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 2	0 5 0 0 0 2 8 1	1 OF 1 1

TITLE (4) Snubbers

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 3	1 5	8 4	8 4	— 0 0 4	— 0 0	0 4	2 3	8 4		0 5 0 0 0
										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 0 0	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(e)
		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"
		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
J. L. Wilson - 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	S B	S N B	I 2 0 7	Y		X	B P	S N B	I 2 0 7	Y	
X	B P	S N B	I 2 0 7	Y		X	S B	S N B	I 2 0 7	Y	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	√ NO				

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

As a result of the performance of PT's 39.3 and 39.4 (Mechanical and Hydraulic Snubber Functional Tests respectively) performed in July, 1983 and March, 1984, 67 of 267 snubbers failed to meet the acceptance criteria stipulated in the snubber administrative procedures.

The testing performed in 1984 resulted from a NRC review of the testing performed in 1983. The review concluded that an insufficient number of snubbers were tested in 1983 contrary to Technical Specification 4.17.C.

The snubber program is being revised to provide better controls on maintenance and tracking of snubbers. All associated procedures will be reviewed and modified as necessary to ensure snubbers remain capable of performing their intended function and provide positive control for the seal life program.

NRC Form 3668 (9-83)

LICENSEE EVENT REPORT (LER) FAILURE 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	0 5 0 0 0 2 8 1	8 4	— 0 0 4	— 0 0	0 2 OF 1 1

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	SJ	SNB	I207	Y		X	SB	SNB	I207	Y	
X	SJ	SNB	I207	Y		X	SB	SNB	I207	Y	
X	SJ	SNB	I207	Y		X	SB	SNB	I207	Y	
X	SB	SNB	I207	Y		X	AB	SNB	I207	Y	
X	SB	NB	I207	Y		X	AB	SNB	I207	Y	
E	AB	SNB	I207	Y		E	SJ	SNB	I207	Y	
X	AB	SNB	I207	Y		X	SJ	SNB	I207	Y	
E	AB	SNB	I207	Y		X	BP	SNB	I207	Y	
E	SJ	SNB	I207	Y		E	BP	SNB	I207	Y	
X	BE	SNB	I207	Y		E	BP	SNB	I207	Y	
X	BE	SNB	I207	Y		E	AB	SNB	I207	Y	
X	CB	SNB	I207	Y		X	CB	SNB	I207	Y	
X	BP	SNB	I207	Y		E	AB	SNB	I207	Y	
X	BP	SNB	I207	Y		X	CC	SNB	I207	Y	
X	BP	SNB	I207	Y		X	BP	SNB	I207	Y	
X	BB	SNB	I207	Y		X	BP	SNB	I207	Y	
X	BP	SNB	I207	Y		X	CB	SNB	I207	Y	
X	BP	SNB	I207	Y		E	AB	SNB	I207	Y	
X	SB	SNB	I207	Y		X	AB	SNB	I207	Y	
X	SB	SNB	I207	Y		X	AB	SNB	P029	Y	
X	SB	SNB	I207	Y							
X	SB	SNB	I207	Y							
X	BE	SNB	I207	Y							
X	BE	SNB	I207	Y							
X	SB	SNB	I207	Y							
X	SB	SNB	I207	Y							

NRC FORM 366B (9-83)

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	0 5 0 0 0 2 8 1	8 4	— 0 0 4	— 0 0	0 3 OF 1 1

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

1. Description of the Event

As a result of the performance of PT's 39.3 and 39.4 (Mechanical and Hydraulic Snubber Function Tests respectively) performed in July, 1983 and March, 1984, 67 of 267 snubbers failed to meet the acceptance criteria stipulated in the snubber administrative procedure. The breakdown of hydraulic and mechanical snubbers is given below and a listing of failed snubbers is provided in Attachment 1.

