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VPNPD-96-106

December 11, 1996

Document Control Desk  
US NUCLEAR REGULATORY COMMISSION  
Mail Station P1-137  
Washington, DC 20555

Gentlemen:

DOCKET 50-266 AND 50-301  
LICENSEE EVENT REPORT 96-010-00  
EMERGENCY DIESEL GENERATOR (G-01) GOVERNOR FAILURE  
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

Enclosed is Licensee Event Report 96-010-00 for Point Beach Nuclear Plant, Units 1 and 2. This report is provided in accordance with 10 CFR 50.73(a)(2)(i)(B), "any operation or condition prohibited by the plant's Technical Specifications". This report describes an event where an A-train emergency diesel generator (G-01) was inoperable coincident with several periods of B-Train safeguards equipment inoperability. The emergency diesel generator inoperability was discovered during routine surveillance testing.

If you require additional information, please contact us.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Scott Patulski'.

Scott Patulski  
Site Vice President  
Nuclear Power

GDA

170074

Enclosure

cc: NRC Resident Inspector  
NRC Regional Administrator

9612180290 961211  
PDR ADOCK 05000266  
S PDR

## LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1) Point Beach Nuclear Plant, Unit 1						DOCKET NUMBER (2) 05000266		PAGE (3) 1 OF 5		
TITLE (4) Emergency Diesel Generator (G-01) Governor Failure										
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
11	12	96	96	-- 010 --	00	12	11	96	PBNP Unit 2	05000301
									FACILITY NAME	DOCKET NUMBER
										05000
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)								
N		20.2201(b)		20.2203(a)(2)(v)		X		50.73(a)(2)(i)		50.73(a)(2)(viii)
POWER LEVEL (10)		20.2203(a)(1)		20.2203(a)(3)(i)				50.73(a)(2)(ii)		50.73(a)(2)(x)
100		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 Glenn Adams, Licensing Engineer						TELEPHONE NUMBER (Include Area Code) (414) 221-4691				
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
X	EK	65	W290	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)										
<p>On November 11, 1996, with Unit 1 operating at 100% power and Unit 2 partially defueled with the refueling cavity flooded, surveillance testing was performed on emergency diesel generator G-01. During the test, the G-01 governor failed to operate. During subsequent troubleshooting of the governor, it was determined that a spring clip had come loose from the synchronizer indicator assembly and lodged in the governor gears, thus preventing the governor from operating. The physical configuration indicated that the existing governor setting would not have accelerated the diesel to its rated speed upon demand. Licensee engineers conservatively assumed that the time of failure could have been one month prior; during the last surveillance test conducted on October 14, 1996. During this one-month period of G-01 inoperability, redundant opposite-train safeguards equipment was taken out of service for testing and/or maintenance. The condition of having B-Train equipment out-of-service coincident with the A-Train emergency power supply (G-01) out-of-service is a condition prohibited by Technical Specification 15.3.7.B.1.f. The governor was repaired, G-01 was satisfactorily tested, and returned to service.</p>										

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Point Beach Nuclear Plant, Unit 1	05000266	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 5
		96	010	00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**Event Description:**

While Unit 1 was operating at 100% power and Unit 2 was partially de-fueled in a refueling condition (U2R22), routine periodic surveillance was performed on emergency diesel generator (EDG) G-01.

At 1732 hours on November 11, 1996, Unit 1 entered a 7-day Limiting Condition for Operation (LCO) to perform Routine Maintenance Procedure RMP-110B, "G-01 (G-02) Redundant Systems Six-Month Post-Diesel Annual Check". During this test, the governor of EDG G-01 failed to operate. When the governor control switch is rotated to the "lower" position during this test, rotation of the speed setting knob is observed to verify proper governor response. During this test, no rotation was observed. Physical tension on the speed setting knob indicated that it would not rotate in either direction.

During subsequent troubleshooting of the governor, it was determined that a spring clip had come loose from the synchronizer indicator assembly and lodged in the governor gears, thus preventing the governor from operating. The spring clip was replaced and the EDG and governor were satisfactorily tested per RMP-110B and TS-81, "Emergency Diesel Generator G-01 Monthly". The EDG was returned to service and the LCO was terminated at 0550 on November 12, 1996.

