

# CATEGORY 1

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9812210172      DOC.DATE: 98/12/14      NOTARIZED: NO      DOCKET #  
 FACIL: 50-305 Kewaunee Nuclear Power Plant, Wisconsin Public Service      05000305  
 AUTH.NAME      AUTHOR AFFILIATION  
 MILLER, P.C.      Wisconsin Public Service Corp.  
 MARCHI, M.L.      Wisconsin Public Service Corp.  
 RECIPIENT NAME      RECIPIENT AFFILIATION

SUBJECT: LER 98-016-00: on 981113, noted that 1B RCP underfrequency trip relay was inadvertently disconnected in 1982 during mod installation. Caused by design oversight. Circuitry was returned to original design & tested. With 981214 ltr.

DISTRIBUTION CODE: IE22T      COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 5  
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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Public Service

NRC-98-124

**Public Service Corporation**

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December 14, 1998

10 CFR 50.73

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

Ladies/Gentlemen:

Docket 50-305  
Operating License DPR-43  
Kewaunee Nuclear Power Plant  
Reportable Occurrence 1998-016-00

In accordance with the requirements of 10 CFR 50.73, "Licensee Event Report System," the attached Licensee Event Report (LER) for reportable occurrence 1998-016-00 is being submitted.

Sincerely,

*Mark L. Marchi*

for Mark L. Marchi  
Vice President-Nuclear

PCM

Attach.

cc - INPO Records Center  
US NRC Senior Resident Inspector  
US NRC, Region III

9812210172 981214  
PDR ADOCK 05000305  
8 PDR

*IE22/1*

211 AC

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If 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.

**LICENSEE EVENT REPORT (LER)**

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

FACILITY NAME (1)

Kewaunee Nuclear Power Plant

DOCKET NUMBER (2)

05000305

PAGE (3)

1 OF 4

TITLE (4)

1B Reactor Coolant Pump Underfrequency Trip Relay Inadvertently Disconnected in 1982 During Modification Installation

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
11	13	1998	1998	-- 016	-- 00	12	14	1998	FACILITY NAME	DOCKET NUMBER
										05000
									FACILITY NAME	DOCKET NUMBER
										05000

  

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)					
POWER LEVEL (10)	000	20.2201(b)	20.2203(a)(2)(v)	X	50.73(a)(2)(i)	50.73(a)(2)(viii)	
		20.2203(a)(1)	20.2203(a)(3)(i)		50.73(a)(2)(ii)	50.73(a)(2)(x)	
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)		50.73(a)(2)(iii)	73.71	
		20.2203(a)(2)(ii)	20.2203(a)(4)		50.73(a)(2)(iv)	OTHER	
		20.2203(a)(2)(iii)	50.36(c)(1)		50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A	
		20.2203(a)(2)(iv)	50.36(c)(2)		50.73(a)(2)(vii)		

**LICENSEE CONTACT FOR THIS LER (12)**

NAME

Paul C. Miller - Engineering and Technical Support - Senior Analyst

TELEPHONE NUMBER (Include Area Code)

(920) 388-8350

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

**SUPPLEMENTAL REPORT EXPECTED (14)**

YES (If yes, complete EXPECTED SUBMISSION DATE).

X NO

EXPECTED SUBMISSION DATE (15)

MDNTH DAY YEAR

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

On November 13, 1998, with the plant in refueling shutdown, the supply breaker for reactor coolant pump (RCP) motor 1B did not trip on bus underfrequency (UF) while being tested. The RCP supply breakers' trip logic circuitry is designed to provide a trip signal to the RCPs' supply breakers when a frequency of less than 55 Hertz on 2 of 2 buses and is sensed by 1 of 2 sensors per bus. This failure was found during performance of surveillance procedure (SP) 36-141, "Reactor Coolant Pump Breakers Reactor Trip Logic Test." The circuitry for RCP 1A was also tested under the same procedure and was found to function as designed.

Prior to the 1998 refueling/maintenance outage, testing performed under SP 36-141 did not include the auxiliary UF relay contacts that initiate the RCP motor breaker trip. The need for testing these contacts was discovered during Kewaunee's efforts in response to Generic Letter (GL) 96-01, "Testing of Safety-Related Logic Circuitry."

The failure was caused by the power lead to the UF auxiliary relay contacts being disconnected when a design change was implemented in 1982. The root cause of the event could not be conclusively determined, but appears to be a design oversight. The individuals involved in the change are no longer with Wisconsin Public Service. The circuitry was returned to the original design and successfully retested on November 15, 1998.

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Kewaunee Nuclear Power Plant	05000305	1998	-- 016	-- 00	2 OF 4

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

Description of Event

On November 13, 1998, with the plant in refueling shutdown, the supply breaker [BKR] for reactor coolant pump (RCP)[P] motor [MO] 1B did not trip on bus underfrequency (UF) while being tested. The RCP supply breakers' trip logic circuitry is designed to provide a trip signal to the RCPs' supply breakers when an underfrequency condition exists. More specifically, when a frequency of less than 55 Hertz on 2 of 2 buses is sensed by 1 of 2 sensors per bus. This failure was found during performance of surveillance procedure SP 36-141, "Reactor Coolant Pump Breakers Reactor Trip Logic Test." The circuitry for RCP 1A was also tested under the same procedure and was found to function as designed.

