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SUBJECT: Requests approval for relief from insp scope & frequency of IGSCC Category C exams of NUREG-0313.Second ISI interval program Relief Request RR-12 encl.

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SUSQUEHANNA STEAM ELECTRIC STATION
SECOND INSERVICE INSPECTION INTERVAL
PROGRAM RELIEF REQUEST RR-12: NUREG-0313,
TECHNICAL REPORT ON MATERIAL SELECTION
AND PROCESSING GUIDELINES FOR BWR
COOLANT PRESSURE BOUNDARY PIPING

Docket Nos. 50-387
and 50-388

PLA-4387 **FILES R41-2, R15-10**

In accordance with the inspection requirements of NUREG-0313, 100% of the Susquehanna SES Units 1 and 2 IGSCC Category C welds shall be examined within two refueling cycles following Mechanical Stress Improvement Process (MSIP) and again within ten years of MSIP. Pennsylvania Power & Light Company requests approval for relief from the inspection scope and frequency of the IGSCC Category C examinations.

The following provides justification for relief from the IGSCC Category C recommended inspection schedule of NUREG-0313:

- Mechanical stress improvement is a NUREG-0313 Revision 2 qualified stress improvement process for mitigation of IGSCC. By removing residual tensile stresses from weldments, MSIP effectively prevents the initiation of cracks and retards/arrests the growth of pre-existing flaws. Nearly ten years of industry experience with MSIP (since 1986), both domestic and abroad, and over 1180 welds processed, have resulted in no IGSCC initiation to date in protected weldments. Moreover, pre-existing flaws treated with MSIP have been arrested allowing MSIP to be considered an acceptable repair alternative for minor (short, medium depth or long, shallow) cracks.

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- NUREG-0313 augmented inservice inspections of stainless steel welds for IGSCC throughout the service life of Susquehanna SES Units 1 and 2 have revealed no IGSCC to date. Individual IGSCC Category C welds were routinely inspected on both units several times prior to MSIP with no IGSCC indications.

- All Category C MSIP welds were ultrasonically inspected post-MSIP with no indication of IGSCC. Ultrasonic inspections were performed utilizing IGSCC qualified procedures and IGSCC certified inspection personnel. Welds 12" and over were inspected remotely using the GE SMART 2000 ultrasonic system (23 welds on Unit 1 and 24 welds on Unit 2). The remaining welds, 6" and under, were inspected manually.

- At the time of issuance of NUREG-0313, limitations in ultrasonic examination systems in detection and sizing of IGSCC elicited marginal confidence in reliable detection of IGSCC. Therefore, the prescribed NUREG-0313 extent and frequency of inspection of IGSCC Category C welds were more stringent than IGSCC Category B welds (stress improvement within two years of operation). That is, the longer service life of IGSCC Category C welds prior to stress improvement coupled with the possibility of undetected service induced flaws, at the time, justified the need for a more rigorous inspection schedule. However, significant advances in ultrasonic inspection technology and IGSCC procedure qualification and inspection personnel training/certification, now provide for reliable detection and sizing of IGSCC flaws. The differences between the inspection requirements of IGSCC Categories B and C are now, by current standards, overly conservative to ensure adequate safety margins and continued structural integrity/reliability.

In summary, welds included in IGSCC Category C have recently undergone MSIP to increase the welds' immunity to IGSCC. MSIP is a NUREG-0313 accepted stress improvement process. Nearly a decade of experience with MSIP has exhibited excellent resistance to IGSCC. In addition, advances in ultrasonic testing technology and inspection personnel qualification in the detection and sizing of IGSCC, has resulted in consistent, reliable IGSCC inspections. In light of these factors, the IGSCC Category C inspection requirements prescribed in NUREG-0313 are more rigorous than is necessary to ensure plant safety. The inspection requirements requested in Relief Request RR-12 provide for inspections commensurate with the level of IGSCC resistance of the welds involved.

PP&L is pursuing this relief as a Cost Beneficial Licensing Action in accordance with NRC Administrative Letter 95-02 to substantially reduce the dose associated with the examinations of the IGSCC Category C welds. Many of the IGSCC Category C welds are dose intensive nozzle-to-safe end welds. The inspections outlined in Relief Request RR-12 results in an estimated dose savings of 146 person-rem over the life of the plant. PP&L calculates a benefit from the requested change of approximately $1.5 million over the remaining life of the plant.

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

Very truly yours,

R. G. Byram

Attachment

copy: NRC Region I
Ms. M. Banerjee, NRC Sr. Resident Inspector
Mr. C. Poslusny, NRC Sr. Project Manager

RELIEF REQUEST RR-12

I. RELIEF REQUEST APPLICABILITY

A. UNIT(S): 1 and 2
B. CODE EXAMINATION CATEGORY: N/A
C. CODE ITEM NUMBER: N/A
D. REFERENCE: The Augmented Inservice Inspection Program - AUG2, NUREG-0313, "Technical Report On Material Selection And Processing Guidelines For BWR Coolant Pressure Boundary Piping"

II. IDENTIFICATION OF COMPONENTS

SSES Units 1 and 2 stainless steel piping welds subject to the IGSCC Category C examination requirements of NUREG-0313, "Technical Report On Material Selection And Processing Guidelines For BWR Coolant Pressure Boundary Piping" are the subject of this relief request. There are 32 IGSCC Category C welds on Unit 1 and 31 IGSCC Category C welds on Unit 2. The subject welds are listed below:

