



Audit of the U.S. Nuclear Regulatory Commission's Oversight of Irretrievable Well Logging Source Abandonments

OIG 23-A-04
May 4, 2023



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MEMORANDUM

DATE: May 4, 2023

TO: Daniel H. Dorman
Executive Director for Operations

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

SUBJECT: AUDIT OF THE U.S. NUCLEAR REGULATORY
COMMISSION'S OVERSIGHT OF IRRETRIEVABLE
WELL LOGGING SOURCE ABANDONMENTS
(OIG 23-A-04)

Attached is the Office of the Inspector General's (OIG) audit report titled *Audit of the U.S. Nuclear Regulatory Commission's (NRC) Oversight of Irretrievable Well logging Source Abandonments*.

The report presents the results of the subject audit. Following the April 26, 2023, exit conference, NRC staff indicated that they had no formal comments for inclusion in this report.

Please provide information on actions taken or planned on each of the recommendations within 30 days of the date of this memorandum.

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 Mike Blair, Team Leader, at 301.415.8399.

Attachment:
As stated

cc: M. Bailey, OEDO
J. Jolicoeur, OEDO



Results in Brief

Why We Did This Review

The U.S. Nuclear Regulatory Commission (NRC) provides licensing and inspection oversight for well logging licensees in non-Agreement States. Well logging is a process that involves lowering and raising measuring devices that contain licensed nuclear material to obtain information about well formations that may be used in oil, gas, and mineral exploration. If a sealed source gets disconnected during well logging, the licensee must make a reasonable effort to recover the source prior to deeming it irretrievable. The licensee is required to notify the NRC and seek authorization to implement abandonment procedures and must subsequently follow up with a 30-day written report.

The audit objective was to determine the adequacy of the NRC's handling and processing of irretrievable well logging source abandonments.

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What We Found

The NRC's handling and processing of irretrievable well logging source abandonments are generally aligned with the agency's regulations. However, opportunities exist to improve the NRC's staff procedures for receiving irretrievable well logging source abandonment notifications and documenting well logging source abandonment licensee reports.

Notably, the NRC has not developed standard guidance for handling irretrievable well logging source abandonment notifications, and there is inconsistent documentation of irretrievable well logging source abandonment notifications and licensee reports. This has resulted in inconsistencies and inefficiencies in the abandonment notification process, and the possibility of ineffective oversight of these abandonments.

What We Recommend

This report makes four recommendations to improve the handling and processing of irretrievable well logging source abandonment notifications, and one recommendation to promote consistency in documenting well logging source abandonment notifications and licensee reports received.

TABLE OF CONTENTS

<u>ABBREVIATIONS AND ACRONYMS</u>	iii
I. <u>BACKGROUND</u>	1
II. <u>OBJECTIVE</u>	6
III. <u>FINDINGS</u>	6
1. Standard Guidance for Handling Irretrievable Well Logging Source Abandonment Notifications has not been Developed	6
2. Documentation of Irretrievable Well Logging Source Abandonment Notifications and Reports is Inconsistent	13
IV. <u>CONSOLIDATED LIST OF RECOMMENDATIONS</u>	18
V. <u>NRC COMMENTS</u>	19
 APPENDICES	
A. <u>10 C.F.R. 39.77</u>	20
B. <u>OBJECTIVE, SCOPE, AND METHODOLOGY</u>	21
 <u>TO REPORT FRAUD, WASTE, OR ABUSE</u>	 23
<u>COMMENTS AND SUGGESTIONS</u>	23

ABBREVIATIONS AND ACRONYMS

10 C.F.R.	Title 10 of the Code of Federal Regulations
ADAMS	Agencywide Documents Access and Management System
DPO	Differing Professional Opinion
HOO	Headquarters Operations Officer
NMED	Nuclear Material Events Database
NMSS	Office of Nuclear Material Safety and Safeguards
NRC	U.S. Nuclear Regulatory Commission
OIG	Office of the Inspector General

I. BACKGROUND

Well logging is any operation involving the lowering and raising of measuring devices or tools that contain licensed nuclear material¹ for the purpose of obtaining information that may be used in oil, gas, mineral, groundwater, or geological exploration.

During well logging, the operator drills vertically or directionally thousands of feet underground. Drilling may occur both onshore and offshore. With well logging, there is the possibility that the sealed source² could become lodged in the underground well. Sources are more likely to become lodged during offshore well logging since it is more difficult to drill. Additionally, it is harder and costlier to retrieve the lodged source without damaging the source. Those considerations make it more likely that a source is deemed irretrievable³ and subsequently abandoned in the well.

