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U.S. Nuclear Regulatory Commission
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Point Beach Nuclear Plant, Unit 2
Docket 50-301
License No. DPR-27

Licensee Event Report 301/2004-001-00
Safety Injection System Accumulator Operated
With Fluid Level Out Of Specification High

Enclosed is Licensee Event Report (LER) 301/2004-001-00 for the Point Beach Nuclear Plant Unit 2. This LER discusses an event involving operation of Unit 2 with an inoperable Safety Injection system accumulator. This condition is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B).

Corrective actions identified during our evaluation of this event have been identified in the enclosed report and are being tracked within the corrective action program. There are no new commitments identified in this report.



Gary D. Van Middlesworth
Site Vice-President, Point Beach Nuclear Plant
Nuclear Management Company, LLC

Enclosure:

cc: Regional Administrator, Region III, USNRC
Project Manager, Point Beach Nuclear Plant, NRR, USNRC
NRC Resident Inspector - Point Beach Nuclear Plant
PSCW

ENCLOSURE 1

LICENSEE EVENT REPORT

6 pages follow

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)

FACILITY NAME (1) POINT BEACH NUCLEAR PLANT UNIT 2	DOCKET NUMBER (2) 05000301	PAGE (3) 1 OF 6
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TITLE (4)
SAFETY INJECTION SYSTEM ACCUMULATOR OPERATED WITH FLUID LEVEL OUT OF SPECIFICATION HIGH

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
03	30	2004	2004	- 001 -	00	05	21	2004	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9) 1	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					
		20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	Specify in Abstract below or in NRC Form 366A					
		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 Charles Wm. Krause, Senior Regulatory Compliance Engineer	TELEPHONE NUMBER (Include Area Code) (920) 755-6809
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On March 30, 2004, at 11:27 AM, plant operators determined that the borated water level in the Point Beach Nuclear Plant (PBNP) Unit 2 Safety Injection system "A" accumulator (2T-34A) was greater than the level band allowed by Technical Specification (TS) 3.5.1, "Accumulators." This condition was discovered while conducting troubleshooting activities to resolve a discrepancy between the readings of the two "A" accumulator level detectors, 2LT-939 and 2LT-938. An ultrasonic measurement indicated that the actual level in 2T-34A was above the top of the indicating range. With 2T-34A level greater than 100% (i.e. greater than 1136 ft³), TS LCO 3.5.1 was not met. TS 3.5.1, Action C.1 requires that an inoperable accumulator be restored to operable status within one hour. If that action cannot be completed, the action statement requires the unit to be placed in Mode 3 within an additional six hours. Since 2T-34A could not be recovered within the hour, a reactor load reduction was initiated at 12:15 PM. 2T-34A was recovered at 14:03 and the power reduction secured at 14:05. A RCE investigation determined that PBNP Unit 2 had operated since November 17, 2003, with 2T-34A overfilled, a condition prohibited by Technical Specifications. That condition was created due to an improper vent and fill of the level transmitters following a calibration of the level transmitter while the accumulator was drained for valve maintenance. In addition to restoring the 2T-34A level and pressure to within TS limits, corrective actions have or will include procedure revisions, reviews for extent of condition and staff training to improve understanding of the instrument loop. Based on the PBNP specific PRA modeling and an evaluation of the capability of the 2T-34A accumulator to complete its safety function in the as found condition, this event was identified as having a very low risk significance.

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

Event Description:

At approximately 11:27 AM on March 30, 2004, NMC determined that the borated water level in the Point Beach Nuclear Plant (PBNP) Unit 2 Safety Injection system [BQ] "A" accumulator [ACC] (2T-34A) was greater than the level band allowed by Technical Specification (TS) Limiting Condition for Operation (LCO) 3.5.1, "Accumulators." This condition was discovered while using an ultrasonic device to determine the actual 2T-34A tank level as part of a troubleshooting process to resolve the discrepancy between the readings of the two "A" accumulator level detectors [LIT], 2LT-939 and 2LT-938. The ultrasonic measurement indicated that the actual level in 2T-34A was approximately 10 inches above the top of the indicating range and outside the TS band. TS Surveillance Requirement (SR) 3.5.1.2 specifies that the borated water volume in each accumulator shall be verified between 1100 ft³ and 1136 ft³. With 2LT-939 indicating greater than 100% (i.e. greater than 1136 ft³) accumulator 2T-34A was declared inoperable. TS 3.5.1, Action C.1 required the "A" accumulator to be restored to operable status within one hour. If that action cannot be completed, the specification requires the unit to be placed in Mode 3 within an additional six hours.

