



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

(FSME-14-045, May, Other, Radiological Events)

May 13, 2014

ALL AGREEMENT STATES

RADIOLOGICAL EVENTS INVOLVING ACUREN USA AND ACUREN INSPECTION
INC. (FSME-14-045)

Purpose: To inform Agreement State program staff of recent radiography incidents involving Acuren USA and Acuren Inspection, Inc. and reemphasize the importance of personnel safety.

Background: On April 10, 2014, two U.S. Nuclear Regulatory Commission (NRC) inspectors performed an unannounced inspection of Acuren USA (NRC radiography licensee) at the licensee's field station in Kena, Alaska. As the inspectors walked around the outside of the shop, they entered a high radiation area as indicated on their survey meter (greater than 200 mR/hour). There were no boundaries or physical controls established. Later, Acuren personnel confirmed that six exposures had taken place inside the shop within the last hour. Acuren shares the building with 4 other businesses. Inspectors became concerned about the lack of controls and the possibility of exposure to members of the public. No overexposure occurred during this event involving an employee of Acuren Inspection Inc.

The State of Ohio recently reported [\(NRC Event Number 50014\)](#) a radiographer overexposure event. A radiographer approached the end of the source tube believing incorrectly that the source had been retracted into the camera. The State has determined that the radiographer's alarming rate meter had a dead battery and his survey meter was not functional and was not operationally checked that work day. The radiographer's whole body dose was assigned as 13 Rem with an extremity dose of 6.5 Rem.

The State of Texas reported on March 13, 2014, [\(NRC Event Number 49912\)](#) a potential overexposure to a radiographer trainee's hand. The trainee was employed by Acuren Inspection, Inc. The radiographer and two radiographer trainees were working on a tank. The trainees were positioned inside the tank, and the radiographer was positioned outside the tank. After the radiography shot was completed, the trainee had attempted to disconnect the guide tube from the camera when he noticed the reading on his rate meter increase. The source was then returned to the fully shielded position. Subsequent interviews with the radiographers revealed that a radiographer trainee was not wearing any personnel monitoring devices and the other trainee was wearing dosimetry but failed to turn on his alarming rate meter.

Discussion: In response to these events, a number of actions were taken by the NRC and the States. On May 5-7, 2014, a NRC reactive inspection team was conducted in Anchorage and Kena, Alaska, to inspect field stations operated by Acuren USA.

The State of Ohio issued Ohio Information Notice 2014-01 (see attachment) and the NRC issued a Confirmatory Action Letter (ADAMS Accession No. ML14114A765). These events have common performance issues including not performing functional checks of survey equipment and alarming rate meters, not using survey equipment on the jobsite, and not wearing required dosimetry.

The licensee has initiated a number of actions to address the causes of these events. NRC will be using the findings of the team inspection, upon completion, and analysis of the events in Alaska to determine whether additional actions are warranted.

If you have any questions regarding this communication, please contact me at 301-415-3340 or the individual named below:

POINT OF CONTACT: Joe O'Hara
TELEPHONE: (301) 415-6854

INTERNET: Joe.OHara@nrc.gov
FAX: (301) 415-3502

/RA/

Laura A. Dudes, Director
Division of Materials Safety and State Agreements
Office of Federal and State Materials
and Environmental Management Programs



OHIO DEPARTMENT OF HEALTH

246 North High Street
Columbus, Ohio 43215

614/466-3543
www.odh.ohio.gov

John R. Kasich / Governor

OHIO INFORMATION NOTICE IN 2014-01

April 18, 2014

SUBJECT: Safe Conduct of Industrial Radiographic Operations to Minimize the Potential for Radiation Exposure to Radiography Workers and Members of the Public

ADDRESSEES: All Industrial Radiography Licensees Authorized to Operate in Ohio under Ohio License Categories 03310, 03320, or under Reciprocity

PURPOSE:

The Ohio Department of Health (ODH) Bureau of Radiation Protection (Bureau) is currently investigating two recent incidents involving the possible overexposure of industrial radiography workers at temporary job-site locations in Ohio. In addition, a search of event reports published by the US Nuclear Regulatory Commission (NRC) since January 1, 2014 showed three other incidents which had the potential to cause overexposure to radiography workers and/or members of the public. Summaries of these event reports are attached to this Information Notice.

The Bureau is issuing this Information Notice to remind Ohio industrial radiography licensees – including those licensed in other jurisdictions and operating in Ohio under a reciprocity authorization – of the requirements to properly maintain and use personal dosimetry and survey equipment when conducting radiography operations, and to ensure they maintain constant surveillance and control of devices (cameras) containing radioactive material and used for industrial radiography.

