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Martin, Robert

From:	Lupold, Timothy (NRC)
Sent:	Wednesday, September 14, 2011 2:41 PM
To:	Khanna, Meena; Martin, Robert
Cc:	Tsao, John
Subject:	Questions Related to North Anna Restart from Earthquake
Attachments:	REQUEST FOR ADDITIONAL INFORMATION.docx

I had John Tsao put together a list of questions we would be interested in seeing the answers to in order to assess the restart acceptability of the North Anna units. The attached is a sub-set of his list, concentrating on three major premises: 1) Will the systems be analyzed to determine if ASME Code Allowable limits were exceeded, 2) What walkdowns will be performed of the piping systems and supporting structures to look for damage, and 3) Will existing flaws that have been identified by the ISI program and accepted for continued service be examined?

We have additional questions, but these are what we feel are the most important to be shared with the licensee now. Once we see the submittal the licensee makes on Friday, we may have additional questions.

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REQUEST FOR ADDITIONAL INFORMATION
IMPACT OF EARTHQUKE ON PIPING SYSTEMS AT
NORTH ANNA POWER STATION, UNIT NOS. 1 AND 2 (NAPS)
VIRGINIA ELECTRIC AND POWER COMPANY (VEPCO)
DOCKET NOS. 50-338 AND 50-339

On September 8, 2011, the NRC staff met with Virginai Electric and Power Company represenatives in a public meeting in the NRC headquarters in Rockville, Maryland to discuss the earthquake of August 23, 2011, and its effect on the North Anna Power Station (NAPS). The NRC staff has reviewed the information provided in the presentation slides provided by the Virginia Electric and Power Company for the meeting. To complete its safety evaluation, the NRC staff requests additional information regarding the impact of the earthquake on piping systems at both units as identified below.

The requested information is focused on the scope of the licensee's assessment of piping systems, inspection/evaluation methods, acceptance criteria, results, and corrective actions. The intent of the NRC's questions is to determine whether the ASME Class 1, 2, and 3 piping systems and any non-safety related systems that connect to safety related systems satisfy the design basis the safety related piping so as to demonstrate that their structural integrity is maintained after the recent earthquake.

1. Pipe Stress Analyses.

The NRC is interested in the affect of the earthquake on ASME Class 1, 2, and 3 piping systems and any non-safety related systems which connect or could affect ASME Class 1, 2, or 3 piping systems. Will all of these systems for which stress analyses were developed by re-analyzed using the loads experienced from the earthquake on August 23, 2011, including any aftershocks? The NRC would like to know the following specific information:

A. The list of all pipe systems whose stress analyses that have been/will be re-analyzed.
B. The list of any pipe systems whose stress analyses will not be re-evaluated. Provide justification for those systems that will not be re-analyzed.
C. Describe in detail how the pipe stresses will be re-evaluated considering the loading from the recent earthquake. Discuss how the loading from the aftershocks, in addition to the loading from the earthquake on August 23, 2011, will be considered.
D. Discuss how the seismic anchor movements resulting from the recent earthquake are considered in the re-evaluation.
E. Discuss the acceptance criteria for the stress analyses and provide references. Identify the Code of Construction, including the specific edition that was used in the original stress analyses.
F. Discuss the results of the assessment. Identify which piping systems that do not satisfy the acceptance criteria.

G. Discuss any corrective actions that would be taken for those piping systems/components whose stress analysis exceeded the ASME Code, Section III allowable limits as result of the earthquake.

2. The Condition of Piping Systems and Supports.

Much information can be obtained from the walkdown of piping systems and supports. Such walkdowns may provide insights as to damage and where additional inspections may be warranted.

2.1 For ASME Class 1, 2, and 3 piping systems:

A. Identify the piping systems that will and will not be inspected.
B. There are many piping systems that do not require stress analysis (e.g., small-bore piping). Discuss whether they will be inspected for degradation. If not, provide justification for their structural integrity.
C. Discuss whether the buried pipe will be inspected/evaluated.
D. Discuss the inspection technique that will be used and what areas will be inspected. For example, discuss whether the pipe routing (i.e., elevation and location) will be verified to ensure that the pipes have not dislocated from the original design and analyzed position.
E. Discuss how the buried pipes will be inspected.
F. Discuss whether the inspection used will be able to detect flaws inside the pipe wall thickness resulting from the earthquake. If not, discuss how the inspection will ensure the structural integrity of the piping system.
G. Discuss whether pipe insulation will be inspected for damages.
H. Discuss whether the pipes will be inspected after the insulation is removed. If not, discuss how the inspection can be effective to determine the conditions of piping components such as flanges, valves connections, support clamps, and shear lugs that are covered by the insulation.
I. Discuss how the nozzles connecting pipe to the rotary equipment (pumps/compressors/turbines), and vessels (reactor pressure vessels, pressurizers, steam generators, heat exchangers, and tanks) will be inspected.
J. Discuss how the bolted flanges will be inspected for degradation.
K. Discuss how the structural integrity of those pipes or pipe segments that are inaccessible for inspection (e.g., encased in concrete) is assessed.
L. Discuss how the operator inspects those pipes that are located in the higher elevation than the operator (whether scaffolds will be built).
M. Discuss the acceptance criteria of an acceptable pipe and provide the reference of any standards that will be used.
N. Discuss the results of inspection and identify the piping systems that are not acceptable.
O. Discuss the corrective actions for the piping system(s) that is found to be unacceptable.

2.2 For pipe support system includes spring and rigid hangers, rigid lateral struts, snubbers, clamps, I-beams, lugs welded to pipe, and base plates that are anchored to the building structures or walls either by bolting and/or welding:

A. Discuss which pipe system's supports will be inspected. Discuss whether all pipe supports in all piping systems will be inspected. If not, discuss the basis for the sample inspection selection.
B. Discuss which components in a pipe support system will and will not be inspected.
C. Discuss inspection technique.
D. Discuss whether the gaps between the pipe and the support structure (e.g., I-beams) will be inspected to verify a sufficient clearance for thermal expansion in accordance with the pipe stress analysis.
E. Discuss whether the snubbers are returned to its original position (i.e., not in the locked position). Discuss whether snubbers are removed from the pipe and tested for operability. If not removed for testing, discuss how a visual examination can determine the operability of the snubbers.
F. Discuss whether the spring hangers have been inspected to ensure proper load carrying capability after the earthquake.
G. Discuss whether the rigid struts have been inspected to ensure that it is not damaged. 4B6. Discuss whether the support base plates that are anchored to the building structures and walls are inspected for the proper attachment.
H. Discuss the acceptance criteria for the pipe support components and reference the bases. 4D. Discuss results. Provide a list of damaged pipe supports.
I. Discuss corrective actions for the degraded pipe support. If a pipe support is found to be degraded, discuss whether a stress analysis will be perform for that pipe to ensure that the pipe still satisfies the stress allowable. If not, provide justification.

3. Identify any pipe systems that contain flaws in service prior to the earthquake. Discuss whether these flaws will be inspected by ultrasonic testing (UT) to ensure the flaw(s) has not grown as a result of the earthquake prior to restart. If UT will not be performed, discuss how the flaw(s) can be demonstrated to remain within the acceptance standards of the ASME Code, Section XI, IWB-3000, as a result of the earthquake.