Audit of the U.S. Nuclear Regulatory Commission's Safety Inspections of Class II Research and Test Reactors

OIG-24-A-07

April 11, 2024

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MEMORANDUM

DATE: April 11, 2024

TO: Raymond V. Furstenau
Acting Executive Director for Operations

FROM: Hruta Virkar, CPA */RA/*
Assistant Inspector General for Audits

SUBJECT: AUDIT OF THE U.S. NUCLEAR REGULATORY COMMISSION'S SAFETY INSPECTIONS OF CLASS II RESEARCH AND TEST REACTORS (OIG-24-A-07)

Attached is the Office of the Inspector General's (OIG) audit report titled: *Audit of the U.S. Nuclear Regulatory Commission's Safety Inspections of Class II Research and Test Reactors*.

The report presents the results of the subject audit. Following the March 21, 2024, exit conference, agency staff indicated that they had no formal comments for inclusion in this report.

Within 30 days of the date of this memorandum, please provide information on actions taken or planned on each of the recommendation(s).

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 301.415.1982 or Avinash Jaigobind, Team Leader, at 301.415.5402.

Attachment:
As stated

cc: J. Martin, Acting ADO
T. Govan, Acting DADO
J. Jolicoeur, OEDO

Results in Brief

Audit of the U.S. Nuclear Regulatory Commission's Safety Inspections of Class II Research and Test Reactors

OIG-24-A-07
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Why We Did This Review

The U.S. Nuclear Regulatory Commission (NRC) regulates research and test reactors (RTR) to ensure that licensees' systems and operations are in accordance with regulatory requirements and provide acceptable protection of public health and safety.

The Class II RTR inspection program is designed to provide sufficient flexibility to optimize the use of inspection resources and provide inspection commensurate with the safety significance of the RTR.

The audit objective was to determine whether the NRC performs safety inspections at Class II RTRs in accordance with agency guidance and inspection program objectives.

What We Found

The U.S. Nuclear Regulatory Commission (NRC) performs safety inspections at Class II research and test reactors (RTR) in accordance with agency guidance. However, opportunities exist to improve policies, procedures, and controls for managing safety inspections of Class II RTRs. Specifically, the OIG found that RTR inspection hours were not accurately charged. The NRC does not consistently track post-qualification and refresher training requirements and does not take a consistent approach in reviewing requests to approve alternate methods for meeting inspector qualification requirements (e.g., equivalency justifications).

In addition, the NRC does not centrally retain RTR inspection program information and has not periodically reviewed RTR inspection program guidance as required.

What We Recommend

This report makes seven recommendations to improve the NRC's policies, procedures, and program controls for managing safety inspections of Class II RTRs.

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ABBREVIATIONS AND ACRONYMS

CAC	Cost Activity Code
CAC SYSTEM	Cost Activity Code System
EPID	Enterprise Project Identifier
GAO	U.S. Government Accountability Office
HCM CLOUD	Human Capital Management Cloud System
IMC	Inspection Manual Chapter
IP	Inspection Procedure
MD	Management Directive
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OIG	Office of the Inspector General
RPS	Reactor Program System
RTR	Research and Test Reactor
T&L	Time and Labor

I. BACKGROUND

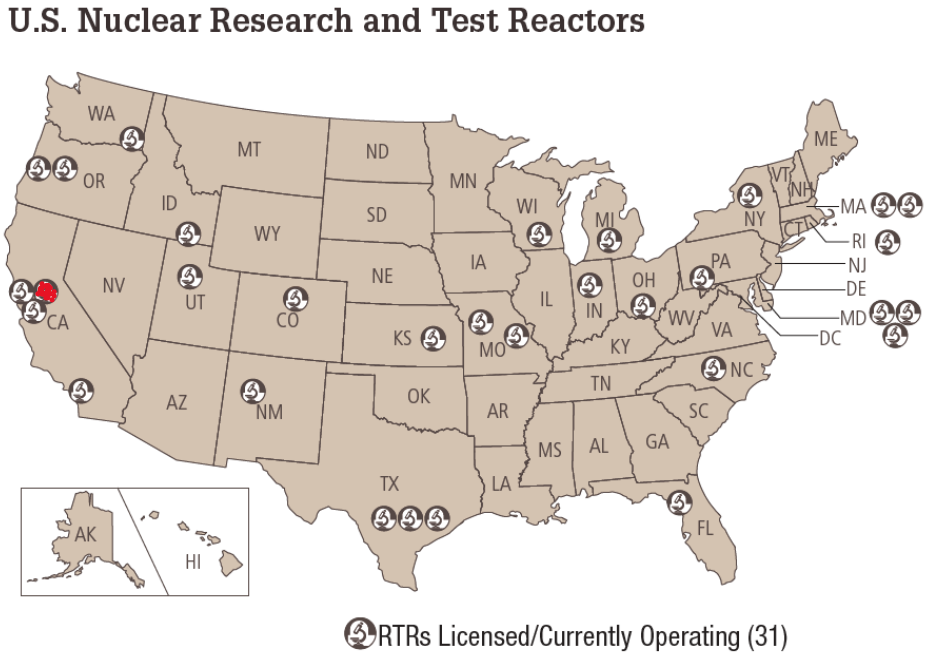
The U.S. Nuclear Regulatory Commission (NRC) regulates research and test reactors (RTR) to help ensure that licensees' systems and operations adhere to regulatory requirements and provide acceptable protection of the health and safety of the public. RTRs, also called "non-power reactors," are nuclear reactors primarily used for research, training, and development; therefore, most RTRs in the United States are at universities or colleges. The NRC currently oversees a total of 30 operational RTRs.