The Bureau expects that affected licensees will review this information and consider actions, as appropriate, to avoid similar compliance issues. In addition, the Bureau is requiring specific actions to be taken by those licensees to document employee training on the requirements found in relevant sections of the Ohio Administrative Code (OAC) and the topics discussed in this Information Notice. These requirements are detailed in a later section of this notice.

SUMMARY:

Two incidents were recently reported to the Ohio regulatory program that involved the possible overexposure of industrial radiography workers at temporary job-site locations. Upon investigation by Bureau staff it was determined that two common issues contributed to both situations:

1. Licensee personnel were not maintaining appropriate alertness during radiographic operations.

2. Licensee personnel were not wearing and/or using required personal dosimetry and monitoring devices during radiography operations.

As part of the Bureau investigation a search was made of NRC published event reports for the first quarter of 2014. This search revealed three other incidents that included one or both of the same contributing factors and could have resulted in a significant exposure to radiography workers and/or members of the public. Summaries of these event reports are attached to this Information Notice.

There is no acceptable excuse for any situation in which radiography personnel are not wearing and/or using their assigned personal dosimetry, including alarming rate meters. The same applies to the use of calibrated and operable survey meters. The requirement for use of these devices is to ensure the safety of licensee personnel. Had those items been properly used, operable, and monitored during the radiographic operations discussed in the event notices, the over exposures reported probably would not have occurred.

In addition, due to the types and activities of the radioactive materials used in industrial radiography, it is inherent that all personnel involved in radiographic operations be especially vigilant when performing these activities. Awareness of the equipment, set-up, boundaries, and surroundings is imperative to ensure that operations are conducted safely and do not create situations that could result in an exposure to workers or a member of the public.

ACTIONS TO BE TAKEN BY LICENSEES - SPECIFIC TRAINING AND DOCUMENTATION:

Ohio industrial radiography licensees (including those licensed in other jurisdictions and operating in Ohio under a reciprocity authorization) shall conduct training on the information contained in this notice for all employees who are or may be performing industrial radiography work in Ohio. This training must also cover the requirements found in OAC Chapter 3701:1-48, *Radioactive Material Standards - Industrial Radiographers*, which governs industrial radiographic operations conducted in Ohio.

This training must be completed within forty-five (45) days of the date of this Information Notice. In addition, the training must be documented with the date, time, location, and signature of those employees who have attended the training. Documentation that the required training has been completed must be received by the Bureau no later than sixty (60) days from the date of this Information Notice.

Failure to perform the required training and provide the necessary documentation to the Bureau within the mandated time period may result in additional oversight actions by the Bureau. These may include the performance of a special inspection of the licensee's operations (to be billed at full-cost to the licensee), revocation of a reciprocity authorization, and/or the issuance of a notice of violation, administrative fine, or penalty.

CONTACT:

If you have any questions regarding the information in this notice, please contact Stephen James, Supervisor, Industrial Licensing and Inspection, at 614-728-0873, or by e-mail: Stephen.James@odh.ohio.gov.

Documentation of the training required by this Information Notice may be submitted to Mr. James at the same e-mail address, or to the Bureau's e-mail: BRadiation@odh.ohio.gov.

AGREEMENT STATE REPORT SUMMARY – NRC Event Number: 50014

RADIOGRAPHER OVEREXPOSURE

"On 4/9/14, the Agreement State regulatory agency (Agency) was notified by the licensee's RSO of a radiographer overexposure at a temporary job site that happened about 1100-1130 that morning. The radiographer was working with an 89 Ci Ir-192 source at the time. The radiographer supposedly had all his dosimetry and a survey meter at the time of the incident.

Initial estimates regarding the male radiographer is that he may have received a 15 Rem whole body exposure and an estimated 3000-5000 Rem to the hand. The radiographer's whole body dosimeter is being sent off for immediate processing. The radiographer has been sent for medical attention. REAC/TS was contacted by the licensee.

Sequence of events is understood to be as follows: The radiographer had sat down and was chatting while waiting for an exposure to complete. At the end of the shot time, he had assumed that the other radiographer had retracted the source and proceeded to set up for the next shot. When he noticed that the other radiographer was not present he went back and checked to find that the source had not been cranked back. The Agency will have an inspector on scene to investigate the incident and also to observe and review the incident reenactments.

***** UPDATE ON 4/10/14 *****

On 4/10/14, the Agency performed an onsite inspection and observed the licensee perform a reenactment of the incident scenario. It was determined that the radiographer did not handle the end of the source tube with the source in it and did not receive the initially assumed hand dose. The whole body deep dose is still expected to be about 15 Rem. The hand dose is expected to be on the order of the whole body dose, about 15 Rem.

