February 20, 2007

MEMORANDUM TO: Chairman Klein
Commissioner McGaffigan
Commissioner Merrifield
Commissioner Jaczko
Commissioner Lyons

FROM: Luis A. Reyes ***/RA/***
Executive Director for Operations

SUBJECT: HOW THE NUCLEAR REGULATORY COMMISSION REGULATES MATERIAL DEGRADATION AND AGING ISSUES AT THE FUEL CYCLE FACILITIES

This memorandum responds to the September 26, 2006, Staff Requirements Memorandum, "Staff Requirements - SECY-06-0186 - Increasing Licensing Terms for Certain Fuel Cycle Facilities." To be sure that the proposed increase in license term duration is appropriate, the Commission directed the staff to review the U.S. Nuclear Regulatory Commission (NRC) fuel cycle facilities' inspection program, to ensure that the inspectors are appropriately focused on the licensees' existing programs that address material degradation and aging issues (e.g., the chemical process safety, corrosion prevention, and environmental qualification programs). The Commission also directed the staff to describe how material degradation and aging issues are addressed in accordance with 10 CFR Part 70 (Part 70), Subpart H, and NRC 's licensing and inspection programs.

Material degradation and aging issues are considered when implementing the requirements of Part 70, Subpart H. As discussed below, the staff finds that no changes to the NRC inspection and regulatory programs are now needed to support the proposed increase in license term duration. Currently licensed fuel cycle facilities do not have significant aging and degradation issues, because they: (1) can halt processes at any time to replace or repair equipment; (2) do not have large radiation source terms to consider when they replace or repair equipment; (3) have easy access when repairing or replacing equipment; and (4) do not have material neutron embrittlement.

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Summary of Subpart H Provisions Related to Material Degradation and Aging Issues

The Subpart H performance requirements are set forth in 10 CFR 70.61, and include 10 CFR 70.61(e). These regulations require that each licensee establish and maintain a safety program to ensure that each item relied on for safety (IROFS) will be available and reliable to perform its intended function when needed. In establishing the safety program, the licensee must identify process safety information to support the performance of an integrated safety analysis (ISA). As part of conducting the ISA, using a methodology acceptable to the NRC, licensees are required to identify all potential accident sequences that can result in significant consequences. Licensees must adhere to the performance requirements of 10 CFR 70.61 on a continuous basis, and the management measures (MMs) established under 10 CFR 70.62(d) must ensure that the IROFS are designed, implemented and maintained such that they will always be available and reliable.

Section 70.62(a)(3) requires that each fuel cycle licensee maintain records of IROFS or MMs that have failed to perform their functions on demand, or have degraded such that the performance requirements of 10 CFR 70.61 are not satisfied. The MM program includes: (1) preventive maintenance; (2) corrective maintenance; (3) surveillance and monitoring; and (4) functional testing of IROFS to ensure that IROFS are not used beyond their anticipated life. In designing new facilities or new processes at existing fuel fabrication facilities that will require a license amendment, 10 CFR 70.64(a)(4) requires the licensee to consider whether the design provides adequate protection from environmental and dynamic effects associated with normal operations that could lead to loss of safety functions. In addition to maintaining the ISAs current, which includes consideration of material degradation and aging issues, licensees are required to provide the NRC with annual updates to the ISA Summaries. The ISA Summary provides a synopsis of the results of the ISA and contains the information specified 10 CFR 70.65(b).

Summary of Inspection Program

Inspections for fuel cycle facilities are planned according to Inspection Manual Chapter (IMC) 2600, Fuel Cycle Facility Operational Safety and Safeguards Inspection Program. Following the revisions to Part 70 in 2000, IMC 2600 and the Inspection Procedures (IPs) were revised to address the changes made to Part 70 by the addition of Subpart H, and to reflect the enhancements made to the fuel cycle facilities' inspection program. The IPs provide guidance to the inspectors for evaluating: (1) the licensee's configuration management and change control programs, to ensure that permanent plant modifications do not degrade the performance capabilities of the IROFS, or other safety controls that are part of the safety design basis; (2) the initial risk significance of the licensees' events and degraded conditions, considering the information in the ISA Summary, if any, and the level of safety controls or the IROFS lost or degraded and remaining; (3) the maintenance of the IROFS, ensuring they are available and reliable to perform their functions when needed; and (4) equipment conditions and items that might degrade plant performance.

Through the license review process and inspection program, the NRC staff assess the licensees' safety programs, including their MMs, ISA Summaries, and facility change reviews, to ensure that the IROFS are reliable and available to perform their intended safety functions and, when appropriate, will share generic equipment failures with other fuel cycle licensees. The

inspection program evaluates the MM program that includes preventive and corrective maintenance, surveillance and monitoring, and functional testing to ensure the availability and reliability of IROFS. Additionally, in the event that the NRC receives a license application for a different technology (e.g., reprocessing and recycling facilities), the NRC will reevaluate the license and inspection programs to address the material degradation and aging issues for these new technologies.

Conclusion

Licensed fuel cycle facilities do not have significant aging and degradation issues. The licensing and inspection programs ensure that: (1) safety equipment is reliable and available; (2) licensees maintain records of safety equipment; (3) the design for the environmental and dynamic effects for new facilities or new processes at existing facilities provides adequate protection; (4) the licensees have an adequate configuration management program; (5) plant modifications do not degrade the performance of the safety controls; (6) generic information of equipment failures are shared with other fuel cycle licensees; and (7) the preventive and corrective maintenance, surveillance and monitoring, and functional testing of IROFS are adequate. Based on this, the staff does not believe that additional regulations pertaining to material degradation and aging issues are needed at this time, and concludes that the material degradation and aging issues do not affect the duration of the license term. However, in the event that the NRC receives a license application for a different technology, the NRC will reevaluate the license and inspection programs to ensure that material degradation and aging issues are adequately addressed.

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