

March 22, 2011

Dr. Said Abdel-Khalik, Chairman  
Advisory Committee on Reactor Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

SUBJECT: RESPONSE TO THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
REPORT ON THE COMPARISON OF INTEGRATED SAFETY ANALYSIS  
AND PROBABILISTIC RISK ASSESSMENT FOR FUEL CYCLE FACILITIES

Dear Dr. Abdel-Khalik:

During the 580<sup>th</sup> meeting of the Advisory Committee on Reactor Safeguards (the Committee), which took place February 10–12, 2011, the Committee completed its review of the U.S. Nuclear Regulatory Commission (NRC) staff's white paper, "A Comparison of Integrated Safety Analysis and Probabilistic Risk Assessment." The Radiation Protection and Nuclear Materials Subcommittee had also reviewed this matter during a meeting on January 11, 2011. On February 17, 2011, the Committee provided a letter to Chairman Jaczko with a substantial discussion, three conclusions, and one recommendation about the subject of the staff's paper. The NRC staff appreciates the Committee's thorough review of the integrated safety analysis (ISA) and probabilistic risk assessment (PRA) comparison paper. This letter provides some additional information related to the Committee's recommendation that may be helpful for the Committee's future discussions of this and related subjects.

The Committee's letter included the following conclusions and recommendation:

1. The staff's report, "A Comparison of Integrated Safety Analysis and Probabilistic Risk Assessment," provides an exposition of the advantages and disadvantages of the use of ISA and PRA methodologies in the regulation of fuel cycle facilities (FCFs).
2. ISAs, in combination with practices required by current regulations, are adequate for the protection of the health and safety of workers and the public, and for licensing FCFs under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 70.
3. For more complex facilities, especially those with the potential for large radiological exposure or releases, the use of a PRA approach is advantageous because it provides a basis for prioritization of safety systems and maintenance activities.
4. The staff should continue to develop and test the use of focused PRA-like analyses to help assess the risk significance of inspection findings for FCFs.

Regarding conclusions 1 and 3, it should be noted that, because of the context of the staff requirements memorandum (SRM) that directed the staff to produce the ISA-PRA comparison

paper, the staff had restricted the scope of its paper to only two applications of ISA and PRA methodologies: (1) for safety and compliance under 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," and (2) for risk significance determination in a fuel cycle oversight process. The paper did not substantively address the complex subject of the use of ISA or PRA methodologies for the prioritization of systems and activities, mentioned in conclusion 3. In fact, the staff has engaged in prioritizing safety systems in centrifuge enrichment facilities and the Mixed Oxide Fuel Fabrication Facility (MFFF) for regulatory purposes. Such prioritizations have used ISA results, with limitations, since the ISAs were not performed for this purpose. Specifically, the staff used the ISA's to prioritize the focus of the operational readiness inspections at the Louisiana Energy Service's National Enrichment Facility and at USEC, Inc.'s American Centrifuge Plant. For the MFFF, the staff used ISA information to prioritize items relied on for safety in the development of the verification program for principal structures, systems and components, which is required by 10 CFR 70.23a(8) prior to issuance of a license. Although actual PRA information would be useful for the prioritization of complex facilities, it should be noted that the ISA regulation (10 CFR Part 70, Subpart H, "Additional Requirements for Certain Licensees Authorized To Possess a Critical Mass of Special Nuclear Material") does not require licensees to provide a PRA.

It should also be noted that most fuel cycle facilities do not have the potential for large radiological exposures to persons offsite. One type of facility that could is a reprocessing plant. Staff is currently reviewing how PRA methods might be used in a regulatory framework appropriate for reprocessing.

Conclusion 2, that ISAs are adequate for safety, supports a key point of the staff's white paper. A related point in the paper is that the front end of ISAs, identifying accident sequences, is essentially the same as for PRA. Thus, the adequacy of this step depends on execution rather than methodology. Also some ISAs have used PRA methods in other ISA steps as well.

Recommendation 4, pursuing PRA-like risk significance determination, is a subject that the staff will address in a paper to the Commission in late July 2011, along with other topics related to risk-informing the fuel cycle oversight program, as directed in the SRM to SECY-10-0031, "Revising the Fuel Cycle Oversight Process," dated August 4, 2010. Consistent with this SRM, the staff is developing a set of cornerstones. The staff will integrate the knowledge gained from this activity and the ISA-PRA comparison to provide recommendations for the next steps on revising the fuel cycle oversight process. These recommendations will be provided to the Commission in July 2011. The NRC staff hopes to present this broader subject to the Committee at an appropriate time after the recommendations have been submitted to the Commission.

The NRC staff recognizes the Committee's commitment to excellence in the NRC's regulation of the safety of FCFs and looks forward to future interactions on the use of ISA and PRA methodologies in this area.

Sincerely,

***/RA by Michael F. Weber for/***

R. W. Borchardt  
Executive Director  
for Operations

cc: Chairman Jaczko  
Commissioner Svinicki  
Commissioner Apostolakis  
Commissioner Magwood  
Commissioner Ostendorff

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