Entergy

Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
600 Rocky Hill Road
Plymouth, MA 02360

Stephen J. Bethay
Director, Nuclear Assessment

April 29, 2007

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

SUBJECT: Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
Docket No. 50-293
License No. DPR-35

Revised Request for Authorization under the Provision of 10 CFR 50.55a(a)(3)(i) for Modification of Core Shroud Stabilizer Assemblies (TAC NO. MD4918)

REFERENCES:

1. Entergy Letter No. 2.07.016, Request for Authorization Under the Provision of 10 CFR 50.55a(a)(3)(i) for Modification of the Core Shroud Stabilizer Assemblies, dated March 22, 2007

2. Entergy Letter No. 2.07.035, Pilgrim Repair of the Core Shroud Stabilizer Assemblies - Torsion Arm Clamp Stress Evaluation Report, dated April 10, 2007

3. Entergy Letter No. 2.07.039, Response to NRC Request for Additional Information Related to Repair of the Core Shroud Stabilizer Assemblies, dated April 20, 2007

4. Entergy Letter No. 2.07.041, Revision to Entergy Response to NRC Request for Additional Information Related to Repair of the Core Shroud Stabilizer Assemblies, dated April 24, 2007

5. NRC Safety Evaluation Regarding Pilgrim Nuclear Power Station Core Shroud Repair (TAC No. M91305), dated May 12, 1995

LETTER NUMBER: 2.07.042

Dear Sir or Madam:

By Reference 1, Entergy requested NRC authorization under the provisions of 10 CFR 50.55a(a)(3)(i) for a pre-emptive modification of the upper supports of the previously NRC approved core shroud stabilizer assemblies (Reference 5) during refueling outage (RFO) 16. By References 2, 3, and 4, Entergy provided additional information supporting the modification of the upper supports of the core shroud stabilizer assemblies.

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During RFO-16, Entergy has replaced the upper supports of the 45° and 225° azimuthally located core shroud stabilizer assemblies as described in Reference 1. The upper supports of the 135° and 315° azimuthally located core shroud stabilizer assemblies were not replaced due to the difficulties encountered with tooling. As such, these core shroud stabilizer assemblies remain in the configuration previously approved by the NRC by Reference 5. Thus, the configuration of the core shroud stabilizer assemblies in the reactor vessel includes two modified core shroud stabilizer assemblies in the 45° and 225° locations and two unmodified core shroud stabilizer assemblies in the 135° and 315° locations.

Entergy requested the approval of the modified core shroud stabilizer assembly design by Reference 1. That request will continue to apply to modified core shroud stabilizer assemblies.

This letter requests NRC approval of an alternative configuration of two modified core shroud stabilizer assemblies and two unmodified core shroud stabilizer assemblies for one operating cycle. This submittal along with the referenced documents contain the basis for concluding that the modifications of 45 ° and 225 ° core shroud stabilizer assemblies and the existing previously NRC approved stabilizer assemblies in the 135 ° and 315 ° locations provide an acceptable level of quality and safety for one cycle of operation.

The regulatory commitments made in this submittal are presented in Attachment 2 and replace the commitments previously made in Reference 1.

NRC authorization to use this proposed alternative is requested on or before May 5, 2007, to support the scheduled startup of Pilgrim following RFO-16.

If you have any questions or require additional information, please contact Mr. Bryan Ford, Licensing Manager, at (508) 830-8403.

Sincerely,

for Stephen J. Bethay

Attachments:
1. Information In Support of Proposed Core Shroud Stabilizer Assembly Configuration
2. Regulatory Commitments

cc: Mr. James S. Kim, Project Manager
Plant Licensing Branch I-1
Division of Operator Reactor Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
One White Flint North 4D9A
11555 Rockville Pike
Rockville, MD 20852

Regional Administrator, Region 1
U.S. Nuclear Regulator Commission
475 Allendale Road
King of Prussia, PA 19406

Senior Resident Inspector
Pilgrim Nuclear Power Station

ATTACHMENT 1

Information in Support of Proposed Core Shroud Stabilizer Assembly Configuration

1.0 Background

2.0 Design Reconciliation of Core Shroud Stabilizer Assemblies with Unmodified and Modified Upper Supports

3.0 Acceptability of the Core Shroud Stabilizer Assemblies

3.1 Evaluation of Unmodified Upper Support Bracket

3.2 Acceptability of Not Installing the Torsion Arm Clamps on the Unmodified Core Shroud Stabilizer Assemblies

4.0 Results of Pilgrim Inspections

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Information in Support of Proposed Core Shroud Stabilizer Assembly Configuration

1.0 Background

Pilgrim installed four core shroud stabilizer assemblies in 1995 on a pre-emptive basis in lieu of ultrasonic (UT) inspection of the core shroud horizontal welds. The core shroud stabilizer assemblies functionally replace the shroud horizontal welds H1 through H10. Recently it was discovered during an in-vessel visual inspection (IVVI) at another plant that tie rod upper supports experienced cracking. The root cause of the cracking was intergranular stress corrosion cracking (IGSCC) in the Alloy X-750 tie rod upper support material.

