



The Deputy Secretary of Energy
Washington, DC 20585

December 23, 2013

The Honorable Peter S. Winokur
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW, Suite 700
Washington, DC 20004-2901

Dear Mr. Chairman:

I am writing to notify you of the Department of Energy's (DOE) completion of all actions identified in the DOE Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 2009-1, *Risk Assessment Methodologies at Defense Nuclear Facilities*.

Recommendation 2009-1 identified the need for adequate policies and associated standards and guidance on the use of quantitative risk assessment methodologies at DOE's defense nuclear facilities. DOE accepted Recommendation 2009-1 and took the requisite action to improve its infrastructure for ensuring the appropriate use and control of quantitative risk assessments in nuclear safety applications. This included revising DOE's Nuclear Safety Policy and developing a new technical standard to provide Departmental policy, criteria and guidance on the development and use of quantitative risk assessments.

The enclosed report describes the actions taken by DOE to meet its Implementation Plan commitments. If you have any questions, please contact Dr. James O'Brien, Director, Office of Nuclear Safety, at (301) 903-1408.

Sincerely yours,

A handwritten signature in black ink, appearing to read "D. B. Poneman", written over a horizontal line.

Daniel B. Poneman

Enclosure



U. S. Department of Energy

**Report to the
Defense Nuclear Facilities Safety Board on
the Completion of the Implementation Plan
for Recommendation 2009-1**

**Risk Assessment Methodologies at Defense Nuclear
Facilities**



Washington, DC 20585

December 2013

Report to the Defense Nuclear Facilities Safety Board on the Completion of the Implementation Plan for Recommendation 2009 -1

1. Purpose

This report:

- Documents completion of the final deliverable (Deliverable #5) of the Implementation Plan (IP) for Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2009-1, *Risk Assessment Methodologies at Defense Nuclear Facilities*;
- Provides a summary of actions taken to complete all of the commitments made in the IP; and,
- Identifies ongoing efforts to continue to improve the Department's capabilities to effectively utilize risk assessments in nuclear safety applications.

2. Background

On July 30, 2009, the DNFSB issued Recommendation 2009-1 to the Department of Energy (DOE). This Recommendation identified the need for adequate policies and associated standards and guidance on the use of quantitative risk assessment methodologies at DOE's defense nuclear facilities. It included the following four sub-recommendations:

- Establish a policy on the use of quantitative risk assessment for nuclear safety applications.
- Consistent with this policy, establish requirements, and guidance in a DOE directive or directives that prescribe controls over the quality, use, implementation, and applicability of quantitative risk assessment in the design and operation of defense nuclear facilities.
- Evaluate current ongoing uses of quantitative risk assessment methodologies at defense nuclear facilities to determine if interim guidance or special oversight is warranted pending the development of formal policy and guidance.
- Establish a requirement to identify deficiencies and gaps in ongoing applications of quantitative risk assessment along with the additional research necessary to fill those gaps in support of the development and implementation of the final policy and guidance.

DOE accepted Recommendation 2009-1 on November 3, 2009, and transmitted its finalized IP to the DNFSB on April 27, 2010.

The IP identified the following major actions to be taken by the Department to address Recommendation 2009-1:

- Provide periodic briefings to the Board or Board staff on DOE's actions to complete the IP.
- Establish the Risk Assessment Technical Experts Working Group (RWG).
- Issue a complex-wide Information Notice to provide interim advice on existing policies for the use of quantitative risk assessment.
- Revise the DOE Nuclear Safety Policy to address the use of quantitative risk assessment in nuclear safety.
- Transmit a letter to the Board on the Department's plans for the appropriate changes to directives or standards on the use of risk assessments at defense nuclear facilities based on the results of the risk assessment study.

As described in Section 3 and 4 below, the Department has completed all of these actions (with this report providing formal documentation and transmittal to the Board of the last of these actions).

Furthermore, in support of these actions, and to enhance DOE managers' and staff's understanding of existing DOE policy and requirements on use of risk assessments, DOE:

- Performed a study of the use of quantitative risk assessment methodologies at DOE and other government agencies and by industry;
- Developed and presented supplemental training specific to DOE nuclear safety use of risk assessment as part of the risk assessment module of the Nuclear Executive Leadership Training; and
- Developed and piloted a new course on risk assessment for DOE technical staff and managers.

3. Completion of the IP's Final Action

The last action in the Department's IP was to develop:

The Department's plans for the appropriate changes to directives or standards on the use of risk assessments at defense nuclear facilities based on the results of the risk assessment study.

The Department performed a risk assessment study to determine how best to utilize and control the use of risk assessments, in particular probabilistic risk assessment (PRA) at DOE. This risk assessment study was performed in 2010 and consisted of an evaluation of the application of risk

assessments at DOE and at other Federal Agencies and an evaluation to determine that the controls put in place to ensure risk assessments, if conducted, were properly performed. The results of these reviews were documented in June 2011. Copies have been provided to Board staff.

