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SUBJECT: LER 93-005-01:on 930420,10CF50 APP R cable routing & compliance stategy conerns identified.Caused by personnel error.appropriate sections of SSCA & fire protection program manual revised.W/931230 ltr.

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INDIANA MICHIGAN POWER

December 30, 1993

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In accordance with the criteria established by 10 CFR 50.73 entitled Licensee Event Report System, the following report is being submitted:

93-005-01

Sincerely,

for A. A. Blind
Plant Manager

/sb

Attachment

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

APPROVED BY OMB NO. 3150-0104
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LICENSEE EVENT REPORT (LER)

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FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Donald C. Cook Nuclear Plant - Unit 2	05000 316	1 OF 7

TITLE (4)
10CFR50 Appendix R Cable Routing and Compliance Strategy Concerns

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
04	20	93	93	-- 005 --	01	12	30	93	FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	1
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)		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)	X	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)
P. C. Mangan - Appendix R Coordinator	(614) 223-2020

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

This is a follow-up report to LER 93-005-00.

Upon completion of certain design changes in 1986, RCS loop temperature indications and pressure indication were routed through the LSI panels to the Control Room. Thus, a potential fire which could fail all of the LSI panels would also fail this indication in the Control Room, thereby not complying with the requirements of 10 CFR 50 Appendix R. Such a fire was possible in any fire zone where both the normal and alternate power supply cables to the LSI panels were routed. This condition was corrected in 1990 with the completion of design changes which provided additional Control Room RCS temperature and pressure indication which was not routed through the LSI panels.

This update to the original LER is being submitted to appraise you of the results of the evaluations that have since been performed. The evaluations have resulted in a number of changes to the safe shutdown equipment database. However, no additional cases of non-compliance with Appendix R were identified.

Description of Event

In 1992 a multi-discipline team of engineers was chartered to ensure that Cook Nuclear Plant meets and can demonstrate compliance with the requirements of 10CFR50 Appendix R. As part of the process of reviewing and updating the cook Nuclear Plant Safe Shutdown Capabilities Assessment documents it was discovered that we had requested and received authorization from the NRC to change the automatic aspect of the CO2 suppression system to manual operation in Fire Zones 23, 24, 26, and 27. On 4-20-93 our documentation indicated that these fire zones should have been categorized in the Appendix R strategy of III.G.2.c, which requires automatic fire detection and suppression.

The subsequent investigation concluded that the condition reported on 4-20-93 is not reportable because the requirements of Appendix R III.G.1 are met in Fire Zones 23, 24, 26 and 27 without automatic fire suppression. Therefore, the condition is not reportable per 10CFR50.72(b)(ii)(B).

An interim LER was submitted because our investigation of the 4-20-93 condition identified new conditions that were still preliminary in nature and under review. The conditions described in this LER occurred in the past and do not reflect the current conditions physically in place at Cook Nuclear Plant.

Since the interim report, these conditions have been evaluated. This evaluation involved an extensive review of all electrical circuits associated with the safe shutdown instrumentation for both units. As a result, a number of changes were made to the safe shutdown equipment database. These changes included adding cables and correcting errors in cable routing. The fact that these cables were not previously in the database, or in some cases, had an incorrect routing listed, was also evaluated for impact on Appendix R compliance. No additional cases of non-compliance with Appendix R were identified.

1. Cable Routing

The Safe Shutdown Capability Assessment (SSCA) was first submitted to the NRC in 1983. In 1983, AEPSC had recognized the need to provide additional instrumentation at the LSI panels, as well as to provide an alternate source of power to the LSI panels from the unaffected unit. The 1983 SSCA included proposed modifications (RFCs 02-2684 and 02-2683) which would implement these improvements. RFC 02-2684 included adding a new panel, LSI-4, and providing RCS loop temperature indication at the LSI panels. RFC 02-2683 provided the alternate power supply to the LSI panels from the opposite unit.

Upon completion of RFCs 2683 and 2684 in 1986, RCS loop temperature indications and pressure indication were routed through the LSI panels to the Control Room. Thus a potential fire which could fail all of the LSI panels would also fail this indication in the Control Room, thereby not complying with the requirements of Appendix R. Such a fire was possible in any fire zone where both the normal and alternate power supply cables to the LSI panels were routed.

Description of Event (Cont'd)

Fire Zones 22, 23 and 24 contain both the normal and alternate power supply cables for Unit 2 LSI panels. Fire Zone 22 was in non-compliance with III.G.2.c since detection and automatic suppression were not installed in the Zone. Fire Zones 23 and 24 were in non-compliance with III.G.2.c since neither the normal or alternate power supply cable were wrapped in these Zones. The non-compliance for Fire Zone 24 was reported by LER 90-10.

