# CATEGORY 1

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ACCESSION NBR:9609030339 DOC.DATE: 96/08/28 NOTARIZED: NO DOCKET #
FACIL:50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylva 05000387
50-388 Susquehanna Steam Electric Station, Unit 2, Pennsylva 05000388
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SUBJECT: Requests approval of relief requests (RRPT-2 & RRPT-5) for ISI Pressure Test Program for SSES Units 1 & 2.

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**SUSQUEHANNA STEAM ELECTRIC STATION**
**REQUEST FOR APPROVAL OF RELIEF**
**REQUEST NOS. RRPT-2 AND RRPT-5 FOR THE**
**ISI PRESSURE TEST PROGRAM**
**PLA-4495** **FILE R41-2**

**Docket Nos. 50-387**
**and 50-388**

Pennsylvania Power & Light Company requests the approval of the attached relief requests (RRPT-2 and RRPT-5) for our ISI Pressure Test Program for Susquehanna SES Units 1 and 2. Relief Request No. RRPT-2 is a revision to a previously submitted relief request. The original Relief Request No. RRPT-2 was denied by the NRC staff in a Safety Evaluation Report (SER) for the Susquehanna SES ISI Program Plan, dated 6/07/96. The SER stated that the original relief request was denied "... because the license's proposed alternative did not contain adequate standards for bolting evaluation and did not provide sufficient technical justification to justify the impracticality or burden associated with performing the Code-required examination." The relief request has been revised to provide additional technical information to justify the impracticality and burden associated with performing the Code required examinations.

Relief Request No. RRPT-5 is a new relief request which requests the use of ASME Code Case N-498-1 in establishing alternative rules for the 10-year System Hydrostatic Tests that are required by the 1989 Edition of Section XI.

We request Relief Request RRPT-2 be approved as soon as possible.

If you have any questions, please contact Mr. C. T. Coddington at (610) 774-7531.

Very truly yours,

R. G. Byram

Attachment

A047

copy: NRC Region I
Mr. K. Jenison, NRC Sr. Resident Inspector
Mr. C. Poslusny, NRC Sr. Project Manager

RRPT-2

## I. RELIEF REQUEST APPLICABILITY

A. Units: 1 and 2
B. Code Examination Category: N/A
C. Code Item Number: N/A
D. Code Reference: ASME Section XI (1989 Edition), Paragraph IWA-5250(a)(2), Corrective Measures

## II. IDENTIFICATION OF COMPONENTS

ASME Section XI Class 1, 2, & 3 bolted connections with leakage identified during pressure testing.

## III. CODE REQUIREMENTS FROM WHICH RELIEF IS REQUESTED

The 1989 Edition of ASME Code Section XI paragraph IWA-5250(a)(2), stating:

> "The source of leakages detected during the conduct of a system pressure test shall be located and evaluated by the Owner for corrective measures as follows:
>
> > If leakage occurs at a bolted connection, the bolting shall be removed, VT-3 visually examined for corrosion, and evaluated in accordance with IWA-3100."

## IV. BASIS FOR RELIEF

Removal of all bolting from a leaking control-rod-drive-to-housing bolted connection beneath a reactor vessel loaded with fuel could cause significant equipment damage, as described below. Disturbing of the seal at the bolted connection could necessitate lowering of the drive for replacement of the special O ring seals on the flange. Lowering of the drive requires it to be uncoupled from its control rod. With the reactor head on (following completion of the ASME Class 1 System Leakage or Hydrostatic Test), the possibility exists that the drive might not recouple to its control rod; and the reactor might then have to be disassembled again to accomplish recoupling. When attempting to reinsert and recouple the drive to its control rod, three types of damage to the mechanism could occur:

1) The uncoupling rod in the top of the CRD can become bent;
2) One or more spud fingers in the top of the CRD can become bent; and
3) The lock plug in the bottom of the control rod can become bent.

At the least, significant leakage of contaminated reactor coolant would be created by the act of removing the bolting, lowering the drive, and replacing the special O ring seals on the flange. This operation would also challenge the reactor internal control-rod-to-housing metal-to-metal water seal, which has the potential to become a significant leak for draining the reactor vessel if proper seating does not (automatically) occur. Also, this additional control rod drive O ring replacement operation beneath the reactor vessel contradicts the need to keep personnel radiation exposure As Low As Reasonably Achievable.

