

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Browns Ferry - Unit 2										DOCKET NUMBER (2) 0 5 0 0 0 2 6 1 0										PAGE (3) 1 OF 03	
TITLE (4) Reactor Water Chemistry - Low pH																					
EVENT DATE (5)			LER NUMBER (6)				REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)											
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES						DOCKET NUMBER(S)						
06	11	85	85	004	01	01	24	86							0 5 0 0 0						
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)																					
OPERATING MODE (9) N		20.402(b)				20.405(c)				50.73(a)(2)(iv)						73.71(b)					
POWER LEVEL (10) 0 10 10		20.405(a)(1)(i)				50.36(c)(1)				50.73(a)(2)(v)						73.71(c)					
		20.405(a)(1)(ii)				50.36(c)(2)				50.73(a)(2)(vii)						OTHER (Specify in Abstract below and in Text, NRC Form 365A)					
		20.405(a)(1)(iii)				X 50.73(a)(2)(i)				50.73(a)(2)(viii)(A)											
		20.405(a)(1)(iv)				50.73(a)(2)(ii)				50.73(a)(2)(viii)(B)											
		20.405(a)(1)(v)				50.73(a)(2)(iii)				50.73(a)(2)(ix)											
LICENSEE CONTACT FOR THIS LER (12)																					
NAME Patrick N. Ebersole, Compliance Engineer										TELEPHONE NUMBER 210 5 712 91-1317 1818											
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																					
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC											
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)											
YES (If yes, complete EXPECTED SUBMISSION DATE)										X NO											

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

Routine sampling of reactor water chemistry taken from unit 2 on June 10, 1985, revealed a pH value of 5.12. Technical specifications require the pH be above 5.3 when the vessel is not pressurized. All fuel was removed from the vessel at the time of this occurrence.

Prior to the pH deviation the vessel level had been lowered for several weeks to accommodate weld repairs to the jet pump instrument nozzle safe end. Following vessel reflood, water quality was lower than normal but within limits. After returning the reactor water cleanup system (RWCU) to service, the deviation was measured. Further operation of the RWCU returned the water chemistry to within limits within 12 hours. A review of the circumstances did not indicate a definitive cause for the pH depression.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Browns Ferry - Unit 2	05000260815	0	04	01	02	OF	03

TEXT (If more space is required, use additional NRC Form 366A's) (17)

Results of a reactor water chemistry sample taken from unit 2 at 2240 on June 10, 1985, revealed a pH value of 5.12. The lower limit allowed by technical specifications is 5.3 when the reactor vessel is not pressurized. At the time of this occurrence, units 1 and 2 were in refueling outages (all fuel was removed from the unit 2 vessel), and unit 3 was in an extended maintenance outage.

The unit 2 reactor vessel was drained on April 24, 1985, for replacement of the jet pump instrument nozzle safe end. The vessel remained in this low level condition through May and was reflooded on June 8, 1985. During the drain down condition, the reactor water cleanup system was out of service so no method was available for maintenance of water quality. By the time reflooding of the vessel was performed the water quality had declined somewhat but was still well within the technical specification requirements. After refilling on June 8, the quality did not change appreciably and remained around a pH of 5.45 and a conductivity of 2.4 umho/cm.

A cleanup demineralizer was placed in service at 2059 on June 10. The routine vessel water laboratory sample taken at 2240 on June 10 showed a pH of 5.12 with a conductivity value of 5.1 umho/cm. Analytical results of these samples showed some elevation in chlorides but the major impurities were nitrites and nitrates. The impurity was removed quickly by further operation of the reactor water cleanup (RWCU) system (CE), and the water quality was within technical specification limits in approximately 12 hours.

Since nitrogen compounds were the major impurities present during this deviation, investigation of the event centered on potential sources of nitrogen. Suspected accumulation and subsequent injection of reactor building closed cooling water which presumably leaked across the nonregenerative heat exchangers into the RWCU system during the layup period was originally considered to be the most likely source of the contaminants. Sodium nitrite is added to the RBCCW system, (CC), as a corrosion inhibitor. During this lengthy drain down period, the reactor water side of the nonregenerative heat exchanger was depressurized, and the RBCCW system was in service. However, follow-up testing of these heat exchangers revealed no leakage. A resin breakthrough following return of the RWCU system to service has also been eliminated since a significant increase in nitrogen levels due to resin breakthrough would also produce other contaminants such as sulfates, and no such contaminants were found. In addition, no mechanism existed in the vessel to degrade the resin, since the reactor water was cold. Finally, activities associated with the repair of the instrument nozzle safe end were considered. During this work, a nitrogen compound was used for etching the stainless steel prior to welding. However, the quantities used for this purpose would not produce the levels of nitrogen concentrations in the reactor water found during this excursion. During this repair work, no spillage of this nitrogen compound was reported.

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Browns Ferry - Unit 2	0500026085	-	004	-	01	03	OF 03

TEXT: (If more space is required, use additional NRC Form 365A's) (17)

Prior to returning the RWCU system to service after reflood, the pH of the reactor water had already been significantly reduced as the result of air saturation. Absorption of carbon dioxide from the atmosphere promotes formation of bicarbonate acid and the accompanying reduction in pH. With the RWCU system in service, the bicarbonate is continually removed from the reactor water. Without the cleanup process, air saturation of the reactor water would result in a reduction of the reactor water pH. Following return of the RWCU system the noted decline in the reactor water of 0.35 pH units may have occurred as the result of the circulation of an impurity present in the reactor water. However, to reduce the probability of recurrence and improve our ability to measure reactor water quality during periods of low vessel inventory the following items are being followed.

1. Inclusion of formal procedures for handling of chemistry deviations in the special operating instructions for future safe end replacement work.
2. Perform a follow-up study of the reactor vessel drain sampling point to ensure that representative samples are obtained.

A metallurgical evaluation revealed that the deviation would have very little or no effect on the reactor since nitrogen oxides which were the primary impurities found in the reactor water sample do not aggressively attack stainless steel. A specific cause for the pH reduction has, however, not been determined.

Responsible Plant Section - None

Previous Events - None

TENNESSEE VALLEY AUTHORITY

Browns Ferry Nuclear Plant

P.O. Box 2000

Decatur, Alabama 35602

January 24, 1986

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

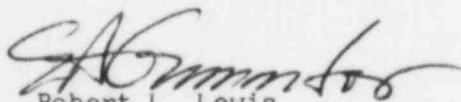
Dear Sir:

TENNESSEE VALLEY AUTHORITY - BROWNS FERRY NUCLEAR PLANT UNIT 2 - DOCKET
NO. 50-260 - FACILITY OPERATING LICENSE DPR-52 - REPORTABLE OCCURRENCE
REPORT BFRO-50-260/85004 R1

The enclosed report provides details concerning the reactor water
chemistry - low pH. This report is submitted in accordance to
10 CFR 50.73 (a)(2)(i).

Very truly yours,

TENNESSEE VALLEY AUTHORITY



Robert L. Lewis
Plant Manager
Browns Ferry Nuclear Plant

Enclosures

cc (Enclosures):

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NRC Resident Inspector, Browns Ferry Nuclear Plant

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