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SOUTHERN COMPANY
Energy to Serve Your World℠

September 3, 2008

Docket No.: 50-366

NL-08-1301

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

Edwin I. Hatch Nuclear Plant - Unit 2
Request for Authorization Under the Provision of 10 CFR 50.55a(a)(3)(i) for
Modification of the Core Shroud Stabilizer Assemblies

Ladies and Gentlemen:

Southern Nuclear Operating Company (SNC) proposes to replace the Hatch Unit 2 stabilizer assembly upper supports and tie rod top nuts during the Spring 2009 Refueling Outage (2RFO20). Similar core shroud tie rod components in Hatch Unit 1 experienced crack indications in two upper supports. At this time, there is no indication that the Unit 2 components have experienced cracking similar to that experienced on Unit 1. However, SNC has determined that Unit 2 components should be replaced with a more robust design that is judged to have improved stresses. This submittal requests that the NRC authorize the proposed modification of each of the four core shroud stabilizer assemblies pursuant to 10 CFR 50.55a(a)(3)(i).

Should difficulties be experienced loosening the upper supports and tie rod top nuts on any of the four stabilizers, SNC has a contingency plan to remove the stabilizer assembly by cutting the tie rod using Electrical Discharge Machining (EDM). The applicable tie rod assembly would then be replaced in its entirety. The replacement lower tie rod and lower spring assembly is functionally identical to the existing design, but includes some stress reduction design enhancements.

Enclosure 1 provides a summary of the evaluations performed to confirm that the core shroud stabilizer modification provides an acceptable level of quality and safety. The presentation of this information generally follows the format of BWRVIP-04-A, "BWR Vessel and Internals Project Guide for Format and Content of Core Shroud Repair Design Submittals," dated April 2002, as applicable considering the scope of the proposed modification.

Enclosure 2 provides the affidavit from GE-Hitachi (GEH) for withholding Enclosure 3 from the public document room. Enclosure 3 provides the design documentation that describes the proposed modification. This is a GEH proprietary report considered by its preparer to contain proprietary information exempt from disclosure pursuant to 10 CFR 2.390. Therefore, on behalf of GEH,

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NRR

SNC hereby requests that Enclosure 3 be withheld from public disclosure in accordance with 10 CFR 2.390(b)(1).

The core shroud stabilizers are not included under the American Society of Mechanical Engineers (ASME) Code Section XI definition for repair or replacement. Consequently, the design details of the proposed modification are being submitted to the NRC for review and approval as an alternative repair pursuant to 10 CFR 50.55a(a)(3)(i). This submittal provides the basis for concluding that the modification provides an acceptable level of quality and safety. This submittal is similar to the Nine Mile Point Station submittal of February 12, 2007 and the Pilgrim Nuclear Power Station submittal of March 22, 2007 and the Hatch Unit 1 submittal of August 14, 2007 on the same topic.

NRC authorization to use this proposed alternative is requested by February 1, 2009 to support the scheduled startup of Hatch Unit 2 following 2RFO20.

Historically, by References 1 and 2, SNC proposed a preemptive repair to the Hatch Unit 2 core shroud by installation of four stabilizer assemblies (i.e., tie rods). By Reference 3, the NRC found the proposed repair acceptable as an alternative to the ASME Code as allowed by 10 CFR 50.55a(a)(3)(i). That repair was installed during the 1995 Refueling Outage (2RFO12).

This letter contains no NRC commitments. If you have any questions please contact Ray Baker at 205-992-7367.

Sincerely,

Mark J Ajluni

M. J. Ajluni
Manager, Nuclear Licensing

MJA/PAH/daj

Enclosures:
1. Core Shroud Stabilizer Replacement Evaluation Summary
2. Affidavit for Withholding of Proprietary Information
3. GE-NE-0000-0080-0259-R2; Hatch 2 Nuclear Plant Shroud Repair Replacement of Upper Support Stress Analysis Report (Proprietary)
4. GE-NE-0000-0080-0259-R2; Hatch 2 Nuclear Plant, Shroud Repair Replacement of Upper Support Stress Analysis Report (Nonproprietary)

References:

1. Georgia Power Company (GPC) Letter HL-4877, Hatch Unit 2 Core Shroud Stabilizer Design Submittal, dated July 3, 1995.
2. GPC Letter HL-5019 Hatch Unit 2 Response to Request for Additional Information Regarding Core Shroud Modification dated August 25, 1995.
3. NRC Safety Evaluation Report for Core Shroud Stabilizer Design for Hatch Unit 2 (TAC No. M92783), dated September 25, 1995.

cc: <u>Southern Nuclear Operating Company</u>
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Edwin I. Hatch Nuclear Plant - Unit 2
Request for Authorization Under the Provision of 10 CFR 50.55a(a)(3)(i) for Modification of the Core Shroud Stabilizer Assemblies

