



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555 - 0001**

August 20, 2003

Mr. Robert L. Moscardini, President
U.S. Tool & Die, Inc.
200 Braddock Avenue
Pittsburgh, PA 15145

**SUBJECT: NRC INSPECTION REPORT NO. 99901082/2003-201 AND NOTICE OF
NONCONFORMANCE**

Dear Mr. Moscardini:

This refers to the inspection conducted July 7-10, 2003, at your facility at Pittsburgh, Pennsylvania. The purpose of the inspection was to review the implementation of your quality assurance program associated with the fabrication of spent fuel racks in the areas of welding, weld rod control, visual and nondestructive examination (NDE), and NDE personnel qualification records. The enclosed report presents the results of this inspection.

During this inspection it was found that the implementation of your quality assurance (QA) program failed to meet certain requirements for direct visual examination of welds. Specifically, visual weld inspections for the upper water gap joint welds were not performed in accordance with your approved visual weld inspection procedure. The findings and references to the pertinent requirements are identified in the enclosures of this letter.

You completed corrective actions prior to the end of the NRC inspection and therefore no response is required to address the nonconformance.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures 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/

Theodore R. Quay, Chief
Emergency Preparedness & Plant Support Branch
Division of Inspection Program Management
Office of Nuclear Reactor Regulation

Docket No.: 99901082

Enclosures: Nonconformance
Inspection Report 99901082/2003-201

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Accession Number: ML032340008

OFFIC	IEHB:DIPM	SC:IEHB:DIP	BC:IEHB:DIP
NAME	KNaidu	DFThatcher	TRQuay
DATE	8/20/03	8/20/03	8/20/03

OFFICIAL RECORD COPY

NOTICE OF NONCONFORMANCE

U.S. Tool & Die, Inc.
Pittsburgh, Pennsylvania

Docket No. 99901082
Report No. 2003201

Based on the results of the Nuclear Regulatory Commission inspection conducted July 7-10, 2003, of activities supporting the fabrication of spent fuel racks and related equipment, it appears that one of your activities was not conducted in accordance with NRC requirements.

Criterion V, "Instruction, Procedures, and Drawings," of 10 CFR 50, Appendix B, states in part, that activities affecting quality be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and be accomplished in accordance with these instructions, procedures, and drawings. Instructions, procedures and drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

U.S. Tool & Die, Inc. Procedure CSP: 0025-5 Weld Visual Examination Procedure for KEPCO Ulchin 5 & 6, Revision 0, requires, in part, that weld inspections be performed "when access is sufficient to place the eye within 24 in. of the surface to be examined and at an angle not less than 30 deg. to the surface examined."

Contrary to the above, the NRC inspector observed a U.S. Tool & Die, Inc. QC inspector inspecting welds on the surface of a spent fuel rack at an angle less than 30 degrees to the surface examined. The surface of the welds being visually inspected was located above the inspector's head at the top water gap joints (the highest location on the fuel rack) on the fuel rack, and could not be inspected at an angle less than 30 deg. to the surface examined. (99901082/2003201-01)

A written statement or explanation to this Notice of Violation is not required because U.S. Tool & Die took necessary actions to correct the nonconformance before the conclusion of the inspection.

Issued this 20th day of August 2003
at Rockville, Maryland.

Enclosure 1

**US NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
DIVISION OF INSPECTION PROGRAM MANAGEMENT
EMERGENCY PREPAREDNESS AND PLANT SUPPORT BRANCH
QUALITY ASSURANCE AND MAINTENANCE SECTION**

INSPECTION REPORT

ORGANIZATION: U.S. Tool & Die, Inc.
200 Braddock Avenue
Pittsburgh, PA 15145

DOCKET: 99901082

REPORT NO: 99901082/2003-201

ORGANIZATIONAL CONTACT: Christopher Srock, Vice President

NUCLEAR ACTIVITY: Fabricators of Spent Fuel Racks
And Spent Fuel Casks

INSPECTION LOCATION: 200 Braddock Avenue
Pittsburgh, PA 15145

INSPECTION DATES: July 7-10, 2003

INSPECTORS: Peter A. Balmain, Reactor Operations Engineer, Quality
and Maintenance Section (QMS)
Kamalakar R. Naidu, Senior Reactor Engineer, QMS

SUBMITTED BY: /RA/ Date: 8/19/03
Kamalakar R. Naidu

APPROVED BY: /RA/ Date: 8/20/03
Dale F. Thatcher, Chief
Quality and Maintenance Section
Emergency Preparedness and Plant Support
Division of Inspection and Program Management
Office of Nuclear Reactor Regulation

Enclosure 2

1 INSPECTION SUMMARY

The bases for this inspection were (1) Criterion V, "Instructions, Procedures, and Drawings," and Criterion X, "Inspection," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR Part 50, Appendix B), and (2) US Tool and Die Inc. (USTD) Quality Assurance Manual.

