U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 030-20787/87-001

Docket No. 030-20787

License No. 29-21452-01 Priority 1 Category C1

Licensee: Consolidated NDE, Incorporated
6 Woodbridge Avenue
Woodbridge, New Jersey 07095

Facility Name: Consolidated NDE, Incorporated

Inspection At: Woodbridge, New Jersey and Port Reading, New Jersey

Inspection Conducted: June 10, 1987

Inspectors: for F. Costello, Senior Health Physicist — 6/26/87 date signed

for E. Ullrich, Health Physicist — 6/26/87 date signed

Approved by: J. Kinneman, Chief, Nuclear Materials Safety Section A — 6/26/87 date signed

Inspection Summary: Special safety inspection on June 10, 1987 (Report No. 030-20787/87-001)

Areas Inspected: Unannounced, special inspection of the circumstances pertaining to an incident which resulted in the inadvertent entry of several non-radiation workers into a high radiation area. The inspection included a review of the incident, NRC notification, personnel dosimetry records, inspection and maintenance records, training and qualification of personnel, utilization logs, and interviews with both licensee and non-licensee personnel.

Results: Two violations were identified: (1) failure to adequately maintain direct surveillance of high radiation area during radiographic operations (Section 4) and (2) failure to post high radiation area (Section 4).

DETAILS

1. Persons Contacted

*Bruce Ballard, Radiation Safety Officer
Dan Williams, Radiographer
Jim Geaslin, Radiographer
*Carl Frazee, Vice-President
John Edmunds, Safety Manager, Chicago Bridge and Iron Company

In addition, two other Chicago Bridge and Iron workers were also interviewed.

*Indicates those present during exit interview

2. Organization and Scope

Consolidated NDE has its home office in Woodbridge, New Jersey and maintains field offices in Charlotte, North Carolina and Atlanta, Georgia which operate under licenses from the Agreement State in which each is located. The licensee also has radiographers permanently stationed in Connecticut and West Virginia who have their offices in their residences and store their sources in their trucks. The size of the licensee's radiographer work force is seasonal, and varies from approximately 30 in the winter to approximately 100 in the summer.

Mr. J. Lee Ballard is the President of Consolidated NDE. Mr. C. J. Williams is the Vice-President. Mr. Bruce Ballard is the Radiation Safety Officer. There are also Assistant Radiation Safety Officers at the licensee's offices in North Carolina, Georgia, West Virginia, Connecticut, and at the Woodbridge, New Jersey offices.

3. Notification of NRC

On Monday, June 8, 1987, the licensee contacted NRC Region I to report that several employees of Chicago Bridge and Iron Company may have accidently gained access to the high radiation area at a radiographic field site in Port Reading, New Jersey. The licensee representative said that there were four individuals involved and that they were not radiation workers. The licensee estimated the maximum dose to the individuals to be 208 millirems. In addition, there was uncertainty as to exactly when the individuals were in the area of the radiographic exposure, so that it was possible that no actual dose had been received. The licensee said the incident had occurred on Friday, June 5, 1987 at approximately 6 p.m.

4. Interviews with Personnel

A. Radiographers

The inspectors interviewed the two radiographers who were involved in the incident. The interviews took place at both the licensee's office in Pennsauken, New Jersey and at the field site in Port Reading, New Jersey, where the radiographers showed the inspectors the area where the incident had occurred. The radiographers provided the following description of the incident.

The radiographers said that they were working at the Hess Refinery in Port Reading, New Jersey on a project which was under the direction of Chicago Bridge and Iron Company. The radiographers had been given the shift change time of 5:15 p.m. - 6:00 p.m. to make radiographic exposures on a valve in 68-inch flue gas line located about 40 feet above ground level. The exposure was planned for 22 minutes with a 97-curie iridium-192 radiographic source. They said that they had begun to prepare for the exposure at approximately 4:30 p.m. by setting up the film. No collimation was used by the radiographers because they were performing a panoramic exposure. The exposure was set up such that the exposure device and guide tube were inside the pipe which was being radiographed. The device drive cable extended through a manway in the pipe to a location outside and just under the pipe where one of the radiographers was located. The other radiographer was at the ground level and established the restricted area with ropes and signs which were around the tower where the work was being performed. The three ladders which provided access to the work area from ground level were roped off and posted. Postings were also made at the tops of these ladders at the level of the radiography work area.

