AUDIT REPORT

Audit of NRC's Oversight of
Independent Spent Fuel Storage Installations Safety

OIG-11-A-12 May 19, 2011

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

OFFICE OF THE
INSPECTOR GENERAL

May 19, 2011

MEMORANDUM TO: R. William Borchardt
Executive Director for Operations

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

SUBJECT: AUDIT OF NRC'S OVERSIGHT OF INDEPENDENT SPENT FUEL STORAGE INSTALLATIONS SAFETY (OIG-11-A-12)

Attached is the Office of the Inspector General's (OIG) audit report titled, *Audit of NRC's Oversight of Independent Spent Fuel Storage Installations (ISFSIs) Safety.*

The report presents the results of the subject audit. Agency comments provided at the April 26, 2011, exit conference have been incorporated, as appropriate, into this report.

Please provide information on actions taken or planned on each of the recommendations within 30 days of the date of this memorandum. Actions taken or planned are subject to OIG followup as stated in Management Directive 6.1.

We appreciate the cooperation extended to us by members of your staff during the audit. If you have any questions or comments about our report, please contact me at 415-5915 or Sherri Miotla, Team Leader, Nuclear Materials & Waste Safety Team, at 415-5914.

Attachment: As stated

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EXECUTIVE SUMMARY

BACKGROUND

The United States has entered a period where the national policy for storing, reprocessing, and disposal of spent nuclear fuel is being reexamined. With the prospect of spent nuclear fuel being stored at reactor sites for the foreseeable future due to the uncertainty surrounding the proposed Yucca Mountain repository program, the Nuclear Regulatory Commission (NRC) has been reviewing the issues associated with long-term storage.

An independent spent fuel storage installation (ISFSI) is an NRC licensed facility designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with the spent fuel. An ISFSI typically consists of a concrete storage pad, storage containers (casks), and any support facilities.

The majority of ISFSIs are located at operating reactor sites. Other ISFSIs are located away-from-reactors and typically operate at sites where decommissioning related to reactor operations is complete. As of April 2011, there were ISFSIs storing spent nuclear fuel or preparing to store spent nuclear fuel in the near term at 57 different locations across the United States. Of these ISFSI sites, 47 were located at operating reactors and the remaining 10 were located away from an operating reactor.

NRC's safety oversight program for spent fuel storage is designed to prevent radiation-related deaths and illnesses, and protect the environment. The oversight program includes inspections and assessments of licensee and vendor activities with a focus on minimizing risk to public health and safety. NRC periodically inspects the design, fabrication, and use of dry cask storage systems by sending inspectors to licensee and cask vendor facilities. Inspectors follow agency guidance that contains objectives and procedures to use for each type of inspection. Upon completion of these inspections, NRC issues reports to document the inspection findings.

PURPOSE

The audit objective was to determine if NRC has the requisite processes in place for reviewing ISFSIs safety. Appendix B contains information on the audit scope and methodology.

RESULTS IN BRIEF

The nuclear industry is expecting that by 2025 all commercial nuclear power plants in the United States will have operational ISFSIs at their sites. Currently, there are 104 operating nuclear reactors in the United States. This unprecedented growth in operational ISFSIs, coupled with an uncertainty surrounding the fate of a national high-level waste repository, brings NRC's oversight of ISFSI safety to the forefront. NRC's oversight program for ISFSI safety is designed to prevent radiation-related deaths and illnesses and protect the environment. Although there have been no significant issues at ISFSIs, the Office of the Inspector General identified opportunities for improvement within the ISFSI safety inspection program in the following two areas:

- ISFSI safety inspector training.
- Frequency of routine ISFSI inspections.

Opportunities Exist To Improve ISFSI Safety Inspector Training

NRC conducts ISFSI safety inspections with regional, resident, and headquarters-based inspectors. The training requirements for these inspectors vary. Although it is NRC's policy to assign only trained and qualified individuals with the knowledge and aptitude to perform onsite inspection activities consistent with agency expectations, there is no formalized agencywide training program for ISFSI safety inspectors. When ISFSI safety inspectors do not have a consistent understanding of agency inspection requirements, oversight can be compromised. Specifically, there is an increased potential for inadequate inspections to occur, which could result in an increased risk to public health and safety.

