NMC
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Point Beach Nuclear Plant
Operated by Nuclear Management Company, LLC

NRC 2003-0066 10 CFR 50.73

July 28, 2003

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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POINT BEACH NUCLEAR PLANT UNIT 2
DOCKET NO. 50-301
LICENSEE EVENT REPORT 301/2003-001-01
CONTAINMENT ACCIDENT FAN BACKDRAFT DAMPER FAILURE RESULTS IN A CONDITION PROHIBITED BY TECHNICAL SPECIFICATION 3.6.6.C

Enclosed is Licensee Event Report (LER) 301/2003-001-01 for the Point Beach Nuclear Plant Unit 2. This LER supplements LER 301/2003-001-00 which was submitted on May 30, 2003. This LER discusses the discovery of an inoperable backdraft damper in the Unit 2 "D" containment fan cooler. This event was reported in accordance with 10 CFR 50.73(a)(2)(i)(B) as, "Any operation or condition which was prohibited by the plant's Technical Specifications."

Corrective actions, completed and proposed, have been identified in the enclosed report. There are no new commitments in this report.

If you have any questions concerning the information provided in this report, please contact Mr. C. W. Krause at (920) 755-6809.

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Enclosure

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NRC FORM 366 (7-2001)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

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

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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.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4)
CONTAINMENT ACCIDENT FAN BACKDRAFT DAMPER FAILURE RESULTS IN CONDITION PROHIBITED BY TECHNICAL SPECIFICATION 3.6.6.C

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 05000
04	02	2003	2003	- 001 -	01	07	28	2003	FACILITY NAME	DOCKET NUMBER 05000

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 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)
Charles Wm. Krause, Senior Regulatory Compliance Engineer	(920) 755-6809

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
B	BK	UDMP	A340	Y					

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 15 single-spaced typewritten lines) (16) On April 2, 2003, the Nuclear Management Company (NMC) determined that the backdraft damper associated with the Point Beach Nuclear Plant (PBNP) Unit 2 W-1D2 containment cooling fan was substantially degraded. The function of that damper is to close when the 2W-1D2 fan is not operating to prevent diversion of air flow through the normal cooling fan when the 2W-1D1, Containment Accident Recirculation Fan, is operating. The damper was found in the open position with only the top louver being fully closed. The top louver was detached from the two louver linkage members. A gravity counterweight was found to be missing from the top louver shaft mounting location. Based on these findings, the 2W-1D1, Containment Accident Recirculation Fan, and the 2W-1D2, Containment Cooling Fan, were declared out of service at 14:05 on April 2, 2003. LCO 3.6.6, "Containment Spray and Cooling Systems," was declared not met and TSAC 3.6.6.Condition C was entered for one accident fan cooler unit not operable. Required action C.1 directs restoration of the cooler unit to operable status within a 72 hour completion time. A temporary modification was completed to secure the damper in the closed position and the containment fan cooler was returned to service.

Further investigation determined that the degraded condition of the backdraft damper should have been identified during performance of a heat exchanger performance test on March 20, 2003, and a 72 hour TSAC entered at that time. Since the allowed completion time for the TSAC required action was exceeded, the unit was operated in a condition prohibited by the Technical Specification and is reportable per 10 CFR 50.73. The failure of the backdraft damper is due to long term degradation of the assembly. The failure to identify the condition of the damper on March 20, 2003, was due to incomplete communication regarding the detached parts and the fact that other indications of damper degradation were not recognized.

Event Description:

On April 2, 2003, a Point Beach Nuclear Plant (PBNP) Unit 2 containment [NH] entry was made to perform a visual inspection and confirm the condition of the backdraft damper [UDMP] associated with the 2W-1D2, Containment Cooling [BK] Fan. The function of that damper is to close when the 2W-1D2 fan [FAN] is not operating to prevent diversion of air flow through the normal cooling fan when the 2W-1D1, Containment Accident Recirculation Fan, is operating. The inspection of the back draft damper was initiated after a maintenance mechanic informed the system engineer that a backdraft damper counterweight was found in the controlled side maintenance shop. The visual damper inspection determined that with the fans secured the damper was in the open position with only the top louver [LV] being fully closed. The top louver was detached from the two louver linkage members. A gravity counterweight was found to be missing from the top louver shaft mounting location. Balancing counterweight was confirmed to be intact on the fourth louver shaft. Five bearings on the left side of the damper assembly were determined to be degraded, loose but intact. The bearing on the balancing counterweight shaft was found free but still seated in the frame end cap.

