Chairman Stephen G. Burns
FYI
Jim Sundzie

9 Twin Orchard Drive
Oswego, NY 13126
April 14, 2015

Mr. Robert F. Willard
President and Chief Executive Officer
Institute of Nuclear Power Operations
700 Galleria Parkway, SE, Suite 100
Atlanta, GA 30339-5943

Dear Mr. Robert F. Willard:

I am writing to you to explain what I feel is a very big problem with the current way the U.S. commercial nuclear industry would handle a bad reactor accident. In short, after they are no longer able to keep the nuclear fuel cool, they are allowed to reestablish a flow of water into the reactor vessel, regardless of the temperature of the fuel cladding at that time.

This doesn't bother the NRC. I got a letter from them telling me that supplying water at any time is always acceptable. I don't agree. Here is why: some recent reading that I have done explained, (as I read it), that water or steam has, in the past, been intentionally injected into furnaces/boilers to provide auxiliary fuel by the decomposition of water into hydrogen. Note that they do not require, (as we do), that zirconium be present in order to make hydrogen. In other words, it appears that high temperature alone is sufficient to disassociate the water molecule.

So, here is my idea. When you have experienced core melting, do not add water. If you do, not only will you have lost the reactor core, you will also have blown-up the reactor building.

Here are the references, all from Knight's "American Mechanical Dictionary":

p. 1911 6th paragraph down, right hand column

"..steam may be injected to form hydrogen gas by its decomposition."

p. 2226 4th & 5th paragraph up, left hand column

"In 1844, Christian Burckhardt, of Cincinnati, consumed the smoke of a steamboat furnace by projecting fine jets of steam into its upper part.

Economy of fuel being a secondary consideration on the Western waters, contrivances of this kind have met with but little attention."

p. 2329 2nd paragraph, right hand column

"Directly over the above-named deflectors are placed a series of cups for receiving and distributing the steam which is conveyed to them through the coiled pipes from the exhaust of the engine, or directly from the generator, for the purpose of being decomposed by the heat, and thus burned as auxiliary fuel."

p. 2365 3rd paragraph, left hand column (This reference, on Bessemer process steel, shows the need for sufficient temperature.)

"Nasmyth employed blowing-tubes to inject steam below the surface of the metal, to agitate the iron mechanically, and by the decomposition of the steam furnish oxygen for the removal of the carbon, and hydrogen for separating the sulphur and phosphorus. The process failed by too great a reduction of temperature."

Can you have somebody look into this concern?

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Telephone (613) 256-0350 ext. 224

Thank you,

Tom Gurdziel
Member, ASME

Attach. (2)

Copy:

US NRC Chairman
US NRC Commissioners
NEI
EPRI
US Senate Committee on Environment and Public Works

BRITANNIA TUBULAR BRIDGE ACROSS THE MENAI STRAITS, VIEWED FROM THE CARNARVON SIDE.

TELFORD'S SUSPENSION BRIDGE AND THE MARQUIS OF ANGLESEA'S COLUMN IN THE DISTANCE.

See page 2646

PLATE LXXII.

KNIGHT'S AMERICAN MECHANICAL DICTIONARY.

A DESCRIPTION OF TOOLS, INSTRUMENTS, MACHINES, PROCESSES, AND ENGINEERING; HISTORY OF INVENTIONS; GENERAL TECHNOLOGICAL VOCABULARY;

AND

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"Thus Time brings all things, one by one, to sight,
And Skill evolves them into perfect light." — LUCRETIUS, Book V.

First Steam Engine.

NEW YORK:
PUBLISHED BY HURD AND HOUGHTON.
Cambridge: The Riverside Press.
1876.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 10, 2013

Mr. Tom Gurdziel
9 Twin Orchard Drive
Oswego, NY 13126

Dear Mr. Gurdziel:

Thank for your letter dated February 28, 2013 to Chairman Allison Macfarlane expressing your view that water should not be injected into the reactor vessel once the reactor fuel starts to melt during severe accident conditions. You also suggested that the water should be used to fill up the primary containment.

The concept of whether to inject water onto melting fuel has been considered since at least 1975, when it was thought that core melting could not be arrested once it had started. The conclusions of research since that time found that water should be injected onto melting fuel. The accident at TMI-2 in 1979 demonstrated that a core melt can be arrested by supplying water to the reactor vessel after core melt commences. The accident also demonstrated the non-uniform progress of core damage within a core, which shows that not all the core is degrading to the same extent at the same time. Additionally, German experiments also showed that a metal-water reaction can be quenched by supplying water.

The concept of filling a BWR containment vessel with water is not as straight forward as it might appear. Structurally, a BWR drywell may be able to withstand the loads created by filling a significant portion with water. However, if the severe accident was caused by a seismic event, such as occurred at Fukushima, then aftershocks should be expected. It is not structurally clear whether the sloshing of water inside the containment and other hydrodynamic forces would create loads which might challenge the integrity of the containment.

Nevertheless, under the NRC's Fukushima Near Term Task Force (NTTF) recommendation 8, "Strengthen and Integrate Onsite Emergency Response," the implementation of Severe Accident Management Guidelines will be further considered.

Sincerely yours,

Kathy Halvey Gibson, Director
Division of Systems Analysis
Office of Nuclear Regulatory Research

NRC FORM 253 (9-96)

U.S. NUCLEAR REGULATORY COMMISSION

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