Routine ISFSI Inspection Frequency Varies Among Regions

The period between routine ISFSI inspections varies among regions from 1 to almost 6 years. Although NRC expects a level of consistency in the performance of ISFSI inspections, inspection frequencies vary because the frequency required to conduct routine ISFSI inspections is not clearly defined. Routine ISFSI safety inspections could be delayed indefinitely without clearly defined inspection frequency guidance, potentially increasing the risk to public health and safety.

RECOMMENDATIONS

This report makes two recommendations to improve the agency's oversight of ISFSIs safety. A consolidated list of these recommendations appears in Section IV of this report.

AGENCY COMMENTS

An exit conference was held with the agency on April 26, 2011. At this meeting, agency management provided supplemental information that has been incorporated into this report as appropriate. As a result, agency management stated their general agreement with the findings and recommendations in this report and opted not to provide formal comments for inclusion in this report.

ABBREVIATIONS AND ACRONYMS

IMC	Inspection Manual Chapter
ISFSI	Independent Spent Fuel Storage Installation
NRC	Nuclear Regulatory Commission
OIG	Office of the Inspector General

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I. BACKGROUND

The United States has entered a period where the national policy for storing, reprocessing, and disposal of spent nuclear fuel[1] is being reexamined. With the prospect of spent nuclear fuel being stored at reactor sites for the foreseeable future due to the uncertainty surrounding the proposed Yucca Mountain repository program, the Nuclear Regulatory Commission (NRC) has been reviewing the issues associated with long-term storage.

Independent Spent Fuel Storage Installations

An independent spent fuel storage installation (ISFSI) is an NRC licensed facility designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with the spent fuel. An ISFSI typically consists of a concrete storage pad, storage containers (casks), and any support facilities.[2] The casks are typically steel cylinders that are either welded or bolted closed. The steel cylinder provides a leak-tight containment of the spent fuel. Surrounding each cylinder with additional steel, concrete, or other material provides radiation shielding to workers and members of the public. The casks can either be stored vertically on a storage pad or horizontally in concrete storage bunkers (see Figure 1).

[1] Spent nuclear fuel or spent fuel means fuel that has been withdrawn from a nuclear reactor following irradiation, has undergone at least 1 year's decay since being used as a source of energy in a power reactor, and has not been chemically separated into its constituent elements by reprocessing.

[2] NRC regulations allow the storage of spent fuel in both pool-type wet storage and dry casks. There is one pool-type wet storage ISFSI in the United States.

