United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VA. 22092

Mail Stop 908
April 22, 1980

Mr. Robert Jackson
Chief, Geosciences Branch
Division of Site Safety & Environmental
Analysis
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Bob:

C. A. Baskerville has called my attention to an informal discussion during the Site visit regarding hydrology at the Carroll County Site. In the original trip report, I deleted the question; now it appears that the question should be reconsidered. Baskerville's memo to me is enclosed.

Bob Morris

Robert H. Morris
Deputy Chief for Reactor Programs
Office of Environmental Geology

Enclosure

8005220221

April 14, 1980

Memorandum

To: Robert H. Morris

From: C. A. Baskerville

Subject: Addendum to Trip Report to Carroll County Nuclear Generating Station, October 5, 1979

In the original trip report, reference was made to a hypothetical question posed to the consultants present during the site visit concerning a potential hazardous leakage problem. This question was left out of the final report sent to the Nuclear Regulatory Commission (NRC) December 14, 1979, because it more properly should be included under Hydrology.

To ensure that the question is raised, the U.S. Geological Survey (USGS) would like to suggest the following:

Mr. Baskerville posed a question during the field trip on October 5, 1979, which stated, "If the bottom of the containment structure were to sustain a crack such that ground water could flow through (similar to a dug well), and if contaminated fluid from the plant should spill and mix with ground water in flow through said crack, what would stop the ground water from flowing out and down gradient carrying the contaminant with it?"

This question was based on preliminary reading of the SSR, section 2.4.12, titled Dispersion, Dilution, and Travel Times of Accidental Release of Liquid Effluents in Surface Waters. The question was further enhanced by reasoning that (1) dynamic water pressure on subsurface walls in the vicinity of the hypothetical crack on the up-gradient side of the facility could mobilize water through the structure, and from the SSR that (2) 36% of the total pumpage in Carroll County is from shallow Silurian and Devonian dolomite aquifers (p. 2.4-30), and (3) the hydraulic gradient is 200 feet per mile across the site (figs. 2.4-8, 2.5.1-39.3 and para. 2.4.13.1.2.2.3).

The answer given at the time was that, if such an accident occurred, a "bathtub" effect would occur and ground water would come into the structure, preventing an outflow of contaminated effluent. This is similar to the statements in the SSR, sections. 2.4.12 and 2.4.13.3.

The week of April 7, 1980, news media reported that test wells were drilled on Three Mile Island and indicated radwaste contamination beneath the containment in the ground water.

In reconsidering the applicant's response in light of the above, I considered that, even if they were right, what about a fluctuating water table? Water could leak out when the table dropped. On re-reading the SSR, section 2.4.13.2.1.2, page 2.4-32, Future Use, where it is stated that long-term draws should be expected, and therefore provide the regime for migration of effluent to the water tables.

It appears that the question should be formally addressed by the applicant.