NRC FORM 366 (6-89) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92
ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Point Beach Nuclear Plant, Unit 1	0 5 0 0 0 2 6 6	1 OF 0 6

TITLE (4)

Improper Sequencing of Emergency Safety Features

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 NAMES	DOCKET NUMBER(S)
0 5	1 5	9 2	9 2	0 0 4	0 0	0 7	0 9	9 2	PBNP, Unit 2	0 5 0 0 0 3 0 1
										0 F 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 1 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		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 (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		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
T. J. Koehler, Manager - Maintenance & Engineering	AREA CODE 4 1 4 7 5 5 - 2 [illegible] 2 1

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	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		0 7	1 0	9 2

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

ABSTRACT

On May 15, 1992, Operations Refueling Test 3 (ORT-3), "Safety Injection Actuation with Loss of Engineered Safeguards AC," was performed on Point Beach Nuclear Plant, Unit 1. This test is performed in accordance with Point Beach Nuclear Plant Technical Specification Section 15.4.6, "Emergency Power System Periodic Tests," Specification A.2. This test is conducted to assure that the emergency diesel generators will, following the initial start signal, automatically start and assume required loads in less than the time periods listed in the Point Beach Final Safety Analysis Report (FSAR), Section 8.2.3, "Emergency Power." The loading sequence requirements in FSAR Section 8.2.3 are conservative with respect to the assumed start times in the PBNP FSAR Chapter 14, "Safety Analysis." During initial review and analysis of the test data completed on May 19, 1992, it was identified that one service water pump and one containment ventilation fan sequenced onto the emergency diesel generator in greater than the times listed in FSAR Section 8.2.3. However, the start times remained within the maximum assumed start times in the FSAR Chapter 14. During a subsequent review of ORT-3 test data for Unit 1 and the November 2, 1991, test results for Unit 2 (completed on June 11, 1992), additional relays were determined to have measured setpoints greater than Technical Specification criteria.

EVENT DESCRIPTION

On May 15, 1991, Operation Refueling Test (ORT) 3, "Safety Injection Actuation with Loss of Engineered Safeguards AC," was performed as required by Point Beach Nuclear Plant Technical Specification Section 15.4.6, "Emergency Power System Periodic Tests," Specification A.2. This test verifies the ability of a diesel generator to automatically start, shed load, and sequence vital loads onto the safeguards buses as a result of a loss of AC power to the safeguards buses concurrent with a simulated safety injection signal. The acceptance criterion in the PBNP Technical Specifications specifies that the diesel generator automatically start and that the appropriate loads sequence on in less than the times listed in the Point Beach Nuclear Plant updated FSAR Section 8.2.3, "Emergency Power." Two equipment items, Service Water Pump P-32C (train B) and Containment Ventilation Fan 1-W1B1 (train A), failed to start within the specified times. All other equipment satisfactorily started within the criteria used to analyze the test results.

The analysis and review of the ORT-3 test data completed on May 19, 1992, determined that Service Water Pump P-32C started at 20.5 seconds vice the maximum specified time of 15 seconds. Containment Ventilation Fan 1-W1B1 started at 53.1 seconds vice the maximum specified time of 35 seconds.

On June 11, 1992, during preparation of this LER, we determined that the criteria used to analyze the ORT-3 test results contained tolerance bands on the required start times. The tolerances procedurally defined on ORT-3 were inconsistent with the Technical Specification criteria which required the relay start times to be established at values less than those contained in the PBNP FSAR. A complete review of the most recent Point Beach Nuclear Plant, Units 1 and 2, ORT-3 test results was conducted. From this review, we determined that three relays had measured setpoints which did not conform to the Technical Specification and ORT-3 tolerance acceptance criteria. These three relays were tested and adjusted, as necessary, to bring the relay setpoints into procedural tolerance. Following completion of the testing of these three relays, we concluded that all appropriate safeguards relays conformed to ORT-3 procedural tolerances. However, twenty-six safeguards relays, which were tested during the last two ORT-3 procedures or by special retest, were determined not to conform with the Technical Specification requirements to sequence on in times less than those defined in the PBNP FSAR.

