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

October 17, 2011

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

SUBJECT: ENHANCING THE FUEL CYCLE OVERSIGHT PROCESS

Dear Chairman Jaczko:

During the 587th meeting of the Advisory Committee on Reactor Safeguards (ACRS), October 6-8, 2011, we reviewed the staff's proposed approach to enhance the NRC's Fuel Cycle Oversight Process (FCOP). Our Radiation Protection and Nuclear Materials Subcommittee met on June 20, and September 23, 2011, to review and discuss this issue. During these meetings we had the benefit of discussions with representatives from the NRC staff and Industry, and we reviewed summary comments from the Nuclear Energy Institute (NEI). We also had the benefit of the documents referenced.

CONCLUSIONS AND RECOMMENDATIONS

1. The proposed FCOP framework is a substantial improvement over the traditional process and is ready to go to the next stage of development. Performance criteria and thresholds for the cornerstones, cross cutting issues, significance determination process (SDP), and action matrix need to be defined.

2. We agree with the choice of "hazard-based" cornerstones that are analogous to the cornerstones used in the Reactor Oversight Process (ROP) which support the Commission's strategic goals for maintaining safety and security. The use of a separate cornerstone that explicitly reflects barrier performance, rather than having barrier performance integrated into the safety controls cornerstone, should be considered further during the pilot process.

3. The qualitative SDP proposed by the staff should be adequate to assess most performance deficiencies and should be developed. However, development of a quantitative process should also be pursued for the evaluation of more significant deficiencies.

4. The staff's proposed structure for the oversight process provides incentives for effective corrective action programs (CAPs).

BACKGROUND

On March 19, 2010, the staff transmitted to the Commission SECY-10-0031, "Revising the Fuel Cycle Oversight Process," and requested that the Commission approve a plan to enhance the FCOP. In a Staff Requirements Memorandum (SRM) dated August 4, 2010, the Commission disapproved the staff's plan, and directed that the staff pilot a project to develop a set of cornerstones that could link licensee performance to regulatory action through an action matrix. The SRM also directed the staff to provide incentives to licensees to maintain a strong CAP and to revise the baseline inspection program to credit effective problem identification and resolution. In addition, the Commission directed the staff in a March 12, 2010, SRM to prepare a white paper that compares Integrated Safety Analyses (ISAs) for fuel cycle facilities (FCFs) and Probabilistic Risk Assessments (PRAs), "to better inform proposed enhancements to the oversight process." We subsequently reviewed and issued a letter report to the Commission on the comparison study. Both the study and our letter report were used by the staff to better identify enhancements to the oversight process.

DISCUSSION

The framework being proposed by the staff to enhance the oversight process for FCFs is a substantial improvement over the traditional process currently being used to assess licensee performance. The traditional process has less flexibility because it is focused on compliance rather than risk significance and safety performance. The key components of the conceptual process now being proposed are analogous to those used by the ROP: (1) cornerstones that focus on key safety functions, (2) consideration of cross-cutting areas, (3) use of a risk-informed SDP, and (4) an action matrix to link licensee performance to regulatory actions. The proposed process provides incentives to licensees to maintain a strong CAP. This includes the authority to resolve minor performance deficiencies in an effective and timely fashion.

<u>Cornerstones</u>

The use of cornerstones to help organize the inspection and monitoring of licensee performance is well established within the NRC. The ROP uses seven cornerstones to address licensee performance at all 104 operating power reactors. These cornerstones support three key areas: (1) reactor safety, (2) radiation safety, and (3) safeguards.

The proposed FCOP uses a similar approach for currently operating FCFs within the U.S. Six cornerstones support three key areas: (1) fuel facility safety, (2) radiation safety, and (3) safeguards. The cornerstones provide a basis to explicitly link regulatory action to licensee performance. The action matrix and associated criteria to assess licensee performance, including performance indicators at FCFs, still need to be developed. Nevertheless, the process is a step in the right direction and can build upon NRC's success with the ROP.

Operations-based cornerstones organized along program lines that reflect day-to-day operations have been considered as an alternative to hazards-analysis based cornerstones. The hazards-analysis based cornerstones focus on key safety functions and align with the way licensees develop and maintain their ISAs. These cornerstones enable licensees to capitalize on insights from their ISAs and are a better choice for the oversight process.

A comparison of the cornerstones being proposed for FCFs to those currently being used for operating reactors is provided below.

