

ORGANIZATION: CIRCLEVILLE METAL WORKS  
CIRCLEVILLE, OHIO

REPORT NO.: 99901075/88-01	INSPECTION DATES: 01/11-14/88	INSPECTION ON-SITE HOURS: 48
CORRESPONDENCE ADDRESS: Circleville Metal Works ATTN: Mr. Michael Hooper, President 305 Logan Street Post Office Box 410 Circleville, Ohio 43113 ORGANIZATIONAL CONTACT: Mr. Joe Riddlebarger, Quality Control Supervisor TELEPHONE NUMBER: (614) 474-6016		
NUCLEAR INDUSTRY ACTIVITY: This spent fuel transportation cask is the first nuclear product manufactured by Circleville Metal Works.		
ASSIGNED INSPECTOR: <u>Claudia M. Abbate</u> <u>2/12/88</u> Claudia M. Abbate, Program Development and Reactive Inspection Section (PDRIS) Date		
OTHER INSPECTOR(S): Carl Czajkowski, Consultant		
APPROVED BY: <u>Edward T. Baker</u> <u>2/15/88</u> Edward T. Baker, Acting Chief, PDRIS, Vendor Inspection Branch Date		
INSPECTION BASES AND SCOPE: A. <u>BASES</u> : 10 CFR Part 71, Subpart H and 10 CFR Part 21. B. <u>SCOPE</u> : This inspection was performed at the request of the Australian government and provided an independent verification of the fabrication of the LHRL-120 spent fuel transportation cask. The areas reviewed during the inspection included welding, procurement, NDE, testing and inspection, measuring and test equipment, nonconforming items, training and audits. The inspection consisted of observation of work and a record review.		
PLANT SITE APPLICABILITY: Not applicable.		

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A. VIOLATIONS:

There were no violations identified during the inspection.

B. NONCONFORMANCES:

1. Contrary to Paragraph 71.115(b) of Subpart H to 10 CFR Part 71, Paragraph 18.1 of CMW-QAP-1, "Quality Assurance Program," Revision 0, dated December 4, 1986, Paragraph 3.1 of the CMW Quality Control Manual, Revision 1, dated March 3, 1986, and Section 2 of the Edlow International Quality Assurance Plan, Revision 4, dated September 9, 1987, the Certification of Chemical and Physical Properties for Purchase Order (PO) 87/2017-01/48 had missing chemical and mechanical test data, the material was not ordered to an ASTM/ASME specification and, although already installed in two basket assemblies, the material had not been approved by the CMW Quality Control Supervisor (QCS) (88-01-01).
2. Contrary to Paragraph 71.115(a) of Subpart H to 10 CFR Part 71, and Paragraph 3.1(a.1) of the CMW Quality Control Manual, Revision 1, dated March 3, 1986, PO 40938-99-8-02-03 for aluminum was purchased to specification QQ-A-200B, while the Certificate of Compliance (C of C) was not reviewed by CMW to that specification (88-01-02).
3. Contrary to Paragraph 71.125 of Subpart H to 10 CFR Part 71, Sections 9.1a and b of the CMW Quality Control Manual, Revision 1, dated March 3, 1986 and Paragraph 5.4a of CMW Specification #2, "Liquid Penetrant Examination," Revision 1, dated May 7, 1986, temperature gauges used in liquid penetrant tests and in weld rod ovens were not controlled in the CMW calibration system (88-01-03).

C. UNRESOLVED ITEMS:

No unresolved items were identified during the inspection.

D. STATUS OF PREVIOUS INSPECTION FINDINGS:

Not applicable since this was the first NRC inspection of the CMW QA program.

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E. OTHER FINDINGS AND COMMENTS:

1. Background Information

This inspection was performed at the request of the Australian Department of Transport. It was conducted to provide an independent verification of the fabrication of the LHRL-120 spent fuel transportation cask. This transportation cask will be used to transport spent fuel of U.S. origin from the Australian Atomic Energy Commission (AAEC) Lucas Heights Research Laboratory in New South Wales, Australia to the United States. Edlow International Company (EIC) is providing overall service for the project, including the cask and transportation. Eggers Ridihaigh Partners, Incorporated (ERP) designed the cask and is responsible for the fabrication, QA program and acceptance testing. CMW is responsible for the actual fabrication of the cask. This is the first nuclear component manufactured at CMW.

