UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 E. LAMAR BLVD.
ARLINGTON, TX 76011-4511

October 11, 2017

EA-17-101

Mr. Travis Snowder
President/Chief Executive Officer
Qal-Tek Associates, LLC
3998 Commerce Circle
Idaho Falls, ID 83401

SUBJECT: NRC SPECIAL INSPECTION REPORT 030-34866/2017-001

Dear Mr. Snowder:

This letter refers to the announced special inspection conducted on April 24-25, 2017, at your facility in Idaho Falls, Idaho. The purpose of the inspection was to review the circumstances surrounding your staff's April 13, 2017, notification to the U.S. Nuclear Regulatory Commission (NRC) of a transportation event (Event Notification 52676) where your staff identified dose rates on a shipment of radioactive material that were in excess of NRC and U.S. Department of Transportation limits. Your staff had packaged radioactive sources at a temporary jobsite in New York City for shipment by common carrier to your Idaho Falls facility. During the shipment, all three radioactive sources came out of the inner lead containment system, but remained contained and inside the outer carbon steel drum. This resulted in dose rates above regulatory limits. This information is in the enclosed report and presents the results of this inspection. The inspectors conducted a preliminary exit briefing with you and members of your staff at the conclusion of the onsite portion of the inspection on April 25, 2017.

Subsequent to the onsite inspection, the inspectors reviewed various documents submitted to the NRC (root-cause evaluation and corrective actions) and conducted telephone interviews with common carrier personnel in order to determine the radiation doses that the carrier's workers potentially received. The inspectors discussed the preliminary inspection results with you and members of your staff at the conclusion of the on-site portion of the inspection. A final exit briefing was conducted (telephonically) with you, Mr. Michael Albanese, Radiation Safety Officer, and Mr. Bryce Rich, Chairman of the Radiation Safety Committee, on August 17, 2017. The enclosed inspection report describes the inspection findings.

Based on the results of this inspection, two apparent violations 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 Web site at http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html. The apparent violations involved the failures to: (1) use a containment system that had a positive fastening device that could not be opened unintentionally during normal transport, as required by Title 10 of the *Code of Federal Regulations* (10 CFR) 71.5 and 49 CFR 173.412(d); and (2) design and prepare the shipment so that under conditions normally incident to transportation, the radiation levels do not exceed 200 millirem/hour on the external surface of the package and the transport index does not exceed 10, as required by 10 CFR 71.5 and 49 CFR 173.441(a).

Before the NRC makes its enforcement decision, we are providing you an opportunity to: (1) request a pre-decisional enforcement conference (PEC); or (2) request alternative dispute resolution (ADR). If a PEC is held, it will be open for public observation and the NRC may issue a press release to announce the time and date of the conference. If you decide to participate in a PEC or pursue ADR, please contact Ms. Vivian Campbell at 817-200-1455 within 10 days of the date of this letter. A PEC should be held within 30 days and an ADR session within 45 days of the date of this letter.

If you choose 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 PEC 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. You can find an updated excerpt from NRC Information Notice 96-28, on the NRC Web Site at http://www.nrc.gov/docs/ML0612/ML061240509.pdf.

In lieu of a PEC, you may also request ADR with the NRC in an attempt to resolve this issue. Alternative dispute resolution 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 (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 at Cornell University has agreed to facilitate the NRC’s program as a neutral third party. Please contact the Institute on Conflict Resolution at 877-733-9415 within 10 days of the date of this letter if you are interested in pursuing resolution of these issues through ADR.

In accordance with 10 CFR 2.390 of the NRC’s “Agency Rules of Practice and Procedure,” a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room and from the NRC’s ADAMS, accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

If you have any questions concerning this matter, please contact Ms. Vivian H. Campbell of my staff at 817-200-1455.

Sincerely,

/RA/

Mark R. Shaffer, Director
Division of Nuclear Materials Safety

Docket No. 030-34866
License No. 11-27610-01

Enclosure: Inspection Report

cc w/Enclosure:

M. Diedrich, State of Idaho Department
of Radiation Control

Mr. Christopher Boyd
Assistant Commissioner
Environmental Sciences and Engineering
42-09 28th Street, 14th Floor CN#56
Long Island City, NY 11101

NRC SPECIAL INSPECTION REPORT 03034866/2017-001 – DATED OCTOBER 11, 2017.

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	030-34866
License:	11-27610-01
Report:	2017-001
EA No.:	EA-17-101
Licensee:	Qal-Tek Associates, LLC
Location Inspected:	3998 Commerce Circle Idaho Falls, ID 83401
Inspection Dates:	Onsite inspection - April 24-25, 2017 In-office Reviews through August 17, 2017
Exit Meeting Date:	August 17, 2017
Inspectors:	G. Michael Vasquez, Technical Assistant Division of Nuclear Materials Safety Jason E. vonEhr, Health Physicist Materials Licensing and Inspection Branch Division of Nuclear Materials Safety
Approved By:	Vivian H. Campbell, Chief Materials Licensing and Inspection Branch Division of Nuclear Materials Safety
Attachments:	(1) Supplemental Inspection Information (2) Inspection Charter to Evaluate Transportation Event At Qal-Tek Associates, LLC in Idaho Falls, Idaho

Enclosure

EXECUTIVE SUMMARY

Qal-Tek Associates, LLC
NRC Inspection Report 030-34866/2017-001

This was an announced special inspection of a transportation event that was reported by Qal-Tek Associates, LLC (QTA) to the U.S. Nuclear Regulatory Commission (NRC) on April 13, 2017, (Event Notification 52676) in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 20.1906(d)(2). The licensee shipped by common carrier a carbon steel drum containing radioactive sources from New York City to its main office in Idaho Falls, Idaho. When the drum arrived in Idaho Falls, it had external radiation levels in excess of NRC limits and U.S. Department of Transportation (DOT) limits as a result of three radioactive sources which had come out of the shielded inner containment system during transport. This special inspection was limited to a review of this event.

