

CATEGORY 1

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FACIL:50-305 Kewaunee Nuclear Power Plant, Wisconsin Public Service 05000305
AUTH.NAME AUTHOR AFFILIATION
HARRINGTON,G.I. Wisconsin Public Service Corp.
MARCHI,M.L. Wisconsin Public Service Corp.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 95-008-00:on 951206,A2 svc water pump supply breaker failed.Caused by failure of breaker hydraulic charging sys.
Failed breaker replaced w/spare breaker.W/960106 ltr.

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600 North Adams • P.O. Box 19002 • Green Bay, WI 54307-9002

January 5, 1996

10 CFR 50.73

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

Ladies/Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Reportable Occurrence 95-008-00

In accordance with the requirements of 10 CFR 50.73, "Licensee Event Report System," the attached Licensee Event Report (LER) for reportable occurrence 95-008-00 is being submitted. This report describes an event which resulted in the plant operating in a condition prohibited by Technical Specifications.

On December 6, 1995, one of the four required Service Water pumps' 4160 volt power supply breakers failed to operate. Investigation into the failure determined that the pump was out of service greater than the allowed Limiting Condition for Operation. Interim measures to preclude recurrence will be to locally inspect all safeguards 4160 volt power supply breakers every time they are closed. The interim measures will remain in place until all the 4160 volt safeguards power supply breakers are replaced.

Sincerely,

M. L. Marchi
Manager - Nuclear Business Group

GIH
Attach.

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

9601160200 960105
PDR ADOCK 05000305
S PDR

LICENSEE EVENT REPORT (LER)

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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.

FACILITY NAME (1)

Kewaunee Nuclear Power Plant

DOCKET NUMBER (2)

05000 305

PAGE (3)

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TITLE (4)

A2 Service Water Pump Supply Breaker Failure

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
12	06	95	95	008	00	01	05	96	FACILITY NAME	DOCKET NUMBER
										05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)																	
N	98	20.402(b)	20.405(a)(1)(i)	20.405(a)(1)(ii)	20.405(a)(1)(iii)	20.405(a)(1)(iv)	20.405(a)(1)(v)	20.405(c)	50.36(c)(1)	50.36(c)(2)	50.73(a)(2)(iv)	50.73(a)(2)(v)	50.73(a)(2)(vii)	50.73(a)(2)(viii)(A)	50.73(a)(2)(viii)(B)	50.73(a)(2)(x)	73.71(b)	73.71(c)	OTHER

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Gary I. Harrington	(414) 388-2560 X2559

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
H	02	BKR	M175	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

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

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

On December 6, 1995 with the reactor at 98 percent power the A2 Service Water (SW) pump failed to start. Inspections at the 4160 volt switchgear revealed that the pump supply breaker closing spring was discharged. Reviews of the operating logs indicated that the pump had been last operated on December 1, 1995. The closing spring should have charged at that time. Therefore, the A2 SW pump was inoperable for approximately 4.5 days. This was in excess of the allowed 72 hour Limiting Condition for Operation for the SW system per the Kewaunee Technical Specifications section 3.3.e.2.

Maintenance personnel replaced the failed breaker with a spare and returned the pump to service within one hour. Additional inspections were made of the remaining 4160 volt safeguards supply breakers to ensure their closing springs were charged.

This event was caused by a failure of the breaker's hydraulic charging system. The hydraulic system's dump valve failed to realign to direct hydraulic fluid to the charging cylinder. The misaligned valve prevented charging the breaker's closing spring.

Interim corrective measures will be to locally inspect all safeguards breakers after each closing operation to ensure the closing springs are charged. These measures will remain in place until all the 4160 volt safeguard breakers are replaced.

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

DESCRIPTION OF EVENT

This report describes a failure of one of the four required Service Water (SW) [BI] pumps [P] to start on demand using the Control Room control switch. The failure was identified on December 6, 1995 at 0931 when the plant was at 98% power. Investigation into the failure by utility personnel revealed that the pump's 4160 volt supply breaker [BKR] closing spring failed to charge following the last operation of the breaker on December 1, 1995 at 1135. This resulted in the pump being inoperable for approximately 4.5 days. This is in violation of the 72 hour Limiting Conditions for Operation (LCO) allowed in the Kewaunee Technical Specifications (TS) section 3.3.e.2.

