August 12, 2004

Mr. Mark E. Warner
Site Vice President
c/o James M. Peschel
FPL Energy Seabrook, LLC
Seabrook Station
P.O. Box 300
Seabrook, NH 03874

SUBJECT: SEABROOK STATION - SUPPLEMENTAL INSPECTION FOR WHITE PERFORMANCE INDICATOR REPORT NO. 05000443/2004006

Dear Mr. Warner:

On May 14, 2004, the NRC completed the onsite portion of a supplemental inspection at the Seabrook Nuclear Power Station. Subsequent to the onsite inspection, additional in-office inspection activities were conducted which involved the review of engineering documents. The enclosed report documents the results of the inspection, which were discussed during a debrief on May 14, 2004, and during a telephone exit with Mr. Paul Freeman and other members of your staff on June 28, 2004.

The NRC performed this supplemental inspection to assess your activities to address FPL Energy's evaluation of the White performance indicator resulting from a reactor coolant system steam leak from a flow transmitter on November 11, 2003. The purpose of this inspection was to assure that the root cause and contributing causes of the failure were understood, the extent of condition had been identified, and that corrective actions were sufficient to prevent recurrence. This supplemental inspection was performed in accordance with Inspection Procedure 95001, "Inspection For One Or Two White Inputs In A Strategic Performance Area".

The inspector determined that FPL Energy completed evaluations which determined the primary and contributing causes of the failure, extent of condition, and identified corrective actions to address the root and contributing causes.

Based on the results of this inspection, the inspector identified one finding of very low safety significance (Green). The NRC determined that the corrective actions were non-timely for an adverse condition involving the torque of reactor coolant system instrument tubing adapter to transmitter connecting bolts. However, because this violation is of very low safety significance, the NRC is treating the violation as a non-cited (NCV) consistent with Section VI.A of the NRC Enforcement Policy. If you contest the finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D. C. 20555-0001; and the NRC Resident Inspector at Seabrook Station.

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Sincerely,

/RA/

Raymond K. Lorson, Chief
Performance Evaluation Branch
Division of Reactor Safety

Docket No. 50-443
License No. NPF-86

Enclosure: Inspection Report 05000443/2004006

cc w/encl:
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REGION I

Docket No.:	50-443
License No.:	NPF-86
Report No.:	05000443/2004006
Licensee:	FPL Energy Seabrook, LLC
Facility:	Seabrook Nuclear Power Station Unit 1
Location:	US Route 1, Lafayette Road Seabrook, New Hampshire
Dates:	May 10 - 14, 2004
Inspector:	T. Burns, Reactor Inspector (onsite and in-office review) J. Krafty, Reactor Inspector (in-office review)
Approved by:	Raymond K. Lorson, Chief Performance Evaluation Branch Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000443/2004006; 05/10/2004 - 05/14/2004; Seabrook Station, Unit 1; Supplemental Inspection for One or Two White Inputs in a Strategic Performance Area.

This report covered a one week period of onsite inspection by a regional engineering inspector and subsequent in-office review by two regional engineering inspectors. One Green non-cited violation was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

The U.S. Nuclear Regulatory Commission (NRC) performed this supplemental inspection to evaluate the adequacy of Seabrook's corrective actions for a reactor coolant system (RCS) instrument leak that occurred on November 11, 2003. This leak resulted in a "White" reactor coolant system (RCS) leakage performance indicator (PI) during the fourth quarter of 2003. The inspector determined that Seabrook's immediate actions to isolate the leak, replace the failed instrument transmitter, and perform walkdowns to assess the extent of condition, were appropriate. However, one Green finding was identified for failure to promptly address a condition adverse to quality associated with the torque applied to reactor coolant system instrument tubing adapter to transmitter connecting bolts.

A. NRC Identified and Self-Revealing Findings

Cornerstone: Initiating Events

- Green. The inspector identified a Green, non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action" for failure to implement prompt corrective actions for a condition adverse to quality involving the torque of instrument tubing adapter to transmitter connection bolts.