Based on information from the common carrier regarding handling techniques, the NRC concluded that the maximally exposed package handler (a member of the public) could receive an estimated whole body dose of approximately 26 millirem (mrem), which is below the NRC annual limit of 100 mrem. The licensee's dose assessment of the maximally exposed package handler which was 20 mrem, very close to the NRC's results. (Section 2)

The NRC determined the root cause of the event was inadequate management oversight over portions of the transportation program. For example, senior licensee management did not ensure that the licensee's procedures and training provided sufficient guidance on the requirements for using containment systems with positive fastening devices. This conclusion was similar to the licensee's root-cause determination. In addition, the NRC found that senior management was not effective in ensuring that its personnel knew to stop and raise concerns to senior management when challenges were encountered that resulted in staff deviating from the procedural guidance and training. (Section 3)

Two apparent violations were identified involving: (1) the failure to use a containment system that had a positive fastening device that could not be opened unintentionally during normal transport; and (2) the failure to design and prepare the shipment so that under conditions normally incident to transportation, the radiation levels do not exceed 200 mrem/hour on the external surface of the package and the transport index does not exceed 10. (Section 4).

Corrective Actions

After discovery of the event, the licensee initiated an immediate company-wide ban on shipping sources that were not part of a device, such as a portable gauge, until an investigation was completed and corrective actions implemented. The licensee performed a root-cause analysis and developed corrective actions that were approved by the Radiation Safety Committee (RSC). Corrective actions included procedure enhancements, reviewing lessons learned during training, and not allowing shipments of sources in containment systems that needed positive fastening devices until the staff successfully completed training on the new procedure. (Section 5)

REPORT DETAILS

1 Program Overview (87103)

1.1. Inspection Scope

This was an announced special inspection of Qal-Tek Associates, LLC (QTA or licensee), which was performed in response to QTA's telephonic notification to the NRC of a transportation event on April 13, 2017 (Event Notification 52676). The licensee had packaged and shipped by common carrier radioactive sources from New York City to QTA's facility in Idaho Falls, Idaho, and upon arrival the dose rates exceeded NRC and DOT limits. The inspectors interviewed the QTA corporate radiation safety officer (RSO), QTA management, and employees either directly or indirectly involved in the transportation of sources.

The inspectors reviewed license requirements, operating and emergency procedures, training records, transportation and survey records, radiation safety committee (RSC) meeting minutes, performed independent radiation measurements, and observed licensee reenactments of the packing and unpacking of the transportation package. In order to perform independent dose assessments of common carrier package handlers who might have been exposed to the package, the inspectors interviewed common carrier personnel in order to understand package handling practices.

1.2. Observations and Findings

Qal-Tek Associates, LLC, is licensed under NRC license 11-27610-01 as a commercial service provider with the flexibility of a Type A Broad Scope license. The license authorizes QTA to provide services related to use, recycling, and disposal of radioactive sources, both sealed and unsealed. Qal-Tek Associates, LLC, is also authorized to calibrate survey meters and to calibrate and repair portable nuclear density gauges. The majority of QTA's shipments involved portable gauges with sealed sources inside the device and survey meters with exempt quantity sources. Normally, the licensee ships by common carrier via ground transport and rarely ships by overnight express.

The licensee was contracted to provide first responder training using radioactive sources in New York City. Qal-Tek Associates, LLC, decided to use radioactive sources from its Idaho Falls facility and ship them to New York in one of several DOT 7A Type A transportation packages the licensee had available. The licensee selected five sources for this training: (1) cesium-137 (Cs-137), special form, 19.4 millicuries (mCi); (2) Cs-137, special form, 23 mCi; (3) cobalt-60 (Co-60), normal form, 2.5 mCi; (4) radium-226 (Ra-226), normal form, 6 mCi; and (5) uranium-238 (U-238), normal form, 6.23 mCi.

The plans for shipping the sources involved placing the two Cs-137 sources and the Co-60 source inside a lead containment system to provide shielding and placed the containment system inside a 10-gallon carbon steel drum that was certified as a DOT 7A Type A package. The licensee selected a containment system typically used for ground transportation possessing a positive fastening device to prevent the containment system from opening during transport. The Ra-226 source was a small point source at the end of a metal rod with the source end secured inside a second lead container. The U-238 was in the form of a metal 'hockey puck' placed within a metal cylinder. The Ra-226 rod

and the U-238 hockey puck were placed next to the Cs-137/Co-60 containment system inside the 10-gallon DOT 7A Type A container.

