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Energy to Serve Your World™

NL-04-1764

September 13, 2004

Docket Nos.: 50-321
50-366

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Hatch Nuclear Plant
Third 10-Year Interval Inservice Inspection Program
Submittal of Revised Relief Request RR-38

Ladies and Gentlemen:

By letter dated March 29, 2004 Southern Nuclear Operating Company (SNC) submitted RR-38 to allow the deletion of the Section XI required RPV circumferential shell weld examinations (during the remainder of the 40 year initial license) based on NRC approved BWRVIP-05 (BWR Reactor Pressure Vessel Shell Weld Inspection Recommendations). During the review of relief request RR-38, the NRC and SNC agreed that the relief request should be amended to include the period of extended operation (PEO). Accordingly, the attached revised relief request extends the requested duration to include the PEO.

This letter contains no NRC commitments. If you have any questions, please advise.

Sincerely,

A handwritten signature in cursive script that reads "H. L. Sumner, Jr.".

H. L. Sumner, Jr.

HLS/il/daj

Attachment: Revised Relief Request RR-38

cc: Southern Nuclear Operating Company
Mr. J. T. Gasser Executive Vice President
Mr. G. R. Frederick, General Manager – Plant Hatch
RTYPE: CHA02.004

U. S. Nuclear Regulatory Commission
Dr. W. D. Travers, Regional Administrator
Mr. C. Gratton, NRR Project Manager – Hatch
Mr. D. S. Simpkins, Senior Resident Inspector – Hatch

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SOUTHERN NUCLEAR OPERATING COMPANY
EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2
THIRD 10-YEAR INTERVAL
REQUEST FOR RELIEF NO. RR-38

- I. System/Component for Which Relief is Requested: This Relief Request applies to the Reactor Pressure Vessel (RPV) circumferential shell weld examinations for Hatch Units 1 and 2.
- II. Code Requirements: The following 1989 Edition of ASME Section XI Code requirements apply to this request.
- IWB-2500 requires components to be examined as specified in Table IWB-2500-1.
 - Table IWB-2500-1, Category B-A, Item No. B1.11 requires that all circumferential welds be essentially 100% examined.
- III. Code Requirement from Which Relief is Requested: Southern Nuclear Operating Company (SNC) proposes to permanently exclude the examination of RPV circumferential shell welds as required in Table IWB-2500-1, Category B-A, Item No. B1.11 [This request is applicable for the current 40-year license and the Period of Extended Operation (PEO)].
- IV. Background Information: By letter dated September 28, 1995 the Boiling Water Reactor Vessel and Internals Project (BWRVIP) submitted BWRVIP-05 (BWR Reactor Pressure Vessel Shell Weld Inspection Recommendations) to the NRC. BWRVIP-05 initially proposed to reduce the inspection coverage of the BWR RPV shell welds from essentially 100% of all RPV shell welds to 50% of the longitudinal welds and 0% of the circumferential welds. By letter dated October 29, 1996 the BWRVIP modified the recommendation in BWRVIP-05 to examine essentially 100% of the longitudinal welds and 0% of the circumferential welds (except for that portion of a circumferential weld intersecting with the longitudinal weld being examined).

The NRC issued their final safety evaluation (SE) for BWRVIP-05 by letter dated July 28, 1998. The SE stated that, "BWR licensees may request relief from the inservice inspection requirements of 10 CFR 50.55a(g) for volumetric examination of circumferential reactor pressure welds (ASME Code Section XI, Table IWB-2500-1, Examination Category B-A, Item 1.11, Circumferential Shell Welds) by demonstrating: (1) at the expiration of their license, the circumferential welds satisfy the limiting conditional failure probability for circumferential welds in this evaluation, and (2) they have implemented operator training and established procedures that limit the frequency of cold over pressure events to the amount specified in this report." The SE indicated that the NRC staff concluded that a near-term safety concern did not exist; however, the NRC staff identified a need to evaluate the high conditional failure probabilities for axial welds. In a request for additional information, the NRC requested the BWRVIP to provide a more realistic potential for axial weld failures due to cold over-pressure events and to provide the failure frequency of axial welds based on NRC recommendations.

