

CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9610100116 DOC.DATE: 96/10/03 NOTARIZED: NO DOCKET #
FACIL:50-400 Shearon Harris Nuclear Power Plant, Unit 1, Carolina 05000400
AUTH.NAME AUTHOR AFFILIATION
VERRILLI,M. Carolina Power & Light Co.
DONAHUE,J.W. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 96-018-00:on 960903,manual reactor trip initiated.Caused
by mechanical failure of "B" NSW pump & "A" NSW pump.
Restored "A" pump to service & performed secondary plant
walkdown to support plant re-start.W/961003 ltr.

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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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OCT 3 1996

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Serial: HNP-96-164
10CFR50.73

SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1
DOCKET NO. 50-400
LICENSE NO. NPF-63
LICENSEE EVENT REPORT 96-018-00

Sir or Madam:

In accordance with Title 10 to the Code of Federal Regulations, the enclosed Licensee Event Report is submitted. This report describes a manual reactor trip due to the loss of Normal Service Water.

Sincerely,

J. W. Donahue
Director of Site Operations
Harris Plant

MV

Enclosure

c: Mr. J. B. Brady (HNP Senior Resident - NRC)
Mr. S. D. Ebnetter (NRC Regional Administrator - Region II)
Mr. N. B. Le (NRC Project Manager - NRR)

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Page 2 of 2

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NRC FORM 366 (4-95)	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB NO. 3150-0104 EXPIRES 04/30/98 <small>ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 500 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.</small>
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)		

FACILITY NAME (1) Harris Nuclear Plant Unit-1	DOCKET NUMBER (2) 50-400	PAGE (3) 1 OF 3
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TITLE (4)
Manual reactor trip due to loss of Normal Service Water

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 NAME	DOCKET NUMBER
9	03	96	96	-- 018	-- 0	10	03	96		05000
										05000

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)									
POWER LEVEL (10) 100%		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)		
		20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)		
		20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71		
		20.2203(a)(2)(ii)		20.2203(a)(4)		<input checked="" type="checkbox"/> 50.73(a)(2)(iv)		OTHER		
		20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A		
	20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)					

LICENSEE CONTACT FOR THIS LER (12)

NAME Michael Verrilli Sr. Analyst - Licensing	TELEPHONE NUMBER (Include Area Code) (919) 362-2303
---	---

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
B	KG	P	P115	Y						

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)		
<input checked="" type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE).		<input type="checkbox"/> NO		MONTH	DAY	YEAR
				1	15	97

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On September 3, 1996 at approximately 2338 hours, with the plant operating in mode 1 at 100% power and the "B" Normal Service Water (NSW) pump in service, operators in the main control room received numerous NSW system alarms and observed indication of zero flow and pressure in the NSW header. The Reactor Operator manually started the standby "A" NSW pump to restore flow, but the pump tripped after running for less than two minutes. When re-start attempts on the "A" NSW pump failed, a manual reactor trip was initiated at approximately 2342 hours. Plant systems responded as expected, including an automatic start of the Auxiliary Feedwater System and the unit was stabilized in mode 3 (Hot Standby).

The cause of this event was a mechanical failure of the "B" NSW pump and the failure of the "A" NSW to remain running once manually started. The "B" NSW pump shaft sheared. The cause of the "A" NSW pump trip will require additional investigation.

Corrective actions included restoring the "A" NSW pump to service, performing a secondary plant walkdown to support plant re-start, and evaluating the acceptability of having only one NSW pump available during plant operation while repairs continue on the "B" NSW pump. Additional planned actions include repair of the "B" NSW pump, continuing evaluation and/or testing of the NSW system, failure analysis for the "B" NSW pump sheared shaft and incorporation of lessons learned from this event into operator training.

This event is reportable per 10CFR50.72 and 10CFR50.73. A 4-hour non-emergency report was made to the NRC at approximately 0207 via the emergency notification system.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Shearon Harris Nuclear Plant - Unit #1	50-400	96	018	00	2 OF 3

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

EVENT DESCRIPTION:

On September 3, 1996 at approximately 2338 hours, with the plant operating in mode 1 at 100% power and the "B" Normal Service Water pump (NSW, EIIS Code: KG-P) in service, operators in the main control room received numerous NSW system alarms and observed indication of zero flow and pressure in the NSW header. The Reactor Operator manually started the standby "A" NSW pump to restore service water flow. After observing closed indication for the "A" NSW pump breaker and indication that the "A" NSW pump discharge valve was opening, the "B" NSW pump was secured to allow the "B" discharge valve to shut. At this time, the Reactor Operator noticed that the "A" NSW pump had tripped. Following two unsuccessful re-start attempts on the "A" NSW pump, the Unit-Senior Control Operator directed a manual reactor and turbine trip at approximately 2342 hours. Prior to the reactor trip, the "A" Emergency Service Water (ESW) pump automatically started due to low header pressure. Plant systems responded to the reactor trip signal as expected, including an automatic start of the Auxiliary Feedwater System (EIIS Code: BA) on steam generator low-low level due to Reactor Coolant System (RCS, EIIS Code: AB) shrink following the reactor trip. The unit was stabilized in mode 3 with RCS temperature at 557 degrees and pressure at 2235 psig.

Following investigation and repairs, the plant was restarted on September 9, 1996 and returned to the grid at approximately 0342 on September 10, 1996. Delays were encountered in plant re-start due to the passage of Hurricane Fran (reference LER 96-019). Since the forced outage exceeded 72 hours, hot rod drop testing was performed prior to reactor startup in accordance with Harris Plant's response to NRC Bulletin 96-01. Reference Attachment 1 for hot rod drop testing results.

This event is reportable per 10CFR50.72 and 10CFR50.73 as a Reactor Protection System actuation. A 4-hour non-emergency report was made to the NRC at approximately 0207 via the emergency notification system.

CAUSE:

The cause of this event was a mechanical failure in the "B" NSW pump and a malfunction resulting in the "A" NSW pump tripping after being manually started. The "B" NSW pump experienced a sheared pump shaft. A metallurgical analysis is currently in progress to determine the failure mode. The cause of the "A" NSW pump trip is still under investigation.

SAFETY SIGNIFICANCE:

There were no safety consequences as a result of this event. The manual reactor/turbine trip was initiated per plant operating procedures to protect secondary plant components following the loss of Normal Service Water. Plant systems responded as expected following the initiation of the manual reactor/turbine trip.

PREVIOUS SIMILAR EVENTS:

Previous similar problems with the NSW pumps and discharge valves were experienced during the reactor/turbine trip that occurred on April 25, 1996, which was reported in LER 96-008. Corrective actions for that event included adjusting the mechanical latch mechanism on the "A" NSW pump discharge valve control relay (CR1/2189) to ensure that it "latched in" properly and replacing two of the "B" NSW pump discharge valve control relays (CR4/2190 & CR1/2190) that experienced intermittent failures. Based on indications observed during the September 3, 1996 loss of NSW event, these corrective actions were effective since their associated functions performed as required. LER 96-008 also contained a corrective action to perform additional NSW testing during the next refueling outage (RFO-7). This testing will still be performed and will incorporate the results of the investigation referenced in planned corrective action #2 of this LER.

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Shearon Harris Nuclear Plant - Unit #1	50-400	96	018	00	3 OF 3

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

CORRECTIVE ACTIONS COMPLETED:

1. Trouble shooting was performed which determined that a common-mode failure mechanism did not exist with the NSW pumps.
2. The "A" NSW pump was returned to service on September 7, 1996.
3. A safety analysis was performed on September 5, 1996, which determined the acceptability of returning the plant to service with only one NSW pump available while repairs continued on the "B" NSW pump. This analysis, combined with the results of an engineering evaluation, concluded that repairs to the "B" NSW pump could be made on-line with the "A" NSW pump in service.
4. A secondary plant walkdown to assess potential damage related to the loss of NSW transient was completed on September 4, 1996. Discrepancies identified during the walkdown that would prevent plant re-start were repaired on September 4, 1996.

CORRECTIVE ACTIONS PLANNED:

1. Repairs will be completed on the "B" NSW pump by November 25, 1996.
2. Additional testing and/or evaluation will be performed to determine the cause of the "A" NSW pump trip after being manually started on September 3, 1996. This will be completed during the next refueling outage (RFO-7) scheduled to start in March 1997.
3. Additional analysis will be performed to determine the failure mechanism involved in the "B" NSW pump sheared shaft. This will be completed by November 30, 1996.
4. Upon completion of the on-going investigations, training on the lessons learned from the loss of NSW event will be incorporated into the operator training program. This will be completed by November 30, 1996.