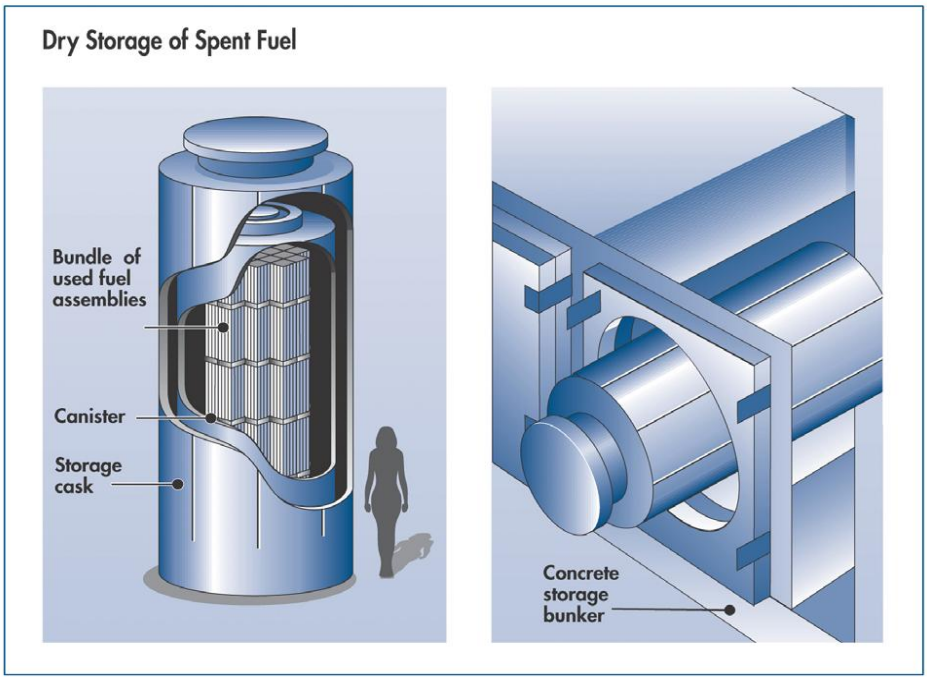

Figure 1. Dry cask storage
Source: **NRC**

The majority of ISFSIs are located at operating reactor sites. Other ISFSIs are located away-from-reactors and typically operate at sites where decommissioning related to reactor operations is complete. As of April 2011, there were ISFSIs storing spent nuclear fuel or preparing to store spent nuclear fuel in the near term at 57 different locations across the United States. Of these ISFSI sites, 47 were located at operating reactors and the remaining 10 were located away from an operating reactor.

Recent Regulatory Action

On December 23, 2010, NRC's Commission published its generic determination that, if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts for at least 60 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor. This storage would occur in a

combination of spent fuel storage pools or dry casks at either onsite or away-from-reactor ISFSIs. Appendix A of this report contains an overview of this decision, known as the Waste Confidence Decision.

Figure 2. ISFSI at the Dresden Nuclear Power Plant
Source: **Holtec International Web site**

NRC's Oversight of ISFSI Safety

NRC's safety oversight program for spent fuel storage is designed to prevent radiation-related deaths and illnesses, and protect the environment. The oversight program includes inspections and assessments of licensee and vendor activities with a focus on minimizing risk to public health and safety. NRC periodically inspects the design, fabrication, and use of dry cask storage systems by sending inspectors to licensee and cask vendor facilities. Inspectors follow agency guidance that contains objectives and procedures to use for each type of inspection. Upon completion of these inspections, NRC issues reports to document the inspection findings.

Roles and Responsibilities

The Office of Nuclear Material Safety and Safeguards, Division of Spent Fuel Storage and Transportation, Rules, Inspections, and Operations Branch, at NRC headquarters maintains overall management of the spent fuel storage inspection program. The branch develops inspection policy, procedures, and guidance on spent fuel storage. Additionally, the branch conducts inspections of spent fuel storage system vendors and provides technical and programmatic assistance to the NRC regions in conducting safety inspections of ISFSIs. The branch has recently begun an independent self-assessment focusing, in part, on the ISFSI safety inspection process.

Performing ISFSI safety inspections is primarily a regional responsibility. Each of NRC's four regional offices manages, plans, schedules, and implements an ISFSI safety inspection program. Staff trained in various disciplines conduct these inspections throughout the regions. For example, some regions use health physicists, while others use reactor inspectors. Routine ISFSI safety inspections may last up to 1 week, while pre-operational inspections may last several weeks.

