January 10, 2007

MEMORANDUM TO: Luis A. Reyes
Executive Director for Operations

FROM: Stephen D. Dingbaum **/RA/**
Assistant Inspector General for Audits

SUBJECT: MEMORANDUM REPORT: AUDIT OF NRC'S REGULATION OF NUCLEAR FUEL CYCLE FACILITIES (OIG-07-A-06)

This memorandum is the second and concluding report to be issued by the Office of the Inspector General during its audit of NRC's regulation of nuclear fuel cycle facilities.[1] Auditors identified an issue that warrants your attention.

NRC could improve upon its regulation of nuclear fuel cycle facilities by developing and implementing a framework for its oversight program that is modeled after a structured process, such as the Reactor Oversight Process (ROP).

BACKGROUND

NRC's safety oversight program for major fuel cycle facilities includes inspections focused on reviews of safety, safeguards, and environmental protection. This program applies to gaseous diffusion plants, highly enriched uranium fuel fabrication facilities, low-enriched uranium fuel fabrication facilities, and uranium hexafluoride production facilities. The uranium mill facilities have a separate inspection program.

Currently, NRC regulates 10 major fuel cycle facilities to ensure they are operating safely. Title 10 of the Code of Federal Regulations (CFR), codifies the rules for regulating fuel cycle facilities. The CFR is divided into parts covering

[1] On June 23, 2006, OIG issued its first report, *Audit of NMSS' Procedures for Processing Inspection Guidance* (OIG-06-A-13), regarding NRC's regulation of nuclear fuel cycle facilities.

specific regulatory areas. As such, two fuel cycle facilities are regulated under 10 CFR Part 76,[2] seven facilities (including one that was recently approved for a license) are regulated under 10 CFR Part 70,[3] and one facility is regulated under 10 CFR Part 40.[4]

The Office of Nuclear Material Safety and Safeguards (NMSS) has overall responsibility for the agency's regulation of fuel cycle facilities. Specifically, the Division of Fuel Cycle Safety and Safeguards (FCSS) in NMSS is responsible for developing, implementing, and evaluating overall agency safety policy for the fuel cycle facilities. In fiscal year 2006, for fuel cycle facility regulation, FCSS was authorized a staff of 87 with an estimated budget of $11.7 million for salaries and benefits, and $1.3 million for travel, training, and contract support costs.

NRC's current fuel cycle facility oversight program relies primarily on inspections. Inspections at fuel cycle facilities occur several times a year and typically cover activities such as nuclear criticality control, chemical process, emergency preparedness, fire safety, and radiation safety. NRC's inspection results are documented in inspection reports.

PURPOSE

This audit's objective was to determine if NRC has an effective and efficient approach to fuel cycle facility oversight.

FINDING

The agency's current Fuel Cycle Facility Oversight Program would be enhanced by developing and implementing a framework that is modeled after a structured process, such as the ROP. NRC staff identified needed improvements in its oversight program for regulating fuel cycle facilities. To address such issues, staff began developing a structured process that emulates the ROP. However, NRC stopped short of fully developing and implementing a framework that would improve NRC's Fuel Cycle Facility Oversight Program. Today, the staff-identified improvements from 2000 are still needed. As a result, the framework for regulating fuel cycle facilities is not as robust as it could be.

Staff Identified Needed Improvements

Over the years, NRC staff reviewed the agency's regulation of major fuel cycle facilities and recommended changes to improve the program. In the early 1990s, an agency task force issued NUREG-1324, "Proposed Method for Regulating Major Materials Licensees." The NUREG highlighted findings and

[2] 10 CFR Part 76 - Certification of Gaseous Diffusion Plants
[3] 10 CFR Part 70 - Domestic Licensing of Special Nuclear Material
[4] 10 CFR Part 40 - Domestic Licensing of Source Material

recommendations for correcting deficiencies in NRC's regulations and its licensing and inspection programs for fuel cycle facilities. The recommendations identified a number of weaknesses in areas such as quality assurance, maintenance, training and qualification, management controls and oversight, configuration management, criticality safety, and fire protection. In response, the staff implemented some changes to the program and deferred others. By 2000, staff began work on a proposed Revised Fuel Cycle Facility Oversight Program to emulate the newly developed ROP. A hallmark of the ROP is continual self-assessment and improvement by NRC.

NRC designed the ROP to verify that commercial nuclear power plant licensees operate in accordance with agency rules and regulations to identify and resolve issues before the safety of plant operations is affected. The process for reactor oversight includes risk-informed baseline inspections, use of licensees' performance indicator data, and a revised reactor assessment process. A goal of the ROP is to effectively focus attention on risk-significant activities while reducing unnecessary regulatory burden on licensees. The process assesses key performance areas and each area contains "cornerstones" of safety to reflect the essential aspects of safe plant operation. The ROP uses inspection findings developed from selective examinations and performance indicator data to assess plant performance within the framework of the safety cornerstones. The process employs a significance determination process[5] to evaluate the safety significance of inspection findings.

