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ILLINOIS POWER COMPANY



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U-10206

CLINTON POWER STATION, P.O. BOX 678, CLINTON, ILLINOIS 61727

Docket No. 50-461

October 18, 1984

Mr. James G. Keppler  
Regional Administrator  
Region III  
U.S. Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

Subject: 10CFR50.55(e) Deficiency 55-83-10  
Weld Deficiencies on Containment Dome Liner

Dear Mr. Keppler:

On December 1, 1983, Illinois Power notified Mr. F. Jablonski, NRC Region III (ref: IP memorandum Y-18886 dated December 1, 1983) of a potentially reportable deficiency per 10CFR50.55(e) concerning welding deficiencies identified on the containment dome liner circumferential closure seam weld R2-R3 (elevation 916'7"). This initial notification was followed by three (3) interim reports (ref: IP letter U-10116, D. P. Hall to J. G. Keppler dated December 29, 1983; IP letter U-10140, D. P. Hall to J. G. Keppler dated April 6, 1984; and IP letter U-10175, D. P. Hall to J. G. Keppler, dated July 11, 1984). Illinois Power's investigation of the above issue is complete and has determined that this issue represents a reportable deficiency under the provisions of 10CFR50.55(e). This letter is submitted as a final report regarding the reportable deficiency. Attachment A provides the details of our investigation.

We trust that this final report provides sufficient background information to perform a general assessment of this reportable deficiency, and adequately describes our overall approach to resolve the issue.

Sincerely yours,

D. P. Hall  
Vice President

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RLC/cbs (NRC)

cc: NRC Resident Office  
Director-Office of I&E, USNRC, Washington, DC 20555  
Illinois Department of Nuclear Safety  
INPO Records Center

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ATTACHMENT A

Illinois Power Company  
Clinton Power Station

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10CFR50.55(e) Deficiency 55-83-10  
Weld Deficiencies on Containment Dome Liner

Final Report

Statement of Potentially Reportable Deficiency/Background

During the removal of temporary attachments from the containment dome liner, vendor welding deficiencies were observed by Baldwin Associates' (BA) personnel on the containment dome liner circumferential closure seam weld (designated R2-R3), fabricated by Chicago Bridge & Iron Co. (CB&I). The deficiencies include areas of undercut, porosity, incorrect weld profile, arc strikes, and several small cracks. Also found were dimensional tolerance violations during base metal fit-up of the weld, and the presence of a foreign substance on an intersecting vertical seam weld. An evaluation was performed to determine the full extent and significance of these conditions on operational safety of Clinton Power Station (CPS).

Investigation Results/Corrective Action

Illinois Power has prepared and implemented an investigation plan to identify and evaluate the extent and nature of weld deficiencies and other irregularities noted by Baldwin Associates' personnel. The investigation proceeded in the following manner:

1. Illinois Power retained the services of a chemist from Southwest Research Institute (SWRI) to inspect and to obtain and analyze a sample of the foreign substance found on the dome weld. SWRI reported that the foreign substance was chewing gum placed over the weld area after the primer paint had been applied. The area where the gum was removed was subsequently cleaned and magnetic particle (MT) examined. No adverse indications were found, indicating that the gum had not masked any weld defects. It has been concluded that this was an isolated incident.
2. The liner areas reported as dimensionally out of tolerance were evaluated by Sargent & Lundy. This evaluation determined that the identified dimensional deviations will not affect the functioning of the liner.

ATTACHMENT A

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3. An area twelve (12) inches on either side of the closure seam R2-R3 and several adjacent areas exhibited suspect visual indications. These areas were cleaned and examined by magnetic particle testing by U.S. Testing Company and then visually inspected by BA. The examination/inspection was performed in 10° increments around the circumference of the R2-R3 weld, and resulted in the issuance of 36 Nonconformance Reports (NCRs). These NCRs were written primarily to document adverse visual indications. The visual inspection criteria used by BA was, however, different from that used by CB&I at the time of construction. Two (2) small cracks and two (2) linear MT indications were identified by the examinations. These adverse indications were explored further to determine their relevance/significance and the need for repairs.

