

Duquesne Light Company

Beaver Valley Power Station
P.O. Box 4
Shippingport, PA 15077-0004

JOHN D. SIEBER
Vice President - Nuclear Group

(412) 393-5255

February 23, 1990

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Reference: Beaver Valley Power Station, Unit No. 1
Docket No. 50-334, License No. DPR-66
Inspection Report 50-334/89-24

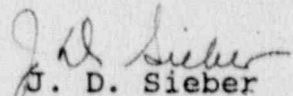
Gentlemen:

In response to NRC correspondence dated January 23, 1990 and in accordance with 10 CFR 2.201, the attached reply addresses the Notice of Violation included with the referenced inspection report.

Note that we have performed a detailed review of the circumstances surrounding the alleged violation. Based on this evaluation, included as part of our reply, we respectfully request that this violation be withdrawn.

If there are any questions concerning this response, please contact my office.

Very truly yours,


J. D. Sieber
Vice President
Nuclear Group

Attachment

cc: Mr. J. Beall, Sr. Resident Inspector
Mr. W. T. Russell, NRC Region I Administrator
Mr. Jacques P. Durr, Chief, Engineering Branch
Division of Reactor Safety, Region I
Mr. P. Tam, Sr. Project Manager
Mr. R. Saunders (VEPCO)

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DUQUESNE LIGHT COMPANY
Nuclear Group
Beaver Valley Power Station
Unit No. 1

Reply to Notice of Violation
Inspection Report 50-334/89-24
Letter Dated January 23, 1990

VIOLATION (Severity Level IV, Supplement I)

Description of Violation (50-334/89-24-01)

The Beaver Valley Power Station Unit 1 Technical Specifications, Section 6.8.1, requires that written procedures be established, implemented and maintained in accordance with Section 9C, Repairs, of Regulatory Guide 1.33, Revision 2 dated February 1978. Accordingly, the licensee developed procedural drawing No. PIPS MO 6.1, Detail C, which specified a counterbore taper of 18° maximum for the steam generator feedwater nozzle to elbow weld.

Contrary to the above, as of October 19, 1989, the ultrasonic thickness profile for the elbow to steam generator nozzle weld indicated that the counterbore taper was greater than 18° for approximately 30% of the weld length.

Discussion of Violation

Duquesne Light Company does not agree that the information stated above constitutes a violation.

We have reviewed the details of the elbow end preparation, welding and inspection. Additionally, an elbow to nozzle weld mock-up was produced to determine the accuracy of the ultrasonic test (UT) technique for internal diameter (ID) contouring on a short radius elbow. Our evaluation included a review of the following:

- Counterbore machining and preparation of the elbow
- Weld data sheets/quality control inspections
- Radiography film density surveys
- Ultrasonic contouring of the elbow mock-up

Details of our activity review, the mock-up testing, and our results and conclusions are included in Attachment I.

As a result of our evaluation, we have concluded that:

- 1) UT profiling using thickness measurements is capable of determining the general ID contour. However, due to the inherent limitations of the UT method, the ability to accurately determine the counterbore transition angle from the UT profile is not possible with any degree of confidence.

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- 2) The counterbore transition angle is correct and uniform around the full circumference of the ID. There is no evidence to indicate a deviation from the engineering specifications.

Therefore, we ask that you review the details of our evaluation as presented in Attachment I and, based on this information, we respectfully request that this violation be withdrawn.

ATTACHMENT I

DUQUESNE LIGHT COMPANY
Nuclear Group
Corporate Nuclear Services Unit
Nuclear Engineering Department

NRC Inspection Report 50-334/89-24

The results of the routine NRC safety inspection conducted by Mr. H. Kerch on November 13 - 16, 1989 focused on an ultrasonic report, WP-89-185, produced by the ISI Department during final inspection of the elbow-to-nozzle weld in line 16WFPD-22-60 at the steam generator.

That report, with subsequent checks of the thickness measurements by DLCo and NRC personnel, is the basis for the notice of violation, received January 28, 1990, which states "...the ultrasonic thickness profile for the elbow to steam generator nozzle weld indicated that the counterbore taper was greater than 18° for approximately 30% of the weld length." The details of that elbow end preparation, welding, and inspection, were reviewed and the following information is pertinent.

Activity Review

The elbow replacement was performed on MWR No. 894035 in accordance with Duquesne Light Co. Plant Installation Process Standard MO6.1 "Category 1 Piping Installation." The applicable end preparation configuration is Detail C of Figure 5.1 which specifies a maximum transition angle of 18° from the machined counterbore to the as-forged fitting internal diameter (ID).

The machining of the 16", short radius 90° schedule 80 elbow was done using a WACHS end prep lathe.