  This finding is more than minor because the licensee failed to promptly evaluate (or correct) an adverse condition that had the potential to result in a RCS leak. The significance of this problem was evaluated using the "Significance Determination of Reactor Inspection Findings for At Power Situations" (SDP) Phase I worksheet and determined to be of very low significance (Green) since a loss of the instrument bolt integrity would not result in a primary or secondary system loss of coolant accident (LOCA), contribute to the likelihood of a reactor trip combined with the loss of a mitigating equipment function and did not increase the likelihood of a fire or flood. (Section 02.03.1)

Report Details

01. INSPECTION SCOPE (95001)

The U.S. Nuclear Regulatory Commission performed this supplemental inspection to evaluate the adequacy of Seabrook's corrective actions for a reactor coolant system (RCS) instrument leak that occurred on November 11, 2003. This leak resulted in a "White" reactor coolant system leakage performance indicator (PI) during the fourth quarter of 2003. The inspector's activities included document reviews and personnel interviews. A list of all documents reviewed is listed in Attachment 1 to this report.

02. EVALUATION OF INSPECTION REQUIREMENTS

02.01 Problem identification

a. Determination of who identified the issue and under what conditions

The November 2003 RCS instrument leak was a self-revealing event that occurred while the plant was operating at 100% reactor power. The White reactor coolant system leakage PI was identified through the collection of PI as required by the NRC's reactor oversight program (ROP).

b. Determination of how long the issue existed, and prior opportunities for identification

The November 2003 RCS leak event was identified shortly after it occurred through plant alarms and indications. The inspector did not identify any prior opportunities to identify this leak.

c. Determination of the plant-specific risk consequences (as applicable) and compliance concerns associated with the issue

The instrument leak resulted in a White RCS leakage PI which is considered to be of "Low to Moderate" significance. The inspector noted several factors that mitigated the significance of this event including: the leak rate was within the capability of existing make-up sources and below the Technical Specification (TS) limit for identified leakage; the leak did not involve the degradation of a RCS pressure boundary component, and was isolable.

02.02 Root Cause and Extent of Condition Evaluation

a. Evaluation of method(s) used to identify root cause(s) and contributing cause(s)

Seabrook performed a Significance Level "A" root cause evaluation that used a "cause and effect" methodology to determine the causal factors for this leak. The evaluation included plant walkdowns, document reviews, and external laboratory testing of the tubing adaptor to transmitter o-ring. The inspector determined that the methods Seabrook used to perform the root cause evaluation of the RCS instrument leak were adequate and provided sufficient justification for the identified causal factors.

b. Level of detail of the root cause evaluation

Seabrook's root cause analysis was thorough and identified the primary root cause of this event to be a loss of the clamping force used to connect the instrument tubing adaptor to the transmitter. The loss of the clamping force was attributed to improper installation during the initial plant construction. The licensee identified two attributes which supported this root cause including: the tubing adaptor to transmitter connection was observed to be misaligned, and the two tubing adaptor to transmitter connecting bolts were discovered to be loose (i.e., the lower bolt was found to be "finger tight" and the upper bolt was found to be "easily rotated").

c. Consideration of prior occurrences of the problem and knowledge of prior operating experience

Seabrook's conducted an extensive review of plant records including condition reports, original installation records, operations phase work history and industry event reporting databases to determine whether this was a repeat occurrence or similar to a previous problem. Seabrook determined that this was a unique event. The inspector found that the root cause evaluation of the RCS leakage went into sufficient detail to identify prior occurrences of the problem.

d. Consideration of potential common cause(s) and extent of condition of the problem

The inspector found that the Seabrook's "extent of condition" review associated with the underlying contributing causes for the RCS leakage was appropriate. Specifically, Seabrook identified multiple additional systems where instrument transmitters of similar design had been installed during the initial plant construction.

02.03 Corrective Actions

a. Appropriateness of corrective action(s)

Seabrook implemented immediate corrective actions to isolate the RCS leak and to replace the failed transmitter with one of improved design. Additionally, Seabrook inspected the remaining potentially affected transmitters located inside the primary containment to ensure that the tubing adaptor to transmitter connection was properly aligned and leak tight. In addition to the immediate actions, Seabrook developed a longer term action to verify that the instrument tubing connection bolts were properly torqued. A schedule was developed to complete these torque checks over the next approximate eighteen month period. The inspectors determined that the corrective actions discussed above were reasonable and appropriate with exception of the decision to defer completion of the torque checks. This issue is discussed in the finding at the end of this section.

b. Prioritization of corrective actions

Seabrook's immediate corrective actions were to isolate the leak, replace the failed transmitter and determine the extent of condition. One finding was identified involving the decision to defer completion of the connecting bolt torque checks on similarly affected transmitters as discussed at the end of this section.

c. Establishment of a schedule for implementing and completing the corrective actions

As discussed above and in the finding listed below, the inspector determined that Seabrook did not provide a substantive technical basis to support deferral of the instrument tubing adapter to transmitter bolt torque checks.

d. Establishment of quantitative or qualitative measures of success for determining the effectiveness of the corrective actions to prevent recurrence

The effectiveness of the actions for this event will continue to be monitored through the existing RCS leakage monitoring programs.