Comparison of BOC 7 and 3/29/96 and 9/9/96 Rod Drop Times

Rod Bank	Core Loc	Assembly Serial #	Assembly Region	Current	Current	Projected	Fuel Assembly Spacer/Grid Type	Rod Drop	Recoils	Rod Drop	Recoils	Rod Drop	Recoils	BOC Delta 3/11/96	BOC Delta 9/9/96
				Burn Up 3/11/96 GWD/MTU	Burn Up 9/4/96 GWD/MTU	Burn Up EOC7 GWD/MTU		Times Spacer/Grid	BOC	Times 3/11/96	3/11/96	Times 9/9/96	9/9/96		
CA	F02	G33	7	42.46	46.08	50.67	Vantage 5	1.988	2	1.996	3	1.95	3	0.008	-0.038
CA	K14	G34	7	42.53	46.15	50.67	Vantage 5	2.138	2	2.170	3	2.14	3	0.032	0.002
CA	K02	G38	7	45.46	46.87	53.16	Vantage 5	2.003	2	2.038	2	1.97	4	0.035	-0.033
CA	B06	G41	7	45.47	48.88	53.16	Vantage 5	2.288	3	2.314	3	2.23	3	0.028	-0.058
CA	B10	G47	7	42.54	46.16	50.67	Vantage 5	2.160	2	2.123	3	2.05	3	-0.037	-0.110
CA	F14	G48	7	45.46	48.87	53.16	Vantage 5	2.040	2	1.990	1	1.96	3	-0.050	-0.080
CA	P06	G49	7	42.52	46.13	50.67	Vantage 5	1.988	3	1.994	3	1.94	3	0.006	-0.048
CA	P10	G52	7	45.45	48.85	53.16	Vantage 5	1.935	3	1.959	3	1.93	2	0.024	-0.005
CB	D06	H37	8	30.31	37.93	47.01	*HTR/IFM/BI-M	1.913	2	1.911	3	1.89	3	-0.002	-0.023
CB	F04	H38	8	30.35	37.99	47.08	*HTR/IFM/BI-M	1.883	3	1.899	2	1.86	2	0.016	-0.023
CB	K04	H39	8	30.30	37.91	47.01	*HTR/IFM/BI-M	1.901	3	1.915	3	1.91	3	0.014	0.009
CB	M06	H40	8	30.32	37.95	47.08	*HTR/IFM/BI-M	1.851	3	1.889	3	1.87	4	0.038	0.019
CB	M10	H41	8	30.29	37.90	47.01	*HTR/IFM/BI-M	1.881	2	1.889	3	1.89	2	0.008	0.009
CB	K12	H42	8	30.33	37.97	47.08	*HTR/IFM/BI-M	1.873	3	1.903	3	1.87	4	0.030	-0.003
CB	F12	H43	8	30.30	37.93	47.01	*HTR/IFM/BI-M	1.901	2	1.894	3	1.88	3	-0.007	-0.021
CB	D10	H44	8	30.34	37.99	47.08	*HTR/IFM/BI-M	1.903	3	1.899	2	1.89	3	-0.004	-0.013
CC	H10	H33	8	29.77	37.01	45.41	*HTR/IFM/BI-M	1.891	2	1.916	2	1.87	3	0.025	-0.021
CC	F08	H34	8	29.78	37.02	45.41	*HTR/IFM/BI-M	1.873	2	1.888	3	1.87	3	0.015	-0.003
CC	H06	H35	8	29.74	36.98	45.41	*HTR/IFM/BI-M	1.912	2	1.939	2	1.91	3	0.027	-0.002
CC	K08	H36	8	29.76	36.99	45.41	*HTR/IFM/BI-M	1.902	2	1.913	3	1.89	3	0.011	-0.012
CC	D04	J10	9	5.92	13.63	22.90	*HTR/IFM/BI-M	1.888	3	1.897	3	1.88	4	0.009	-0.008
CC	M04	J13	9	5.89	13.58	22.90	*HTR/IFM/BI-M	1.872	2	1.922	3	1.87	4	0.050	-0.002
CC	M12	J16	9	5.89	13.59	22.90	*HTR/IFM/BI-M	1.882	2	1.874	3	1.85	4	-0.008	-0.032
CC	D12	J19	9	5.92	13.63	22.90	*HTR/IFM/BI-M	1.852	3	1.875	3	1.83	3	0.023	-0.022
