CENTERIOR ENERGY

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November 4, 1996
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United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Perry Nuclear Power Plant
Docket No. 50-440
LER 96-008

Ladies and Gentlemen:

Enclosed is Licensee Event Report 96-008, Degraded Breaker Results in Loss of Safety Function and Exceeding Technical Specification Action Statements.

If you have questions or require additional information, please contact Mr. James D. Kloosterman, Manager - Regulatory Affairs, at (216) 280-5833.

Very truly yours,

Lew W. Myers
Vice President - Nuclear

DTG:sec

Enclosure: LER 96-008

cc: NRC Region III Administrator
NRC Resident Inspector
NRC Project Manager

IE22

120036

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY 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 (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)

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TITLE (4)

DEGRADED BREAKER RESULTS IN LOSS OF SAFETY FUNCTION AND EXCEEDING TECHNICAL SPECIFICATION ACTION STATEMENTS

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
10	04	96	96	-- 008 --	00	11	04	96		05000
									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)

	20.2201(b)		20.2203(a)(2)(v)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)
	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)	X	OTHER
	20.2203(a)(2)(iii)		50.36(c)(1)	X	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	TELEPHONE NUMBER (Include Area Code)
Keith R. Jury, Supervisor - Compliance Unit	(216) 280-5594

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	EC	BKR	B455	YES						

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION	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)

On October 4, 1996, at 1515 hours, the Perry Nuclear Power Plant (PNPP), Unit No. 1, was operating at 100 percent rated thermal power, when it was identified that multiple occasions of past equipment inoperability occurred constituting a loss of safety function for multiple systems. On September 16, 1996, 480 V supply circuit breaker EF-1-D-09 to 480 V EF-1-D-09 Motor Control Center was found to be in a degraded state based on overcurrent trip setpoint prematurely tripping the breaker when specific loading conditions existed. Subsequent inspection of the breaker and review of past maintenance history determined the cause to be a manufacturing error where two wires were reversed on one phase of the overcurrent trip device. This configuration rendered the breaker and its associated loads inoperable during specific bus configurations. It was determined that multiple unknown conditions previously existed where the Division 2 bus would have tripped when required to operate during accident conditions coincident with either a Division 1 outage or when one of the individual Division 1 subsystems were electively removed from service for maintenance. This event resulted in a series of safety function losses between March 10, 1996, and September 16, 1996. This event had minimal safety significance since either the tripped breaker or the out-of-service safety system, could have been returned to service via operator breaker trip recovery actions within a time frame for which the consequences would have been bounded by the worst case accident analysis.

The corrective actions for this event include: replacement of the degraded breaker; inspection of other related breakers; and, evaluation and/or validation of the susceptibility of other breakers by the manufacturer. This event is reported in accordance with 10 CFR 50.73(a)(2)(v)(D) and (a)(2)(i)(B) as a condition that could have prevented the fulfillment of the safety function of a system needed to mitigate the consequences of an accident, and a condition prohibited by Technical Specifications and the Facility Operating License, Section 2.F.

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

I. Introduction

On September 16, 1996, at 1351 hours, Perry Nuclear Power Plant (PNPP), Unit No. 1 480 Volt (V) supply circuit breaker EF-1-D-09 [52] to 480 V EF-1-D-09 Motor Control Center (MCC) [EC], prematurely tripped on its overcurrent trip setpoint. On October 4, 1996, at 1515 hours, the results of a subsequent inspection and maintenance history review for breaker EF-1-D-09, determined that the breaker and its associated loads were inoperable on a number of occasions from March 10, 1996, when the breaker was installed during the Refueling Outage (RFO) 5, until September 16, 1996, when the breaker was replaced. Further review for past operability resulted in identification of multiple times where a condition existed where a loss of safety function and exceeding TS Action Statements occurred for systems supported by the applicable buses. This event is reported in accordance with 10 CFR 50.73(a)(2)(v)(D) and (a)(2)(i)(B), as a condition that could have prevented the fulfillment of the safety function of a system needed to mitigate the consequences of an accident, exceeding the Action Statements of the associated Technical Specifications, and the PNPP, Unit No. 1 Facility Operating License, Section 2.F. The event was also reported via the Emergency Notification System in accordance with 10 CFR 50.72(b)(2)(iii)(A) and the Facility Operating License, Section 2.F. However, an error was made when reporting the event on October 4, 1996; the notification should have been made in accordance with 10 CFR 50.72(b)(2)(iii)(D) versus 10 CFR 50.72(b)(2)(iii)(A).

