NRC-03-106

10 CFR 50.73

October 31, 2003

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

KEWAUNEE NUCLEAR POWER PLANT
DOCKET 50-305
LICENSE No. DPR-43
REPORTABLE OCCURRENCE 2003-004-00

In accordance with the requirements of 10 CFR 50.73, " Licensee Event Report System," the attached Licensee Event Report (LER) for reportable occurrence 2003-004-00 is being submitted.

This letter contains no new commitments and no revisions to existing commitments.

Thomas Coutu
Site Vice President, Kewaunee Nuclear Power Plant
Nuclear Management Company LLC

Enclosure

cc: Senior Resident Inspector, Kewaunee, USNRC
Project Manager, Kewaunee, USNRC
Administrator, Region III, USNRC
INPO Records Center

IE22

NRC FORM 366 (1-2001) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

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

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TITLE (4)

Failure to Log Nuclear Instrumentation Quadrant Power Tilt as Required by Tech Spec 3.10.j Due to Procedural Inadequacy

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
09	02	2003	2003	-- 004 --	00	11	03	2003	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N
POWER LEVEL (10)	100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)

20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)	
20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)	
20.2203(a)(1)	50.36(c)(1)(i)(A)	50.73(a)(2)(iv)(A)	73.71(a)(4)	
20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)	
20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A	
20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)		
20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)		
20.2203(a)(2)(v)	X 50.73(a)(2)(i)(B)	50.73(a)(2)(vii)		
20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)		
20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Robert Reynnells	(920) 388-8791

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

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

ABSTRACT

On September 2, 2003, with the plant operating at 100% power, Nuclear Management Company (NMC) Instrumentation & Control (I&C) personnel conducted a quarterly calibration of excore nuclear instrumentation (NI) channel N41. At the completion of the calibration, it was noticed that Control Room annunciator LOWER QUADRANT POWER TILT RATIO HIGH was lit. The alarm response procedure and procedure A-NI-48 "Abnormal Nuclear Instrumentation" were reviewed, and it was determined that logging of the power tilt was not necessary, since three of the four NI channels still had the same calibration and were operable. A-NI-48 did not provide clear guidance relative to the logging requirement, or on blocking the N41 channel to clear the alarm. On September 3, 2003, this alarm condition was further evaluated, and it was subsequently determined that the N41 channel should have been defeated. At this point, N41 was defeated, and a manual power tilt calculation was performed. No power tilts were found to be present.

The root cause of this event was procedural deficiency relative to A-NI-48, in that it did not provide clear guidance as to how an NI channel should be addressed when it would alarm during a calibration. It was also not realized by the operating crews that the alarm would not re-flash if an actual power tilt had occurred.

Corrective actions to be taken include a revision to procedure A-NI-48 to provide specific guidance on actions when an alarm is annuciated due to calibration. This report does not describe a safety system functional failure.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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

DESCRIPTION

On September 2, 2003, with the plant operating at 100% power, Nuclear Management Company (NMC) Instrumentation & Control (I&C) personnel conducted a quarterly calibration surveillance of excore nuclear instrumentation (NI) [IG] channel N41 in accordance with procedure SP-48-004G. At the completion of the calibration, it was noticed by the shift operating crew that annunciator [ANN] 47032-M "LOWER QUADRANT POWER TILT RATIO (QPTR) HIGH" remained lit. The setpoint for this alarm is when all four power range lower detectors [DET] are less than 50%, OR when the ratio of the highest Lower Detector current over the average of all Lower Detectors' currents exceeds 1.02 (which is what caused the alarm in this case). This alarm was not expected to stay in the annuciated condition following completion of the surveillance.

The alarm response procedure was reviewed, which directed the operating crew to procedure A-NI-48 "Abnormal Nuclear Instrumentation". This procedure was also reviewed, and it was determined that QPTR logging was not necessary. This was based on the fact that three of the four NI channels still had a valid current calibration, and were therefore considered to be operable. QPTR logging was also believed not to be necessary until a second NI channel would go into calibration, thereby causing two of the four NI channels to be alarming.

The crew also questioned as to whether NI channel N41 should be blocked. It was determined that the A-NI-48 procedure did not provide clear guidance on the conditions required to accomplish blocking of the channel to clear the alarm. It was not recognized at the time that the annunciator would not re-flash if an actual radial tilt problem were encountered. The re-flash feature of an annunciator with multiple inputs, is designed such that if a redundant input were to exceed its setpoint, the annunciator would re-alarm to alert the operator. This particular annunciator has only one input, so it would not re-flash.

During shift turnover from the day to night crew, it was discussed that annunciator 47032-M "LOWER QUADRANT POWER TILT RATIO HIGH" was alarmed due to calibration of the NI. Procedure A-NI-48 was reviewed, and the conclusion was reached that the QPTR monitor was still in service, since three channels still had the same valid calibration and were operable.

On September 3, 2003, a new day shift operating crew questioned the 47032-M alarm condition. The alarm response procedure was reviewed, and the Assistant Operations Manager was contacted for guidance. Procedure A-NI-48 was collectively examined, and it was concluded that procedure A-NI-48 step 4.4.1 directs that the affected channel be defeated. Channel N41 was then defeated on the detector current comparator drawer, and annunciator 47032-M was cleared. This made the annunciator available for alarming conditions in the other quadrants.

A manual quadrant power tilt calculation was then performed to verify that an actual power tilt did not exist.

