

# ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

## REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 9001290119      DOC. DATE: 90/01/22      NOTARIZED: NO      DOCKET #  
 FACIL: 50-400 Shearon Harris Nuclear Power Plant, Unit 1, Carolina      05000400  
 AUTH. NAME      AUTHOR AFFILIATION  
 JEFFRIES, C.      Carolina Power & Light Co.  
 RICHEY, R.B.      Carolina Power & Light Co.  
 RECIP. NAME      RECIPIENT AFFILIATION

SUBJECT: LER 89-020-00: on 891031, limiter torque operator gear boxes overfilled w/grease resulting in contamination.

DISTRIBUTION CODE: IE22T      COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 6  
 TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: Application for permit renewal filed. 05000400

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**Carolina Power & Light Company**

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JAN 22 1990

R. B. RICHEY  
Manager  
Harris Nuclear Project

Letter Number: HO-900020 (0)

U.S. Nuclear Regulatory Commission  
ATTN: NRC Document Control Desk  
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1  
DOCKET NO. 50-400  
LICENSE NO. NPF-63  
LICENSEE EVENT REPORT 89-20

Gentlemen:

In accordance with Title 10 to the Code of Federal Regulations, the enclosed Licensee Event Report is submitted. This report fulfills the requirement for a written report within thirty (30) days of a reportable occurrence and is in accordance with the format set forth in NUREG-1022, September 1983.

Very truly yours,



R. B. Richey, Manager  
Harris Nuclear Project

RBR:dgr

Enclosure

cc: Mr. R. A. Becker (NRR)  
Mr. S. D. Ebnetter (NRC - RII)  
Mr. J. E. Tedrow (NRC - SHNPP)

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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) <b>SHEARON HARRIS NUCLEAR POWER PLANT - UNIT 1</b>		DOCKET NUMBER (2) <b>0 5 0 0 0 4 0 0</b>	PAGE (3) <b>1 OF 5</b>
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TITLE (4) **Limitorque Operator Gear Boxes Were Overfilled With Grease Resulting in Contamination & Degradation to Electrical Components**

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)										
1	0	3	1	8	9	8	9	0	1	2	2	9	0	0	5	0	0	0	0	0

OPERATING MODE (9) <b>5</b>	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)									
POWER LEVEL (10) <b>0 0 0</b>	<input type="checkbox"/>	20.402(b)	<input type="checkbox"/>	20.405(e)	<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 (Specify in Abstract below and in Text, NRC Form 366A)		
	<input type="checkbox"/>	20.405(a)(1)(iii)	<input type="checkbox"/>	50.73(a)(2)(i)	<input type="checkbox"/>	50.73(a)(2)(viii)(A)				
	<input type="checkbox"/>	20.405(a)(1)(iv)	<input checked="" 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)(ix)					

LICENSEE CONTACT FOR THIS LER (12)		TELEPHONE NUMBER	
NAME <b>C. JEFFRIES - REGULATORY COMPLIANCE</b>		AREA CODE <b>9 1 9</b>	<b>3 6 2 - 2 6 9 5</b>

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)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO				

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

The plant was at 0 percent reactor power in Mode 5, Cold Shutdown, on October 31, 1989. Plant personnel were preparing for refueling activities during the outage.

Three jumper wires in a Limitorque operator for pressurizer power operated relief valve block valve IRC-117 were found contaminated with grease which was leaking from the limit switch gear box. This was discovered during a routine periodic inspection. A similar condition was discovered on two Limitorque operators for auxiliary feedwater valves IAF-55 and IAF-93. These operators were being inspected for degraded Conax connectors as recommended by IE Notice 88-89, "Degradation of Kapton Electrical Insulation."

An evaluation of the condition of the operators determined that they were not environmentally qualified (EQ) and, therefore, it could not be ensured that they would perform their safety function under a design basis event.

The cause of the grease leakage was attributed to overfilling the operator limit switch gear box with grease. Overfilling the gear box provides no room for thermal expansion of the grease due to high ambient temperatures or local steam leaks and results in excessive weepage through the seals. This weepage allows contamination and degradation of the electrical components which could result in a malfunction of the valve. Subsequent inspections of containment and the main steam tunnel revealed no other grease contamination and all gear boxes were inspected to ensure proper grease levels. These inspections were completed prior to start-up from the refueling outage. Corrective actions included repair or replacement of the damaged and contaminated wires. Additionally, applicable maintenance procedures will be revised to include (1) the proper fill levels for the limit switch gear boxes and (2) an EQ holdpoint for a site EQ inspection on those operators which are found with grease contamination. Training will also be provided regarding the consequences of exceeding the proper grease level in the limit switch gear box.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)  SHEARON HARRIS NUCLEAR POWER PLANT - UNIT 1	DOCKET NUMBER (2)  0   5   0   0   0   4   0   0	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8   9	-   0   2   0	-   0   0	2	OF 5

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

Description:

The plant was at 0 percent reactor power in Mode 5, Cold Shutdown, on October 31, 1989. Plant personnel were working toward detensioning the reactor vessel head.

Plant maintenance technicians were performing a preventive maintenance procedure PM-I0020, "Limitorque Operator Inspection," on pressurizer power operated relief valve (PORV) block valve IRC-117. The technicians noticed oil contamination in the electrical compartment where three electrical jumper wires were damaged (insulation swollen) due to the grease contamination. The site environmental qualification (EQ) unit was notified on November 3, 1989 and an evaluation of the condition began. Simultaneously, the EQ unit was performing an inspection for Conax connectors with Kapton insulated wire as recommended by I.E. Notice 88-89 on Limitorque operators in containment and the steam tunnel. Two additional Limitorque operators had electrical compartments which were found to be contaminated with grease. The operators were for auxiliary feedwater (AFW) valve IAF-55 discovered on November 5, 1989 and IAF-93 discovered on November 9, 1989. These valves were added to the evaluation being performed for IRC-117.

