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USNRC

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

'84 MAY 30 A10:49

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

In the Matter of)
)
CAROLINA POWER & LIGHT COMPANY)
and NORTH CAROLINA EASTERN) Docket Nos. 50-400 OL
MUNICIPAL POWER AGENCY) 50-401 OL
)
(Shearon Harris Nuclear Power)
Plant, Units 1 and 2))

AFFIDAVIT OF PETER M. YANDOW,
EDWARD M. STEUDEL AND HAROLD W. BOWLES

County of Wake)
 : ss:
State of North Carolina)

Peter M. Yandow, Edward M. Steudel and Harold W. Bowles,
being duly sworn, depose and say as follows:

1. I, Peter M. Yandow, am a Senior Engineer in the Electrical Unit, Harris Plant Engineering Section, Nuclear Plant Engineering Department, Carolina Power & Light Company. My business address is Route 1, Box 101, New Hill, North Carolina 27562. A summary of my professional qualifications and experience is attached hereto as Exhibit A. I have personal knowledge of the matters set forth herein and believe them to be true and correct.

2. I, Edward M. Steudel, am Manager-Technical Support, Shearon Harris Nuclear Power Plant, Carolina Power & Light

Company. My business address is Route 1, Box 101, New Hill, North Carolina 27562. A summary of my professional qualifications and experience is attached hereto as Exhibit B. I have personal knowledge of the matters set forth herein and believe them to be true and correct.

3. I, Harold W. Bowles, am Director of On-site Nuclear Safety, Shearon Harris Nuclear Power Plant, Carolina Power & Light Company. My business address is Route 1, Box 101, New Hill, North Carolina 27562. A summary of my professional qualifications is attached hereto as Exhibit C. I have personal knowledge of the matters set forth herein and believe them to be true and correct.

OPERATING EXPERIENCE AT BRUNSWICK AND ROBINSON

4. Carolina Power & Light Company ("CP&L") currently operates two commercial nuclear power plants, the Brunswick Steam Electric Plant ("Brunswick"), Units 1 and 2, and the H. B. Robinson Steam Electric Plant ("Robinson"). These operating plants are important sources of information for CP&L concerning the performance of equipment and materials, including electrical cable insulation, in commercial nuclear power plant applications. CP&L has reviewed the operation and maintenance history of electrical cable insulation used at Brunswick and Robinson in order to determine whether polyethylene or other cable insulation has experienced significant degradation from radiation dose-rate effects.

5. Brunswick is a Boiling Water Reactor. Unit 1 has been operating since 1975. Unit 2 has been operating since 1977. Robinson is a Pressurized Water Reactor, as is the Shearon Harris Nuclear Power Plant ("SHNPP"), which has been operating since 1971. The combined operating reactor history of these plants is 29 years.

6. Neither Robinson nor Brunswick uses simple polyethylene cable insulation for safety-related electrical cables. Brunswick uses a variety of cable insulation materials, including cross-linked polyethylene and ethylene propylene rubber. Ethylene propylene rubber is the bulk of cable insulation used at SHNPP.^{1/} Robinson also uses several different kinds of cable insulation. One type of cable used at Robinson has a cross-linked polyethylene jacket.

7. The majority of safety-related electrical cables at Brunswick and Robinson are located in radiation environments where the dose rate is well below the threshold dose rate of 13 to 25 rads/hr. suggested by the Sandia Studies, i.e., the dose rate below which significant dose-rate effects have not been shown to occur. For example, the cables with cross-linked polyethylene jackets at Robinson are exposed to radiation dose rates of ranging from .007 to 3.14 rads/hr. However, cross-linked polyethylene-insulated electrical cables in the drywell at Brunswick Unit 1 have been exposed to dose rates as high as

^{1/} See index of cable types attached to Letter from M. A. McDuffie to Harold R. Denton (April 26, 1983).

171 rads/hr., for a total 9 year integrated dose of 1.35×10^7 rads. This is an order of magnitude higher than the total integrated dose which the radiation zone with the highest dose rate at SHNPP will experience in 40 years of normal full power operation.

8. The results of the review showed no evidence that cable insulation (or other electrical insulation) used in these commercial nuclear power plants exhibits any degradation attributable to dose-rate effects. There have been some instances in which cable insulation degradation was detected during routine maintenance or surveillance tests (e.g., embrittlement of a section of cable insulation). This degradation was determined in every instance to be the result of improper installation (e.g., the cable was allowed to come into contact with hot metal surfaces). In all cases, cables have been replaced and installation modified. Upon modification, these failures have not reoccurred.

