The Deputy Secretary of Energy
Washington, DC 20585

July 19, 2012

The Honorable Peter S. Winokur
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, DC 20004

Dear Chairman Winokur:

Safety is of vital importance to the Department of Energy (DOE), its workers, the public, and our ability to perform our mission. As you know, by statute we measure safety by the standard of "adequate protection." "Adequate protection" is defined as those measures that permit a facility to operate safely for its workers and the surrounding community. As the phrase itself indicates, it is not an absolute, but reflects the condition achieved when all necessary measures are being taken in a manner that is consistent with applicable requirements and regulatory process.

Adequate protection is partly demonstrated by meeting Departmental requirements with regard to the design of engineered safety systems and controls, which protect workers and the public from normal operations and possible accidents. These design aspects do not stand alone, but rather are supported by operational and management programs – including training, conduct of operations, quality assurance, maintenance, and inspections. Of course, a strong safety culture is essential to preserving adequate protection.

"Safety basis" is defined as the documented set of safety analyses and hazard controls which DOE relies on to provide reasonable assurance that a nuclear facility can be operated safely. The safety basis requirements of 10 Code of Federal Regulations Part 830 require the contractor responsible for a DOE nuclear facility to analyze the facility, the work to be performed, and the associated hazards, as well as to identify the conditions, safe boundaries, and hazard controls necessary to protect workers, the public and the environment from adverse consequences. Performing work consistent with the safety basis provides reasonable assurance of adequate protection of workers, the public, and the environment.

As you know, the Secretary – in his responses to the Defense Board's Recommendation 2010-1 dated February 28, 2011, and May 27, 2011, and in our public Federal Register Notice dated June 28, 2011 – discussed the provisions of the Department's position regarding nuclear safety and adequate protection. The enclosed "Path Forward" presents the Department's commitments to assure adequate protection and supports DOE Policy 420.1, *Department of Energy Nuclear Safety Policy*, including its Technical Basis

Document DOE/HS-0006. It describes how to implement the Secretary's commitments for new and existing facilities, and how we intend to respond to new information (e.g., regarding new seismic hazards). The Path Forward also provides additional criteria by which we can evaluate the adequacy of the safety basis and its implementation, and describes the documentation required for areas that must be revisited or receive further management oversight and approval.

The provisions contained within the "Path Forward" transmit a Departmental commitment under Recommendation 2010-1, and we intend to include them in the revised DOE Standard 3009 (*Preparation Guide for U.S Department Of Energy Nonreactor Nuclear Facility Documented Safety Analyses*) and DOE Standard 1104 (*Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents).* Through integration of those provisions into DOE Standards, as well as through the implementation of those standards throughout the DOE complex, the Department will continue to strive to provide adequate protection at all DOE sites and facilities.

Sincerely yours,

Daniel B. Poneman

Enclosure

Department of Energy (DOE) Path Forward on Adequate Protection

Summary

Adequate protection is defined as those measures that permit a facility to operate safely for its workers and the surrounding community. Adequate protection is achieved through combinations of multiple safety measures and comprehensive management systems, consistent with DOE nuclear safety policy and requirements, which effectively reduce hazards and seek to prevent postulated accidents or reduce their consequences to levels that are acceptably low for workers, the public, and the environment.

Background

The Department of Energy established a commitment in DOE Policy 420.1 (DOE P 420.1), *Nuclear Safety Policy*, to design, construct, operate, and decommission its nuclear facilities in a manner that provides adequate protection of workers, the public, and the environment. The policy is consistent with the high level safety objective (i.e., "adequate protection of the public") for the Nuclear Regulatory Commission's (NRC) licensing of commercial nuclear power plants and the current DOE Federal Regulations in 10 CFR Part 830, *Nuclear Safety Management*. DOE P 420.1 also includes two quantitative Safety Objectives for public protection as "aiming points" to guide development of DOE requirements. The NRC uses the same two Safety Objectives, which are expressed in terms of protection from potential latent cancer fatalities from facility operations and prompt fatalities from an accident.

