

50-261

NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

FILE NUMBER  
INCIDENT REPORT

TO: Mr Noseley

FROM: Carolina Pwr & Light Co  
Raleigh, NC  
H R Banks

DATE OF DOCUMENT  
5-3-76

DATE RECEIVED  
5-5-76

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DESCRIPTION

Ltr trans the following licensee evnet rpts:

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PLANT NAME:  
*Robinson*

ENCLOSURE

1/RO#76-8 on 4-4-76 concerning dropping of rod L-9 due to loose electrical connector .....(one cy rec'd)

2/RO#76-9 on 4-4-76 concerning radial tilt which was experienced due to radial xenon imbalance.....

3/RO#76-10 on 4-4-76 concerning total cumulative time outside CACC limits exceeded 1 hour.....

NOTE: IF PERSONNEL EXPOSURE IS INVOLVED SEND DIRECTLY TO KREGER/J. COLLINS

SAFETY		FOR ACTION/INFORMATION		ENVIRO	5-13-76
BRANCH CHIEF:	<i>Reid</i>				
W/3 CYS FOR ACTION					
LIC. ASST:	<i>Ingram</i>				
W/ CYS					
ACRS 16 CYS	HOLDING/SENT TO LA				

INTERNAL DISTRIBUTION					
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I & E (2)					
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HOUSTON					
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GRINES/SCHWENGER					
CASE					
F. WILLIAMS					
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TEDESCO/MACCARY					
EISENHUT					
BAER					
SHAO					
VOLLNER/BUNCH					
KREGER/J. COLLINS					

EXTERNAL DISTRIBUTION				CONTROL NUMBER
LDR: <i>Hartsville, TN</i>				4495
TIC				
NSIC				

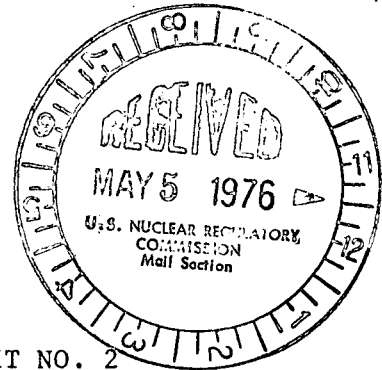
Carolina Power & Light Company

May 3, 1976

File: NG-3513 (R)

Serial: NG-76-651

Mr. Norman C. Moseley, Director  
U. S. Nuclear Regulatory Commission  
Region II, Suite 818  
230 Peachtree Street, N.W.  
Atlanta, Georgia 30303

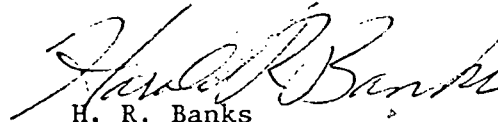


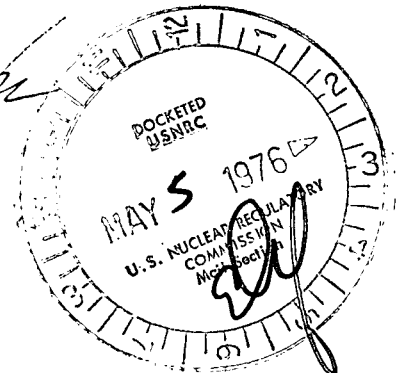
Dear Mr. Moseley:

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2  
DOCKET NO. 50-261  
LICENSE NO. DPR-23  
LICENSEE EVENT REPORTS 76-8, 9, AND 10

In accordance with Section 6.9.2.b of the Technical Specifications for H. B. Robinson Steam Electric Plant, Unit 2, the attached Licensee Event Reports are submitted. These reports fulfill the requirement for a written report within thirty (30) days of a reportable occurrence and are in accordance with the format set forth in Regulatory Guide 1.16, Revision 4.

