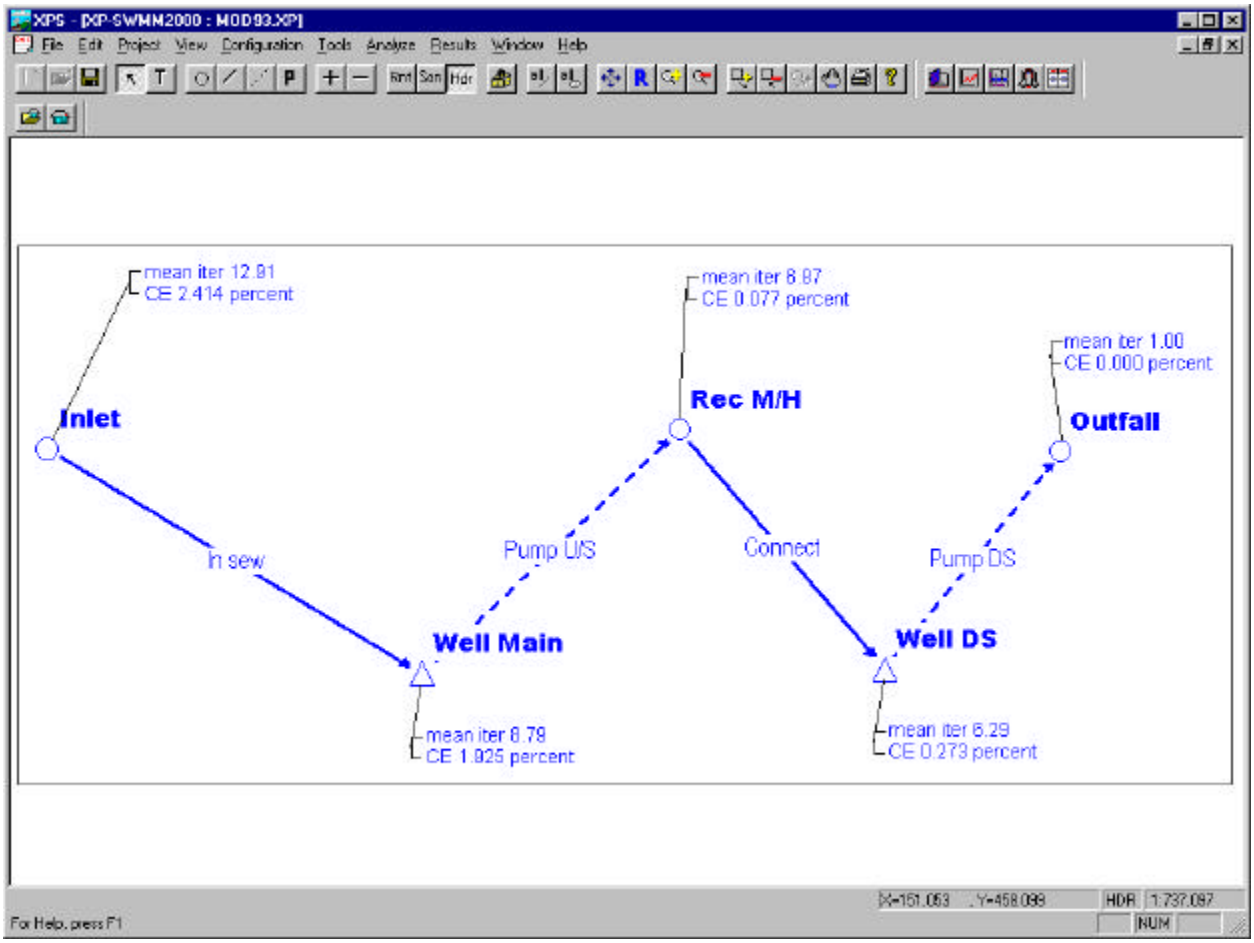
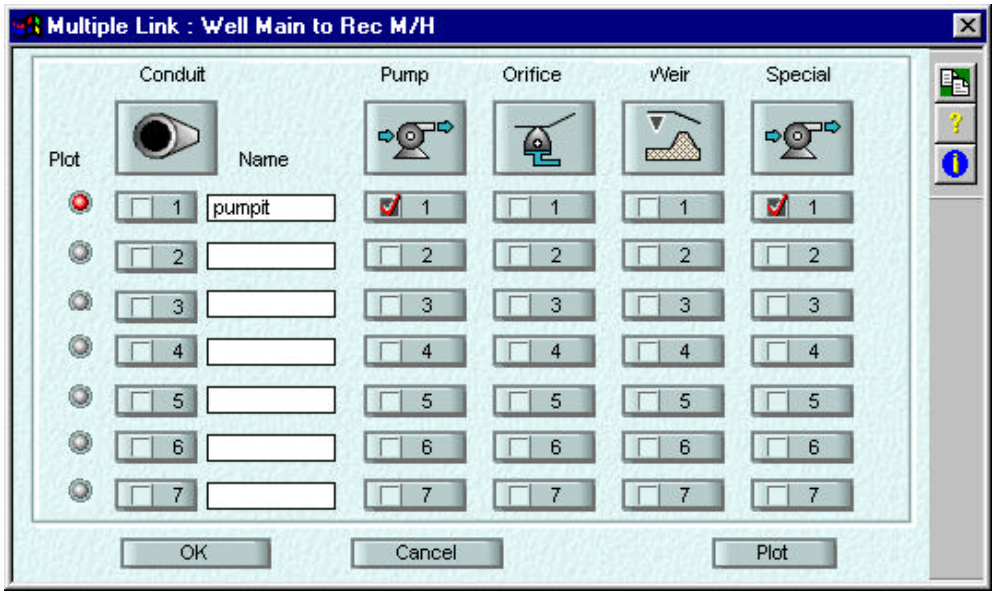
Module 93: Real Time Control based on Depth

