

LRN-03-0349



AUG 28 2003

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

**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
PRESSURE SENSOR RESPONSE TIME TESTING
SALEM UNIT NOS. 1 AND 2
FACILITY OPERATING LICENSE NOS. DPR-70 AND DPR-75
DOCKET NOS. 50-272 AND 50-311**

On August 5, 2003, the NRC issued a request for additional information (RAI) concerning PSEG Nuclear LLC's (PSEG) request for amendment dated April 11, 2003. This request for amendment proposed to revise the surveillance requirements for pressure sensor response time testing.

Attachment 1 provides the responses to the NRC questions. Attachment 2 contains a revised insert 'A' for bases section 3/4.3.1 and 3/4.3.2. The change to the Technical Specification Bases contained in this submittal does not alter the content or conclusions of the no significant hazards consideration evaluation contained in the April 11, 2003 submittal. Attachment 3 provides revised pages of Attachment 1 of letter LR-N03-0142 dated April 11, 2003. The changes are marked with revision bars.

Should you have any questions regarding this submittal, please contact Mr. Brian Thomas at 856-339-2022.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on Aug 28, 2003

Sincerely,

A handwritten signature in black ink, appearing to read "John Carlin", written over a horizontal line.

John Carlin
Vice President – Engineering

Attachments (3)

A001

AUG 28 2003

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**SALEM GENERATING STATION
UNIT NOS. 1 AND 2
FACILITY OPERATING LICENSE DPR-70 AND DPR-75
DOCKET NOS. 50-272 AND 50-311
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
PRESSURE SENSOR RESPONSE TIME TESTING**

On August 5, 2003, the NRC issued a request for additional information (RAI) concerning PSEG Nuclear LLC's (PSEG) request for amendment to revise the response time requirements for pressure sensors for Salem Unit Nos. 1 and 2.

NRC Question 1:

In order to verify that the bounding response times for each protective function are allocated in accordance with topical report WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," and that each sensor is accounted for, please provide a listing of the bounding values for each sensor for all RTS and ESFAS functions where RTT is being eliminated. Additionally, provide the method and analysis used in determining sensor response times. The listing should be in table format, and any of the following tables could serve as a guide:

- Duke Energy Corporation response to an RAI, Catawba Nuclear Station, Tables 1 and 2 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML020440424)
- Carolina Power and Light request for license amendment, Shearon Harris Nuclear Power Plant, Enclosure 1, Tables 1 and 2 (ADAMS Accession No. ML022520060)
- South Carolina Electric and Gas Company request for license amendment, Virgil C. Summer Nuclear Station, Attachment 2, Tables on Pages 3 through 7 (ADAMS Accession No. ML003703671)

PSEG Response to Question 1:

The tables below provide the current bounding response times for pressure sensor where response time testing (RTT) is being eliminated. These values are subject to change as a result of any transmitter replacements or actual need to perform response time testing. The values listed in the table below are conservative values based upon the review of historical testing records for last four 18-month surveillance tests.

Table 1 – Reactor Trip System (RTS) Functions

FUNCTION	SENSOR TYPE	SENSOR TIME
Pressurizer Pressure - Low	Rosemount 1154	0.600 sec
Pressurizer Pressure - High	Rosemount 1154	0.600 sec
RCS Loss of Flow	Rosemount 1154	0.300 sec
S/G Level – Low-Low	Rosemount 1154	1.000 sec

Table 2 – Engineered Safety Feature Actuation System (ESFAS) Functions

FUNCTION	SENSOR TYPE	SENSOR TIME
Containment Pressure - High	Rosemount 1153	0.300 sec
Pressurizer Pressure - Low	Rosemount 1154	0.600 sec
Steam Line Differential Pressure - High	Rosemount 1154	0.100 sec
Steam Flow – High	Rosemount 1154	0.900 sec
Containment Pressure – High-High	Rosemount 1153	0.300 sec
S/G Water Level – High	Rosemount 1154	1.000 sec
S/G Water Level – Low-Low	Rosemount 1154	1.000 sec

NRC Question 2:

The Safety Evaluation (SE) for topical report WCAP-13632-P-A, Revision 2, states that utilities should perform a RTT on transmitters and switches that use capillary tubes after initial installation, and after any maintenance or modification activity that could damage the capillary tubes. In addition, the SE identifies a concern that the potentiometers for sensors with variable damping could be inadvertently changed during maintenance activities, thereby affecting response times. In order for the NRC staff to complete its review, please identify all the sensors for which RTT is to be eliminated that:

- a. use capillary tubes
- b. use variable damping.

Also, verify that appropriate plant procedures, and/or administrative controls, will be in place prior to implementation of the proposed TS change to ensure that the damping potentiometer cannot be inadvertently changed.