In the final stages of shipment preparation, a QTA shipper noted that the package was overweight for the common carrier's overnight express (the package had to weigh less than 150 pounds). As a result, the QTA packager, who was under schedule pressures, used an alternate containment system that weighed less and provided sufficient shielding for a Yellow-II shipment. The QTA employee used the lead shielded container in which the sources had been stored that did not have a positive closure mechanism to secure the lead container lid. The employee placed the Cs-137 and Co-60 sources inside the containment system and used a 2 by 4-inch wooden board between the lid of the containment system and the lid of the drum to maintain pressure on the lid of the containment system. The voids inside the drum were filled with various high-density foam pieces (see Figure 1). The drum was sealed with a serialized tamper seal and provided to the common carrier.

Figure 1 - Demonstration during on-site reactive inspection showing how the package was likely packed on departure from the Idaho Falls facility and New York City. Also visible are the lead containment system actually used, wooden board acting as a wedge, as well as the radium rod and uranium puck.

The package arrived in New York City, New York, as scheduled and dose rates had not changed. The on-site employee who received the shipment was QTA's RSO on a QTA agreement state license. While performing the receipt survey the RSO observed a dent in the drum. The RSO discussed the dented drum with the QTA corporate RSO and the common carrier and determined that the dent in the drum did not compromise the Type A package for use in the return shipment.

On April 11, 2017, following the demonstration and training provided to the client in New York, the QTA RSO repackaged the sources similar to the configuration it was received, including a serialized tamper seal, and drove the package to the common carrier's facility in Bronx, New York, for transport back to Idaho Falls. Before providing the package to the common carrier, the QTA RSO re-surveyed the package and verified that the external radiation levels were within regulatory limits.

Upon arrival in Idaho Falls at the QTA facility, the package was surveyed by a QTA employee and determined to have external radiation levels in excess of regulatory limits. No contamination on the external surface of the drum was found. After notifying the corporate RSO, the package was transferred to a separate building for unpacking. Licensee employees found the serialized tamper seal was intact. They documented a detailed dose profile of external radiation levels for the package and, after opening the package, they found the lid of the Cs-137/Co-60 containment system was seated on the body of the containment system as normal, but the sources were outside of it.

Since the sources were not shielded inside the lead containment system, the dose rates exceeded NRC and DOT limits (see Figure 2). The highest measured dose rate on the package was 1.4 R/hour on contact and the transport index was 15 (10 CFR 71.4 defines the transport index as the dimensionless number representing the dose rate in mR/hour at 1 meter). The highest dose rate was found on the bottom of the package where one of the Cs-137 sources was located against the wall on the bottom of the drum. The second Cs-137 source and the Co-60 source were found near the drum's centerline just outside the Cs-137/Co-60 containment system and higher up in the drum on top of a section of high density foam.

The inspectors noted that the lid of the containment system had an approximately ¼ inch lip. Therefore, the lid needed to open less than 1 inch for the small sources to come out of the containment system. It was possible that the miscellaneous sizes and shapes of the high-density foam pieces allowed the internal void spaces in the drum to form a larger void space above the lid of the containment system such that the lid was able to lift off the containment system enough for the radioactive sources to fall out but simultaneously small enough to allow the lid to re-seat itself once the package and the containment system were placed right side up.

Because the licensee used a high volume detector for its survey of the contact dose rate, a correction factor of 1.95 was applied to the measured on-contact reading to account for situations in which the distance from the source to the instrument was small in relation to the detector volume (refer to International Atomic Energy Agency (IAEA) Specific Safety Guide No. SSG-26, "Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (2012 Edition))." Therefore, the licensee determined the corrected on-contact dose rate was 2.8 R/hour as documented in the licensee's submittal to the NRC dated June 9, 2017 (NRC's Agencywide Documents Access and Management System (ADAMS) Accession ML17174B004).

