

**WRITTEN STATEMENT**  
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**UNITED STATES NUCLEAR REGULATORY COMMISSION**  
**TO THE**  
**ENVIRONMENT AND PUBLIC WORKS COMMITTEE**  
**AND THE**  
**CLEAN AIR AND NUCLEAR SAFETY SUBCOMMITTEE**  
**UNITED STATES SENATE**

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Chairman Boxer, Ranking Member Inhofe, Chairman Carper, Ranking Member Barrasso, and Members of the Committee, we appreciate the opportunity to appear before you to provide a summary of the findings of the NRC's Near-Term Task Force review of the Fukushima Dai-ichi nuclear accident.

I first want to thank, on behalf of the Commission, Dr. Charles Miller and the other members of the Task Force for all of their work in conducting the 90-day review. I also want to acknowledge the numerous other NRC staff who were available to the Task Force as a resource in conducting its review, as well as the Federal Emergency Management Agency, which engaged the Task Force in discussions of offsite emergency preparedness and provided insights on the U.S. National Response Framework, the Institute of Nuclear Power Operations – which shared information on the industry's post-Fukushima actions, and other groups and individuals who shared their views with the Task Force.

In my testimony today, I would like to provide you with a summary of the Task Force findings and recommendations. My colleagues and I are in the process of developing the Commission's direction to the NRC staff on addressing the Task Force recommendations.

### Overview

The Near-Term Task Force was established in response to unanimous Commission direction to conduct a systematic and methodical review of NRC processes and regulations to determine whether the agency should make additional improvements to its regulatory system. The six-member Task Force, who collectively have over 135 years of regulatory experience, was responsible for making recommendations to the Commission for its policy direction in light of the accident at the Fukushima Dai-ichi Nuclear Power Plant. With its 90-day review completed, the Task Force issued its report to the Commission on July 12, 2011. The Commission made the report publicly available on July 13, 2011. The Task Force briefed the Commission on its findings on July 19, 2011.

Overall, the Task Force found that continued operation and continued licensing activities do not pose an imminent risk to public health and safety. The Task Force concluded that a sequence of events like the Fukushima Dai-ichi accident is unlikely to occur in the United States, and that some appropriate mitigation measures have been implemented, reducing the likelihood of core damage and radiological releases. The Task Force was clear, however, that any accident involving core damage and uncontrolled radioactive releases of the magnitude of Fukushima Dai-ichi—even one without significant health consequences—is inherently unacceptable.

The Task Force also concluded that a more balanced application of the Commission's defense-in-depth philosophy using risk insights would provide an enhanced regulatory

framework. Such a framework would support appropriate requirements for increased capability to address events of low likelihood and high consequence, such as prolonged station blackout resulting from severe natural phenomena. This concept is the basis for the Task Force's proposal to redefine the level of protection regarded as adequate and provides the foundation for the Task Force's recommendations.

The Task Force report included a comprehensive set of twelve overarching recommendations. The Task Force recommendations are intended to clarify and strengthen the regulatory framework for nuclear power plants, and are structured around the focus areas of the NRC's defense-in-depth philosophy as applied to protection from natural phenomena; mitigation of prolonged station blackout events; and emergency preparedness. The Task Force also provided recommendations to improve the effectiveness of the NRC's programs.

In addition to these overarching recommendations, the Task Force report also includes a number of detailed recommendations that provide an integrated implementation strategy. The detailed recommendations are grouped into five categories: 1) a policy statement; 2) rulemakings; 3) orders; 4) staff actions; and 5) long-term evaluation topics. The longer-term evaluation topics are those issues about which sufficient information was not yet available for the near-term Task Force to make specific recommendations, and these topics were therefore deferred for possible consideration as part of the longer-term review.

Recognizing that conducting a rulemaking and the subsequent implementation typically takes several years to accomplish, the Task Force recommended interim actions to be taken in the near-term. The recommended orders are intended to provide those interim safety enhancements for protection, mitigation, and preparedness while the rulemaking activities are conducted.

