

### LICENSEE EVENT REPORT (LER)

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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 6

TITLE (4)

Fuel Oil Transfer Pump Cable in the AFW Pump Room Outside Appendix R Design Basis

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
04	20	1999	1999	004	01	09	02	1999	Unit 2	05000301
									FACILITY NAME	DOCKET NUMBER
									Unit 2	05000

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

OPERATING MODE (9)	POWER LEVEL (10)	20.2201(b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
N	100			X	
		20.2203(a)(1)	20.2203(a)(3)(i)	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 or in NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME  
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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)

YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	X					

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

While conducting a revalidation and verification project for the Point Beach Nuclear Plant 10 CFR 50 Appendix R fire protection programs, the licensee discovered that a postulated fire in the north half of AFW room fire zone could potentially result in the disruption of the electrical power supply to the Fuel Oil Transfer Pump, P-206A, which provides a continuous fuel oil supply to the G-01 Emergency Diesel Generator (EDG). Following the postulated fire, G-01 is the only available emergency backup power source to provide emergency power to the Unit 1 "A" Train 4160 Volt Safeguards Bus (1A-05). Fire rounds in the AFW pump room (FZ 304) were increased to hourly, in excess of the normal Appendix R compensatory measure. Use of transient combustibles and issue of ignition permits in the fire zone have been curtailed. This event was reported in accordance with 10 CFR 50.72 as a condition outside the Appendix R design basis for the plant. Subsequent analysis has verified that the on-site combustion turbine (G-05) can be used as an alternate source of power to the 1A05 bus following the postulated fire. Procedures are being developed to facilitate using G-05 as an Appendix R credited power source. During development of these procedures, we concluded that the current procedures do not provide adequate guidance to the operating staff to address all of the potential actions necessary in the event of a fire in the AFW pump room. Additional corrective actions, including physical modifications, are planned.

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Point Beach Nuclear Plant, Unit 1	05000266	1999	- 004	- 00	2 OF 6

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

**Event Description:**

Wisconsin Electric, licensee for the Point Beach Nuclear Plant (PBNP), is conducting a rebaselining project to verify and revalidate conformance with the plant's 10 CFR 50 Appendix R, (Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979,) programs. This project includes reviews and revalidation of the bases and assumptions for the Appendix R Safe Shutdown analyses and fire scenario evaluations as described in the PBNP Fire Protection Evaluation Report (FPER). While reassessing the fire hazard evaluation for Fire Zone (FZ) 304, the Auxiliary Feed Water (AFW) pump room; the licensee discovered that a postulated fire in the north half of fire zone could potentially result in the unavailability of the electrical power supply to motor control center 1B-30, 480V DGB Safeguards. 1B-30 provides power to Fuel Oil Transfer Pump P-206A which provides a continuous fuel oil supply to the G-01 Emergency Diesel Generator (EDG). G-01 is the only available emergency backup power source to provide emergency power to the Unit 1 "A" Train 4160 Volt Safeguards Bus (1A-05) following a postulated fire in the north half of FZ 304.

For a postulated fire in the north end of the AFW Pump Room, the 1B-30 and 2B-30 power cables would be potentially damaged by the fire resulting in a loss of power to both "A" Train Fuel Oil Transfer Pumps P-206A and P-207A. Due to the potential for numerous other cable failures, Safeguards Bus 1A-05 is the relied upon source for power distribution to safe shutdown loads. G-01 would be the only EDG available to power 1A-05 for the fire scenario because postulated damage to other cables in the north half of the zone could result in loss of ventilation for the other "A" train EDG, G-02. Fuel Oil Transfer Pump P-206A is the relied upon method of supplying fuel oil to G-01. Without this fuel supply, the EDG Day Tank Fuel (including the G-02 Day Tank via the drain cross tie) will only have enough fuel to supply G-01 for about four hours. This is insufficient to maintain the unit in an Appendix R hot safe shut down condition as long as necessary, and places the plant outside its design basis.

A one hour event notification was made to the NRC in accordance with 10 CFR 50.72(b)(1)(ii)(B) at 1439 on April 20, 1999. Both PBNP units were operating at full power. This LER is provided pursuant to 10 CFR 50.73(a)(2)(ii).

During development of a procedure to perform a power system line-up to supply the safeguards bus using the G-05 Gas Turbine, it was determined that the current plant procedures may not provide adequate guidance to the operating staff to address all of the potential actions necessary for all postulated fire events in the AFW Pump Room. Depending on where in the AFW Pump room the postulated fire occurs, the manual valve actuations and breaker manipulations to prevent spurious operations and to ensure appropriate available equipment is utilized can be quite complex and extensive. The current procedures do not capture this complexity or the decision making processes which would be required. Using the existing procedures, the plant operating staff could be significantly challenged to maintain the plant within the required performance goals of 10 CFR Appendix R for a postulated fire event in the AFW Pump Room.