RTRs are licensed by the NRC according to the total thermal (heat) energy produced by a reactor. These facilities range in size from 10 watts to 20 megawatts thermal. RTRs have a limited amount of radioactive material on site and therefore pose a low risk from radiation and the theft of nuclear material. The NRC categorizes RTRs as Class I, Class II, or Class III. This audit focused on safety inspections at Class II RTRs, which are licensed to operate at power levels less than 2 megawatts.[1] Currently, there are 24 operating Class II RTRs. Figure 1 shows operating RTR locations throughout the United States.[2]

[1] Class I RTRs have licensed power levels of 2 megawatts (MW) or greater. Class III RTRs are Class I or Class II RTRs on extended shutdown (e.g., shutdowns greater than 1 year for a Class I and greater than 2 years for a Class II) or only have authority to possess nuclear materials and not operate.

[2] Figure 1 shows 31 RTRs, which includes Aerotest. Aerotest, marked in red, is no longer operational, resulting in a total of 30 operational RTRs.

Figure 1: RTR Locations



Source: Agencywide Documents Access and Management System

The RTR Inspection Program

The Office of Nuclear Reactor Regulation (NRR) is responsible for NRC oversight of RTRs, including the RTR inspection program. The general policy for the RTR inspection program is described in Inspection Manual Chapter (IMC) 2545, *Research and Test Reactor Inspection Program*.[3] The program establishes an inspection methodology for operating, safeguards, and decommissioning activities and conditions. The program is designed to provide sufficient flexibility to optimize the use of inspection resources and provide inspection commensurate with the safety significance of the RTRs. The NRC inspectors examine each facility periodically to help ensure licensees operate their facilities in accordance with the agency's safety and security requirements and reactor-specific license conditions.

Performance-Based Inspection Approach

Using a performance-based approach, inspectors focus their attention on activities important to safety. Performance-based inspection emphasizes observing activities and the results of licensee programs by reviewing procedures or records and having discussions with facility personnel.

[3] Inspection Manual Chapter 2545 provides guidance for the scheduling, conducting, and implementing of NRC inspections at RTRs.

For example, an inspector may identify an issue by observing a facility activity in progress, monitoring equipment performance, or the in-facility results of an activity (such as an engineering calculation), and then let the observation lead to evaluation of other associated areas. Although most aspects of the inspection program are performed onsite using the performance-based approach, certain activities, such as portions of procedure review and administrative program inspection, can be conducted offsite.

RTR Inspection Procedures

The RTR inspection program consists of Inspection Procedures (IP) for each RTR class, category, or situation. The IPs describe an inspection approach that allows the NRC to assess facility safety and compliance to applicable requirements. Although each IP contains many inspection elements, the individual inspector is expected to apply professional judgment regarding the need for completing each specific item. As a general rule, inspections should be conducted in accordance with inspection procedures. However, it is not possible to anticipate all the unique circumstances that might be encountered during a particular inspection. Therefore, individual inspectors are expected to exercise initiative in conducting inspections, based on their expertise and experience, to ensure that all the inspection objectives are met. RTR inspectors use IP 69001, *Class II Research and Test Reactors*, and IP 86740, *Transportation*, to inspect Class II RTRs.

Time and Labor Data for Class II RTR Inspections

The Reactor Program System

The Reactor Program System (RPS) is one of the tools used by NRC staff and management to assess the effectiveness and uniformity of the implementation of the NRC's reactor inspection and licensing programs. The RPS is also used by the inspection program offices as the primary tool to plan and schedule work assignments and inspection activities, and to record inspection findings. The assignments and schedules entered in the RPS are passed electronically to the NRC's timekeeping system,[4] where time and labor (T&L) data are collected. Accurate and timely entry of information into the RPS provides data necessary to ensure correct management assessment of program implementation. RPS users are responsible for ensuring they enter information in the RPS accurately and timely.

[4] Human Capital Management Cloud System is the NRC's current time-keeping system, effective August 2022.

Tracking Class II RTR Inspection Hours

RTR inspection hours are tracked in both the RPS and the NRC timekeeping system using Cost Activity Codes (CAC).[5] NRC management approves the CACs and assigns inspectors in the RPS. The CAC data from the RPS is transferred into the NRC timekeeping system and loaded into the inspectors' profiles for time reporting. The hours charged to a CAC are then reviewed by NRC management during the T&L closeout process.

The official record copy of T&L data is entered into and maintained in the NRC timekeeping system. The RPS retrieves these officially certified hours from the timekeeping system for reporting, budgeting, and planning purposes. Additionally, the CAC is required to record labor hours; however, a docket number,[6] and an Enterprise Project Identifier (EPID)[7] are optional for non-fee billable[8] work. EPIDs can be established to capture the cost of non-fee billable project or significant agency initiatives for management tracking and reporting. In 2021, NRC management transitioned the RTR inspection program to the CAC/EPID structure within the RPS.