Prior to the 1998 refueling/maintenance outage, testing performed under SP 36-141 did not include the auxiliary UF relay [81] contacts that initiate the RCP motor breaker trip. The need for testing these contacts was discovered during Kewaunee's efforts in response to Generic Letter (GL) 96-01, "Testing of Safety-Related Logic Circuitry." The UF channels are tested monthly using surveillance procedure SP 39-021A(B) "BUS 1-1 (1-2) 4 KV Voltage and Frequency Test and Calibration." However, the UF relays are tested one at a time to prevent actual tripping of the RCP during normal operation. Following the GL 96-01 discovery, SP 36-141 was revised to include UF auxiliary relay contact testing during refueling outages. The 1998 performance of the revised SP 36-141 was the first time the auxiliary UF relay contacts were tested simultaneously.

Cause of Event

Investigation of the event found that the conductor that supplies power to the RCP 1B breaker trip coil via the UF auxiliary relay contacts was not terminated in all locations. The conductor was unterminated in 1982 during a plant modification (DCR 1024) that removed the RCP foam fire suppression system (FFSS). The untermination inadvertently disabled the UF trip feature for RCP 1B.

A review of DCR 1024 records indicated that untermination of the conductor was per procedure, and was documented on cable termination reports and plant wiring diagrams. The conductor was the positive common conductor to the FFSS and the UF auxiliary relay contacts that trip the RCP motor breaker. The UF trip of RCP 1B was the only non-FFSS circuit affected.

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Since the individuals involved with the design of DCR 1024 are no longer at Kewaunee and were unavailable for interviews, a specific root cause could not be determined. However, it is likely that the complexity of the circuit, lack of thoroughness in review of the modification and inadequate post-installation testing contributed to the problem.

Analysis of Event

This condition is being reported under 10 CFR 50.73(a)(2)(i)(B), "any event or condition prohibited by the plant's Technical Specifications (TS)." TS section 3.5 applies to reactor protection and engineered safety features instrumentation. Plant operation is conditional to the requirements of TS tables applicable to TS section 3.5. Table TS 3.5-2 lists the RCP underfrequency trip feature as a requirement for operation above Hot Shutdown.

Although the RCP 1B UF trip feature has not been operational since 1982, the loss of this function has no safety significance. In the event of an underfrequency condition, the breaker for RCP 1A would have tripped. The tripping of either RCP motor breaker results in a reactor trip. In addition, the UF trip is redundant to the reactor coolant system (RCS) low-flow reactor trip provided at the KNPP. WCAP 8424, "An Evaluation of Loss of Flow Accidents Caused by Power System Frequency Transients in Westinghouse PWRs," Rev. 1, May 1975 states the following:

No credit need be taken in the analysis for tripping the reactor coolant pump circuit breakers on underfrequency. Therefore, there is no reason to include the RCP breaker trip on underfrequency as part of the protection system, this feature may be deleted.

The reactor coolant system (RCS)[AB] low-flow reactor trip protects the core against departure from nucleate boiling (DNB) in the event of either a decreasing actual measured flow in the loops or a sudden loss of power to one or both RCPs. The undervoltage (UV) and UF trips provide additional redundant protection against a decrease in flow. UV protection provides a direct reactor trip and a RCP breaker trip. The underfrequency circuitry provides a RCP breaker trip and the RCP breaker trip initiates a reactor trip. Based on accident analysis, the reactor coolant system low flow trip setting will be reached before a reactor trip signal is generated by the low

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frequency setting. Therefore, the unavailability of the UF trip has not decreased the margin of safety provided by the plant's reactor protection system.

Corrective Actions

Upon discovery, a maintenance work request (MWR) was initiated to troubleshoot the problem, and a Kewaunee Assessment Process (KAP) form was initiated to investigate and document the condition. A plant physical change was also initiated to restore the bus UF trip to original design. The change was completed November 15, 1998 and subsequently tested successfully using SP 36-141.

Since installation of DCR 1024 in 1982, many improvements have been made to the physical change process that should help preclude a similar event from occurring. Specifically, more thorough design reviews and post installation testing are now being performed. Multidisciplinary teams are used in the physical change process which provides added expertise needed to perform field verification of wiring both before and after installation of a modification. In addition, drawing quality has improved since 1982. In this case, the wiring diagrams for the RCP switchgear were redrawn in 1993 using a computer aided design and drafting (CADD) program which enhanced drawing clarity. Due to the substantial number of administrative improvements made since 1982, no further corrective actions are planned.

Additional Information

None

Similar Events

None identified.