Governing Regulations

The U.S. Nuclear Regulatory Commission (NRC) regulations in Title 10 of the Code of Federal Regulations (10 C.F.R.), Part 39, *Licenses and Radiation Safety Requirements for Well Logging*, establish radiation safety requirements for the issuance of licenses for the use of sealed sources containing byproduct material. These regulations also address radiation safety requirements for persons using these sealed sources in well logging operations.

Part 39 specifies what information must be submitted in an application for a licensee to conduct well logging operations, including, for example, information regarding the applicant's program for training logging supervisors and logging assistants, written operating and emergency procedures, and a description of the applicant's organizational structure as it applies to the radiation safety responsibilities in well logging.

¹ This process uses byproduct or special nuclear material tracer and sealed sources in connection with the exploration for oil, gas, or minerals in wells.

² A sealed source is any radioactive or byproduct material encased in a capsule designed to prevent leakage or escape of the material.

³ An irretrievable well logging source is any sealed source containing licensed material that is not connected to the wireline that suspends the source in the well, and for which all reasonable efforts at recovery have been expended. An irretrievable source that receives approval from the NRC to implement abandonment procedures is not considered a lost source.

The information required by Part 39 is collected because it is necessary to ensure that a well logging applicant is properly qualified to perform this activity, and to ensure the safety of employees and members of the public. The regulations provide for comprehensive and consistent radiation safety requirements in NRC and Agreement State⁴ regulations, and safety requirements designed to reduce the likelihood of accidents involving radioactive sources in well logging operations.

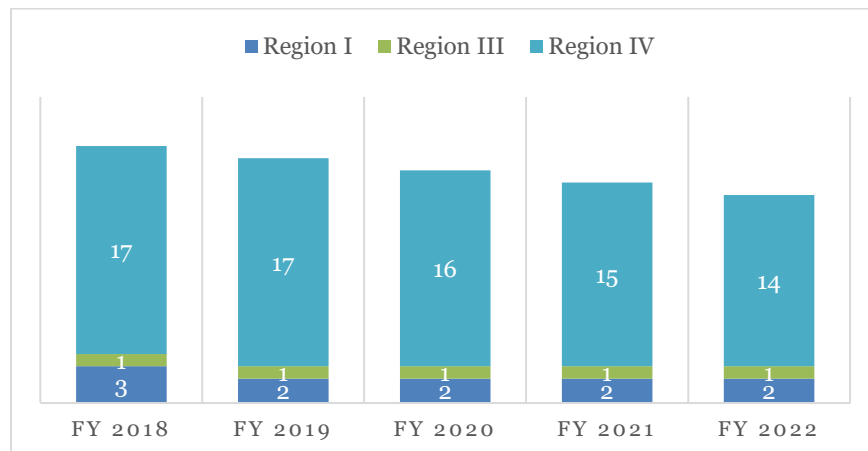
Oversight

The NRC's Responsibilities

Regional Offices

As of November 2022, the NRC had 17 well logging licenses within its purview, spread throughout the agency's four regions. Regions I,⁵ III, and IV oversee the NRC's materials licensees. Each of these regions has a licensing program where staff perform reviews for materials license applications, including new licenses, amendments, and terminations. Further, staff in each region perform materials inspections for byproduct, source, and special nuclear material. A majority of the NRC's well logging licensees are located in Region IV. See Figure 1 for the breakdown of licensees per region.

Figure 1: NRC Well Logging Licenses per Region Between Fiscal Years 2018 and 2022



Source: OIG generated

⁴ Agreement States are States that have assumed the NRC's regulatory authority under the Atomic Energy Act of 1954, as amended. Agreement States have entered into agreements with the NRC that give them the authority to license and inspect byproduct, source, or special nuclear materials used or possessed within their borders. As of February 24, 2023, there are 39 Agreement States, and 3 States that have submitted Letters-of-Intent to become Agreement States.

⁵ Region I also oversees material licensees in Region II.

Office of Nuclear Material Safety and Safeguards (NMSS)

The NMSS performs safety and environmental reviews of agency licensing actions, provides technical expertise in the development of licensing guidance for use of radioactive materials in industrial applications, and supports the regions, as needed. If the Regions have a technical issue related to well logging or receive a request from a licensee involving activities outside of the scope of its license, the regional staff reach out to the NMSS through a Technical Assistance Request.⁶ The NMSS also develops and maintains program guidance for the Agreement States.

NRC Operations Center

The NRC Operations Center is the primary center of communication and coordination among the NRC, its licensees, State and Tribal agencies, and other federal agencies, regarding operating events involving nuclear reactors or materials. Located in Rockville, Maryland, the NRC Operations Center is staffed 24 hours a day by employees trained to receive and evaluate event reports and coordinate incident response activities. Contacting the NRC Operations Center is not a requirement under 10 C.F.R. 39.77(c). However, NRC staff involved with well logging abandonment notifications encourage licensees to contact the NRC Operations Center to ensure timely regional notification of any irretrievable source. NRC Operations Center staff, called Headquarters Operations Officers (HOO), facilitate communication between the regional staff and licensees, and track these communications via non-public logbook entries.

