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July 6, 1990

Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Dresden Nuclear Power Station Units 2 and 3
Supplementary Information on Proposed
Change to EPA Surveillance Interval
<u>NRC Docket Nos. 50-237 and 50-249</u>

Reference: (a) June 27, 1990 and May 21, 1990
Conference Calls with participants
from NRR (P. Eng, T. Dunning, R. Lobel)
and CECo (J. Silady et al.).

(b) Letter from J.A. Silady to T.E. Murley
dated April 18, 1990 on Proposed change
to EPA Surveillance Interval.

Dr. Murley:

This letter is in response to your staff's request for additional information during the Reference (a) conference calls on the Reactor Protection System Electrical Protection Assembly (EPA) surveillance interval Technical Specification change proposed in Reference (b). The information requested is provided in the following enclosures:

- Enclosure A contains a description of EPA breaker reliability during testing at six CECo reactors as well as reliability information from the Grand Gulf surveillance testing of EPA breakers.

- Enclosure B provides a description of the current status of the Main Steam Line Radiation Monitors power supply upgrade program.

- Enclosure C provides a description of a) Dresden's current vulnerability to potential trips during the performance of EPA breaker surveillances and b) other problems that may occur during the EPA breaker surveillance.

- Enclosure D provices examples of other plants that have experienced problems during EPA breaker testing.

Additional detailed technical information concerning the Reactor Protection System and the EPA's (schematics, vendor manual, test procedure, etc.) was previously provided in late April to the acting NRR Project Manager for Dresden.

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Please contact this office should further information be required.

Very truly yours,

J.A. Silady
Nuclear Licensing Administrator

cc: A.B. Davis - Regional Administrator, RIII
B.L. Siegel - Project Manager, NRR
S.G. DuPont - Sr. Resident Inspector, Dresden
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ENCLOSURE A

CECo BWR and Grand Gulf EPA Reliability

Dresden

Dresden's RPS EPA breakers were installed in Unit 2 and Unit 3 in 1983 and in 1984, respectively. Each unit utilizes 6 EPAs. Two are electrically located between RPS Bus A and its MG set, two are electrically located between RPS Bus B and its MG set, and two are electrically located between the RPS reserve power supply breakers (at the RPS bus) and the reserve RPS power supply. The EPAs are functionally tested every 6 months. During a functional test, each of the 6 EPAs are tripped once. There have been 9 functional tests performed on Unit 2 and 11 functional tests performed on Unit 3. This amounts to a total of 20 functional tests with 6 trip signals each, or a total of 120 trip signals. The EPAs are also calibrated every refuel outage. During a calibration surveillance each of the 6 EPAs are tripped a minimum of 6 times, for a total of 36 trip signals. The EPAs are tripped once by undervoltage, underfrequency, and overvoltage conditions. The time delays are also verified for all three of these abnormal conditions. These setpoints are typically checked several times to ensure repeatability. If any of these setpoints are found to be near or outside of acceptable limits, it is adjusted and tripped repeatedly until a proper setting is reached and verified to be repeatable. There have been 3 calibration surveillances performed on Unit 2 and 3 performed on Unit 3. This amounts to a total of 6 calibration surveillances with a minimum of 36 trip signals each, or a total of 216 trip signals. The 120 trip signals from functional tests added to the 216 trip signals from calibrations has resulted in a minimum of 336 EPA trip signals at Dresden Station without a failure to trip. Additionally, Dresden has had no failures to trip on demand during normal operation. This represents a total of 81 EPA-years of reliable operation at Dresden.

Quad Cities

Quad Cities Station's RPS system design is similar to Dresden's. Two EPAs are located electrically between each RPS M/G set and its associated RPS bus. There are two EPAs located between the reserve supply and the RPS Bus reserve supply breakers. The EPAs were installed on 4/25/83 for Unit 1 and 11/30/83 for Unit 2. Functional testing is performed every 6 months and calibration is performed once per operating cycle. Quad Cities has also experienced the same reliability as Dresden Station in that they have not experienced any failures to trip. This represents a total of 81 EPA-years of operation without a failure to trip on demand at Quad Cities.

LaSalle County

LaSalle County Station also has 6 EPAs installed per unit. LaSalle Station Units 1 and 2 received licenses to operate in April 1984 and December 1984, respectively. LaSalle has experienced one failure to trip on demand in June of 1985. LaSalle has experienced approximately 87 EPA-years of operation with one failure of an EPA to trip on demand.

Grand Gulf

Grand Gulf Station has 8 RPS EPAs which have been in service since 1982. Grand Gulf has performed 11 functional tests on these EPAs. These functional tests trip each EPA breaker a minimum of 3 times. Therefore, there have been a minimum of 264 trip signals to the EPA breakers. If adjustment of any of the setpoints is required, then more breaker trips are performed. Grand Gulf has also performed 4 calibration surveillances including one prior to startup. Each calibration surveillance trips each of the 8 EPA breakers a minimum of 6 times for a total of 48 trip signals per calibration surveillance. Therefore, there have been a minimum of 192 trip signals initiated during EPA breaker calibrations. The 264 trip signals from functional tests added to the 192 trip signals from calibrations has resulted in a minimum of 456 EPA trip signals with 3 failures to trip. These 3 failures occurred during functional testing. Grand Gulf has had a conservative total of 62 EPA-years of operation with only 3 failures to trip found during surveillance testing.

Summary

The sum of the EPA operating years for the CECo BWRs and Grand Gulf yields a total 311 EPA-years of operation (representing over 1300 trip signals) with only 4 failures to trip on demand.