To address the concerns raised by the General Electric (GE) Part 21 Notification (Reference 8) Entergy proposed to modify the previously installed core shroud stabilizer assemblies on a pre-emptive basis as described in Reference 1. This design change was planned for installation during refueling outage (RFO)-16.

During RFO-16 Entergy replaced the upper supports and the torsion arm clamps on the 45° and 225° azimuthally located core shroud stabilizer assemblies. However, the upper supports of the 135° and 315° azimuthally located core shroud stabilizer assemblies were not replaced due to difficulties encountered with tooling. Thus, these tie rods and the upper supports of the stabilizer assemblies remain in the configuration reviewed and accepted by the NRC in Reference 5. Figure 1 provides the locations of the core shroud stabilizer assemblies.

The purpose of this document is to describe the acceptability of Pilgrim core shroud integrity with a tie rod configuration that involves two modified and two unmodified upper support stabilizer assemblies and to summarize the evaluations performed to confirm that the current configuration of tie rod stabilizer assemblies provide an acceptable level of quality and safety.

The modifications to the 45° and 225° tie rod stabilizer assemblies conform to the requirements of the core shroud repair criteria provided in BWRVIP-02-A and BWRVIP-84 as described in References 1 through 4. The 135° and 315° core shroud stabilizer assemblies remain in the configuration previously reviewed and accepted in Reference 5.

2.0 Design Reconciliation of Core Shroud Stabilizer Assemblies with Unmodified and Modified Upper Supports

The modified upper supports installed during RFO-16 were redesigned with geometric improvements to mitigate susceptibility to IGSCC. These replacement upper supports were to be installed in all core shroud stabilizer assemblies during the RFO. The upper supports at 45° and 225° azimuths were replaced successfully. Due to installation difficulties with tooling, it was decided not to replace the upper supports at the 135° and 315° azimuths. The objective is to operate for one cycle with two (2) core shroud stabilizer assemblies with unmodified upper supports and two (2) core shroud stabilizer assemblies with the modified upper supports.

The design qualifications of the unmodified and the modified core shroud stabilizer assembly design are documented in References 6 and 7, respectively. The following evaluation is based on the as-designed configurations of the modified and unmodified upper core shroud stabilizer assemblies The evaluation demonstrates that the two designs are compatible and it is acceptable to operate with two core shroud stabilizer assemblies of each design installed.

(i) Core Shroud Stabilizer Assembly Stiffness and Operational Preload

The difference in the net combined stiffness of the four original core shroud stabilizer assemblies as compared to the proposed arrangement is negligible. Therefore, the thermal preload, which is a function of the stiffness, remains unaffected. It is a requirement that adequate compression be maintained by the core shroud stabilizer assemblies in the shroud welds to prevent separation during normal operation. Since the design basis preload is maintained, adequate clamping force is available to preclude weld separation during normal operation, consistent with the original analysis.

At the 45° and 225° locations, the upper supports have been replaced and the assemblies restored. The core shroud stabilizer assemblies at the 135° and 315° locations were left as-is with no cracking identified, without replacing the upper supports. At the 135° location, an attempt was made to de-torque the tie rod nut and remove the original upper support in order to install the replacement. This attempt was aborted due to field difficulties with tooling. However, there is no discernable rotation of the tie rod nut based on detailed visual examinations, between the as-found and as-left conditions. Thus, there is no degradation of the tightness of 135° core shroud stabilizer assembly. Also, the inspections verified that there is no looseness in the vertical load path in any of the four core shroud stabilizer assemblies.

Therefore, it is concluded that adequate preload and shroud compression is maintained with the proposed arrangement.

(ii) Operating Loads

Since the stiffness of the core shroud stabilizer assemblies with the unmodified and modified upper supports are equivalent, there is no impact on the operating loads such as pressure, thermal, seismic, and LOCA, due to the proposed configuration. In addition, the operating preload remains unaffected.

(iii) Structural Adequacy

As discussed above, since the preload as well as the operational loads remain unaffected, the structural adequacy of the components in the modified and unmodified core shroud stabilizer assemblies remains consistent with the design bases.

In conclusion, the proposed configuration is functionally and structurally equivalent to the configuration with all four (4) upper supports replaced, based on the as-designed configurations of the components.

