NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Dresden Nuclear Power Station, Unit 2	05000237	1 of 6

TITLE (4)
Unit 2 Reactor Scram While Shutdown from Scram Discharge Instrument Volume Level HI-HI Due to Valve Failure As a Result of Inter-Granular Stress Corrosion Cracking

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 NAME	DOCKET NUMBER
									N/A	
03	11	98	98	006	00	04	10	98	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more) (11)							
			20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
POWER LEVEL (10)	000		20.2203(a)(2)(i)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
			20.405(a)(1)(ii)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
			20.2203(a)(2)(ii)		20.2203(a)(4)	X	50.73(a)(2)(iv)		OTHER
			20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Richard W. Burns (Operations Staff) ext.: 3294	(815) 942-2920

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
B	AA	ISV	H037	Y					

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MONTH	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 March 11, 1998 at approximately 2316 with Unit 2 in Mode 5, an automatic scram signal was received due to a Scram Discharge Volume HI-HI level condition. Prior to the time of the Scram signal, the Reactor was shutdown with all Control Rods fully inserted into the core. The safety significance of this occurrence was considered to be minimal.

Approximately 3 hours prior to the Scram, Operations had isolated the Scram Discharge Volume by closing the system air operated vent and drain isolation valves to support refueling outage maintenance activities. An investigation determined that leakage past the 2-0305-102 valves for hydraulic control units 46-43 and 46-27 resulted in the water level slowly increasing in the Scram Discharge Volume, causing the subsequent reactor Scram. An ENS notification was made in accordance with regulatory requirements.

The cause of this event was determined to be equipment failure which resulted in leakage past the 2-0305-102 valves for two Control Rod Drives. The root cause of the valve failures is inter-granular stress corrosion cracking of the valve seat insert. The leaking valves were replaced. Additionally, the Operations Department will review this event and revise the current contingency planning methodology to incorporate direction for Out Of Services on the Control Rod Drive System.

PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2527 MWt rated core thermal power

Energy Industry Identification System (EIIS) Codes are identified in the text as [XX] and are obtained from IEEE Standard 805-1984, IEEE Recommended Practice for System Identification in Nuclear Power Plants and Related Facilities.

EVENT IDENTIFICATION:

Unit 2 Reactor Scram While Shutdown from Scram Discharge Instrument Volume Level HI-HI, caused by leaks in two 2-0305-102 valves (HCU WITHDRAW VLV).

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2	Event Date: March 11, 1998	Event Time: 2316 CST
Reactor Mode: 5	Mode Name: Refueling	Power Level: 0

Unit 2 was in a refueling condition with all control rods fully inserted. All Unit 2 Control Rod Drives[AA] were out of service with their accumulator water pressure discharged, and the Control Rod Drive pumps were secured. Activities in progress included preparation for fuel off-load. No other systems or components were inoperable at the start of this event that contributed to the event.

B. DESCRIPTION OF EVENT:

This LER is being submitted pursuant to 10 CFR 50.73(a)(2)(iv), which requires the reporting of any event or condition that results in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection system (RPS).

On March 11, 1998, at approximately 2010, Operations completed placement of an Out Of Service (OOS) which included manual isolation of the air supply to the air operated Scram Discharge Volume vent and drain valves. The OOS was authorized to support maintenance activities, which included: replacement of various valves in the Control Rod Drive System, work on the Scram Discharge Instrument Volume, and repair of minor pre-identified air leaks on the Scram Discharge Header. Prior to placement of the OOS, Operations had verified that no scheduled activities were in progress which had the ability to provide an input into the Scram Discharge Volume, Scram Instrument Volume or its associated system piping. As a result of placement of the OOS, air pressure downstream of the Scram Air Header isolation valve began to decrease, as expected, causing the closure of the Scram Discharge Instrument Volume vent and drain from loss of air pressure to maintain the vent and drain valves open. This closure of the associated vent and drain valves was a planned evolution and was successfully performed in this manner during the previous D3R14 refueling outage without incident.

At approximately 2306 (3 hours after placement of the OOS), the Control Room received an alarm (902-5 E-1, Scram Discharge Instrument Volume Not Drained), indicating rising level within the Scram Discharge Instrument Volume. After receiving the alarm, the Nuclear Station Operator (NSO) (Licensed Reactor Operator) reviewed the associated Dresden Operating Annuciator Procedure (DAN) 902-5-E-1.

The Unit Supervisor (Licensed Senior Reactor Operator) and NSO discussed their concerns of the increasing level. Based on the discussion, Operations personnel recognized that, if not corrected, the Unit would eventually achieve a full scram from Scram Discharge Instrument Volume HI-HI Level.

There are three alarms / automatic actions associated with the Scram Discharge Instrument Volume (SIV):

- SIV Volume Not Drained - Indication of rising level within the SIV causing no automatic action,
- SIV HI Level - Indication of level above the "Not Drained" alarm, and generates a Control Rod withdrawal Rod Block in the Reactor Manual Control System, and
- SIV HI-HI Level - Generates an alarm, in addition to generating a full trip of RPS logic. The function of the SIV HI-HI Level RPS trip is to cause the full insertion of all Control Rods while adequate free volume is available within the SIV to receive water exhausted from the Control Rod over-piston during insertion. (Figure 1, CRD Hydraulic Control Unit Piping Configuration)

Recognizing the potential for a reactor scram from increasing SIV level, the Unit Supervisor contacted the Shift Manager, Operations Outage Manager and the Work Execution Center (WEC) Supervisor for their support. The Operations Outage Manager promptly exited the Outage Control Center and proceeded to the Control Room to help resolve the event in progress. At approximately 2313, a second alarm was received in the Control Room, 902-5 C-1, "SDV Hi Level Rod Block". The Operating Team discussed temporarily clearing the OOS on the air supply to the SDV vents and drains, but based upon the rate of level increase concluded that adequate time did not exist to complete the evolution before the scram signal would be received.