As a result of the discovery of this plant configuration, Wisconsin Electric requested an NRR Waiver of Compliance from the requirements of PBNP Technical Specification Section 15.4.6, "Emergency Power System Periodic Tests," Specification A.2. This waiver was verbally granted on

the evening of June 11, 1992, and followed by our formal request in a letter dated June 12, 1992.

On August 9, 1991, Wisconsin Electric requested a change to our Technical Specifications which would eliminate the requirements to sequence loads in less than the times specified in the PBNP FSAR. This requested Technical Specification change would thereby allow Point Beach Nuclear Plant to implement the appropriate tolerances on the equipment start times. The tolerances would be specified in the PBNP FSAR along with the required start times.

A license amendment authorizing this change to PBNP Technical Specification 15.4.6.A.2 was issued by the NRC on June 10, 1992, and received on June 12, 1992. The issuance of this license amendment and associated FSAR revision, which occurred on June 12, 1992, authorized operation in the discovered plant configuration and established compliance with license conditions.

SYSTEM AND COMPONENT DESCRIPTION

The safeguards logic racks contain time delay relays, nine per train, used to time the start of the equipment in the safeguards sequence. The time delay relays are actuated when no bus undervoltage condition exists (e.g., the safeguards buses are energized) and a valid SI signal occurs. This ensures that the safeguards loads will start in sequence and will not attempt to start on a dead bus. This, in turn, provides assurance that the emergency diesel generators do not attempt to reengergize safeguards buses with major loads connected and ensures that the starting of major loads do not overlap. Each of these conditions could result in an overload and subsequent failure of the diesel generator and the loss of one train of safeguards equipment.

The time delay relays are AGASTAT Model 2412PE for the Containment Ventilation Fan and Model 2412PD for the Service Water Pump.

SAFETY ASSESSMENT

The start times for the Service Water Pump and Containment Ventilation Fan were compared to the start times assumed in the safety analyses contained in the PBNP FSAR, Chapter 14. For the Containment Ventilation Fan 1-W1B1, the start time was compared to the start times assumed in the large break Loss of Coolant Accident (LOCA) analysis and the containment capability analysis. These are the bounding accident scenarios for this component. For the LOCA analysis, it is conservative to assume an early start time for the Containment Ventilation Fans, since this will lower the containment pressure and consequently maximize the LOCA blowdown transient. The earliest assumed start time for containment recirculation fan coolers in the LOCA analysis is 35

seconds. In the containment capability analysis, an assumed later Containment Ventilation Fan start time is more conservative, since it will demonstrate that the containment structure can withstand higher internal pressures. The containment capability analysis assumes the Containment Fan Coolers begin providing heat removal after 70 seconds. The actual time delay for the start of Containment Ventilation Fan 1-W1B1 measured during ORT 3 was 53.1 seconds. Therefore, the start time for the Containment Ventilation Fan, measured during the performance ORT-3, is bounded by the LOCA and containment capability analyses.

For the Service Water Pump, the accident analyses assume that two of the six Service Water Pumps are restarted following a loss of off-site power. The service water system is required to provide heat removal capacity for both the Emergency Diesel Generator (EDG) glycol coolers and the containment ventilation fan coolers. As noted above, the PBNP FSAR containment capability analysis assumes the containment fan cooler heat removal begins at 70 seconds following accident initiation. The EDG manufacturer states that the diesel generator can operate at full load, without service water for cooling, for three minutes. The time delay for the start of Service Water Pump P-32C was measured at 20.5 seconds during the performance of ORT-3. Therefore, the start time for this Service Water Pump, measured during ORT-3, was within the requirements of the containment capability analysis and the EDG manufacturer's operability requirements for cooling.

The sequenced times listed in the PBNP FSAR for the start of the first Service Water Pump is 15 seconds and 20 seconds for the start of the second Service Water Pump. Service Water Pump P-32C was determined and reported to have sequenced on in 20.5 seconds following bus reenergization by the diesel generator. This is essentially the same time that the second Service Water Pump sequences on, at 20 seconds. With the safeguards bus energized, a containment spray pump will sequence on 10 seconds after a containment high pressure signal. Therefore, the potential existed in this situation for two Service Water Pumps and one Containment Spray Pump to attempt to start at the same time. This may potentially result in a transient overload of the diesel generator and the loss of that train of safeguards equipment. The total horsepower of two Service Water Pumps or a Service Water Pump and a Containment Spray Pump is less than the horsepower of a single Safety Injection Pump. The diesel generator is capable of handling the transient load of the Safety Injection Pump when it is loaded onto the safeguards bus following reenergization. Therefore, starting of any two of these pumps at the same time should not result in a transient overload condition.