Enclosure 1

Core Shroud Stabilizer Replacement Evaluation Summary

Edwin I. Hatch Nuclear Plant - Unit 2
Request for Authorization Under the Provision of 10 CFR 50.55a(a)(3)(i) for Modification of the Core Shroud Stabilizer Assemblies
Enclosure 1
Core Shroud Stabilizer Replacement Evaluation Summary

Table of Contents

1.0 Introduction and Summary

2.0 Background
- 2.1 Shroud Operational and Safety Functions
- 2.2 NRC and Industry Actions
- 2.3 Southern Nuclear Response to Generic Letter 94-03

3.0 Description of the Proposed Tie Rod Assembly Modifications
- 3.1 Design Objectives
- 3.2 Design Criteria
- 3.3 Description of Repair Components and Design Features

4.0 Structural and Design Evaluation
- 4.1 Analysis Models and Methodology
    - 4.1.1.1 Description of Seismic Model
    - 4.1.1.2 Description of Structural Models
  - 4.1.2 Linear vs. Non-Linear Analysis Method
  - 4.1.3 Weld Crack Model
  - 4.1.4 Load Cases and Load Combinations
  - 4.1.5 Shroud Deflections
- 4.2 Reactor Pressure Vessel and Reactor Internals
- 4.3 Evaluation of Shroud Shell, Shroud Head, and Shroud Support Plate
- 4.4 Flow Induced Vibration
- 4.5 Radiation Effects
- 4.6 Loose Parts Consideration

5.0 Systems Evaluation
- 5.1 Bypass Flow

6.0 Materials and Fabrication
- 6.1 Materials Selection
- 6.2 Material Procurement Specifications
- 6.3 Materials Fabrication

7.0 Pre-modification and Post-modification Inspection
- 7.1 Pre-modification Inspection
- 7.2 Post-modification Inspection
  - 7.2.1 Inspections Prior to RPV Reassembly
  - 7.2.2 Inspections During Subsequent Refueling Outages

8.0 References

9.0 Figure 1

Core Shroud Stabilizer Replacement Evaluation Summary

1.0 INTRODUCTION AND SUMMARY

This request is for NRC approval of the modification of certain components of the existing Hatch Unit 2 core shroud stabilizer assemblies (i.e., the upper supports and the tie rod nuts) with a modified design. This proposed modification to the previously reviewed and accepted core shroud repair is not included under the American Society of Mechanical Engineers (ASME) Code, Section XI definition for repair or replacement. Thus, the design details of the proposed core shroud stabilizer modification are being submitted to the NRC for review and authorization for use as an alternative repair, pursuant to 10 CFR 50.55a(a)(3)(i). The proposed modification addresses the potential for intergranular stress corrosion cracking (IGSCC) of the tie rod upper supports that were identified in a General Electric-Hitachi Company (GEH) 10 CFR Part 21 notification dated May 12, 2006 (Reference 4).

By letters dated July 3, 1995 and August 25, 1995 SNC proposed a preemptive repair to the Hatch Unit 2 core shroud by installation of four stabilizer assemblies (i.e., tie rods) (References 1 and 2). By letter dated September 25, 1995, (Reference 3) the NRC found the proposed repair acceptable as an alternative to the American Society of Mechanical Engineers (ASME) Code as allowed by 10 CFR 50.55a(a)(3)(i). This repair was installed during the 1995 Refueling Outage (2RFO12).

This attachment describes the design of the Hatch Unit 2 core shroud stabilizer assembly modification and summarizes the evaluations performed to substantiate that the tie rod assembly modification provides an acceptable level of quality and safety. These descriptions and evaluations focus on the differences between the previously reviewed and accepted core shroud tie rod design and the proposed modification to that design.

The repair conforms to the requirements of the core shroud repair criteria provided in BWRVIP-02-A (Reference 11) without any alternate approaches or exceptions.

2.0 BACKGROUND

In 1994, Hatch Unit 1 (1RFO15) installed core shroud stabilizers on a pre-emptive basis in lieu of ultrasonic (UT) inspection of the core shroud horizontal welds. The stabilizers functionally replaced the shroud horizontal welds H1 through H8. The General Electric Company (GE) designed and installed the Hatch Unit 1 tie rod assemblies.

In 1995, Hatch Unit 2 (2RFO12) installed core shroud stabilizers on a pre-emptive basis in lieu of ultrasonic (UT) inspection of the core shroud horizontal welds. The stabilizers functionally replaced the shroud horizontal welds H1 through H8. The stabilizer assembly is shown in Figure 1. GE, now GEH, designed and installed the Hatch Unit 2 tie rod assemblies.

Core Shroud Stabilizer Replacement Evaluation Summary

During the Hatch 1 2006 Refueling Outage (1RFO22) two of four shroud stabilizer assembly upper supports were found cracked. This condition was the subject of several GEH 10 CFR Part 21 communications (References 4 through 6). The root cause of the condition was intergranular stress corrosion cracking (IGSCC) in the Alloy X-750 upper support material. Alloy X-750 material is susceptible to IGSCC if subjected to sustained, large peak stress conditions.