In the overall context of nuclear safety, the terms "adequate protection" and "reasonable assurance of adequate protection" originated with the Atomic Energy Act of 1954 as amended. The Act gave the Atomic Energy Commission (AEC) broad authorities to establish standards to protect health and minimize danger to life or property. The Act did not include a formal definition of "adequate protection" or "reasonable assurance of adequate protection." Rather, Congress left it up to the AEC to apply and give practical meaning to these terms. Today, the NRC and DOE operate under the same Congressional authorities.

DOE Regulatory Process for Adequate Protection

The nuclear safety policy describes five complementary measures that DOE has established to assure adequate protection is achieved. The principal measure is the system of nuclear safety requirements that are designed to satisfy the intent of the Department's Safety Objectives, thus providing adequate protection when met. DOE uses an expansive set of nuclear safety-related requirements at both the Departmental level (e.g., high-level policies such as Integrated Safety Management) and facility-specific levels (e.g., nuclear facility safety analysis requirements and standards) to provide adequate protection. The most salient of these are summarized in Attachment 1. At the facility level, various means and combinations of controls follow the philosophy of defense-in-depth to ensure there is no reliance on a single control in order to achieve adequate protection. DOE's nuclear safety oversight of contractor-operated facilities is also an essential element of the adequate protection process.

"Safety Basis" is defined as the mandatory and documented set of safety analyses and hazard controls which DOE relies on to provide reasonable assurance that a nuclear facility can be operated in a manner that adequately protects workers, the public, and the environment. A key element of the Safety Basis is the Documented Safety Analysis (DSA), which systematically evaluates significant hazards

and accidents, and defines the controls necessary to provide adequate protection of workers, the public, and the environment. To maintain the adequacy and currency of a facility's DSA, DOE has also institutionalized a formal process by which any potential changes of facility conditions, or new information (e.g., regarding new seismic hazards), are thoroughly evaluated for potential impacts on the Safety Basis.

The DSA includes an analysis of postulated accidents to determine safety controls necessary to protect the public. As part of the accident analysis methodology, an Evaluation Guideline (EG) of 25 rem is used to classify the systems, structures, components, and administrative controls necessary for adequate protection of the public. Those controls that are relied upon to prevent an accident and/or reduce its consequences below the EG are designated as Safety Class (SC). NRC uses a similar value for evaluating design basis accidents as part of the criteria used in determining where new reactors may be located. Design basis accidents for all new DOE nuclear facilities will either be prevented or their consequences mitigated to below the EG.

Exigent Circumstances

DOE will require that all design basis accidents considered for new facilities have consequences below the EG, which provides a conservative margin of public safety compared with the quantitative safety objectives included in DOE P 420.1. For the overwhelming majority of its existing nuclear facilities, DOE has implemented the necessary SC controls to meet the EG. However, an unusual situation could occur at very few existing facilities where no viable control strategy exists to prevent or mitigate the consequence in one or more of the accident scenarios from exceeding the EG. In such an event, a discussion of potential corrective and compensatory measures must be included in the DSA. In addition, for temporary situations, DOE can prepare a formal "Justification for Continued Operations" for the facility. If necessary, DOE could develop a quantitative risk assessment (compliant with the interim DOE risk assessment standard) to inform the decision authority on the prioritization of necessary facility modifications and to obtain risk perspective with respect to the quantitative safety objectives.

Through its existing regulatory framework established in 10 CFR 830, DOE Standard 3009 (DOE STD 3009), *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*, is established as an approved methodology (i.e., a "safe harbor") for documenting a nuclear facility's safety basis. DOE has committed to revise DOE STD 3009 and its associated safety analysis review Standard (DOE STD 1104) to ensure the Standards clearly describe how the EG is to be applied for designating safety controls and to strengthen the DOE's review criteria and approval process for situations where the EG cannot be met for existing facilities, including designation of appropriate senior management levels of approval authority when the guideline is exceeded. To this end, DOE has proposed that the requirements below for exigent circumstances be included in the draft revisions to DOE STD 3009. These same requirements would be incorporated into a formal attachment to the facility's DSA in order to explain the new control strategy and its adequacy. The required steps follow:

- Identify the accidents that cannot be mitigated or prevented, including the likelihood of the event(s) and the mitigated consequences associated with the event(s).

- Provide a detailed analysis of the expected frequency and consequence of the associated accident. The detailed analysis should address the significant contributors to uncertainties in both the frequency and consequence evaluations.

