

EXPIRES 4-30-82

(PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

CONT

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

SYSTEM CODE		CAUSE CODE		CAUSE SUBCODE		COMPONENT CODE				COMP. SUBCODE		VALVE SUBCODE					
C	F	B	A	S	U	P	O	R	T	X	Z						
9	10	11	12	13	14	15	16	17	18	19	20						
EVENT YEAR		SEQUENTIAL REPORT NO.		OCCURRENCE CODE		REPORT TYPE		REVISION NO.									
8	3	0	1	8	0	3	L	0									
21	22	23	24	25	26	27	28	29	30	31	32						
ACTION TAKEN		FUTURE ACTION		EFFECT ON PLANT		SHUTDOWN METHOD		HOURS		ATTACHMENT SUBMITTED		NPRD-4 FORM SUB.		PRIME COMP. SUPPLIER		COMPONENT MANUFACTURER	
X	Z	Z	Z	0	0	0	0	Y	N	L	Z	9	9	9			
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48		

8 9
FACILITY STATUS % POWER OTHER STATUS (30) METHOD OF DISCOVERY DISCOVERY DESCRIPTION (32)

1 5 | X (28) | 0 0 0 (29) | Modes 5 & 6 | C (31) | System walkdown

ACTIVITY CONTENT
RELEASED OF RELEASE

1 6 Z 33 Z 34

AMOUNT OF ACTIVITY (35)

N/A

LOCATION OF RELEASE (36)

N/A

PERSONNEL EXPOSURES									
NUMBER		TYPE		DESCRIPTION (39)					
1	7	0	0	0	(37)	Z	(38)	N/A	

PERSONNEL INJURIES		DESCRIPTION (41)	
NUMBER			
1	8	0	0
			(40)
			N/A

9 9		11 12		LOSS OF OR DAMAGE TO FACILITY		(43)
TYPE		DESCRIPTION				
1	9	Z	(42)	N/A		

PUBLICITY		ISSUED		DESCRIPTION		NRC USE ONLY	
2	0	N	(44)	N/A			

NAME OF PREPARER Phillip B. Nardoci

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PDR ADCK 05000369
S PDR

DUKE POWER COMPANY

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HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
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May 20, 1983

Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street NW, Suite 2900
Atlanta, Georgia 30303

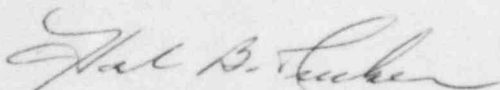
Re: McGuire Nuclear Station Unit 1
Docket No. 50-369

83 JUN 2 19:35
USNRC REGION II
ATLANTA, GEORGIA

Dear Mr. O'Reilly:

Please find attached Reportable Occurrence Report RO-369/83-18. This report concerns T.S. 3.7.8, "All snubbers listed in Tables 3.7-4a and 3.7-4b shall be operable". This incident was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,



Hal B. Tucker

PBN:jfw
Attachment

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

Records Center
Institute of Nuclear Power Operations
1100 Circle 75 Parkway, Suite 1500
Atlanta, Georgia 30339

Mr. W. T. Orders
NRC Resident Inspector
McGuire Nuclear Station

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DUKE POWER COMPANY
MCGUIRE NUCLEAR STATION
REPORTABLE OCCURRENCE REPORT NO. 369/83-18

REPORT DATE: May 20, 1983

FACILITY: McGuire Unit 1, Cornelius, NC

IDENTIFICATION: Residual Heat Removal System Hanger Failures due to
Water Hammers

DESCRIPTION: Following the identification of inoperable Residual Heat Removal (ND) System hangers and snubbers (reported in RO-369/83-16), a system walkdown was performed, revealing additional hanger failures. These failures were discovered from 4/7/83 through 4/21/83, involving hangers LMCA-ND-H273, H287, H7, H21, H274, H282, H306 and H308.

These hanger failures, discovered during Mode 6 and Mode 5, are attributed to ND system water hammers and are reportable pursuant to Technical Specification 3.7.8.

This incident is a result of Design Deficiency, due to the vulnerability of the ND system to experience water hammers.

EVALUATION: Following the identification of hanger and snubber failures on the Residual Heat Removal (ND) System, a walkdown inspection of suspect piping was performed. Hangers ND-H273 and H287 were discovered pulled loose with broken concrete around their wall anchors on 4/7/83. Moving the baseplates of the hangers to undamaged locations was accomplished on 4/12/83. Continuation of the system walkdown on 4/8/83 revealed six more hanger failures (ND-H7, H21, H274, H282, H306, and H308). The exact time that this damage occurred cannot be determined, or attributed to a certain water hammer. As recently as January 1983, these hangers were inspected and approved. Since that time, at least two ND water hammers are thought to have occurred.