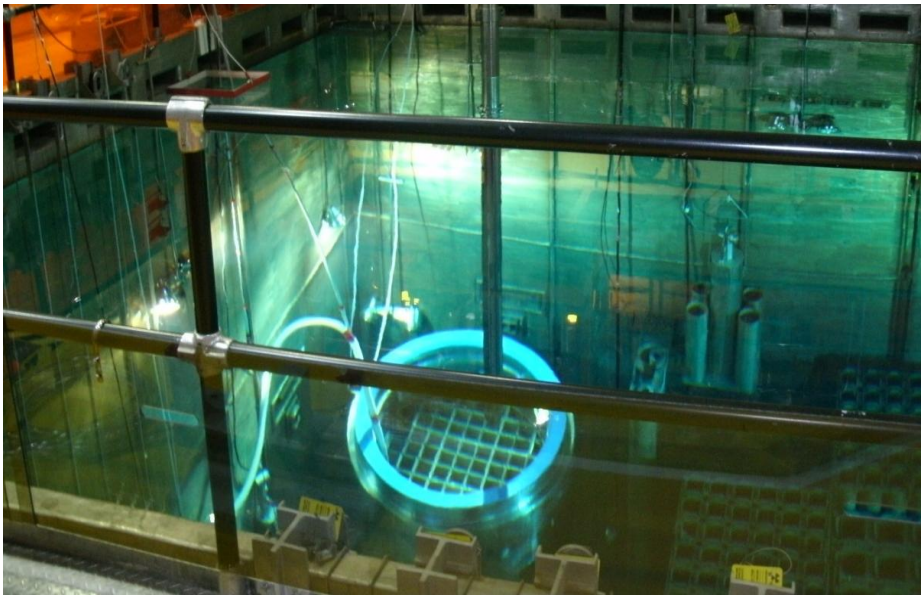

Figure 3. Fuel assembly loading at the Brunswick nuclear power plant
Source: **Office of the Inspector General, NRC**

For fiscal year 2011, NRC's ISFSI safety oversight program budget (including project management and response to incidents and events for headquarters and the regions) consists of 11 full time equivalents, equating to a cost of approximately $1.65 million. Some staff are not assigned to the ISFSI safety oversight program full time; they also perform other duties. As a result, there are more than 11 people working on the ISFSI safety oversight program.

II. PURPOSE

The audit objective was to determine if NRC has the requisite processes in place for reviewing ISFSIs safety.[3] Appendix B contains information on the audit scope and methodology.

[3] The original objective of this audit, as noted in the Office of the Inspector General's fiscal year 2011 *Annual Plan,* was to determine if NRC has the requisite processes in place for reviewing and approving ISFSIs. The objective was narrowed during fieldwork to specifically focus on reviewing ISFSIs safety.

III. FINDINGS

The nuclear industry is expecting that by 2025 all commercial nuclear power plants in the United States will have operational ISFSIs at their sites. Currently, there are 104 operating nuclear reactors in the United States. This unprecedented growth in operational ISFSIs, coupled with an uncertainty surrounding the fate of a national high-level waste repository, brings NRC's oversight of ISFSI safety to the forefront. NRC's oversight program for ISFSI safety is designed to prevent radiation-related deaths and illnesses and protect the environment. Although there have been no significant issues at ISFSIs, the Office of the Inspector General (OIG) identified opportunities for improvement within the ISFSI safety inspection program in the following two areas:

- ISFSI safety inspector training.
- Frequency of routine ISFSI inspections.

A. Opportunities Exist To Improve ISFSI Safety Inspector Training

NRC conducts ISFSI safety inspections with regional, resident, and headquarters-based inspectors. The training requirements for these inspectors vary. Although it is NRC's policy to assign only trained and qualified individuals with the knowledge and aptitude to perform onsite inspection activities consistent with agency expectations, there is no formalized agencywide training program for ISFSI safety inspectors. When ISFSI safety inspectors do not have a consistent understanding of agency inspection requirements, oversight can be compromised. Specifically, there is an increased potential for inadequate inspections to occur, which could result in an increased risk to public health and safety.

Figure 4. A cask being set on an ISFSI with a Vertical Cask Transporter
Source: **Holtec International Web site**

Maintaining Technical Excellence and Regulatory Process Proficiency

NRC is dedicated to maintaining its technical excellence and regulatory process proficiency now and in the future through a strategic approach to training, development, and knowledge management. NRC's policy is that only trained and qualified individuals, who have the knowledge and aptitude to perform onsite activities, should perform ISFSI safety inspections. Management is responsible for overseeing employees who conduct onsite activities by:

- Clearly establishing and communicating performance expectations.
- Providing staff development opportunities.
- Ensuring that onsite inspections are conducted as intended.

