



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

MAR 4 1983

MEMORANDUM FOR: Darrell Eisenhut, Director
Division of Licensing

FROM: Themis P. Speis, Director
Division of Safety Technology

SUBJECT: BNL REVIEW OF LGS PRA

Per your letter of May 6, 1980, the Philadelphia Electric Company (PECo) performed a preliminary risk assessment of the Limerick Generating Station (LGS). As part of the staff review, Brookhaven National Laboratory (BNL) was contracted to evaluate and assess the applicant's Probabilistic Risk Assessment (PRA). The BNL final report was received February 22, 1983, as NUREG/CR-3028.

BNL calculated a mean frequency of core damage for the Limerick plant of 1.0×10^{-4} per year of reactor operations as compared with the value of 1.5×10^{-5} per year of reactor operations inferred by the PECo PRA. BNL calculated that the value of the mean acute fatalities for Limerick is 4.8×10^{-5} per year of reactor operations as compared with the value of 2.4×10^{-6} per year of reactor operations calculated by the PECo PRA. The mean latent fatalities calculated by BNL is 0.18 per year of reactor operations versus 0.012 by the PECo PRA. The paramount contributor to these differences is due to the higher core damage frequency estimated by BNL. There are other contributors, e.g., consequence analyses, which the staff is evaluating.

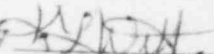
The overall results are reproduced here in summary fashion.

Source	Mean Core Damage Frequency	Mean Frequency of Acute Fatalities	Mean Frequency of Latent Fatalities
PECo PRA	1.5×10^{-5}	2.4×10^{-6}	.012
BNL Reassessement	1.0×10^{-4}	4.8×10^{-5}	.18
WASH-1400 BWR	5.7×10^{-5}	3.0×10^{-5}	.021

You should be aware that these numbers have large uncertainties associated with them. The magnitude of the uncertainties were estimated by BNL and will be evaluated by the staff. BNL estimates that there is an 80 percent likelihood that the core damage frequency for LGS is less than 1×10^{-4} per reactor year of operation.

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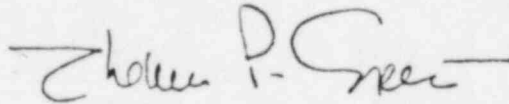
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The staff is exploring what appear to be the important causes that give rise to these different results. BNL considers that the differences are primarily due to three factors: (1) the dependencies that exist as a result of common support systems, and dependencies between an initiator and a mitigating system, (2) the corrections and modifications to the event trees and the fault trees, and (3) the estimates of the frequency for some initiating events. PECO has disagreed (letters from V. G. Boyer, PECO, to D. G. Eisenhut, NRC, dated December 22, 1982, and January 25, 1983) with some aspects of the BNL review. The staff in its assessment of the BNL review will focus attention on areas of disagreement between BNL and PECO. The staff will focus specific attention to the following issues which impact dominant accident sequences

1. The staff is evaluating the initiating event frequency for loss of offsite power transients. The differences appear centered upon perceptions that led to data selection e.g., nuclear versus fossil plant operating experience, partial versus total losses of offsite power, and switchyard versus network caused losses. The staff is evaluating the data to select that data base most representative of the LGS.
2. There is a difference between the probability of recovery of the power conversion system after transients generally referred to as "Loss of Feedwater." The difference appears centered around the estimated time for recovery of the feedwater function for either high pressure injection or containment heat removal.
3. The staff is evaluating the estimated reliability of manual depressurization and if the operating procedures can be improved to enhance the conditional reliability of manual depressurization.
4. The staff is reviewing the probabilities for HPCI restart and considering improvements that can be made to the high pressure injection systems' availability. There are potential procedural changes to achieve alternative room cooling for the HPCI and RCIC systems.
5. Both BNL and PECO modelled the plume pathway emergency response modes with the same model as used in WASH-1400 for comparison purposes. The staff is considering the sensitivity of the results to the plume exposure pathway emergency response modes for other purposes.

The mean core damage frequency could be changed significantly by the resolution of the first four issues. For each issue, the staff's resolution shows the potential to reduce the value calculated by BNL for the mean core damage frequency.

We recommend consideration be given to forwarding this report to the Limerick Board since a copy of the draft report had been sent to them previously.



Themis P. Speis, Director
Division of Safety Technology

Attached:
NUREG/CR-3028

- cc: T. Novak
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