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UNITED STATES NUCLEAR REGULATORY COMMISSION  
TO THE COMMITTEE ON ENERGY AND NATURAL RESOURCES  
UNITED STATES SENATE**

**NRC RESPONSE TO RECENT NUCLEAR EVENTS IN JAPAN AND THE CONTINUING  
SAFETY OF THE U.S. COMMERCIAL NUCLEAR REACTOR FLEET**

**MARCH 29, 2011**

The staff of the U.S. Nuclear Regulatory Commission is deeply saddened by the tragedy in Japan. I and many of my colleagues on the NRC staff have had many years of very close and personal interaction with our regulatory counterparts and we would like to extend our condolences to them.

**Introduction**

The NRC is mindful that our primary responsibility is to ensure the adequate protection of the public health and safety of the American people. We have been very closely monitoring the activities in Japan and reviewing all currently available information. Review of this information, combined with our ongoing inspection and licensing oversight, allows us to say with confidence that the U.S. plants continue to operate safely. There has been no reduction in the licensing or oversight function of the NRC as it relates to any of the U.S. licensees.

We have a long history of conservative regulatory decision-making. We have been using risk insights to help inform our regulatory process, and, over more than 35 years of civilian nuclear power in this country, we have never stopped making improvements to our regulatory framework as we learn from operating experience.

Notwithstanding the very high level of support being provided to respond to events in Japan, we continue to maintain our focus on our domestic responsibilities.

I'd like to begin with a brief overview of our immediate and continuing response. I then want to spend the bulk of my time discussing the reasons for our confidence in the safety

of the U. S. commercial nuclear reactor fleet, and the path forward that we will take to ensure we learn any lessons we need to from events in Japan.

### **The NRC's immediate and Continuing Response to Events in Japan**

On Friday, March 11th an earthquake hit Japan, resulting in the shutdown of more than 10 reactors. From what we know now, it appears possible that the reactors' response to the earthquake went according to design. The ensuing tsunami, however, appears to have caused the loss of normal and emergency AC power to the six units at the Fukushima Daiichi site; it is those six units that have received the majority of our attention since that time. Units One, Two, and Three at the site were in operation at the time of the earthquake. Units Four, Five, and Six were in previously scheduled outages.

Shortly after 4:00 AM EDT on Friday, March 11th, the NRC Emergency Operations Center made the first call, informing NRC management of the earthquake and the potential impact on U.S. plants. We went into the monitoring mode at the Emergency Operations Center and the first concern for the NRC was possible impacts of the tsunami on U.S. plants and radioactive materials on the West Coast, and in Hawaii, Alaska, and U.S. Territories in the Pacific.

On that same day, we began interactions with our Japanese regulatory counterparts and dispatched two experts to help at the U.S. embassy in Japan. By Monday, we had dispatched a total of 11 staff to Japan. We have subsequently rotated in additional staff to continue our on-the-ground assistance in Japan. The areas of focus for this team are: 1) to assist the Japanese government with technical support as part of the USAID response; and 2) to support the U.S. ambassador. While our focus now is on helping Japan in any way that we can, the experience will also help us assess the implications for U.S. citizens and the U.S. reactor fleet in as timely a manner as possible.

We have an extensive range of stakeholders with whom we have ongoing interaction,

including the White House, Congressional staff, our state regulatory counterparts, a number of other federal agencies, and international regulatory bodies around the world.

The NRC response in Japan and our Emergency Operations Center continue with the dedicated efforts of over 250 NRC staff on a rotating basis. The entire agency is coordinating and pulling together in response to this event so that we can provide assistance to Japan while continuing the normal activities necessary to fulfill our domestic responsibilities.

Let me also just note here in concluding this section of my remarks that the U.S. government has an extensive network of radiation monitors across this country. Monitoring equipment at nuclear power plants and in the U. S. Environmental Protection Agency's (EPA) system has not identified any radiation levels of concern in this country. In fact, natural background radiation from sources such as rocks, the sun, and buildings, is 100,000 times more than doses attributed to any level of the radiation from this event that has been detected in the U.S. to date. Therefore, we feel confident, based on current data, that there is no reason for concern in the United States regarding radioactive releases from Japan.

### **Continuing Confidence in the Safety of U.S. Nuclear Power Plants**

I will now turn to the factors that assure us of ongoing domestic reactor safety. We have, since the beginning of the regulatory program in the United States, used a philosophy of Defense-in-Depth, which recognizes that nuclear reactors require the highest standards of design, construction, oversight, and operation, and does not rely on any single layer for protection of public health and safety. We begin with designs for every individual reactor in this country that take into account site-specific factors and include a detailed evaluation for any natural event, such as earthquakes, tornadoes, hurricanes, floods, and tsunamis, as they relate to that site.

There are multiple physical barriers to radiation in every reactor design. Additionally, there are both diverse and redundant safety systems that are required to be maintained in

operable condition and frequently tested to ensure that the plant is in a high condition of readiness to respond to any scenario.

We have taken advantage of the lessons learned from previous operating experience to implement a program of continuous improvement for the U.S. reactor fleet. We have learned from experience across a wide range of situations, including most significantly, the Three Mile Island accident in 1979. As a result of those lessons learned, we have significantly revised emergency planning requirements and emergency operating procedures. We have addressed many human factors issues regarding how control room employees operate the plant, added new requirements for hydrogen control to help prevent explosions inside of containment, and created requirements for enhanced control room displays of the status of pumps and valves.

The NRC has a post-accident sampling system that enables the monitoring of radioactive material release and possible fuel degradation. One of the most significant changes after Three Mile Island was expansion of the Resident Inspector Program, which has at least two full-time NRC inspectors on site at each nuclear power plant. These inspectors have unfettered access to all licensees' activities.

