From:	M.H. Specter
To:	Kauffman, John; H.D.Public.Resource@nrc.gov
Cc:	CMRAPOSTOLAKIS Resource; CMRSVINICKI Resource
Subject:	May 14, 2012 meeting on containment venting systems
Date:	Tuesday, May 22, 2012 6:00:54 PM

Dear Mr.Kauffman,

You may recall that I was an active participant in the NRC's May 14, 2012 meeting on containment venting systems. My overall impression was that the meeting was a good one and that the staff conducted itself in a very professional way. However, there is one aspect of the meeting that I found disturbing. This was the discussion of the containment filtered vent systems installed in Sweden and Switzerland in the 1980s. One or both of these filtered vent systems included the use of drywell sprays as part of an overall package of actions to reduce offsite consequences. As I mentioned in my earlier submittal to you and at the meeting, the use of drywell sprays once the non-condensable gases are no longer in the drywell, could lead to very serious consequences in that the drywell could rapidly become sub-atmospheric and crumple. To the best of my knowledge, nobody has investigated the effects of a BWR Mark I or II containment that becomes sub-atmospheric and crumples. However, since the steam lines penetrate the containment and directly connect to the reactor core, any crumpling failure of the containment could possibly cause the loss of the isolation of these steam lines and cause the near instantaneous flashing of the very hot water in the reactor core, with a direct connection to the environment. This would be very dangerous.

There are other aspects of these Swedish and Swiss safety systems that I believe are detrimental. Specifically, these vent systems are connected to the drywell. However, the hardened vent systems in the USA are connected to the wetwell airspace, and for good reason. This arrangement forces the steam, fission products, and drywell gas (mostly nitrogen) to pass through the suppression pool wherein most of the radioactive material would be trapped.

Perhaps I am wrong, but it appeared that the staff did not realize that one of the main purposes of the suppression pool is to trap radionuclides. I recall that there was a request to have more information about the decontamination factor in the pool. EPRI has revisited this subject recently and supplied me with the following reference: A.T. Wassel, J.L. Farr, and M.S. Hoseyni, "SUPRA: A Code for Simulating Removal of Radionuclides by Water Pools Under Severe Accident Conditions", EPRI/NP-3886-CCMP, February 1985. The greater the trapping of radioactive material in the pool, especially cesium-137, the lower the safety significance of other mitigation systems, like the Swedish and Swiss designs.

The representative from NEI who made a presentation on the nuclear industry's FLEX program, in my opinion, made a valid point that the FLEX system is intentionally designed to deal with the expected uncertainties of rare events, especially those tied to very large natural phenomena. What would add to the defense-in-depth philosophy of nuclear regulation would be to demonstrate that the FLEX system is also capable of opening and closing the containment hardened vent isolation valves in a timely manner for those BWR plants that do not already have a dedicated source of electrical power that can open and close these isolation valves. I suggest that it be determined if the FLEX system has this capability and, if not, to either increase capability of the FLEX system or

use one of the passive designs described in my earlier letter to you.

Instead of dwelling on these 1980 style Swedish and Swiss designs, I suggest we assure the operation of the hardened containment vent system under station blackout conditions and develop strategies to use the vent system in a manner that maximizes cesium retention. Useful ideas are already being talked about, such as opening and closing this containment vent system one or more times in a series of actions that would prevent the containment from becoming over-pressurized while minimizing the release of radioactive material and avoiding hydrogen explosions that challenge containment structures. Both containment hardened vent designs, the active design with electric power to operate vent valves during station blackout and the passive design I wrote about with two hand operable isolation valves, would be capable of this intermittent pressure relief strategy.

Further, I suggest that we extend the time horizon for postulated severe accidents. We need to have a strategy (ies) to cover the time period from accident initiation to an end point where whatever is left of a damaged plant does not require electric power or operator actions to continue to protect the public, possibly an air cooled, passive long term system that assures stability. We do not want to end up with the types of problems that people have with the Chernobyl sarcophagus. Investigating how to reach such an end point might reveal other issues, such as the limited ability to just continue to add cold water to a stricken plant. One may run out of space to store water that has passed through the damaged plant. It may be that some form of a feed and bleed system is needed during an interim time period before the long term end point could be reached.

Please circulate these comments to the other NRC participants in this meeting.

Thank you,

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