

LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1) Dresden Nuclear Power Station, Unit 2	Docket Number (2) 0 5 10 10 10 12 13 17	Page (3) 1 of 0 7
--	--	----------------------

Title (4) Leak Rate Limits Exceeded in Drywell Head Seal and MSIV 2-203-1D Tests  
Due to Misalignment and Seat Wear

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)
1	0	3	0	8	8	8	8	8	N/A	0 5 10 10 10
1	0	3	0	8	8	1	1	2	N/A	0 5 10 10 10

OPERATING MODE (9) N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)					
POWER LEVEL (10) 0 0 0	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 20.405(a)(1)(ii)	<input checked="" type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 20.405(a)(1)(v)
	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(iii)
	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 73.71(b)	<input type="checkbox"/> 73.71(c)	Other (Specify in Abstract below and in Text)			

LICENSEE CONTACT FOR THIS LER (12)	
Name Richard H. Johnson, Plant Performance Monitoring Group Leader	TELEPHONE NUMBER AREA CODE: 8 1 5 9 4 2   -   2 9 12 10

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS
X	N   H	V   S   L	C   3   1   0	Y						
X	S   B	I   S   V	C   6   6   5	Y						

SUPPLEMENTAL REPORT EXPECTED (14)			Expected Submission Date (15)	Month	Day	Year
X Yes (If yes, complete EXPECTED SUBMISSION DATE)			NO	0	6	0 13 8 19

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

On October 30, 1988, at 1935 hours, with Unit 2 in a refueling outage during the performance of Dresden Technical Staff Surveillance Procedure (DTS) 1600-15, Local Leak Rate Testing of Double Gasketed Seals, the drywell head seal was discovered to have an "as found" leak rate of 491.37 standard cubic feet per hour (scfh). This resulted in a total "as found" leak rate, using the maximum pathway method for Type B and C local leak rate testing, of 623.917 scfh, which exceeds the Technical Specification (TS) 3.7.A.2.b.(2)(a) limit of 493.116 scfh. Subsequently, on November 3, 1988, inboard Main Steam Isolation Valve (MSIV) 2-203-1D was determined to have a through leakage of 12.99 scfh. This exceeded the TS 3.7.A.2.b limit of 11.5 scfh for any individual MSIV. The cause of the excessive drywell head seal leakage has been attributed to improper seating of the outer gasket due to an installation procedure deficiency. The MSIV leakage has been attributed to seating surface wear. The drywell head will be installed and retested prior to unit startup; MSIV 2-203-1D will also be repaired and tested. A supplement to this report will then be submitted to provide the retest results and the final Type B and C leak rate test results. This supplement will also contain a tabulation of all the testable penetration maximum and minimum pathway leakages. The safety significance of this event was minimal since the drywell head was properly seated on the full circumference of the inner gasket and redundant outboard MSIV 2-203-2D was verified to comply with the 11.5 scfh limit; therefore, the "through" leakage (representing actual containment leakage) was judged to have been minimal. A previous occurrence of exceeding the leak rate limit is outlined in Licensee Event Report #88-004 on Docket #050249.

BB12060031 881129  
PDR ADDCK 05000237  
S PNU

IE 22

LICENSE EVENT REPORT (LER) TEXT CONTINUATION

Form Rev 2.0

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						Page (3)		
		Year	///	Sequential Number	///	Revision Number				
Dresden Nuclear Power Station	0   5   0   0   0   2   3   7	8   8	-	0   1   8	-	0   0	0   2	OF	0   7	

TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2527 Mwt rated core thermal power.

Nuclear Tracking System (NTS) code numbers are identified in the text as (XXX-XXX-XX-XXXXX).

EVENT IDENTIFICATION:

Leak Rate Limits Exceeded During Testing of the Drywell Head Seal and Main Steam Isolation Valve 2-203-1D Due to Misalignment and Seat Wear.

