

Non-Agreement State

Event # 51181

<b>Rep Org:</b> ELECTRIC POWER RESEARCH INSTITUTE	<b>Notification Date / Time:</b> 06/25/2015 15:40 (EDT)
<b>Licensee:</b> ELECTRIC POWER RESEARCH INSTITUTE	<b>Event Date / Time:</b> 05/01/2015 (EDT)
	<b>Last Modification:</b> 07/24/2015
<b>Region:</b> 1	<b>Docket #:</b>
<b>City:</b> CHARLOTTE	<b>Agreement State:</b> Yes
<b>County:</b>	<b>License #:</b>
<b>State:</b> NC	
<b>NRC Notified by:</b> TRACY WILSON	<b>Notifications:</b> JOHN ROGGE R1DO
<b>HQ Ops Officer:</b> DONG HWA PARK	KATHLEEN O'DONOHUE R2DO
<b>Emergency Class:</b> NON EMERGENCY	VIVIAN CAMPBELL R4DO
<b>10 CFR Section:</b> 21.21(a)(2) INTERIM EVAL OF DEVIATION	

## PART 21 REPORT - DEVIATION IN NOZZLE MODELING INTERNAL REPORTS

The following was received via facsimile:

"[This report pertains] to a deviation in a basic product (EPRI nozzle modeling internal reports) supplied by EPRI (Electric Power Research Institute) regarding Westinghouse Pressurizer Head Nozzle Inner Corner Region Ultrasonic Inspections. EPRI will complete all evaluation efforts and provide a determination of reportability in accordance with 10 CFR Part 21 no later than July 24, 2015.

"EPRI has conducted an evaluation to the basic product's actual use and determined that the ASME examination volume coverage for at least one of the pressurizer nozzles has changed and is now 90 percent or less. A 90 percent threshold is required by ASME Boiler & Pressure Vessel Code, Section XI.

"Design inputs used in EPRI modeling for ultrasonic scanning coverage for nuclear safety related component nozzles may have been inaccurate. In some cases, the upper and lower heads of Westinghouse pressurizers can be offset from the center of each nozzle (spray, safety, relief, surge). This offset results in a change in the thickness of the pressurizer head as compared to an on-axis pressurizer head with the same radial dimensions. Some of the computer models EPRI used to describe these pressurizer heads did not account for an increase in the thickness due to these offsets. As a result, in some cases the ultrasonic inspection parameters produced by these computer models may have produced inaccuracies in the examination volume coverage calculations.

"In the case of a basic component which contains a defect or falls to comply, the number and location of these components in use at, supplied for, being supplied for, or may be supplied for, manufactured, or being manufactured for one or more facilities or activities subject to the regulations in this part.

IE19  
NRR

Utility Name/Plant Name  
 Exelon Corporation / Ginna  
 First Energy Nuclear Operating / Beaver Valley 1  
 Entergy / Indian Point 2  
 Entergy / Indian Point 3  
 Pacific Gas & Electric Co. / Diablo Canyon Unit 2  
 Dominion Generation / North Anna

"EPRI has reviewed the pressurizer upper and lower head drawings for the nozzles that it has modeled and determined if these offsets are present. For those cases that are potentially affected EPRI has recalculate the new examination volume coverage for the nozzle inspection detection techniques and provided this information to the corresponding licensees.

"EPRI staff shall develop a matrix or table to better define the necessary design inputs for computer modeling of nozzles. This should also include a question to the utility regarding any obstructions or thickness changes which would impact the ultrasonic inspection parameters. EPRI staff shall improve its documentation for review and approval of design inputs for computer modeling. Consideration shall also be given to including a review of design inputs by the member along with an acknowledgement from the member that the design inputs are appropriate for use. EPRI staff shall consider methods of including additional conservatism to the modeling results to better accommodate changes which may be observed in the field. The project quality plan and quality project instruction shall be updated as necessary to accommodate or clarify these improvements. Completion commitment date - 10/27/2015.

"The coverage calculations indicated in the notification letters would likely increase if the EPRI modeled scan plans are exceeded and or if additional inspection angles were implemented. Conversely, these coverage calculations would likely decrease if physical field limitations prevented the ultrasonic probe from executing the EPRI modeled scan pattern. It is on this basis that recipients of this letter must evaluate the condition pursuant to 10 CFR Part 21.21 to determine if it could represent a substantial safety hazard reportable under 10 CFR Part 21."

