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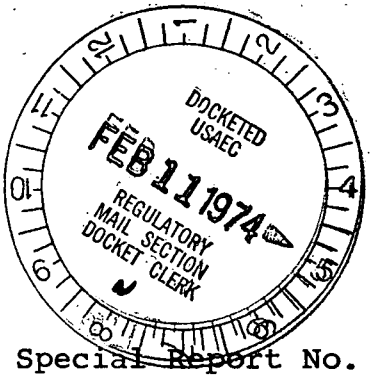
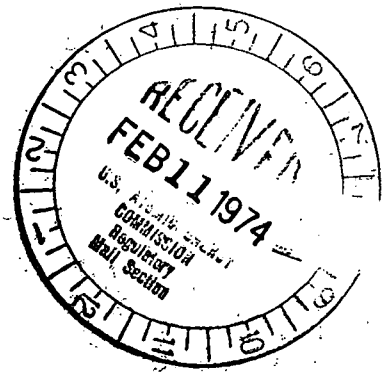
Regulatory Docket File

February 4, 1974





Mr. D. J. Skovholt
Assistant Director for
Operating Reactors
Directorate of Licensing
Office of Regulation
U.S. Atomic Energy Commission
Washington, D.C. 20545

Subject: Dresden Station Special Report No. 29, "Dresden Unit 3 - Transient Analyses for Cycle 2 Using Current Methods," Supplement A - AEC Dkt 50-249

Dear Mr. Skovholt:

Attached is Supplement A to Dresden Station Special Report No. 29. This supplement discusses the transient analysis for Dresden Unit 3 for core exposures beyond those discussed in Special Report No. 29. As indicated in a letter to you dated October 18, 1973, the analyses discussed in Special Report No. 29 were expected to be applicable to Dresden Unit 3 through the end of fuel Cycle 2, which was scheduled for mid-January 1974. Since the fuel cycle was extended to mid-February 1974, it will be necessary to further derate Unit 3 to 91% power during the last two weeks of fuel cycle 2.

The analyses discussed in Dresden Special Report No. 29 were performed using the "B" scram reactivity curve shown on Figure 1 of the report. The pressure transient analysis discussed in the attached Supplement A was performed using the "C" scram reactivity curve shown on Figure 2 of Supplement A. As can be seen by comparing the two curves, the "C" curve has a slower initial rate of negative reactivity insertion during a scram; therefore for similar initial conditions, a postulated pressure transient with the "C" curve results in higher predicted peak pressures. This increase in peak pressure is limited to an acceptable level by limiting the initial condition of reactor power.

As of February 4, 1974, Dresden Unit 3 will be limited to 91% of rated reactor thermal power. This will ensure that the unit will remain within all transient limits established in the Final Safety Analysis Report until the end of fuel cycle 2 (currently scheduled for February 15, 1974).

One signed original and 39 copies of this supplement are provided for your use.

Very truly yours,

J. S. Abel
Nuclear Licensing Administrator
Boiling Water Reactors

Att.

DRESDEN UNIT 3

End of Cycle 2 Scram Reactivity

The current scram reactivity bases, the "B" curve analysis described in Dresden special report number 29 (SR-29), is valid for 97% power operation out to 2750 Mwd/T into cycle 2. Operation beyond 2750 Mwd/T to the end of cycle condition under SR-29 is valid only for powers of 91% of rated or lower. The possibility of operation at this reduced power was previously indicated in reference (1). The end of cycle condition is 4000 Mwd/T.

The reduction in power is required to maintain the recommended pressure margin between the lowest safety valve set-point and the peak pressure of the turbine trip without bypass transient. The turbine trip without bypass transient results in the highest pressure for the single failure type transients. It is a measure of the relative response of other similar transients. As such, determination of the acceptable margin for the turbine trip without bypass transient indicates acceptability of the margins for the other similar transients. The attached figure, Figure 1, shows that operation of the plant at 91% power beyond 2750 Mwd/T with the end of cycle ("C") scram reactivity curve results in the recommended pressure margin.

Initial conditions prior to the event are reactor power at 91 percent of licensed, core recirculation flow at 98 million lb. per hour and reactor steam dome pressure at 1005 psig. The relief valve setpoints remain unchanged.

The sudden closure of the turbine stop valves with no initial bypass flow causes a rapid rise in system pressure at a rate essentially double that which results when the bypass system functions. Position switches on the stop valves initiate immediate reactor scram. The rapid pressurization causes core void collapse and neutron flux increases, peaking at about 136 percent of the initial value at the start of the transient before the scram becomes effective. Core average surface heat flux dips initially and then increases to 97 percent of its initial value at the start of the transient at about 1.7 seconds. No significant reduction in MCHFR occurs as the core recirculation flow increases due to the reduction in core voids resulting from the pressure increase and the reactor scram and the heat flux increase is small.

Reactor pressure rises to the set point of the first relief valve within 2.0 seconds and all relief valves are open by 2.2 seconds. The peak pressure at the location of the safety valves is 1185 psig which is 25 psi below the 1210 psig set point of the first two safety valves.

