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)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Browns Ferry Nuclear Plant (BFN) Unit 2	05000260	1 OF 8

TITLE (4) An invalid local leak rate test on the drywell head seals resulted in a condition prohibited by Technical Specifications

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
05	25	93	93	011	00	11	01	94	NA	
									FACILITY NAME NA	DOCKET NUMBER

OPERATING MODE (9)	N
POWER LEVEL (10)	000

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

	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)
	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
	20.405(a)(1)(iii)	X	50.73(a)(2)(i)(B)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)
	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 (Include Area Code)
James E. Wallace, Compliance Licensing Engineer	(205)729-7874

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		01	25	95

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On October 2, 1994, during the Unit 2 Cycle 7 refueling outage, TVA was removing the Unit 2 drywell head when it was noticed that a sealant material (i.e., RTV), used to adhere the O-ring seals in their grooves on the bottom flange, displaced from the grooves. This condition occurred when the drywell head was reset on the lower flange during the Unit 2 Cycle 6 refueling outage. This condition existed when Unit 2 was restarted on May 25, 1993. It was determined that the excessive amount of RTV in the O-ring grooves caused the LLRT performed during the last outage to be invalid. This event is reportable in accordance with 10 CFR 50.73 (a)(2)(i)(B) as a condition prohibited by BFN Technical Specifications. An initial investigation of this event determined that the RTV was applied without an approved procedure, without proper authorization, and was not incorporated into the design prior to installation. Before reinstalling the drywell head, documentation will be provided as to limiting the amount of RTV allowed for the drywell head installation to ensure that it does not interfere with the LLRT. To further determine the root cause of the event and corrective actions to preclude recurrence, TVA is currently conducting an incident investigation on this event after which a supplemental report will be submitted. The event date of this report is May 25, 1993, when Unit 2 was restarted with an invalid LLRT having been performed.

I. PLANT CONDITIONS

At the time this event was discovered, Unit 2 was shutdown for a scheduled refueling outage. Units 1 and 3 were shutdown and defueled.

II. DESCRIPTION OF EVENT

A. Event

On October 2, 1994, TVA was removing the BFN Unit 2 drywell head during a scheduled refueling outage. While removing the drywell head, personnel observed an excessive amount of sealing material (i.e., RTV-102) on the lower flange. The sealant had been used to facilitate installation of the drywell head O-rings during the cycle 6 refueling outage. Additionally, approximately three inches of the inner O-ring protruded from its groove (the drywell head flange O-ring configuration is shown on page 7).

Based on the observations of the O-rings [SEAL] when the drywell head [NH] was removed this outage, it was concluded that an invalid LLRT had been performed before the restart of Unit 2 on May 25, 1993. Specifically, the RTV was in the area between the O-rings, and the inner O-ring seal was broken. Thus, the excessive amount of RTV obstructed the LLRT test volume. Further details of this event are provided below.

On May 13, 1993, during the Unit 2 Cycle 6 refueling outage, the drywell head seal failed its initial as-left LLRT. RTV-102 was placed in the O-ring grooves to augment the sealing characteristics of the O-rings. The drywell head was subsequently reset, the bolts were retorqued, and the LLRT was reperformed on May 15, 1993. The followup LLRT measured 0.0036 SCFH of seal leakage which was within the acceptance criteria for this test.

The use of RTV-102 was not documented on applicable drawings; therefore, the use of this material should have required a design change to implement the addition of the RTV to the O-rings. On May 16, 1993, after the drywell head was installed and leak rate tested, a Design Change Notice (DCN) was processed to justify the use of RTV-102 to augment the sealing characteristics of the O-rings. However, the engineering evaluation for the DCN failed to identify that excessive RTV would be forced out of the O-ring groove upon compression of the O-rings by the head flange. This amount would have been sufficient to obstruct the LLRT test volume.

BFN Technical Specification 4.7.A requires that a LLRT of primary containment penetrations be performed once per operating cycle. The LLRT performed on the drywell head during the last refueling outage was determined to be invalid. Thus, this event is reportable pursuant to 10 CFR 50.73 (a)(2)(i)(B) due to a condition prohibited by the BFN Technical Specifications. The event date of this report is May 25, 1993 when Unit 2 was restarted with an invalid LLRT. The discovery date of this event was October 2, 1994, which initiated the 30-day timeclock for reportability purposes.

As described further in Section IV of this report, TVA has not observed any abnormal leakage from the drywell O-rings during the past operating cycle. An Incident Investigation (II) of this event is in progress.

