System, the Heating Ventilation and Air Conditioning Systems, the Cooling Water Systems, and the Diesel Generators. In addition I have evaluated analysis on piping system failures, internally generated missiles, water hammers and nuclear power plant fires.

From 1979 to 1984, I was assigned to the Containment Systems Branch of the NRC. In this position I was responsible for the evaluation of containment systems and the analysis of the containment environmental response to main steam system and reactor coolant system piping failures.

From 1968 to 1973, I was employed by the Department of the Navy. While employed by the Navy I conducted systems analysis of ships propulsion plants. I also developed a method of projecting future fleet size ahd future fleet fuel consumption.

I received an M. S. degree in Energy Conversion at the University of Maryland in 1974 and a B. S. degree in Mechanical Engineering at the Polytechnic Institute of New York in 1968.

As part of my Master Degree Program I wrote and delivered a technical paper entitled "Design of a nuclear Service Water System for a 1150 MWE Pressurized Water Reactor.

March 8, 1983

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APPLICANTS' ANSWERS TO OHIO CITIZENS FOR RESPONSIBLE ENERGY INTERROGATORIES 9-1 THROUGH 9-25 AND 9-38 THROUGH 9-52 RELATING TO ISSUE NOS. 13 AND 15

Applicants for their answers to Ohio Citizens for Responsible Energy ("OCRE") Interrogatories #9-1 through #9-25 and #9-38 through #9-52 from OCRE's Ninth Set of Interrogatories to Applicants, dated January 31, 1983, state as follows:

All documents supplied to OCRE for inspection will be produced either at Perry Nuclear Power Plant ("PNPP"), for documents in the possession of The Cleveland Electric Illuminating Company ("CEI"), or at the offices of Gilbert

The piping for which potential problems were identified was replaced in Unit 2 with a more erosion-resistant material (A335, grade P11 or P12). Since it was not practical at that time to replace the Unit 1 extraction piping, it was decided to design an inservice inspection program to monitor piping elbow wall thickness in Unit 1 in order to enhance system reliability. See response to Interrogatory #9-43, supra.

In addition to the above changes, the seating surfaces of the MSIVs have been covered with more erosion-resistant materials.

9-45. Describe in detail any plans, provisions, programs, etc. which Applicants may have for detecting and assessing steam erosion or the effects thereof.

Response:

Plans for detecting and assessing steam erosion in Unit 1 extraction steam piping are described in response to Interrogatory #9-43, supra. Plans for "Type C" leak testing of the MSIVs are described in response to Interrogatory #9-46, infra. In addition, Applicants will have an inservice testing program for all valves as required by ASME Section XI. This program is still being developed.

9-46. Describe in detail any plans, provisions, procedures, etc. which Applicants may have for mitigating steam erosion or the effects thereof. Include any procedures for the repair or replacement of any affected components.

Response:

As stated in response to Interrogatory #9-43, supra, repair or replacement of Unit 1 extraction steam piping will be carried out as necessary to comply with the minimum wall thicknesses set forth in Attachment 3. Note also that the erosion allowances shown in Attachment 3 exceed the corresponding minimum wall thicknesses from 50% to 400%. The inspection program together with the conservatism in the erosion allowances will minimize steam erosion problems in the extraction steam piping.

The PNPP main steam isolation valve ("MSIV") leakage control system also will mitigate the effects of steam erosion. See FSAR § 6.7. This system is used to reduce the amount of radioactive material released to the environment. To accomplish this, MSIV leakage is directed into the shield building annulus, which is serviced by the annulus exhaust gas treatment system. The MSIV leakage control system is designed to process 100 scfh total leakage per main steam line.

Main steam line leakage results from leakage past the MSIVs. Each line consists of an inboard isolation valve (B21F022), an outboard isolation valve (B21F028), and a long term leakage control valve (N11F020).

To control valve leakage and to insure that the total main steam line leakage does not exceed the capacity of the MSIV leakage control system, the inboard MSIV and outboard MSIV will

be "Type C" leak tested according to the requirements of Appendix J to 10 C.F.R., Part 50. Leakage will not exceed 25 scfh per valve. See FSAR Table 6.2-40, n.4. In addition, PNPP's Tech Specs will require that the leakage rate per valve be restored to less than 25 scfh prior to increasing reactor coolant system temperature above 200° F. In the event these valves become a maintenance problem with regard to leakage, appropriate action (repair or replacement) will be taken.

To insure that the system capacity (100 scfh per line) is not exceeded, conservatism has been built into the MSIV leakage rate (25 scfh). Additional reliability is built into design due to the fact that leakage must pass through these isolation valves in series. Further, no credit has been taken in this analysis for the long term leakage control valve.

9-47. What is the vendor/manufacturer of the MSIV's to be used at PNPP?

Response:

Valve	Manufacturer
B21F022A,B,C,D	Atwood and Morill Co.
B21F028A,B,C,D	Atwood and Morill Co.
N11F020A,B,C,D	Borg-Warner

9-48. It is stated in IE Information Notice 82-22 that the Oconee licensee (Duke Power Co.) theorized that reduced power operation and resultant lower quality steam contributed to accelerated steam erosion.