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)

NARCFACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Dresden Nuclear Power Station, Unit 2	05000237	1 OF 5

TITLE (4)
250V ESF Battery Not Tested As Required By Technical Specifications Due to Changes in Battery Loading Not Being Reflected in Service Testing

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	11	96	96	-- 019 --	01	04	17	97	Dresden, Unit 3	05000249
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N
POWER LEVEL (10)	097

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, NARC Form 366A)
	20.2203(a)(2)(iii)		50.36(c)(2)		50.73(a)(2)(viii)(A)		
	20.2203(a)(2)(iv)	X	50.73(a)(2)(i)		50.73(a)(2)(viii)(B)		
	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)
D. Spencer - Engineering Lead Ext. 3292	(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 an Independent Safety Inspection conducted by the NRC, it was identified that the 250 VDC System design load profile was incorrectly modeled for the actuation of several Motor Operated Valves (MOVs). Though modeled as starting at separate times, testing revealed overlap of starting currents. The model was revised to show simultaneous starts resulting in a higher peak current during battery loading. Both Unit 2 and 3 250V Batteries were affected.

Technical Specifications require the batteries to be tested to verify that capacity is adequate to supply emergency loads for the design duty cycle when the battery is subjected to a service test. Contrary to this, due to a personnel error in calculating the load profile, the most recent testing for the Unit 2 and Unit 3 250V Batteries did not account for a load profile representative of the associated MOVs starting simultaneously.

A battery capability analysis determined the battery capacity was adequate. Since the Unit 2 Battery service test did not account for the expected loading, the Unit 2 250V Battery was declared inoperable at 1810 on November 11, 1996.

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The 250V Batteries provide DC power to emergency loads in the opposite unit. Since Unit 3 was in cold shutdown, several Unit 3 DC components were placed out of service to reduce the projected load on the Unit 2 250 Battery. The Unit 2 250V Battery was declared operable at 1824 hours on November 11, 1996. Long term corrective action is in place to improve the quality of calculations performed for the Dresden station.

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:

250V ESF Battery not tested as required by Technical Specifications due to changes in battery loading not being reflected in the service testing.

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2(3) Event Date: 11/11/96 Event Time: 1810

Reactor Mode: N(N) Mode Name: Run(S/D) Power Level: 97(0)

Reactor Coolant System Pressure: 980(0) psig

B. DESCRIPTION OF EVENT:

This issue is reportable pursuant to 10CFR50.73 (a)(2)(i)(B) which requires that the licensee report any operation or condition prohibited by the plant's Technical Specifications. The 250V ESF Battery [EJ] was determined to have not been tested in accordance with Technical Specification 3/4.9 surveillance requirements.

During an Independent Safety Inspection conducted by the NRC, it was identified that the 250 VDC System design load profile was incorrectly modeled for the actuation of several Motor Operated Valves (MOVs) associated with the High Pressure Coolant Injection system. The MOVs had been modeled as starting at separate times but a review of MOV "VOTES" testing revealed overlap of starting currents. The model was revised to show simultaneous starts resulting in a higher peak current during the first minute of battery loading. Both Unit 2 and 3 250V Batteries were affected.

Technical Specifications require the batteries to be tested to verify that capacity is adequate to supply emergency loads for the design duty cycle when the battery is subjected to a service test. Contrary to this, the most recent testing for the Unit 2 and Unit 3 250V Batteries did not account for a load profile representative of the associated MOVs starting simultaneously.

A battery capability analysis was performed, with the results showing that the batteries could sustain the larger peak current during the first minute, and still supply their design load profiles for the remainder of the required four hour period. An evaluation of the Unit 3 250V Battery showed that its most recent service test was more demanding than the new design load profile. The evaluation for the Unit 2 Battery determined that the most recent service test did not account for the expected loading. Since the capacity had not been verified by test, the Unit 2 250V Battery was declared inoperable at 1810 hours on November 11, 1996.

The 250V Batteries provide DC power to normal operating loads in their associated unit and to emergency loads in the opposite unit. Since Unit 3 was in cold shutdown, several Unit 3 HPCI valves and the Aux. Oil Pump were placed out of service. This action reduced the projected load on the Unit 2 250 Battery below the value simulated in its most recent service test. The Unit 2 250V Battery was declared operable at 1824 hours on November 11, 1996.