Based on discussions, the Operating Team concluded that the best course of action would be to prepare for the scram signal. The NSO reviewed Dresden General Procedure (DGP) 2-3, Reactor Scram, in preparation for the expected scram.

At approximately 2316, the reactor scram and associated "Scram Discharge Instrument Volume Level HI-HI" alarms were received in the Control Room and the plant responded as designed. The NSO performed the required actions per DGP 02-03, and an ENS call promptly made. A Prompt Investigation was initiated by the Operating Team to ensure that there were no activities in progress that had caused the level input. Upon completion of the initial investigation, the Operating Team concluded that the only available water source could be valve leakage from one or more HCU valves. The Out Of Service (OOS) was temporary cleared, the lines drained, and the scram reset.

During troubleshooting, it was discovered there was leakage through the 2-0305-102 valves (HCU WITHDRAW VLV) for Control Rod Drives 46-43 and 46-27. This leakage was identified by the System Engineer using a local, hand-held temperature indicator. This indicator was used on all suspected valves until the two in question (46-43 & 46-27, 2-0305-102 valves) were found to have a high temperature indication as a result of leakage. Action Requests were immediately prepared and the failed valves were replaced.

C. CAUSE OF EVENT:

The cause of this event is the failure of the valves' seat insert (NRC Cause Code B). The failure of the seat insert of the valves prevented full isolation; thereby allowing leakage past the seat of the 2-0305-102 valves on Control Rod Drive 46-27 and 46-43. The leakage filled the SIV to the HI-HI level resulting in the reactor scram.

The failed valves were evaluated to determine the failure mechanism. Based on the evaluation, it was determined that the root cause of the equipment failure is inter-granular stress corrosion cracking of the seat insert.

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

The seat insert cracking issue has been addressed in GE SIL 419 Revision 1. During manufacturing, the seat inserts of the valves are cold-rolled which introduces a localized stress point. A combination of the stress and the hardness of the seat insert material results in axial and circumferential cracking of the seat inserts. As documented in the SIL, these valve failures were limited to HCUs for BWR 2, 3, and 4s.

D. SAFETY ANALYSIS:

Prior to the time of the event, all control rods were fully inserted and the shutdown margin met. Based upon these initial conditions, the reactor would have remained shutdown during all postulated reactor conditions. Additionally, the identified source of SDV in-leakage (2-0305-102 valves) does not create a new, unanalyzed leakage path as water leaking beyond this point would remain within the SDV isolation boundary. Lastly, the valve leakage condition did not prevent nor degrade fulfillment of the system basic function to fully insert its associated control rod upon receipt of a reactor scram signal.

The scram discharge volume level switch arrangement actuates to indicate that the volume is not completely empty during post-scram or to indicate that the volume starts to fill through leakage accumulation at other times during reactor operation. The control rod withdraw block level switch actuates upon accumulation of water within the scram instrument volume. Additional switches are interconnected with the trip channels of the Reactor Protection system (RPS) to initiate a reactor scram while adequate volume still exists for exhaust water from HCU, ensuring full insertion of all control rods. Based on these items, the safety significance of the leakage past the 2-0305-102 valves was considered to be minimal. The system worked as designed and no adverse safety concerns to the facility or personnel existed.

Although each CRD has the subject valves associated with it, it is unlikely that seat insert failure of the 102 valves would prevent the associated rod from scramming to fulfill its intended safety function. Therefore, the health and safety of the public would not be compromised as a result of the described condition.

E. CORRECTIVE ACTIONS:

1. The System Engineer promptly investigated for possible leaks using a hand-held temperature indicator. The System Engineer checked each control rod drive for leaks and identified Control Rod Drives 46-43 and 46-27 had increased temperatures downstream of the isolation valves. (Complete)

2. The Operating Team performed a temporary lift of the Out Of Service (#980000415), closed the affected 2-0305-112 , HCU 46-43 SCRAM DISCH VLV and 2-0305-112 HCU 46-27 SCRAM DISCH VLV, to isolate the leakage path and opened manual drain valves on the Scram Discharge Instrument Volume to prevent any further scrams. (Complete)

3. The failed valves were replaced. (Complete)

4. The Operations Department will review this event and revise the current contingency planning methodology to incorporate direction for Out Of Services on the Control Rod Drive System. (237-180-98-00601)

Due to previous valve seat insert failures, Dresden Station is currently replacing the effected valves in the Control Rod Drive system which experience seat insert cracking due to IGSCC as the failures are identified.

F. PREVIOUS OCCURRENCES:

The described failures were the subject of GE SIL 419 Revision 1. The valves have been limited to BWR 2, 3, and 4s. Dresden has previously experienced the failure of the these valves (initially in January and March 1995). Based on evaluation of the failures, our current approach is to replace these valves when failure occurs. Our previous corrective action would not have prevented this occurrence.

G. COMPONENT FAILURE DATA:

Manufacture	Nomenclature	Model Number	Mfg. Part Number
Hancock	HCU Isol. Valve	N/A	950W

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

FIGURE 1
CRD HYDRAULIC CONTROL UNIT PIPING CONFIGURATION