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SUBJECT: Comments on missing neutron dosimeter in reactor pressure vessel. Installation of neutron dosimeter neither necessary or beneficial, nor does lack thereof impact plant safety. Unit in compliance w/10CFR50 Apps G & 4 & ASTM-E-185-73.

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Harold W. Keiser
Vice President-Nuclear Operations
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MAY 0 8 1987

Director of Nuclear Reactor Regulation
Attention: Dr. W. R. Butler, Project Director
Project Directorate I-2
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
UNIT 2 IN-CORE NEUTRON DOSIMETRY
PLA-2852 FILES R41-2, A17-16

Dear Dr. Butler:

The purpose of this letter is to document Pennsylvania Power & Light Company's position with regard to the missing neutron dosimeter in the Unit 2 reactor pressure vessel. What follows is a description of the event.

As part of the ISI program, the separate GE neutron dosimeter at the 30° azimuth was to be removed and analyzed. The camera crew could not locate the dosimeter however they did locate the dosimeter holder which was empty and appeared undamaged. An NCR was written documenting the nonconforming condition and the potential for a loose part in the vessel. Additional, unsuccessful underwater camera inspections were conducted in an attempt to locate the dosimeter.

The construction documentation was reviewed and it was determined that the dosimeter was to have been installed in April, 1983 but there was no evidence to substantiate whether or not the dosimeter was ever installed. PP&L's Procurement Department was requested to obtain a dosimeter from another utility - which they did - and in parallel, plans were made for its installation. Prior to any installation attempts, PP&L received information which negated the need to install the dosimeter. Throughout this period of time, NRC's resident inspector was kept informed with regard to the missing dosimetry.

It is PP&L's position that installation of a neutron dosimeter is neither necessary or beneficial, nor does the lack thereof impact plant safety. Data from the dosimeter would have been used to verify the fluence estimate used to generate the P-T curves for Unit 2. Since both Susquehanna units have geometric similarity, the Unit 1 data is applicable to Unit 2. The Unit 1

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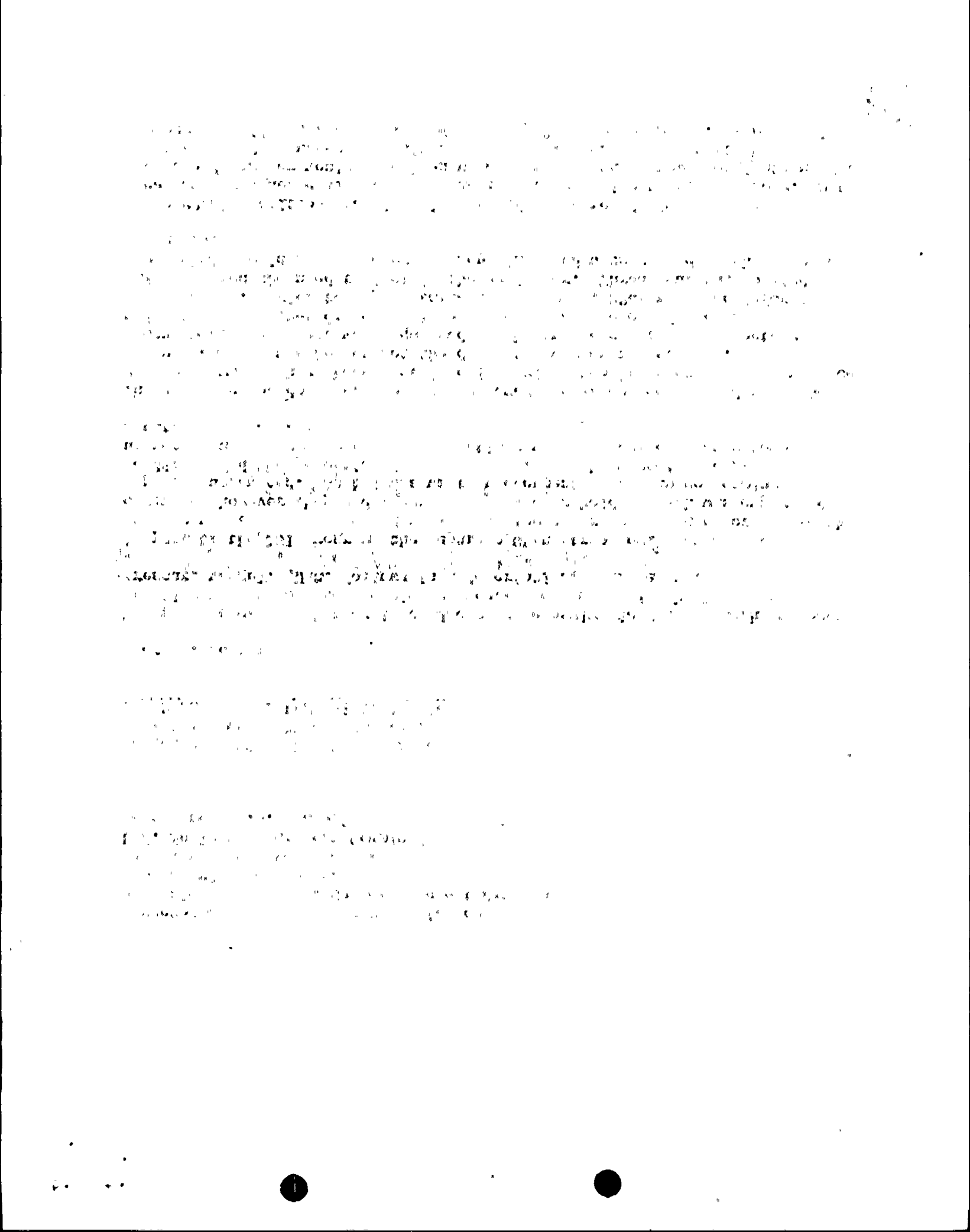

