NRC RESPONSE TO GAO RECOMMENDATIONS

In its report, "Nuclear Regulatory Commission: NRC Needs to Do More to Ensure That Power Plants Are Effectively Controlling Spent Nuclear Fuel" (GAO-05-339), the U.S. Government Accountability Office (GAO) made two recommendations to improve the effectiveness of nuclear reactor licensees' material control and accounting programs for spent nuclear fuel. These recommendations, and the U.S. Nuclear Regulatory Commission's (NRC's) responses to them, are provided below. The background information describes other ongoing material control and accounting (MC&A) actions taken by NRC in response to recent findings.

Background:

In late 2000, Northeast Nuclear Energy Company, then the licensee for Millstone Unit 1 (Connecticut), discovered that two irradiated fuel rods were missing. Northeast Utilities and the new licensee, Dominion Nuclear Connecticut, searched extensively and conducted a study of the root cause and possible scenarios leading to the failure to account for the rods throughout 2001, which NRC monitored and reviewed. The licensee did not find the rods and determined that they likely had been shipped in a burial cask to a licensed disposal site. The NRC enforcement action culminated on June 25, 2002, with NRC issuing a Severity Level II violation and a $288,000 civil penalty to the licensee.

Further actions to determine if the MC&A problem identified at Millstone Unit 1 also existed at other plants were delayed because of the events of September 11, 2001, and the associated need to focus NRC resources on enhanced security matters. On November 26, 2003, the NRC issued Temporary Instruction (TI) 2515/154, "Spent Fuel Material Control and Accounting at Nuclear Power Plants," which directed NRC Regional Inspectors to inspect licensee programs for accounting for and controlling their spent fuel and also required a more extensive review of licensees' programs by qualified MC&A inspectors if individual fuel pins had been removed from assemblies or fuel had been reconstituted. The TI also required more detailed inspections at 12 sites.

During the conduct of the inspections, in early 2004, the NRC Resident Inspector at Vermont Yankee required the licensee to confirm visually that two pieces of irradiated fuel rods, which licensee records indicated were stored in a container in the spent fuel pool, were in their assigned locations. Retrieval of the container and visual examination revealed that the fuel pieces were not in their last known location. After an extensive 3-month search, the licensee found the two pieces in another location in the spent fuel pool. Possible NRC enforcement action is pending.

Also in early 2004, during preparation for dry storage, and with heightened MC&A awareness as a result of NRC inspection activities, the licensee for Humboldt Bay discovered that three pieces cut from a spent fuel rod in the mid-1970s could not be located. The search and investigation are ongoing. In this case, as in the other two cases, there is no reason to conclude that the pieces were ever in the public domain or posed a threat to the public.

It is important to note that for these cases of missing or unaccounted for fuel rods and pieces, the initiating events occurred decades ago. Loss of continuity for knowledge of the location of

the pieces that were eventually found at Vermont Yankee occurred around 1980. The two missing spent fuel rods at Millstone were first left off the spent fuel pool map in 1980. The pieces at Humboldt Bay date to the 1960s.

In June 2004, NRC issued Information Notice 2004-12, "Spent Fuel Rod Accountability," informing licensees about the Millstone and Vermont Yankee problems.

In February 2005, after analyzing results from the inspections conducted under TI 2515/154 and based on the experience gained from findings at Millstone Unit 1, Vermont Yankee, and Humboldt Bay, NRC issued Bulletin 2005-01, "Material Control and Accounting at Reactors and Wet Spent Fuel Storage Facilities." The Bulletin called for licensees to review and report information concerning their MC&A program. NRC is currently analyzing licensees' Bulletin responses in order to establish the priority for the additional more detailed inspections of MC&A programs under TI 2515/154. Based on the Bulletin response by the licensees and any findings from the additional NRC inspections, NRC will determine if further action is required on a plant-specific or generic basis.