Compliance with Appendix R was restored in 1990 with the completion of RFCs 2900-B.04 and 3053. These RFCs provided additional Control Room RCS temperature and pressure indications which were not routed through the LSI panels. Therefore, a fire in Fire Zones 22, 23 or 24 would not affect the ability to safely shut down from the Control Room.

2. T/S Submittal

On February 2, 1989, AEPSC requested a change to T/S to allow conversion of the CO_2 Suppression Systems in Zones 23, 24, 26, and 27 from automatic to manual. This change could only be granted if Section III.G.1, III.G.2.a or III.G.3 criteria was implemented for these zones since these criteria do not require automatic suppression systems. The SSCA was used to determine the compliance strategy for these zones. Consequently, the submittal stated that these zones were in compliance with III.G.1 when, in fact, the zones were intended to meet III.G.2 (Zones 23 and 24 also failed to meet this intent at this time).

The NRC granted the T/S change on 02/01/90 and the installation of the modification to the CO_2 System was initiated in October 1990 and completed in July 1991 by PM 12-1085. From February 1990 to December 1990, when RFC 12-3053 was completed, the T/S allowed less stringent requirements for the CO_2 System than what was required by Appendix R. Our initial investigation of the installation sequence for PM 12-1085 determined that the automatic CO_2 Suppression Systems were converted to manual operation in Fire Zones 23, 24, 26 and 27 after December 1990. RFC 3053 was implemented to provide RCS pressure indication in the Control Room in the event of a station blackout event. These instruments were not recognized at the time as required safe shutdown equipment in the SSCA list of SSD equipment nor were they called out in the emergency remote shutdown procedure. However, this indication was called out in EOPs concerning station blackout. Therefore, the operators were aware of the indication in the Control Room and would us it if needed. The cable for one of the pressure transmitters does not run through any of the fire zones associated with the LSI panels or their power supply cables. As a result of the completion of RFC 3053, none of the normal or alternate power supply cables to the Unit 2 LSI panels needed to be wrapped and the compliance strategy for the fire zones containing the LSI panels and their power cables meets the requirements of III.G.1. The SSCA will be updated to reflect this change.

Description of Event (Cont'd)

Two other documentation inconsistencies were identified as part of the condition report investigation. LER 90-10 identified that an RCS pressure transmitter was available to the operators as a mitigating means to the event of a fire in Fire Zone 24. Although this particular transmitter was actually not available there were other means available to the operators to access this information and the conclusion of safety significance in the LER remains unchanged.

LER 92-10, submitted on 12/23/92, reported that surveillances required by the T/S for fire-rated assemblies was not performed in Fire Zone 22. At the time of the report, the Appendix R compliance strategy did not require cables in this fire zone to be wrapped with one-hour fire barrier material. Both LER 92-10 and LER 90-10 will be reevaluated and revised as necessary.

Analysis of Events

Analysis of these events shows that apparent errors involved with the design and implementation of RFC 2683 in 1985 (alternate power supply) may have led to a period of non-compliance with Appendix R. These errors also led to a failure to provide the NRC with the correct information when requesting a change to T/S affecting Fire Zones 23, 24, 26 and 27. Cables in Zones 23 and 24 were not wrapped as required to meet III.G.2 and detection and automatic suppression were not provided in Zone 22, even though general instructions were provided in the RFC packet to protect one of the cables when both the normal and alternate power supply cables ran through the same zone. No documentation is included in the RFC packet which would indicate that the engineer performing the engineering work was involved in the determination of which specific cables require wrapping. There was no procedure in place to ensure such involvement.

LER 90-010 submitted on 9/2/90 reported the discovery of one of these errors. The lack of cable protection in Zone 24 was identified and corrected at this time. It is not clear why the investigation for the problem report associated with this LER did not also identify that the same problem existed in Zone 23 for the same two cables. Documentation included in this problem report showed that Cable 1-1936R, the alternate power supply from Unit 1, ran through both Zones 23 and 24, and that the cable routing in the Safe Shutdown System Analyses (SSSA) failed to include these zones.

Failure to properly record the cable routing of Cable 1-1936R probably led to the incorrect cable routing being included in the SSSA data base. The error in the SSSA data base was identified and corrected due to the walkdowns, but the cable and conduit schedule was not updated at this time.

Analysis of Events (Cont'd)

The failure to provide the NRC with correct information when requesting a change to T/Ss can be attributed directly to a failure to update the SSCA following the completion of RFC 2683. Table 1-1 of the SSCA lists the Appendix R compliance strategy for each fire zone. At the time of RFC 2683 development and implementation, the SSCA listed compliance strategy for Zones 23, 24, 26 and 27 as being III.G.1. Although the documentation in the RFC clearly shows that the intent was to meet III.G.2 for these zones, the SSCA was not updated to reflect this change.