data shows predicted values for neutron fluence to be 1.75 times greater than actual conditions. Information obtained from GE indicates that other BWRs measured fluences are less than or equal to estimated values.

Also, installation of the neutron dosimeter at this time would have little benefit to Susquehanna Unit 2. The Unit 2 P-T curves are not beltline (neutron embrittlement) limited, therefore there would be no potential for revising the curves on the basis of dosimeter data. When Regulatory Guide 1.99, Revision 2 is issued, the beltline will become limiting however the impact on Unit 2 is minor - the 1100 psig minimum hydrotest temperature increases from 170°F to 176°F.

PP&L also maintains that Susquehanna Unit 2 is currently in compliance with 10CFR50 Appendix G, 10CFR50 Appendix 4, and ASTM-E-185-73 since there are neutron dosimeters within each surveillance specimen capsule as required by the regulations. Also, the dosimeter in the lead capsule (to be withdrawn in 6 EFPY) will not saturate and will be usable to determine neutron fluence.

Proposed FSAR changes to reflect the missing dosimetry are attached.

If you have any questions, please contact us.

Very truly yours,

H. W. Keiser
Vice President - Nuclear Operations

Attachments

cc: NRC Document Control Desk (original)
NRC Region I
Mr. L. R. Plisco, NRC Resident Inspector
Mr. M. C. Thadani, NRC Project Manager

Present Form.

5.3.1.6 Material Surveillance

5.3.1.6.1 Compliance with "Reactor Vessel Material Surveillance Program Requirements"

The materials surveillance program monitors changes in the fracture toughness properties of ferritic materials in the reactor vessel beltline region resulting from their exposure to neutron irradiation and thermal environment.

Materials for the program are selected to represent materials used in the reactor beltline region. The specimens are manufactured from a plate actually used in the beltline region and a weld typical of those in the beltline region and thus represent base metal, weld metal, and the transition zone between base metal and weld. The plate and weld are heat treated in a manner which simulates the actual heat treatment performed on the core region shell plates of the completed vessel.

The surveillance program includes three capsule holders per reactor vessel. Each holder is loaded with capsules which contain the following surveillance specimens:

REPLACE WITH ATTACHED

First Holder - 36 Charpy impact specimens which consist of 12 base metal, 12 weld metal, and 12 weld heat affected zone material; 10 tensile specimens which consist of 3 base metal, 4 weld metal, and 3 weld heat affected zone material.