**Cause:**

Two new emergency diesel generators were added by plant modification in the mid-1990s. This was a complex modification and was completed over several successive refueling outages in a sequential approach. The modification included construction of a new

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Point Beach Nuclear Plant, Unit 1	05000266	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 6
		1999	004	00	

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

building for the new EDGs and the installation of a new safety related fuel oil storage and transfer system. During the design of the new fuel oil transfer system, the power supply cables for the new fuel transfer pumps were routed from the south end to the north end of FZ 304. This created the vulnerability to the power cable for the P-206A fuel oil transfer pump. This discrepancy was discovered during an ongoing Appendix R revalidation project.

### Corrective Actions:

- Upon discovery of this design vulnerability, a condition report was initiated (CR 99-1140) and an operability determination completed.
- As an immediate compensatory measure, fire rounds in the AFW pump room (FZ 304) were increased to hourly, in excess of the normal Appendix R compensatory measure. Use of transient combustibles and issue of ignition permits in the fire zone have been curtailed.
- The PBNP operating crews have been briefed on the consequences of this potential scenario and the necessity for realigning the fuel oil system to supply the G-01 EDG.
- The following modifications and procedural changes are planned to restore compliance with the Appendix R safe shutdown requirements:
  1. Construct a three hour fire wall to enclose the electric driven AFW pumps and separate the fire zone into a north and south half. This would ensure that either the electric or steam driven AFW pumps and either G-01/G-02 or G-03/G-04 are always available.
  2. Reroute or fire wrap appropriate instrumentation and power feed cables to ensure that instrumentation and power is available to support safe shutdown of the plant.
  3. Issue a revised procedure that provides necessary guidance in the event of a fire in the AFW Pump Room. With the above modifications this procedure can be greatly simplified since segregation of the room by new fire walls and the use of the existing heat/smoke detectors will allow identification of which area of the room the fire is located in and will facilitate manual actions in the non-fire affected areas.

### Component and System Description:

The Point Beach Nuclear Plant, Unit 1 and 2, has four emergency diesel generators, G01 through G04, which provide standby emergency power to the 4.16 kV safeguards buses. G01 and G02 are "A" train EDGs and are normally aligned to provide the standby emergency power to the "A" train safeguards buses (1A05 and 2A05) in Unit 1 and 2 respectively. G03 and G04 are "B" train EDGs and are normally aligned to the "B" train safeguards (1A06 and 2A06) in Units 1 and 2 respectively. G01 and G02 are dependant on the service water system for cooling and are located in the Control Building. G03 and G04 are cooled via a closed cycle cooling system through air cooled radiators and are located in a separate Class IE building.

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Point Beach Nuclear Plant, Unit 1	05000266	1999	- 004	- 00	4 OF 6

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

No. 2 fuel oil is used for the emergency diesel generators. A 550 gallon "day tank" is located near each unit. The Train A day tanks are normally split and the Train B day tanks are normally split, but can be cross-connected allowing either tank to supply either unit in the same Train. Two underground fuel oil storage tanks on site (one Train A, one Train B) each have a capacity of approximately 35,000 gallons. Sufficient fuel is normally maintained between the two tanks to allow one diesel to operate continuously at the required load for 7 days. At minimum required level, which is 11,000 gallons in each emergency diesel fuel oil storage tank, one tank could provide enough fuel for an emergency diesel generator to operate for over 48 hours. Transfer of oil from each fuel oil storage tank to automatically maintain level in the unit day tanks is accomplished by two motor-driven pumps in each train. Either oil transfer pump is capable of serving either emergency generator unit in that train and by use of a manual cross-connect between the Train A and Train B fuel oil systems, any of the four pumps is capable of serving any of the four emergency generator units. The tanks and piping needed for emergency diesel operation meet Class I seismic criteria. An additional supply of diesel oil is maintained on the site in two 60,000 gallon storage tanks to supply the gas turbine, heating boilers, and diesel fire pump. Additional information concerning the EDGs and fuel oil transfer system can be found in the PBNP FSAR, Section 8.8.

Appendix R requires ensuring that a set of equipment, which can safely shutdown the plant, be maintained free of fire damage for any given fire in the plant. The Appendix R Safe Shutdown Analysis relies on the G-01 Diesel being available for supplying Emergency Diesel Power to safe shutdown equipment for a postulated fire in the north half of the AFW Pump Room (All other diesels will be unavailable due to DC control circuitry and/or G-02 Diesel Room Exhaust Fan power cables being located in the fire. In addition 2B-30, which supplies P-207A will also be lost, due to its cables being in the same area). 1B-30 is relied upon to power Fuel Oil Transfer Pump P-206A which would provide a continuous supply of fuel to G-01. Appendix R requires maintaining the Diesels as long as necessary to support safe shutdown of the plant.

**Safety Assessment:**

The postulated fire event identified in this report assumes a worst case condition that the fire propagates throughout the entire North half of the FZ 304 and all offsite power has been lost. This condition is unlikely to occur due to the defense-in-depth approach to Point Beach Nuclear Plant's Fire Protection Program which includes full area detection and full area Halon suppression for the AFW Pump Room. In addition fire brigade crews are trained and available for immediate response to a fire event. These features would mitigate the significance of this condition and provide a high likelihood that postulated in plant fires would be prevented or controlled adequately and the safe shutdown equipment would remain available. The hourly fire rounds, which have been implemented as a compensatory measure in the affected fire zone for this event, plus the strict control of transient combustibles and ignition sources in the area, provide additional assurance that conditions leading to this potential in-plant fire are unlikely to occur. It also should be noted that the fire event itself cannot cause a loss of offsite power and loss of all offsite power could not cause a fire in the AFW pump Room. The conditions would have to occur independently at or during the same time period.

