

**Virginia Electric and Power Company
Surry Power Station
P. O. Box 315
Surry, Virginia 23883**

November 29, 1993

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

Serial No.: 93-753
SPS:VAS
Docket No.: 50-280
License No.: DPR-32

Dear Sirs:

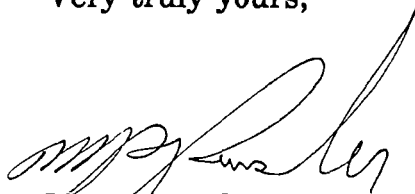
Pursuant to Surry Power Station Technical Specifications, Virginia Electric and Power Company hereby submits the following Licensee Event Report applicable to Surry Power Station Unit 2.

REPORT NUMBER

50-280/93-012-00

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

Very truly yours,



M. R. Kansler
Station Manager

Enclosure

cc: Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

M. W. Branch
NRC Senior Resident Inspector
Surry Power Station

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LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Surry Power Station, Unit 1		DOCKET NUMBER (2) 05000 - 280	PAGE (3) 1 OF 4
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TITLE (4) Safety Injection Accumulator Boron Concentration Level Less Than TS Limits for Greater Than Four Hours

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
11	01	93	93	-- 012 --	00	11	29	93	FACILITY NAME	DOCKET NUMBER 05000
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9) N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10) 100	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> OTHER
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME M. R. Kansler, Station Manager	TELEPHONE NUMBER (Include Area Code) (804) 357-3184
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On October 15, 1993, with Unit 1 at 100% power and Unit 2 at 98.5% power, boron concentration in the Unit 1 Safety Injection Accumulator 'B' was found to be below the Technical Specification (TS) limit. A Limiting Condition of Operation (LCO) was entered at 2206 hours in accordance with TS 3.3.B which allows one accumulator to be inoperable for a period not to exceed four hours. The SI Accumulator 'B' was placed on recirculation from the Refueling Water Storage Tank (RWST) to increase the boron concentration. The four-hour LCO was exited at 0140 hours on October 16, 1993, when a resample of boron concentration was found to be within the TS limit. On November 1, 1993, System Engineering calculated that the Unit 1 SI Accumulator 'B' boron concentration level dropped below the TS limit approximately four days prior to the October 15, 1993 sample. Operating below the TS boron concentration limit for greater than four hours is in violation of TS 3.3.B which allows one accumulator to be inoperable for a period not to exceed four hours.

The SI Accumulator 'B' was continually available to deliver cooling water to the core. The accident analysis requirements for sump boron concentrations were satisfied. Therefore, no safety consequences resulted from this event and the health and safety of the public were not affected.

This report is being made pursuant to 10CFR50.73(a)(2)(i)(B) since the Station was operated in a condition not allowed by TS 3.3.B.

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Surry Power Station, Unit 1	05000 - 280	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		93	- 012 -	00	

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

1.0 DESCRIPTION OF THE EVENT

Safety Injection (SI) Accumulator [EIS-BP-ACC] chemistry samples are routinely taken monthly to verify that accumulator boron concentrations remain above the TS minimum value. On September 19, 1993, a routine sample of the Unit 1 SI Accumulator 'B' was taken. This sample found the boron concentration to be within the TS limit. However, Operations personnel noticed the boron concentration in the SI Accumulator 'B' had decreased from the previous month. Due to the decrease, a non-routine sample was taken on October 9, 1993 which was found to be below the required TS limit. Based on the out of specification condition, a four-hour LCO was entered at 1531 hours on October 9, 1993, for one inoperable accumulator in accordance with TS 3.3.B. The SI Accumulator 'B' was placed on recirculation from the RWST [EIS-BP-TK], and resample results were within the TS requirements. The LCO was exited at 1656 hours when the boron concentration was above the TS limit.

Based on the October 9, 1993 results, a decision was made to increase the sampling frequency to weekly and a test was developed to quantify the in-leakage that had been observed. The test was conducted October 15, 1993. From data obtained during this test, it was concluded that the SI Accumulator 'B' in-leakage was due to minor back-leakage of primary system coolant through the discharge check valves (1-SI-128 and 1-SI-130) [EIS-BP-V]. The leakage was calculated to be approximately 0.04 gpm. Because Unit 1 was near the end of its operating cycle and primary system boron concentration was approaching 0 ppm, the in-leakage was diluting the boron concentration in the SI Accumulator 'B'.

Later on October 15, 1993, with Unit 1 at 100% power and Unit 2 at 98.5% power, the weekly sample found the Unit 1 SI Accumulator 'B' boron concentration below the required TS limit. The TS 3.3.B LCO was entered at 2206 hours. The SI Accumulator 'B' was placed on recirculation from the RWST to increase the boron concentration. The four-hour LCO was exited at 0140 hours on October 16, 1993, when the resample boron concentration was within the TS limit. The SI Accumulator 'B' was not isolated during either out of specification condition maintaining the core cooling function of the accumulator.

On November 1, 1993, System Engineering calculated that the Unit 1 SI Accumulator 'B' boron concentration dropped below the TS limit approximately four days prior to the October 15, 1993 sample. Operating an accumulator for this extended period of time below the required TS boron concentration limits is in violation of TS 3.3.B which allows one accumulator to be inoperable for a period not to exceed four hours.