Potentially affected US plants include Ginna, Beaver Valley Unit 1, Indian Point Units 2 and 3, Diablo Canyon Unit 2, and North Anna.

\*\*\* UPDATE AT 0938 EDT ON 07/24/15 FROM NEIL WILMSHURST TO JEFF HERRERA VIA FACSIMILE \*\*\*

"As part of the evaluation, EPRI [Electric Power Research Institute] performed an 'extent of condition' review. During the course of the review, EPRI found that the above described deviation also affected EPRI nozzle modeling internal reports supplied by EPRI (Electric Power Research Institute) regarding Westinghouse Steam Generator Primary Nozzles.

"After conducting the 'extent of condition' review, which included recalculation of the modeling data, EPRI concluded that there were no other known reportable conditions associated with this deviation.

"EPRI has completed all evaluation efforts and issued reportability notification letters in accordance with 10CFR Part 21 within the respective reporting timeframes."

Notified the R1DO (Kennedy), R2DO (Musser) and R4DO (Gepford) and Part 21 Group (via email).

\*\*\*\*\*

## FAX Transmittal

To:	NRL Operations Center	Date:	DT. 24. 15
Company:	NRL	Fax:	301.816.5151
From:	Neil Wilmschurst	Page 1 of 8	
Phone:	704-545-2000	Fax:	704-545-2862

## Message

Dear Sir/Madam

Please find included with this fax cover the final submission of the EPRI Part 21 Notification (Westinghouse Pressurizer Head Nozzle Inner Corner Region Ultrasonic Inspections Report.

If you have questions please contact me.

Thank You!

Tracy Wilcox for  
Neil Wilmschurst

704-545-2643

trwilcox@epri.com

July 22, 2015

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

Subject: Final Report: Part 21 - Notification:  
Westinghouse Pressurizer Head Nozzle Inner Corner Region Ultrasonic Inspections

Dear Sir/Madam:

This letter constitutes the Electric Power Research Institute's (EPRI) final report addressing a deviation in a basic product (EPRI nozzle modeling internal reports) supplied by EPRI to its utility members regarding Westinghouse Pressurizer Head Nozzle Inner Corner Region Ultrasonic Inspections.

As part of the evaluation, EPRI performed an "extent of condition" review. During the course of the review, EPRI found that the above described deviation also affected EPRI nozzle modeling internal reports supplied by EPRI (Electric Power Research Institute) regarding Westinghouse Steam Generator Primary Nozzles.

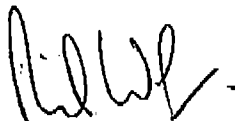
After conducting the "extent of condition" review, which included recalculation of the modeling data, EPRI concluded that there were no other known reportable conditions associated with this deviation.

EPRI has completed all evaluation efforts and issued reportability notification letters in accordance with 10CFR Part 21 within the respective reporting timeframes.

The information for this report per §21.21 is provided in the following attachments.

If you have any questions, please contact me.

Sincerely,



NMW/rv/tw

Attachment(s)

Together . . . Shaping the Future of Electricity

1300 West W.T. Harris Boulevard, Charlotte, NC 28262-8550 USA • 704.595.2732 • Mobile 704.490.2653 • [nwilmshurst@epri.com](mailto:nwilmshurst@epri.com)

## Attachment 1 U.S. Plants Affected

<i>Utility Name</i>	<i>Plant Name</i>	<i>Nozzle Affected</i>
Exelon Corporation	Genoa	Pressurizer
First Energy Nuclear Operating	Beaver Valley 1	Pressurizer
Entergy	Indian Point 2	Pressurizer
Entergy	Indian Point 3	Pressurizer
Pacific Gas & Electric Co.	Diablo Canyon Unit 2	Pressurizer
Dominion Generation	North Anna Unit 1	Pressurizer
Dominion Generation	North Anna Unit 2	Pressurizer

**NOTE:** Calculations for another twelve plants resulted in changes to certain examination coverage calculations, but not to levels below the 90% threshold. EPRI has sent Information Notices to these plants. A third group of plants had no changes.

## Attachment 2 Part 21 Reporting Information

**(i) Name and address of the individual or individuals informing the Commission.**

Neil M. Wilmshurst  
Vice President and CNO  
Electric Power Research Institute  
1300 West WT Harris Blvd | Charlotte NC 28262-2867

**(ii) Identification of the facility, the activity, or the basic component supplied for such facility which fails to comply or contains a defect.**

EPRI has conducted an evaluation to the basic product's actual use and determined that the ASME examination volume coverage for the pressurizer nozzles identified in this letter have changed since original modeling calculations were performed and are now 90% or less. A 90% threshold is required by ASME Boiler & Pressure Vessel Code, Section XI.

