



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

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Docket No. 50-537

MEMORANDUM FOR: R. Wayne Houston, Chief
Accident Evaluation Branch, Radiation Protection, DSI

FROM: George Lear, Chief
Hydrologic & Geotechnical Engineering Branch, DE

SUBJECT: LIQUID PATHWAY ANALYSIS FOR CLINCH RIVER BREEDER
REACTOR PLANT

Docket No.: 50-537
Licensing Stage: CP - FES Supplement

Richard Codell of the Hydrologic Engineering Section is the hydrologic reviewer for the Clinch River Breeder Reactor Plant. A question concerning the liquid pathway consequences of a core melt accident was prepared and given to Paul Leech but was not forwarded to the applicant at the time because of the understanding that no further Class 9 atmospheric pathway analysis would be undertaken for the preparation of this supplement. We, therefore, have not prepared a detailed Class 9 liquid pathway analysis. However, a qualitative description of several major aspects of the liquid pathway is provided in this memorandum for your use in updating the accident analysis section. The staff can prepare a detailed analysis should this become necessary in the future.

The surface water hydrologic properties for the CRBRP should be similar to those used for the LPGS "small river" site. The LPGS site is, in fact, based on the Clinch-Tennessee-Ohio-Mississippi River system. Liquid pathway usage (e.g., drinking water, fishing, swimming) and populations for the LPGS case were based on national averages, however, and not on the Clinch River site. No comparison of these usages has been performed.

Ground water use and transport properties at the Clinch River site do not appear to be extraordinary. There are two factors which would indicate that releases to the ground water following an assumed meltdown accident would be smaller in the CRBRP case than for the LPGS case:

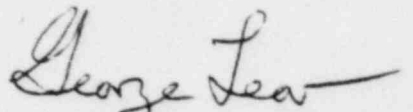
- a. The CRBRP is considerably smaller (1121 MWT vs 3425 MWT in the LPGS case) and would, therefore, have a smaller fission product inventory; and
- b. Unlike a LWR, the CRBRP containment does not have any large stores of water which could serve as a potential "prompt source" to the liquid pathway. Only the radioactivity leached from the core debris

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by surrounding ground water would be transported to the Clinch River. The "prompt source" scenarios in the LPGS were always several orders of magnitude more severe than the delayed "leaching" scenarios.

The staff, therefore, concludes from this preliminary appraisal that the liquid pathway consequences would probably be smaller than those for the LPGS "small river" site.


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