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Point Beach Nuclear Plant, Unit 1	05000266	1999	004	00	5 OF 6

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

None the less, assuming that the postulated fire has occurred and that power to A-Train Fuel Oil Transfer pumps has been lost and only the safeguards bus 1A-05 is available to supply power to safe shutdown loads, it will be necessary to assure that power can be maintained to the available safeguards bus should offsite power be lost. By design, this can be accomplished from any of three sources; 1) Offsite Power, 2) the G-01 Emergency Diesel Generator (EDG) or 3) the G-05 Combustion Turbine. Until now the credited path for Appendix R analysis has been the G-01 EDG. When the condition for losing fuel oil supply to the G-01 was discovered, G-05 had not been analyzed for possible use for a fire event in the AFW Pump Room. Subsequent to the discovery a prompt analysis was performed on the necessary equipment to supply 1A-05 from G-05 and it has been determined that this option will in fact be available. Once procedures are in place this will be the credited source of power. In the interim it will be necessary to rely upon G-01 as the primary source of power.

An alternative to providing a continuous supply of fuel oil to G-01 could be use of the above ground fuel oil tanks via the old fuel oil transfer system. Up until 1995, when two additional Emergency Diesels (G-03 & G-04) and a new emergency fuel oil system was installed, this was the relied upon method of supplying fuel oil to both G-01 and G-02. Operations personnel are familiar with the use of this system for this purpose. The option is not considered ideal due to the quality of the fuel oil supply and the fact that this valve lineup is not subject to routine scheduled testing or maintenance. However, for emergency purposes, this source of fuel oil would allow the G-01 diesel to run for the duration of the event. The operations crews have been briefed via an Operations Notebook entry of this potential source of fuel oil should the postulated fire event occur.

Initially it was thought that the B-Train fuel oil transfer pumps could be powered via G-03 or G-04 and used to supply fuel oil to G-01. However, this may not be possible due to potential damage to the remote DC control cables for G-03/G-04 which are routed through the postulated fire area. A certain type fault could blow the fuses in the local control panel, then due to the way the remote cables are isolated with the LOCAL/REMOTE transfer switch, the faulted cables could not be isolated even by replacing the fuses. That is, as long as the fault is present the circuit cannot be re-energized with out blowing the fuses. The circuit will require a minor modification to ensure that the local/remote relay contacts will sequence properly to clear the fault prior to restoring DC power to the control circuit. This type of fault requires the exact conductors of a cable to come in contact with each other. This would have to occur on both Diesels control circuits which are located in separate raceways. While for analysis purposes this is considered credible, it is highly likely that it will not occur and at least one of either G-03 or G-04 can have the LOCAL/REMOTE switch placed in LOCAL and started to power the B-Train fuel oil transfer pumps. Therefore, this still remains a potential option for use by operations.

With the compensatory measures already in place as a result of this LER (see Corrective Actions) the possibility of a fire in the room is minimized and, if a fire does occur, the consequences would be mitigated resulting in more equipment and power distribution options being available. This will significantly reduce the complexity of actions necessary to respond to any fire related casualties and will provide the operating staff adequate opportunity to handle the event with the existing procedures. As long as those compensatory measures remain in place this condition does not represent any additional concerns beyond what has already been documented in this LER.

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Point Beach Nuclear Plant, Unit 1	05J00266	1999	004	00	6 OF 6

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

Based on the above assessment, there are measures in place which provide adequate assurance that emergency power will be available for safe shutdown of the plant. For these reasons, we believe that the actual safety significance of this discovery is minimal and that the impact of this event on the health and safety of the public and plant personnel is not significant.

**System and Component Identifiers:**

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

<u>Component/System</u>	<u>Identifier</u>
Cable, Low Voltage Power	CBL4
Tank	TK
Pump	P
Generator, Diesel	DG
Turbine	TRB
Motor Control Center	MCC
Auxiliary Feed Water System	BA
Diesel Fuel Oil System	DC
Fuel Oil Receiving, Storage and Transfer	DE
Emergency Onsite Power Supply System	EK
Medium Voltage Power System - Class 1E	EB
Low Voltage Power System - Class 1E	ED
Fire Protection System	KP

**Similar Occurrences:**

A review of recent LERs (past two years) identified the following events which involved Appendix R safe shutdown equipment:

<u>LER NUMBER</u>	<u>Title</u>
301/1999-002-00	Red Channel of Steam Generator Pressure Indication Passes Through Fire Zone
266/98-030-00	Assumptions for Equipment Necessary To Maintain Hot Safe Shutdown Outside Appendix R Design Basis
266/97-020-01	Conditions Outside 10 CFR 50 Appendix R Safe Shutdown Analysis
266/97-022-00	Electrical Short Circuits During A Control Room Fire Could Affect Safe Shutdown Capability