U.S. NUCLEAR REGULATORY COMMISSION
REGION 1

DOCKET NO.	50-458
REPORT NO.	92-14
LICENSE NO.	DPR-27
LICENSEE:	Gulf States Utility Company PO Box 2951 Beaumont, Louisiana 77704
FACILITY NAME:	River Bend Nuclear Plant Unit 1
INSPECTION AT:	St. Francisville, LA
INSPECTION DATES:	May 4, 1992 to May 15, 1992

Inspectors: _____ 5/26/92
P. M. Peterson, Technician, Mobile NDE Laboratory, Engineering Branch, DRS — Date

_____ 5/26/92
R. H. Harris, Technician, Mobile NDE Laboratory, Engineering Branch, DRS — Date

D. C. Wiggins; TET, Inc.; Mobile, Alabama

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Approved by: _____ 5/22/92
M. C. Modes, Chief, Mobile NDE Laboratory, Engineering Branch, DRS — Date

Inspection Summary and Conclusions: An announced inspection was conducted by the NRC's Mobile Nondestructive Evaluation (NDE) Laboratory at River Bend Station, Unit 1, during the period May 4 through 15, 1991, (Report No. 50-458/92-14). The purpose of the Mobile Nondestructive Examination (NDE) Laboratory is to perform independent evaluations of components, systems and welds to assure that NDE performed by the licensee is done in compliance with the requirements.

Areas Inspected: Selected areas of the reactor coolant injection (ICS), reactor water cleanup system (WCS), residual heat removal system (RHS), feedwater system (FWS), safety relief valve system (SVV), main steam system (MSS), stand by liquid control system (SLS), and the control rod drive system (RDS) were examined by the NRC utilizing various NDE methods as listed in the attached tables. The licensee's procedures, in conjunction with NRC procedures, were used for nondestructive evaluation. The licensee's final evaluation reports were reviewed and compared with the results obtained by the NRC.

Results: The inservice inspections, evaluated by the NRC, were thorough, detailed and in full compliance with the requirements of the Federal Code and ASME Section XI. The program for inspection is well manned by professional and enthusiastic personnel and uses capable vendors. The individual inspections performed were conservatively executed and recorded in greater detail than required by the code. This made for more precise analysis of indications along with comparison against historical records.

1.0 INTRODUCTION

The Code of Federal Regulations, 10 CFR 50.55a requires that inservice inspections of safety related equipment be performed to identify any service related degradation of safety systems. These inspections are required to be performed in accordance with the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI for Inservice Inspection. This inspection was made using the Mobile Nondestructive Examination (NDE) Laboratory. The Mobile NDE Laboratory is capable of independently duplicating the examinations required of the licensee. This provides the NRC with an overview of the licensee's inservice inspection (ISI) program and tests the adequacy and accuracy of the licensee's inspections.

2.0 INSERVICE INSPECTION PROGRAM REVIEW

The official inservice inspection program is the *ISI Plan 1st Interval Revision 03* issued August 2, 1988 and approved by the NRC under letter dated April 3, 1990. This program includes thirteen (13) relief requests and forty nine (49) plan change notifications (PCN). In order to keep the program current, River Bend is committed to revising the program after each outage is completed. Thus revision 4 of the program was issued with 37 PCN's and the current plan is revision 5 with 15 PCN's. After each revision of the plan a copy is sent to NRR for approval. The ISI program has committed to ASME Section XI, 1974 Edition with Addenda to Summer of 1975 for the selection of welds in the emergency core cooling system and residual heat removal system as required in 10 CFR 50.55a (b) (2) (iv). The remainder of the program along with ancillary procedures for NDE, conforms to ASME Section XI, 1980 Edition with the Addenda to the Winter of 1981. The only exception to this commitment is the evaluation of intergranular stress corrosion cracking to ASME Section XI, 1983 Edition, paragraph IWB 3640 with out any addenda. The program disallows the use of automated ultrasonic equipment on vessel safe-ends smaller than 10 nominal diameter.

3.0 INDEPENDENT MEASUREMENTS - NONDESTRUCTIVE EXAMINATION AND QUALITY RECORDS REVIEW OF SAFETY-RELATED SYSTEMS

During the period of May 4 through 14, 1991, an onsite independent inspection was conducted of the River Bend Station. The inspection was performed by NRC inspectors and NDE personnel contracted by the NRC. The objectives of this inspection were to assess the adequacy of the licensee's inservice inspection and flow assisted corrosion (FAC) inspection program.

