



Entergy Operations, Inc.  
River Bend Station  
5485 U.S. Highway 61N  
St. Francisville, LA 70775  
Tel 225-381-4157

William F. Maguire  
Site Vice President

RBG-47791

October 12, 2017

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555

Subject: Licensee Event Report 50-458 / 2017-008-00  
River Bend Station – Unit 1  
Docket No. 50-458  
License No. NPF-47

RBF1-17-0119

Dear Sir or Madam:

In accordance with 10 CFR 50.73, enclosed is the subject Licensee Event Report. This document contains no commitments. If you have any questions, please contact Mr. Tim Schenk at 225-381-4177.

Sincerely,

A handwritten signature in black ink, appearing to read "W. F. Maguire", with a large, stylized loop at the bottom.

WFM / dhw

Enclosure

cc: U. S. Nuclear Regulatory Commission  
Region IV  
1600 East Lamar Blvd.  
Arlington, TX 76011-4511

NRC Sr. Resident Inspector  
P. O. Box 1050  
St. Francisville, LA 70775

INPO  
(via ICES reporting)

Licensee Event Report 50-458 / 2017-008-00  
October 12, 2017  
RBG-47791  
Page 2 of 2

Central Records Clerk  
Public Utility Commission of Texas  
1701 N. Congress Ave.  
Austin, TX 78711-3326

Department of Environmental Quality  
Office of Environmental Compliance  
Radiological Emergency Planning and Response Section  
Ji Young Wiley  
P.O. Box 4312  
Baton Rouge, LA 70821-4312

NRC FORM 366 (04-2017)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB: NO. 3150-0104		EXPIRES: 03/31/2020				
<b>LICENSEE EVENT REPORT (LER)</b> (See Page 2 for required number of digits/characters for each block)											
(See NUREG-1022, R.3 for instruction and guidance for completing this form <a href="http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/">http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/</a> )											
1. FACILITY NAME River Bend Station – Unit 1					2. DOCKET NUMBER 05000-458			3. PAGE 1 OF 3			
4. TITLE Automatic Reactor Scram due to Failure of Main Feedwater Regulator Transfer Relay											
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER	
08	18	2017	2017	008	00	10	12	2017		05000	
									FACILITY NAME	DOCKET NUMBER	
										05000	
9. OPERATING MODE		11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)									
1		<input type="checkbox"/> 20.2201(b)			<input type="checkbox"/> 20.2203(a)(3)(i)			<input type="checkbox"/> 50.73(a)(2)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
		<input type="checkbox"/> 20.2201(d)			<input type="checkbox"/> 20.2203(a)(3)(ii)			<input type="checkbox"/> 50.73(a)(2)(ii)(B)		<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
		<input type="checkbox"/> 20.2203(a)(1)			<input type="checkbox"/> 20.2203(a)(4)			<input type="checkbox"/> 50.73(a)(2)(iii)		<input type="checkbox"/> 50.73(a)(2)(ix)(A)	
		<input type="checkbox"/> 20.2203(a)(2)(i)			<input type="checkbox"/> 50.36(c)(1)(i)(A)			<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)		<input type="checkbox"/> 50.73(a)(2)(x)	
10. POWER LEVEL		<input type="checkbox"/> 20.2203(a)(2)(ii)			<input type="checkbox"/> 50.36(c)(1)(ii)(A)			<input type="checkbox"/> 50.73(a)(2)(v)(A)		<input type="checkbox"/> 73.71(a)(4)	
		<input type="checkbox"/> 20.2203(a)(2)(iii)			<input type="checkbox"/> 50.36(c)(2)			<input type="checkbox"/> 50.73(a)(2)(v)(B)		<input type="checkbox"/> 73.71(a)(5)	
		<input type="checkbox"/> 20.2203(a)(2)(iv)			<input type="checkbox"/> 50.46(a)(3)(ii)			<input type="checkbox"/> 50.73(a)(2)(v)(C)		<input type="checkbox"/> 73.77(a)(1)	
		<input type="checkbox"/> 20.2203(a)(2)(v)			<input type="checkbox"/> 50.73(a)(2)(i)(A)			<input type="checkbox"/> 50.73(a)(2)(v)(D)		<input type="checkbox"/> 73.77(a)(2)(i)	
		<input type="checkbox"/> 20.2203(a)(2)(vi)			<input type="checkbox"/> 50.73(a)(2)(i)(B)			<input type="checkbox"/> 50.73(a)(2)(vii)		<input type="checkbox"/> 73.77(a)(2)(ii)	
		<input type="checkbox"/> 50.73(a)(2)(i)(C)			<input type="checkbox"/> OTHER			Specify in Abstract below or in NRC Form 366A			
12. LICENSEE CONTACT FOR THIS LER											
LICENSEE CONTACT Tim Schenk, Manager – Regulatory Assurance								TELEPHONE NUMBER (Include Area Code) 225-381-4177			
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT											
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX		
D	SJ	83	Agastat	yes							
14. SUPPLEMENTAL REPORT EXPECTED					15. EXPECTED SUBMISSION DATE						
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE)					<input checked="" type="checkbox"/> NO						
					MONTH      DAY      YEAR						
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)											
On August 18, 2017, at 8:55 p.m. CDT, an automatic reactor scram occurred while the plant was operating at 100 percent power. The operators promptly established control of reactor water level and pressure, and a controlled plant cooldown was commenced. The initial scram signal was a flow-biased thermal power trip on the average power range monitors. This action closely followed a planned shift of the master feedwater controller from channel "B" to channel "A." Troubleshooting discovered that the feedwater level channel select relay had failed such that no signal was present on the "A" channel. When that channel was selected, the feedwater system erroneously sensed that reactor water level was low, and caused all three feedwater regulating valves to move fully open. At the same time, the false low water level signal was sensed in the control circuitry for the reactor recirculation system, resulting in an automatic shift of the recirculation pumps to slow speed. The resultant decrease in core flow caused the flow-biased thermal power trip in the average power range monitors, actuating the reactor scram. The failed feedwater system relay was replaced with an updated model with gold contacts. This condition is being reported in accordance with 10 CFR 50.73(a)(2)(iv) as an event resulting in the automatic actuation of the reactor protection system.											