On November 10, 1998 the NRC issued Generic Letter 98-05 (Boiling Water Reactor Licensees Use of the BWRVIP-05 Report to Request Relief from Augmented Examination Requirements on Reactor Pressure Vessel Circumferential Shell Welds) to provide guidance for licensees to request relief from the augmented examination requirements for circumferential RPV shell welds. [By letter dated December 2, 1998 SNC requested approval to permanently exclude the examination of the Hatch Unit 1 RPV circumferential shell welds, based on this guidance, and by letter dated March 11, 1999 the NRC issued an SE for Hatch Unit 1 granting this request pursuant to 10 CFR 50.55a(a)(3)(i).]

SOUTHERN NUCLEAR OPERATING COMPANY
EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2
THIRD 10-YEAR INTERVAL
REQUEST FOR RELIEF NO. RR-38 (cont.)

By letters dated December 15, 1998 and November 12, 1999 the BWRVIP supplied additional information regarding axial weld failure probabilities. By letter dated March 7, 2000 the NRC issued a supplement to the July 28, 1998 SE concluding that, "the RPV failure frequency due to the failure of the limiting axial welds in the BWR fleet are below 5×10^{-6} per reactor-year, consistent with RG 1.154, given the assumptions described in the attached SE." Therefore, the issue with axial welds was resolved.

By letter dated January 31, 2001, in response to a request for additional information (RAI) for the Hatch Units 1 and 2 License Renewal Application (LRA), SNC supplied Hatch Units 1 and 2 RPV weld conditional failure probabilities and information regarding cold over-pressure events to the NRC. The NRC concluded in Section 4.6.2 of the October 5, 2001 Safety Evaluation Report that SNC has justified relief from the inservice inspection requirements of 10 CFR 50.55a(g) for volumetric examination of circumferential RPV welds during the PEO. The information supplied to the NRC in response to the RAIs is provided in Enclosure 1. Because of issues associated with the conditional failure probability of axial welds during the PEO, conditional failure probabilities for axial welds were also provided to the NRC and are included in this relief request (for information purposes) as Enclosure 2.

V. Technical Basis: Per the NRC SE dated July 28, 1998 and Generic Letter 98-05, BWR licensees may request relief from the inservice inspection requirements of 10 CFR 50.55a(g) for volumetric examination of circumferential reactor pressure welds (ASME Section XI Code, Table IWB-2500-1, Examination Category B-A, Item 1.11, Circumferential Shell Welds) by demonstrating:

1. At the expiration of their license, the circumferential welds satisfy the limiting conditional failure probability for circumferential welds in this evaluation.
2. Licensees have implemented operator training and established procedures that limit the frequency of cold over pressure events to the amount specified in this report.

Based on these two requirements, the NRC has previously:

- Granted approval for permanent deferral (during the initial 40-years of operation) of the Hatch Unit 1 augmented examination requirements for the circumferential welds pursuant to 10 CFR 50.55a(g)(6)(ii)(A)(5).
- Indicated that SNC has justified relief from the volumetric examination of the circumferential RPV welds during the PEO.

Hatch Units 1 and 2 are bounded by the NRC analysis for circumferential weld limiting conditional failure probabilities during and at the end of the PEO, as shown in Enclosure 1. Therefore, at the expiration of the initial 40-year license period, the Hatch Units 1 and 2 circumferential welds also will satisfy the limiting conditional failure probability for circumferential welds. (Note: Hatch Unit 1 is currently in its 29th year of commercial operation and Hatch Unit 2 is currently in its 25th year of commercial operation).

SOUTHERN NUCLEAR OPERATING COMPANY
EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2
THIRD 10-YEAR INTERVAL
REQUEST FOR RELIEF NO. RR-38 (cont.)

SNC has previously demonstrated that operator training and established procedures limit the frequency of cold over pressure events. This information was supplied to the NRC in the December 2, 1998 Hatch Unit 1 submittal (for the permanent deferral of the augmented examination requirements), which was subsequently approved by the NRC in the March 11, 1999 SE. This information was later referenced by SNC in the January 31, 2001 response to License Renewal RAIs, where, it was also noted that the operator training and procedures for Hatch Units 1 and 2 are the same. Extracts of this information are shown in Enclosure 3.