## Regulatory Framework

The Task Force's first recommendation is for the Commission to establish a logical, systematic and coherent regulatory framework for adequate protection that appropriately balances defense-in-depth and risk considerations. In the Task Force's view, the NRC's existing regulatory framework does not apply defense-in-depth and risk insights consistently. For example, beyond design basis events and severe accident issues have sometimes been addressed with new requirements such as the station blackout rule and in other cases have been addressed by voluntary industry initiatives such as severe accident management guidelines (SAMGs) which were not included in NRC requirements. The Task Force concluded that the proposed regulatory framework would serve all stakeholders well to facilitate staff and Commission decision-making, provide transparency and clarity for public stakeholders, and provide stability and predictability for the industry's business decisions on meeting regulatory requirements.

## Protection Recommendations

With regard to protection of equipment from natural phenomena, the Task Force concluded that protection of important plant equipment from the appropriate external hazards is a key foundation of safety and that it is essential for nuclear plants to be protected against the appropriate design basis external events.

Design basis external hazards were established during the construction permit phase for operating U.S. plants, and they are not typically revisited through the life of the plant. The last construction permit for an operating U.S. plant was issued in 1978, and for many plants, this was completed in the 1960s. Since that time, there have been significant advancements in the state of knowledge and state of analysis methods for seismic and flooding hazards.

Through the years, various NRC programs have been initiated to evaluate the risk from external hazards, and actions were taken to address plant vulnerabilities that were identified. However, the hazards were not comprehensively reevaluated for all sites and the design basis was not necessarily updated. The Task Force concluded that the state of knowledge of seismic and flooding hazards has evolved to the point that it is appropriate for licensees to reevaluate the designs of existing nuclear power reactors to ensure that structures, systems and components important to safety will withstand such events without loss of capability to perform their intended safety function.

On this basis, the Task Force made its second recommendation, which is for the Commission to require licensees to reevaluate the design basis seismic and flooding hazards and as necessary, upgrade the protection of plant structures, systems and components. In its third recommendation, the Task Force also recommended, as part of the longer-term review, that the NRC evaluate potential enhancements to the capability to prevent or mitigate seismically- induced fires and floods.

The Task Force recognized that the proposed analysis and potential modifications would take time to implement. Therefore, as an interim action, the Task Force recommended seismic and flooding protection walkdowns be completed over the next several months to identify and address plant-specific vulnerabilities and verify the adequacy of monitoring and maintenance for protection features such as watertight barriers and seals.

### Mitigation Recommendations

The Task Force also provided recommendations covering several aspects of mitigation of low frequency events. These include mitigation of prolonged station blackout events,

containment overpressure prevention, hydrogen control, spent fuel pool cooling, and onsite emergency response capabilities.

#### Station Blackout

In order to strengthen the ability of nuclear power plants to deal with the effects of prolonged station blackout events, the Task Force made its fourth recommendation: the development of a comprehensive integrated approach to provide uninterrupted core and spent fuel cooling, and provide integrity of the reactor coolant system and containment. The proposed approach is divided into three phases: (1) an eight hour minimum coping phase; (2) a 72-hour extended coping phase; (3) and an offsite support phase. As an interim measure, the Task Force recommended that licensees be ordered to take reasonable action to protect existing mitigation equipment and to ensure that adequate capability is available to mitigate multiunit accidents.

#### Containment Overpressure

All boiling water reactors with Mark I containments voluntarily installed hardened wetwell vents in the early 1990's. The wetwell vents are intended to ensure containment integrity is maintained by preventing containment overpressure. The Task Force recommended that Mark I wetwell vents be a requirement and that the wetwell vent designs be enhanced to provide capability to open and to reclose as needed during prolonged station blackout scenarios. Eight boiling water reactor units in the United States have Mark II containment designs. Three of these units have installed hardened vents, and the remaining five units at Columbia, Limerick and Susquehanna have not installed hardened vents. The Task Force concluded that a Mark II under similar circumstances as Fukushima Dai-ichi units 1, 2 and 3, would have suffered similar consequences. Therefore, in its fifth recommendation, the Task Force recommended that reliable hardened wetwell vents be required at all boiling water reactors with Mark II containments. Additionally, the Task Force also recommended that the NRC staff reevaluate

other containment designs as part of the long-term review to ensure that hardened vents are not necessary to mitigate beyond design basis accidents at other facilities.