**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

(See NUREG-1022, R.3 for instruction and guidance for completing this form  
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollects.Resource@nrc.gov](mailto:Infocollects.Resource@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOF-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
River Bend Station – Unit 1	05000-458	YEAR	SEQUENTIAL NUMBER	REV NO.
		2017	008	00

**NARRATIVE****REPORTED CONDITION**

On August 18, 2017, at 8:55 p.m. CDT, an automatic reactor scram occurred while the plant was operating at 100 percent power. The operators promptly established control of reactor water level and pressure, and a controlled plant cooldown was commenced. No safety-related equipment was out of service at the time of the scram.

The initial scram signal was a flow-biased thermal trip on the average power range monitors (APRMs). This action closely followed a planned shift of the master feedwater [SJ] controller from channel "B" to channel "A." When the shift was made, all three main feedwater regulating valves unexpectedly moved fully open. At the same time, the reactor recirculation pumps shifted to slow speed.

This condition is being reported in accordance with 10 CFR 50.73(a)(2)(iv) as an event resulting in the automatic actuation of the reactor protection system.

**INVESTIGATION and CAUSAL ANALYSIS**

At the time of the event, operators were performing a planned shift of the controlling channel of the master feedwater regulation system as part a scheduled surveillance test on the system.

Troubleshooting discovered that the feedwater level channel select relay (\*\*83\*\*) had failed, such that no signal was present on the "A" channel. When that channel was selected, the feedwater control system erroneously sensed that reactor water level was low, and caused all three feedwater regulating valves to move fully open. The operator took manual control of the system to restore the feedwater regulating valves to their original positions.

The false low water level signal was also sensed in the control circuitry for the reactor recirculation system. This initiated the automatic downshift of the recirculation pumps to slow speed, as designed. The decrease in core flow resulted in the flow-biased thermal trip in the APRMs.

