Wisconsin Electric
POWER COMPANY

231 W Michigan, PO Box 2046, Milwaukee, WI 53201-2046 (414) 221-2345

VPNPD-94-028
NRC-94-021

March 9, 1994

Document Control Desk
U.S. NUCLEAR REGULATORY COMMISSION
Mail Station P1-137
Washington, DC 20555

Gentlemen:

DOCKETS 50-266 AND 50-301
LICENSEE EVENT REPORT 94-002-00
INOPERABILITY OF BOTH EMERGENCY DIESEL GENERATORS
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

Enclosed is Licensee Event Report 94-002-00 for Point Beach Nuclear Plant, Units 1 and 2. This 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." This report describes a situation that caused a failure in the generator of one emergency diesel generator while the other emergency diesel generator was already out of service for maintenance.

Please contact us if there are any questions.

Sincerely,

for

Bob Link
Vice President
Nuclear Power

CAC/jg

150019

Enclosure

cc: NRC Regional Administrator, Region III
NRC Resident Inspector

IE22
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NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
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 6

TITLE (4)
INOPERABILITY OF BOTH EMERGENCY DIESEL GENERATORS

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
02	08	94	94	-- 002 --	00	03	09	94	PBNP UNIT 2	05000301
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	N
POWER LEVEL (10)	100%

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	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
	20.405(a)(1)(iii)	X	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)
CURTIS A. 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
B	EK	DG	E147	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)

At 0339 hours, on February 7, 1994, with both units operating at full power, Emergency Diesel Generator (EDG) G02, the Train B EDG, was voluntarily removed from service for annual maintenance. This required placing both PBNP units into the LCO defined in Specification 15.3.7.B.1.g which states that an emergency diesel generator can be inoperable for up to 7 days provided the other emergency diesel generator (in this case the Train A EDG G01) is tested daily to ensure operability. On February 8, 1994, at 2204 hours, EDG G01 was declared inoperable due to abnormal voltage regulator indications. The declaration of EDG G01 as inoperable placed both units in a condition, which by Technical Specification 15.3.0.A, required both units be placed in hot shutdown within 3 hours (by 0104 hours on February 9, 1994). A Notice of Enforcement Discretion (NOED) was requested from the NRC, to allow additional time in the LCO to return at least one EDG to service. The NOED was granted at 2320 hours on February 8, 1994. At 0244 hours, EDG G01 was returned to an operable status, Technical Specification LCO 15.3.0.A was exited and the 7-day LCO required when one EDG is inoperable (EDG G02) was continued.

EVENT DESCRIPTION

At 0339 hours, on February 7, 1994, with both Point Beach Units operating at full power, EDG G02, the Train B EDG, was voluntarily removed from service for maintenance. This required placing both PBNP units into the LCO defined in Specification 15.3.7.B.1.g which states that an emergency diesel generator can be inoperable for up to 7 days provided the other emergency diesel generator (in this case the Train A EDG G01) is tested daily to ensure operability.

On February 8, 1994, at 0753 hours, the daily test of EDG G01 was being performed as required. During this test, at 0951 hours, the control room received an EDG G01 alarm on Main Control Board C02. A check of the EDG G01 local alarm panel revealed that the fuel pressure alarm was in and the electric fuel oil pump was malfunctioning. Engineering and maintenance personnel were called to troubleshoot EDG G01.

The troubleshooting determined that the electric fuel pump for EDG G01 had become decoupled from its motor. EDG G01 continued operating with fuel oil supplied from the shaft driven mechanical fuel oil pump. The mechanical fuel oil pump is fully capable of starting and operating the EDG independently, without reliance on the redundant electric fuel oil pump. Therefore, EDG G01 was operable because the electric fuel pump is not necessary for starting or operating the EDG. At 1202 hours. EDG G01 was placed in automatic mode to enable it to respond to a loss of AC power automatically. EDG G01 was maintained running in an unloaded condition to provide additional assurance that it was operable. At 1940 hours, the electric fuel oil pump repairs were completed and EDG G01 was shutdown.

