March 10, 1981

INTERIM REPORT

POST FIRE SHUTDOWN CAPABILITY
DRESDEN STATION, UNITS 2 AND 3

Section 4.1 of the SER, Safe Shutdown Systems, states that the licensee has not determined the consequences of fire damage in all areas and the impact on the capability for safe shutdown. It further states that the licensee will confirm that the capability for safe shutdown exists which is independent of systems which could be damaged by a fire in the area or an alternative means for safe shutdown will be provided. The fire areas addressed in the SER are as follows:

- Reactor Building, Ground Floor, Elevation 517 ft.
- Reactor Building, Mezzanine Floor, Elevation 545 ft.
- Reactor Building, Main Floor, Elevation 570 ft.
- Control Room
- Auxiliary Electrical Equipment Room
- Turbine Building, Unit 3 Cable tunnel
- Turbine Building, Ground Floor, Elevation 517 ft.
- Turbine Building, Mezzanine Floor, Elevation 538 and 534

By letters dated June 5, 1978, January 23, 1980, January 24, 1980, February 29, 1980, October 31, 1980, and November 5, 1980, the licensee has discussed the safe shutdown program. These documents are titled respectively, Fire Protection Safe Shutdown Analysis, dated June 1978; Fire Protection Safe Shutdown Analysis; Fire Protection Safe Shutdown Analysis, Supplement 1, Cold Shutdown Analysis, dated January 1980; Fire Protection Safe Shutdown Analysis, Enclosure 2; Fire Protection Safe Shutdown Analysis Attachment 1; and Response to NRC Request Concerning Interim Criteria for Shift Staffing, Attachment.

The Dresden program for safe shutdown relies on existing system equipment plus manual realignments of valves and local control of pumps and circuit breakers to achieve hot and cold shutdown. The safe shutdown program also relies heavily on existing or proposed fire protection methods. Primary coolant inventory will be maintained by a variety of equipment such as the control rod drive pump, the Feedwater System, the High Pressure Coolant Injection (HPCI) System, and the Low Pressure Coolant Injection (LPCI) System. Overpressure protection will be provided by the relief and/or safety valves and the isolation condenser. Decay heat will be removed using a variety of systems to include the Isolation Condenser, the Shutdown Cooling System, LPCI, the Main Condenser and the Condensate System.

We have evaluated the post fire shutdown capability using NRC guidelines in "Staff Position Safe Shutdown Capability" dated June 19, 1979 and NRC requirements in Section III.L of Appendix R to 10 CFR Part 50. We have found that:

1. The post fire shutdown capability has not been shown to be isolated from associated circuits so that fire damage to the associated circuits in a fire area may not prevent the operation of shutdown equipment.

2. The review indicates that all fire areas have not been addressed to insure a safe shutdown capability will exist after any fire.

3. The post fire support functions have not been shown to be capable of providing the lubrication and component cooling necessary to permit the operation of equipment used for shutdown functions. In addition, it is not clear if instrument and service air can be lost and safe shutdown be achieved.

4. The post fire process monitoring function has not been shown to be capable of providing direct readings of the process variables necessary to perform and control shutdown functions. The licensee has not clearly shown that reactor coolant temperature, radiation levels, suppression pool-temperature and level, and applicable flow rates will be monitored.

5. In the January 23, 1980 response to NRC question 8(f) the licensee says that the plant modifications are not complete and the procedures have not been written. The response does not address how manual operation of valves will be conducted to assure a safe shutdown can be achieved. The response to NRC question 8(h) in the January 23, 1980 submittal indicates manpower requirements will not be known until the procedures are written for question 8(f). The licensee has not demonstrated how manual valve operation will allow the safe shutdown of the plant if it is not known whether or not sufficient manpower is available. Also some fire zones, such as 1.1.2.3A and 1.1.1.3A, page 3-10 and 3-4 of the Hot Shutdown submittal have the valve located inside the zone. The licensee has not demonstrated how manual valve operation will be performed in the zone containing the fire.

6. Items 3.1.8, page 3-28, Item 3.1.9, page 3-31, Item 3.1.10, page 3-33 and Item 3.1.1.1, page 3-35 utilize the HPCI System for Reactor Water Makeup. The licensee then states, therefore up to two hours are available before reactor water makeup is necessary. There is no information presented to explain why no reactor water make-up will be provided until after two hours have passed.

7. The submittal proposes to isolate the Condensate Transfer Pumps by utilizing fuse disconnects. In our opinion, fuse removals should not be permitted during repairs as possible changes in design logic could result if allowed.

8. The response to question 8(i), acceptance testing, in the January 23, 1980 submittal is not valid. This question must be answered to assure that in the event an item of equipment is required to function in the local control mode that this operation will not be impaired by the control room.

9. The Hot Shutdown Analysis, Item 1.4, Assumptions, page 1-5 states that loss of off-site power will not occur. The October 31, 1980 submittal, page 2 states a modification is currently being installed to power fire detection and suppression systems from emergency power sources. This submittal does not provide an analysis showing that safe shutdown can be achieved with the loss of off-site power.

10. The post fire shutdown capabilty depends on fire protection measures at least in part in every fire area except Fire Areas 6.1 and 6.2. These protection features should meet the NRC requirements of Section III G of Appendix R to 10 CFR Part 50.

We conclude that the proposed alternative shutdown capability for the Dresden Station Units 2 and 3 does not conform with NRC guidelines and requirements and, therefore, is unacceptable.

We recommend the following:

A. The alternative shutdown capability should be modified to meet the requirements of Section III L of Appendix R to 10 CFR Part 50, taking into consideration the above findings.