Based on this inspection, the backdraft damper was determined to be substantially degraded. The capability of the backdraft damper to close in the event of an accident requiring operation of the "D" containment fan cooler was questioned. Accordingly, the 2W-1D1, Containment Accident Recirculation Fan, and the 2W-1D2, Containment Cooling Fan, were declared out of service at 14:05 on April 2, 2003. LCO 3.6.6, "Containment Spray and Cooling Systems," was declared not met and TSAC 3.6.6.Condition C was entered for one accident fan cooler unit not operable (CAP 31978). Required action C.1 directs restoration of the cooler unit to operable status within a 72 hour completion time.

A temporary plant modification was prepared to secure the 2W-1D2-A backdraft damper in the closed position. The temporary modification was installed on April 2, 2003. Post installation testing confirmed that the damper remained closed with the 2W-1D1, Containment Accident Recirculation Fan, operating. Following that confirmatory test, the 2W-1D1 fan was returned to service and Unit 2 exited TSAC 3.6.6 Condition C at 00:30 on April 3, 2003.

Following the inspection of the backdraft damper, the system engineer recalled that a work order (0303731) had been written on this fan cooler following the completion of an OI 131, "Performance Test of 2HX-15D1-D8 Containment Fan Cooler Unit 2," on March 20, 2003. As directed in Step 5.4.10 of this procedure, the test coordinator for this cooler capacity test had performed a closeout inspection of the fan housing on the evening of March 20. During his close out inspection, an item was removed from the floor of the fan housing under the 2W-1D2, Containment Cooling Fan. It appeared to be the bracket that attached the top blade of the backdraft damper to the positioning rod attached to the other blades. The test coordinator noticed at that time the top blade was shut and all other blades were open. Upon further investigation of the fan area, a nut and a four inch cube block of welded shims with a hole through the middle were also found and removed.

After exiting containment, the test coordinator reported the results of the test and his inspection to the control room at approximately 19:14 on March 20, 2003. The test coordinator noted that there was a missing piece of linkage on the top louver. The control room Operations Supervisor (OS) questioned the operability of the louvers. The test director further detailed the condition of the louvers. The information communicated to the OS concerned the missing piece of linkage between the topmost louver and the rest of the damper louvers. The OS understood that the disconnected louver was closed and that the missing linkage did not prevent the rest of the louvers from performing their safety related close function. After this discussion on the condition of the louvers, the OS and the test coordinator left the control room to contact the system engineer to ensure that the missing piece of linkage did not negatively impact the safety function of the louvers. The OS contacted the system engineer at home and described the state of the louvers and the missing piece of linkage. The system engineer agreed that the missing linkage did not prevent the louvers from performing their safety related close function. The OS notified the shift manager of the state of the louvers (the disconnected piece of linkage) and the conclusion that the louvers remained operable based on the understanding that

the disconnected louver was closed and would remain closed during fan operation. In addition, the OS understood that the missing piece of linkage did not degrade the rest of the louvers. The shift manager concurred with the operability determination. The test coordinator then initiated a work order to document the broken linkage on the top damper louver. The OS then screened the work order and noted the louvers remained operable with the broken linkage. At 20:02 hours on March 20, 2003, the accident fan was started following completion of the OI-131 performance test. The fan operated satisfactorily and was returned to service. TSAC 3.6.6.C was exited and LCO 3.6.6 was logged as being met for Unit 2.

We have concluded that the backdraft damper on the 2W-1D2 fan should have been identified as degraded when observed on March 20, 2003. The "D" fan cooler should have been declared inoperable on March 20, 2003, and LCO TSAC 3.6.6.C entered with a 72 hour completion time. However, this condition was not recognized until the April 2, 2003, damper inspection. Therefore we are hereby reporting that the PBNP Unit 2 was operated in a condition prohibited by the Technical Specifications from 72 hours after the "D" containment accident fan cooler was removed from service for performance testing on March 20, 2003, until the completion of the temporary modification which shut the damper on April 3, 2003. This condition is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B) as, "Any operation or condition which was prohibited by the plant's Technical Specifications..."