The Agreement States' Responsibilities

Agreement States with the regulatory authority for materials oversight issue well logging licenses within their respective jurisdictions. If an irretrievable well logging source requires abandonment within Agreement State jurisdiction, licensees notify the State's regulatory authority of the lodged source and need for abandonment. The Agreement State, in turn, is encouraged to submit a 30-day written report to the Nuclear Material Events Database (NMED) per SA-300, *Handbook on Nuclear Material Event Reporting for the Agreement States, Appendix A*.

⁶ A Technical Assistance Request is a formal submittal from regional Division Directors or Agreement States to the appropriate NMSS Division Director requesting technical or policy assistance on a licensing or inspection issue.

License Review Process for Well Logging Licensees

A person must file an application for a specific license authorizing the use of licensed material in well logging. NRC staff use NUREG 1556, Volume 14, *Consolidated Guidance about Materials Licenses, Program-Specific Guidance About Well Logging, Tracer, and Field Flood Study Licenses*, to review, if warranted, and approve the application.

Well logging operations using sealed sources can be performed only after a written agreement is executed between the licensee and the employing well operator.⁷ These written agreements must identify a responsible party for ensuring the following steps will be taken if a source becomes lodged in a well:

- A reasonable effort will be made to recover the source, following current industry standards and safe practices;
- A person will not attempt to recover a lodged sealed source in a manner that, in the licensee's opinion, could result in its rupture; and,
- If a licensee classifies a sealed source as irretrievable after reasonable efforts at recovery have been expended, within 30 days, (1) the source must be immobilized and sealed in place with a cement plug; (2) the licensee must provide a means to prevent inadvertent intrusion on the source; and, (3) the licensee must install a permanent identification plaque at the surface of the well.

During inspections, NRC staff further verify that the licensee has adequate procedures in place for the abandonment of irretrievable sources, and that the licensee has a written agreement with the well owner or operator for recovery or abandonment of sources.

Source Abandonment Reporting Process and Recordkeeping

NRC Licensee Reporting Requirements

When the licensee, in consultation with the well owner or operator, determines that a sealed source in a well becomes irretrievable, the licensee is required to notify the NRC regional office immediately by telephone to request approval to implement abandonment procedures. The NRC regional office, based on the information provided by the licensee, approves the

⁷ The well operator is the company that has responsibility for the well.

abandonment if all reasonable efforts at recovery have been expended. Within 30 days after a sealed source has been classified as irretrievable, the licensee must then submit a report in writing to the appropriate NRC regional office. The NRC will use these licensee reports to determine whether the irretrievable source has been abandoned properly and permit the NRC staff to decide whether an inspector should be dispatched to the site and to assure that corrective actions have been taken.

The requirements for reporting an irretrievable well logging source are contained in 10 C.F.R. 39.77(c) and (d). See Appendix A for the notification and reporting requirements.

Records of Source Abandonment

Agencywide Documents Access and Management System (ADAMS)

ADAMS is the agency's official recordkeeping system. It is used to organize, preserve, and retrieve a wealth of documents written by NRC staff, contractors, and licensees, including email and correspondence, and other regulatory and technical documents. Well logging source abandonment notifications and reports are stored in ADAMS, along with any other documents associated with each license.

HOO Database

The Operations Center has its own process and database for tracking events. Once the HOOs get a notification from the licensee, they contact the appropriate authority and record information from the conference call. Then, they gather the information necessary to evaluate the licensee's request under 10 C.F.R. Part 39 – well location, depth, latitude and longitude locations, and the grid associated with that well. The licensee will also describe the procedures they will implement, including the concrete seal, deflection device, and plaque to make sure no one will try to drill there in the future. The HOO will follow up with a summarized logbook entry into the HOO database.

NMED

NRC licensees, Agreement States, and non-licensees report to the NRC any events involving nuclear material, and those records are stored and accessed in the NRC's NMED. Idaho National Laboratory manages the database. Reported events are classified based on reporting requirements established in NRC regulations. The event reports are evaluated to identify statistically significant trends and events of higher significance. The event classification category "Lost/Abandoned/Stolen Material" encompasses well logging source

abandonments. Though irretrievable well-logging sources are not deemed significant or reportable events, and it is not a requirement for the abandonments to be recorded in the database, the NMED still includes this data. Annually, the NRC issues a summary report of all materials events that have occurred within a 10-year timespan.