These objectives were accomplished by independently performing selected examinations required of the licensee by regulations and codes.

3.1 Visual Examination (Inspection Procedure 57050)

Fifteen (15) safety related hangers were visually examined in accordance with NRC procedure NDE-10, Rev. 1, Appendix B, and Gulf States Utility procedure QCI-3.25: Visual Examination VT-3; Revision 7, dated 1/27/92. Visual examination was performed utilizing QC documents, isometrics and as-built drawings. Included in this inspection were ASME Class 3 hangers selected from the SVV system and Class 1 hangers selected from the MSS system. The purpose of this examination is to determine the general mechanical and structural conditions of components and their supports, such as the presence of loose parts, debris or abnormal corrosion products, wear, erosion, corrosion, and the loss of integrity at bolted or welded connections.

Thirty eight (38) safety related pipe weldments and adjacent base material (1/2 inch on either side of the weld) were visually examined in accordance with NRC procedure NDE-10, Rev. 1, Appendix A, and River Bend procedure QCI-3.23 Revision 4, dated 10/5/90. Visual examination was performed of pipe systems and attached components utilizing QC documents, isometrics and as-built drawings. Included in this inspection were the samples listed in Table 1 under section 5.0 of this report. The examination was performed specifically to identify any cracks or linear indications, gouges, leakage, arc strikes with craters, or corrosion, which may infringe upon the minimum pipe wall thickness. Mirrors, flash lights and weld gauges were used, as required, to aid in the inspection and evaluation of the weldments.

Results: The welds were found to be in compliance with the visual standards applicable to their classification with good surface preparation and appearance. The hangers listed in Table 2 of section 5.0 were in acceptable condition with no missing parts.

3.2 Liquid Penetrant Examination (57060)

Five (5) safety related pipe weldments and adjacent base material (1/2 inch on either side of the weld) were examined using the visible dye, solvent removable, liquid penetrant method per NRC procedure NDE-9, Rev. 0, in conjunction with the River Bend procedure QCI-3.13, Revision 6, dated 10/5/90. For a listing of welds see Table 1 in Section 4.0.

Results: The results of the liquid penetrant examinations compared favorably with the results reported by the River Bend subcontractor.

3.3 Magnetic Particle Examination (57070)

Seventeen (17) safety related pipe weldments and adjacent base material (1/2 on each side of the weld) were examined using the red dry powder magnetic particle method. The magnetization was by induced field with a solid state yoke utilizing AC. NRC procedure NDE-6, Rev 0 was used in conjunction with the licensee procedure QCI-3.12, Revision 5, dated July 10, 1990. A listing of the welds examined can be found in section 5.0 Table 1.

Results: The examinations performed by the NRC did not reveal any indications that had not been previously disposed of by the licensee.

3.4 Ultrasonic Examination (57080)

Sixteen (16) safety related pipe weldments were ultrasonically examined using a Stavely Model 136D ultrasonic flaw detector in accordance with NRC procedure NDE-1 Revision 1 and River Bend approved subcontractor procedure GS-UT-W81-3 Revision 3, dated 8/21/90. The specific weld identifications are listed in Table 1 in Section 5.0 of this report. The Stavely Model 136D was verified for linearity in conformance with NRC procedure NDE-2 Rev 1. To obtain the greatest possible repeatability the examination was undertaken utilizing transducers and cable that matched, as closely as possible, those used by the licensee . The distance amplitude compensation curves, used for acceptance of the welds, was established utilizing River Bend calibration standards. The specific calibration standards applicable to the welds are listed in the footnote to Table 1 in Section 5.0 of this report.

In addition to a direct comparison of the results of the ultrasonic examination, a number of the welds were profiled utilizing a profile gauge and thickness readings. This data was used to construct a scale model of the weld in order to determine if adequate coverage was obtained in keeping with the requirements of ASME Section XI, Appendix III. These coverage calculations were then compared with the coverage claimed by the subcontractor and accepted by the licensee in the final inspection reports.

Results: All the examinations compared favorably. The results of the NRC examinations were essentially the same as those of the River Bend subcontractor. The calculations for coverage, based on profile data, showed adequate coverage was being obtained. The examinations, performed by the subcontractor, were accurate, conservative, and detailed. Careful consideration was reflected in the reports by the number of notes and comments referring to additional evaluations undertaken to determine conclusively the results of an examination.