GEH conducted an extent of condition review to determine if other Alloy X-750 shroud stabilizer components have similar potential for high peak stress. GEH identified that the root radii of the threads in the shroud stabilizer threaded components may be smaller than the nominal values used in previous design evaluations. GEH submitted a 10 CFR Part 21 communication by letter dated January 5, 2007 (Reference 7) to address the potential for IGSCC in shroud stabilizer threaded components.

The proposed modification includes a modified nut that incorporates an improved locking mechanism. To improve IGSCC resistance, the new nuts will be fabricated from XM-19.

This submittal describes the proposed modification of the shroud stabilizer upper supports and the effect that this modification has on previously performed analyses and evaluations.

2.1 Shroud Operational and Safety Functions

The core shroud operational and safety functions have previously been described in the initial core shroud repair submittals (References 1 and 2), and are also described in the Hatch Unit 2 Updated Final Safety Analysis Report (UFSAR), Section 4.1.2.2, 4.2.2, 3.7B.2.1.6.3, and 5.4.6.3.2. In summary, the core shroud provides a partition to separate the upward flow of coolant through the core from the downward recirculation flow on the outside of the shroud, supports the top guide and core plate which maintain core geometry, and houses the core spray spargers, which provide emergency core cooling.

The four (4) core shroud repair stabilizer assemblies (tie rods) structurally replace horizontal (circumferential) shroud welds H1 through H8 and maintain the above shroud functions. Core shroud weld numbers H1 through H8 are all horizontal (circumferential) shroud welds. Weld H8 attaches the shroud support ring to the shroud support plate. Each tie-rod assembly consists of a tie-rod, upper support, upper stabilizer, middle support, lower spring, lower support with clevis hook, and other minor components (See Figure 1). The ends of the tie-rod assemblies are attached at the top to the shroud head flange and at the bottom to clevis pins installed in shroud support plate collets. The shroud flange is notched at four azimuth locations (eight notches) using electric discharge machining (EDM) to accommodate the installation of the upper stabilizer support. At the bottom, holes are machined in the shroud support plate at the same four azimuth locations and a collet/clevis pin installed for attaching each tie-rod assembly.

The upper supports combined with the upper stabilizer are designed to restrain lateral movement of the shroud shell between welds H1 and H2, the ring between H2 and H3, and the shell between H3 and H4. The top of the tie rod has male threads that attach to the upper support by a tie rod top nut. This threaded joint transfers the vertical preload from the upper support down through the tie rod and the lower tie rod components. The mechanical load applied to the nut during installation plus the thermal preload developed during normal operating conditions ensures that the core shroud will perform its safety functions and meet power generation objectives.

2.2 NRC and Industry Actions

On July 25, 1994 Generic Letter (GL) 94-03 (Reference 8) requested operating BWR licensees to address the core shroud cracking issue. For recent tie rod upper support cracking issues associated with the above-referenced GE Part 21 notifications, the BWRVIP has issued several communications to the NRC and BWRVIP member utilities. As discussed in the NRC safety evaluation (SE) for BWRVIP-76, dated July 27, 2006 (References 9 and 10), the BWRVIP has addressed the generic impact of the tie rod cracking operating experience in the BWRVIP-76 report inspection guidelines. Actions that the BWRVIP committed to take included: (1) work with the industry to understand the root cause; (2) require plants to inspect the tie rods at their next scheduled outage; and (3) take appropriate follow-up actions including revision of applicable BWRVIP documents.

In their SE for BWRVIP-76, the NRC requested that if the BWRVIP determines that the root cause indicates that changes are needed to the BWRVIP material requirements or to the BWRVIP inspection guidelines that the BWRVIP take appropriate action to address the impact of the industry core shroud tie rod repair cracking as needed.

The BWRVIP is working with GEH to develop an ongoing strategy to address the potential limited life of Alloy X-750 components under high-sustained peak stress. At this time, the BWRVIP has not changed the BWRVIP-84 requirement that the maximum allowable peak stress for Alloy X-750 be less than 80% of the yield strength of the material at the intended operating temperature. Southern Nuclear considers the major concern for the tie rod upper support to be the lack of a radius that maintains the peak principle stress below the BWRVIP-84 criterion of 0.8Sy. Southern Nuclear established a design goal of 0.6Sy to provide for additional margin to the BWRVIP limit.

2.3 Southern Nuclear Response to Generic Letter 94-03

Shroud

The Plant Hatch Unit 2 shroud stabilizer design modification was initially installed during 2RFO12 as a preemptive repair. Following the installation,

Core Shroud Stabilizer Replacement Evaluation Summary

SNC initiated visual exams on the shroud vertical welds as required by BWRVIP-76 beginning in 2RFO13 (1997).

Single sided EVT examinations from the outside diameter (OD) were last performed on shroud vertical welds V1, V2, V9, V10, and V11 during 2R16 (Fall 2001). Lower vertical welds V12, V13 and V14 were examined from the OD during 2R18 (Spring 2005). No cracking was identified in any of these welds.

