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)
Indian Point Unit 3	05000286	1 OF 7

TITLE (4)
Potential Unavailability of Appendix R Equipment Due to Inadequate Controls for Replacement of Fuses

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
01	13	95	95	-- 002 --	00	02	13	95		05000
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	N
POWER LEVEL (10)	000

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)		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)
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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
	YES (If yes, complete EXPECTED SUBMISSION DATE).	✓ NO				

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

On January 13, 1995 with the plant in cold shutdown, Design Engineering determined that they did not properly analyze the installed fuses for the 10 CFR 50, Appendix R alternate power supply (MCC312A) to 32 Component Cooling Water Pump (32CCWP), because they did not recognize that the motor starter was on the primary side of the control power transformer. The controller for 38 Backup Service Water Pump (38BUSWP) also supplied by MCC312A has a control circuit design similar to 32CCWP and contains the same fuses. Therefore, the fuses may be subject to opening and this would have prevented the fulfillment of the safety functions required to mitigate the fires postulated in accordance with Appendix R, 10 CFR 50. The 32CCWP functioned acceptably during testing on September 28, 1993 but fuses blew during a test on November 20, 1994. The 38BUSWP has functioned acceptably during previous testing. On January 11, 1995 the 1 amp fuses installed in MCC312A for 32CCWP were replaced with 3 amp fuses and a successful surveillance test was performed on the 32CCWP. Corrective actions include determining and installing the correct size fuse, upgrading administrative controls to encompass the Appendix R spare fuse boxes, reviewing the extent of condition to other fuse control program fuses and revising engineering work standards.

Description of Event

At 1500 hours on January 13, 1995 with the plant in cold shutdown, the reactor coolant system depressurized and at 100 degrees F, Engineering determined that they had not recognized the unique circuit configuration of MCC312A (EC). Therefore, they did not properly analyze the 1 amp fuses (KTK-1) that were installed in the primary side of the control power transformer (CPT) for the 10 CFR 50, Appendix R alternate power supply (MCC312A) to 32 Component Cooling Water Pump (32CCWP) (CC) (1075) for the starting coil in-rush current. The 32CCWP passed a surveillance test in September 1993 with the KTK-1 fuses installed, but failed to pass the surveillance test on November 20, 1994 because of blown fuses. Because the fuses blew, an investigation and troubleshooting began on December 21, 1994 resulting in engineering reviewing a fuse sizing evaluation performed in June 1994 for LER 93-037. Design Engineering revised the evaluation using manufacturer's "typical" starter in-rush current and concluded the installed fuses were not properly sized.

On January 11, 1995 the installed 1 amp fuses (KTK-1) were replaced with 3 amp fuses (KTK-3), as recommended by a December 1994 engineering evaluation, and a successful surveillance test was performed on the 32CCWP. The 38BUSWP (KG) and 31/32 Charging Pump (CB) are also fed from MCC312A and contain 1 amp fuses (KTK-1) in the primary side of their CPT. The 38 Backup SW Pump has performed successfully in quarterly surveillance tests per 3PT-Q58. The 31/32 Charging Pumps Appendix R alternate power supply has not been tested since installation. LER 93-037 contained a corrective action to test and verify operable those Appendix R components not currently being tested prior to the plant exceeding cold shutdown. However, because the fuses opened during recent 32CCWP testing (i.e., November 20, 1994), and evaluations determined improper fuse sizing, engineering concluded the fuses could be subject to opening and prevent the fulfillment of the safety functions required to mitigate the fires postulated in accordance with Appendix R, 10CFR50.

During the surveillance test for the 32CCWP on September 28, 1993, the fuses for MCC312A were discovered missing and replaced with KTK-1 fuses (1 amp), as documented in LER-93-037. The surveillance test (3PT-R150) of the alternate feed (MCC312A) for 32CCWP was successfully performed after installing 1 amp fuses (KTK-1). However, during the September 28, 1993 test, the KTK-1 fuses were not installed using fuses approved under the fuse control program (DCM-26). The fuses were obtained from an Appendix R equipment box using a "non-controlled" fuse list. At that time the Appendix R equipment box was not included in the Fuse Control Program.

