

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8801280147 DOC. DATE: 88/01/28 NOTARIZED: NO DOCKET #
 FACIL: 50-305 Kewaunee Nuclear Power Plant, Wisconsin Public Service 05000305
 AUTH. NAME AUTHOR AFFILIATION
 BERGMANN, J. W. Wisconsin Public Service Corp.
 HINTZ, D. C. Wisconsin Public Service Corp.
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 87-011-00: on 871208, util advised of potential failure of Model 62H controller internal relays. Caused by overvoltage condition. Periodic surveillance testing provided & final corrective actions being investigated. W/880122 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 5
 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

| | RECIPIENT ID CODE/NAME | COPIES LTTR ENCL | RECIPIENT ID CODE/NAME | COPIES LTTR ENCL |
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| | PD3-3 LA | 1 1 | PD3-3 PD | 1 1 |
| | QUAY, T | 1 1 | | |
| INTERNAL: | ACRS MICHELSON | 1 1 | ACRS MOELLER | 2 2 |
| | AEOD/DOA | 1 1 | AEOD/DSP/NAS | 1 1 |
| | AEOD/DSP/ROAB | 2 2 | AEOD/DSP/TPAB | 1 1 |
| | ARM/DCTS/DAB | 1 1 | DEDRO | 1 1 |
| | NRR/DEST/ADS | 1 0 | NRR/DEST/CEB | 1 1 |
| | NRR/DEST/ELB | 1 1 | NRR/DEST/ICSB | 1 1 |
| | NRR/DEST/MEB | 1 1 | NRR/DEST/MTB | 1 1 |
| | NRR/DEST/PSB | 1 1 | NRR/DEST/RSB | 1 1 |
| | NRR/DEST/SCB | 1 1 | NRR/DLPQ/HFB | 1 1 |
| | NRR/DLPQ/QAB | 1 1 | NRR/DOEA/EAB | 1 1 |
| | NRR/DREP/RAB | 1 1 | NRR/DREP/RPB | 2 2 |
| | NRR/DRIS/SIB | 1 1 | NRR/PMAS/ILRB | 1 1 |
| | REG FILE 02 | 1 1 | RES TELFORD, J | 1 1 |
| | RES/DE/EIB | 1 1 | RES/DRPS DIR | 1 1 |
| | RGN3 FILE 01 | 1 1 | | |
| EXTERNAL: | EG&G GROH, M | 5 5 | FORD BLDG HOY, A | 1 1 |
| | H ST LOBBY WARD | 1 1 | LPDR | 1 1 |
| | NRC PDR | 1 1 | NSIC HARRIS, J | 1 1 |
| | NSIC MAYS, G | 1 1 | | |

LICENSEE EVENT REPORT (LER)