2. Entrance and Exit Meetings

An entrance meeting was conducted on January 11, 1988 at the CMW facility in Circleville, Ohio. The purpose and scope of the inspection were discussed during this meeting. During the exit meeting, conducted on January 14, 1988, the inspection findings and observations were summarized.

3. Fabrication Control

During the inspection, the inspectors observed work being performed on the cask. The work area was roped off from the rest of the facility and the cask and fabrication material were covered in plastic when work was not being performed.

CMW had one welder perform most of the work on the cask and basket assemblies. The qualifications of all the welders who did perform work on the cask and baskets were reviewed. This review consisted of examining the Welders Log, which described what welders were qualified to what procedure. Also reviewed were the Weld Procedure Specifications (WPS), Procedure Qualification Records (PQR), and fabrication drawings for the cask and basket assemblies. During this review several observations concerning welding were noted by the inspectors. These are as follows:

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- a. Upon review of the basket assembly drawing CMW 4035-2, it was observed that a notation is shown for tack welding nuts to the basket. CMW stated that the two baskets which had already been shipped to Australia actually had fillet welds in lieu of tack welds, contradicting the drawing requirements. Since the baskets had already been shipped, the inspectors had no way of verifying the technique used. Tack welding of nuts is not addressed by the ASME Code and is an undefined procedure due to the lack of control of weld heat input. CMW stated that fillet welds would be used on the two remaining baskets and that this would be noted on the Fabrication Control Sheets and fabrication drawings.
- b. Although required by drawing, there was no procedure or certified welder available at CMW to weld P-6 stainless steel to P-1 carbon steel. This process was to be performed later in the fabrication process and had not yet been used on the cask. CMW committed to writing a procedure and qualifying a welder to cover this item.
- c. During the inspection it was noted that temporary attachments were welded to the cask to reduce ovality. There were no procedures available at CMW for the removal and inspection of these attachments. The CMW QSC modified the Fabrication Control Sheet to require a liquid penetrant test on all temporary attachment welds after attachment removal. This was confirmed by the inspectors during the inspection.
- d. The inprocess inspections and liquid penetrant tests were performed by the QCS. The liquid penetrant test procedure, liquid penetrant test reports and the qualifications of the QCS were reviewed. The QCS had certified himself as a Level III in Nondestructive Examination (NDE). It is not general practice to certify oneself; rather, a designated officer usually certifies NDE personnel. During the inspection the CMW president certified the QCS as a Level III after reviewing the qualifications. Additionally, the QCS's eye examination requirement had expired prior to the inspection. The QCS is required to have an eye examination annually. During the inspection, the QCS passed an eye examination thus fulfilling the SNT-TC-1A requirement.

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The inspectors also witnessed liquid penetrant testing. The QCS adhered to the procedure and in one instance, upon discovery of indications due to surface conditions, the QCS rejected the welds until the welds were ground smooth and retested. Upon retesting, the welds were found acceptable.

The temperature gauge used during the liquid penetrant test to verify that the temperature of the test material was between 60°F and 125°F was not controlled under the CMW calibration system. During the inspection the temperature gauges were removed from the calibration system and the QC Manual was revised. CMW will rely on the manufacturer's guarantee of a  $\pm 2^\circ\text{F}$  accuracy since the gauges are used for qualitative rather than quantitative measurements.

Nonconformance 88-01-03 was identified in this area.

CMW installed three portable weld rod ovens in the roped off area. The weld rod contained in the ovens was to be used only for this project. This was done to segregate the stainless steel weld rod used on this job from the other carbon and stainless steel weld rod used throughout the shop. Upon inspection of the ovens, it was noted that the ovens were at three different temperatures varying from 175°F to 250°F and that the temperature gauges being used in the ovens were not included in the CMW calibration system (see nonconformance 88-01-03). These temperature gauges were the same model as that used during the liquid penetrant test. During the inspection, the weld rod manufacturer was contacted by CMW to obtain the correct weld rod storage temperatures. CMW was informed by the manufacturer that the weld rod should be stored in a warm dry place. CMW feels that the  $\pm 2^\circ\text{F}$  accuracy range guaranteed by the gauge manufacturer will be sufficient for indicating oven temperature and therefore, removed the temperature gauges from the calibration system.