The Authority determined that the alternate power supply breakers which feed 38BUSWP and 31/32 Charging Pumps also contain the same KTK-1 fuses in the primary side of their CPT and were verified to be in place as documented in LER-93-037-01. LER-93-037-01 also noted that the system engineer's investigation did not determine when the control power fuses were removed from 32CCWP. The fuse control program was implemented May 1993 and walkdowns to obtain as-built data were initiated in 1992. The 1992 fuse walkdown was for all equipment defined as Category I and any non Category I equipment which is connected to a power supply that also supplies a Category I piece of equipment. MCC312A was not classified as Category I equipment nor was it connected to a power supply that also supplies Category I equipment, therefore fuse data was not obtained for it and included in the fuse database. MCC312A is categorized as Category M. Category M is applied to equipment which has a modified quality assurance program applied commensurate with its importance to safety. Appendix R equipment was specifically identified for walkdown in 1994 as a result of quality assurance reports.

In May 1994, an Appendix R fuse control walk down, using walkdown procedure ENG-541, was conducted that included MCC312A and it identified similar control circuit configurations and fuse installations for 32CCWP, 38BUSWP, and 31/32 Charging Pumps. The walkdown showed that all the pumps had KTK-1 fuses installed in the primary circuit of their control power transformers (CPT) and all had a second CPT with its own fuse. A data analysis was performed in June 1994 using the information from the May 1994 walkdown. Even though Engineering had a NYPA drawing showing a 3 amp fuse, the drawing was incomplete and engineering determined that the KTK-1 fuses for the believed configuration were the largest permitted for the assumed loads by Engineering Standards Manual EES-8 and the National Electric Code. On November 20, 1994, the Appendix R power supply to 32CCWP blew the fuses on the primary side of the control power circuitry (CPT) during performance of test 3PT-R150 "Test of Appendix R Alternate Feed to 32 Component Cooling Water Pump". The fuses were replaced with like in kind fuses per the Master Fuse List and in accordance with DCM-26 paragraph 6.3.1. When an attempt to continue the test was made, the fuses blew again. Because the replacement fuses blew, troubleshooting was performed and revealed that there were no grounds, short circuits, loose wires or excessively dirty connections. At this point Engineering walked the circuit down again and determined that the coil for the starting contactor is wired on the primary side (480v) of the CPT.

This design is unique because other MCC's at Indian Point 3 have the contactor in the CPT secondary circuit. The circuit configuration is significant to fuse selection for circuit protection requirements.

In December 1994, engineering continued with their investigation including assessments and document searches. Vendor drawings and documents, showing the actual CPT configuration and rating were obtained after searching engineering files. These documents had not been incorporated into the document control system. The vendor documents also showed a 3 amp fuse in the primary circuit of the CPT, however they were incomplete [e.g., failed to identify the type fuse (i.e., fast acting or time delay)]. Engineering then reviewed the June 1994 fuse sizing evaluation using the starting contactor manufacturer's "typical" in-rush current, and found that the installed KTK-1 fuses were not properly sized for the motor starting coil in-rush current. Design Engineering then revised the June 1994 fuse sizing evaluation and on January 11, 1995 a KTK-3 fast acting fuse, capable of passing the starter coil in-rush current, was selected and installed in the Appendix R feed (MCC312A) to 32CCWP, and a surveillance test (3PT-R150) was successfully performed.

However, because 32CCWP had passed previous surveillance tests, and the same type and size fuses (KTK-1) were installed in the Appendix R feeds to 38BUSWP (KG) and 31/32 Charging Pumps (CB), and the 32CCWP and 38BUSWP successfully passed previous surveillance tests, Engineering still questioned whether or not the fuses were the source of the problem. In February 1995, an engineering analysis was performed and determined that the 38BUSWP power feed's (MCC312A) 1 amp control fuses (KTK-1) were not the proper size for the starter coil in-rush current and should be changed to 3 amp fuses (KTK-3). However, the evaluation determined that the KTK-1 fuses for MCC312A for the 31/32 Charging Pumps are properly sized.

Cause of the Event

The cause of the event was inadequate administrative controls for sizing and replacement of Appendix R fuses at the time the 1 amp fuses were placed in these applications.

Corrective Actions

The following corrective actions have been or will be completed:

- The fuse control procedure OD-16 Revision 2, "Storage and Control of Fuses" was revised (effective date 12/29/94) to require use of the master fuse list and directed the use of a new procedure on fuse control, SED-SD-02. Procedure SED-SD-02 states the governing document for fuse data is the Master Fuse List and requires the use of DCM-26, "Fuse Control." Previous revisions to OD-16 did not require use of a controlled fuse list and did not require activities to be conducted in accordance with a fuse control program (DCM-26).