During the reactive inspection, the Agency found that the radiographer's alarming rate meter had a dead battery, and the survey meter was not functional and had not been checked that day. The Assistant Radiographer was trailing the radiographer approximately one and a half minutes in entering the shielded bunker, and it was the assistant radiographer's alarming rate meter and survey instrument that identified the presence of the exposed source. The source collimator was not being used in the bunker, so the 89 Ci Ir-192 source was not shielded.

***** UPDATE ON 4/11/14 *****

On 4/11/14, the licensee RSO has provided the Agency with the following updates:

1. The radiographer's whole body dosimeter reading was 836 mRem.
2. Based on the dose estimates from the scene reenactments, the licensee will assign the radiographer a whole body dose of 13 Rem, and an extremity dose of 6.5 Rem. (The radiographer's chest was much closer to the source than his dosimeter was.)
3. The radiographer will be under continued medical surveillance and REAC/TS will remain involved.

AGREEMENT STATE REPORT SUMMARY – NRC Event Number: 49912

POTENTIAL OVEREXPOSURE TO A RADIOGRAPHER'S HAND

On 3/13/14, the Agreement State regulatory agency (Agency) was notified by the licensee's Site Radiation Safety Officer (SRSO) that one of its radiographer trainees may have received an overexposure while performing radiography at a field site on 3/12/14. The radiographers were using a QSA 880D camera containing a 69 curie iridium-192 source. At 2100 hours, the

radiographers had completed a shot and the trainee went to the camera to disconnect the guide tube from the camera. The trainee stated while attempting to disconnect the guide tube he observed the reading on the dose rate meter had gone back up. The trainee backed away from the camera and the source was returned to the fully shielded position. It is unknown at this time where the source was located in the guide tube.

The SRSO stated the trainee may have been in contact with the guide tube for as long as 15 seconds. The SRSO stated the radiographer trainer was near the trainee during the event. The SRSO stated the trainee's self-reading dosimeter was off scale. The SRSO did not know if the trainee's alarming rate meter was alarming at the time of the event. The SRSO stated he was not at the licensee's facility when he contacted this Agency, but he was returning to the facility. The SRSO stated he would provide additional information as soon as they had a chance to interview the individuals involved. The Agency contacted the licensee's Corporate Radiation Safety Officer who stated they were on their way to the company's facility to do reenactments and preliminary dose assessments. The SRSO stated the trainee's dosimetry had been collected and will be sent for processing. No other individual received an exposure due to this event. The Agency contacted the REAC/TS and informed them of the event. REAC/TS agreed to provide the licensee with assistance when requested.

***** UPDATE ON 3/14/14 *****

The Agency was contacted by the licensee's Corporate Radiation Safety Officer (CRSO) at 1700 on 3/13/14 and provided with additional information on the event. The CRSO stated they had interviewed the radiographers involved in the event and discovered a second radiography trainee was involved. The CRSO stated the three individuals were shooting welds on a tank. The two radiography trainees were inside the tank in a man lift basket operating the camera. The camera would hang on the side of the tank. The radiography trainees would place the collimator to perform the shoot and then back off from the camera the distance of the control cables, approximately 35 feet, and operate the camera. The trainer was in a man lift outside the tank placing film. The CRSO stated the camera had been retrieved from the wall of the tank and placed in the basket with them while they waited to set up for the next shot. The radiography trainees stated they were in the basket for as long as 15 minutes, with the source not fully shielded. The radiography trainee who tried to remove the guide tube stated he had difficulty removing the guide tube, so the 10-15 second estimate for the time he spent trying to remove the guide tube was accurate. The radiography trainee stated when they retracted the source to the fully locked position it took about one-quarter turn of the crank handle to fully retract the source.

During the interviews with the radiographers, it was discovered that the radiography trainee who attempted to remove the guide tube was not wearing any personnel monitoring devices. He had left them in the truck. The other radiography trainee was wearing their dosimetry, but failed to turn the alarming rate meter on. The CRSO stated the dosimetry will be sent to their dosimetry lab for processing. The CRSO stated they had contacted REAC/TS for assistance. They have taken the radiography trainee who attempted to remove the guide tube to the hospital for blood samples to be provided to REAC/TS.

The Agency contacted the CRSO at 0700 on 3/14/14, and asked the condition of the radiography trainee's hand. The CRSO stated they were not aware of any issues with the individual's hand. The Agency discussed the previous event in another jurisdiction with similar circumstances. The consultant for the licensee working with the CRSO was also the consultant in the previous event and is providing the licensee with information gained in that event. The licensee currently plans to have the Site RSO to manage the health aspects of this event. The CRSO will manage the investigation of the event.

