



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005**

August 7, 2006

NDT Repair Service and Supply, Inc.
Attn: Mr. Brian Bellard, President
7874 Hwy 90 East
Morgan City, Louisiana 70380

SUBJECT: NRC INSPECTION REPORT 999-90004/06-002

Dear Mr. Bellard:

This refers to the special inspection conducted on June 7, 2006, at your facility located in Morgan City, Louisiana. The purpose of the inspection was to follow up on a 10 CFR Part 21 Report of Defect and Noncompliance issued to NRC by your company on May 22, 2006. The inspection was performed to determine the causes of the reported defect with associated equipment that is used by NRC licensees in the performance of industrial radiographic operations. Within these areas, the inspection consisted of a selected examination of records, observation of activities, and interviews with personnel. The preliminary inspection findings were discussed with you at the conclusion of the onsite portion of the inspection. After the onsite inspection additional review was conducted in the NRC Region IV office. A final exit meeting was then conducted telephonically with you on August 3, 2006. The enclosed report presents the results of this inspection.

Based on the results of the inspection, it was determined that the defects existing in the associated equipment distributed from your company were responsible, in part, for two events involving industrial radiographic source misconnects, which resulted in the inability of licensees to retract a source of radiation back to the shielded position within the radiographic exposure device. However, the requirements of 10 CFR 21.21 were met, and no violations or deviations were identified; therefore, no response to this letter or the enclosed report is required.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

/RA/

Leonard D. Wert, Director
Division of Nuclear Materials Safety

Docket No.: 999-90004
Enclosure: NRC Inspection Report 999-90004/06-002

cc w/Enclosure: Louisiana Radiation Control Program Director

bcc w/Enclosures 1-2 (via ADAMS distrib):

LDWert

CLCain

VHCampbell

JEWhitten

JPJankovich

JLThompson

KEGardin

NMIB File

RIV File (5th Floor)

SUNSI Review Completed: JLT

ADAMS: ☒ Yes ☐ No Initials: JLT

☒ Publicly Available ☐ Non-Publicly Available ☐ Sensitive ☒ Non-Sensitive

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ENCLOSURE

U.S. Nuclear Regulatory Commission
Region IV

Docket No.:	999-90004
Report No.:	999-90004/06-002
Company:	NDT Repair Service and Supply, Inc.
Location:	7874 Hwy. 90 East Morgan City, Louisiana
Date:	June 7, 2006
Inspectors:	John P. Jankovich, Ph.D., Team Leader NMSS, IMNS, MSIB James L. Thompson, Health Physicist RIV, DNMS, NMIB
Approved By:	Vivian H. Campbell, Chief RIV, DNMS, NMIB
Enclosure:	Supplemental Inspection Information

EXECUTIVE SUMMARY

NDT Repair Service and Supply, Inc.
NRC Inspection Report 999-90004/06-002

This was an announced inspection of activities associated with two 10 CFR Part 21 reports of defect and noncompliance submitted by Team Industrial Services, Inc. and NDT Repair Service and Supply, Inc. (NDT), regarding NDT's distribution of defective associated equipment. These items of associated equipment, specifically drive assemblies, contained defects that were responsible, in part, for two industrial radiography source misconnect events that occurred on April 18, 2006, and May 24, 2006. The inspection consisted of reviews of design drawings for the NDT control drive assemblies, as well as interviews with the NDT representative responsible for these designs. The report of defect and noncompliance from NDT was submitted to the NRC on May 22, 2006.

Program Overview

NDT is a repair and supply company whose services include providing industrial radiography companies with associated equipment for use with industrial radiographic exposure devices. NDT does not, however, manufacture the specific components of the associated equipment. The individual components are fabricated by outside vendors and sent to NDT, and NDT assembles the components and distributes the associated equipment to radiography companies nationwide. (Section 1)

Inspection Findings

NDT was found to have altered the dimensions of the drive cable backstop used in the control drive assemblies associated with two misconnect events that occurred in April and May of 2006. Specifically, NDT distributed a batch of drive cable assemblies which had the depth of the backstops altered on each drive assembly adapter, which allowed the drive cable to be retracted too far into the adapter. This allowed the control drive assembly to be connected to the industrial radiographic exposure device without the required connection of the drive cable to the source assembly, which does not meet the provisions of the standards found in ANSI N432-1980. This in turn allowed the sealed source to be pushed out of the exposure device without a means for the source to be retracted. (Section 2)

Corrective Actions

Both short term and long term corrective actions were taken by NDT. The short term corrective actions included an immediate notification of affected radiography companies and a recall of all potentially defective control drive assembly adapters. The long term corrective actions included institution of a final QA check by NDT personnel to ensure adherence to the standards found in ANSI N432-1980. (Section 3)

REPORT DETAILS

1. Program Overview (87103)

1.1 Inspection Scope

The inspectors reviewed records maintained by NDT Repair Service and Supply, Inc. (NDT), and held interviews with NDT personnel concerning the ordering, assembly, and distribution of associated equipment used in the performance of industrial radiography operations.