II. OBJECTIVE

The audit objective was to determine the adequacy of the NRC's handling and processing of irretrievable well logging source abandonments.

III. FINDINGS

The NRC's handling and processing of irretrievable well logging source abandonments are generally aligned with the agency's regulations. However, opportunities exist to improve the NRC's staff procedures for handling irretrievable well logging source abandonment notifications, and for documenting irretrievable well logging source abandonment notifications and licensee reports.

1. The NRC has not developed formal guidance for handling irretrievable well logging source abandonment notifications.
2. There is inconsistent documentation of irretrievable well logging source abandonments.

1. Standard Guidance for Handling Irretrievable Well Logging Source Abandonment Notifications has not been Developed

Well-designed guidance documents serve many important functions in regulatory programs; however, the NRC has not developed standard guidance for handling irretrievable well logging source abandonment notifications. This has occurred because agency positions have not been clearly established and implemented. As a result, there have been inconsistencies and inefficiencies in source abandonment approvals, staff is unable to determine if alternate abandonments pose a risk to public safety, and exemptions have been improperly granted.

What Is Required

Well-designed guidance helps interpret existing law and retain organizational knowledge.

The Office of Management and Budget's Final Bulletin for Agency Good Practices

Well-designed guidance documents serve many important functions in regulatory programs. The Bulletin on “Agency Good Guidance Practices” sets forth general policies and procedures for developing, issuing, and using guidance documents. As stated in the Bulletin, agencies may provide helpful guidance to interpret existing law through an interpretive rule or to clarify how they tentatively will treat or enforce a governing legal norm through a policy statement. Guidance documents, used properly, can channel the discretion of agency employees, increase efficiency, and enhance fairness by providing the public clear notice of the line between permissible and impermissible conduct while ensuring equal treatment of similarly situated parties.

Government Accountability Office Standards for Internal Control in the Federal Government

In the *Standards for Internal Control in the Federal Government*,⁸ the Government Accountability Office (GAO) states management should establish an organizational structure, assign responsibility, and delegate authority to achieve the entity’s objectives. Effective documentation assists in management’s design of internal control by establishing and communicating the who, what, when, where, and why of internal control execution. Documentation also provides a means to retain organizational knowledge and mitigate the risk of having that knowledge limited to a few personnel. Further, management should implement control activities through policies, including documenting responsibilities in those policies.

⁸ GAO-14-704G, September 2014

What We Found

The NRC has not developed standard guidance for handling irretrievable well logging source abandonment notifications.

There is no standard process for handling irretrievable well logging source abandonments. The requirements for well logging abandonments are found in 10 C.F.R. Part 39; however, the guidance developed by regional staff to implement requirements in this regulation has not been standardized. Region IV staff members developed their own process for how they will handle these abandonment notifications, such as a source abandonment telephone notification log form to help document the abandonment phone notifications. Region IV also has a database for tracking well logging abandonment notifications, separate from other events reported to the agency. Regions I and III do not have any specific guidance for well logging source abandonments but can refer to NUREG 1556, vol. 14, for guidance on what needs to be validated when a licensee is notifying the Region of an abandonment. However, the guidance does not describe the next steps after receiving the notification.

There are no specific criteria for granting permission to implement preapproved or alternate abandonment procedures. Section 39.77(c) requires licensees to notify the NRC by telephone if a source becomes irretrievable and to obtain NRC approval for abandoning a sealed source in a well. The requirement for prompt notification is needed to permit the NRC to judge whether all reasonable efforts at recovery have been expended. Staff explained, however, that the agency has fundamentally never established the conditions under which permission to implement abandonment procedures would not be granted. Therefore, this part of the regulation is not supported by any generic guidance for the staff regarding what should be approved or denied, nor is there guidance for approving alternate abandonment procedures.

No current guidance exists to support analysis of exemption requests related to well logging abandonments. Abandonment procedures are typically reviewed during the licensing process, but the licensee may request approval to implement alternate procedures, or even request an exemption, from the regulations. For deviations from those preapproved procedures, a licensee may apply, pursuant to Section 39.91, for Commission approval, on a case-by-case basis, of proposed procedures to abandon an irretrievable well logging

source in a manner not otherwise authorized. 10 C.F.R. 39.91 further states that “the Commission may, upon application of any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest.” The regions can grant exemptions which are considered routine without notification to Headquarters. All non-routine exemption requests are referred to Headquarters for review.

In 2020, a licensee contacted the NRC to notify regional staff that a source had become irretrievably lodged while drilling, and that they did not intend to immediately abandon the source until well production was completed. Rather than implementing abandonment procedures, that licensee requested an exemption under which a temporary storage location would be added to their license as a license condition. Despite previous NRC staff granting this exemption in the past, current staff filed a Differing Professional Opinion (DPO)⁹ citing various issues with the process used to grant the exemption, including that an environmental assessment had never been conducted to support these previous exemptions. The DPO resulted in multiple recommendations, including a recommendation that staff complete an environmental assessment to support future exemption requests, and develop guidance to support analysis of these types of requests.

