## PMSTPCOL PEmails

**From:** Tai, Tom
**Sent:** Monday, February 28, 2011 4:22 PM
**To:** Scarbrough, Thomas
**Cc:** Scheide, Richard; STPCOL
**Subject:** FW: Draft RAI response
**Attachments:** Draft Rai Response.pdf

Tom,

Attached for your use is NINA's draft response to RAI 03.09.06-21 on the RHR pump alternative test. Since you are traveling this week, I'd appreciate if you can provide any feedback by next Tuesday (3/8), COB.

Thanks

Tom Tai
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**From:** Scheide, Richard [mailto:rhscheide@STPEGS.COM]
**Sent:** Monday, February 28, 2011 3:26 PM
**To:** Tai, Tom
**Subject:** Draft RAI response

Tom,

Attached is the draft response to RAI 03.09.06-27 for Mr. Scarbrough's review. Please provide feedback.

Thanks,

Dick Scheide
Office: 361-972-7336
Cell: 479-970-9026

**Hearing Identifier:** SouthTexas34Public_EX
**Email Number:** 2635

**Mail Envelope Properties** (0A64B42AAA8FD4418CE1EB5240A6FED125D25D0545)

**Subject:** FW: Draft RAI response
**Sent Date:** 2/28/2011 4:22:06 PM
**Received Date:** 2/28/2011 4:22:07 PM
**From:** Tai, Tom

**Created By:** Tom.Tai@nrc.gov

**Recipients:**
"Scheide, Richard" <rhscheide@STPEGS.COM>
Tracking Status: None
"STPCOL" <STP.COL@nrc.gov>
Tracking Status: None
"Scarbrough, Thomas" <Thomas.Scarbrough@nrc.gov>
Tracking Status: None

**Post Office:** HQCLSTR02.nrc.gov

| **Files** | **Size** | **Date & Time** |
|---|---|---|
| MESSAGE | 671 | 2/28/2011 4:22:07 PM |
| Draft Rai Response.pdf | 287236 | |

**Options**
**Priority:** Standard
**Return Notification:** No
**Reply Requested:** No
**Sensitivity:** Normal
**Expiration Date:**
**Recipients Received:**

## RAI 03.09.06-27

## QUESTION:

On December 15, 2010, STP submitted a supplemental response to RAI 03.09.06-5 to justify relief from the inservice testing (IST) requirement for flow rate testing in the ASME *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code) for the Residual Heat Removal (RHR) system fill pumps. In its RAI response, STP proposes to modify the STP FSAR to include Subsection 3.9.6.9.3, "Relief Requested Pursuant to 10 CFR 50.55a(f)(5)(iii) for Testing RHR Fill Pumps." The proposed subsection states that the primary function of the three RHR system fill pumps is to maintain a watersolid condition in the RHR pump discharge piping. The proposed subsection indicates that the RHR system fill pumps will not meet the requirement for measurement of flow rate in ASME OM-2004, Table ISTB-3000-1, "Inservice Test Parameters," during the Group A tests and Comprehensive Tests for these pumps. The proposed subsection asserts that measurement of flow rates is impractical for the RHR system fill pumps because the pump flow rate is expected to vary considerably around a small value due to variations in leakage through the RHR system. The proposed subsection states that the ISTB-3000 requirement for measuring pump differential pressure and peak vibration velocity will assure detection of any significant degradation in the pumps' hydraulic or mechanical performance. The proposed subsection indicates that the plant technical specifications will require confirmation of a watersolid RHR pipeline on a 31-day frequency. The proposed subsection also specifies that the RHR system pressure will be continuously monitored and alarmed in the plant control room. The proposed subsection asserts that the operation of the pumps on the flat portion of their pressure-flow curve and the planned monitoring of pump performance will provide an acceptable level of quality and safety. The COL applicant is requested to discuss compliance with the ASME OM Code requirement to perform Comprehensive Testing every 24 months for the RHR system fill pumps. The applicant is also requested to clarify why the proposal is submitted as relief from the OM Code based on 10 CFR 50.55a(f)(5)(iii) as an impractical test, rather than as an alternative to the OM Code based on 10 CFR 50.55a(a)(3)(i) that provides an acceptable level of quality and safety.

## RESPONSE:

The proposal has been revised to propose alternative testing, in accordance with 10 CFR 50.55a(a)(3)(i), which provides an acceptable level of quality and safety. The proposed alternative is in lieu of flow rate measurement during the Type A and Comprehensive test. The following revised markups to COLA Section 3.9.6.9.3 and Table 3.9S-8 are being provided as a response to RAI 03.09.06-27. The markup below provides (1) the required changes for Section 3.9.6.9.3 provided in the supplemental response to RAI 03.09.06-5, and (2) the changes to Table 3.9S-1 and Note (i1) submitted as part of RAI 03.09.06-7.

**3.9.6.9.3 Alternative Testing Pursuant to 10CFR CFR 50.55a(a)(3)(i) for Testing RHR Fill Pumps.**

OM-2004 Table ISTB-3000-1 requires measurement of flow rate (Q) for all pumps during Group A, Group B and Comprehensive Tests. The three RHR System Fill Pumps (E11-C002) are classified as Group A pumps. STP proposes alternative measures in lieu of the OM-2004 ISTB-3000 requirement to measure flow rate during Group A and Comprehensive Tests for the RHR

system fill pumps, as indicated in Note (i1) in Table 3.9-8. The alternative measures discussed below provide an acceptable level of quality and safety.

As described in Section 6.3.2, the primary function of the RHR System Fill Pumps is to maintain a water solid condition in the RHR pump discharge piping, and the piping will be maintained full by a small fraction of the pump's flow capacity. The RHR System Fill Pumps are expected to run continuously providing a small makeup flow to compensate for any back leakage through the RHR system. These pumps will provide a low flow rate that is dependent on the piping system leakage characteristics at any given time. Without a constant, explicit, and definable piping system leak rate and path, the system resistance and make up requirements cannot be set. Therefore, the pump flow rate may vary considerably around a small value and these variations likely would exceed the ISTB-5221 Acceptance Criteria, but actually be due to variations in RHR system back leakage rather than the pump's hydraulic performance. Accordingly, it is impractical to perform the measurement of flow rates for the three RHR System Fill Pumps, as designed, to obtain meaningful results.

The RHR System Fill Pump will be designed so that they will normally operate in the flat region of the pump pressure-flow performance curve. The pumps will be designed and analyzed to continuously operate in this low-flow regime without any significant pump degradation. Since the pump will normally be operating on the flat region of the pump performance curve, the pump differential pressure is the hydraulic parameter of interest in monitoring pump nonperformance. The ISTB-3000 requirement for measuring pump differential pressure as well as peak vibration velocity, as reflected in Table 3.9-8, will assure detection of any significant degradation in the pumps' hydraulic or mechanical performance during normal plant operation. In addition, SR 3.5.1.1 in Chapter 16 requires the physical confirmation of a water solid RHR pipeline by opening a high point vent to confirm solid water flow on a 31-day frequency and RHR system pressure is continuously monitored and alarmed in the control room.

In lieu of measuring flow rate, the use of pumps that are designed and analyzed to ensure that (1) the expected flow rate stays well within the flat portion of the pressure-flow curve and that (2) no significant degradation occurs with the expected continuous low flow operation, combined with the system monitoring and alarms, will provide an acceptable level of quality and safety.

DRAFT



**Table 3.9S-1, Inservice Testing Program Plan (OM-2004)**

Note (i) Summary justification for alternative testing request (ISTB-5120)

(i1) The piping is maintained full by a small fraction of the pump's flow capacity. These pumps are a constant speed centrifugal type with a cooling by-pass loop. Normal operation will be near minimum flow in the flat or constant region of the pressure/flow performance curve. Therefore, a flow measurement would not be useful. The pumps will be designed and analyzed to withstand low flow operation without significant degradation.

DRAFT