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**CORRESPONDENCE CONTROL TICKET**

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**AFFILIATION:**

**ADDRESSEE:** Chairman

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**ACTION:** Appropriate

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**From:** <Bobleyse@aol.com>
**To:** <Chairman@nrc.gov>
**Date:** Thu, Jul 3, 2003 3:42 PM
**Subject:** Fouling is Dangerous

Mr. Chairman:

Yes, fouling is dangerous and the NRC persists in covering up the danger with plenty of inducement from the nuclear power lobbyists. Here is the full extent of reporting of the recent Paks-2 event in your Weekly Information Report:

Region II
Items of Interest
Week Ending June 20, 2003
International Atomic Energy Agency (IAEA) Mission To Hungary
On June 16-27, 2003, the Director, Division of Reactor Safety, was on International travel in Hungary to support an IAEA Mission to a PAKS reactor that recently experienced fuel damage and a small radioactive release during refueling operations.

The above report is deceptive. The fuel damage was extensive. The incident was during cleaning of highly fouled fuel. This was not a routine refueling operation.

I addressed the potential for far more dangerous accidents than happened at Paks-2 in my PRM 50-73, September 3, 2001. According to Roecklein of your Rulemaking Program, May 15, 2003, my PRM 50-73, September 3, 2001, has been evaluated by NRC staff and a recommendation for your consideration has been written. Roecklein tells me that I may not see that document until after you have completed your deliberations. My PRM 50-73 was submitted almost two years ago, yet NRC continues to treat this as a matter of trivial importance.

Consider what happened at Paks-2, Hungary, a few months ago when highly fouled fuel was being chemically cleaned: Details are hidden, but clearly hundreds of fuel rods were destroyed when the rods heated up and zircaloy rapidly corroded in the water-based cleaning solution. Now, Mr. Chairman, the power density of those Hungarian fuel rods was less than one percent of the power density of the fuel rods that are addressed in my PRM-50-73. Here are key paragraphs from PRM-50-73:

The specific issue is that 50.46 and Appendix K and perhaps other regulations do not address the impact of severe crud deposits on fuel bundle coolability during normal operation of a light water reactor at power within its Licensing Basis and Technical Specifications. A licensed power reactor has operated with unusually heavy crud deposits within several fuel bundles. These deposits were found and at least partially classified during a refueling outage. If the deposits had continued to build during normal reactor operation at power, the unusually heavy crud deposits would have become severe crud deposits. Blockage of the flow channels within the fuel bundles would likely have developed. Severe crud deposits within the fuel bundles can lead to a loss of coolability with consequent overheating of zirconium cladding within fuel bundles, autocatalytic zirconium-water reactions of the fuel cladding, chemical reactions between the fuel cladding and the uranium oxide fuel pellets, initiation of zirconium water reactions involving zirconium core structures such as fuel bundle spacer grids and channel boxes, melting of certain control element materials, melting of braze materials in certain fuel bundle spacer grids, metallurgical

reactions between certain fuel bundle spacer grid springs and the zirconium cladding on the fuel pins, and, very likely, additional sources of structural degradation . These factors can initiate substantial and rapid localized core melting while the LWR is at power. Even if the LWR is then shut down, the core meltdown may rapidly propagate among the fuel bundles and core structures with sequential and parallel destruction of the barriers that constitute defense in depth. Thus, the single entity, unusually heavy crud deposits on the fuel pins, might be only one step before the unusually heavy crud deposits thicken and become severe crud deposits. Severe crud deposits then threaten the integrity of all of the barriers that in total constitute the defense in depth.

Performance-based experience reveals that when unusually heavy crud deposition on fuel bundles occurs during normal operation of an LWR, there are likely to be indications of fuel element cladding defects by increases in the offgas activity. However, this increase in the offgas activity is not regarded as an indicator of a possible heavy crud deposition. Thus, an LWR may be operated within its Licensing Basis and the Technical Specifications until the transition from unusually heavy crud deposition to severe crud deposition is effected. At this point it is likely that rapid localized core melting will be initiated while the LWR is at power. There will likely be delays (several seconds) before the LWR is shut down. However, by then the rapid propagation of the meltdown will likely be well underway and it will likely continue even though the LWR is shut down.

My PRM 50-73 was written after I read Licensee Event Report 50-458/99-016-00, River Bend Station, Unit 1, March 1, 2000. That Report led me to seek details of the character of the "unusually heavy deposition of crud." I have not been allowed access to the data that would answer the question: "How close to meltdown at full power was River Bend?"

Mr. Chairman as you review my PRM 50-73, you will note that the nuclear power suppliers, operators and lobbyists are opposed to this petition. Now, when you become informed about the recent serious accident at Paks-2 you will learn that the cleaning process was designed by Framatome ANP. This organization, Framatome ANP, is the same organization that vigorously opposes my Petition for Rulemaking, PRM 50-73. On December 21, 2001, Framatome ANP wrote the following to the NRC, "Experience demonstrates that crud effects are insignificant...." That comment letter by Framatome ANP is on the NRC web site under the file of my PRM 50-73.

Regarding the work at INEEL that is apparently partially funded by NRC:

INEEL tells me "ΓÇ¬we are not aware of any user who has modeled crud on fuel elements with SCDAP/RELAP5-3D." Mr. Chairman, why is that the case? The RELAP Users further tell me, "We suspect that none of the other codes have been applied to consider fuel crud buildup because it has not been demonstrated conclusively that this effect should be considered?" Again, Mr. Chairman, why are the code manipulators not provided with facts regarding fouling? None of their so-called modeling bases; LOFT, SEMISCALE and countless round robin exercises have come close to exploring the real fouling that characterizes the operations of dozens of nuclear power plants worldwide.

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 15, 2003

Mr. Robert H. Leyse
P.O. Box 2850
Sun Valley, ID 83353

Dear Mr.Leyse:

I am writing to inform you of the status of four petitions for rulemaking that you submitted concerning the effects of crud deposition and fouling on the performance of heat-transfer surfaces in nuclear power plants.

The first two petitions, Docket Nos. PRM-50-73 and PRM-50-73A, were received by the NRC on September 3, 2001, and November 4, 2001, respectively. They were merged together and evaluated by the staff, and a recommendation to the Commission has been written. A letter will be sent to you regarding disposition of the petitions as soon as the Commission has voted on the staff recommendation.

The third petition for rulemaking, Docket No. PRM-50-76, dated May 1, 2002, requested changes to the regulations and guidance on evaluating emergency core cooling system (ECCS) performance. In the staff review process, a decision was made to request review of the petition by the NRC Office of Research (RES) relative to ongoing work on ECCS performance. The Program Office staff will develop recommendations to the Commission upon completion of the RES review.

With respect to the fourth petition for rulemaking, Docket No. PRM-50-78, dated September 2, 2002, requesting that fouling of heat transfer surfaces in nuclear power plants be addressed by rule changes, a staff working group has been convened and analysis of the petition is ongoing. The target for providing a recommendation to the Petition Review Board is September 2003.

If you have any questions or comments, please contact me at 301-415-3883.

Sincerely,

Alan K. Roecklein
Policy and Rulemaking Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation