NRC FORM 366 (7-77)

U. S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT

CONTROL BLOCK: (1) (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

Field	Value
01 Licensee Code (2)	SCHBR2
License Number (3)	00-00000-00
License Type (4)	41111
CAT (5)	
CON'T Report Source (6)	L
Docket Number (7)	0500261
Event Date (8)	081182
Report Date (9)	091582

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

02 On August 11, 1982, at 2305 hours during unit startup, double disc gate valve SI-861A
03 failed to open fully. The cause of failure was determined to be deformation of the
04 valve discs due to disc interspace overpressurization resulting from system heatup.
05 This event resulted in operation in a degraded mode permitted by a Limiting Condition
06 for Operation as defined by Technical Specification 3.3.1.3 which is reportable pur-
07 suant to 6.9.2.b.2. The redundant recirculation flow path was operable so there was
08 no threat to the public health and safety.

Field	Value
09 System Code (11)	SF
Cause Code (12)	B
Cause Subcode (13)	A
Component Code (14)	VALVEX
Comp. Subcode (15)	E
Valve Subcode (16)	D
(17) LER/RO Report Number — Event Year	82
Sequential Report No.	011
Occurrence Code	03
Report Type	L
Revision No.	0
Action Taken (18)	A
Future Action (19)	F
Effect on Plant (20)	C
Shutdown Method (21)	Z
Hours (22)	0000
Attachment Submitted (23)	Y
NPRD-4 Form Sub. (24)	N
Prime Comp. Supplier (25)	N
Component Manufacturer (26)	A391

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

10 Repair efforts included replacement of the valve discs and modification of the high
11 pressure disc to provide an interspace pressure relief path. SI-861A was declared
12 operable at 0700 hours on August 15, 1982. Additional corrective actions include
13 identification of all valves potentially subject to this failure mechanism and
14 procedure revisions to require valve cycling or operability check where applicable. All identified valves will be modified as plant conditions permit.

Field	Value
15 Facility Status (28)	C
% Power (29)	000
Other Status (30)	N/A
Method of Discovery (31)	B
Discovery Description (32)	PERIODIC TEST
16 Activity Released (33)	Z
Content of Release (34)	Z
Amount of Activity (35)	N/A
Location of Release (36)	N/A
17 Personnel Exposures Number (37)	000
Type (38)	Z
Description (39)	N/A
18 Personnel Injuries Number (40)	000
Description (41)	N/A
19 Loss of or Damage to Facility Type (42)	Z
Description (43)	N/A
20 Publicity Issued (44)	N
Description (45)	N/A

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NRC USE ONLY

NAME OF PREPARER: Howard T. Cox

PHONE: (803) 383-4524

GPO 917-926

SUPPLEMENTAL INFORMATION

LER-82-011

I. Cause Description and Analysis

On August 11, 1982, at 2305 hours during the performance of Periodic Test PT-2.8B, valve SI-861A ("A" Residual Heat Removal Pump Suction Isolation Valve from Containment Sump) failed to open fully. The unit was critical and preparing to startup when this event occurred. The valve was closed satisfactorily, declared inoperable, and an investigation was initiated. A subsequent reactor trip, due to an unrelated feedwater valve problem, placed the unit in hot shutdown conditions at 0300 hours on August 12, 1982.

Examination of SI-861A revealed that the valve operator had torqued out and tripped at approximately one-half of the valve stem travel. The valve operator was determined to be in satisfactory operating condition. Upon examination of the SI-861A internals, it was discovered that both discs of this double disc gate valve were bowed outward at their centers which prevented the valve from opening more than halfway. It was determined that the bowed condition of the valve discs was due to internal valve overpressurization. When the unit was at cold shutdown conditions for the 1982 refueling outage, valve SI-861A was cycled during the performance of normal periodic testing. As a result, cold water was apparently trapped in the interspace between the valve discs. With unit heatup, following the outage, the RHR system was heated to approximately 350°F which also resulted in heating the water trapped in the valve disc interspace. Since there was no relief path for this water, the pressure in the valve disc interspace apparently increased until it resulted in plastic deformation of the discs. It is also believed at this time that a contributing factor to the occurrence of this event is the fact that the valve was repacked during the refueling outage. Although this repacking, as examined by a representative of the valve vendor, was adequate in all respects, it resulted in no valve stem leakage which could have provided an interspace pressure relief path. Valve stem leakage in the past is considered the reason interspace overpressurization has not occurred until now, nor has it occurred in other similar valves as indicated by repeated successful operability checks.