The failure in the channel select relay was traced to degradation in the electrical contacts on the relay that caused a high resistance condition. This condition also masked an alarm that could have potentially alerted the operator to the fact that the "A" channel was inoperative.

The high resistance condition on the contacts was caused by the use of a relay model with silver contacts instead of gold contacts. Industry operating experience had shown that the Agastat GPI (silver contact) relay, when used in low-current applications, had a tendency to develop contact point oxidation that increased electrical resistance. A parts interchangeability evaluation had been performed in the past at River Bend to approve the Agastat GPIA with gold contacts as a replacement part. However, when that evaluation was performed, the part number for the model GPIA was added to the appropriate design documentation, but the part number for the GPI was not deleted.





**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

(See NUREG-1022, R.3 for instruction and guidance for completing this form  
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollects.Resource@nrc.gov](mailto:Infocollects.Resource@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
River Bend Station – Unit 1	05000-458	YEAR  2017	SEQUENTIAL NUMBER  008	REV NO.  00

**CORRECTIVE ACTIONS TO PREVENT RECURRENCE**

The failed GPI relay was replaced with a GPIA with gold contacts.

Design documentation for the feedwater regulation system will be updated to reflect the model GPIA as the required replacement part. This is being tracked in the corrective action program.

**PREVIOUS OCCURRENCE EVALUATION**

No events with a common root cause have been reported by River Bend Station in the last three years.

**SAFETY SIGNIFICANCE**

The plant response was bounded by the event described in the Updated Safety Analysis Report as a loss of the in-service feedwater level transmitter signal. This event was thus of minimal significance to the health and safety of the public.

(NOTE: Energy Industry Identification System component function identifier and system name of each component or system referred to in the LER are annotated as (\*\*XX\*\*) and [XX], respectively.)

Letter #: RBF1-17-0119

Response Due: 10/17/2017

**Subject:** LER 2017-008-00 (Automatic Reactor  
Scram due to Failure of Main Feedwater Control  
Transfer Relay)

Date Issued for Review: 9/26/2017

Correspondence Preparer / Phone #: Danny Williamson x4279

## Section I

## Letter Concurrence and Agreement to Perform Actions

POSITION / NAME	Action (concurrence, certification, etc.)	Signature (sign, interoffice memo, e-mail, or telecom)
Bill Maguire	(comment / concur)	
Marvin Chase	(comment / concur)	
Tim Schenk	(comment / concur)	(see attached email)
Steve Vercelli	(comment / concur)	(see attached email)
Tim Venable	(comment / concur)	(see attached email)
Sergio Vazquez	(comment / concur)	(see attached email)
James Henderson	(comment / concur)	

## Section II

## Correspondence Screening

Does this letter contain commitments? If "yes," identify the commitments with due dates in the submittal and in Section III. When fleet letters contain commitments, a PCRS LO (e.g., LO-LAR, LO-WT) should be initiated with a CA assigned to each applicable site to enter the commitments into the site's commitment management system.	Yes No	<input type="checkbox"/> <input checked="" type="checkbox"/>
Does this letter contain any information or analyses of new safety issues performed at NRC request or to satisfy a regulatory requirement? If "yes," reflect requirement to update the UFSAR in Section III.	Yes No	<input type="checkbox"/> <input checked="" type="checkbox"/>
Does this letter require any document changes (e.g., procedures, DBDs, FSAR, TS Bases, etc.), if approved? If "yes," indicate in Section III an action for the responsible department to determine the affected documents. (The Correspondence Preparer may indicate the specific documents requiring revision, if known or may initiate an action for review.)	Yes No	<input type="checkbox"/> <input checked="" type="checkbox"/>
Does this letter contain information certified accurate? If "yes," identify the information and document certification in an attachment. (Attachment 9.5 must be used.)	Yes No	<input checked="" type="checkbox"/> <input type="checkbox"/>