At the time of the event, the plant was in Operational Condition 1 at 100 percent of rated thermal power. The reactor pressure vessel pressure was at approximately 1,024 psig with the reactor coolant at saturated conditions.

II. Event Description

On September 16, 1996, at 1349 hours, M40C001B, "Fuel Handling Building (FHB) Heating, Ventilation, and Air Conditioning (HVAC) Supply Fan B" [VG] was being energized from 480 V EF-1-D-09 MCC during a normal evolution that ensures equal run times between plant equipment trains. At 1351 hours, 480 V supply circuit breaker EF-1-D-09 to the MCC, tripped which caused the following loss of loads:

1R14S0013, "Anticipatory Transient Without Scram (ATWS) Uninteruptable Power Supply Alternate Supply";
M23C002B, "MCC Switchgear (SWGR) and Battery Room Recirculation Fan B";
C41C002B, "Standby Liquid Control (SLC) Auxiliary Mixing Tank Transfer Pump B";
M24C001B, "MCC SWGR and Battery Room Exhaust Fan B";
M25C001B, "Control Room (CR) HVAC Supply Fan B";
M25C002B, "CR HVAC Return Fan B";
M28B001B, "Emergency Closed Cooling (ECC) Pump Area Ventilation Fan B";
M26C001B, "CR Emergency Recirculation (CRER) Fan B";
M40C002B, "Fuel Handling Building (FHB) HVAC Exhaust Fan B";
M40D001B, "FHB HVAC Exhaust Electrical Heater"; and,
M40C001B, "FHB Supply Fan B"; and,
P47C5011B, Control Complex system "Chiller B Oil Pump."

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

II. Event Description (continued)

On September 16, 1996, at 1351 hours the EF-1-D Breaker Trip annunciation was received in the control room. At approximately 1400 hours, supply breaker EF-1-D-09 was found to have tripped due to an overcurrent condition; an apparent cause could not be found at that time. The control room operators responded by manually starting Control Complex Chiller C, FHB HVAC A train subsystems, and switching Control Complex MCC SWGR and Battery Room area HVAC, and CR A train subsystems [VI] into the normal mode. Technical Specifications (TS) 3.8.7, "Electrical Distribution Systems - Operating," Action A, TS 3.7.3, "CRER System," Action A, and TS 3.7.4, "CR HVAC System," Action A requirements were entered. The breaker was removed for inspection and testing; however, no immediate causes could be identified. In addition, further investigation and review of historical data from the Emergency Response Information System (ERIS) computer and inspection of the MCC confirmed that there was neither faulty MCC equipment nor an electrical fault present to cause the breaker to trip. After the MCC was inspected and it was determined that no damage resulted from the event, a spare refurbished breaker was tested and installed in breaker cubical EF-1-D-09. On September 17, 1996, at 0044 hours, the bus was declared operable and the applicable TS Action Statements were exited.

The affected breaker, along with six other K-600S model breakers, were purchased from ABB Company, Inc. to facilitate efficient performance of a ten year repetitive task. The new breakers were manufactured by ABB in December of 1995. On March 10, 1996, during RFO 5, the breaker was installed in breaker cubical EF-1-D-09. No maintenance was performed on the affected breaker after installation. The six other breakers were installed in breaker cubicles EF-1-A-07, EF-1-C-07, EF-1-C-08, EF-1-C-09, EF-1-D-07, and EF-1-D-08 following initial routine maintenance.