2LT-939 was declared out of service on February 14, 2004, when the indicated level had drifted low and then pegged high. At that time the 2LT-938 level indication was unchanged and no evolutions that would have affected the accumulator level were in progress. Accordingly, 2LT-938 remained in service. Extensive trouble shooting was conducted between February 14 and the date of this event. These activities included several transmitter recalibrations and three 2LT-939 transmitter replacements. In addition, a small amount of water had been drained from the 2T-34A accumulator to confirm that the 2LT-938 level transmitter was tracking changes in the accumulator water volume. Following the determination of the actual accumulator tank level on March 30, 2004, 2LT-938 was declared out of service and 2LT-939 was declared in service.

In order to restore 2T-34A to operability, the operating crew commenced draining the accumulator to bring the level into range. At approximately 12:14 PM, the draining was completed. At that point, 2LT-939 was reading 44% and 2LT-938 indicated less than 0%. Total volume drained from the "A" accumulator was approximately 700 gallons based on the volume change in the reactor coolant drain tank [TK]. The "A" accumulator pressure at this time was reading 655 psig. TS SR 3.5.1.3 requires the accumulator pressure to be between 700 psig and 800 psig; therefore, Nitrogen was being added to increase the accumulator pressure. At 12:15 PM plant operators commenced a reactor [AC] load reduction. At 12:27 the one hour completion time for Technical Specification Action Condition (TSAC) 3.5.1 required action C.1 was not met. Unit 2 then entered TSAC 3.5.1 D. required action D.1 to be in Mode 3 in six hours. At 14:03 PM, the level and pressure indications [PIT] for 2T-34A accumulator were restored to within TS limits. At 14:05 PM the Unit 2 load reduction was secured with reactor power at approximately 83%. The unit returned to full power operation at 17:05 PM.

At 14:26 PM a four hour notification was made in accordance with 10 CFR 50.72(b)(2)(i) due to initiation of a TS required shutdown (EN#40626). NMC has concluded that, as discussed in the following Event Analysis, Unit 2 was operated from its initial critical operation following the U2R26 refueling outage on November 17, 2003, until March 30, 2004, with the "A" SI accumulator level out of specification high and inoperable. This was a condition prohibited by the TS and is reportable as a LER pursuant to 10 CFR 50.73(a)(2)(i)(B).

Subsequent to this event, a work plan was completed to troubleshoot the 2LT-938 transmitter and restore that level channel to service. These actions were completed on March 31, 2004, at 04:47 AM and the channel returned to service. The level indicators for the Unit 2 "B" accumulator, 2T-34B, were also calibrated and found to be within channel tolerances.

The PBNP Unit 1 accumulator use a different design for level detection, specifically capacitance probes. That design is not susceptible to the problems experienced with the Unit 2 accumulator level devices.

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Event Analysis:

A Root Cause Evaluation (RCE) team was established to investigate and identify the cause(s) for the Unit 2 Safety Injection Accumulator being returned to service with the water volume of the tank out of specification high. The RCE identified the following conditions:

During the Unit 2 Fall 2003 refueling outage (U2R26) a routine calibration of all four SI accumulator level transmitters was included in the outage work scope. In addition, the 2T-34A accumulator was scheduled to be drained to allow maintenance of the accumulator outlet valve (2SI-841A).

On October 9, 2003, the work packages for the calibration of the 2T-34A level detectors, 2LT-939 and 2LT-938, were released for work. The pre-job brief failed to address the fact that 2T-34A was drained. During the calibration, the level channels were found to be out of tolerance low by approximately 2.5%. The I&C technician recalibrated the transmitters and left them in tolerance in accordance with plant procedures.