Quality Control inspection was required and was recorded on the Weld Data Sheet. The records show a hold point for "end preparation/wall thickness", which is attribute W-403 of I.P. No. W-04P Rev. 0, "ANSI B31.1 Pipe/Tubing Welding". The verification included bevel angle, land thickness, counterbore depth, and counterbore transition angle and wall thickness. The counterbore transition angle was physically measured, using a protractor, at several points around the circumference of the ID at the time of verification. The end preps were magnetic particle inspected prior to welding and radiography was done at the root pass completion and as a final inspection.

These process and inspection records were reviewed for any discrepancies which would explain the contours obtained by the ultrasonic thickness measurements. Concurrently, an elbow to nozzle weld mock-up was produced to determine the accuracy of the ultrasonic testing (UT) technique for ID contouring on a short radius elbow.

Results

The use of a pipe end prep lathe to machine the counterbore contour would result in a uniform transition angle for 360° of the circumference. A steeper angle for 30% of the circumference would require that angle to be machined the entire circumference and the remaining 70% to be hand worked. The entire prep contour was done using the end prep lathe with minor hand working for blending of rough edges.

The Weld Data Sheet contains the record of the inspection attributes for the end preparation/wall thickness which were signed off by Construction Welding and Quality Control. No abnormalities or deviations were noted. During the exit interview, it was called to the attention of the NRC inspector that the transition angle verification was an actual physical measurement. The Holdpoint Checklist, which is an attachment to the Weld Data Sheet, provides another sequence of signoffs and also includes the end prep signoff. The Construction Weld Engineer, at the time of verification, made a supplementary note on the checklist detailing visible machining score marks on the machined transition at the 6:30 to 7:30 position, 1 1/4 inches from the prep edge. This corresponds to an area adjacent to the datum 2 position where the questionable ultrasonic contour was taken.

The radiography films for the completed weld were examined for sharp density changes indicating a steep transition angle. There was nothing visually apparent. Film density surveys were taken from the centerline of the weld to the edge of the film at the datums 0 and 2 (Extrados and Intrados, respectively) on each of two films covering these locations. The surveys extended to 1 1/2 inches off the weld centerlines. The density change due to the transition angle is expected in the area 1/2" to 1 1/8 inches off the centerline. The density survey readings, shown in Figure 1, were as expected for a properly machined contour.

The ultrasonic contouring of the elbow mock-up was performed using the same equipment and technique as that used during the nozzle-to-elbow inspection. The mock-up consisted of two transition angles, one each end, 18° and 45°. The UT profiles were performed independently by two technicians and included an additional profile using a digital thickness gauge. Following the profiling, the contours were measured using a profile gauge. The results of the angles from the UT profiles and the actual measured contours are shown in Table 1. The conclusions by ISI of the mock-up UT profiling were as follows:

"It appears that UT profiling techniques specified within UT-308 are adequate for the intended purpose of determining ID configuration. Configuration is needed to confirm ID surface features that may produce ultrasonic reflectors. If the presence of a counterbore is detected, the actual transition angle is not normally as important as the fact that there is a thickness change. The ability to determine counterbore transition angle from the UT profile may have a marginal accuracy due to several factors. These include:

1. Lack of parallel reflecting surface (on counterbore transition).
2. Final transition angle may be difficult to measure due to radial shrinkage and weld cover pass configuration.
3. Short-radius elbow intrados curvature and thickness both combine to make intrados profiling difficult. An error in transducer position measurement as small as 1/10 inch from weld centerline may result in an apparent transition angle 20 to 30 degrees steeper than actually exists."

The following is a summary of the process review:

1. The end prep tooling used on the counterbore machining would produce a uniform contour for 360° of the circumference. A variable angle is not possible.
2. The proper inspections were performed and documented. The transition angle had been physically verified. An additional note made during the inspection, documented a "machine score mark", on the transition surface, near the intrados, 1/1/4 inches from the prep edge.

This is not consistent with the UT profile which indicates a counterbore depth of 3/8 inch and a maximum machined transition depth of 3/4 inch.

