

(PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

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REPORT SOURCE

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60 61 DOCKET NUMBER 68 69 EVENT DATE 74 75 REPORT DATE 80

SECRET NO 8824

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

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0	8
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SYSTEM CODE C F 11		CAUSE CODE X 12		CAUSE SUBCODE Z 13		COMPONENT CODE P U M P X X 14				COMP. SUBCODE B 15		VALVE SUBCODE Z 16					
LER/RO REPORT NUMBER 8 3 17		EVENT YEAR 8 3 21 22		SEQUENTIAL REPORT NO. 1 0 1 24 25		OCCURRENCE CODE 0 1 28 29		REPORT TYPE T 30		REVISION NO. 0 32							
ACTION TAKEN X 12		FUTURE ACTION X 19		EFFECT ON PLANT Z 20		SHUTDOWN METHOD Z 21		HOURS 0 0 0 0 22		ATTACHMENT SUBMITTED Y 23		NPD 4 FORM SUB. N 24		PRIME COMP. SUPPLIER L 25		COMPONENT MANUFACTURE I 0 7	

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

114 RWST allowed the level to be pumped below the nozzle.

8 9  
FACILITY STATUS (1) 5 (2) 8 (3) 0 (4) 0 (5) 0 (6) 29 NA OTHER STATUS (30) METHOD OF DISCOVERY (31) A Operator DISCOVERY DESCRIPTION (32) observation  
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100  
ACTIVITY CONTENT RELEASED OF RELEASE AMOUNT OF ACTIVITY (35) NA LOCATION OF RELEASE (36) NA  
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100  
PERSONNEL EXPOSURES NUMBER TYPE DESCRIPTION (39) NA  
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100  
PERSONNEL INJURIES NUMBER DESCRIPTION (41) NA  
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100  
LOSS OF OR DAMAGE TO FACILITY TYPE DESCRIPTION (43) NA  
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100  
PUBLICITY ISSUED DESCRIPTION (45) NA  
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100  
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LER SUPPLEMENTAL INFORMATION

SQRO-50-328/83101

Technical Specification Involved: 3.9.8.1 & 3.9.8.2

Reported Under Technical Specification: 6.9.1.12.b

Date of Occurrence: 08/06/83

Time of Occurrence: 0838 CDT

Identification and Description of Occurrence:

At approximately 0830 (C), the unit operator (UO) began pumping down the refueling cavity to the unit 2 RWST via the train 'B' RHR pump. The AUO stationed at the tygon level gauge reported that no water level change was occurring in the tubing and, upon investigation, found a root valve to the level tubing closed. The AUO opened the valve, returned to the level gauge, and reported the water level beyond the tygon tube area into the rubber hose which was consistent with the then-present water level in the RCS. At approximately 0838 (C), the UO noticed the pump amp meter and flow meter fluctuating indicating pump cavitation. The UO stopped the train 'B' RHR pump and placed the train 'A' RHR pump in service which also began to cavitate. At approximately 0902 (C), the UO began charging the RCS from the RWST via a centrifugal charging pump at 95 gpm. The RHR pump suction piping was vented in an attempt to remove any entrained air and, at approximately 0957, the RHR pumps were restarted again resulting in pump cavitation. 2-FCV-63-1, RWST to RHR pump flow control valve, was opened to reflood the RCS and recirc was established.

At 1103 (C), a second attempt to pump down the refueling cavity was started at a slower pumping rate. At 1200 (C), with the level in the tygon tube indicating water level at approximate elevation 702, the train 'A' RHR pump began cavitating. 2-FCV-63-1 was reopened and level allowed to increase until the pump stabilized.

During the event, the average RCS hot leg temperature, as indicated by the hot leg RTDs, increased above 140°F at 0920 (C) and peaked at approximately 195°F at 0955 (C). The temperature decreased below 140°F at 1145 (C).

