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January 3, 2008

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

Subject: Duke Power Company LLC d/b/a Duke Energy Carolinas, LLC (Duke)
Catawba Nuclear Station, Unit 2
Docket No. 50-414
Licensee Event Report 414/07-002

Attached is Licensee Event Report 414/07-002 titled "Technical Specification Violation Associated with Containment Valve Injection Water System."

There are no regulatory commitments contained in this letter or its attachment.

This event is considered to be of no significance with respect to the health and safety of the public. If there are any questions on this report, please contact L.J. Rudy at (803) 831-3084.

Sincerely,

James R. Morris

Attachment

IE22
NRR

xc (with attachment):

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Acting Regional Administrator, Region II
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Master File CN-801.01
LER File
RGC Date File
NCMPA-1
NCEMC
PMPA
SREC

NRC FORM 366 (9-2007) | U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

APPROVED BY OMB: NO. 3150-0104 | EXPIRES: 08/31/2010

Estimated burden per response to comply with this mandatory collection request: 50 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 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@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. PAGE
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4. TITLE

Technical Specification Violation Associated with Containment Valve Injection Water System

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
11	05	2007	2007	- 002 -	00	01	03	2008	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE	5
10. POWER LEVEL	0%

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

	20.2201(b)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)
	20.2201(d)		20.2203(a)(4)		50.73(a)(2)(iii)		50.73(a)(2)(x)
	20.2203(a)(1)		50.36(c)(1)(i)(A)		50.73(a)(2)(iv)(A)		73.71(a)(4)
	20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)		50.73(a)(2)(v)(A)		73.71(a)(5)
	20.2203(a)(2)(ii)		50.36(c)(2)		50.73(a)(2)(v)(B)		OTHER Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iii)		50.46(a)(3)(ii)		50.73(a)(2)(v)(C)		
	20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)		
	20.2203(a)(2)(v)	X	50.73(a)(2)(i)(B)		50.73(a)(2)(vii)		
	20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)		
	20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)		

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
L.J. Rudy, Regulatory Compliance	803-831-3084

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

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

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

On 10/07/07 at 1629 hours, during the End-of-Cycle 15 Refueling Outage, calibration of Containment Valve Injection Water System (CVIWS) surge chamber 2A level transmitter 2NWLT5020 was being performed. It was observed that the transmitter's loop output began to drop steadily after the transmitter was returned to service following its calibration. Investigation revealed that CVIWS surge chamber 2A narrow range level high pressure root isolation valve 2NWIV5020 was closed. Investigation concluded that the valve was most likely closed during the End-of-Cycle 14 Refueling Outage. This rendered the associated CVIWS train inoperable for longer than allowed by Technical Specifications. During the time period that valve 2NWIV5020 was closed, there were two instances during which the unit was unknowingly in Technical Specification Limiting Condition for Operation 3.0.3 for a time period longer than allowed. This event was determined to be inconsequential from a plant risk perspective based on the fact that the affected containment penetrations are not considered to be likely pathways for radiation release. Therefore, the health and safety of the public were not adversely affected by this event.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

BACKGROUND

This event is being reported under the following criterion:

10 CFR 50.73(a)(2)(i)(B), any operation or condition which was prohibited by the plant's Technical Specifications.

Catawba Nuclear Station Unit 2 is a Westinghouse four-loop Pressurized Water Reactor (PWR) [EIIS: RCT].

The Containment Valve Injection Water System (CVIWS) [EIIS: none] ensures a water seal to a specific class of containment isolation valves [EIIS: ISV] during a Loss of Coolant Accident (LOCA), to prevent leakage of containment atmosphere through the gate valves.

The CVIWS is designed to inject water between the two seating surfaces of double disc gate valves used for containment isolation. The injection pressure is higher than containment design peak pressure during a LOCA. This will prevent leakage of the containment atmosphere through the gate valves, thereby reducing potential offsite dose below regulatory limits following the postulated accident.

During normal power operation, the CVIWS is in a standby mode and does not perform any function. During accident situations, the CVIWS is activated to perform its safety related function. Containment isolation valves, for systems which are not used to mitigate the consequences of an accident, will be supplied with CVIWS seal water upon receipt of a Phase A isolation signal. Containment isolation valves, for accident mitigating systems which are supplied with seal water from the CVIWS, have their seal water supplies actuated by a Containment Pressure - High-High signal.

The CVIWS consists of two independent, redundant trains; one supplying gate valves powered by the A train diesel generator and the other supplying gate valves powered by the B train diesel generator. The separation of trains prevents the possibility of both containment isolation valves not sealing due to a single failure.