During fiscal years 2022 and 2023, the NRC allocated three and four full-time equivalents, respectively, to conduct Class II RTR inspections, for an estimated program cost of $1.4 million over 2 years. Figure 2 specifies the allocated cost per fiscal year.

Figure 2: Full-Time Equivalent and Cost Allocated to Class II RTRs

Fiscal Year	Full-Time Equivalent	Cost
2022	3	$612,376
2023	4	$769,286

Source: NRC

[5] A CAC is a unique, six-character alphanumeric or numeric code that is aligned to the agency's budget structure. CACs are based on a three-tiered system and are used primarily to identify labor reporting.

[6] Docket Number represents a licensee's facility or a licensed entity, or one for which a license or certification has been applied for and the application review process has begun.

[7] An EPID is a standard alphanumeric code representing a project. The EPID code begins with an alpha character designating the project type, followed by the calendar year that the project began (for inspections, the year that onsite work begins), a three character alphanumeric code as the project sub-type to further identify the type of product or output produced (for example, type of major licensing review, category of inspection report) and a four digit sequentially generated number that allows each EPID to be unique.

[8] The NRC is required to have a fee validation process, allowing the agency to ensure timely and accurate billing for fee paying licensees.

II. OBJECTIVE

The audit objective was to determine whether the NRC performs safety inspections at Class II RTRs in accordance with agency guidance and inspection program objectives.

III. FINDINGS

The NRC performs safety inspections at Class II RTRs in accordance with agency guidance. However, the NRC could improve its policies, procedures, and program controls for managing safety inspections of Class II RTRs by:

1. Ensuring RTR inspection hours are charged accurately;
2. Ensuring RTR inspectors meet training and qualification requirements;
3. Retaining RTR inspection information centrally; and,
4. Reviewing and updating RTR inspection guidance periodically.

1. The NRC Should Ensure RTR Inspection Hours Are Charged Accurately

The NRC should ensure, through monitoring, that RTR inspection hours are charged accurately. Between 2020 and 2022, the NRC staff did not always accurately charge RTR inspection hours, and the RPS and the CAC System reported time and labor data inconsistently. This occurred because the NRC lacked updated guidance and the NRC did not ensure the accuracy of RTR inspection hours charged. These incorrectly charged RTR inspection hours could impact internal controls and resource planning for future RTR inspections.

What Is Required

The NRC Should Ensure RTR Inspection Hours Are Charged Accurately Through Monitoring

Federal Standards

The U.S. Government Accountability Office, *Standards for Internal Control in the Federal Government* (GAO Green Book),[9] states management should establish and operate monitoring activities and evaluate the results. For example, management should perform ongoing monitoring of the design and operating effectiveness of the internal control system as part of the normal course of operations. Ongoing monitoring includes regular management and supervisory activities, comparisons, reconciliations, and other routine actions.

What is internal control?
Internal control is a process used by management to help an entity achieve its objectives.

How does internal control work?
Internal control helps an entity:

- Run its operations efficiently and effectively;
- Report reliable information about its operations; and,
- Comply with applicable laws and regulations.

Additionally, NRC Management Directive (MD) 10.43, *Time and Labor Reporting,* states employees are responsible for accurately and timely entering daily time and classifying hours according to a time reporting code and assigning the hours to CACs. Approving officials are also responsible for assigning work to employees on an ongoing basis and for assisting employees in locating the correct CAC and the proper CAC/Docket/EPID code combination for fee-billable work. While employees are required to enter time and activity codes accurately, timekeepers ensure the time recorded meets T&L reporting rules. In turn, approving officials are responsible for reviewing activity codes and time entries and attesting to their accuracy by approving entries in the agency's timekeeping system.

[9] Government Accountability Office, *Standards for Internal Control in the Federal Government*, GAO-14-704G, September 2014.

What We Found

The NRC Does Not Always Accurately Charge RTR Inspection Hours and Time and Labor Data Are Inconsistent Between the Reactor Program System and the Cost Activity Code System

The NRC does not always accurately charge RTR inspection hours to the correct CAC, and T&L data reported in RPS are not consistent with T&L data reported by the CAC System.[10]

The OIG analyzed hours charged to 63 inspections conducted at the 24 Class II RTRs between January 1, 2020, and December 31, 2022. Specifically, the OIG analyzed T&L data recorded in the RPS and the CAC System[11] to determine if Class II RTR inspection hours were consistent and complete. The OIG found 23 errors in data reported for 20 of the 63 inspections. In these errors, NRC staff members did not accurately charge Class II RTR inspection hours to the correct CAC in the CAC System.

Inspection Hours Charged to Wrong CAC

In 18 of the 23 errors, NRC staff charged RTR inspection hours to the wrong CAC. For example, in 6 of these 18 errors, the Preparation and Documentation CAC was charged instead of the Inspection of Transportation Activities CAC. The Preparation and Documentation CAC is used for time spent preparing for inspections, while the Inspection of Transportation Activity CAC is used for performing inspection activities related to transporting materials. Figure 3 summarizes the number of errors where inspection hours were charged to the wrong CAC.

[10] The CAC System is the centralized authoritative source for the CACs. The CACs are created, maintained, edited, and closed using the CAC system.

[11] The CAC System has the functionality to provide *Labor Summary Reports* that can be used to derive a cumulative number of hours for a particular CAC/Docket/EPID combination for NRC offices.