Conditions Prior to Occurrence and Background Information:

With unit 2 in mode 6 (refueling) with the average reactor coolant system (RCS) hot leg temperature of 103°F, the refueling cavity had been flooded to about 4-5 feet above the reactor pressure vessel flange when leakage past the RCS loop 4 cold leg nozzle inspection plate was identified. Pump down of the refueling cavity is accomplished by use of one RHR pump taking suction from the RCS loop 4 hot leg and pumping to the refueling water storage tank (RWST) with partial flow returned to the RCS cold legs, through the RHR heat exchanger, for core cooling. The pump down rate is controlled by throttling valve 2-HCV-74-34, RHR discharge to RWST.

During refueling, RCS water level indication is facilitated by a temporary line of tygon tubing and rubber hose. This temporary line is connected between RCS loop 1 crossunder drain valve and a vent valve on the pressurizer. The calibrated area of the tygon tubing ranges from approximate plant elevations 685 to 705. The top of the vessel flange is located at approximate elevation 702 and the center line of the RCS loop 4 hot leg at elevation 695.

An assistant unit operator (AUO) is stationed at the tygon tubing to observe changes in level during the pump down operation, and personnel at the refueling cavity could observe level changes in the cavity.

Apparent Cause of Occurrence:

The cause of the pumps cavitating has been attributed to loss of suction head due to the RCS water level being pumped below the center line of the RCS loop 4 hot leg (elevation 695). Pumping of the water level below this point has been attributed to the tygon tube water level not changing at the same rate as the actual RCS water level. The false indication in the tygon tube was apparently due to a flow restriction in the tygon tube or rubber hose and possible contribution from an excessive pump down rate through 2-HCV-74-34 to the RWST.

Corrective Action:

Maintenance personnel checked the temporary level hose for indications of kinks, twists, pinches, or damage. With no such conditions apparent, high pressure air was utilized to clear any unseen blockage from the line. A calibration check of the level gauge was performed and found to be  $3\frac{1}{2}$  inches off from actual level. The tube was recalibrated and subsequent pumping operations indicated the level indication responding properly. Pump down of the refueling cavity was successfully completed at approximately 1400 (C) with the water level about 1 foot below the vessel flange and the level gauge indication at approximate elevation 701.

Installation procedures for the temporary level hose will be revised to ensure the hose is run to prevent the possibility of flow restrictions. Operating procedures for refueling cavity pump down will be revised to include stopping of the pump down at approximately 1 foot above the vessel flange (by visual indication in refueling cavity) to allow verification of proper valve alignment to the level hose and proper water level in the tygon tube prior to proceeding. A note will also be made to use a slower pump down rate with slight opening of 2-HCV-74-34 to complete the pump down to desired level.

Action has been initiated to develop and install a second level gauge consisting of hard piping and a sightglass to be used as second verification of water level.

Use of hard piping and a sightglass will prevent the possibility of flow restriction due to kinks and twists that may occur in the flexible hosing now in use. In the future, after use and verification of proper operation of this new sightglass level gauge, the free running, flexible tygon/rubber hose level gauge may be eliminated.

Failure Data:

None.

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

1750 Chestnut Street Tower II

83 AUG 23

August 18, 1983

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

Dear Mr. O'Reilly:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT UNIT 2 - DOCKET  
NO. 50-328 - FACILITY OPERATING LICENSE DPR-79 - REPORTABLE OCCURRENCE  
REPORT SQRO-50-328/83101

The enclosed report provides details concerning both residual heat removal  
pumps being inoperable because of cavitation during pump down of the  
refueling cavity. This report is submitted in accordance with Sequoyah  
unit 2 Technical Specification 6.9.1.12.b.

Very truly yours,

TENNESSEE VALLEY AUTHORITY



H. J. Green  
Director of Nuclear Power

Enclosure

cc (Enclosure):

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Washington, D.C. 20555

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Institute of Nuclear Power Operations  
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Atlanta, Georgia 30339

NRC Inspector, Sequoyah

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