NOTICE OF VIOLATION

Industrial NDT Services Division
Indianapolis, Indiana

Docket No. 030-12208
License No. 13-06147-04
EA 90-202

During an NRC inspection conducted on November 14, 1990, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), 10 CFR Part 2, Appendix C (1990), the violations are listed below:

A. VIOLATIONS RELATING TO THE OVEREXPOSURE OF AN EXTREMITY OF A RADIOGRAPHER

1. 10 CFR 34.43(b) requires, in part, that the licensee ensure that a survey, with a calibrated and operable radiation survey instrument, is made after each radiographic exposure to determine that the sealed source has been returned to its shielded position. The survey must include the entire circumference of the radiographic exposure device and any source guide tube.

   Contrary to the above, on September 12, 1990, at a field site in Indianapolis, Indiana, a licensee radiographer did not perform a survey after each radiographic exposure to determine that the sealed source had been returned to its shielded position.

2. 10 CFR 20.101(a) requires that the licensee limit the extremity radiation dose of an individual in a restricted area to 18.75 rems per calendar quarter.

   Contrary to the above, the licensee did not limit the extremity radiation dose of an individual performing radiographic operations to 18.75 rems per calendar quarter. Specifically, on September 12, 1990, a radiographer, working in a restricted area, received a extremity radiation dose of 111.4 rems to his left hand.

   These violations have been categorized in the aggregate as a Severity Level II problem. (Supplements IV and VI)

B. VIOLATIONS RELATING TO AN IMPROPER EVALUATION OF AN OVEREXPOSURE AND UNTIMELY REPORT

1. 10 CFR 20.201(b) requires that each licensee make such surveys as may be necessary to comply with the requirements of Part 20 and which are reasonable under the circumstances to evaluate the extent of radiation hazards that may be present. As defined in 10 CFR 20.201(a), "survey" means an evaluation of the radiation hazards incident to the production, use, release, disposal, or presence of radioactive materials or other sources of radiation under a specific set of conditions.

9012280133 901214
REG3 LIC30
13-06147-04 PDR

Contrary to the above, on October 1, 1990, the licensee did not make an adequate survey to assure compliance with 10 CFR 20.403(b)(1). Specifically, the licensee made an incorrect determination that the calculated dose received by an individual's extremity was approximately 5.5 rems when the correct value was 111.4 rems.

2. 10 CFR 20.403(b)(1) requires, in part, that each licensee, within 24 hours of discovery of the event, report any event involving licensed material possessed by the licensee that may have caused or threatens to cause exposure of the feet, ankles, hands, or forearms of an individual to 75 rems or more of radiation.

   Contrary to the above, the licensee failed to report within 24 hours, an overexposure which exceeded 75 rems to the left hand. Specifically, an individual received a dose of 111.4 rems to the left hand on September 12, 1990, and the event was not reported until October 4, 1990, when the licensee's letter was received by the NRC.

   These violations have been categorized in the aggregate as a Severity Level III problem. (Supplement IV)

C. VIOLATIONS RELATING TO SOURCE DISCONNECT EVENT

1. 10 CFR 34.22(a) requires, in part, that during radiographic operations, the sealed source assembly be secured in the shielded position each time the source is returned to that position.

   Contrary to the above, on October 31, 1990, a licensee radiographer did not secure the sealed source assembly in the shielded position after returning the source to the shielded position at the termination of a radiographic exposure.

   This is a Severity Level IV violation (Supplement VI).

2. License Condition 17 of License Number 13-06147-04 requires, in part, that licensed material be possessed and used in accordance with statements, representations and procedures contained in an application dated November 11, 1986.

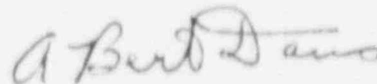
   The referenced application states in section NDT-20 (11.1) (7) that, upon completion of the last radiographic exposure, the radiographer shall disconnect the source tube and insert the safety plug.

   Contrary to the above, on October 31, 1990, upon completion of the last radiographic exposure, a licensee radiographer disconnected the source tube but failed to insert the safety plug.

   This is a Severity Level IV violation (Supplement VI).