Spent fuel is subject to multiple layers of protection, of which MC&A is one layer. Prior to September 11, 2001, spent fuel was protected by armed guards, physical barriers, intrusion detection systems, radiation detection systems, area surveillance systems, and access authorization requirements for employees working inside the plant. Since September 11, 2001, NRC has significantly modified its requirements, and licensees have significantly improved security at spent fuel facilities and nuclear power plants. NRC believes that the multiple measures associated with spent fuel provide adequate defense and that the public health and safety, the environment, and the common defense and security are adequately protected. In addition, we believe that heightened awareness brought about through the Information Notice, Bulletin, and NRC inspections under TI 2515/154 continue to strengthen MC&A programs.

Recommendation 1:

Establish specific requirements for the control and accounting of loose spent fuel rods and rod segments and nuclear reactor licensees' conduct of their physical inventories.

NRC Response:

As stated in NRC's comments on the draft GAO report (see final report, Appendix III), the NRC believes the regulations related to MC&A are clear and do not need revision. Under 10 CFR 74.19, each licensee is required to keep records of receipt, shipment, disposal, and inventory (including location) of all special nuclear material in its possession and to perform annual physical inventories of all special nuclear material. In this context, all special nuclear material includes irradiated nuclear fuel in all forms and includes rods and pieces. This regulation was the basis for the civil penalty assessed the licensee for the Millstone Unit 1 missing fuel rods incident.

The NRC agrees that licensees need more specific guidance in the control and accounting of rods and pieces and the conduct of physical inventory. The NRC plans to revise its guidance to clarify that the regulations apply to rods and pieces that have been separated from their parent assemblies. The NRC will revise the guidance documents for MC&A at nuclear power plants, including Regulatory Guide 5.29, "Nuclear Material Control Systems for Nuclear Power Plants"

and Regulatory Guide 5.49, “Internal Transfers of Special Nuclear Material.” Information and experience gained from the additional inspections conducted under TI 2515/154 will form the basis for revising these documents. Following Commission review, the scope and schedule of any modifications to the guidance will be developed.

The NRC staff has also taken responsibility for leading an American National Standards Institute (ANSI) committee to revise its standard N15.8, “Nuclear Material Control Systems for Nuclear Power Plants.” Experts from government and industry have been asked to review the existing standard and to propose changes designed to improve MC&A programs at nuclear power plants. The draft will be presented to the ANSI –15 Technical Standards Committee on Methods of Nuclear Material Control at the annual meeting of the Institute of Nuclear Materials Management in July 2005.

Information gathered from the inspection under the TI and responses to the Bulletin increased NRC understanding of the variety and extent of problems associated with MC&A, especially in relation to control of fuel rods and rod pieces. NRC expects to gather more information during conduct of additional, more detailed inspections, which can be used to improve the written regulatory guidance.

Recommendation 2:

Develop and implement appropriate inspection procedures to verify compliance and assess the effectiveness of licensees’ material control and accounting programs for spent fuel.

NRC Response:

NRC agrees with the recommendation and is in the process of developing inspection procedures to assess the effectiveness of licensees’ MC&A programs, including control and accounting of separated fuel rods and rod pieces. The NRC staff is preparing a revision of Inspection Procedure (IP) 85102, “MC&A - Reactors,” and plans to finalize the procedure by the end of the second quarter of FY 2006. The revision will take into consideration the information from inspectors collected under of TI 2515/154 and other information reported by licensees in response to Bulletin 2005-01. Additional, more detailed inspections under the TI will be conducted in accordance with the TI instruction.

As stated above, NRC staff members are analyzing licensee responses to Bulletin 2005-01 as they are received and using the responses in conjunction with information collected during inspections conducted under the TI to establish priority for the additional 12 inspections of power reactor MC&A programs under the IT. The first of the more detailed inspections under the TI will be conducted during June 2005. Twelve inspections are scheduled to be conducted by November 26, 2005, the date established in the TI. Each inspection will be tailored to emphasize areas identified in the analysis of answers to TI questions and Bulletin responses. The NRC is reviewing long-term inspection requirements for ongoing oversight of licensees in this area. NRC will continue to evaluate and revise the MC&A inspection program at power reactors, as appropriate, as additional information indicates.