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ComEd

March 27, 1997

JSPLTR #97-0063

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

Enclosed is Licensee Event Report 97-007, Docket 50-237, which is being submitted pursuant to 10CFR50.73(a)(2)(v)(D) which requires that the licensee report any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

This correspondence contains the following commitment:

1. Provide a lessons learned presentation on this LER at a Design Engineering tailgate. Focus on the importance of the procedural requirement for including the UFSAR as applicable design input for all calculation, including revisions. (Reference NEP-12-01 and NEP-12-02, Section 5.2.4). (NTS Item 2371809700701)

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

Sincerely,

for

J. Stephen Perry
Site Vice President
Dresden Station

Enclosure

cc: A. Bill Beach, Regional Administrator, Region III
NRC Resident Inspector's Office

JE22

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)
LPCI Recirculation Loop Line Break Detection 900 psig Reactor Pressure Permissive Setpoint Set Outside Design Basis Limit Due to Personnel Error

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
02	26	97	97	-- 007 --	0C	03	27	97	Dresden Unit 3	05000249
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1
POWER LEVEL (10)	100

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)		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)
J. G. Kovach, Design Engineer Ext. 3645	(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)

During the Dresden Station Key Parameter Screening Review effort, a discrepancy was identified relating to the LPCI loop selection initiation logic setpoint. The UFSAR identifies the design limit for this setpoint as </= 900 psig. Contrary to this, as a result of a personnel error that incorrectly established the design limit as a >/= value, the existing setpoint was calculated and set above the UFSAR limit.

The LPCI loop selection logic ensures the LPCI injection flow is directed to an unbroken recirculation pump loop. With the current setting set non-conservative, this function was in question. Therefore, the LPCI injection subsystem was declared inoperable at 1920 hours on February 26, 1997 and a 7 day LCO was entered per Technical Specification 3.5.A.2.b. Immediate corrective action was initiated to revise the setpoint calculation and re-calibrate the pressure switches to be in compliance with the UFSAR limit. The system was restored to operability on March 03, 1997 at 0132 CST. Long term corrective action is in place to improve the quality of calculations performed for the Dresden station.

This event was determined to be reportable pursuant to 10CFR50.73(a)(2)(ii)(B). The safety significance concerning the non-conservative setpoint was minimal, based upon completion of an analysis demonstrating that the loop select function would have functioned properly with the as-found setpoints.

PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2527 Mwt rated core 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:

LPCI recirculation loop line break detection 900 psig reactor pressure permissive setpoint set outside design basis limit due to personnel error.

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2(3) Event Date: 02/26/97 Event Time: 1920

Reactor Mode: 1(1) Mode Name: Run(Run) Power Level: 100(069)

Reactor Coolant System Pressure: 1000(1000) psig

B. DESCRIPTION OF EVENT:

This issue is reportable pursuant to 10CFR50.73(a)(2)(ii)(B) which requires that the licensee report any event or condition that resulted in the nuclear power plant being in a condition that was outside the design basis of the plant.

Operations received notification from engineering through the station's problem reporting process that the Low Pressure Coolant Injection (LPCI) loop select logic [JE] 900 psig reactor pressure permissive were not in compliance with the UFSAR. This pressure setpoint logic is designed to allow recirculation pumps to coast down so that the loop differential pressure will be meaningful to the LPCI loop select logic under design basis LOCA conditions. The LPCI loop selection logic ensures that LPCI injection flow is directed to an unbroken recirculation pump loop. Based on the current setpoint calculation and instrument surveillance procedure, it was determined that the existing settings were non-conservative and, therefore, the operability of this function was in question.

The discrepancy relating to the LPCI loop selection initiation logic setpoint was identified during the Dresden Station Key Parameter Screening Review effort. Section 7.3.1.2.2 of the Dresden UFSAR states that a reactor vessel pressure permissive will delay the LPCI loop selection logic initiation until reactor pressure has dropped to a value </= 900 psig to allow for coastdown of any recirculation pump which has just been tripped. However, the current Dresden setpoint calculation, NED-I-EIC-0114, Rev. 1, "Reactor Vessel Pressure Switch (LPCI Recirculation Loop Line Break Detection Logic) Setpoint Error Analysis" and the current Dresden instrument surveillance procedure DIS 1500-07, Rev. 07, "Reactor Vessel Pressure Switch Calibration (LPCI Recirculation Loop Line Break Detection Logic)" stated that the instrument setpoint was 917.5 psig, and that the setpoint error analysis was performed using an acceptance criteria of >/= 900 psig.

