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10 CFR 50.73

U.S. Nuclear Regulatory Commission
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Point Beach Nuclear Plant, Units 1 and 2
Dockets 50-266 and 50-301
Renewed License Nos. DPR-24 and DPR-27

Licensee Event Report 266/301-2007-001-00
Control Room Emergency Filtration System Inoperable

Enclosed is Licensee Event Report 266/301/2007-001-00 for the Point Beach Nuclear Plant Units 1 and 2. This LER discusses the discovery of an inoperable Control Room Emergency Filtration System (CREFS). This event is reportable in accordance with 10 CFR 50.73(a)(2)(v)(D) for, "Event or Condition That Could Have Prevented Fulfillment of a Safety Function."

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

Dennis L. Koehl
Site Vice-President, Point Beach Nuclear Plant
Nuclear Management Company, LLC

Enclosure

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

NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

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LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Point Beach Nuclear Plant	05000266	1 of 6

TITLE (4)

CREFS Inoperability, Both Control Room Charcoal Filter Fans Inoperable

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
02	06	2007	2007	-- 001 --	00	04	05	2007	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 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)	x	50.73(a)(2)(v)(D)		
	20.2203(a)(2)(v)		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)
Tom Staskal, Compliance Engineer	920/755-7621

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

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

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

ABSTRACT

On February 3, 2007, TS-9, Control Room Heating and Ventilation System Monthly Checks, was conducted on the Control Room Emergency Filtration System (CREFS) to satisfy Technical Specification (TS) 3.7.9 surveillance requirements. W-14B, Control Room Charcoal Filter Fan, was declared inoperable at 1957 CST when the fan supply breaker tripped on thermal overload. Technical Specification Action Condition (TSAC) 3.7.9.A.1, with a completion time of 7 days, was entered. During follow-up extent of condition and troubleshooting activities on the W-14A fan on February 6, it was determined that the W-14A fan would not have operated under degraded grid voltage conditions with minimum design outside air temperature. The W-14A fan was declared inoperable at 1415 hours. With both fans inoperable, an 8-hour non-emergency Event Notification (EN 43149) was made in accordance with 10 CFR 50.72(b)(3)(v)(D). The overload heater element size was increased for the W-14A and W-14B fans based on design basis requirements. Follow-up testing demonstrated the system to be operable and CREFS was returned to service. A root cause evaluation (RCE) determined that some process procedures in the areas of design-control, maintenance and margin-management need improvement. Process and procedure corrective actions will be tracked via the site's corrective action program. Plant-specific probabilistic risk analysis modeling and the defined system safety function determined the event to be of very low safety significance.

Event Description:

On February 3, 2007, surveillance testing per TS-9 was conducted on the Control Room Emergency Filtration System (CREFS)[VI] per Technical Specification (TS) 3.7.9 to satisfy Surveillance Requirements (SRs) 3.7.9.1, 3.7.9.3, and 3.7.9.4. Fan W-14B, "F-16 Control Room Charcoal Filter Fan," [FAN] was declared inoperable at 1957 CST when the fan motor power supply breaker tripped on thermal overload. Investigations into fan inoperability determined a common cause associated with supply breaker thermal overload heater element device sizing existed. Accordingly, the W-14A fan was declared inoperable at 1415 CST on February 6, 2007. One or both fans inoperable causes Units 1 and 2 to enter Technical Specification 3.7.9, "Control Room Emergency Filtration System (CREFS)," Action Condition A, "CREFS Inoperable" with a Required Action of "Restore CREFS to OPERABLE status" in a completion time of seven (7) days. Both units were in Mode 1 at 100% rated thermal power at the time of the event.

The W-14B fan motor tripped on thermal overload during operation. The outside air temperature during testing was -6 deg F, as indicated by the primary meteorological tower, and during subsequent troubleshooting the temperature was consistently at or below 0 deg F. The investigation concluded that the increased air density at these temperatures was the cause for the elevated motor current draw. Subsequently, the W-14A fan motor overload heater element sizing was considered, and it was determined that W-14A would trip under design basis conditions. Therefore, W-14A was declared inoperable. Event Notification 43149 was made at 1908 hours EST on February 6, 2007.

Event Analysis:

A Root Cause Evaluation (RCE) team was chartered to investigate the cause(s) for the CREFS inoperability. RCE01075472-01 provided the following information:

In August 2004 a CREFS low air flow event occurred which resulted in RCE000270 being conducted. An action from RCE000270 was to increase system air flow margin which was subsequently satisfied by developing modifications.