## Section III

## Actions and Commitments

Required Actions	Due Date	Responsible Dept.
<i>Note: Actions needed upon approval should be captured in the appropriate action tracking system</i>		
none		
<b>Commitments</b>	<b>Due Date</b>	<b>Responsible Dept.</b>
<i>Note: When fleet letters contain commitments, a PCRS LO should be initiated with a CA assigned to each applicable site to enter the commitments into the site's commitment management system.</i>		
none		

## Section IV Final Document Signoff for Submittal

Correspondence Preparer	Danny Williamson <i>DW</i>
Final Submittal Review (optional)	na
Responsible Department Head	na



## **WILLIAMSON, DANNY H**

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**From:** WILLIAMSON, DANNY H  
**Sent:** Tuesday, October 10, 2017 10:11 AM  
**To:** WILLIAMSON, DANNY H  
**Subject:** FW: \*\*\*\*\*FINAL DRAFT LER\*\*\*\*\*

---

**From:** SCHENK, TIMOTHY A  
**Sent:** Tuesday, October 10, 2017 10:04 AM  
**To:** WILLIAMSON, DANNY H  
**Subject:** RE: \*\*\*\*\*FINAL DRAFT LER\*\*\*\*\*

I concur

*Tim Schenk*

*Regulatory Assurance Manager  
River Bend Station  
Cell 225-405-4793  
Office 225-381-4177*

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### REPORTED CONDITION

On August 18, 2017, at 8:55 p.m. CDT, an automatic reactor scram occurred while the plant was operating at 100 percent power. The operators promptly established control of reactor water level and pressure, and a controlled plant cooldown was commenced. No safety-related equipment was out of service at the time of the scram.

The initial scram signal was a flow-biased thermal trip on the average power range monitors (APRMs). This action closely followed a planned shift of the master feedwater controller from channel "B" to channel "A." When the shift was made, all three main feedwater regulating valves unexpectedly moved fully open. At the same time, the reactor recirculation pumps shifted to slow speed.

This condition is being reported in accordance with 10 CFR 50.73(a)(2)(iv) as an event resulting in the automatic actuation of the reactor protection system.

### INVESTIGATION and CAUSAL ANALYSIS

At the time of the event, operators were performing a planned shift of the controlling channel of the master feedwater regulation system as part a scheduled surveillance test on the system.

Troubleshooting discovered that the feedwater level channel select relay had failed, such that no signal was present on the "A" channel. When that channel was selected, the feedwater control system erroneously sensed that reactor water level was low, and caused all three feedwater regulating valves to move fully open. The operator took manual control of the system to restore the feedwater regulating valves to their original positions.

The false low water level signal was also sensed in the control circuitry for the reactor recirculation system. This initiated the automatic downshift of the recirculation pumps to slow speed, as designed. The decrease in core flow resulted in the flow-biased thermal trip in the APRMs.

The failure in the channel select relay was traced to degradation in the electrical contacts on the relay that caused a high resistance condition. This condition also masked an alarm that could have potentially alerted the operator to the fact that the "A" channel was inoperative.

The high resistance condition on the contacts was caused by the use of a relay model with silver contacts instead of gold contacts. Industry operating experience had shown that the Agastat GPI (silver contact) relay, when used in low-current applications, had a tendency to develop contact point oxidation that increased electrical resistance. A parts interchangeability evaluation had been performed in the past at River Bend to approve the Agastat GPIA with gold contacts as a replacement part. However, when that evaluation was performed, the part number for the model GPIA was added to the appropriate design documentation, but the part number for the GPI was not deleted.

#### CORRECTIVE ACTIONS TO PREVENT RECURRENCE

The failed GPI relay was replaced with a GPIA with gold contacts.

Design documentation for the feedwater regulation system will be updated to reflect the model GPIA as the required replacement part. This is being tracked in the corrective action program.

#### PREVIOUS OCCURRENCE EVALUATION

No events with a common root cause have been reported by River Bend Station in the last three years.

#### SAFETY SIGNIFICANCE

The plant response was bounded by the event described in the Updated Safety Analysis Report as a loss of the in-service feedwater level transmitter signal. This event was thus of minimal significance to the health and safety of the public.