According to the latest instrument data sheets, the current process line setpoint pressure permissive setpoint was 917.5 psig (944 psig minus 26.5 psig for head correction). The error associated with this instrument is +/-13.2 psig, using a 6 month surveillance cycle per the setpoint calculation NED-I-EIC-0114, Rev 1.

Instrument Surveillance Procedure DIS 1500-07 is performed on a 18 month surveillance cycle. The current Unit 2 surveillance was performed within the last 6 months, therefore, the maximum pressure permissive setpoint at the process line for Unit 2 could be as high as approximately 931 psig (917.5 psig + 13.2 psig). The last calibration on Unit 3 was performed on 04/23/96. Using an instrument error of a 10 month surveillance of approximately +/-20 psig, the pressure permissive setpoint for Unit 3 could be as high as approximately 938 psig.

Based on the above, the current setpoint of 917.5 psig was concluded to be a non-conservative setting and the Unit 2 and Unit 3 LPCI injection subsystems were declared inoperable at 1920 hours on February 26, 1996 and a 7 day LCO entered per Tech Spec 3.5.A.2.b. An ENS phone call was made to the NRC at 2051 EST.

Immediate corrective action was taken to revise the affected setpoint calculation and instrument surveillance procedure and issue a setpoint change request to reset the pressure switches. The setting changes were implemented under nuclear work requests and the LPCI injection subsystem LCO's were exited on March 03, 1997 at 0132 CST.

No structures, systems, or components were inoperable at the start of or during this event which could have contributed to the event. In addition, no manual or automatic engineered safety feature (ESF) actuation occurred as a result of this event.

C. CAUSE OF EVENT:

The initial setpoint for the Reactor Vessel Pressure Switch Calibration as documented in Dresden Instrument Surveillance Procedure DIS 1500-07 was 900 psig which accounted for a head correction of 25 psig. This setpoint did not take into account instrument loop uncertainties and was essentially set to equal the design limit reflected in the FSAR.

As part of a ComEd calculation upgrade program begun in the early 1990's, Calculation NED-I-EIC-114, Rev. 0 was prepared using newly established setpoint methodology for addressing instrument loop errors. Design input was taken from applicable IMD instrument surveillance procedures and the LPCI system description. The calculation did not reference the UFSAR for design input. The error as determined by the calculation was applied to the existing setpoint of 900 psig. The calculation concluded that a negative margin of -33.2438 psig (i.e., 900 psig +/-33.24 psig) resulted when the instrument uncertainties are taken into consideration.

An ENC-QE-40.1 Exhibit A operability evaluation (CHRON 196198, dated December 30, 1992) was prepared to address the negative margin. The operability evaluation concluded that the instruments were operable up to a pressure setpoint of 933.2 psig. No change to the existing 900 psig setting was made.

In April of 1993, a calculation was prepared by an Architect Engineering (AE) firm in support of the Reactor Vessel Level Instrumentation System (RVLIS) modification for both Dresden Units 2 and 3. The calculation determined the instrument uncertainty, for each process instrument affected by the RVLIS modification, and determined each instrument setpoint taking the instrument uncertainty into account. The calculation listed DIS 1500-07, Rev. 3 as a design input reference. It did not make any reference to the ComEd calculation (NED-I-EIC-114) or to the UFSAR design limit. DIS 1500-07, Rev. 3 stated the required actuation setpoint as 925 psig decreasing, which included a 25 psig head correction. A new head correction value was determined in the AE calculation and applied to the existing 900 psig setpoint. The calculation tabulated design limits for the pressure switches, including head correction, as follows:

PS-2-263-111A: >/= 926.52	PS-3-263-111A: >/= 926.71
PS-2-263-111B: >/= 926.48	PS-3-263-111B: >/= 926.60
PS-2-263-111C: >/= 926.52	PS-3-263-111C: >/= 926.71
PS-2-263-111D: >/= 926.48	PS-3-263-111D: >/= 926.60

As shown in the tabulation, the design limits were reflected as a >/= value. How the limits became reflected as a >/= values was not developed in the calculation. There was no reference to a source for the >/= 900 psig limit; the new value appeared in the tabulation without any supporting design input.

