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EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT

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, Units 1 and 2	05000266	1 of 7

TITLE (4)

Containment Accident Fan Motor Cooler Heat Exchanger
Flow Rates Found to be Outside the Design Basis of the Plant

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 NAME	DOCKET NUMBER
									Unit 2	05000301
01	09	1998	1998	- 003 -	01	10	07	1998	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)	098		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(ii)		50.73(a)(2)(viii)
			20.2203(a)(1)		20.2203(a)(3)(i)	X	50.73(a)(2)(ii)		50.73(a)(2)(x)
			20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
			20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER
			20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		or in NRC Form 366A

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
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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)				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 January 9, 1998, while Point Beach Nuclear Plant Unit 1 was operating at 98 percent power and Unit 2 was in a cold shutdown condition, Wisconsin Electric determined that the Unit 2 containment accident fan motor cooler heat exchanger service water flowrate on at least one fan motor cooler was less than the required design flow rate of 10 gpm. The cooler was not required to be operable at the time of discovery. The corresponding Unit 1 fan motor cooler service water flows were checked using ultrasonic flow instrumentation on January 10, 1998. The Unit 1 "C" and "D" containment accident fan motor coolers were each tested and found with flows below the procedurally specified range of 20-40 gpm. At the time of these discoveries, the flow through the Unit 1 "C" and "D" coolers was reset to within the required range. The Unit 1 "A" and "B" fans were then each declared inoperable and evaluated for inadequate flowrates. Adjustments have been made to ensure adequate flows to all of the Accident Fan Motor Coolers in both Units. The cause of the flow inadequacies was due to the differential pressure flow indicators being calibrated to indicate flow corresponding to a pressure drop across the heat exchanger and the instrument taps being installed such that the pressure drop in the associated inlet and outlet piping was also being measured.

Event Description:

On January 9, 1998, while Point Beach Nuclear Plant Unit 1 was operating at 98 percent power and Unit 2 was in a cold shutdown condition, Wisconsin Electric determined that the Unit 2 containment accident fan motor cooler heat exchanger service water flow rate on at least one fan motor cooler was less than the assumed design flow rate. This called into question the flow rates in the remaining accident fan motor coolers in both Unit 2 and Unit 1. The accident fans for Unit 2 were not required to be operable at the time of discovery. A non-emergency call was made to the NRC operations center on January 9, 1998 at approximately 11:49 Central Standard Time in accordance with 10 CFR 50.72(b)(2)(i), "Any event, found while the reactor was shut down, that had it been found while the reactor was in operation, would have resulted in the nuclear power plant,..., being in an unanalyzed condition."

Unit 1 Description

Continued operation of Unit 1 was to be justified with an operability determination. The service water flows to the four Unit 1 fan motor coolers were checked using ultrasonic flow instrumentation on January 10, 1998. The Unit 1 "C" and "D" containment accident fan motor coolers were found with flows below the procedurally specified range of 20-40 gpm which has been established to ensure the minimum design basis flow of 10 gpm will be met under all accident conditions. During the testing process Unit 1 was placed in a 72 hour LCO. At the time of the testing, the flow through the Unit 1 "C" and "D" coolers was reset to within the required range. Ultrasonic flow testing of the Unit 1 "A and "B" motor cooler flows could not determine the as found flowrates due to having either too low of a flow or due to interference experienced in the ultrasonic signal at the piping location where the portable flowmeter was initially attached. The Unit 1 "A" and "B" coolers were then placed in a flushing alignment to remove any silt buildup that may have been present due to the low flow settings. After flushing, the flows through the Unit 1 "A" and "B" accident fan motor coolers were adjusted to assure design flows and the 72 hour action statement exited.

Two calls to the NRC operations center were made in accordance with 10 CFR 50.72(a)(2)(ii)(B). "Any event or condition during operation that

results in the condition of the nuclear power plant... being... in a condition outside the design basis of the plant." The first call was at approximately 1605 Central Standard Time on January 10, 1998. The second follow-up call was made at approximately 2304. The calls were made due to the discovery of degraded service water flow in at least three of four motor coolers in Unit 1.

