



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION III
2056 WESTINGS AVENUE, SUITE 400
NAPERVILLE, IL 60563-2657

October 17, 2024

EA-24-097
EN 57157
NMED 240194 (closed)

Steven Elliott, P.E.
President
Materials Testing Consultants, Inc.
693 Plymouth Avenue, NE
Grand Rapids, MI 49505

SUBJECT: NRC REACTIVE INSPECTION REPORT NO. 03013918/2024001(DRSS) –
MATERIALS TESTING CONSULTANTS, INC.

Dear Steven Elliot:

On August 9, 2024, an inspector from the U.S. Nuclear Regulatory Commission (NRC) conducted a reactive inspection at your facility in Dexter, Michigan, with continued in-office review through September 17, 2024. The purpose of this inspection was to review the circumstances, root and contributing causes, and corrective actions for the loss of a device containing regulated material which you reported to the NRC on May 31, 2024. The purpose of the in-office review was to evaluate the significance of the inspection findings. The enclosed inspection report presents the results of the inspection. The inspector, Ryan Craffey, discussed the preliminary inspection findings with Timothy Lautenbach, your Radiation Safety Officer, and Dan Elliott of your staff at the conclusion of the on-site portion of the inspection. Ryan conducted a final exit briefing with Timothy on September 25, 2024.

This inspection examined activities conducted under your license as they relate to safety and compliance with the NRC's rules and regulations and with the conditions in your license. Within these areas, the inspection consisted of an examination of licensed material and relevant records and interviews with personnel.

Based on the results of this inspection, two apparent violations of NRC requirements were identified, and are being considered for escalated enforcement action in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's website at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>. The apparent violations concerned: (1) the failure to control and maintain constant surveillance of a portable moisture density gauge containing regulated material, as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20.1802; and (2) the failure to conduct physical inventories every six months to account for all sealed sources and devices received and possessed under NRC License No. 21-15281-02 as required by Condition 15 of the license. The circumstances surrounding the apparent violations, the significance of the issues, and the need for lasting and effective corrective action were discussed with your staff at the inspection exit meeting on September 25, 2024.

Before the NRC makes its enforcement decision, we are providing you an opportunity to (1) respond in writing to the apparent violations addressed in this inspection report within 30 days of the date of this letter, (2) request a Pre-decisional Enforcement Conference (PEC), or (3) request Alternative Dispute Resolution. If a PEC is held, it will be open for public observation and the NRC will issue a press release to announce the time and date of the conference. **Please contact Rhex Edwards at (630) 829-9722 or Rhex.Edwards@nrc.gov within 10 days of the date of this letter to notify the NRC of your intended response or request.** A PEC should be held within 30 days and an ADR session within 45 days of the date of this letter.

If you choose to provide a written response, it should be clearly marked as "Response to the Apparent Violations in Inspection Report No. 03013918/2024001(DRSS); EA-24-097," and should include, for the apparent violations: (1) the reason for the apparent violations, or, if contested, the basis for disputing the apparent violations; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken to avoid further violations; and (4) the date when full compliance was or will be achieved. Your response may reference or include previously docketed correspondence, if the correspondence adequately addresses the required response. Your response should be sent to the NRC's Document Control Desk, Washington, DC 20555-0001, with a copy mailed to the NRC Region III Office, 2056 Westings Avenue, Suite 400, Naperville, IL 60563, within 30 days of the date of this letter. If an adequate response is not received within the time specified or an extension of time has not been granted by the NRC, the NRC will proceed with its enforcement decision or schedule a PEC.