In November 2004 it was proposed to replace the W-14A and B fan motors with higher efficiency 7.5 horsepower motors to achieve the desired flow margin. In March 2006 modification 05-016 R.1 was submitted for new fan motors. Support calculation 06-038 was submitted in April 2006. An assumption in the modification concluded that temperature had a negligible effect on motor performance so no compensation for low temperature was included in the calculation. Equipment changes to the system were subsequently made in accordance with the approved modification.

On December 8, 2006, at 1812 hours during TS-9 testing, the W-14A fan overload relay tripped. Outside air temperature at the time of the event was 23 deg F. The relay was investigated and the cause of the actuation determined to be premature failure of the relay.

On January 3, 2007, TS-9 was conducted successfully. During the next scheduled TS-9 in February 2007, the W-14B fan overload relay tripped. Results of troubleshooting showed motor current averaging 9.3 amps. The overload relay should have tripped at approximately 10.3 amps given vendor instructions for ultimate trip current. The cause of the above expected current draw was determined to be increased air density at low outside air temperatures. Upon understanding the cause for the W-14B fan relay actuation, the W-14A fan was evaluated. The determination was made that W-14A was not operable.

Cause:

The root cause of the February 2007 event was that PBNP processes contain no requirement or method for ensuring overload relays trip at a value that both protects the motor and provides Technical Specification functionality under design basis conditions. A contributing cause was that there was no formal process or decision-making model in place that provided a strategy for managing identified margin (margin in this case is the difference between Technical Specification requirements and actual equipment capabilities) related issues. Another contributing factor, although not causal, was the assumption that air temperature had negligible effects on motor performance.

Corrective Action:

The overload heater elements were replaced with elements having trip current setpoints adjusted to values that considered design requirements. The previously installed FH38 overload heater elements were sized for a motor nameplate current of 8.8 amps. The overload relay with FH38 heater elements should have tripped at approximately 10.3 amps given vendor instructions for ultimate trip current. The overload relays with FH38 heater elements were replaced with FH40 elements with tripping current setpoints adjusted to between 11.5 to 12.3 amps. In accordance with the 2002 National Electric Code, Section 430.32(c), motors with a marked service factor of 1.15 or greater may have overload protection up to 140% of nameplate current. In this case, 140% of the nameplate current is 12.32 amps. Thus, the replacement elements provide adequate electrical protection while at the same time allowing operation with degraded voltage and at the -15 deg F design temperature required by the FSAR. Following the overload heater element replacements, W-14A and W-14B were tested on February 8, 2007, in accordance with TS-9. Outside air temperature was at 10 to 15 deg F as indicated by the primary meteorological tower.

Other corrective actions being tracked to completion via the site's corrective action program are:

- Creation and implementation of a design guide addressing motor overload selection and sizing.
- Revision of maintenance procedures to provide methods of setting and testing motor overload relays.
- Implement and/or revise process procedures on margin management, operational decision-making results revision and other associated decision-making processes.

Safety Significance:

The W-14A and B, "F-16 Control Room Charcoal Filter Fans," are part of the control room ventilation system used for emergency operation to maintain control room personnel radiation dose within regulatory requirements.

This event was of low safety significance because the system affected, CREFS, has no direct accident mitigation effect as would, for example, safety injection, containment spray or auxiliary feedwater. The accident mitigation feature the system provides is the reduction in the control room operating staff's whole-body radiation exposure, which is a long-term health effect.

Probabilistic risk assessment (PRA) engineers evaluated the event and determined that because the tripping of the control room ventilation fans cannot impact either the Core Damage Frequency (CDF) or the Large Early Release Frequency (LERF), this event had no significance with respect to the health and safety of the public. However, because the tripping of these ventilation fans could affect the radiological dose to the control room operators following a core damage accident, the likelihood of this happening was examined.

The probability of this event having a radiological impact on the control room operators was evaluated for Unit 1 operating at 100% power. The results are also applicable to Unit 2 operating at 100% power. The conclusion is that this event had a very low probability of impacting the control room operators, primarily because of the small fraction of the year when both Engineering Change (EC) 1601 (formerly modification MR 05-016) was installed and the outside air temperature was low enough to have an increased air density sufficient to cause the control room fan motor to trip on thermal overload.

