



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, D. C. 20555

June 29, 1979

W. Kerr, Chairman  
Hatch Subcommittee

FAILURE OF BACKUP CORE COOLING SYSTEMS AT HATCH UNIT 2 BWR

Attached is a PNO (Attachment I) describing an event that occurred at E. I. Hatch Unit 2 which resulted in the failure of the reactor core isolation cooling (RCIC) and high pressure coolant injection (HPCI) systems following a low water level reactor scram. Core cooling was eventually established by use of the condensate system.

Of particular interest in this event was the system interaction failure mode of the HPCI system (see Attachment II). The steam supply valve to the HPCI turbine failed to open due to water leaking from the HPCI pump seal cooling water line and entering the valve oil control system. The water entered the oil system as a result of a closed drain valve beneath the HPCI pump which allowed the water to back up and enter the pump housing and drain to the oil system.

Additional investigation revealed that the drain valve was not included in any plant diagrams, nor was it known why it was even installed.

It was also noted that the turbine oil systems lack a water detection system and this may have generic implications.

Yesterday (June 28) I attended a meeting between the D. Ross Bulletins and Orders Task Force and representatives of BWR utilities. The above event was discussed and the utilities have been asked to address this item.

Given the above NRC action I recommend no ACRS action on this item at this time.

*Paul Boehmert*  
Paul Boehmert  
Reactor Engineer

Attachments: as stated

cc: ACRS Members  
ACRS Staff  
ACRS Fellows

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PDR FOIA  
UDELL82-261 PDR

PRELIMINARY NOTIFICATION

June 6, 1979

PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE -- PNO-79-139

This preliminary notification constitutes EARLY notice of an event of POSSIBLE safety or public interest significance. The information presented is as initially received without verification or evaluation and is basically all that is known by IE staff as of this date

FACILITY: Georgia Power Corporation  
Hatch, Unit No. 2  
Docket No. 50-366  
Baxley, Georgia

SUBJECT: FAILURE OF BACKUP CORE COOLING SYSTEMS

On June 3, one of two operating feedwater pumps tripped, causing a low water level reactor trip. The Reactor Core Isolation Cooling (RCIC) turbine started automatically as required but isolated due to a ruptured exhaust diaphragm. The licensee's investigation revealed an internal problem in the check valve on the turbine exhaust line, apparently causing a temporary flow blockage. The stud fastening the check valve disc to its operating arm had failed. Replacement valve internals are enroute to the site and the RCIC will be repaired prior to startup.

The High Pressure Coolant Injection (HPCI) pump was signalled to start automatically during this event but did not start because the steam supply valve to HPCI turbine did not open. The failure to open has been attributed to water in the oil control system. This problem is being corrected. The unit is expected to be restored to service in approximately two days.

There has been no media interest. Neither the licensee nor the NRC plan to issue a news release. The State of Georgia has been informed.

Region II (Atlanta) received notification of this occurrence by telecon from the Resident Inspector at 9:15 a.m. on June 4. This information is current as of 2:00 p.m. on June 5.

Contact: GKlingler, IE x28019 FNolan, IE x28019 SEBryan, IE x28019

Distribution: Transmitted H St <sup>12:35</sup> 10/35  
Chairman Hendrie  
Commissioner Kennedy  
Commissioner Gilinsky <sup>10:35</sup>  
Transmitted: MNBB <sup>10:35</sup>  
L. V. Gossick, EDO  
H. L. Ornstein, EDO  
J. J. Fouchard, PA  
N. M. Haller, MPA  
R. G. Ryan, OSP  
H. K. Shapar, ELD  
Commissioner Bradford  
Commissioner Ahearne  
ACRS  
P. Bldg <sup>11:30</sup>  
H. R. Denton, NRR  
R. C. DeYoung, NRR  
R. J. Mattson, NRR  
V. Stello, NRR  
R. S. Boyd, NRR  
SS Bldg <sup>11:40</sup>  
W. J. Dircks, NASS  
S. Levine, RES