If you choose to request a PEC, the conference will afford you the opportunity to provide your perspective on these matters and any other information that you believe the NRC should take into consideration before making an enforcement decision. The decision to hold a pre-decisional enforcement conference does not mean that the NRC has determined that a violation has occurred or that enforcement action will be taken. This conference would be conducted to obtain information to assist the NRC in making an enforcement decision. The topics discussed during the conference may include information to determine whether a violation occurred, information to determine the significance of a violation, information related to the identification of a violation, and information related to any corrective actions taken or planned. In presenting your corrective action, you should be aware that the promptness and comprehensiveness of your actions will be considered in assessing any civil penalty for the apparent violations. The guidance in NRC Information Notice 96-28, "Suggested Guidance Relating to Development and Implementation of Corrective Action," may be helpful in preparing your response. You can find the information notice on the NRC website at: <http://www.nrc.gov/reading-rm/doc-collections/gen-comm/info-notices/1996/in96028.html>.

You may also request ADR with the NRC in an attempt to resolve this issue. ADR is a general term encompassing various techniques for resolving conflicts using a neutral third-party. The technique that the NRC has decided to employ is mediation. Mediation is a voluntary, informal process in which a trained neutral party (the "mediator") works with parties to help them reach resolution. If the parties agree to use ADR, they select a mutually agreeable neutral mediator who has no stake in the outcome and no power to make decisions. Mediation gives parties an opportunity to discuss issues, clear up misunderstandings, be creative, find areas of agreement, and reach a final resolution of the issues. Additional information concerning the NRC's program can be obtained at <http://www.nrc.gov/about-nrc/regulatory/enforcement/adr.html>. The Institute on Conflict Resolution (ICR) at Cornell University has agreed to facilitate the NRC's program as a neutral third party. **Please contact ICR at 877-733-9415 within 10 days of the date of this**

letter if you are interested in pursuing resolution of this issue through ADR. In addition, if you choose ADR, please also contact Rhex Edwards at the telephone number or email address listed above.

Since the apparent violation of 10 CFR 20.1802 involved the loss of regulated material, the NRC is considering proposing imposition of a civil monetary penalty. Consistent with Section 2.3.4, Civil Penalty, of the NRC Enforcement Policy, for violations where a licensee has lost its regulated radioactive material, the NRC will normally exercise discretion to impose a civil penalty. The base civil penalty amounts for lost material in Section 8.0, Table of Base Civil Penalties, of the NRC Enforcement Policy are based on approximately three times the expected average cost of authorized disposal; however, the NRC may exercise its discretion to mitigate or escalate a civil penalty amount based on the merits of a specific case. Therefore, you may provide information regarding the actual expected cost of authorized disposal for the NRC to consider in making a final enforcement decision. However, the NRC will not normally decrease the civil penalty to an amount below the lowest applicable base civil penalty amount in Section 8.0.

In addition, please be advised that the number and characterization of the apparent violations described in the enclosed inspection report may change as a result of further NRC review. You will be advised by separate correspondence of the results of our deliberations on this matter.

In accordance with the NRC's "Agency Rules of Practice and Procedure" in 10 CFR 2.390, a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC's Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC's website at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, any response should not include any personal privacy, proprietary, or safeguards information so that it can be made publicly available without redaction.

Please feel free to contact Ryan Craffey of my staff if you have any questions regarding this inspection. Ryan can be reached at 630-829-9655 or ryan.craffey@nrc.gov.

Sincerely,



Signed by Curtis, David
on 10/17/24

David Curtis, Director
Division of Radiological Safety and Security

Docket No. 030-13918
License No. 21-15281-02

Enclosure: Inspection Report No. 03013918/2024001(DRSS)

cc w/encl: Nick Fransted, Vice President
Timothy Lautenbach, Radiation Safety Officer
State of Michigan

Letter to S. Elliott from D. Curtis, dated October 17, 2024.

SUBJECT: NRC REACTIVE INSPECTION REPORT NO. 03013918/2024001(DRSS) – MATERIALS TESTING CONSULTANTS, INC.

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**U.S. Nuclear Regulatory Commission
Region III**

Docket No. 030-13918

License No. 21-15281-02

Report No. 03013918/2024001(DRSS)

EA No. EA-24-097

EN No. / NMED No. 57157 / 240194

Licensee: Materials Testing Consultants, Inc.

