

Gallagher, Carol

From: Aladar Stolmar [astolmar@gmail.com]
Sent: Wednesday, February 29, 2012 2:03 AM
To: Gallagher, Carol
Cc: Barr, Jonathan
Subject: Re: Comments on NUREG-1935 draft

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2012 FEB 29 AM 11:58

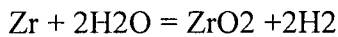
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Dear Carol,
Thank You for the detailed reply.

2/2/2012
77FR5281

Filed through the regulations.gov comments by Aladar Stolmar with returned references!

Item #1 "Even "Zirconium being one of the strongest reducing agents in the periodic table" page 148 of NRC-2012-0022-0002 "At the same time, Zr is also reacting with steam from concrete decomposition, producing hydrogen gas,"



But the reaction heat of 5 MJ/kg Zr reacted is missing as well as the reaction of steam not from concrete, but the coolant itself! WHY? NRC does not allow the steam from coolant react with the zirconium, just with the steam from the concrete?! And the nature just follows the orders of NRC?! As we saw it in Fukushima Daiichi, indeed!" **80fc3853**

Item 2 "Objectives "Incorporate state-of-the-art integrated modeling of severe accident behavior, which includes the insights of several decades of research into severe accident phenomenology..." goal could be achieved that way, disregarding the very key phenomenon of Zirconium firestorm in steam?! No surprise that the objective does not extend on the improving the safety of Nuclear power plants, which would be the duty of NRC!

Once and for all let's describe the fuel destruction causing processes as it happens and happened in all severe nuclear power plant accidents:

1. Stagnant steam covers significant parts of the fuel containing region, core of the reactor.
2. The steam heats-up to above 600 C and the Zirconium cladding in places with reduced or damaged oxide cover goes into runaway, self-catalytic reduction of water molecules and oxidizing with the reaction heat igniting a fire. $\text{Zr} + 2\text{H}_2\text{O} = \text{ZrO}_2 + 2\text{H}_2 + 5\text{MJ/kgZr}$ reacted.
3. Firestorm engulfs the core with intense upward Hydrogen flow jets and precipitating downward Zirconium dioxide, which – together with eroded fuel pellet parts, UO2 molecules - dropping down into the water pool supplies the steam for the oxidizer in the firestorm. The down leg forms on the periphery in the colder regions of core and through the bypass channels of shroud cooling passages.

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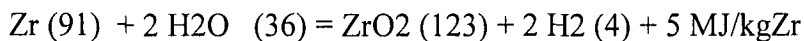
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And yes, by incorporating the real process it is obvious that adding a depressurization vent will avoid the severe accident, will prevent the fuel damage.” **80fc3854**

Item # 3 “There is only one reference to zirconium in NRC-2012-0022-0004: “These pellets are stacked and sealed inside long, slender, zirconium metal-based alloy (Zircaloy) tubes to form fuel rods”.

Zircaloy Mass in Fuel Cladding [kg / lb] 16,465/ 36,300 in the PWR and 40,580 /89,500 in BWR from NRC-2012-0022-0002 and NRC-2012-0022-0003.



Water required for complete reaction for the PWR $16,465 * 36/91 = 6513,6$ kg or about 6.5 m3 (available), it produces $16,465 * 123/91$ ZrO2 = 22,255 kg zirconium dioxide and $16,465 * 4/91 = 723.7$ kg Hydrogen and 82,325 MJ heat. For a 10 second firestorm duration it gives 8GW power... or twice the full power of the reactor...

Water required for complete reaction for the BWR $40,580 * 36/91 = 16053,6$ kg or about 16 m3 (available), it produces $40,580 * 123/91$ ZrO2 = 54,850 kg zirconium dioxide and $40,580 * 4/91 = 1784$ kg Hydrogen and 204,250 MJ heat. For a 10 second firestorm duration it gives 20GW power... or five-six times the full power of the reactor...

Considering that NRC does not require a top of the reactor depressurization vent to prevent the zirconium firestorm in the reactor, the above back of the envelope calculated worst case scenario should be considered. **80fc471e**

Sincerely,

Aladar

On Tue, Feb 21, 2012 at 4:44 PM, Gallagher, Carol <Carol.Gallagher@nrc.gov> wrote:

Mr. Stolmar,

NRC's preferred method for receiving electronic public comments on notices is through the [regulations.gov](http://www.regulations.gov) website. From the [regulations.gov](http://www.regulations.gov) homepage, enter NRC-2012-0022 in the Search area and select the "Search" button. On the search results page, select the "Open Docket Folder" link associated with NRC-2012-0022 (located in the Actions column). Click on the comment icon for NRC-2012-0022-0005. Complete the comment form and select the "Submit" button.

Alternatively, you may mail comments to Cindy Bladey, Chief, Rules, Announcements and Directives Branch (RADB), Office of Administration, Mail Stop TWB-05-B01M, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. You may also fax your comment to RADB at (301) 492-3446.

Carol Gallagher

From: Aladar Stolmar [mailto:astolmar@gmail.com]

Sent: Monday, February 20, 2012 12:17 AM

To: Gallagher, Carol; Barr, Jonathan

Subject: Comments on NUREG-1935 draft

It is not clear that could the comments be filed in by email as well or not. Please answer me with the email address which could be used for comments.

Sincerely,

Aladar Stolmar