Objective: To explore unsaturated flow concepts using the model WATERFLO.

On your K drive should be 3 files: WATER.BAT
WATERFLO.EXE
SOIL.S

WATER.BAT is a batch file which will run WATERFLO from your PC. SOIL.S contains water saturation curve and unsaturated conductivity data for 4 soils. WATERFLO is not a multiuser program, so only one of you can run it from the K drive at a time.

Specific Objectives:

1. Create a plot of water saturation with depth for a static case (zero flow) and a shallow water table (try 3 - 10 m), and compare this to the water saturation curve.

2. Make it rain. Plot inflow at the surface (infiltration rate) versus time. Do this for various precipitation rates and discuss your results.

3. Investigate water flux to a shallow water table from a rainfall event. Consider the cases of net flux to the atmosphere = 0 (no evapotranspiration) and net flux to the atmosphere = some reasonable ET rate. (Note: ET rates are important after the rainfall event is complete!) Note: Try a shallow water table for this problem (depth < 1m).

Hints:

I suggest you use either the Yolo clay or the Cobb loam (or invent your own!)

You will probably do better if you consider these problems as separate problems rather than one continuous problem.

WATERFLO should do all the individual graphs for you by print screen. However, I have had trouble getting this command to work on the networked computers at AFIT. You will have to combine graphs by hand. You will have to play with the program settings to get the scales and the computational intervals that you need.

A key to doing this work is setting the initial and boundary conditions! Think about what they ought to be!

Date Due: 22 Nov 95

You will be graded on: (1) your ability to identify and solve the problem (2) your analysis of the results (summary and discussion), (3) extra credit for innovative lines of inquiry, interesting approaches, etc. Item 2 is the most important.