## **WILLIAMSON, DANNY H**

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**From:** WILLIAMSON, DANNY H  
**Sent:** Wednesday, October 11, 2017 5:04 AM  
**To:** WILLIAMSON, DANNY H  
**Subject:** FW: \*\*\*\*\*FINAL DRAFT LER\*\*\*\*\*

**From:** Vercelli, Steven  
**Sent:** Tuesday, October 10, 2017 4:18 PM  
**To:** WILLIAMSON, DANNY H  
**Subject:** RE: \*\*\*\*\*FINAL DRAFT LER\*\*\*\*\*

approve

Steven Vercelli  
General Manager Plant Operations  
River Bend Station  
2253814200  
Cell 6018268454

---

### **REPORTED CONDITION**

On August 18, 2017, at 8:55 p.m. CDT, an automatic reactor scram occurred while the plant was operating at 100 percent power. The operators promptly established control of reactor water level and pressure, and a controlled plant cooldown was commenced. No safety-related equipment was out of service at the time of the scram.

The initial scram signal was a flow-biased thermal trip on the average power range monitors (APRMs). This action closely followed a planned shift of the master feedwater controller from channel "B" to channel "A." When the shift was made, all three main feedwater regulating valves unexpectedly moved fully open. At the same time, the reactor recirculation pumps shifted to slow speed.

This condition is being reported in accordance with 10 CFR 50.73(a)(2)(iv) as an event resulting in the automatic actuation of the reactor protection system.

### **INVESTIGATION and CAUSAL ANALYSIS**

At the time of the event, operators were performing a planned shift of the controlling channel of the master feedwater regulation system as part a scheduled surveillance test on the system.

Troubleshooting discovered that the feedwater level channel select relay had failed, such that no signal was present on the "A" channel. When that channel was selected, the feedwater control system erroneously sensed that reactor water level was low, and caused all three feedwater regulating valves to move fully open. The operator took manual control of the system to restore the feedwater regulating valves to their original positions.



The false low water level signal was also sensed in the control circuitry for the reactor recirculation system. This initiated the automatic downshift of the recirculation pumps to slow speed, as designed. The decrease in core flow resulted in the flow-biased thermal trip in the APRMs.

The failure in the channel select relay was traced to degradation in the electrical contacts on the relay that caused a high resistance condition. This condition also masked an alarm that could have potentially alerted the operator to the fact that the "A" channel was inoperative.

The high resistance condition on the contacts was caused by the use of a relay model with silver contacts instead of gold contacts. Industry operating experience had shown that the Agastat GPI (silver contact) relay, when used in low-current applications, had a tendency to develop contact point oxidation that increased electrical resistance. A parts interchangeability evaluation had been performed in the past at River Bend to approve the Agastat GPIA with gold contacts as a replacement part. However, when that evaluation was performed, the part number for the model GPIA was added to the appropriate design documentation, but the part number for the GPI was not deleted.

#### CORRECTIVE ACTIONS TO PREVENT RECURRENCE

The failed GPI relay was replaced with a GPIA with gold contacts.

Design documentation for the feedwater regulation system will be updated to reflect the model GPIA as the required replacement part. This is being tracked in the corrective action program.

#### PREVIOUS OCCURRENCE EVALUATION

No events with a common root cause have been reported by River Bend Station in the last three years.

#### SAFETY SIGNIFICANCE

The plant response was bounded by the event described in the Updated Safety Analysis Report as a loss of the in-service feedwater level transmitter signal. This event was thus of minimal significance to the health and safety of the public.

## **WILLIAMSON, DANNY H**

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**From:** WILLIAMSON, DANNY H  
**Sent:** Wednesday, October 11, 2017 10:19 AM  
**To:** WILLIAMSON, DANNY H  
**Subject:** FW: \*\*\*\*\*FINAL DRAFT LER\*\*\*\*\*

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**From:** VENABLE, TIMOTHY J  
**Sent:** Wednesday, October 11, 2017 10:16 AM  
**To:** SCHENK, TIMOTHY A; WILLIAMSON, DANNY H  
**Subject:** RE: \*\*\*\*\*FINAL DRAFT LER\*\*\*\*\*

I have reviewed the LER, and it looks sound and accurate.

