



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

March 27, 1987

*50-250*  
Docket Nos. 50-275  
and 50-323

MEMORANDUM FOR: Chairman Zech  
Commissioner Roberts  
Commissioner Asselstine  
Commissioner Bernthal  
Commissioner Carr

FROM: Thomas M. Novak, Acting Director  
Division of PWR Licensing-A

SUBJECT: BOARD NOTIFICATION REGARDING BNL DRAFT REPORT  
ON SPENT FUEL POOL ACCIDENTS, (BN 87-05)

In accordance with NRC procedures for Board Notification (BN) we are providing for your information the following enclosed Brookhaven (BNL) draft report:

"Beyond Design-Basis Accidents in Spent Fuel Pools (Generic Issue 82)," Department of Nuclear Energy, Brookhaven National Laboratory, Draft, January 1987, transmitted by letter from K. R. Perkins (BNL) to E. Thom (NRC), dated February 5, 1987.

The report addresses the risk of spent fuel storage at nuclear power plants and includes an evaluation of accident initiating events and their probabilities, fuel cladding failure scenarios arising from uncertainties in Zircaloy oxidation reaction rate data, and the potential for releases of radionuclides under various cladding failure scenarios. The draft report presents the results of a study performed by BNL for the staff on Generic Issue 82, "Beyond Design-Basis Accidents in Spent Fuel Pools." The draft report has been distributed widely within the staff for a peer review. Like most of the Generic Issues and Unresolved Safety Issues currently being studied by the staff, the likelihood of beyond design basis accidents is being examined to assess whether vulnerabilities could exist which might require further consideration of changes in design or operations. Preliminary staff opinion is that substantial portions of the report will need more critical review because some assumptions appear to be oversimplified. Comments will be provided to BNL and the final report is expected to be issued this summer.

The contractor states, based on these preliminary results, that the risk from spent fuel pools is comparable to the risk from core melts in general. The spent fuel pool risk is primarily due to postulated fires from self-sustaining oxidation of the Zircaloy cladding of the spent fuel stored in high-density racks if water is lost from the pool. The dominant causes of water loss are due to structural failures of the pool caused by dropping of a spent fuel cask or by an earthquake. However, all of the estimates of the factors affecting the risk are preliminary and the report is less an estimate of the risk than identification of the factors that need further study in order to make a reasonably accurate estimate of risk.

~~87-05-312~~

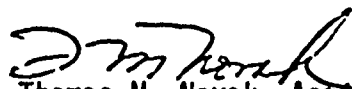
7pp.



Based on a brief review, the staff expects that the final result of the study is likely to provide a much lower estimate of risk. The risk estimate in the report is not based on an analysis of the structural capability of fuel pools, but of similar concrete structures. Furthermore, the report effectively assumed that failure of the pool would result in the loss of integrity of the pool liner without considering whether the strain would be sufficient to fail the liner. Based on other seismic risk studies, the fuel pool could require a much stronger, and therefore less probable, earthquake than that required to fail the systems necessary to control reactivity and cool a core. Failure due to a cask drop is not likely now since casks are used infrequently at only a few plants.

The report also assumes that all of the cesium would be released from the equivalent of three cores if a Zircaloy fire occurred. While the spent fuel in a pool has less of the short half-life fission products than a fresh core, this would primarily only affect estimates of early fatalities. However, in the analysis of the fraction of cesium released from the spent fuel, it was assumed that all of the fuel was at the maximum calculated clad temperature. If the radial and axial temperature distribution were considered, the calculated release fraction would likely be less, possibly by a factor of two. The report also assumes no retention of cesium in the fuel pool building. Even if an earthquake destroyed the building, the debris would likely cause much of the cesium to be retained. Other studies of the cesium retention in similar buildings and the large fraction of cesium retained at Chernobyl indicate that the report may underestimate retention by a factor of ten. Overall the report may overestimate the risk from fuel pools by a factor of about 200.

The draft report does not pertain directly to currently ongoing licensing efforts for spent fuel pool expansion amendment requests by utilities, including hearings. However, we believe that the subject may involve substantial public, press or Congressional interest. For this reason we are providing you with the enclosed report. We also are providing the report, by copy of this Board Notification, to the Boards and Service Lists for the Diablo Canyon Plant and Vermont Yankee Station. We will inform you of further developments.