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| FACILITY NAME (1) Kewaunee Nuclear Power Plant | | | | | | | | | | DOCKET NUMBER (2) 0 5 0 0 0 3 0 5 1 | | | | | | | | | | PAGE (3) 1 OF 0 4 | | | | | |
| TITLE (4) Potential Failure of Model 62H Controller Internal Relays Due to Overvoltage Condition as Described By Foxboro in a 10CFR21 Report | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 NAMES NA | | | | | | DOCKET NUMBER(S) 0 5 0 0 0 | | | | | | | | | | |
| 1 | 2 | 2 | 1 | 8 | 7 | 8 | 7 | - | 0 | 1 | 1 | - | 0 | 0 | 0 | 1 | 2 | 2 | 8 | 8 | 0 | 5 | 0 | 0 | 0 |
| OPERATING MODE (9) N | | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11) | | | | | | | | | | | | | | | | | | | | | | | |
| POWER LEVEL (10) 1 0 0 | | 20.402(b) | | | | 20.406(e) | | | | 80.73(a)(2)(iv) | | | | 73.71(b) | | | | | | | | | | | |
| | | 20.406(e)(1)(i) | | | | 80.20(a)(1) | | | | 80.73(a)(2)(v) | | | | 73.71(c) | | | | | | | | | | | |
| | | 20.402(e)(1)(ii) | | | | 80.30(a)(2) | | | | 80.73(a)(2)(vi) | | | | <input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 305A) | | | | | | | | | | | |
| | | 20.406(e)(1)(iii) | | | | 80.73(a)(2)(i) | | | | 80.73(a)(2)(vii)(A) | | | | 10CFR21 | | | | | | | | | | | |
| | | 20.406(e)(1)(iv) | | | | 80.73(a)(2)(ii) | | | | 80.73(a)(2)(viii)(B) | | | | | | | | | | | | | | | |
| | | 20.406(e)(1)(v) | | | | 80.73(a)(2)(iii) | | | | 80.73(a)(2)(ix) | | | | | | | | | | | | | | | |
| LICENSEE CONTACT FOR THIS LER (12) | | | | | | | | | | | | | | | | | | | | | | | | | |
| NAME Jeffrey W. Bergmann - Associate Engineer | | | | | | | | | | TELEPHONE NUMBER AREA CODE 411 4 318 181-12 15 16 10 | | | | | | | | | | | | | | | |
| COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13) | | | | | | | | | | | | | | | | | | | | | | | | | |
| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NRC | | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NRC | | | | | | | | | | | | | | | |
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| SUPPLEMENTAL REPORT EXPECTED (14) | | | | | | | | | | EXPECTED SUBMISSION DATE (15) | | | | MONTH | DAY | YEAR | | | | | | | | | |
| <input checked="" type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE) | | | | | | | | | | <input type="checkbox"/> NO | | | | 0 | 4 | 2 | 9 | 8 | 8 | | | | | | |
| ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single space typewritten lines) (16) | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>On December 8, 1987, while the plant was operating at 100% power, Wisconsin Public Service Corporation (WPSC) was advised by another utility of a concern regarding the premature failures of certain relays in Foxboro 62H controllers. These same relays were installed at KNPP as part of an overall controller refurbishment project for both the reactor protection (RPS) and plant process control systems. Included in the scope of refurbishment is the changeout of a non-hermetically sealed relay to a hermetically sealed unit to eliminate failures caused by contact corrosion.</p> <p>The investigation into the cause of the relay failures is not complete; however, initial investigations strongly suggest that the relays failed due to an overvoltage condition. Presently, the voltage across both the originally installed and the recently installed replacement relays is higher than their rated voltage. However, the original relays do not appear as susceptible to premature failures.</p> <p>Although the replacement relays are susceptible to premature failure, they are operable and capable of performing their safety related function. Periodic surveillance testing provides continued assurance of relay operability. In addition, a letter which identifies the systems which use the 62H controller and provides contingent instructions has been made required reading for all operators.</p> <p>Final corrective actions are still being investigated. However, a solution to resolve the RPS circuitry concerns, as a minimum, is expected to be implemented during the next refueling outage in March of 1988.</p> <p>This report is submitted to supplement the 10CFR 21 report which Foxboro provided to the NRC on December 21, 1987.</p> | | | | | | | | | | | | | | | | | | | | | | | | | |

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | | |
| Kewaunee Nuclear Power Plant | 0500030587 | 87 | 011 | 010 | 02 | OF 04 |

TEXT (If more space is required, use additional NRC Form 388A's) (17)

Description of Event

On December 8, 1987, while the plant was operating at 100% power, Wisconsin Public Service Corporation (WPSC) was advised by another utility of a concern regarding the premature failures of certain relays [RLY] (Foxboro Part B8002DN, relay numbers K1 and K2) in Foxboro 62H controllers [STC]. The apparent failure mechanism is an opening of the coil due to overvoltage. An investigation was immediately initiated to determine if similar failures had occurred at the Kewaunee Nuclear Power Plant (KNPP).

In 1987, WPSC began a refurbishment project to recondition the original plant Foxboro controllers. The refurbishment project will eventually include eight (8) 62H controllers in the reactor protection system (RPS) [JC] and twenty-seven (27) 62H controllers in the plant's process control systems. However not all of these controllers have been refurbished. As recommended by Foxboro, the scope of refurbishment included the changeout of a non-hermetically sealed relay (Foxboro part NO196ZN) to a hermetically sealed unit (Foxboro part B8002DN) to eliminate failures caused by contact corrosion. The electrical characteristics of the two relays are identical. Approximately 65% of the Kewaunee Nuclear Power Plant (KNPP) controllers were refurbished in 1987 and the balance are scheduled to be refurbished in 1988. The KNPP has experienced a relay failure in a control system since the controller refurbishment and it is highly suspected that the relay failure mechanism was the same as that occurring at the aforementioned plant.

WPSC and Foxboro have been performing investigations and on December 21, 1987, Foxboro filed a 10 CFR 21 report with the NRC regarding the potential for relay failures in the 62H Controller. This report is being submitted to supplement Foxboro's 10 CFR 21 Report.