TV

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**From:** SCHENK, TIMOTHY A  
**Sent:** Wednesday, October 11, 2017 7:50 AM  
**To:** VENABLE, TIMOTHY J  
**Subject:** Fwd: \*\*\*\*\*FINAL DRAFT LER\*\*\*\*\*  
**Importance:** High

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### REPORTED CONDITION

On August 18, 2017, at 8:55 p.m. CDT, an automatic reactor scram occurred while the plant was operating at 100 percent power. The operators promptly established control of reactor water level and pressure, and a controlled plant cooldown was commenced. No safety-related equipment was out of service at the time of the scram.

The initial scram signal was a flow-biased thermal trip on the average power range monitors (APRMs). This action closely followed a planned shift of the master feedwater controller from channel "B" to channel "A." When the shift was made, all three main feedwater regulating valves unexpectedly moved fully open. At the same time, the reactor recirculation pumps shifted to slow speed.

This condition is being reported in accordance with 10 CFR 50.73(a)(2)(iv) as an event resulting in the automatic actuation of the reactor protection system.

### INVESTIGATION and CAUSAL ANALYSIS

At the time of the event, operators were performing a planned shift of the controlling channel of the master feedwater regulation system as part a scheduled surveillance test on the system.

Troubleshooting discovered that the feedwater level channel select relay had failed, such that no signal was present on the "A" channel. When that channel was selected, the feedwater control system erroneously sensed that reactor water level was low, and caused all three feedwater regulating valves to move fully open. The operator took manual control of the system to restore the feedwater regulating valves to their original positions.

The false low water level signal was also sensed in the control circuitry for the reactor recirculation system. This initiated the automatic downshift of the recirculation pumps to slow speed, as designed. The decrease in core flow resulted in the flow-biased thermal trip in the APRMs.

The failure in the channel select relay was traced to degradation in the electrical contacts on the relay that caused a high resistance condition. This condition also masked an alarm that could have potentially alerted the operator to the fact that the "A" channel was inoperative.

The high resistance condition on the contacts was caused by the use of a relay model with silver contacts instead of gold contacts. Industry operating experience had shown that the Agastat GPI (silver contact) relay, when used in low-current applications, had a tendency to develop contact point oxidation that increased electrical resistance. A parts interchangeability evaluation had been performed in the past at River Bend to approve the Agastat GPIA with gold contacts as a replacement part. However, when that evaluation was performed, the part number for the model GPIA was added to the appropriate design documentation, but the part number for the GPI was not deleted.

#### CORRECTIVE ACTIONS TO PREVENT RECURRENCE

The failed GPI relay was replaced with a GPIA with gold contacts.

Design documentation for the feedwater regulation system will be updated to reflect the model GPIA as the required replacement part. This is being tracked in the corrective action program.

#### PREVIOUS OCCURRENCE EVALUATION

No events with a common root cause have been reported by River Bend Station in the last three years.

#### SAFETY SIGNIFICANCE

The plant response was bounded by the event described in the Updated Safety Analysis Report as a loss of the in-service feedwater level transmitter signal. This event was thus of minimal significance to the health and safety of the public.



## **WILLIAMSON, DANNY H**

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**From:** WILLIAMSON, DANNY H  
**Sent:** Tuesday, October 10, 2017 9:25 AM  
**To:** WILLIAMSON, DANNY H  
**Subject:** FW: \*\*\*\*\*FINAL DRAFT LER\*\*\*\*\*

**From:** Vazquez, Sergio  
**Sent:** Tuesday, October 10, 2017 9:22 AM  
**To:** WILLIAMSON, DANNY H; Vercelli, Steven; CHASE, MARVIN L; REYNOLDS, JEFFREY W; VENABLE, TIMOTHY J; SCHENK, TIMOTHY A; HENDERSON, JAMES  
**Subject:** RE: \*\*\*\*\*FINAL DRAFT LER\*\*\*\*\*

I concur

---

### **REPORTED CONDITION**

On August 18, 2017, at 8:55 p.m. CDT, an automatic reactor scram occurred while the plant was operating at 100 percent power. The operators promptly established control of reactor water level and pressure, and a controlled plant cooldown was commenced. No safety-related equipment was out of service at the time of the scram.