The simultaneous start of these three pumps (two Service Water Pumps and one Containment Spray Pump) has a very small probability of occurrence.

The total horsepower requirements of these three pumps is 800 HP vice 700 HP for one Safety Injection Pump. The diesel generator response to the simultaneous start of multiple loads is currently being evaluated. For this event, further evaluation of the ORT-3 test data from May 15, 1992, revealed that the strip chart recorder data for Service Water Pump P-32C was incorrectly interpreted. Pump P-32C started in 15.5 seconds vice the 20.5 seconds originally determined and reported. This subsequent review and the identification of the revised start time of 15.5 seconds for Pump P-32C demonstrates that the three-pump starting scenario could not have occurred during this operating period.

Operation with safeguards relay setpoints established within defined tolerances did not result in a safety significant hazard. The establishment and implementation of appropriate tolerances in the load sequence times provides greater assurance that the diesel generator and safeguard loads will function as designed. This safety assessment was delineated in our August 9, 1991, Technical Specification Change Request 146 and resummarized in our June 12, 1992, Waiver of Compliance request. Therefore, the health and safety of the public and plant personnel were not endangered.

CAUSE AND CORRECTIVE ACTION

Maintenance work requests were issued for investigation into the cause of the failures and to replace, test, and adjust the time delay relays as necessary. In both cases the relays were original plant equipment. TDR-17, the time delay relay for Containment Ventilation Fan 1-W1B1, actuated outside the tolerances applied to the relay setpoint but within the required Technical Specification acceptance criterion during three of the last four ORT-3 tests. In response to the two previous ORT-3 tests which identified tolerance deviations for this relay, the time delay relay setpoint was adjusted and tested satisfactorily. Because of the large setpoint shift identified during the May 15, 1992, test and the previously required adjustments, we determined that the relay was no longer suitable for continued operation. TDR-17 relay was replaced on May 19, 1992; adjusted; and tested satisfactorily.

TDR-23, the time delay relay for Service Water Pump P-32C, was adjusted and tested satisfactorily because our initial data analysis concluded this relay to be in nonconformance with acceptance criteria. The maintenance history on the Point Beach Nuclear Plant computerized data base for this relay was reviewed. No previous history of setpoint shifts was identified. Continued use of this relay is considered acceptable.

Because the late starting of loads could potentially exceed the accident analyses assumptions and could potentially result in the overload of an emergency diesel generator, resulting in the loss of a safeguards train,

an evaluation of safeguards time delay relay application and operating history will be performed. This evaluation will be completed by September 25, 1992. Based upon the results of this evaluation, we will ascertain the necessity and make appropriate determinations to replace relays, perform a complete upgrade to relays potentially better suited for this application, and/or improve testing and evaluation methods to better determine relay performance and acceptability.

We are presently developing the capability to evaluate the transient response of the Point Beach Nuclear Plant diesel generators to changes in the load starting sequence. Actual test data are being used to validate the accuracy of this capability. We expect to have this capability by August 14, 1992. This capability will be available to predict diesel generator response to the simultaneous starting of multiple loads. Based on the diesel generator response, additional actior will then be taken as appropriate.

We are continuing our assessment of the events and the attributable root causes which resulted in the noncomplying safeguard relay setpoints. We expect to submit a supplemental Licensee Event Report by July 10, 1992. This supplemental LER will further detail our assessment of these events and identify any additional corrective actions as appropriate.

REPORTABILITY

This event is being reported in accordance with the requirements in 10 CFR 50.73(a)(2)(i)(B), "The licensee shall report any operation or condition prohibited by the plant's Technical Specifications."

GENERIC IMPLICATION

There are no known generic implications to this event.

SIMILAR OCCURRENCES

A review of previously submitted Licensee Event Reports did not identify any similar occurrences.