SYSTEM ENERGY RESOURCES, INC.
A Middle South Utilities Company

WILLIAM T. COTTLE
Vice President
Nuclear Operations

June 7, 1989

U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D.C. 20555

Attention: Document Control Desk

Gentlemen:

SUBJECT: Grand Gulf Nuclear Station
Unit 1
Docket No. 50-416
License No. NPF-29
RWCU Isolation Due to Flow
Perturbations
LER 89-007-00
AECM-89/0107

Attached is Licensee Event Report (LER) 89-007-00 which is an interim report.

Yours truly,

WTC:mtc
Attachment

cc: Mr. T. H. Cloninger (w/a)
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NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

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TITLE (4)
RWCU Isolation Due to Flow Perturbations

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)
0 5	0 8	8 9	8 9	0 0 7	0 0	0 6	0 7	8 9	NA	0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
	2	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)	0 1 0 0	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
Ronald Byrd/Licensing Engineer	6 0 1 — 4 3 7 - 2 1 8 2

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
X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		0 1	1 2	9 0

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

On May 8, 1989 the Reactor Water Cleanup (RWCU) system isolated on a leak detection differential flow signal while shifting RWCU operation from the pre-pump to the post-pump mode at a reactor pressure of 27 psig. Operators checked instrumentation to ensure no actual leak had occurred and restored RWCU to service in the post-pump mode.

An evaluation of the RWCU system operation and design was performed. It was determined that a reactor pressure of 27 psig may not supply sufficient net positive suction head (NPSH) to facilitate switching RWCU operation to the post-pump mode. Additionally, erroneous flow indications may result when establishing or ceasing blowdown due to the valve lineup sequence in relation to the location of the flow element.

Operating Instructions have been changed to require shifting from pre-pump to post-pump modes, and vice-versa, at approximately 100 psig reactor pressure. Valve lineups have also been modified to prevent erroneous flow indications during future blowdown modes of operation. Additional design enhancements are being considered.

NRC Form 366A (9-83)

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

A. REPORTABLE OCCURRENCE

On May 8, 1989 the Reactor Water Cleanup (RWCU) system isolated on a leak detection differential flow signal while shifting RWCU operation from the pre-pump mode to the post-pump mode. The automatic isolation of the RWCU system containment isolation valves is reported as an ESF actuation pursuant to 10CFR50.73(a)(2)(iv).

B. INITIAL CONDITIONS

The plant was in mode 2, Startup, with a reactor pressure of 27 psig.

C. DESCRIPTION OF OCCURRENCE

On May 8, 1989, the plant was in a startup evolution. At 27 psig reactor pressure, operators began shifting RWCU (EIIS code:CE) operation from the pre-pump mode (pump discharge flow through the heat exchangers) to the post-pump mode (pump suction flow through the heat exchangers) when erratic differential flow indications and alarms were received. After the transfer was made and the alarms cleared, operators re-established RWCU blowdown to the main condenser. Differential flow indications on both "A" and "B" channels became erratic. At 0919, approximately five minutes after establishing blowdown flow, the delta flow delay timer alarm annunciated. The delta flow timer is set to time out at approximately 45 seconds. Operators attempted to clear the delta flow signal by securing the RWCU pump and closing the filter demineralizer bypass valve, 1G33-F044. The delta flow timer timed out and the RWCU system containment isolation valves automatically closed.

Operators checked instrumentation to ensure that no actual leak had occurred and restored RWCU to service in the post-pump mode.

D. APPARENT CAUSE

An evaluation of system operation and design revealed the following:

- The Integrated Operating Instruction requires shifting RWCU operation to the post-pump mode above 25 psig reactor pressure for thermal protection of the seals and additional Net Positive Suction Head (NPSH) (See LER 88-014). However, a review of this incident has revealed that a reactor pressure of 27 psig may not supply sufficient NPSH to eliminate flow perturbations while switching RWCU operation to the post-pump mode.

- Erroneous flow indications may result when establishing or ceasing blowdown to the condenser because of a vacuum in the blowdown line. This vacuum condition may cause an imbalance in the impulse lines to the flow transmitter.

- The RWCU leak detection flow transmitters are not temperature compensated and induce minor flow indication errors due to the temperature change between different reactor operating conditions.

E. SUPPLEMENTAL CORRECTIVE ACTIONS

Integrated Operating Instructions have been changed to require shifting from pre-pump to post-pump modes of operation (and vice-versa) at approximately 100 psig reactor pressure.

Additionally, System Operating Instruction 04-1-01-G33-1 was changed to modify the blowdown lineup such that the final condenser isolation valve to be opened is the last valve next to the condenser when establishing blowdown. When securing blowdown, this valve will be the first valve closed to ensure vacuum is not drawn on blowdown flow instrumentation. The lineup will prevent erroneous flow indications during future blowdown modes of operation.

SERI is also evaluating the feasibility of the following long term actions:

- a design change to move the existing flow element 1G33-N011 upstream of flow control valve 1G33-F033 to ensure more accurate flow indications.

- a design change to the differential flow circuitry to include a new timer for a 300 gpm delta flow trip to be set at 10-15 seconds and the present timer for the 79 gpm delta flow trip to be set at 5 minutes. The time delay extension for the lower delta flow setpoint would allow for perturbations to clear during RWCU evolutions. The short time delay for a higher leakage rate would ensure rapid isolation for more significant flow transients.

- the addition of differential flow indicators to the P680 Control Room panel. The indication is currently installed on a Control Room backpanel separated from the Main Control Room panel where system alignments are performed.

- enhancement of instrument venting procedures.

The result of these evaluations and actual changes to be implemented will be reported in an update to this report by January 12, 1990.

The magnitude of induced flow indication errors caused by reactor water temperature changes was evaluated and considered insignificant when compared to the effects of low NPSH and vacuum conditions in the blowdown line. Adjustments to compensate for temperature changes at this time are not warranted.

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F. SAFETY ASSESSMENT

There were no adverse safety consequences as a result of this event. Containment isolation valves responded as designed. No actual unidentified RWCU leakage was present.