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ACCESSION NBR:9205180196 DOC.DATE: 92/05/08 NOTARIZED: NO DOCKET #
 FACIL:50-305 Kewaunee Nuclear Power Plant, Wisconsin Public Servic 05000305
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 DRESSEN,J.D. Wisconsin Public Service Corp.
 SCHROCK,C.A. Wisconsin Public Service Corp.
 RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 92-009-00:on 920410,unanalyzed condition identified w/
 design of EDG load sequencer re loading of AFW,SW & internal
 containment spray pump onto safeguards electrical bus.Cause
 not determined.Temporary mod implemented.W/920508 ltr.

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May 8, 1992

10 CFR 50.73

U. S. Nuclear Regulatory Commission
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Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Reportable Occurrence 92-009-00

In accordance with the requirements of 10 CFR 50.73, "Licensee Event Report System," the attached Licensee Event Report for reportable occurrence 92-009-00 is being submitted.

Sincerely,

C. A. Schrock

C. A. Schrock
Manager-Nuclear Engineering

VJC/jac

Attach.

cc - INPO Records Center
Mr. Patrick Castleman, US NRC
US NRC, Region III

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Kewaunee Nuclear Power Plant										DOCKET NUMBER (2) 0 5 0 0 0 3 0 5										PAGE (3) 1 OF 07																																		
TITLE (4) Unanalyzed Condition Identified In Emergency Diesel Generator Load Sequence Design																																																						
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										DOCKET NUMBER(S)																	
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OPERATING MODE (9) N										THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)																																												
POWER LEVEL (10) 0 0 0										20.402(b)										20.408(c)										80.72(a)(2)(iv)										73.71(b)														
										20.408(a)(1)(i)										80.38(c)(1)										80.73(a)(2)(v)										73.71(c)														
										20.408(c)(1)(ii)										80.38(c)(2)										80.73(a)(2)(vi)										OTHER (Specify in Abstract below and in Text, NRC Form 366A)														
										20.408(a)(1)(iii)										80.73(a)(2)(i)										80.73(a)(2)(vii)(A)																								
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LICENSEE CONTACT FOR THIS LER (12)																																																						
NAME Jay D. Dressen - Associate Engineer																				TELEPHONE NUMBER																																		
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																																																						
CAUSE					SYSTEM					COMPONENT					MANUFACTURER					REPORTABLE TO NRCDS					CAUSE					SYSTEM					COMPONENT					MANUFACTURER					REPORTABLE TO NRCDS									
SUPPLEMENTAL REPORT EXPECTED (14)																				EXPECTED SUBMISSION DATE (15)										MONTH DAY YEAR																								
YES (If yes, complete EXPECTED SUBMISSION DATE)																				X NO																																		

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

On April 10, 1992, at 1330 hours, with the plant in refueling shutdown, an unanalyzed condition was identified with the design of the Emergency Diesel Generator (EDG) load sequencer. The electrical load sequencer is designed to sequentially load safety-related equipment onto the safeguards electrical buses following a Design Bases Accident. The potential exists for simultaneously loading an Auxiliary Feedwater (AFW) Pump, a Service Water (SW) Pump and an Internal Containment Spray (ICS) Pump onto the safeguards electrical bus. The simultaneous loading of these 3 pumps onto the EDG had not been previously analyzed.

This condition has existed since plant start-up. The cause of the failure to analyze this event during original construction could not be determined.

A temporary plant modification was implemented, prior to start-up for cycle 18, to modify the loading sequence to ensure the AFW pump will start as specified in the load sequence. Although the potential still exists for the ICS pump to start simultaneously with another pump, this has been analyzed and determined acceptable. A permanent change will be implemented to ensure the 3 pumps in question do not start simultaneously.

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

DESCRIPTION OF EVENT

On April 10, 1992, with the plant in refueling shutdown, an unanalyzed condition was identified with the design of the emergency diesel generator (EDG) [DG] load sequencer. The unanalyzed condition was found during an investigation into a question raised during an electrical distribution functional inspection being conducted by the Nuclear Regulatory Commission (NRC). During the inspection one of the Inspectors questioned the ability of the diesel generator to start a Containment Spray Pump (ICS) [P] concurrent with another large motor during an assumed small or medium break loss of coolant accident (LOCA). While investigating the question, Wisconsin Public Service Corporation (WPSC) identified an unanalyzed condition with the EDG load sequence design. The electrical load sequencer is designed to sequentially load safety related equipment onto the emergency electrical buses [BU] following a Design Basis Accident (DBA). The potential existed for simultaneous loading of an Auxiliary Feedwater (AFW) Pump [P], a Service Water (SW) Pump [P], and an ICS pump onto the safeguards bus. The starting of these 3 pumps, simultaneously, had not been previously analyzed for the EDG load sequencer.