**(iii) Identification of the firm constructing the facility or supplying the basic component which fails to comply or contains a defect.**

EPRI supplied the basic product (report) to the licensees listed in Table 1 from 2008 to the present.

**(iv) Nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply.**

Design inputs used in EPRI modeling for ultrasonic scanning coverage for nuclear safety related component nozzles may have been inaccurate. In some cases, the upper and lower heads of Westinghouse pressurizers can be offset from the center of each nozzle (spray, safety, relief, surge). This offset results in a change in the thickness of the pressurizer head as compared to an on-axis pressurizer head with the same radial dimensions (see examples in Attachment 3). Some of the computer models EPRI used to describe these pressurizer heads did not account for an increase in the thickness due to these offsets. As a result, in some cases the ultrasonic inspection parameters produced by these computer models may have produced inaccuracies in the examination volume coverage calculations. This offset condition was also found in the case of some Westinghouse steam generator channel heads (refer to Figure 3).

**(v) The date on which the information of such defect or failure to comply was obtained.**

An EPRI Corrective Action Report (CAR 2015-0032) to explore the extent of the issue was initiated on 1 May 2015.

**(vi) In the case of a basic component which contains a defect or fails to comply, the number and location of these components in use at, supplied for, being supplied for, or may be supplied for, manufactured, or being manufactured for one or more facilities or activities subject to the regulations in this part.**

See Table 1.

**(vii) The corrective action, which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action.**

EPRI has reviewed the pressurizer upper and lower head drawings for the nozzles that it has modeled and determined that these offsets are present. Steam generator channel head drawings were as included in this review. For those cases that are potentially affected EPRI has recalculated the new examination volume coverage for the nozzle inspection detection techniques and provided this information to the corresponding licensees.

EPRI staff shall develop a matrix or table to better define the necessary design inputs for computer modeling of nozzles. This should also include a question to the utility regarding any obstructions or thickness changes which would impact the ultrasonic inspection parameters. EPRI staff shall improve its documentation for review and approval of design inputs for computer modeling. Consideration shall also be given to including a review of design inputs by the member along with an acknowledgement from the member that the design inputs are appropriate for use. EPRI staff shall consider methods of including additional conservatism to the modeling results to better accommodate changes which may be observed in the field. The project quality plan and quality project instruction shall be updated as necessary to accommodate or clarify these improvements. Completion commitment date – 10/27/2015

**(viii) Any advice related to the defect or failure to comply about the facility, activity, or basic component that has been, is being, or will be given to purchasers or licensees.**

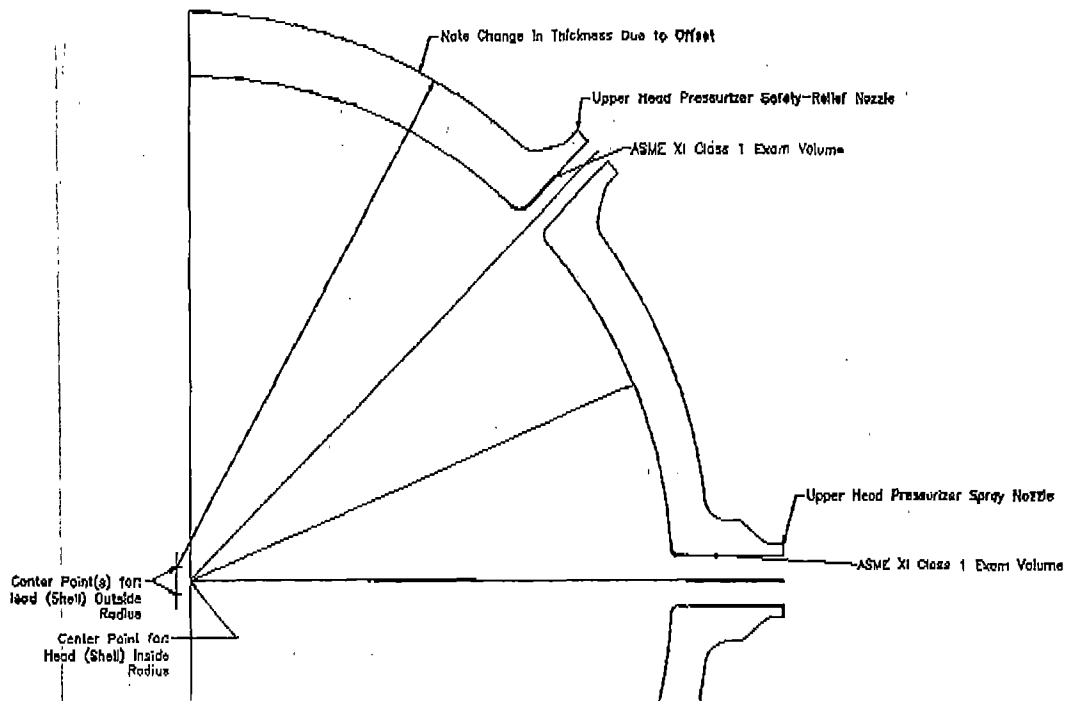
The coverage calculations indicated in the notification letters would likely increase if the EPRI modeled scan plans were exceeded and or if additional inspection angles were implemented. Conversely, these coverage calculations would likely decrease if physical field limitations prevented the ultrasonic probe from executing the EPRI modeled scan pattern. It is on this basis that recipients of this letter must evaluate the condition pursuant to 10 CFR Part 21.21 to determine if it could represent a substantial safety hazard reportable under 10 CFR Part 21.

