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AUTH.NAME AUTHOR AFFILIATION
DRESSEN,J.D. Wisconsin Public Service Corp.
SCHROCK,C.A. Wisconsin Public Service Corp.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 92-018-00:on 920922,licensed power exceeded due to inaccurate feedwater flow indication.Caused by corrosion product build up between ultrasonic flow meters.Ultrasonic flow meters transducers replaced.W/921026 ltr.

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October 26, 1992

10 CFR 50.73

U. S. Nuclear Regulatory Commission
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Washington, D.C. 20555

Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Reportable Occurrence 92-018-00

In accordance with the requirements of 10 CFR 50.73, "Licensee Event Report System," the attached Licensee Event Report for reportable occurrence 92-018-00 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

9211030327 921026
PDR ADOCK 05000305
S PDR

IE22

NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO 3150-0104
EXPIRES 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Kewaunee Nuclear Power Plant	0 5 0 0 0 3 0 5	1 OF 0 6

TITLE (4)
Licensed Power Exceeded Due to Inaccurate Feedwater Flow Indication

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)
0 9	2 4	9 2	9 2	0 1 8	0 0	1 0	2 6	9 2	N/A	0 5 0 0 0
										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)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
Jay D. Dressen - Plant Nuclear Engineer	4 1 4 3 8 8 - 2 5 6 0

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	
X	S J	F I C G	2 6	N							

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

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

On September 22, 1992, the plant was returning to 100 percent power after a September 15, 1992, unit trip. After applyimg the ultrasomic flow meters (UFMs) correction factor to in-line venturi feedwater (FW) flow measurements and escalating to 100 percent power, it was noted that the electric output was 1 to 2 megawatts higher than before the unit trip. This prompted an engineering evaluation. On September 24, 1992, the evaluation determined indicated FW flow, measured by the UFMs, was 0.41 percent low and reactor power was approximately 0.2 percent greater than licensed thermal power. Immediate actions were taken to decrease power to within licensed limits.

The change in UFM output was caused by corrosion product build up between the UFM transducers and the FW pipe in conjunction with age related degradation of the transducers. This results in a decrease in UFM signal repeatability.

The FW UFMs were calibrated, using the full flow bypass line venturi, to accurately measure FW flow and determine actual 100 percent reactor power on Septeinber 24, 1992. The FW pipe surface between the UFM transducers is scheduled to be cleaned during the 1993 refueling outage. Additionally, a program is being developed to replace the UFM transducers on a regular basis. These actions will ensure UFM repeatability. Until the 1993 refueling outage the full flow bypass line venturi will be used to calibrate the UFMs after a trip. This will ensure the UFMs are calibrated until the corrective actions can be taken.

Description of Event

This report describes a violation of Kewaunee's Technical Specifications. Section 2.c.1 of Kewaunee's Operating License limits steady-state core power level to 1650 megawatts thermal (MWt). On September 24, 1992, an engineering investigation into a slight increase in electrical output concluded Kewaunee had been operating at 1653 MWt since achieving full power on September 22, 1992. Immediate actions were taken to decrease power to within licensed limits.

On September 22, 1992 the plant was returning to 100 percent power after a unit trip on September 15th. Steady-state 100 percent reactor power was determined by performance of a secondary calorimetric.

At Kewaunee, ultrasonic feedwater flow meters (UFMs)[FI], are used in conjunction with in-line feedwater (FW) venturies to determine the FW flow rate used in the calorimetric calculation. The UFMs are used to apply a correction factor to the in-line FW flow venturi measurements.

At the beginning of an operating cycle, the UFMs are calibrated using a more accurate venturi located in a full flow main feedwater bypass line. The bypass line venturi measurement is compared to the UFM measurements and a calibration factor is determined. The UFMs are then used to determine a correction factor for the in-line venturi measurements.

Following any transient (approximately a 5 percent power decrease from 100 percent power), the in-line venturi correction factor is conservatively removed from the computation of flow measurement until its accuracy can be ascertained by the examination of other plant parameters.

When escalating to full power after the unit trip, there were no apparent changes in plant parameter values from those that existed prior to the trip. Since plant parameters (including FW flow, steam flow, and in-line venturi differential pressure measurements) had not changed noticeably, it was determined that the UFM calibration factor and the in-line venturi correction factor used prior to the trip were appropriate.

When the UFMs were used to correct FW flow, and power was escalated to 100 percent indicated thermal power, electric output was noted to be 1 to 2 megawatts higher than before the trip. Upon closer scrutiny, other plant parameters were identified that differed slightly from before and after the trip. This prompted an engineering evaluation to determine if licensed reactor power was being exceeded. Numerous instrument checks and comparisons were initially performed, including the lengthy preparations (approximately eighteen hours to warm the FW bypass line and perform the test) necessary for verifying the calibration of the UFMs.

Reactor power was definitively determined by calibrating the UFMs in accordance with the annual calibration procedure RXT-21, "Calibration of Feedwater Ultrasonic Flowmeters using the Feedwater Bypass Line," on September 24, 1992. The results indicated that the UFMs were

reading 0.41 percent low and reactor power was approximately 0.2 percent greater than the licensed limit.

The maximum steady state power level allowed by the Kewaunee Nuclear Power Plant Facility Operating License is 1650 megawatts thermal. It was calculated that the power level was approximately 1653 megawatts thermal with the UFMs out of calibration.

Cause of the Event

The change in UFM output was caused by corrosion product build-up between the UFM transducers and the FW pipe in conjunction with age related degradation of the transducers. This resulted in a decrease in UFM signal repeatability. This is consistent with information obtained from the vendor and experience of other licensees.

Analysis of Event

This report is submitted as a violation of Kewaunee Technical Specifications. Section 2.c.1 of the Kewaunee Nuclear Power Plant Facility Operating License states, " The licensees are authorized to operate the facility at steady-state reactor core power levels not in excess of 1650 megawatts (thermal)." Contrary to this from September 22, 1992 to September 24, 1992 reactor power was approximately 1653 megawatts thermal.

Section 14 of the USAR, titled Safety Analysis states, "For accident evaluation, the initial conditions are obtained by adding maximum steady-state error to rated values." The rated values for power are plus or minus 2 percent of 1650 MWt (or 33 MWt) for calorimetric error. The error associated with the FW flow measurement using the FW bypass line is $\pm$0.461. This is well within the error of $\pm$1.25% assumed by the USAR for FW flow measurement. With reactor power reaching 100.2 percent, the reactor power limits of USAR section 14 were not exceeded. Therefore the assumptions in the safety analysis are still applicable and there was no increased risk to the health and safety of the public.

Corrective Actions

When it was noticed that there was a difference in electric output from before the trip on September 15, 1992, an engineering evaluation was conducted. A review of plant parameters provided no firm indication as to why there was a difference in electric output. It was determined to verify the calibration of the UFMs, by using the FW bypass line, in accordance with procedure RXT-21, "Calibration of Feedwater Ultrasonic Flowmeters using the Feedwater Bypass Line," on September 24, 1992. After calibrating the UFMs reactor power was returned to 100 percent power at 1900 on September 24, 1992.

The FW pipe surface between the UFM transducers is scheduled to be cleaned and polished during the 1993 refueling outage. Additionally, a program is being developed to replace the UFM transducers on a regnlar basis. These actions will ensure UFM repeatability.

Until the 1993 refueling outage the FW bypass line will be used to calibrate the UFMs after a trip. This will ensure the UFMs are accurate until the corrective actions can be taken.

Additional Information: None

Equipment Failure: Controlotron Inc., Model nunber 960 ultrasonic flow ineter.

Similar Events: None.