PSEG Response to Question 2:

The RTT functions being eliminated that utilize capillary tubes are the Containment Pressure High and Containment Pressure High-High functions. The RTT function being eliminated that utilizes variable damping is the Steam Flow function.

Plant procedures and/or administrative controls are being developed to ensure that the damping potentiometer cannot be inadvertently changed. These changes will be put in place during the implementation of the approved amendment request.

NRC Question 3:

PSEG states that surveillance testing procedures will be reviewed, and/or revised, to meet action (2) of the alternative approach to drift monitoring for Rosemount transmitters. Please verify that the appropriate surveillance testing procedures will be revised prior to implementation of the proposed TS change.

PSEG Response to Question 3:

The calibration procedures for those pressure sensors where RTT is being eliminated will be revised during the implementation of the approved amendment request to meet action (2) of the alternative approach to drift monitoring for Rosemount transmitters.

NRC Question 4:

"Insert A" of Attachment 2 differs from the wording used in WCAP-13632-P-A, Revision 2. Specifically, the reference to WCAP-13632-P-A, Revision 2, as a methodology "in the overall verification of the channel response time for specific sensors identified in the WCAP" was deleted, and the sentence "[r]esponse time verification for other sensor types must be demonstrated by test" was deleted. In addition, there appears to be a typographical error on line 12 of the insert. WCAP-13632-P-A, Revision 2, is referred to as WCAP-13632-P-A, "Revision 1" Please explain the reasons deviating from the approved text, and provide a correction for the reference to the WCAP.

PSEG Response to Question 4:

The mark-up of the technical specification bases contained in PSEG's April 11, 2003 submittal were based on the August 1995 pre-approved version of WCAP-13632. Attachment 2 of this submittal contains a revised marked up copy of the technical specification bases insert based upon the January 1996 approved version of WCAP-13632.

NRC Question 5:

The NRC staff has identified the following typographical errors in PSEG's TS Amendment request. Please correct these mistakes:

- Pages 2 and 3 in Section 4 of Attachment 1: While referring to variable damping, PSEG uses the word dampening. This is done twice in this section.
- Page 4, line 8, in section 4 of Attachment 1: The NRC SE on WCAP 13632-P-A, Revision 2, is dated September 5, 1995. PSEG lists this date as September 8, 1995.

PSEG Response to Question 5:

PSEG has revised the appropriate pages in attachment 1 of the April 11, 2003 submittal. These pages are included as attachment 3 and include revision bars to reflect the changes.

Attachment 2

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Revised Technical Specification Bases Insert

INSERT A

The verification of response time at the specified frequencies provides assurance that the reactor trip and the engineered safety features actuation associated with each channel is completed within the time limit assumed in the safety analysis. No credit is taken in the analysis for those channels with response times indicated as not applicable (i.e., N.A.).

Response time may be verified by actual response time tests in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be obtained from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) in-place, onsite, or offsite (e.g. vendor) test measurements, or (3) utilizing vendor engineering specifications. WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements" provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for specific sensors identified in the WCAP. Response time verification for other sensor types must be demonstrated by test.

The allocation for sensor response times must be verified prior to placing the component in operational service and re-verified following maintenance that may adversely affect response time. In general, electrical repair work does not impact response time provided the parts used for repair are of the same type and value. One example where response time could be affected is replacing the sensing assembly of a transmitter.

Attachment 3

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**Revised Pages of Attachment 1 of
Letter LR-N03-0142 dated April 11, 2003**

discussed alternate test methodology that would show that the instrument was functioning properly. The WOG licensing Topical Report WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," was approved by the NRC on September 5, 1995. The safety evaluation approving this document stipulated certain conditions that a licensee must meet when implementing the guidelines presented in this document.

The footnote to Unit 1 Surveillance Requirement 4.3.2.1.3 was added by Amendment 222 to allow the surveillance interval to be extended until completion of the Unit 1 thirteenth refueling outage (1R13). 1R13 was completed in the Fall of 1999 and therefore this footnote is no longer necessary. This change is considered an administrative change.