Two-sided EVT examinations were last performed on V3, V4, V5, V6, V7 and V8 during 2R18. An indication was detected on the ID of V6 at the intersection of H4. The indication contained a horizontal component running parallel to H4 approximately 3.5" long and a vertical component into V6 of approximately 3/8". The indication was evaluated as acceptable using the guidance of BWRVIP-76. This indication was reëxamined during 2R19 and no new crack growth was identified.

Shroud Stabilizers

All tie rod assemblies were inspected during 2RFO13, the 225d assembly was inspected during 2RFO14, and all tie rod assemblies were re-inspected during 2RFO19, and on each occasion exhibited no indications and acceptable tightness.

3.0 DESCRIPTION OF THE PROPOSED TIE ROD ASSEMBLY REPLACEMENTS

3.1 Design Objectives

The objective of the proposed tie rod modification is to design and install replacement upper support assemblies and tie rod nuts that will remain resistant to IGSCC over the remaining plant life (i.e., until 2038) and that interface correctly with the existing shroud repair hardware.

3.2 Design Criteria

The design of the upper support and tie rod top nut comply with the criteria delineated in BWRVIP-02-A and BWRVIP-84 (References 11 and 12, respectively), with no exceptions taken. The original codes and design standards used for construction of the original tie rod assemblies were delineated in GE Specification 25A5718 Rev. 0, which was included in the 1995 core shroud repair submittal (Reference 1). The original codes and design standards remain applicable to the proposed modifications, as well as other more recent standards (e.g., BWRVIP-84), as discussed in later sections of this attachment.

3.3 Description of Repair Components and Design Features

The geometry of the replacement hardware (upper support, tie rod nut, and other associated upper support components) is shown in the attached GE design Documents. These newly-designed components incorporate features that improve their ability to resist IGSCC. These features include: (1) a large fillet radius at the corner of the upper support; (2) geometry change of the U-shaped upper support horizontal arm to a rectangular plate; (3) sharp edges eliminated; (4) a larger root radius of the tie rod nut threads; and (5) use of a more IGSCC resistant material (XM-19) for some upper support components and the tie rod nut. The original tie rod installation required that cutouts be made in the shroud flange to accommodate the upper supports. The geometry of the cutouts will be changed to accommodate the simplified design of the modified upper supports.

4.0 STRUCTURAL AND DESIGN EVALUATION

4.1 Analysis Models and Methodology

4.1.1 <u>Description of Structural Models and Analysis</u>

4.1.1.1 Description of Seismic Model

An input to the seismic model was the stiffness of the tie rod system. As discussed in Section 4.3 below, the overall tie rod assembly stiffness was changed by a small amount due to the modification to the tie rod upper support. The stiffness change had such a negligible effect on the overall dynamic characteristics of the vessel and internals primary structure that the seismic loads were judged to remain unchanged and the original seismic model (described in the original 1995 core shroud repair submittal – Reference 1) was not revised.

4.1.1.2 Description of Structural Models

Finite element analysis (FEA) and/or hand calculations were used to structurally analyze the modified upper support components and the tie rod nut. The original FEA of the upper support brackets used the ANSYS finite element code. The mesh size in the original model was coarse and not suitable for capturing peak stresses. A revised FEA of the replacement upper support bracket with smaller mesh sizes to capture peak stresses was performed using the ANSYS computer program. Details of the analysis, such as input criteria, applied loading, material properties, boundary conditions, and analysis methods are provided in Attachment 2. Structural Integrity Associates, Inc. (SIA) was contracted to perform an independent third party review of the GE upper support finite element analysis methodology. SIA developed a similar ANSYS model and their results compared favorably to the GE results for the maximum principle tensile stress.

The replacement hardware components (upper support, tie rod nut, and other associated upper support components) were evaluated for their susceptibility to IGSCC. The design goal established and achieved by SNC was to maintain total stress, which includes peak stress, below 0.6Sy for all the new Alloy X-750 upper support components, thereby providing margin to the BWRVIP-84 criteria of 0.8Sy.

The replacement hardware components are also being evaluated against ASME Code allowable stresses. The values of Sm and Sy for Alloy X-750 material were specified in accordance with Code Case N-60-5 (Reference 13). This is consistent with BWRVIP-84, Section B.6.2. The membrane and bending stresses calculated for these components do not exceed the ASME Code allowable stress limits. The results of the structural integrity evaluation are provided in Attachment 2.

4.1.2 Linear vs. Non-Linear Analysis Method

As noted above, the proposed modification has an insignificant affect on the original seismic dynamic analysis; therefore, the original dynamic analysis methods were not changed by the proposed modification.

4.1.3 Weld Crack Model

The proposed modification does not impact the original cracked shroud weld analysis that was included in the original 1995 core shroud repair submittal (Reference 1). Therefore, modeling of the individual cracked shroud welds remains unchanged from the original analysis.

4.1.4 Load Cases and Load Combinations

The applicable normal, upset, emergency and faulted loading combinations remain consistent with the original design basis of the shroud repair tie rods. The original design basis load combinations are presented in the original 1995 core shroud repair submittals (Reference 1). The loads and load combinations are also in accordance with BWRVIP-02-A.