Pursuant to the provisions of 10 CFR 2.201, Industrial NDT Services Division is hereby required to submit a written statement or explanation to the U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D. C. 20555 with a copy to the Regional Administrator, Region III, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. If an adequate reply is not received within the time specified in this Notice, an order may be issued to show cause why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time. Under the authority of Section 182 of the Act, 42 U.S.C. 2232, this response shall be submitted under oath or affirmation.

FOR THE NUCLEAR REGULATORY COMMISSION



A. Bert Davis
Regional Administrator

Dated at Glen Ellyn, Illinois
this 14th day of December 1990

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 030-12208/90-001(DRSS)

Docket No. 030-12208

License No. 13-0F147-06 Priority 1 Category C1

Licensee: Industrial NDT Services Division
2126 Wendell Avenue
P. O. Box 2245
Indianapolis, IN 46202

Inspection Conducted: November 14, 1990

Inspector: James R. Mullauer, M.S. — 11/26/90 Date
Radiation Specialist
Nuclear Materials Safety
Section 1

Reviewed By: W. H. Schultz, Chief — 11-26-90 Date
Nuclear Materials Safety
Section 1

Approved By: J. A. Grobe, Chief — 11-26-90 Date
Nuclear Materials Safety Branch

Inspection Summary

Inspection on November 14, 1990, (Report No. 030-12208/90-001(DRSS))
Areas Inspected: This was an announced special safety inspection to review the facts surrounding a reported 111.4 rem exposure to a radiographer's left hand. The inspection included a reenactment of the events leading to the reported exposure; a review of the individuals training; exposure history; notifications and reports.
Results: In the areas inspected, six (6) apparent violations were identified: (1) 10 CFR 20.101(a) - failure to maintain an individual's quarterly extremity exposure below 18.75 rem (Section 4); (2) 10 CFR 20.201(b) - failure to make a reasonable evaluation of an individuals extremity exposure (Section 4); (3) 10 CFR 20.403(b)(1) - failure to notify the NRC within 24 hours of an event that caused or threatened to cause an exposure exceeding 75 rem to the

9012040138 7pp

extremity (Section 4); (4) 10 CFR 34.43(B) - failure to perform a survey to determine if the sealed source had been returned to the shielded position (Section 4); (5) 10 CFR 34.22(a) - failure to secure the exposure device after the sealed source was returned to the shielded position (Section 5); (6) - License Condition No. 17 - failure to insert the safety plug after the source guide tube was removed from the exposure device (Section 5).

DETAILS

1. Persons Contacted

*Mike Thompson, Manager and Radiation Safety Officer
*Merrill Miller, Assistant Manager
*Brian Babbs, Assistant Radiographer

*Attended the exit interview.

(NOTE: The radiographer involved in the following incidents no longer works for Industrial NDT. His employment was terminated November 1, 1990, and he was not available for interview during this special inspection.)

2. Scope of Licensed Activities

NRC License No. 13-06147-04 authorizes Industrial NDT Services Division to perform industrial radiography at any location in the United States where NRC maintains jurisdiction for regulating the use of licensed material. Currently, License Amendment No. 05 authorizes no single source to exceed 100 curies to be used in Gamma Industries Model Century SA exposure devices for industrial radiography and in Gamma Industries Model C-4 or C-10 source changers for storage and replacement of sources. Industrial NDT currently employees five full time radiographers and two full time assistant radiographers. Industrial NDT also uses two trucks to transport radiographic devices to temporary job sites.

3. Enforcement History

a. Routine Safety Inspection: June 15, 1990

Result: Form 591 issued in the field.

Comment: No violations were identified.

b. Routine Safety Inspection: January 25, 1989

Result: Form 591 issued in the field.

Comment: One violation was issued for failure to perform quarterly audits of radiographs and assistants.