4. TECHNICAL ANALYSIS

WCAP-13632-P-A, Revision 2 contains the technical basis and methodology for eliminating RTT requirements on selected pressure sensing instruments. This WCAP was approved by the NRC on September 5, 1995 (reference 2). The NRC Safety evaluation stipulates that when submitting a plant-specific license amendment request, the licensee must confirm the applicability of the generic analysis to their plant and must commit to the following actions:

a) Perform a hydraulic RTT prior to installation of a new transmitter/switch or following refurbishment of the transmitter/switch (e.g., sensor cell or variable damping components) to determine an initial sensor-specific response time value.

b) For transmitters and switches that use capillary tubes, perform a RTT after initial installation and after any maintenance or modification activity that could damage the capillary tubes.

c) If variable damping is used, implement a method to assure that the potentiometer is at the required setting and cannot be inadvertently changed or perform hydraulic RTT of the sensor following each calibration.

d) Perform periodic drift monitoring of all the Model 1151, 1152, 1153 and 1154 Rosemount pressure and differential pressure transmitters, for which RTT elimination is proposed, in accordance with the guidance contained in Rosemount Technical Bulletin No. 4 and continue to remain in full compliance with any prior commitments to Bulletin 90-01, Supplement 1. As an alternative to performing periodic drift monitoring of Rosemount transmitters, licensees may complete the following actions: (1) ensure that operators and technicians are aware of the Rosemount transmitter loss of fill-oil issue and make provisions to ensure that technicians monitor for sensor response time degradation during the performance of calibrations

and functional tests of these transmitters, and (2) review and revise surveillance testing procedures, if necessary, to ensure that calibrations are being performed using equipment designed to provide a step function or fast ramp in the process variable and that calibrations and functional tests are being performed in a manner that allows simultaneous monitoring of both the input and output response of the transmitter under test, thus allowing, with reasonable assurance, the recognition of significant response time degradation.

Salem Units 1 and 2 utilize the following pressure and differential pressure transmitters for sensing pressure in the RTS and ESFAS instrumentation loops.

Function	Transmitter Type
Steam Generator Water Level	Rosemount 1154
Pressurizer Pressure	Rosemount 1154
Steamline Pressure	Rosemount 1154
Steamline Flow	Rosemount 1154
Containment Pressure	Rosemount 1153
Reactor Coolant Flow	Rosemount 1154

These sensors are bounded by the generic analysis contained in WCAP-13632-P-A, Revision 2, however, an allocated response time for these instruments is not provided in Table 9-1 of the WCAP. As directed in the WCAP, baseline response time values for these transmitters will be determined by evaluating data obtained from previous plant response time testing or if the transmitter is replaced, the response time obtained through testing.

As part of the implementation of the approved license amendment PSEG will satisfy the NRC required actions as follows:

- a) Consistent with the proposed change to SR 4.3.1.1.3 and SR 4.3.2.1.3 and EPRI Report NP-7243, Revision 1, "Investigation of Response Time Testing Requirements," the applicable plant procedures will include requirements that pressure sensor response times be verified by performance of an appropriate response time test prior to installation of a new sensor and re-verified following maintenance that may adversely affect sensor response time.
- b) For those sensors that utilize capillary tubing, the applicable plant procedures will include requirements to perform a RTT after initial installation and after any maintenance or modification that could damage the capillary tubes.
- c) For pressure or differential pressure sensors with variable damping, plant procedures and/or other administrative controls will be revised and/or developed to assure the variable damping potentiometer can not be inadvertently changed or RTT testing will be performed following each calibration.

d) PSEG responded to NRC Bulletins 90-01 and 90-01, Supplement 1, "Loss of Fill-Oil in Transmitters Manufactured by Rosemount," by submittals dated July 18, 1990, March 5, 1993, and April 27, 1994. These submittals address the actions taken by Salem with respect to loss of fill-oil for the Rosemount transmitters. Salem is currently in the process of developing a commitment change to eliminate the Bulletin 90-01 drift monitoring. As a result, Salem will implement the alternative actions identified in the NRC's SER dated September 5, 1995. Action (1) to ensure that operators and technicians are aware of the Rosemount transmitter loss of fill-oil issue and make provisions to ensure that technicians monitor for sensor response time degradation is currently being implemented as documented in our March 5, 1993 response to Bulletin 90-01, Supplement 1. As stated in the March 5, 1993 response, calibration of the transmitters includes observation of the transmitter for sluggish response and during channel checks performed by the operating staff deviations from channel to channel are noted and investigated. To meet action (2) of the alternative approach, surveillance testing procedures will be reviewed and/or revised as necessary to ensure that calibrations are being performed using equipment designed to provide a step function or fast ramp in the process variable and that calibrations and functional tests are being performed in a manner that allows simultaneous monitoring of both the input and output response of the transmitter under test, thus allowing, with reasonable assurance, the recognition of significant response time degradation.

The proposed changes are similar to changes approved for the Virgil C. Summer Nuclear Station Unit 1 (Amendment No. 146, TAC Nos. MA8632) on August 29, 2000, and Millstone Nuclear Power Station Unit 3 (Amendment No. 187, TAC No. MA9360) on November 3, 2000.

5. REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration

PSEG Nuclear LLC (PSEG) has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment" as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

This change to the Technical Specifications does not result in a condition where the design, material, and construction standards that were applicable prior to the change are altered. The same RTS and ESFAS