Breaker EF-1-D-09 was inspected in greater detail and compared to the design drawings and on September 20, 1996, it was then discovered that the A phase sensor leads from the current transformer [XCT] were landed on the incorrect terminal block location. This wiring configuration did not agree with the design drawing nor with comparison to other K-600S model low voltage breakers manufactured by the same vendor. A polarity check was performed across the A phase sensor leads from the current transformer and it was verified that the polarity was reversed in the as-found wiring configuration. On September 26, 1996, the manufacturer was contacted to determine what effects reverse polarity of the current transformer leads would have on the solid state trip device. The vendor indicated that the reversal would cause the trip device to sense approximately twice the amount of current than that actually supplied through the breaker and would result in a premature trip setpoint. The breaker was shipped to the vendor where further laboratory testing and root cause determination were performed.

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II. Event Description (continued)

On October 4, 1996, it was determined that the breaker had a reduced trip setpoint from March 10, 1996, when the breaker was installed, through September 16, 1996, when the breaker was replaced. This time period was based on a manufacturing error affecting the breaker from the point of time it was installed. A preliminary review of past inoperability times for affected equipment was then conducted. The review scope was based on a design analysis of load conditions that would have caused the breaker to trip. There were two occasions identified on April 17, 1996, and August 5, 1996, where an unknown condition existed when the CRER loss of safety function and exceedance of TS Section 3.7.3 Action Statements occurred. At this point the condition was reported to the NRC in accordance with 10 CFR 50.72.

On October 10, 1996, the vendor's laboratory test results were received which determined the affected breaker trip setpoint to be below the actual trip current as recorded at the plant during the event. Therefore, an additional review for past inoperability was performed based on re-analysis of the vendor information to determine other periods of time when a loss of safety function and TS Action Statement exceedances occurred. It was determined that when EF-1-D-09 MCC supplied power to M40C002B, "FHB HVAC Exhaust Fan B" and M40D001B, "FHB Exhaust Heater," a bus configuration existed such that if a Loss of Off-Site Power (LOOP), Loss Of Coolant Accident (LOCA), or a LOOP coincident with a LOCA were to occur, breaker EF-1-D-09 would have tripped based on the breaker's reduced trip setpoint in conjunction with the automatic re-connection of specified safety loads as required by plant design. The review determined that between March 10, 1996, and September 16, 1996, a series of multiple safety function losses occurred. In addition, a series of multiple TS Action Statements were also exceeded. The following is a summary of PNPP systems for which safety function losses and/or TS Action Statements were exceeded during this time period.

- EF-1-D-09
- CR HVAC
- CRER
- ECC
- Reactor Core Isolation Cooling (RCIC)
- Residual Heat Removal (RHR) which affected Low Pressure Core Spray and Low Pressure Coolant Injection, Containment Spray, and Suppression Pool Cooling

III. Cause

Based on the vendor's laboratory test results and root cause evaluation, it has been concluded that the current sensor leads had been inadvertently installed backwards during the breaker manufacturing which caused the affected breaker to prematurely reach its trip setpoint. The vendor's laboratory test results revealed the breaker trip setpoint to occur at 350 amps, well below the 660 amp trip setting of the breaker's trip unit. This problem is only apparent when three phase current is sent through the breaker. However, breaker overcurrent testing as performed during manufacturing, as well as on-site maintenance, utilizes single phase overcurrent testing to check the trip point of the trip device. The vendor could not identify any previous similar occurrence of this manufacturing error. In addition, the vendor confirmed that the relevant wiring diagram is correct, and personnel performing the wiring during manufacture are trained on how to properly install and wire the trip unit. The leads are color coded to aid in proper placement and Quality Control checks are in place to detect these type of problems before shipment. Although the vendor determined this discovery is an isolated instance of a manufacturing defect and a report in accordance with 10 CFR Part 21, "Reporting of Defects and Noncompliance," is not warranted at this time, the manufacturers determination is being evaluated and validated by PNPP.

