Docket Nos.: 50-327
and 50-328

NOV 18 1987

LICENSEE: Tennessee Valley Authority

FACILITY: Sequoyah Nuclear Plant, Units 1 and 2

SUBJECT: SEQUOYAH 2 CIRCUIT BREAKER POLE SHAFT WELD FAILURE (TACs 65955/65956)

Reference: Memorandum from D. Hood dated October 23, 1987 "Record of Telephone Conversation Regarding Sequoyah 2 Circuit Breaker Pole Shaft Weld Failure," Docket Nos. 50-327 and 50-328

The above reference summarized an October 20, 1987 telephone discussion between the NRC and Tennessee Valley Authority regarding two broken fillet welds on the pole shaft assembly of the circuit breaker that energizes the emergency fire protection pumps for Sequoyah Unit 2. The reference acknowledged that TVA's preliminary findings from the engineering analysis by its Material Engineering Section were discussed in J. B. Hosmer's memorandum dated July 10, 1987 (same as enclosure 2 of D. Hood memorandum, "Summary of September 23, 1987 Meeting on Westinghouse Switchgear Failures," dated October 2, 1987). The NRC's copy of photographs attached to Hosmer's July 10, 1987 memorandum were of poor reproduction quality and better copies were to be forwarded to NRC.

Accordingly, the NRC has received the enclosed Technical Report No. M86-87-A216 dated October 3, 1987 with attached Figures 1 through 4.

Darl Hood, Project Manager
Project Directorate II-3
Division of Reactor Projects, I/II

Enclosure: As stated

cc: E. Pugh, TVA
J. Hosmer, TVA
J. Jelovich, W

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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TECHNICAL REPORT

REPORT NO.: M86-87-A216

SHEET NO.: 1 of 1 sheets

DATE OF REPORT: 10/3/87

LOCATION: Central Laboratories - PSC - Chattanooga

SUBJECT: CONTROL ROD DS-15 BREAKER, SEQUOYAH NUCLEAR PLANT - CUSTOMER SAMPLE NUMBER 87-33

COPIES SENT TO: Robert L. Phillips (2), RIMS, Lab Files

PREPARED BY: Delsa L. Frazier CHECKED BY: Rebecca Goins APPROVED BY: R. L. Morley

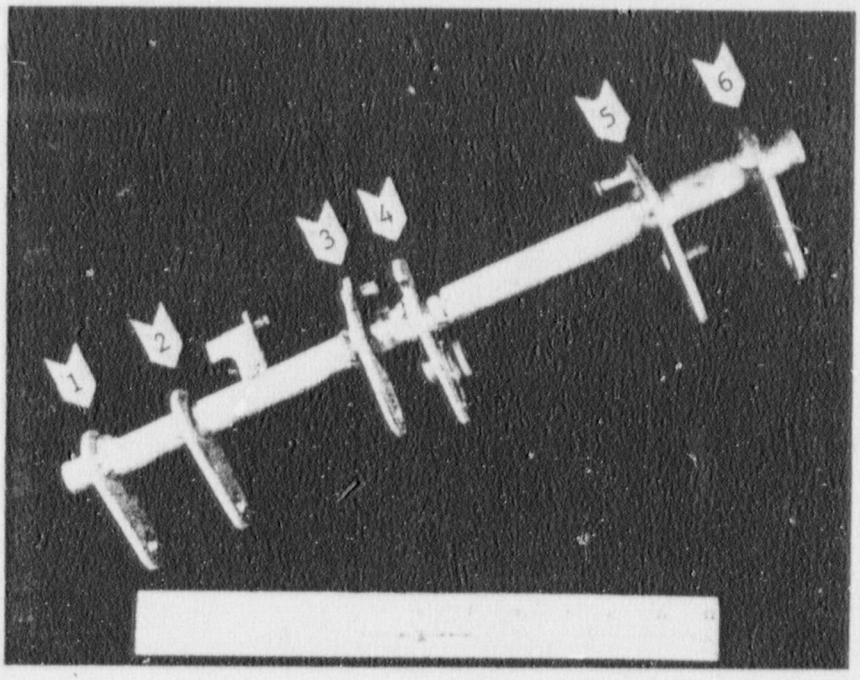
The Metallurgical Laboratory Section received the subject sample (Figure 1a) with a request to determine the fracture mode. Visual examination of the sample showed that the plate in Area 3 had completely separated from the rod at the weld and that cracking was observed at the weld in Area 4 (Figures 1b and 2). Porosity was also observed in the weld of Area 4.