This event resulted in operation in a degraded mode permitted by a Limiting Condition for Operation as defined by Technical Specification 3.3.1.3 which is reportable pursuant to 6.9.2.b.2. The redundant recirculation flow path was operable so there was no threat to the public health and safety.

II. Corrective Action

Upon examination of the valve and valve internals, it was determined that repair efforts could potentially require more time than the amount allowed by the Technical Specification Limiting Condition for Operation. A request for extended maintenance was made on August 13, 1982 to the NRC Region II on the basis that the unit was in a safe condition at hot shutdown and the Limiting Condition for Operation would require that the unit be placed in cold shutdown which would necessitate the use of the RHR system that was under repair. The request was subsequently approved on August 13, 1982.

A modification was developed for the repair of SI-861A which included replacement of the valve discs and drilling a 3/16 inch hole in the high pressure side (RHR pump side) of the valve disc. This action, which was recommended by the NSSS vendor, will ensure a pressure relief path for the valve disc interspace and will prevent disc deformation from overpressurization. The modification/repair work was completed and SI-861A was declared operable at 0700 hours on August 15, 1982.

III. Corrective Action to Prevent Recurrence

Further investigations were made into the susceptibility of other double disc gate valves to this failure mechanism. It was identified that an internal NSSS vendor study was performed in 1970 to determine which valves were susceptible to disc warpage (Table 1) and what modifications would prevent the failures from occurring. Additional NSSS vendor documentation indicates that three (3) of the valves (SI-862B, RHR-750, CVC-350), most susceptible to this problem, were modified in 1970 by drilling a pressure relief hole in the appropriate valve disc. SI-861A was not one of the valves modified, and there is no documentation on the remaining eleven (11) valves to indicate if they were modified. Of the valves for which modifications must still be performed, SI-860A, SI-860B, SI-865C and SI-861B will be modified during the next refueling outage. Any modifications on the remaining valves will require the entire RHR system be taken out of service, which requires that the reactor core be totally off-loaded. Current plans are to modify these valves during the next full core off-load which is currently scheduled for the steam generator replacement outage.

In the interim, the operability of valves SI-861B, SI-863A, SI-863B, SI-891C and SI-891D have been verified by completion of a Special Procedure, and SI-860A and SI-860B were verified operable by Periodic Test PT-2.8C. RHR valves RHR-759A and RHR-759B are required to be open during power operation and, therefore, are verified operable during startup. In addition, a Standing Order Operating Note which requires that SI-861B be cycled every time the RHR system temperature increases more than 50°F has been approved. The NSSS vendor has

stated that, since SI-861A and SI-862B have been drilled and normally remain closed, it is not necessary to cycle the SI-860A and SI-862A valves since they are not subjected to the full convective heat cycling of the RHR system. Therefore, SI-860A and SI-862A are not included in any special operability testing. Revisions to the Plant Operating Manual are currently being made which include the fourteen valves on Table 1 except those previously modified and SI-860A and SI-862A. These revisions will function as the long term administrative controls to minimize the chances of valve damage and to verify valve operability until the final modifications can be performed.

TABLE I

Valve Number	Description	Modification Date
SI-860A	"A" RHR Pump Suction from Containment Sump	- -
SI-860B	"B" RHR Pump Suction from Containment Sump	- -
SI-861A	"A" RHR Pump Suction from Containment Sump	1982
SI-861B	"B" RHR Pump Suction from Containment Sump	- -
SI-862A	Refueling Water Storage Tank to RHR Pump Suction	- -
SI-862B	Refueling Water Storage Tank to RHR Pump Suction	1970
SI-863A	"A" RHR Heat Exchanger Discharge to SI and Containment Spray Pumps Suction	- -
SI-863B	"B" RHR Heat Exchanger Discharge to SI and Containment Spray Pumps Suction	- -
SI-865C	"C" Accumulator Isolation	- -
SI-891C	"A" RHR Heat Exchanger Discharge to "B" and "C" SI Pumps	- -
SI-891D	"B" RHR Heat Exchanger Discharge to "B" and "C" SI Pumps	- -
RHR-750	RCS Loop 2 Hot Leg to RHR System	1970
RHR-759A	"A" RHR Heat Exchanger Discharge	- -
RHR-759B	"B" RHR Heat Exchanger Discharge	- -
CVC-350	Boric Acid to Charging Pumps Suction	1970