FORM 366

U. S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT

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

Field	Value
Licensee Code (2)	V A S P S 1
License Number (3)	0 0 - 0 0 0 0 0 - 0 0
License Type (4)	4 1 1 1 1
Cat (5)	
Report Source (6)	L
Docket Number (7)	0 5 0 0 0 2 8 0
Event Date (8)	0 9 1 0 8 1
Report Date (9)	0 9 3 0 8 1

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

With the unit at full power, periodic testing disclosed that control rods from Power Cabinet 1AC would not respond to a demand signal. A rampdown was begun per T.S.-3.12.C.3. During the ramp, rod M-4 dropped 75 steps, and could not be recovered, contrary to T.S.-3.12.F.1. The dropped rod contributed to a radial flux tilt of greater than 2%, contrary to T.S.-3.12.B.5. These events are reportable per T.S.-6.6.2.b.(2). The health and safety of the public were not affected.

System Code (11)	Cause Code (12)	Cause Subcode (13)	Component Code (14)	Comp. Subcode (15)	Valve Subcode (16)
R B	E	G	I N S T R U	X	Z

LER/RO REPORT NUMBER (17)

Event Year		Sequential Report No.		Occurrence Code	Report Type		Revision No.
8 1	—	0 4 6	/	0 3	L	—	0

Action Taken (18)	Future Action (19)	Effect on Plant (20)	Shutdown Method (21)	Hours (22)	Attachment Submitted (23)	NPRD-4 Form Sub. (24)	Prime Comp. Supplier (25)	Component Manufacturer (26)
A	Z	A	A	0 0 3 6	Y	N	N	W 1 2 0

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

The rods became inoperable due to a failure of a regulation card in the 1AC Power Cabinet. The same card contributed to the partial dropping of rod M-4 which in turn caused the flux tilt. The failed card was replaced and all rods tested to verify proper operation.

Facility Status (28)	% Power (29)	Other Status (30)	Method of Discovery (31)	Discovery Description (32)
E	1 0 0	N/A	B	Routine Testing

Activity Released (33)	Content of Release (34)	Amount of Activity (35)	Location of Release (36)
Z	Z	N/A	N/A

PERSONNEL EXPOSURES

Number (37)	Type (38)	Description (39)
0 0 0	Z	N/A

PERSONNEL INJURIES

Number (40)	Description (41)
0 0 0	N/A

LOSS OF OR DAMAGE TO FACILITY (43)

Type (42)	Description
Z	N/A

PUBLICITY

Issued (44)	Description (45)
N	N/A

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NRC USE ONLY

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ATTACHMENT 1
SURRY POWER STATION, UNIT 1
DOCKET NO: 50-280
REPORT NO: 81-046/03L-0
EVENT DATE: 09-10-81

TITLE OF THE EVENT: ROD CONTROL PROBLEMS

1. DESCRIPTION OF THE EVENT:

With the unit at full power, it was found through PT-6 (Control Rod Assembly Partial Movement) that the rods powered by power cabinet 1AC (Group 1 of Shutdown bank A, Control banks A and C) would not respond to demand signal. It was determined that the problem was in the power cabinet which is external to the control rod drive mechanisms. The provisions of T.S.-3.12.C.3 were therefore applicable.

The origin of the problem was localized, but the exact cause could not be found within two hours; therefore a controlled rampdown was initiated as per T.S.-3.12.C.3.

During the rampdown, control rod M-4 dropped from about 200 steps to 125 steps. The cause of the dropped rod was due to the circuitry failure coincident with rod manipulations and was independent of any troubleshooting. The rod could not be retrieved, resulting in a control rod misaligned by more than 15 inches, contrary to T.S.3.2.F.1.

The partial drop of rod M-4 resulted in a rate of change of flux, as seen on nuclear instrumentation channel N-41, of greater than 5% in 2 seconds, which initiated a turbine runback. Rod M-4 being partially inserted in the core was the main factor contributing to a radial flux tilt of greater than 2% which is contrary to T.S.-3.12.B.5.

Unit rampdown was continued at an increased rate. The reactor was shutdown and a "notification of an unusual event" was made in accordance with the Emergency Plan.

2. PROBABLE CONSEQUENCES AND STATUS OF REDUNDANT EQUIPMENT:

The control rods must be capable of being inserted to fullfill part of the shutdown margin requirement necessary to shut down the reactor. At all times during these events, all control rods were capable of being tripped. Following the unit shutdown, the rods were tripped and all rods dropped to the completely inserted position.

Boron is used in addition to control rods for reactivity control of the reactor. There were numerous ways in which boron could have been injected in the core if needed, including the charging pumps, Boron Injection Tank, RWST, and the accumulators.

Continued operation with a flux tilt of greater than 2% would lead to non-uniform fuel burn up which could make reactivity control of the reactor more difficult, or have adverse effects on power distribution. Therefore, after the unit stabilized following the runback, the rampdown was continued until the unit was off the line.

For the above reasons, the health and safety of the public were not affected.

3. CAUSE:

The control rods would not properly respond to demand signals due to a failed regulation card in power cabinet 1AC. The rods could move in, but not out. This regulation card is designed to regulate the amount of current that is sent to the lift coils of the CRDM's controlled by that cabinet. The failure resulted in a constant 26 amps applied to the lift coils. The current sent to a lift coil during a movement sequence while the coil is not moving is 16 amps. It requires 40 amps to actually lift a rod. The 26 amps was enough to move the lift coil while it was not carrying the weight of a rod (inward motion), but was insufficient to lift a rod during outward motion.

During the rampdown, control rod M-4 dropped from about 200 to about 125 steps. The exact reason for the dropped rod is unknown; however, Westinghouse representatives have indicated that the rod drop was due to the failed circuit card coincident with repeated manipulations of the affected rod groups.

Because of the regulation card failure as described above, M-4 could not be retrieved and was therefore designated as a misaligned rod.

The radial flux tilt was caused by several factors. The variation from the normal rod configuration due to rod manipulations with the failed circuit card as described above created some imbalance in the flux profile. The rampdown and turbine runback could also have contributed to some of the flux tilt. The main factor contributing to the flux tilt of >2%, however, was the dropping of M-4 which suppressed the flux in that quadrant of the core as compared to the flux in the rest of the core.

4. IMMEDIATE CORRECTIVE ACTION:

The immediate corrective action was to initiate troubleshooting of the rod control system. When the fault could not be located and corrected within two hours, a unit shutdown was initiated as required by Tech. Spec. 3.12.C.3. Following the unit shutdown, a "notification of an unusual event" was made in accordance with the Emergency Plan.

5. SUBSEQUENT CORRECTIVE ACTION:

The subsequent corrective action was to determine the faulty card, replace it, and then verify proper movement of all control rods. All banks of control rods were moved individually 50 steps out, and then 50 steps in.

6. ACTION TO PREVENT RECURRENCE:

The failure of the regulation card is a random failure, therefore no further action is required.

7. GENERIC IMPLICATIONS:

None.