B. Inoperable Structures, Components, or Systems that Contributed to the Event:

None

C. Dates and Approximate Times of Major Occurrences:

May 13, 1993	The drywell head LLRT failed three times.
May 14, 1993	The drywell head was lifted, the grooves were cleaned, RTV-102 was placed in the O-ring grooves, the drywell head was reset, and the bolts were retorqued.
May 15, 1993	The drywell head LLRT was performed.
May 25, 1993	Unit 2 was restarted.
October 2, 1994	This condition was detected when the drywell head was lifted at the start of the next refueling outage.

D. Other Systems or Secondary Functions Affected:

None.

E. Method of Discovery:

This condition was discovered when the drywell head was being lifted off its lower flange during a scheduled outage after operating cycle 7.

F. Operator Actions:

None

G. Safety System Responses:

None

III. CAUSE OF THE EVENT

A. Immediate Cause:

The RTV was applied without an approved procedure, without proper authorization, and was not incorporated into the design prior to installation. A design change notice was issued without correctly specifying the limit for the amount of RTV applied.

B. Root Cause:

The root cause(s) of this event has not yet been determined. TVA is currently conducting an Incident Investigation (II) of this event. The results of the II will be provided in a supplemental report.

IV. ANALYSIS OF THE EVENT

The top portion of the drywell is removable during refueling operations. The drywell head is connected to the remainder of the drywell via a flange connection held together by 208 bolts. This flange connection is sealed via a double captured seal ring arrangement. The dual O-ring configuration and the intermediate leak rate testing tap permits leak rate testing of the drywell head flange seal.

As stated previously, an excessive amount of RTV was observed on the lower flange of the drywell head. The RTV was found to be uniformly distributed around the lower flange surface from near the inner radius of the flange across the O-rings outward past the O-ring grooves. Examination of the RTV on the lower flange of the drywell head

indicated that it was adhering tightly to the flange surface. The LLRT volume between the inner and outer O-rings was completely filled. Approximately three inches of the inner O-ring flange groove was empty because the O-ring had been dislodged and was crushed between the flange surfaces with a small portion extending from between the flange surfaces into the drywell interior.

Examination of the outer O-ring indicated that it was seated in its associated groove and compressed along the entire circumference of the drywell head flange. Only one O-ring is required to provide the seal between the upper and lower flange surfaces for the drywell head. Therefore, the drywell head was effectively sealed.

Additionally, a calculation was performed to determine the pressure in the drywell that would be required to overcome the bolt preload and lift the head. This calculation showed a pressure in excess of twice the design basis accident drywell pressure.

No abnormal nitrogen makeup [LK] requirements for drywell inerting were observed during operating cycle 7 (See chart 1 on page 8). The average amount of nitrogen consumed for the first 81 days was less than the amount that was used during operating cycle 6 when the drywell head was sealed without RTV [see chart 2 on page 8). However, the average amount of nitrogen consumed did increase over the remainder of the operating cycle 7. This increase was due to a drywell air compressor problem. If the drywell air compressor problem had not occurred, TVA believes that the nitrogen consumption would have continued to follow the trend of the first 81 days (i.e., less than cycle 6 nitrogen consumption). During the last two operating cycles, the amount of nitrogen consumed was significantly below the Technical Specifications limit.

Based on the examination of the joint flange, and the amount of nitrogen used to maintain the inerting of the drywell during the operating cycle, TVA has determined that an effective seal was in place.

V. CORRECTIVE ACTIONS

A. Immediate Corrective Actions:

Before reinstalling the drywell head during the Unit 2 Cycle 7 refueling outage, documentation will be provided as to limiting the amount of RTV allowed for the drywell head installation to ensure that it does not interfere with the LLRT. A Problem Evaluation Report (PER) has been initiated and an II is in progress.

B. Corrective Actions to Prevent Recurrence:

The Unit 2 replacement of the drywell head O-rings for the Unit 2, Cycle 7 restart will be performed using an approved procedure that addresses the use of RTV. Any further substantial corrective actions that result from the II will be provided in the supplemental report.