SURVEILLANCE AND MAINTENANCE

9. CP&L will have a surveillance and maintenance program for SHNPP in place prior to fuel loading of Unit 1. CP&L has committed to follow the guidance of Regulatory Guide 1.33, Revision 2 in designing the surveillance and maintenance program. The program will include the following program elements: preventive maintenance, corrective maintenance and performance testing. One function of the program will be to detect significant equipment degradation; this will include meggar testing

(testing to measure insulation breakdown) of selected cables as part of preventive maintenance. In addition, CP&L has an operational experience feedback system which will provide information for maintenance activities.

10. Corrective maintenance will be performed, when required, to assure satisfactory equipment operability. Corrective maintenance, when performed in recurring situations on like or similar equipment, will identify component or component part performance trends.

11. Preventive maintenance scheduled and performed on equipment will identify regular activities to extend component life and assure performance of the component's function. Preventive maintenance procedures will take into account equipment manufacturers' recommendations and operating experience.

12. Preventive or corrective maintenance that may affect the performance of safety-related equipment will be conducted in accordance with approved procedures, instructions and/or drawings. In addition, good maintenance practice provides that, during performance of maintenance, a visual check of the equipment's condition be conducted, including the condition of cable terminations, in order to detect component degradation which may be due to wear and/or inservice aging.

13. Periodic performance testing will be scheduled and performed on a routine basis. These tests are performed to monitor safety system operation. All failures will be analyzed to determine their cause and whether any trend is indicated.

14. In addition to the surveillance and maintenance program, CP&L has an operational experience feedback system which will provide information for maintenance activities. One part of this system is the Nuclear Plant Reliability Data System ("NPRDS"). This program collects failure data, including any failure data relating to electrical cables, from Brunswick, Robinson and other participating nuclear utilities. NPRDS issues periodic reports on the data collected.

15. A second part of the operational experience feedback system is CP&L's Corporate Nuclear Safety Section's system for assuring that nuclear industry operating experience feedback is supplied to the appropriate organizations at SHNPP, Brunswick and Robinson. This responsibility is shared between the Nuclear Safety Review Unit in CP&L's corporate office and the Nuclear Safety Unit at each plant. The Nuclear Safety Unit at SHNPP performs a detailed evaluation of all INPO Significant Event Reports and Significant Operating Experience Reports, applicable Licensee Event Reports from Brunswick and Robinson, and other industry reports and bulletins. Data supplied to the Plant Operations Department by the Nuclear Safety Unit is further evaluated and incorporated into maintenance procedures, as appropriate.

16. Similar to the system for monitoring industry experience, the SHNPP Regulatory Compliance Unit reviews NRC bulletins, circulars and notices for applicability to SHNPP, and distributes and tracks such documents to the appropriate SHNPP

organizations. Data is incorporated into maintenance procedures as appropriate.

17. The SHNPP surveillance and maintenance program thus will include features that will enable identification of equipment degradation. In addition, any cable failures at SHNPP will be routinely evaluated by various levels of technical personnel, including management. Finally, a comprehensive system is already in place for collecting and evaluating other industry operating experience, including any experience with radiation dose-rate effects in cable or other electrical insulation. Since dose-rate effects on electrical cable or other insulation, if they occur, are a long-term phenomenon, there will be ample means for identifying significant degradation before unsafe conditions can occur.

Peter M. Yandow
Peter M. Yandow

Subscribed and sworn to before me
this 25th day of May, 1984.

Marilyn V. Pease
NOTARY PUBLIC

My Commission Expires

10/19/85



Edward M. Steddel
Edward M. Steddel

Subscribed and sworn to before me
this 25th day of May, 1984.

Marilyn V. Pease
NOTARY PUBLIC

My Commission Expires

10/19/85



Harold W. Bowles
Harold W. Bowles

Subscribed and sworn to before me
this 24th day of May, 1984.

William V. Pease
NOTARY PUBLIC



My Commission Expires

October 19, 1985

EXHIBIT A

Peter Maurice Yandow
Senior Engineer

Education/Training:

Bellows Free Academy, Fairfax,
Vermont - 1969

B.S.E.E., Northeastern University,
Boston, Massachusetts - 1974

Experience:

June 1974 to
December 1974

Stone and Webster Engineering
Corporation, Boston, Massachusetts
Employed as a Career Development
Engineer

January 1975 to
April 1978

Combustion Engineering, Incorporated,
Boston, Massachusetts
Employed as a Cognizant Engineer
for Protection System for five operating
nuclear power plants. Duties included
maintenance of operating systems,
detection and solution of design
problems and the procurement of
spare and replacement items.