Second Holder - 24 Charpy impact specimens which consist of 8 base metal, 8 weld metal, and 8 weld heat affected zone material; 6 tensile specimens which consist of 2 base metal, 2 weld metal, and 2 weld heat affected zone material.

Third Holder - 24 Charpy impact specimens which consist of 8 base metal, 8 weld metal, and 8 weld heat affected zone material; 8 tensile specimens which consist of 3 base metal, 3 weld metal, and 2 weld heat affected zone material.

A set of out-of-reactor baseline Charp V-notch specimens is provided with the surveillance test specimens.

Charpy impact specimens for the reactor vessel surveillance programs are of the longitudinal orientation consistent with the ASME requirements prior to the issuance of the Summer 1972 Addenda and ASTM-E-185-73. Based on GE experience, the amount of

shift measured by these irradiated longitudinal test specimens will be essentially the same as the shift in an equivalent transverse specimen.

The program includes three capsules in the reactor. Since the predicted adjusted reference temperature of the reactor vessel beltline steel is less than 100°F at end of life, the use of three capsules meets the requirements of 10 CFR 50, Appendix H, and ASTM-E-185-73. The withdrawal schedule is provided in the Technical Specifications for each unit.

For the extent of compliance to 10 CFR 50, Appendix H, see Tables 5.3-1b and 5.3-2b.

5.3.1.6.2. Neutron Flux and Fluence Calculations

A description of the methods of analysis is contained in Subsections 4.1.4.5 and 4.3.2.8.

5.3.1.6.3 Positioning of Surveillance Capsules and Method of Attachment

Surveillance specimen capsules are located at three azimuths at a common elevation in the core beltline region. The sealed capsules are not attached to the vessel but are in welded capsule holders. The capsule holders are mechanically retained by capsule holder brackets welded to the vessel cladding as shown in Figure 5.3-3. The capsule holder brackets allow the capsule holder to be removed at any desired time in the life of the plant for specimen testing. These brackets are designed, fabricated and analyzed to the requirements of Section III of the ASME Code. A positive spring-loaded locking device is provided to retain the capsules in position throughout any anticipated event during the lifetime of the vessel.

5.3.1.6.4 Time and Number of Dosimetry Measurements

~~GE provides a separate neutron dosimeter so that fluence measurements may be made at the vessel ID during the first fuel cycle to verify the predicted fluence at an early date in plant operation. This measurement is made over this short period to avoid saturation of the dosimeters now available. Once the fluence-to-thermal power output is verified, no further dosimetry is considered necessary because of the linear relationship between fluence and power output.~~

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SSES FSAR Section 5.3.1.6 Revisions Proposed

5.3.1.6.1

The surveillance program includes three capsule holders per reactor vessel. Each holder is loaded with capsules which contain the following surveillance specimens and dosimeter wires:

First holder:

36 Charpy impact specimens including 12 base metal, 12 weld metal, and 12 heat affected zone metal specimens; 10 tensile specimens including 3 base metal, 4 weld metal, and 3 weld heat affected zone metal specimens; 4 metal wire dosimeters including 2 made of iron and 2 made of copper.

Second holder:

24 Charpy impact specimens including 8 base metal, 8 weld metal, and 8 weld heat affected zone metal specimens; 6 tensile specimens including 2 base metal, 2 weld metal, and 2 weld heat affected zone metal specimens; 4 metal wire dosimeters including 2 made from iron and 2 made from copper.

Third Holder:

24 Charpy impact specimens including 8 base metal, 8 weld metal and 8 weld heat affected zone metal specimens; 8 tensile specimens including 3 base metal, 3 weld metal, and 2 weld heat affected zone metal specimens; 4 metal wire dosimeters including 2 made of iron and 2 made of copper.

Proposed Revision to Section 5.3.1.6.4:

5.3.1.6.4 Time and Number of Dosimeter Measurements

GE has provided neutron dosimetry wires in each of the specimen holders. The first holder removed will have its wires analyzed, the neutron fluence calculated and the result compared to the predicted values. No further dosimetry is considered necessary because of the linear relationship between fluence and power output. The capsule withdrawal schedule is listed in the Technical Specifications, Table 4.4.6.1.3-1.