A. CONDITIONS PRIOR TO EVENT:

Unit: 2    Event Date: October 30, 1988    Event Time: 1935 hours

Reactor Mode: N    Mode Name: Shutdown    Power Level: 0%

Reactor Coolant System (RCS) Pressure: 0 psig

B. DESCRIPTION OF EVENT:

On October 30, 1988, at 1935 hours, with Unit 2 in a refueling outage during the performance of Dresden Technical Staff Surveillance (DTS) 1600-15, Local Leak Rate Testing of Double Gasketed Seals, the drywell head seal [NH] was discovered to have an "as found" leak rate of 491.37 scfh. This brought the total "as found" leak rate using the maximum pathway method for Type B and C testing to 623.917 scfh. This exceeded the Technical Specification 3.7.A.2.b.(2)(a) limit of 493.116 scfh.

Subsequently, on November 3, 1988, at 1030 hours while performing local leak rate testing in accordance with DTS 250-1, Main Steam Isolation Valve (MSIV) [SB] Local Leak Rate (Dry) Test, a leak rate of 21.27 scfh was measured from a test volume comprised of inboard MSIV 2-203-1D and outboard MSIV 2-203-2D. In order to identify the source of leakage, DTS 250-3, MSIV Local Leak Rate (Wet) Test, was then performed. It was then concluded that inboard MSIV 2-203-1D had a through leakage of 12.99 scfh. This exceeded the Technical Specification 3.7.A.2.b limit of 11.5 scfh for any individual MSIV.

C. APPARENT CAUSE OF EVENT:

The apparent cause of the excessive drywell head seal leakage has been attributed to improper seating of the outer gasket between the drywell head and the drywell head flange. This was caused by the outer gasket not being fully inserted in the drywell head flange groove prior to installation of the drywell head. The root cause of the outer gasket not being fully inserted is attributed to a procedure deficiency. No other inoperable components or systems were found to have contributed to this event.

The arrangement of the drywell head, gaskets, and drywell head flange are shown in Figure 1. Rounded "knife edges" on the drywell head are designed to seat on the inner and outer gaskets on the drywell head flange. The endless gaskets used are 3/4" wide by 1/2" thick.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Form Rev 2.0

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						Page (3)		
		Year	///	Sequential Number	///	Revision Number				
Dresden Nuclear Power Station	0   5   0   0   0   2   3   7	8   8	-	0   1   8	-	0   0	0   3	Of	0   7	

TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

The drywell head was installed beginning March 24, 1987, at the end of the 1986-1987 refueling outage. Work was performed in accordance with instructions contained in Work Request 53321 and Dresden Maintenance Procedure (DMP) 1600-5, Drywell Head Replacement and Installation of Shield Blocks. A review of the work package and gasket purchase orders verified that the proper gasket material, Garlock 8364, was used. The work package included a statement that the southeast section of the drywell head was pushed inward using a jack to permit the drywell head to seat properly (knife edges in the drywell head flange grooves). It should be noted that use of a jack in this manner is permitted by DMP 1600-5. The local leak rate test (LLRT) using DTS 1600-15 following installation resulted in an "as left" leak rate of 0.1335 scfh.

DMP 1600-5 implements the manufacturer's instructions for tightening the drywell head bolts in order to achieve metal to metal contact between the drywell head and the drywell head flange. With metal to metal contact achieved, the knife edges on the drywell head would extend 5/16" into the grooves holding the gaskets.

Following removal of the drywell head on October 31, 1988, a continuous impression from the inner knife edge was seen on the inner gasket for the full circumference of the drywell head flange. Examples of normal gasket seating are illustrated in Figure 2. No damage to either knife edge was observed and the gasket material was found to be pliable.

However, for approximately six inches of the outer gasket, the knife edge was beside rather than atop the outer gasket, and a portion of the gasket material appeared to have been forced into the normally empty volume between the two knife edges. This improper gasket seating is illustrated in Figure 3. It was concluded that the leakage path was caused by this improperly seated outer gasket.