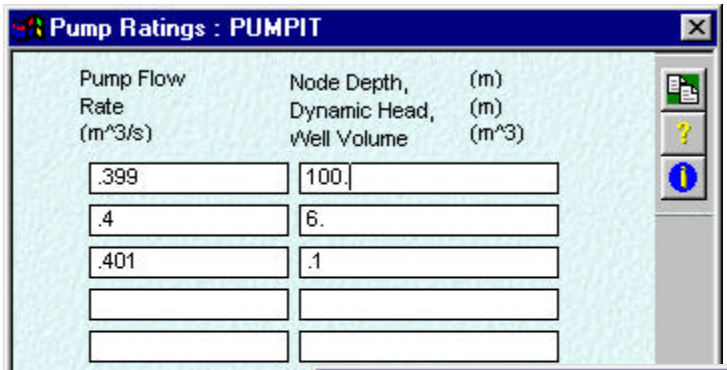
Synopsis

The file ***MOD93.XP*** illustrates how to use a real time control "rule curve" to modify the flow in a pump based on the depth of water at a non-adjacent node. There are two dynamic head pump curves and two real time control curves in this model.

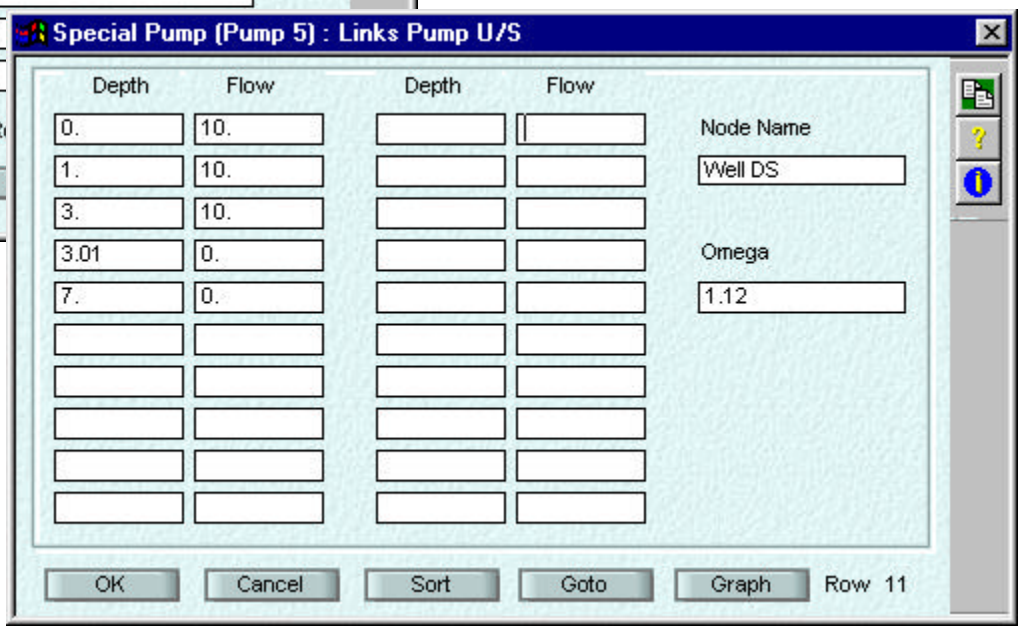


The pump and its "rule curve" are on the same row of a multi-conduit dialog. The "rule curve" is entered in the special column of the dialog. The base or unmodified flow in this pump is 0.040 cms.