Figure 3: Inspection Hours Charged to the Wrong CAC

Errors	Count
Did not charge IP 86740 Inspection of Transportation Activities	6
Did not charge IP 69001 Class II RTRs	6
Did not charge Preparation and Documentation	3
Incorrectly charged General Oversight	1
Charged Preparation and Documentation for Special Inspections	2
Total	18

Source: OIG analysis of the RPS data and the CAC data

Inspection Hours not Recorded in RPS

Additionally, in 5 of 23 CAC errors, the Class II RTR inspection hours were not recorded in the RPS. Specifically, in 3 of these 5 errors, the RTR inspection occurred, but no hours were recorded to the CAC System or the RPS. The OIG also found errors where inspection hours were charged to the appropriate CAC, but the hours were not entered in the RPS. For example, Inspection of Transportation Activity occurred as documented in the inspection report and was recorded to the appropriate CAC, but the hours were not recorded in the RPS. Figure 4 summarizes inspection hours not recorded in the RPS.

Figure 4: Inspection Hours Missing in RPS

Errors	Count
No hours recorded	3
No RTR Inspection Travel hours	1
No IP 86740 – Inspection of Transportation Activities hours	1
Total	**5**

Source: OIG analysis of RPS data and CAC data

Why This Occurred

The NRC Lacks Updated Guidance and Does Not Ensure the Accuracy of the RTR Inspection Hours Charged

The NRC lacks updated guidance and internal controls to ensure the RTR inspection hours are charged to the correct CACs. For example, MD 10.43 has not been updated since January 2020. That update predates the NRC's current timekeeping system, the Human Capital Management Cloud System, which was implemented in August 2022. Thus, MD 10.43 does not address the new system, and the NRC has not supplemented the MD with any guidance addressing how to correctly record RTR inspection hours to specific CACs.

Furthermore, the CACs for inspection travel (time devoted to travelling to and from a location to perform inspection activity) involving RTRs and the inspection procedure for special inspections were not available in the RPS.[12] NRC management is aware of these problems and plans to apply corrective actions as the transition to the RPS progresses.

Why This Is Important

The NRC Risks Impacts to Internal Controls and Resource Planning for Future RTR Inspections

Charging inspection hours to the wrong CAC could adversely affect the planning and budgeting for future inspections. Additionally, with new advanced reactor technologies on the horizon, new non-power reactor facilities will increase demand for inspection resources. Thus, the NRC must accurately capture inspection hours so that the agency understands the inspection resources needed for the current and future RTRs.

[12] According to NRC management, inspection hours were not recorded in the RPS because in the early phases of the RTR inspection program transition, the CAC/EPID structure required manual entry in the RPS.

Recommendations

The OIG recommends that the Executive Director for Operations:

1.1. Update and implement guidance applicable to the NRC's current timekeeping system; and,

1.2. Establish guidance and training for recording and approving the RTR inspection hours to specific CACs.

2. The NRC Should Ensure RTR Inspectors Meet Training and Qualification Requirements

The NRC should ensure RTR inspectors meet training and qualification requirements. Specifically, the NRC does not consistently track whether inspectors have completed post-qualification and refresher training requirements. The NRC also is not consistent in how the agency reviews requests to approve alternate methods for meeting the RTR inspector qualification program requirements.[13] This occurred because the NRC lacks management controls to ensure RTR inspectors receive post-qualification and refresher training, and required procedures to approve alternate methods for meeting inspector qualification requirements are not always adhered to. As a result, the NRC risks impacts to the RTR inspectors' performance and knowledge transfer capabilities.

What Is Required

The NRC Should Ensure RTR Inspectors Meet Training and Qualification Requirements

According to the GAO Green Book, management should establish expectations of competence for key roles, and other roles at management's discretion, to help the entity achieve its objectives. Competence is the qualification to carry out assigned responsibilities. It requires relevant knowledge, skills, and abilities, which are gained largely from professional experience, training, and certifications. It is demonstrated by the behavior of individuals as they carry out their responsibilities. Training enables individuals to develop competencies appropriate for key roles, reinforce standards of conduct, and tailor training based on the needs of the role.

[13] This includes credit for previous experience and training.

Additionally, IMC 1245 Appendix D1, *Maintaining Qualification,*[14] states that post-qualification requirements are to be completed prior to the end of the third calendar year after achieving full qualification. Refresher training is to be completed within the established re-qualification cycle, calculated based on the full qualification month, with required training completed by the end of the third calendar year as outlined in IMC 1245 Appendix D1.

Under Appendix D1, RTR inspector post-qualification requirements include:

1. Attending classes beyond the core requirements if needed for oversight mission basis; and,
2. Reading relevant RTR license amendments, incident reports, new regulatory requirements, etc.

Additionally, RTR inspector refresher training requirements include but are not limited to:

1. Attending courses that have been taken previously or taking a refresher course on the subject matter;
2. Participating in exchange forums with counterparts;
3. Performing a joint inspection with another RTR inspector; and,
4. Completing a site access refresher training course once every 5 years by completing H-101S in the Training Management System.