Yours very truly,

  
H. R. Banks  
Manager  
Nuclear Generation



CSB:jwk  
Attachments

cc: Messrs. W. G. McDonald  
E. Volgenan

4495

# LICENSEE EVENT REPORT

CONTROL BLOCK: 

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(PLEASE PRINT ALL REQUIRED INFORMATION)

01	S	C	H	B	R	2	14	0	0	-	0	0	0	0	0	-	0	0	25	4	1	1	1	0	30	0	3	32	
7	8	9																											
01	CONT																												
7	8																												

## EVENT DESCRIPTION

02	During performance of Periodic Test 21.2, Rod Exercise, Rod L-9 dropped due to loose																												80
7	8	9																										80	
03	electrical connector. A radial tilt was induced resulting in operation in a degraded																												80
7	8	9																										80	
04	mode permitted by Technical Specification 3.10.3.2. (HBR2 RO 76-8)																												80
7	8	9																										80	
05																													80
7	8	9																										80	
06																													80
7	8	9																										80	

07	R	B	E	X	X	X	X	X	X	N	C	7	2	0	N	
7	8	9	10	11	12	13	14	15	16	17	43	44	45	46	47	48

## CAUSE DESCRIPTION

08	The radial tilt was induced by rod L-9 when its electrical connector at the R.V. head																												80
7	8	9																										80	
09	failed open. A replacement connector was installed to correct the problem, Part No.																												80
7	8	9																										80	
10	RPE-233-014-POINT-107.																												80
7	8	9																										80	

11	I	0	6	0	Dropped Rod	A	Indication on instruments.			
7	8	9	10	11	12	13	44	45	46	80

12	Z	Z	NA	NA			
7	8	9	10	11	44	45	80

## PERSONNEL EXPOSURES

13	0	0	0	Z	NA		
7	8	9	10	11	12	13	80

## PERSONNEL INJURIES

14	0	0	0	NA		
7	8	9	10	11	12	80

## OFFSITE CONSEQUENCES

15	NA		
7	8	9	80

## LOSS OR DAMAGE TO FACILITY

16	Z	NA		
7	8	9	10	80

## PUBLICITY

17	NA		
7	8	9	80

## ADDITIONAL FACTORS

18	See attached joint Supplemental Information for RO 76-8, 9, and 10.																												80
7	8	9																										80	

19																													80
7	8	9																										80	

NAME: Jack B. McGirt PHONE: 803-332-1351

# LICENSEE EVENT REPORT

CONTROL BLOCK: 

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(PLEASE PRINT ALL REQUIRED INFORMATION)

LICENSEE NAME [01] S C H B R 2						LICENSE NUMBER 0 0 - 0 0 0 0 0 - 0 0						LICENSE TYPE 4 1 1 1 0				EVENT TYPE 0 3			
7	8	9	14	15	25	26	30	31	32										
[01] CONT		CATEGORY 57 58		REPORT TYPE L		REPORT SOURCE L		DOCKET NUMBER 0 5 0 - 0 2 6 1				EVENT DATE 0 4 0 4 7 6				REPORT DATE 0 5 0 3 7 6			
7	8	57	58	59	60	61	68	69	74	75	80								

### EVENT DESCRIPTION

[02] During recovery from forced outage prompted by dropped rod, (refer to HBR2-RO-76-8)	7	8	9	80
[03] a radial tilt was experienced due to radial xenon imbalance. The previous power tilt	7	8	9	80
[04] created this imbalance. The resultant operation in a degraded mode was permitted by	7	8	9	80
[05] Technical Specification 3.10.3.1. (HBR2-RO-76-9)	7	8	9	80
[06]	7	8	9	80

SYSTEM CODE [Z] [Z]	CAUSE CODE [F]	COMPONENT CODE [Z] [Z] [Z] [Z] [Z] [Z]	PRIME COMPONENT SUPPLIER [Z]	COMPONENT MANUFACTURER [Z] [9] [9] [9]	VIOLATION [N]					
7	8	9	10	11	12	17	43	44	47	48

### CAUSE DESCRIPTION

[08] A previous power tilt resulting from dropped rod L-9 induced a radial xenon tilt.	7	8	9	80
[09] After correction of the dropped rod the residual effects of the xenon poisoning	7	8	9	80
[10] maintained a small power tilt. Equilibrium conditions were re-established by xenon	7	8	9	80

FACILITY STATUS [I]	% POWER [0] [9] [0]	OTHER STATUS Radial Xe Tilt	METHOD OF DISCOVERY [A]	DISCOVERY DESCRIPTION Indication on instruments					
7	8	9	10	12	13	44	45	46	80
FORM OF ACTIVITY RELEASED [Z]	CONTENT OF RELEASE [Z]	AMOUNT OF ACTIVITY NA	LOCATION OF RELEASE NA						
7	8	9	10	11	44	45	80		

