



February 14, 1994

Docket No. 52-001

Chet Poslusny, Senior Project Manager  
Standardization Project Directorate  
Associate Directorate for Advanced Reactors  
and License Renewal  
Office of the Nuclear Reactor Regulation

Subject: Submittal Supporting Accelerated ABWR Schedule -  
**Simultaneous Withdrawal of a Control Rod and FMCRD**

Dear Chet:

Enclosed is the write-up on the consequences of simultaneous withdrawal  
of a control rod and its FMCRD you requested.

Please provide a copy of this transmittal to Dave Diec.

Sincerely,

Jack Fox  
Advanced Reactor Programs

cc: Alan Beard (GE)  
Gary Ehlert (GE)  
Norman Fletcher (DOE)  
Joe Quirk (GE)  
Craig Sawyer (GE)

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## CONSEQUENCE OF SIMULTANEOUS WITHDRAWAL OF CONTROL ROD AND FMCRD

In the unlikely event that a control rod and its FMCRD are removed simultaneously, sufficient capability is available to maintain RPV water level while emergency action is taken to plug the opening in the bottom of the vessel. The FMCRD orifice is 60mm in diameter, producing an expected flow rate from the opening of 96 cubic meters/hr. Any motor driven ECCS pump or condensate/feedwater pump can maintain water level. The lower drywell volume up to the equipment platform is 106 cubic meters. At this flow rate, it takes a little over an hour for the water level to reach the tunnel entrances and begin flowing into the access tunnels. It is expected that the plant personnel can close the equipment hatch and secure a sufficient number of bolts within this period of time. The leakage around this hatch can be easily maintained by sump pumps in the secondary containment.

In the time it takes to fill the lower drywell up to the openings that connect the lower drywell to the upper drywell inside the connecting vents plant personnel on the refueling floor can replace the control rod. Plant personnel can easily perform this operation, because the fuel channels surrounding the missing control rod blade will act as guides for replacing the missing control rod blade.