

U.S. NUCLEAR REGULATORY COMMISSION
LICENSEE EVENT REPORT

CONTROL BLOCK / / / / / / / 1) (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)
 /0/1/ /V/A/N/A/S/1/ (2) /0 0/-/0/0/0/0/0/-/0/0/ (3) /4/1/1/1/1/ (4) / / / (5)
 LICENSEE CODE LICENSE NUMBER LICENSE TYPE CAT
 /C/1/ REPORT /L/ (6) /0/5/0/0/0/3/3/8/ (7) /1/1/0/3/8/1/ (8) /1/1/2/5/8/1/ (9)
 SOURCE SOCKET NUMBER EVENT DATE REPORT DATE

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

/0/2/ / On November 3, 1981, during Mode 1 operation the boron concentration in the /
 /0/3/ / safety injection accumulators went higher than the maximum limit specified by /
 /0/4/ / T.S. 3.5.1. Since the concentration was returned to within the limit in accor- /
 /0/5/ / dance with the action statement, the health and safety of the public were not /
 /0/6/ / affected. This event is reportable pursuant to T.S. 6.9.1.9.b. /
 /0/7/ / /
 /0/8/ / /

SYSTEM CODE	CAUSE CODE	CAUSE SUBCODE	COMPONENT CODE	COMP. SUBCODE	VALVE SUBCODE
/0/9/ /S/F/ (11)	/E/ (12)	/B/ (13)	/V/A/L/V/E/X/ (14)	/D/ (15)	/D/ (16)
LER/RO	EVENT YEAR	SEQUENTIAL REPORT NO.	OCCURRENCE CODE	REPORT TYPE	REVISION NO.
(17) REPORT NUMBER	/8/1/	/-/ /0/8/1/ / \ /	/0/3/	/L/	/-/ /0/

ACTION TAKEN	FUTURE ACTION	EFFECT ON PLANT	SHUTDOWN METHOD	HOURS	ATTACHMENT SUBMITTED	NPRD-4 FORM SUB.	PRIME COMP. SUPPLIER	COMPONENT MANUFACTURER
/X/ (18)	/B/ (19)	/Z/ (20)	/Z/ (21)	/0/0/0/0/ (22)	/Y/ (23)	/N/ (24)	/A/ (25)	/G/2/5/5/ (26)

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

/1/0/ / The high boron concentration in the accumulators was due to inleakage into the /
 /1/1/ / make-up supply header from the Spent Fuel Pit. The accumulator boron concentra- /
 /1/2/ / tion was restored by partially draining the accumulator and refilling with /
 /1/3/ / borated water from the RWST. /
 /1/4/ / /

FACILITY STATUS	%POWER	OTHER STATUS	METHOD OF DISCOVERY	DISCOVERY DESCRIPTION (32)
/1/5/ /E/ (28)	/0/9/9/ (29)	/ NA / (30)	/B/ (31)	/ Routine Test /
ACTIVITY RELEASED	CONTENT OF RELEASE	AMOUNT OF ACTIVITY (35)	LOCATION OF RELEASE (36)	
/1/6/ /Z/ (33)	/Z/ (34)	/ NA /	/ NA /	
PERSONNEL EXPOSURES NUMBER	TYPE	DESCRIPTION (39)		
/1/7/ /0/0/0/ (37)	/Z/ (38)	/ NA /		
PERSONNEL INJURIES NUMBER	DESCRIPTION (41)			
/1/8/ /0/0/0/ (40)	/ NA /			
LOSS OF OR DAMAGE TO FACILITY TYPE	DESCRIPTION (43)			
/1/9/ /Z/ (42)	/ NA /			
PUBLICITY ISSUED	DESCRIPTION (45)			
/2/0/ /N/ (44)	/ NA /			

NRC USE ONLY

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NAME OF PREPARER W. R. CARTWRIGHT

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Description of Event

On November 3, 1981, the boron concentration in 1A Safety Injection accumulator was 2149 ppm. This exceeded the T.S. 3.5.1 limit of 2100 ppm.

Probable Consequences of Occurrence

The accumulators are installed to provide a large volume of cooling water onto the core following a postulated Loss of Coolant Accident. The maximum limit on boron concentration ensures that the chemical conditions (specifically pH) within the containment sump following this accident are met.

Since the concentrations obtained were only slightly above the maximum limit and the proper concentration was obtained within the requirements of the Action Statement, the health and safety of the public were not affected.

Cause of Event

This event was caused by inleakage from the Spent Fuel Pit (SFP) via the Refueling Purification (RP) system into the normal fill suction header to the hydrostatic test pump.

The boron concentration in the spent fuel pit was in excess of 2300 ppm boron. When the refueling purification system was aligned to recirculate the Spent Fuel Pit, a leakage path was established through the discharge check valve of the idle RP pumps through the pump and into the intersystem connection to the large suction header of the hydrostatic test pump. The valves installed in this intersystem connection (1-RP-11 Unit 1, 1-RP-53 Unit 2) were leaking and since the pressure head at the point of this leakage was greater than the head of the RWST, the inleakage path was established.

The suction to the hydrostatic test pump is from the 10" Safety Injection header from the RWST to the charging pumps. This header contains in excess of 7000 gallons of normally stagnant fluid. When the inleakage occurred, the boron concentration of this volume of water went as high as 2190 ppm. Through normal additions via the hydrostatic test pump to the accumulators to maintain the contained water volume, the highly borated fluid in this header was added thereby driving the accumulator boron concentration above the maximum T.S. 3.5.1 limit.

In the process of verifying the cause of this event, a previously unrealized temperature effect on the boron samples was discovered. When numerous samples were taken on the suction header as part of the test to identify the cause of this event, it was noted that a colder sample would indicate a lower boron concentration than a warmer sample. This effect is attributed to the temperature effects of using a non-positive displacement pipette. The make-up supply from the RWST is normally maintained between 4.4°C and 10°C. The error resulting from the colder sample made the make-up supply concentration appear to be within the T.S. limit when in fact, the actual concentration was 20 to 30 ppm

Cause of Event

higher. The effect of these erroneous samples was that the recovery from an event of high boron concentration in an accumulator was complicated. It also accounts for several conditions wherein the accumulator was within the limit one month following recirculation and, without adding any make-up, the accumulator boron concentration was high on the following monthly sample.

Immediate Corrective Action

When the accumulator boron concentration was found to be higher than the T.S. 3.5.1 limit, the accumulator was declared inoperable and the action statement implemented. The boron concentration was lowered by partially draining and refilling the accumulator.

The boron concentration in accumulators has been reduced by the addition of water that contains no boron.

The intersystem connection between the RP system and the make-up header has been isolated by closing the discharge and suction valves on the idle RP pumps. A maintenance request has been submitted to repair the valves which were determined to be leaking.

The chemistry samples will be conducted at a standardized temperature. If there is insufficient time available to allow the sample to reach the required temperature, a positive displacement pipette has been tested and will be used.

Scheduled Corrective Action

No further action required.

Actions Taken to Prevent Recurrence

The actions described above should preclude recurrence of these events.

Generic Implications

These events are generic to North Anna Units 1 and 2.