

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 030-08223
License No: 21-14894-01

Licensee: NTH Consultants, Ltd.
38955 Hills Tech Drive
Farmington Hills, Michigan

Dates: November 5-16, 1998

Inspector: Andrea Kock, Radiation Specialist

Approved By: Geoffrey C. Wright, Chief
Materials Inspection Branch 2
Division of Nuclear Materials Safety

EXECUTIVE SUMMARY

NTH Consultants, Ltd.
NRC Inspection Report 030-08223/98002(DNMS)

This was a reactive, announced inspection to identify the sequence of events and contributing factors associated with this licensee's report that a moisture density gauge containing 8 millicuries (0.3 gigabecquerels) of cesium-147 and 40 millicuries (1.48 gigabecquerels) of americium-241, had been damaged by a construction vehicle at a temporary job site in Rochester, Michigan. The root cause of this incident was miscommunication between the gauge operator and the driver of the involved construction vehicle regarding the location of the gauge and the intended path of the vehicle involved. The event did not result in safety consequences because the licensee's response was prompt and comprehensive.

The inspection also included a routine review of the radiation safety program, including management oversight of the program, security and control of licensed materials, training of authorized users, facilities and equipment, contamination control, and transportation of radioactive materials.

The inspection determined that, in general the licensee's radiation protection procedures, training program, and equipment ensured that portable gauges were used, stored, and transported safely. The inspection determined that actions could not have been taken to prevent this incident, and did not identify safety concerns regarding the licensee's response to the reported incident. However, the inspector's routine review of the radiation safety program identified one violation for failure to block and brace packages containing radioactive material in accordance with 49 CFR 177.842(c).

Report Details

1.0 Organization and Scope of Program

NTH Consultants, Ltd., was authorized to possess and use a maximum of 52 moisture density gauges containing approximately 8 millicuries of cesium-137 and 40 millicuries of americium-241 and a maximum of 2 asphalt content gauges containing up to 300 millicuries of americium-241. At the time of the inspection, the licensee possessed 36 Troxler 3400 series moisture density gauges containing approximately 8 millicuries of cesium-137 and 40 millicuries of americium-241, and one Troxler 3216 moisture content gauge containing 40 millicuries of americium-241.

The company maintained three offices where gauges were stored. These offices were located in Farmington Hills, Detroit, and Grand Rapids, Michigan. The Farmington Hills, Michigan, office was the corporate office. The licensee used the gauges for detection of the moisture content and density of soil and asphalt at temporary job sites sporadically during the summer months. The licensee employed approximately 100 gauge users between the three offices; however, the majority of the gauges were maintained at the Farmington Hills, Michigan, location and most of the gauge users worked out of this office. The gauge involved in the incident was originally maintained at the Detroit, Michigan, office; however, at the time of the inspection, the licensee had returned the gauge to the manufacturer.

Gauge users reported directly to a supervisor at each office. These supervisors reported to the radiation safety officer (RSO), who was also the manager for Environmental Field Services. The RSO reported directly to the chief executive officer. According to the supervisor at the Detroit, Michigan, office there had not been changes to the licensee's organizational structure since the last inspection.

Discussions with the RSO and two gauge users confirmed that, other than the October 19, 1998 events, damage to gauges or leaking sources had not occurred at the facility since the last inspection.

2.0 Inspection History

A July 20, 1998, inspection did not identify violations of NRC requirements. A November 3, 1993, inspection identified a violation for failure to secure a moisture density gauge at a temporary job site. The July 24 through August 4, 1998, inspection reviewed and closed this issue. The NRC did not issue escalated enforcement actions involving this licensee in last two inspections.

3.0 Incident Involving Damage to a Moisture Density Gauge

a. Inspection Scope

To review the circumstances surrounding the damage of a Troxler 3411B moisture density gauge containing approximately 8 millicuries (0.3 gigabecquerels) of cesium-137 and 40 millicuries (1.5 gigabecquerels) of americium-241, the inspector interviewed the RSO, the gauge user involved in the incident, and the gauge user's supervisor. In addition, the inspector reviewed documentation specific to the event. The inspector also interviewed employees of the construction company working at the site at the time of the

incident and observed the layout of the field site.

b. Observations and Findings

After completing a moisture density test at a temporary job site in Rochester, Michigan, on October 19, 1998, a gauge user from the licensee's Detroit, Michigan, office looked up and saw a construction scraper approaching him. To avoid being hit, the gauge operator stepped out of the way. The construction scraper then ran over the gauge. Although both the licensee and the construction crew took actions to avoid damage to the gauge, a misunderstanding regarding the location of the gauge and the scraper operator's intended path resulted in the reported event.

