Commonwealth Edison Company
Dresden Generating Station
6500 North Dresden Road
Morris, IL 60450
Tel 815-942-2920

ComEd

October 4, 1996

JSPLTR #96-0176

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Enclosed is Licensee Event Report 96-014, Docket 50-237 which is being submitted pursuant to 10 CFR 50.73(a)(2)(iv), which requires the reporting of any event or condition which results in manual or automatic actuation of any Engineered Safety Feature (ESF).

This correspondence does not contain any regulatory commitments.

If you have any questions, please contact Pete Holland, Dresden Regulatory Assurance Supervisor at (815) 942-2920 extension, 2714.

Sincerely,

J. Stephen Perry
Site Vice President
Dresden Station

Enclosure

cc: A. Bill Beach, Regional Administrator, Region III
NRC Resident Inspector's Office
Illinois Department of Nuclear Safety

110005

NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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 5

TITLE (4)
Control Rod Scrammed During Half Scram Periodic Surveillance Testing Due To Foreign Material in Scram Solenoid Pilot Valve

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
09	09	96	96	-- 014 --	00	10	04	96	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N
POWER LEVEL (10)	084

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.2201(b)		20.2203(a)(3)(i)		50.73(a)(2)(iii)	73.71(b)
	20.2203(a)(1)		20.2203(a)(3)(ii)	X	50.73(a)(2)(iv)	73.71(c)
	20.2203(a)(2)(i)		20.2203(a)(4)		50.73(a)(2)(v)	OTHER
	20.2203(a)(2)(ii)		50.36(c)(1)		50.73(a)(2)(vii)	(Specify in Abstract below and in Text, NRC Form 366A)
	20.2203(a)(2)(iii)		50.36(c)(2)		50.73(a)(2)(viii)(A)	
	20.2203(a)(2)(iv)		50.73(a)(2)(i)		50.73(a)(2)(vii	
	20.2203(a)(2)(v)		50.73(a)(2)(ii)		50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
P. M. Chenell, System Manager Ext. 2363	(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

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 September 9, 1996 while performing periodic planned maintenance in accordance with Dresden Operating Surveillance 1700-01, "Main Steam Line Radiation Monitor Scram and Isolation Channel Function Test", Control Rod J-13 scrammed from position 48 to position 00. Hydraulic Control Unit (HCU) J-13 was disarmed administratively and trouble shooting determined that the Scram Solenoid Pilot Valves (SSPVs) for CRD J-13 were malfunctioning. Disassembly of the HCU SSPVs identified a piece of foreign material inside the pilot head assembly of the top (V118) SSPV. The foreign material was analyzed by an offsite laboratory and it's chemical makeup was determined. The material was a polyacrylate resin and was not teflon tape. The origin of the material could not be accurately determined. A new set of SSPVs were installed on Hydraulic Control Unit (HCU) J-13. Component testing and scram time testing were performed with satisfactory results. Review of HCU performance has determined that there is no evidence of additional foreign materiel contamination in the system. The safety significance of this event was considered minimal.

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 Recommendation Practice for System Identification in Nuclear Power Plants and Related Facilities.

EVENT IDENTIFICATION:

Control rod scrammed during half scram periodic surveillance testing due to foreign material in scram solenoid pilot valve

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2 Event Date: 09/09/96 Event Time: 0410

Reactor Mode: N Mode Name: N Power Level: 084

Reactor Coolant System Pressure: 974 psig

At the time of the event the Instrument Maintenance Department was performing planned periodic surveillance testing in accordance with Dresden Operating Surveillance (DOS) 1700-01, "Main Steam Line Radiation Monitor Scram and Isolation Channel Function Test.

B. DESCRIPTION OF EVENT:

This report is submitted in accordance with 10CFR73(a)(2)(iv) which requires the reporting of any event or condition which results in manual or automatic actuation of any Engineered Safety Feature (ESF). On September 9, 1996 at 0410 (CDT) control rod J-13 scrammed from position 48 to position 00 during half scram testing. Initial notification of the event was performed pursuant to 10CFR72(b)(2)(ii) at 0547 (EDT) on September 9, 1996 through Emergency Notification System (ENS) number 30984.

On September 9, 1996 the Instrument Maintenance Department was performing periodic planned surveillance testing in accordance with DOS 1700-01, "Main Steam Line Radiation Monitor Scram and Isolation Channel Function Test". At 0410:00 the main steam line radiation monitor channel 'A' was ranged to the high-high trip level causing RPS channel 'A' to trip. This resulted in a Reactor Protective System (RPS) half scram on RPS channel A. At 0410:19 Control Rod J-13 scrammed from position 48 to position 00. At 0411:18 the half scram on channel 'A' was reset from the control room. At 0800 Hydraulic Control Unit (HCU) J-13 was disarmed through Dresden Administrative Procedure (DAP) 03-05, "Out-Of-Service Program". Troubleshooting of the HCU Scram Solenoid Pilot Valves (SSPV) was then performed by WR 960083612-01. The results indicated that SSPV 2-305-34-51-117 and 2-305-34-51-118 were performing improperly.

On September 10, 1996 at 0315 SSPV 2-305-34-51-117 and 2-305-34-51-118 were replaced (WR 960083612-03) with new valves. At 0600 post maintenance testing of the new SSPV valves was completed satisfactorily on HCU J-13 per DEP 0300-16, Rebuilding The Unit 2/3 ASCO Scram Pilot Solenoid Valves". At 2000 CRD J-13 was satisfactorily scram time tested per DTS 0300-12, "Control Rod Drive Scram Testing At Power". At 2014 control rod J-13 was returned to service at position 48. The unit returned to normal operation at 638 MWe.