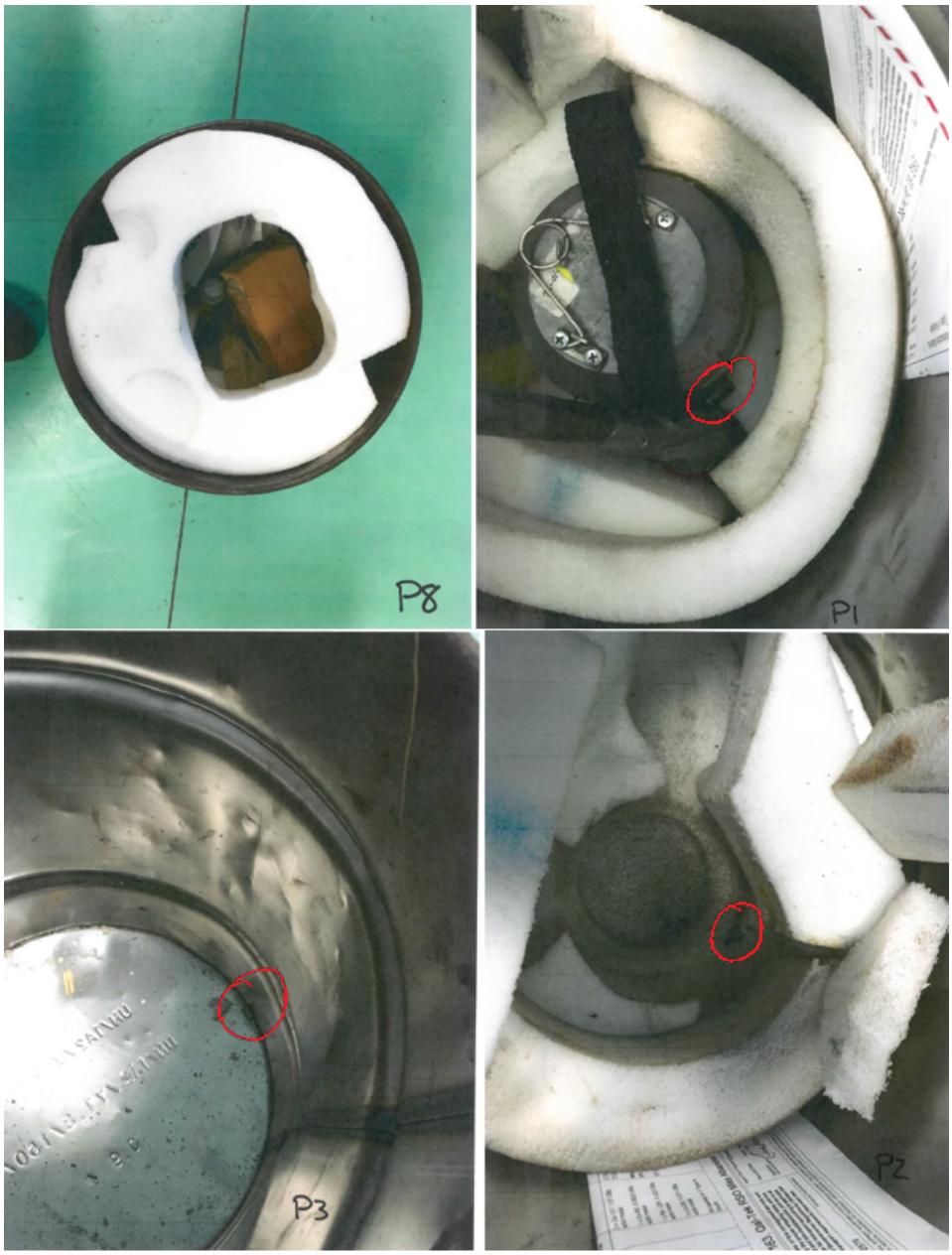

Figure 2 - Clockwise from the top left, in order of the licensee's unpacking of the drum: (1) Top-down view of how the licensee found the package on arrival in Idaho, with the drum's lid removed, (2) the discovery of the first Cs-137 source found outside the containment system; (3) the location of the Co-60 source (containment system was removed); and (4) the second Cs-137 source outside the containment system. Note the first image where the 2 inch by 4 inch wooden board is now diagonal, not vertical, and beneath the top layer of foam, and the last picture of the drum wall: the second Cs-137 source rested against the bottom corner of the steel drum.

2 Licensee and NRC Dose Estimations

2.1. Licensee Dose Estimations

Based on not knowing exactly when the sources came out of the containment system during transport to Idaho Falls, a bounding dose estimate was performed. The dose estimate was based on using conservative assumptions, such as distance from the sources to the whole body. For example, the package was assumed oriented such that the highest exposure rate was orientated towards the whole body (not the extremities), and the extremity dose was calculated based on the same orientation.

As described in the licensee's letter dated June 9, 2017, the QTA RSO contacted the common carrier's station manager in the Idaho Falls facility and reviewed the transit route the package took from New York to Idaho Falls. Based on the tracking information, the common carrier transported the package by truck from the Bronx facility in New York to the Newark, New Jersey airport where it was flown to Memphis, Tennessee. In Memphis, it was transferred to another plane and flown to Salt Lake City, Utah, and transferred to another plane for its final airport destination in Idaho Falls, Idaho.

As a result of the reduced automation at the common carrier's facility in Idaho Falls compared to the other three airports, the workers in Idaho Falls physically handled the package more than workers at the other airport facilities. Consequently, the maximally exposed member of the public would have most likely been one of the package handlers at the common carrier's Idaho Falls facility. The package containing the sources was a 10-gallon carbon-steel drum that weighed approximately 82 pounds with dimensions of approximately 19 inches in height and 14 inches diameter.

The common carrier's station manager in Idaho Falls described the workers' handling of the package from the airplane until delivery at QTA's facility. The station manager originally informed the licensee that in the airplane, package handlers would have to lift the drum to place it on a conveyor, and the station manager conservatively estimated the time a package handler might have to "bear hug" the drum to be about 3 seconds in order to place it on a conveyor. The station manager described how workers would manually push the drum on conveyors, lifting it from one conveyor to the next to get the package into the facility and onto the delivery truck. The licensee performed dose calculations based on the information from the station manager.

By letter dated July 3, 2017, (ADAMS Accession ML17200C908), the licensee updated its calculation as a result of a subsequent conversation, in which the station manager stated the handlers could not place the 82 pound steel drum on the rollers inside the aircraft. The handlers would likely have carried the drum to the edge of the plane (no more than 25 seconds transit time) where the handler could then place the drum on the belt conveyor where it could be pushed into the facility. Although a handler may have moved the drum to the edge of the plane using other techniques, the licensee conservatively assumed a worse-case scenario where a worker carried the drum. The licensee determined that a worker carrying the package for 25 seconds could have received an estimated whole body exposure of 20 mrem and an extremity exposure of about 3 mrem. This whole body exposure estimate is less than the NRC annual limit of 100 mrem for a member of the public.