Facility: 693 Plymouth Avenue, NE
Grand Rapids, MI

Inspection Date: August 9, 2024

Exit Meeting Date: September 25, 2024

Inspector: Ryan Craffey, Senior Health Physicist

Approved By: Rhex Edwards, Chief
Materials Inspection Branch
Division of Radiological Safety and Security

Enclosure

EXECUTIVE SUMMARY

Materials Testing Consultants, Inc. NRC Inspection Report 03013918/2024001(DRSS)

This was an announced reactive inspection of licensed activities performed under NRC License No. 21-15281-02, which authorized Materials Testing Consultants, Inc. (the licensee) to use and store byproduct material for measuring physical properties of materials with portable moisture density gauges at facilities in Grand Rapids, Okemos, and Dexter, Michigan, as well as at temporary job sites in NRC jurisdiction. This inspection was performed in response to the loss of licensed material reported to the NRC by the licensee on May 31, 2024, and included an in-office review through September 17, 2024, to evaluate the significance of the inspection findings.

As a result of this inspection, two apparent violations of NRC requirements were identified: (1) the failure to control and maintain constant surveillance of a portable moisture density gauge containing licensed material, as required by Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20.1802; and (2) the failure to conduct physical inventories every six months to account for all sealed sources and devices received and possessed under NRC License No. 21-15281-02, as required by Condition 15 of the license.

The licensee took prompt action upon discovery of the missing gauge to determine the nature of the loss and attempt its recovery. However, as of the date of the exit meeting on September 25, 2024, the device remains missing, and the circumstances of its loss remain uncertain.

The licensee has also taken comprehensive action to restore compliance and to address the potential for recurrence of similar issues, including installation of tracking devices in all gauges, policy revisions limiting acceptable methods of gauge storage, additional audits and inventories, and enhanced oversight and materials accountability practices.

REPORT DETAILS

1 Program Overview and Inspection History

Materials Testing Consultants (MTC, the licensee) is authorized by NRC Materials License No. 21-15281-02 to use byproduct material in portable moisture density gauges for measuring the physical properties of construction materials. The licensee is authorized to store gauges at facilities in Grand Rapids, Okemos, and Dexter, Michigan, and to use them at temporary job sites in NRC jurisdiction. At the time of the inspection, the licensee had 48 gauges, and a similar number of individuals authorized to use them.

The NRC last completed a routine inspection of the licensee remotely on June 22, 2021. No violations were identified during this inspection.

The previous routine inspection of the licensee was completed on August 5, 2015, at its office in Grand Rapids, and at a temporary job site in West Olive, Michigan. During this inspection, one Severity Level III violation of 10 CFR 30.34(i) was identified for failure to adequately secure gauges in storage at the Grand Rapids office. Three Severity Level IV violations were also identified for the failure to confine the possession and use of byproduct material to authorized locations on its NRC license per 10 CFR 30.34(c); the failure to have an approved RSO per Condition 12 of its NRC license; and the failure to comply with US Department of Transportation hazmat training requirements in 49 CFR 172.702, as required of NRC licensees by 10 CFR 71.5(a). All four violations were reviewed and closed during a follow-up inspection on April 5, 2016, at the Grand Rapids office and at a nearby temporary job site, and no other violations were identified.

Since the routine inspection in 2015, the NRC also performed non-routine inspections of the licensee at temporary job sites in Ann Arbor, Michigan, on August 1, 2019, and in Grand Rapids, Michigan, on July 28, 2021. No violations were identified during either inspection.

2 Sequence of Events and Licensee's Response

2.1 Inspection Scope

The inspector visited the licensee's office in Dexter, interviewed the licensee's management, and reviewed records related to the discovery and investigation of a missing portable moisture density gauge reported to the NRC on May 31, 2024.

