June 2, 2011

The Honorable Ed Whitfield
Chairman, Subcommittee on Energy and Power
Committee on Energy and Commerce
United States House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

The U.S. Nuclear Regulatory Commission appeared before the Committee on Energy and Commerce on March 16, 2011. From that hearing, you forwarded questions for the hearing record. The responses to those questions are enclosed. If I can be of further assistance, please do not hesitate to contact me.

Sincerely,

/RA/

Rebecca L. Schmidt, Director
Office of Congressional Affairs

Enclosures:
As stated

cc: Honorable Bobby L. Rush, Ranking Member
Subcommittee on Energy and Power

June 2, 2011

The Honorable John Shimkus
Chairman, Subcommittee on Environment and the Economy
Committee on Energy and Commerce
United States House of Representatives
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Dear Mr. Chairman:

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cc: Honorable Gene Green, Ranking Member
Subcommittee on Energy and Power

QUESTIONS FOR THE RECORD
FOR THE NUCLEAR REGULATORY COMMISSION
HOUSE COMMITTEE ON ENERGY AND COMMERCE
SUBCOMMITTEE ON ENERGY AND POWER,
AND SUBCOMMITTEE ON ENVIRONMENT AND THE ECONOMY
Hearing on FY12 Department of Energy and Nuclear Regulatory Commission Budgets
March 16, 2011

Responses to Questions from the Honorable Bobby Rush

<u>QUESTION 1.</u> **What are the qualifications for becoming an NRC inspector and approximately how many qualified inspectors are there currently in the U.S.?**

<u>ANSWER.</u>

There are more than 400 NRC reactor inspectors in the United States. Inspectors have either an engineering or science college degree, extensive professional engineering or technical experience, or both. Each qualified NRC inspector is certified by the regional administrator or office director, the basis of which is a recommendation by the inspector qualification board. Full inspector qualification also indicates that the individual has completed the full complement of required training in NRC's qualification program outlined in Appendices to Inspection Manual Chapter 1245, "Qualification Program for Operating Reactor Programs." In general, each inspector takes about two years to complete required training and pass the final qualification board. A typical training program for a reactor inspector would include about 600 hours of training courses, 430 hours of independent study activities, and 400 hours of on-the-job training. In addition to reactor inspectors, the NRC has inspectors that oversee safety and security associated with nuclear materials and waste.

Achieving full inspector qualification allows an individual to independently perform the full scope of inspection related activities, with routine oversight and supervision from NRC management.

<u>QUESTION 2.</u> **What are the protocols for deploying Resident Inspectors? Where and how are they assigned geographically and logistically?**

<u>ANSWER.</u>

There are a minimum of two resident inspectors (RIs) assigned to each operating reactor site in the United States. RIs live near the reactor sites to which they have been assigned. They are expected to provide daily NRC oversight of these facilities, as well as act as the first NRC responders to any events at the facility. The NRC's RIs are an extremely dedicated corps of inspectors and take no direction from licensees. The NRC also assigns RIs to new reactor construction sites and selected nuclear fuel cycle facilities.

Each regional office selects RIs for assignment to each of the sites for which the region provides regulatory oversight. The maximum tour length for a RI is seven years at the same site, although some transfer from their site before the end of the seven year period. The NRC also has measures to assess the continued objectivity of inspectors in the field.

<u>QUESTION 3.</u> **What are the protocols for deploying Regional Inspectors? Where and how are they assigned geographically and logistically?**

<u>ANSWER.</u>

Regional inspectors are employed in each of the NRC regional offices: Region I in King of Prussia, Pennsylvania; Region II in Atlanta, Georgia; Region III in Lisle, Illinois; and Region IV in Arlington, Texas. They perform baseline inspections at each reactor site overseen by the regional office. Most inspections carried out by regional inspectors are announced and scheduled 18 months in advance, which enables the licensee to support the inspections with needed documentation and personnel. In addition, advance planning ensures the plant conditions are appropriate for the area to be inspected (ie, performing inspections during refueling outages of areas that are accessible only when the reactor is shutdown). In response to events, the NRC also deploys regional inspectors as needed to assess conditions, with little or no advance notice to the licensee.