.1 Non-Timely Corrective Actions for Degraded Instrument Tubing Adapter to Transmitter Connecting Bolts

Introduction. The inspector identified a Green, non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action" for failure to implement prompt corrective actions for a condition adverse to quality involving the torque of instrument tubing adapter to transmitter connection bolts.

Description. Subsequent to the RCS leak on November 11, 2003, Seabrook identified that the two bolts used to connect the instrument tubing adapter to the transmitter for reactor flow instrument (RC-FT-434) were well below the specified torque value of 50 ft-lbs. Specifically, the lower bolt was found to be finger tight while the upper bolt was noted to be "easily rotated." Seabrook's planned corrective action to address the extent of condition for this adverse condition was to perform a torque check of these bolts on the other similarly affected instrument transmitters. Seabrook planned to complete this action over an approximate eighteen month period and considered that this was an acceptable schedule based upon a visual inspection of the similarly affected instrument transmitters.

The inspector determined that Seabrook's evaluation did not provide sufficient technical justification for deferral of the torque checks. Specifically, Seabrook did not demonstrate that the similarly affected transmitters would remain intact under the limiting condition (i.e., the worst case design condition coupled with the lowest connecting bolt torque value). In June 2004, Seabrook measured the connecting bolt torque values for selected instruments and determined that three bolts had torque values in the 4.0 - 4.6 ft-lb range. Prior to performing the measurements, Seabrook had developed a calculation (C-S-1-10103, revision 00) that indicated that a minimum torque value of 1.88 ft-lbs/bolt would provide adequate clamping force to retain the system design pressure. The inspector reviewed this calculation and noted that Seabrook

assumed that the pressurized area internal to the tubing adaptor to transmitter manifold interface was limited to the tubing bore diameter and did not encompass the entire potentially wetted surface. Seabrook, with assistance from an external vendor, developed a subsequent engineering evaluation (EE-04-011, revision 00) that extended the wetted surface area out to the mean diameter of the transmitter manifold o-ring. The inspector determined that this approach resolved the issue.

Additionally, engineering evaluation EE-04-011, revision 00, indicated that the lowest "as found" combined clamping force of the connecting bolts was adequate to retain RCS design pressure. The inspector noted that the results of this calculation indicated that there was no margin between the limiting "as found" torque values and the calculated required torque values. Additionally, the inspector noted that the nut factor assumption used in the calculation did not appear bounding based on the vendor data that was experimentally collected in support of this calculation. In response to this concern, Seabrook provided an additional calculation (C-S-1-10103, revision 3) and information which demonstrated that the transmitter connecting bolts would not elongate sufficiently under the design conditions to allow a leak to develop.

Analysis. The inspector determined that Seabrook's failure to promptly implement or provide an adequate basis for deferral of the instrument tubing adapter to transmitter connecting bolt torque checks was a performance deficiency. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function, and was not the result of any willful violation of NRC requirements or Seabrook procedures.

This finding is more than minor because the licensee failed to promptly evaluate (or correct) an adverse condition that had the potential to result in a RCS leak. As a result, it adversely affected the Initiating Events Cornerstone objective of limiting events that upset plant stability and could challenge safety functions during shutdown as well as power operations. The inspector evaluated the significance of this problem using the "Significance Determination of Reactor Inspection Findings for At Power Situations" (SDP) Phase I worksheet and determined that it was of very low significance (Green) since a loss of the instrument bolt integrity would not result in a primary or secondary system loss of coolant accident (LOCA), contribute to the likelihood of a reactor trip combined with the loss of a mitigating equipment function and did not increase the likelihood of a fire or flood.