FCOP Cornerstones	***ROP Cornerstones***
accident sequence initiators	initiating events
safety controls	mitigating systems
	barrier integrity
emergency preparedness	emergency preparedness
occupational radiation safety	occupational radiation safety
public radiation safety	public radiation safety
security/material control and accountability (MC&A)	physical protection

There is excellent alignment between the cornerstones for the FCOP and ROP except for the barrier integrity cornerstone which is not being proposed for the FCOP because of differences in technology. Operating reactors rely on a series of physical barriers to prevent the release of radioactive material. While physical barriers are important to the control of radioactive and chemical materials in FCFs, such facilities have a strong reliance on non-physical barriers such as procedures, controls, or systems (e.g., filtered ventilation systems). Because of this relative decrease in reliance on physical barriers, the staff integrated the barrier integrity cornerstone into the safety control cornerstone.

Although performance indicators for barriers such as procedures and controls would be different from those for physical barriers, the function to retain hazardous materials onsite during an off normal or accident condition is similar. Indeed, the functionality of the primary system as a barrier to releases in reactors has similar attributes to barriers at fuel cycle facilities (e.g., piping, tanks). A pilot project should go forward to test the cornerstones, and further consideration should be given to a barrier cornerstone.

Significance Determination Process

The staff proposes to use a qualitative SDP to assess inspection findings. The recommended approach is consistent with the ISA process used in FCFs. ISAs identify accident sequences and management measures to assure that the items relied on for safety (IROFS) are reliable and available to prevent or mitigate accidents, but are generally conservative and not amenable to estimation of realistic integrated risk. We previously recommended that the staff “continue to develop and test the use of focused PRA-like analyses to help assess the risk significance of inspection findings for FCFs.” A qualitative SDP approach, such as that proposed by the staff, is simpler and less resource intensive than a PRA, easier to standardize across licensees, and is adequate to assess most findings of performance deficiencies. It should be developed as part of the oversight process. However, a more quantitative process is needed to help evaluate more significant events. Thus, we continue to recommend that the staff also develop and test the use of focused PRA-like analyses.

Corrective Action Program

The proposed process would allow licensees who maintain effective CAPs to manage and correct performance deficiencies of very low safety significance (Severity IV) without being cited for a violation. In addition, the proposed process allows the staff to reduce the level of inspection oversight for licensees with effective CAPs. To receive credit, a license condition would be added that commits the licensee or certificate holder to the objectives as well as attributes of an effective CAP.

An effective CAP involves maintaining a strong safety culture and in-depth understanding of the safety significance of a performance deficiency, its root cause, and the implication of a deficiency to other processes and practices. It also promotes a questioning attitude that examines the extent of condition and performance improvement beyond the identified performance deficiency.

We look forward to additional discussions with the staff on the development of performance criteria and thresholds for the cornerstones, cross-cutting areas, the SDP, and action matrix, and guidance for implementing credit for the CAP.

Sincerely,

/RA/

Said Abdel-Khalik
Chairman

REFERENCES

1. U.S. Nuclear Regulatory Commission, “Enhancements to the Fuel Cycle Oversight Process,” Draft SECY-11-0140, provided to the ACRS on October 3, 2011 (ML111180705)

2. U.S. Nuclear Regulatory Commission, “Revising the Fuel Cycle Oversight Process,” SECY-10-0031, March 19, 2010 (ML100570250)

3. U.S. Nuclear Regulatory Commission, “Revising the Fuel Cycle Oversight Process,” Staff Requirements Memorandum (SRM) - SECY-10-0031, August 4, 2010 (ML102170054)

4. U.S. Nuclear Regulatory Commission, “Briefing on the Fuel Cycle Oversight Process Revisions,” Staff Requirements Memorandum (SRM) M100429, May 12, 2010 (ML101320075)

5. U.S. Nuclear Regulatory Commission, “Paper Comparing Integrated Safety Analysis for Fuel Cycle Facilities and Probabilistic Risk Assessments for Reactors,” December 15, 2010 (ML103330474)

6. ACRS Letter, “Comparison of Integrated Safety Analysis (ISA) and Probabilistic Risk Assessment (PRA) for Fuel Cycle Facilities,” February 17, 2011 (ML110460328)

7. Nuclear Energy Institute Letter, “Summary of Industry Comments as Discussed During August 18-19, 2011, NRC Public Meeting on Fuel Cycle Oversight Program,” August 31, 2011 (ML112490224)

6. ACRS Letter, “Comparison of Integrated Safety Analysis (ISA) and Probabilistic Risk Assessment (PRA) for Fuel Cycle Facilities,” February 17, 2011 (ML110460328)

7. Nuclear Energy Institute Letter, “Summary of Industry Comments as Discussed During August 18-19, 2011, NRC Public Meeting on Fuel Cycle Oversight Program,” August 31, 2011 (ML112490224)

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