Chairman Macfarlane U.S. N.R.C. Washington D.C.20555-0001 John S. Alden 5060 N. Marine Dr. Apt. D4 Chicago, IL 60640 (773) 769-4682

7/11/2014

Dear Chairman Macfarlane,

The nuclear fuse is intended to prevent nuclear reactor meltdowns (NM). NMs occur when uncontrolled fission creates heat faster than circulating water can remove it. Two functional failures are involved. First heat cannot be removed by water flow thru the reactor due to pump failure. Secondly, control rods cannot be inserted into the fuel rod array because of control malfunction, power failure, or mechanical damage.

The Nuclear Fuel Rod Fuse (NFRF)Is the dead man switch to stop fission. It is designed to work in the event of control rod failure. Emergency separation of the fuel rods is accomplished by positioning the fuel rods on a beveled plate of fuse material. This fuse is fitted into the base of the reactor's main chamber. The fuse plug is surrounded by a collar to stabilize the fuel rod in the event of earthquake or other shock. Engineered to melt at a temperature above the highest operating temperature but below meltdown temperature, the nuclear fuse could benefit from recent research on alloys at Duke University.

Operation is simple. When the danger point is reached the fuse melts and the fuel rod falls into the safe pit enclosure made of neutron absorbing material. The set of safe pit enclosures located under the reactor floor functions as a backup control rod assembly to bring the reactor to a cold stop, preventing meltdown and allowing the next step of heat removal. Not dependent on human or computer control or electrical power the nuclear fuse needs only gravity and the heat an out of control core to work.

A variation of the basic concept would have a tube of neutron absorbing material sitting on a fuse plate embedded in the ceiling of the main reactor chamber directly over the fuel rod. Again, the heat of an out of control reaction would melt the fuse allowing the tube to fall around the fuel rod. Finally, a lift cable could be attached to the top of the fuel rod to allow for reset.

This simple design feature could, I believe, pass the Three Mile Island and Fukushima tests. It could make nuclear reactors safer. It could help convince a skeptical public that this vital source of electrical power should reenter the marketplace. Safe nuclear power offers a carbon free path to energy independence.

I am a residential building engineer by trade. My understanding of nuclear power comes primarily from the press and Scientific American. I would not at all be surprised if this idea is common knowledge among nuclear professionals. If, however, it is new to the discussion, and helpful I offer it as public intellectual property.

Sincerely,

John S. Alden

CC: John Podesta DOE RAND DARPA



John S. Alden 5060 N. Marine Dr. Apt. D4 Chicago, IL 60640



Chairman Allison M. Macfarlane U.S. Nuclear Regulatory Commission Washington, DC 20555-0001

20555000i

իսով իրկինին ներաներին անդաներին ու ներերուներին հետերին հետերին հետերին հետերին հետերին հետերին հետերին հետերի

 \hat{s}

and the second sec