Alternate Methods for Meeting a Program Requirement

IMC 1245, *Qualification Program for Reactor Inspectors,*[15] states an individual's division director has the authority to accept previous experience and training as an alternate method for meeting the requirements contained in IMC 1245. Justification for accepting previous experience and training to meet program requirements must be documented and recorded in the individual's training record. Forms for documenting the equivalency justification are in each qualification journal.

[14] IMC 1245 Appendix D1, *Maintaining Qualifications* consolidates post-qualification and refresher training requirements needed to maintain full inspector qualification for each inspector qualification program including RTRs.

[15] IMC 1245 defines training and qualification requirements for inspectors and operator licensing examiners performing activities in NRR and Office of Nuclear and Security Incident Response programs; establishes the requirements for completing refresher and continuing training; and establishes and defines the process for evaluating the effectiveness of the inspector training and qualification process.

Additionally, under the guidance in NRR Office Instruction ADM-504, Revision 4, *Qualification Program,* employees may be qualified without any further activity for a position based on previous experience where applicable. ADM-504 refers to granting this type of qualification as "grandfathering." A memo recommending grandfathering will be written from the branch chief to the division director for approval. Additionally, previous training or work experiences that meet the intent of a given training requirement may provide a demonstration of competency that can be used to justify meeting the training requirement. The justification for accepting previous experience and training to meet program requirements must be documented using an equivalency justification form.

What We Found

The NRC Does Not Consistently Track Post-Qualification and Refresher Training and Does Not Take a Consistent Approach in Reviewing Requests to Approve Alternate Methods for Meeting Inspector Qualification Requirements

The NRC does not consistently track post-qualification and refresher training and does not take a consistent approach in reviewing requests to approve alternate methods for meeting inspector qualification requirements.

Inconsistent Tracking of Post-Qualification and Refresher Training

The OIG analyzed the qualification documentation for five RTR inspectors that the agency completed between January 1, 2020, and December 31, 2022. The documentation reviewed included RTR qualification cards, training certificates, and justification approval forms. These qualification documents were analyzed to determine whether the RTR inspectors complied with RTR training requirements.

Based on the analysis of this documentation, the OIG found that NRC management does not consistently track completion of post-qualification and refresher training requirements. For example, for each of the five inspectors whose documentation the OIG reviewed, the OIG could not verify that the inspectors completed three of six post-qualification and refresher training requirements. During interviews with the OIG, RTR inspectors stated that they (1) participate in exchange forums with

counterparts, (2) perform joint inspections with other RTR inspectors, and (3) read relevant RTR license amendments, incident reports, and new regulatory requirements. However, because the NRC did not maintain the relevant documentation, the OIG was unable to validate whether the RTR inspectors met these requirements.

Insufficiently Supported Approvals of Alternate Methods for Meeting a Program Requirement

The OIG found that approvals of alternate methods for meeting RTR inspector qualification requirements, such as equivalency justifications,[16] were inconsistent.

Equivalency Justification

During the OIG's analysis of equivalency justification approvals, the OIG identified the following deficiencies:

1. One instance where the inspector did not use the required justification form; and,
2. Two instances where the justification form was not signed by the division director, as required by IMC 1245.

Grandfathering

Like equivalency, "grandfathering" is a process for evaluating an employee to be exempt from the qualification process based on prior experience. A memo recommending grandfathering must be written and approved by NRC management. The OIG found one RTR inspector was grandfathered into the RTR inspection program; however, there is no documentation to verify the NRC evaluated the inspector's experience for grandfathering.

[16] Equivalency is previous training or work experiences that meet the intent of a given training requirement such that the demonstration of competency can be used to justify meeting the training requirement.

Why This Occurred

The NRC Lacks Management Controls to Ensure RTR Inspectors Receive Adequate Training

The guidance in IMC 1245 Appendix D1, *Maintaining Qualification,* lacks specific courses in the section related to the RTR inspector post-qualification and refresher training requirements. The guidance identifies only *Site Access Refresher (H-101s)*,[17] which is required training for all NRC inspectors every 5 years and not specific to RTRs. Additionally, the guidance does not identify any required minimum hours or continuing professional education courses.

All five RTR inspectors interviewed by the OIG stated that they participate in required exchange forums. The exchange forums are not captured or recorded in their training records, so their attendance cannot be readily validated and confirmed. Furthermore, there is no emphasis on tracking and confirming the completion of post-qualification and refresher training requirements, except for courses inherently captured in the NRC's Talent Management System (such as *Site Access Refresher*).

Additionally, an NRC manager told the OIG that their expectations are focused on maintaining an inspector's proficiency through on-the-job training and joint inspections to ensure there are no long lapses in performing inspections. Certain NRC managers also stated they believe it is, therefore, unnecessary to document and track post-qualification and refresher training.

Why This Is Important

The NRC Risks Impacts to the RTR Inspectors' Performance and Knowledge Transfer

Training programs create opportunities to gain, reinforce, and transfer knowledge. However, without management controls to ensure the RTR inspectors receive adequate training, the RTR inspectors may lack:

[17] All NRC employees requiring unescorted access to licensee facilities must maintain this training.

1. Sufficient or up-to-date skills;
2. Knowledge to perform RTR inspections; and,
3. The ability to identify and address updates to the RTR program and processes.

Additionally, there could be impacts to the NRC's knowledge transfer capability if NRC managers and subject matter expert(s) depart from their positions.