The inspection was conducted to review selected portions of the USTD quality assurance (QA) program and its implementation procedures and inspections associated with the fabrication of wet spent fuel storage racks.

The inspection identified one nonconformance in the area of failure to follow established procedures for direct visual weld examination. Visual weld inspections for the upper water gap joint welds were not performed in accordance with the vendors approved visual weld inspection procedure. However, because USTD completed action to correct the nonconformance before the completion of the inspection, no reply is required.

2. STATUS OF PREVIOUS INSPECTION FINDINGS

This was the first Office of Nuclear Reactor Regulation inspection conducted at this facility.

3. INSPECTION FINDINGS AND OTHER COMMENTS

3.1 Activities in Progress

USTD was fabricating one new fuel storage rack and several spent fuel storage racks and accessories for the Korean Electric Power Corporation (KEPCO), South Korea, intended for installation in its nuclear plants, Ulchin 5 and 6.

3.2 Review of Production Planning

Production Work Routing Plan (PWRP) is the traveler that is used to document the various operations that are performed to fabricate a spent fuel box. The operations consist of punching and welding fuel cell halves, QC inspection of fuel cell halves, fitting and tack welding the seams, welding the seam to form the spent fuel box, inspecting the fuel cell welds and assigning a fuel cell serial number.

Drawing 20025-204, Revision 3, shows the sizes and locations of the welds that have to be performed. To supplement the PWRPs, USTD prepares contract-specific procedures (CSPs) to augment the quality control requirements and to document additional information, such as the inspections performed. USTD uses Material Inventory Control (MIC) numbers to trace the material to the unique heat numbers of the material used in the fabrication.

3.2 Review of Corrective Action

Corrective Action Request (CAR) 111 was initiated on January 30, 2001, to address the issue of documents recently discovered in the quality control (QC) department that indicated that a QC inspector had supplied falsified qualification documents to USTD. As a result, correction action was taken to identify the components on which the individual performed liquid penetrant tests (PT), and to re-inspect a representative sample to ensure that the inspections he performed were adequate. All the qualifications of the remaining QC inspectors were reviewed to determine if there were similar instances. USTD contacted employers to validate the stated qualifications.

USTD reviewed the performance of this QC inspector and determined that he did receive on-the-job training in PT prior to his certification at USTD. He successfully passed the Level II Inspector written and practical tests administered by USTD. He had demonstrated competence and the ability to perform inspections during the probationary period at USTD and was retained as a skilled inspector. A record documenting a conversation between USTD and the manager where this QC inspector was previously employed indicated that the manager trained and certified this individual in PT and found the individual's work acceptable. USTD immediately re-inspected a representative sample of the items previously inspected by this individual during the six weeks he held a Level II PT certification and found no discrepancies. The NRC inspector reviewed USTD's re-examination of the inspections this QC inspector performed and determined that USTD's corrective action was satisfactorily. The inspector determined that it was not necessary for USTD to have notified the end users that they received indeterminate components because the components were inspected by this QC inspector, and that USTD satisfied the provisions of 10 CFR Part 21.

3.3 Review of QA Records

USTD utilizes Material Dedication Report and Quality Plan (MDR&QP) for raw material to document the materials used in the fabrication and spent fuel racks. The inspector reviewed the MDR&QP for partial release #6 for Material ASME S240 Type 304L sheets 0.197"x 13.179"x 180", 0.235"x 8.191"x 157.236", and 0.9"x 17.058"x 180." The MDR&QP lists the critical characteristics for dedicating the above commercial-grade purchased items. Northern American Stainless, Ghent, Kentucky, manufactured the 304 L type stainless steel (SS) sheets and provided certified material test reports (CMTRs). Ryerson Company, a distributor, shipped the sheets to USTD. Holtec, USTD's subcontractor, who procured the sheets from Ryerson, cut samples from the SS material and sent them to, MMA Laboratories /Stork Materials Technology, 2 Pheasant Run, Newton, Pennsylvania, and obtained independent CMTRs for them.