2.2 Observations and Findings

A. Sequence of Events

On May 31, 2024, the licensee's Field Manager for Southeast Michigan attempted to retrieve an InstroTek 3500 gauge (s/n 5130), nominally containing 10 millicuries of cesium-137 (Cs-137) and 40 millicuries of americium-241 (Am-241) and believed to be in storage at the licensee's office in Dexter, for annual calibration. However, the manager was unable to find it there, at the licensee's other storage locations in Grand Rapids and Okemos, or in use by any employee at the time. Moreover, the manager was unable to find the device-specific standardization block and shipping papers.

The gauge, acquired in June 2023 from the manufacturer, was last used on November 16, 2023, by an authorized user who had worked for the company since May 2022. The user had received nuclear gauge safety training as well as hazmat employee training on May 24, 2022, reviewed the licensee's operating and emergency procedures with the RSO on June 30, 2022, and received on-the-job training from the Dexter office manager thereafter.

Since June 2023, the user had been assigned to a project in Saline, Michigan, and kept a gauge, as approved by the licensee's RSO, in the bed of a company truck on nights and weekends at their residence in Brooklyn, Michigan. The gauge was reportedly stored in a shipping container, secured with multiple locks and chains in a manner which, as described by the licensee, met portable gauge security requirements in 10 CFR 30.34(i).

The project in Saline finished shortly after the date of last use, and the user returned all company equipment to the Ann Arbor office on December 11, 2023, at the conclusion of the construction season. The user believed that the now-missing gauge was among the equipment they returned.

On February 7, 2024, the licensee received approval from the NRC to store licensed material at a new office in Dexter via Amendment No. 13 to its license. On February 20, the licensee recruited several authorized users to transport all gauges currently in storage at the Ann Arbor office to the new office in Dexter. The licensee did not identify any gauges as missing at that time.

B. Licensee's Response and Conclusions

The licensee's management searched all company vehicles and premises, interviewed all gauge users, conducted a physical inventory of all gauges in its possession, and reviewed available standardization records and utilization logs. The licensee's Corporate Risk Manager performed an independent investigation, which included a review of messages between employees, records, photos, vehicle and device GPS data, and additional employee interviews.

The licensee attempted to retrieve security camera footage from the former Ann Arbor office and several local businesses that the gauge user visited following their last use of the gauge. All attempts at retrieving footage were unsuccessful.

The licensee filed reports with the City of Saline (where the gauge was last used), Columbia Charter Township (where the last user of the gauge resided), and the Washtenaw County Sherriff (the county in which Saline and Dexter are located).

The licensee interviewed all users involved in moving gauges from the Ann Arbor to Dexter offices but was unable to confirm that the now-missing gauge was present during the move. The licensee determined through these interviews that it likely moved one gauge less than would have been expected from Ann Arbor to Dexter, had they accounted for or otherwise performed an inventory of gauges expected to be present at the time of the move. In fact, the licensee discovered through the investigation that it had not conducted a physical inventory of its portable gauges since July 2023. One was typically performed every January, but for reasons unknown this was not done in 2024.

The licensee concluded that the most probable explanation for the missing gauge was that it could have been stolen from the user's company vehicle sometime between November 16 and December 11, 2023, and that user may have been mistaken in their recollection of returning the gauge along with other company equipment at the end of the 2023 construction season.

C. Corrective Actions

The licensee already had video surveillance for gauge storage locations at its Grand Rapids and Dexter locations and has scheduled the installation of video surveillance for the storage location at the Okemos location as well.

The licensee contacted two portable gauge service providers and requested that they notify them if the missing gauge is brought in for service in the future. The licensee also intends to contact additional service providers from the directory maintained by the American Portable Nuclear Gauge Association.

The licensee had already installed Bluetooth tracking devices inside 46 of 48 of its gauges (the missing gauge was one of the two which had yet to receive one). The licensee has since installed a tracker in the remaining gauge and committed to place trackers on all gauges it purchases in the future.

