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FINAL REPLY:

Representative Edward J. Markey

TO:

Chairman Diaz

FOR SIGNATURE OF :

** PRI **

CRC NO: 04-0335

Chairman Diaz

DESC:

ROUTING:

NRC's Efforts to Ensure that Steam Generator Tubes
in Operating Reactors are not Cracked or Thinned
(Due: 6/30/04)

Reyes
Norry
Virgilio
Kane
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Dean
Burns
Miller, RI
Paperiello, RES
Cyr, OGC
Rathbun, OCA

DATE: 06/01/04

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Dyer

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AUTHOR: REP Edward Markey
AFFILIATION: REP
ADDRESSEE: Nils Diaz
SUBJECT: Adequacy of NRC's efforts to ensure that steam generator tubes in operating reactors are not cracked or thinned

ACTION: Signature of Chairman
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LETTER DATE: 05/28/2004
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EDWARD J. MARKEY

7TH DISTRICT, MASSACHUSETTS

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House of Representatives
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May 28, 2004

The Honorable Nils J. Diaz
Chairman
Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD, 20852

Dear Chairman Diaz:

I am writing regarding the adequacy of NRC's efforts to ensure that steam generator tubes in operating reactors are not cracked or thinned. Then-NRC Commissioner Kenneth Rogers remarked during a 1988 speech that "degradation [of steam generator tubes] would decrease safety margins so that, in essence, we have a 'loaded gun,' an accident waiting to happen." The February 2000 event at Indian Point caused by steam generator tube degradation prompted the NRC to issue the first Red, or most serious, finding in the history of the agency's reactor oversight program.

Thousands of steam generator tubes are used in Pressurized Water Reactors (PWRs) to transfer heat to the steam-producing systems that will generate electricity. These tubes make up nearly half of the surface area of the components keeping the pressurized water within the reactor. If a tube breaks, cooling water (that could contain radioactive materials) would leak into the [secondary side], and the plant's containment would thus be breached. In fact, the NRC document entitled "NUREG/CR-6365 Steam Generator Tube Failures" indicated that if as few as 15 of the thousands of steam generator tubes in a PWR failed, a core-melt accident and a radioactive release would result.

Some of each reactor's steam generator tubes must be inspected for cracks by the plant's owner during every refueling outage. If a particular tube is found to be more than 40% cracked or thinned, mitigation techniques (plugging the tube, replacing the tube, or inserting a metal sleeve to plug the crack) must be used. Once 10-15% (depending on the particular reactor) of the tubes are cracked, the entire steam generator must be replaced.

Of the 69 operational Pressurized Water Reactors (PWR) that were the subject of then-Commissioner Roger's warning, only 31 have replaced their steam generators as of July 2002. Of that number, only 22 units replaced their vulnerable steam generators with components fabricated of what is currently

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thought to be the more crack-resistant Alloy 690, instead of Alloy 600 that has been shown to be susceptible to early degradation.

On April 1, 2003, the Commission sent NRC Information Notice 2002-32, Supplement 1 entitled "Axial Outside-Diameter Cracking Affecting Thermally Treated Alloy 600 Steam Generator Tubing" to all licensees of operating nuclear reactors. The Notice reported that the Seabrook nuclear power station had been found to have numerous cracks in one of its steam generator tubes, and that it was not possible to determine why the tubes cracked. It also went on to state that the cracking was both unsuspected and unusual, since Seabrook had only been operating for roughly 10 effective full-power years and since the material the tubes were made of had been used without reports of such cracking occurring in the U.S. While the Notice stated that the problems at Seabrook "illustrates the need for thorough inspections," it also stated that "suggestions contained in this information notice are not NRC requirements; therefore no specific action or written response is required."

I am concerned that the NRC may not be doing enough to ensure the integrity of steam generator tubes, and that when inspections uncover unexpected problems, other licensees are not required to take appropriate actions. Consequently, I ask for your prompt assistance in responding to the following questions:

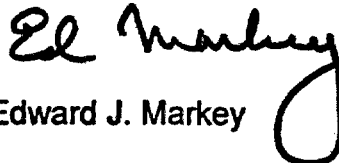
- 1) During November 2000, after the Indian Point 2 steam generator leakage event, NRC developed a Steam Generator Action Plan to consolidate activities related to steam generators. For each year since 2000, please describe all the activities of the Plan:
 - a) How many full-time employees were/are devoted to working on the Action Plan?
 - b) What milestones were met? What milestone deadlines were missed?
 - c) What milestones for the next 5 years exist?
 - d) How is information regarding the activities of the Action Plan conveyed to the PWR licensees?
 - e) Have the activities to the Action Plan resulted in any recommendations? If so, please list each recommendation, as well as whether the recommendation has been communicated to all PWR licensees.
 - f) Have any of the recommendations of the Action Plan resulted in any changes in NRC regulations or otherwise been made mandatory? If so, please describe them.

- 2) My understanding is that not all steam generator tube inspections are conducted using the best available technologies, and that some of the technologies used have only a 70% detection rate. Why doesn't the NRC require the best available technologies for all of these inspections?

- 3) How many steam generator tubes currently in use are made of Alloy 600 rather than Alloy 690? Please provide a list of all PWRs, indicating for each whether (and if so, when, and with which Alloy) the steam generators have been replaced. If some PWR licensees have chosen to replace their steam generator tubes with Alloy 600, please explain why, since Alloy 690 has been found to be less likely to degrade.
- 4) For the past 10 years, please provide a list of all PWRs that have requested deferrals of their required steam tube generator inspections. For each such request, please list the dates upon which it was requested, whether or not the request was granted (and if so, on what date) and when the inspection was completed.
- 5) For the past 10 years, please provide a list of all instances (including the name of the reactor and the date of the instance) in which the Commission discovered that a PWR licensee was operating with steam generator tubes that are either a) out of compliance with the 40% limit on cracking and thinning, b) out of compliance with the 10-15% plugging limit or c) out of compliance with regulations mandating that inspections be conducted. Please include complete information on any enforcement actions that may have been taken, penalties that may have been imposed, the date on which the reactor came back into compliance, and what NRC did to ensure that the licensee did take the required corrective measures.
- 6) How many inspection hours are allocated to steam generators within the NRC's baseline module of the reactor oversight program? For all reactors receiving more than the baseline inspection effort, please list the reactor, the reason for the increased inspection effort, and the results from the inspections.

Thank you very much for your attention of this important matter. Please provide your response no later than Wednesday June 30, 2004. If you have any questions or concerns, please have your staff contact Dr. Michal Freedhoff of my staff at 202-225-2836.

Sincerely,


Edward J. Markey