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

ComEd

December 19, 1994

TPJLTR 94-0002

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

Licensee Event Report 94-028, Docket 50-237 is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10CFR50.73(a)(2)(ii).

Sincerely,

Thomas P. Joyce
Site Vice President

TPJ/AL:cfq

Enclosure

cc: J. Martin, Regional Administrator, Region III
NRC Resident Inspector's Office
File/NRC
File/Numerical

TPJ94\0002.94

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 7

TITLE (4)
Unit 2 Mark I Torus Spray Piping Outside of UFSAR Allowables Due to Incomplete Walkdowns Which Led to the Use of Inaccurate Design Basis Documentation

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
11	19	94	94	-- 028 --	0	12	16	94	None	
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
POWER LEVEL (10)	002		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)		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)(viii)(B)		
			20.2203(a)(2)(v)	X	50.73(a)(2)(ii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Aras Lintakas Ext. 2245	(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 June 4, 1992 an operability assessment was generated to document a weight discrepancy on the Torus spray subsystem containment isolation valves. In September 1994, comment design drawings were issued for the Unit 2 piping support modifications for these valves. The extent of the support changes along with the piping acceleration values of the original Mark I analysis raised a concern about the condition of the existing piping configuration. Although stresses on this piping were determined to be within operability allowable limits, it was determined by engineering judgement that the stresses on this piping exceed code allowable limits. The weight discrepancy is attributed to incomplete walkdowns performed which led to the use of inaccurate design basis documentation. The stresses and accelerations on all other Mark I piping have been evaluated and have been found to be acceptable. Torus Spray piping support modifications for Unit 2 are scheduled for D2R14, currently scheduled for June 1995. A piping analysis will be performed on the Unit 3 Torus Spray piping by February of 1995. If support modifications are determined to be required they will be implemented during D3R14.

EVENT IDENTIFICATION:

Unit 2 Mark I Torus Spray Piping Outside of UFSAR Allowables Due to Incomplete Walkdowns Which Led to the Use of Inaccurate Design Basis Documentation

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2 Event Date: September 28, 1994 Event Time: 15:00

Reactor Mode: 4 Mode Name: Shutdown Power Level: 0%

Reactor Coolant System Pressure: 0 psig

B. DESCRIPTION OF EVENT:

In September of 1994, comment Engineering Change Notices (ECNs), for the Unit 2 Torus Spray sub-system of the Low Pressure Coolant Injection System (LPCI)(BO) Mark I piping support modifications were issued. The extent of the support changes along with the piping acceleration values of the original Mark I analysis raised a concern about the condition of the existing piping configuration. Although the stresses on this piping were determined to be within operability allowable limits, it was determined by engineering judgement that the stresses on this Unit 2 Mark I piping exceed code allowable limits. On November 19, 1994, an NRC notification was made in accordance with 10CFR 50.72(b)(ii) identifying this discrepant condition.

As part of the Generic Letter 89-10 Program, calculations were performed to determine the structurally limiting components for all safety related Motor-Operated Valves (MOVs). The design basis seismic and hydro-dynamic accelerations acting on each MOV are two of the design inputs for these calculations. This data was taken from the piping analyses containing the specific MOV. During this process, it was determined that there was a discrepancy between the MOV components specified in the Mark I piping analysis when compared to the as-built MOV configuration. An operability assessment was generated on June 4, 1992 to document these discrepancies.

The original operability assessment identified discrepancies on 4 computer math models of the Unit 2 Mark I piping and 6 computer math models on the Unit 3 Mark I piping. These math models included 39 lines containing 13 valves.

At that time, all lines, including the Torus Spray lines, were determined to be within operability limits based on engineering judgement. Operability calculations were initiated to verify this assessment, and the piping system stresses were found to be within operability limits for all lines. Further analysis determined that the piping stresses of all lines associated with six of these ten math models are within UFSAR code allowables.

The discrepant condition in the remaining 4 Mark I piping analyses was related to the Torus Spray inboard containment isolation valves (2(3)-1501-19A/B). The Mark I analyses modeled these MOVs with SMB-000 actuators, when in fact, these MOVs were equipped with larger SMB-00 actuators.

The MOV design team determined that the accelerations on the Unit 2 Torus Spray piping were excessive and that support modifications should be implemented to assure the actuator had adequate design margin and could operate under all design basis conditions.