Why This Occurred

Agency positions have not been clearly established and implemented.

The agency relies on its staff to implement processes applying to source abandonments. Region IV staff created regional processes for documenting the abandonment notifications, but also noted that the processing of abandonments is more word-of-mouth, and there are only a few staff members that are experienced with the process. In the absence of standard guidance, staff in Regions I and III indicated they would consult with Region IV if they were to receive notification from a licensee of an irretrievable source to make sure they processed incoming abandonment requests similarly and consistently.

⁹ A DPO is a formal concern submitted by employees based on a difference of opinion. The DPO Program exists as a formal process that all NRC employees and contractors can use to have their differing views on established positions considered by appropriate office directors and regional administrators.

The agency has not provided guidance to address the implementation of Part 39 that reflects its current practices in processing and handling well logging abandonments. The NRC has not evaluated whether it is necessary for a licensee to request authorization to implement abandonment procedures that have already been previously approved by the NRC. Additionally, there is no minimum guidance that states what would be an acceptable form of abandonment if a licensee wishes to deviate from the preapproved procedures, and there is no limit to the deviations a licensee can request. Thus, staff cannot confidently approve these abandonments.

For example, 10 C.F.R. Part 39 requires the licensee to call the NRC to request permission to implement abandonment procedures once deeming a source irretrievable. The NRC generally approves abandonment procedures quickly because most abandonments are requested by a small number of large licensees that have significant experience with well logging and abandonment procedures. However, NRC licensees may also request exemptions and alternate abandonment procedures, that is, deviations from preapproved abandonment procedures. Those licensees have acknowledged that the Part 39 regulations do not give enough direction on abandonment procedures for alternative, temporary, and atypical source locations, including long-term management of sealed sources until final well abandonment. Providing that direction may assist parties to achieve effective alternative solutions in a timely and cost-effective manner while posing minimal public risk.

Since its inception, Part 39 has not been formally revisited to determine if it should be supplemented. The NRC conducted a technical study for the regulation prior to its codification, but the agency did not perform any follow-up environmental assessment to assist in processing exemptions though licensees have abandoned many sources in alternate ways. Staff members were directed to develop explicit guidance to ensure the quality, objectivity, and consistency of exemption packages, but this was not completed in this regulatory area.

Region IV has sought NMSS help in developing an environmental assessment to be used in support of future similar exemption requests through the submission of a Technical Assistance Request. The NMSS has not completed the environmental assessment. Further, Region IV's Regional Administrator sent a memo to the NMSS Director requesting some of the DPO recommendations be considered for inclusion in NMSS's program-specific licensing guidance. In particular, the recommendation was "to develop guidance to support analysis of exemption requests, including identifying the

types of information and issues requiring analysis, related regulation requirements that need to be assessed, duration concerns, and examples of appropriate documentation.” The NMSS has not completed the associated guidance.

NMSS staff claimed they still plan to complete these tasks, but have been unable to do so thus far due to their competing high-priority workload.

Why This Is Important

The NRC’s handling of irretrievable well logging source abandonment notifications has been inconsistent and inefficient.

Without standard guidance and established agency positions, the handling and processing of irretrievable well logging source abandonments may vary across the regions, and even between different inspectors within the same region. The NRC would not have the information needed to ensure that licensees are maintaining records, and that those licensees will continue to operate programs in a manner that will assure adequate protection of public health and safety.

Irretrievable well logging source abandonment notifications are important because they:

- Alert the NRC to irretrievable well logging sources;
- Permit the NRC to judge whether all reasonable efforts at recovery have been expended;
- Ensure that abandonment procedures will be implemented in the event of an irretrievable well logging source;
- Require licensees to describe the conditions under which abandonments are occurring, including location and depth of the sealed source;
- Determine whether an inspector should be dispatched to a site; and,
- Document staff’s acknowledgement that a notification has been made and allow staff to determine when the 30-day report should be expected.

A few Region IV inspectors who frequently receive irretrievable well logging source abandonment notifications are very familiar with the process. However, due to the lack of developed guidance, loss of knowledge is a serious risk when these experienced inspectors eventually leave the agency or retire.

Newer staff would then have to implement these nonstandard procedures. Furthermore, because Region I and III management and staff members do not have experience with handling abandonments, it is important that guidance exists to aid these regions in handling such situations in the future. Similar guidance among the regions reduces the likelihood of inconsistencies in assessing the licensees' recovery efforts and authorization to implement abandonment procedures. Management across the regions stated they have no problem with coordinating or standardizing guidance in this area, as long as it is not too prescriptive, since licensees are unique to their regions.