An evaluation of the condition of the operators determined that they were not EQ and, therefore, it could not be ensured that they would perform their safety function under a design basis event. The plant had operated prior to the outage with this undiscovered condition.

Cause:

The cause of the grease leakage was attributed to overfilling the operator limit switch gear box with grease. Overfilling the gear box provides no room for thermal expansion of the grease due to high ambient temperatures. The PORV block valve IRC-117 is located in containment where the normal operating temperature is high. AFW valves IAF-55 and IAF-93 are located in the steam tunnel where IAF-55 was subjected to steam spray by a body to bonnet leak on the valve and IAF-93 was subjected to steam spray by a packing leak from AFW valve IAF-64. The steam blowing on these valves resulted in higher than normal temperatures. The normal ambient operating temperature for the steam tunnel is 116 degrees fahrenheit. The design basis accident temperature in the steam tunnel is 437 degrees fahrenheit. It is estimated that the temperature in the vicinity of the valves when the steam leaks existed was on the order of 150 - 200 degrees fahrenheit. High ambient temperature and steam impingement caused thermal expansion resulting in excessive weepage through the seals. This weepage allows contamination and degradation of the electrical components which could result in a malfunction of the valve.

LICENSEE EVENT REPORT (LER)  
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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
					3	OF 5

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

Subsequent to an NRC EQ audit in March, 1988 an investigation by Maintenance Engineering was underway to determine the maximum grease level in limit switch gear boxes. The determination was made to fill the gear box to the 75% level, and applicable procedures were revised in March, 1988 to reflect this new level.

All three valves were inspected using the revised procedures during the 1988 refueling outage. It is felt that inadequate training on the newly revised procedures was the cause of the grease level not being reduced to 75% as required.

Since procedures were originally revised to indicate a 75% fill level, EPRI guideline NP-6229 dated January, 1989 has been published which specifies adding only enough grease to cover the lower gears. An engineering evaluation will be completed to determine if additional procedure revisions are required based on this new guideline.

Safety Significance:

The pressurizer PORV block valve functions to isolate a PORV in the event of excessive seat leakage or a failure to close of the PORV. Although this function is required by Technical Specifications, no credit is taken for the operation of the PORV block valves in the plant safety analysis.

The AFW isolation valves provide automatic termination of AFW flow to their respective steam generator if that generator's pressure is less than the other two steam generators and a Main Steam Isolation Signal exists. This condition would occur during accidents involving a secondary side fault upstream of the Main Steam Isolation Valve. This function ensures that (1) no excessive cooldown of the Reactor Coolant System occurs due to AFW flow to a faulted steam generator, (2) no excessive pressurization of containment due to continued AFW flow and steam production in the faulted steam generator, and (3) sufficient AFW flow is delivered to the two intact steam generators by stopping the diversion of the AFW flow to the faulted steam generator.

The valves in question are located in the lines from the motor-driven AFW pumps to the A and B steam generators. In the event either of these valves failed to actuate during an accident, an upstream flow control valve is provided which also receives an isolation signal. The flow control valves are electro-hydraulic valves not subject to this potential failure mechanism. The isolation function would therefore have occurred unless a failure of the flow control valve had also occurred. The flow control valves, as well as manual isolation valves, are located in the Reactor Auxiliary Building accessible to the operator to allow for local isolation of the faulted steam generator.

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

This potential failure mechanism could also have occurred on any Limitorque valve located in the containment or steam tunnel areas which can be subjected to high ambient temperatures during normal operation. Other safety related functions could therefore have been adversely impacted by this condition.

This condition is being reported in accordance with 10CFR50.73 (a)(2)(ii) as a condition found while shutdown which put the plant in an unanalyzed condition due to an environmental qualification deficiency.

Previous Event Information:

No previous event has been reported, however, during the NRC EQ Audit of March, 1988 a similar condition was discovered during a plant walkdown. NRC Question #47 from that audit addressed one situation where a Limitorque operator main gear box appeared to be overfilled with grease. Follow-up actions were to include revising applicable Maintenance procedures to incorporate minimum/maximum grease levels in the gear boxes of Limitorque operators.

Corrective Action:

1. The damaged wires for valve LRC-117 were corrected on November 1, 1989. The contaminated wires for valve LAF-55 were replaced on December 4, 1989 and the limit switch gear box was inspected and grease replaced on November 29, 1989. The contaminated wires for valve LAF-93 were replaced on November 16, 1989, and the limit switch gear box was inspected and grease replaced on November 9, 1989. All valves have been verified operable.
2. Maintenance procedures will be revised based on an evaluation of the EPRI data on fill levels for the limit switch gear box. Also, included in the revision will be an EQ holdpoint for a site EQ inspection on those operators which are found with grease contamination.
3. A complete inspection was done on all Limitorque operators in containment and the steam tunnel for grease contamination and proper grease levels in the limit switch gear boxes. These inspections were completed prior to start-up from the refueling outage.
4. Maintenance Instrumentation and Control personnel will be trained on the grease level requirements for the limit switch gear box based on newly revised procedures.

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

EIIS Code Information:

Pressurizer PORV Block Valve	AB
Auxiliary Feedwater Isolation Valve	BA
Steam Generator	AB
Main Steam Isolation Valve	SB
Reactor Coolant System	AB
Motor-Driven Auxiliary Feedwater Pump	BA
Auxiliary Feedwater Flow Control Valve	BA
Auxiliary Feedwater Manual Isolation Valve	BA



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