

April 30, 2015

The Honorable Peter J. Visclosky  
United States House of Representatives  
Washington, D.C. 20515

Dear Congressman Visclosky:

On behalf of the U.S. Nuclear Regulatory Commission (NRC), I am responding to your letter of March 2, 2015, forwarding information from your constituent Mr. George Smolka. Mr. Smolka is concerned about the threat to nuclear power plants from electromagnetic pulse (EMP), both manmade and naturally occurring from geomagnetic solar storms (also referred to as coronal mass ejections).

The NRC is well aware of the potential significance of electromagnetic threats to the Nation's critical infrastructure. In the late 1970s, concerns with EMP-induced large currents and voltages in electrical systems led the NRC to undertake research to study the effects of EMP on nuclear power plant safe-shutdown systems. The NRC study's results are documented in NUREG/CR-3069, "Interaction of Electromagnetic Pulse with Commercial Nuclear Power Plant Systems," issued in February 1983 and available at <http://prod.sandia.gov/techlib/access-control.cgi/1982/822738-2.pdf>. The study concluded that the safe-shutdown capability of nuclear power plants would survive the postulated manmade EMP event.

In 2007, the NRC revisited this earlier study in light of the modernization of nuclear plants with digital systems, which potentially could be more susceptible to EMP. The additional study, completed in 2009, also concluded that nuclear power plants could achieve safe shutdown following a manmade EMP event. A supplemental study, completed in 2010, analyzed and compared at a high level the potential impacts on nuclear power plants from solar induced events to those of the EMP events previously analyzed and reached a similar conclusion. These additional studies are not publicly available because they address sensitive matters beyond nuclear power plants.

The NRC also has reviewed the 2008 Critical National Infrastructures Report prepared by the congressionally authorized Commission to Assess the Threat to the United States from Electromagnetic Pulse Attack.

Current NRC regulations for design and operation of nuclear power plants require structures, systems, and components (SSCs) important to safety to be designed to withstand the effects of various natural phenomena, that such plants have onsite and offsite electrical power systems to permit the functioning of SSCs important to safety, and that such plants are able to withstand and recover from a station blackout. In addition, in 1989 following a solar storm that caused damage to electrical equipment in the U.S and elsewhere, the agency issued an Information Notice (IN) to licensees to alert them about possible failure modes of electrical power equipment in nuclear power plants and the connected transmission systems due to solar magnetic disturbances. That IN can be found in the NRC's Agencywide Documents Access and

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Management System Accession No. ML031130296. Additional regulatory requirements regarding loss of electric power for an extended duration due to natural events are being considered as part of the NRC's post-Fukushima activities, specifically the Mitigation of Beyond-Design-Basis-Events rulemaking currently underway.

Finally, I want to assure you that the agency also collaborates closely with the Federal Energy Regulatory Commission and the North American Electric Reliability Corporation on electric grid reliability issues, including their activities related to solar storms. The NRC also is participating in a National Science and Technology Council interagency task force that is developing a national space weather strategy and an associated action plan. Additional NRC activities may be considered once that plan is completed.

I hope this information is useful to you and Mr. Smolka. If you have any questions, please contact me or Eugene Dacus, Director of the Office of Congressional Affairs, at (301) 415-1776.

Sincerely,

**/RA/**

Mark A. Satorius  
Executive Director  
For Operations



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