IV. Safety Analysis

The EF-1-D-09 bus supplies the following Division 2 safety-related loads:

1R14S0013, "ATWS Uninteruptable Power Supply - Alternate Supply";
M23C002B, "MCC SWGR and Battery Room Recirculation Fan B";
C41C002B, "SLC Auxiliary Mixing Tank Transfer Pump B";
M24C001B, "MCC SWGR and Battery Room Exhaust Fan B";
M25C001B, "CR HVAC Supply Fan B";
M25C002B, "CR HVAC Return Fan B";
M28B001B, "ECC Pump Area Ventilation Fan B";
M26C001B, "CRER Fan B";
M40C002B, "FHB HVAC Exhaust Fan B";
M40D001B, "FHB HVAC Exhaust Electrical Heater";
M40C001B, "FHB Supply Fan B"; and,
P47C5011B, Control Complex system "Chiller B Oil Pump."

It was determined that when M40C002B, "FHB HVAC Exhaust Fan B" and M40D001B, "FHB Exhaust Heater" were operating, a bus configuration existed such that if a LOOP, LOCA, or a LOOP coincident with a LOCA were to occur, breaker EF-1-D-09 would have tripped based on the reduced trip setpoint in conjunction with the automatic re-connection of specified safety loads as required by plant design. Because the FHB HVAC and Electric Heater Exhaust loads automatically start only if they were in service prior to the LOOP, LOCA, or LOOP/LOCA events, these events were determined the most limiting. Based upon the potential to trip breaker EF-1-D-09 in the event of a LOOP, LOCA or LOOP/LOCA while the FHB HVAC Exhaust train B is in operation, a review to determine the loss of safety functions that would have occurred during these events was performed.

IV. Safety Analysis (continued)

During the period of time between March 10, 1996 and September 16, 1996, there were multiple occasions when the Division 1 diesel generator was removed from service for maintenance or surveillance activities coincident with breaker EF-1-D-09 being inoperable that constituted a series of safety function losses. There were time periods identified when CR HVAC train A and CREC train A were also removed from service for maintenance or surveillance activities. During these time periods and when breaker EF-1-D-09 was inoperable, a series of safety function losses occurred with these CR ventilation subsystems. The following analyses determined the implications that these configurations had on plant operation, and the associated safety consequences and mitigating circumstances.

The ATWS function was not affected as a result of the degraded breaker since this Division 2 load of the affected bus was an alternate ATWS power source. The SLC Auxiliary Mixing Tank Transfer Pumps are not safety-related and have no safety function. In addition, since no fuel movement activities were performed during the time the affected breaker was installed, the FHB HVAC system was not required to be operable. Therefore, the loss of these functions would not have affected the consequences of the most limiting design basis accidents as described below.

In the event of an accident when breaker EF-1-D-09 trips and coincident with Division 1 Diesel Generator (DG) inoperable, a direct loss of CR HVAC, CRER, MCC SWGR and Battery Room Ventilation, and ECC Pump Area ventilation safety-related systems resulting in a loss of safety function would have occurred that could have impacted the mitigation of the accident. As a result of the loss of ECC Pump Area ventilation safety system, loss of Emergency Closed Cooling (ECC) safety function would have occurred based on escalated temperatures resulting in Low Pressure Core Spray (LPCS) train A, Low Pressure Coolant Injection (LPCI) train A, B and C, Reactor Core Isolation Cooling (RCIC), Containment Spray, and Suppression Pool Cooling, and both Hydrogen Analyzer channels being declared inoperable. Division 2 EF-1-D-09 breaker restoration would be accomplished by operations according to Perry Administrative Procedure (PAP)-0201, "Conduct of Operations," breaker operating practices by an operator. It is expected that this action could be performed between 52 minutes and two hours which is based on a time motion study performed by Operations. In addition, an interchange with the identical Division 1 EF-1-B-09 breaker could also be utilized to restore the bus.

It is recognized that the loss of the ECC Pump Room train B ventilation could result in a loss of the ECC system over an extended period of time. The cascading affect could result in loss of several additional systems as the Control Room temperature rose to unacceptable levels. A detailed review of each system that could be lost under this scenario has not been performed. However, a characterization of the restoration activities has determined that this level of degradation would not be reached based on actions which would be taken to restore the breaker EF-1-D-09.