Recommendations

The OIG recommends that the Executive Director for Operations:

2.1. Update the RTR training guidance to include specific courses and hours for refresher training;

2.2. Track post-qualification and refresher training; and,

2.3. Periodically review the RTR training program to ensure consistency, effectiveness, and relevance.

3. The NRC Should Centrally Retain RTR Inspection Program Information

The NRC does not centrally retain RTR inspection program information related to completed RTR inspections, and the RTR inspection preparation process is inefficient. This occurred because the NRC has not fully implemented a centralized system to retain RTR inspection information. Without a centralized system, the NRC loses the ability to track the RTR inspection information and optimize the RTR inspection program processes.

What Is Required

The NRC Should Centrally Retain RTR Inspection Program Information

According to the GAO Green Book, management processes should ensure that relevant data from reliable sources are retained as quality information within the entity's information system. Management should use quality information to make informed decisions and evaluate the entity's performance in achieving key objectives and addressing risks.

What We Found

The NRC Does Not Centrally Retain RTR Inspection Program Information and the RTR Inspection Preparation Process Is Inefficient

Currently, the NRC does not centrally retain RTR inspection program information, such as prior inspection results and open items for follow-up inspections. Additionally, the RTR inspection preparation process is inefficient. Since 2021, the NRC has undertaken efforts to implement the RPS for the RTR inspection program.

Incorporating RTR Inspection Program Information into RPS

To determine the extent to which the RPS is used to record RTR inspection data, the OIG analyzed RTR inspection reports and inspection information entered into RPS between January 2020 and December 2022. The OIG identified 21 Class II RTR inspection findings; however, only 10 were entered into the RPS. The OIG found that the agency's use of the RPS is limited for recording RTR inspection data.

Inefficient RTR Inspection Preparation Process

The OIG found that the RTR inspection preparation process is inefficient. Specifically, when preparing for an RTR inspection, the RTR inspectors use multiple sources to identify prior RTR inspection information. According to NRC staff, full implementation of the RTR inspection program in the RPS would provide better support and improve communication between RTR inspectors. For example, the RTR inspectors currently use:

1. The NRC's Agencywide Documents Access and Management System, for previous inspection reports, Safety Analysis Reports, and Technical Specifications;
2. SharePoint to review security-related and other documents;
3. The RPS to document inspection findings, and inspection follow-up items;[18]
4. Microsoft OneDrive, which stores the checklist for the RTR inspection program completion requirements;

[18] Inspection follow-up items are issues which merit additional inspection. Inspection follow-up items include unresolved items, violations, non-cited violations, and deviations.

5. Microsoft Excel documents, which are used to track inspection schedules and due dates; and,
6. RTR inspectors' personal working files for facilities to which they commonly are assigned.

Why This Occurred

The NRC Has Not Fully Implemented a Centralized System to Retain RTR Inspection Program Information

Although the NRC has been increasing use of the RPS for RTR inspections since 2021, the RTR inspection program is not yet fully implemented in the RPS. Additionally, NRC management does not have a specific time frame for fully implementing the RPS for the RTR inspection program and has not designated resources to prioritize the implementation effort. Furthermore, the agency lacks an overarching written plan to fully execute the implementation of the RTR inspection program into the RPS.

Why This Is Important

Without a Centralized System, the NRC Loses the Ability to Track the RTR Inspection Program Information and Optimize the RTR Inspection Program Processes

Without centrally retaining RTR inspection information, the NRC's ability to track the RTR inspection program information and optimize its inspection program processes could be severely impacted.

Centralized retention of RTR inspection information could improve efficiencies and allow information from previous and current RTR inspections to be readily accessible. According to NRC staff, full implementation of the RTR inspection program in the RPS would inform trend analysis, provide better support, and improve communication between RTR inspectors.

Moreover, without centrally retaining RTR inspection information, NRC inspectors may not be able to easily determine the complete history of a Class II RTR facility prior to an inspection. For example, the RTR inspector could overlook previous open items, which could lead to missed opportunities to assess the status of previously identified safety deficiencies and ensure that those items are dispositioned through the

oversight and enforcement processes. Additionally, centralized data can support management assessments of program resource effectiveness.

Recommendation

The OIG recommends that the Executive Director for Operations:

3.1 Establish a plan and milestones to fully implement the use of RPS to support oversight of the RTR inspection program.

4. The NRC Should Periodically Review and Update RTR Inspection Guidance

The NRC should periodically review and update its Class II RTR inspection program guidance to ensure the guidance remains relevant and achieves the inspection program objectives.[19] However, the NRC's RTR inspection program guidance has not been reviewed and updated since 2004. This occurred because NRC management believes the current RTR inspection program guidance is adequate. Without periodically reviewing and updating the RTR inspection guidance for relevance, the NRC risks not improving the RTR inspection program and its readiness to inspect new RTR technology.

What Is Required

The NRC Should Periodically Review and Update RTR Inspection Program Guidance

According to the GAO Green Book, management is responsible for internally communicating the necessary quality information to achieve the entity's objective. The GAO Green Book also states that management should implement control activities through policies; specifically, by including periodic reviews of policies, procedures, and related control activities for continued relevance and effectiveness in achieving the entity's objectives or addressing related risks.