Unit 2 Description

Unit 2 was in cold shutdown at the time of the discovery of the inadequate flow rates. The Unit 2 "A" accident fan motor cooler heat exchanger was found with less than 10 gpm (minimum assumed design flow). The throttle valve for the heat exchanger had not been changed since Unit 2 had last been in a condition requiring operability of the containment accident fan coolers. The as-found flowrate through the Unit 2 "B" accident fan motor cooler heat exchanger was also measured and the flowrate was found below the procedurally specified range of 20-40 gpm which has been established to ensure the minimum design basis flow of 10 gpm will be met under all accident conditions. As found flowrates on the Unit 2 "C" and "D" coolers could not be obtained due to either too low of a flow or due to interference experienced in the ultrasonic signal at the piping location where the portable flowmeter was initially attached. All of the Unit 2 motor cooler piping and coolers have been flushed to remove any silt buildup due to the low flow settings and new sections of piping installed to provide better locations for attaching an ultrasonic flowmeter. The flows through all of the Unit 2 coolers have been adjusted to within the procedurally specified range to ensure design basis flows will be available during all accident conditions.

Common Issues

Investigation into the past setting of the motor cooler heat exchanger flow using the installed differential pressure flow meters identified that flow through each individual heat exchanger was routinely isolated to "null" the flow meter without entry into a Technical Specification 72 hour Action statement. Periodic Check PC-24, "Containment Inspection Checklist (Monthly)," was used for the setting of these containment accident fan motor cooler flows on a monthly basis.

Cause:

The cause for the flow inadequacies was the use of installed differential pressure flow gauges designed specifically to measure the pressure drop across the heat exchanger. However, they were used to measure the piping, fittings, as well as the heat exchanger pressure drop, thus indicating a higher flow than what was actually going through the heat exchanger. The pressure taps for the flow instruments were located at least 23 feet and up to 60 feet upstream and downstream of the heat exchanger. The runs of pipe also had a number of pipe fittings. The differential pressure flow gauges take a 0 -54 " w.c. differential pressure which result in an indicated range of 0 - 50 GPM. Given the as-built configuration of the piping and heat exchanger between the pressure taps, an informal engineering calculation was performed for a clean system. The calculated pressure drop for Unit 2 "A" was 8.5 " w.c. and 193.9 " w.c. and for Unit 2 "B" was 5.1 " w.c. and 125.7 " w.c. for 10 and 50 GPM flowrates respectively.

To illustrate the discrepancy found in the installed configuration the following flow data is provided:

Unit 2 "B" Motor Cooler	
2DPI-2904 (gpm)	Ultrasonic (gpm)
20	8
30	13
40	19
49.5	23

As can be seen the flow indicated by the installed instrumentation does not provide the actual flow going through the heat exchanger.

Corrective Actions:

1. The flows have been adjusted to provide adequate flows to all of the accident fan motor coolers in both Units using a portable Ultrasonic flowmeter.

2. On Unit 2, new sections of motor cooler supply and/or return piping were installed in order to provide an ideal location for use of the

ultrasonic flowmeter for setting the flow and to facilitate periodic flow checks. In addition, since the Unit 2 "A" accident fan cooler had the longest supply and return piping runs and consequently lowest flows, all of the easily accessible horizontal piping was replaced (approx. 60 feet) due to compact sedimentation on the bottom of the piping and nodule growth. Removal of this piping will assist in reducing the hydraulic losses allowing higher flows to be established so future sedimentation problems are minimized.

3. During the Spring 1998 Unit 1 refueling outage, the majority of the service water piping for the unit 1 containment fan motor cooler heat exchangers was replaced. As discussed in Item 2 above, some of the fan motor cooler piping in PBNP Unit 2 has already been replaced. The corrective actions listed in the original LER also discussed plans to replace the majority of the remaining piping for the Unit 2 fan motor coolers during the next unit refueling outage. Subsequent monitoring of cooling water flow rates to all the Unit 2 fan motor coolers using more accurate portable ultrasonic flowmeters has consistently demonstrated improved service water flow rates to those coolers. The flowrates have been evaluated as satisfactory and adequate to minimize the potential for sedimentation problems. Accordingly, we have determined that it is not necessary to proceed with replacement of the majority of the Unit 2 fan motor cooler service water piping.

