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R.B. Cowles, Lead Engineer, Technical	AREA CODE	
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On September 10, 1987 two isolations of the Cleanup System occurred during attempts to r pump to service following maintenance. At 1 isolation was initiated by an RWCU high diff signal. Investigation determined that two d discharge side of the "A" RWCU pump had been resulting in a high differential flow condit the pump. At 1339, another RWCU isolation o "A" RWCU pump mechanical seal failed due to water to the seal cavity cooler. This resul high temperatures in the RWCU pump room, and Detection System high room temperature signa isolation. The cause of this occurrence has a combination of factors, the most predomina errors committed while placing the pump back Corrective actions were primarily administra the Equipment Operator involved in the perso counseled with respect to the errors made.	Reactor estore ' 046, an erential rain val left op ion when ccurred lack of ted in l a Stean l initia been at te being in serv tive in nnel err	Water "A" RWCU RWCU I flow lves on the pen, h warming up when the cooling localized h Leak ated the ttributed to g personnel vice. nature, and cor was

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U.S. NUCLEAR REGULATORY COMMISSION APPROVED OME NO. 3150-0104

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# PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor (BWR/4) Reactor Water Cleanup System (EIIS Designation: CE) Pumps (EIIS Designation: P)

# IDENTIFICATION OF OCCURRENCE

Reactor Water Cleanup (RWCU) System Isolations (2) Following RWCU Pump Maintenance Due To Not Adhering To Procedures

Event Date: 09/10/87 Event Time: 1046 and 1339 This LER was initiated by Incident Report Nos. 87-139 & 87-140

#### CONDITIONS PRIOR TO OCCURRENCE

Plant in OPERATIONAL CONDITION 1 (Power Operation), Reactor Power 100%, Unit Load 1085 MWe.

## DESCRIPTION OF OCCURRENCE

On September 10, 1987 two RWCU isolations occurred during attempts to restore "A" RWCU pump to service following maintenance. At 1046, an RWCU isolation was initiated by an RWCU high differential flow signal. Investigation determined that two drain valves on the discharge side of "A" RWCU pump had been left open, resulting in a high differential flow condition when warming up the pump. The drain valves were closed, the isolation was reset, and both RWCU pumps were returned to service at 1210.

At 1339, another RWCU isolation occurred when the "A" RWCU pump mechanical seal failed. This resulted in localized high temperatures in the the RWCU pump room, and a Steam Leak Detection System high room temperature signal initiated the isolation. Subsequent investigation determined that the seal cooler cooling water supply valve was closed, and this caused the seal to fail. At 1558, the "A" pump was valved out and at 1632 the RWCU system was restored utilizing "B" RWCU pump.

# ANALYSIS OF OCCURRENCE

Refer to attachment 1, which is a one line diagram of the "A" RWCU pump piping and valve arrangement. On 9/7/87, the mechanical seal on "A" RWCU pump failed, and a safety tagging request was initiated in preparation for repairing the pump. The following valves were used as blocking points:

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ANALYSIS OF OCCURRENCE	CONT'D		
VALVE	<u># T2</u>	AGGED POSITIONED	
V003		CLOSED	
V004		CLOSED	
V006		CLOSED	
V024		OPEN	
0000		CLOSED	
V200		CLOSED	
V200 V147		the same of the same same	

Additionally, a note on the tagging request required draining the discharge line via V194 and V195, however, these valves were not used as blocking points.

The pump was repaired and ready to be returned to service on the morning of 9/10/87. In preparation for testing the pump following completion of repairs, a temporary release of the tagging request was authorized and accomplished. After removing the safety tags, the Equipment Operator began valve manipulations in preparation for warm-up of the pump utilizing the RWCU system operating procedure. Valves V003 and V004 were opened, and the EO was in the process of opening V006 when the control room informed him that an RWCU isolation had occurred. Subsequent investigation by the control room determined that an RWCU high differential flow signal had caused the isolation. The EO was instructed to check valve alignment, and at this time, discharge drain line valves V194 and V195 were discovered open. (The drain valves apparently had been left open after draining/flushing the line per the tagging request two days earlier.) After closing the drain valves, the RWCU isolation was reset, the pump was started to verify no seal leakage, and then stopped after a brief run.