1.2 Observations and Findings

NDT is a repair and supply company whose services include providing industrial radiography companies with associated equipment for use with industrial radiographic exposure devices. NDT does not, however, manufacture the specific components of the associated equipment. The individual components are fabricated according to NDT's design specifications by outside vendors and sent to NDT. NDT assembles these components and distributes the associated equipment to radiography companies nationwide.

2. Inspection Findings (87103, 87121)

2.1 Inspection Scope

On June 7, 2006, the NRC dispatched inspectors to NDT's facility in Morgan City, Louisiana, in an effort to determine the cause of the defects associated with the NDT control drive assemblies, and the corrective actions taken by NDT to prevent recurrence. The inspection included a review of the complete set of drawings for the control drive assembly components, concentrating on the critical dimensions of the control assembly adapters. The inspectors also reviewed the ANSI standards (ANSI N432-1980) applicable to the construction of industrial radiographic exposure devices and associated equipment, and held interviews with NDT personnel regarding the assembly and quality assurance testing of the control drive assemblies prior to distribution.

2.2 Observations and Findings

On April 18, 2006, the NRC Operations Center was notified of a source disconnect event (later determined to be a misconnect event) involving the use of an AEA Model 660B exposure device by Team Industrial Services, Inc. (TIS), an NRC licensee. The direct cause of this event, as determined by a subsequent NRC reactive inspection (Inspection Report 030-35252/06-001), was that the drive cable was not connected to the source assembly during the connection of the control drive assembly to the exposure device, and the radioactive source was pushed out of the exposure device with no means to retract it. The drive assembly in use was distributed by NDT for use with AEA Model 660B and AEA Model 880B exposure devices. On May 8, 2006, NDT was notified by TIS of an equipment failure involving the NDT control drive assembly in

use during the April 18 source misconnect event. In response to this notification, NDT performed an internal investigation and issued a 10 CFR Part 21 Report of Defect and Noncompliance to the NRC on May 22, 2006.

An additional source misconnect event occurred on May 24, 2006, and involved the Metco radiography company (License Number LA-8043-L01) in Sulphur, Louisiana. The State of Louisiana's Department of Environmental Quality investigated this event, as documented in Inspection Report Number 39098, and determined that the cause of the event was attributed to the use of a defective drive assembly adapter purchased from NDT. It was later determined that this adapter was one of the 25 defective adapters that were recalled by NDT. Metco representatives stated that they had received the recall letter the day of the source misconnect event, and had not had time to take the defective adapter and drive assembly out of service prior to the event.

NDT made available to the inspectors a complete set of design drawings which were originated in 1994 and 1995. The basic components of the drive assembly design are identical for all three makes of radiography exposure devices marketed in the U.S. (AEA, SPEC, and INC); however, to be able to connect to the different makes of exposure devices, the NDT drive cables were designed with specific connectors to match the face plates of the different exposure devices. The inspectors reviewed the design drawings, and concentrated on the design of the connector, called "Control Assembly Adaptor" (NDT drawing No. 141101, Rev. 0) for the Model AEA-QSA 660B exposure device which was involved in the TIS misconnect event, as well as the misconnect event involving the Metco radiography company. The design, as specified in the drawing, complies with the applicable standards in ANSI N432-1980, Section 6.1.4.

The inspectors also reviewed changes made by NDT since the original design. The NDT representative stated that there was only one design change since the start of production of the drive assemblies. That design change, however, involved the material that composed the crank handle and, thus, was not related to the component which caused the misconnect events. The inspectors confirmed that the control assembly adaptor design had not been changed since production started in 1994.

NDT's in-house production consists of assembling components of associated equipment supplied by various outside vendors. The inspectors reviewed the quality assurance (QA) measures that are to be performed by NDT during the fabrication process. NDT is to conduct a complete inspection of all machined components received from vendors for dimensional compliance with the design specifications. Final inspection and operational testing of the drive assemblies are conducted by NDT prior to distribution, which includes performing crank-out/crank-in tests without connecting the drive assemblies to an exposure device.

The inspectors reviewed all purchase orders to vendors, NDT receipt records for components, as well as sales records to customers for the control assembly adaptor from the present time back to 1998. The records were readily available in either hard copy form or found in electronic data bases. The inspectors also conducted dimensional measurements, similar to the receipt QA inspections conducted by NDT, on

the stock of adaptors available at the facility at the time of the inspection, and found the results to be in agreement with NDT's records.