Improper seating of the outer gasket is believed to have resulted from the intermediate cause of that section of the outer gasket not being fully inserted in the drywell head flange groove prior to installation of the drywell head. As shown in Figure 1, the knife edges are rounded with a 1/8" radius. Therefore any section of the gasket extending more than approximately 1/8" above the drywell head flange would have been caught by the knife edge when the southeast section of the drywell head was jacked inward to allow the knife edges to seat into the grooves. This conclusion is further supported by the fact that the improperly seated length of outer gasket was located in the southeast section of the drywell head flange.

The low leakage rate observed following installation is evidence that the inner gasket provided a tight seal and that the outer gasket initially made sufficient contact with the knife edge to provide a tight seal. The six inch section of the outer gasket apparently pulled away from the side of the knife edge due to the thermal cycling of the drywell head flange during operation and subsequent cooldown, thus providing the leakage path.

DMP 1600-5 was reviewed and found to contain inadequate instructions for ensuring that the gaskets were properly inserted into the grooves prior to installation of the drywell head. The root cause of the drywell head seal leakage was therefore attributed to procedure deficiency.

The cause of the inboard MSIV 2-203-1D leakage was attributed to seating surface wear. Inspection of the packing assembly with a soap solution indicated that no packing leakage was present. Inboard MSIV 2-203-1D will be rebuilt and retested prior to unit startup.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Form Rev 2.0

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						Page (3)		
		Year	Sequential Number	Revision Number						
Dresden Nuclear Power Station	0   5   0   0   0   2   3   7	8   8	-   0   1   8	-	0   0		0   4	Of	0   7	

TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

D. SAFETY ANALYSIS OF EVENT:

The safety significance of the drywell head seal outer gasket failure is considered minimal since the drywell head was properly seated on the full-circumference of the inner gasket. In addition, no abnormal nitrogen makeup [LK] requirements for drywell inerting were observed during the last operating cycle. Therefore, the "through" leakage representing actual containment leakage is believed to have been minimal.

There have been no previous events of significant drywell head seal leakage at Dresden Nuclear Power Station. The only drywell head seal failures found in a search of the Nuclear Power Reliability Data System (NPRDS) data base were attributed to use of a material other than the Garlock 8364 specified by the drywell head manufacturer (discussed in Section G, Component Failure Data). For these reasons, this instance of excessive leakage is judged to be an isolated case and does not pose any generic concerns.

The safety significance of the inboard MSIV 2-203-1D local leak rate test failure is mitigated by the fact that the redundant outboard MSIV 2-203-2D did not exceed the MSIV leak rate limit of 11.5 scfh.

E. CORRECTIVE ACTIONS:

Immediate corrective action included inspection of the drywell head knife edges and the drywell head flange and gaskets following removal of the drywell head on October 31, 1988. A multidisciplinary task force met on October 31, 1988, to plan further investigation and to review previous drywell head seal problems at Quad Cities Nuclear Power Station. On November 1, 1988, photographs of the drywell head flange and gaskets were taken to document the improper seating observed on the outer gasket. On November 2, 1988, two samples of the outer gasket were removed and later photographed on November 4, 1988. The multidisciplinary task force met again on November 2, 1988, to plan long-term corrective actions.

Prior to unit startup, DMP 1600-5 will be revised to require a Quality Control inspection to ensure that the gaskets are properly inserted into the grooves in the drywell head flange prior to installing the drywell head (237-200-88-13101). DTS 1600-15 will also be revised to include troubleshooting guidance should a double-gasketed seal show significant leakage during an LLRT (237-200-88-13102). Gaskets currently in stock for the drywell head flange will be verified to be of the proper material prior to use (237-200-88-13103). A supplement to this report will then be submitted to provide the retest results and the final Type B and C leak rate test results; included with the supplement will be a tabulation of all the testable penetration maximum and minimum pathway leakages (237-200-88-13104).