  
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Enclosure:  
As stated

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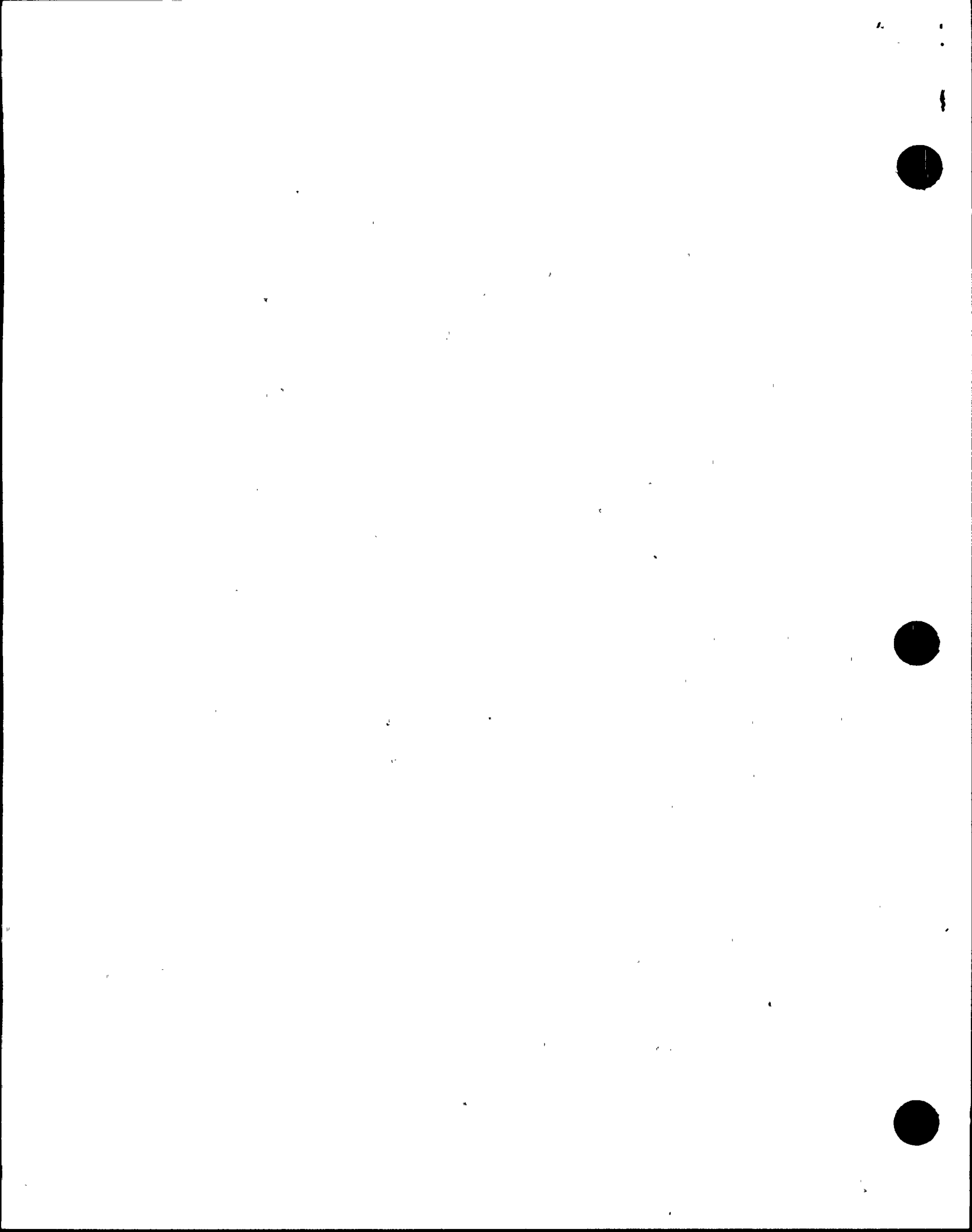
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