

## Memorandum

**To:** PC-PUMP Users

**Date:** December 23, 2004

**From:** Paul Skoczylas

**cc:**

**C-FER File:** P065100

**Subject: Changes in PC-PUMP V2.65**

### Message:

PC-PUMP V2.65 has the following fixes and improvements over Version 2.64:

1. The Filter window for pump selection now remembers the values entered into it, even after the Pump Selection window has been closed.
2. If casing from pump seating depth to surface has been selected, the Filter window will give the option of only displaying pumps which fit inside the specified casing's drift diameter.
3. The program now has the concept of a rod torque limit. Every rod has two switches: One turns on the basic rod stress calculations (the ones in all previous versions), while the other turns on the new torque limit comparison. For "API" rods, only the previous calculation is available. However, manufacturers' specific rods are now included in the database with their stated torque limits. In addition, the concept of a rod's pin being a different nominal size from its body has been improved.
4. The concept of gas-liquid ratio (GLR) has been added to the program. This is intended to help users who are dealing with gas well dewatering (either coalbed methane or traditional). If the water cut is 100% and there is gas, this allows users to use the multiphase mode without needing to trick the program into allowing it.
5. When the filters in the Pump Comparison window are used, the full results will now appear in the Comparison Table, but will still be coloured red. (Note: the current case [the one which is active in the main output windows] will still be blue, even if it was filtered.) A new column at the end of the table will also say that the case has been filtered. (Previously, most of the data would have been listed as N/A if a pump did not meet the filter criteria.) In the Pump and Equipment Comparison Tables, a column at the end of the table will say "Warning" if any warning messages were generated as part of the case. Likewise it will say "Error" if an error message of the type which does not abort the calculation is generated. (As before, an error which does abort the calculation will mean that case is not displayed on the table, while any other cases which can be completed will appear.)

6. In the comparison tables and charts, there are two new options for controlling what data is viewed. Previously, these tables/charts had so many columns/tabs that it was difficult to see the data that a user really wanted. The two options are 1) a “Filter” option, which (when turned on for each column/tab individually) will cause that column/tab to be displayed only if it has real data (i.e., not just N/A) in it, and 2) a “Show” option, which can be used to turn off the display of whatever columns/tabs the user wants. A large number of new parameters for the comparison tables and charts have also been added. Some multiphase flow parameters are included, but most of the new parameters are related to drive equipment loading.
7. The pump axial load calculations have been revised to match the algorithm described in the following paper: SPE 90153 (PCP Axial Load: Theory and Lab Results, by Alhanati & Skoczylas, presented at the 2004 SPE Annual Technical Conference and Exhibition)
8. PC-PUMP will now use new data to determine if multilobe pumps will fit in the tubing drift diameter. (Note: in V2.63 and earlier, this was checked but improperly. In V2.64 this was corrected by not checking multilobes at all. V2.65 now checks properly.) If old pump data is used (e.g. from an older PCP file), the check will not be done, but a warning message will be issued to that effect.
9. The ability to use CTRL-V to paste into the wellbore geometry has been fixed. (This was introduced in fixing another problem.) In addition, the ability to paste large surveys in a single block has been fixed. (In earlier versions the survey could not accept large surveys at all. More recent versions could accept very large surveys, but above a certain size they would have to be entered in two or more smaller chunks.)