At the time of discovery, the system engineer determined that the engine-mounted "racks" were configured for idle-speed engine operation. The system engineer also determined that the governor speed setting was idle-speed. This information, coupled with the discovery of the failed governor, indicated that the EDG G-01 may not have accelerated to its rated speed on demand. Although the spring clip may have jammed during initiation of the RMP-110B test, there was no immediate evidence to indicate the exact time of its failure. Therefore, the system engineer conservatively judged that the spring clip could have jammed in the governor during the last operation of the governor, which occurred during engine shutdown following a successful surveillance test (TS-81 conducted on October 14, 1996). Thus, the conservative judgment was made that G-01 was inoperable during the period from October 14, 1996 to the point of discovery of this condition.

During the period that G-01 was inoperable, several instances were found where opposite-train safeguards equipment had been removed from service for short periods of time, primarily for Technical Specification surveillance testing. In addition to testing, an opposite-train auxiliary feedwater pump (P38B) was removed from service for approximately 21 hours of maintenance. Subsequently, an opposite-train service water pump was removed for approximately 5 hours of maintenance (2 separate occurrences).

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		96	- 010	- 00	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**Component and System Description:**

As described in the PBNP FSAR, the emergency power system consists of four shared emergency diesel generators (EDGs). Two A-Train and two B-Train EDGs are normally available. The two A-Train EDGs are designated G-01 and G-02. G-01 is normally aligned as a standby emergency power source to Unit 1 A-Train bus 1A-05 and G-02 is similarly aligned to Unit 2 A-Train bus 2A-05. G-01 may be manually connected to provide power to bus 2A-05, and G-02 may be manually connected to provide power to bus 1A-05. If G-01 is out-of-service, G-02 may be placed in a mode that will allow it to automatically provide power to 1A-05 or 2A-05 or both, if either or both buses lose power. G-01 has the same capability in the A-Train.

When an undervoltage condition is sensed on either of the associated buses, the associated EDG starting sequence is initiated. Within 10 seconds, the EDG must reach operating speed and voltage prior to the closure of the EDG output breaker. EDG operating speed is 900 rpm. The speed of G-01 and G-02 diesel engine is controlled by a governor, automatically set for the proper speed when given a fast-start signal.

The speed adjustment, or synchronizer will change engine speed when running with the generator unsynchronized or change engine load when the generator is paralleled with another electrical system. A manual synchronizer knob on the front of the governor adjusts the speed (load) control setting. The same adjustment can be made via a synchronizing motor mounted on top of the governor. This enables speed or load to be controlled from a remote location or from automatic circuitry.

EDG G-01 may be controlled locally for testing purposes. The governor control switch has two functions. In the RAISE position, the governor motor is moved in a direction to increase diesel speed. In the LOWER position, the governor motor is moved to decrease diesel speed.

The Technical Specifications (§15.4.6) require a monthly load test of each emergency diesel generator. During this surveillance the emergency diesel generator is considered out-of-service and the applicable LCO is entered. Annually, each EDG is taken out-of-service for routine maintenance and testing. Six months subsequent to the G-01/G-02 annual maintenance, RMP-110B is performed to prove the reliability of the EDG starting systems.

The emergency diesel generators G-01 and G-02 were manufactured by the General Motors Electro-Motive Division, Model Number 999-20. The installed governors were manufactured by Woodward, Model Number UG-8.

The IEEE Standard 803A-1983 component identifiers for this report are:

Pump	p
Diesel Generator	DG
Governor	65



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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**Corrective Actions:**

1. The spring clip was replaced with a spare, and the EDG and governor were satisfactorily tested per RMP-110B and TS-81. The EDG was returned to service and the LCO was terminated at 0550 on November 12, 1996.
2. A formal root cause evaluation (RCE) will be conducted to investigate the precise cause and time of the governor failure. Any corrective actions resulting from that failure analysis will be implemented in accordance with our corrective action process.

