

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Point Beach Nuclear Plant	DOCKET NUMBER (2) 0 5 0 0 0 3 0 1 1	PAGE (3) 1 OF 0 5
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TITLE (4)
Misalignment of Shutdown Bank "B" Rods

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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<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="2">OPERATING MODE (8)</td> <td colspan="10">THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)</td> </tr> <tr> <td colspan="2">POWER LEVEL (10) 1 0 0</td> <td>20.402(b)</td> <td>20.406(c)</td> <td>50.73(a)(2)(iv)</td> <td>73.71(b)</td> </tr> <tr> <td colspan="2"></td> <td>20.406(a)(1)(i)</td> <td>50.38(c)(1)</td> <td>50.73(a)(2)(v)</td> <td>73.71(c)</td> </tr> <tr> <td colspan="2"></td> <td>20.406(a)(1)(ii)</td> <td>50.38(c)(2)</td> <td>50.73(a)(2)(vii)</td> <td rowspan="4">OTHER (Specify in Abstract below and in Text, NRC Form 365A)</td> </tr> <tr> <td colspan="2"></td> <td>20.406(a)(1)(iii)</td> <td>X 50.73(a)(2)(i)</td> <td>50.73(a)(2)(viii)(A)</td> </tr> <tr> <td colspan="2"></td> <td>20.406(a)(1)(iv)</td> <td>50.73(a)(2)(ii)</td> <td>50.73(a)(2)(viii)(B)</td> </tr> <tr> <td colspan="2"></td> <td>20.406(a)(1)(v)</td> <td>50.73(a)(2)(iii)</td> <td>50.73(a)(2)(x)</td> </tr> </table>												OPERATING MODE (8)		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(c)	50.73(a)(2)(iv)	73.71(b)			20.406(a)(1)(i)	50.38(c)(1)	50.73(a)(2)(v)	73.71(c)			20.406(a)(1)(ii)	50.38(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 365A)			20.406(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)			20.406(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)			20.406(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)
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LICENSEE CONTACT FOR THIS LER (12)

NAME C. W. Fay, Vice President - Nuclear Power	TELEPHONE NUMBER AREA CODE: 4 1 4 2 7 7 2 8 1 1
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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
B	A A C T R	W	1 8 5						

SUPPLEMENTAL REPORT EXPECTED (14)

<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15) MONTH: DAY: YEAR:
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single space typewritten lines) (16)

On April 30, 1986, the Unit 2 control operator, upon reviewing the operator logs, noted that analog rod position indications for shutdown bank "B" indicated the control rods in that bank were farther into the core than expected for the power level at the time. The plant process computer printout of rod positions confirmed the misalignment of shutdown bank "B." The computer and analog rod position indication both showed the bank 5 to 8 inches lower than expected. Shutdown bank "B" was withdrawn and the positions and nuclear instrumentation indications after withdrawal were compared to pretrip conditions. Subsequently, all banks were fully withdrawn to verify position.

Failure of the mechanical demand counter by advancing a digit in the tens column is suspected but could not be confirmed.

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

EVENT DESCRIPTION

Background and Time Sequence:

On April 29, 1986, Unit 2 had experienced a reactor trip from full power. See LER 86-001-00 for details. Unit 2 had reached criticality after the trip at 1114 hours on April 29, 1986. The unit had reached 100% power by 2110 hours on April 30, 1986. At approximately that same time, the control operator was reviewing his logs after assuming the watch. He noted that, according to rod position indications, the shutdown bank "B" rods were inserted into the core farther than expected.

Rod positions are printed out on the trend typewriter on a periodic basis as part of the normal operation of the plant process computer. When the alarm typewriter fails, the alarms are printed on the trend printer due to the higher priority of the alarm data. Coincidentally, at 0729 hours on April 29, 1986, the alarm typewriter for Unit 2 had failed at approximately the time of the reactor trip. At 0742 hours, the trend printer also failed. During the time of these failures, the computer was storing the trend information on disk for later retrieval. Over the next 36 hours, the printers were returned to service and failed again a number of times. Because of the alarm printer failure, the rod positions were not being printed out on the trend printer for use by the operator. The data was being collected and stored on disk but was not readily available to the operator. Due to the multiple failures of the printers, a comparison of step counter demand position and rod position indication (RPI) instrumentation was not immediately accomplished by the operator. However, the plant process computer continually monitors the difference between the demand position of the rods and the rod position indication. The plant computer will alarm if the differential exceeds that allowed by the Technical Specifications. At no time during the startup did an alarm of this type occur.

After it was recognized that shutdown bank "B" was possibly misaligned, a computer printout was obtained of the rod position history. The pretrip rod positions were compared to the rod position indicators at the time of the discovery of the misalignment and it was verified that shutdown bank "B" was positioned into the core approximately 5 to 6 inches farther than the 225 steps required by Technical Specifications.

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At approximately 0224 hours, shutdown bank "B" was withdrawn three steps (approximately 1-7/8 inches). Rod position indication, delta flux, power, and Tave responded corresponding to the rod movement. The rods were then withdrawn three more steps with the parameters responding again indicating actual rod movement. The rods were again withdrawn two steps. After the last withdrawal, all rod position indication and computer printouts indicated shutdown bank "B" rods approximately equal to pretrip levels.