The inspectors observed hold tags on some material in the shop. These tags, although not numbered, were traceable back to the nonconformity report (NCR) and the hold tag form. The inspectors did not identify any instance where material had an NCR written on it and did not have a hold tag attached.

ERP had imposed a requirement on CMW stating that the chloride content of anything in contact with the cask would be less than 100 ppm. In response to this requirement, CMW had the Circleville water supply, marking pens used on cask material, and other material in



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contact with the cask analyzed for chloride content. The certifications for these tests were reviewed and found to be, for the most part, in compliance with 100 ppm limit. It was noted by the inspectors, however, that in some cases when the standard deviation was added to the measured chloride content, the 100 ppm specification was exceeded.

In addition to the inspection of each of the fabrication steps on the Fabrication Control Sheet by the QCS, ERP has a list of audits of procedures to be performed during hold and witness points. The procedures to be audited and witnessed by ERP include material inspection, liquid penetrant tests and visual examinations of welds, basket assembly, lead pour, gamma scan, and various leak tests, lift tests and acceptance tests. Each of the audits is performed according to a checklist the ERP QA manager fills out during the audit.

#### 4. Procurement

The inspectors reviewed the procurement system at CMW. Purchase Orders, C of Cs, test reports and receipt inspection forms were reviewed. During this review two nonconformances, 88-01-01 and 88-01-02, were identified in the area of purchased material control.

During the review of the Certification of Chemical and Physical Properties for PO 87/2017-01/48, it was noted that the material was apparently not purchased to an ASTM/ASME specification. The EIC Quality Assurance Plan states that the ASME BPV, Section II be used for material specification reference. Additionally, some data for chemical tests and all the data for mechanical tests were missing. The certification had the QCS stamp on it, but the QCS had not approved or dated the certification. The material had been purchased by ERP and was used in two basket assemblies which have already been shipped to Australia. During the inspection CMW obtained the missing chemical data and committed to obtaining samples from the lot and performing tensile, elongation, yield strength and hardness tests. The results from the chemical and mechanical tests were reviewed after the inspection and the inspectors verified that the material met the chemical and physical specifications for ASTM B241 material.

Additionally, during the review of a certified mill test report (CMTR) for 6061-T651 aluminum, it was noted that the material was purchased to specification QQ-A-200B, but the CMTR was not reviewed to that specification by the QCS. CMW personnel obtained a copy of

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QQ-A-200E (the latest revision) and a copy of ASME BB-211 (a comparable specification) during the inspection and compared them to the CMTR. The material was found to be acceptable.

5. 10 CFR Part 21

The inspectors reviewed CMW procedure, "Section 206 Nonconformity Report," Revision 1, dated November 3, 1987. This procedure outlines the steps to be taken when a nonconformity is identified as described in 10 CFR Part 21. The inspectors noted that the procedure contained provisions for informing the licensee or purchaser (in this case ERP) of the nonconformance, however, it was unclear as to who notified the NRC. The inspectors reviewed ERP's procedure, QAP 15.1, "Reporting of Defects and Nonconformance," Revision 0, dated June 1, 1986. ERP's procedure did provide for notification of the NRC. During the inspection, CMW issued revision 2 to the procedure which identified the CMW president as being responsible for verifying NRC notification.

6. Audits

For this job, no specific internal audits of the CMW QA program had been performed by CMW. ERP, however, had reviewed and approved the CMW QA program prior to fabrication. Subsequent to the inspection CMW committed to perform an internal audit before the LHRL-120 project was completed and annually thereafter if more nuclear products are manufactured.

Only one external audit of a supplier was performed for this job. The QCS had obtained QA program manuals for most of the remaining suppliers used to supply material for this job. Of those, most had supplied quality materials to CMW prior to this job with no history of supplying poor quality materials. Subsequent to the inspection CMW committed to initiate a supplier survey log for potential suppliers and perform on-site audits when needed.

F. PERSONS CONTACTED:

- \*Herman Crawford, QA Manager, Eggers Ridihaigh Partners, Incorporated
- \*Michael Hooper, President, Circleville Metal Works (CMW)
- \*Joe Riddlebarger, QSC, CMW
- \*Jerold Schaeper, Project Coordinator, CMW
- Joe Shomaker, Welder, CMW
- \*Howard Sobel, QA Manager, Edlow International Company
- \*Attended exit meeting.