4. Event on September 12, 1990

On Wednesday, September 12, 1990, an Industrial NDT radiography crew consisting of one radiographer and one assistant radiographer was performing radiography at Major Tool and Machine Company located in Indianapolis, Indiana. At approximately 8:00 p.m. (four hours into the shift) the radiographer completed an exposure on a weld joint when he

approached the camera which was located on a ladder step approximately six feet off the ground. The radiographer while holding the crank control mechanism in the right hand attempted to push the lock plunger down to the secured position. The plunger would not move to the secure position. When the radiographer attempted again to push the plunger down, the camera started to tilt off of the ladder. To keep the camera from falling off the ladder, the radiographer grabbed the guide tube at the port window to balance the camera. The radiographer called the assistant for help. As the assistant approached the scene, he noticed that his survey instrument was off-scale. When the assistant informed the radiographer that the survey instrument was off-scale, the radiographer backed away approximately 10 feet to straighten the control cable and turned the crank approximately 1/3 of a turn. At this point, the assistant radiographer's survey instrument read normal. According to the assistant radiographer, the radiographer failed to perform a survey of the camera and guide tube to assure the source was in the shielded position. 10 CFR 34.43(b) requires a survey with a calibrated and operable survey instrument is made after each exposure to determine that the sealed source has been returned to its shielded position. <u>The licensee's failure to survey the exposure device and guide tube after a radiation exposure is an apparent violation of 10 CFR 34.43(b)</u>.

After the radiographer confirmed that the source was now in the safe shielded position, the radiographer and assistant checked their pocket dosimeters. The radiographer's dosimeter read 60 millirem and the assistant's dosimeter read 5 millirem. The radiographer notified the RSO of the incident and reported the results of the dosimeter readings. Even though the dosimeter was not off-scale, the RSO had the radiographer's film badge processed the next day. The film badge showed a dose of 120 millirem for the first two weeks of September 1990. After discussion with the radiographer concerning the incident, the RSO calculated that at most, the left hand of the radiographer received a radiation dose of 5.5 rem. The RSO submitted a brief description of the incident as well as his evaluation of the extremity exposure to the NRC Region III in letter dated October 1, 1990. The NRC Region III received this report on October 4, 1990. (See Attachment A) Upon review of this report by Region III personnel, a mistake in the RSO's calculation was identified. The RSO was notified by Region III of the apparent mistake and the RSO was requested to reevaluate the exposure to the radiographer's hand. 10 CFR 20.201(b) requires that each licensee make such surveys as may be necessary to comply with the requirements of Part 20 and which are reasonable under the circumstances to evaluate the extent of radiation hazards that may be present. As defined in 10 CFR 20.201(a) "survey" means an evaluation of the radiation hazards incident to the production, use, release, disposal, or presence of radioactive materials or other sources of radiation under a specific set of conditions. <u>The licensee's failure to make a reasonable evaluation of the radiographer's hand exposure is an apparent violation of 10 CFR 20.201(b)</u>.

On October 25, 1990, the NRC Region III office received the licensee's corrected evaluation of the exposure reporting a 111.4 rem dose to the left hand. (See Attachment B) 10 CFR 20.403(b)(1) requires each

licensee to within 24 hours of discovery of an event, report to the Commission any event involving licensed material that may have caused or threatens to cause an exposure to the extremity of 75 rem or more of radiation. The licensee's failure to make a 24 hour report to the Commission concerning an event that caused or threatened to cause an extremity dose of 75 rem or more is an apparent violation of 10 CFR 20.403(b)(1). 10 CFR 20.101(a) states that no licensee shall possess, use, or transfer licensed material in such a manner as to cause any individual in a restricted area to receive in any period of one calendar quarter from radioactive material and other sources of radiation a total occupational dose to the extremities in excess of 18.75 rem. The licensee's failure to maintain a radiation worker's extremity dose to less that 18.75 rem is an apparent violation of 10 CFR 20.101(a).

According to the RSO, this incident was discussed with radiography personnel at Industrial NDT as well as with the radiographer involved in the incident. The radiographer involved in this incident was also given a written reprimand warning that any future serious radiation safety violation would result in employment termination.

Four apparent violations of NRC requirements were identified.