IV. Safety Analysis (continued)

An engineering analysis has determined that when the CR HVAC ventilation safety-related system is lost, a temperature rise in excess of the Technical Specification limit would not occur within a four hour period. Based on reasonable breaker restoration actions performed by operations, adequate time is available to restore the CR HVAC ventilation cooling prior to exceeding the temperature limits. Therefore, the CR temperature would not have risen high enough to impact CR habitability or equipment qualifications.

During the time period when CR ventilation train A and Control Complex Chillers train A were removed from service for maintenance coincident with breaker EF-1-D-09 inoperability and assuming a LOOP, LOCA, or LOOP/LOCA occurred at this time, no CR ventilation nor Control Complex Chillers would be available. The Control Complex Chiller A supplies cooling water for the following safety-related train A subsystems: CR ventilation; ECC Pump Room coolers; and, MCC SWGR and Battery Room Area ventilation. Assuming worst case where no losses of the normal non-safety loads, the following additional systems would be in operation: Computer Room ventilation train A, both trains of Chiller Water pumps, and both trains of ECC pumps. No credit is taken for the Control Complex Chiller train C which may or may not have been available based upon the extent of a LOOP event. Based on the above equipment operating without cooling water available, the engineering analysis determined that the limiting temperature rise would be in the Divisional SWGR area. The analysis indicates that the equipment qualifications temperature for the SWGR area would not be affected for up to approximately 2.5 hours. As discussed above, when the CR ventilation system is secured it would take approximately four hours before the CR temperature would reach the TS temperature limit and begin to effect CR habitability. However, the time required to impact the ECC Pump room components' equipment qualifications would be in excess of four hours. During the short time period when the Control Complex Chillers are unavailable, the ECC water system and Emergency Core Cooling System (ECCS) are considered inoperable; however, they will continue to be operated and will remain available. The expected time for restoration of MCC EF-1-D-09 and subsequently the Division 2 CR ventilation subsystems is within approximately two hours. Therefore as a result of loss of the Control Complex Chillers, there is not a significant impact to the equipment needed to mitigate the effects of an accident.

IV. Safety Analysis (continued)

During the time period when Division 1 DG was removed from service coincident with breaker EF-1-D-09 inoperability and with ECC train A and Emergency Service Water (ESW) train A also removed from service for maintenance, the Division 1 CR ventilation subsystems could not be relied upon during a LOOP, LOCA, or LOOP/LOCA events. The Division 2 ECCS subsystems would have been considered inoperable resulting from loss of the ECC Pump Area train B room cooler; however, the Division 2 ECCS subsystems would be available to automatically respond if required. In addition, during this period, train A of MCC SWGR and Battery Room ventilation and CR ventilation systems were considered inoperable, but available and would be automatically initiated during a LOCA. Therefore, the LOCA is considered the limiting event during this configuration because the Division 1 ventilation subsystems would be operating without heat transfer capability thereby causing heat to be added to the Control Complex areas. Based on engineering analysis, the loss of the ECC pump room coolers would not have significantly affected the ECC pump room temperatures since the analysis shows that the temperatures in the ECC pump room would not have approached the equipment qualifications temperature limits within the first four hours of the event. In addition, during the time period while the Division 1 DG is out of service, the MCC SWGR and Battery Room Area ventilation and the CR ventilation systems would also be considered inoperable, but available and operating without cooling water. Engineering analysis indicates that it would have taken approximately 2.5 hours for the SWGR area to exceed the equipment qualifications temperature limits. The CR temperature rise would take approximately two hours to reach the TS limit and begin affecting CR habitability. The time for restoration of MCC EF-1-D-09 and the required loads as stated above would have been within approximately a maximum of two hours. These area temperatures would not have become sufficiently high enough to affect personnel or equipment during this time; therefore, the safety significance would have been minimized.

Without ventilation available in the MCC SWGR and Battery Room Areas and ECC pump room area, equipment qualifications temperature rise would have taken in excess of approximately four hours to reach the equipment qualifications temperature limits. Based upon operations short restoration time of MCC EF-1-D-09, no short term effects on the safety function capabilities of the ECC or ECCS systems would have occurred.

