Kenneth D. Bergeron, PhD
17 Tierra Monte NE
Albuquerque, NM 87122
e-mail: kenberg@flash.net

September 13, 2001

50-390

Dr. Brian W. Sheron
NRR/ADPT
US Nuclear Regulatory Commission
Mailstop O-5 E7
Washington, DC 20555

Dear Dr. Sheron,

I am writing to you about the ongoing staff review of TVA's License Amendment Request that would allow production of tritium at the Watts Bar plant. I have a specific suggestion in that regard, but before getting into it, I'd like to re-introduce myself to you. In the late 1980s, I worked for you as a manager of one of the groups at Sandia doing research on severe accidents. My group's principal focus was the CONTAIN code and performing studies with it for NRC. I remember a number of very stimulating meetings with you after you took over the severe accident program for RES. Around 1989, not long after you moved into RES, I got out of NRC work in order to manage Sandia's support to DOE's New Production Reactor, which was intended to replace Savannah River's K reactor as the source of tritium for the US nuclear arsenal. For a containment specialist like me, this was a very exciting time, because the government and its industry partners on the Heavy Water design were committed to building the most severe-accident-proof containment in history. I had the job of coordinating severe-accident-related work at Sandia, Argonne, Brookhaven and Savannah River, and it was very satisfying to be able to apply some of the lessons from TMI to the design of a reactor that was actually going to be built (or so we thought).

All that changed in 1992 when progress on nuclear arms reductions allowed President Bush to defer the tritium production program (the reason being that the tritium from decommissioned weapons could be used to replenish the weapons that remained in the arsenal). I then found other work at Sandia in international programs, but in 1994 Nestor Ortiz asked me to return to his program and manage all NRC work on severe accident computer codes. So I was responsible for not only CONTAIN, but also MELCOR, VICTORIA, IFCI, RADTRAD (actually an NRR project) and a number of analysis projects for RES and NRR. I continued in that role until I retired in 1999 after 25 years at Sandia.

This little biography is relevant to the Watts Bar LAR because it shows that I'm pretty knowledgeable about tritium production and severe reactor accidents, particularly from the perspective of containment. It turns out, too, that I know quite a bit about TVA's ice condenser plants, since they were a big focus for the CONTAIN project during the

A001 Add: Beverly Clayton

Containment Performance Improvements program in the '80s, and since one of the last projects I worked on at Sandia was the project to resolve DCH for Ice Condensers. In that project I found myself in the unusual position of actually doing the CONTAIN calculations for the project leader, Marty Pilch. This is because most of the people who knew how to run CONTAIN had left the program or retired.

My professional experience with ice condensers and tritium production lead me to have grave misgivings about DOE's plans to obtain weapons tritium by having TVA produce it in the normal course of electricity production at their Watts Bar and Sequoyah plants. I believe that the modifications to the reactor and the added mission for the nuclear management team at TVA will add significantly to the already serious safety problems with these plants. I will, of course, detail the reasons for my concerns in my comments to the licensing Project Manager, Mark Padovan. What I want to ask you is on a higher level than such details. I want to encourage you to insist that the powerful new tools of Risk-Informed Regulation be brought to bear fully on this license amendment.

I was alarmed to see the schedule Mr. Padovan distributed at the August 20 meeting at White Flint. He showed the NRC review process being complete by early March 2002. Such a compressed schedule is completely inconsistent with a thorough assessment even if no element of Reg Guide 1.174 is brought to the review. As an aside, if the schedule is said to have actually begun in April 2001 well I have to cry "foul," since in May I asked NRC by e-mail when the LAR was expected and was informed that it would not be until late summer. I had asked to be kept informed about this and received no notification until Padovan e-mailed me on August 13 about the August 20 meeting.

In other recent public information, NRC has indicated they were planning for a yearlong review, so perhaps I should not focus too much on Padovan's handout. But what that document suggests to me is that the staff is assuming that this license amendment will be reviewed only via deterministic methods, with no additional insight brought in from risk methods.