5. Event on October 31, 1990

At approximately 8:30 p.m. on October 31, 1990, the same radiographer and assistant were working at the Marathon Refinery in Indianapolis, Indiana. Upon completion of one set of radiographs on a weld site, the radiographer removed the source guide tube so that the guide tube and stand could be moved into position for the next set of radiographs at the next weld site. He then moved the camera in place when he was called away from the camera setup to discuss film placement on the pipe. When the radiographer returned to the area of the camera, he walked over to the control cable and moved the source to the exposed position. The radiographer notice that the crank turned more turns than normal. Normally for a seven foot guide tube, approximately five turns is required to place the source in the source collimator. The radiographer realized that something was wrong and retracted the source. However, at some point, the pigtail to which the sealed source is connected had already disconnected from the control cable. According to the assistant radiographer, he was told by the radiographer to maintain surveillance around the area while the radiographer called the RSO to report the disconnect. After arriving onsite, the RSO placed a 1/4 inch thick lead sheet on top of the source and retreated to a safe position to evaluate worst case exposure under a certain set of assumptions. The RSO determined that he could reconnect the source and retract the source to the safe shielded position without serious radiation exposure to the whole body or extremity. The reconnection of the source pigtail went without further incident. The individuals all checked their dosimeters which read as follows; RSO was 35 millirem, radiographer was 20 millirem and the assistant radiographer was 40 millirem.

According to the assistant radiographer, the radiographer did not lock the camera after the previous exposure. 10 CFR 34.22(a) requires that during radiographic operations, the sealed source assembly shall be secured in the shielded position each time the source is returned to that position. The licensee's failure to secure the assembly each time the source was returned to the shielded position is an apparent violation of 10 CFR 34.22(a). Also according to the assistant radiographer, the radiographer did not insert the source safety plug in the camera after the source guide tube was disconnect from the camera. License Condition No. 17 which references NDT-20 (11.1)(7) requires that upon completion of the last radiographic exposure, disconnect the source tube and insert the safety plug. The licensee's failure to insert the source safety plug after removing the source guide tube is an apparent violation of License Condition No. 17.

The radiographer's employment with Industrial NDT was terminated shortly after this incident.

Two apparent violations of NRC violations were identified.

6. Training

During this special inspection, the inspector reviewed the radiographer and the assistant radiographer's training and experience.

The radiographer was employed by Industrial NDT since November 6, 1989. He came to Industrial NDT as a trained and experienced radiographer since 1984. On November 16, 1989, the RSO conducted a six hour retraining session with the radiographer covering radiation safety and operating and emergency procedures. Upon completion of the training, the radiographer was given two written examinations and a practical examination. The radiographer received a 95% and 91% on the written examinations and 100% on the practical.

The assistant radiographer has been employed by Industrial NDT since July 24, 1989. He came to Industrial NDT with no training or experience in radiography. The assistant has been given 15 hours of training in radiation safety and operating and emergency procedures and passed the written examination with a 100% score. The assistant also completed a 40 hour course in the Fundamentals of Radiography in June 1990 presented by MOS. He passed the required examination with an 86%. The assistant has also received further training by Industrial NDT and has passed the written assistant radiographers examination with a grade of 100% and received an 85% on the practical examination.

No violations of NRC requirements were identified.

7. External Dosimetry for 1990

Industrial NDT Services uses NRC Form 4 for all their radiographers and radiographer assistants which allows a maximum annual dose up to 12 rem and a maximum quarterly dose up to 3 rem in accordance with

10 CFR 20.101(b). The NRC Form 4 of the radiographer involved in the September 12, 1990, incident shows an accumulated occupational dose of 4.5 rem for the period of July 1984 to July 1987. Therefore this individuals calculated permissible dose is 60.5 rem. The radiographer's quarterly 1990 doses are as follows:

1st quarter	2nd quarter	3rd quarter	4th quarter
500 millirem	260 millirem	600 millirem	No total to date

The NRC Form 4 of the assistant radiographer involved in the September 12, 1990, incident shows no accumulated occupational dose since this individual never worked with radioactive material. Based on the age of this individual, his permissible accumulated dose is 25 rem. The radiographer's assistant quarterly 1990 doses are as follows:

1st quarter	2nd quarter	3rd quarter	4th quarter
300 millirem	40 millirem	120 millirem	No total to date

These whole body doses appear to be well within the specified limits of 10 CFR 20.101.

8. Exit Meeting on November 14, 1990

The inspector met with the those individuals denoted in Section 1 of this report at the conclusion of the inspection. A lengthy discussion was held concerning the facts learned from the reenactment of the incidents and interviews with the assistant radiographer. A discussion was also held concerning the NRC enforcement policy. The Radiation Safety Officer was informed of the apparent violations identified and that the NRC staff may notify Industrial NDT Services management to make arrangements for an enforcement conference to discuss these matters in the near future.