2.2. NRC Dose Estimations

The NRC inspectors also interviewed common carrier personnel to confirm the licensee's information and to gain assurances that other package handlers had not received unexpected doses. The inspectors interviewed the common carrier's Idaho Falls station manager, the dangerous goods handler at the common carrier's Bronx facility, and the common carrier's radiation safety consultant.

The inspectors reviewed the common carrier's tracking information and noted that the package was received at the common carrier's Bronx, New York facility where it remained for over 24 hours before it began its transit route. In order to better understand the likelihood that the sources might have come out of the shielded containment system, which might have caused exposures to the common carrier's package handlers in the Bronx, the inspectors reviewed the circumstances surrounding the licensee's transfer of the package to the common carrier at the Bronx facility and how the common carrier stored the package in that facility.

The inspectors were informed that when the QTA employee in New York delivered the drum to the common carrier's facility in the Bronx, the employee re-surveyed the package and verified the transport index had not changed prior to providing it to the common carrier. The survey results indicated that the Cs-137 and Co-60 sources were still inside the containment system upon delivery to the common carrier.

The inspectors contacted and interviewed the dangerous goods handler at the common carrier's Bronx facility who handled the package after arrival in the Bronx. The handler informed the inspectors that the package did not fall or roll and was not otherwise handled in a rough manner. The handler moved the drum to the dangerous goods storage cage where the handler performed a radiation survey of the package and confirmed the transport index. The handler indicated that if the radiation survey readings had been higher than expected, the handler would have photographed the package and notified the supervisor. The handler checked the records and confirmed that no photographs were taken on April 11, 2017, the date the drum was provided to the common carrier.

The dangerous goods handler told the inspectors that the handler recalled moving the package because the Bronx facility does not receive many radioactive materials packages for shipment. The handler locked the drum in the dangerous goods cage located away from workers. The inspectors concluded that while the package was stored in the Bronx, the Cs-137 and Co-60 sources remained in their shielded containment system.

The common carrier's package tracking information showed that after leaving the Bronx, the package never remained at any of the common carrier's facilities for more than three hours, thus reducing the potential for another member of the public to have received radiation exposure in excess of NRC limits. Based on discussions with common carrier personnel, the inspectors were informed that while it is true that Idaho Falls is less automated then the common carrier facilities at the other three airports, the packages are often manually handled at all the common carrier locations. Normally, the common carrier limits a person to lifting a package of no more than 75 pounds, however, there may be times when a package that is within a few pounds of the 75-pound limit could be lifted based on the capabilities of the package handler.

In addition, common carrier workers that handle dangerous goods receive annual training on how to recognize the markings and labeling of dangerous goods packages, to properly handle these packages, and to segregate and secure dangerous goods packages while in storage. These activities limited the potential for common carrier package handlers to have received unnecessary exposures.

The NRC inspectors concluded that the licensee's determination of the maximally exposed individual was reasonable based on several factors. First, most package handlers would not have carried the package for a longer period than the 25-second estimate for the package handlers in Idaho Falls because of the weight of the drum. Second, the result of the NRC's dose estimation for the maximally exposed individual was approximately 26 mrem, which is in good agreement with the licensee's estimation. The slight difference was due to the inspectors using a higher correction factor for the external radiation levels on the surface of the package than the licensee used in its calculation. Based on all the available information, the inspectors concluded that it was highly unlikely a common carrier package handler received a dose in excess of NRC's limit of 100 mrem.

3 Causal Analysis of the Transportation Event

3.1. Licensee Root Cause Analysis

The licensee performed a root cause analysis following its investigation into the transportation event (ADAMS Accession ML17174B171). The investigation was led by the QTA President and Chief Executive Officer (CEO), the RSC Chairman, and the corporate RSO. Following completion of the investigation and root cause analysis, the results were reviewed and approved by the RSC.

The licensee's root-cause analysis concluded that QTA had not provided adequate function-specific packaging training for their shippers prior to working independently, and that QTA shipping procedures provided inadequate packaging instructions or standards and relied on experienced shippers to prevent improper packaging.

3.2. NRC's Causal Analysis

The inspectors used different analytical techniques to determine the direct cause, the contributing causes, and the root cause. The NRC's conclusions were based on the 5-Whys Analysis and the Barrier Analysis with portions of the Management Oversight and Risk Tree analysis.

3.2.1 NRC's Determination of the Direct Cause

The inspectors determined that the direct cause for the event was the licensee's failure to use a containment system that could be securely closed by a positive fastening device and that could not be opened unintentionally during normal transport as required by transportation regulations (49 CFR 173.412(d)). While most of QTA's containment systems with positive fastening devices would cause the package to exceed the weight restrictions for an overnight express package, QTA had other appropriate containment systems that could have been used to meet the weight restrictions.

Qal-Tek Associates, LLC, operations personnel who normally package shipments (known as packagers) had a practice of using containment systems that had positive fastening devices. That practice was included in the specific on-the-job training for operations personnel, but was not included in the more general transportation training and was not incorporated in QTA transportation procedures.