As a result of operating experience and ongoing research programs, we have developed requirements for severe accident management guidelines. These are components and procedures developed to ensure that, in the event all of the above precautions failed and a severe accident occurred, the plant would still protect public health and safety. The requirements for severe accident management have been in effect for many years and are frequently evaluated by the NRC inspection program.

As a result of the events of September 11, 2001, we identified important pieces of equipment that, regardless of the cause of a significant fire or explosion at a plant, we want licensees to have available and staged in advance, as well as new procedures, training requirements, and policies that would help deal with a severe situation.

Our program of continuous improvement based on operating experience will now include evaluation of the significant events in Japan as well as what we can learn from them. We already have begun enhancing inspection activities through temporary instructions to our inspection staff, including the resident inspectors and the region-based inspectors in our four Regional offices, to look at licensees' readiness to deal with both the design basis accidents and the beyond-design basis accidents. The information that we gather will be used to evaluate the industry's readiness for similar events, and will aid in our understanding of whether additional regulatory actions need to be taken in the immediate term.

We have also issued an information notice to the licensees to make them aware of the events in Japan, and the kinds of activities we believe they should be engaged in to verify their readiness. Specifically, we have requested them to verify that their capabilities to mitigate conditions that result from severe accidents, including the loss of significant operational and safety systems, are in effect and operational. Licensees are verifying the capability to mitigate a total loss of electric power to the nuclear plant. They also are verifying the capability to mitigate problems associated with flooding and the resulting impact on systems both inside and outside of the plant. Also, licensees are confirming the equipment that is needed is in place for the potential loss of equipment due to seismic events appropriate for the site, because each site has its own unique seismic profiles.

During the past 20 years, there have been a number of new rulemakings that have enhanced the domestic fleet's preparedness against some of the problems we are seeing in Japan. The "station blackout" rule requires every plant in this country to analyze what the plant response would be if it were to lose all alternating current so that it could respond using batteries for a period of time, and then have procedures in place to restore alternating current to the site and provide cooling to the core.

The hydrogen rule requires modifications to reduce the impacts of hydrogen

generated for beyond-design basis events and core damage. There are equipment qualification rules that require equipment, including pumps and valves, to remain operable under the kinds of environmental temperature and radiation conditions that you would see under a design basis accident. With regard to the type of containment design used by the most heavily damaged plants in Japan, the NRC has had a Boiling Water Reactor Mark I Containment Improvement Program since the late 1980s, which has required installation of hardened vent systems for containment pressure relief, as well as enhanced reliability of the automatic depressurization system.

The final factor I want to mention with regard to our belief in the ongoing safety of the U.S. fleet is the emergency preparedness and planning requirements in place that provide ongoing training, testing, and evaluations of licensees' emergency preparedness programs. In coordination with our federal partner, the Federal Emergency Management Administration (FEMA), these activities include extensive interaction with state and local governments, as those programs are evaluated and tested on a periodic basis.

### **The Path Ahead**

Beyond the initial steps to address the experience from the events in Japan, the Chairman, with the full support of the Commission, directed the NRC staff to establish a senior level agency task force to conduct a methodical and systematic review of our processes and regulations to determine whether the agency should make additional improvements to our regulatory system and make recommendations to the Commission for its policy direction. This activity will have both near-term and longer-term objectives.

For the near term effort, we are beginning a 90-day review. This review will evaluate all of the currently available information from the Japanese events to identify immediate or near-term operational or regulatory issues potentially affecting the 104 operating reactors in the U.S., including their spent fuel pools. Areas of investigation will include the ability to

protect against natural disasters, response to station blackouts, severe accidents and spent fuel accident progression, radiological consequence analysis, and severe accident management issues regarding equipment. Over this 90-day period, we will develop recommendations, as appropriate, for changes to inspection procedures and licensing review guidance, and recommend whether generic communications, orders, or other regulatory requirements are needed.

This 90-day effort will include a 30-day “Quick Look Report” to the Commission to provide a snapshot of the regulatory response and the condition of the U.S. fleet based on information we have available at that time. Preparing a “Quick Look Report” will also ensure that the Commission is both kept informed of ongoing efforts and prepared to resolve any policy recommendations that surface. I believe we will have limited stakeholder involvement in the first 30 days to accomplish this. However over the 90-day and longer-term efforts we will seek additional stakeholder input. At the end of the 90-day period, a report will be provided to the Commission and to the public. The task force’s longer-term review will begin as soon as the NRC has sufficient technical information from the events in Japan.

The task force will evaluate all technical and policy issues related to the event to identify additional potential research, generic issues, changes to the reactor oversight process, rulemakings, and adjustments to the regulatory framework that should be pursued by the NRC. We also expect to evaluate potential interagency issues, such as emergency preparedness, and examine the applicability of any lessons learned to non-operating reactors and materials licensees. We expect to seek input from stakeholders during this process. A report with appropriate recommendations will be provided to the Commission within 6 months of the start of this evaluation. Both the 90-day and final reports will be made publicly available in accordance with normal Commission processes.

## **Conclusion**

In conclusion, I want to reiterate that we continue to make our domestic responsibilities for licensing and oversight of the U.S. licensees our top priority and that the U.S. plants continue to operate safely. In light of the events in Japan, there is a near-term evaluation of their relevance to the U.S. fleet underway, and we are continuing to gather the information necessary for us to take a longer, more thorough look at the events in Japan and their lessons for us. Based on these efforts, we will take all appropriate actions necessary to ensure the continuing safety of the U.S. fleet.