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 RECIP. NAME RECIPIENT AFFILIATION
 MILLER, C.L. Project Directorate I-2

SUBJECT: Forwards Relief Requests 1RR-22 & 2RR-19 to Inservice Insp Programs, for relief from Code requirements for addl exams of CRD bolting when cracks detected in head to shank fillet area, for approval by 911231.

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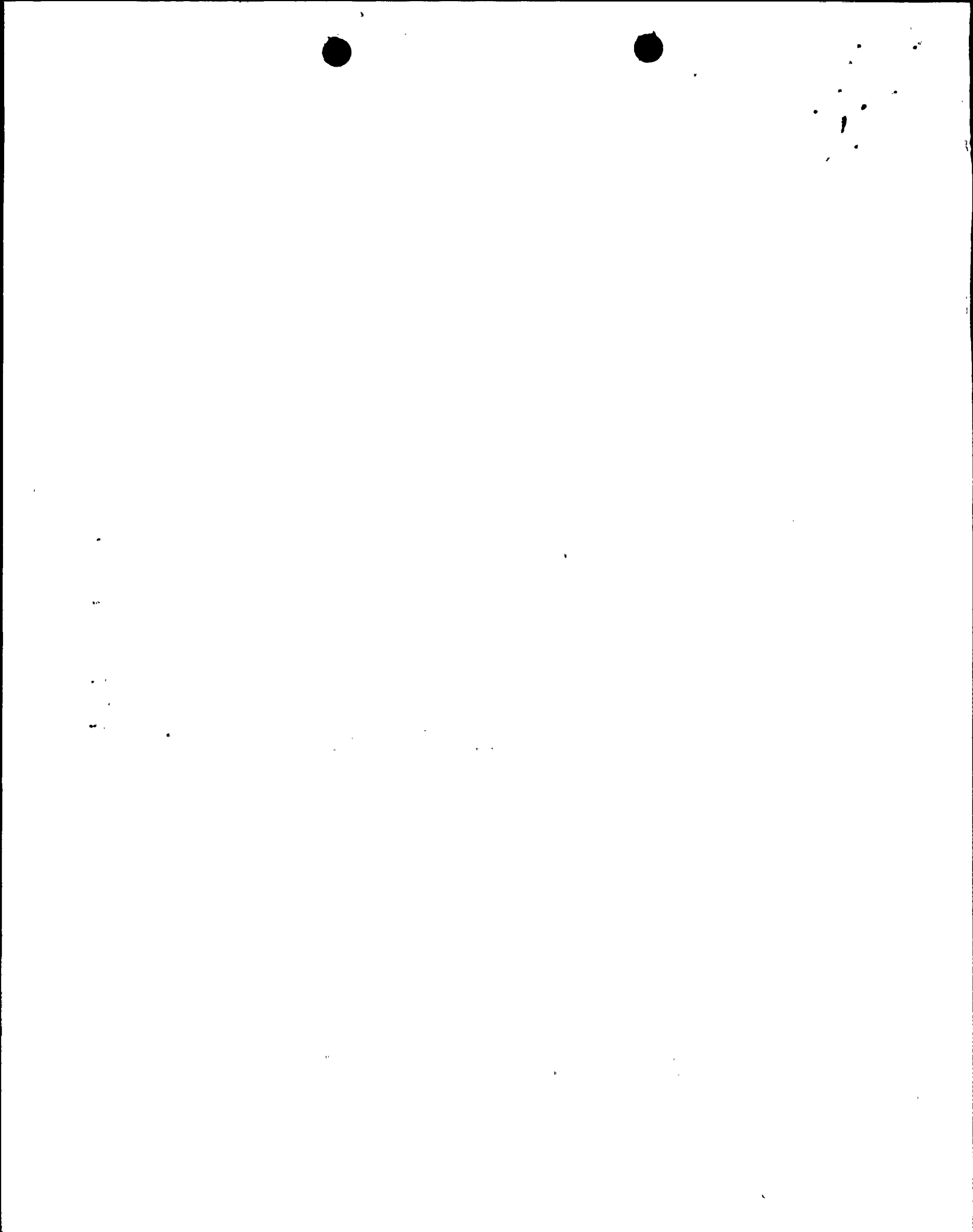
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Pennsylvania Power & Light Company