### Hydrogen Control

With regard to hydrogen control, the Task Force recommendation regarding enhanced mitigation of prolonged station blackout would, if implemented, reduce the likelihood of core damage and hydrogen production. This recommendation also includes provisions for backup power for hydrogen igniters in containment designs that require those features. In addition, while primarily aimed at containment overpressure prevention, enhanced wetwell vents for Mark I and Mark II containments designs would provide a reliable means for venting hydrogen to the atmosphere. These steps would greatly reduce the likelihood of hydrogen explosions from a severe accident.

Sufficient information from the detailed sequence of events and cause of hydrogen explosions at the Fukushima Dai-ichi plants was not available, however, for the Task Force to reasonably formulate any further specific recommendations related to combustible gas control. Therefore, in its sixth recommendation, the Task Force recommended that the NRC staff identify insights about hydrogen control and mitigation in primary containment and other buildings as part of the longer-term review.

### Spent Fuel Safety

In the area of spent fuel pool safety, the Task Force concluded that the two most important insights from the Fukushima Dai-ichi accident relate to instrumentation to provide information about the condition of the pool and the spent fuel and the plant's capability for spent fuel cooling. To address both of these insights, the Task Force made its seventh recommendation to enhance spent fuel pool makeup capability and instrumentation for the spent fuel pool. Specifically, the Task Force recommended that spent fuel pool instrumentation be required to provide reliable information on the conditions in the spent fuel pool. Additionally,

the Task Force recommended a requirement for spent fuel makeup to have safety-related backup power, and lastly, the Task Force recommended a requirement for a seismically qualified flow path to spray water into the spent fuel pools.

#### Onsite Emergency Response

The Task Force's eighth and final recommendation for enhanced mitigation capability is in the area of onsite emergency response. The Task Force recommended that the onsite emergency response capabilities be strengthened and integrated for a seamless response to severe accidents.

#### Emergency Response Recommendations

In addition to protection and mitigation measures, the Task Force examined how the insights from the accident at Fukushima Dai-ichi might inform both onsite and offsite emergency planning in the U.S. While the Task Force believes that the emergency planning basis in the U.S. provides radiological protection to members of the public, the Task Force identified two aspects of the Fukushima Dai-ichi accident that it concluded warrant additional consideration in the U.S. These two aspects are emergency planning for prolonged station blackout events and emergency planning for multiple unit events. In its ninth recommendation, the Task Force recommended that licensees be required to address prolonged station blackout and multiunit events in their facility's emergency plans. Examples of the proposed requirements include backup power supplies for communications equipment, and ensuring adequate staffing is available to respond to an event affecting more than one unit on a multiunit site.

In its tenth and eleventh recommendations, the Task Force proposed several topics that it believes warrant further evaluation during the longer-term review. These topics include protective equipment for emergency responders, qualifications for emergency decisionmakers,



off-site radiation monitoring capability, and training for decisionmakers and the public on radiation safety and the appropriate use of potassium iodide.

### NRC Programs

Finally, the Task Force identified one recommendation to enhance NRC programs. The Task Force concluded that enhancements to the NRC inspection program would improve its focus on safety. Specifically, in its twelfth recommendation, the Task Force recommended that the NRC strengthen regulatory oversight of licensee safety performance by balancing the use of risk by providing additional emphasis on defense-in-depth requirements.

### Conclusion

In summary, the Task Force identified a number of important recommendations that touch on a broad range of issues. These recommendations seek to clarify the NRC's regulatory framework, to enhance safety through interim actions, orders, and rulemakings, and lastly, to provide recommended topics for long-term evaluation.

With the Task Force report now in hand, the Commission is considering the recommendations and deliberating on the path forward. We have a shared interest in stakeholder participation, including questions and feedback received at the Task Force's public meeting on July 28<sup>th</sup>. I look forward to ongoing dialogue and exchange of ideas among my colleagues and me in the coming weeks.

Chairman Boxer, Ranking Member Inhofe, Chairman Carper, Ranking Member Barrasso, and Members of the Committee, this concludes my formal testimony today. On behalf of the Commission, thank you for the opportunity to appear before you. We look forward

to continuing to work with you to advance the NRC's important safety mission. We would be pleased to respond to any questions you may have.