B. The licensee should demonstrate that adequate acceptance tests are being performed to provide local control as a replacement for the components lost in the fire. These tests should verify that: The equipment operates from the local control station when the transfer or isolation switch is placed in the "local" position and that the equipment cannot be operated from the control room; and that equipment operates from the control room but cannot be operated at the local control station when the transfer or isolation switch is in the "remote" position as per NRC Staff Position. The response to question 8(i) of the January 23, 1980 submittal does not fully answer this question. If the CECo. Quality Assurance Program Procedures for fire protection cover these types of tests the resubmittal should so state explicitly.

C. The licensee should demonstrate that procedure(s) have been developed which describe the tasks to be performed to effect the shutdown method. Also, the licensee should demonstrate that the manpower required to perform the shutdown functions using these procedures, as well as to provide fire brigade members to fight the fire is available as required by the fire brigade technical specifications. The answers to items 8(h) and 8(f) in the January 23, 1980 submittal are incomplete.

D. The licensee should demonstrate how valves located in the effected fire zone/area are going to be manually operated.

E. The licensee should address all items identified in the SER as requiring further analysis, namely items 5.1.2, 5.1.3, 5.1.4, 5.3, 5.4, 5.9.3, 5.9.4, and 5.9.5.

F. The licensee should demonstrate that process monitoring instrumentation is available to completely monitor the plant to assure a safe shutdown is being reached. This should include flow indication for each system used to safely shutdown the plant such as the RBCCW System and the Service Water System. Additional process monitoring capability should include reactor coolant temperature, suppression pool temperature and level, and radiation levels.

G. The licensee should demonstrate that the supporting functions are capable of providing the process cooling, lubrication etc. necessary to permit the operation of the equipment used for safe shutdown by the systems identified in items 3.1 thru 3.4 in the NRC's "Staff Position Safe Shutdown Capability" dated June 19, 1979.

H. The licensee should provide the technical basis which supports the fact that when HPCI is used for reactor water makeup there can be a two hour delay in adding water to the vessel.

I. The licensee should provide an isolation system, similar to the response for question 8(c) #2 in the January 23, 1980 submittal, utilizing perhaps an isolation switch to achieve local control rather than through fuse disconnects which is not acceptable.

J. The licensee should demonstrate that safe shutdown can be achieved upon the loss of off-site power.

K. The licensee should demonstrate that the equipment and systems used to achieve and maintain hot shutdown conditions are capable of maintaining such conditions for an extended period of time longer than 72 hours.

L. Section III.G of Appendix R to CFR Part 50 requires cabling for or associated with redundant safe shutdown systems necessary to achieve and maintain hot shutdown conditions be separated by fire barriers having a three hour fire rating or equivalent protection (see Section III.G.2 of Appendix R). Therefore, if option III.G.3 is chosen for the protection of shutdown capability, cabling required for or associated with the alternative method of hot shutdown for each fire area must be physically separated by the equivalent of a three-hour rated fire barrier from the fire area.

In evaluating an alternative shutdown method, associated circuits are circuits that could prevent operation or cause malfunction of the alternative train which is used to achieve and maintain hot shutdown conditions due to fire induced hot shorts, open circuits, or shorts to ground.

Safety related and nonsafety related cables that are associated with the equipment and cables of the alternative or dedicated method of shutdown are those that have a separation from the fire area less than that required by Section III.G.2 of Appendix R to 10 CFR 50 and have either (1) a common power source with the alternative shutdown equipment and the power source is not electrically protected from the post fire shutdown circuit of concern by coordinated circuit

breakers, fuses, or similar devices, (2) a connection to circuits of equipment whose spurious operation will adversely effect the shutdown capability, e.g., RHR/RCS isolation valves or (3) a common enclosure, e.g., raceway, panel, junction box with alternative shutdown cables and are not electrically protected from the post fire shutdown circuits of concern by circuit breakers, fuses, or similar devices.

For each fire area where an alternative or dedicated shutdown method, in accordance with Section III.G.3 of Appendix R 10 CFR Part 50 is provided by proposed modifications, the following information is required to demonstrate that associated circuits will not prevent operation or cause malfunction of the alternative or dedicated shutdown method.

(1) Provide a table that lists all equipment including instrmentation and support system equipment that are required by the alternative or dedicated method of achieving and maintaining hot shutdown.

(2) For each alternative shutdown equipment listed in (1) above, provide a table that lists the essential cable (instrumentation, control and power) that are located in the fire area.

(3) Provide a table that lists safety related and nonsafety related cables associated with the equipment in cables constituting the alternative or dedicated method of shutdown that are located in the fire area.

(4) Show that fire induced failures of the cables listed in (2) and (3) above will not prevent operation or cause malfunction of the alternative or dedicated shutdown method.

(5) For each cable listed in (2) above provide a detailed electrical schematic drawing that shows how each cable is isolated from the fire area.

M. The residual heat removal system is generally a low pressure system that interfaces with the high pressure primary coolant system. To preclude a LOCA through this interface, we require compliance with the recommendations of Banch Technical Position RSB 5-1. Thus, this interface most likely consists of two redundant and independent motor operated valves. These two motor operated valves and their associated cable may be subject to a single fire hazard. It is our concern that this single fire could cause the two valves to open resulting in a fire-initiated LOCA through the subject high-low pressure system interface. To assure that this interface and other high-low pressure interfaces are adequately protected from the effects of a single fire, we require the following information:

Identify each high-low pressure interface that uses redundant electrically controlled devices (such as two series motor operated valves) to isolate or preclude rupture of any primary coolant boundary.

Identify the device's essential cabling (power and control) and describe the cable routing (by fire area) from source to termination.

Identify each location where the identified cables are separated by less than a wall having a three-hour fire rating from cables for the redundant device.

For the areas identified in the above paragraph, provide the bases and justification as to the acceptability of the existing design or any proposed modifications.