[19] The OIG issued a Special Inquiry Report dated September 29, 2023, titled *"Special Inquiry into the U.S. Nuclear Regulatory Commission's Oversight of Research and Test Reactors,"* which had a similar finding. Specifically, the OIG found that the agency's RTR inspection program policy and guidance are outdated because the NRC has not implemented risk-informed approaches and safety culture elements. The guidance includes IMC 2545, *"Research and Test Reactor Inspection Program,"* and 10 IPs specifically applicable to Class I RTR inspections.

Additionally, IMC 0040, *Preparation, Revision, Issuance, and Ongoing Oversight of NRC Inspection Manual Documents*, states that each IMC and IP be reviewed at least once every 5 years. Upon completing the review, the IMC or IP will be updated as necessary, and reissued noting that a periodic review was completed.

What We Found

The NRC's RTR Inspection Program Guidance Has Not Been Reviewed and Updated

The OIG reviewed IMCs and IPs applicable to Class II RTR inspections to determine if periodic reviews were conducted every 5 years in accordance with IMC 0040. The OIG found that guidance documents were last updated in 2004 and 2020, resulting in an 11 to 19-year gap between reviews. Additionally, there is no indication that a review was performed within the 5-year period to determine the effectiveness of the RTR inspection program guidance. Figure 5 shows a summary of RTR inspection program guidance documents that were not reviewed within the required timeframe.

Figure 5: RTR Inspection Program Guidance Review Gap

PROGRAM GUIDANCE	ISSUE DATE	REVISION DATE	YEARS	PURPOSE/ADDITIONAL INFORMATION
Inspection Manual Chapter 1245, Appendix C5 *Research and Test Reactor Inspector Proficiency Training and Qualification Journal*	7/8/2009	6/26/2020	11	Outlines course requirements for the RTR inspector qualification
Inspection Manual Chapter 2545 *Research and Test Reactor Inspection Program*	6/23/2004	3/13/2020	15	Establishes the program for inspection of the RTRs; however, the OIG identified no material changes to safety inspection guidance in the revised version dated 3/13/2020
Inspection Manual Chapter 0615 *Research and Test Reactor Inspection Reports*	6/23/2004	None	19	Establishes guidance for the RTR inspection reports for content, format, and style and is currently undergoing review
Inspection Procedure 69001 Class II *Research and Test Reactors*	2/3/2004	None	19	Establishes guidance for conducting Class II RTR inspections

Source: OIG's analysis of applicable NRC RTR Inspection Program Guidance

Why This Occurred

NRC Management Believes Current RTR Inspection Program Guidance Is Adequate

NRC managers told the OIG they have not identified a need, nor have they designated the resources, to update the guidance, and they believe the current RTR inspection guidance documents are adequate. As such, the NRC has not conducted periodic and systematic formal assessments to determine the effectiveness of its RTR inspection guidance.

Why This Is Important

The NRC Risks Not Improving the RTR Inspection Program and Its Readiness to Inspect New RTR Technology

Without periodic assessment of inspection program guidance, NRC staff may lack awareness of regulatory changes that could impact IPs or IMCs, such as regulatory requirements, regulatory guides, and licensee

commitments. Therefore, inspectors could overlook requirements or guidance that is intended to help the NRC achieve its oversight. Additionally, outdated guidance may not properly reflect management expectations or assist inspectors with their inspection assessments.

With new technology on the horizon, including the SHINE Medical Isotope Production Facility[20] and prospective RTRs based on advanced reactor technology, it is important that the RTR inspection program remain dynamic, with the ability to respond to changes in the RTR community and gain insights from operational experience. During their interviews with the OIG, NRC managers acknowledged that the SHINE facility may necessitate a review of the agency's RTR guidance to determine whether updates are needed.

Recommendation

The OIG recommends that the Executive Director for Operations:

4.1 Periodically review and update the RTR inspection guidance in accordance with IMC 0040.

[20] SHINE Medical Isotope Production Facility is a non-power facility currently under construction. SHINE will irradiate and process special nuclear material to produce medical radioisotopes, such as molybdenum-99 (Mo-99), that are primarily used in cancer screening and stress tests to detect heart disease.

IV. CONSOLIDATED LIST OF RECOMMENDATIONS

The OIG recommends that the Executive Director for Operations:

1.1. Update and implement guidance applicable to the NRC's current timekeeping system;

1.2. Establish guidance and training for recording and approving the RTR inspection hours to specific CACs;

2.1. Update the RTR training guidance to include specific courses and hours for refresher training;

2.2. Track post-qualification and refresher training;

2.3. Periodically review the RTR training program to ensure consistency, effectiveness, and relevance;

3.1 Establish a plan and milestones to fully implement the use of the RPS to support oversight of the RTR inspection program; and,

4.1 Periodically review and update the RTR inspection guidance in accordance with IMC 0040.

V. NRC COMMENTS

The OIG held an exit conference with the agency on March 21, 2024. Before the exit conference, agency management reviewed and provided comments on the discussion draft version of this report, and the OIG discussed these comments with the agency during the exit conference. Following the exit conference, agency management stated their general agreement with the findings and recommendations in this report and opted not to provide additional comments. The OIG has incorporated the agency's comments into this report, as appropriate.

OBJECTIVE, SCOPE, AND METHODOLOGY

Objective

The audit objective was to determine whether the NRC performs safety inspections at Class II research and test reactors in accordance with agency guidance and inspection program objectives.