The inspector reviewed the documentation for MIC 4228 and determined that Ryerson supplied 799 pieces of .090"x36"x182" SS SA 240-340L material. North American Stainless, Ghent, Kentucky, the manufacturer of the steel supplied the CMTRs, and MMA Laboratories/Stork Materials Technology independently verified the characteristics. There were no discrepancies. The inspectors reviewed the CMTR for weld wire 308/308L manufactured by ARCO and supplied by Weldstar Company and determined it acceptable.

The inspector reviewed the welder qualification records of two individuals and found them acceptable. The inspector reviewed the qualification records of four NDE Level II inspectors and found three of them acceptable. USTD had had a problem with the fourth. He was terminated for furnishing forged documents to USTD. This issue is discussed in Paragraph 3.3 of this report.

3.4 Observation of Internal Weld Inspections

The inspectors observed the weld inspections performed at the multiple purpose canister (MPC) basket internal weld inspection station for Project 9925. At this station, remote inspection equipment consisting of the following is used to inspect the welds inside compartments:

- a. One color video monitor, 500 line resolution (or equivalent)
- b. One EMCO power/focus control unit (or equivalent)
- c. One inspection probe mounted with:
 - 1. Camera
 - 2. Light source-lamp or fiber optic, minimum 50 foot-candles at an inspection point
 - 3. Optical measuring system (line generated)

Before the QC inspector uses the equipment, he calibrates the inspection tool in the tool set-up standard 10-5H-1, which contains various indications and unwelded areas. This check verifies that the equipment is functioning properly. The QC inspector also verifies the line generator function for the optical measuring system and adjusts it. The camera used in this inspection is capable of magnifying the images up to 8 times on the screen. The results of the inspection are documented on an Visual Weld Inspection checklist with provisions for a QC inspector to document unacceptable welds and their locations with an initial sign off. After the welder repairs the weld, the QC inspector trains the camera to the area where the weld was repaired and verifies its acceptability before he signs off in the final inspection column.

3.5 Review of QC Visual Weld Inspections

a. Inspection Scope

The inspector reviewed the procedures and practices for USTD QC visual weld inspections with particular emphasis on visual weld inspections for wet fuel storage racks. The inspectors witnessed inspections of QC visual weld inspections for a Region I fuel rack being fabricated under PO PYC-P-9N224m for the Ulchin facility. The inspectors also reviewed Holtec and USTD visual weld inspection procedures.

b. Observations and Findings

Fabrication of the Ulchin Region I rack was nearing completion at the time of the inspection. Completed fuel cell boxes were being fitted and welded to the baseplate and water gap flat plates were being welded to join the fuel cell boxes together. All fabrication activities were tracked through the production work routing plan and performed using approved procedures and drawings.

While observing QC inspection of completed welds for cell locations 77, 78, 79 and 80, the NRC inspector identified a failure to comply with visual weld inspection procedure CSP,"0025-5 Weld Visual Examination Procedure for KEPSCO Ulchin 5 & 6, Revision 0". The procedure requires the QC inspector to view welds at an angle of not less than 30 degrees. Contrary to the requirement, the NRC inspector observed a QC inspector fail to utilize a bench in order to stand at a height that permitted him to inspect the weld within the 30-degree angle requirement. The welds being visually inspected were located above the inspector's head at the top water gap joints on the fuel rack. This is the highest location on the fuel rack. The NRC inspector informed USTD that failure to inspect in accordance with an approved weld inspection procedure was contrary to the requirements of 10 CFR 50, Appendix B, Criterion V.

The fuel rack is welded together vertically in an assembly fixture. Scaffold platforms are positioned completely around the fuel rack at an approximate height of 7-8 feet on the rack for access by welders and QC inspectors. The scaffold platform is accessed by a ladder from the shop floor. The top of the fuel rack is approximately 8-9 feet above the scaffold platform. To access the welds within the 30-degree cone inspectors must place a small bench approximately 1-2 feet high on the scaffold platform.