Design changes associated with Control Room indication made it possible to establish III.G.1 compliance for the zones covered by our 4/20/93 LER. These design changes' effects were unknown at the time of reporting in April 1993. The present listing of manual CO_2 Systems in the T/S for these fire zones is therefore correct. No action is required with respect to changing T/S 3.7.9.3 or T/S Table 3.7-6. In addition, the CO_2 Suppression Systems addressed by this T/S for Zones 23, 24, 26 and 27 should be considered operable and no report need be made per 10CFR50.73.

Present Need for Wrapping Unit 2 Power Supply Cables

This investigation shows that total loss of power to the Unit 2 LSI panels would not affect the ability to safely shut down from the Unit 2 Control Room. The LSI panels provide alternate safe shutdown capability for a fire in the Control Room or Control Room Cable Vault. Since the alternate power supply to the Unit 2 LSI panels is not routed through any fire areas which potentially require shutdown from the LSI panels, none of the LSI power supply cables in Zones 5, 22, 23, 24, 26 or 27 needs to be wrapped. Therefore, the TSI material is no longer required and fire watches are not necessary in these zones.

Cause Description

No procedure existed at the time RFC 2683 was performed that would have ensured Appendix R cables were properly protected. The engineer assigned to develop RFC 2683 specified that redundant power supply cables routed through the same fire zone were to be protected in accordance with Appendix R Section III.G.2. There is no evidence that the assigned engineer verified that this requirement was carried out.

The Electric Plant Section Checklist completed by Design personnel marked Item 8P "Appendix R Requirements considered" as complete. However, several cables were not wrapped as required and the Cable and Conduit Schedule was not correctly updated to show the routing for Cable 1-1936R.

Table 1-1 and Section 8 of the SSCA were not updated to reflect the impact of RFC 2683. This led to incorrect information being used as input for the T/S change. The T/S change submittal and PM 12-1085 were based on information associated with RFC 2683; therefore, the error for Appendix R was perpetuated.

Cause Description (Cont'd)

NEP 5.7 and NDG 5.7 were approved on 1/17/90 and 3/25/91, respectively. These procedures provide the necessary controls to ensure new Appendix R cables are properly identified, routed and protected. We believe these procedures (NEP 5.7 and NDG 5.7) would have precluded the above listed deficiencies.

Corrective Action by July 31, 1993

1. Add NPS-110 and NPS-111 to the SSCA and SSSA as safe shutdown equipment.

   NPS-110 and NPS-111 were identified as safe shutdown equipment by Change Sheet 1 to Revision 3 of the SSCA. This change was issued on July 30, 1993.

2. Revise the ERS procedures to recognize the use of NPS-110, 111 in the event of the loss of both NPS-121 and NPS-122.

   Procedure changes which recognize the use of NPS-110 and NPS-111 as safe shutdown equipment were issued for 1/2 OHP 4023.001.001 in July 1993.

3. Correct Drawing 1-2006-76 (Cable and Conduit Schedule) for Cable 1-1936R.

   The drawing was corrected and issued on July 12, 1993.

4. Revise the appropriate sections of the SSCA and Fire Protection Program Manual to reflect RFC 2683.

   The appropriate sections of the SSCA were revised by Change Sheet 1 to Revision 3 issued in July 1993. At the same time, appropriate changes were made to the Fire Protection Program Manual (FPPM) which was in draft form. The FPPM was issued as a controlled document on December 15, 1993.

Preventive Action by December 30, 1993

1. Verify correct and complete cable information is contained in the Unit 1 and Unit 2 SSSA data base for all LSI panels and all Appendix R required Control Room indication for both units.

   AEPSC has reviewed the safe shutdown data base to ensure that all required cables associated with instrumentation have been appropriate identified and entered into the data base. As a result of this effort, over 100 cables associated with

Preventive Action by December 30, 1993 (Cont'd)

instrumentation were added to the data base. The impact of not previously including these cables in the data base was evaluated for each cable. In no case did the absence of these cables in the data base have any impact on compliance with Appendix R.

2. Develop effective Appendix R screening criteria for use with design changes implemented as Plant Modification.

The Plant procedure for controlling Plant Modifications (PMs) was revised to include a requirement to screen all PMs for fire protection and Appendix R impact. Procedure 12 PMP 5040 MOD.003, Revision 5 included this new requirement. This revision was issued after the events described in this LER and will ensure that design changes processed as PMs will receive appropriate reviews for Appendix R impact.