

Protecting, Enhancing, and Restoring Our Environment

July 03, 2018

United States Nuclear Regulatory Commission (NRC) Division of Incident Response Operations Washington, D.C. 20555-0001

Email: H001@nrc.gov

RE: Troxler Moisture Density Gauge Incident – 06/05/2018 Event Notification #53446 NRC Materials License #21-17007-01

To Whom It May Concern:

The purpose of this letter is to formally report an incident occurring to a Troxler moisture density gauge.

The moisture density gauge is owned and operated by CTI and Associates, Inc. (CTI) under NRC Materials License number 21-17007-01. The gauge is a Troxler Electronic Laboratories, Inc. Model 3440, serial number 17420, manufactured in 1989. The gauge contains the following radiological sources: 8mCi Cesium-137 and 40mCi Americium-241:Be.

The incident occurred at 4:00 PM on 6/5/2018 at a construction site located at the University of Michigan (UM) NC 53 parking lot, in Ann Arbor, Michigan. The gauge was being used by CTI certified and trained user, Mr. Zachary Czapla, to perform in-place density testing on aggregate base material placed during construction of a new asphalt parking lot. Site work was being performed by Fonson Company, Inc. (Contractor), 7644 Whitmore Lake Rd, Brighton, MI 48116.

On the day of the incident, the Contractor was performing finish grading and compaction of crushed aggregate placed as pavement base material in the parking lot. The Contractor had several active pieces of heavy equipment working in the area throughout the day, including a motor grader, wheel-loader, and smooth drum roller. As compaction was completed, Mr. Czapla performed in-place density testing on the material, working his way from west to east along the south half of the parking lot, and east to west along the north half in a general "U" pattern. Mr. Czapla was heading to the northwest corner of the parking lot to the proposed location of his last required test when he observed the foreman of the crew operating the wheel loader toward his area. The foreman waved for him to move out of the work area. Mr. Czapla moved his equipment

Troxler Moisture Density Gauge Incident – 6/05/2018 Event Notification #53446 NRC Materials License #21-17007-01 Page 2 of 4

to a neighboring parking lot and continued to wait until the wheel loader passed through the area, then returned to the proposed testing location at the northwest corner of the lot. Mr. Czapla began to set up the scraper plate and drill rod and observed the motor grader working east of his location, approximately halfway down the 700' long parking lot. Mr. Czapla continued preparation for his test until he observed the backup alarm of a machine growing louder. He then looked up and noticed the motor grader approximately 20' east of his location, backing quickly in his direction and assuming the operator did not see him, began waving his arms and shouting at the operator to stop. When he realized that the operator was not going to stop he jumped out of the way to avoid being struck. The back left rubber tire of the motor grader ran over the gauge, damaging the plastic topshell and front panel assembly. The source rod was in the shielded position when struck and the gauge was within arm's reach and under his immediate control until Mr. Czapla evacuated the area.

The equipment operator heard a yell and halted the machine. Mr. Czapla requested he shut the machine down, and began to establish a 15-foot perimeter around the damaged gauge. The foreman for the Contractor was informed of the incident and provided cones and yellow caution tape to assist in establishing the 15-foot perimeter. Mr. Czapla immediately contacted CTI's Assistant Radiation Safety Officer (RSO) Todd Bowling, who contacted CTI's Corporate RSO Tim Moore. Mr. Moore alerted appropriate CTI upper management personnel of the incident. Todd Bowling arrived on the project site at approximately 4:55 PM and received a first-hand account of the incident from Mr. Czapla. A radiation safety representative from UM was on site and met with Mr. Bowling to discuss the incident. Mr. Bowling and the UM radiation safety representative noted that a 15-foot perimeter had been properly established, and that although the yellow plastic topshell had been cracked, the gauge bottom remained flat on the ground, and the source rod, housing and shielding appeared undamaged. Mr. Bowling and the UM radiation safety representative each conducted separate radiation surveys of the area, and Mr. Bowling collected statements from the Contractor's operator and foreman.

A calibrated TroxAlert Radiation Survey Monitor was used to obtain readings from the surrounding area and near the nuclear gauge. Radiation readings were not observed outside the 15-foot perimeter area surrounding the gauge and readings taken 3 feet from the gauge did not exceed anticipated radiation dose equivalent rates, as provided by the manufacturer. With this information, Mr. Bowling concluded that radiation sources remained fully shielded in the gauge.

The damaged gauge was securely locked in its shipping case and transported to CTI's storage facility located at 27280 Haggerty Road, Suite C-20, Farmington Hills, Michigan. The gauge was locked inside our storage room until a leak test could be performed.

CTI RSO, Tim Moore, contacted the NRC's Incident Response Operations Center on 6/6/2018 via telephone and verbally reported the incident to Mr. Howie Crouch, under 10 CFR 30.50 (b) (2).