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) [JE] actuation occurred as a result of this event.

C. CAUSE OF EVENT:

Battery discharge testing is performed to a load profile which reflects the sequence of loads expected during actual plant conditions. That load sequence or load profile is documented in the DC Electrical Load Monitoring System (ELMS). An analysis of the load profile contained in ELMS indicated that the peak load for the 250VDC batteries on units 2 and 3 was the maximum instantaneous or in rush current for an individual load on the battery. This method of establishing peak loading is in accordance with IEEE 485, section 4.2.3 which defines the peak loading for non coincidental loads as the maximum current at any one instant within a given minute time period.

Based on questions raised in November of 1996, the calculational data contained in ELMS was compared to field data obtained during valve testing. Specifically, the in- rush current duration of certain Motor Operated Valves (MOVs) assumed in ELMS was compared to current traces obtained by VOTES testing. During this review, it was determined that, due to differences in the actual versus calculated inrush current durations, the loads which actuated in the first two discrete time frames overlapped. Thus the peak current values assumed in ELMS did not envelope maximum expected values.

The actuation logic for the subject MOV's has an inherent delay due to a single relay operation. In the ELMS calculations reviewed in October 1991, this was considered adequate to avoid an overlap of the MOV inrush current. This consideration was substantiated by the fact that, on two of the larger MOV's for which VOTES testing data was obtained, the relay's operating time was longer than the inrush current of the valves. However, the MOVs which were in question during the 1996 review were smaller than those for which VOTES test data was available. It was determined that the smaller MOVs had a longer inrush current duration. The inrush current duration was in fact longer than the actuation time of the relay and therefore, the MOVs' in-rush currents overlapped.

The load profile calculation, which was prepared by an Architect Engineering (AE) firm, listed various assumptions that were used as design input. However, the fact that the test data from the larger MOV was also being used as design input for the smaller MOV was not documented as an assumption that required verification.

Because the data obtained for a large MOV was applied to a smaller MOV without committing to further substantiate the validity of this decision, the root cause of the event is concluded to be a misapplication of required design inputs (Causal Code M.2.a) [NRC Cause Code A - Personnel error].

At the time the calculation was prepared, a formal ComEd calculation procedure was not in place. Procedures have since been developed that provide requirements for addressing assumptions. Justification for all assumptions is required. In addition, if any assumption requires verification at a later date, such assumptions must be clearly identified within the calculation and be tracked to ensure closure.

Also, the 1991 calculation was prepared under severe time pressure which was a contributing factor in the event (reduced ability to interpret the design input causal code E.3.e).

D. SAFETY ANALYSIS

The safety significance of this event is minimal, given that the capacity of the 250V Station Batteries has been calculated to be adequate for the maximum load sequence. No event occurred which required the full loading of 250V Station Batteries.

E. CORRECTIVE ACTIONS:

1. Immediate actions were to remove loads from the unit 2 battery in order to bring the analytical load profile to a value within the values tested during the last service test. This action allowed the battery to be declared operable. (Complete)

2. Modification M12-3-96-008 was installed. This modification added a time delay relay in the intiation logic of the 3-2301-15 valve to avoid overlap of the valve's in-rush current. (Complete) This restored the Unit 2 250Vcc battery to service. Similar corrective actions are not required for the Unit 3 battery because its last service test was more restrictive than the revised load profile.

3. Review all 125Vdc and 250Vdc battery calculations to determine if any similar situations exist. (Complete)

4. A ComEd 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 all assumptions be identified, justified, and tracked to closure if verification is required. (Complete - NEP-12-02)

5. 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, dated 09/05/96)

6. Provide a lessons learned presentation on this LER at a Design Engineering tailgate. Focus on the importance of the procedural requirement for documenting all calculation assumptions, identification of assumption requiring verification, and tracking unverified assumptions to closure. (NTS Item 23718096019-01)

F. PRIOR SIMILAR OCCURRENCES:

A review of prior LERs was conducted for significant similar issues related to station batteries or programmatic breakdowns of this nature. No similar issues were identified.

G. COMPONENT FAILURE DATA:

Not Applicable.