Inboard MSIV 2-203-1D will be repaired and retested prior to startup under Work Request 79797.

F. PREVIOUS OCCURRENCES:

The most recent occurrences in which the Primary Containment Type B and C leakage totals exceeded the Technical Specification limit of 493.116 scfh are documented in the following Licensee Event Reports. A previous event involving an MSIV local leak rate testing failure is also listed below. No previous occurrences included significant leakage through the drywell head seal.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Form Rev 2.0

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						Page (3)		
		Year		Sequential Number		Revision Number				
Dresden Nuclear Power Station	0   5   0   0   0   2   3   7	8   8	-	0   1   8	-	0   0	0   5	OF	0   7	

TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]

LER Number/Docket Number

Title

88-004/050249

Type B and C Local Leak Rate Test Limit Exceeded Due to Leakage Through Primary Containment Isolation Valve.

Atmosphere Containment and Dilution System [LK] purge check valve 3-2599-238 leaked 192.66 scfh. Corrective action included cleaning and lapping the valve.

87-004/050237

Unit 2 Primary Containment Type B and C Local Leak Rate Test Limit Exceeded Due to Excessive Leakage Through Primary Containment Isolation Valve.

The torus [BS] to condenser [SG] drain valve A02-1599-61 leaked 135.985 scfh. Corrective action included cleaning and lapping the valve.

86-030/050237

Leakage in Excess of Technical Specification 3.7.A.2.b Limit Found on MSIV 2-203-2B Due to Packing Leak.

The 2-203-2B MISV was then repaired and retested satisfactorily.

G. COMPONENT FAILURE DATA:

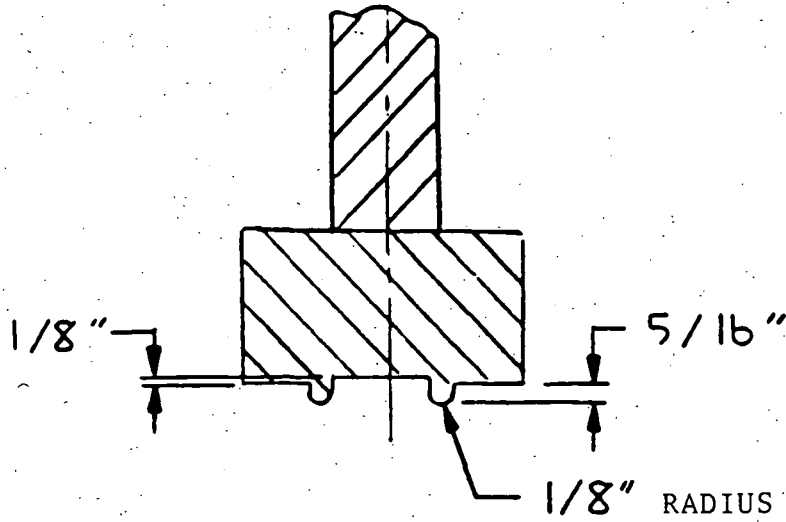
A search of the NPRDS data base revealed that the only previously reported failures of drywell head seals are for Quad Cities Nuclear Power Station; the same drywell head seal design is used for the Dresden and Quad Cities units. Those failures involved a different gasket material than the Garlock 8364 material specified by the drywell head manufacturer, and the corrective action included returning to the use of Garlock 8364. No significant "as found" leakage has been measured during three drywell head seal LLRT's performed at Quad Cities Nuclear Power Station subsequent to the return to the use of Garlock 8364 (one operating cycle for Unit 1 and two operating cycles for Unit 2).

<u>Manufacturer</u>	<u>Nomenclature</u>	<u>Model Number</u>	<u>MFG. Part Number</u>
Crane Co.	Inboard MISV 2-203-1D	DR34289-20" Y Pattern Globe Valve	N/A

An industry-wide data base search regarding leak rate testing failures of this type of MSIV listed 40 local leak rate test failures. Repairs included seating surface machining and packing adjustment/replacement.