Removal, VT-3 visual examination, and reinstallation of all 8 bolts in any CRD flange exhibiting leakage or seepage would result in a minimum expenditure of 0.6 person rem per CRD under the optimum condition of restraining the CRD in position -- if lowering of the drive were not necessary. The hardship of this personnel radiation exposure is without any compensating increase in nuclear safety because the CRD flange bolted connection is designed with considerable safety margin. (Total capacity of all 8 bolts is established by Susquehanna FSAR paragraph 4.6.2.1.2.2.3 as 118,400 pounds; compared with total load of 45,000 pounds, at the 1,250 psi. reactor design pressure. Accordingly, the capacity of 5 of the 8 bolts is in excess of the load requirements for the connection, when at design pressure.)

Leakage from the control-rod-drive-to-housing bolted connection during the system pressure test generally decreases and stops with vessel heatup at operating pressure. Evaluation of this leakage is done in accordance with the guidelines of the General Electric Co. Control Rod Drive System Operation and Maintenance Instructions GEK-73594 (for Unit 1) and GEK-83270 (for Unit 2). Should significant leakage from this bolted connection persist, it would be detected by the leakage collection system (drywell sump) serving this equipment, be investigated, and be corrected.

Additionally, this CRD flange bolting must receive VT-1 visual examination whenever any CRD is disassembled, per paragraph IWB-2500. Satisfaction of this periodic inspection requirement ensures periodic monitoring of this bolting for evidence of corrosion; and replacement, whenever warranted, as CRD's are regularly changed out during refueling outages at the rate of approximately 20 (of the total 185) CRDs per outage. Thus, approximately 160 CRD flange bolts have been visually examined in each of the past outages. In this way the proposed alternative provides an acceptable level of quality and safety.

For leakage observed at a bolted connection on other than a gaseous system, the NRC letter to PP&L, dated 11/28/94, whose subject was "Request For Additional Information on the Susquehanna Steam Electric Station, Units 1 and 2, Second 10-Year Interval Inservice Inspection Program Plan and Associated Requests For Relief," stated that "Because degradation rates cannot be reliably predicted and bolting material records may not be accurate, direct visual examination and prompt corrective action for leakage at bolted connections is warranted. Verify that at least one bolt, closest to the source of leakage, will be removed for a VT-3 visual examination as part of each leakage evaluation."

Additionally, in the 1992 and later editions of ASME Code Section XI, paragraph IWA-5250(a)(2) has been improved to state, "If leakage occurs at a bolted connection, one of the bolts shall be removed, VT-3 examined, and evaluated in accordance with IWA-3100. The bolt selected shall be the one closest to the source of leakage. When the removed bolt has evidence of degradation, all remaining bolting in the connection shall be removed, VT-3 examined, and evaluated in accordance with IWA-3100." Although not yet endorsed by the NRC, this updated requirement suggests the future direction of the industry.

ASME Code Intent Interpretation XI-1-92-51 states that it is not the intent of IWA-5250(a)(2) that, if leakage is detected at a bolted connection during the pressure test of a gaseous system, the bolting be removed for a VT-3 examination.

This is reasonable because a leak from a gaseous system is not likely to induce any corrosion of the bolting of a bolted connection.

## V. ALTERNATE PROVISIONS

If leakage occurs at a control-rod-drive-to-housing bolted connection, the bolting shall be examined in place under tension. This bolting is as specified in Table IWB-2500-1, Examination Category B-G-2, Item Number B7.80. All accessible surfaces of the bolting shall be VT-3 visually examined for corrosion, and evaluated in accordance with IWA-3100.

If leakage occurs at any other bolted connection on other than a gaseous system, one of the bolts shall be removed, VT-3 examined, and evaluated in accordance with IWA-3100. The bolt selected shall be the one closest to the source of leakage. When the removed bolt has evidence of degradation, all remaining bolting in the connection shall be removed, VT-3 examined, and evaluated in accordance with IWA-3100.

If leakage occurs at a bolted connection on a gaseous system, no bolts shall be removed nor VT-3 examined.