The electrical load sequence consists of eleven timed steps (0-10). A safety injection (SI) signal activates steps 0 through 10 and a blackout (BO) signal activates steps 6 through 10 (refer to attachment 1 for an example of a detailed loading description). At step 3 the ICS pump receives a permissive to start. The pump will not start until a Hi-Hi containment pressure signal is present (23 psig). Step 6 provides a signal to start an AFW pump and the associated auxiliary lube oil pump. The AFW pump

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will not start until the auxiliary lube oil pump [P] provides approximately 10 psig of lube oil pressure. Historical data indicates that this takes approximately 10 seconds. Under a worst case scenario, the AFW pump and the ICS pump could have started at step 8 concurrent with the SW pump.

This scenario was not previously analyzed. Temporary Change Request (TCR) 92-08, Rev. 1 was implemented prior to start-up for cycle 18, to modify the loading sequence to ensure the three pumps would not start concurrently.

The temporary change removed the auxiliary lube oil pressure start permissive and the low lube oil pressure trip from the logic circuitry for the AFW pump. This ensures that the AFW pump will start at step 6 of the SI sequence as designed. The temporary change also added a start signal to the auxiliary lube oil pump at step zero of the SI sequence. For a BO signal, the AFW pump and its associated auxiliary lube oil pump will start simultaneously at step 6. These changes have been analyzed and found acceptable.

The potential still exists for an ICS pump and another pump to start simultaneously. WPSC has analyzed the start of the ICS pump after step 3 of the SI load sequence. The analysis demonstrates that the EDG is capable of providing a voltage profile to accelerate all concurrently started motors, after step 3, to full speed with freedom from spurious protective relay tripping. This is consistent with the Updated Safety Analysis Report that states that the ICS pump will start simultaneously with any of the loads after step 2.

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Cause of Event

The lube oil pressure start permissive for the AFW pump has existed since plant start-up. This could have caused an AFW, SW and an ICS pump to load onto an EDG simultaneously.

The cause of the failure to analyze this event during original construction could not be determined.

Analysis of Event

This event is being reported in accordance with 10 CFR 50.73(a)(2)(ii), as a previously unanalyzed condition that existed in the EDG electrical load sequence. TCR 92-08, Rev. 1 was implemented to modify the loading sequence to ensure that the AFW, SW and ICS pumps do not start simultaneously. This event was also reported in accordance with 10 CFR 50.72(b)(2)(i) as an unanalyzed condition that significantly compromised plant safety. The report was made at 1524 on April 10, 1992.

To determine the safety significance of the unanalyzed condition that existed prior to the implementation of the modification, a Probabilistic Risk Assessment was performed.

This assessment determined the probability of the loss of offsite power concurrent either a LOCA or steam line break in containment. The analysis used the MAAP Code to establish the break sizes for a main steam line break and for a reactor coolant system break which would result in containment pressure reaching 23 psig in the 15 to 60 second time period of concern. The probability of these breaks was then determined and combined with the frequency of a loss of offsite power event to

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establish an overall frequency for a simultaneous start of a SW pump and an ICS pump. This frequency is on the order of $5E-8$ /per year. This event is considered incredible by WASH 1400 and Generic Letter 88-20 guidance.

Corrective Actions

A modification has been made to the EDG load sequence to ensure that an ICS, an AFW, and a SW pump do not start concurrently. This modification consists of eliminating the lube oil pressure permissive and the low lube oil trip for the AFW pump. The AFW pump manufacturer, Dresser Pump Division, has advised WPSC that emergency starts of the pump, without lube oil, can be made without pump damage. This requires running the auxiliary lube oil pump once per week for 5 minutes or greater. This recommendation will be implemented by manually starting and running the auxiliary lube oil pump twice per week for 10 minutes. As a good engineering practice, an additional start signal of the auxiliary lube oil pump has been added at step 0 of the SI sequence. This will ensure lube oil will be available by step 6. The start signal of the Auxiliary lube oil pump at step 6 of the BO signal is unaffected. Permanent design changes to address this issue are currently being evaluated.

The potential still exists for an ICS pump and another pump to start simultaneously. The simultaneous start of the two pumps was analyzed during the 1992 refueling outage and found to be acceptable.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/85

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Additional Information:

Equipment Failures: None

Similar Events: None

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ATTACHMENT 1 TO LER 92-009

Max. Time
Lapse(sec.)

(Step "0") Motor Operated Valves	0
(Step "1") Start Safety Injection Pump 1A	10
(Step "2") Start Residual Heat Removal Pump 1A	15
(Step "3") Start Shield Building Fan 1A, Start Zone SV equipment, Start Containment Spray Pump 1A if containment Hi-Hi pressure is present	20
(Step "4") Start Service Water Pump 1A1	25
(Step "5") Start Containment Fan Coil Units 1C and 1D	30
(Step "6") Start Auxiliary Feedwater Pump 1A	35
(Step "7") Start Component Cooling Pump 1A	40
(Step "8") Start Service Water Pump 1A2	45
(Step "9" and Step "10") Manual or Auto Start of any auxiliary as required for safe plant operation	60