Problem Description and Corrective Actions for Main Steam Line Rad Monitors (MSLRMs)

Each RPS MG set is equipped with a pair of EPAs located between the MG set and the RPS Bus. The reserve power supply is also equipped with a pair of EPAs. To functionally test the EPAs for an MG set, the corresponding RPS bus is placed on the reserve power supply. The transfer of power is a "dead bus transfer" which causes a loss of power to the affected RPS bus and a subsequent half scram by design. RPS Bus A supplies power to the MSLRMs "A" and "C". Loss of power to the MSLRMs will cause not only a half scram but a half Group I Primary Containment Isolation. MSLRMs "B" or "D" are not affected by the EPA surveillance since they are powered from the Essential Service Bus via an uninterruptible power supply.

Dresden has encountered problems with resetting half scrams after the transfer of power to the reserve RPS Bus has been completed. The MSLRMs have experienced a mode unknown status when power is lost and then restored. This unknown mode will not allow the half scram nor the Group I Isolation signal to be reset. With regard to the mode unknown behavior, the NUMAC unit is designed to automatically initialize when power is applied to the unit. This is also designed to continue to operate with interruption of power for up to 20 milliseconds, to accommodate automatic bus transfers. However, power interruptions longer than 20 milliseconds and less than several seconds can lead to incorrect initialization and the observed symptom of "mode unknown".

Analysis has shown that the "mode unknown" condition can occur either due to manual switching of busses, resulting in a longer than 20 milliseconds loss of power, or due to "bounce" on the switch, which results in interruption of the initialization process. The specific result of the mode unknown condition is that the main NUMAC computer is not properly initialized and communications to the display computer are not established. The display computer is designed to display "mode unknown" in the event of loss of communications from the functional computer.

An improved design of the functional computer is available from G.E. and this modifies the initialization control circuitry to eliminate the problem of the mode unknown condition. All MSLRMs have been upgraded with the improved initialization control circuitry software.

Dresden has also replaced the low voltage power supplies (LVPS) on all MSLRMs except the "3D" in response to recommendations from G.E. Service Information Letter (SIL) 499, NUMAC Low Voltage Power Supply Reliability. The LVPS will be installed in the 3D monitor during the upcoming quarterly surveillance in August, 1990. G.E. recommended two other improvement items which were 1) replacement of the line fuses with 5 amp slow blow fuses and 2) installation of a transient suppressor. These improvement items are being implemented on all of the MSLRMs. The station is also in the process of replacing the EPROM chips to eliminate the spurious downscale spikes which have occurred in the past.

ENCLOSURE C

Potential Problems Which Could Occur During Performance of RPS EPA Functional Testing

During performance of Dresden Technical Staff Surveillance 500-2, "Functional Testing of RPS MG Set and RPS Reserve Power Supply", the Channel A RPS Bus is deenergized twice, once while transferring to reserve power and again while transferring back to normal power after completion of the surveillance. As a result of these required bus deenergizations, a 1/2 scram and 1/2 Group I, II and III Primary Containment Isolations occur. The Channel B RPS Bus is also deenergized twice during this surveillance, once while transferring to reserve power and again while transferring back to normal power. When the Channel B RPS Bus is deenergized a 1/2 scram occurs. For Channel B, the 1/2 Group I, II and III Primary Containment Isolations do not occur because the Channel B Primary Containment Isolation logic is fed from the Essential Service System. During the time it takes to transfer power to the deenergized bus and reset the 1/2 scram, the possibility exists for a full scram or a full Group I, II or III Primary Containment Isolation to occur.

The following are examples of potential problems that could then occur and cause either a direct, full reactor scram or a full Group I Isolation (with associated reactor scram) during the performance of this surveillance.

1) Local power range monitor spikes of sufficient magnitude to result in an APRM Hi-Hi half scram.

2) Spurious Main Steam Tunnel High Temperature trips.

3) Main Steam Line Low pressure trips. (Previously experienced due to instrument rack vibration. Vibration dampeners have been installed on the affected instrument racks).

4) Main Steam Line Radiation Monitor failure to reset upon reenergization.

ENCLOSURE D

Additional Examples of EPA Testing Problems

Two instances of reactor trips related to EPA testing occurred at Dresden in 1989 as discussed in the Reference (b) submittal and the November 7, 1989 request for emergency Technical Specification relief.

The following are additional examples of EPA testing problems including those which occurred during shutdown conditions. If similar problems had been experienced during power operation, reactor isolations and scrams could have occurred.

1) August 25, 1988, WNP-2 experienced a full reactor scram during calibration and functional testing of EPA breakers. The plant also received numerous Nuclear Steam Supply Shutoff System Isolations as a result of loss of power on the RPS bus.

2) February 3, 1990, Susquehanna 1 experienced a loss of shutdown cooling (reactor in mode 4 at the time of the transient) during the transfer of power supplies to an RPS bus in preparation for EPA breaker testing. Although alternate shutdown cooling systems were available, reactor coolant temperature reached 200°F and an alert was declared.

3) May 18, 1990, Nine Mile Point 2 lost shutdown cooling for a period of 20 minutes during the testing of EPA breakers. The testing procedure did not identify the need to defeat an isolation signal to shutdown cooling system. Shutdown cooling was restored with reactor coolant temperature reaching 120°F from an original temperature of 115° F.

4) August 4, 1987, Fermi 2 received a full closure of the MSIVs during testing of the EPA breakers. With DIV 1 RPS already on alternate supply, the trip occurred when DIV 2 RPS was manually transferred to its alternate supply. The unit was in cold shutdown before and after the event.

5) August 13, 1987, Nine Mile Point 2 inadvertently isolated Shutdown Cooling when they opened DIV 1 EPA breaker in preparation for the EPA surveillance. They had difficulty in resetting the isolation because the DIV 1 EPA breaker which was opened would not reset. Alternate shutdown cooling was not needed since coolant temperature did not increase.