Each CVIWS train consists of a surge chamber which is filled with water and pressurized with nitrogen. One main header exits the chamber and splits into several headers. A solenoid valve [EIIS: FSV] is located

in the main header before any of the branch headers which will open after a 60 second delay on a Phase A isolation signal. Each of the headers supplies injection water to containment isolation valves located in the same general location, and close on the same engineered safety signal. A solenoid valve is located in each header which supplies seal water to valves closing on a Containment Pressure - High-High signal. These solenoid valves open after a 60 second delay on a Containment Pressure - High-High signal. Since a Phase A isolation signal occurs before a Containment Pressure - High-High signal, the solenoid valve located in the main header will already be injecting water to containment isolation valves closing on a Phase A isolation signal. This leaves an open path to the headers supplying injection water on a Containment Pressure - High-High signal. The delay for the solenoid valves opening is to allow adequate time for the slowest gate valve to close, before water is injected into the valve seat.

Makeup water is provided from the Makeup Demineralized Water System [EIIS: KC] for testing and for adding water to the surge chamber during normal plant operation. Assured water is provided from the essential header of the Nuclear Service Water System [EIIS: BI]. This supply is assured for at least 30 days following a postulated accident. If the water level in the surge chamber drops below the low-low level or if the surge chamber nitrogen pressure drops below the low-low pressure after a Phase A isolation signal, a solenoid valve in the supply line from the Nuclear Service Water System will automatically open and remain open, assuring makeup to the CVIWS at a pressure greater than 110% of peak containment accident pressure.

Technical Specification 3.6.17 governs the CVIWS. Limiting Condition for Operation 3.6.17 requires two CVIWS trains to be operable in Modes 1, 2, 3, and 4. Condition A states that with one CVIWS train inoperable, the train must be restored to operable status within 7 days. If this is not accomplished, Condition B requires the unit to be in Mode 3 within 6 hours and in Mode 5 within 36 hours. There is no Condition for two CVIWS trains inoperable; therefore, Limiting Condition for Operation 3.0.3 is applicable in this case.

On November 5, 2007, when this event was determined to be reportable, Unit 2 was in Mode 5 during its End of Cycle 15 Refueling Outage.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

EVENT DESCRIPTION

(Certain event times are approximate.)

Date/Time	Event Description
10/07/07/1629	On 10/07/07, during the End-of-Cycle 15 Refueling Outage, calibration of CVIWS surge chamber 2A level transmitter 2NWLT5020 was being performed under Work Order 01775573-01. It was observed that the transmitter's loop output began to drop steadily after the transmitter was returned to service following its calibration. Investigation revealed that CVIWS surge chamber 2A narrow range level high pressure root isolation valve 2NWIV5020 was closed.

CAUSAL FACTORS

The cause of root isolation valve 2NWIV5020 being closed could not be determined. The transmitter loop utilizes a filled reference leg design that requires the transmitter to be reverse acting in order to indicate surge chamber level. The root isolation valve isolates the filled reference leg from the surge chamber. Since the surge chamber normally operates with a fixed nitrogen overpressure, the effect on the transmitter loop due to the root isolation valve being closed depends on when it was closed. If it were closed while the surge chamber was pressurized, the surge chamber overpressure would be trapped on the high pressure side of the transmitter. This would result in a false high reading any time the surge chamber overpressure decreased below what it was when the valve was closed and in a false low reading any time the surge chamber overpressure increased above that value. If the root isolation valve were closed while there was no overpressure on the surge chamber, the high pressure side of the transmitter would not see the overpressure when the surge chamber was pressurized. However, the low pressure side would, which would cause the transmitter to peg high and not respond to decreasing surge chamber level as long as the overpressure was present. Based on the observed transmitter behavior, it is believed that the root isolation valve was closed while there was no overpressure on the

surge chamber. The root isolation valve requires approximately one turn to move over its full travel. Therefore, it is not considered plausible that the valve could have been bumped into the fully closed position.

A review of Operator Aid Computer (OAC) trends indicated that the valve was most likely closed during the End-of-Cycle 14 Refueling Outage. On the trends prior to the End-of-Cycle 14 Refueling Outage, the indicated surge chamber level did not vary more than approximately 0.1 inch. After the End-of-Cycle 14 Refueling Outage, the trend varied approximately 0.3 inch. After the valve was opened following discovery of its closed position during the End-of-Cycle 15 Refueling Outage, the trend returned to normal (approximately 0.1 inch).

Plant personnel conducted a review of work orders and work requests. No maintenance work could be ascertained that would have manipulated valve 2NWIV5020 or any of the other root isolation valves on the CVIWS surge chambers. No procedures were found that would have manipulated this valve. The only potential evolution where Operations could have procedurally manipulated this valve was investigated. It was determined to be non-credible due to the fact that this evolution would have required multiple errors to have been made coupled with multiple incorrect independent verifications.

Considerable work occurred near this valve during the End-of-Cycle 15 Refueling Outage; however, no explanation was evident as to how the valve could have been closed. Based on the available information, it appears likely that the valve was actually closed during the End-of-Cycle 14 Refueling Outage based on the OAC trends for the affected loop.

CORRECTIVE ACTIONS

Immediate:

1. Root isolation valve 2NWIV5020 was re-opened following its discovered closed position.

Subsequent:

1. Plant personnel conducted a review of this event to determine the cause of the valve being mispositioned. No conclusive cause of this event could be determined.