On May 1, 1986, all banks were checked by use of a Visicorder to count the steps to a fully withdrawn position. Shutdown bank "B" was found to be at 222 steps at that time. Shutdown bank "A" and control banks "A," "B," and "C" were found to be at 224 steps. All banks were subsequently pulled to greater than 225 steps except control bank "D."

It should be noted that none of the rod banks has had a history of misstepping.

System Description:

The control rod positions are monitored by two systems. First, each bank of rods has a demand counter that counts the number of steps that the rods are asked to step. This demand count is indicated on the plant process computer and control board mechanical counters on the control board. The counter system is strictly a digital count of the number of times the rods are asked to step out or in. The counter keeps a running count of the number of steps from the fully inserted position.

Second, there is an analog rod position indication system that displays on analog meters on the control board and on the plant process computer. The analog system reads the position of the rods by sensing the actual position of the drive shaft of the rod. The system displays the number of inches the rods are above the fully inserted position. The analog system is somewhat sensitive to the temperature of the RPI coil stack. The indicated elevation of the rods may vary because head temperature changes with reactor power. When the control rod is fully withdrawn, the rod position indications for any one rod may read as much as eight inches farther out at 100% power than at 1% power. The rods are not physically out eight inches farther, it is only the position indication that varies with the temperature.

The plant process computer continually compares the analog rod position indication to the digital demand position and alarms if bank misalignment exceeds Technical Specification limits.

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The step counters at Point Beach are manufactured by the Whittaker Corporation. The counters are Neuron counters, Model #127FA110AS/3.

The Energy Industry Identification System component function identifier and system name of the digital demand step counter is:

- System - AA
- Component - CTR
- Manufacturer - W185

Generic Implications:

There appears to be no generic implication associated with this event.

Reportability:

This Licensee Event Report is provided under the reporting requirement of 10 CFR 50.73(a)(2)(i)(B), "Any operation or condition prohibited by the plant's Technical Specifications."

Cause:

The mechanical counter has been thoroughly inspected for possible failure mechanisms. The counter appears to have no indications of failure or miscounting. None-the-less, the counter has been replaced because it is suspected as the source of the miscount leading to the rod misalignment. It is possible that the mechanical digital counter advanced a tens digit as a random occurrence.

The computer printout and analog RPIS agreed throughout the startup and subsequent realignment of the rods.

Safety Assessment:

This event was reported because Technical Specifications require that the shutdown banks be fully withdrawn when in fact shutdown bank "B" was not. The ten steps is negligible from a reactivity standpoint for shutdown margin. During the startup, control bank "D" was always more than 33 steps above the insertion limit for bank "D". When at full power, control bank "D" was withdrawn to step 204. Since the insertion limit for control bank "D" at 100% power is 171 steps, the insertion of shutdown bank "B" by only 10 steps would not affect the shutdown margin requirements of the Technical Specifications.

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Technical Specification 15.3.10 allows up to 15 inches misalignment between the rod position indication and the bank demand position when above 215 steps. Therefore, hot channel factors are not a concern with the rod misalignment discussed in this LER.

The insertion limit takes into account a rod ejection accident. The unlikely event of a rod ejection accident in shutdown bank at 215 steps would be bounded by the analysis for control bank D at 171 steps.

Corrective Actions:

Since the analog rod position indications have read low historically when the reactor is at low power levels than full power temperatures, the operators have suspected that in these cases, the low readings on the analog rod position indications had been due to the low power levels. Operating Procedure OP-1B, "Reactor Startup," will be revised to require the operator to verify rod position during startups on a more frequent basis than presently. This enhanced procedural requirement for independent verification should result in a lower probability for this type of rod misalignment to take place in the future.

The current procedure requires the monitoring of rod position indications and bank demand positions for possible misalignment. The revised procedure may ask for comparison of the bank step counter with rod demand position on the plant process computer. This revision will be made after a thorough review of the procedure and the impact any changes will have on the correct operation systems involved in this event.

Similar Occurrences:

Demand step counters have failed in the past. Sticking mechanical counters have resulted in the demand counter reading lower than the actual position of the rods. The procedure mentioned above has been used to verify the sticking of counters in the past.

The failure mode of the counter this time is a new one. For some reason, the counter appears to have counted forward an additional ten digits without the rods being asked to move. If any further information as to the actual failure mechanism is found, it will be provided in a supplement to this LER.



Wisconsin Electric POWER COMPANY
231 W. MICHIGAN, P.O. BOX 2046, MILWAUKEE, WI 53201

VPNPD-86-234
NRC-86-48

May 29, 1986

Mr. J. G. Keppler, Regional Administrator
Office of Inspection and Enforcement
Region III
U. S. NUCLEAR REGULATORY COMMISSION
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Mr. Keppler:

DOCKET 50-30L
LICENSEE EVENT REPORT 86-002-00
MISALIGNMENT OF SHUTDOWN BANK "B" RODS
POINT BEACH NUCLEAR PLANT, UNIT 2

Enclosed is Licensee Event Report 86-002-00 for Point Beach Nuclear Plant, Unit 2. This report details the misalignment of a shutdown bank of control rods. LER 86-002-00 is filed under the reporting requirement of 10 CFR 50.73(a)(2)(i)(B), "Any operation or condition prohibited by the plant's Technical Specifications."

Very truly yours,

C. W. Fay
Vice President
Nuclear Power

Enclosure

Copies to NRC Document Control Desk
Washington, D. C. (with original)
NRC Resident Inspector

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