We have not considered the Monte Carlo technique seriously. We are looking at a Galerkin procedure to solve the transport equation. The transport equation cannot be adequately solved using difference approximations. I think that is very clear. If you have a zero dispersion coefficient, finite difference approximations break down, and you get numerical dispersion, as you know. Thus, we must use either a method of characteristics or some other procedure. The method of characteristics, which we are using, I don't particularly like. I think it is very “messy” to program.

A. GORDON EVERETT

The other question I had was, what did you folks decide to do with the chloride-bearing waters from the relief wells?

JOHN BREDEHOEFT

It's not very bad water; we're dealing with water of approximately 4,000 parts per million dissolved solids, and 2,000 parts per million chloride in the most contaminated areas. Such water is useful for paper processing. You can use it in a mill for washing logs and this sort of thing. My own feeling is that, to protect the aquifer, you could discharge into the river or the estuary and not really worry about it, because there is so much water available.

H. C. CLAIBORNE, Oak Ridge National Laboratory, Oak Ridge, Tennessee

The equations you wrote on the board described the physics of flow for the system. The implication I get is that you solved these equations through some techniques. Now, obviously, you did not solve the three-dimensional, anisotropic problem, which is time-dependent, very easily. My question really is in two parts: What simplifications did you make to solve the system, and have you considered Monte Carlo techniques for solving these complex problems in multidimensional systems?

JOHN BREDEHOEFT

We have simplified the system in the sense that we have generalized to two dimensions and treated essentially horizontal flow in the aquifer. This is the sort of simplification that we generally make in aquifer problems where we deal with two-dimensional areal flow. The model is set up for fully transient conditions. We iterate back and forth so that the two equations are solved simultaneously. In other words, we can take into account changes in fluid density. If you are willing to say the changes in density are small and have a negligible effect in the equation of motion, which would be so in relatively dilute solutions, you can then separate the two equations and solve the motion equation, neglecting the change in fluid density. I used this method for this particular problem. We are using an iterating alternative-direction technique to solve the pressure equation; we are using a method of characteristics to solve the transport equation; and they are coupled in the sense that one goes back and forth between the two.

The answer to the other question is, “no.”