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Harold W. Keiser
Senior Vice President-Nuclear
215/774-4194

OCT 31 1991

Director of Nuclear Reactor Regulation
Attention: Mr. C. L. Miller, Project Director
Project Directorate I-2
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

**SUSQUEHANNA STEAM ELECTRIC STATION
REQUEST FOR APPROVAL OF RELIEF REQUEST
NOS. 1RR-22 AND 2RR-19 TO THE SSES UNITS 1 AND 2
ISI PROGRAMS
PLA-3651**

FILE R41-2

Docket Nos. 50-387
and 50-388

Dear Mr. Miller:

Attached are Relief Requests 1RR-22 and 2RR-19 to the Susquehanna SES Unit 1 and Unit 2 Inservice Inspection Programs. This submittal requests relief from meeting the Code requirements for additional examinations of CRD bolting when cracks are detected in the head to shank fillet area. Engineering and metallurgical analysis has concluded that the cracking does not compromise plant safety or CRD bolting integrity. Performance of the additional examinations on the CRD bolting is not practical and will not increase plant safety or improve bolting integrity.

We request that these relief requests be approved by December 31, 1991. If you have any questions please contact Mr. C.T. Coddington at 215-774-7915.

Very truly yours,

H. W. Keiser

Attachments

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PDR ADOCK 05000387
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cc: NRC Document Control Desk (original)
NRC Region I
Mr. G. S. Barber, NRC Sr. Resident Inspector
Mr. J. J. Raleigh, NRC Project Manager

RELIEF REQUEST NO. 1RR-22

I. IDENTIFICATION OF COMPONENTS AND IMPRACTICAL REQUIREMENTS

ASME Section XI 1980 Edition, Winter 1980 Addenda, IWB-2430, "Additional Examinations" requires that when examinations performed during an inspection reveal indications exceeding the allowable standards of IWB-3000, an additional number of components (or areas) within the same examination category shall be examined. If the additional examinations reveal further indications exceeding the allowable standards, the remaining number of similar components (or areas) within the same examination category shall be examined to the extent specified in Table IWB-2500-1.

This relief request covers the additional examination requirements for Code Category B-G-2, Item B7.80, CRD Housing Bolting. The performance of additional examinations whenever rejectable visual indications are detected around the bolt shank on the head to shank fillet area of CRD bolting is not practical. The performance of additional examinations poses unreasonable plant hardship and radiological hazards. Relief is requested from meeting the Code requirements for additional examinations of CRD bolting when cracks are detected in the head to shank fillet area.

II. BASIS FOR RELIEF

Engineering and metallurgical analysis has concluded that the cracking does not compromise plant safety or CRD bolting integrity. The ASME Section XI required visual examination (VT-1) of CRD bolting has detected cracking in the head to shank fillet area of the bolting. Detailed metallurgical analysis of the defects has determined that the cracking mechanism to be stress corrosion blunted by general corrosion. Samples of bolting with up to seven years of service life have been examined with the deepest cracking measured at .040". Magnified cross-sections of the defects always show elongated corrosion pits with blunted ends. Crack growth calculations conclude that the cracks grow at a decreasing rate. It would take 22 years for the worst case crack in a single bolt to grow to the minimum required average bolt diameter. The longest period of time a bolt will be in service without receiving the code required visual examination is 12 years. Inspection frequency coincides with CRD mechanism refurbishment exchange frequency (approx. 24 CRD's per outage, 8 bolts per CRD). Therefore, cracked bolting will be detected prior to the worst case single bolt failure. In addition, analysis of the CRD bolted joint indicates that only 3 bolts out of 8 are needed to meet ASME Code margins. Thus adequate safety margin exists even when a bolted joint contains potentially cracked bolts. See references G. E. Report NEDE-31616, dated July 1988, and PP&L Reports: SEA-CW-028 and SEA-CW-033 for details of the analyses.