### PERSONNEL EXPOSURES

NUMBER [0] [0] [0]	TYPE [Z]	DESCRIPTION NA				
7	8	9	11	12	13	80

### PERSONNEL INJURIES

NUMBER [0] [0] [0]	DESCRIPTION NA				
7	8	9	11	12	80

### OFFSITE CONSEQUENCES

[15]	NA		
7	8	9	80

### LOSS OR DAMAGE TO FACILITY

TYPE [Z]	DESCRIPTION NA			
7	8	9	10	80

### PUBLICITY

[17]	NA		
7	8	9	80

### ADDITIONAL FACTORS

[18] Cause Description Cont'd... decay after approximately 10 hours with a tilt less than	7	8	9	80
[19] 2%. See attached joint Supplemental Information for RO 76-8, 9, and 10.	7	8	9	80

NAME: Jack B. McGirt PHONE: 803-332-1351

# LICENSEE EVENT REPORT

CONTROL BLOCK: 

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[PLEASE PRINT ALL REQUIRED INFORMATION]

LICENSEE NAME						LICENSE NUMBER						LICENSE TYPE				EVENT TYPE														
01	S	C	H	B	R	2	0	0	-	0	0	0	0	-	0	0	4	1	1	1	0	0	3							
7	8	9				14	15									25	26					30	31	32						
01		CONT		CATEGORY		REPORT TYPE		REPORT SOURCE		DOCKET NUMBER				EVENT DATE				REPORT DATE												
0	1						L	L		0	5	0	-	0	2	6	1	0	4	0	4	7	6	0	5	0	3	7	6	
7	8						59	60		61							68	69						74	75					80

**EVENT DESCRIPTION**

02	As a result of various forced power maneuvers due to dropped rod, radial tilts, and	80
03	low RCP seal flow, the total cumulative time outside CAOC limits exceeded 1 hour.	80
04	Refer to HBR2-RO-76-8 and 76-9. This resulted in operation in a degraded mode as	80
05	allowed in Technical Specification 3.10.2.8 and 3.10.2.9. (HBR2-RO-76-10)	80
06		80

SYSTEM CODE		CAUSE CODE		COMPONENT CODE				PRIME COMPONENT SUPPLIER		COMPONENT MANUFACTURER			VIOLATION	
07	Z	Z	F	Z	Z	Z	Z	Z	Z	9	9	9	N	
7	8	9	10	11	12				43	44			47	48

**CAUSE DESCRIPTION**

08	Time outside of the CAOC band was accumulated during a turbine runback from a dropped	80
09	rod, shutdown recovery, and when a rapid power reduction was initiated due to de-	80
10	creasing RCP seal flow. Seal flow decreased as a result of charging pump air	80

FACILITY STATUS		% POWER		OTHER STATUS				METHOD OF DISCOVERY		DISCOVERY DESCRIPTION							
11	I	0	7	0	Forced Reduction				A	Indication on instruments and log							
7	8	9	10	11	12	13			44	45			46				80
FORM OF ACTIVITY RELEASED		CONTENT OF RELEASE		AMOUNT OF ACTIVITY				LOCATION OF RELEASE									
12	Z	Z	NA				NA										
7	8	9	10	11					44	45							80

**PERSONNEL EXPOSURES**

NUMBER		TYPE		DESCRIPTION													
13	0	0	0	Z	NA												
7	8	9	11	12	13												80

**PERSONNEL INJURIES**

NUMBER		DESCRIPTION															
14	0	0	0	NA													
7	8	9	11	12													80

**OFFSITE CONSEQUENCES**

15	NA	80
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**LOSS OR DAMAGE TO FACILITY**

TYPE		DESCRIPTION															
16	Z	NA															
7	8	9	10														80

**PUBLICITY**

17	NA	80
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**ADDITIONAL FACTORS**

18	Cause Description Cont'd... binding. The pumps were vented and seal flow was re-	80
19	established. See attached joint Supplemental Information for RO 76-8, 9, and 10.	80