Cross sections through Areas 1, 3, and 4 (Figure 3) showed porosity in the weld in Area 4. Also, the weld in this area did not appear to penetrate into the plate and rod, resulting in a poor bond. Fracture surfaces were ductile (Figure 4a) in Area 3 and Area 4. Poor welding techniques were determined to be the cause of failure.

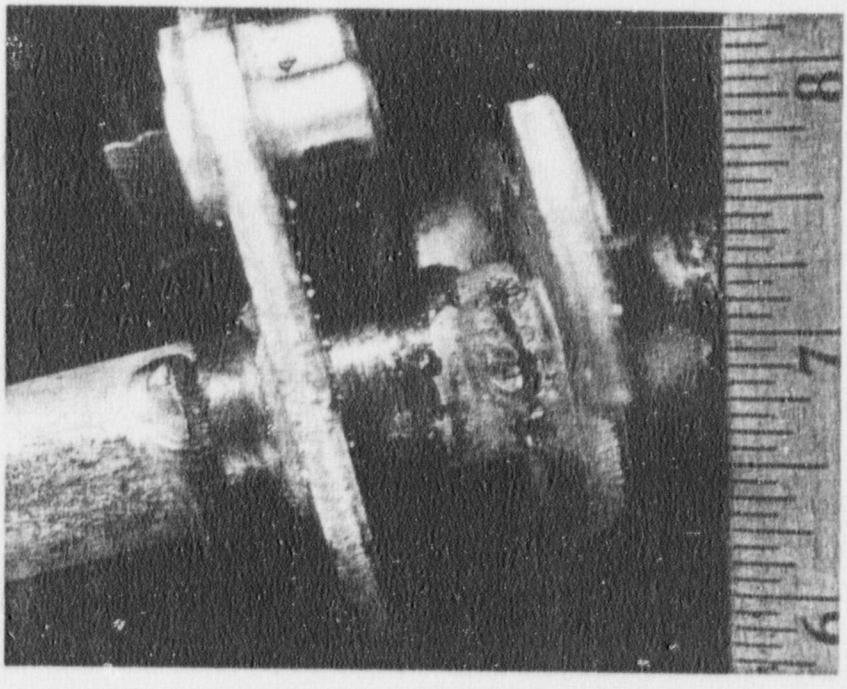
The microstructure of the rod consisted of ferrite and pearlite, while the microstructure of the plate consisted of ferritic grains (Figure 4b and c).

If any additional information is required, please refer to Metallurgical Laboratory Report No. M86-87-A216.

DLF:SAV (2333)
Attachments: Figures 1 through 4

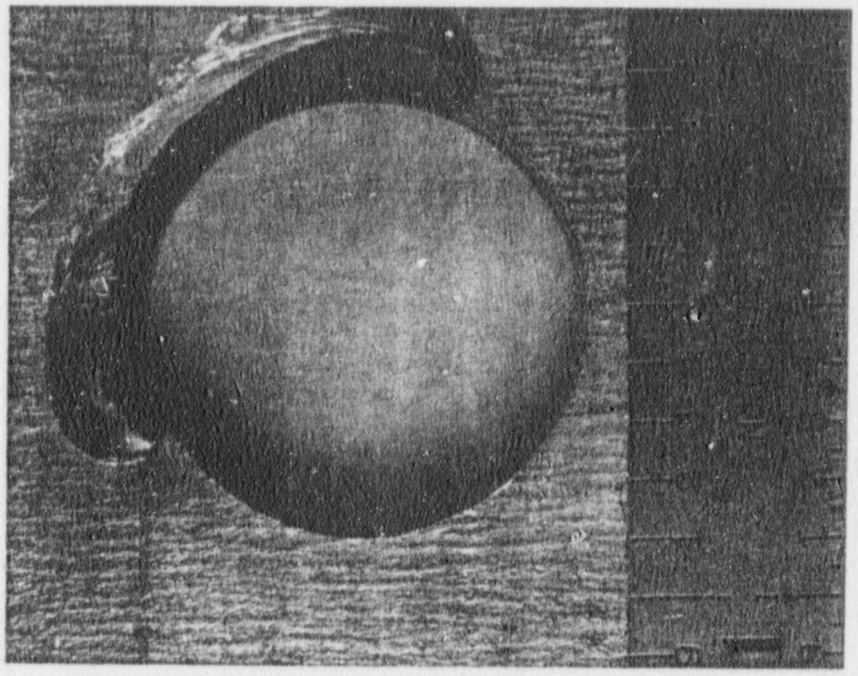


a. Photograph of the sample in the as-received condition.