3.5 Radiography (57090)

During the current outage, River Bend Station was preparing to replace a reactor vessel feedwater inlet nozzle (NA) and the piping attached to it. The NRC Mobile NDE Laboratory chose two sections of the replacement piping for radiography. The sections chosen at random from the holding area of the receiving warehouse were 1-WCS*003-A1 (with welds 01 to 06) and 1-WCS*001-SW (with welds 01 to 06). The welds were radiographed utilizing four, double wall exposures per weld using two film per cassette. The resulting 96 film were evaluated for acceptance.

Results: The results of the NRC Mobile NDE Laboratory radiography compared favorably with the radiographs taken by the vendor producing the spool pieces.

3.6 Flow Assisted Corrosion (49001)

Concerns regarding flow assisted corrosion (a. k. a., erosion/corrosion) in balance of plant piping systems nas heighten as a result of the December 9, 1986 feedwater piping line rupture which occurred at Surry. This event was the subject of the NRC Information Notice 86-106, issued December 16, 1986, and its supplement issued on February 13, 1987.

The licensee's actions with regard to the detection of erosion/corrosion in plant components were reviewed with respect to NUREG-1344, "Erosion/Corrosion Induced Pipe Wall Thinning in U.S. Nuclear Power Plants", dated April 1989, Generic Letter 88-08 issued May 2, 1989, and NUMARC Technical Subcommittee Working Group on Piping and Erosion /Corrosion Summary Report, dated June 11, 1987.

The River Bend flow assisted corrosion (FAC) inspection program is defined in their procedure INS-17-004, Revision 2, dated 11/1/91. The program is administered by the supervisor of ISI under the authority of the manager of oversight. The following systems are included in the program per 5.7.2 of their procedure: cold reheat (cross-under piping), hot reheat (cross-over piping), high pressure turbine extraction steam, low pressure turbine extraction steam, heater drains and vents, turbine drains (drains to condenser), feedwater (including inside containment), condensate, service water (as an augmented inspection), residual heat removal, and feedwater recirculation. In addition to this determination; the CHECKMATE program is used to model the plant. The original warranted GE heat-balance calculation has been replaced by plant specific calculation.

River Bend uses a complex series of calculations to determine the remaining wall thickness of a component. The basis for projected wear is cycles which gives rise to an inspection index. This index may be arbitrarily adjusted by a constant multiplier based on flow rate. This number is assigned by the supervisor of ISI. If the component is predicted to wear below the design based minimum wall before the next outage (designated by River Bend as an inspection index ≤ 1) the component shall: "replace, repair, perform ISI/Engineering evaluation or inspect first available opportunity as specified by ISI group." Two condition reports were reviewed that were generated based on components exceeding the design basis min wall.

The flow assisted program at River Bend is comprehensive and complete. It exceeds the industry recommendations in every regard and takes a conservative approach in its sampling and application.

4.0 REVIEW OF SITE NDE PROCEDURES AND MANUALS

PROCEDURE	TITLE	REV	DATE
UT-CP-2	Procedure for Inspection System Performance Checks	1	11/4/86
UT-CP-3	Procedure for P-Scan Inspection System Performance Checks	3	8/30/91
GS-UT-W81-1	UT Manual Examination of Class 1 & 2 Vessel Welds Greater Than 2 Inches Including RPV Welds	1	8/3/9
GS-UT-W81-2	Ultrasonic Examination of Class 1 Class 1 & 2 Vessel Welds Less Than or Equal to 2 inches	3	8/21/90
GS-UT-W81-3	Ultrasonic Examination of Class 1 & 2 Piping Welds Joining Similar and Dissimilar Materials	3	8/21/90
GS-UT-W81-4	Ultrasonic Examination for the Detection of Intergranular Stress Corrosion Cracking	4	8/21/90
GS-UT-W81-5	Ultrasonic Examination of Pressure Retaining RPV Studs 2 Inches or Greater with Bore Holes	5	8/21/90
GS-UT-W81-6	Ultrasonic Manual Examination of Class 1 & 2 Bolts and Studs	3	8/21/90
GS-UT-W81-7	Ultrasonic Examination Procedure for the Sizing of IGSCC	2	8/3/87
GS-UT-W81-8	UT Manual Examination of Class 1 Reactor Vessel Welds Covered by Regulatory Guide 1.150	4	8/21/91
GS-UT-W81-9	Ultrasonic Manual Examination of the Reactor Vessel Flange Ligament Areas	0	7/31/87