NAME: \_\_\_\_\_ Jack B. McGirt PHONE: 803-332-1351

Supplemental Information for Reportable Occurrence 76-8; 76-9; and 76-10

1. Report No: 50-261/76-8;76-9;76-10
- 2a. Report Date: April 20, 1976
- 2b. Occurrence Date: April 4, 1976
3. Facility: H. B. Robinson Unit No. 2  
Hartsville, South Carolina 29550

4. Identification of Occurrence

Operation in degraded modes allowed by Technical Specifications due to radial power tilts on two occasions and as a result of exceeding the one hour limitation on Constant Axial Offset Control. The effected sections of Technical Specifications are 3.10.2.8, 3.10.2.9, 3.10.3.1, and 3.10.3.2.

5. Conditions Prior to Occurrence

The unit was operating at full power steady-state conditions with the weekly Periodic Test 21.2, Control Rod Exercise, in progress.

6. Description of Occurrence

At 0030 hours on April 4, 1976 while performing Periodic Test 21.2, Control Rod Exercise, rod L-9 dropped to the fully inserted position. An automatic turbine runback was initiated by the dropped rod. Power was decreased to approximately 64% by the automatic protective functions. Power tilt conditions exceeded 9% at 0118 hours. In accordance with section 3.10.3.2 of the Technical Specification, the condition was to have been corrected by 0318 hours or a unit shutdown initiated. At 0250 hours Instrumentation and Control Technicians found the problem to be an open circuit inside the containment vessel. A reactor shutdown was initiated at 0300 hours in accordance with operating procedure GP-10.

While performing Periodic Test 1.3 as required by GP-10, a rod control failure resulted in the dropping of the group 2 rods. Since reactor power was approximately 6% no temperature transients occurred. The group rod drop was immediately followed by a manual reactor trip. Subcritical conditions existed prior to the trip due to inserted negative reactivity from the dropped rods. After the trip, the reactor was borated to hot shutdown conditions.

An inspection entry was made inside containment to determine the cause of the initial rod drop. This inspection revealed a failed connector pin retaining ring at the vessel head. The second rod drop occurred when a multiplexing relay failed in rod control cabinet 2AC.

After completion of repairs the unit was started up using operating procedure GP-1B. The axial offset was outside of the allowed limits from 1401 hours until 1456 hours, 1502 hours until 1512 hours, 1518 hours until 1524 hours. Since these accumulations were at power levels less than 50%, only half the time is logged. Total accumulation was 35.5 minutes. This amount is added to 17 minutes collected during the turbine run-back for a total of 52.5 minutes. Power was increased above 50% at 1600 hours.

During the power increase the xenon induced radial tilt averaged approximately 4%. At 1846 hours technicians commenced resetting the power range high level flux trips to 98% in accordance with Technical Specification 3.10.3.1. While resetting the trip setpoints, the charging pump flow became erratic due to air binding. Each pump was vented to remove the air, but before this could be completed the reactor coolant pump thermal barrier differential pressure decreased and various alarms were received indicating low seal water injection flow. At 1958 hours the operator began reducing load rapidly, (2 to 3% per minute) in preparation for shutdown of reactor coolant pumps in accordance with Operating Procedure 29. Additional cooling water pumps were started and the alarms cleared. The power reduction was terminated at approximately 70%.

The rapid power reduction was achieved using control rods, which resulted in the accumulation of an additional 27 minutes outside the constant axial offset band. Power was then reduced to less than 50% in accordance with Technical Specification 3.10.2.8 and Fuel Follow Procedure No. 5. Instrumentation and Control Technicians reduced the power range high level flux trip setpoints to 55% at 2100 hours. Power remained less than 50% until 1440 hours on April 5, 1976 when the total point accumulation fell below 60. Full load was subsequently achieved at 1820 hours.

7. Designation of Apparent Cause of Occurrence

Failure of the connector pin retaining ring on control rod L-9 electrical connector created the dropped rod and automatic runback. The radial power tilt was a result of the dropped rod. A xenon imbalance formed when operation of the unit continued for approximately two hours with a power tilt. This imbalance created the second radial power tilt. During both tilt conditions the unit was operated in a degraded mode allowed by Technical Specifications.

The point accumulation occurred during the runback, shutdown recovery, and when power was reduced after the loss of seal injection flow. This resulted in operation in a degraded mode allowed by Technical Specifications.

