NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

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EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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, Unit 1	05000266	1 of 4

TITLE (4)
Reactor Trip Due to Loss of Generator Excitation

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
										05000
07	14	95	95	-- 006 --	00	08	14	95	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)							
			20.402(b)		20.405(c)	X	50.73(a)(2)(iv)		73.71(b)
POWER LEVEL (10)	100		20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)
			20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER
			20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)
			20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)		
			20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Curt Castell, Senior Engineer, Licensing	(414) 221-2019

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
C	TL	EXC	W120	Y						

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

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

At 1010 on July 14, 1995, the Point Beach Nuclear Plant (PBNP) Unit 1 main generator tripped. The generator trip caused a turbine trip, which resulted in a reactor trip from 100% power. The generator trip was initiated by a "Unit Lockout" signal from a loss of generator excitation. Inspection of the exciter revealed that water had condensed inside the exciter housing. The condensation caused shorting and failure of the exciter. The exciter was repaired and Unit 1 was placed back on-line at 1405 hours on July 18, 1995. The condensation in the exciter was caused by a period of extremely hot and humid weather coupled with the cold exciter cooler water supply. Corrective actions for this event include; mitigation of this problem in Unit 2, increasing the exciter-cooler outlet temperature by reducing cooling water flow, and development of appropriate guidance to initiate the necessary actions when exciter-cooler condensation could cause problems. Unit 1 safety equipment responded as required and the health and safety of the public and plant personnel were not impacted by this event.

Event Description:

At 1010 hours on July 14, 1995, the Point Beach Nuclear Plant (PBNP), Unit 1, main generator tripped. The generator trip caused a turbine trip, which in turn caused a reactor trip from 100% power. The generator trip was initiated by a "Unit Lockout" signal.

Shortly after the trip, PBNP operations, maintenance, and engineering personnel investigated the cause of the trip. Inspection of the exciter revealed that water had condensed inside the exciter housing. Over a period of many hours the amount of water that had accumulated in the exciter housing was sufficient to cause liquid entrainment in the rotating assembly. The entrained water was propelled to locations in the exciter that caused shorting of the rotating rectifier. The shorting of the rotating rectifier led to a loss of excitation and the subsequent generator trip.

All safety equipment responded as required dur[illegible] and after the unit trip. The cause of the trip was determined and repa[illegible] to the exciter were initiated. Unit 1 was maintained in hot shutdown with the primary system heat removal via the steam generator atmospheric steam dumps and feedwater provided by the auxiliary feedwater system.

Unit 1 criticality was re-established at 0522 hours on July 17, 1995, in anticipation of completion of repairs to the exciter and returning the unit to operation. Unit 1 was placed back on-line at 1405 hours on July 18, 1995 and achieved full power at 1557 hours on July 19, 1995.

Component and System Description:

The generator excitation system supplies and controls the DC power applied to the generator field windings. Control of the field winding's magnetic st[illegible]gth regulates the terminal voltage and reactive power of the generator. The excitation system is a Westinghouse brushless exciter with a Type WMA voltage regulator.

The IEEE Std. 803A-1983 component identifications for this report include:

EXC	Exciter
GEN	Generator

The manufacturer code for Westinghouse Electric Corporation is W120.

Causes:

The Unit 1 generator trip initiated by the "Unit Lockout" signal was

caused by a loss of generator excitation. The loss of excitation was the result of condensation which had accumulated in the generator exciter.

Prior to the Unit 1 trip, the weather at the PBNP site had been extremely hot and humid. The cooling system for the exciter was condensing a substantial amount of water inside the exciter housing. At 1010 hours on July 14, 1995, the amount of water inside the exciter housing was sufficient to cause shorting of some circuitry inside the exciter and the subsequent loss of excitation.

At PBNP, the exciter-cooler outlet temperature is normally maintained at approximately 20°C. The technical information for the exciter states that the normal exciter-cooler outlet temperature is 45°C, but the exciter is suitable for operation with exciter-cooler outlet air temperatures up to 50°C. The lower temperature is used in the PBNP exciter to lower the probability of thermally induced failures in the exciter and the higher flow rates through the exciter-cooler reduces silting. Actions, such as reducing cooling water flow or opening the exciter doors, aid in reducing the amount of condensation in the exciter, during periods of very hot and humid weather. This event occurred because the condensation in the exciter cabinet was not recognized and hence mitigating actions were not taken.

Corrective Actions:

The Unit 2 generator exciter was inspected for a similar accumulation of condensation. Condensation was also observed in the exciter housing. The housing doors and joints were taped to reduce air exchange and to minimize the amount of moisture in the housing. Also, the flow of cooling water to the exciter-cooler was reduced to minimize the condensation and the increase in exciter temperature was used to promote evaporation of the water that was already present.

The Unit 1 generator exciter was inspected and repaired. The flow of cooling water to the Unit 1 exciter cooler has also been reduced to minimize condensation.

Appropriate guidance is being established to initiate the necessary actions when exciter cooler condensation could cause problems.

Reportability:

This event is being reported in accordance with the requirements of 10 CFR 50.73(a)(2)(iv), "The licensee shall report any event or condition that resulted in a manual or automatic actuation of any engineered safety feature (ESF), including the reactor protection system (RPS)."

The NRC Operations Center was notified via the Emergency Notification System at 1100 on July 14, 1995, of the reactor trip in accordance with 10 CFR 50.72(b)(2)(ii), "Any event or condition that results in a manual or automatic actuation of any engineered safety feature (ESF), including the reactor protection system (RPS)."

Safety Assessment:

All safety systems functioned properly and Unit 1 was maintained in the hot shutdown condition until the cause of the trip was determined and appropriate approval for restart was given. No safety-related equipment was made inoperable as a result of the turbine and reactor trip. The health and safety of the public and plant personnel were not impacted by this event.

The transient that was initiated by the generator trip was a loss of external electrical load. A description of such transients is provided in the PBNP FSAR, section 14.1.9. As stated previously in this report, the trip of the reactor by the turbine trip signal occurred as expected.

Similar Occurrences:

None.