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

Serial: HNP-01-161
10CFR50.73

SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1
DOCKET NO. 50-400
LICENSE NO. NPF-63
LICENSEE EVENT REPORT 2001-003-00

Sir or Madam:

The enclosed Licensee Event Report is submitted in accordance with 10CFR50.73. This report describes a Technical Specification violation due to a Residual Heat Removal Pump (RHRP) inoperability. The report, LER 01-03-00, describes a condition that could have resulted in the inability of the 1A-SA RHRP to perform as designed.

Sincerely,

R. J. Duncan II
General Manager
Harris Plant

RTG/rtg

Enclosure

c: Mr. J. B. Brady (HNP Senior NRC Resident)
Mr. J. M. Goshen (NRC-NRR Project Manager)
Mr. B. S. Mallett (NRC Regional Administrator, Region II - Acting)

Harris Nuclear Plant
5413 Shearon Harris Road
New Hill, NC 27562

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NRC FORM 366 (MM-YYYY) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4) 1A-SA Residual Heat Removal Suction Line Debris - Nonconforming Condition

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER 05000
10	8	01	2001	- 03 -	00	11	27	2001	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	0
POWER LEVEL (10)	0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)

	20.2201(b)		20.2203(a)(3)(i)		50.73(a)(2)(i)(C)		50.73(a)(2)(vii)
	20.2201(d)		20.2203(a)(3)(ii)		50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(A)
	20.2203(a)(1)		20.2203(a)(4)		50.73(a)(2)(ii)(B)		50.73(a)(2)(viii)(B)
	20.2203(a)(2)(i)		50.36(c)(1)(i)(A)		50.73(a)(2)(iii)		50.73(a)(2)(ix)(A)
	20.2203(a)(2)(ii)		50.36(c)(1)(ii)(A)		50.73(a)(2)(iv)(A)		50.73(a)(2)(x)
	20.2203(a)(2)(iii)		50.36(c)(2)		50.73(a)(2)(v)(A)		73.71(a)(4)
	20.2203(a)(2)(iv)		50.46(a)(3)(ii)	X	50.73(a)(2)(v)(B)		73.71(a)(5)
	20.2203(a)(2)(v)		50.73(a)(2)(i)(A)		50.73(a)(2)(v)(C)		OTHER
	20.2203(a)(2)(vi)	X	50.73(a)(2)(i)(B)		50.73(a)(2)(v)(D)		Specify in Abstract below or in NRC Form 366A

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Rick Garner, Principal Analyst - Licensing	(919) 362-2033

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MO	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

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

On October 8, 2001, with the Harris Nuclear Plant (HNP) defueled for Refueling Outage 10, work was being performed on 1SI-310, "Containment Vessel (CV) Sump To Residual Heat Removal Pump (RHRP) 1A-SA Downstream Isolation Valve." During the job, the mechanics observed foreign material in the RHR system piping. The mechanics removed the material and reported the discovery to management. Additional debris was found in the A train RHR and Containment Spray system lines during the event investigation. An Engineering Analysis of the material concluded that 1A-SA RHRP could have been impacted by the larger pieces of debris if they moved to the pump suction. The pump may then experience a loss of capacity and become inoperable. Cause: "Work Practices (improper work methods used in the performance of the task); Workmanship, substandard cleanliness" was the root cause for this event. Corrective actions: Remove the foreign material. Perform visual inspections of: RHR and Containment Spray (CT) systems suction piping, the Containment Recirculation Sump piping, the Refueling Water Storage Tank (RWST), the CT discharge lines near Containment Isolations, and the 1A-SA RHRP impeller eye. Incorporate industry best practices into HNP Foreign Material Exclusion (FME) Program (i.e. Procedure, Training, Barriers, Management Oversight, and site culture), (Corrective Action to Prevent Recurrence)

I. DESCRIPTION OF EVENT

SUMMARY:

On October 8, 2001, at approximately 1130, with the Harris Nuclear Plant (HNP) defueled for Refueling Outage 10, work was being performed on 1SI-310, "Containment Vessel (CV) Sump To Residual Heat Removal (RHR) PUMP 1A-SA Downstream Isolation Valve" (EIIS: BP-ISV), to repair a body-to-bonnet leak. With the reactor defueled, the RHR trains were not required to be operable. During the maintenance, the mechanics observed foreign material in the RHR system piping. The mechanics removed the material and reported the discovery to management. During the resulting investigation, additional debris was found in this line and similar system lines. Based on an Engineering Analysis of the material discovered, it was determined that the debris could potentially have impacted the 1A-SA RHR train operability. It was determined that if the pieces of "rubber-type" debris (also referred to as "rubber") had moved to the suction of the 1A-SA RHRP (EIIS: BP-P), the pump could potentially experience a loss of capacity and become inoperable.