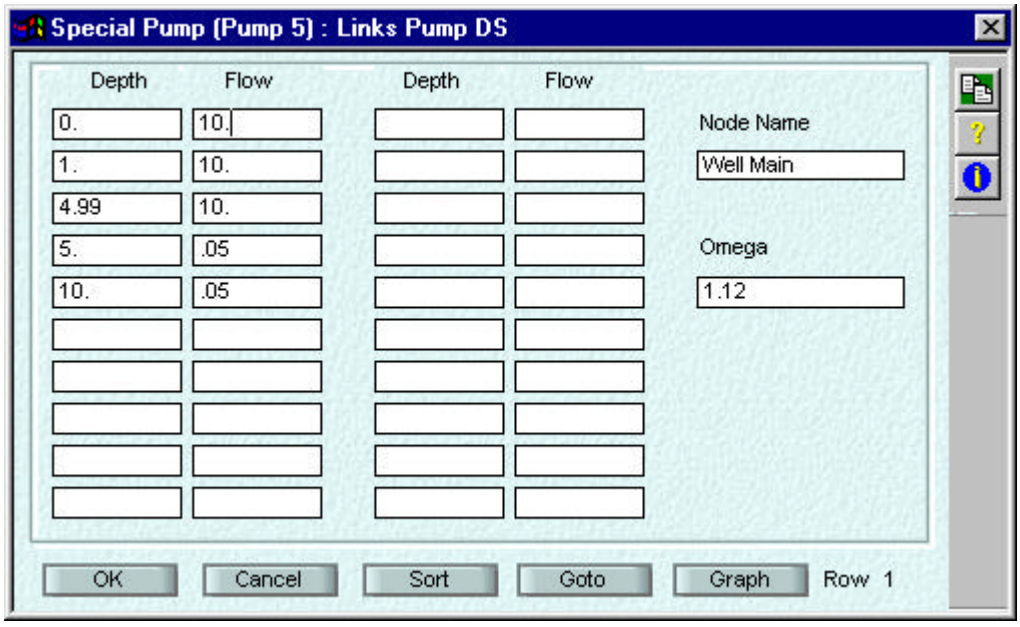




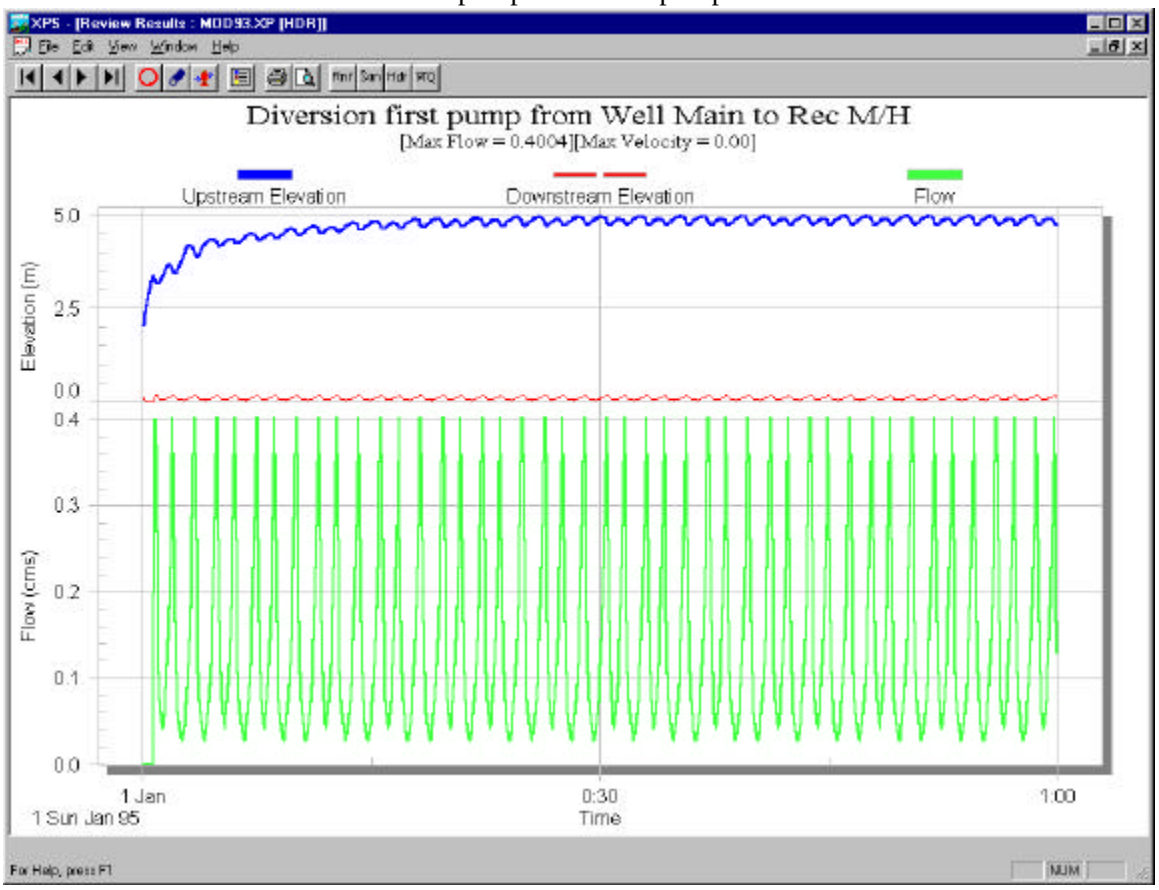
The "rule curve" is entered in the special pump (pump 5) dialog. This table of depth versus flow states that based on the depth of water at node "Well DS" the flow in the pump is 0.0 cms after the depth reaches 3.01 meters. The flow below 3 meters is up to 10 cms or the maximum pump flow of 0.40 cms. The omega value will allow a change in pump flow of 12 percent per iteration or time step. Omega varies between 1.0 and 2.0.