Cause:

The cause of the 2W-1D2-A containment cooling fan backdraft damper failure is believed to be related to long term degradation of the assembly. During the inspection on April 2, 2003, the gravity counterweight was found missing from the assembly. The apparent cause appears to be a component (probably the gravity counterweight) being prevented from moving in the downward direction and then the weight of the rest of the damper assembly, over a period of time, finally pulling the linkage brackets away from the top louver. This is supported by the observed elongation of the remaining detached bracket from the top louver and the actual displacement of the counterweight. There are two other possible causes ranging from a seized bearing to inadequate weldment of the counterweight to the louver shaft. The seized bearing, resulting from fan vibration or improper grounding during repair, would have prevented damper movement and could have led to the bracket detachment. The inadequate weldment, coupled with fan vibration, could have detached the counterweight and caused it to wedge in between the vertical structural column and damper assembly leading to the eventual failure. A more thorough inspection of the damper will be performed during the next Unit 2 refueling outage when the damper assembly is repaired. These backdraft damper assemblies have become high maintenance items with one or more dampers being repaired each refueling outage. The "D" fan cooler backdraft damper unit had been rebuilt (bearings, linkages and louvers) during the last Unit 2 refueling outage in the Spring of 2002.

The failure to recognize that the damper degradation observed on March 20 impacted the operability of the fan cooler was due to several human factors. The test coordinator was performing the task for the first time and did not have a complete understanding of the damper operation. He was also at the end of a 14 hour shift. His description of the parts removed from the fan cubicle was apparently incomplete or not understood and led to an operability call on the louvers that was later found to be incorrect. The control room OS did not have complete information on the status of the louvers and focused primarily on the missing piece of linkage and how it impacted the louvers. The OS verified that the disconnected upper louver would stay closed and verified that the missing linkage would not directly impact the rest of the louvers. This was the basis for the operability call. The OS did not recognize that the other louvers were degraded and should not have been in an open condition under the conditions that the test director observed. The position of the other louvers was not the focus of the discussion between the test director and the OS and was not part of the discussion between the OS and the system engineer. The focus on the missing linkage resulted in the significance of the position of the rest of the louvers not being questioned. The test coordinator did not consider the position of the dampers to be unusual as damper designs often require backflow pressure to shut the dampers. The position of the louvers could have indicated that there was a separate problem with the louvers other than the missing linkage. Since it was concluded on March 20, 2003, that the damper was operable in the configuration described by

the test coordinator, only a work order was initiated as the means of tracking repair on the damper. There was no follow up or validation of these assumptions and no corrective action request was initiated to evaluate the foreign material removed from the fan housing.

An expanded apparent cause evaluation identified the following human performance factors which influenced this event. The following error likely situations were present:

- Time/Schedule Pressure – This event occurred at the end of a long (14 hour) working day for the test coordinator.
- Multiple Tasks – The OS who made the call to the system engineer to discuss the event was also involved in routine activities and was not present during the initial description by the test coordinator of the items found in the fan plenum.
- Unfamiliar Tasks – This was a first time task for the test coordinator. This condition was recognized in the planning of the test performance and adequate provisions were made to prepare the individual for the test; however, he was not knowledgeable of the functioning of the backdraft damper.
- Ineffective Communications – Due to misunderstood and incomplete communications, not all of the personnel involved were completely aware of the conditions identified in the containment fan cooler plenum.

Corrective Actions:

As mentioned in the Event Description, a temporary modification was installed to clamp shut the backdraft damper and restore the fan cooler to operable status.

On April 5, 2003, during a Unit 2 downpower, the backdraft dampers in the remaining three Unit 2 containment fan coolers were either visually inspected or checked for proper operation. No discrepancies were observed. On April 25 a visual inspection was made for proper operation of all four of the PBNP Unit 1 backdraft dampers. No problems or degradations were noted.