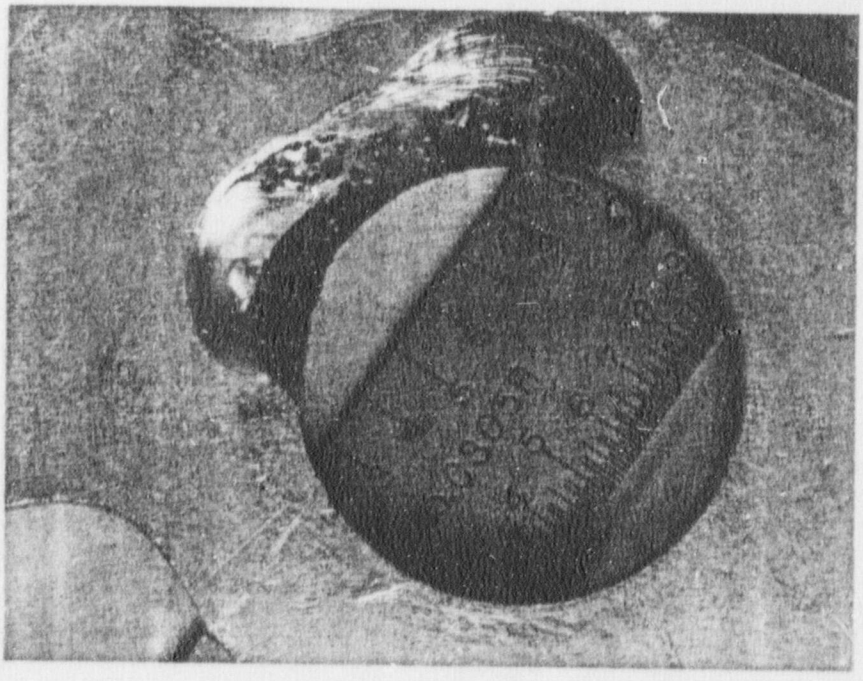


b. Photograph of the area of interest.

Figure 1 - Control Rod DS-15 Breaker, Sequoyah Nuclear Plant - M86-87-A216, Customer Sample No. 87-33.

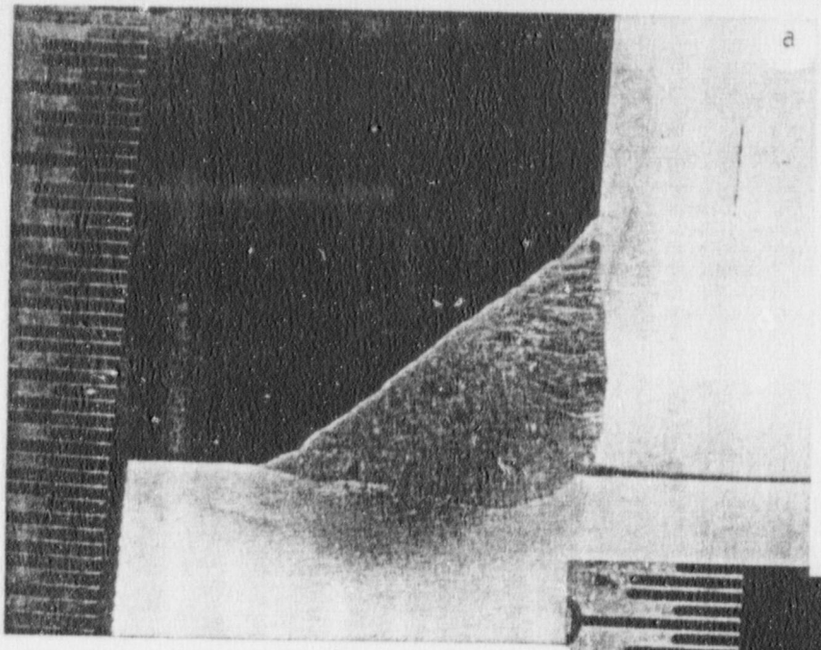


a. Photograph of the fracture in Area 3, ~3X.