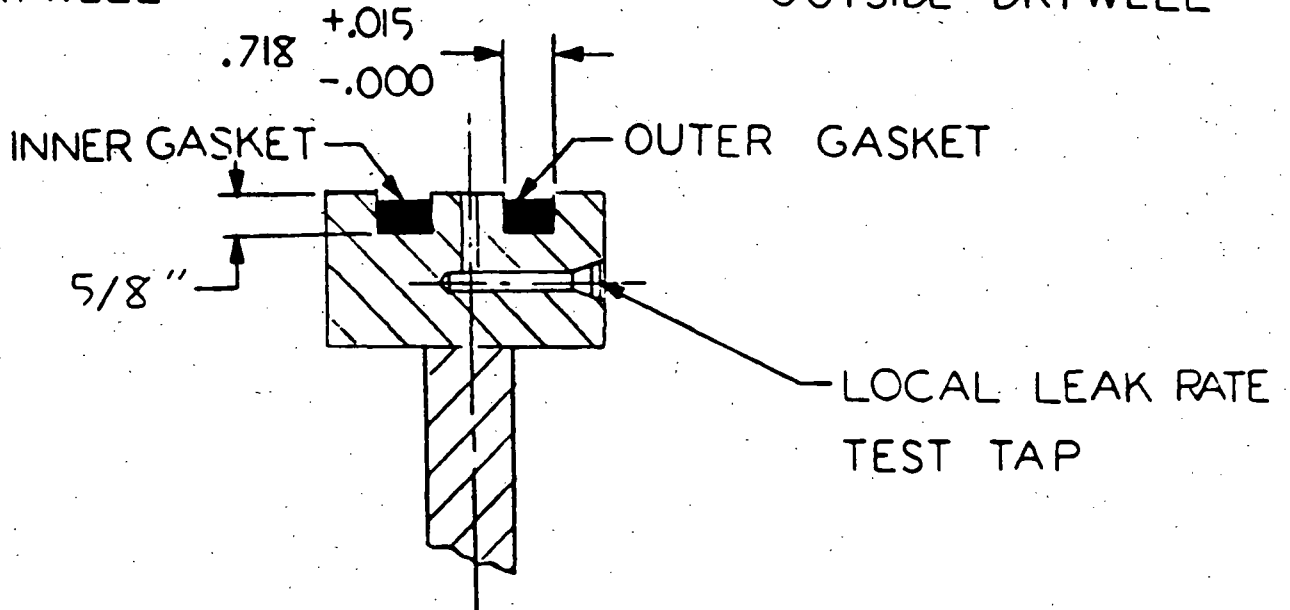
FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)				Page (3)		
		Year	Sequential Number	Revision Number				
Dresden Nuclear Power Station	0   5   0   0   0   2   3   7	8   8	-   0   1   8	-   0   0	0   6	0 F	0   7	

TEXT Energy Industry Identification System (EIIS) codes are identified in the text as [XX]



INSIDE DRYWELL

OUTSIDE DRYWELL



DOUBLE - GASKETED  
DRYWELL HEAD SEAL

Figure 1

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Form Rev 2.0

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (6)

Page (3)