Regional inspectors are specialists in areas such as radiation protection, emergency preparedness, security, design engineering, and fire protection, who perform inspections requiring their expertise.

QUESTION 4. **What is the rationale for deploying Resident Inspectors at facilities geographically and logistically?**

ANSWER.

Assigning inspectors to work onsite at nuclear power plants was initiated as a trial program in 1974. Prior to this, all NRC inspectors were stationed in regional offices. Chief criticisms of regional office-based inspectors were: (1) there were too few NRC inspections; (2) inspectors spent only about 25 percent of their total available time at licensed facilities; and (3) when onsite, inspectors spent too much time reviewing paperwork rather than observing actual work or other licensee activities.

Evaluation of the trial program concluded that the resident inspector (RIs) program provided more efficient and effective use of an inspector's time and better enabled the NRC to assure the safety of licensee facilities. The RI program was initiated in 1978, and was intended to improve the existing region-based inspection program by:

(1) Increasing NRC knowledge of conditions at a licensed facility and providing a better technical basis for regulatory action.

(2) Improving NRC incident response.

(3) Improving the inspector's ability to independently verify licensee performance, and providing assurance that licensee management control systems are effective.

QUESTION 5. **What is the rationale for deploying Regional Inspectors at facilities geographically and logistically?**

ANSWER.

Regional inspectors are assigned to their respective regional offices, and, unless engaged in an inspection activity, they are not normally deployed to the sites. Having inspectors assigned to the NRC's Regional Offices as opposed to Headquarters decreases the travel time for performing inspection activities and provides for better oversight of facilities.

Please see the answer to QUESTION 3 for a full discussion of Regional Inspectors.

QUESTION 6. **What are the term limits for both Resident Inspectors and Regional Inspectors?**

ANSWER.

Resident Inspectors are expected to rotate from their site assignment after seven years. Normally, they are not reassigned for the first four years of their assignment to allow them to become familiar with the facility, plant operations, and the community. They do not normally return to a previously assigned facility.

Regional inspectors are dedicated to all sites in a specific region. There are no term limits applied to Regional Inspectors.

<u>QUESTION 7</u>. **How do Resident Inspectors receive data for the plants [where] they are assigned? Is this data collected independently or obtained from facility managers?**

<u>ANSWER.</u>

A Resident Inspector (RI) has unfettered access to the site. Thus, the RI is able to obtain data from the plant's instrumentation at the same time as the plant's licensed operators. In addition, the RI has access to documentation such as operator logs, engineering evaluations, plant procedures, and maintenance reports. The RIs make independent evaluations of the data to determine whether any regulatory concerns require follow-up. RIs also obtain data from facility managers as required to conduct baseline inspections. Licensees often notify RIs of events or conditions in anticipation of the inspector's interest in the issue. RIs collect information for use by risk analysts in evaluating the risk significance of the event and whether a response beyond the baseline program is warranted.

<u>QUESTION 8.</u> **Does the NRC have independent sensors or monitoring equipment at each nuclear facility?**

<u>ANSWER.</u>

No. However, during a declared emergency of “Alert” or higher, the NRC requires each power reactor licensee to electronically transmit certain plant parameters collected by the plant process computer to NRC Headquarters. This is referred to as the Emergency Response Data System (ERDS). While the exact parameters transmitted to the NRC are specific to each nuclear power reactor unit, they include parameters selected to provide the NRC with an ability to independently determine the status of the reactor and containment, as well as measure radiation levels within certain parts of the facility. Meteorological information is also transmitted so that the NRC can independently assess the potential offsite consequences of a radiological release from the facility.