1983

	TESTED	FAILED		%
HYDRAULIC	45	10	=	22.2
MECAHNICAL	11	7	=	63.6

1984

	TESTED	FAILED		
HYDRAULIC	193	49	=	25.4
MECHANICAL	18	1	=	5.6
TOTALS	267	67	=	25.1

The testing performed in 1984 was in response to a NRC review of the testing performed in 1983. The review concluded that an insufficient number of snubbers were tested in 1983 contrary to Technical Specification 4.17.C.

2. Safety Consequences and Implications

Snubbers prevent unrestrained pipe motion during seismic or severe hydraulic transients while allowing pipe thermal movement during normal operation. An inoperable snubber may increase the probability of pipe overstress in either case depending upon the failure mode of the snubber.

As required by Technical Specification 4.17.C.9, all snubbers determined inoperable by functional testing were analyzed to determine the affect on the associated equipment or piping.

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	0 5 0 0 0 2 8 1	8 4	— 0 0 4	— 0 0	0 4 OF 1 1

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

Since a snubber with lockup rates below the acceptance criteria would still perform its intended function during a seismic or severe hydraulic transients, snubbers which performed in this manner were analyzed under normal operational thermal movement conditions as rigid constraints utilizing the NUPIPE stress code. The results of this analysis, indicated that no safety related piping or components would have been overstressed.

A snubber exhibiting high lockup rates does not affect piping or components during normal operation, but could degrade the capability of a system to withstand seismic or severe hydraulic transient events. Engineering review indicates that no such dynamic events have occured which might result in overstress concerns. However, because of the high failure rate exhibited in this test population, a seismic analysis was conducted assuming no restraint in DBE conditions. These analyses results indicate that no piping overstress would have occurred had a dynamic event been sustained. Analysis of equipment and nozzle loads in this condition is not complete at this time.

Snubbers which failed the functional test due to high or low bleed rates were not analyzed since bleed occurs only after lockup and therefore does not pose a problem during normal operations.

Based on the above, the health and safety of the public were not affected.

3. Cause

Hydraulic: Of the 59 snubbers that failed the functional test, 23 have been disassembled to date in an attempt to determine the cause of failure. The results of the disassembly are presented below:

Mark No.	Size	Mfgr. Type	Probable Cause
1983			
2-WFPD-HSS-15	3¼	Miller	Valve Block
2-WAPD-HSS-140	1½	Lynair	Scored Piston
2-WFPD-HSS-7	4	Lynair	Scored Piston
2-WAPD-HSS-142	1½	Lynair	Scored Piston
2-RS-HSS-101	1½	Lynair	Scored Piston
2-RC-HSS-163	12	Bergen-Paterson	Seal Degradation
2-RC-HSS-167	12	Bergen-Paterson	Seal Degradation

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	
SSURRY POWER STATION	0 5 0 0 0 2 8 1	8 4	— 0 0 4	— 0 0	0 5 OF 1 1

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

Mark No.	Size	Mfgr. Type	Probable Cause
1984			
2-RC-HSS-105	1½	Lynair	Polyurethane Piston Seals
2-RC-HSS-104	1½	Lynair	Polyurethane Piston Seals
2-RC-HSS-103	1½	Lynair	Polyurethane Piston Seals
2-RH-HSS-25	1½	Lynair	Polyurethane Piston Seals
2-RC-HSS-118	3¼	Lynair	Debris in Fluid
2-WFPD-HSS-6	2½	Lynair	Debris in Fluid
2-SHP-HSS-5A	2½	Lynair	Debris in Fluid
2-WFPD-HSS-4	2½	Lynair	Debris in Fluid
2-RH-HSS-13	1½	Lynair	Poppet Upside Down
2-RC-HSS-117	1½	Lynair	Tension Lockup Screw Broken
2-WFPD-HSS-5	2½	Miller	No Observable Defect
2-RC-HSS-188A	2½	Miller	No Observable Defect
2-RH-HSS-15	1½	Lynair	No Observable Defect
2-RS-HSS-103	1½	Lynair	No Observable Defect
2-SHP-HSS-9	10	Tompkins-Johnson	No Observable Defect
2-SHP-HSS-10	10	Tompkins-Johnson	No Observable Defect

The nature of the test results and small sampling size do not yield conclusive results. The most common feature among the failed snubbers is that the majority are of the ITT Grinnel Lynair Type. As a result, action is being taken to remove all Lynair type snubbers from service and replace them with Miller type snubbers where possible.