Troxler Moisture Density Gauge Incident – 6/05/2018 Event Notification #53446 NRC Materials License #21-17007-01 Page 3 of 4

After the initial incident investigation was completed on 6/6/18, the RSO held a mandatory meeting with all certified gauge operators and applicable project and senior managers. Discussion topics included detailed recounting of the incident, emergency response procedures, reinforcement of proper nuclear density gauge usage, storage, and transportation; and construction safety topics including the importance of communication, defensive awareness, and working around heavy equipment. Attendance at the meeting was documented and CTI personnel not able to attend were personally contacted in the following days by the RSO.

A leak test swab sample was collected from the damaged gauge on 6/7/18 and mailed to Troxler Electronic Laboratories for analysis. Leak test results were provided to CTI on 6/13/18. The certified test results showed detectable activity was less than 185 Bq (0.005 uCi), confirming that the radioactive sources are not leaking and no individuals received unintended exposure to radiation or radioactive materials.

Mr. Czapla and Mr. Bowling completed draft Incident Reports, and a finalized Incident Report was distributed to all applicable CTI management and safety personnel on 6/11/18. After thorough investigation of the incident, CTI believes that Mr. Czapla was following proper nuclear density gauge operating procedures, and did not let the gauge out of his direct control until the moment he evacuated the area out of fear for his own safety. As a result, CTI believes the root cause of the incident was not a radiation safety violation, but rather a general construction safety issue. As Mr. Czapla was complying with CTI and project site safety and PPE requirements and Contractor site direction, CTI feels responsibility for the incident lies with the Contractor's lack of ground spotting personnel while backing equipment and the motor grader operator's failure to visually clear an area prior to entry with heavy equipment.

Safety of our personnel is paramount, and in a continued effort to better protect our certified users and equipment on future construction projects, CTI management will provide additional safety education during scheduled staff meetings. Staff meetings will typically be held monthly during busy periods of the year. Meeting frequency will be adjusted throughout the year in response to changing staff level and work load. Safety education will include relevant construction and radiation safety topics and discussion of accidents and incidents focusing on lessons learned. CTI supplements our internal safety program with a membership to the National Safety Council to provide our employees with the most relevant and up-to-date construction safety news and education.

As the majority of our nuclear density gauge usage occurs on client construction sites, CTI strives to provide our employees with the knowledge to identify and avoid unsafe situations and to be responsible for their personal safety, regardless of the safety program implemented by our clients. In addition, prior to mobilization to a new site, CTI project managers will engage in additional discussion of site safety programs and communication, training requirements, and safety expectations with client representatives. Project managers will then disseminate pertinent information to certified users. If CTI personnel observe unsafe practices on a client Troxler Moisture Density Gauge Incident – 6/05/2018 Event Notification #53446 NRC Materials License #21-17007-01 Page 4 of 4



site, project management will communicate concerns with client representatives and CTI management. If site conditions and contractor work practices are deemed unsafe, CTI personnel may be removed from the project site until corrective actions have been implemented.

The damaged nuclear moisture density gauge will be securely stored in our Farmington Hills storage room, until such time CTI decides to repair or decommission the gauge.

Please contact me at 248.486.5100 if you have any questions.

Sincerely,

CTI and Associates, Inc.

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Timothy A. Moore, Jr., P.E. Radiation Safety Officer

Cc: Luis Nieves Folch (USNRC Region III) – Luis.NievesFolch@nrc.gov

Attachments:

A- Leak Test Certificate

ATTACHMENT A

LEAK TEST CERTIFICATE



Troxler Electronic Laboratories, Inc.

3008 Comwallis Rd., P.O. Box 12057 Research Triangle Park, NC 27709 Tel: (877) 876-9537 Fax: (919) 485-2250 License: NC 032-0182-1

TODD BOWLING CTI & ASSOCIATES 28001 CABOT DRIVE SUITE 250 NOVI, MI 48377

LEAK TEST CERTIFICATE

DEVICE:

Model: 3440 Serial No: 17420

SEALED SOURCES:

Serial No.	Measure Date	Nuclide	GBq	mCi
47-12847	3/29/1989	Am-241:Be	1.48	40
50-6800	6/29/1989	Cs-137	0.296	8

LEAK TEST ANALYSIS:

Sample collected on:	06/07/2018		
Sample analyzed on:	06/12/2018	at	1:34:00 PM

Analyzed by: HEB

	ALPHA	BETA-GAMMA	
Conversion factor (cpm/Bq)	1.21E+01	2.02E+01	
Background measurement (cpm)	0	25	
Sample measurement (cpm)	1	29	
Activity (Bq)	< MDA	< MDA	
Min. Detectable Activity (Bq)	4.2E-01	1.3E+00	

This certifies that the leak test results are:

Less than 185 Bq (0.005 uCi)

Greater than 185 Bq (0.005 uCi)

Rev. 9/2006