QUESTION 9. **If an emergency takes place at a facility, does the NRC have the authority to intervene independently or must it wait for permission from facility managers?**

ANSWER.

If an emergency takes place at an NRC licensed facility, the NRC has full authority to take whatever action is necessary to protect public health and safety, and can demand immediate licensee actions, up to and including a plant shutdown.

QUESTION 10. **Does the NRC require each nuclear reactor at each facility to have emergency backup power generators both underground and also off-site?**

ANSWER.

NRC regulations (10 CFR Part 50, Appendix A, General Design Criterion 17) require U.S. plants to have 2 independent power supplies (an onsite electric power system and an offsite electric power system). For the onsite electric power system, all plants, except one (i.e., Oconee), have emergency diesel power generators and battery backup systems. Most of the U.S. plants with emergency diesel power generators have two per unit and those that have only one dedicated diesel power generator have a swing diesel power generator available. The regulations require that the onsite electric power sources be protected from natural phenomena and hazards, but do not require them to be underground.

The NRC also has requirements (10 CFR Part 50.63) in place requiring plants to have additional means to power essential equipment on-site. U.S. nuclear power plants are required to conduct a "coping" assessment and develop a strategy to demonstrate to the NRC that they could maintain the plant in a safe condition during a scenario in which the plant has lost all offsite and onsite AC power sources (i.e., station blackout). Several plants added additional AC power sources to comply with this regulation.

<u>QUESTION 11.</u> **Does the NRC require each nuclear reactor at each facility to have hardened vents installed in the containment areas?**

<u>ANSWER.</u>

In the 1980s, the NRC staff completed a determination of what actions should be taken to reduce the vulnerability of the original Mark I containments to severe accident challenges. This work is documented in NRC's Generic Letter 89-16. The Mark I containment has a light-bulb shaped "drywell" in which the reactor pressure vessel is located; below the drywell, there is a donut or torus-shaped "wetwell" partially filled with water (i.e. the "suppression pool"). There are pipes that connect the drywell to the suppression pool. If there is damage to the reactor pressure vessel or piping connected to it, the drywell will fill with steam and the resulting pressure will force the steam into the suppression pool. The water in the suppression pool will cool and condense the steam, thus reducing the pressure in the containment drywell and wetwell. Even before the installation of the hardened wetwell vents, the NRC staff recognized that under emergency conditions the plant's operators might vent the wetwell to avoid exceeding the maximum containment pressure limits. However, the previous methods of venting used non-pressure retaining pathways, and thus could have made vital areas of the plant inaccessible and potentially unsafe during and after venting. Therefore, the Commission directed the staff to pursue enhancements to the Mark I containments, and in particular to approve installation of a hardened vent for plants that elect to incorporate this improvement. For the remaining plants, the staff was directed to initiate plant-specific backfit analyses for each of the Mark I plants to evaluate the efficacy of requiring the installation of hardened wetwell vents.

Given a scenario of a long-term loss of decay heat removal, the staff found that use of reliable containment venting path and procedures could reduce the chance of a core melt by a factor of ten, and that the vent would also reduce the likelihood of a core melt accident during other events like a station blackout. Hardened wetwell vents are designed to allow operators to prevent containment failure by controlled reduction of containment pressure during severe accidents. Venting from the wetwell allows for significant reduction in the release of radioactive airborne contamination by the scrubbing action of the suppression pool water. The vent was designed to discharge away from the secondary containment building, better supporting subsequent operator actions there. The vent capability was also designed to allow release of combustible gas (hydrogen resulting from the reactor of fuel cladding with coolant at elevated temperatures) to prevent containment failure.

No NRC orders were issued to require installation of a hard pipe vent, and all modifications made were voluntarily. Licensees were allowed to justify not installing the hard pipe vent based on plant unique configuration and circumstances. All 23 BWR Mark I plants either installed the modification described in the generic letter (22 plants), or justified use of existing plant safety features (one plant). Installation of the vent was designed to improve safety of the plants in the U.S.