For this LAR, I strongly encourage you to take full advantage of the authority the Commission has given your staff to use probabilistic methods to supplement the incomplete picture that traditional analysis provides. There are many important reasons:

1. For most containment types, Design Basis analysis is not a bad surrogate for assessing the overall level of protection that the containment adds to the safety of the plant. For ice condensers, the DBA is almost irrelevant as a test for robustness. The ice does a great job with a DEGB LOCA, if you ever were to have one, but it has the effect of increasing hydrogen concentrations in more risk-significant accidents, making the real safety problems worse. Put simply, it is impossible to gauge the effectiveness of the ice condenser containment system with traditional deterministic analysis.
2. It is also impossible to evaluate the true effect of the core modifications on the safety of the plant via deterministic analysis. It is my guess that the principal effect will be on the complexity of fuel handling, and that new event pathways will be important contributors to increased risk. I also think that the likelihood of accidents induced by

sabotage may be increased because of the plant's new defense mission. Obviously, only level II PRA can address such effects.

3. A significant source of added risk is the burden that this new military mission places on the overall management of the plant. There will be many new ways that management commitment to a safety culture at the plant could be compromised. A top-rung utility might be able to rise to such challenges and ensure that the commitment to safety remains the highest priority, but TVA has shown itself not to be in this class. Moreover, TVA's motivation for cooperating with DOE in this partnership is troubling. Most knowledgeable observers believe that TVA is cooperating only because by becoming effectively a part of the nuclear weapons complex the agency will be less vulnerable to those in Congress who for years have been trying to disband and privatize it. The conflicted motivational situation at the highest management level does not bode well for maintaining an adequate safety culture at the plant. It may be difficult to assess the subtle effects of compromised management commitment, but we all know that such effects are real and can be large. It is incumbent upon the NRC to address the issue, and it is only through risk methods that this can be done.

4. Normally, the staff might hesitate to apply risk methods when the licensee doesn't volunteer such analyses, because the NRC has a responsibility to avoid imposing unnecessary burdens on the licensee. The streamlining of many processes and regulations in recent years has been motivated by this philosophy because of the concern that over-regulation might threaten the viability of the nuclear industry itself. Such reasoning is irrelevant in this case. The nuclear industry gets no benefit from these changes (in fact, I believe it will be damaged by it in the long run because of public concerns about mixing military and civilian missions). The cost of the LAR and its review is not coming from ratepayers but from the DOE, which is saving billions by not having to build a dedicated production facility.

5. Time is not of the essence. DOE's schedule for producing tritium by 2005 is a ridiculous exaggeration. It ignores the arms reductions dictated by START-II, which has been ratified by both Russia and the US. The respected physicist Frank von Hippel (former Assistant Director for National Security at OSTP) estimates that we won't really need new tritium until 2029 or later.

6. This is an extraordinarily sensitive Federal interagency issue. Never before have two giant agencies, each with complex agendas quite different from NRC's, joined forces to demand concurrence from your licensing organization on an operating license change. All possible resources should be made available to your reviewers, and the overall process should come under the most intense scrutiny by senior management and the Commission itself. I believe firmly that this license amendment request satisfies the criterion cited in RIS 2001-02, that the change "could create 'special circumstances' under which compliance with existing regulations may not produce the intended or expected level of safety and plant operation may pose an undue risk to public health and safety." Therefore use of risk-informed methods is appropriate. I would go farther and say that not to use the much-vaunted RG-1.174 methods in these extraordinary circumstances would be irresponsible in the highest degree. It would

certainly strengthen the case of critics who see risk-informed regulation as nothing but a way for licensees to be relieved of any safety requirements they dislike.

I recognize that the NRC is in a very uncomfortable position because of this License Amendment Request. But the recent, terrible events of this week show only too clearly that the price of regulatory complacency can be incalculably high. I suggest to you that the only rational way for you to proceed is cautiously, using the best scientific tools available.

I would be glad to discuss this matter with you or your staff further, if you so desire.

I have taken the liberty of sharing this letter with some of my former colleagues who are members of the ACRS.

Sincerely,

Kenneth Bergeron

Copies to:

D. Powers
T. Kress
G. Apostolakis

Kenneth D. Bergeron
17 Tierra Monte NE
Albuquerque NM 87122-2101

Dr. Brian W. Sheron
NRR/ADPT
US Nuclear Regulatory Commission
Mailstop O-5 E7
Washington, DC 20555