Enforcement. 10 CFR 50, Appendix B, Criterion XVI, "Corrective Actions," requires that prompt corrective actions be implemented for conditions adverse to quality. Contrary to the above, the licensee failed to implement prompt corrective actions for a condition adverse to quality involving low torque values associated with the instrument tubing adapter to transmitter connector bolts. Because the failure to implement prompt corrective actions for this condition is of very low safety significance, and has been entered into Seabrook's corrective action program (CR 03-10061), this violation is being treated as an NCV, consistent with Section VI.A of the Enforcement Policy. **(NCV 05000443/2004006-01, Non-Timely Corrective Actions for Degraded Instrument Tubing Adapter to Transmitter Connecting Bolts)**

03. MANAGEMENT MEETINGS

Exit Meeting Summary

The results of this inspection were discussed during a debrief on May 14, 2004, and during a telephone exit with Mr. Paul Freeman and other members of your staff on June 28, 2004. No proprietary information was received as part of this inspection.

ATTACHMENT 1

KEY POINTS OF CONTACT

Licensee Personnel

A.M. Chesno	Tech Maintenance Manager
P. Freeman	Director of Engineering
M. Makowicz	Plant Engineering Manager
C. Moynihan	Analyst
M. O'Keefe	Regulatory Compliance
J. Peschel	Regulatory Programs Manager
V. Robertson	Regulatory Compliance Analyst
R. White	Mechanical Design Manager

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened/Closed:

NCV 05000443/2004006-01	Non-Timely Corrective Actions for Degraded Instrument Tubing Adapter to Transmitter Connecting Bolts

DOCUMENTS REVIEWED

Calculations

C-S-1-10103 R00	Flow Transmitter Manifold Bolt Torque (Establish Preload Force)
C-S-1-10103 R01	Flow Transmitter Manifold Bolt Torque (Max Bolt Load and Torque)
C-S-1-10103 R02	Flow Transmitter Manifold Bolt Torque (Pressure Boundary)
C-S-1-10103 R03	Flow Transmitter Manifold Bolt Torque (Bolt Preload Value - Loss of Load Transient)
EE-04-011 R00	Flow Transmitter Manifold Bolt Tightness

Procedures

OE 3.6 Rev 5	Condition Reports
OE 4.3 Rev 13	Root Cause Analysis
OE 4.8 Rev 12	Apparent Cause Evaluation

Condition Reports

02-11368	Active Leak At Lefthand Football-One Drop Every 2 Minutes 1-RC-FT-424
02-11841	Leak From 1-RC-FT-434 Low Side Vent One Drop Every 15 Minutes
02-14768	Boric Acid Leaks On Valves And Flow Transmitters
03-10058	Configuration Control And Troubleshooting 1-RC-FT-434
03010061	Significant Steam Leak Identified In Containment
03-10072	Job Hazard Analysis Leak 11/11/03
03-10076	Release of O-Rings Prior to Receipt Inspection
03-10095	Swagelock Fittings With Backing Ferrel Installed Backwards
03-10380	Valve Manifolds For Replacement In 1-RC-FT-434
03-11020	Inspection Of 55 Transmitters Results From WO 0341215
04-04579	Inconsistency in as found torque values on Transmitter RC-FT-434

Work Orders

0224574	Inspection Of Leakage Noted From FT-434 Low Side Vent
0230500	Calibration on 07/17/03 FT 434 RCS Loop 3
0338242	Calibration on 11/11/03 FT 434 RCS Loop 3
0339107	Disassembly of FT 434 After Failure Of 11/11/03
0341215	Inspection of RC and FW Transmitters Inside Containment
0333552	Pressurizer Level Remote Shutdown Indicator Calibration Check

Miscellaneous Documents

Root Cause Summary, CR 03-10061 Transmitter Leak in Containment
Root Cause Analysis For CR 03-1006, Transmitter Leak In Containment-Final Report
November 11, 2003 Timeline Of Leakage From FT-434 Event
Plant Engineering Action Plan Register 12/09/2003
Condition Assessment Of 1-RC-FT-434 O-Ring
Altran Corporation ltr dated July 16, 2004, “Independent Review - Seabrook Flow Transmitter Manifold Bolt Calculation C-S-1-10103, rev 3"

LIST OF ACRONYMS

CFR	Code of Federal Regulations
CR	Condition Report
LOCA	Loss of Coolant Accident
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
PARS	Publically Available Records
PI	Performance Indicator
RCS	Reactor Coolant System
ROP	Reactor Oversight Program
SDP	Significance Determination Process
TS	Technical Specification