This report is being made pursuant to 10CFR50.73(a)(2)(i)(B) since the Station was operated in a condition not allowed by TS 3.3.B.

2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS

An accumulator is a passive feature designed to provide significant quantities of cooling water directly to the core in a very short period of time. In addition, the required boron concentration level in the accumulator helps assure that the containment sump boron

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Surry Power Station, Unit 1	05000 - 280	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 4
		93	- 012	- 00	

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

concentration will be adequate to maintain the core subcritical during the recirculation mode of operation (long term core cooling). Each Surry reactor has three SI accumulators. The Unit 1 SI Accumulator 'B' was capable of performing its core cooling function. The other two accumulators were fully operable. A review of the core design and accident analysis requirements indicated that even with the SI Accumulator 'B' boron concentration level below TS minimum limits, the requirements for sump boron concentration were still satisfied.

The SI Accumulator 'B' was continually available to deliver cooling water to the core and accident analysis requirements for sump boron concentration levels were satisfied. Therefore, no safety consequences resulted from this event and the health and safety of the public were not affected.

3.0 CAUSE OF THE EVENT

This event was the result of cognitive personnel error in that actions taken following the October 9, 1993 event were not timely in evaluating the full effect of the in-leakage on the Unit 1 SI Accumulator 'B' boron concentration levels. Unit 1 was at the end of core life, and the primary system boron concentrations were less than 50 ppm and decreasing daily toward 0 ppm. With this decreasing boron concentration, the minor rate of in-leakage was causing the SI Accumulator 'B' boron concentration to drop requiring more frequent sampling. Following the October 9, 1993 event, the sampling frequency was increased to weekly and a test was developed to quantify the in-leakage rate.

On the afternoon of October 15, 1993, Operations personnel isolated the SI Accumulator 'B' discharge Motor Operated Valve (MOV) for a period of three hours. The results of data taken indicated that, with the MOV closed, the in-leakage was significantly reduced. With this data, it was concluded the SI Accumulator 'B' in-leakage was primarily due to minor back-leakage through the discharge check valves (1-SI-128 and 1-SI-130). A review of Operations Department logs indicated that the rate of in-leakage increased on August 29, 1993 following the Periodic Test which stroked the SI Accumulator 'B' discharge motor operated valves. The increased in the leakage is attributed to a minor shift of the check valves on their seats during this testing which was performed in compliance with TS 4.11.A.3.

4.0 IMMEDIATE CORRECTIVE ACTION(S)

During both events, the SI Accumulator 'B' was placed on recirculation from the RWST to increase the boron concentration level. Resampling and analysis were performed until the boron concentration level was within the required TS limit.

As an additional precaution after the October 15, 1993 event, the SI Accumulator 'B' was placed on recirculation to increase the boron concentration level to greater than 2350 ppm on October 16, 1993, at 1225 hours. This recirculation was completed at 1530 hours when the boron concentration level was 2357 ppm. Actions were initiated to evaluate the in leakage condition and determine further corrective actions. Engineering was requested to provide a timetable for the sampling rate to ensure that the SI Accumulator 'B' boron concentration would not drop below the TS minimum values.

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Surry Power Station, Unit 1	05000 - 280	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 4
		93	- 012 -	00	

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5.0 ADDITIONAL CORRECTIVE ACTION(S)

On October 18, 1993, the Operations Engineer and the System Engineer calculated when the SI Accumulator 'B' boron concentration would drop below the TS minimum value with the current in-leakage rate. Calculations were performed based on the 0.04 gpm in-leakage rate, an initial boron concentration level of at least 2350 ppm in the SI Accumulator 'B' and a primary system boron concentration level of 0 ppm. The calculation indicated that dilution of the SI Accumulator 'B' to below the TS minimum of 2250 ppm could occur within approximately 120 hours. Accordingly, in order to preclude challenging the TS minimum boron concentration level, Operations and System Engineering recommended recirculating and sampling the SI Accumulator 'B' once every 96 hours. All samples of the boron concentration level since the October 15, 1993 event have been within the TS limit.

An addition to the Operations Periodic Testing and Work Schedule was made which schedules recirculation and sampling of the Unit 1 SI Accumulator 'B' every three days until the end of this fuel cycle or until a change in conditions is identified.

Communication between Operations and System Engineering is ongoing, and additional sampling will occur if a decreasing trend in boron concentration level is observed.

6.0 ACTIONS TO PREVENT RECURRENCE

The accumulator drain and fill procedures will be changed to alert Station personnel of the possibility of a change in the boron concentration based on fill and drain frequency.

This event was reviewed with operating shift personnel to increase sensitivity to occurrences of this kind. The event will be discussed in Technical Staff Continuing Training and Technical Staff Managers Training to reinforce attention to detail and alertness in evaluating and responding to off-normal trends. A training synopsis will also be included as part of the required reading of Operations personnel and Shift Technical Advisors.

Work Orders are in place to inspect and repair, as necessary, check valves, 1-SI-128 and 1-SI-130, during the upcoming refueling outage.

7.0 SIMILAR EVENTS

None.

8.0 ADDITIONAL INFORMATION

None.