On September 10, 1996 at 0730 the SSPVs which were operating improperly were disassembled for inspection. A white substance was found in the pilot head of the upper SSPV, 2-305-34-51-118. This valve is powered by RPS channel 'B'. The amount of materiel was such that if it became lodged in the SSPV seat area it would not allow the SSPV to properly seal. The foreign material was sent offsite to the ComEd System Materials Analysis Department (SMAD) for chemical analysis.

The foreign material was analyzed by an offsite laboratory. The foreign material was approximately 1.5 millimeters in diameter and weighed approximately 9 milligrams. The material was analyzed using Fourier Transform Infrared (FTIR) microscopy, a Scanning Electro Microscope (SEM) equipped with an x-ray analyzer, and a Thermogravimetric Analyzer (TGA). The results indicated that the material was a polyacrylate resin which has a variety of applications including coatings, adhesives, and elastomers. The origin of the sample could not be determined and further analysis could not be performed due to the small size of the sample. The material was determined to not be teflon tape.

CRD J-13 scrammed as a result of the following sequence of events. RPS channel 'A' was tripped per the DOS, thereby deenergizing the V117 SSPV. The foreign material in the V118 SSPV pilot head assembly caused partial sealing of the pilot valve vent path. When the RPS half scram was initiated on channel 'A' the channel 'B' pilot vent path needed to remain sealed to ensure control rod J-13 did not scram. With the channel 'B' pilot head partially blocked open by the foreign materiel the pressurized side of the SSPV exhaust diaphragm depressurized, and caused the exhaust diaphragm to reposition to the exhaust (vent) position. This allowed air to rapidly vent from the top of both scram valves, causing both scram valves to open. With both scram valves open, a hydraulic signal was sent to control rod J-13 causing it to scram to position 00. Position 00 is the rod's fail safe and safety related position.

The station determined that there was no wide spread foreign material contamination in the HCU SSPVs. The Safety Evaluation of this LER provides discussion to support this conclusion.

The station evaluated the need to perform disassembly and inspections of SSPVs for foreign materiel. The inspection procedure for SSPVs involves numerous opportunities for introduction of new valve failure modes. The pursuit of additional disassembly and inspection was determined to not be prudent based on this single failure of V118 during testing. This type of failure caused the rod to fail in a conservative manner, fully insert. Upon additional SSPV failures it would be standard practice for the station to initiate a disassembly and inspection of a sample population of the installed valves. CRD SSPV performance will continue to be monitored by scheduled weekly half scram surveillances and measurement of core average scram times as required by Technical Specifications.

C. CAUSE OF EVENT:

The cause of this event was a Management Deficiency (NRC Cause Code E) in that the station Foreign Material Exclusion Program was ineffective in preventing an unknown foreign substance from entering into the pilot head assembly of Valve 2-305-34-51-118, Scram Solenoid Pilot Valve.

D. SAFETY ANALYSIS:

The safety significance of CRD J-13 scramming while at a power level of 660 MWe (2083 MWt) was minimal. The thermal limits at the time J-13 was inserted were well below 0.800, therefore the upper limit of 1.000 was not challenged. Additionally, the fuel conditioning limits were not challenged as the four fuel assemblies surrounding J-13 containing liner fuel which is resistant to pellet cladding interaction.

The station has determined that there is no wide spread foreign material contamination in the HCU SSPVs. The following supports this conclusion:

Performance of full core scram testing provides evidence that the SSPVs are operating successfully.

Successful post maintenance testing was performed after replacement of all 354 SSPVs in September of 1995 and after replacement of SSPV exhaust diaphragms in February and August of 1996. This post maintenance testing included separate testing of each SSPV to verify correct seating of the solenoid valve and also tested them together to simulate full core scram signal conditions.

Each of the 177 sets of SSPVs have been tested multiple times by weekly scheduled half scram testing since their installation in September 1995, and no other failures have occurred.

Industry experience of cases where known foreign material contamination has occurred in the scram air header and various SSPVs, has shown that such a condition causes the core average 5% scram times to degrade (the scram times increase). The Dresden's Unit 2 5% core average scram times are currently the best (lowest) that they have been in over 5 years.

The safety significance of this event was therefore minimal.

E. CORRECTIVE ACTIONS:

1. A new set of SSPVs were installed on Hydraulic Control Unit (HCU) J-13. Component testing in accordance with DEP 0300-16 and scram time testing in accordance with DTS 0300-12 were performed with satisfactory results.

2. The foreign material was analyzed by an offsite laboratory. It's chemical makeup was determined. The origin of the material could not be accurately determined. The material was not teflon tape.

3. The station evaluated the need to perform disassembly and inspections of SSPVs for foreign materiel. Since this was an isolated occurrence it was determined that additional inspections were not warranted. As discussed in Section D, SAFETY ANALYSIS, it was concluded that wide spread foreign material contamination of the HCU SPPVs did not exist. Should additional failures occur this will be reevaluated.

4. CRD SSPV performance is monitored by scheduled weekly half scram surveillances and measurement of core average scram times as required by Technical Specifications.

F. PREVIOUS OCCURRENCES:

The station has recently evaluated it's Foreign Materiel Exclusion (FME) control program due to several non-reportable events related to inadequate FME controls. Enhancements to the FME program are in progress. No reportable events due to inadequate FME have occurred within the last two years. However the following 1993 LER did concern inadequate station FME practices.

LER/Docket Number	Title
93-007/050000249	Reactor Scram on reactor high pressure caused by blockage of the high pressure section of the main turbine. The reactor scram was caused by a wrench which was left in the high pressure turbine casing during turbine overhaul activities. Corrective actions included enhancements to the Foreign Materiel control program.

G. COMPONENT FAILURE DATA:

Manufacturer	Model Number	MFG Part Number
GE Nuclear Energy	HVA-266000-2J	107E6022P001