Illinois Power retained the services of an independent third party, Brand Examination Services and Testing Co. (BESTCo), to act as IP's Designated Reviewer, to further evaluate the weld surface condition, visual inspection results, and MT examination results. The Designated Reviewer evaluated the MT procedures used by CB&I and U.S. Testing Company, the fabrication specification, and applicable design codes for the original work.

Additional MT examinations were performed by the Designated Reviewer to further evaluate the adequacy of installation and investigation work performed on the dome welds.

The results of our investigation, following completion of activities by the Designated Reviewer (BESTCo), were as follows:

1. The surface of the R2-R3 weld is suitable for MT inspection.
2. Two (2) areas on vertical welds intersecting R2-R3 considered unsuitable for MT were to be cleaned and reinspected (NCRs 14348 and 14349).
3. The MT inspection of the R2-R3 weld was valid at the time it was performed by Chicago Bridge & Iron (CB&I). CB&I had also vacuum box tested this weld for leakage per specification requirements, and found it acceptable.

ATTACHMENT A

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4. Indications noted were explored for relevance (NCRs 14360, 13402, and 14340).
5. The crack in the liner was repaired (NCR 14340/21481).
6. The weld area previously reported with gum overlaid is acceptable (NCR 15113).
7. Welds on the repair plate at AZ 9° were excavated/ repaired (NCR 14927).
8. Areas with out of tolerance liner geometry are acceptable as is (NCR 12824).

Since our last report, the disposition of NCRs 14348 and 14349 was implemented. This required reinspection of 2" and 2 3/4" areas of vertical welds intersecting R2-R3. As a result of improper interpretation of the dispositions, certain areas of weld R2-R3 were overground. The overground areas were documented on NCR 20294.

The overground areas of R2-R3 weld were observed by the NRC Region III Inspectors on site to review the dome liner investigation progress. As a result of this incident, the NRC Region III Inspectors recommended that more detailed instructions be given to personnel involved in rework of the dome liner, and that a visual assessment of other welds on the dome liner be performed.

In response to the recommendations of the NRC Region III Inspectors, Illinois Power's and Baldwin Associates' Management established a team of personnel from Quality Assurance, Construction, Technical Services and Sargent & Lundy to be assigned to the dome liner rework tasks.

A training session was conducted for all personnel concerned, to assure that each individual understood their assigned task and the scope of the work to be accomplished. All subsequent work on the dome liner has proceeded without further incident.

The overground areas of weld R2-R3 were blended/ground, MT inspected, and repair welded where the excavations were greater than 1/16". IPQA provided surveillance of this activity and evaluated the repair work as acceptable. In addition to the above, a review was performed of all liner welds (vertical and horizontal seams) from the top of the dome at elevation 924' to the R1-R2 horizontal seam at elevation 893'9". The review

identified 15 small areas that required examination by certified welding inspectors. Of the 15 areas identified, only three (3) required rework in that the undercut after excavation was in excess of 1/16" (Ref. NCR 21836, 21837, and 21838).

To date all NCRs requiring rework have been dispositioned and issued to construction. The investigation has found only one (1) crack that has penetrated through the full 1/4" dome liner thickness. This crack was repaired. All repair welds performed as a part of this investigation are being MT examined and Vacuum Box tested to insure the leak tight integrity of the dome liner.

Illinois Power's investigation of this issue has shown that the surface of the dome liner was suitable for inspection and interpretation, and that the MT inspections performed by CB&I were valid.

#### Safety Implications/Significance

Investigation of this issue has identified and has required a repair to one (1) crack in the dome liner that penetrated the full 1/4" thickness of the liner. The design function of the liner is to be a leak tight membrane for the containment, therefore, the through crack would have been a breach of the leak tight integrity had the condition gone uncorrected.

Illinois Power's evaluation of this matter has determined that the issue is significant and represents a reportable condition under the provisions of 10CFR50.55(e).