On December 6, an attempt was made to start the A2 SW pump in order to establish maximum system conditions to perform testing of an opposite train air operated valve (the status of the air operated valve had no impact on the operability status of its associated SW train). When the control room control switch [HS] was positioned to start, the Nuclear Control Operator (NCO) noted that the red "breaker closed" indicating light [IL] failed to light. A Nuclear Auxiliary Operator (NAO) was sent to the associated 4160 volt switchgear [SWGR] to investigate. The NAO confirmed that the pump supply breaker did not close. Electrical maintenance personnel were then sent to investigate. The maintenance personnel discovered that the breaker closing spring was discharged and attempted to charge it. Their efforts were unsuccessful. The breaker was replaced with a spare, and the pump and breaker tested

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satisfactorily on December 6 at 1020. The time from identifying the breaker failure to returning the pump to operable status was less than one hour.

Kewaunee's 4160 volt breakers are McGraw - Edison Type PSD Magnetic - Air Circuit Breakers. They are electrically operated, horizontal draw-out breakers, with a hydraulically charged, compressed spring, stored energy operating mechanism. They operate using spring force to open and close. The closing spring is compressed using a hydraulic fluid system. In order to close the breaker the closing spring must discharge. The closing action also compresses the opening spring. When the breaker reaches the closed position the hydraulic system is actuated to recharge the closing spring. When the breaker is in the closed position, the opening spring is compressed, allowing the breaker to be opened; the closing spring is charged, allowing the breaker to be reclosed after opening; and the hydraulic operating system is stopped.

Normally, after the breaker is closed, the hydraulic charging system operates until the closing spring is compressed. When spring compression is completed a system of mechanical linkage operates to stop the hydraulic charging system. A hydraulic dump valve controls the direction of the hydraulic fluid to develop or relieve the hydraulic system pressure. The investigation into this failure found the hydraulic dump valve was not aligned properly. The misaligned condition resulted in the hydraulic fluid being

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directed to the fluid sump, preventing development of sufficient pressure to compress the closing spring. Ultimately, the hydraulic compressor motor operated until the motor brushes failed.

Since the operating requirements of the SW pumps are such that the supply breakers must be able to open and subsequently reclose in response to a design basis event, the loss of the automatic close feature of the pump supply breaker causes the pump to be inoperable. The A2 SW pump supply breaker was incapable of satisfying its required operating function since the last time the breaker was closed on December 1st. Therefore, the pump was inoperable for approximately 4.5 days (4 days, 10 hours and 45 minutes)

Kewaunee TS require that two SW trains be operable whenever the reactor is critical. Each SW train requires two SW pumps. A 72 hour LCO is allowed when a single SW train is inoperable. Therefore, Kewaunee was in operation outside of TS requirements for approximately 1.5 days.

CAUSE OF THE EVENT

The SW pump breaker failure was caused by a failure of the breaker's hydraulic charging system dump valve to align properly to charge the breaker's closing spring. The dump valve's alignment is established and maintained with an alignment screw and locking nut. Shop inspections of the failed breaker found

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the locking nut loose. Loosening of the locking nut is assessed to have occurred from vibration due to breaker operation.

ANALYSIS OF THE EVENT

This event is reportable in accordance with 10CFR50.73(a)(2)(i)(B), as an event or condition prohibited by the plant's Technical Specifications. The nature of this failure was such that it was unidentifiable using normal plant operating parameters. This was a "blind" failure which could not be identified without unusual efforts being undertaken. The only manner in which this type of failure can be detected is to physically inspect the breaker after the breaker is closed. This inspection requires an individual to locally open the applicable switchgear cubicle and verify a mechanical "flag" indicates the closing spring status as charged.