DETAILS:

During the removal of the valve from the valve body, one of the two mechanics performing the maintenance observed a 6.5 inch long by 5/16 inch wide cable tie lying inside the piping near the seating ring for the valve. 1SI-310 is one of two in-series valves that open to provide a suction path from the Containment recirculation sump to the 1A-SA Residual Heat Removal Pump (RHRP) upon entering the recirculation mode due to an accident involving the loss of Reactor Coolant System (RCS) inventory to the Containment. The mechanics proceeded with the removal of the valve from the valve body and began to search to ensure that no other material was in the line. The mechanics discovered a small piece of triangular shaped (longest sides about 3.5 by 2.5 inches long and about 5/16 inches thick) rubber-type (polymer) material further downstream of 1SI-310 toward the RHRP. Following this discovery, the mechanics investigated further and obtained a flashlight and survey mirror to aid them in the search. They then found a large mostly rectangular shaped piece (dimensions of about 5 by 20 by 3/16 inch) of the rubber-type material. The mechanics removed all of the foreign material they found and placed 1SI-310 valve bonnet back on the valve as a Foreign Material Exclusion boundary and reported what they found to management. Management initiated a root cause investigation for the event.

Additional piping inspections requested by the Root Cause Investigation (RCI) Team discovered additional rubber pieces, two pieces of metal, and some small elastic particles in A RHR and A CT Systems (see Figure 1). All foreign material was removed and system piping was inspected by a video camera. A past operability determination of A RHR resulted in the system being inoperable with the debris in the piping. A separate operability determination concluded that Containment Spray (CT) system operability was not affected. The redundant Containment recirculation sump for 1B-SB train was also inspected and no significant debris was found in that sump or the suction lines for the 1B-SB RHRP or 1B-SB CT Pump. Laboratory analysis, and RCI Team research could not determine the exact time or event that introduced this foreign material. Five entry opportunities were identified from construction of plant (1987) to time of discovery in RFO-10 (2001).

Possible Sources of Foreign Material

The five potential opportunities are listed chronologically below.

1. Material left in the piping during construction.
2. Work on 1A-SA RHRP in 1991 (RFO-3), to repair leaking pump seal.
3. Removal of 1SI-310 in 1991 (RFO-3) to remove foreign material from piping.
4. Material introduced from the RWST due to dropped material during manual boration of the tank and other work requiring the man-way access hatch to be opened.
5. Work in the Containment Recirculation sump in 1997 (RFO7) and 1998 (RFO8). (cont.)

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

I. DESCRIPTION OF EVENT (cont.)

One of these (introduction from RWST) has been eliminated. Two others (left from construction and 1SI-310 removal in RFO-3) are less probable since both were cleaning activities designed to remove foreign material. The two remaining potential sources are the most probable. These are: the work on 1A-SA RHRP in 1991 (RFO-3), to repair leaking pump seal and the work in the Containment Recirculation sump in 1997 (RFO7) and 1998 (RFO8). Regardless of the exact time of entry, the root cause of this event is historical poor work practices with respect to FME control.

II. CAUSE OF EVENT

The root cause investigation identified "Work Practices (improper work methods used in the performance of the task); Workmanship, substandard cleanliness" as the root cause for this event.

