NRC Form 366 (9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
SURRY POWER STATION, UNIT 1	0 5 0 0 0 2 8 0	1 OF 0 4

TITLE (4)

QUADRANT POWER TILT

EVENT DATE (5)			LER NUMBER (6)				REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR		SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
											0 5 0 0 0
0 6	2 0	8 4	8 4	—	0 1 7	— 0 0	0 7	1 7	8 4		0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 2 9	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	√ OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	SPECIAL REPORT
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
ROBERT SAUNDERS, STATION MANAGER	8 0 4 — 3 5 7 - 3 1 8 4

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	
X	I G	R I	W 1 2 0	Y							
X	A C	R O D	W 1 2 0	Y							

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
√ YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		1 2	3 1	8 4

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

A quadrant power tilt of greater than 2.0% existed for greater than 24 hours because control rod B-6 was stuck at the 56 step position. Extensive monitoring is being performed until the cause of the stuck rod is determined during the upcoming refueling outage.

NRC Form 366A (9-83)

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
SURRY POWER STATION, UNIT 1	0 5 0 0 0 2 8 0	8 4	— 0 1 7	— 0 0	0 2 OF 0 4

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

1. Description of the Event

A reactor startup was in progress at 1125 on 6-14-84 following a reactor trip on 1-13-84 (See LER-84-015-00). While withdrawing Control Bank A, the first control bank of rods to be withdrawn, rod position indicator (RPI) B-6 stopped at 30 steps and was suspected to be malfunctioning. After the RPI was verified to be correct, the reactor trip breakers were opened and all rods dropped into the core except B-6. Rod B-6 was verified stuck at 30 steps using the rod's search coil. The control rod was exercised using abnormal procedure AP-1.5. This action did result in some movement of B-6, however, when it was tripped from the fully withdrawn position, it became stuck at 56 steps and could not be moved in or out.

A Westinghouse representative was unsuccessful in freeing rod B-6 using a special control box that extends the time the lift coil is energized. Rod drop testing was satisfactorily completed on other rods to verify operability. In another unsuccessful attempt to free B-6, the unit was cooled down to 250°F and the Westinghouse control box was used. After a return to hot shutdown, rod drop testing was successfully completed on all rods except B-6.

The safety analyses required in T.S.-3.12.C.7 for continued operation with an inopearable rod were completed prior to station approval for a startup. During the performance of the safety analysis, it was revealed that the control rod insertion limit curve for one inoperable rod contained in Technical Specifications was not appropriate for this situation. A more restrictive insertion limit curve was generated for use. Also, before startup was approved, Special Test 163 was written. This test delineates the monitoring requirements to insure that Unit 1's operation remains within the bounds of Surry's Technical Specifications during operation with B-6 partially withdrawn. At 0414 on 6-19-84, a reactor trip occurred from about 10% power (See LER-84-016-00).

At 1940 on 6-19-84, excore detector NI-43 failed due to a loss of detector voltage. The Instrument Technicians and Electricians determined that the problem with NI-43 was in the detector or the detector cable inside containment. Additional monitoring requirements were initiated for operation with one inoperable excore detector per T.S-3.12.D.1.

Following a startup on 6-20-84, reactor power was held at 29% for a flux map. The results of this map indicated that the hot channel factors were within Technical Specification limits, but a quadrant power tilt (QPT) of 5.52% existed. A flux map taken on 6-21-84 at 50% power yielded a QPT of 3.58%. Another map taken on 6-22-84 at 80% power indicated a QPT of 3.13%. The results of all flux maps have indicated that the hot channel factors are within Technical Specification limits. Since the QPT exceeded 2.0% for greater than 24 hours, this event is reportable per T.S.-3.12.B.7.

NRC Form 366A
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
SURRY POWER STATION, UNIT 1	0 5 0 0 0 2 8 0	8 4	— 0 1 7	— 0 0	0 3 OF 0 4

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

2. Probable Consequences

Nuclear Engineering has performed a safety analysis to verify that continued operation with rod B-6 stuck can be safely accomplished. This analysis included revision of insertion limits, re-evaluation of the potential ejected rod worth and transient power distribution peaking factors, and included the effects of non-uniform fuel depletion in the area of the stuck rod.

The results of this analysis indicate that with the revised insertion limits, all applicable safety limits will continue to be met with rod B-6 stuck. Reanalysis or reevaluation of the accidents potentially impacted has confirmed that the results of the current licensing analysis remained bounding. Reactor power has been adminstratively limited to 80% with a Technical Specification limit of 88%, therefore, an unreviewed safety question is not created and the health and safety of the public are not affected.

3. Cause

The quadrant power tilt was created because control rod B-6 is stuck at the 56 step position.

The cause of the stuck rod is unknown at this time, however, Westinghouse representatives could not rule out debris or a bent or broken RCCA spider vane. The cause will be determined with the reactor disassembly and inspection during the upcoming refueling.

The exact cause for the NI-43 failure will also be determined during the upcoming refueling.

4. Immediate Corrective Action

Extensive efforts were made to free the stuck rod. A program was developed to monitor the flux tilt as long as it exists. The NI-43 channel was placed in trip and the Instrument Technicians began to troubleshoot the problem.

5. Additional Corrective Actions

Efforts were made by Westinghouse personnel to analyze the problem with control rod B-6 and to free it.

The safety analysis for continued operation was performed. The Instrument Technicians and Electricians determined that the problem with NI-43 is in the detector or the detector cable inside containment in an inaccessible location.

NRC Form 366A (9-83)

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
SURRY POWER STATION, UNIT 1	0 5 0 0 0 2 8 0	8 4	— 0 1 7	— 0 0	0 4 OF 0 4

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

6. Action Taken to Prevent Recurrence

Actions taken to prevent recurrence cannot be determined until the cause for the stuck rod is found. Cause determination cannot be made without dismantling the reactor, therefore this will be done at the upcoming refueling outage. Until then, all core parameters will be closely monitored.

The actions taken to prevent a recurrence of the NI-43 failure cannot be determined until access to the suspect components is available during the upcoming refueling.

7. Generic Implications

The generic implications cannot be addressed until the cause for this event is determined.