UNIT 1	UNIT 2
DBB1071-1-B	DBB2071-1-B
DBB1072-1-A	DBB2071-FW-3
DBB1072-1-D	DBB2072-1-A
DCA1081-FW-12	DBB2072-1-D
DCA1101-FW-1	DBB2072-FW-3
DCA1102-FW-1	DCA2081-FW-11
DCB1021-FW-1	DCB2021-FW-2
DCB1021-FW-2	DCB2021-FW-4
DCB1021-FW-4	HBB2111-1-A
GBB1171-1-C	N1A NOZ-SE
HBB1111-1-A	N1B NOZ-SE
N1A NOZ-SE	N2A NOZ-SE
N1B NOZ-SE	N2B NOZ-SE
N2A NOZ-SE	N2C NOZ-SE
N2B NOZ-SE	N2D NOZ-SE
N2C NOZ-SE	N2E NOZ-SE
N2D NOZ-SE	N2F NOZ-SE
N2E NOZ-SE	N2G NOZ-SE
N2F NOZ-SE	N2H NOZ-SE
N2G NOZ-SE	N2J NOZ-SE
N2H NOZ-SE	N2K NOZ-SE
N2J NOZ-SE	N5A NOZ-SE
N2K NOZ-SE	N5A SE-SEXT
N5A NOZ-SE	N5B NOZ-SE
N5A SE-SEXT	N5B SE-SEXT
N5B NOZ-SE	N8A NOZ-SE
N5B SE-SEXT	N8A SE-PEN SEAL
N8A NOZ-SE	N8B NOZ-SE
N8A SE-PEN SEAL	N8B SE-PEN SEAL
N8B NOZ-SE	N9 NOZ-CAP
N8B SE-PEN SEAL	VRRB313-10-C
N9 NOZ-CAP	

III. REQUIREMENTS FROM WHICH RELIEF IS REQUESTED

In accordance with NUREG-0313, the current extent and frequency of augmented inservice inspection is determined by categorization of the susceptibility of the weldment to IGSCC. SSES Units 1 and 2 IGSCC Category C weldments are those Class 1, 2, or 3 stainless steel welds that are not made of resistant materials, but have had a mechanical stress improvement process (MSIP) performed sometime after two years of operation. The NUREG-0313 ultrasonic examination frequency for IGSCC Category C welds is as follows:

IGSCC Weld Category	Type of Examination	Extent of Examination	Frequency of Examination
Category C	Ultrasonic examination	100% of the welds	once within two refueling cycles after MSIP
	Ultrasonic examination	100% of the welds (at least 50% in 6 years)	once every ten years following MSIP

Relief is requested to upgrade the inspection extent and schedule of all IGSCC Category C welds to the inspection extent and schedule prescribed for IGSCC Category B; i.e. ultrasonic examination of 50% of IGSCC Category C weldments once every ten years following MSIP.

IV. BASIS FOR RELIEF

SSES Units 1 and 2 had a total of 63 welds (32 and 31, respectively) in IGSCC Category D (non-resistant materials with no stress improvement). MSIP was performed on all of these welds during the 7th and 8th refueling outages on Unit 1, and the 6th and 7th refueling outages on Unit 2, allowing these welds to be upgraded to IGSCC Category C.

Relief is requested from the IGSCC Category C examination extent/frequency prescribed in NUREG-0313 due to impracticality and substantial collective personnel dose expenditure. The frequency of examination - 100% of the welds within the next 2 refueling cycles following MSIP, and 100%, again, within ten years of MSIP - is considered excessive in light of the person-rem costs involved to perform these examinations, and the extent and frequency prescribed for "similarly processed" IGSCC Category B weldments.

- Confirmation of the absence of IGSCC via both routine augmented inspections and post-MSIP inspection of the IGSCC Category C welds warrants upgrade of the welds to IGSCC Category B inspection requirements.
- Examinations of all IGSCC Category C welds within two refueling cycles of MSIP is not warranted. All IGSCC Category C welds were demonstrated free of IGSCC indications during routine examinations prior to MSIP and post-MSIP examinations. Given the demonstrated effectiveness of MSIP, any incremental assurance of structural integrity gained by additional examinations performed within two cycles of MSIP, is gained at a dose cost of 44 person-rem.
- Seventeen of the IGSCC Category C welds on each unit are nozzle-to-safe end welds. Because of their physical location in the plant (typically in radiation fields of 0.5 - 5 R/hr), augmented inservice inspection of these particular welds is very costly in terms of collective personnel dose. By elimination of IGSCC Category C examinations within two cycles of MSIP and reducing the examination scope to 50% of the welds, a minimum estimated dose savings of 75 person-rem would be realized over the remaining life of SSES Units 1 and 2. Additionally, if the 50% weld sample were engineered specifically to select the least dose intensive weld locations (i.e., the most dose intensive welds would be avoided), the dose savings would nearly double to 146 person-rem over the life of SSES Units 1 and 2.

V. ALTERNATE INSPECTION REQUIREMENTS

Augmented inspection of SSES Units 1 and 2 IGSCC Category C welds will be conducted in accordance with the alternate inspection requirements below:

IGSCC Weld Category	Type of Examination	Extent of Examination	Frequency of Examination
Category C	Ultrasonic examination	50% of the welds (at least 25% in 6 years)	once every ten years following MSIP