In response to this event, the gauge user immediately stopped the scraper that ran over the gauge and called the RSO and his supervisor. He visually inspected the gauge for damage and roped off approximately a 15 foot area around the gauge and controlled access to the area. The gauge user took no further action and waited for arrival of the RSO outside of the roped area. These actions were consistent with the licensee's emergency procedures.

When the RSO arrived at the site, he assessed the radiation levels in the area. His measurements were consistent with the manufacturer's measurements with the source in the shielded position. He then took radiation level measurements which indicated that the source was in tact. A leak test completed when the gauge was returned to the Detroit, Michigan, location confirmed that the source was not leaking.

Neither the RSO nor the office supervisor determined that this incident could have been prevented. They both concurred that the gauge operator met company expectation regarding communicating his presence to construction personnel. They also concluded that the licensee's response to the incident was appropriate and in accordance with licensee procedure. According to the gauge user, supervisor, and the RSO, this incident was isolated.

The RSO planned to publish information on this incident in the company newsletter to make other gauge operators aware of the circumstances of the event.

c. Conclusions

Although the gauge user maintained surveillance of the gauge until he believed he was in danger and took steps to alert individuals that the gauge was in use, misunderstanding between the gauge operator and a scraper operator regarding the location of the gauge and the intended path of the scraper caused an isolated incident resulting in damage to the licensee's moisture density gauge. The licensee's response to the event was prompt and comprehensive, in that appropriate members of licensee management were notified, and the licensee's actions ensured that doses to members of the public and occupationally exposed workers were as low as possible and within regulatory limits.

4.0 Other Areas Inspected

a. Inspection Scope

The inspector interviewed licensee personnel, observed licensed activities at a temporary job site in Detroit, Michigan, toured the licensee's gauge storage location and reviewed records of training, dosimetry, and leak tests to evaluate whether the licensee radiation safety program ensured occupational and public radiation safety.

b. Observations and Findings

The inspector's discussion with gauge users confirmed that the individuals were knowledgeable of the licensee's operating and emergency procedures and trained as required by the license. A review of training certificates confirmed this finding.

The inspector found that the licensee controlled licensed materials in storage and in the field. The inspector noted that gauges in storage were secured, and the office supervisor tracked the location of each gauge using a utilization log. Gauge users interviewed stated that they did not attend to other duties while using the moisture density gauges so that they could maintain control of the devices.

The inspector's review showed that the licensee monitored workers as required by the license and occupational and public doses at the facility were within regulatory limits. The inspector noted that the gauge users wore film badges, as required by the license and January 1997 through April 1998 dosimetry reports showed that the maximum accumulated exposure at the Detroit, Michigan office was significantly less than the NRC's limit of 5000 millirem.

Observations of a gauge during transportation at the licensee's Detroit, Michigan, office confirmed that the licensee generally transported radioactive materials safely. The package was marked and labeled in accordance with applicable Department of Transportation regulations. Inspection of the licensee's shipping papers showed that they contained the information required by 49 CFR 172.201 through 204 and were accessible. However, the inspector noted that the package was not blocked and braced. Specifically, the gauge operator placed the gauge in the back seat of a van. He stated that he usually put the package in the back of the van, which provided adequate blocking and bracing. However, he had, on several occasions placed the package in the back seat. **Failure to block and brace packages so that they cannot change position during conditions normally incident to transport is a violation of 49 CFR 177.842(c).** This noncompliance was apparently an oversight. The RSO committed to ensuring that packages were properly blocked and braced in the future by re-instructing the employees on proper blocking and bracing procedures.

c. Conclusions

Based on the above observations, the inspector concluded that the licensee's radiation protection procedures, training, and equipment ensured that licensed material was used, stored, and transported safely. ~~However, the inspector identified one violation for failure to block and brace packages:~~

5.0 Exit Meeting Summary

The inspector discussed the preliminary conclusions described in this report with licensee management during an exit meeting conducted at the licensee's Detroit, Michigan, facility on November 5, 1998. In addition, the RSO was contacted via telephone on November 16, 1998, to inform him of additional inspection findings.

PARTIAL LIST OF PERSONS CONTACTED

Ernst Dumus, Gauge User, Detroit, Michigan Office
* John Kosnak, Construction Service Coordinator, Detroit, Michigan Office
* James Parsons, Manager, Environmental Field Services, RSO
Charles Peterson, Gauge User, Detroit, Michigan Office
Ennis Smith, Gauge User, Detroit, Michigan Office

*Indicates this individual was present during the on site exit meeting conducted on November 5, 1998.

INSPECTION ITEMS OPENED

030-08223/98002/01 failure to block and brace packages during transport.