Mechanical: Of the 8 mechanical snubbers that failed the functional test, all failed due to high drag. Seven (7) snubbers were disassembled to determine failure mode. The results of this disassembly are presented below.

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	0 5 0 0 0 2 8	8 4	0 0 4	0 0	0 6 OF 1 1

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

Mark No.	Size	Failure Mode	Cause
1983			
2-PS-MSS-1A	1	High Drag	No Observable Defects
2-PS-MSS-2A	½	High Drag	No Observable Defects
2-PS-MSS-1B	1	High Drag	No Observable Defects
2-PS-MSS-2B	½	High Drag	No Observable Defects
2-PS-MSS-1C	1	High Drag	No Observable Defects
2-PS-MSS-14A	½	High Drag	Gritty Material in Snubber.
2-PS-MSS-16B	½	High Drag	Gritty Material, light corrosion and Bent Guide Rods.

All of the mechanical snubber failures were due to high drag. Converstions and comparisons made at the manufacturer's facilities have disclosed that the manufacturer's test sequence performs accelerating testing before measuring drag, while the test method used in PT 39.3 requires a drag test before acceleration testing. It should be noted that after acceleration testing, the drag values normally return to acceptable levels and thus the method of testing used in the PT is considered conservative. The drag phenomena is being further evaluated.

4. Immediate Corrective Action

In addition to performing the analysis described in 2 above, all failed snubbers were either rebuilt, reset to design conditions, or replaced prior to installation and unit startup.

5. Additional Corrective Action

Because of the improper seals discovered in some of the failed snubbers, a records search was initiated to verify all snubbers contain proper seal material with adequate remaining service life.

In addition, most Lynair snubbers will be replaced to alleviate any generic concerns with this type snubber. Note, however, five (5) Lynairs will not be replaced since the stroke length or loading requirements between a Lynair and newer replacement Millers is different and precludes changeout. In these cases, the Lynair will be overhauled and tested.

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	0 5 0 0 0 2 8 1	8 4	— 0 0 4	— 0 0	0 7 OF 1 1

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

6. Action Taken to Prevent Recurrence

The entire snubber program is being reviewed and revised with emphasis on providing improved controls on maintenance and tracking of snubbers. All associated procedures will be reviewed and modified as necessary to ensure snubbers remain capable of performing their intended function and provide positive control for the seal service life program.

7. Generic Implications

Generic to Unit I.

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	0 5 0 0 0 2 8 1	8 4	— 0 0 4	— 0 0	0 8 OF 1 1

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ATTACHMENT 1

HYDRAULIC
1983

Mark No.	Size	Type	Failure Mode
1983			
2-WGCB-HSS-4A	1½	Miller	LLT
2-WGCB-HSS-05	1½	Miller	LLC
2-WFPD-HSS-15	3¼	Miller	HBT, HBC
2-WFPD-HSS-7	4	Lynair	LBT
2-WFPD-HSS-8	4	Lynair	LBT
2-WAPD-HSS-140	1½	Lynair	LBC
2-WAPD-HSS-142	1½	Lynair	LBT, LBC
2-RS-HSS-101	1½	Lynair	LBT
2-RC-HSS-163	12	Bergen-Paterson	HLT
2-RC-HSS-167	12	Bergen-Paterson	HLT
1984			
2-SHP-HSS-21	4	Lynair	LLT
2-SI-HSS-104A	2½	Miller	LBC
2-SI-HSS-104B	2½	Miller	LLT, LBT, LBC
2-SHP-HSS-5A	2½	Lynair	LBT, LBC
2-WFPD-HSS-9	4	Lynair	LBC
2-WFPD-HSS-10	4	Lynair	LBC
2-WFPD-HSS-14	2½	Miller	HLT, HBT
2-SHP-HSS-42	2½	Miller	HLT, HBT
2-SHP-HSS-33	6	Tompkins-Johnson	HLT, HLC
2-RC-HSS-117	1½	Lynair	HLT
2-RC-HSS-110	1½	Lynair	HLT, HBT
2-RC-HSS-118	3¼	Lynair	LLC
2-WFPD-HSS-4	2½	Lynair	LLT, LBC
2-RS-HSS-104	1½	Lynair	LBT
2-RS-HSS-103	1½	Lynair	LBT