The ROP provides a structured framework for NRC's regulation of commercial nuclear power plants. On the basis of the information attained through the ROP, NRC takes a graded approach to its oversight, increasing the level of regulatory attention to plants where safety is declining. NRC assesses overall plant performance and communicates the results to the public.

Proposed Revised Fuel Cycle Facility Oversight Program

To address shortcomings with the oversight program, staff identified a number of features that the Revised Fuel Cycle Facility Oversight Program should contain. These features included using risk-informed methods to measure facility performance, and employing a predictable, graded process to focus NRC oversight based on risk and acceptability of performance. The revised program would include a baseline level of oversight that would be carried out for all licensees through the inspection program. The inspection program would focus on the most safety- and safeguards-significant plant activities, hazards, risks, controls, and management measures, and would supplement the performance indicator information volunteered by licensees. Staff believed that significant implementation processes would include:

[5] The significance determination process is a series of analytical steps that NRC staff use to evaluate inspection findings and designate the significance of those findings.

- a framework for oversight
- cornerstones of safety

Framework for Oversight

The framework for oversight would include a process for gathering and processing performance information. The proposed framework would begin with *significance evaluations*, which consist of the different types of inspections[6] that NRC performs. Inspection findings would be evaluated for risk using a significance determination process based on results from integrated safety analyses that licensees prepare under 10 CFR Part 70. NRC intended to use licensee provided performance indicator data to complement its core inspection, allowing NRC to reduce the scope of these inspections, thereby enhancing efficiency for both the NRC and the licensees. Next, the *overall assessment process* was to assess licensee performance using an action matrix. *Stakeholder communication*, another important step, would include assessment and inspection reports, inspection plans, and, if available, performance indicators. This information would be made available through a variety of means, including NRC's website, press releases, and public meetings. Also, within its framework, NRC planned to maintain the capability to perform generic issue resolution, event response, and special inspections.

Cornerstones of Safety

NRC intended to use the fuel cycle facility cornerstones to provide reasonable assurance that NRC's mission/goals are met when the cornerstone objectives are met. Staff identified four key strategic performance areas and the associated cornerstones to reflect safety aspects of operations. NRC's mission would be addressed through the following four performance areas:

- facility operations safety
- nuclear related hazard safety
- special nuclear material safeguards
- classified information and material safeguards

The cornerstones associated with the facility operations safety performance area would be initiating events, systems and barriers, and emergency preparedness. Under nuclear related hazard safety, the cornerstones would be occupational and public. The cornerstones for special nuclear material safeguards and classified information and material safeguards would be initiating events, systems and barriers, and contingency preparedness. The proposed fuel cycle facility cornerstones also would include cross-cutting considerations such as a safety and safeguards conscious work environment; human performance; and problem identification, resolution, and correction.

[6] Inspections include: Special Inspections, Event Response, General Issues, and Baseline Inspections.

Commission Directed Staff to Proceed

In 2000, staff was developing the Revised Fuel Cycle Facility Oversight Program and implementing changes to its regulations to 1) improve efficiency of its regulatory processes and 2) provide for objective assessments and predictable responses. Staff was also in the midst of implementing its recently amended regulations (10 CFR Part 70) governing the domestic licensing of special nuclear materials for fuel cycle facility licensees. Through the amended 10 CFR Part 70, the agency sought to achieve its objectives through a risk-informed approach. The Part 70 amendments included, among other things, the requirement for affected licensees to perform integrated safety analyses (ISA); the establishment of performance requirements; and the requirement that safety bases be maintained, and changes reported to NRC.

In early 2001, through a staff requirements memorandum,[7] the Commission directed the staff to proceed as planned with the proposed Revised Fuel Cycle Facility Oversight Program. However, the Commission cautioned the staff to ensure that revision efforts, and the resources associated with them, do not negatively impact full implementation of the recently revised 10 CFR Part 70 and its associated guidance.

Work On Revised Program Stopped

On March 18, 2002, the Executive Director for Operations (EDO) sent a memo to the Commission providing an update regarding the proposed Revised Fuel Cycle Facility Oversight Program. In that memo, the EDO suggested that essential features of the proposed Revised Fuel Cycle Facility Oversight Program be deferred until after the 10 CFR Part 70 revisions were implemented. However, the EDO did not give a date or predictable timeframe for restarting activities associated with the oversight program.