Training Requirements Vary Among Staff

ISFSI safety inspector training requirements vary among the regional, resident, and headquarters-based inspectors. Regional inspectors conduct pad construction, pre-operational, initial loading, and (with the exception of Region II) routine ISFSI

safety inspections. In Region II, resident inspectors conduct the routine ISFSI safety inspections. Headquarters inspectors focus primarily on inspections of the cask manufacturing program; however, they also assist the regional inspectors with ISFSI safety inspections. When conducting safety inspections at ISFSIs, all inspectors use the same NRC inspection guidance, although the training they receive to implement the guidance varies.

Training Requirements

Typically, NRC inspectors qualify to conduct ISFSI safety inspections by completing one of the following qualification programs:

- Inspection Manual Chapter (IMC) 1245, Operating Reactor Programs.
- IMC 1246, Section VI, Attachment 2, Spent Fuel Storage and Transportation Inspector.
- IMC 1246, Section IX, Decommissioning Inspectors.
- Region I's ISFSI inspector qualification program.

Specific regional requirements further add to the variations found among these qualification programs. For example, Region I's current qualification program was developed based on a need for additional ISFSI training. This qualification program requires that inspectors qualify under IMC 1246, Section II, Materials Health Physics Inspector. Inspectors-in-training must then successfully perform an ISFSI inspection while observed by a qualified ISFSI Inspector, review additional ISFSI related guidance, and be interviewed by the decommissioning branch chief. In Region III, inspectors typically supplement decommissioning (IMC 1246, Section IX)

or operating reactor (IMC 1245) qualifications with additional ISFSI training found in the Spent Fuel Storage and Transportation Inspector (IMC 1246, Section VI, Attachment 2) qualification program.

The NRC programs used to qualify ISFSI inspectors require no classroom training in areas such as concrete technology, the use of cranes for heavy loads, and welding inspection techniques. However, specialized knowledge in these areas may be required when conducting critical inspection activities such as pad fabrication, dry runs, and initial loading campaigns.[4] As such, some ISFSI inspectors have taken additional training in these areas. NRC also utilizes experts in these fields, from across the agency, to assist ISFSI inspectors when specific needs arise.

Training in Development

Realizing the need for a formal ISFSI inspector qualification process, Region I requested to take the lead in developing an agencywide ISFSI safety inspector qualification program. In authorizing this request, the Director, Division of Spent Fuel Storage and Transportation, Office of Nuclear Material Safety and Safeguards, stated that coordinating this effort with the other regions will allow for a more consistent qualification program for ISFSI inspectors. Region I, with assistance from the regions, headquarters, and NRC's Technical Training Center, is currently developing the new ISFSI qualification program, although it is not complete.

[4] NRC conducts pad fabrication inspections to ensure that requirements contained in the Safety Analysis Report, Safety Evaluation Report, and license or technical specifications have been properly incorporated into construction of the ISFSI storage pad. The Safety Analysis Report is submitted by the applicant (licensee) and the Safety Evaluation Report is NRC's response.

NRC conducts dry run inspections to ensure that the licensee has developed, implemented, and evaluated preoperational testing activities to safely load spent fuel from the spent fuel pool into a dry cask storage system and to transfer the loaded cask to the ISFSI in accordance with the requirements for the particular cask storage system used.

NRC conducts initial loading inspections to ensure that the licensee provides reasonable assurance that the spent fuel can be handled, stored, and retrieved without undue risk to the health and safety of the public.

Inconsistent Understanding of Agency Requirements

Current ISFSI safety inspector training does not provide inspectors with a consistent understanding of NRC's inspection requirements. Specifically, NRC staff do not have a consistent understanding of the agency's requirements relating to ISFSI inspections, the use of enforcement at ISFSIs, and the role of resident inspectors at sites with ISFSIs.