S. J. Chilk, SECY  
C. C. Kammerer, CA  
(For Distribution)  
J. G. Davis, IE  
Region II <sup>40:40</sup>

(MAIL)  
J. J. Cummings, OIA  
R. Minogue, SD

PRELIMINARY NOTIFICATION

7910150801

USNRO REGION II  
ATLANTA, GEORGIA

RC TELEGRAM FORMAT

19 JUN 8 08:09

01 DEXLEY, GEORGIA 31513  
PMS MR. JAMES P. O'REILLY  
UNITED STATES NUCLEAR REGULATORY COMMISSION  
DIRECTOR OF INSPECTION AND ENFORCEMENT  
REGION II  
SUITE 3100  
101 MARILTA STREET  
ATLANTA, GEORGIA 30303

SUBJECT: HATCH UNIT 2, DOCKET NO. 50-356, NOTIFICATION OF REPORTABLE OCCURRENCE  
NO. 50-356/1979-45, Rev. 1

DATE: 6/7/79

NOTIFIED: Ross F. Rogers

DATE: 6/4/79  
TIME: 3:30 PM

DESCRIPTION OF REPORTABLE OCCURRENCE

Initial Condition:

During reactor power ascension, at 2387 mega watts thermal, a reactor scram occurred at 1850 CDT due to a condensate system trip. The reactor power level fell below 1000 counts per second.

Nature of Occurrence:

Due to the low level in the reactor at 1855 CDT, the HPCI System was required to initiate and pump water to the vessel. Although the HPCI received an initiation signal, it did not start because the turbine stop valve failed to open.

Immediate Corrective Action:

The HPCI was secured and the requirements of Technical Specifications 3.5.1 complied with. The vessel level was maintained by restoring the condensate system to operability.

Cause:

One of the HPCI pump mechanical seal cooling injection water lines was leaking at the threaded connection at the pump casing. This leak drained to the bracket drain cavity. The bracket drain cavity drain line had a valve installed for reasons presently unknown. This valve was closed thus allowing the leak to fill the bracket drain cavity to a point above the shaft. The adjacent bearing housing does not have a liquid tight seal by design (not required). This allowed water to enter the bearing housing from the flooded bracket drain cavity. This water then drained to the oil system. Had the bracket drain line valve not been closed the leak would not have affected the operation of the HPCI in any way. The bracket drain line valve was not listed in the system valve lineup procedure nor was it shown on the system P&ID.

PDR 7906190436

RO Telegram Cont'd  
June 7, 1979

Supplemental Corrective Action:

- a. The reactor was brought to the hot shutdown condition.
- b. The leaking seal injection line was repaired by replacing a section of the leaking line.
- c. The oil system was drained, flushed and refilled twice.
- d. An investigation of the oil system was made to determine if there were any other ways for water to enter the system. The oil cooler in the system was identified as being a possibility but pressure test proved the cooler to be good. No other possible water sources were identified.
- e. The turbine bearings were inspected for possible damage. The inspection revealed a "like new" condition.
- f. The valves in the bracket drain lines will be locked open prior to startup and a study initiated to determine if the valves could be removed from the lines. In the interim this valve has been added to the system valve lineup procedure.
- g. A study has been initiated to select a method whereby water in the oil systems of RCIC and HPCI turbines may be readily identified.
- h. Until the above study is completed the oil system on the HPCI turbine will be sampled on a weekly basis.
- i. A study has been initiated to determine if the seal injection lines need additional support to help prevent future leaks.

Status of Redundant or Backup Systems:

The RCIC failed to operate but the Automatic Depressurization System, Core Spray System and Low Pressure Coolant Injection System were operable.

Impact To Other Unit:

- a. A lack of a water detection in the turbine oil systems may be a problem with other steam-driven pumps.
- b. An investigation was made on Unit 2 RCIC system and Unit 1 HPCI and RCIC Systems to determine if the same valves exist in the cavity drain lines. The results are as follows:
  1. Unit 2 RCIC - No drain line. The cavity drain hold is open and will drip to the pump skid.  
Unit 1 HPCI - Drain line to floor drain with no valve installed.  
Unit 1 RCIC - No drain line. The cavity drain hole is open and will drip to the pump skid.

RO Telegram Cont'd  
June 7, 1979

Justification For Continued Operation:

The HPCI system oil was analyzed for water. No detectable moisture was present. The stop and control valves were cycled to insure proper operation. An operability test will be performed as soon as reactor conditions permit.