The requirement to grant permission to implement pre-reviewed and preapproved abandonment procedures is redundant and inefficient. While it is important for the NRC to be notified of incidences of irretrievable sources as they occur, a staff member suggested that it would be more logical for the licensee to only notify the NRC of an abandonment event if the licensee intends to deviate from their preapproved abandonment procedures. These inefficiencies have led to more effort from staff to determine if alternate procedures are offering the same protection to the public.

Conversely, according to NRC staff, licensees have used this undefined requirement as a loophole on several occasions to avoid implementing abandonment procedures. Moreover, there was an incident where a licensee that had been approved for an exemption had not properly abandoned sources even after they stopped producing oil. Staff was unaware these sources had been abandoned because the licensee never followed up with the notification and subsequent 30-day report. Without these licensee reports, the NRC had no method of ensuring the submittal of information needed to protect public health and safety.

Finally, more exemptions may be granted without proper review. Under 10 C.F.R. 39.91, exemptions to the regulations in Part 39 must not endanger life or property or the common defense and security. These criteria for granting exemptions must be applied objectively, consistently, and without preconceived notions that exemptions should be limited or circumscribed. In the absence of supplemental guidance, exemptions have been granted inconsistently and improperly. The 2020 DPO was developed because the NRC previously granted multiple exemptions for abandonments without completing the typical review processes for exemptions. Having an established technical basis, supported by a thorough environmental assessment and clear guidance to support analysis of exemption requests, would establish a consistent methodology for handling such requests in the

future. It would also prevent the regions from having to request assistance from NMSS for each individual exemption request.

Recommendations

The OIG recommends that the Executive Director for Operations:

- 1.1 Collaborate with the regions and the NMSS to establish policy and agencywide positions related to well logging source abandonments;
- 1.2 Review and standardize processes and guidance related to the handling and processing of irretrievable well logging source abandonments;
- 1.3 Develop an environmental assessment to be used in support of exemptions related to the approval of temporary storage locations for abandoned well logging sources; and,
- 1.4 Develop guidance to support analysis of exemption requests.

2. Documentation of Irretrievable Well Logging Source Abandonment Notifications and Reports is Inconsistent

Quality information should be organized and communicated to respond to the agency's objectives. However, the NRC's process for documenting irretrievable well logging source abandonments is inconsistent. This has occurred because there is no standard process or guidance for documenting irretrievable well logging source abandonments and licensee reports. As a result, the NRC may not be providing effective oversight of irretrievable well logging sources.

What Is Required

Quality information should be organized and communicated, internally and externally, to respond to the agency's objectives.

NRC's 2022-2026 Strategic Plan

The NRC's strategies for promoting organizational health include improving knowledge management by identifying and capturing critical information and

leveraging the agency's investment in modern information management and technology to enhance information accessibility and searchability.

Government Accountability Office Standards for Internal Control in the Federal Government

Management should design the entity's information system and related control activities to achieve objectives and respond to risks, and internally and externally communicate the necessary quality information to achieve the entity's objectives.

What We Found

The NRC's documentation for irretrievable well logging source abandonments is inconsistent.

Documentation across NRC systems is not aligned. The HOO has records of the source abandonment notifications in its logbook. Licensees contact the HOO, and they are connected to the appropriate staff to collect all details related to abandonments. This process is beneficial because the HOO records the date and time that each notification is made, details of the abandonments, and the approving official for each notification. Staff can then confirm the initial details provided in the notification are consistent with the 30-day report that the licensee submits. Nevertheless, the process for notifying through the HOO has only been implemented recently, and the logbook cannot be fully relied upon for past events.

ADAMS is the agency's official agency record and should contain all regulatory actions under each licensee's docket, including the licensee's submitted 30-day report. However, the OIG was unable to locate some licensee 30-day reports in ADAMS that were located elsewhere. NMSS staff were unable to explain why these licensee reports were not located in ADAMS.

Though it is not a requirement for abandonment notifications to be included in the NMED, it is still considered a repository that staff can use to identify abandonments by NRC licensees. NMED contractors utilize the Publicly Available Records System¹⁰ to identify any events that need to be input into the NMED. This is typically done by conducting a cursory search and

¹⁰ The Publicly Available Records System Library is a repository linked to ADAMS that contains only public documents from the ADAMS Main Library. NMED contractors do not have access to the non-public documents in ADAMS.

identifying the 30-day licensee abandonment reports by the ADAMS “document name,” not the actual information in the documents. Titles in ADAMS vary, so if an abandonment report’s title does not reflect its contents, the contractors may not recognize it, and they could miss it. Additionally, the NMED records may sometimes be incomplete, and the contractors must request specific information from staff to make a complete record. Further, the annual NMED report issued by the NRC does not accurately describe the quantity of abandonments that have occurred each fiscal year.

