



## Department of Energy

Washington, DC 20585

May 15, 2015

Ms. Kimberly Pestovich  
293 Los Pueblos St.  
Los Alamos, New Mexico 87544

Dear Ms. Pestovich:

Thank you for your April 16, 2015, letter to Secretary Moniz expressing support for the continued safe and effective use of nuclear energy. Your letter was forwarded to the Office of Nuclear Energy for a response.

We certainly agree with the major points expressed in your letter, that understanding materials degradation issues is an important consideration in the long-term operation of our nuclear power plants. The Department of Energy (DOE), Office of Nuclear Energy has a program called Light Water Reactor Sustainability (LWRS) in which roughly half of the program funding is directed at addressing material degradation issues that may arise as our nuclear power plants operate for longer periods of time.

As you stated in your letter, nuclear reactors present a very challenging service environment. Components within the containment of an operating reactor must tolerate high-temperature water, stress, vibration, and an intense neutron field. Degradation of materials in this environment can lead to reduced performance and, if unmitigated, can lead to failure. Materials degradation in a nuclear power plant is very complex due to the variety of materials, environmental conditions, and stress states. Over 25 different metal alloys can be found within the primary and secondary systems; additional materials exist in concrete, the containment vessel, instrumentation and control equipment, cabling, buried piping, and other support facilities. Dominant forms of degradation may vary greatly between the different structures and can have an important role in the safe and efficient operation of a nuclear power plant.

Extending reactor service lifetimes to and beyond 60 years increases the operational demands on materials and components. Therefore, DOE in a joint project with the Nuclear Regulatory Commission (NRC), completed an evaluation of the possible effects of extended material lifetimes, which is documented in an NRC report, "NUREG/CR-7153" available on NRC's web site at <http://www.nrc.gov/>. This report gives a detailed assessment of many of the key issues in today's reactor fleet and provides a starting point for evaluating those degradation forms particularly important for consideration in extended lifetimes.

The LWRS program's Materials Aging and Degradation research has been organized into four principal areas: reactor metals, concrete, cables, and mitigation strategies. These research areas cover material degradation in components that were designed for service without replacement throughout the life of the plant. As nuclear power plant licensees seek approval for extended



operation, the way in which these materials age is evaluated and their capabilities reassessed to ensure they maintain the ability to perform their intended functions in a safe and reliable manner.

The LWRS program works in partnership with industry to conduct the research and development on advanced technologies that improve the reliability, sustain the safety, and extend the life of the current fleet of reactors. More information on the LWRS program is available at <http://energy.gov/ne/office-nuclear-energy>.

Sincerely,

A handwritten signature in black ink, appearing to read "Rebecca F. Smith-Kevern for". The signature is fluid and cursive, with a large initial "R" and "S".

Rebecca F. Smith-Kevern, Director  
for Light Water Reactor Technologies  
Office of Nuclear Energy