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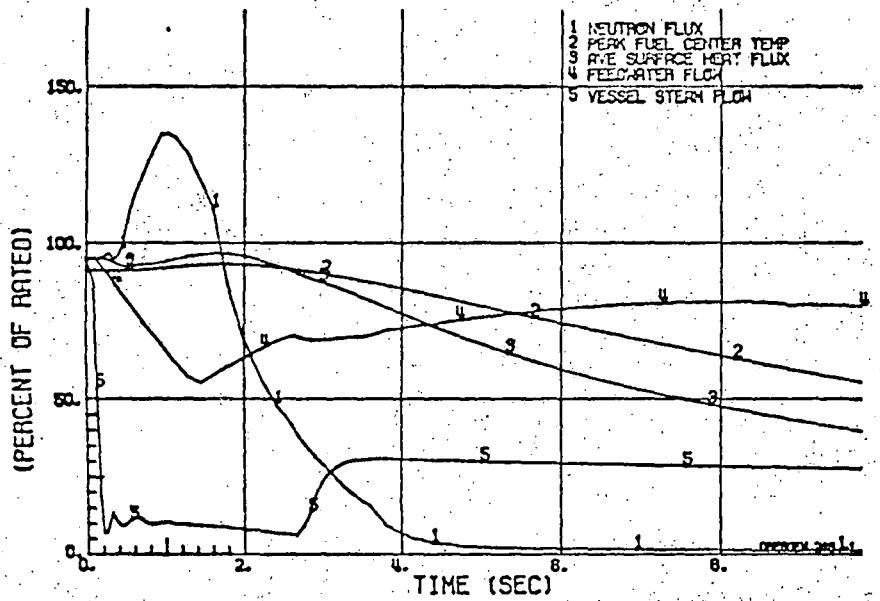
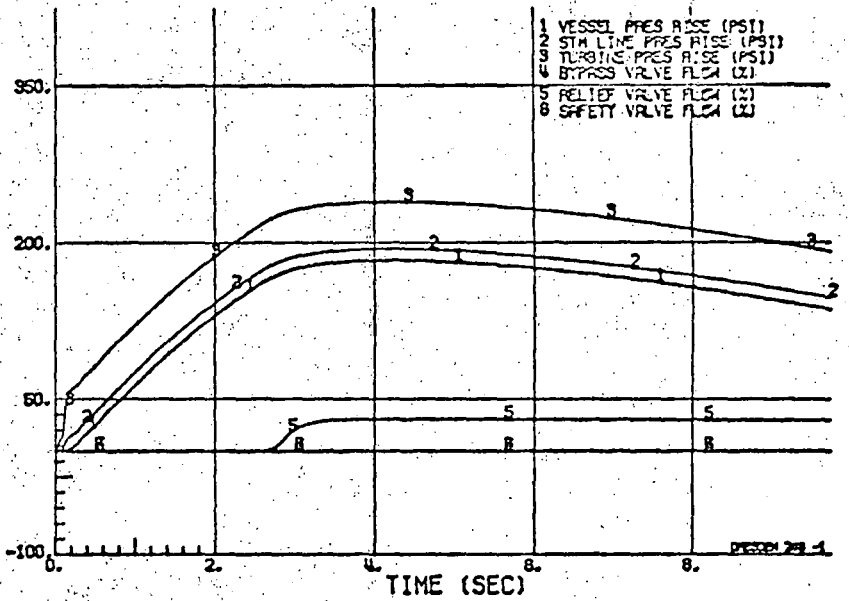
(1) J. S. Abel letter to D. J. Skovholt, "Scram Reactivity Limitations for Dresden Units 2 and 3 and Quad Cities Units 1 & 2 - AEC dkts. 50-237, 50-249, 50-254, and 50-265," dated October 18, 1973.





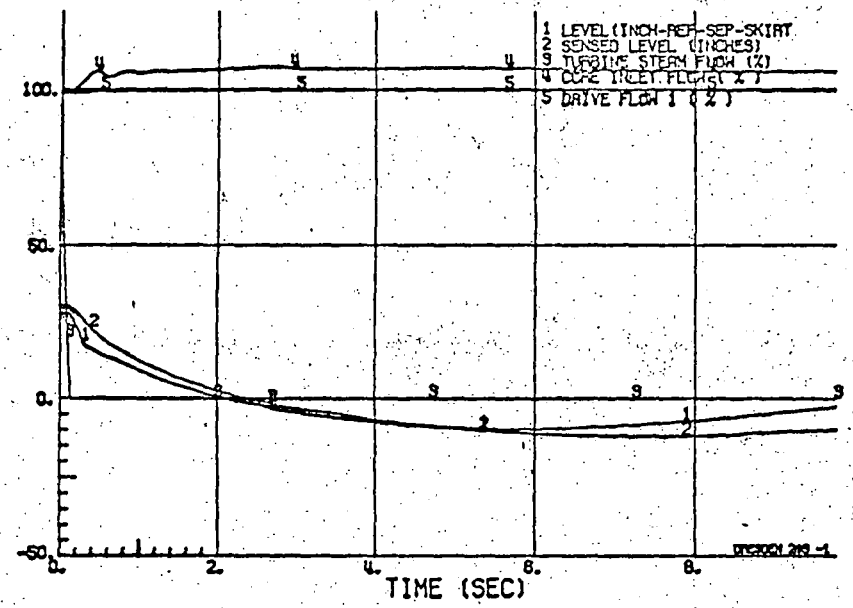


Figure 1 - Dresden-3 Reload 1 Cycle 2

Turbine Trip-No Bypass-Trip Scram

91% Rated Power

FIGURE 2
Dresden 3
Scram ΔK Curves