The MOV design team decided that if a support modification was required for the Unit 2 Torus Spray lines, it would be advantageous to keep the existing larger actuator.

Following is chronological history of the event:

June 4, 1992 — Walkdowns were performed for the GL 89-10 program and discrepancies with actuator sizes were found. This was documented in the June 4, 1992 letter from B.M.K. Wong to C. Schroeder, Chron #186845, "Operability Determination for MOVs. The Actual Weight of These Valves is More Than 10% Over the Analyzed Weight". This operability determination showed that, by engineering judgement, the support loads are still within operability limits. Follow up actions were to complete operability calculations (which have been completed), perform FSAR evaluations to determine if the piping systems meet FSAR criteria (complete for Unit 2, in progress for Unit 3), and to perform any necessary modifications pending resolution of GL 89-10 MOV upgrade evaluations.

The lines in question are the Torus Spray lines for both units. At some time during this year, a recommendation is made to replace the existing actuators with the smaller, SMB-000 actuators to return the piping systems to their as-analyzed condition. This was planned to be accomplished with an Exempt Change.

Another operability assessment was performed for the for 2-1501-19A & 19B, Chron #186846. This operability assessment was written to address the fact that these valve's yokes may not pass Mark I FSAR structural criteria. This operability assessment determined that "there is reasonable assurance by engineering judgement that the maximum yoke stress will be less than 1.5 Sy." At 1.5 Sy, plastic deformation was determined to not affect valve operation.

January 16, 1993 — Begin D2R13

February 26, 1993 — Begin D3F15

April 8, 1993 — A kick-off meeting was held for the actuator replacement modification on April 8, 1993. During this kick-off meeting, the accelerations of 23g and 11g for the Unit 2 and Unit 3 torus spray valves 2(3)-1501-19A & 2(3)-1501-

19B, respectively, were discussed. A question was raised as to whether the actuators would be able to function after being subjected to these accelerations. It was determined that the original manufacturer rating for these actuators was 6g in any direction.

Over the next two weeks many options were evaluated - perform Mark I piping analysis; qualify actuators to higher g values; remove the Torus Spray sub-system from the Technical Specifications and lock the Torus Spray containment isolation valves closed. During these two weeks, preliminary operability calculations are being performed to determine the actual accelerations at the valves. Unit 3 calculations were given priority.

April 26, 1993 — Operability calculations are completed for unit 3. This is documented in the letter from B. M. K. Wong to C. W. Schroeder, Chron #0120020, "Operability Determination of the Motor Actuators for Valves 3-1501-19A and 3-1501-19B for Mark I Loads". The unit 3 actuators are covered by testing performed by outside organizations. The decision is made to replace these actuators with SMB-000 actuators during D3R13 to make the installed conditions reflect the design basis analysis. The accelerations would still be high, but would be within allowable limits. The analysis of the Unit 2 valve was in progress due to the additional refinements of the calculations required.

April 28, 1993 — End D3F15

May 21, 1993 — Letter from B. M. K. Wong to C. W. Schroeder, Chron #0210388, "Operability Determination of the Motor Actuators for Valves 2-1501-19A and 2-1501-19B for Mark I Loads". The Unit 2 actuators, because of their higher accelerations, are more difficult to evaluate. Calculation refinements are performed that bring the accelerations down to acceptable limits. These calculations take out many conservatisms, and are valid for operability only. Replacing the actuators with the smaller SMB-000s would not solve the problem, since the accelerations with the smaller actuators are still excessive. A decision is made to perform a Mark I piping analysis to try to bring the accelerations down and reflect the operator discrepancy in the design basis analysis. This scope of work begins in June of 1993.

May 25, 1993 — End D2R13

June 30, 1993 — Letter from J. D. Williams to G. Spedl, Chron #0120900, "Status of the 2(3)-1501-19A & 19B Torus Spray Valves"