At 2046 hours, EDG G01 was started and loaded to clean the exhaust system of carbon and other contaminants which may have built up as a result of running the diesel engine unloaded for an extended period of time during the trouble-shooting and repair of the electric fuel oil pump. At 2100 hours small swings in power on the varmeter were observed. The intensity of these swings increased such that at 2204 hours EDG G01 was declared inoperable and TS 15.3.0 was entered.

At 2208 hours, load decreases of 15% per hour was commenced for both units. An Unusual Event was declared at 2210 hours in accordance with our emergency plan based on the loss of both trains of standby emergency power. At approximately 2230 hours, engineering and maintenance trouble-shooting determined that the malfunction was caused by shorting of the DC exciter voltage between a rotating bus bar and one of the two stationary brush jumper cables which connects the slip rings within the generator.

At 2320 hours, NRC regional representative Mr. Robert Greger verbally approved our request to suspend the requirements of the LCO specified in TS 15.3.0, pending review of a request for a Notice of Enforcement Discretion (NOED). Therefore, at 2320 hours, the power reductions on Unit 1 and Unit 2 were stopped and the units were maintained at 86% and 85% power, respectively. A NOED was requested to allow additional time on the 3-hour LCO to return an EDG to an operable status and for sequential shutdown of PBNP Units 1 and 2, if efforts to return at least one EDG to an operable condition were unsuccessful. The NOED was granted by NRC Region III personnel at 0225 hours to hold in abeyance the shutdown of both units until 0800 hours on February 9, 1994, at which time the orderly rampdown of the units would be initiated if an EDG had not been restored to an operable status. Also, three hours were granted for placing one unit in a hot shutdown condition and an additional three hours granted for placing the other unit in hot shutdown.

The return to service test for EDG G01 was completed and results were accepted at 0244 hours. EDG G01 was declared operable at 0244 hours and the extended 3-hour LCO on both units was exited. The 7-day LCO required when one EDG is inoperable (EDG G02) was continued. At 0247 hours, a load increase on both units was initiated. Unit 2 achieved full load at 0350 hours and Unit 1 achieved full load at 0446 hours.

EDG G02 was declared operable at 1638 hours on February 11, 1994 and the 7-day LCO, which was entered at 0339 hours, on February 7, 1994 for EDG G02, was exited.

CAUSES

EDG G01 was declared inoperable at 2204 hours on February 8, 1994, due to power fluctuations as seen on the varmeter in the control room during a load test. Trouble-shooting determined that the power fluctuations were caused by shorting of the DC exciter voltage between a rotating bus bar and one of the two stationary brush jumper cables which connects the slip rings within the generator.

The brush jumper cable had been installed in an improper orientation 5 days earlier on February 3, 1994, during the annual maintenance outage on EDG G01. The brush jumper cable was inspected as part of the routine EDG annual maintenance. Based on the inspection, in which some damaged and loose strands were noted near the lug, the brush jumper cable was removed, re-lugged, and replaced. The amount of damaged and loose strands did not pose an operability concern for the EDG, therefore, the re-lugging was not considered absolutely necessary and was performed as normal corrective maintenance.

A Human Performance Root Cause evaluation (HPRC 94-02) was performed and documented for this event. HPRC 94-02 concludes that the improper installation of the brush jumper cable was caused by (1) lack of adequate work control and (2) lack of adequate post-maintenance testing for the maintenance that was performed, which should include inspection for interference while rotating the generator.

CORRECTIVE ACTIONS

The immediate corrective action that was completed for this situation of both emergency diesel generators being inoperable was to expedite the return to service of one of the emergency diesel generators (EDG G01). The damaged bus bar and jumper wire were replaced by using the identical parts from EDG G02. The proper clearance between the brush jumper cable and the rotating bus bars was verified, prior to returning EDG G01 to service.