Following identification of this error, USTD initiated corrective action request CAR 221 to document the nonconformance. USTD took immediate corrective actions to require 100-percent reinspection of all of the upper water gap joint welds on the fuel rack, and retrained all QC inspectors on visual weld inspection requirements. Subarticle T-952 of the American Society of Mechanical Engineers (ASME) in Section 5, Article 9, "Visual Examination," states "Direct visual examination may be usually made when access is sufficient to place the eye within 24 in. of the surface to be examined and an angle not less than 30 deg. to the surface examined." Specifically, the word "usually" used in the ASME code was missing in the procedure. USTD also revised its visual weld inspection procedure to use the exact language of ASME Section 5, Article 9, Subarticle T-952 regarding direct visual examination.

c. Conclusions

During observation of QC visual inspection of water gap joints welds, the inspector identified one nonconformance related to visual weld inspections for the upper water gap joint welds not being performed in accordance with the vendor's approved visual weld inspection procedure. Accordingly, Nonconformance 99901082/03-01-01 with respect to Criterion V of 10 CFR 50, Appendix B, was identified in this area. USTD completed appropriate corrective actions for this issue prior to the end of the NRC inspection and, therefore, no vendor response is required. Nonconformance 99901082/200320-01 was identified.

3.6 Review of Completed QA Fabrication Records

a. Inspection Scope

The inspectors reviewed three documentation packages and Certificates of Conformance for wet spent fuel racks supplied to Duke McGuire nuclear plants to verify compliance with quality assurance requirements. The documentation packages were

identified as Holtec Doc Pack No: 1254-10011 Rev 0 - CoC No.: 0227-3 Rev 0, Holtec Doc Pack No: 1254-10012 Rev 0 - CoC, No.: 0227-4 Rev 0, Holtec Doc Pack No: 1254-10010 Rev 0 - CoC No.: 0227-2 Rev 0,

b. Observations and Findings

These fuel racks were assembled from prefabricated fuel cell boxes during the period March 2003 to May 2003. Each document package contains a fuel cell locator map and in-process weld inspection record. A weld inspection record is generated for each weld fabricated during assembly of the fuel rack. On the weld map, each weld is identified by fuel cell location or the water gap location. The weld records clearly provide a traceable record of the welder identification number, filler metal, QC inspector initials, and dates when the welds were inspected and accepted by QC.

c. Conclusions

The inspector determined that QA records associated with fuel rack assembly were complete and met NRC quality requirements.

4. List of Documents Reviewed

Holtec Procedures

HSP-201 Liquid Penetrant Examination Procedure.

USTD Procedures

Weld Procedure Specification (WPS) 4T, Revision II, Gas Tungsten Arc Welding [primarily for "V," "U" and "J" grooves with single, double, or compound bevel welds (to control heat input in accordance RG 1.44)]

WPS 52, Revision 14, Gas Tungsten Arc Welding (to control heat input in accordance with RG 1.44)

WPS 52, Revision 14, Gas Tungsten Arc Welding [primarily for square groove butt joints]

WPS-54, Revision 13, Gas Tungsten Arc Welding [primarily for lap joints where the spot penetrates through thinner member into backing member producing a 1/8" minimum nugget]

WPS 76, Revision 15, GMAW-Spray/Globular [primarily for "V," "U", and "J" groove with single, double or compound bevels, fillets and repairs]

CSP: 0025-5 Weld Visual Examination Procedure for KEPCO Ulchin 5 & 6, Revision 0

10.5.H, Revision 8, Visual Inspection Procedure for Holtec Spent Fuel Storage Systems

5. Persons Contacted

US Tool & Die, Inc.

R. Cuda, Project Manager
*V. Curcio, Quality Engineer
T. Kautz, Quality Control Inspector
G. Gourse, Lead Quality Control Inspector
*+R. L. Moscardini, President
*+C. Srock, Vice President

Holtech International

P. Kumar, Quality Control Engineer
+J. J. Lievecchi, Quality Control Manager
**+M. Soler, Quality Assurance Manager
**B. Gutherman, Licensing Manager

+ Attended entrance meeting on 7/7/03

* Attended exit meeting on 7/10/03

** Attended exit meeting by telephone from New Jersey.