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VIRGINIA ELECTRIC AND POWER COMPANY

NORTH ANNA POWER STATION

P. O. BOX 402

MINERAL, VIRGINIA 23117

December 10, 1991

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No. N-91-031
NAPS:WCH
Docket Nos. 50-338
50-339
License Nos. NPF-4
NPF-7


Dear Sirs:

The Virginia Electric and Power Company hereby submits the following Voluntary Report applicable to North Anna Units 1 and 2.

Report No. 50-338/91-020-00

This Report has been reviewed by the Station Nuclear Safety and Operating Committee and will be forwarded to the Corporate Management Safety Review Committee for its review.

Very Truly Yours,


G. E. Kane
Station Manager

Enclosure:

cc: U.S. Nuclear Regulatory Commission
101 Marietta Street, N.W.
Suite 2900
Atlanta, Georgia 30323

Mr. M. S. Lesser
NRC Senior Resident Inspector
North Anna Power Station

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Original signed by

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Mr. M. S. Lesser
NRC Senior Resident Inspector
North Anna Power Station

LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-550), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)
NORTH ANNA POWER STATION UNITS 1 AND 2

DOCKET NUMBER (2)
050003381

PAGE (3)
OF 4

TITLE (4)
SERVICE WATER SYSTEM CONFIGURATION DURING LOGIC TESTING - VOLUNTARY REPORT

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(S)	DOCKET NUMBER(S)
10	31	1991	1991	020	00	12	10	1991	NORTH ANNA UNIT 2	05000339
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)										
OPERATING MODE (9) 1			20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)	
POWER LEVEL (10) 100			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)(vi)		<input checked="" type="checkbox"/> OTHER (Specify in Attachment)	
			20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(vii)(A)			
			20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(vii)(B)			
			20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)			

LICENSEE CONTACT FOR THIS LER (12)

NAME
G. E. Kane, Station Manager

TELEPHONE NUMBER
AREA CODE
703894-2101

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)											
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) ☒ NO

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

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

At 1117 hours on October 31, 1991, with Units 1 and 2 operating at 100 percent power (Mode 1), it was discovered that the shared Service Water (SW) system may not have been able to provide design flow to an accident unit's Recirculation Spray Heat Exchangers. This discovery was made during the performance of a periodic test which removed the automatic start function of the Unit 2 Emergency Diesel Generator which provides emergency power to the Unit 2 "B" SW pump during an accident. The test also removed the automatic start function of the Unit 1 "B" SW pump. Operating procedures require that the SW pump discharge pressure be adjusted to 258 psig by manually throttling Component Cooling Heat Exchanger CCHX valves when less than 4 pumps are operable; however, the system was not throttled as required. It was initially determined that sufficient SW flow may not have been available to mitigate the consequences of an accident, and a four hour report was made on October 31, 1991, pursuant to 10 CFR 50.72 (b) (2) (iii) (D).

On November 26, 1991, an engineering calculation was completed and reviewed by the Station Nuclear Safety and Operating Committee (SNSOC) which determined that sufficient SW flow was available to mitigate the consequences of an accident. Therefore, the health and safety of the public were not affected during the event. The NRC was notified of the change in reportability on November 26, 1991, at 1245 hours. This voluntary report is being submitted to discuss the event and the basis for reclassification to nonreportable status.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (6)

PAGE (3)

North Anna Power Station Units 1 and 2

YEAR

SEQUENTIAL
NUMBERREVISION
NUMBER

0 | 5 | 0 | 0 | 0 | 3 | 3 | 8 | 9 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | OF | 0 | 4

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

1.0 Description of the Event

At 1117 hours on October 31, 1991 with Units 1 and 2 operating at 100 percent power (Mode 1), it was discovered that the shared Service Water system (SW) (EIIIS System Identifier BS) may not have been able to provide design flow to an accident unit's Recirculating Spray Heat Exchangers (RSHX) (EIIIS System Identifier BE, Component Identifier HX). This discovery was made during the performance of Periodic Test 2-PT-36.1B "Reactor Protection and ESF Logic Test Train B." The test blocked the automatic start function of the Unit 2 "J" Emergency Diesel Generator (EDG) (EIIIS System Identifier EK, Component Identifier DG) which provides power to the Unit 2 "B" SW pump during an loss of power event. The test also defeated the automatic start function of the Unit 1 "B" SW pump. Current operating procedures require that the SW system flow resistance be adjusted to obtain 2 58 psig pump discharge pressure by manually throttling Component Cooling Heat Exchanger (CCHX) (EIIIS System Identifier CC) valves when less than 4 SW pumps are operable. This throttling ensures that the non-accident flow is limited to a value consistent with the previous flow balance initial conditions. Since the system was not throttled and only two pumps were operable, it was initially determined that sufficient SW flow would not have been available to mitigate the consequences of an accident. Therefore, a four hour report was made at 1510 hours on October 31, 1991 pursuant to 10CFR50.72(b)(2)(iii)(D).