Year	Sequential Number	Revision Number
8   8	-   0   1   8	-   0   0

Dresden Nuclear Power Station

0 | 5 | 0 | 0 | 0 | 2 | 3 | 7

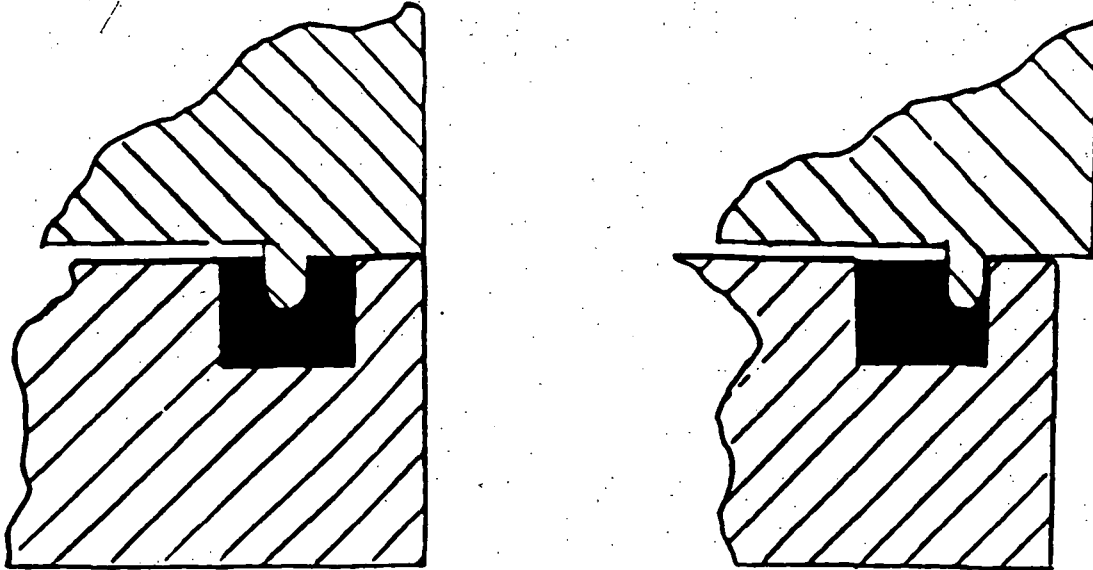
8 | 8

- | 0 | 1 | 8

- | 0 | 0

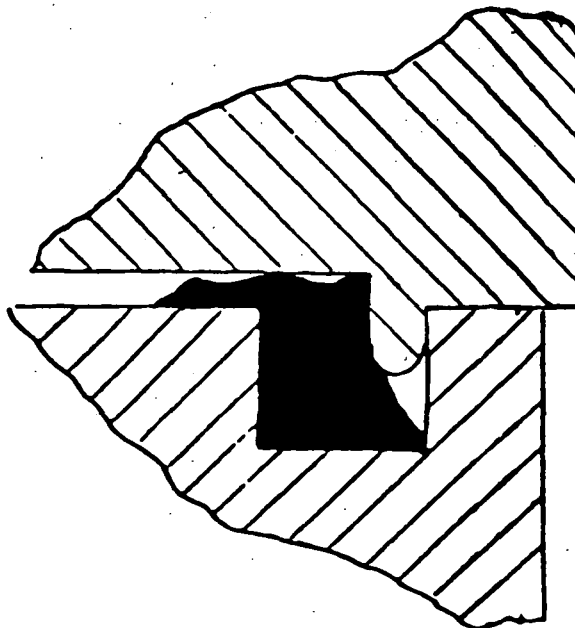
0 | 7 | OF | 0 | 7

TEXT Energy Industry Identification System (EIS) codes are identified in the text as [XX]



NORMAL GASKET SEATING EXAMPLES

Figure 2



IMPROPER GASKET SEATING EXAMPLE

Figure 3



**Commonwealth Edison**  
Dresden Nuclear Power Station  
R.R. #1  
Morris, Illinois 60450  
Telephone 815/942-2920

November 29, 1988

EDE LTR #88-890

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

Licensee Event Report #88-018-0, Docket #050237 is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10 CFR 50.73(a)(2)(i)(B).

E.D. Eenigenburg  
Station Manager  
Dresden Nuclear Power Station

EDE/ade

Enclosure

cc: A. Bert Davis, Regional Administrator, Region III  
File/NRC  
File/Numerical

0432k

IE22  
1/1