RRPT-5

## I. RELIEF REQUEST APPLICABILITY

| | |
|---|---|
| A. Units: | 1 and 2 |
| B. Code Examination Category: | N/A |
| C. Code Item Number: | N/A |
| D. Code Reference: | USNRC Regulatory Guide 1.147<br>ASME Code Case N-498-1, Alternative Rules For 10-Year System Hydrostatic Testing For Class 1, 2, and 3 Systems Section XI, Division 1 |

## II. IDENTIFICATION OF COMPONENTS

ASME Section XI Class 1, 2, & 3 systems subject to requirement for 10-year system hydrostatic pressure testing.

## III. CODE REQUIREMENTS FROM WHICH RELIEF IS REQUESTED

Requirement for performance of one System Hydrostatic Test per 10-year Interval, established in the following locations in Section XI, Division 1:

1) Table IWB-2500-1, Category B-P, Items B15.11 through B15.71;
2) Table IWC-2500-1, Category C-H, Items C7.20 through C7.80;
3) Table IWD-2500-1, Category D-A, Item D1.10;
4) Table IWD-2500-1, Category D-B, Item D2.10;
5) Table IWD-2500-1, Category D-C, Item D3.10.

## IV. BASIS FOR RELIEF

ASME Code Case N-498-1, which is identical to the Alternate Provisions below, has been issued by the ASME to provide an alternative rule to the 10-year System Hydrostatic Tests required by the 1989 Edition of Section XI.

## V. ALTERNATE PROVISIONS

(a) As an alternative to the 10-year system hydrostatic test required by Table IWB-2500-1, Category B-P, the following rules shall be used:

(1) A system leakage test (IWB-5221) shall be conducted at or near the end of each inspection interval, prior to reactor startup.

(2) The boundary subject to test pressurization during the system leakage test shall extend to all Class 1 pressure retaining components within the system boundary.

(3) Prior to performing the VT-2 visual examination, the system shall be pressurized to nominal operating pressure for at least 4 hours for insulated systems and 10 minutes for noninsulated systems. The system shall be maintained at nominal operating pressure during performance of the VT-2 visual examination.

(4) Test temperatures and pressures shall not exceed limiting conditions for the hydrostatic test curve as contained in the plant Technical Specifications.

(5) The VT-2 visual examination shall include all components within the boundary identified in (a) (2) above.

(6) Test instrumentation requirements of IWA-5260 are not applicable.

(b) As an alternative to the 10-year system hydrostatic test required by Table IWC-2500-1, Category C-H, the following rules shall be used:

(1) A system pressure test shall be conducted at or near the end of each inspection interval or during the same inspection period of each inspection interval of Inspection Program B.

(2) The boundary subject to test pressurization during the system pressure test shall extend to all Class 2 components included in those portions of systems required to operate or support the safety system function up to and including the first normally closed valve, including a safety or relief valve, or valve capable of automatic closure when the safety function is required.

(3) Prior to performing the VT-2 visual examination, the system shall be pressurized to nominal operating pressure for a minimum of 4 hours for insulated systems and 10 minutes for noninsulated systems. The system shall be maintained at nominal operating pressure during performance of the VT-2 visual examination.

(4) The VT-2 visual examination shall include all components within the boundary identified in (b) (2) above.

(5) Test instrumentation requirements of IWA-5260 are not applicable.

(c) As an alternative to the 10-year system hydrostatic test required by Table IWD-2500-1, Categories D-A, D-B, or D-C, as applicable, the following rules shall be used:

(1) A system pressure test shall be conducted at or near the end of each inspection interval or during the same inspection period of each inspection interval of Inspection Program B.

(2) The boundary subject to test pressurization during the system pressure test shall extend to all Class 3 components included in those portions of systems required to operate or support the safety system function up to and including the first normally closed valve, including a safety or relief valve, or valve capable of automatic closure when the safety function is required.

(3) Prior to performing the VT-2 visual examination, the system shall be pressurized to nominal operating pressure for a minimum of 4 hours for insulated systems and 10 minutes for noninsulated systems. The system shall be maintained at nominal operating pressure during performance of the VT-2 visual examination.

(4) The VT-2 visual examination shall include all components within the boundary identified in (c) (2) above.

(5) Test instrumentation requirements of IWA-5260 are not applicable.