January, 1994	Engineering informed that differential pressure testing has been performed on various valves, and has shown that the valve factors that we have been using are low. With higher valve factors, the SMB-000 actuators on the 1501-19A & 19B valves are not sufficient to meet the design basis requirements. Thus, the larger, SMB-00 actuators must remain on the valves and Mark I piping analyses must be performed using these larger actuators. Since a Mark I piping analysis and subsequent modifications could not be completed prior to the end of the upcoming Unit 3 outage, it is decided to continue the re-analysis on Unit 2 and shift directly to Unit 3 after the Unit 2 analysis is complete.
February 8, 1994	White Paper 134, "EPRIs MOV Testing Program Measured Valve Factors" (Draft Issue)
March 3, 1994	HPCI declared inoperable due to the new information regarding valve factors contained in White Paper 134. D3R13 begun two days early because of this.
March 10, 1994	Begin D3R13.
September 9, 1994	Comment ECN issued for support modifications to the Unit 2 Torus Spray Lines.
September 28, 1994	Final ECN comment meeting held at Vectra offices.
September 28, 1994	ENS Notification made. Upon further review, it was determined that the conditions for the ENS notification did not exist, since both units were in an outage.
October 5, 1994	Mechanical and Structural Engineering finishes their review of the operability calculations per ENC-QE-81. Based on their review, they concluded that assumptions, methodology, design input, judgement and the results are acceptable, well documented and meet the operability requirements of Nutech Technical Instructions TI-10, rev. 02. TI-10, rev. 02 meets all the NRC operability criteria requirements except that it does not address the secondary stress evaluation against the FSAR/UFSAR allowable. However, the above operability review is a seismic operability concern rather than a thermal concern, hence the secondary stresses are not affected by the discrepancies. No technical deficiencies were found in the calculations.
October 6, 1994	Meeting between representatives of ComEd (H. Massin, A. Lintakas, et.al.,) and the U. S. NRC staff (J. Gavula).
October 7, 1994	Formal documentation of independent review of operability calculations and engineering judgement that

Unit 3 Torus Spray sub-system is within UFSAR allowables.

November 19, 1994 — ENS notification made to document the condition outside design basis. This ENS notification replaces the ENS notification made on September 28, 1994.

C. CAUSE OF EVENT:

This LER is submitted in accordance with 10CFR50.73(a)(2)(ii)(B), which requires that the licensee report any event or condition that resulted in the nuclear power plant, including its principal safety barriers, being seriously degraded, or that resulted in the nuclear power plant being in a condition that was outside the design basis of the plant.

The SMB-000 were the originally intended actuators. These actuators were replaced with the larger SMB-00 actuators, however no design drawings were revised. During the Mark I program in the early 1980s, the valves were not specifically checked in the field; design drawings were used for information.

The root cause of the event was the performance of incomplete walkdowns which led to the use of inaccurate design basis documentation.

D. SAFETY ANALYSIS:

Although the piping stresses for the Mark I math models containing the Drywell and Torus Spray containment isolation valves have the potential for exceeding UFSAR code allowable limits during design basis transient conditions, the piping will remain intact and perform its primary containment integrity function.

The actuators on the Torus Spray containment isolation valves (2-1501-19A&B) may be subject to significant accelerations. Although the Mark I analyses with the smaller actuators show that code allowables would be exceeded, tests have been performed on Limitorque actuators that demonstrate these components would operate following a design basis event. Therefore, this is not a safety concern.

The potential exists for over stressing the Torus Spray actuator yokes. Calculations have shown that the MOV would still be capable of performing its design function following the high acceleration conditions.

An independent, third party review was performed by the Mechanical Structural group in accordance with the requirements of ENC-QE-81, rev. 01, "Review of Assumptions and Judgements for Architect Engineer Supplied Design Evaluations". It was concluded that the assumptions, methodology, design input, judgements and the results were acceptable, well documented and met the operability requirements of Nutech Technical Instruction TI-10, rev. 02. The TI-10 meets all the NRC operability criteria requirements except that it does not address the secondary stress evaluation against the FSAR/UFSAR allowable. However, these operability evaluations concern seismic and Mark I load cases rather than thermal, hence the secondary stresses are not affected by the procedural differences. No technical deficiencies were found in the calculations.

E. CORRECTIVE ACTIONS:

Torus Spray piping support modifications for Unit 2 have been issued to resolve the open operability concerns for Unit 2. The modifications will be installed during D2R14 which is presently scheduled for June 1994.

Mark I piping analysis will be performed on the Unit 3 Torus Spray piping to show the piping stresses to be within UFSAR code allowable limits. If support modifications are determined to be required they will be implemented during a future outage.

As a result of the Generic Letter 89-10 program, all safety related motor operated valves, and their associated equipment including piping, yokes, and breakers, were reviewed and analyzed. All discrepancies that were discovered were found to be acceptable.

F. PREVIOUS OCCURRENCES:

None.

G. COMPONENT FAILURE DATA:

None.