CD	B08	J21	9	5.45	12.74	21.34	*HTR/IFM/BI-M	2.068	3	2.047	2	2.02	2	-0.021	-0.048
CD	H02	J22	9	5.44	12.72	21.34	*HTR/IFM/BI-M	1.940	2	1.924	3	1.89	3	-0.016	-0.050
CD	P08	J23	9	5.41	12.67	21.34	*HTR/IFM/BI-M	1.878	2	1.904	2	1.86	3	0.026	-0.018
CD	H14	J24	9	5.44	12.73	21.34	*HTR/IFM/BI-M	1.948	2	1.886	3	1.9	2	-0.062	-0.048
CD	F06	J57	9	6.13	14.43	24.82	*HTR/IFM/BI-M	1.870	3	1.897	3	1.9	3	0.027	0.030
CD	K06	J58	9	6.11	14.39	24.82	*HTR/IFM/BI-M	1.836	3	1.892	3	1.87	3	0.056	0.034
CD	K10	J59	9	6.11	14.40	24.82	*HTR/IFM/BI-M	1.868	3	1.874	3	1.87	3	0.006	0.002
CD	F10	J60	9	6.13	14.42	24.82	*HTR/IFM/BI-M	1.878	2	1.883	3	1.85	3	0.005	-0.028
SA	G13	H01	8	25.58	32.99	41.77	*HTR/IFM/BI-M	1.889	3	1.889	4	1.87	3	0.000	-0.019
SA	N07	H02	8	25.44	32.84	41.65	*HTR/IFM/BI-M	1.879	3	1.891	2	1.89	4	0.012	0.011
SA	C07	H03	8	25.59	32.99	41.77	*HTR/IFM/BI-M	1.868	3	1.897	3	1.86	3	0.029	-0.008
SA	J13	H04	8	25.45	32.88	41.65	*HTR/IFM/BI-M	1.879	3	1.897	3	1.87	3	0.018	-0.009
SA	J03	H05	8	25.58	32.97	41.77	*HTR/IFM/BI-M	1.889	3	1.890	3	1.92	3	0.001	0.031
SA	C09	H06	8	25.42	32.86	41.65	*HTR/IFM/BI-M	1.959	3	1.926	2	1.89	3	-0.033	-0.069
SA	N09	H07	8	25.51	32.89	41.77	*HTR/IFM/BI-M	1.888	2	1.892	3	1.87	3	0.004	-0.018
SA	G03	H08	8	25.47	32.90	41.65	*HTR/IFM/BI-M	1.959	3	1.887	3	1.88	3	-0.072	-0.079
SB	J07	A20	1	20.83	26.18	32.63	LOPAR	1.904	3	1.914	2	1.93	3	0.010	0.026
SB	G09	A26	1	20.83	26.19	32.63	LOPAR	1.982	3	1.984	3	1.93	3	-0.018	-0.052
SB	J09	A28	1	20.83	26.17	32.63	LOPAR	1.922	3	1.937	3	1.88	3	0.015	-0.042
SB	G07	A50	1	20.84	26.20	32.63	LOPAR	1.996	2	1.952	3	1.97	3	-0.044	-0.026
SB	E05	H21	8	30.49	38.07	47.07	*HTR/IFM/BI-M	1.956	3	1.928	3	1.93	3	-0.028	-0.028
SB	L05	H22	8	30.47	38.02	47.07	*HTR/IFM/BI-M	1.917	3	1.926	2	1.87	3	0.009	-0.047
SB	L11	H23	8	30.43	37.99	47.07	*HTR/IFM/BI-M	1.877	3	1.901	3	1.85	4	0.024	-0.027
SB	E11	H24	8	30.44	38.03	47.07	*HTR/IFM/BI-M	1.927	3	1.916	2	1.89	4	-0.011	-0.037
SC	E03	J02	9	5.60	12.91	21.63	*HTR/IFM/BI-M	1.893	4	1.898	4	1.87	4	0.005	-0.023
SC	.N05	J04	9	5.57	12.85	21.63	*HTR/IFM/BI-M	1.892	4	1.895	3	1.87	4	0.003	-0.022
SC	L13	J06	9	5.59	14.17	21.63	*HTR/IFM/BI-M	1.963	3	1.957	3	1.92	3	-0.006	-0.043
SC	C11	J08	9	5.60	12.91	21.63	*HTR/IFM/BI-M	1.882	2	1.898	3	1.88	4	0.016	-0.002



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