The code required visual examination of CRD bolting will continue to identify indications which exceed acceptance criteria and hence additional examinations would be required. Performance of additional examinations on the CRD bolting will not increase plant safety or improve bolting integrity. The additional examinations would only augment the total sample of cracked bolts with no change to the results of the engineering and metallurgical analyses. It is impractical to perform these additional examinations because of the adverse radiological environment, plant and personnel safety hazards experienced during removal of the CRD bolting. The condition of the bolting is being continually monitored via the code required visual examinations coupled with metallurgical and engineering analysis.



III. ALTERNATE PROVISIONS

Plant maintenance practices require all visually rejected bolting to be documented on a plant nonconformance report. Visually accepted bolts are magnetic particle (MT) inspected and any bolts with linear indications greater than 1/16" are rejected, segregated and documented on a plant nonconformance report. No rejected/cracked bolts are returned to service. Only bolts which are accepted both by visual and magnetic particle examination are returned to service. A sampling of bolts with cracks in the head to shank fillet area undergo subsequent engineering and metallurgical analysis. If this analysis discloses new conditions which have not been evaluated then additional examinations (to the extent practicable) will be performed.



RELIEF REQUEST NO. 2RR-19

I. IDENTIFICATION OF COMPONENTS AND IMPRACTICAL REQUIREMENTS

ASME Section XI 1980 Edition, Winter 1981 Addenda, IWB-2430, "Additional Examinations" requires that when examinations performed during an inspection reveal indications exceeding the allowable standards of IWB-3000, an additional number of components (or areas) within the same examination category shall be examined. If the additional examinations reveal further indications exceeding the allowable standards, the remaining number of similar components (or areas) within the same examination category shall be examined to the extent specified in Table IWB-2500-1.

This relief request covers the additional examination requirements for Code Category B-G-2, Item B7.80, CRD Housing Bolting. The performance of additional examinations whenever rejectable visual indications are detected around the bolt shank on the head to shank fillet area of CRD bolting is not practical. The performance of additional examinations poses unreasonable plant hardship and radiological hazards. Relief is requested from meeting the Code requirements for additional examinations of CRD bolting when cracks are detected in the head to shank fillet area.

II. BASIS FOR RELIEF

Engineering and metallurgical analysis has concluded that the cracking does not compromise plant safety or CRD bolting integrity. The ASME Section XI required visual examination (VT-1) of CRD bolting has detected cracking in the head to shank fillet area of the bolting. Detailed metallurgical analysis of the defects has determined that the cracking mechanism to be stress corrosion blunted by general corrosion. Samples of bolting with up to seven years of service life have been examined with the deepest cracking measured at .040". Magnified cross-sections of the defects always show elongated corrosion pits with blunted ends. Crack growth calculations conclude that the cracks grow at a decreasing rate. It would take 22 years for the worst case crack in a single bolt to grow to the minimum required average bolt diameter. The longest period of time a bolt will be in service without receiving the code required visual examination is 12 years. Inspection frequency coincides with CRD mechanism refurbishment exchange frequency (approx. 24 CRD's per outage, 8 bolts per CRD). Therefore, cracked bolting will be detected prior to the worst case single bolt failure. In addition, analysis of the CRD bolted joint indicates that only 3 bolts out of 8 are needed to meet ASME Code margins. Thus adequate safety margin exists even when a bolted joint contains potentially cracked bolts. See references G. E. Report NEDE-31616, dated July 1988, and PP&L Reports: SEA-CW-028 and SEA-CW-033 for details of the analyses.

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