



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001**

February 22, 2010

The Honorable Gregory B. Jaczko  
Chairman  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**SUBJECT: DRAFT FINAL NUREG-1520 REVISION 1, "STANDARD REVIEW PLAN FOR REVIEW OF A LICENSE APPLICATION FOR A FUEL CYCLE FACILITY"**

Dear Chairman Jaczko:

During the 569<sup>th</sup> meeting of the Advisory Committee on Reactor Safeguards, February 4, 2010, we completed our review of Draft Final NUREG-1520 Revision 1, "Standard Review Plan for Review of a License Application for a Fuel Cycle Facility." Our Radiation Protection and Nuclear Materials Subcommittee also reviewed this matter during its meeting on November 4, 2009. During these reviews we had the benefit of discussions with representatives of the NRC staff. We also had the benefit of the documents referenced.

**CONCLUSION AND RECOMMENDATIONS**

1. Draft Final NUREG-1520 Revision 1, "Standard Review Plan for Review of a License Application for a Fuel Cycle Facility," should be issued.
2. The staff should continue to move in the direction of risk-informed regulations using analytic techniques and terminology consistent with other Agency applications.
3. As follow-on activities for developing and reporting the results of Integrated Safety Analysis (ISAs), attention should be given to:
  - a. Fire-induced "hot shorts" and their potential to place systems in conditions other than a fail-safe condition
  - b. Assessment of chemical hazards, including accident sequences that may result in injuries as well as fatalities
  - c. Treatment of the safety-security interface consistent with other ongoing regulatory initiatives

**BACKGROUND**

Fuel Cycle Facilities (FCFs) are defined as facilities that possess and use special nuclear materials to produce nuclear reactor fuel. These facilities are licensed under 10 CFR Part 70.

The Standard Review Plan (SRP) does not apply to conversion facilities that are regulated under 10 CFR Part 40, nor to gaseous diffusion plants that are currently operating and regulated by 10 CFR Part 76. The SRP also does not address spent nuclear fuel reprocessing or production facilities regulated by 10 CFR Part 50. Guidance for licensing the Mixed Oxide (MOX) facility is provided separately and contained in NUREG-1718, "Standard Review Plan for the Review of an Application for a MOX Fuel Fabrication Facility."

Significant changes to the SRP on the application and use of ISA as a framework for making safety decisions were reviewed and discussed with the Committee. "Integrated" in this context is intended to mean integration of chemical, criticality, fire, and radiological safety into one analysis. Changes to the SRP were made to enhance linkage between review guidance and regulatory requirements, and to add lessons learned from previous reviews. The revision provided additional guidance on the extent to which the approval of an ISA is based on a programmatic review as opposed to a detailed design review. The revised SRP incorporated a number of Interim Staff Guidance documents (ISGs) that currently support the NRC review process. The staff explained the motivation for integrating ISGs into the SRP, which included the associated changes that were made to clarify the review process, and additional information to support operational readiness reviews that are required to be completed prior to introducing radioactive material into a facility.

## **DISCUSSION**

A key strategy used by the staff to risk-inform the review process of FCF license applications is the development and application of ISAs to systematically identify potential accident sequences, and to quantify their associated likelihood and consequences. Although quantification is not required, most licensees do use some form of quantification to determine the significance of an accident sequence instead of solely relying on expert judgment. Items Relied on For Safety (IROFS), that have been found to be necessary to comply with Part 70 Subpart H requirements, are evaluated within the ISA framework in order to determine the appropriate level of management oversight. Guidance has been added to the SRP for reviewers to determine what constitutes an acceptable level of detail for licensing approval of IROFS identified using an ISA process. The added guidance should enhance the review process.

In 2002, the Advisory Committee on Nuclear Waste (ACNW) reported to the Commission that ISAs have a number of shortcomings in the way they address dependencies, uncertainties, and human reliability. The current approach for addressing dependencies, for example, is not systematic. A more systematic approach should be developed that addresses both dependencies and uncertainties. Nevertheless, the ACNW report indicated that ISAs can provide a foundation from which a risk-informed methodology could evolve. That evolution would result in a methodology that provides an integrated risk perspective, and should use terminology consistent with other approaches being used throughout the Agency. Although steps have been taken in that direction, a complete transition has not occurred. For example, the definition and use of the term "risk" is not consistent with the way it is being considered in other applications, most notably in nuclear reactor applications. The term "risk" is currently defined within the ISA framework as the scoring of individual accident sequences. This is inconsistent with the Agency's approach that aggregates scenarios into an overall measurement of risk. Once this is accomplished, importance measures such as "risk achievement worth" and "risk reduction worth" can be applied to capture valuable insights on the significance of structures, systems, and components and their role in maintaining a safe facility.

Currently, “significant events” at fuel cycle facilities are considered to be those that can result in worker fatalities. However, analytical treatment of chemical hazards using an ISA approach should not overlook accident sequences that in the end do not lead to a fatality. In fact, injuries without fatalities are more frequent than those with fatalities. The staff should ensure that applicants do not eliminate accident sequences simply because they do not cause fatalities, or because the sequence is perceived to be of low risk when considered from that perspective.

Consideration of the effects of fire and explosions on safety equipment is always an important part of the licensing process. The impact of fire on electrical systems can be significant not only because of high temperatures that can cause system failure, but also because fires have been shown to cause “hot shorts,” placing equipment in conditions potentially worse than a failed condition. In FCFs, IROFS that depend on electrical power are assumed to fail in a safe condition during a fire. The possibility that fire-induced hot shorts can spuriously operate equipment is not currently considered in the SRP but should be.

Neither current regulation nor the SRP addresses the interface between safety and security in FCFs. While full integration of safety with security will take time, it is important that the staff proceed in accordance with Commission direction on this matter.

The revised SRP will be beneficial to the preparation and review of license applications and should be issued.

Sincerely,

*/RA/*

Said Abdel-Khalik  
Chairman

**References:**

NUREG-1520 Rev 1, “Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility,” Draft Report for Comment, 8/2009 (ML092260348)

NUREG-1718, “Standard Review Plan for the Review of an Application for a Mixed Oxide (MOX) Fuel Fabrication Facility,” 8/2000 (ML003741461 and ML003741581)  
(<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1718/>)

Letter to Richard A. Meserve, Risk-Informed Activities in the Office of Nuclear Material Safety and Safeguards 1/14/2002 (ML020240223) (<http://www.nrc.gov/reading-rm/doc-collections/acnw/letters/2002/1310177.html>)

Resolution of Comments Received on Draft NUREG-1520, Revision 1, 12/30/2009 (ML093451435)

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Letter to the Honorable Gregory B Jaczko, Chairman, NRC, from Mario V. Bonaca, Chairman, ACRS, dated February 22, 2010.

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