8. Analysis of Occurrence

The maximum radial power tilt obtained during the occurrence was 11.97% at 0258 hours. The maximum point accumulation was 80 at 2029 hours on April 4, 1976. Westinghouse reactor systems are capable of operating under both situations. The basis for not allowing continued operation over long periods of time with the above conditions present is formed in the LOCA analysis. If these conditions were present during a postulated accident, the acceptance criteria of 10CFR50 Appendix K could not be met. Therefore in reviewing the probability of such an accident, no threat existed from either condition.

9. Corrective Action

A new connector was installed on rod L-9 using a priority 2 trouble ticket, (No. 831). The failure of the multiplexing relay was unrelated to the connector failure. Trouble ticket No. 830 was initiated for the multiplexing relay replacement.

To compensate for the xenon induced radial tilt after shutdown recovery, power was limited to approximately 90% and the High Level Flux trips were reduced to 98%. This was performed to remain in compliance with Technical Specification 3.10.3.1. Xenon re-established equilibrium in approximately 10 hours and thus reduced the radial tilt to less than 2%.

The point accumulation resulted primarily from the automatic actions of the protection system and operator reaction to a situation requiring rapid manual power reduction. Both of these conditions were unavoidable. The corrective action taken was to procedurally limit power to less than 50% and reduce the High Level Flux trips to 55% in accordance with Technical Specification 3.10.2.8.

10. Failure Data

A radial tilt created a similar situation on July 18, 1974 when rod L-5 dropped. Refer to Abnormal Occurrence Report 50-261/74-15 for details.

The connector that created the dropped rod condition was a Crouse-Hines connector, part No. RPE-233-014-POINT-107.





Carolina Power & Light Company

May 3, 1976

File: NG-3513 (R)

Serial: NG-76-651

Mr. Norman C. Moseley, Director  
U. S. Nuclear Regulatory Commission  
Region II, Suite 818  
230 Peachtree Street, N.W.  
Atlanta, Georgia 30303

Dear Mr. Moseley:

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2  
DOCKET NO. 50-261  
LICENSE NO. DPR-23  
LICENSEE EVENT REPORTS 76-8, 9, AND 10

In accordance with Section 6.9.2.b of the Technical Specifications for H. B. Robinson Steam Electric Plant, Unit 2, the attached Licensee Event Reports are submitted. These reports fulfill the requirement for a written report within thirty (30) days of a reportable occurrence and are in accordance with the format set forth in Regulatory Guide 1.16, Revision 4.

Yours very truly,

H. R. Banks

Manager

Nuclear Generation

CSB:jwk

Attachments

cc: Messrs. W. G. McDonald  
E. Volgenan

LICENSEE EVENT REPORT

CONTROL BLOCK: [ ] [ ] [ ] [ ] [ ] [ ]  
1 6

[PLEASE PRINT ALL REQUIRED INFORMATION]

LICENSEE NAME: [1][8][9] S C H B R [2] 14  
LICENSE NUMBER: [15] 0 0 - 0 0 0 0 0 0 - 0 0 25  
LICENSE TYPE: [26] 4 1 1 1 0 30  
EVENT TYPE: [31] 0 3 32

CONT: [1][8] CATEGORY [57] [58] REPORT TYPE [59] L REPORT SOURCE [60] L  
DOCKET NUMBER: [61] 0 5 0 - 0 2 6 1 68  
EVENT DATE: [69] 0 4 0 4 7 6 74  
REPORT DATE: [75] 0 5 0 3 7 6 80

EVENT DESCRIPTION

[2] During performance of Periodic Test 21.2, Rod Exercise, Rod L-9 dropped due to loose  
[3] electrical connector. A radial tilt was induced resulting in operation in a degraded  
[4] mode permitted by Technical Specification 3.10.3.2. (HBR2 RO 76-8)  
[5]  
[6]

SYSTEM CODE [7] R B 10 CAUSE CODE [11] E 11 COMPONENT CODE [12] X X X X X X 17  
PRIME COMPONENT SUPPLIER [43] N 43 COMPONENT MANUFACTURER [44] C 7 2 0 47  
VIOLATION [48] N 48

CAUSE DESCRIPTION

[8] The radial tilt was induced by rod L-9 when its electrical connector at the R.V. head  
[9] failed open. A replacement connector was installed to correct the problem, Part No.  
[0] RPE-233-014-POINT-107.

