ENTERGY

Entergy Operations, Inc.
River Bend Station
5485 U.S. Highway 61
P.O. Box 220
St. Francisville, LA 70775
Tel 504 336 6225
Fax 504 635 5068

James J. Fisicaro
Director
Nuclear Safety

February 1, 1996

U.S. Nuclear Regulatory Commission
Document Control Desk
Mail Stop P1-37
Washington, D.C 20555

Subject: River Bend Station - Unit 1
Docket No. 50-458
License No. NPF-47
Licensee Event Report 50-458/96-002-00
File Nos. G9.5, G9.25.1.3

RBG-42434
RBF1-96-0019

Gentlemen:

In accordance with 10CFR50.73, enclosed is the subject report.

Sincerely,

JW Leavines for
JJ Fisicaro

JJF/BMB/kvm
enclosure

050049

IE22
1/1

cc: U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011

NRC Sr. Resident Inspector
P. O. Box 1051
St. Francisville, LA 70775

INPO Records Center
700 Galleria Parkway
Atlanta, GA 30339-3064

Mr. C. R. Oberg
Public Utility Commission of Texas
7800 Shoal Creek Blvd., Suite 400 North
Austin, TX 78757

Louisiana Department of Environmental Quality
Radiation Protection Division
P. O. Box 82135
Baton Rouge, LA 70884-2135
ATTN: Administrator

NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
River Bend Station	**05000-458**	**1 of 4**

TITLE (4)

Residual Heat Removal - Suppression Pool Return Pipe Weld Failure

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 NAME	DOCKET NUMBER
									N/A	05000
01	05	96	96	002	00	02	01	96	N/A	05000

OPERATING MODE (9)	3
POWER LEVEL (10)	0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more (11))

	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)
	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
	20.405(a)(1)(iii)	x	50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in abstract below and in text, NRC Form 366A)
	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)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
David N. Lorfing, Supervisor - Nuclear Licensing	**504-381-4157**

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE)	x	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On January 5, 1996, the plant was in Mode 3 cooling down for refueling outage (RF) - 6. At approximately 0620 hours it was discovered that the return piping for the Division II (B) Residual Heat Removal (RHR) (*BO*) system, was missing from approximately one foot above the suppression pool level to below the water level. This piping provides a flow path from the pump discharge into the suppression pool. The failure appeared to have occurred at the bimetallic weld of the pipe. The containment penetration was isolated as required by Technical Specification 3.6.1.3. Investigation determined the failure was the result of lack of fusion on the carbon steel side of the weld. Therefore, the water seal required for containment isolation did not exist and this penetration has not been in compliance with specification 3.6.1.3, which is being reported pursuant 10 CFR 50.73 (a) (2) (i) (B).

The pipe was reassembled in the system during the scheduled maintenance period this outage. An evaluation of the safety significance determined the health and safety of the public was not compromised at any time during the event.

Note: Energy Industry Identification Codes are identified in the text as (*XX*).

REPORTED CONDITION:

On January 5, 1996, the plant was in Mode 3 cooling down for refueling outage (RF) - 6. Mode 4 was scheduled to be entered within approximately 12 hours. At approximately 0620 hours, during initiation of the upper pool gravity drain for flushing RHR "B" as part of refueling activities, a building operator noticed that the minimum flow / test return piping was missing from approximately one foot above the suppression pool level to below the water level. This piping provides a flow path from the pump discharge into the suppression pool below the minimum water level. The failure appeared to have occurred at the bimetallic weld of the pipe. The control room personnel were notified and the upper pool flush was secured. The containment penetration was isolated as required by Technical Specification 3.6.1.3. Technical Specification 3.5.1, Emergency Core Cooling System (ECCS) was also entered.

The weld did pass a hydrostatic test; therefore, the water seal required for containment existed at the time of original construction. While the water seal assumed in the design did exist at the time of original construction, the weld was not in agreement with design requirements. As a result, this penetration has not been in compliance with specification 3.6.1.3, which is being reported pursuant 10 CFR 50.73 (a) (2) (i) (B).

INVESTIGATION:

A Significant Event Response Team (SERT) was formed to investigate the cause of the failure and to determine corrective actions. Divers in the suppression pool viewed the broken pipe, submerged pipe support, and surrounding equipment and verified no collateral damage had occurred. The divers also were able to rig and recover the pipe piece for further analysis. The piece was successfully recovered and inspected by the engineering staff.