The outside air temperature from PPCS for the primary meteorological tower (PPCS Point MT1TL0) was evaluated from October 6, 2006, (date of completion of EC 1601) to February 3, 2007, (date of W-14B tripping on thermal overload). For these 120 days, the outside air temperature fell below +10 deg F twelve (12) times. For each instance of these 12 occurrences, the duration of being below +10 deg F was added to 24 hours to obtain a conservative estimate of the time when the plant may have been susceptible to potential thermal overload of the fans at a time when the fans may have been needed in the event of an accident. The 24-hour duration is the mission time used in the PRA. From October 6, 2006, to February 3, 2007, the combination of the 24-hour mission time and the time that the outside air temperature was below +10 deg F totals approximately 18 days, which is referred to below as the "vulnerable time."

Each initiating event postulated to cause core damage for PBNP was evaluated to determine the probability of having core damage during the 18 days of vulnerable time. The sum of these probabilities totals 4.0E-6. This value represents the probability of having an event that causes core damage during the vulnerable time. At this point, if containment remained intact and there was not sufficient leakage, there would not be a radiological consequence of the event.

Each initiating event postulated to cause a large early release from containment for PBNP was evaluated to determine the probability of having core damage and a large early release during the 18 days of vulnerable time. The sum of these probabilities totals 1.5E-7. This value represents the probability of having an event that causes core damage and a large early release during the vulnerable time. At this point, if the release from containment were completely directed to the control room outside air intake and the control room fans tripped on thermal overload, there could be radiological consequences for the control room operators.

These probabilities are conservatively high for the following reasons:

1) For conservatism in this evaluation, the potential to trip on thermal overload was assumed to occur below +10 deg F (i.e., colder than 10 deg F above zero). The outside air temperature at the time that the W-14B fan motor tripped on thermal overload was actually below -5 deg F (i.e., colder than 5 deg F below zero). In

reality, the trip on thermal overload would not always happen when the outside temperature was below +10 deg F.

2) Both fans were assumed to trip. No credit was taken for the operators attempting to restart the tripped fans once the temperature rose above +10 deg F.

3) For conservatism in this evaluation, the leak or release from containment was assumed to be entirely directed to the control room outside air intake. In reality, the control room operators would only be vulnerable to a release from containment a small fraction of this time because the wind would disperse the release and could even direct the entire release away from the control room due to the wind direction at the time.

The impact of having a fan trip due to a degraded grid voltage condition was also examined. There has not been a degraded voltage condition at the PBNP during its operating life. The probability of having a degraded grid condition during the four months between installation of the engineering change and when the issue was discovered was, therefore, determined to be significantly less than the fraction of that same time where a temperature less than 10 deg F occurred. The estimated likelihood of a fan trip due to low temperature impacting dose to the control room operators, therefore, bounds any impact that a degraded grid voltage condition would have had.

The very low probabilities of having a core damage accident or release from containment while the temperature was such that the control room ventilation fans were susceptible to tripping (4E-06 and 1.5E-07, respectively) concluded that the increase in risk to the health and safety of the control room operators due to this condition was insignificant. This conclusion also bounds the impact of a potential degraded grid voltage condition during the four months between installation of the mod and discovery of the issue.

This event had no personnel industrial safety implications.

However, because CREFS was unable to perform its function, it is concluded the event is a Safety System Functional Failure.

Component and System Description:

The CREFS provides a protected environment from which operators can control the unit following an uncontrolled release of radioactivity.

The CREFS consists of one emergency makeup air filtration unit, two emergency makeup fans, two recirculation fans, and the required ducts and dampers necessary to establish the required flow paths and isolation boundaries. The CREFS is an emergency system, parts of which operate during normal operations.

The air entering the control room is continuously monitored by a noble gas radiation monitor and the control room itself is continuously monitored by an area radiation monitor. One detector output above its setpoint will actuate the emergency makeup mode of operation for the CREFS.

The limiting design bases accident for the control room dose analysis is the large break Loss of Coolant Accident (LOCA).

The CREFS will pressurize the control and computer rooms to at least 0.125 inches water gauge in the emergency makeup mode of operation. The CREFS role in maintaining control room habitability is discussed in the Final Safety Analysis Report (FSAR), Section 9.8.

The CREFS provides airborne radiological protection for control room personnel, as demonstrated by the limiting control room dose analysis for the design basis LOCA. Control room dose analysis assumptions are presented in the FSAR, Section 14.3.5.

Previous Occurrences:

A review of recent LERs (past three years) identified one other event reported as a condition that could have prevented fulfillment of a safety function needed to mitigate the consequences of an accident for the same system. This previous similar event contained no causal connections with the current event:

- LER 266/2006-001-00, Control Room Emergency Filtration System Inoperable

Failed Components Identified: None.

Additional Information:

Past operability evaluations are continuing. A supplement to this report will be submitted, if appropriate, based upon the results of those evaluations.