VI. ADDITIONAL INFORMATION

A. Failed Components:

None

B. Previous LERs on Similar Events:

None

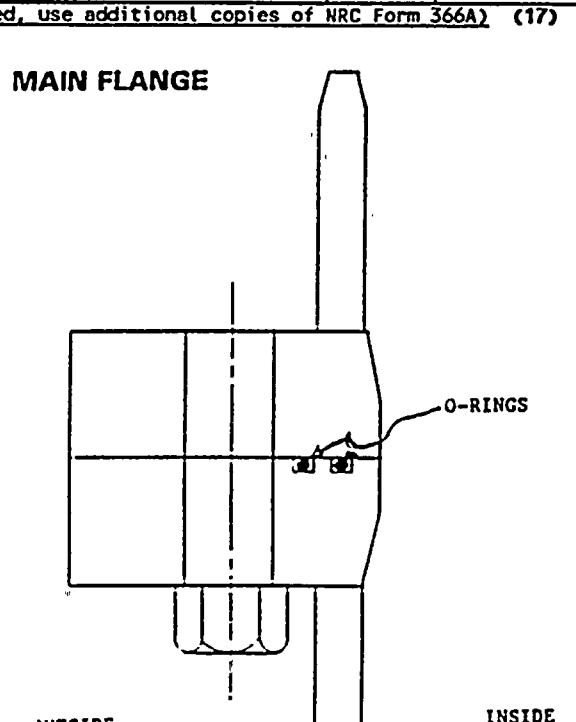
VII. Commitments

1. The Unit 2 replacement of the drywell head O-rings for the Unit 2 Cycle 7 restart will be performed using an approved procedure that addresses the use of RTV.

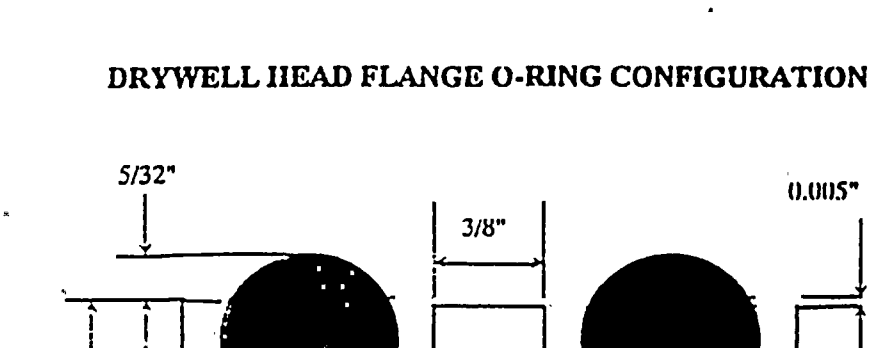
2. Documentation will provide instructions on limiting the amount of RTV allowed for the drywell head installation to ensure that it does not interfere with the LLRT. This corrective action will be completed prior to resetting the drywell head.

3. TVA expects to provide a supplemental report by January 25, 1995.

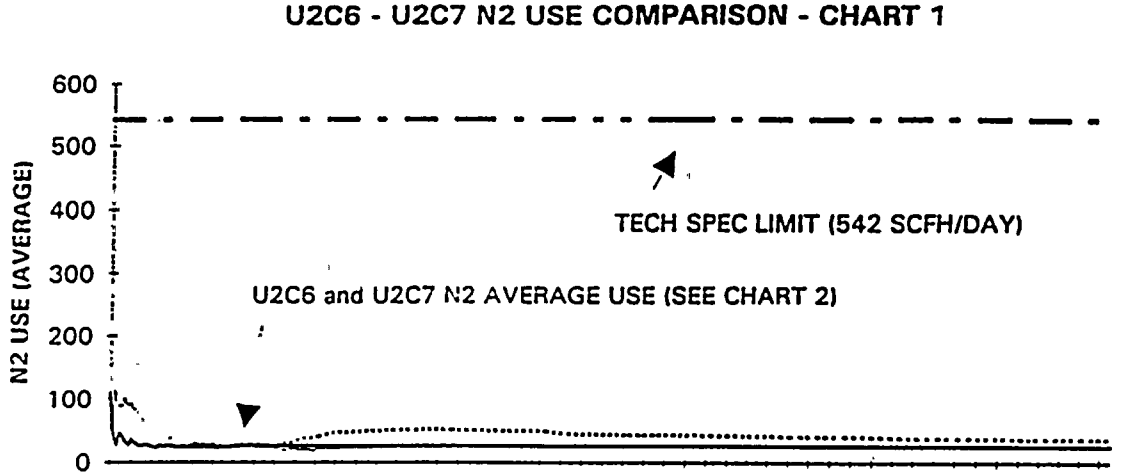
Energy Industry Identification System (EIIS) system and component codes are identified in the text with brackets (e.g., [XX].



DRYWELL HEAD FLANGE O-RING CONFIGURATION



U2C6 - U2C7 N2 USE COMPARISON - CHART 1



U2C6 - U2C7 N2 USE COMPARISON - CHART 2