FACILITY STATUS [1] I 9 % POWER [10] 0 6 0 12 OTHER STATUS [13] Dropped Rod 44 METHOD OF DISCOVERY [45] A 45  
DISCOVERY DESCRIPTION [46] Indication on instruments. 80

FORM OF ACTIVITY RELEASED [2] Z 9 CONTENT OF RELEASE [10] Z 11 AMOUNT OF ACTIVITY [44] NA 44  
LOCATION OF RELEASE [45] NA 80

PERSONNEL EXPOSURES

[3] NUMBER [11] 0 0 0 TYPE [12] Z 13 DESCRIPTION [13] NA 80

PERSONNEL INJURIES

[4] NUMBER [11] 0 0 0 DESCRIPTION [12] NA 80

OFFSITE CONSEQUENCES

[5] NA 80

LOSS OR DAMAGE TO FACILITY

[6] TYPE [10] Z 10 DESCRIPTION [11] NA 80

PUBLICITY

[7] NA 80

ADDITIONAL FACTORS

[8] See attached joint Supplemental Information for RO 76-8, 9, and 10. 80

[9] 80

LICENSEE NAME: 01 | S | C | H | B | R | 2 | 14  
 LICENSE NUMBER: 15 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 25  
 LICENSE TYPE: 26 | 4 | 1 | 1 | 1 | 0 | 30  
 EVENT TYPE: 31 | 0 | 3 | 32

01 | CONT | 8  
 CATEGORY: 57 | | 58  
 REPORT TYPE: 59 | L | 60  
 REPORT SOURCE: 60 | L | 61  
 DOCKET NUMBER: 61 | 0 | 5 | 0 | - | 0 | 2 | 6 | 1 | 68  
 EVENT DATE: 69 | 0 | 4 | 0 | 4 | 7 | 6 | 74  
 REPORT DATE: 75 | 0 | 5 | 0 | 3 | 7 | 6 | 80

EVENT DESCRIPTION

02 | During recovery from forced outage prompted by dropped rod, (refer to HBR2-RO-76-8)  
 03 | a radial tilt was experienced due to radial xenon imbalance. The previous power tilt  
 04 | created this imbalance. The resultant operation in a degraded mode was permitted by  
 05 | Technical Specification 3.10.3.1. (HBR2-RO-76-9)  
 06 |

07 | SYSTEM CODE: 8 | Z | 9 | Z | 10  
 CAUSE CODE: 11 | F | 12  
 COMPONENT CODE: 12 | Z | Z | Z | Z | Z | Z | 17  
 PRIME COMPONENT SUPPLIER: 43 | Z | 44  
 COMPONENT MANUFACTURER: 44 | Z | 9 | 9 | 9 | 47  
 VIOLATION: 48 | N | 49

CAUSE DESCRIPTION

08 | A previous power tilt resulting from dropped rod L-9 induced a radial xenon tilt.  
 09 | After correction of the dropped rod the residual effects of the xenon poisoning  
 10 | maintained a small power tilt. Equilibrium conditions were re-established by xenon

11 | FACILITY STATUS: 8 | I | 9  
 % POWER: 10 | 0 | 9 | 0 | 12  
 OTHER STATUS: 12 | Radial Xe Tilt | 13  
 METHOD OF DISCOVERY: 44 | A | 45  
 DISCOVERY DESCRIPTION: 46 | Indication on instruments | 80

12 | FORM OF ACTIVITY RELEASED: 8 | Z | 9  
 CONTENT OF RELEASE: 10 | Z | 11  
 AMOUNT OF ACTIVITY: 44 | NA | 45  
 LOCATION OF RELEASE: 45 | NA | 80

PERSONNEL EXPOSURES

13 | NUMBER: 8 | 0 | 0 | 0 | 11  
 TYPE: 12 | Z | 13  
 DESCRIPTION: NA | 80

PERSONNEL INJURIES

14 | NUMBER: 8 | 0 | 0 | 0 | 11  
 DESCRIPTION: NA | 12 | 80

OFFSITE CONSEQUENCES

15 | NA | 80

LOSS OR DAMAGE TO FACILITY

16 | TYPE: 8 | Z | 9  
 DESCRIPTION: NA | 10 | 80

PUBLICITY

17 | NA | 80

ADDITIONAL FACTORS

18 | Cause Description Cont'd... decay after approximately 10 hours with a tilt less than  
 19 | 2%. See attached joint Supplemental Information for RO 76-8, 9, and 10.

