



**Entergy Nuclear Northeast
Entergy Nuclear Operations, Inc.**

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Lawrence M. Coyle
Site Vice President – JAF

JAFP-13-0165
January 3, 2014

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Subject: LER: 2013-004, RCIC Condensate Storage Tank Level Switch Inoperable
due to Misalignment

James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
License No. DPR-59

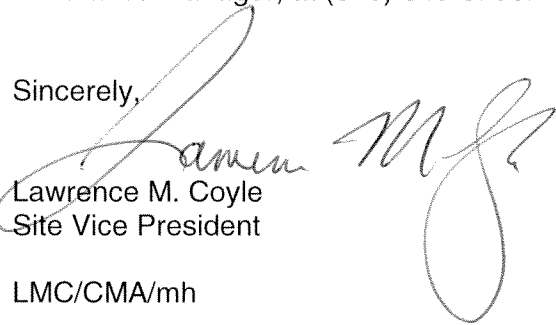
Dear Sir or Madam:

This report is submitted in accordance with 10 CFR 50.73(a)(2)(i)(B), An Operation or Condition Prohibited by Technical Specifications.

There are no commitments contained in this report.

Questions concerning this report may be addressed to Mr. Chris M. Adner, Regulatory Assurance Manager, at (315) 349-6766.

Sincerely,


Lawrence M. Coyle
Site Vice President

LMC/CMA/mh

Enclosure(s): JAF LER 2013-004, RCIC Condensate Storage Tank Level Switch Inoperable
due to Misalignment

cc: USNRC, Region 1
USNRC, Project Directorate
USNRC, Resident Inspector
INPO Records Center (ICES)

NRC FORM 366 (10-2010)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013 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 Records and FOIA/Privacy Service Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to 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.																																					
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FACILITY NAME Mr. Chris M. Adner, Regulatory Assurance Manager				TELEPHONE NUMBER (Include Area Code) (315) 349-6766																																					
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT																																									
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) <p>The Reactor Core Isolation Cooling (RCIC) "B" condensate storage tank (CST) level switch (13LS-76B) failed to trip on November 4, 2013 while performing the switch's low water level functional test. The cause of the failure was a misalignment of the microswitch assembly. The microswitch assembly was replaced on September 17, 2013; it passed its functional test but microswitch alignment was not performed per vendor instructions which resulted intermittent performance.</p> <p>13LS-76B is 1 of 4 channels for the CST low level function of the RCIC system. All other channels are Operable and are unaffected by this microswitch assembly misalignment. Upon discovery, 13LS-76B channel was placed in trip per plant Technical Specifications (TS) and RCIC is Operable. Since, TS require all 4 RCIC CST level switches to be Operable, RCIC was in a condition prohibited by TS. This report is being submitted in accordance with 10 CFR 50.73(a)(2)(i)(B).</p>																																									

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NARRATIVE

Background

Reactor Core Isolation Cooling (RCIC) System [EIS component identifier: BN] is comprised of various components which include pumps, valves, piping, and instrumentation. The RCIC System is designed to operate either automatically or manually following reactor pressure vessel isolation accompanied by a loss of coolant flow from the feedwater system to provide adequate core cooling and control the reactor water level under these conditions. The normal water source for the RCIC is the Condensate Storage Tanks (CST) [KA] 33TK-12A and 33TK-12B.

Low CST Level indicates the unavailability of an adequate supply of makeup water from this normal source (CST). Normally, the suction valve between the RCIC pump and the CSTs is open and, upon receiving a RCIC initiation signal, water for RCIC injection would be taken from the CSTs. However, if the water level in both CSTs falls below a preselected level, the water source is automatically transferred to the suppression pool. This ensures that an adequate supply of makeup water is available to the RCIC pump. Procedure ISP-75-1 performs low CST level testing.

Level switches detect the water level for the 2 CSTs. Each tank has 2 RCIC instrumentation level switches, 13LS-76A and 13LS-77A for the "A" tank and 13LS-76B or 13LS-77B for the "B" Tank. Four channels of low CST level function are available and are required to be Operable when RCIC is required to be Operable to ensure that no single instrument failure can preclude RCIC automatic suction source alignment to suppression pool source.