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	0 5 0 0 0 2 8 1	8 4	— 0 0 4	— 0 0	0 9 OF 1 1

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

Mark No.	Size	Type	Failure Mode
1984 (cont')			
2-CH-HSS-306B	1½	Miller	LLT
2-SI-HSS-27	6	Tompkins-Johnson	LBT
2-RH-HSS-101	1½	Lynair	HLT, HLC
2-SI-HSS-25	8	Tompkins-Johnson	LBT, LBC
2-SI-HSS-26	8	Tompkins-Johnson	LLT, LBT, LBC
2-SHP-HSS-11	8	Tompkins-Johnson	LBT, LBC
2-SI-HSS-20	8	Tompkins-Johnson	LBC
2-SI-HSS-23	8	Tompkins-Johnson	LBT
2-SHP-HSS-12	8	Tompkins-Johnson	LBT, LBC
2-SHP-HSS-9	10	Tompkins-Johnson	LBC, LBT
2-SHP-HSS-10	10	Tompkins-Johnson	LBC, LBT
2-CS-HSS-1B	2½	Miller	LBT
2-CS-HSS-1A	2½	Miller	LBT, LBC
2-SHP-HSS-41	2½	Miller	LLC
2-SHP-HSS-26	4	Lynair	LLC
2-SHP-HSS-21	4	Lynair	LLC
2-SHP-HSS-23	4	Miller	LLC
2-SHP-HSS-25	4	Miller	LLC
2-RC-HSS-188B	2½	Miller	LLT
2-RC-HSS-188A	2½	Miller	LLT, LLC
2-WFPD-HSS-6	2½	Lynair	LBC
2-WFPD-HSS-5	2½	Miller	LLT
2-RH-HSS-5	2½	Lynair	LBC
2-RH-HSS-13	1½	Lynair	HLT, HLC
2-RH-HSS-25	1½	Lynair	HLC
2-RC-HSS-104	1½	Lynair	HLT, HLC
2-CH-HSS-307	1½	Miller	LLT, LLC
2-RC-HSS-105	1½	Lynair	HLT, HLC
2-CC-HSS-359	1½	Miller	LLC
2-RH-HSS-15	1½	Lynair	HLT, HLC

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	0 5 0 0 0 2 8 1	8 4	— 0 0 4	— 0 0	1 0 OF 1 1

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

Mark No.	Size	Type	Failure Mode
2-RH-HSS-38	1½	Miller	LBC
2-RH-HSS-34	1½	Miller	LLT
2-CH-HSS-305	1½	Miller	LLT
2-RC-HSS-103	1½	Lynair	HLT, HLC

FAILURE CODES:
LLT - Low Lockup Tension
LLC - Low Lockup Compression
LBT - Low Bleed Tension
LBC - Low Bleed Compression
HLT - High Lockup Tension
HLC - High Lockup Compression
HBT - High Bleed Tension
HBC - High Bleed Compression

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	0 5 0 0 0 2 8 1	8 4	— 0 0 4	— 0 0	1 1 OF 1 1

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

Mechanical

1983

Mark No.	Size	Failure Mode
2-PS-MSS-1A	1	High Drag
2-PS-MSS-2A	¼	High Drag
2-PS-MSS-1B	1	High Drag
2-PS-MSS-2B	¼	High Drag
2-PS-MSS-1C	1	High Drag
2-PS-MSS-14A	¼	High Drag
2-PS-MSS-16B	¼	High Drag

1984

2-RC-MSS-3	½	High Drag