In conclusion, without the FHB HVAC Exhaust and Electric Heater train B loads lined-up on MCC EF-1-D-09, the automatic re-connection of the MCCs' accident loads in a LOOP, LOCA, or LOOP/LOCA condition would not have exceeded the amperage necessary to prematurely trip the breaker. However, during the time periods where the bus was configured with these loads energized and in the event of the breaker tripped, it is reasonable to assume that only the minimum essential loads would have re-established. Since no damage was incurred as a result of the breaker tripping, coupled with the fact that the FHB HVAC Exhaust and Electric Heater train B loads are not essential loads (i.e., would not be re-energized), it is expected that the bus would have been safely energized without failure. Therefore, the consequences from the loss of safety functions as a result of EF-1-D-09 tripping, would have been minimized.

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IV. Safety Analysis (continued)

This event is considered safety significant based on a series of safety function losses and the associated TS Action Statement exceedances between March 10, 1996, and September 16, 1996; however, since the safety-related loads were not called upon and, if so, would have been restored by operations according to Perry Administrative Procedure (PAP)-0201, "Conduct of Operations," breaker operating practices in conjunction with stripping non-essential loads by an operator within two hours, the consequences from the loss of a safety functions from the EF-1-D-09 breaker tripping would have been minimized. Additionally, an interchange with identical Division 1 EF-1-B-09 breaker could have been an alternative action taken if necessary to restore the bus.

Because of the credit taken for operator actions in the above accident analyses to restore the bus operable during the postulated events, a radiological impact study was performed. As a result of the study, a determination was made that the design dose rate received during this accident scenario would not have exceeded the requirements of General Design Criterion 19, "Control Room." The radiological impact study concluded that based on a time motion study, which determined that the operator actions taken to restore the bus could be accomplished in 52 minutes, the radiation dose received by the operator would be very low and well within site and regulatory criteria.

In addition, the total loss of CR ventilation effect on CR post accident habitability during a LOCA was evaluated. It was determined that there would not be a significant amount of outside air in-leakage in to the CR within a two hour period of time based on the USAR accident analysis bounding this condition. The potential in-leakage, if it were to occur, would be caused from pressure fluctuations or temperature gradient between the CR and the outside atmosphere. Therefore, it is not expected that there would be any additional dose concerns above that assumed in the USAR during this time period.

V. Similar Events

LER 94-005-00 documents an event in which a loss of both trains of Control Room Emergency Recirculation occurred due to low Emergency Closed Cooling temperature. This event was caused by inadequate design. The cause and corrective actions from this event were directed toward system operations and procedure changes to implement operating instructions.

LER 95-003-00 documents an event in which loss of safety system function occurred due to inoperable RHR system snubbers. The event was caused by lack of design interface reviews during the construction phase for ensuring design changes were factored into design of pipe supports. The cause and corrective actions from this event were directed toward modification of affected piping supports.

The causes and corrective actions for the two previous events are such that they could not reasonably have been expected to prevent the situation being reported in this LER.

VI. Corrective Actions

Extensive investigation/evaluation efforts were initiated, and circuit breaker EF-1-D-09 was replaced with an on-site spare refurbished breaker. Inspection of other related breakers including a confirmation that the Division 1 breaker was operable was conducted and no immediate problems were identified. The manufacturer provided an evaluation which determined the root cause and corrective actions. The vendors corrective actions included training on the incident to stress attention to detail and explicitly following wiring procedures, and revision to add an additional item to their Low Voltage Checklist to check the wiring connections. An additional comprehensive evaluation and/or validation will be conducted of the susceptibility of other breakers manufactured by this vendor.

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

The following table identifies those actions which are considered to be regulatory commitments. Any other actions discussed in this document represent intended or planned actions, are described for the NRC's information, and are not regulatory commitments. Please notify the Manager-Regulatory Affairs at the Perry Nuclear Power Plant of any questions regarding this document or any associated regulatory commitments.

Commitments

None