Preceding events

On 8-19-2013, 13LS-76B failed during ISP-75-1 testing. The cause was corrosion initiated by water intrusion into the level switches assembly from a junction box. This event was reported by LER-2013-002 (Reference JAFP-13-0125). Subsequent to this event, corrective actions were put in effect to replace the microswitch or "topworks" of the two affected level switches, 13LS-76B and 13LS-77B.

On 8-22-2013 13LS-77B and 13LS-76B, topworks were replaced. This was part of the corrective action following the corrosion issue. Afterward, the replaced assemblies were tested by ISP-75-1 satisfactorily. However, a float operation problem was identified in 13LS-76B preventing its return to service.

EVENT DESCRIPTION

On 9-17-2013, 13LS-76B float-switch assembly was replaced. The microswitch alignment was performed during bench testing but the alignment was not performed per vendor instructions. The post installation surveillance testing was performed satisfactorily.

On 10-9-2013, ISP-75-1 was performed successfully.

On 11-04-2013, 13LS-76B did not trip on low CST water level during ISP-75-1. The other three level switches actuated (tripped) properly. Actions specified in Technical Specification (TS) Limiting Condition of Operation (LCO) 3.3.5.2 were entered and 13LS-76B was placed into trip.

EVENT ANALYSIS

The failed RCIC switch was a Robert Shaw SL-300 Series that utilize a snap action switching station to change state of the switch. The switches employ an Alnico magnet that surrounds a sealing tube and concentrates a powerful magnetic force in a small space. Lowering water level sensed by the float causes movement of the magnetic armature or "shunt" into the field of the magnet and shunts attraction away from the external pole pieces. This allows the pivoted actuator plate to "snap" the microswitch poles and depress the plungers, which causes the switch to trip. This assembly is enclosed in a threaded explosion-proof cap housing.

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The failure modes analysis determined that the most probable cause of trip failure of the level switch was due to misalignment of the microswitch assembly. The misalignment would potentially cause a shorter plunger throw and intermittent operation.

Corrosion was not attributed to this event because corrective actions were put in place to seal the conduit from water intrusion and the assembly had relatively short service life when it failed.

The replacement float-switch and topworks were assembled and bench tested prior to installation on September 17, 2013. During the bench testing an alignment was necessary to achieve proper operation however the alignment was not performed per vendor instruction. After installation of the assembly in the plant, a functional test was performed satisfactorily.

Vendor manual instructions were not included or referenced in the replacement work order tasks on September 17, 2013, to ensure correct topworks adjustment. The vendor instructions contained specific adjustment information to ensure proper long term operation of the switch. The omission of this detail by the planner, contributed to the mis-alignment of the actuator plate/microswitch. This type of misalignment may cause intermittent failures.

On October 9, a satisfactory test was performed. However, due to misalignment, the potential for intermittent failure of the 13LS-76B existed since September 17, 2013.

RCIC Instrumentation

Limiting Condition of Operation (LCO) 3.3.5.2 requires that the RCIC System instrumentation for each 4 channels of Low CST water level be Operable while in Mode 1, Mode 2, and Mode 3 with reactor steam dome pressure > 150 psig. When the channel was inoperable, Condition D action required that the channel be placed in trip. When this condition was not met Condition E required that RCIC be declared inoperable.

LCO 3.5.3 required RCIC be restored to Operable within 14 days or be in Mode 3.

Since level switch 13LS-76B was Inoperable between September 17, 2013 and November 4, 2013. This period of time is longer than allowed by the Technical Specifications (TS); therefore, JAF had a condition reportable per 10 CFR 50.73(a)(2)(i)(B) as prohibited by TS.

