**Introduction to HEC-HMS Solution CE374K Hydrology Spring 2013**

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*1. Verify with hand computation the amount of excess precipitation that results from a 2 inch rainfall in 1 hour falling on a basin with a curve number of 80 and 25% impervious cover.*

* Hec-HMS



Precipitation in Excess:

* Hand Calculation

*2. Prepare a graph that shows the relation between the peak discharge and curve number for increments of the curve number of 10 from 60 to 90.  Assume zero impervious cover and a lag time of 60 min.*

*3. For a curve number of 80, prepare a graph that shows the relation between the peak discharge and the % impervious cover for impervious cover 0 to 50% in 10% increments. Assume a lag time of 60 min*

*4. For a curve number of 80 and zero impervious cover, prepare a graph that shows the relation between peak discharge and lag time for lag times in the range 30 min to 90 min in 10 min increments.*

*5. How long (min) does it take the peak to traverse the reach? Change the slope to 0.0001 (typical of slopes in Houston). What effect does this have on the outflow?*

The peak takes 18 min (2:00 – 1:42) to transverse the reach.

The peak outflow is



The peak takes 6 min (1:48 – 1:42) to transverse the reach.

The peak outflow is

In this case, the peak takes less time to transverse the reach; the peak flow magnitude is reduced significantly (50%).



*6. By how much does Dam 7 reduce the outflow from the basin? Suppose that you change the rainfall from 2 inches in the first hour to 12 inches, with 6 inches in the first hour and 6 inches in the second hour (this is the “rain bomb” that happened in Tropical Storm Hermine). What is the outflow from the Routing Reach then? By how much does Dam-7 then reduce the outflow? Does water start going over the Emergency Spillway in this case?*

* Reduction in outflow by Dam 7



Peak outflow w/o reservoir:

Peak outflow Dam-7:

The outflow is reduced by (that is a 96% reduction in the peak flow)

* Rain bomb



The peak outflow in the routing reach is .



The peak outflow in the Dam-7 is . The outflow is reduced by (that is an 84% reduction in the peak flow)



The peak (max) storage is , that corresponds to an elevation of 833.25ft greater than the emergency spillway elevation (829ft). Water does go to the emergency spillway in this case.