The initial scram signal was a flow-biased thermal trip on the average power range monitors (APRMs). This action closely followed a planned shift of the master feedwater controller from channel "B" to channel "A." When the shift was made, all three main feedwater regulating valves unexpectedly moved fully open. At the same time, the reactor recirculation pumps shifted to slow speed.

This condition is being reported in accordance with 10 CFR 50.73(a)(2)(iv) as an event resulting in the automatic actuation of the reactor protection system.

### **INVESTIGATION and CAUSAL ANALYSIS**

At the time of the event, operators were performing a planned shift of the controlling channel of the master feedwater regulation system as part a scheduled surveillance test on the system.

Troubleshooting discovered that the feedwater level channel select relay had failed, such that no signal was present on the "A" channel. When that channel was selected, the feedwater control system erroneously sensed that reactor water level was low, and caused all three feedwater regulating valves to move fully open. The operator took manual control of the system to restore the feedwater regulating valves to their original positions.

The false low water level signal was also sensed in the control circuitry for the reactor recirculation system. This initiated the automatic downshift of the recirculation pumps to slow speed, as designed. The decrease in core flow resulted in the flow-biased thermal trip in the APRMs.

The failure in the channel select relay was traced to degradation in the electrical contacts on the relay that caused a high resistance condition. This condition also masked an alarm that could have potentially alerted the operator to the fact that the "A" channel was inoperative.

The high resistance condition on the contacts was caused by the use of a relay model with silver contacts instead of gold contacts. Industry operating experience had shown that the Agastat GPI (silver contact) relay, when used in low-current applications, had a tendency to develop contact point oxidation that increased electrical resistance. A parts interchangeability evaluation had been performed in the past at River Bend to approve the Agastat GPIA with gold contacts as a replacement part. However, when that evaluation was performed, the part number for the model GPIA was added to the appropriate design documentation, but the part number for the GPI was not deleted.

#### CORRECTIVE ACTIONS TO PREVENT RECURRENCE

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#### PREVIOUS OCCURRENCE EVALUATION

No events with a common root cause have been reported by River Bend Station in the last three years.

#### SAFETY SIGNIFICANCE

The plant response was bounded by the event described in the Updated Safety Analysis Report as a loss of the in-service feedwater level transmitter signal. This event was thus of minimal significance to the health and safety of the public.

 <b>Entergy</b>	<b>NUCLEAR MANAGEMENT MANUAL</b>	QUALITY RELATED	EN-LI-106	REV. 16
		INFORMATIONAL USE	PAGE 1 OF 1	
NRC Correspondence				

**ATTACHMENT 9.5**
**CERTIFICATION REFERENCE FORM**
**Letter Number:**

RBF1-17-0119

**Subject:**

LER 2017-008-00 (Automatic reactor scram due to failure of feedwater controller transfer relay)

**Certifiable Statement(s):** Use one of the following methods to identify certifiable statements in the table below:

- 1 Identify location in submittal (e.g., page 3, para 2, sentence 1) OR,
- 2 Paste in the exact words of the statement(s) OR,
- 3 State "see attachment" and attach a copy of the correspondence with the certifiable statements indicated (e.g., by redlining, highlighting, or underlining, etc.).

Each statement or section of information being certified should be uniquely numbered to correspond with the supporting documentation listed below.

**Objective Evidence or Basis of Peer Review:** List the supporting documents in the table below and attach a copy of the documents OR give basis of peer review. Large documents need not be attached.

Certifiable Statement(s)	Objective Evidence or Basis of Peer Review
1. "...no safety-related equipment out of service."	1. See excerpt from GOP-0003.
2. "The failed GPI relay was replaced with a GPIA with gold contacts."	2. See excerpts from Work Order 482739..
3. "The plant response was bounded by the event described in the Updated Safety Analysis Report as a loss of the in-service feedwater level transmitter signal. ."	3. See excerpt from GOP-0003

**Individual certifying the statement(s):** Certification may be documented using e-mail, telecom, "sign off" sheet, or inter-office memorandum. The form of documentation should specifically identify the information being certified.