3.0 Acceptability of the Core Shroud Stabilizer Assemblies

The modification to the 45° and 225° core shroud stabilizer assemblies conform to the requirements of the core shroud repair criteria provided in BWRVIP-02-A and BWRVIP-84. The 135° and 315° core shroud stabilizer assemblies were previously reviewed and accepted in Reference 5.

3.1 Evaluation of Unmodified Upper Support Bracket

The purpose of this section is twofold. First, an assessment is provided of the risk of IGSCC initiation in the Pilgrim Alloy X-750 upper support brackets after 12 years of operation. This evaluation compares the predicted stresses for the unmodified Pilgrim tie rod upper support brackets that have been in service since the time of the original installation to the tie rod supports that have been in service at other plants to demonstrate that there is a sound basis for establishing that IGSCC initiation has not occurred in these parts. Secondly, this section provides a summary of the BWR fleet performance of core shrouds. This discussion provides strong assurance that the Pilgrim shroud and as left tie rod configuration will perform as required for one cycle of operation.

(i) Acceptability of Unmodified Upper Support Brackets

As documented in Reference 8, efforts were made to assess the peak stresses in all Alloy X-750 tie rod upper supports following the detection of significant cracking in two supports at another plant. Reference 8 presented the stress levels as determined using finite element analysis and recommended that plants perform visual inspection of the accessible surface of the tie rod supports at the next outage. Two plants, including Pilgrim, decided to replace the susceptible components at the next outage on a pre-emptive basis. This conservative action allowed both plants to perform a thorough visual inspection of all high stress surfaces of the susceptible supports after they were removed from service.

Table 1 lists the stresses associated with the supports for the different plants. The stresses for the Pilgrim supports are significantly lower than the stresses calculated for the plant where cracking was found and another plant where the supports had no evidence of cracking. Additionally, a refined stress analysis indicates that the actual stresses in the Pilgrim supports are lower than the stress basis of Reference 8. Table 1 also lists the nine plants that have inspected the supports and the years of operation following installation of the tie rod repair. These inspections were performed using EVT-1 inspection methods. Except for the plant discussed in Reference 8, none of those inspections have detected any crack indications as indicated in the table. The upper supports at two plants received additional inspections of the hidden interior surface that also revealed no cracking.

In summary, two factors provide a strong basis that the existing tie rod supports are acceptable. First, the peak stresses in the Pilgrim supports are significantly lower than the stresses in the supports that exhibited IGSCC after 12 years of operation. Secondly, the specific inspections performed including the thorough inspections of the two upper supports that were removed from service provide confirmation that no IGSCC has occurred to date in any of the upper supports.

(ii) BWR Fleet Core Shroud Integrity

The purpose of the core shroud stabilizer assemblies is to provide adequate structural margin for the core shroud based on the highly unlikely situation that one or more of the horizontal welds are completely cracked around the entire circumference and completely through wall. This situation would not be expected since the stresses that are driving stress corrosion crack lengthening and deepening are residual stresses.

These residual stresses, which result from welding, must be in equilibrium leading to balancing tensile and compressive stresses through the shroud thickness. The inspections to date confirm the apparent self-limiting nature of cracking in the BWR core shrouds. Several plants are operating without tie rod modification. Therefore, these plants have established adequate structural margin in all welds. Additionally, several plants either had inspection data that established adequate structural margin prior to the tie rod installation or have recently inspected to confirm adequate structural margin with the core shroud stabilizer assemblies in place. Repeat inspections have also been conducted and have shown that previously un-cracked welds continue to remain un-cracked. Only some changes in crack length and depths have been observed. In particular, under Hydrogen Water Chemistry (HWC) or HWC with Noble Metal Chemistry Addition (HWC/NMCA), there is little or no additional deepening. Pilgrim has been on HWC since 1991 and implemented Noble Metal Chemistry Addition during the current outage.

In that the shrouds contain both vertical and horizontal welds, inspections and re-inspections of vertical welds have also continued. Table 2 details these inspection results including the results at Pilgrim. For Pilgrim, the recent inspections performed this outage continue to confirm the absence of cracking in the vertical welds. This lack of cracking, in conjunction with HWC, provides indirect evidence and a high degree of confidence that the shroud's horizontal welds retain their structural integrity as well.

In summary, the BWR fleet experience provides sound evidence that the core shroud welds retain their structural integrity without the tie rod repair. Additionally, the implementation of HWC/NMCA effectively mitigates the propensity for IGSCC cracking, further assuring that the total cracked regions at the welds will not increase significantly.