At 1210, both RWCU pumps were placed in service. The pumps ran until 1339, when the mechanical seal on "A" RWCU pump failed again, resulting in the second RWCU isolation. An EO was dispatched to the pump and determined that the seal cooler cooling water inlet valve (V148) was closed. The lack of cooling water caused the seal to burn up. Although the seal cavity is provided with a high temperature alarm, the alarm was inoperable at the time of this occurrence due to a broken thermoccuple. A new thermocouple had been on order but had not been received prior to this incident. Since the RWCU system was needed to reduce Reactor water conductivity, a decision was made to return both RWCU pumps to service without the high temperature alarm being operable.

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	1.	Adequacy of the tag determined that the tagging request we lines. However, he points on the tagg re-positioned close	gging request was e blocking points re within station ad V194 and V195 b ing request, the v ed when the taggin	revi esta admi been valve ng re	ewe bli nis lis s w que	d, an shed trati ted a ould st wa	nd on ive as ha	it w gui bloc ve h rele	de kin een	- ng n ed.	
	2.	The EOs actions whe returning the pump properly perform ec Operations Departme procedure. Had a t mis-positioned value	en releasing the t to service were r quipment checks as ent Equipment Oper thorough check bee yes would have bee	aggi revie req ratio en pe en di	ng wed uir nal rfo sco	reque . Thed by Cont rmed, vered	est ne tro , t	EO d he he	l lid	not	5
	3.	The design of the considered. This of 90 degree ball value latching/locking de inadvertent operate	cooling water valu valve is a 1/2", i ve. The operating evice by its locat ion.	ve (V n-li nan ion	148 ne, dle is	) was "qui has susce	s ick no ept	thr	ow'	", D	
	4.	As previously noted was inoperable and time of these event pump would have bee	d, the broken seal a new thermocoupl ts. Had the alarm en stopped before	cav e wa bee the	ity s o n o sea	then n ord perak 1 bun	rmo ler ble	at , th d up	the	a	
	5.	A review of shift a the first valving e been a prudent deci the position of all be checked. Howeve request release con verification after	supervisory action error (drain valve ision by shift sup l valves associate er, it was felt th istituted a valve the first occurre	s wa s op ervi ed wi at b alig	s c en) sio th eca nme was	onduc , it n to the ' use t nt, a	vo re 'A" the a s	d. uld ques RWC tag epar	Aft hay U I gin ate	ter ve that pump ng	2

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# CONCLUSIONS

Several occurrences in the recent past at Hope Creek have dealt with mis-positioned components (switches, valves, etc.). As a result, Hope Creek is currently conducting an extensive analysis to determine methodologies which require improvement to prevent reoccurrence of this type of event.

This event had no potential impact on plant safety. Had RWCU been inoperable for a sufficient period of time to affect reactor water guality, shutdown of the reactor would have been required.

# CORRECTIVE ACTIONS

- 1. The Equipment Operator involved in restoring the "A" RWCU pump to service has been counselled with respect to the proper method of returning equipment to service. Emphasis was placed on the requirements of the Equipment Operational Control procedure.
- 2. Operations Department will conduct shift and regualification training on this sequence of events, emphasizing the missed opportunities discovered during the course of investigating this event. This training will be completed by 2/1/88.
- 3. Operations Department will review safety tagging procedures and equipment control procedures to ensure a consistent philosophy exists with regard to safety tagging of system vent and drain valves. This review will be complete by 3/31/88.
- 4. The Operations Department equipment control procedure has been been revised to ensure proper controls are excersied by personnel when returning equipment to service.
- 5. Systems Engineering will investigate the feasibility of modifying the RWCU pump cooling water skids to provide latching mechanisms for the valves to prevent inadvertent operation.

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NRC Form 386A (9-63)

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# CORRECTIVE ACTIONS, CONT'D

6. The broken seal cavity thermocouple was replaced. I&C department has evaluated stocking levels of spare RWCU thermocouples, and adjusted stocking levels to ensure an adequate supply of spare thermocouples are available.

Sincerely,

ToBruro 19th

S. LaBruna General Manager -Hope Creek Operations

RBC/ SORC Mtg. 87-171



NRC FORM 386A



Public Service Electric and Gas Company P.O. Box L. Hancocks Bridge, New Jersey 08038

Hope Creek Operations

November 24, 1987

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

Dear Sir:

HOPE CREEK GENERATING STATION DOCKET NO. 50-354 UNIT NO. 1 LICENSEE EVENT REPORT 87-040-01

This revised Licensee Event Report is being submitted to include additional corrective actions beyond those listed in the original report.

Sincere'y, S. LaBruna

General Manager-Hope Creek Operations

RBC/

Attachment SORC Mtg. 87-171

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The Energy People