High Pressure Coolant Injection (HPCI) Operability [BJ]

LCO 3.5.1 Condition C states that if HPCI is Inoperable then verify RCIC is Operable administratively. When RCIC is concurrently Inoperable then Condition G requires the plant to be in Mode 3 within 12 hours. The history of HPCI Operability was verified since September 17, 2013. All Inoperable instances were associated with the performance of normal surveillance procedures. At no point was HPCI Inoperable for greater than 12 hours. Therefore, this condition was not prohibited by TS 3.5.1 or the corresponding RCIC TS 3.5.3 Condition B.

CAUSE OF EVENT

The cause of the failure of Reactor Core Isolation Cooling (RCIC) instrumentation for the "B" Condensate Storage Tank (CST) level switch (13LS-76B) was misalignment of the microswitch assembly preventing full plunger motion during installation.

EXTENT OF CONDITION

RCIC uses CST level switches 13LS-76A, 13LS-77A, 13LS-77B to perform a similar function as 13LS-76B. The specified switches are the same type of magnetic 'snap action' component. The switches are all also tested quarterly per ISP-75-1 to verify operability. Since the misalignment was caused by an error during setup, testing and installation of 13LS-76B the cause it is not shared with other level switches which didn't have a similar installation.

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HPCI has its own set of level switches (23LS-74A, 23LS-75A, 23LS-74B, 23LS-75B) which perform a similar CST low-level function. The HPCI level switches have a different manufacturer and utilize three (3) contacts vice two (2) used in the RCIC switches. The switches are all also tested quarterly per ISP-75 to verify operability.

FAILED COMPONENT IDENTIFICATION:

Manufacturer:	Robertshaw Controls
Manufacturer Model Number:	SL301-A2XS11-C31-1
NPRDS Manufacturer Code:	R290
NPRDS Component Code:	LS
FitzPatrick Component ID:	13LS-76B

CORRECTIVE ACTIONS**Completed Actions**

- This deficiency is temporarily being corrected by placing the affected instrument channel in the trip condition, as allowed by Action D.2.1 of LCO 3.3.5.2.

Future Actions

- Engineering Change to improve level switch design and reliability with the use of a new top works design.
- Performance counseling to be conducted with the involved planner.
- Replace all RCIC CST level switch topworks.

SAFETY SIGNIFICANCE**Nuclear Safety**

There were no actual nuclear safety consequences during this period as a result of this event.

Since this condition only affected 1 of 4 channels of RCIC low level CST instrumentation, this deficiency would not have prevented the required function of the low level CST function.

A potential consequence was the RCIC system may not have operated as designed. If RCIC was called upon to Operate during an accident scenario with a concurrent failure of 13LS-77B (failed to trip) and the CSTs at the low water level setpoint, RCIC would not automatically transfer to the suppression pool. Operators do have the ability to override this circuit from the control room and remote manually operate the valves to perform this transfer.

JAF accident analysis does not take credit for the operation of the RCIC system. The accident analysis assumes the operation of the HPCI system and operation of the Automatic Depressurization System in conjunction with the Low Pressure Coolant Injection System. These systems were unaffected by the identified condition. Therefore, the potential consequences of the RCIC system being inoperable during this period were minimal.

Radiological Safety

No radiological impact or dose associated with this condition.

Industrial Safety

No safety events or abnormal increases to personnel risk.

SIMILAR EVENTS

There are no historical cases of RCIC or HPCI level switches not functioning as a result of misalignment at JAF. LER-2013-002 was submitted due to failures of 13LS-76B and 13LS-77B caused by water intrusion and

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corrosion buildup in the switch mechanism. The corrosion condition is not applicable to this event.

REFERENCES

- Condition Report, CR-JAF-2013-5576, dated November 4, 2013
- JAF Technical Specifications and Bases, 3.3.5.2, "Reactor Core Isolation Cooling (RCIC) System Instrumentation"
- ISP-75-1, RCIC CST Low Water Level Switch Functional Test
- Entergy letter to NRC, JAFP-13-0125, LER: 2013-002, RCIC Condensate Storage Tank Level Switch Inoperable due to Corrosion, dated September 16, 2013