These original load combinations were:

Normal
Upset Seismic D Wt + OBE + N-ΔP
Upset Thermal D Wt + Upset ΔT + N-ΔP
Emergency 1 D Wt + N-ΔP + DBE
Emergency 2 D Wt + MSL LOCA

Emergency 3 D Wt + N-ΔP + ½ SME
Faulted 1 D Wt + MSL LOCA + DBE
Faulted 2 D Wt + RSL LOCA + DBE
Faulted 3 D Wt + MSL LOCA + ½ SME
Faulted 4 D Wt + RSL LOCA + ½ SME

The original Normal and Upset load combinations were used in the replacement upper support design. Emergency 2 and Faulted 2 conditions were determined to be bounding and were also used in the replacement upper support design.

4.1.5 Shroud Deflections

The original shroud horizontal and vertical deflections presented in the original 1995 core shroud repair submittal (Reference 1) are not increased by the proposed modification. Hence, there is no reduction in margin to the allowable horizontal displacements for control rod insertion. Also, since there is no increase in the shroud emergency/faulted vertical deflections, there is no additional strain imposed on shroud attached core spray piping as compared to the original analysis. For normal/upset pressure conditions, the small change in the overall tie rod assembly stiffness as compared to the stiffness used in the original weld separation analysis slightly reduces the weld separation under upset pressure conditions and assures that no separation occurs under normal operating pressure conditions.

4.2 Reactor Pressure Vessel and Reactor Internals

The original tie rod design included an evaluation of the stress in the reactor pressure vessel (RPV) shell due to the horizontal load in the radial direction applied to the vessel by the upper tie rod support/spring assembly. The horizontal load is not changed as a result of the proposed upper support and tie rod nut modification. As such, the original RPV stress report is not impacted by the proposed change.

4.3 Evaluation of Shroud Shell, Shroud Head, and Shroud Support Plate

The major cross sectional dimensions of the new upper support brackets are not significantly different from the original brackets. However, the geometry change of U-shaped upper support horizontal arm to a rectangular plate and the enhanced ANSYS modeling have resulted in a slight increase in total tie rod assembly stiffness of less than 1%. This change is considered to have a negligible impact on tie rod or seismic loads.

With the original tie rod thermal preloads maintained; there is no impact on available stress safety margins in existing tie rod components that are not being modified or in tie rod attachment points such as the shroud support plate or shroud flange. Since the tie rod horizontal seismic loads and the tie rod thermal preload are not changed, there is also no change in the load imparted to the shroud shell adjacent to tie rod contact points.

4.4 Flow Induced Vibration

The GEH design goal for the original tie rod design was to maintain a factor of three between the vortex shedding (excitation) frequency and the lowest natural frequency of the core shroud tie rod repair. The proposed tie rod modification result in an increased upper support stiffness and an insignificant increase in annulus flow velocity as compared to the original flow induced vibration (FIV) analysis. The original FIV analysis was included in the original 1995 core shroud repair submittals (References 1 and 2). There is negligible change to the original tie rod natural frequency and vortex shedding frequency calculation and the factor of three-design goal was maintained.

4.5 Radiation Effects

The replacement of these components does not adversely impact the original radiation effects evaluation.

4.6 Loose Parts Consideration

The redesigned upper support and tie rod nut have design features that ensure capture of all threaded parts with the potential to work loose within the reactor vessel environment. These features, such as retainer pins and ratchet mechanisms, prevent rotation of threaded fasteners by mechanically obstructing movement. The capturing mechanisms are designed to last for the design life of the repair (2038).

5.0 SYSTEMS EVALUATION

5.1 Bypass Flow

The original tie rod system evaluation summarized the leakage flows at rated conditions through the shroud flange cutouts and horizontal shroud welds assumed to be cracked through-wall. The evaluation concluded that the impact of the leakage flows is sufficiently small such that there was negligible impact on steam separation system performance, core monitoring, fuel thermal margin, fuel cycle length, and emergency core cooling system (ECCS) performance. This evaluation was not impacted by the proposed modification.

6.0 MATERIALS AND FABRICATION

6.1 Materials Selection

Core Shroud Stabilizer Replacement Evaluation Summary

The material specified for the replacement tie rod upper supports and nut are listed in the table below.

Component ID	Material	ASME or Other Description
Upper Support	Alloy X-750	AMS 5542 Rev. L ASME SB-637, UNS N07750
Retainer Spring	Alloy X-750	ASME SB-637, UNS N07750
Tie Rod Nut Top Support Bracket Retainer Pin Socket Head Screw Cap Dowel Pin	XM-19	ASME SA-479, Type XM-19 ASME SA-182, Grade F XM-19 ASME SA-336, Class F XM-19

The above-listed materials have been used for many other reactor internal components and have demonstrated good resistance to stress corrosion cracking in laboratory testing and long-term service experience in the non-welded and low sustained operating stress condition. Both Alloy X-750 and XM-19 are acceptable BWRVIP-84 and ASME Code Section III materials. The proposed materials for the replacement parts are consistent with those used in the original Hatch 2 tie rod design, which was found acceptable by the NRC as documented in the NRC SE dated September 25, 1995.