3.2 Acceptability of Not Installing the Torsion Arm Clamps on the Unmodified Core Shroud Stabilizer Assemblies

The modification to the core shroud stabilizer assemblies included the installation of a clamp to address concerns over the potential failure of the torsion arm bolt due to IGSCC. This clamp is not being installed on the unmodified core shroud stabilizer assemblies.

The torsion arm clamp's design function is to eliminate the possibility of loose parts from the torsion arm connection and replace the function of the torsion arm bolt. The torsion arm clamp serves as a capture device for the torsion arm, torsion arm bolt, and a pin. The upper stabilizer assembly design is not adversely affected by not installing the torsion arm clamp for one cycle. If the function of the torsion arm was lost:

1. The resulting rotation of the upper spring and the impact on interfacing components in the upper spring bracket yield stresses within acceptable limits.
2. Reactor safety is not impacted by the release of loose parts.

The following provides an analysis of the potential impacts of not installing torsion arm clamps on the unmodified core shroud stabilizer assemblies for one cycle.

(i) Pilgrim Upper Stabilizer Assembly and Torsion Arm Design Basis

The upper stabilizer support/upper spring assembly, in conjunction with the lower spring, provides lateral support to the shroud. The upper stabilizer support contacts the shroud and is radially restrained by the upper stabilizer/upper spring assembly. The upper stabilizer assembly has a small radial preload such that it is held tightly in place and does not vibrate during plant startup and heatup/cooldown evolutions. During normal operation, the radial growth of the shroud and the upper stabilizer/upper stabilizer support due to thermal loading is slightly more than the RPV radial growth due to the combined thermal and pressure expansion. This increases the radial preload of the upper spring and assures that the upper springs provide radial support for the shroud during normal operation. The absence of gaps assures applicability of linear seismic analysis, consistent with the design basis. The upper stabilizer assembly transmits the horizontal seismic load to the RPV. The upper spring connection to the upper spring bracket is designed to allow the upper spring to swivel slightly. The clearance between the lower end of the upper spring and the pocket where it rests in the upper spring bracket allows approximately 5° of clockwise and counterclockwise rotation of the upper spring.

The function of the torsion arms is to keep the upper spring aligned radially towards the vessel wall during a seismic event when the seismic displacement is sufficient to completely unload the upper spring. This swivel function was included because it was judged that the upper spring needed some compliance to handle off-axis seismic motion. Even if the torsion arms do not function to center the springs, possible misalignment of approximately 5° off-center would not impair the horizontal support capability for reacting to shroud seismic load. As the shroud modification design has evolved, it has been determined that this swivel function is not required, and the swivel was dropped from later shroud modification designs.

(ii) Torsion Arm Functional Description

The torsion arms are attached to both sides of the upper spring by the torsion arm bolt. The upper ends of the torsion arms fit into slots in the upper spring and are held in place with the torsion arm bolts. The bottom end of the torsion arm fits into pockets in the upper spring bracket. When the upper spring is in the radial position, the torsion arms are not loaded. However, if the upper spring starts to rotate during a seismic event, the torsion arms will resist rotation of the upper spring. This tends to keep the upper spring centered within its small range of rotational motion.

(iii) Structural Assessment of the Upper Spring without the Torsion Arm

An assessment was performed discounting the function of the torsion arm. The assessment evaluated the effect of the potential approximate 5° rotation on the upper spring, and the interfacing components in the upper spring bracket. This effect was combined with the other applicable operating condition stresses of these components. The calculated stresses were compared to the design basis stress limits and were found to be acceptable.

(iv) Loose Parts Analysis Summary

The potential lost parts are the torsion arm, torsion arm bolt, and a pin. A number of different pathways were evaluated to determine the effects of leaving the parts in the reactor. A partial list includes: a potential for fuel bundle flow blockage and fuel damage due to overheating of the fuel cladding, interference with control rod operation, corrosion or adverse chemical reaction with other reactor materials, interference with Reactor Water Cleanup (RWCU) or Residual Heat Removal (RHR) isolation valves or bottom head drain, interference with instrumentation, and impairment of recirculation system performance. The evaluation concluded that reactor operations would not be compromised with the presence of the potential lost parts in the reactor vessel. There is no design concern for flow blockage to the fuel bundles (fuel debris filter), interference with the control rod scram function (fuel debris filter and guide tubes), and corrosion or adverse chemical reaction with other reactor materials. Also, no significant damage to RPV internals, interference with Neutron Monitoring Instrumentation (no flow), interference with the RWCU or RHR isolation valves (single failure proof), or significant plugging of the bottom head drain will result.

