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To: RulemakingComments Resource; Bladey, Cindy
Subject: Stolmar supplement

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US Nuclear Regulatory Commission

Responding to Your August 15, 2014 letter http://pbadupws.nrc.gov/docs/ML1418/ML14183B539.pdf

First of all I'm repeating here the proposed regulation changes to the 10 CFR 50 even Your rejection letter did not commented on this text:

"§ 52.47 Contents of applications; technical information.

(4) An analysis and evaluation of the design and performance of structures, systems, and components with the objective of assessing the risk to public health and safety resulting from operation of the facility and including determination of the margins of safety during normal operations and transient conditions anticipated during the life of the facility, and the adequacy of structures, systems, and components provided for the prevention of accidents and the mitigation of the consequences of accidents. Analysis and evaluation of emergency core cooling system (ECCS) cooling performance and the need for high-point vents following postulated loss-of-coolant accidents shall be performed in accordance with the requirements of §§ 50.46 and 50.46a of this chapter;"

add "Analysis and evaluation of dedicated severe accident prevention system shall be performed in accordance with the requirements of § 50.46b of this chapter"

and add new "§**50.46b Acceptance criteria for dedicated severe accident prevention system** with the following elements: 1 the means to vent the possible stagnant steam from the volume under the reactor head and depressurize the reactor, 2 the means to inject coolant under the core to be able to pass through the core in upward motion, 3 sufficient coolant reserves to be injected under the force of gravity into the core of the reactor (from below) to achieve cold shutdown.

For PWR a siphon-free connection of the Reactor head top to the Pressurizer steam volume from where the venting of steam, depressurization is performed, a check valve in the connecting the Pressurizer to the hot leg line is proposed. All the ECCS injection lines are to be connected to the cold leg side or injecting coolant under the core, allowing free upward flow through the core.

For the BWR a direct venting of the downstream steam after the ECCS turbine driven pump to the environment in order to utilize the available coolant reserves, prevent the heat-up by this steam of the water reserves in the torus.

In both cases the gravity injection reserves could be the water reserves in the refueling – spent fuel storage ponds by keeping an elevated water level for this function. The pipe connections and the means for opening the gravity injections have to be added.

In both cases the three events when the core damage prevention depressurization starts are: 1. no information about the state of the reactor, 2. failure of forced coolant circulation through the reactor core and 3. the connection through heat transfer mediums from the core to the ultimate heat sink is severed."

Supplement to my June 14, 2014 letter to address the deficiencies with my petition as described in NRC's August 15, 2014 rejection letter as quoted.

1. "Your letter does not clearly explain the term "firestorm."" In each subparts of my petition I indicated that the fiery zirc-water or cladding-coolant interaction is the subject. The proposed regulation changes are designed to prevent the ignition of Zirconium-steam reaction and therefore preclude the development into a firestorm in the PWR or BWR reactor core. The firestorm as it is commonly known is an intense fire and the stack effect causing an intense uplift drawing in storm force winds. The $Zr + 2H2O = ZrO2 + 2H2 + 5$ MJ /kg Zr reacted governing reaction suggest that there is no escape of a firestorm once it is ignited. Both the very large amount of heat and the very low density of generated Hydrogen.

2. "Also, your letter does not provide arguments or a rationale and technical information supporting your view that a "firestorm" is a problem at nuclear power plants." Once we have an ignition of zirc-water reaction it will develop into a firestorm in the PWR or BWR reactor as it did in the TMI-2 reactor in 1979, in PBF SFD Scoping Test, in the Chernobyl-4 reactor in 1986 and in the Fukushima Daiichi reactors 1, 2 and 3 in 2011 as it is also demonstrated by several dedicated experiments like the one cited here:
http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/25/022/25022666.pdf

It would be wise to accept that similar end result suggest a similar cause, in our case a firestorm of Zirconium-steam reaction in the core of nuclear reactor.

3. "In addition, your letter does not explain why the NRC's existing regulatory requirements are insufficient or why a rulemaking is the best way to address the problem of a "firestorm." In this regard, we note that your letter does not explain why the NRC's requirements with respect to core cooling and emergency core cooling systems are inadequate or insufficient from the standpoint of safety." The current regulatory requirements does not define a turning point in the events at a nuclear power plant when it is directed toward a grave outcome of fuel destruction and there are no dedicated means required to prevent such fuel destruction. The proposed regulatory changes correct this deficiency: define the signs when the turn of the events require special dedicated actions, define the requirements for the hardware changes in order to achieve a successful prevention of fuel destruction. Please note that the proposed signs of the severe accident prevention system activation already indicate that the existing emergency core cooling system functionality is lost, and the proposed depressurization and cooling by adding evaporating coolant passive reserves will still prevent the fuel destruction. Due to the proposed minor changes to the primary system.

4. "Finally, your petition does not clearly explain the technical requirements of a proposed rule—beyond those requirements already covered by the NRC's existing regulations—to address (preclude or mitigate) a "firestorm" at a nuclear power plant." The explanation of the technical requirements of a proposed rule—beyond those requirements already covered by the NRC's existing regulations is that in a PWR Primary System the connecting the top of the reactor head with a siphon-free pipeline to the steam volume of the Pressurizer and adding check-valve into the connecting the Pressurizer to the hot leg existing pipeline allows the operators to safely cool the core of the reactor even after they detect that "1. no information about the state of the reactor, 2. failure of forced coolant circulation through the reactor core and 3. the connection through heat transfer mediums from the core to the ultimate heat sink is severed" by opening at least one of the available on the top of Pressurizer vent or pilot operated safety relief valves and dumping the pressure in the Primary System. The existing in the Primary System coolant and the passive reserves of coolant will be able to flow under the reactor core, evaporate in the reactor fueled region and cool efficiently the fuel rods preventing the ignition of zirc-water reaction. Similarly, in the BWR design the action of venting the downstream steam from the turbine driving the ECCS (RHIC) pump directly outside prevent the heat-up of emergency coolant reserves in the torus and allows the pumping it into the reactor to achieve the same cooling. The proposed added amounts in the refueling, spent fuel storage ponds also increase the time we are able to cool the core to achieve cold shutdown without fuel destruction.

Sincerely,

Aladar Stolmar