May 28, 2008

The Honorable Edward J. Markey
Chairman, Select Committee on Energy
Independence and Global Warming
United States House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

On behalf of the U.S. Nuclear Regulatory Commission (NRC), I am responding to your letter of April 21, 2008, requesting that the NRC respond to questions related to the impact of climate change on the continued safe operation of U.S. nuclear power plants and spent fuel storage installations.

The NRC continually evaluates information as it becomes available for the potential to impact the safety of all U.S. nuclear power installations be they operating reactors, decommissioned facilities or spent fuel storage installations. As an element of those efforts, the NRC is working directly with scientists from the Intergovernmental Panel on Climate Change, World Meteorological Organization, and International Atomic Energy Agency (IAEA) to update IAEA regulatory guidance to address climate change issues. The results of these efforts will be incorporated into existing NRC guidance.

Current NRC requirements specify not only the cooling water which must be available to safely operate the facilities, but also the severe weather events, such as floods, each facility must be able to withstand. These requirements help ensure public health and safety are maintained at all times.

Detailed responses to the questions contained in your letter are provided in the enclosure. In summary, the NRC is evaluating the potential impacts of climate change on the continued safe operation of our regulated facilities and is working with the international community to develop guidance on how to assess potential impacts. If you have any additional questions about the NRC activities related to the potential impact of climate change on nuclear power plants, please do not hesitate to contact me.

Sincerely,

/RA/

Dale E. Klein

Enclosure: Response to Questions

cc: Representative F. James Sensenbrenner, Jr.

Response to Questions

Question 1. **Using the same models on sea water elevation used by the recent NAS study, how many nuclear plants (operational or decommissioned) will be under water or threatened by rising water levels by 2025 and 2050?**

Answer 1.

Based on the models discussed in the National Academy of Sciences (NAS) study, none of the U.S. nuclear power plants (operational or decommissioned) will be under water or threatened by water levels by 2050.

The climate change models used in the NAS study are based on work by the Intergovernmental Panel on Climate Change (IPCC). Currently, NRC staff is working directly with IPCC scientists, as well as scientists from the World Meteorological Organization (WMO) and from the International Atomic Energy Agency (IAEA), to update regulatory guidance for the IAEA, expected to be published in 2010. This guidance will directly address climate change issues and will describe tools and methods for incorporating sea level rise and meteorological phenomena into safety assessments for nuclear facilities. This guidance will also be incorporated into a revision to NRC Regulatory Guide 1.59, "Design Basis Floods for Nuclear Power Plants," expected to be published in 2011. As a result, the latest information from the IPCC and WMO are being directly incorporated into NRC guidance on flooding.

Question 2. **Has the Nuclear Regulatory Commission examined how climate change affects the water supply needed to operate a nuclear power plant? If so, what did the NRC conclude and what steps will be taken based on these conclusions? If not, why not?**

Question 3. **Has the NRC examined how climate change affects the storage of spent nuclear fuel in both wet and dry storage facilities, including independent spent fuel storage installations? Will rising sea levels pose a threat to any spent storage facilities, assuming they remain in place in 2025 and 2050?**

Answer 2 & 3.

Current NRC regulations for design characteristics specifically address severe weather events. Before licensing a nuclear power plant or spent fuel storage installation, the NRC requires utilities to submit design parameters on the ability of these facilities to withstand severe weather conditions such as hurricanes, tornadoes, and floods. Each utility is responsible for ensuring – and the NRC verifies – that the design of these facilities protect vital safety systems and spent fuel under severe weather conditions. Nuclear power plant license applicants must also demonstrate that the plants are capable of a safe shutdown and are able to maintain safe shutdown conditions during and throughout severe weather events.

Enclosure

The NRC has published regulatory guidance that describes acceptable approaches to minimize the impact of severe weather. Additionally, the staff is addressing climate change in updates to its guidance as discussed in response to question 1.

For slower changes in climate such as rising temperatures, droughts and rising sea level, existing NRC operating specifications (called technical specifications) limit plant operations in certain conditions. If a so-called “limiting condition for operation,” such as a requirement for water temperature or level, is approached, then the technical specifications (a part of each plant’s operating license) for the plant will force the utility to take action, such as reducing power or shutting the plant down entirely. If plants wish to continue operating under sustained extremes in climate conditions, then the utility must examine the effects of these conditions on their plants. They must then submit their proposed license change in the form of a license amendment to the NRC for review and the NRC will make a determination on the acceptability of the change. In the same way, a utility would have to examine the effects of climate change on the continued viability of existing spent fuel storage installations.

Based on NRC’s activities related to climate change, and the relatively slow rate of this change, NRC is confident that any regulatory action that may be necessary will be taken in a timely manner to ensure the safety of all nuclear facilities regulated by the NRC.

Question 4. **How many nuclear power plants are located less than two miles from an ocean? Of these plants, how many are elevated more than three feet above sea level?**

Answer 4.

Plant	Region	Location	Distance from shore	Grade of Facility (above sea level)	Comments
Pilgrim	I	Plymouth, Massachusetts	less than 2 miles	20 feet	
Millstone 2 & 3	I	Waterford, Connecticut	less than 2 miles	14 feet	protected to 24 feet
Brunswick 1 & 2*	II	Southport, North Carolina	about 2 miles from intercoastal waterway	20 feet	
St. Lucie 1 & 2	II	Hutchinson Island, Florida	less than 2 miles	19 feet	
Turkey Point 3 & 4	II	Homestead, Florida	less than 2 miles	18 feet	
Crystal River	II	Crystal River, Florida	less than 2 miles	30.5 feet	
San Onofre 2 & 3	IV	Camp Pendleton, California	less than 2 miles	30 feet	
South Texas Project	IV	Bay City, Texas	west bank of the Colorado River	28 feet	
Diablo Canyon 1 & 2	IV	Avila Beach, California	less than 2 miles	85 feet	
Waterford*	IV	Taft, Louisiana	West bank of Mississippi River	14.5 feet	protected to 30 feet

* These plants are located more than two miles from the ocean but are located near bodies of water that could be impacted by rising sea level.

Question 5. **How many nuclear power plants are near non-ocean bodies of water that have been threatened by drought over the past 10 years?**

Answer 5.

Over the past 10 years, no nuclear power plants near non-ocean bodies of water have had to shutdown due to drought conditions.

A small number of operating nuclear facilities have had to lower power due to state water temperature requirements, such as the National Pollutant Discharge Elimination System limits, that are more restrictive than NRC-imposed safety limits. These actions are not necessary for public health and safety, but in support of environmental requirements.

As discussed in the response to questions 2 and 3, nuclear power plant technical specifications would require an operating plant to shut down well before the effects of a lack of water (e.g., low river or lake level) would threaten safety systems.