At the conclusion of the calibration activity, a post-maintenance test (PMT) on the 2T-34A level transmitters was conducted. The PMT was determined to be inadequate because the filling and venting of level transmitters could not be performed correctly with the accumulator empty. With 2T-34A drained, the venting process drew air from the empty tank into the transmitter sensing lines. The 2LT-939 sensing line has a very short length of tubing from the lower tap on the tank before it enters the vertical sensing line tray resulting in a vertical void in the line. 2LT-938 is on the other side of the tank and has a considerable length of tubing prior to entering the vertical sensing line tray. On this sensing line, the void was primarily contained in horizontal tubing lengths. As a result, 2LT-939 saw reduced head pressure that put the transmitter out of range low and caused a 0% reading. However, 2LT-938 indicated the correct level, but due to the smaller vertical void, it would exhibit sluggish response as the tank was filled. The PMT guidance in the plant procedure did not specify the necessary conditions for performing a fill and vent of the instruments. The technician performing these evolutions was not aware that the tank was drained, nor was this condition identified in the work package.

On October 29, 2003, Operations began preparations for restoring the water level in the 2T-34A accumulator. The plan was to fill 2T-34A from a dry condition to 35% indicated level. The amount of water added to the tank is monitored by SI pump run time and refueling water storage tank (RWST) level change. Operations secured filling the 2T-34A with 2LT-938 reading 35% and 2LT-939 reading 0%. Operations calculated that approximately 8500 gallons had been transferred from the RWST.

Subsequent to the filling of 2T-34A, Operations noted that 2LT-938 level indication continued to show a slow level increase. With 2LT-939 still indicating 0%, the operators suspected that the level indication for 2T-34A was in error. Work orders were written to have the Fix It Now (FIN) team I&C technician perform a "fill and vent" of the 2T-34A level transmitters under a Toolpouch maintenance activity. Instead of performing the specified "fill and vent", the I&C technician inadvertently equalized pressure across 2LT-938 and 2LT-939 (sequentially). When the pressure was equalized across the level transmitters, the level indication reverted to the "neutral" indication of 35% level for these transmitters. The 35% indicated level corresponded to the desired level that Operations had filled the tank to earlier. The actions of the technician introduced a bias to the level indication for 2T-34A (level indication reading lower than actual conditions).

The accumulator was then returned to service with faulty level transmitters and an actual tank level approximately 800 gallons above the TS band limits. Unit 2 entered the mode of applicability for the accumulators (Mode 3 and reactor coolant system pressure greater than 1000 psig) on November 10, 2003 with this condition not being recognized. This discrepancy was subsequently identified on March 30, 2004, as discussed in the Event Description.

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Safety Significance

The accumulators are among the principal components of the safety injection system which provide emergency core cooling immediately following a loss of coolant accident. The accumulators are passive components. They discharge into the cold legs of the reactor coolant piping when pressure decreases below about 750 psig, thus rapidly assuring core cooling for large breaks. Each unit has two accumulators, one for each loop. The events described in this report did not involve the level detection or functionality of the "B" accumulator.

The Safety Injection accumulators are credited in three accident scenarios:

- Small Break (0-2") – If both Safety Injection pumps fail, one accumulator is required to function until pressure reaches the low head injection point of the Residual Heat Removal (RHR) system.
- Medium Break (5") – If both Safety Injection pumps fail, and the break is on the 'B' side of the vessel, the 'A' accumulator is required to function until the low head injection point of the RHR system is reached.
- Large Break Loss of Coolant Accident (LOCA) – The 'A' accumulator is required to reflood the core if the break is on the 'B' side of the vessel. RHR will maintain the core flooded after accumulator reflooding.

Using the existing Point Beach specific modeling for Probabilistic Risk Assessments and the conservative assumption that no borated water was available for injection from the 2T-34A accumulator for the approximately four and one half months that 2T-34A was overfilled, the NMC PRA group has estimated that this event had a very low risk significance. In addition, an analysis of the overfilled condition of 2T-34A by the NSSS vendor has determined that the 2T-34A accumulator was capable of performing its design basis function in the as found condition and would not have challenged the 10 CFR 50.46 LOCA acceptance criteria.