Responses to Questions from the Honorable Jim Matheson

<u>QUESTION 1a.</u> **I understand that the NRC is currently updating rulemaking and guidance regarding storage for blended radioactive waste and other "unique" waste streams, like depleted uranium. I have long had concerns about these unique waste streams and whether the Class A storage site in Clive Utah is appropriate to accept these wastes. I am pleased that the State of Utah decided to require a site-specific performance analysis for these types of waste before they are allowed to be stored there, and I hope that the State remains firm in requiring this analysis.**

a. When will NRC have their Branch Technical Guidance on site-specific performance analysis ready?

<u>ANSWER.</u>

On March 18, 2009, the Commission directed the NRC staff to pursue a limited rulemaking to specify a requirement for a site-specific performance analysis and associated technical requirements for unique waste streams including, but not limited to, the disposal of significant quantities of depleted uranium. In a Staff Requirements Memorandum on disposal of blended wastes, dated October 13, 2010, the Commission directed the staff to add large-scale blended wastes to the scope of the unique waste streams rulemaking. The staff has initiated this rulemaking, including the development of associated guidance that will describe how the new site-specific performance analysis can be conducted. The proposed rule is scheduled to be sent to the Commission in October 2011. After Commission approval, the proposed rule will be published for public comment. The final rulemaking is expected to be completed approximately one year after publication of the proposed rule. After its completion, Agreement States will have to adopt compatible rules within three years.

The NRC staff is aware of Utah's efforts to promulgate a site-specific analysis rulemaking and has supported this effort, including participation in a State-sponsored workshop. Because the NRC's site-specific analysis rulemaking will not be completed for more than a year, NRC staff has also issued interim guidance to Agreement States on how to conduct such analyses until the rulemaking is completed. The guidance was sent to States, including Utah, on April 13, 2010, for depleted uranium disposal, and on March 17, 2011, for large-scale blended waste disposal.

The NRC staff also has a related effort underway to update and risk-inform the Branch Technical Position on Concentration Averaging and Encapsulation. This guidance defines how low level waste generators and processors can appropriately average the concentrations of radioactivity in determining the classification of waste. Although this guidance will not specify how site-specific performance analyses are to be conducted, it will affect the characteristics of the waste (for example, how much radioactivity concentration can vary within a shipping container) that would be subject to such analyses. It is due to be completed in mid-2012.

QUESTION 1b. **Given the increase in unique waste streams that were not included in the low-level wastes classification system as defined in Federal code at 10 CFR 61.55, do you believe this classification system should be revised? If so, how long would this process take?**

ANSWER.

In the same March 18, 2009, action the Commission also directed the staff to propose the necessary resources for a comprehensive revision to risk-inform the 10 CFR Part 61 waste classification framework. Among other things, this rulemaking would explicitly address the waste classification of depleted uranium.

In another Staff Requirements Memorandum, dated July 1, 2010, the Commission directed the NRC staff to provide the Commission with the staff's approach to initiate activities related to a risk-informed, performance-based comprehensive revision to Part 61, including the resources and the timeline for completing the rulemaking. One of the options for such a revision is to risk-inform the waste classification framework in 10 CFR Part 61. On December 27, 2010, the NRC staff provided the requested approach in a formal paper to the Commission. This paper identified five options for revising 10 CFR Part 61, including the waste classification system. The staff committed to gather additional information from stakeholders on these approaches and to provide the Commission with a notation-vote paper summarizing their suggestions and recommending an option for Commission consideration. That paper will be submitted near the end of 2012. Because the staff provided a range of options in their paper to the Commission that vary in scope and complexity, it is not possible to provide a schedule for such a rulemaking at this early juncture. The rulemaking, however, would take at least as long as the ongoing unique waste streams rulemaking addressed in response to question 1(a) (i.e., several years), and potentially longer depending on the option chosen.