Notes for T2Well/ECO2N V1.02

T2Well/ECO2N V1.02 is an updated T2Well/ECO2N V1.01 with the following new capabilities and bug fixes:

1. The heat flow between wellbore and surrounding formations calculated using Ramey's solution was not correctly scaled into the energy balance equation in the old code, which could result in over- or under-estimation of the wellbore/formation heat exchange depending on the volume of the wellbore grid cells. This is now fixed.

2. The previous implementation of the potential energy term requires all wellbores to be monotonically downward (i.e., a well always goes down from wellhead to well bottom). If one wants to simulate a system with a U-shaped wellbore (e.g., an injection well (downward) joining with a horizontal well that then connects to a production well), the new version of the code must be used to correctly account for changes in gravitational potential energy.

3. The permeability change (in porous media) due to salt deposition is now implemented*.

4. The intermediate variables used in calculation of the binary diffusion term were the same as those used for the grid cell coordinates. This bug may not be caught by all compilers, but could result in unpredictable errors.

5. Potential energy is now accounted for in the entire domain (i.e., both wellbore and reservoir). The user must provide correct Z coordinates in the ELEME block for all grid cells; the reference elevation could be arbitrary. In addition, the injection enthalpy specified in GENER block (if any) must also include the gravity potential energy.

6. The output files in the example folders are updated accordingly. The major differences in the results between V1.0 and V1.02 are the predicted wellbore temperatures, because the well/formation heat exchange is calculated correctly in V1.02.

*Note that the effects of salt deposition in the well are still not accounted for. Users should continue to avoid such situations in their simulations.