While one radiographer exposed the source, the other radiographer, at ground level, observed the ladders which were considered to be the normal means of access to the radiography work area. Shortly after the exposure began, the radiographer at ground level observed four individuals walking on the outside of the roped-off area. They approached the radiographer and inquired whether radiography was in progress. The radiographer at ground level then contacted the other radiographer and directed him to retract the source into the exposure device. The radiographers then questioned the individuals and determined that the closest approach to the radiography work area was within eleven feet of the source for approximately 3-4 minutes. They also attempted to determine how long it would have taken the four individuals to climb down from the radiography work area to ground level. Based on a re-enactment, the radiographers concluded that it had taken 4-5 minutes to climb down and that, because the radiographic source had not been exposed that long, the individuals may have left the radiographic work area before the source was actually exposed. The radiographers stated that the four individuals had climbed to the

work area from an adjacent tower via a nearby temporary scaffold and that no signs or ropes had been used on that scaffold because it had not been recognized as a possible access path into the radiography work area.

Subsequent to the incident, the radiographers stationed a Chicago Bridge and Iron employee on the adjacent tower to maintain surveillance of the path which had been used to gain access to the radiography work area. The radiographers then completed the radiographic planned exposure.

B. Chicago Bridge and Iron Employees

The inspectors interviewed two of the Chicago Bridge and Iron (CBI) employees who were involved in the incident and the CBI safety manager. These individuals confirmed the description of the incident which had been provided by the radiographers. They added that the path to the radiography work area was, for them, the normal means of travelling from one tower to the other. The two individuals involved stated that they did not approach the source to a distance closer than that described by the radiographers. They said that one of the four individuals had remained even further back on the scaffolding away from the source than had the other three. They said that they left the radiography work area when they did because one of them recalled seeing the radiographers setting up the radiographic exposure earlier. They stated that when they had climbed down from the tower, they approached the radiographer who was in his truck and that this radiographer when asked, did not know whether the source had been exposed or not.

The finding that the radiographers failed to maintain direct surveillance of the radiography operation to protect against possible unauthorized entry into the high radiation area represents an apparent violation of 10 CFR 34.41.

The finding that the radiographers failed to post the entrance from the scaffolding to the high radiation area with a "Caution-High Radiation Area" sign represents an apparent violation of 10 CFR 20.203(c)(1).

5. Dose Evaluation

Although it is apparent that the four CBI employees had access to the high radiation area, there is some uncertainty from both the statements of the radiographers and the CBI employees themselves whether the CBI employees were actually present in the radiography work area when the source was exposed. However, under the assumption that these employees were in the area when the source was exposed, the inspectors calculated the maximum dose to these individuals as follows:

1. Activity of Source: 97 curies of iridium-192
2. 5.9 rem per hour is the dose rate at one foot from a one-curie iridium-192 source
3. Distance from source: 11 feet
4. Maximum time of exposure: 4 minutes

Under these assumptions, the inspectors calculated the maximum dose received by the CBI employers to be 315 millirems, which is consistent with the evaluation of the licensee.

6. Training

The inspectors reviewed the training records for the two radiographers involved in the incident. These records indicated that the individuals had received the initial training and periodic re-training required by the license.

No violations were identified.

7. Personnel Monitoring

The inspectors reviewed the licensee's records of personnel monitoring for 1987. They noted that there were several examples of individuals receiving is excess of 1.25 rem, but less than 3 rem, in a calendar quarter. The inspectors noted that the licensee maintained properly completed NRC-4 forms for each of these individuals.

No violations were identified.

8. Licensee Audits

The inspectors reviewed records of audits of radiographer performance which had been made by the licensee. They noted that the records indicated that each of the radiographers involved in the incident had been audited as required by the license.

No violations were identified.

9. Inventory of Sources

The inspectors reviewed the licensee's records of its inventories of radiography sources. These records indicated that source inventories were being performed as required on a quarterly basis. They selected one source, which the records indicated as being at the Woodbridge, New Jersey facility, and verified that it was in storage as expected.

No violations were identified.

10. Exit Interview

The inspectors met with the individuals indicated in Paragraph 1 at the conclusion of the inspection and described the scope and findings of the inspection.