CONTROL BLOCK: 1 6

[PLEASE PRINT ALL REQUIRED INFORMATION]

LICENSEE NAME: S C H B R 2 | LICENSE NUMBER: 00-000000-00 | LICENSE TYPE: 41110 | EVENT TYPE: 03

CATEGORY: CONT | REPORT TYPE: L | REPORT SOURCE: L | DOCKET NUMBER: 050-0261 | EVENT DATE: 040476 | REPORT DATE: 050376

EVENT DESCRIPTION

As a result of various forced power maneuvers due to dropped rod, radial tilts, and low RCP seal flow, the total cumulative time outside CAOC limits exceeded 1 hour. Refer to HBR2-RO-76-8 and 76-9. This resulted in operation in a degraded mode as allowed in Technical Specification 3.10.2.8 and 3.10.2.9. (HBR2-RO-76-10)

SYSTEM CODE: ZZ | CAUSE CODE: F | COMPONENT CODE: ZZZZZZ | PRIME COMPONENT SUPPLIER: Z | COMPONENT MANUFACTURER: Z999 | VIOLATION: N

CAUSE DESCRIPTION

Time outside of the CAOC band was accumulated during a turbine runback from a dropped rod, shutdown recovery, and when a rapid power reduction was initiated due to decreasing RCP seal flow. Seal flow decreased as a result of charging pump air

FACILITY STATUS: I | % POWER: 070 | OTHER STATUS: Forced Reduction | METHOD OF DISCOVERY: A | DISCOVERY DESCRIPTION: Indication on instruments and log

FORM OF ACTIVITY RELEASED: Z | CONTENT OF RELEASE: Z | AMOUNT OF ACTIVITY: NA | LOCATION OF RELEASE: NA

PERSONNEL EXPOSURES

NUMBER: 000 | TYPE: Z | DESCRIPTION: NA

PERSONNEL INJURIES

NUMBER: 000 | DESCRIPTION: NA

OFFSITE CONSEQUENCES

NA

LOSS OR DAMAGE TO FACILITY

TYPE: Z | DESCRIPTION: NA

PUBLICITY

NA

ADDITIONAL FACTORS

Cause Description Cont'd... binding. The pumps were vented and seal flow was re-established. See attached joint Supplemental Information for RO 76-8, 9, and 10.

1. Report No: 50-261/76-8;76-9;76-10
- 2a. Report Date: April 20, 1976
- 2b. Occurrence Date: April 4, 1976
3. Facility: H. B. Robinson Unit No. 2  
Hartsville, South Carolina 29550

4. Identification of Occurrence

Operation in degraded modes allowed by Technical Specifications due to radial power tilts on two occasions and as a result of exceeding the one hour limitation on Constant Axial Offset Control. The effected sections of Technical Specifications are 3.10.2.8, 3.10.2.9, 3.10.3.1, and 3.10.3.2.

5. Conditions Prior to Occurrence

The unit was operating at full power steady-state conditions with the weekly Periodic Test 21.2, Control Rod Exercise, in progress.

6. Description of Occurrence

At 0030 hours on April 4, 1976 while performing Periodic Test 21.2, Control Rod Exercise, rod L-9 dropped to the fully inserted position. An automatic turbine runback was initiated by the dropped rod. Power was decreased to approximately 64% by the automatic protective functions. Power tilt conditions exceeded 9% at 0118 hours. In accordance with section 3.10.3.2 of the Technical Specification, the condition was to have been corrected by 0318 hours or a unit shutdown initiated. At 0250 hours Instrumentation and Control Technicians found the problem to be an open circuit inside the containment vessel. A reactor shutdown was initiated at 0300 hours in accordance with operating procedure GP-1C.

While performing Periodic Test 1.3 as required by GP-1C, a rod control failure resulted in the dropping of the group 2 rods. Since reactor power was approximately 6% no temperature transients occurred. The group rod drop was immediately followed by a manual reactor trip. Subcritical conditions existed prior to the trip due to inserted negative reactivity from the dropped rods. After the trip, the reactor was borated to hot shutdown conditions.