The calculation also tabulated the following setpoint information:

	Old Setpoint	New Setpoint
PS-2-263-111A	925 +/-5 Dec	944.031 +/-5 Dec
PS-2-263-111B	925 +/-5 Dec	943.991 +/-5 Dec
PS-2-263-111C	925 +/-5 Dec	944.031 +/-5 Dec
PS-2-263-111D	925 +/-5 Dec	944.991 +/-5 Dec
PS-3-263-111A	925 +/-5 Dec	944.221 +/-5 Dec
PS-3-263-111B	925 +/-5 Dec	944.111 +/-5 Dec
PS-3-263-111C	925 +/-5 Dec	944.221 +/-5 Dec
PS-3-263-111D	925 +/-5 Dec	944.111 +/-5 Dec

These setpoints were incorporated into Rev. 6 of DIS 1500-07 during the 1993 time frame and the instruments were set accordingly.

In 1995, it was recognized that negative margin in setpoint calculations was an inappropriate position and an effort was subsequently launched to remove negative margins from applicable calculations. This effort took place during the Tech Spec Upgrade Program (TSUP) at which time a significant quantity of calculations were being revised to support the upgrade program. ComEd Calculation NED-I-EIC-0114 was identified as one of the calculation to be revised to remove the negative margin.

The approach taken in this calculation revision was to remove the negative margin while justifying the existing setting. Information from the AE calculation was used as the design input in preparation of this revision. The UFSAR design limit of </=900 psig was not referenced in the calculation as a design input. Since the AE calculation referenced a >/= value for the setting, the same mind-set was carried over in preparation of Rev. 1 to NED-I-EIC-0114. It was concluded in the calculation that the setpoint remain the same at 944 psig and that positive margin can be assured with a 6 month surveillance.

Based on the above discussion, it is concluded that the root cause is an incorrect interpretation of a design input that was made in the AE setpoint calculation (Causal Code M.2.a) [NRC Cause Code A - Personnel Error]. The design input used in the setpoint calculation was obtained from the Dresden instrument surveillance procedure and was applied to ensure that the 900 psig decreasing setpoint was met when the calculated instrument uncertainties were taken into account. The UFSAR which establishes the </=900 psig limit was not checked to verify acceptability of this interpretation.

At the time the AE calculation was prepared, formal ComEd calculation procedures were not in place. There was also no established requirement that AE calculations be reviewed and accepted by ComEd prior to use. Procedures have since been developed that provice specific requirements for addressing design inputs and the use of calculations in design applications. The UFSAR is one of the sources that must be referenced when establishing design inputs. AE's are required to work to ComEd procedures when preparing calculations for use at the Dresden station. ComEd cognizant engineers are required to review and validate design basis to be applicable and current.

A contributing cause has been determined to be a misunderstanding of responsibilities for verifying design basis. The AE believed their responsibility to be limited to determining a new setpoint based on client provided instrument surveillance input data. No additional information was apparently provided to permit verification of the process limit (Causal Code A.3.f).

A subsequent opportunity became available to resolve the initial discrepancy during the preparation of Revision 1 to ComEd Calculation NED-I-EIC-0114. However, since the purpose of this calculation was to verify that negative margin could be removed from the existing setting without changing it, the design limit was not re-verified. Therefore, the incorrect design limit was carried through in this calculation.

It was also noted that previous revisions to DIS 1500-7 provided an opportunity to verify the design information but it was not. The procedure change process has subsequently been made more robust to ensure that licensing and design basis information is reflected correctly in the procedures.

D. SAFETY ANALYSIS:

The LPCI recirculation loop line break detection logic uses dP instruments which measure recirculation pump dP to determine the number of recirculation pumps running. If both recirculation pumps are running, the dP across both pumps will indicate greater than 2 psid. With both pumps running, the break detection DP logic will be applied, which provides the greatest break selection sensitivity. This mode of operation does not employ the LPCI </=900 psig loop break detection logic. Both Units 2&3 are normally only operated in the two loop recirculation mode.