The inspectors were informed that, at the time of the event, experienced QTA packagers did not realize there was a DOT regulation requiring positive fastening devices. Instead, the packager who had been at QTA more than 5 years had been trained to use containment systems with positive fastening devices as a management expectation and a good practice. When asked, the inspectors were informed by a licensee representative that the packager could not recall another time in the past when sources were shipped in a containment system that did not have a positive fastening device. Thus, this appeared to have been an isolated event rather than a programmatic breakdown.

3.2.2 NRC's Determination of the Contributing Causes

The NRC determined the contributing causes included recent personnel changes, schedule pressures, lack of awareness of containment systems that were available, and the fact that shipping overnight express was an infrequently performed task.

With regard to personnel changes, QTA had recently (within the previous 2 weeks of the event) lost one of its experienced packagers and the second experienced packager was off-site the day the shipment was prepared. Because the sources were needed in New York, a licensee employee who was relatively new to QTA, and who was authorized to package and ship sources, volunteered to assist as needed.

The second contributing cause was the scheduling pressures associated with the shipment. The licensee did not ship the sources two weeks earlier, as originally planned, when the package could have been transported by ground and would not have had the 150 pound weight restriction. In addition, on the day of the shipment, the person who packaged the sources was under schedule pressures because the shipment needed to get out that day, and the employee had other competing priorities.

The third contributing cause involved the lack of a questioning attitude of the employees that packaged the sources. Specifically, both individuals recognized that the containment system did not have a positive fastening device and neither raised the concern to their management. Rather, both individuals believed the wooden board could be used to secure the lid of the containment device.

The fourth contributing cause was that shipping by overnight express was an infrequently performed task. Out of almost 40 shipments where sources needed to be packaged in a containment system in the previous 12-month period, this was only the second radioactive shipment sent via overnight express. Neither of the two individuals involved with packaging this shipment were aware of other lighter containment systems available because the majority of QTA's containment systems were used for ground transportation, which allowed for the heavier containment systems.

3.2.3 NRC's Determination of the Root Cause

The inspectors used the Barrier Analysis and portions of the Management Oversight and Risk Tree analysis in order to determine the root cause for this event. The NRC concluded that the root cause of the event was the less than adequate management oversight over the certain aspects of the QTA transportation program.

The first example of this root cause is that the licensee's transportation program did not have procedural guidance nor adequate training to ensure that QTA met transportation regulatory requirements for the use of containment systems that could be securely closed by a positive fastening device that cannot be opened unintentionally during normal transport, as required by 49 CFR 173.412(d). Although there was a practice of using containment systems with positive fastening devices, which the QTA operations staff followed, there was no procedural guidance related to this practice.

The QTA employee, who packaged the sources in Idaho Falls for shipment to New York, was relatively new to QTA, having been employed by QTA for about 2 years. The employee had experience and training in transportation regulations and was authorized to package and ship radioactive materials. The inspectors reviewed the last transportation training the employee attended and found it was a course taught by a third party. The course outline and materials were not specific enough to show that the requirements for a positive fastening device were reviewed. The employee was not hired into the operations department, so the employee had not received the on-the-job training that operations personnel received (about containment systems with positive fastening devices), and the employee was not aware of the lighter weight containment systems available at QTA.

The QTA employee, who packaged the sources in New York, was also relatively new to QTA having been employed just over a year. The employee had prior experience and training in transportation regulations (mostly other types of hazardous material shipments) and, after receiving transportation training from QTA, the employee was also authorized to package and ship radioactive materials. The inspectors determined that the QTA transportation training the employee received was generally thorough and the testing comprehensive; however, the QTA training did not cover the specific information about selecting a containment system with a positive fastening device.

Neither of the two individuals involved with packaging the sources recognized that the containment system failed to meet transportation regulations relating to the positive fastening device. Both individuals depended on a 2 by 4-inch wooden board placed between the lid of the containment system and the lid of the drum to apply pressure to the lid of the containment system.

The second example was that senior management was not effective in ensuring that its personnel knew to stop and raise a concern to senior management in the situation where procedures and training were silent on which containment system to use. If licensee staff had raised the question that procedures and training were silent about this, it would have given licensee management the opportunity to research the issue and provide adequate procedural guidance and training to comply with the regulations.

3.3. Conclusions

The outcome of the licensee's root cause analysis was in overall agreement with the NRC's root cause analysis with only one exception. The licensee identified the inadequacy of the function-specific packaging training for the shippers prior to conducting the activity independently, and the inadequacy of the shipping procedures and standards relied upon by the shippers. However, the licensee's root cause did not include the issue that senior management was not effective in ensuring that its personnel knew to stop and raise a concern in this situation where procedures and training were silent on which containment system to use.

4 Inspection Findings (87103)

4.1. Inspection Scope

The inspectors conducted interviews of the QTA corporate RSO, QTA management, and employees either directly or indirectly involved in the transportation event. The inspectors also reviewed license requirements, operating and emergency procedures, training records, and observed licensee reenactments of the packing and unpacking of the transportation package.