Figure 5. An aerial view of an away-from-reactor ISFSI
Source: **Connecticut Yankee Atomic Power Company**

Inconsistent Understanding of ISFSI Inspection Requirements

Agency staff does not have a consistent understanding of requirements relating to the inspections of ISFSIs. NRC procedures require that inspectors assess the overall material condition of the ISFSI facility as it pertains to the safe operation of the ISFSI. The procedures also require that inspectors verify by direct observation that any radioactive material present at the ISFSI is properly controlled and stored in accordance with site requirements. Among the regions, ISFSI safety inspectors have an inconsistent understanding regarding the implementation of safety inspection requirements. Specifically, ISFSI safety inspectors in one region believe that it is acceptable to walk around the perimeter of an ISFSI to perform inspection activities, rather than actually enter the ISFSI pad. Inspectors from other

regions disagree with this inspection methodology, explaining that it is important to walk onto the pad in order to assess the condition of the casks and to make sure that the airflow cooling vents of the casks are unobstructed. For example, birds or squirrels sometimes block these vents with nests.

Inconsistent Understanding of ISFSI Enforcement Requirements

Agency staff do not have a consistent understanding of requirements relating to the use of enforcement at ISFSIs. Some ISFSI safety inspectors are unsure if enforcement can occur during a dry run. Some inspectors consider dry runs free from enforcement, while another stated that inspectors act as "consultants" during dry runs. A regional branch chief explained that NRC's role during dry runs is that of an "observer" rather than an inspector. This branch chief was also unsure if enforcement could occur during a dry run. A regional deputy division director stated that NRC could cite licensees for violations observed during dry runs; dry runs are not free from enforcement.

Inconsistent Understanding of the Role of Resident Inspectors at Sites with ISFSIs

Agency staff do not have a consistent understanding of the role of resident inspectors at ISFSIs. OIG interviewed at least one resident inspector or senior resident inspector from 45 of the operating reactors that have an ISFSI.[5] The results of these 64 interviews follow:

- ISFSI Safety Involvement - Overall, 36 percent reported being involved with ISFSI safety, while 55 percent reported limited involvement. Finally, 9 percent of the resident inspectors reported no involvement with ISFSI safety.

[5] Inspectors from each of the 47 reactors sites with ISFSIs were interviewed, although only interviews from the inspectors at the reactor sites with ISFSIs currently storing spent nuclear fuel were included in the interview results.

- Management Expectations - Only 28 percent stated that NRC management had conveyed any expectations regarding their duties pertaining to ISFSI safety.

- ISFSI Hours Allocation – 70 percent stated that there are no hours specifically allocated to resident inspectors for ISFSI safety inspections.

- ISFSI Training – Approximately 77 percent stated that they had received no ISFSI related training, while 22 percent stated that they had received very generic ISFSI training.

A senior resident inspector stated that determining who is responsible for observing various inspection segments during cask loading is difficult. The inspector continued that he would like to see the responsibilities better defined. Another resident inspector stated that he would like to receive ISFSI training; currently, the only ISFSI information he receives comes from the licensee.

No Formalized Agencywide Training Program Exists

ISFSI safety inspectors do not have a consistent understanding of agency requirements because a formalized agencywide training program clearly establishing and communicating performance expectations, and requiring training on critical inspection activities, does not exist. Although the agency is in the process of developing an agencywide formal qualification program, this task is not complete.

Compromised Oversight Can Occur

When training requirements vary among staff, compromised oversight of ISFSI safety inspections can occur. Specifically, there is an increased potential that inspections will overlook discrepancies, resulting in an increased risk to public health and safety.

Recommendation

OIG recommends that the Executive Director for Operations:

1. Develop and implement a formalized agencywide ISFSI safety inspector training program.

B. Routine ISFSI Inspection Frequency Varies Among Regions

The period between routine ISFSI inspections varies among regions from 1 to almost 6 years. Although NRC expects a level of consistency in the performance of ISFSI inspections, inspection frequencies vary because the frequency required to conduct routine ISFSI inspections is not clearly defined. Routine ISFSI safety inspections could be delayed indefinitely without clearly defined inspection frequency guidance, potentially increasing the risk to public health and safety.