6.2 Material Procurement Specifications

GE Materials Specification 26A5733, Revision 8 was used for procurement of the tie rod upper support and nut components which complies with the material requirements of BWRVIP-84 including the latest BWRVIP positions documented in BWRVIP Letter 2004-288, dated July 30, 2004 (Reference 14) and BWRVIP Letter 2006-500, dated December 5, 2006 (Reference 15). No exceptions to the material and material processing practices as described in BWRVIP-84 have been taken.

6.3 Materials Fabrication

GE Fabrication Specification 26A5734, Revision 7 is being used for fabrication of the tie rod upper support and nut components. This specification complies with the fabrication requirements of BWRVIP-84 including the latest BWRVIP positions documented in BWRVIP Letter 2004-288, dated July 30, 2004 (Reference 14) and BWRVIP Letter 2006-500, dated December 5, 2006 (Reference 15). No exceptions to the previous NRC-accepted fabrication standards in BWRVIP-84 have been taken.

Furthermore, review of GE Fabrication Specification 26A5734, Revision 7 confirms that the applicable replacement hardware conforms specifically to the conditions described in Sections 3.5.2, 3.6.2, and 3.6.3 of the NRC staff's safety evaluation for BWRVIP-84 dated September 9, 2005.

For austenitic stainless steel components in the assembly, surface cold work was addressed by controlled machining in accordance with demonstrated procedures or solution annealing of the components subsequent to machining.

For the Alloy X-750 components, surface preparation was addressed as follows:

- The material was supplied in the precipitation-hardened condition, and therefore no surface preparation techniques (e.g., machining, grinding) were applied prior to age hardening.
- Final machining passes were limited to 0.010".
- Grinding was controlled in accordance with a written procedure, such that the process used successively finer grit with the final grit size being #120 (or finer).

For the case of electro-discharge machining of the Alloy X-750 components, the process was qualified. Qualification consisted of performing a cut using the maximum heat input parameters, removing a metallographic cross-section, and examining the cut surface. Since no fissures or cracks were found, the process was considered acceptable.

The replacement upper supports are similar to the original tie rod assemblies in that they do contain threaded connections that could potentially act as crevices. No other avoidable crevices have been added to the replacement upper bracket design. BWRVIP-02-A states that it is recognized that fasteners and mechanical joints may contain crevices and it suggests the following requirements when crevices can not be avoided: (1) The design of such features should avoid sensitized areas and should utilize IGSCC-resistant materials, and (2) such features should be vented to the extent practical to minimize stagnant conditions. There are no welds in the replacement upper supports assemblies. The replacement upper support materials have been procured and processed to prevent sensitized material by meeting the requirements of BWRVIP-84. There are no threaded fasteners associated with the modification where venting is judged practical or effective.

7.0 PRE MODIFICATION AND POST-MODIFICATION INSPECTION

7.1 Pre-modification Inspection

Because the Hatch Unit 2 shroud stabilizers were recently inspected in 2007 only the examinations necessary to support successful installation of the proposed modification will be performed.

Core Shroud Stabilizer Replacement Evaluation Summary

7.2 Post-modification Inspection

7.2.1 Inspections Prior to RPV Reassembly

A post-modification inspection prior to RPV reassembly will include a general post-maintenance visual inspection and recording of the fit of the shroud support hardware onto the shroud to confirm that there are no interferences at the support locations and that the installation is in accordance with the requirements of the modification drawings and the GE installation specification 26A5716. This inspection will include, as a minimum, the following attributes:

a. All retainer clips and latches are in place for the upper stabilizer, the mid-support, the lower spring, and the tie rod nut.

b. The upper stabilizer, the mid-support, and the lower spring are all in contact with the RPV wall.

c. Contact between the lower support clevis pin and hook and on both sides of the hook.

d. Contact exists between the mid-support and shroud, and between upper support and shroud.

e. The "as-left" inspection cleanliness is equal to or better than the "as-found" inspection.

7.2.2 Inspections During Subsequent Refueling Outages

In the first refueling outage following installation of the modified tie rod upper supports, SNC will inspect the tie rod assemblies in accordance with the requirements defined in BWRVIP-76, Section 3.5, Option 1 or 2, and SNC will repeat the post-installation inspections described in Section 7.2.1 (items a through e) above.

SNC will inspect the upper support arm inner and outer corner radius locations during the 2011 refueling outage and on a 10-year interval thereafter. The technique used will be VT-1, visual examination as described in the 2001 Edition of the ASME Section XI Code with 2003 Addenda.

Core Shroud Stabilizer Replacement Evaluation Summary

Furthermore, the table below indicates previous examination history.