In conclusion, the structural integrity and functionality of the core shroud stabilizer assemblies will be maintained even with the potential loss of function of the torsion arm and any potential loose parts will not adversely impact plant safety.

4.0 Results of Pilgrim Inspections

4.1 Inspection of As-Found Core Shroud Stabilizer Assemblies

The unmodified core shroud stabilizer assemblies were inspected during RFO-16 at the 45°, 135°, 225°, and 315° locations. Item 7.1 of Attachment 1 of Reference 1 discusses the pre-installation inspection requirements. Pre-modification inspections that included a video recording of the as-found condition of the core shroud stabilizer assemblies, to confirm tie rod integrity and to satisfy the BWRVIP-76 requirements for verification of tie rod tightness was completed for all four core shroud stabilizer assemblies. Each tie rod inspection included numerous inspections by EVT-1, VT-1, and VT-3 to ensure the tie rod was in acceptable condition and no cracking was present. The inspections were performed in accordance with BWRVIP requirements.

The examinations included the following:

- EVT-1 inspections of the four core shroud stabilizer assemblies to ensure there was no cracking in the upper support area similar to that observed at another BWR.
- The tie rod upper support top surface was inspected for wear contact and cracking of all four core shroud stabilizer assemblies. This inspection was by EVT-1 with no indications of cracking.
- The 45° and 225° upper support contact areas (underside) were inspected by EVT-1 with no indications of cracking. Since the 135° and 315° core shroud stabilizer assemblies were not disassembled this inspection could not be performed on those upper supports.
- An EVT-1 examination of high stress locations identified in GE Part 21 Notification letter was completed for all four core shroud stabilizer assemblies.
- The torsion arm bolt was inspected by EVT-1 on all four core shroud stabilizer assemblies with no indications of cracking.
- General VT-3 inspection of the entire tie rod assembly was performed on all four core shroud stabilizer assemblies with no indications of cracking.
- A VT-1 inspection of the Lower Support engagement onto the gusset pin from both sides on all four core shroud stabilizer assemblies was performed with no indications of cracking.
- The tie rod nut threads and tie rod threads were inspected by EVT-1 with no indications of cracking for the 45° and 225° core shroud stabilizer assemblies. Since the 135° and 315° core shroud stabilizer assemblies were not disassembled this inspection could not be performed.
- Gusset inspections were performed on all four core shroud stabilizer assemblies by EVT-1 with no indications of cracking. The gusset area has

been protected by hydrogen water chemistry since approximately 1991 and will be protected in the future by HWC/NMCA. However, no credit is being given to HWC/NMCA for the upper portion of the tie rod near the H-1 weld.

The core shroud stabilizer assemblies have been inspected in accordance with BWRVIP-76 requirements and vendor recommendations. The gussets have been inspected in accordance with BWRVIP-38 requirements.

4.2 Post-Installation Inspections

A post-modification inspection was performed for the 45° and 225° core shroud stabilizer assemblies. These inspections included 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 was in accordance with the requirements of the modification drawings and the GE installation specification 26A7096. This inspection included as a minimum the following attributes:

a. Verified the upper supports are located between the shroud head bolt lugs. Verified that the upper supports are fully engaged over the steam dam, and there is contact between the horizontal surface of upper support and the shroud flange.

b. Verified the upper spring contact pad is in contact with the RPV wall. Verified that the spring retainers are properly engaged to lock the jacking bolts.

c. Verified that the lower contact pads on the upper support are in contact with the shroud exterior on both sides of the upper support. Verified that the upper support retainer pin is engaged.

d. Verified that the upper mid-support is in contact with the RPV wall. Verified that the mid support latches are engaged on the tie rod collar.

e. Verified that the lower mid-support is in contact with the RPV wall. Verified that the mid support latches are engaged on the tie rod collar.

f. Verified that the lower contact block is in contact with the RPV wall. Verified that the lower contact block latch is engaged.

g. Verified that the lower spring hooks are in contact with the bottom side of the clevis pin.

h. Performed a final video-recorded inspection of the completed modification.

5.0 <u>Status of Regulatory Commitments</u>

Table 3 identifies the status of the regulatory commitments made in Reference 1.

6.0 Acceptable Level of Quality and Safety Pursuant to 10 CFR 50.55a(a)(3)(i)

The current configuration of the core shroud stabilizer assemblies with modified and unmodified upper supports retains the integrity of the core shroud. The modified core shroud stabilizer assemblies are designed in accordance with the BWRVIP-02-A and BWRVIP-84 requirements while the unmodified core shroud stabilizer assemblies were reviewed and approved by the NRC in 1995 (Reference 5) and has been in use since RFO-10.