Consistency in the Performance of ISFSI Inspections

The expected receipt of applications to construct and operate new nuclear power plants, and to dispose of high-level radioactive waste, are two of the major challenges potentially facing the NRC over the next several years. NRC strives to be a stable regulator in an ever changing and dynamic environment. To that end, NRC expects a level of consistency in the performance of ISFSI inspections. NRC's guidance not only defines inspection program requirements, it also serves as a framework intended to achieve consistency in the performance of ISFSI inspections.

Figure 6. Fuel assembly loading at the Brunswick Nuclear Power Plant
Source: **OIG, NRC**

Routine ISFSI Inspection Frequency Varies Among Regions

Currently the time between routine inspections at ISFSIs varies from 1 to almost 6 years. Reviewing the two most recent inspection reports for all ISFSIs currently storing spent nuclear fuel (110 reports), OIG found that the shortest period between routine ISFSI safety inspections was 1 year. OIG also found that the longest period between routine ISFSI safety inspections was almost 6 years. The routine inspection sequence most often occurring was a 2-year frequency.

Routine Inspection Frequency Is Not Clearly Defined

The frequency required to conduct routine ISFSI inspections is not clearly defined. Routine inspections occur once an ISFSI is operational. NRC's IMC 2690 defines routine inspection frequencies as "when required" and states that an inspection effort should be performed when the activity[6] occurs at the facility. The manual chapter then refers to either an appendix or a guidance section of a specific inspection procedure for additional clarification. The "when required" performance standard described in the appendixes does not specifically state a required periodicity. The definition only states that the inspection effort "should" be performed when the activity occurs. However, "should" does not indicate a requirement that an activity "must" occur with any definitive frequency.

Inspections Could Be Delayed

Without clearly defined minimum inspection frequency guidance for routine ISFSI safety inspections, inspections could be delayed indefinitely. Licensees may become complacent knowing that NRC is not required to inspect their facility at any

[6] ISFSI activities, which occur in four phases, include the following:
Phase 1 - Design, fabrication, and construction.
Phase 2 - Preoperational testing, including dry runs.
Phase 3 - Spent fuel loading and unloading operations.
Phase 4 - Storage monitoring of the loaded ISFSI.

defined minimum frequency, potentially putting the public's health and safety at an increased risk. Therefore, it is important for NRC to clarify its guidance to define a minimum frequency to conduct routine ISFSI inspection activities.

Recommendation

OIG recommends that the Executive Director for Operations:

2. Modify inspection guidance to include a minimum inspection frequency for conducting routine ISFSI safety inspections.

IV. CONSOLIDATED LIST OF RECOMMENDATIONS

OIG recommends that the Executive Director for Operations:

1. Develop and implement a formalized agencywide ISFSI safety inspector training program.

2. Modify inspection guidance to include a minimum inspection frequency for conducting routine ISFSI safety inspections.

V. AGENCY COMMENTS

An exit conference was held with the agency on April 26, 2011. At this meeting, agency management provided supplemental information that has been incorporated into this report as appropriate. As a result, agency management stated their general agreement with the findings and recommendations in this report and opted not to provide formal comments for inclusion in this report.

Waste Confidence Decision

On September 18, 1990, NRC issued a decision reaffirming and revising, in part, the five Waste Confidence Findings reached in its 1984 Waste Confidence Decision. The 1984 decision and the 1990 update to the decision were products of rulemaking proceedings designed to assess the degree of assurance that radioactive wastes generated by nuclear power plants can be safely disposed of, to determine when disposal or offsite storage would be available, and to determine whether radioactive wastes can be safely stored onsite past the expiration of existing facility licenses until offsite disposal or storage is available. In 2008, the Commission decided to undertake a review of its Waste Confidence Decision and Rule as part of an effort to enhance the efficiency of combined license proceedings for applications for nuclear power plant licensees anticipated in the near future by ensuring that the findings are up to date. The Commission has considered developments since 1990 and has reviewed its five prior findings and supporting environmental analysis.[7] As a result of this review, the Commission revised the second and fourth findings in the Waste Confidence Decision. This decision was published in the Federal Register on December 23, 2010, and is as follows:

- Finding 2: The Commission finds reasonable assurance that sufficient mined geologic repository capacity will be available to dispose of the commercial high-level radioactive waste and spent fuel generated in any reactor when necessary.