Scope

This audit focused on the NRC's performance of safety inspections at Class II RTRs. We conducted this performance audit at NRC headquarters in Rockville, Maryland from October 6, 2022, to November 1, 2023.

The OIG reviewed and analyzed internal controls related to the audit objective. Specifically, the components of control environment, risk assessments, control activities, information and communication, and monitoring. Within those components, the OIG reviewed the principles of establishing structure, responsibility, and authority organizational structure, assigning responsibility and delegating authority to achieve the entity's objectives; demonstrating a commitment to recruit, develop, and retain competent individuals; defining objectives and risk tolerances; identifying, analyzing, and responding to risks and significant changes; designing information system and control activities; implementing control activities; using quality information; communicating internally and externally; performing monitoring activities; and, remediating internal control deficiencies timely.

We assessed the reliability of data to ensure there was a complete list of Class II RTR safety inspections, by comparing EPIDs in the RPS report data to the EPIDs in the CAC Labor Summary Report from the CAC System. These efforts allowed the OIG to identify five additional EPIDs that were not in the RPS report data.

Methodology

The OIG reviewed relevant criteria for this audit, including, but not limited to:

- U.S. Government Accountability Office, *Standards for Internal Control in the Federal Government*, GAO-14-704G, dated September 2014;

- Management Directive 10.43, *Time, and Labor Reporting*, dated January 23, 2020;

- Inspection Manual Chapter 0040, *Preparation, Revision, Issuance, and Ongoing Oversight of NRC Inspection Manual Documents*, dated July 23, 2020, and January 17, 2023;

- Inspection Manual Chapter 0615, *Research and Test Reactor Inspection Reports* dated June 23, 2004;

- Inspection Manual Chapter 1245, Appendix C5, *Research and Test Reactor Inspector Technical Proficiency Training and Qualification Journal*, dated June 26, 2020;

- Inspection Manual Chapter 1245, *Qualification Program for Reactor Inspectors*, May 15, 2023;

- Inspection Manual Chapter 1245, Appendix D1, *Maintaining Qualifications,* dated January 1, 2023*;*

- Inspection Manual Chapter 2545, *Research and Test Reactor Inspection Program,* dated June 1, 2020;

- Inspection Procedure 69001, *Class II Research and Test Reactor,* dated February 3, 2004; and,

- Office of Administration (ADM)-504, Revision 4, *Qualification Program,* dated April 10, 2023.

The OIG observed two safety inspections at Class II RTR facilities, Purdue University, West Lafayette, Indiana, and Ohio State University, Columbus, Ohio. The OIG obtained and analyzed Class II RTR safety inspection data

for 24 RTRs between January 1, 2020, and December 31, 2022. Specifically, the OIG assessed the completeness of 63 RTR inspections. The OIG also analyzed T&L data from the CAC System and the RPS to determine if inspection hours were consistent and complete.

The OIG analyzed five RTR inspectors' qualification documentation to ensure training requirements were met. The documents reviewed included qualification cards, justification approvals, and training certificates.

The OIG interviewed NRC staff and management from the Office of Nuclear Reactor Regulation to understand the Class II RTR inspection program, processes, and procedures, and staff from the Office of the Chief Human Capital Officer to understand site training and qualification curriculum requirements.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Throughout the audit, auditors considered the possibility of fraud, waste, and abuse in the program.

The audit was conducted by Avinash Jaigobind, Team Leader; Paul Rades, Team Leader, Alecia Hylton, Audit Manager; Amy Hardin, Audit Manager, Brigit Larsen, Senior Auditor; Melissa Chui, Senior Auditor; Jennifer Cheung, Senior Auditor; Christopher Tan, Student Intern; and Andy Hon, Senior Technical Advisor.

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COMMENTS AND SUGGESTIONS

If you wish to provide comments on this report, please email the OIG using this link.

In addition, if you have suggestions for future OIG audits, please provide them using this link.

NOTICE TO NON-GOVERNMENTAL ORGANIZATIONS AND BUSINESS ENTITIES SPECIFICALLY MENTIONED IN THIS REPORT

Section 5274 of the James M. Inhofe National Defense Authorization Act for Fiscal Year 2023, Pub. L. No. 117-263, amended the Inspector General Act of 1978 to require OIGs to notify certain entities of OIG reports. In particular, section 5274 requires that, if an OIG specifically identifies any non-governmental organization (NGO) or business entity (BE) in an audit or other non-investigative report, the OIG must notify the NGO or BE that it has 30 days from the date of the report's publication to review the report and, if it chooses, submit a written response that clarifies or provides additional context for each instance within the report in which the NGO or BE is specifically identified.

If you are an NGO or BE that has been specifically identified in this report and you believe you have not been otherwise notified of the report's availability, please be aware that under section 5274 such an NGO or BE may provide a written response to this report no later than 30 days from the report's publication date. Any response you provide will be appended to the published report as it appears on our public website, assuming your response is within the scope of section 5274. Please note, however, that the OIG may decline to append to the report any response, or portion of a response, that goes beyond the scope of the response provided for by section 5274. Additionally, the OIG will review each response to determine whether it should be redacted in accordance with applicable laws, rules, and policies before we post the response to our public website.

Please send any response via email using this link. Questions regarding the opportunity to respond should also be directed to this same address.