

April 24, 2001

MEMORANDUM TO: Chairman Meserve  
Commissioner Dicus  
Commissioner Diaz  
Commissioner McGaffigan  
Commissioner Merrifield

FROM : J. Hopenfeld  
Engineering Research Application Branch  
Division of Engineering Technology  
Office of Nuclear Regulatory Research

SUBJECT: DIFFERING PROFESSIONAL OPINION ON STEAM  
GENERATOR TUBE INTEGRITY ISSUES

It is now almost 10 years since I originally raised several serious safety issues concerning the NRC practice of permitting excessively degraded steam generators tubes to remain in service during plant operations. This practice while benefiting the nuclear industry, has had a serious negative potential impact on public safety. After many and continuing attempts by NRC management to ignore these DPO issues, they remain unresolved. As demonstrated by the Indian Point 2 (IP2) accident, excessively degraded tubes continue to threaten public safety.

Blatantly disregarding the recent ACRS findings (items 1-9 below) the staff granted South Texas 2 relief on March 8, 2001.

This memo is to request that you take the appropriate actions and instruct PWR plants to plug all tubes that exceeded 2 volts at the beginning of the last fuel cycle. These plants are in violation of 10 CFR PART 100 and present an unacceptable safety risk. Further regulatory relief under GL95-05 should be suspended until all the ACRS safety concerns are addressed.

During the past ten years, the NRC has expended inordinate resources on my DPO safety issues and has publically claimed that they have been properly addressed. The new ACRS findings, NUREG-1750, clearly indicate that the staff contentions were flawed and misleading, and that the allocated resources have been wasted.

The ACRS had concluded last November that the staff position on the issues raised by the DPO is indefensible. Accordingly, the Executive Director for Operations, EDO, was requested to resolve these issues and report the outcome to the ACRS. Instead, the EDO merely instructed the divisions of RES and NRR to draft a new action plan and closed the DPO. Closing the DPO without specifying how it will be resolved is a clear violation of Management Directive (MD) 10.159(C). The EDO's latest action compounds previous violations of MD 10.159, making a sham of the entire process of encouraging employees to raise safety concerns. The NTEU union filed a grievance on my behalf to keep the DPO open until it is resolved.

The EDO has already tried before, and failed to cause the staff to address adequately the DPO issues. In a memo to me dated May 1, 1996, the EDO stated that the staff would undertake “a vigorous research program to investigate steam generator material behavior, adequacy of crack detection and analysis methods, behavior of steam generators under selected severe accidents scenarios, and improved understanding of iodine spiking in regard to radiological consequence, as recommended by the ACRS regard to your DPO.”

Ten years of “vigorous research” clearly did not produce results that can be used to grant regulatory reliefs. These results only reflect technical ignorance and incompetence. Nevertheless, the EDO now plans to invest additional funds on “research”. This practice of spending money on research for the ostensible purpose of masking regulatory inaction should be stopped.

The transcripts from the ACRS hearings and the following quotations from NUREG-1750 clearly demonstrate the poor state of knowledge at the NRC regarding steam generator safety issues.

1. “ the **staff has not** adopted a **technically defensible** position on the choice of iodine spiking factor to be used on the analysis of design for compliance with requirements of 10 CFR Part 100 or General Design Criteria 19.”
2. “The **staff need to develop a defensible analysis** of the uncertainties in its risk **assessment**, including uncertainties in its assessments of human error probabilities” (during design basis accidents.)
3. “The **staff has not** developed **persuasive arguments** to show that steam generator tubes will **remain intact** under the conditions of **risk-important accidents** which the reactor coolant remain pressurized.”
4. “The Ad-Hoc Subcommittee found that the **staff did not have a technically defensible understanding** of these processes to assess adequately the potential for **progression of damage of steam generator tubes.**”
5. “The Ad-Hoc Subcommittee did not feel that the staff has **developed an adequate understanding** of how movements of the tube support plate during an event could damage the tubes.”
6. “The Subcommittee did not attempt to reach conclusions concerning occasions when staff granted exemptions to these criteria (1& 2 V) except to note that these exemptions **should have been accompanied by more complete risk analysis.**”
7. “The databases for 7/8” tubes **need to be greatly improved to be useful.**”
8. “This issue (tube shearing during depressurization), at the **current level of understanding cannot be used** to judge the adequacy of the alternative repair criteria described in **GL-95-05.**”
9. “ the issue of the possible evolution of severe accidents to involve **gross failure of steam generator tubes** and bypass of the containment **is not yet resolved.**”

The EDO's memorandum to me dated March 5, 2001, misrepresented the ACRS findings by stating that the ACRS "found that no immediate regulatory actions are necessary." There is no reference in the ACRS report (NUREG -1750) to such findings. It is difficult to comprehend how anyone, even with minimal engineering background and knowledge of reactor operation, could conclude that the ACRS concerns do not raise serious safety issues that require immediate actions. Nevertheless, the EDO decided that these concerns can be resolved with additional research.