GS-UT-W81-10	Ultrasonic Examination of Pressure Retaining RPV Studs 2 inches or Greater with Bore Holes	0	12/15/88
GS-UT-W81-11	Ultrasonic Examination For Nozzle Inner-Radius	1	3/15/89
GS-UT-W81-12	Ultrasonic Examination For Detection of Cracking in Alloy 182 Nozzle Weldments	1	8/21/90
GS-UT-W81-13	Procedure for the Manual Ultrasonic Examination of Weld Overlay Repairs	0	5/1/89
GS-UT-W81-P2	Automated Ultrasonic Examination of Piping (P-Scan Detection)	1	8/30/91
GS-UT-W81-P3	Automated Ultrasonic Examination Piping (P-Scan Sizing)	1	8/30/91
QCI-3.12	Magnetic Particle Examination (MT) Dry Method	5	7/10/90
QCI-3.13	Liquid Penetrant Examination (PT)	6	10/5/90
QCI-3.23	Visual Examination VT-1	4	10/5/90
QCI-3.24	Visual Examination VT-2	4	10/5/90
QCI-3.25	Visual Examination VT-3	7	1/27/92
QCI-3.26	Visual Examination VT-4	4	9/19/90
QCI-3.27	Ultrasonic Examination of Similar and Dissimilar Pipe Welds	3	5/14/90
QCI-3.28	Ultrasonic Thickness Measurement	3	5/14/90
QCI-3.29	Radiographic Examination Requirements	2	8/15/90
QCI-3.35	Magnetic Particle Examination (MT) Fluorescent Method	3	8/12/91

QCI-3.38	Visual Examination VT-1 and VT-3 of Reactor Pressure Vessel (RPV) Internals	1	6/3/91
QCI-3.39	Fluorescent Penetrant Examination	1	5/4/91
QCI-3.48	Manual Ultrasonic Examination for Detection of Intergranular Stress Corrosion Cracking	0	3/15/92
N315DWP00001	Equivalency Determination Between Inspection Cables and the Calibration Cable	None	None
N315ISI00006	Marking and Identification of Components for Inservice Inspection	None	7/13/84
N001ISI000001	Preservice/Inservice Inspection Ultrasonic Examination of BWR Vessel Shell Welds	A	12/11/86
N001ISI000002	Preservice/Inservice Inspection Ultrasonic Examination of Boiling Water Reactor Safe End to Nozzle Welds and Safe End to Pipe Welds	None	12/11/86
N001ISI000003	Inservice Inspection - Ultrasonic Examination of BWR Nozzle Inside Radius Section from the Outside Surface	B	12/11/86

5.0 COMPONENTS AND WELDS INSPECTED BY NRC

NRC INDEPENDENT MEASUREMENTS TABLE No. 1									
WELD ID. No. OR ISO/DRAWING	SYS OR LIN	NONDESTRUCTIVE TEST						SHT.# 1	
		CL	RT	UT	PT	MT	VT	ACC	REJ
ICS*006B-FW001	ICS	2		1		X	X	X	
ICS*006B-FW007A	ICS	2		1		X	X	X	
ICS*006B-FW008	ICS	2		1		X	X	X	
ICS*006A-FW003	ICS	2		1		X	X	X	
ICS*006A-SW012	ICS	2		1		X	X	X	
ICS*006A-SW013	ICS	2		1		X	X	X	
WCS*001-A1-SW-01	WCS	1	X				X	X	
WCS*001-A1-SW-02	WCS	1	X				X	X	
WCS*001-A1-SW-03	WCS	1	X				X	X	
WCS*001-A1-SW-04	WCS	1	X				X	X	
WCS*001-A1-SW-05	WCS	1	X				X	X	
WCS*001-A1-SW-06	WCS	1	X				X	X	
WCS*003-A1-01	WCS	1	X				X	X	
WCS*003-A1-02	WCS	1	X				X	X	
WCS*003-A1-03	WCS	1	X				X	X	
WCS*003-A1-04	WCS	1	X				X	X	
WCS*003-A1-05	WCS	1	X				X	X	
WCS*003-A1-06	WCS	1	X				X	X	
RHS*014B-SW031	RHS	2		2		X	X	X	
RHS*155A-FW001A	RHS	2			X		X	X	
RHS*155A-SW001	RHS	2			X		X	X	
RHS*006A-FW001	RHS	2				X	X	X	

