Westinghouse

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Mr. Stuart Rubin
Regulatory Effectiveness Assessment and Human Factors Branch
Division of Systems Analysis and Regulatory Effectiveness
Office of Nuclear Regulatory Research
Mail Stop: T-10E32
U.S. Nuclear Regulatory Commission
Washington DC 20555-0001

Subject: Westinghouse Comments on "Non-LWR Containment Functional Performance" Public Meeting, January 14, 2004

Dear Mr. Rubin:

We appreciated the opportunity to participate in the January 14, 2004, public workshop and the open discussions with the NRC staff on non-LWR containment functional performance.

SRM SECY-03-0047 instructed the NRC staff to "...develop performance requirements and criteria...regarding options in ...the containment building area..., taking into account such features as core, fuel, and cooling systems design. The staff should pursue the development of functional performance standards..."

The workshop announcement stated that the workshop would provide for the exchange of information "to develop options for containment functional performance requirements and criteria for future non-light water reactors."

As the workshop progressed, we were disappointed that emphasis was being placed on containment *structures*, and not on containment functional performance requirements and criteria, as identified in the SRM and the workshop announcement. The attendees as a group voiced concern that the NRC staff were prejudging the necessity of containment structure(s), and were preparing to prejudge functions for such structure(s) based on LWR legacy.

Only the passively safe, modular gas-cooled reactor concepts were considered in this non-LWR workshop. These concepts have not selected the LWR pressure retaining containment building, after rigorous design assessments which confirm the protection of public health and safety. The containment structure focus of the NRC presentations in the workshop is therefore a concern.

However, the NRC staff were receptive to the attendees' recommendation that additional workshop(s) be held, with agenda which would encourage the modular gas-cooled reactor

(GCR) industry to present the bases for their current selection of vented confinement reactor buildings.

We look forward to that opportunity.

When the development of the modular gas-cooled reactor performance requirements and criteria are presented, we would expect to conclude with reactor building functions appropriate to the passively safe, modular GCR concept which are very similar to inputs provided at the workshop.

Required safety functions:

- *Provide structural support for reactor vessel, reactor cavity cooling system and major reactor components, for maintenance of core geometry and passive heat removal*
- *Provide structural protection of reactor vessel, helium pressure boundary, and safety-related SSCs (to the extent needed to support required safety functions) from loads of internal and external hazards during design basis events*

Supportive safety functions which provide margin for offsite requirements and an element of defense-in-depth:

- *Limit air ingress to control chemical attack*
- *Provide protection of all SSCs from loads for internal and external hazards*
- *Provide additional retention through deposition and other natural phenomena for any fission products released from the helium pressure boundary*
- *Provide shielding for workers and prevent excessive direct shine doses offsite*

The mechanistic containment system function is provided by the combination of:

- *highly reliable and robust fuel particles*
- *demonstrated acceptable fuel performance during normal operation and accidents*
- *retention of the vast proportion of fission products within the fuel*
- *provisions for a highly reliable Helium Pressure Boundary (HPB)*
  - *whose performance is not dependent on the performance of the fuel,*
  - *which retains fission products which may be released from the fuel*
  - *which is designed to prevent excessive air ingress*
- *provisions for a reactor building structure*
  - *whose performance is not dependent on the performance of the fuel or HPB,*
  - *which provides a concentric transport barrier to fission products released from the HPB*
  - *which prevents excessive air ingress, and*

- *most importantly, which structurally maintains core geometry for heat removal and control of heat generation*

The passively safe, modular gas-cooled reactor is not a LWR. LWR structures are not arbitrarily appropriate for the GCR concept. This distinction was very concisely identified by Karl Fleming in his November 19, 2003, presentation to NRC staff, a portion of which we include below.

Observations on MHTGR Accident Sequences:

- *The fuel capabilities support defense-in-depth for all examined sequences*
- *The helium primary pressure boundary and confinement [reactor building] all support defense-in-depth on selected sequences*
- *Risk mitigation is balanced between prevention and mitigation*
- *Active and passive core cooling systems each support defense-in-depth via prevention and mitigation*

We look forward to further discussions on this issue.

Sincerely,

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