- VI. Alternative Examinations: Axial welds and intersecting portions of circumferential welds will be examined to the extent practical, dependent upon interference by another component or restrictions due to the geometrical configuration. For those cases where the reduction in coverage is greater than 10%, relief will be requested pursuant to 10 CFR 50.55a requirements.
- VII. Justification for Approval: At the expiration of the PEO (60 years) and therefore the initial 40-year license period as well (which corresponds to the start of the PEO), the Hatch Units 1 and 2 circumferential welds will satisfy the limiting conditional failure probability for circumferential welds. Procedures and training used to limit cold over-pressure events are the same for both Hatch units (approved for Hatch Unit 1 by NRC letter dated March 11, 1999). The NRC has previously concluded that elimination of the Hatch Units 1 and 2 circumferential weld examinations during the PEO is justified and the NRC has previously granted approval for the permanent deferral of the augmented circumferential weld examination requirements for Hatch Unit 1. Therefore, approval should be granted to eliminate the examination of the Hatch Units 1 and 2 RPV circumferential shell welds pursuant to 10 CFR 50.55a(a)(3)(i).
- VIII. Implementation Schedule: Required for the Hatch 2 RPV weld examinations during the 18th Refueling Outage (currently scheduled to begin in February 2005).
- IX. Relief Request Status: Awaiting NRC approval.

SOUTHERN NUCLEAR OPERATING COMPANY
EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2
THIRD 10-YEAR INTERVAL
REQUEST FOR RELIEF NO. RR-38 (cont.)

ENCLOSURE 1

EVALUATION OF LIMITING CONDITIONAL FAILURE PROBABILITIES FOR HATCH
CIRCUMFERENTIAL WELDS DURING THE PERIOD OF EXTENDED OPERATION

By letter dated January 31, 2001, in response to a request for additional information (RAI) for the Hatch License Renewal Application (LRA), SNC supplied Hatch RPV weld conditional failure probabilities to the NRC. RAI 4.6-1 addressed the circumferential welds, and as shown below, the Hatch RPV conditional failure probability for circumferential welds is bounded by the NRC analysis.

“The Hatch limiting circumferential weld properties from Tables 3-1 and 3-2 of the LRA Appendix E are compared to the information in Table 2.6-4 and Table 2.6-5 from the staff SER on BWRVIP-05.”

“The NRC staff used materials and fluence data in Tables 2.6-4 and 2.6-5 to evaluate failure probability of BWR circumferential welds at 32 and 64 EFPY. The NRC used Mean RT_{NDT} for the comparison. Mean RT_{NDT} is defined as: $RT_{NDT} + \Delta RT_{NDT}$. The Mean RT_{NDT} used by the NRC have been compared to the Hatch values derived using Appendix E of the LRA. The Hatch 1 and Hatch 2 values at 54 EFPY are bounded by the 32 EFPY analysis by the NRC by at least 40 °F, and almost 75 °F at 64 EFPY. Although a conditional failure probability has not been calculated, the fact that the Hatch 54 EFPY value is bounded by the 32 and 64 EFPY value the staff used leads to the conclusion that Hatch RPV conditional failure probability is bounded by the NRC analysis.”

See the table below for the comparison of values.

Group	CE(VIP) 32 EFPY	CE(CEOG) 32EFPY	CE(VIP) 64 EFPY	CE(CEOG) 64 EFPY	Hatch 1 54 EFPY	Hatch 2 54 EFPY
Cu%	0.13	0.183	0.13	0.183	0.197	0.047
Ni%	0.71	0.704	0.71	0.704	0.060	0.049
CF	151.7	172.2	151.7	172.2	91.0	31.0
Fluence (10^{19} n/cm ²)	0.20	0.20	0.40	0.40	0.236	0.244
ΔRT_{NDT} (°F)	86.4	98.1	113.2	128.5	55.5	19.2
$RT_{NDT(U)}$ (°F)	0	0	0	0	-10	-50
Mean RT_{NDT} (°F)	86.4	98.1	113.2	128.5	45.5	-30.8
P(F/E) NRC	2.81E-5	6.34E-5	1.99E-4	4.38E-4	---	---
P(F/E) BWRVIP	No Failure	---	---	---	---	---

SOUTHERN NUCLEAR OPERATING COMPANY
EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2
THIRD 10-YEAR INTERVAL
REQUEST FOR RELIEF NO. RR-38 (cont.)