The inspections of the unmodified version of the upper supports and the supporting gusset plates in accordance with BWRVIP-76 and 38 requirements have found no flaws. Therefore, the unmodified core shroud stabilizer assemblies have maintained tie rod integrity and the integrity of the shroud for the thermal cycles and transients experienced. Analysis of the stress levels in the two remaining unmodified core shroud stabilizer assemblies have shown that the actual stress is lower than that identified in the GE Part 21 report (Reference 8). The newly installed tie rod upper supports meet the stress limits of 0.7Sy for all X-750 components. For the tie rod threads a criteria of 0.78Sy is used. Both these criteria are more restrictive than the BWRVIP-84 criteria of 0.8Sy.

There is no functional difference in the tie rod design (unmodified vs. modified) that will alter any of the design basis loads and the designs are compatible. Installation of the torsion arm clamps on the unmodified core shroud stabilizer assemblies is unnecessary. The modified design has improved design features to lower the stress below BWRVIP criteria, whereas the original design has withstood 12 years of operation with no indications of flaws. The tie rod and gusset inspection results in accordance with BWRVIP-76 and 38 requirements have shown no flaws and showed tightness to maintaining the integrity of the core shroud.

Pilgrim has operated with Hydrogen Water Chemistry (HWC) since 1991. During RFO-16, Pilgrim implemented Noble Metal Chemical Addition (NMCA). Pilgrim HWC has been very effective reducing the ECP values significantly below the -230 mV threshold for IGSCC in the recirculation system and lower down comer and lower plenum area of the core.

In summary, the present design configuration is acceptable for all load conditions. No cracking has been detected in the core shroud stabilizer assemblies at Pilgrim. This is similar to other plants that have recently replaced tie rod upper support brackets. The stress level at the unmodified tie rod upper support brackets is lower than the stress level presented in Reference 8 and substantially lower than the stress levels in supports that have exhibited cracking and there is a high confidence that there will be no cracking in one cycle. The Pilgrim tie rod upper support brackets were installed in 1995 and thus have about 12 years of service in a BWR environment with no cracking identified.

Based on the foregoing, Entergy has concluded that the present configuration of tie rod stabilizer assemblies provides the designed protection for the integrity of the core shroud for all operational conditions and provides an acceptable level of quality and safety pursuant to 10 CFR 50.55a(a)(3)(i) for one cycle of operation.

7.0 References

1. Entergy Letter No. 2.07.016, Request for Authorization Under the Provision of 10 CFR 50.55a(a)(3)(i) for Modification of the Core Shroud Stabilizer Assemblies, dated March 22, 2007.

2. Entergy Letter No. 2.07.035, Pilgrim Repair of the Core Shroud Stabilizer Assemblies- Torsion Arm Clamp Stress Evaluation Report, dated April 10, 2007.

3. Entergy Letter No. 2.07.039, Response to NRC Request for Additional Information Related to Repair of the Core Shroud Stabilizer Assemblies, dated April 20, 2007.

4. Entergy Letter No. 2.07.041, Revision to Entergy Response to NRC Request for Additional Information Related to Repair of the Core Shroud Stabilizer Assemblies, dated April 24, 2007.

5. NRC Safety Evaluation Regarding Pilgrim Nuclear Power Station Core Shroud Repair (TAC No. M91305), dated May 12, 1995.

6. GENE-771-79-1194, Rev. 2, "Pilgrim Nuclear Power Plant, Shroud repair hardware Stress Analysis," January 1995, including Supplement A, March 1995.

7. GE-NE-0000-0061-6306-R3, "Pilgrim Nuclear Power Station – Shroud Repair Replacement Upper Support Assembly – Stress Analysis Report," March 2007.

8. SC 06-07, 10CFR Part 21 Communication, "Core Shroud Repair Tie Rod Upper Support Cracking," GE Energy – Nuclear, May 12 2006.