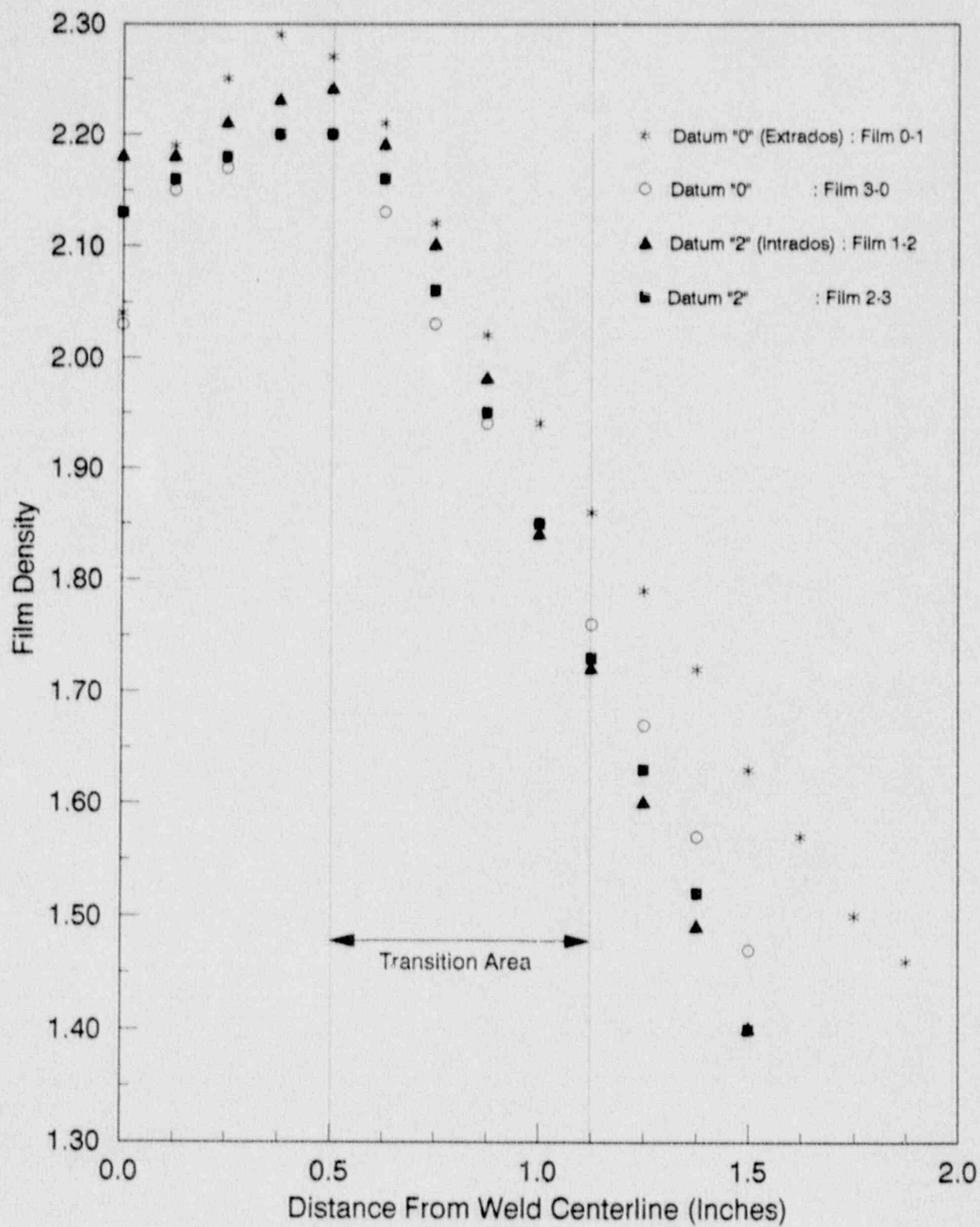
3. The radiography film density survey indicates no significant density change differences between the datum 0 (extrados) and datum 2 (intrados) locations.
4. The UT profiling of the elbow mock-up was able to produce near shape contours of the ID surface sufficient to interpret ultrasonic results. However, determining the angle of the transition from the counterbore diameter to the mill surface inside diameter was not possible for several reasons.
 - A. The distortions caused by welding and the presence of the weld root penetration.
 - B. The differing part contours at the intrados and extrados.

- C. The inaccuracies of a small diameter transducer with a 13° beam spread on a welded and ground contour and on a mill surface finish.

Deviations on the mock-up UT profile angles exceeded 20°. The actual measured ID transitions deviated from the prewelded angles by 7° for the 18° transition and by 14° for the 45° transition.

Conclusions:

1. UT profiling using thickness measurements is capable of determining the general ID contour. Because of the inherent limitations of the UT method, determination of the angle between non-parallel sides with the technique used, is not possible with any degree of accuracy.
2. The counterbore transition angle is correct and uniform around the full circumference of the ID. There is no evidence to indicate a deviation from the engineering specifications.



Radiography Film Density Survey

Figure 1

TABLE 1

ULTRASONIC AND MEASURED PROFILE
COUNTERBORE TRANSITION ANGLES

TECHNICIAN EQUIPMENT	T.C.H.		G.L.B.		ACTUAL MEASURED	
	EPOCH	DIGITAL	EPOCH	DIGITAL		
<u>Nozzle-Elbow Weld</u>						
DATUM 0		20°				
1		-				
2		45°				
3		29°				
<u>Mock-Up Elbow</u>						
FW-1 (18°)						
DATUM 0		20°	-	26°	15°	22°
1		33°	-	24°	28°	25°
2		21°	-	25°	19°	20°
3		15°	-	32°	23°	22°
FW-2 (45°)						
DATUM 0		55°	-	38°	36°	32°
1		40°	-	59°	43°	45°
2		39°	-	51°	24°	31°
3		-	-	-	-	-