NRC INDEPENDENT MEASUREMENTS TABLE No. 1 (CONTINUED)									
WELD ID. No. OR ISO/DRAWING	SYS OR LIN	NONDESTRUCTIVE TEST						SHT. # 2	
		CL	RT	UT	PT	MT	VT	ACC	REJ
ICS*006B-FW009	ICS	2				X	X	X	
ICS*006B-FW011B	ICS	2		1		X	X	X	
FWS*062A-FW004	FWS	2		3		X	X	X	
FWS*063A-FW005	FWS	2		3		X	X	X	
FWS*063A-FW006	FWS	2		3		X	X	X	
FWS*063A-SW031	FWS	2		3		X	X	X	
RDS*067-SW037	RDS	2		4			X	X	
DS*067-SW039	RDS	2		4			X	X	
SLS*006B-FW013B	SLS	2			X		X	X	
SLS*007A-FW023A	SLS	2			X		X	X	
SLS*042B-FW001	SLS	2			X		X	X	
RHS*036B-FW12X1	RHS	2		5			X	X	
HS-036C-SW017	RHS	2		5			X	X	
RHS*006A-SW002	RHS	2				X	X	X	
RHS*006A-SW003	RHS	2				X	X	X	
ICS*006B-FW006	ICS	2				X	X	X	

NOTES:
(1) Ultrasonic examination calibrated with River Bend calibration block RBS-03
(2) Ultrasonic examination calibrated with River Bend calibration block RBS-10
(3) Ultrasonic examination calibrated with River Bend calibration block RBS-22
(4) Ultrasonic examination calibrated with River Bend calibration block RBS-09
(5) Ultrasonic examination calibrated with River Bend calibration block RBS-06

NRC INDEPENDENT MEASUREMENTS PROGRAM HANGER/SUPPORTS TABLE 2					
IDENTIFICATION	SYS	CL	ACC	REJ	COMMENTS
1RHS*PSA2265A2	RHS	2	X		STM TNL
1RHS*PSST2210A2	HRS	2	X		" "
1SVV*PSSP3036A3	SVV	3	X		DRYWELL
1SVV*PSSP3134A3	SVV	3	X		" "
1SVV*PSSP3223A3	SVV	3	X		" "
1SVV*PSSP3053A3	SVV	3	X		" "
1SVV*PSSP3046A3	SVV	3	X		" "
1SVV*PSSP3135A3	SVV	3	X		" "
1SVV*PSSP3208A3	SVV	3	X		" "
1SVV*PSSH3207A3	SVV	3	X		" "
1SVV*PSR3047A3	SVV	3	X		" "
1SVV*PSR3108A3	SVV	3	X		" "
1SVV*PSSP3107A3	SVV	3	X		" "
1ICS*PSSH3009A1-A	ICS	1	X		REFUEL
1ICS*PSSH3009A1-B	ICS	1	X		FLOOR
1MSS*PSSP3001A1	MSS	1	X		" "
1MSS*PSSP3013A1	MSS	1	X		" "
1MSS*PSSP3011A1	MSS	1	X		" "
1RHS*PSSH2019A2-A	RHS	2	X		" "
1RHS*PSSH2019A2-B	RHS	2	X		" "

6.0 MANAGEMENT MEETINGS

Licensee management was informed of the scope and purpose of the inspection at the entrance interview on May 4, 1992. The findings of the inspection were discussed with the licensee representatives during the course of the inspection and presented to licensee management at the exit interview (see paragraph 7.0 for those who attended).

7.0 EXIT INTERVIEW

On May 15, 1992 an exit interview was held with members of the licensee's staff listed in Section 8.0. At the meeting, the findings of the inspection were discussed with licensee's management.

8.0 PERSONS CONTACTED

Gulf States Utility Company

*	D. L. Andrews	Director Quality Assurance
*	J. B. Blakley	Supervisor ASME ISI
*	W. G. Chatterton	ISI/QA
*	R. K. Jackson	ISI/QA
*	F. E. Lenox Jr.	ISI/QA
*	M. W. Briley	GSU/QC
*	R. W. Wright Sr.	GSU/ISI/EC
*	R. Carlyle	GSU/QA-ISI
	W. H. Odell	Manager GSU/Oversight
	J. C. Deddens	Sr. Vice President
	C. W. Walker	Supervisor Quality Control

Nuclear Regulatory Commission

I. Barnes	Chief M&SP, RIV
L. Gilbert	Inspector

* Persons attending the exit and entrance meetings.