- Finding 4: The Commission finds reasonable assurance that, if necessary, spent fuel generated in any reactor can be stored safely without significant environmental impacts for at least 60 years beyond the licensed life for operation (which may include the term of a revised or

[7] Federal Register 75:246 (December 23, 2010) pages 81037-81076.

renewed license) of that reactor in a combination of storage in its spent fuel storage basin and either onsite or offsite independent spent fuel storage installations.

The Commission also reaffirmed the three remaining findings. The reaffirmed findings follow:

- Finding 1: The Commission finds reasonable assurance that safe disposal of high-level radioactive waste and spent fuel in a mined geologic repository is technically feasible.

- Finding 3: The Commission finds reasonable assurance that high-level radioactive waste and spent fuel will be managed in a safe manner until sufficient repository capacity is available to assure the safe disposal of all high-level radioactive waste and spent fuel.

- Finding 5: The Commission finds reasonable assurance that safe, independent onsite spent fuel storage or offsite spent fuel storage will be made available if such storage capacity is needed.

Appendix B

SCOPE AND METHODOLOGY

The audit objective was to determine if NRC has the requisite processes in place for reviewing ISFSIs safety. The audit focused on reviewing the oversight and implementation of the safety inspection program for dry storage of spent reactor fuel at ISFSIs through an examination of documents, interviews, and observations.

OIG reviewed relevant Federal legislation pertaining to NRC's regulatory authorities to oversee ISFSIs, including the *Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974*; and the *Nuclear Waste Policy Act of 1982.* OIG also reviewed agency guidance including inspection manual chapters, inspection procedures, and office instructions that pertain to the inspection of ISFSIs. OIG also reviewed NRC and industry reports, briefings, and presentations that address the relevant aspects of used nuclear fuel storage and the safety inspections of ISFSIs in the United States.

OIG also reviewed records during the course of the audit. Specifically, the audit team reviewed 110 ISFSI safety inspection reports to determine the frequency of ISFSI safety specific inspections. Documentation pertaining to the allocation of resources for the ISFSI safety inspection program was also reviewed.

OIG interviewed inspectors and managers from headquarters (Rockville, MD) and each of the four regions (Region I, King of Prussia, PA; Region II, Atlanta, GA; Region III, Lisle, IL; and Region IV, Arlington, TX) who participate in activities related to ISFSIs. These interviews were conducted to obtain staff insights into the oversight and implementation of the ISFSI inspection program. More specifically, OIG conducted telephone interviews with 64 resident inspectors (including senior resident inspectors) working at each of the 45 operating reactor sites with ISFSIs storing spent nuclear fuel.

The audit team also observed the following inspection activities:

- Initial fuel loading campaign at the Brunswick nuclear power plant in Southport, North Carolina.

- NRC inspection at Holtec International Headquarters in Marlton, New Jersey.

- NRC safety inspection at the Connecticut Yankee Atomic Power Company ISFSI in East Hampton, Connecticut.

We conducted this performance audit at NRC headquarters, NRC's Region I office, and at licensees in Regions I and II from September 2010 through February 2011 in accordance with generally accepted Government auditing standards. Those standards require that the audit is planned and performed with the objective of obtaining sufficient, appropriate evidence to provide a reasonable basis for any findings and conclusions based on the stated audit objective. OIG believes that the evidence obtained provides a reasonable basis for the report findings and conclusions based on the audit objective. Internal controls related to the audit objective were reviewed and analyzed. Throughout the audit, auditors were aware of the possibility or existence of fraud, waste, or misuse in the program. The audit work was conducted by Sherri Miotla, Team Leader; Robert Woodward, Audit Manager; Kevin Nietmann, Senior Technical Advisor; Cathy Colleli, Senior Management Analyst; Maxine Lorette, Senior Auditor; Yvette Mabry, Senior Auditor; and Kristin Lipuma, Management Analyst.