The licensee revised its policies to no longer allow overnight storage of gauges in the bed of company work trucks using only the original shipping container and locks and chains to secure it. The licensee now requires the use of permanently mounted secondary locking containers, which the inspector confirmed can meet portable gauge security requirements in 10 CFR 30.34(i) while adding a layer of concealment, for overnight storage in the field. Almost all company work trucks already had these containers; the licensee intends to install them on all remaining work trucks. The licensee also informed all gauge users of this revision to its policy for gauge storage.

The licensee's RSO performed audits of compliance with radiation safety policies and procedures at all three field offices, including discussions with Field Managers on their responsibility for gauges in their possession. The licensee discovered that an enhanced utilization log already in use at the Grand Rapids and Okemos offices was not in use in Dexter. The licensee has subsequently instituted the enhanced utilization log there.

The licensee conducted a physical inventory in June 2024 upon discovering the lapse in their timely completion. The licensee will resume conducting inventories in July and January of each year and confirmed that semiannual electronic reminders were in place. The licensee also now requires that each Field Manager review and confirm their gauge inventories during weekly coordination meetings.

The licensee is currently developing a best practices document to determine which of the corrective actions discussed here, as well as any additional future actions, it intends to implement long-term.

D. Findings

(1) Control of Licensed Material

Title 10 of the *Code of Federal Regulations* (10 CFR) 20.1802 requires that each licensee control and maintain constant surveillance of licensed material that is in a controlled or unrestricted area and that is not in storage.

Contrary to the above, between November 16, 2023, and May 31, 2024, Materials Testing Consultants failed to control and maintain constant surveillance of an InstroTek 3500 series portable moisture density gauge (serial number 5130) nominally containing 10 millicuries of Cs-137 and 40 millicuries of Am-241 that was not in storage and last used at a temporary job site in Saline, Michigan. Specifically, the licensee notified the NRC on May 31, 2024, that the gauge was missing and remains lost. This is an apparent violation of 10 CFR 20.1802 and is being considered for escalated enforcement action in accordance with NRC Enforcement Policy Sections 2.3.4 and 6.7.c.10.(a).

(2) Physical Inventories

Condition 15 of Amendment No. 11 through 14 to NRC License No. 21-15281-02, dated August 28, 2023, in effect between July 2023 and June 2024, states that the licensee shall conduct a physical inventory every 6 months, or at other intervals approved by the U.S. Nuclear Regulatory Commission, to account for all sealed sources and/or devices received and possessed under the license.

Contrary to the above, between July 2023 and June 2024, Materials Testing Consultants failed to conduct a physical inventory every 6 months, and no other interval was approved by the U.S. Nuclear Regulatory Commission. This is an apparent violation of License Condition 15 and is being considered for escalated enforcement action in accordance with NRC Enforcement Policy Section 6.3.d.3.

2.3 Conclusions

The inspector determined that apparent violations of 10 CFR 20.1802 and Condition 15 of NRC License No. 21-15281-02 occurred.

3 Notification and Reporting

3.1 Inspection Scope

The inspector reviewed the licensee's initial notification and written report for the missing portable moisture density gauge and discussed their contents with licensee management.

3.2 Observations and Findings

The gauge was determined to be missing on May 31, 2024. The licensee's Field Manager for Southeast Michigan thereafter notified the licensee's RSO, who then notified the NRC's Headquarters Operations Center by telephone at 4:40 pm ET on

May 31, 2024, to report the loss of material under 10 CFR 20.2201(a)(1)(ii). This notification resulted in Event Number 57157 and was recorded in the Nuclear Materials Events Database under item number 240194.

The licensee submitted a 30-day written report under 10 CFR 20.2201(b)(1) on June 26, 2024, with an addendum to provide clarifying information on June 28, 2024. The report included a description of the licensed material involved; a description of the circumstances under which the loss occurred; a statement of disposition, or probable disposition, of the licensed material involved; a statement that no exposures of individuals to radiation were known to have occurred; actions that have been taken and will be taken, to recover the material; and procedures or measures that have been and will be adopted to ensure against a recurrence of the loss or theft of licensed material.