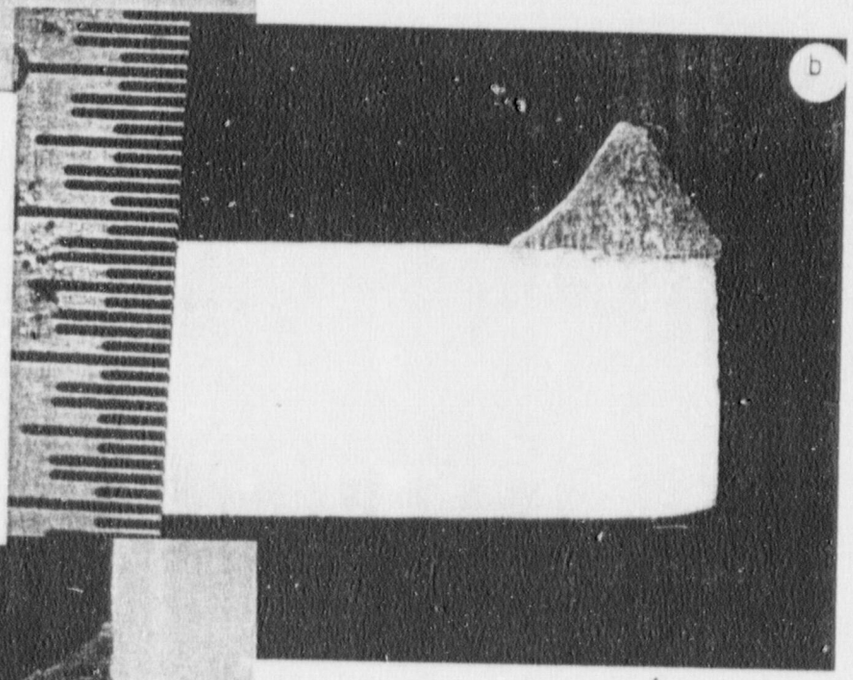


b. Photograph of the fracture in Area 4, ~3X.

Figure 2 - Control Rod DS-15 Breaker, Seguoyah Nuclear Plant - M86-87-A216, Customer Sample No. 87-33.



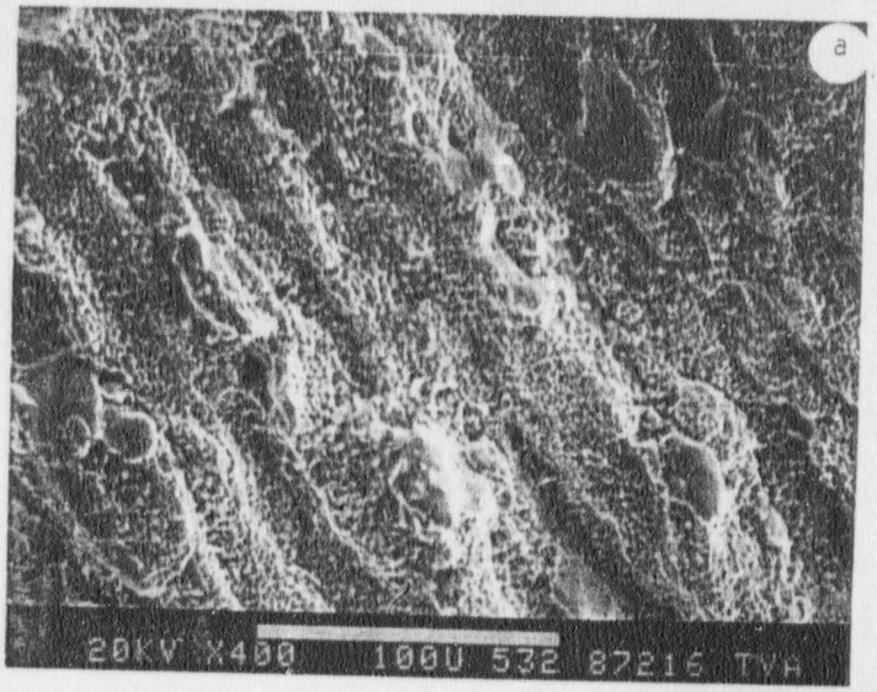
a. Photomacrograph of the weld in Area 1, ~7.5X.