Based on reviews of the fabrication process and the records of QA testing, the inspectors confirmed the conclusions of NDT's internal investigation and its root cause analysis. Specifically, the inspection team confirmed the following:

- C The source misconnect events resulted from a dimensional non-compliance of the control drive assembly adaptor with the design specifications as shown on design drawing No. 141101, Rev. 0. The drawing specified a depth of 1.000 \pm 0.005 inches for the drive cable backstop. However, one order of 25 units (Purchase Order No. 02400, shipped on November 12, 2003) contained 9 units that were received out of tolerance, as shown in NDT's receipt inspection QA record dated November 13, 2003, with a shorter backstop than specified in the design drawing. NDT reworked (repaired) the 9 units by attempting to drill the backstops to the proper depth, built the reworked adaptors into drive assemblies, and distributed them to area radiography companies. NDT's root cause analysis determined that this rework procedure resulted in a deeper than specified seat for the backstop. This allowed the drive cable to be cranked into the drive assembly too far and, thus, allowed the exposure device to be connected to the drive assembly without actually connecting the drive cable to the source assembly. This was responsible, in part, for the two radiography source misconnect events mentioned in this report.
- C This problem was limited only to those control assembly adaptors that were built for AEA Model 660B and 880B radiography exposure devices.
- C The number of units affected was limited to 9 out of the 25 units in one lot (Purchase Order No. 02400).
- C The number of customers (six companies) who purchased the defective drive assemblies were correctly identified by NDT in their 10 CFR Part 21 Report of Defect and Noncompliance dated May 22, 2006.
- C The NDT QA measures are sufficient to assure compliance with the design specifications and the provisions of ANSI Standard N432-1980, as the past operational history of the design had shown. However, the inspection determined that the QA measures were not sufficiently applied after NDT's rework of the components.

2.3 Conclusions

NDT's root cause analysis correctly identified the cause of the failure and the scope of the problem. NDT's corrective actions, such as notifying the customers/licensees to take the affected drive assemblies out of service immediately, are sufficient to ensure compliance with the design specifications and the requirements of ANSI N432-1980 for the units that have been distributed to the present time.

NDT's QA program is not regulated by the NRC and was only reviewed as part of the investigation of the root cause of the failure. In this sense, the inspectors determined that the QA measures performed by NDT for receipt of the fabricated adaptors (to check that the components meet the specifications of the design drawings) were not applied after NDT reworked the components. Had these QA checks been performed after the rework, as during the initial receipt from the vendor, NDT may have discovered that the backstops were drilled too deep. This discovery, then may have prevented the two source misconnect events.

3. Corrective Actions (87103)

NDT became aware of the first source misconnect event by receiving a telephonic report about the failure on May 8, 2006, from TIS. In response, NDT conducted a root cause analysis, identified the defect, and notified the customers who received the drive assemblies fabricated with the adaptors from the affected lot. NDT advised them to stop using the drive assemblies, and to take them out of service permanently. The NDT recall extended to all 25 units of the lot that contained the nine defective units. The extended recall to cover the entire lot was necessary because the control assembly adaptor pieces are not individually marked or traced by serial numbers, and NDT personnel could not determine which of the 25 adaptors had been drilled out.

The inspectors confirmed that NDT also notified the customers of the affected drive assemblies in writing. The NDT notification letters were issued to TIS on May 15, 2006, and to the other five customers on May 24, 2006. The notification letters announced a recall, described the failure, identified the serial numbers of the affected drive assemblies, and advised the customers to take them out of service immediately and to return them to NDT for replacement. NDT filed an equipment failure report with NRC, dated May 22, 2006, in accordance with the requirements of 10 CFR 21.21.

4. Exit Meeting Summary (87103)

A preliminary site exit meeting was conducted with the President of NDT at the conclusion of the onsite inspection on June 7, 2006, pending further review of potentially related source misconnect events. A final telephonic exit meeting was conducted with the President of NDT on August 3, 2006, to review the findings of this report, and to discuss an additional source misconnect event associated with a defective NDT adaptor that was undiscovered at the time of the preliminary exit meeting.

ENCLOSURE

PARTIAL LIST OF PERSONS CONTACTED

Company

Brian Bellard, NDT President # *

personnel present at the inspection entrance

* personnel included in telephone exit

INSPECTION PROCEDURES USED

87121 Industrial Radiography Programs

87103 Inspection of Materials Licensees Involved In An Incident or Bankruptcy Filing

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS USED

ANSI	American National Standards Institute
NRC	Nuclear Regulatory Commission
NDT	NDT Repair Service and Supply, Inc.
INC	Industrial Nuclear Corporation
SPEC	Source Production and Equipment Company
TIS	Team Industrial Services, Inc.
QA	Quality Assurance