TS 3.7.4.1 requires two operable SW loops to satisfy the single active failure requirements in 10 CFR 50 General Design Criteria 44. An unthrottled SW system requires three running pumps to meet this requirement, while only two running pumps are required when the system is throttled. When three SW pumps are operable, SW flow to the non-accident unit Component Cooling Heat Exchangers (CCHX) must be throttled to ensure that design flows are supplied to the accident unit RSHXs in the event that one of the three SW pumps fail. When only 3 SW pumps are operable and the SW system is not throttled, then a 72 hour LCO under TS 3.7.4.1 is entered because the SW system is vulnerable to a single failure. When operating under the LCO, no additional component failures need be considered.

If a Design Basis Accident (DBA) were to occur, a Containment Depressurization Actuation (CDA) would be initiated. If the SW system is aligned in an unthrottled condition with only two pumps running, the DBA unit RSHXs may not receive design flows. On November 26, 1991, an engineering calculation was completed and reviewed by the Station Nuclear Safety and Operating Committee (SNSOC) which determined that, in fact, sufficient SW flow would have been available to mitigate the consequences of an accident.

The NRC was notified of the change in reportability on November 26, 1991, at 1245 hours. This voluntary report is being submitted to discuss the event and the basis for reclassification to nonreportable status.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20545, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)				PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
North Anna Power Station Units 1 and 2	05000338	91	020	00	03	OF	04

TEXT (If more space is required, use additional NRC Form 365A's) (17)

2.0 Significant Safety Consequences and Implications

The operability of the shared SW system ensures that sufficient cooling capacity is available for safety related equipment during normal and accident conditions. During a design basis accident, both loops of SW cross connect to create a single large SW system. The affected units component cooling heat exchangers (CCHX) (EIS System Identifier CC, Component Identifier IX) isolate to ensure that sufficient flow is provided to both the non-affected and affected unit's components.

With four service water pumps operable, the unthrottled flow resistance of the system is such that greater than design flows are achieved if a single pump or power supply failure occurs following an accident. When three service water pumps are operable, the flow resistance of the system is adjusted to ensure that design flows are achieved if a single pump or power supply failure occurs following an accident. When only two SW pumps are operable, the design basis condition can still be met provided that the flow resistance of the system is adjusted and no additional failures occur.

Operators in the control room recognized that the SW system was in a restricted condition after the automatic start function of the EDG was disabled and the automatic start function of the Unit 1 S.W. pump had been defeated. If a DBA had occurred during that time, operations personnel would have responded by placing the Unit 2 "J" EDG and the Unit 1 "B" SW pump in operation.

An engineering calculation (SE-0011) was reviewed by SNSOC on November 26, 1991 which determined that the shared SW system would have provided sufficient flow to either unit if an accident were to occur. This conclusion assumed no additional failures of a SW pump or EDG. Since sufficient SW flow would have been available to mitigate the consequences of an accident, the health and safety of the public was not affected during this event.

3.0 Cause of the Event

The condition was caused by personnel error in that the test procedure was inadequate. The procedure did not address the operating restrictions associated with the service water system.

A previous standing order outlining the service water system requirements was incorporated into the applicable station operating procedures; however, the electrical and instrumentation procedures, which may have a potential effect on SW system operability were not adequately screened for impact.

4.0 Immediate Corrective Actions

SW header "B" was throttled to greater than or equal to 58 psig and spray valves were opened.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)				PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
North Anna Power Station Units 1 and 2	0500053891	0	2	0	0	0	4 OF 04

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

4.0 Immediate Corrective Actions (continued)

The Unit 1 "B" SW pump was returned to automatic operation.

5.0 Additional Corrective Actions

Following completion of 2-PT-36.1B "Reactor Protection and ESF Logic Test Train B," the Unit 2 "J" EDG was returned to auto remote which enabled its automatic start circuit.

The "Reactor Protection and ESF Logic Tests" were revised to address the tests potential impact on the new SW system requirements.

A review of similar test procedures performed during 1991 was performed. During the review, similar operating conditions were identified as existing during tests on January 29, 1991, February 28, 1991, and October 4, 1991. These conditions were also evaluated and it was determined that sufficient flow would have been available for an accident in each case.

6.0 Actions to Prevent Recurrence

A review of other electrical and instrumentation procedures that affect the SW system was performed to ensure SW requirements are identified as precautions or initial conditions. No additional procedures were identified which require revision.

Periodic tests are performed each refueling outage to flow balance the SW system and optimize SW flows to the RSHXs.

7.0 Similar Events

Licensee Event Report (LER) 88-024-00, submitted for Units 1 and 2 November 19, 1988, documents SW flow not within Updated Final Safety Analysis Report (UFSAR) assumptions.

LER 89-008-00, submitted for Unit 1 May 12, 1989 and revised as LER 89-008-01 on June 23, 1989, documents SW flow to the RSHX's as less than design.

LER 90-012-00, submitted for Units 1 and 2 January 2, 1991, documents SW system operation in an unanalyzed condition causing possible low flow to RSHXs.

8.0 Additional Information

A TS change in the form of an amendment has been submitted for Units 1 and 2 to address SW system operability requirements.