An OIG comparative analysis of the HOO logbook, ADAMS, and NMED documentation determined that between fiscal years 2016 and 2022:

- Not all abandonments appear in each database;
- Event data collected varies across the databases; and,
- Documentation for each event varies, as it is either inconsistent, nonexistent, or unavailable.

Because some staff members do not consider abandonments “significant events,”¹¹ not all abandonments are included in the NMED or reflected in the NMED annual reports. Further, in Region IV, abandonment notifications and reports are tracked separately from more significant events, and some staff members are under the impression that they are not typically tracked in the NMED, resulting in the failure to forward the licensee report to the NMED. Even if well logging source abandonments are not considered safety significant, there is still a requirement that the licensee notify the NRC when they occur. The NMED contract specifically states that event reports to be entered into the NMED include material event reports received from NRC licensees and Agreement States, including events reported by non-Agreement States involving lost and/or found, stolen, or abandoned radioactive material.

Why This Occurred

There is no standard agencywide guidance for documenting irretrievable well logging source abandonments.

The NRC lacks agencywide guidance for documenting well logging source abandonment notifications and licensee reports. Regions I and III staff

¹¹ A significant nuclear event has an actual or potential effect on the health and safety of the public and the environment. Significant events are reported to the HOO by the NRC’s licensees, Agreement States, other federal agencies, the public, and other stakeholders, and they are tracked by the NRC Operations Center’s automated event tracking system.

members indicated they were not aware of any guidance in their respective regions for documenting irretrievable well logging source abandonments. Region IV staff previously developed a regional procedure for event notifications, which includes guidance for ADAMS and NMED submissions, but current staff is unaware of this existing guidance.

Specifically, PG 9007B.2, *Reactive Inspection and Licensee Event Report Guidance for DNMS Staff*, establishes a process for evaluating significant operational events within Region IV's Division of Radiological Safety and Security and establishes a process for evaluating licensee event reports, including incident review, follow-up, and closure documentation that are reported by specific byproduct, source, and special nuclear material licensees. PG 9007B.2 includes a flowchart for lost, abandoned, or stolen materials, and references irretrievable well logging abandonments. Region IV staff members currently track the reports in a separate spreadsheet based on HOO notifications, and sometimes have to reconcile their records with the HOO logs. However, there is no way to follow up and ensure that all abandonment reports are actually placed in the NMED, and staff may update records without informing the NMED contractors that availability may have changed, or that an event was backdated.

Why This Is Important

The NRC may not provide effective oversight of irretrievable well logging sources.

NRC staff are unable to identify all events related to irretrievable well logging sources that may be relevant to the agency's licensing or inspection process. The NMED contractors are only aware of what they receive and what is publicly available, and sometimes get information in a roundabout fashion. It is possible that some licensee reports will not be captured by the NMED. It could be due to administrative reasons, the licensee not sending the report, or the contractors missing it (for example, as a result of improper document categorization, folder changes, or title differences). NRC staff members stated they can go to any of the three systems (i.e., HOO logbook, ADAMS, and the NMED) to identify abandonments that have occurred for NRC's licensees, but if the systems do not contain all or even similar abandonment records, staff is unable to identify all abandonments that have occurred when reviewing a license amendment or renewal, or when conducting an inspection.

NRC staff will also not notice trends because the data is inconsistent and unreliable for well logging source abandonment notifications and licensee reports. Unreliable documentation impacts the contractor's ability to properly search ADAMS to identify those reports that should be in the NMED, and it also impacts the staff's ability to analyze and identify actions necessary to improve the effectiveness of the nuclear material regulatory program.

Recommendation

The OIG recommends that the Executive Director for Operations:

- 2.1 Develop consistent guidance across all regions to clarify the processes and procedures for documenting abandonment notifications and licensee reports, and to ensure consistency and completeness for abandonment event documentation in ADAMS.

IV. CONSOLIDATED LIST OF RECOMMENDATIONS

The OIG recommends that the Executive Director for Operations:

- 1.1 Collaborate with the regions and the NMSS to establish policy and agencywide positions related to well logging source abandonments;
- 1.2 Review and standardize processes and guidance related to the handling and processing of irretrievable well logging source abandonments;
- 1.3 Develop an environmental assessment to be used in support of exemptions related to the approval of temporary storage locations for abandoned well logging sources;
- 1.4 Develop guidance to support analysis of exemption requests; and,
- 2.1 Develop consistent guidance across all regions to clarify the processes and procedures for documenting abandonment notifications and licensee reports, and to ensure consistency and completeness for abandonment event documentation in ADAMS.