4.2. Observations and Findings

The inspectors identified two apparent violations, which are as follows:

10 CFR 71.5(a) requires, in part, that each licensee who delivers licensed material to a carrier for transport shall comply with the applicable requirements of the DOT regulations in 49 CFR parts 171 through 180, appropriate to the mode of transport.

A. 49 CFR 173.412(d) requires, in part, that packaging must include a containment system securely closed by a positive fastening device that cannot be opened unintentionally during normal transport. If the containment system forms a separate unit of the package, it must be securely closed by a positive fastening device that is independent of any other part of the package.

   Contrary to the above, on April 7 and 11, 2017, the licensee used a containment system that did not have a positive fastening device that could not be opened unintentionally during normal transport. In addition, the containment system formed a separate unit of the package but it used a device that was not independent of any other part of the package. Specifically, the licensee placed a 2 by 4-inch wooden board between the lid of the containment system (a lead shielded container) and the lid of the steel drum in an unsuccessful attempt to ensure the lid of the containment system would not open during transport.

B. 49 CFR 173.441(a) requires, in part, that each package of Class 7 (radioactive) materials offered for transportation must be designed and prepared for shipment, so that under conditions normally incident to transportation, the radiation level does not exceed 2 mSv/hour (200 mrem/hour) at any point on the external surface of the package, and the transport index does not exceed 10.

Contrary to the above, on April 11, 2017, the licensee failed to ensure that a package of Class 7 (radioactive) materials offered for transportation was designed and prepared for shipment so that under conditions normally incident to transportation the radiation level did not exceed 2 mSv/hour (200 mrem/hour) at any point on the external surface of the package, and the transport index did not exceed 10. Specifically, the licensee used a containment system lacking a positive closure mechanism which opened during conditions normally incident to transportation and allowed the three radioactive sources to come out of the internal containment system and remain inside the Type A container. As a result, upon arrival in Idaho Falls, Idaho, the radiation levels on the external surface were 28 mSv/hour (2800 mrem/hour) and the transport index was 15.

4.3 Conclusions

The inspectors identified two apparent violations of NRC requirements during the inspection, as described above.

5 Corrective Actions (87103)

Upon discovery of the transportation event, the licensee carefully unpacked the drum, found the radioactive sources outside the containment system, and documented the dose rates. The corporate RSO reported the event to the NRC's Headquarters Operations Center. In accordance with its procedures, QTA generated an incident report and formed an investigation team. The event was also formally discussed with the RSC.

The licensee informed the NRC inspectors prior to the onsite inspection that the company implemented a self-imposed ban on radioactive source shipments until the corrective actions were completed, approved by the RSC, and implemented. The licensee's investigation strategy, the root cause analysis, and some of the corrective actions are described in the licensee's Incident Investigation (ADAMS Accession ML17174B171). More specific corrective actions were discussed in the licensee's submittal dated June 15, 2017 (ADAMS Accession ML17174B004)

On June 6, 2017, the inspectors were informed that the QTA RSC approved the updated shipping procedure OP-PRO-152, "Licensed Material Receipt, Accountability, Storage, Handling, & Shipping." The inspectors reviewed the enhanced transportation procedure instructions and found they contained packaging instructions including a description and pictures of acceptable containment systems with positive fastening devices that must be used. In addition, the licensee required the use of a secondary physical inner packaging to ensure containment of sources. The procedure changes provided guidance on selecting appropriate containment systems for various weight limits when shipping by ground transportation and by overnight air transport.

The inspectors were also informed that the licensee's corrective actions included one-on-one function-specific training of all QTA-authorized shippers to ensure a complete understanding of packaging instructions. The licensee lifted the ban and workers were allowed to resume packaging and shipping of radioactive sources after satisfactory completion of the training.

7 Exit Meeting Summary

A preliminary exit briefing was conducted at the conclusion of the onsite inspection on April 25, 2017, with the President/CEO, corporate RSO, and the Chair of the RSC. A final exit briefing was held telephonically with the President/CEO, corporate RSO, and the Chairman of the RSC on August 17, 2017. The licensee acknowledged the NRC's findings.

SUPPLEMENTAL INSPECTION INFORMATION

LIST OF PERSONS CONTACTED

Travis Snowder, President / Chief Executive Officer
Michael Albanese, Corporate Radiation Safety Officer
Bryce Rich, Chairman of the Radiation Safety Committee
Jeremy Teeples, Operations Manager
Christopher Owens, Technician & Radiation Safety Officer for Qal-Tek Associates State of Georgia radioactive materials license
Bryson Hendricks, Technician

INSPECTION PROCEDURES USED

87103 - Inspection of Materials Licensees Involved in an Incident or Bankruptcy Filing

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

030-34866/17001-01	AV	The licensee failed to use a containment system with a positive fastening device when shipping radioactive sources. (10 CFR 71.5 and 49 CFR 173.412(d))
030-34866/17001-02	AV	The licensee failed to package a shipment such that under conditions normal to transport, the package did not exceed 200 mrem/hour on contact and the transportation index did not exceed 10 (10 CFR 71.5 and 49 CFR 173.441(a))