8.0 Figures

Figure 1 Locations of Core Shroud Stabilizer Assemblies

9.0 Tables

Table 1 Alloy X-750 Tie Rod Upper Supports

Table 2 Type 304 Core Shroud Inspections: Vertical Welds

Table 3 Status of Regulatory Commitments Made in Reference 1

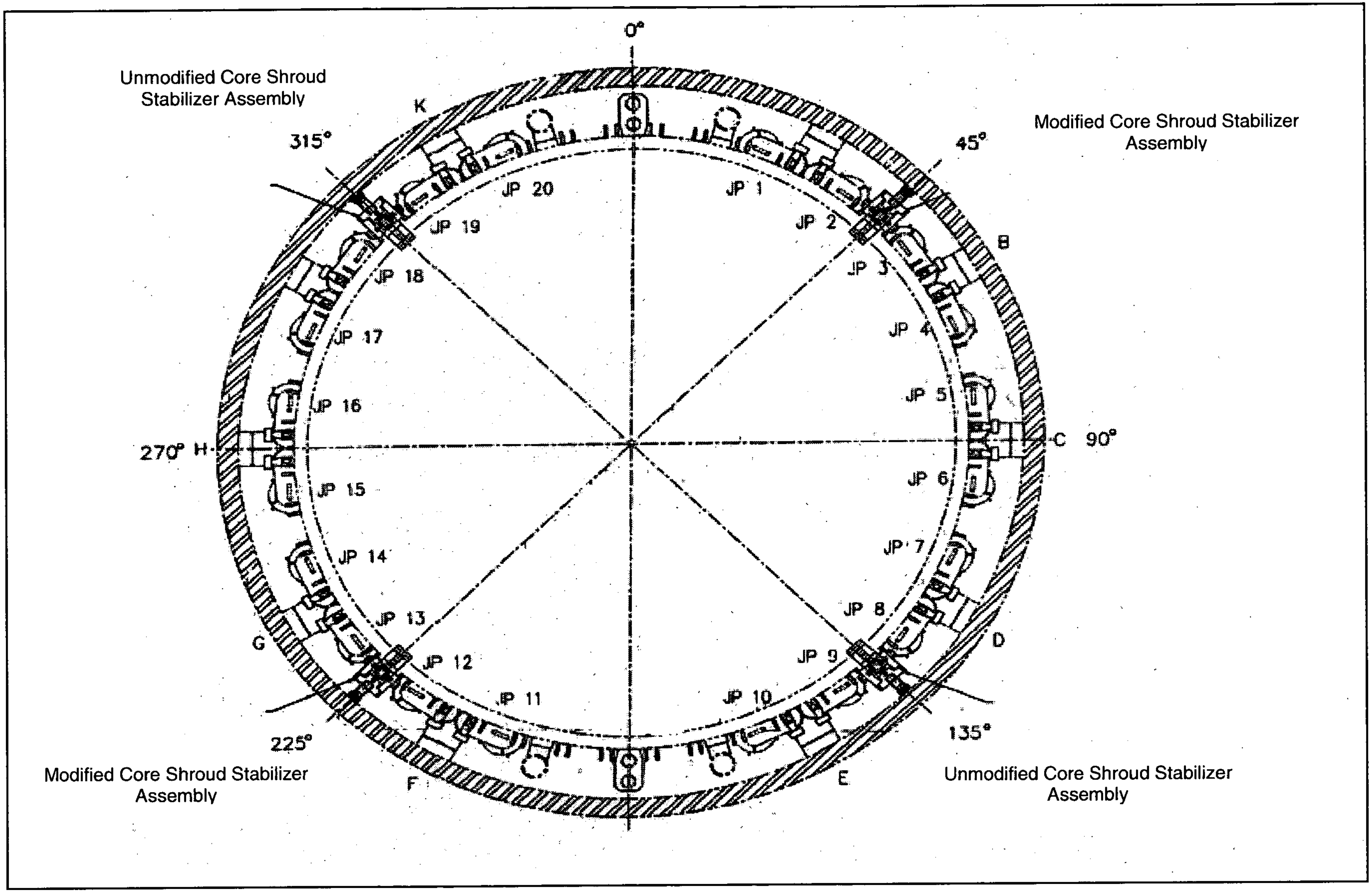

Figure 1: Locations of Core Shroud Stabilizer Assemblies

Table 1: Alloy X-750 Tie Rod Upper Supports

Plant	Calendar Years of Operation	Amount the Pseudo-elastic Stress Exceeds BWRVIP-84 Criterion***	Exterior Inspection results (Number cracked/ Number Inspected)
Plant A Unit 1	11.5	149%	2 Cracked/8 Inspected
Plant B *	12	124%	0 Cracked/4 Inspected
Pilgrim **	12	82%#	0 Cracked/4 Inspected
Plant D Unit 1	10	16%	0 Cracked/4 Inspected
Plant D Unit 2	10	16%	0 Cracked/4 Inspected
Plant E	10	(9%)	0 Cracked/4 Inspected
Plant F Unit 2	11	1%	0 Cracked/4 Inspected
Plant G Unit 3	9	(14%)	0 Cracked/4 Inspected
Plant A Unit 2	11.5	9%	0 Cracked/4 Inspected

Notes:

* All four supports inspected on exterior surfaces and along interior surface with no reported indications.

** Two of the supports were inspected on exterior surface and along interior surface with no indications. The other two supports were inspected on exterior exposed surface with no indications.