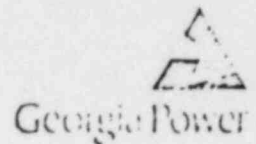
  
R. Henry  
Plant Manager





Edwin I. Hatch Nuclear Plant  
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Edwin I. Hatch Nuclear Plant



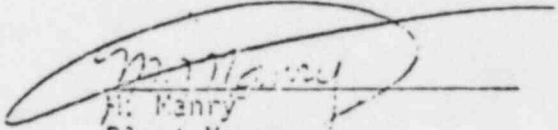
July 6, 1979  
PM-79-601

PLANT E. I. HATCH  
License Event Report  
Docket No. 50-366

United States Nuclear Regulatory Commission  
Office of Inspection and Enforcement  
Region II  
Suite 3100  
101 Marietta Street  
Atlanta, Georgia 30302

ATTENTION: Mr. James P. O'Reilly

Pursuant to section 6.9.1.8 of Hatch Unit 2 Technical Specifications,  
please find attached Reportable Occurrence Report No. 50-366/79-59.

  
H. Manry  
Plant Manager

TVG/peb

xc: W. A. Widner  
R. D. Baker  
Control Room  
File

7907180545



Georgia Power Company  
Plant E. I. Hatch  
Baxley, Georgia 31513

Event Description and Probable Consequences (continued)

There have not been any simultaneous system isolations previously on the subject RCIC and HPCI systems on either Unit 1 or Unit 2. There were no personnel injuries, overexposures, or any release of radioactive materials to the environment as a result of this occurrence.

Cause Description and Corrective Actions (continued)

Cause of RCIC isolation is not known at this time and is under investigation by both utility and NSSS supplier. Switch 2E41-N005 setpoint was within acceptable range; however, switch 4004 was out of calibration. HPCI switch 2E41-N004 was re-calibrated and returned to service. Opinion is that switch calibration may not be sole cause of HPCI isolation and is also under investigation. All switches involved are ITT Barton Model 288. Results of investigations and any followup testing will be reported in an updated LER.



Narrative Report  
for  
LER 50-366/1979-59, Rev. 0

On June 27, 1979, at 1220 CDT, the MSIV Fast Closure startup test was initiated for Hatch Unit 2. Initial reactor power was 97% (2365 MWt). Reactor scram resulted due to MSIV closures. RCIC and HPCI systems isolated on steam line high differential pressure after the reactor scram. Both systems were manually started by plant operators. RCIC system, after manual start, ran throughout the duration of the MSIV closure test. HPCI was started at 1238 CDT to raise water level and was shut down at 1239 CDT by plant operator.

Immediate corrective actions initiated by plant operations personnel were to manually start both RCIC and HPCI systems. Systems were successfully started manually. Redundant systems were available and capable of performing their intended functions. Test shop personnel were notified of the systems isolation and were instructed to check calibration of steam line high differential pressure switches 2E51-N017 and N018 (RCIC) and 2E41-N004 and N005 (HPCI).

Test shop personnel found the calibration of the RCIC switches to be within an acceptable range per procedure requirements. Cause of the RCIC system isolation on high dP is unknown at this time and is under investigation by both utility and the NSSS supplier.

Per the recommendation of the NSSS supplier, instrument piping for RCIC switches 2E51-N017 and N018 is being modified to correct piping geometry which could be a factor in the isolation of the system. The NRC resident inspector was informed on 7-4-79, at 1010 CDT of the instrument piping modification.

HPCI high steam line differential pressure switches N004 and N005 were checked for calibration. Switch 2E41-N005 was found to be acceptable; however, switch N004 was out of calibration. Switch 2E41-N004 was recalibrated and returned to service. Incorrect HPCI switch setpoint may not have been the cause of system isolation and will also be investigated. Upon completion of investigation of HPCI and RCIC isolation problem by utility and NSSS supplier, supplemental corrective actions will be taken and reported in an update to this LER.

At the time of the occurrence, Unit 1 was in a cold shutdown condition for maintenance, hanger modifications, and refueling. Results of the Unit 2 investigation and corrective actions will be considered for application to Unit 1 systems. Previous failures of HPCI and RCIC systems on Unit 1 and 2 will be re-evaluated.