ENCLOSURE 1 (Continued)

EVALUATION OF LIMITING CONDITIONAL FAILURE PROBABILITIES FOR HATCH
CIRCUMFERENTIAL WELDS DURING THE PERIOD OF EXTENDED OPERATION

References:

1. Hatch License Renewal Application, Appendix E, Tables 3-1 and 3-2.
2. Final SER of the BWR Vessel and Internals Project BWRVIP-05 Report (TAC No. M93925), dated July 28, 1998.
3. GE-NE-A00-05389-08, July 1995 Power Uprate Evaluation Task Report for Edwin I. Hatch Plant Units 1 and 2, 110% Power Uprate Revised Impact on Vessel Fracture Toughness.
4. GE-NE-A13-00402-9, March 1998 Extended Power Uprate Evaluation Task Report for Edwin I. Hatch Plant Units 1 and 2 Revised Impact on Vessel Fracture Toughness.
5. BWRVIP-74 – BWR Vessel and Internals Project BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines, TR-113596.
6. Structural Integrity Associates Letter, SIR-00-160, Rev. 0, December 18, 2000.

SOUTHERN NUCLEAR OPERATING COMPANY
 EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2
 THIRD 10-YEAR INTERVAL
 REQUEST FOR RELIEF NO. RR-38 (cont.)

ENCLOSURE 2

EVALUATION OF LIMITING CONDITIONAL FAILURE PROBABILITIES FOR HATCH
 AXIAL WELDS DURING THE PERIOD OF EXTENDED OPERATION

In a response to RAI 4.6-1, SNC supplied Hatch RPV axial weld conditional failure probabilities to the NRC. As shown below, the Hatch RPV conditional failure probability for axial welds is bounded by the NRC analysis. RAI-4.6-2 states (in part):

“The SER in the May 7, 2000 letter supercedes the analysis in the July 28, 1998 letter. Therefore, the applicant should revise its analysis to compare the mean RT_{NDT} for the Plant Hatch axial welds to the mean RT_{NDT} for Pilgrim Mod 2.”

In response, SNC stated:

“The Hatch limiting axial weld properties from Table 3-1 and 3-2 of Appendix E are compared to the information in Table 2.6-4 and Table 2.6-5 from the staff SER on BWRVIP-05. The NRC noted that it issued a revised SER on BWRVIP-05 on March 7, 2000 and that the limiting axial welds should be compared with data in Table 3 of that document (Mod 2 in Table below). Mean RT_{NDT} is defined as: $Mean\ RT_{NDT} = RT_{NDT} + \Delta RT_{NDT}$. The Mean RT_{NDT} used by the NRC have been compared to the Hatch values derived using Appendix E of the LRA. A comparison of the Mean RT_{NDT} values from the NRC report with the Hatch data shows that the NRC analysis bounds the Hatch welds. Although a conditional failure probability has not been calculated, the fact that the Hatch 54 EFPY value is less than the 64 EFPY value the staff used leads to the conclusion that Hatch is bounded by the NRC analysis.”

Group	Mod 2	Hatch 1 54 EFPY	Hatch 2 54 EFPY
Cu%		0.316	0.216
Ni%		0.724	0.043
CF		219	98.0
Fluence (10^{19} n/cm ²)		0.347	0.244
ΔRT_{NDT} (°F)		155.1	60.6
$RT_{NDT(U)}$ (°F)	-2	-50	-50
Mean RT_{NDT} (°F)	114	105.1	10.6
P(F/E) NRC	5.02E-6	---	---
P(F/E) BWRVIP		---	---

References: See circumferential weld references.

SOUTHERN NUCLEAR OPERATING COMPANY
EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2
THIRD 10-YEAR INTERVAL
REQUEST FOR RELIEF NO. RR-38 (cont.)

ENCLOSURE 3

EVALUATION OF OPERATOR TRAINING AND ESTABLISHED PROCEDURES

Plant Hatch has procedures in place which monitor and control reactor pressure, temperature, and water inventory during all aspects of cold shutdown and refueling operations which minimizes the likelihood of a Low Temperature Over-Pressurization (LTOP) event from happening. In addition to procedural controls, periodic Licensed Operator Training further reduces the possibility of occurrence of LTOP events. Initial Licensed Operator Training and Simulator Training of plant heatup and cooldown events includes performance of surveillance tests and monitoring which ensure pressure-temperature curve compliance. In addition, periodic operator training reinforces management's expectations for strict procedural compliance.

Finally, Southern Nuclear operating personnel continuously review industry operating experiences to ensure that Plant Hatch procedures consider the impact of actual events, including LTOP events. Appropriate changes to procedures and training are then implemented to preclude similar situations from occurring at Plant Hatch.

Based on the above, the probability of an LTOP event at Plant Hatch is considered to be less than or equal to that used in the NRC evaluation.