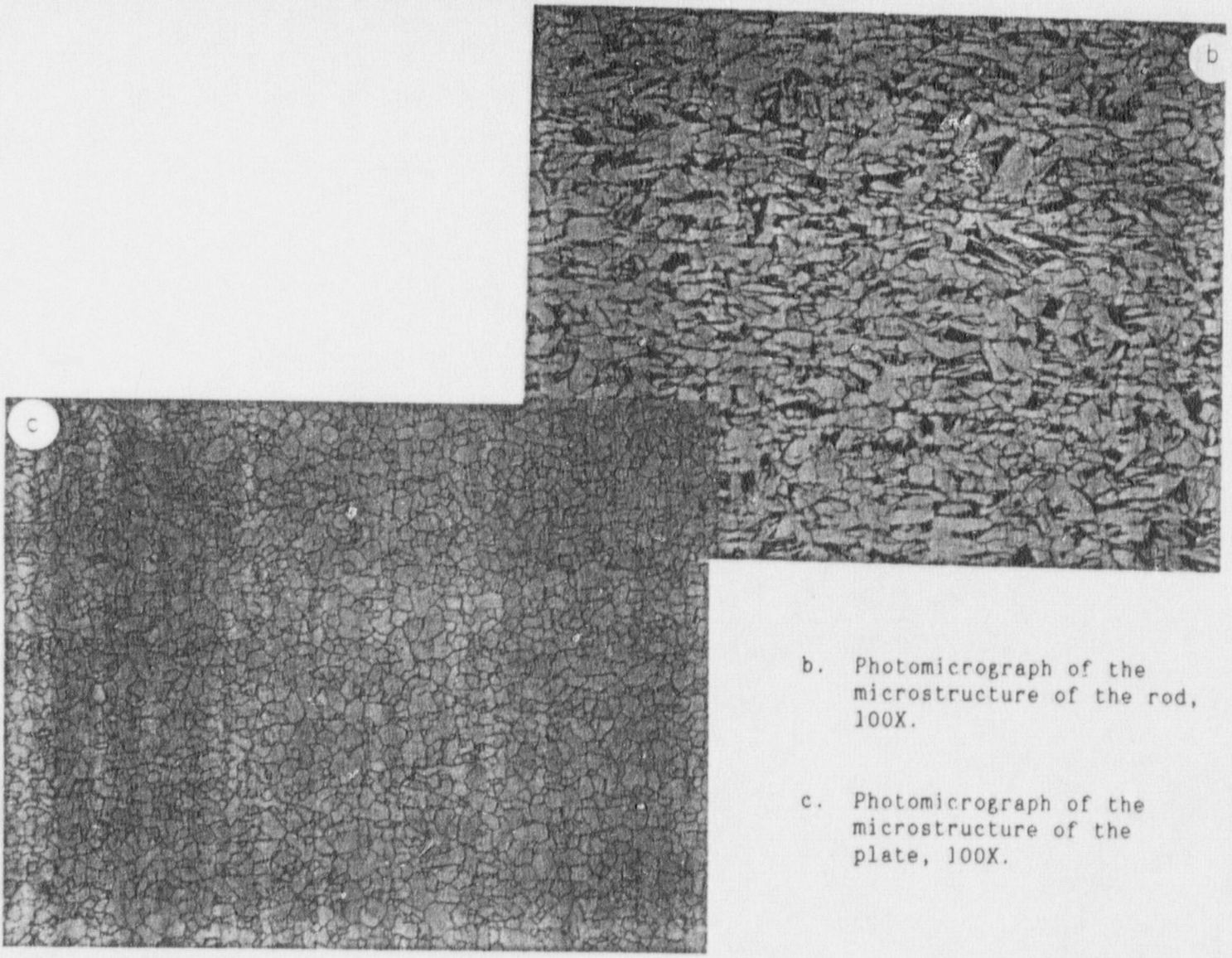
b. Photomacrograph of the weld in Area 3, ~7.5X.

c. Photomacrograph of the weld in Area 4, ~7.5X.

Figure 3 - Control Rod DS-15 Breaker, Sequoyah Nuclear Plant - M86-87-A216, Customer Sample No. 87-33.



a. SEM micrograph of failed Area 3 and typical of Area 4.



b. Photomicrograph of the microstructure of the rod, 100X.

c. Photomicrograph of the microstructure of the plate, 100X.

Figure 4 - Control Rod DS-15 Breaker, Sequoyah Nuclear Plant - M86-87-A216, Customer Sample No. 87-33.