**Cause:**

The cause of the governor failure was the dislodging of the spring clip in the synchronizer indicator assembly and its subsequent jamming in the speed setting gears. A formal root cause evaluation will be conducted to investigate the precise cause and time of the spring clip failure.

**Reportability:**

This Licensee Event Report is being submitted in accordance with the requirements of 10 CFR 50.73(a)(2)(i)(B), "Any operation or condition prohibited by the plant's Technical Specifications". TS 15.3.7.B.1.f allows the standby emergency power supply to bus 1A05 (G-01 in this instance) to be out-of-service for a 7-day period, provided that the redundant engineered safety features (ESF) are operable and the required redundant standby emergency power supplies are started within 24 hours before or after entry into this LCO and every 72 hours thereafter. As discussed above, during some limited periods, redundant ESF equipment had been taken out-of-service during the period that G-01 was inadvertently out-of-service due to the undetected governor failure.

**Safety Assessment:**

During the one-month period that the governor was potentially inoperable, EDG G-01 was potentially inoperable. If EDG G-01 had received a fast-start signal to respond to an actual loss of voltage or safety injection signal, G-01 would have probably started at idle speed, but would not have accelerated to rated speed. Therefore, the emergency power supply to safeguards bus 1A-05 was inoperable. However, emergency power to this bus could have been provided by EDG G-02. Upon discovery of G-01 failure during an accident, the operator could have provided power to bus 1A-05 by the remote-manual closure of the G-02 output breaker to 1A-05. As discussed in FSAR Section 8.2, each diesel generator is sized to start and carry the ESF equipment required for the design basis accident in one unit and provide sufficient power to allow the second reactor unit to be placed in a safe shutdown condition. Therefore, G-02 could have restored all power to the A-Train safeguards electrical loads.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

During the period that G-01 was determined to be inoperable, there were several instances where shared safeguards equipment from the opposite train was coincidentally out-of-service for maintenance reasons. This equipment was a motor-driven auxiliary feedwater pump (for approximately 21 hours) and a service water pump (two separate instances where a single pump was taken out of service for approximately 5 hours). Because this equipment is shared between Unit 1 and Unit 2, the performance requirements of these systems is based on serving the accident loads of one unit and the safe shutdown of the opposite unit. If one unit is in a refueling condition, auxiliary feedwater is not required for that unit. At the time that AFW pump P-38B was out-of-service, turbine-driven AFW pump 1P-29 would have provided all the potential AFW demands of Unit 1. Also, service water requirements are far less than that required for safe shutdown requirements.

As discussed previously, the System Engineer conservatively assumed that the governor had potentially failed when the EDG was shutdown at the conclusion of the October 14, 1996 surveillance test. At that time, and throughout the period of inoperability, Unit 2 was in a refueling condition. Unit 2 was shutdown for refueling outage U2R22 on October 5, 1996 and reached cold shutdown on October 6. The reactor vessel head was removed on October 12 and the refueling cavity was flooded on October 13, 1996. The core was partially defueled at the postulated time of governor failure. Therefore, during the period of G-01 inoperability, the temporary loss of AFW System redundancy and SW System capability is not safety significant.

**Similar Occurrences:**

The following LERs relate to conditions prohibited by Technical Specifications caused by inoperable emergency power supplies:

- |                      |   |
|----------------------|---|
| Unit 1 LER 94-002-00 | Inoperability of Both EDGs - EDG G-01 was declared inoperable due to abnormal voltage regulator indications while G-02 was already out-of-service for maintenance.  |
| Unit 1 LER 93-009-00 | Inoperability of Both EDGs - A relay failure in one of the redundant starting circuits caused EDG G-02 to be declared inoperable while G-01 was already out-of-service for maintenance.   |
| Unit 1 LER 93-002-00 | Inoperability of Both EDGs - The synchroscope switch for EDG G-02 was turned on while the synchroscope switch for EDG G-01 was already on, causing G-02 inoperability when G-01 had been previously taken out of service for maintenance. |