Based on the PRA risk assessment and the vendor analysis that the 2T-34A accumulator was capable of completing its safety related function, NMC believes that the safety significance of this event was minimal and the welfare and safety of the public and plant staff was not significantly impacted by this event. During this event there was at no time a loss of a system, structure or component related safety function. The PBNP Unit 2 "B" accumulator was available to inject water into the RCS in the event of a LOCA throughout this event. NMC therefore concludes that this event did not involve a Safety System Functional Failure.

Cause:

The following root and contributing causes have been identified:

Root Cause(s):

- 1 – The 2T-34A conditions for filling and venting of 2LT-938 and 2LT-939 are not explicitly defined in the stations calibration procedure and the procedure also does not contain a drawing for these instrument loops.
- 2 – The station procedure for performing Toolpouch Maintenance is non-conservative. The procedure allows out of service safety related components to be worked under Toolpouch Maintenance if the work does not involve part replacement or disassembly.

Significant Contributing Causes:

CC1 – The U1R26 outage schedule for 2T-34A work activities incorrectly scheduled the level instrument calibrations to be performed prior to the accumulator being refilled.

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CC2 – A 1996 modification to the 2T-34A and 2T-34B level instrumentation installed a design that called for use of Smart 3051 Rosemont transmitters that have a design functional range of -250" to +250" into the operational range of 0" to +14" making the application of this style of transmitters less than desirable.

CC3 – The closeout of the 1996 modification to the 2T-34A and 2T-34B level instrumentation did not result in revision to the calibration procedure to include an isometric drawing of the instrument loop or sufficient guidance for successful completion of calibration PMT.

CC4 – The knowledge and understanding of the 1996 modification to 2T-34A and 2T-34B by I&C Maintenance is inadequate and did not allow the I&C Technicians, Supervision and Planning personnel to fully understand the situation and the effects that their actions had on system operation.

Corrective Action:

As discussed in the Event Description, actions were immediately taken to drain water from 2T-34A in order to bring the water volume in the tank within the TS requirements and restore the accumulator to operable status. The 2LT-938 level instrument was calibrated, PMT performed and the channel returned to service. The actual water level in the 2T-34B accumulator was verified and the level instruments were calibrated, tested, and found to be fully operable.

The RCE has identified various corrective actions to address the concerns identified in this event and to prevent recurrence. These corrective actions changes include:

- A revision to the toolpouch maintenance procedure to prohibit work activities on safety related instrumentation, even if the component is not in service has been completed.
- The U1R28 I&C procedure review list was examined to ensure that PMT is performed under the correct system conditions. This action has been completed.
- Plant procedure OI-100 was revised to include guidance for filling a SI accumulator and to notify I&C Maintenance to fill and vent the level transmitters if the accumulator has been drained. This action has been completed.
- I&C instrument calibration procedures will be revised to include specific guidance for PMT, isometric drawings for complex instrument loops, and identification of plant/system conditions required for the calibration.
- Develop a lesson plan and implement training for I&C personnel to address details of the currently installed accumulator instrument level loops and lesson learned from this event.

These corrective actions and others have been entered in the PBNP corrective action program and will be tracked to completion within that process.

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Previous Similar Events:

A review of recent LERs (past three years) identified the following events that were reported as conditions prohibited by the Technical Specifications. There is no causal connection between these events and the conditions discussed in this LER.

<u>LER NUMBER</u>	<u>Title</u>
266/2003-001-00	As Found Condition of Degraded Grid Voltage Relays Not Within TS Limits
301/2003-001-00	Containment Accident Fan Backdraft Damper Failure Results in a Condition Prohibited by TS 3.6.6.C
301/2002-002-00	Pressurizer Safety Valve Failed to Lift at Test Pressure
266/2001-004-00	Failure to Comply with LCO to Start Standby Emergency Power Supply