3.3 Conclusions

The inspector determined that the licensee made all required notifications and reports within the required time periods, and that the licensee's written report contained all required information.

4 **NRC Assessment of the Event**

4.1 Inspection Scope

The inspector visited the office in Dexter, interviewed the licensee's management and reviewed a selection of records to evaluate the circumstances of the event and the licensee's response.

4.2 Observations and Findings

A. Root Cause and Contributing Factors

The fate of the missing gauge is still unknown; therefore, the root cause of its loss is as well. However, inadequate oversight and material accountability practices at the Ann Arbor and Dexter offices were identified as contributing factors.

The root cause of the missed inventory was an oversight. The absence of an electronic reminder to complete the inventory in January 2024 was noted as a contributing factor.

B. Independent Assessment of Radiation Exposure

The inspector reviewed and discussed the licensee's assessment of possible radiation exposure from the lost gauge and found it reasonable given the circumstances. The authorized user who last used the gauge was aware of and reported diligent compliance with gauge transportation and security requirements, as well as with the requirement to use a safety lock on the gauge or its outer container to prevent unauthorized or accidental exposure to the unshielded cesium-137 source (Condition 17 of NRC License No. 21-15281-02). The inspector found no reason to disagree with this statement; the licensee reported no previous issues regarding the user's conduct of licensed activities or compliance with regulatory requirements, and all gauges in storage at the Dexter office were confirmed to be secured as required.

The inspector has previously assessed the potential for and significance of exposure to members of the public who may come into possession of a lost portable gauge containing millicurie quantities of cesium-137 and americium-241. As described in IR 03029146/2021001(DNMS) (ML21302A205), the inspector determined that external exposure to such sources, even if unshielded, is unlikely to cause acute radiation syndrome or any grade of cutaneous radiation injury as contact dose rates are insufficient to meet the generally accepted thresholds for either.

This assessment is consistent with the International Atomic Energy Agency's characterization of such sources in Safety Guide RS-G-1.9, *Categorization of Radioactive Sources*. From the text of EN 57157:

"Sources that are "Less than IAEA Category 3 sources," are either sources that are very unlikely to cause permanent injury to individuals or contain a very small amount of radioactive material that would not cause any permanent injury. Some of these sources, such as moisture density gauges or thickness gauges that are Category 4, the amount of unshielded radioactive material, if not safely managed or securely protected, could possibly - although it is unlikely - temporarily injure someone who handled it or were otherwise in contact with it, or who were close to it for a period of many weeks."

C. Independent Assessment of Licensee's Response and Conclusions

The inspector found the licensee's response to be prompt, and its investigation to be thorough. Licensee management acknowledged the opportunity to improve oversight of the Dexter office and demonstrated a sincere commitment to do so through corrective actions including but not limited to those described above in section 2.2.C.

The inspector considered the licensee's conclusion that the gauge was stolen to be plausible; however, the licensee did not provide any material evidence to support this conclusion, suggesting only that other outcomes were less plausible. The last individual to use the gauge maintained that the gauge was not stolen while in their possession. Therefore, the inspector could only conclude that the licensee was no longer in possession or control of the gauge.

4.3 Conclusions

The inspector had no findings in this area and concluded that the missing gauge did not present a substantial potential for significant injury to any member of the public.

5 **Exit Meeting Summary**

The NRC inspector presented preliminary inspection findings following the onsite inspection on September 25, 2024. The licensee did not identify any documents or processes reviewed by the inspector as proprietary. The licensee acknowledged the findings presented.

LIST OF PERSONNEL CONTACTED

Dan Elliott, P.E. – Vice President
Timothy Lautenbach, P.E. – Radiation Safety Officer

Attended exit meeting on September 25, 2024.

INSPECTION PROCEDURES USED

IP 87103 - Inspection of Materials Licensees Involved in an Incident or Bankruptcy Filing
IP 87139 - Portable Nuclear Gauge Programs