CAUSE OF THE EVENT

The root cause of this event was procedural inadequacy relative to A-NI-48 "Abnormal Nuclear Instrumentation". This procedure does not provide clear guidance as to how an NI channel should be treated when it alarms due to a calibration. The operating crews knew that the reason for the alarm was the calibration, but did not realize that defeating a recently calibrated channel was appropriate.

Further, procedural guidance to address a QPTR alarm due to recent calibration of the first instrument, was not provided.

A significant contributing cause of this event was that the operating crews did not realize that the alarm would not re-flash if an actual power tilt had occurred.

The crews involved with this event indicated that there was confusion in the course of trying to implement this procedure. The operating crews did not exhibit a strong questioning attitude relative to implementation of the A-NI-48 procedure, and did not seek guidance from Operations Management Staff.

The shift operating crews exhibited a knowledge deficiency relative to the requirements of Technical Specification 3.10.

ANALYSIS OF THE EVENT

This event was determined to be reportable under 10CFR50.73(a)(2)(i)(B), operation prohibited by the Technical Specifications. Technical Specification (TS) 3.10.j requires that:

> "If one or both of the quadrant power tilt monitors is inoperable, individual upper and lower excore detector calibrated outputs and the quadrant power tilt shall be logged once per shift, and after a load change of >10% of rated power or after 24 steps of control rod motion. The monitors shall be set to alarm at 2% tilt ratio."

With the alarm in the annunciated condition, the lower QPTR alarm was not available to warn of an actual power tilt. Therefore, the alarm and its associated monitor [MON] were not capable of performing their intended function.

Although the quadrant power tilt alarm was inoperable, no actual power tilt existed at any time during this event. During the period that the alarm was disabled, flux levels in the reactor [RCT] remained stable, and no flux differential limits were exceeded. No control rod [ROD] motion took place during this time.

The safety significance of this event is mitigated by the alarm circuitry for the upper QPTR being operable. Also, alarms associated with control rod misalignment, control rod drop, and quadrant core exit thermocouples were operable.

A review of this event has been performed by the Reactor Engineering group. There is a relationship between the Operating Cycle 26 reload core design, its neutron flux distribution changes with cycle burnup, and the associated excore detector current change. Past fuel cycles had a flatter flux shape, and exhibited less change with burnup in flux level in the outer regions of the reactor core. Based on data from past fuel cycle detector currents, changes in detector current averaged fewer than 2% change in a 3 month period. The current Cycle 26 is experiencing larger than previous cycles relative flux changes in the core outer regions. The calculated change in detector current was as large as 5.6% over a two-month period in cycle 26. This condition has not been experienced in past KNPP fuel cycle designs and fuel cycle depletions and is a condition for the current and future operating cycles.

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

CORRECTIVE ACTIONS

Initial corrective actions that were completed on September 3, 2003:

1. Channel N41 was then defeated on the detector current comparator drawer, and annunciator 47032-M was cleared.

2. A manual quadrant power tilt calculation was performed to verify that an actual power tilt did not exist.

Other corrective actions that have been completed:

1. On September 5, 2003, a Root-Cause Evaluation (RCE) was initiated.

2. This event was discussed with the Shift Operating Crews. Expectations were restated for contacting the Operations Staff when questions arise.

Corrective actions to be taken:

1. A procedure revision has been drafted for the complete re-write of A-NI-48, and this revision is currently in the review process.

2. Additional resources have been allocated to complete an in-progress upgrade project, relative to Abnormal Operating Procedures and Alarm Response Procedures.

3. The task matrix training status for Senior Reactor Operators and Shift Technical Advisors, will be evaluated relative to tasks involving the application of the TS during plant operation and the evaluation / interpretation of non-routine plant conditions. Modify the status to require periodic re-training in these areas.

4. The Assistant Manager of Operations will further reinforce expectations to the shift operating crews regarding contacting Operations management staff, to assist in resolving control room issues.

5. Initial License Training and Licensed Operator Requalification Training will be provided on control room alarms that have re-flash capability.

6. Licensed Operator Requalification Training will be provided on the requirements of Technical Specification 3.10 "Control Rod and Power Distribution Limits". This training is in progress, and is part of the current cycle training schedule.

7. An effectiveness review of the corrective actions relative to this event will be performed.

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SIMILAR EVENTS

LER 2003-001-00:

On 1/14/2003, with the plant operating at 100% power, NMC personnel recognized that TS 3.10.b, Power Distribution Limits, action requirements had not been implemented. The condition was discovered when questions were raised regarding operability of the computerized axial flux differential monitor alarm system. TS 3.10.b.13 requires, "If the alarms are temporarily out of service, the axial flux difference shall be logged, and conformance with the limits assessed, every hour for the first 24 hours, and half-hourly thereafter."

On 1/12/03, in response to several spurious "Power Range Upper Radial Flux Tilt" alarms, Control Room Operators entered a fixed computer input value to correct a bad input. Entering the fixed value was not immediately recognized as disabling the axial flux monitoring alarm system. The requirements for logging were initiated according to plant procedures approximately 14 hours later, it was not until 1/14/03 that the event was recognized as failing to comply with TS requirements.

A review of the root cause and corrective actions for LER 2003-001 was performed. The review determined that the identified root cause and corrective actions were specific to this particular event, including the associated specific Technical Specification requirement. The corrective actions have been completed, and they were deemed to be effective in correcting the event. These actions would not have prevented the event reported in LER 2003-004, because they did not address the procedural inadequacies in A-NI-48 relevant to QPTR.