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NUCLEAR ENERGY INSTITUTE

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February 8, 2011

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

**Subject:** Industry Statement on Comparison of Integrated Safety Analysis and Probabilistic Risk Assessment at Fuel Cycle Facilities (Reference: Staff Requirements Memorandum Dated May 12, 2010)

**Project Number: 689**

Dear Dr. Abdel-Khalik:

On behalf of the fuel cycle industry, the Nuclear Energy Institute (NEI)<sup>1</sup> submits the enclosed statement on the U.S. Nuclear Regulatory Commission (NRC) staff's efforts to compare the use of integrated safety analyses at fuel cycle facilities and probabilistic risk assessment at power reactors. Industry has previously provided feedback to the NRC staff on this subject in a November 5, 2010, public meeting and a November 19, 2010, letter on the development of the staff white paper entitled, "A Comparison of Integrated Safety Analysis and Probabilistic Risk Assessment." We also briefed your Subcommittee on Radiation Protection and Nuclear Materials on January 11 and are scheduled to brief your full Committee on February 10.

We look forward to the committee's letter report and the staff's recommendations to the Commission on this important matter expected in March. If you would like to discuss this matter, I may be reached at 202-739-8098; [jrs@nei.org](mailto:jrs@nei.org).

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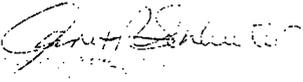
<sup>1</sup>NEI is the organization responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry. NEI's members include all utilities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, nuclear material licensees, and other organizations and individuals involved in the nuclear energy industry.

Dr. Said Abdel-Khalik

February 8, 2011

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Sincerely,



Janet R. Schlueter

Enclosure

c: Mr. Michael Weber, DEDMRS/OEDO, NRC  
Ms. Annette Vietti-Cook, SECY, NRC  
Ms. Catherine Haney, NMSS, NRC  
Mr. John Kinneman, NMSS/FCSS, NRC  
Mr. Anthony Gody, DFFI/RII, NRC  
Mr. Michael Benson, ACRS, NRC

### **Industry Comments on Comparison of Integrated Safety Analysis and Probabilistic Risk Assessment at Fuel Cycle Facilities**

- This statement reflects the consensus of the fuel cycle facilities on the comparison of integrated safety analysis (ISA) and probabilistic risk assessment (PRA) as reflected in an NRC public meeting conducted on November 5, 2010, in a letter dated November 19, 2010, on the development of the staff white paper entitled, "A Comparison of Integrated Safety Analysis and Probabilistic Risk Assessment," and in a briefing to the Advisory Committee on Reactor Safeguards Subcommittee on Radiation Protection and Nuclear Materials on January 11, 2011.
- The ISA methodology is a systematic, risk-informed and performance-based analysis that is implemented by fuel cycle facilities and has been demonstrated to maintain safety and achieve compliance with applicable NRC Performance Requirements (10 CFR 70.61).
- The ISA provides the methodology to assess and establish the needed safety basis to assure that the handling of nuclear material is within the programmatic requirements, that the safety program is appropriate for the risk, and that the measures for carrying out the safety program are appropriately monitored through the existing fuel cycle oversight process (FCOP).
- The ISA is both a design and safety analysis methodology to demonstrate and assure that appropriate safety controls are in place to meet performance requirements intended to protect the worker, the public, and the environment. Risk management techniques, on which the ISAs are based, were established about 50 years ago, are used throughout the chemical industry (known as "Process Hazards Analysis"), and are a critical element in managing process safety as is evidenced in several industry standards.
- ISAs are living documents integrated into the configuration control of our facilities. They rely on conservative safety assumptions, always contain a current safety basis, include a feedback loop for identifying and correcting deficiencies based on operating experience, and are adequately quantitative to provide both the NRC and fuel cycle facilities with essential information about the risks to facility safety, their likelihood, and how best to avoid and mitigate them.
- A significant amount of resources has been expended by industry and NRC to meet existing regulatory requirements. It took 10 years to develop the performance-based rule and the acceptance criteria, each licensee then spent 4-5 years with many diversified technical resources to perform the ISA for their facility, and the NRC staff typically spent 1-2 years for their review. Annual ISA updates require additional licensee resources and subsequent NRC reviews to assure they are maintained as living assessments.
- Given the small number, diversity, and risk profile of the fuel cycle facilities, ISAs allow each facility the flexibility to appropriately address their unique site processes, procedures, and resources.
- The International Atomic Energy Agency in its reporting scale for nuclear and radiological events indicates that the risk from fuel facilities is considered to be three orders of magnitude below that of power reactors. Accidents result in minimal or negligible impact to offsite members of the public.
- Risks posed from hazardous chemicals or fissionable materials associated with a fuel cycle facility are typically limited to workers located within the boundaries of the site, whereas the large radiological source term associated with a power reactor has the potential to affect large populations surrounding the reactor site.

- ISA is not a PRA technique, and is not intended to determine the overall risk of systems, the facility, or the overall risk of a fleet of facilities. A PRA analysis using discreet failure data is not needed to be able to demonstrate the needed basis for safety decisions at fuel cycle facilities.
- Conducting a PRA is a complex and resource intensive undertaking. Due to the small and diverse fleet, the databases needed to develop a PRA would be costly and difficult to develop as there will not likely be any statistically significant event or operational data on which to base a PRA, while providing little additional safety benefit due to the lack of inter-dependent systems that are characteristic of fuel cycle facilities and other differences when compared to power reactors.
- In addition to the financial costs of undertaking PRA for these facilities, which are not a part of current and future business plans, the resource implications to safe operation and higher valued safety work would be significant and would require a different mix of technical resources not currently in place at fuel cycle facilities.
- A decision on the use of PRAs in any phase of safety management of fuel cycle facilities needs to be based on a cost benefit analysis which articulates and justifies anticipated safety improvements, not simply rely on a technical preference in the absence of an identified safety or regulatory concern.
- Industry strongly recommends that PRA techniques not be applied to or replace the current ISA methodology as this would create confusion at most facilities, since those techniques are not readily applicable, and the necessary professional disciplines are not on staff.
- NRC has an adequate FCOP that is focused on safety and compliance and is not in need of immediate repair, but can be improved.
- For example, the FCOP could be made more objective, predictable, and transparent to all stakeholders, and it could integrate available data and risk information to inform the process and help industry and NRC collectively prioritize our resources on our higher risk activities. The industry and NRC are still developing insightful uses for the ISA information in oversight, operations, and design just as the power reactors did in the earlier years of PRA utilization.
- Industry supports discussion of how the ISA methodology could support an enhanced FCOP and stands ready to explore options to reflect additional risk insights/information.
- Fuel cycle facilities have corrective action programs (CAPs) and industry believes there could be value for NRC to disposition inspection findings through facility CAPs and looks forward to further discussions with NRC in this area.
- We encourage NRC to engage industry in a measured and meaningful manner to help achieve our mutual goals.
- Industry's highest priority is ensuring safety, and we will continue to work with NRC to prioritize and identify enhancements to its regulatory programs.