The safety implications of this event were minimal. All redundant SW equipment and components served remained operable. Further, this event involved the reduced capacity of a single train of the SW system. The lake water temperature during the time the pump was unavailable remained below 45°F. A qualitative assessment of single pump operation based upon previous system flow testing concluded, a single pump would be capable of providing the necessary flow for cooling services under accident conditions. However, it is not certain that the SW header pressure at the containment [NH] outlet penetrations would have been high enough to exceed containment design pressure for the affected train

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under all piping failure conditions. This results in a concern that the unlikely combination of a breach in the containment SW piping coincident with postaccident containment pressures creates the potential for a release path direct to the environment. The SW piping in containment, during the time of this event, remained intact.

CORRECTIVE ACTIONS

The following immediate corrective actions were taken:

1. The failed breaker was replaced with a spare breaker. After replacement the pump was satisfactorily tested and returned to service.

2. The remaining 4160 volt safeguards [EK] switchgear breakers were locally inspected for charging spring status. All breakers in both trains of safeguards switchgear were satisfactory.

The following long term corrective actions are being taken:

1. The Operations group implemented actions to locally inspect the 4160 volt safeguards breakers every time one of the breakers is closed. These actions are in the form of written instructions to Operations personnel. This action will serve as an interim corrective measure until all the 4160 volt breakers are replaced.

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- All 4160 volt safeguards breakers will be replaced with a newer design.

NOTE: Kewaunee has previously identified a need to replace the existing 4160 volt breakers with a newer design. This has been identified as a need due to existing equipment aging and unavailability of replacement parts resulting in increased maintenance.

A Design Change Request (DCR) was initiated and approved to replace the existing 4160 volt safeguard breakers with an improved Westinghouse vacuum operated design [VACB]. Since the new design breakers do not have an hydraulic charging system, they are not susceptible to the failure identified in this report. Furthermore, the new design breaker has the capability of providing indication of the charge status of the breaker closing mechanism. This feature was not available on the existing breakers. This feature is under evaluation for incorporation into the DCR. This will enable the operator to identify a failed breaker on routine rounds without having to intrude into the breaker cubicle.

The current schedule for breaker replacement will begin with training of plant personnel on breaker installation and operation beginning the first quarter 1996. Subsequent to training, breaker replacements will begin with the availability of equipment to be removed

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from service. All 4160 volt safeguards breakers are tentatively scheduled to be replaced by the end of the next refueling outage which is scheduled to begin in the fall of 1996.

ADDITIONAL INFORMATION

Equipment Failures:

4160 volt McGraw-Edison Type PSD Magnetic - Air Circuit Breaker.

Similar Events:

Kewaunee has experienced an increasing number of 4160 volt breaker failures in recent years. The failures have been attributed to aging of the existing design. Of four previous events identified in the Incident Report (IR) data base, one failure was identical to this failure, that is a misaligned dump valve due to loose locking nut. One of the corrective measures in response to the previous failure was for the Maintenance group to determine an alternative and more effective way to lock the dump valve in position. To date, an acceptable alternate method of locking the dump valve in place has not been identified.

The previous event involved a failure of the B Safety Injection pump supply breaker. This event occurred on March 16, 1995. During a Plant Operations Review Committee (on-site review committee) meeting, subsequent to the March event, discussions were held involving the need for

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interim corrective measures equivalent to that which are in place now. The determination at the time was that alternative means of identifying breaker status should be pursued as opposed to intruding into the breaker cubicles. Included in the discussions was revising the proposed DCR to include the indicating light feature for the replacement breakers.

The four previous events identified in the IR tracking data base are:

1. IR 87-135 - Diesel Breaker 1-509 Would Not Close - Cause, material deficiency.
2. IR 93-100 - Breaker 1-507, 1A2 SW Pump Breaker Failure to Close - Cause, dump valve linkage binding.
3. IR 95-043 - B SI Pump Breaker Failure - Cause, misaligned dump valve due to loose locking nut (described above).
4. IR 95-057 - 4KV Breaker 1-201 Failed to Close - Cause, 52xy protection relay failure.