The "D" containment fan cooler backdraft damper is planned to be repaired during the next Unit 2 refueling outage.

Engineering is evaluating the replacement of these backdraft dampers, which have become high maintenance items, with a more robust design.

Engineering management will provide a briefing to appropriate engineering staff to discuss the human performance factors which lead to this event and to evaluate the lessons learned from the experience. Completion of this activity will be tracked in the PBNP corrective action program.

Component and System Description:

Adequate heat removal capability for the containment is provided by two separate, full capacity, engineered safety features systems. These are the containment spray system [BE], whose components are described in FSAR Section 6.4, and the containment air recirculation cooling system, whose components operate as described in FSAR Section 6.3. These systems are of different engineering principles and serve as independent backups for each other.

The containment air recirculation cooling system is designed to recirculate and cool the containment atmosphere in the

event of a loss-of-coolant accident and thereby ensure that the containment pressure cannot exceed its design value of 60 psig at 286°F (100% relative humidity).

Any of the following combinations of equipment will provide sufficient heat removal capability to maintain the post-accident containment pressure below the design value, assuming that the core residual heat is released to the containment as steam.

1. All four containment cooling units.
2. Both containment spray pumps.
3. Two of the four containment cooling units and one containment spray pump.

The containment air recirculation system consists of four fan cooler units, a duct distribution system, and the associated instrumentation and controls. The fan cooler units are located in a missile-protected area near the containment wall. Each fan cooler unit consists of a roughing filter bank (filter media are installed during refueling outages with a significant potential for a dusty containment atmosphere), expanded metal screen, plate-fin cooling coils, and fans and motors. To meet the performance requirements during both normal and post accident conditions, each of the four fan cooler units is provided with two separate vane axial fans. The two fans operate in parallel, but are of different design. One fan (the accident fan) and motor are especially designed for the high pressure, temperature and density following a loss-of-coolant accident. The second fan (the normal fan) and motor in the unit are designed for normal operation, and are not required to operate in the post accident atmosphere.

Gravity-operated back-draft dampers in the discharge duct work of the units isolate any inactive air handling unit from the duct distribution system. In addition, a gravity-operated back-draft damper is installed on the normal fan discharge to prevent back flow through the normal fan when it is stationary and the accident fan is in operation. Dampers open automatically when the associated unit is started. Duct work distributes the cooled air to the various containment compartments and areas.

Safety Assessment:

For a period of 14 days, between March 20 to April 2, 2003, PBNP Unit 2 was unknowingly operated with the "D" containment fan cooler not capable of performing its safety related function. Although the backdraft damper was not identified as being inoperable until April 2, 2003, firm evidence existed on March 20 that the backdraft damper was degraded and the "D" fan cooler should have been declared inoperable at that time. During this 14 day interval, the remaining three containment fan cooler units and both trains of the Containment Spray System were available and capable of performing their safety related functions. As mentioned in the system description above, the combination of one containment spray pump and two containment cooling units or both containment spray pumps is adequate to provide sufficient heat removal capability to maintain the post-accident containment pressure below the design value. Based on a review of the station log and maintenance and surveillance records, the containment spray system was determined to be capable of performing its safety related function throughout the period from March 20 to April 2, 2003. Therefore the safety significance of this event was minimal and the safety and welfare of the public and the plant staff were not impacted by this condition. The containment recirculation cooling system is not a PRA risk significant system; therefore, there was no change in CDF as a result of this condition.

At no time during this condition was there a complete loss of a SSC related safety function. Accordingly, we have also concluded that this event did not involve a safety system functional failure.

Similar Occurrences:

A review of recent LERs (past three years) identified no other events or conditions involving failures in the PBNP containment heat removal systems. The review identified the following events that were reported as conditions prohibited by the Technical Specifications:

LER NUMBER	Title
301/2003-003-00	Failure To Place Instrument Channel In Trip As Specified By LCO 3.3.1 Required Action D.1
301/2002-002-00	Pressurizer Safety Valve Failed to Lift attest Pressure
266/2001-004-00	Failure to Comply with LCO to Start Standby Emergency Power Supply