On 1/22/83, during shutdown, the ND system was aligned to provide normal decay heat cooling to the reactor core. In RO-369/83-16, it was theorized that voids between ND1 and ND2 may have contributed to a water hammer at that time. Damage to the hangers listed could have occurred at that time and not been detected.

On 4/5/83, during draining of the refueling cavity, water level in the reactor vessel dropped to the hot legs, and the ND pumps lost suction (ref. RO-369/83-17). During the restorative action for the ND system, six pump start attempts were made while the system was not water solid in order to vent the loop. This action may have caused water hammers in the ND piping, damaging or contributing to existing damage on the failed hangers.

On 4/21/83, a Maintenance worker on 733' elevation heard a loud 'crack' and witnessed the agitated movement of ND piping throw dust into the air. Upon checking ND system supports, he found that the anchor bolts on hanger ND-H21 had partially pulled loose from the wall and H273 bolts had also pulled out, breaking concrete. This occurrence coincided with the starting of ND Pump 1A. Further inspection revealed hanger H287 to be pulled loose from the wall as well.

This damage is attributed to a water hammer which is thought to have occurred upon the starting of ND Pump 1A. For some time before the swapping of ND train, Pump 1B had been running with the reactor vessel level at approximately 740' elevation. The two ND trains were isolated on the discharge side of the two pumps. These conditions, combined with the physical layout of the ND system (top of the ND heat exchanger tubes is approximately 758' elevation), could lead to voids in the piping of the train not in operation. The presence of such voids and the start of the 'A' pump is postulated as having caused the water hammer and subsequent hanger damage.

CORRECTIVE ACTION: An evaluation of ND system water hammers began with the identification of the 3/15/83 failure of ND-H260 (ref. RO-369/83-16). Identification of the ND-H273 and H287 failures on 4/7/83 broadened the areas of concern, and all mechanical snubbers were full-stroked to ensure operability. An expanded-scope piping walkdown continued, revealing six more loose hangers (these were repaired by retorquing their anchor bolts).

Upon discovery that LMCA-ND-H273 and H287 had pulled from their anchors, the hangers were declared inoperable. Repairs to H273 and H287 (moving baseplates to undamaged concrete) were not completed within the 72 hour limit imposed by Technical Specification 3.7.8. The ND 'A' train was therefore declared inoperable on 4/10/83, in accordance with the Action Statement. Repairs were completed on 4/12/83, and the ND 'A' train declared operable.

Action taken following the water hammer damage to three hangers on 4/21/83 included declaring ND 'A' train inoperable, full-stroking of ND system mechanical snubbers, inspection of ND system hydraulic snubbers and restoration of the damaged hangers. Further, Safety Injection (SI) System piping was inspected and mechanical snubbers were full-stroked. Insulation at the nearest elbows to the damaged hangers was removed to allow closer inspection. Hangers H21 and H287 were repaired by retorquing the anchor bolts, and ND 'A' train was declared operable on 4/23/83 (based on an engineering evaluation of ND train 'A' without hanger H273). Hanger H273 was restored to operable on 5/7/83.

The actions deemed necessary to prevent water hammers upon aligning to the ND system during shutdown were detailed in RO-369/83-16. For the water hammers which occurred while recovering from ND pump loss of suction on 4/5/83, the procedure "Loss of Residual Heat Removal System" has been modified to indicate that the system must be vented between valves 1ND-1B and 1ND-2AC. For the water hammer of 4/21/83, a procedure change was incorporated into operating procedure "Residual Heat Removal" to prescribe opening a cross-tie line on the discharge side of the ND pumps prior to swapping trains. This is intended to fill any voids in the non-operating train, without causing water hammers. The water-solid train should then be ready to operate.

SAFETY ANALYSIS: Although the exact time the initial hanger failures occurred cannot be determined, a conservative estimate would be to assume all occurred on 1/22/83, upon starting the ND system during shutdown. The ND system continued to provide normal residual heat cooling.

On 4/10/83, when the ND 'A' train was declared inoperable, 'B' train provided the designed redundant cooling. This was also the case from 4/21-23/83, when ND 'A' train was again declared inoperable.

The ND system was not seismically challenged during this period, and the health and safety of the public was not affected.