V. NRC COMMENTS

The OIG held an exit conference with the agency on April 26, 2023. 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 conference. Following the 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.

10 C.F.R. 39.77 Abandonment Procedures

- (c) If a sealed source becomes lodged in a well, and when it becomes apparent that efforts to recover the sealed source will not be successful, the licensee shall—
 - (1) Notify the appropriate NRC Regional Office by telephone of the circumstances that resulted in the inability to retrieve the source and—
 - (i) Obtain NRC approval to implement abandonment procedures; or
 - (ii) That the licensee implemented abandonment before receiving NRC approval because the licensee believed there was an immediate threat to public health and safety; and
 - (2) Advise the well owner or operator, as appropriate, of the abandonment procedures under § 39.15 (a) or (c); and,
 - (3) Either ensure that abandonment procedures are implemented within 30 days after the sealed source has been classified as irretrievable or request an extension of time if unable to complete the abandonment procedures.
- (d) The licensee shall, within 30 days after a sealed source has been classified as irretrievable, make a report in writing to the appropriate NRC Regional Office. The licensee shall send a copy of the report to each appropriate State or Federal agency that issued permits or otherwise approved of the drilling operation. The report must contain the following information:
 - (1) Date of occurrence;
 - (2) A description of the irretrievable well logging source involved including the radionuclide and its quantity, chemical, and physical form;
 - (3) Surface location and identification of the well;
 - (4) Results of efforts to immobilize and seal the source in place;
 - (5) A brief description of the attempted recovery effort;
 - (6) Depth of the source;
 - (7) Depth of the top of the cement plug;
 - (8) Depth of the well;
 - (9) The immediate threat to public health and safety justification for implementing abandonment if prior NRC approval was not obtained in accordance with paragraph (c)(1)(ii) of this section;
 - (10) Any other information, such as a warning statement, contained on the permanent identification plaque; and,
 - (11) State and Federal agencies receiving copy of this report.

Source: 10 C.F.R. 39.77(c-d)

OBJECTIVE, SCOPE, AND METHODOLOGY

Objective

The audit objective was to determine the adequacy of the NRC's handling and processing of irretrievable well logging source abandonments.

Scope

This audit focused on determining if the NRC's processes for handling irretrievable well logging source abandonments are effectively and efficiently supporting the NRC's ability to accomplish its mission. Specifically, we reviewed the source abandonment notification process from the licensee to the NRC, the decision-making process for granting permission to abandon the source and its associated guidance, and the coordination and communication between the licensees and NRC offices involved. We conducted this performance audit at NRC headquarters in Rockville, Maryland, from August 2022 to March 2023.

Internal controls related to the audit objective were reviewed and analyzed. Specifically, the OIG reviewed the components of control environment, risk assessments, control activities, and information and communication. Within those components, the OIG reviewed the principles of establishing structure, responsibility, and authority organizational structure; identifying, analyzing, and responding to significant changes; designing control activities, including policies for achieving management objectives and responding to risks; and, internally and externally communicating the necessary quality information.

Methodology

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

- Title 10 of the Code of Federal Regulations, Part 39, "Licenses and Radiation Safety Requirements for Well Logging";
- NUREG-1556, Vol. 14, Rev. 1, "Program-Specific Guidance About Well Logging, Tracer, and Field Flood Study Licenses";

- Nuclear Material Events Database Annual Report for fiscal years 2016 – 2021;
- Government Accountability Office’s *Standards for Internal Control in the Federal Government*;
- Revised Interim Procedure SA-300, “Handbook on Nuclear Material Event Reporting for the Agreement States”;
- Inspection Procedure 87123, “Well Logging Programs”;
- PG 9007B.2, “Reactive Inspection and Licensee Event Report Guidance for DNMS Staff”; and,
- DPO-2020-005, “Agency Methodology Used to Grant a Regulatory Exemption From 10 C.F.R. 39.77(c)(3) for Irretrievable Well Logging Sources”.

The OIG interviewed NRC staff and management, staff from the State of Texas, and five of the NRC’s well logging licensees.

The OIG identified well logging source abandonment reports in the NRC’s ADAMS and the NMED. The OIG received well logging source abandonment notifications from the NRC’s Operations Center database. Further, the OIG analyzed management turnover based on data from the Federal Personnel and Payroll System.

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 Mike Blair, Team Leader; Regina Revinson, Audit Manager; Janelle Davis, Senior Auditor; Julie Corwin, Senior Auditor; Connor McCune, Senior Auditor; and, William Schuster, Senior Technical Advisor.

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Mail Stop O12-A12
11555 Rockville Pike
Rockville, MD 20852

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](#).