An inspection entry was made inside containment to determine the cause of the initial rod drop. This inspection revealed a failed connector pin retaining ring at the vessel head. The second rod drop occurred when a multiplexing relay failed in rod control cabinet 2AC.

After completion of repairs the unit was started up using operating procedure GP-1B. The axial offset was outside of the allowed limits from 1401 hours until 1456 hours, 1502 hours until 1512 hours, 1518 hours until 1524 hours. Since these accumulations were at power levels less than 50%, only half the time is logged. Total accumulation was 35.5 minutes. This amount is added to 17 minutes collected during the turbine run-back for a total of 52.5 minutes. Power was increased above 50% at 1600 hours.

During the power increase the xenon induced radial tilt averaged approximately 4%. At 1846 hours technicians commenced resetting the power range high level flux trips to 98% in accordance with Technical Specification 3.10.3.1. While resetting the trip setpoints, the charging pump flow became erratic due to air binding. Each pump was vented to remove the air, but before this could be completed the reactor coolant pump thermal barrier differential pressure decreased and various alarms were received indicating low seal water injection flow. At 1958 hours the operator began reducing load rapidly, (2 to 3% per minute) in preparation for shutdown of reactor coolant pumps in accordance with Operating Procedure 29. Additional cooling water pumps were started and the alarms cleared. The power reduction was terminated at approximately 70%.

The rapid power reduction was achieved using control rods, which resulted in the accumulation of an additional 27 minutes outside the constant axial offset band. Power was then reduced to less than 50% in accordance with Technical Specification 3.10.2.8 and Fuel Follow Procedure No. 5. Instrumentation and Control Technicians reduced the power range high level flux trip setpoints to 55% at 2100 hours. Power remained less than 50% until 1440 hours on April 5, 1976 when the total point accumulation fell below 60. Full load was subsequently achieved at 1820 hours.

7. Designation of Apparent Cause of Occurrence

Failure of the connector pin retaining ring on control rod L-9 electrical connector created the dropped rod and automatic runback. The radial power tilt was a result of the dropped rod. A xenon imbalance formed when operation of the unit continued for approximately two hours with a power tilt. This imbalance created the second radial power tilt. During both tilt conditions the unit was operated in a degraded mode allowed by Technical Specifications.

The point accumulation occurred during the runback, shutdown recovery, and when power was reduced after the loss of seal injection flow. This resulted in operation in a degraded mode allowed by Technical Specifications.

8. Analysis of Occurrence

The maximum radial power tilt obtained during the occurrence was 11.97% at 0258 hours. The maximum point accumulation was 80 at 2029 hours on April 4, 1976. Westinghouse reactor systems are capable of operating under both situations. The basis for not allowing continued operation over long periods of time with the above conditions present is formed in the LOCA analysis. If these conditions were present during a postulated accident, the acceptance criteria of 10CFR50 Appendix K could not be met. Therefore in reviewing the probability of such an accident, no threat existed from either condition.

9. Corrective Action

A new connector was installed on rod L-9 using a priority 2 trouble ticket, (No. 831). The failure of the multiplexing relay was unrelated to the connector failure. Trouble ticket No. 830 was initiated for the multiplexing relay replacement.

To compensate for the xenon induced radial tilt after shutdown recovery, power was limited to approximately 90% and the High Level Flux trips were reduced to 98%. This was performed to remain in compliance with Technical Specification 3.10.3.1. Xenon re-established equilibrium in approximately 10 hours and thus reduced the radial tilt to less than 2%.

The point accumulation resulted primarily from the automatic actions of the protection system and operator reaction to a situation requiring rapid manual power reduction. Both of these conditions were unavoidable. The corrective action taken was to procedurally limit power to less than 50% and reduce the High Level Flux trips to 55% in accordance with Technical Specification 3.10.2.8.

10. Failure Data

A radial tilt created a similar situation on July 18, 1974 when rod L-5 dropped. Refer to Abnormal Occurrence Report 50-261/74-15 for details.

The connector that created the dropped rod condition was a Crouse-Hines connector, part No. RPE-233-014-POINT-107.