Based upon the results of this study, the Department concluded that the following changes to directives or standards on the use of risk assessments should be made:

- DOE's Nuclear Safety Policy should be revised to define how risk assessment can supplement the Department's primarily deterministic method of performing safety analysis and establishing safety controls; and
- A new DOE standard for controlling the development and review of PRA should be developed.

In 2011, the Department issued the revised Nuclear Safety Policy and a draft (for interim use and comment) PRA Standard. In early 2013, the draft PRA standard was refined, processed through the Department's review and comment (RevCom) process, and issued in final in October 2013.

4. Summary of Actions Taken to Complete Recommendation 2009-1 Implementation Plan Commitments

Table 1 provides a summary of the actions taken to complete all of the commitments to the Board made in the IP.

Table 1: Actions Taken to Complete Implementation Plan Commitments

Number	Commitment	Actions Taken
1	Provide briefings to the Board to inform on the progress of the IP.	Briefings and status reports were conducted to the Board and/or the Board's staff on the following dates: June 10, 2010; October 27, 2010; April 5, 2011; July 28, 2011; December 12, 2012; and July 30, 2013. Additionally, numerous meetings and discussions were held between DOE and DNFSB staff during the development and review of the DOE draft standard on risk assessment, training development, and potential pilot reviews.
2	Establish the Risk Assessment Technical Experts Working Group that will be available to assist in the review or development of methodologies for risk assessments to be used in nuclear safety applications at defense nuclear facilities, thereby enhancing the consistency and quality of such assessments and their use.	<p>The RWG Charter was signed April 14, 2010. This group meets periodically, with the most recent formal meetings occurring on January 26, 2012; August 27, 2012, and February 19, 2013. DNFSB staff was present and engaged at the most recent meeting. RWG members are typically involved meetings and review other risk assessment related activities, such as the development of the standard.</p> <p>The DNFSB was formally notified of the establishment of the RWG in a letter dated June 18, 2010.</p>
3	Issue a complex-wide Information Notice to provide interim advice about existing policies on use of quantitative risk assessment in nuclear safety application that: 1) discusses risk assessment and its permitted uses under existing policies and requirements; 2) emphasizes the need to effectively implement DOE quality assurance requirements for nuclear safety analyses.	<p>DOE issued an Information Notice on Risk Assessment in Support of DOE Nuclear Safety in June 2010. The notice provided interim guidance on the applicability of risk assessments within DOE's regulatory framework, discussed the formation of the RWG, and provided sources for additional information on risk assessments.</p> <p>The DNFSB was formally notified of the issuance of this notice in a letter dated June 18, 2010.</p>

4	Update and submit a formal Policy statement within the DOE directives system.	<p>DOE issued DOE Policy (P) 420.1, Department of Energy Nuclear Safety Policy on February 8, 2011. This policy highlighted DOE's position that quantitative and PRAs, when employed, are used in a manner that: supplements qualitative/deterministic processes for hazard assessments, hazard control development, and safety management programs development; is consistent with DOE directives; and is supported by industry practices and availability of risk data.</p> <p>DNFSB and staff participated in the preliminary and RevCom reviews of DOE P 420.1 prior to its publication on February 8, 2011.</p>
5	Determine the appropriate Department-specific guidance, standards, or policy expectations that are necessary to ensure the appropriate and consistent use of quantitative risk assessment in nuclear safety analysis and related decision making to support the design and operation of defense nuclear facilities.	<p>To guide any changes to directives and development of standards on the use of risk assessments to support nuclear safety decisions at defense nuclear facilities, reviews of the uses of risk assessments at other agencies and of internal DOE applications were performed. Results of these reviews were documented in June 2011 and shared with the Board staff.</p> <p>Based on these reviews, the Department concluded that a revision to its Nuclear Safety Policy (to address how risk assessments can be utilized in nuclear safety applications) should be made and a new DOE standard for control of the development and review of PRAs should be established.</p> <p>The Department completed its revision of the Nuclear Safety Policy and issued it in 2011. The Department issued a PRA standard for interim use and comment in 2011. In early 2013, the draft PRA standard was refined, processed through the Department's review and comment (RevCom) process, and issued in final in October 2013.</p>

5. Ongoing Efforts to Support Application of Quantitative Risk Assessments

The Department recently completed (September 2013) a pilot of its newly developed PRA training course. This course will be improved based upon feedback from the participants and other lessons learned. It will also be updated to be consistent with the DOE's newly issued PRA standard.

In addition, as DOE builds experience in application of PRA, it will gather lessons learned to determine how it can perform PRAs of a high quality and in a cost effective manner, and gather information on risk data that can be utilized in PRAs at DOE's non-power reactor nuclear facilities.