***** UPDATE ON 3/15/14 *****

On 3/15/14, the Agency was notified by the licensee that based on the reenactment of the event, they have calculated the exposure to the hand of the radiography trainee to be 3,680 rem. The calculation is based on the trainee's hand being 0.5 centimeter from the source for 10 seconds. The licensee reported the whole body deep dose equivalent was 6.0 rem for the trainee. The licensee stated they examined the trainee's hand today and did not see any visual effects of the exposure. The licensee stated the trainee has not experienced any pain in his hand. The licensee stated they will continue to monitor the trainee's hand. The licensee stated they are still corresponding with REAC/TS.

The badge for the second trainee in the basket was read by the dosimeter processor and reported to be 3.327 rem. The licensee stated based on the reenactment they believed the reading to accurately reflect the individual's exposure.

AGREEMENT STATE REPORT SUMMARY – NRC Event Number: 49816

RADIOGRAPHY CAMERA LEFT UNATTENDED

On 2/10/14, the Agreement State regulatory agency (Agency) received a call from the licensee RSO, indicating that a radiographer had inadvertently left behind a radiography camera when he drove off the parking lot at a customer's job site.

On 2/9/14, at 1035 after the radiographer finished radiography using an IR100 Camera containing 31 Curies of Ir-192, he left the radiography camera on the bumper of the truck; later, assuming that he left the camera inside the truck, he drove off and the camera fell onto the pavement. According to the radiographer, the camera was left unattended for a short period of time. Later, a customer's employee noticed the camera in the parking lot and contacted the facility manager. Facility management contacted the licensee's RSO and he drove to the refinery and took possession of the camera.

AGREEMENT STATE REPORT SUMMARY – NRC Event Number: 49812

RADIOGRAPHY CAMERA LEFT UNATTENDED

The Agreement State regulatory agency (Agency) received an incident report from the licensee, via an email that a radiography camera had been left unattended.

On 2/9/14, between 0030 and 0245, licensee employees were conducting a radiography operation using a camera containing 104 Curies of Ir-192, at a client location. During the operation a few employees from another division of the licensee's operations were in the area. Their presence distracted the two radiographers, who thought that another radiographer was in the area, so they left to process film. While the film was being processed, the camera was left dangling at 2 feet from the floor and unattended. A customer employee discovered the suspended camera and brought it to the licensee employees' attention. Shortly thereafter, the licensee employees took possession of the camera.

There were no personnel overexposures.

AGREEMENT STATE REPORT SUMMARY – NRC Event Number: 49623

POTENTIAL OVEREXPOSURE TO RADIOGRAPHER AND MEMBER OF THE PUBLIC

The Agreement State regulatory agency (Agency) received a report at 14:10 on 12/11/13 from the owner of a licensee's customer facility that an incident involving industrial radiography of a pressure vessel occurred at his facility on 12/10/13.

The individual reported that his site foreman was working with the industrial radiographer who was performing radiography of a pressure vessel. The radiographer approached the source collimator to change the film and the radiographer realized the source was still in the open/exposed position. The amount of exposure is still in question and the site foreman was escorted by his employer to the hospital for evaluation. The employee reported he was in the area for 5 to 8 minutes and approximately 12-24 inches from the source. The employee was not working for the industrial radiography company, thus this is an exposure to the public. The radiographer also received a dose.

The licensee's RSO was contacted by the Agency to verify the incident. The RSO reported that he contacted the Agreement State which issued their license to report the incident and is currently working on sending the radiographer's monitoring badge to be read. The RSO is still trying to contact his radiographer and review details of the incident. A calculated dose for the time period of 8 minutes with a distance of 1 foot from the 67 Curie Ir-192 source was 40 rem in 8 minutes. Investigation is ongoing.

***** UPDATE ON 12/13/13 *****

On 12/13/13, at 1632 hours, the licensee notified the Agency that their dosimetry processor had completed reading the radiographers' badges. One badge read 34 millirem DDE, and the other 30 millirem, DDE. Two Agency inspectors are scheduled to interview all parties involved in the event on 12/17/13.

***** UPDATE ON 1/21/14 *****

The initial report stated a possible public exposure of 40 rem. Upon further investigation and interviews the dose was much lower. The dose for whole body was calculated to be 515 mrem for the public exposure (customer site foreman) and 2.06 rem for the radiographer's exposure, in 5 minutes of exposure time.