NRC FORM 366 (7-77)

U. S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT

CONTROL BLOCK: | | | | | | | (1) (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

01 | F L T P S 4 (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

CON'T
01 | REPORT SOURCE L (6) | 0 5 0 0 0 2 5 1 (7) | 1 1 0 6 7 8 (8) | 1 1 2 0 7 8 (9)
DOCKET NUMBER | EVENT DATE | REPORT DATE

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

02 During normal operation, a routine Boron Injection Tank (BIT) sample
03 indicated a boron concentration of 17,900 ppm, which is less than required
04 by T.S. 3.4.1.a.2. Unit shutdown at a 10 percent per hour rate was begun.
05 Recirculation of the BIT with the "C" Boric Acid Storage Tank (BAST)
06 returned the BIT boron concentration to within specification after about
07 165 minutes, whereupon a return to full power was begun.
08

09 | SYSTEM CODE S H (11) | CAUSE CODE X (12) | CAUSE SUBCODE Z (13) | COMPONENT CODE Z Z Z Z Z Z (14) | COMP. SUBCODE Z (15) | VALVE SUBCODE Z (16)

(17) LER/RO REPORT NUMBER | EVENT YEAR 7 8 | — | SEQUENTIAL REPORT NO. 0 1 5 | / | OCCURRENCE CODE 0 1 | REPORT TYPE T | — | REVISION NO. 0

ACTION TAKEN X (18) | FUTURE ACTION X (19) | EFFECT ON PLANT B (20) | SHUTDOWN METHOD Z (21) | HOURS (22) 0 0 0 2 | ATTACHMENT SUBMITTED Y (23) | NPRD-4 FORM SUB. N (24) | PRIME COMP. SUPPLIER Z (25) | COMPONENT MANUFACTURER Z 9 9 9 (26)

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

10 The exact cause is not known. It is possible that the BIT samples were
11 diluted and the BIT boron concentration was actually within specification.
12
13
14

15 | FACILITY STATUS E (28) | % POWER 1 0 0 (29) | OTHER STATUS (30) NA | METHOD OF DISCOVERY B (31) | DISCOVERY DESCRIPTION (32) Routine Sample

16 | ACTIVITY RELEASED Z (33) | CONTENT OF RELEASE Z (34) | AMOUNT OF ACTIVITY (35) NA | LOCATION OF RELEASE (36) NA

PERSONNEL EXPOSURES
17 | NUMBER 0 0 0 (37) | TYPE Z (38) | DESCRIPTION (39) NA

PERSONNEL INJURIES
18 | NUMBER 0 0 0 (40) | DESCRIPTION (41) NA

LOSS OF OR DAMAGE TO FACILITY (43)
19 | TYPE Z (42) | DESCRIPTION NA

PUBLICITY
20 | ISSUED N (44) | DESCRIPTION (45) NA | NRC USE ONLY

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Additional Event Description and Probable Consequences

During normal operation, a routine sample of the Boron Injection Tank (BIT) indicated a boron concentration of 17,900 ppm. This was less than the minimum concentration of 20,000 ppm required by T.S. 3.4.1.a.2. Unit shutdown at a 10% per hour rate was begun. Recirculation of the BIT with the "C" Boric Acid Storage Tank (BAST) was also begun, and BIT sampling at 30 minute intervals was instituted. A second sample indicated an increasing BIT boron concentration, however, a third sample 30 minutes later indicated that the boron concentration was approximately constant at about 18,300 ppm. This indicated potential blockage of the normal recirculation flow path. This could not be verified because flow transmitter FT-934, which is in the recirculation flow path, was inoperable.

The temperature settings of the heat tracing circuits on the normal recirculation path to the "C" BAST were increased in an attempt to dissolve any precipitated boron that may have been blocking the line. The fourth BIT sample indicated that the boron concentration had not increased, therefore, further action was necessary.

A redundant recirculation flow path, which is kept isolated and filled with non-borated water to preclude boron precipitation and blockage, was put into service. The next BIT sample indicated a boron concentration of 21,700 ppm, which was within specification. Approximately 165 minutes had elapsed since the beginning of the occurrence, and power had been reduced to 66%. A return to full power was begun.

Additional Cause Description and Corrective Action

It is possible that the boron concentration in the BIT itself was within specification during the occurrence, and that only the inlet line actually had a boron concentration less than 20,000 ppm. This is possible because the sample valve is located in the inlet line to the BIT and the solution in that line can become diluted slightly by minor leakage of Refueling Water Storage Tank (RWST) water, which has a minimum boron concentration of 1950 ppm, past the BIT inlet isolation valves. In addition, the BIT inlet isolation valves are cycled open periodically, which further results in a potential dilution mechanism.

The apparent blockage in the normal recirculation flow path to the "C" BAST may be attributed to either inadequate heat tracing or an insufficient number of thermocouple monitoring points on the piping. The normal flow path was intended to operate continuously, thereby precluding recirculation flow path blockage and assuring proper BIT boron concentration. However, the normal flow path has not operated continuously because of recirculation pump seal problems, and has been relegated to a back-up status. An investigation has been in progress for some time in an attempt to resolve the pump seal problems. A redundant recirculation flow path is available to provide another back-up means of recirculation in case the normal recirculation flow path is blocked.

Additional Cause Description and Corrective Action (Continued)

Blockage of the normal recirculation flow path to the "C" BAST could not be confirmed because flow transmitter FT-934 was inoperable. This transmitter has been repaired several times, but it continues to fail due to boron blockage of the sensing lines. This had been recognized as a problem and was under study at the time of the occurrence.

Resolution of the recirculation pump seal problems should prevent recurrence of recirculation line blockage and BIT sample dilution.