4. *Replacement of the existing differential pressure flow indicators with instrumentation providing more positive flow indication to ensure proper flow settings is planned.* The Unit 1 flow indicators were replaced with ultrasonic flowmeters during the Unit 1 Spring refueling outage. The Unit 2 flowrates have been monitored and evaluated using portable ultrasonic flowmeters; however, a modification has also been initiated to install permanent ultrasonic flowmeters on the Unit 2 fan motor cooler piping.

5. Periodic Check PC-24, "Containment Inspection Checklist (Monthly)," has been revised to eliminate the requirement to isolate cooling water flow to the accident fan motor coolers.

6. A Condition Report and Operability Determination were written questioning the possibility of motor winding insulation damage due to long term normal operation of the motors with low service water

flowrates through the motor coolers. Based on several calculational assessments it was concluded that there was adequate heat removal available such that the windings were not affected. In addition to the calculational assessments, one of the accident fans in the shutdown Unit, 2W-1D1 was operated with very low and no service water flow through the motor cooler while monitoring motor air temperatures. In both cases the motor air temperatures stabilized out well below the air temperature corresponding to the maximum allowed motor winding temperature. This operating data supported the operability determination and indicates that the heat transfer calculations done for the motor cooler are very conservative.

Component and System Description:

The containment accident fan coolers are part of the containment air recirculation cooling system. The system is designed to remove sufficient heat from the reactor containment, following the initial loss of coolant accident containment pressure transient, to keep containment pressure from exceeding design pressure. The motors for this system are cooled by air which in turn is cooled by service water. This air to water heat exchanger is connected to the motor base to form a completely enclosed cooling system. Motor exhaust air exits the motor and flows over the heat exchanger tubes prior to reentering the motor. The tubeside of the heat exchanger is supplied with service water.

Safety Assessment:

The acceptance criteria for motor heat exchanger flow (20 to 40 gpm) was used to ensure at least 10 gpm post accident due to the potential for back pressure. The as-found service water flows through the heat exchangers were below that assumed in the design calculations for the heat exchanger. The lowest flow assumed in the motor cooler heat transfer calculations was 10 gpm. The motor coolers are substantially over sized for the application. The 10 gpm corresponds to approximately 200,000 BTU/hr of heat removal. This compares to an assumed 30,000 BTU/hr of heat generated by the motor during normal operation and 70,000 BTU/hr of heat generated during peak motor loading during an accident. Therefore, the heat removal capability of the motor coolers at the reduced service water flows found could have been sufficient to provide the cooling necessary for a loss of coolant accident. In

addition, during operation, the spray pumps and safety injection pumps were operable and if called upon would have provided sufficient cooling to the core and the containment atmosphere to preclude the pressure in containment from exceeding the design pressure of the containment. Therefore, in the unlikely event of a design basis accident, the defense in depth design of the various engineered safeguards systems designed to provide a redundant function to the containment accident fans would have been capable of assuring a containment pressure peak less than the containment design pressure. Therefore, the health and safety of the general public and plant personnel was not compromised.

Currently service water flowrates to all of the accident fan motor coolers are set to conservatively ensure the required design basis flow will be provided to the motor coolers during all accident conditions.

This report is being provided in accordance with 10 CFR 50.73(a)(2)(ii)(B), "in a condition that was outside the design basis of the plant."

System and Component Identifiers

The Energy Industry Identification System component function identifier for each component/system referred to in this report are as follows:

Component/System	Identifier
Containment Accident Fans	FCU
Motor	MO
Heat Exchanger	HX
Pipe	Pipe

Similar Occurrences:

No recent reportable conditions caused by the use of differential pressure instrumentation inappropriately were found.