**(ix) In the case of an early site permit, the entities to whom an early site permit was transferred.**

This is not an early site permit concern.

### Attachment 3 Westinghouse Pressurizer Head Nozzle Inner Corner Region Ultrasonic Inspections – Supporting Figures

Figure 1 below contains a sketch of a typical Westinghouse pressurizer upper head indicating that the outside surface is offset from the center of the inside surface and the center of each safety-relief and spray nozzle. The ASME Section XI Class 1 examination volume is also identified in this figure.

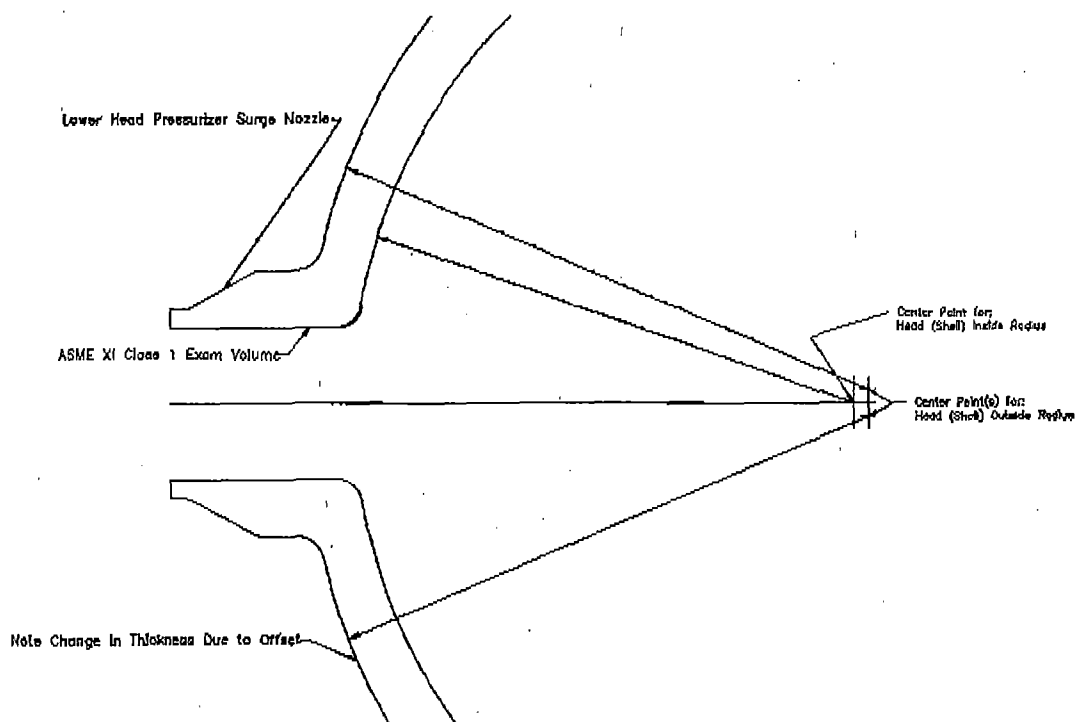


**Figure 1. Westinghouse Pressurizer Upper Head Sketch with Offsets**



### Attachment 3 (cont.)

Figure 2 below contains a sketch of a typical Westinghouse pressurizer lower head indicating that the outside surface is offset from the center of the inside surface and the center of the surge nozzle. The ASME Section XI Class 1 examination volume is also identified in this figure.