- The correct size fuse (KTK-3) was installed into MCC312A for 32CCWP, and the 32CCWP successfully tested and verified operable in accordance with 3PT-R150 on January 11, 1995. An evaluation based on manufacturers typical data was completed on February 7, 1995 for the 31/32 Charging Pumps and confirmed that the installed 1 amp KTK-1 fuses are acceptable.

- As previously committed to in LER 93-037-01 as commitment IPN-94-005-01 the 31/32 Charging Pumps will be verified operable prior to the plant exceeding cold shutdown. The 38 Backup Service Water Pump will have the proper size fuses installed and verified operable prior to the plant exceeding cold shutdown.

- Engineering will assess MCC312A to determine the correct fuse sizes based on current as-built data. Actions include measurement of the in-rush current, steady state current and operating voltage for the starter coils, located in MCC312A, for all three pumps (32CCWP, 31/32 Charging Pump and 38 Backup Service Water Pump) and subsequent determination of correct fuse sizing.

- Upgrade administrative controls to ensure the Appendix R fuse cabinets are maintained as approved storage for spare fuses according to the Fuse Control Program.

- Based on our review and findings of past and present experience with improper sizing of circuit protection devices, we will revise existing engineering guidance (e.g. EES-8) for sizing fuses and motor overload protection devices to improve the engineering requirements. In addition, new standards will be developed for sizing molded case circuit protectors and similar devices.

- The Authority will review all the Appendix R fuses and a sample set of fuses other than Appendix R from the Master Fuse List to determine the extent of condition for improper fuse sizing.

Analysis of the Event

The event is reportable under 10CFR 50.73(a)(2)(v)(D). The licensee shall report any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

Engineering determined that the installed fuses for the 32CCWP and 38 Backup Service Water Pump were not properly sized. As discussed in LER 93-037, prior to the September 28, 1993 test of the alternate power supply, the only other test performed to verify operability was at initial installation on May 18, 1983. The date on which the improper fuse size was used can not be determined and therefore it is assumed the condition could have existed since installation testing (May 18, 1983). The time of concern is from initial installation (May 18, 1983) to the time the plant went into cold shutdown for the current outage (March 7, 1993).

Although the 38 Backup Service Water Pump has functioned properly during 3PR-Q58 surveillance tests, it also was assumed to be inoperable until design engineering completes their evaluation of the current condition. Therefore, the Appendix R equipment (32 CCWP and 38BUSWP) may have been unable to function and mitigate the consequences of fires postulated in accordance with 10CFR50, Appendix R. A February 7, 1995 engineering analysis was performed and determined that the 31/32 Charging Pumps can function with the KTK-1 fuses installed.

A similar event potentially rendering Appendix R alternate shutdown equipment inoperable, was reported in LER 93-037-01. Similar findings of improper motor protective devices were reported in LER 93-042.

Safety Significance

This event had no significant impact on the health and safety of the public.

This conclusion was reached because the pumps (32CCWP, 38 Backup Service Water Pump) had successfully operated (passed 3PT-R150 and 3PT-Q58 testing) using the improperly sized fuses and only the 32CCWP failed the test in November 1994. It is reasonable to assume that the 38 Backup Service Water Pump would have operated since it had performed successfully in previous quarterly surveillance tests and during initial installation tests. The 32CCWP had performed satisfactorily in the September 1993 surveillance test and during initial installation tests. The 31/32 Charging Pumps performed satisfactorily during initial installation tests. An investigation into the correct size fuses is ongoing. An evaluation determined that the 31/32 Charging Pumps can function properly with the KTK-1 fuses installed.

The alternate power supply is used as a result of a postulated fire in areas that will render normal shutdown equipment unavailable. The 10 CFR 50, Appendix R alternate power supply would also be used upon loss of the four vital 480V AC buses. However, the four vital 480V AC buses have the capability to be fed by three independent emergency diesel generators upon failure of two independent offsite power feeds. There has been no occasion that has necessitated the use of the 10 CFR 50, Appendix R power supply to the 32CCWP, or 38BUSWP.

A 10 CFR 50, Appendix R fire scenario is unlikely because of the following:

- A fire of significant magnitude would be required in an area that would disable all the trains or channels for normal shutdown.
- The Authority maintains control of combustibles in these areas.
- Fire suppression systems and measures, both automatically and manually, would likely have been able to be used to minimize the impact of the fire.