*** The BWRVIP-84 IGSCC criterion is 80% of yield stress. Yield stress is ASME code value unless the certified material test report (CMTR) was readily available.

Analysis of the stress levels in the 2 remaining unmodified core shroud stabilizer assemblies have shown that the actual stress is lower than that identified in the GE Part 21 report.

Table 2: Type 304 Core Shroud Inspections: Vertical Welds

Vertical Shroud Inspection Results			
Plant	**Cracks Found**	**Inspection Type**	**Comments**
Plant A	V6		
Plant B	No indications	EVT-1, UT	
Plant C	No indications	UT, EC	
Plant D	V5, V6, V4, V8	EVT-1, UT	
Plant E	No indications	EVT-1	
Plant F	V3, V4, V9, V10, V15, V16, V12	EVT-1, UT	Repaired V9 & V10
Plant G	No indications	EVT-1, UT	
Plant H	No indications	UT, EC	
Plant I	SV5A, SV5B, SV6A, SV6B	EVT-1, UT*	
Plant K	No Indications	EVT-1, UT, EC	Re-inspection
Pilgrim	No indications	EVT-1, UT*	
Plant L	V9 (below H4)		

Notes:

* Belt line high fluence area welds.

EVT-1: Enhanced VT-1, Visual inspection: resolution of 12.7 μm (0.5 mil);

UT: Ultrasonic inspection;

EC: Eddy current inspection

Table 3: Status of Regulatory Commitments Made in Reference 1

REGULATORY COMMITMENTS FROM REF. 1	STATUS	TYPE
Perform pre-modification inspection that includes a video recording of the as-found condition of the shroud repair tie rod assemblies, to confirm tie rod integrity and to satisfy the BWRVIP-76 requirements for verification of tie rod tightness.	COMPLETED	One-Time
Perform inspection of the existing tie rod upper supports when access is provided during the planned replacement activity. The upper support inspection will be an EVT-1 exam of the high stress locations identified in the GE Part 21 notification letter dated October 9, 2006.	COMPLETED	One-Time
Perform an EVT-1 exam of the upper tie rod and tie rod nut threads, to the extent accessible, when access to the tie rod threads and the tie rod nut threads is available.	COMPLETED FOR 45 AND 225 DEGREE SUPPORTS	One-Time
Based on review of tie rod assembly X-750 components in the primary vertical and horizontal load paths, inspect high-stress X-750 locations consistent with the BWRVIP recommendations provided in BWRVIP letters dated March 29, 2006 and April 3, 2006.	COMPLETED	One-Time
Perform a post-modification inspection prior to RPV reassembly, including a general post-maintenance visual inspection and video recording of the fit of the shroud 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 26A7096. Include the inspection attributes identified in Attachment (1), Section 7.2.1 of Reference 1	COMPLETED FOR 45 AND 225 DEGREE SUPPORTS	One-Time
Inspect the tie rod assemblies in accordance with the requirements defined in BWRVIP-76, Section 3.5, Option 1 or 2, and repeat the post-installation inspections described in Section 7.2.1 of Reference 1	Option 1 or Option 2 during RFO-17 and subsequent RFO's.	Continuing

Regulatory Commitments

The following table identifies those actions committed to by Entergy in this submittal. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

REGULATORY COMMITMENTS	COMPLETION DATE	TYPE
For the 135° and 315° tie rods perform a pre-modification inspection that includes a video recording of the as-found condition of the shroud repair core shroud stabilizer assemblies, to confirm tie rod integrity and to satisfy the BWRVIP-76 requirements for verification of tie rod tightness.	During RFO-17	One-Time
For the 135° and 315° tie rods perform an inspection of the existing tie rod upper supports when access is provided during the planned replacement activity. The upper support inspection will be an EVT-1 exam of the high stress locations identified in the GE Part 21 notification letter dated October 9, 2006.	During RFO-17	One-Time
For the 135° and 315° tie rods perform an EVT-1 exam of the upper tie rod and tie rod nut threads, to the extent accessible, when access to the tie rod threads and the tie rod nut threads is available.	During RFO-17	One-Time
For the 135° and 315° tie rods perform a post-modification inspection prior to RPV reassembly, including a general post-maintenance visual inspection and video recording of the fit of the shroud 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 26A7096. Include the inspection attributes identified in Attachment (1), Section 7.2.1 of Reference 1	During RFO-17	One-Time
Inspect the core shroud stabilizer assemblies in accordance with the requirements defined in BWRVIP-76, Section 3.5, Option 1 or 2, and repeat the post-installation inspections described in Section 7.2.1 of Reference 1	Option 1 or Option 2 during RFO-17 and subsequent RFO's.	Continuing