Danny Williamson

Name

Regulatory Assurance

Department

10/2/17

Date

**Peer Review:** Prior to signing for certification, determine if a Peer Review is required per section 5.4[2](c). Indicate "N/A" if not required.

na

Name

Department

Date



POST TRIP REVIEW CHECKLIST

Feedwater Level Control (circle)

Select	3-element	single element	
Master	Auto	Manual	
FW Reg Valve A	Auto	Manual	Isolated
FW Reg Valve B	Auto	Manual	Isolated
FW Reg Valve C	Auto	Manual	Isolated
Startup FW Reg Valve	Auto	Manual	Isolated
Recirc Flow Control (Circle)	Loop	Manual	Loop Auto

2 Record any off-normal status of any of the trains/portions of the following safety systems prior to the scram.

Details

Reactor Protection System

ECCS

RCIC

Standby Gas Treatment

Emergency Busses/Diesels

DC Distribution

3 Record any testing/surveillances or maintenance in progress at the time of the scram.

Test Procedure/Work order

SOP-0009 Reactor Feedwater System

Status/Step/Description

section 5.1 Alternating Feedwater Level  
Control Signals

## REFERENCE USE

ATTACHMENT 1  
PAGE 1 OF 4

## DATA SHEET

AGASTAT TYPE SSC/SCD/SCE, 7000 SERIES AND TR TIMING RELAYCOMPONENT NO. C33A-K12W/O NO. 482739DATA

6.2 Applicable Relay Setpoint Data Sheet#.

N/A

6.3 Elementary Diagram number(s).

GE-828E232AA

6.4 Relay identifying data.

GPIA (Gold contacts)

STEP	PARAMETER	AS-FOUND	AS-LEFT
6.5.1	Desired Time Delay setting		
6.5.2	Time Dial setting of relay		
6.5.3	Type of Delay		
6.6/6.8	Calculated Time Delay		
	MIN		
7.2.6.4.4	MAX		
7.6.1	On Time Delay		
7.2.6.5.5			
7.6.1	Off Time Delay		

DATAINITIALS

7.2.2 Relay Date Code

5299Sat Unsat

7.2.7.6 Results of relay operation.

Sat Unsat

7.2.9 Contact arrangement.

EN-WM-105 RIVER BEND STATION 1		
Work Order # / Sub Type	482739-02	LEVEL 2
Work Entity / Component	C33A-K12	
Discipline	ELECTRICAL	Date 08/19/2017

4.1.11. INSTALL the new replacement C33A-K12 (5C01) relay.

RF 18-19-17  
Initial Date

4.1.12. VERIFY that relay is fully inserted into its socket.

RF 18-19-17  
Initial Date

4.1.13. VERIFY appropriate locking strap/clip or tie wrap is properly installed IAW MCP-1130 step 7.7.6.

RF 18-19-17  
Initial Date

RF 18-19-17  
CON Verify

4.1.14. REMOVE all installed temporary robust barriers.

4.1.14.a Have IDC remove jumper from C33-K650-3 E1 to C33-K610 E1 per GMP-0012 8/19/17

RF 18-19-17  
Initial Date

4.1.15. PERFORM and document an FME Close-out Inspection of the panel IAW EN-MA-118, Foreign Material Exclusion.

RF 18-19-17  
Initial Date 8/19/17

4.2. VERIFY housekeeping items are addressed at the completion of the work activity.

4.3. Notify IDC to perform re-test per MA-125

RF 18-19-17  
Initial Date

## RESTORATION

5.1. Post Maintenance Testing performed on bench testing.

RF 18-19-17  
Initial Date

TemRev 0 AddCounter 25 Att Enc DS Rev KWN OFF

Removed relay turned over to FMA Team.

Imani Robs 8/19/17  
Don Sander 8/19/17