	Location	Initial installation	1st re-exam	2nd re-exam	3rd re-exam	4th re-exam	5th re-exam	
	45°	**2R12**	**2R13**	**2R19**	2R20[1]	2R21[1]		
	135°	**2R12**	**2R13**	**2R19**	2R20[1]	2R21[1]		
	225°	**2R12**	**2R13**	**2R14**	**2R19**	2R20[1]	2R21[1]	
	315°	**2R12**	**2R13**	**2R19**	2R20[1]	2R21[1]		

Notes: 1. The frequency assumes tie rod parts are replaced in 2R20 thus requiring baseline examination and assumes 100% re-examination during the next refueling outage.

SNC will work with GEH and the BWRVIP to establish the appropriate re-inspection criteria and intervals for Alloy X-750 components.

The Alloy X-750 components, excluding the replacement tie rod upper support assembly and nuts, in the primary vertical load path of the core shroud stabilizer assembly are listed below:

- Lower Spring
- Clevis Pin
- Collet

The total sustained tensile stress in these components is less than the BWRVIP-84 IGSCC initiation threshold criteria.

8.0 REFERENCES

1. Georgia Power Company (GPC) Letter HL-4877, Hatch Unit 2 Core Shroud Stabilizer Design Submittal, dated July 3, 1995.

2. GPC Letter HL-5019 Hatch Unit 2 Response to Request for Additional Information Regarding Core Shroud Modification, dated August 25, 1995.

3. NRC Safety Evaluation Report for Core Shroud Stabilizer Design for Hatch Unit 2 (TAC No. M92783), dated September 25, 1995.

4. GE Letter MFN 06-133, Part 21 60-Day Interim Report Notification: Core Shroud Repair Tie Rod Upper Support Cracking, dated May 12, 2006.

5. GE Letter MFN 06-292, Update to Part 21 Interim Report Notification: Failure Analysis of Core Shroud Repair Tie Rod Upper Support Cracking, dated August 21, 2006.

6. GE Letter MFN 06-374, Part 21 Notification: Completion of GE Evaluation on Core Shroud Repair Tie Rod Upper Support Cracking, dated October 9, 2006.

7. GE Letter MFN 07-005, GE Part 21 Communication: Potential for Intergranular Stress Corrosion Cracking in Shroud Repair Tie Rod Threaded Components, dated January 5, 2007.

8. NRC Generic Letter 94-03, "Intergranular Stress Corrosion Cracking of Core Shrouds in Boiling Water Reactors," July 25, 1994.

9. BWRVIP-76, "BWR Vessel and Internals Project BWR Core Shroud Inspection and Flaw Evaluation Guidelines," November 1999.

10. Letter from M. A. Mitchell (NRC) to W. Eaton (BWRVIP) dated July 27, 2006, Safety Evaluation of Proprietary EPRI Report, "BWR Vessel and Internals Project, BWR Core Shroud and Inspection and Flaw Evaluation Guidelines (BWRVIP-76)".

11. BWRVIP-02-A, "BWR Vessel and Internals Project BWR Core Shroud Repair Design Criteria, Rev. 2," October 2005.

12. BWRVIP-84, "BWR Vessel and Internals Project Guidelines for Selection and Use of Materials for Repairs to BWR Internal Components," October 2000.