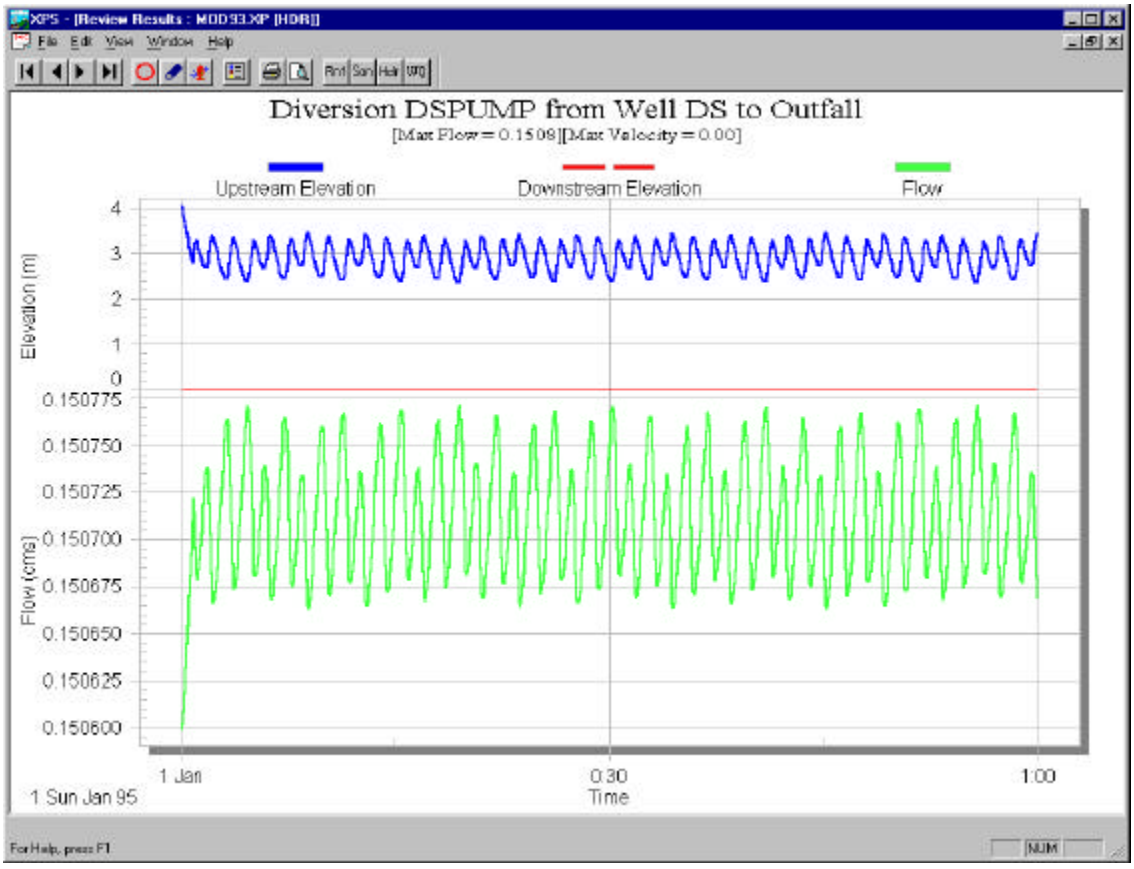
The pump at link "DSPUMP" has a normal pump flow of 0.15 cms until the depth of water at node "Well Main" reached 5 meters and then the flow is limited to 0.05 cms - as shown below in the pump 5 dialog.