Cause of Event

During the 1987 operating cycle, KNPP and the aforementioned plant have experienced failures of the Foxboro Part B8002DN relay. Although the cause of the failures has not been conclusively identified, it is highly suspected that the failures are a result of an overvoltage condition. Presently the voltage across the relay coils exceeds the nominal rating of 48 volts + 10%. Since the electrical characteristics of the B002DN and the NO196ZN relays are identical, both relay types experience the overvoltage condition. However, the NO196ZN relays do not appear as susceptible to premature failures.

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TEXT IF more space is required, use additional NRC Form 386A's (17)

Analysis of Event

The 62H Controllers have either a K1 relay or K1 and K2 relays in their circuitry. The K1 relay controls the auto/manual mode of the controller. The K2 relay controls the source of the controlling input when the controller is in the automatic mode.

KNPP had a failure of a B8002DN (K2) relay in the main feedwater control system [JB] on October 13, 1987. Based on information received from another utility of a concern regarding premature relay failure, WPSC reevaluated the October K2 relay failure. WPSC suspects that the K2 relay failure mechanism was the same as that experienced by the other utility since the K2 relay coil had burnt open at both plants.

A review performed to identify all uses of the 62H Controllers at KNPP concluded that the controllers are used in the plant process control systems and the reactor protection system. The effects of the relay failure (i.e., coil burnout) have been evaluated for each system. It has been determined that the failure of a controller in the plant process control system will not adversely affect plant safety.

There are eight (8) 62H controllers which perform a safety related function in the Reactor Protection System (RPS). Four of these controllers have been refurbished and utilize the B8002DN relay and the other four utilize the N0196ZN relay. The 62H controllers perform a safety related function in the RPS by adding a Delta Flux penalty to the overtemperature and overpower delta temperature (OTAT & OPAT) trip setpoints when Delta Flux is outside of the specified band of +9% to -12%. A relay failure in the 62H controller in the RPS circuitry could cause the flux penalty adjustment to be non-existent, resulting in non-conservative OTAT and OPAT reactor trip setpoints. The KNPP is normally operated within a delta flux target band which is more limiting than the +9% to -12% band. Operations personnel periodically monitor the delta flux indication and log the delta flux hourly. Additionally, the plant process computer monitors delta flux and alarms when the target band is exceeded. Therefore, indications of possible target band exceedance are available which provide early indications of an approach to the +9% to -12% limit.

It must be noted that these relays are operable and remain capable of performing their intended function; however, they may be susceptible to heat induced deterioration resulting in a shortened life expectancy. Monthly surveillance testing of the RPS circuitry provides continued assurance of relay operability.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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TEXT (if more space is required, use additional NRC Form 308A's) (17)

Corrective Actions

The effect of the failure in the currently installed 62H Controllers has been reviewed and a letter which is required reading for all operators has been placed in the Control Room. The letter identifies the systems which utilize 62H Controllers and emphasizes that KNPP utilizes these controllers in Reactor Protection System circuitry for the OPAT and OTAT trip setpoints. Operations personnel are instructed to notify Instrument and Control (I&C) personnel immediately if the Delta Flux is out of the target band. I&C personnel will then ensure that the controllers are operable.

The monthly operability surveillance along with the added requirement to notify I&C upon exiting the target band will, for the short term, provide added assurance of relay operability in these protection circuits.

WPSC is working with Foxboro to develop a permanent hardware solution to the relay problem. A solution to resolve the RPS circuitry concerns, as a minimum, is anticipated to be implemented during the next refueling outage scheduled for March 1988.

A supplemental report will be provided at a later date as final corrective actions are implemented.

Additional Information

Similar Events: None

Equipment Failure: None

Related Information: Letter from M. J. Berberian (Foxboro) to Joseph Petrosino (NRC) dated December 21, 1987.



WISCONSIN PUBLIC SERVICE CORPORATION

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

January 22, 1988

10 CFR 50.73

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

Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Reportable Occurrence 87-011-00

Reference 1: Letter from M. J. Berberian (Foxboro) to Joseph Petrosino (NRC)
dated December 21, 1987

This report is being supplied to respond to concerns raised by the December 21, 1987, 10 CFR 21 report issued by Foxboro (reference 1).

Very truly yours,

D. C. Hintz
Vice President - Nuclear Power

TJW/jms

Attach.

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