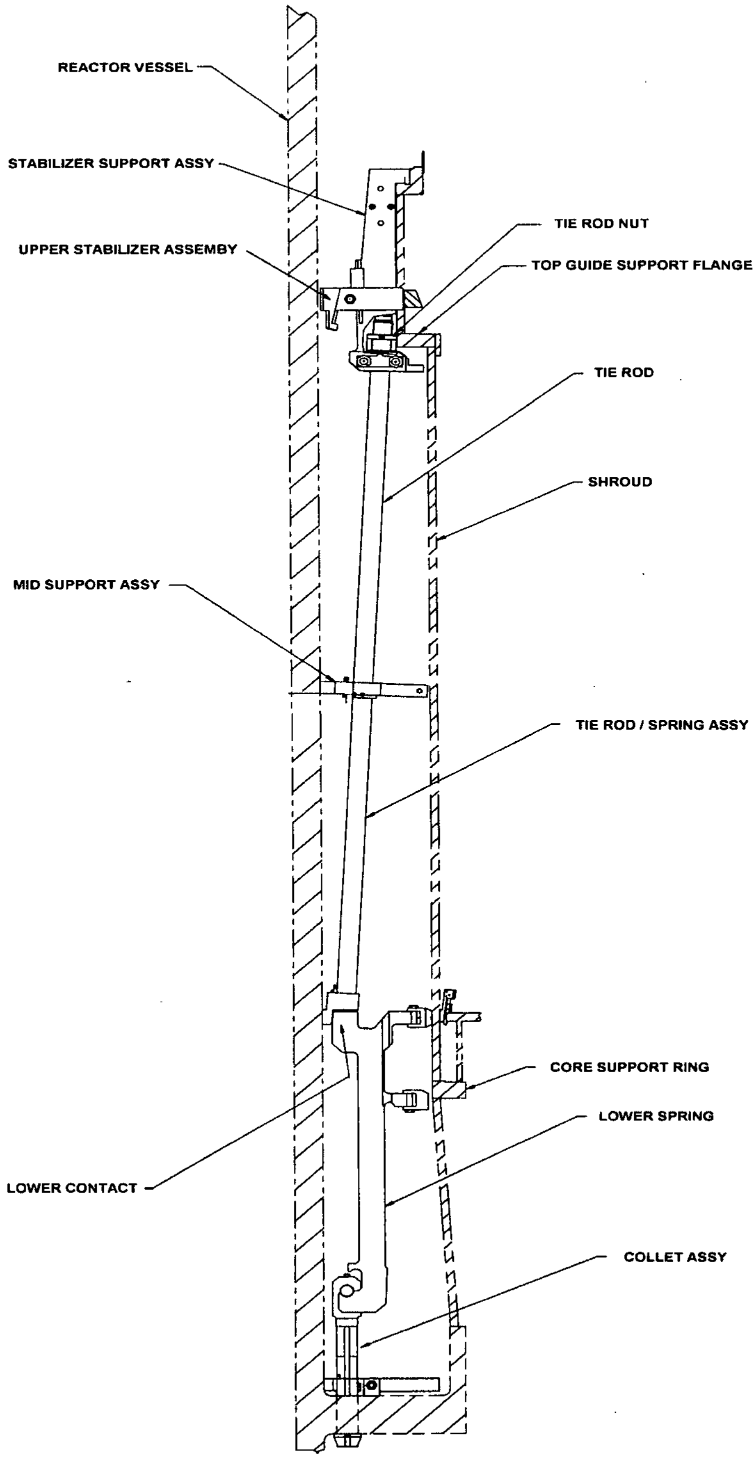
13. ASME Code Case N-60-5, Material for Core Support Structures, Section III, Division 1, February 15, 1994.

14. Letter from W. Eaton (BWRVIP) to Document Control Desk (NRC), dated July 30, 2004, Project 704 – BWRVIP Response to NRC Supplementary Request for Additional Information on BWRVIP-84 (Letter 2004-288).

15. Letter from W. Eaton (BWRVIP) to Document Control Desk (NRC), dated December 5, 2006, Project 704 – BWRVIP Response to NRC Safety Evaluation of BWRVIP-84 (Letter 2006-500).

16. BWRVIP-04-A, "BWR Vessel and Internals Project Guide for Format and Content of Core Shroud Repair Design Submittals, Rev. 0" April 2002.

Core Shroud Stabilizer Replacement Evaluation Summary



9.0 - Figure 1

Edwin I. Hatch Nuclear Plant - Unit 2
Request for Authorization Under the Provision of 10 CFR 50.55a(a)(3)(i) for Modification of the Core Shroud Stabilizer Assemblies

Enclosure 2

Affidavit for Withholding of Proprietary Information

GE-Hitachi Nuclear Energy Americas LLC

AFFIDAVIT

I, **Tim E. Abney,** state as follows:

(1) I am Vice President, Services Licensing, GE-Hitachi Nuclear Energy Americas LLC ("GEH"). I have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in GEH proprietary report, GE-NE-0000-0080-0259-R2, Hatch 2 Nuclear Plant Shroud Repair Replacement of Upper Support Stress Analysis Report, Class III (GEH Proprietary Information), June 2008. GEH text proprietary information in this report, is identified by a dark red dotted underline inside double square brackets [[This sentence is an example.{3}]]. Figures and large equation objects containing GEH proprietary information are identified with double square brackets before and after the object. In each case, the superscript notation {3} refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.

(3) In making this application for withholding of proprietary information of which it is the owner or licensee, GEH relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.390(a)(4) for "trade secrets" (Exemption 4). The material for which exemption from disclosure is here sought also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GEH's competitors without license from GEH constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information which reveals aspects of past, present, or future GEH customer-funded development plans and programs, resulting in potential products to GEH;

d. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a. and (4)b. above.

(5) To address 10 CFR 2.390(b)(4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GEH, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GEH, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or subject to the terms under which it was licensed to GEH. Access to such documents within GEH is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist, or other equivalent authority for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GEH are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information identified in paragraph (2) above is classified as proprietary because it contains details of the analysis methods, loads, qualification criteria, and results of GEH stress analysis of replacement shroud support hardware as well as design details of the replacement hardware. Development of the methods, techniques, information and their application for the stress analysis and the design of the replacement hardware were achieved at a significant cost to GEH.

The development of the analysis methods along with the interpretation and application of the analytical results to design the replacement hardware is derived from the extensive experience database that constitutes a major GEH asset.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GEH's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GEH's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply

the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GEH.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GEH's competitive advantage will be lost if its competitors are able to use the results of the GEH experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GEH would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GEH of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining these very valuable analytical tools.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed on this 27th day of June 2008.

Tim E. Abney
Vice President, Services Licensing
GE-Hitachi Nuclear Energy Americas LLC