Long term corrective actions include:

1. The plant policy and procedure for performing maintenance that is beyond the scope of the preventive maintenance or surveillance work control documents that are being used will be revised to require appropriate work controls for the corrective maintenance being performed. For example, in this case, the routine maintenance procedure used for the EDG G01 maintenance required an inspection of the generator. Based on this inspection, the brush jumper cable was re-lugged. The work control documents should have been revised or supplemented to provide additional work controls for the re-lugging of the brush jumper cable. This corrective action will be implemented by May 31, 1994.

2. Review and revise the Post Maintenance Test Procedure (PBNP 3.2.6) and/or other procedures as necessary to include manual rotation and inspection to verify adequate internal clearances after removal and replacement of parts near rotating equipment. This corrective action will be completed by May 31, 1994.

COMPONENT AND SYSTEM DESCRIPTION

The emergency diesel generators, G01 and G02, at Point Beach, provide emergency electrical power to the safeguards buses if the normal power supply is interrupted or not available. The safeguards buses provide power to equipment that is used to safely shutdown the units and mitigate the consequences of an accident.

The emergency diesel generators, G01 and G02, were manufactured by the General Motors Electro-Motive Division, Model Number 999-20. The IEEE Standard 803A-1983 component identifiers for these components are:

Diesel Generator	DG
Exciter	EXC

REPORTABILITY

This Licensee Event Report is provided pursuant to the requirements of 10 CFR 50.73(a)(2)(i)(B), "Any operation or condition prohibited by the plant's Technical Specifications."

A 1-hour notification to the NRC was made at 2257 hours in accordance with 10 CFR 50.72(a)(1)(i), "The declaration of any of the Emergency Classes specified in the licensee's approved emergency plan," and 10 CFR 50.72(b)(1)(i)(A), "The initiation of any nuclear plant shutdown required by the plant's Technical Specifications."

SAFETY ASSESSMENT

During this event, EDG G02 was out of service for a maintenance outage. EDG G01 failed during testing due to a brush jumper cable that had been installed in an improper orientation 5 days earlier on February 3, 1994, during the annual maintenance outage on EDG G01. EDG G01 had been tested three times prior to the test in which it failed on February 8, 1994. The dates of these tests and the approximate run durations are as follows:

February 4, 1994	3 hours
February 7, 1994	1.9 hours
February 8, 1994	10.3 hours

The failure caused by repeated impingement of the rotating bus bar on the brush jumper cable was such that as EDG G01 was run, cable damage was accumulated. This type of failure mode eventually lead to the short circuit of the brush jumper cable to the bus bar which caused the perturbation of the exciter voltage. Therefore, EDG G01 was able to perform its safety function after the annual maintenance outage ended on February 4, 1994 for approximately 15 hours prior to failure, based on the accumulated run time during testing.

If a loss of off-site power occurred and both emergency diesel generators failed during this event, a Station Blackout would have occurred. If this had occurred, the gas turbine generator (G05) was operable and

available to provide power to the required safe shutdown loads. In addition, both units were at normal operating temperatures which would have allowed the use of the steam generators and auxiliary feedwater system for the removal of decay heat. If the units had been in cold shutdown, a loss of decay heat removal capability would have occurred until the required shutdown loads were repowered from G05, which can be started and loaded within one hour. A loss of decay heat removal for one hour or less would not be expected to cause fuel damage.

SIMILAR OCCURRENCES

Other Licensee Event Reports that describe events that occurred while one EDG was out of service and electrical system operational errors that affected both trains of Engineered Safety Features include:

Unit 1 and Common

LER 88-010 Electrical System Misalignment
LER 93-002 Inoperability of Both Emergency Diesel Generators
LER 93-009 Inoperability of Both Emergency Diesel Generators

Unit 2

LER 80-006 Defeat Containment Spray Actuation during Surveillance
LER 80-007 Loss of RHR Redundancy During Surveillance