I disagree with the ACRS, to a degree, that the staff showed an inadequate understanding of the DPO issues. The **staff has no understanding in certain major issues** of the DPO. Given an environment where technical peer reviews do not exist, where staff with inadequate training is assigned to unfamiliar tasks, and where research results are preselected by management, it would be surprising if the staff had found an adequate resolution of the safety issues.

If the EDO believes that all that is required to resolve the ACRS concerns is additional research he is poorly informed concerning of how research is conducted at the NRC. In 1990, a prominent scientist, Dr. Novak Zuber told the American Nuclear Society at an award ceremony (Inside NRC, Nov 19, 1990) that the NRC conducts research in a manner which completely precludes the resolution of safety issues. What he said then is equally true today, "This (NRC) method of resolving the issue claims victory by waving arms, by twisting arms. However there is no resolution of the technical issues, and the problem is not solved, this problem will come up again next year...because it is not solved."

Technical solutions which are not favorable to the industry are set aside and are declared by management as "solved". Because the management is unwilling to confront the nuclear industry, staffers are afraid to express their concerns and must communicate by whispers in fear that they will be marked as "enemies" and their careers destroyed.

Last November the South Texas Project informed the staff that they would suffer a substantial financial loss if they had to plug tubes in South Texas Unit 2 beyond the 2V limit. Even though the ACRS concluded that leaving tubes beyond the 2V limit may not be conservative and South Texas did not properly address support plate movement and vibrations during depressurization, the staff quickly granted the licensees request.

The disregard of the ACRS findings and the approval of the South Texas Unit 2 request sends a clear signal to the nuclear industry: under the guise of "risk informed regulations", there is no need to have a valid and defensible technical position because regulatory relief is always granted when requested. Any rationale, even if it violates the basic laws of physics, can serve as a justification for requesting relief. Financial impact of the relief takes precedence over public safety.

Steam generators were originally sold to the utilities with the understanding that they would operate acceptably within design parameters for the lifetime of the plant. Because of inadequate and improper material selection, this expectation has never been fulfilled and some steam generators have been replaced after only a few years of service. U.S. plants alone have experienced 11 steam generator tube failure accidents, which can be traced to poor design and lack of meaningful NRC oversight. Additional, and possibly catastrophic, steam generator tube

failure accidents can be expected in the future since many nuclear power plants will be re-licensed for another 20 years.

The nuclear industry, however, has done essentially nothing to seriously address the safety issue. Licensees have demonstrated that their main goal is to continue using severely degraded steam generators as long as they want to do so. The NRC has been unwilling to insist that safety take priority over economics.

My DPO defined the main safety issues that should be addressed before relaxing the existing rules, for utilizing steam generators to the maximum extent possible without endangering the public. While the DPO failed to attain this goal, for ten years it has kept the public informed of the identified technical problems with severely degraded steam generator tubes. On at least one occasion, against NRC wishes, the DPO with public help, was instrumental in preventing severely degraded steam generators from being returned to service.

The NRC practices regarding steam generators contributed significantly to the recent IP2 accident. Fortunately this accident did not have significant safety consequences, it was, however, a serious precursor to the type of accidents which are described by the DPO. The NRC takes the unacceptable position that if the DPO accidents have not occurred they will not occur in the future.

The DPO has served as a reminder to the NRC that it can be held accountable for catastrophes that may follow steam generator tube failures. To remove this constant reminder, the NRC has used various methods in disregard of its own regulations: personal retaliations, attempts to select an unqualified DPO review panel, arm twisting (causing the resignation of one member from that panel), and a refusal to appoint an unbiased outside panel.

Though the ACRS findings apparently were not expected and could not be ignored, no efforts are being spared to minimize and obscure the findings. Regrettably, this continues the NRC culture of failing to keep the public informed of the danger to them from not removing severely degraded steam generators from service.

cc: W.D. Travers, EDO  
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