Ten days after the EDO sent his memo to defer work on the proposed Revised Fuel Cycle Facility Oversight Program, the decision was made to officially stop work. On March 28, 2002, the Office of the Secretary annotated its tracking system that the staff requirements memorandum[8] tasking the staff to proceed was to be closed out. The Commission stopped tracking the staff's progress on revising the oversight program. And, staff ceased actions that it had deferred regarding the development and implementation of improvements for the Revised Fuel Cycle Facility Oversight Program. Because the agency stopped actions to develop and implement significant improvements to the Revised Fuel Cycle Facility Oversight Program, NRC lacks a framework, such as the ROP, for regulating fuel cycle facilities.

[7] SRM-00-0222 -- Date: January 17, 2001; Subject: Briefing on the Status of the Fuel Cycle Facility Oversight Program Revision (SECY-00-0222); 9:30 A.M.; Wednesday, December 20, 2000; Commissioners' Conference Room, One White Flint North, Rockville, Maryland (Open to Public Attendance)
[8] SRM-00-0222

Agency Progress

Although work stopped on the Revised Fuel Cycle Facility Oversight Program, NRC has made some progress on implementing the Part 70 revisions, specifically through ISAs and revised licensee performance reviews.

Integrated Safety Analyses

ISAs are systematic analyses conducted to identify facility and external hazards and their potential for initiating accident sequences, the potential accident sequences, their likelihood and consequences, and the items relied on for safety. In accordance with 10 CFR Part 70, each licensee is required to conduct and maintain an ISA of appropriate detail and complexity. By April 18, 2001, licensees were required to submit their ISA plans to NRC for approval. Licensees then had until October 18, 2004, to complete their ISA, correct all unacceptable performance deficiencies, and submit an ISA summary for NRC approval. However, over 2 years later, NRC still has not approved all of the ISA summaries. A senior NRC manager stated that NRC is behind on reviewing and approving the ISA summaries due to limited staff resources and other technical issues.

Licensees under 10 CFR Part 40 and Part 76 are not required to do ISAs. However, staff stated that the Part 40 licensee is voluntarily performing a function similar to the ISAs required for Part 70 licensees.

Licensee Performance Reviews

The Licensee Performance Review process is designed to provide an assessment of licensee performance to NRC management, while minimizing staff effort beyond that required for routine fuel cycle facility licensing and inspection activities. The Licensee Performance Review process entails an NRC review of each fuel cycle facility licensee's performance and the results of the reviews may be used to support changes in the inspection and licensing program for the subject facility to focus NRC resources where they are most needed. The information gained through this process is also provided to the licensee's senior management and to interested members of the public. In 2002, NRC revised the Licensee Performance Review process in an effort to make it risk-informed and more timely, objective, and transparent. NRC also began the consolidation of inspection manual chapters to make them more risk-informed.

Improvements Still Needed

Senior agency officials acknowledged that more improvements need to be made to NRC's Fuel Cycle Facility Oversight Program. During a public meeting in December 2000, staff stated that regulation of the fuel cycle facilities was fundamentally sound. However, NRC staff identified significant improvements that should be considered. NRC senior management confirmed that those improvements are still needed today. NRC's framework for regulating fuel cycle

facilities is not as robust as it could be. The regulation of fuel cycle facilities could be enhanced with the following staff-identified improvements:

- Reduce regulatory burden
- Increase effectiveness, efficiency, and realism
- Increase public confidence
- Provide objective assessments
- Provide predictable and timely responses to licensee performance
- Improve safety performance

RECOMMENDATION

The Office of the Inspector General recommends that the Executive Director for Operations:

1. Fully develop and implement a framework for the Fuel Cycle Facility Oversight Program that is consistent with a structured process, such as the ROP.

AGENCY COMMENTS

At an exit conference on November 2, 2006, NRC officials agreed with the report's recommendation and provided editorial suggestions, which OIG incorporated as appropriate.

Please provide information on actions taken or planned on the recommendation within 30 days of the date of this memorandum. Actions take or planned are subject to OIG follow-up, as stated in the attached instructions.

SCOPE AND METHODOLOGY

To accomplish the audit's objective, the OIG audit team reviewed various Commission papers and transcripts, and other related documents. The audit team also interviewed senior managers and staff in NRC offices including NMSS, SECY, and Region II. This work was conducted from January 2006 through August 2006 in accordance with generally accepted Government auditing standards and included a review of internal controls related to the objective of this audit. The work was conducted by Anthony Lipuma, Team Leader; Sherri Miotla, Audit Manager; Mike Cash, Senior Technical Advisor; James McGaughey, Senior Analyst; and Andrea Ferkile, Analyst.

cc: Chairman Klein
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