If only one recirculation pump is operating (which would only be for a short period of time while proceeding to cold shutdown after an unplanned recirc pump trip at power), the recirculation pump trip provided by the pumping mode selector is required to allow detection of small breaks. A reactor vessel pressure permissive will delay the loop selection logic initiation until reactor pressure has dropped to a value </=900 psig to allow for coast down of any recirculation pump which has just been tripped. This setpoint optimizes sensitivity while ensuring that injection is not delayed unnecessarily.

A historical operability assessment of the as-found setpoint was performed by ComEd Nuclear Fuel Services (NFS). Information in design basis documents, the UFSAR and preliminary Siemens Power Corporation LOCA break spectrum results for ATRIUM-9B fuel was reviewed. NFS determined that the LPCI loop select logic with an interlock setpoint of 923 psig would have functioned as designed up to and including LOCA break sizes of 0.6 square feet. NFS also concluded that for break sizes larger than 0.6 square feet, this interlock would not be necessary. The larger break sizes de-pressurize the broken loop so rapidly that a single loop recirculation pump operation could not be mistaken for an intact loop by the LPCI loop select logic.

Based on this evaluation, the safety consequence of this event is considered to be minimal. Dresden and ComEd management fully recognize the importance of properly maintaining ECCS design basis setpoints, and a comprehensive set of actions is in place to address design basis issues.

E. CORRECTIVE ACTIONS:

1. Immediate action was taken to reconstitute Calculation NED-I-EIC-0114 and determine a new setpoint that ensured that the UFSAR design limit of </=900 psig would not be exceeded. A new setpoint of 868 psig on decreasing process was established. (Complete - NED-I-EIC-0114, Rev. 2)

2. The new calculated setpoint of 868 psig was issued under Setpoint Change Request's 02-97-014 (Unit 2) and 03-97-015 (Unit 3). (Complete)

3. Dresden Instrument Surveillance Procedure (DIS) 1500-07 was revised to reflect the new setpoints. (Complete - DIS 1500-07, Rev 9)

4. The setpoint changes were implemented under Station Work Requests 970023265 (Unit 2) and 970023266 (Unit 3). (Complete)

5. In response to calculation concerns raised during the NRC ISI, a procedure was prepared to address design input requirements. The procedure establishes the method of preparation, review, and approval of Design Input Requirements for a design change or calculations. The procedure includes the UFSAR to be checked as a source document. (Complete - NEP-12-01)

6. A procedure was developed to address the preparation of calculations. The procedure has been revised periodically in a continuing effort to provide procedural direction to improve the quality of calculations. The current revision of this procedure requires that the UFSAR be reviewed for applicable design inputs and that design inputs be validated to be applicable and current prior to use. (Complete - NEP-12-02)

7. A program has been established to monitor and improve the quality of calculations produced for the Dresden station. The program includes guidance for addressing and learning from comments made from offsite reviews performed by the ComEd Chief Engineers. (Complete - DTI DE-014, Rev. 0, dated 09/05/96)

8. Provide a lessons learned presentation on this LER at a Design Engineering tailgate. Focus on the importance of the procedural requirement for including the UFSAR as applicable design input for all calculation, including revisions. (Reference NEP-12-01 and NEP-12-02, Section 5.2.4). (NTS# 2371809700701)

F. PREVIOUS OCCURRENCES:

LER/Docket Number	Title
96-020/05000237	Containment Cooling Service Water Temperature Outside Design Basis

The Containment Cooling Service Water (CCSW) configuration was determined to be outside of design basis requirements on November 12, 1996. Reduced CCSW flow had been identified in August, 1996, during a surveillance that was being conducted to determine if the CCSW system was meeting its design basis. The Low Pressure Coolant Injection (LPCI) Heat Exchanger performance was determined to be degraded during a detailed system review in preparation for the Independent Safety Inspection in September, 1996. Inability to maintain the 20 psi differential pressure between CCSW and LPCI was identified in November, 1996. The root cause of the event has yet to be determined.

G. COMPONENT FAILURE DATA:

Not Applicable.