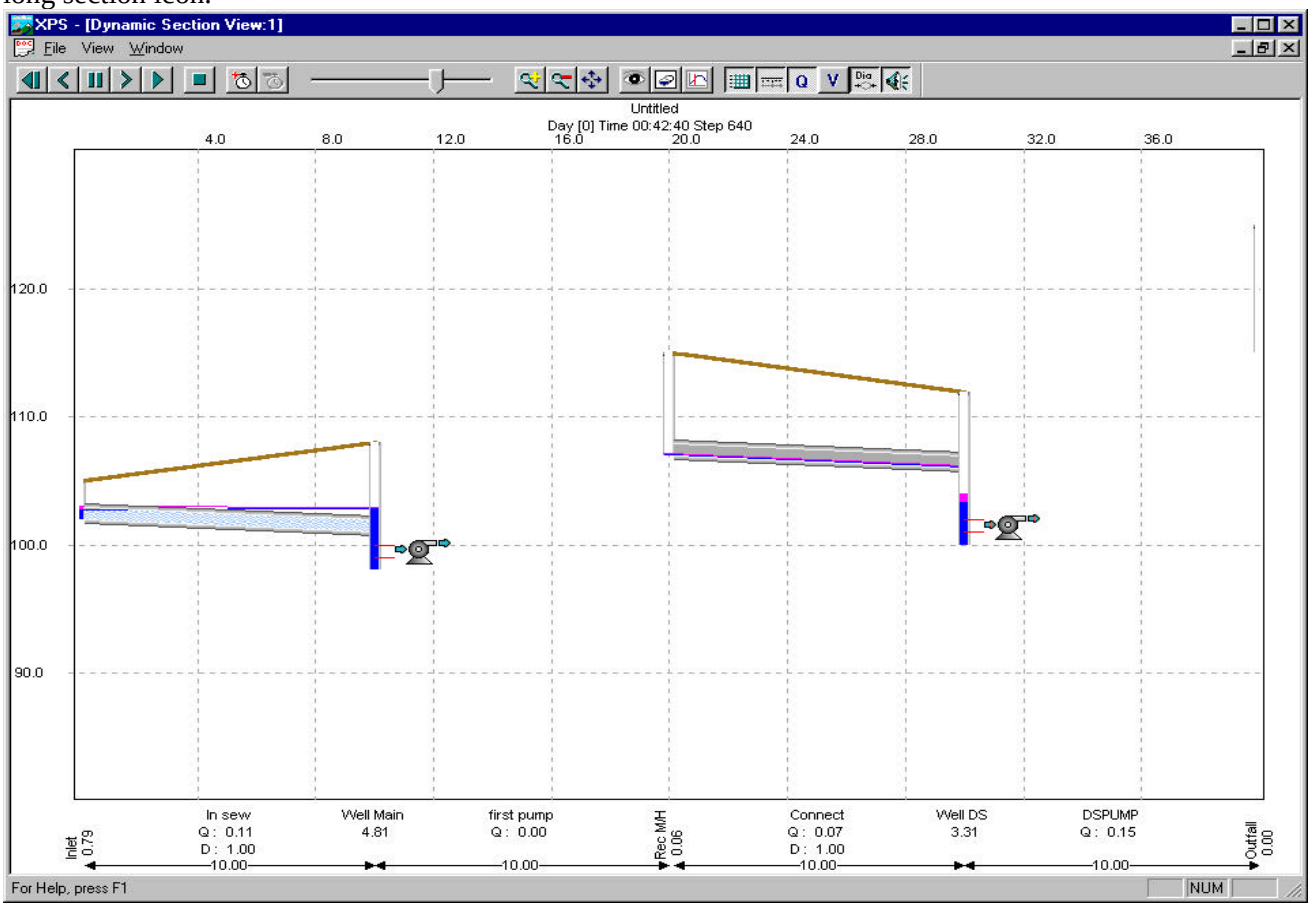
Solve the model and look at the flows in the pumps. The first pump flow oscillates between 0.40 and 0.0 cms.



The second pump, DSPUMP, changes from 0.15 cms to 0.05 cms as the "pump rule" comes into effect.



A look via the long section plot through the two pumps in the system. Highlight the whole model and use the long section icon.



The rule curve for the pump5 pump data is echoed to the output file in the beginning of the output file. The raw curve data and the node the controls the pump5 rule is listed.

```
 Control node = Well DS

  ====================================================
  Input Information for dynamic pump rule curve scada
  ====================================================
 Point       Data       Data       Data       Data
  No.      Column     Column     Column     Column
             # 1        # 2        # 3        # 4
 -----     ------     -----     -------   ---------
     1      0.000      0.000     10.000      0.000
     2      1.000      0.000     10.000      0.000
     3      3.000      0.000     10.000      0.000
     4      3.010      0.000      0.000      0.000
     5      7.000      0.000      0.000      0.000

  Control node = Well Main

  ====================================================
  Input Information for dynamic pump rule curve newpump5
  ====================================================
 Point       Data       Data       Data       Data
  No.      Column     Column     Column     Column
             # 1        # 2        # 3        # 4
 -----     ------     -----     -------   ---------
     1      0.000      0.000     10.000      0.000
     2      1.000      0.000     10.000      0.000
     3      4.990      0.000     10.000      0.000
     4      5.000      0.000      0.050      0.000
     5     10.000      0.000      0.050      0.000
```