Samples from both sides of the fracture (stainless and carbon steel) were subjected to detailed metallurgical evaluation. The results of the metallurgical evaluation showed the existence of lack of fusion (LOF) on the carbon steel side of the bimetallic weld over 80% of the circumference and was through wall at those locations. The remaining 20% of the circumference, which was fused at two locations of the remaining ligaments, showed fatigue fracture in both locations. The fracture initiated from the inside diameter with the lack of fusion acting as a pre-existing crack propagating through the weld metal and finally severing with ductile tearing. Evaluation of the heat affected zone (HAZ) on the carbon steel side at the nonfused locations showed no extensive corrosion. Corrosion was ruled out as a mechanism for lack of bonding between the carbon steel and the weld metal. All metallurgical examination pointed toward the lack of fusion during the welding of this pipe. Historical research of the failed bimetallic weld for RHR "B" revealed that the bimetallic shop weld has not had any work performed directly on it since original construction.

This pipe spool piece was fabricated by B. F. Shaw who supplied greater than 2-inch bore diameter shop piping for non-Nuclear Steam Supply System systems at River Bend. A review of the shop fabrication records confirmed the weld had successfully passed a hydrostatic test demonstrating a leak-tight weld.

ROOT CAUSE:

Approximately 80% LOF was shown on the fracture surface as confirmed by the metallurgical examination. Possible causes for lack of fusion in the bimetallic weld include: low heat input, improper weld technique, and improper cleaning of weld joints. In the metallurgical examination, the results show that it is very likely that the proper procedure, the correct filler material and proper cleaning were used.

The evaluation determined improper heat input and/or improper weld technique were the probable causes of the lack of fusion within this bimetallic weldment. These are common process specific problems which lead to faulty weldments typically in bimetallic joints.

A contributing cause of the piping failure is vibration induced high cycle / low stress fatigue for the remaining 20% of the weld. Another factor influencing this event was the misjudgment in the interpretation of the radiographic data for the weld. The abnormal indication which appeared on the radiograph was incorrectly interpreted as having been due only to weld mismatch at the carbon steel to stainless steel interface.

CORRECTIVE ACTIONS

To assure no similar failure in the test return line for RHR - A loop (Division I), an ultrasonic examination (UT) was performed on the weld joint which is the equivalent bimetallic weld for the "A" RHR test return line, (this weld was replaced with a field weld during construction). RHR "A" was evaluated and determined to have no flaws at the bimetallic weld location.

It was determined that this failure is limited in scope, and can be bounded by the following criteria:

- Safety-related welds that are not included in the In-Service Inspection (ISI) program. All welds within the ISI program either receive some form of examination or a specific relief has been obtained. This type of defective welding would have been recognized early in the program.

- Welds not subjected to high system pressures or hydrostatic testing. Welds in this category would have evidenced this type of failure earlier. This criteria does capture other open ended piping going into the suppression pool.

- Due to metallurgical considerations this type of failure would be more likely to occur in bimetallic welds. This criteria captured B. F. Shaw shop welds, in the above criteria, where the failed weld was fabricated.

A review of other open-ended piping going into the suppression pool and having bimetallic welds, was conducted by re-review of historic radiographs to determine if any additional bimetallic welds exhibited similar indications as the film for RHR 'B' shop weld. After review by a Radiography Level III Inspector, no additional welds were identified as having the same or similar weld configuration (mismatch) as RHR 'B'. In addition, the weld radiograph review indicated no other disqualifying weld features. The review of the radiographic shop fabricated bimetallic weld records (historic) which are subject to criteria above identified a total of fourteen welds that enveloped this criteria. Of the welds reviewed, only the failed weld in the RHR "B" test return line had disqualifying indications.

To restore the test return line on the Division II pipe to service: The pipe will be reassembled using the existing stainless steel elbow and pipe (less a 5" cut section), and a carbon steel extension to make up for the cut section. This pipe was reassembled in the system during the scheduled maintenance period in the current refueling outage.

SAFETY ASSESSMENT

The affected portion of the RHR system provides a path from the pump discharge to the suppression pool. This path is used for three RHR functions: suppression pool cooling, full flow testing, and pump minimum flow returns. An evaluation was performed to determine the safety impact of the existing condition. The remaining piping configuration of Division II was evaluated and determined to maintain its configuration during the Loss of Coolant Accident (LOCA) "suppression pool swell" loads. The offsite dose consequences of the severed pipe would also be bounded by the existing analysis. The potential release path through the severed line is to a closed fluid system in the Auxiliary Building. The existing design basis offsite dose calculations includes the contribution due to ECCS leakage. Therefore, there would not be a resulting increase in offsite dose due to the severed pipe. Results from leak testing performed during RF-5 indicated that the leakage rate assumed in the radiological calculations was 63 times the measured leakage rate for all ECCS systems. Additionally, the containment pressure driving any leakage from containment into the RHR "B" pipe would be much less than the discharge pressure of any ECCS pump during postulated transients.

Therefore, the loss of isolation did not degrade the ability of the plant to mitigate the consequences of an accident. The health and safety of the public were not compromised at any time during this event.