April 1978 to
May 1983

Yankee Atomic Electric Company,
Framingham, Massachusetts
Employed as a Senior Engineer.
Duties included follow-up work on
all major instrumentation systems
at three operating nuclear plants
and one presently being built.

May 9, 1983

Carolina Power and Light Company
Employed as a Senior Engineer in
the Electrical Unit, Harris Plant
Engineering Section, Nuclear Plant
Engineering Department, located at
New Hill, North Carolina.

EXHIBIT B

Edward M. Steudel
Manager - Technical Support

Education/Training:

E. S. Degree in Electrical Engineering,
University of South Carolina, 1964

M. B. A. Degree, Golden Gate University,
1977.

U. S. Naval Nuclear Power Training, 1965

Professional Societies:

National Society of Professional
Engineers
Registered Professional Engineer,
Maryland, Ohio, Florida
Institute of Electrical and Electronic
Engineers
American Nuclear Society
Association of Energy Engineers
Member IEEE Subcommittee SC-6, Related
Systems, and Chairman of Working Group
6.5, Safe Shutdown System

Civic Organizations:

Member of National Association of Regional
Council's Steering Committee on Natural
Resources and Environment
Toastmasters Club
Commander, U.S. Naval Reserve

Experience:

September 1981-
Present

Manager - Technical Support in the Harris
Plant Operations Section, Harris Nuclear
Project.

September 1980-
September 1981

Principal Engineer - Special Projects in the
Environmental & Radiation Control Section
of the Nuclear Operations Department.
Located at the Harris Energy & Environ-
mental Center, New Hill, N.C.

May 1970-August 1980

Engineering Supervisor - Bechtel Power Corp.
Gaithersburg, Maryland

June 1964-May 1970

U. S. Navy - Submarine Officer

EXHIBIT C

Harold Bowles
Director - On-Site Nuclear Safety

Education/Training:

South Charleston, WVa High School - 1965
Washington & Lee University, Lexington,
Va., BS Physics-Engineering, 1969
U.S. Navy Nuclear Power School, Vallejo
CA/Idaho Falls, ID, 1971
North Carolina State University, Raleigh,
N.C., Master of Economics, 1980

Honors:

Phi Beta Kappa, Washington & Lee University,
1969
Navy Achievement Medal, USS Henry L.
Stimson (SSBN 655), 1973

Professional Societies: Member - ANS

Registration:

Registered Professional Engineer - North
Carolina, 1978

Experience:

Carolina Power & Light Company

November 1982 - Present Director - On-Site Nuclear Safety, Harris
Plant. Manage on-site unit responsible
for performing Independent Safety
Engineering Group and Operational
Experience Feedback functions.

October 1981 -
November 1982 Project Engineer - Corporate Nuclear Safety
Section. Conducted independent safety
review of procedures and equipment
associated with Robinson, Brunswick, and
Harris nuclear plants. Company interface
with EPRI in probabilistic risk assess-
ment effort (GO Code).

February 1975 -
October 1981 Nuclear Engineer III, Senior Engineer, Pro-
ject Engineer - Nuclear Fuel Section.
Supervised subunit responsible for
nuclear fuel cost projections, fuel
fabrication procurement, and long term
nuclear fuel cycle economic projections.
Coordinated negotiations on several nuclear
fuel contracts. CP&L Project Manager for
GE/Brunswick nuclear fuel contract.

Harold W. Bowles
Page 2

January 1974 -
February 1975

Nuclear Engineer, Nuclear Plant Engineering
Section. Worked on various projects
associated with three-unit B&W Plant,
including Fuel Handling Building design
and FSAR drafting effort.

U.S. Navy - USS Henry L. Stimpson (SSBN 655) - Electrical Officer,
Auxiliary Division Office, Damage Control Assistant; Qualified
Engineering Officer of the Watch. Duty tour included shipyard
refueling/overhaul (18 months) and two FBM patrols at sea.

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(Shearon Harris Nuclear Power)	
Plant, Units 1 and 2))	

CERTIFICATE OF SERVICE

I hereby certify that copies of all the documents listed on the attached Document List were served this 25th day of May, 1984, by deposit in the U.S. mail, first class, postage prepaid, to the parties on the attached Service List.

Michael A. Swiger

Michael A. Swiger

Dated: May 25, 1984

DOCUMENT LIST

1. Applicants' Motion for Summary Disposition of Eddleman Contention 11.
2. Applicants' Statement of Material Facts As to Which There Is No Genuine Issue To Be Heard on Eddleman Contention 11.
3. Affidavit of Richard M. Bucci.
4. Affidavit of Peter M. Yandow, Edward M. Steudel and Howard W. Bowles.

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Docket Nos. 50-400 OL
50-401 OL

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325 North Salisbury Street
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