The Cobb County Municipal Board has management responsibility for the local water system. The system has one main reservoir from which water is drawn. There is some concern due to the current drought conditions of what steps should be taken to regulate water usage. A consultant suggested that they might want to consider simulating the reservoir water level so that she can investigate the impact of usage changes. The following data has been collected:

1) The maximum capacity of the reservoir is 2,000,000 gallons of water.

2) Currently, the reservoir contains 1,000,000 gallons of water.

3) The national weather service predicts that, over the upcoming months, the probability of rainfall on any given day is 20%. If it rains on any given day the rainfall-related water inflow to the reservoir that day will average 290,000 gallons, normally distributed with a standard deviation of 100,000 gallons. You can treat this as a single addition to the reservoir at the beginning of each day.

4) The water outflow (or usage) per hour is normally distributed with a mean of 6,000 gallons and a standard deviation of 2 gallons between the hours of 8:00 a.m. and 8:00 p.m. (Hint: use a clock range: 7 < CalHour(TNOW) && CalHour(TNOW) < 20 in the decide module). Water outflow (or usage) is normally distributed with a mean of 500 gallons and a standard deviation of 1 gallon between the hours of 8:00 p.m. and 8:00 a.m.

5) If the reservoir water level is less than 10,000 gallons, you can assume that the demand for that hour is merely not met (outage) but there is no impact on demand for future hours. (The reservoir cannot have less than 0 gallons in it.)

Simulate the inflows and outflows of the reservoir for 30 days with actions (including screen updates) occurring on an hourly basis. Assume the simulation begins at midnight and that each day begins at midnight and runs for 24 hours. Set your output file to SIMAN.

Use (4) variable displays for: Day No., No. of Rain Days, Lost Hours, and Reservoir Water Level. In addition, include 1) a Level Indicator for the reservoir water level; and 2) a Time Plot of the Reservoir Water Level using Reservoir Water Level (in Gallons) (y-axis) vs. Hours (x-axis)

Investigate the impact of the following scenarios separately (after you have performed the initial simulation):

- Normal conditions with a 20% chance of rain.

- A conservation program that will reduce average consumption by 10% (@20% rain)

- Drought conditions worsen such that the chance of rain drops to 15%.

- Drought conditions worsen such that the chance of rain drops to 10%.

- Drought conditions worsen such that the chance of rain drops to 5%

Be sure to include variable displays for:

- Current day number

- Number of rain days

- No. of Lost Hours

- Reservoir Water Level

in addition to:

- A level indicator for Reservoir Water Level

- A time plot of Reservoir Water Level (in Gallons) (y-axis) vs. Hours (x-axis)

- Scenario impact labels for Water In Process and Water Out Process

- Results for the following five scenarios on the face of your model

- Water Level end of 30 days with chance of rain at 20% = \_\_\_\_\_\_\_\_ gallons

- Water Level end of 30 days with 10% Conservation Program = \_\_\_\_\_\_\_\_ gallons

- Water Level end of 30 days with chance of rain at 15% = \_\_\_\_\_\_\_ gallons

- Water Level end of 30 days with chance of rain at 10% = \_\_\_\_\_\_\_ gallons

- Water Level end of 30 days with chance of rain at 5% = \_\_\_\_\_\_\_ gallons