Closed

None

Discussed

None

LIST OF ACRONYMS AND ABBREVIATIONS USED

ADAMS	Agencywide Documents Access and Management System
AV	Apparent Violation
CEO	Chief Executive Officer
CFR	*Code of Federal Regulations*
DOT	U.S. Department of Transportation
IAEA	International Atomic Energy Agency
IATA	International Air Transport Association
LC	License Condition
NRC	U.S. Nuclear Regulatory Commission
QTA	Qal-Tek Associates
RSC	Radiation Safety Committee
RSO	Radiation Safety Officer

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 E. LAMAR BLVD.
ARLINGTON, TX 76011-4511

April 20, 2017

MEMORANDUM TO: G. Michael Vasquez, Technical Assistant
Division of Nuclear Materials Safety

Jason E. vonEhr, Health Physicist
Materials Licensing and Inspection Branch
Division of Nuclear Materials Safety

THROUGH: Vivian H. Campbell, Chief ***/RA by JLThompson Acting For/***
Materials Licensing and Inspection Branch
Division of Nuclear Materials Safety

FROM: Mark R. Shaffer, Director ***/RA/***
Division of Nuclear Materials Safety

SUBJECT: INSPECTION CHARTER TO EVALUATE TRANSPORTATION EVENT AT QAL-TEK ASSOCIATES, LLC IN IDAHO FALLS, IDAHO

A special inspection has been chartered in response to the notification of a transportation event involving elevated external radiation levels from a package at the Qal-Tek Associates, LLC (licensee) facility in Idaho Falls, Idaho (License No. 11-27610-01, Docket No. 030-34866).

BACKGROUND AND BASIS

On Thursday April 13, 2017, the U.S. Nuclear Regulatory Commission (NRC) Headquarters Operations Office was notified by the licensee of a package delivered to their facility in Idaho Falls, Idaho, that had a radiation exposure rate of 1.45 R/hr on contact and a Transport Index of 15 (EN 52676). The licensee stated that the package contained five radioactive sources: 1) 19.4 millicuries of cesium-137, 2) 23 millicuries of cesium-137, 3) 2.5 millicuries of cobalt-60, 4) 6 millicuries of radium-226, and 5) 6.32 millicuries of uranium-238. Upon inspection of this package at the receiving facility in Idaho Falls, Idaho, two of the radioactive sources were discovered to be outside of the lead container within the transportation package that was designed to shield them during transport. The package was shipped from The Bronx, New York, where the licensee was conducting training for the State's emergency responders. The licensee confirmed that the sources were originally packaged on April 11, 2017, and were shipped via common carrier, overnight express, to Idaho Falls, Idaho. The package arrived on April 13, 2017, at approximately 9:40 AM local time.

The NRC is chartering this reactive inspection pursuant to NRC Manual Chapter 1301, "Response to Radioactive Material Incidents that Do Not Require Activation of the NRC Response Plan." As part of the inspection, you may decide to conduct additional onsite reviews.

CONTACT: Vivian H. Campbell, MLIB, DNMS
817-200-1455

Attachment 2

SCOPE

The inspection should seek to address the following items at a minimum:

1. Develop a sequence of events associated with the transportation event (i.e., a chronology leading up to and including the discovery of the event, the initial response by the licensee, and the licensee's follow-up response and corrective actions).

2. Assess the licensee's overall investigation including root and contributing causes, as well as the extent of cause/condition.

3. Assess the licensee's compliance with applicable regulatory requirements (including 10 CFR 71.5 and applicable 49 CFR regulations) and the conditions of Qal-Tek's license related to transportation of the sources involved in this event. Assess the adequacy of the shipping papers, the adequacy of the package, the procedures used, and the training for packaging this type of shipment. Conduct interviews of licensee personnel to assess the training provided as well as the compliance with licensee procedures.

4. As needed, perform independent dose estimates by means of calculations, reenactments, and/or time and motion studies based on interviews with personnel and measured readings.

5. Review and assess operability and appropriateness of the radiation safety equipment available and/or in use at the time of the event (i.e. survey instruments).

6. Collect data and records associated with the event (e.g., licensee records of interview and investigation reports, names of individuals involved, training records, applicable procedures, dose calculations, and radiation survey results).

7. Based on the above, perform an independent causal factor analysis of the event.

8. Assess the licensee's 30-day report to the NRC for adequacy of the root and contributing causes and corrective actions to prevent recurrence.

9. Conduct routine briefings with the licensee during the conduct of the inspection.

10. Conduct periodic briefings with Division management, as needed.

Planned Dates of Onsite Inspection: April 24-26, 2017

GUIDANCE

The NRC is chartering this special inspection pursuant to Management Directive 8.3, "NRC Incident Investigation Program," and NRC Manual Chapter 1301, "Response to Radioactive Material Incidents that Do Not Require Activation of the NRC Response Plan." The Manual Chapter identifies Inspection Procedure 87103, "Inspection of Material Licensees Involved in an Incident or Bankruptcy Filing," for specific use in reviewing the event.

This inspection should emphasize fact-finding in its review of the circumstances surrounding the event. Safety concerns identified that are not directly related to the event should be reported to NRC management for appropriate action.

In accordance with Manual Chapter 0610, a report documenting the results of the inspection should be issued within 30 days of the completion of the inspection.

This Charter may be modified should the inspector develop significant new information that warrants review. Should you have any questions concerning this charter, please contact Vivian H. Campbell at 817-200-1455.

Docket No. 030-34866