III. SAFETY SIGNIFICANCE

Based on an Engineering Analysis of all of the material discovered during an extensive search of the impacted and potentially impacted lines, only the larger pieces of rubber material challenged the operability of the associated safety system train. The debris would have impacted only the 1A-SA RHR train. Based on Engineering analysis with vendor assistance, the larger pieces of rubber material could potentially have moved to the impeller of the 1A-SA RHRP if the plant was aligned to the containment recirculation sump on 1A-SA train side. This could occur following an accident that involved a loss of inventory in the Reactor Coolant System (RCS) and resulted in injection of the Refueling Water Storage Tank (RWST) inventory to the point where containment recirculation was required. The rubber material could potentially restrict flow through the suction of the RHRP so that at high flow demand conditions, the pump would not be able to develop rated head and flow. This could result in loss of pumping capacity at high flow demand conditions and could eventually result in pump failure. The RHRP would not be able to perform its design function under Large Break Loss of Coolant Accident (LBLOCA) conditions and would also be degraded and therefore inoperable for Small Break LOCA events. However, it was determined for Probabilistic Safety Analysis input by Engineering with pump vendor support, that the pump would reasonably be expected to pump at a degraded capacity. This amount of flow would help mitigate the consequences of some events such as a Small Break LOCA (SBLOCA). For the majority of time since plant construction the redundant train of equipment, 1B-SB RHR train and the other 1B-SB train Emergency Core Cooling System (ECCS) structures, systems, and components were operable or available.

The foreign material discovered during this investigation was collected and analyzed for impact on the plant systems and components. No actual plant impact occurred since the plant did not experience conditions that would have involved the foreign material. Operability of the 1A-SA RHRP was affected for an extended period of time since there was a potential for the foreign material to disable the pump during its designed recirculation phase function. The pump did not actually suffer any impact due to the presence of the foreign material in the suction lines. Since the operability of the 1A-SA RHRP cannot be assured during all phases of its designed operation, Harris Plant is reporting this event as a violation of the HNP Technical Specifications (TS) pursuant to the criteria of 10CFR50.73 (a)(2)(i)(B) and 10CFR50.73 (a)(2)(v). HNP TS 3/4 .5.2 requires at least one operable RHRP and the associated flow paths, including the ability to transfer suction to the containment sump during the recirculation phase of operation in Modes 1, 2, and 3. Similarly, in Mode 4, TS 3/4 .5.3 requires one operable RHRP and the same containment recirculation capability. Since there are times in the history of the plant when neither pump would have been operable when the B-SB train was intentionally out of service for testing or maintenance, TS 3.0.3 would have applied. In all cases, since the Harris Plant was not aware that the debris existed, no actions were taken to comply with the requirements of TS based on 1A-SA RHR train inoperability.

IV. CORRECTIVE ACTIONS

COMPLETED

1. Remove the foreign material discovered in the process of the 1SI-310 work.
2. Perform a visual inspection of RHR and CT suction piping.
3. Perform a visual inspection of the Containment Recirculation Sump piping.
4. Perform a visual inspection of the RWST.
5. Perform a visual inspection of CT discharge lines near Containment Isolations.
6. Perform a visual inspection of impeller eye of A RHRP.
7. Incorporate industry best practices into HNP FME Program (i.e. Procedure, Training, Barriers, Mgmt Oversight, and site culture). Already performed by AR 20874 (Site Wide Programmatic Deficiency in FME Controls). (Corrective Action to Prevent Recurrence).

V. SIMILAR EVENTS

Previous Operating Experience:

HNP LER 97-19-00 (Reported August 18, 1997)

This LER was generated due to a Turbine Trip/Reactor Trip event that occurred on July 20, 1997. The cause for this event was a three-phase fault that collapsed the excitation field in the main generator, resulting in a generator lockout. The investigation could not conclusively determine the reason for the electrical fault in the generator exciter. However, the most probable cause appeared to be entry of foreign material into the exciter housing that caused multiple shorts on the exciter diode wheel. This 1997 event resulted in corrective actions that included "strengthening" of the Foreign Material Exclusion Program with regards to the Generator Exciter. A revision to Maintenance procedure, PM-E0045 "Generator Exciter Cleaning, Inspection, and Testing" to specify closeout requirements for the Generator Exciter was a part of the corrective actions.

The changes associated with the corrective actions for this LER, and other improvements in the Foreign Materials Exclusion program at Harris Plant, are indicative of a stronger, more vigorous program today. The events that lead to the introduction of foreign material into the 1A-SA RHR train would have been prevented by the more aggressive FME program currently in effect at Harris.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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Figure 1