**Figure 2.** Westinghouse Pressurizer Lower Head Sketch with Offsets

### Attachment 3 (cont.)

Figure 3 below contains a sketch of a typical Westinghouse steam generator channel head (excluding the manway) indicating that the outside surface is offset from the center of the inside surface and the center of the primary nozzles. The ASME Section XI Class 1 examination volume is also identified in this figure.

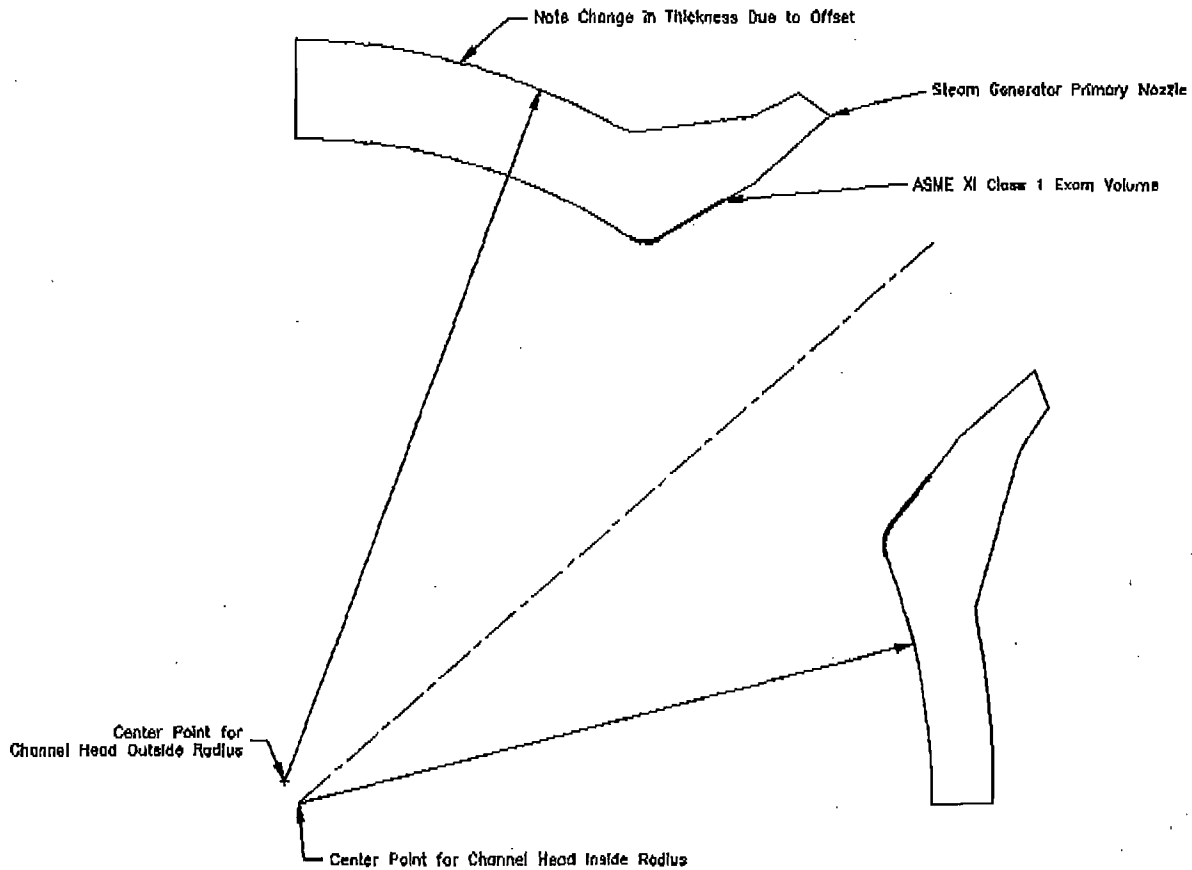


Figure 3. Westinghouse Steam Generator Channel Head Primary Nozzle Sketch with Offset