Planned:

None.

There are no NRC commitments contained in this LER.

SAFETY ANALYSIS

Had an event occurred requiring the operation of the CVIWS, given the as-found position of root isolation valve 2NWIV5020, the A train of the CVIWS could have been rendered ineffective in maintaining the required water seal to its supported containment isolation valves. As a result of the mispositioned root isolation valve, nitrogen would have been eventually injected into the supported A train containment isolation valves. During the time period for which the train was inoperable, no events occurred that would have required the operation of the CVIWS. Except for the brief periods noted below, the B train of the CVIWS was operable and capable of supporting its respective B train containment isolation valves.

It is believed that CVIWS root isolation valve 2NWIV5020 was closed sometime during the End-of-Cycle 14 Refueling Outage. Unit 2 entered Mode 4 following the completion of the End-of-Cycle 14 Refueling Outage on 4/16/06. Unit 2 entered Mode 5 to begin the End-of-Cycle 15 Refueling Outage on 9/15/07. During the time period that Unit 2 was operating in modes where the CVIWS was required to be operable (from 4/16/06 to 9/15/07), there were fifteen documented instances where the B train of the CVIWS was also inoperable. Therefore, Unit 2 was unknowingly in TS Limiting Condition for Operation 3.0.3 during these instances. Four of the fifteen instances were "tracking only" entries for the B train of the CVIWS (i.e., the train was not functionally inoperable and still would have performed its function), but for the other eleven instances, the train was functionally inoperable. For nine of these eleven instances, the duration of time that both CVIWS trains were unknowingly inoperable ranged from approximately 1 hour to approximately 6 hours in length (i.e., the durations were within the time period allowed by TS Limiting Condition for Operation 3.0.3). The remaining two instances were as follows:

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)* **(17)**

Technical Specification Action Item Log Entry C2-06-01383:
B train CVIWS inoperable for 24 hours and 33 minutes beginning on 5/27/06 to investigate and repair an indication problem on valve 2NW-222B

Technical Specification Action Item Log Entry C2-07-00176:
B train CVIWS inoperable for 40 hours and 11 minutes beginning on 1/23/07 to replace a switch and solenoid housing O-rings on valve 2NW-237B

This event was determined to be inconsequential from a plant risk perspective. The containment isolation valves serviced by the A train of the CVIWS are located in the Component Cooling Water System, the Intermediate Head Safety Injection System, the Containment Spray System, the High Head Safety Injection System, the Nuclear Service Water System, and the Liquid Waste Recycle System. Catawba's Probabilistic Risk Analysis (PRA) screens out these system containment penetrations as potential containment isolation failures because they are not air-to-air pathways and would not constitute a probabilistically significant pathway for the release of airborne fission products. The only pathway with statistically significant relevance is the pathway from the Liquid Waste Recycle System to the Containment Ventilation Unit Condensate Drain Tank. However, at Catawba, this pathway is a small isolation failure and it is screened out from the calculation of Large Early Release Frequency (LERF) due to the small diameter piping involved. The PRA does not consider this to be a LERF pathway even if its associated containment isolation valves are open. A closed valve in this pathway that leaks because the CVIWS is inoperable still would not result in a change in LERF.

The health and safety of the public were not adversely affected by this event.

ADDITIONAL INFORMATION

Within the previous three years, there were no LER events involving the CVIWS. Therefore, this event is considered to be non-recurring.

Energy Industry Identification System (EIIS) codes are identified in the text as [EIIS: XX]. This event is not considered reportable to the Equipment Performance and Information Exchange (EPIX) program.

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This event is not considered to constitute a Safety System Functional Failure. There was no release of radioactive material, radiation overexposure, or personnel injury associated with the event described in this LER.

ENCLOSURES:

1. References
2. Corrective Action Schedule
3. Cause Code Assignment Sheet
4. Personnel Contacted

ENCLOSURE 1

REFERENCES

1. PIP C-07-05847
2. NUREG-1022, Rev. 2, Event Reporting Guidelines 10 CFR 50.72 and 50.73
3. Technical Specification 3.6.17 and Bases
4. Technical Specification Action Item Log entries C2-06-00843, 00907, 01005, 01383, 01579, 01893, 02298, 02595, C2-07-00036, 00176, 00412, 00726, 00926, 01410, 01848
5. Compliance Manual Section 3.7, Licensee Event Reports

ENCLOSURE 2

CORRECTIVE ACTION SCHEDULE

Corrective Action	Assigned Group	Due Date
N/A		

ENCLOSURE 3

CAUSE CODE ASSIGNMENT SHEET

INPO CAUSE CODE:	X	Unknown
NRC CAUSE CODE:	X7	Unknown

ENCLOSURE 4

PERSONNEL CONTACTED

1. R.E. Hardin
2. S.B. Putnam
3. S.L. Mays
4. M.J. Barrett