- Discuss the available controls that could reduce the likelihood and/or consequences of an accident, including their potential failure modes and reasons why they are not sufficient to meet the EG.

- Discuss the overall strategy along with timeframe and decision milestones, including planned operational improvements, potential facility modifications and/or additional compensatory measures to reduce the likelihood and/or mitigate consequences of an accident. DOE will independently verify the proposed compensatory measures prior to their implementation.

- Present the rationale for the decision to continue operation of the facility to justify the conclusion that the facility provides a level of protection that would not result in undue risk to the public, taking into account the work to be performed, associated hazards, and existing control strategy.

- Address interactions with all necessary levels of contractor and DOE site and Headquarters line management and oversight organizations to assure that appropriate efforts are taken to rectify the situation.

- Specify a senior level of DOE approval authority for these circumstances, including a Program Secretarial Officer or higher (when appropriate) in consultation with its Central Technical Authority and the Office of Health, Safety and Security.

ATTACHMENT 1: KEY ADEQUATE PROTECTION-RELEVANT RULE AND DIRECTIVES

DOE POLICY 420.1 *NUCLEAR SAFETY POLICY*

"It is the policy of the Department of Energy to design, construct, operate, and decommission its nuclear facilities in a manner that ensures adequate protection of workers, the public, and the environment." DOE takes five high-level actions to provide adequate protection. They include the following measures:

1. Establishment and implementation of nuclear safety requirements that utilize national consensus (or other government) standards or applicable regulations in accordance with DOE's process for developing and implementing rules, directives and technical standards. The requirements include key nuclear safety elements, including:

    - Hazard identification
    - Hazard assessment and control
    - Facility design
    - Quality assurance
    - Management programs such as conduct of operations, emergency preparedness and maintenance

2. Implementation of the core functions and guiding principles of Integrated Safety Management.
    - Establishing and maintaining a strong safety culture
    - Performing effective line management and Independent Oversight

3. Use of a safety management system and approach that includes:

    - Minimizes the use of hazardous materials,
    - Establishes appropriate hazard controls
    - Establishes controls that provide defense-in-depth.

4. The use of appropriate quantitative and probabilistic risk assessments to support nuclear safety decisions.

5. Establishment of quantitative safety goals, which are "targets" not "requirements" that are related to worker and public risk from DOE nuclear facility operations. Goals are adapted from NRC Safety Goals for operation of commercial nuclear power plants:

    - The risk to an average member of the public for prompt fatalities that might result from accidents should not exceed 0.1 percent of the sum of prompt fatality risks resulting from other accidents to which members of the population are generally exposed.

    - The risk to the population in the area of a DOE nuclear facility for cancer fatalities that might result from operations should not exceed 0.1 percent of the sum of all cancer fatality risks resulting from all other causes.

10 C.F.R. PART 830, *NUCLEAR SAFETY MANAGEMENT*

- The safety basis requirements of Part 830 require the contractor responsible for a DOE nuclear facility to analyze the facility, the work to be performed, and the associated hazards and to identify the conditions, safe boundaries, and hazard controls necessary to protect workers, the public and the environment from adverse consequences. These analyses and hazard controls constitute the safety basis upon which the contractor and DOE rely to conclude that the facility can be operated safely. Performing work consistent with the safety basis provides reasonable assurance of adequate protection of workers, the public, and the environment.

- Identification of "Safe Harbor" methods to develop Documented Safety Analyses (DSA), e.g. DOE Standard 3009.

- Use of conservative accident analyses (Design Basis Accidents for new nuclear facilities and Evaluation Basis Accidents for existing nuclear facilities) to evaluate member-of-the-public dose at site boundaries.

- Comparison of public dose estimates to the 25 rem Evaluation Guide (Total Effective Dose Equivalent for a Maximally Exposed Offsite Individual) to determine when Safety Class Systems, Structures, and Components are warranted. This is consistent with NRC's approach and provides an indication of the probable absence of significant health effects from postulated design basis accidents.

- Performance of hazard/accident analysis (consistent with the industry practice) to establish controls and document results in a DSA, a regulatory process which identifies natural and man-made hazards and evaluates normal, abnormal, and accident conditions.

- Potential Inadequacies in Safety Analysis and Un-reviewed Safety Questions (USQ) processes, a regulatory process to maintain adequacy of a DSA.