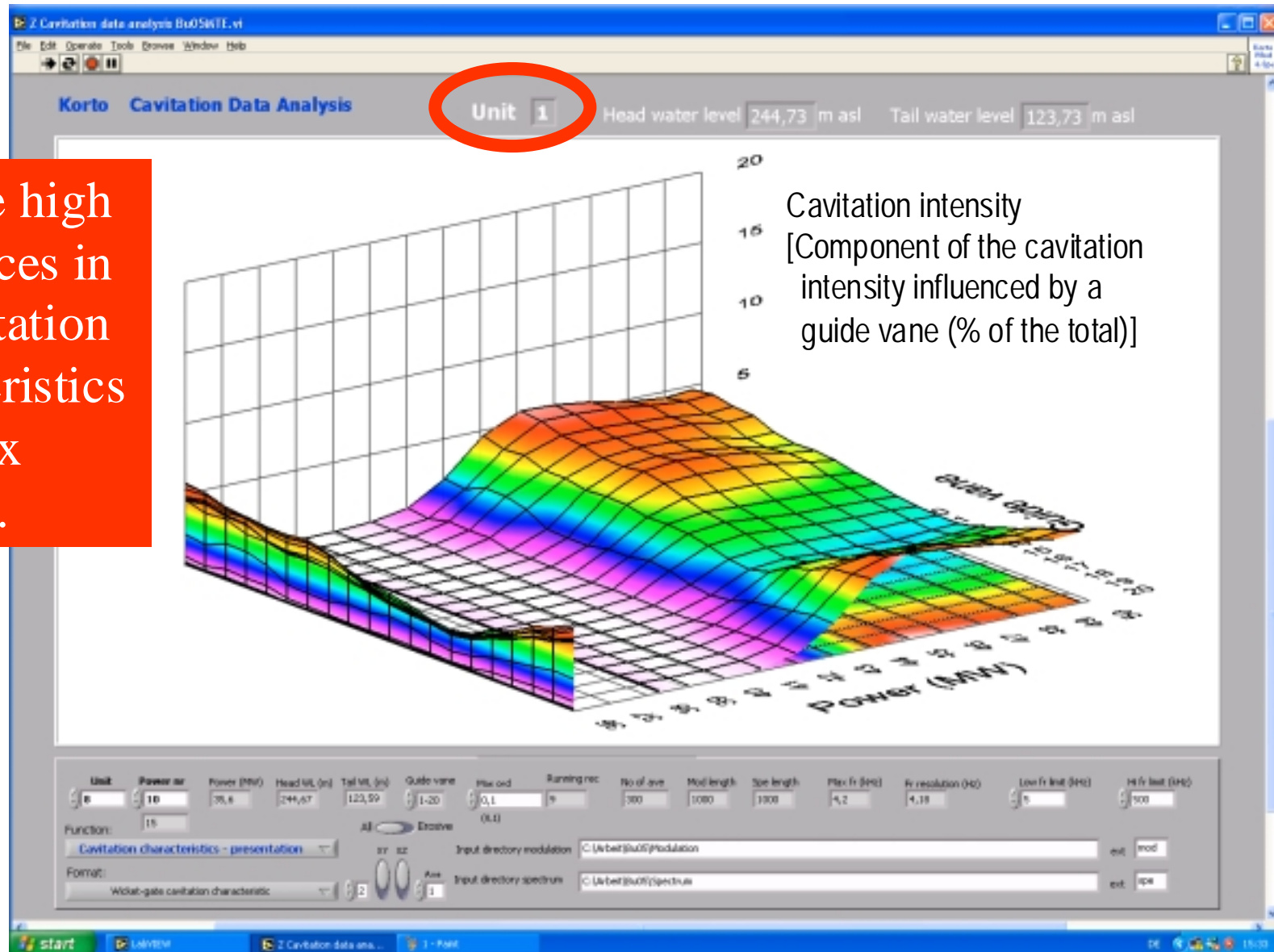


Operation optimisation - Francis

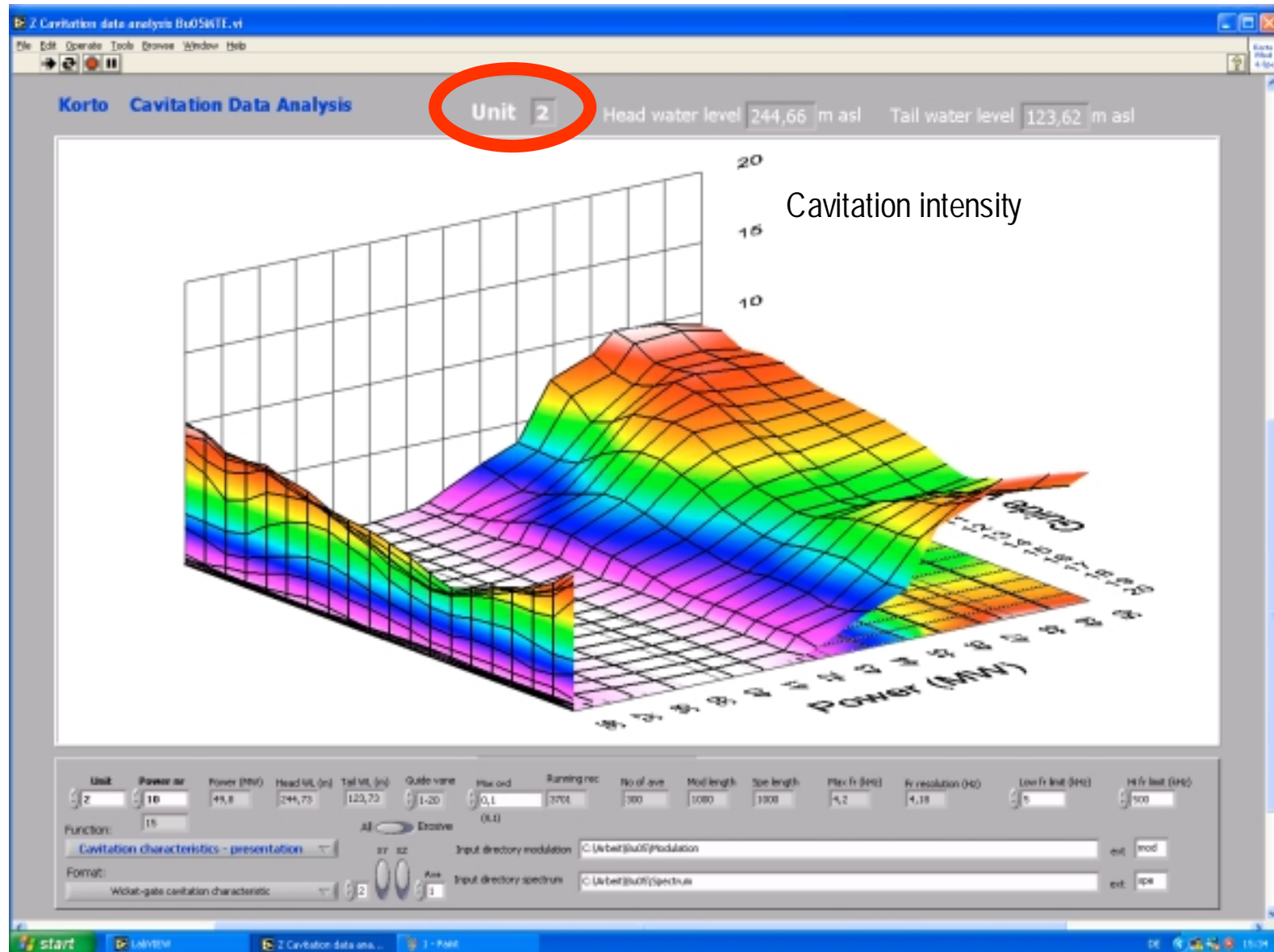
The six 48 MW Francis units in a plant were made according to the same plans. On only one of them, the runner was slightly modified. The units were operating in the same manner. In a multidimensional diagnostic test of cavitation, the six units were compared. The determined wicket-gate and global cavitation characteristics are presented on the following pages.

Optimisation

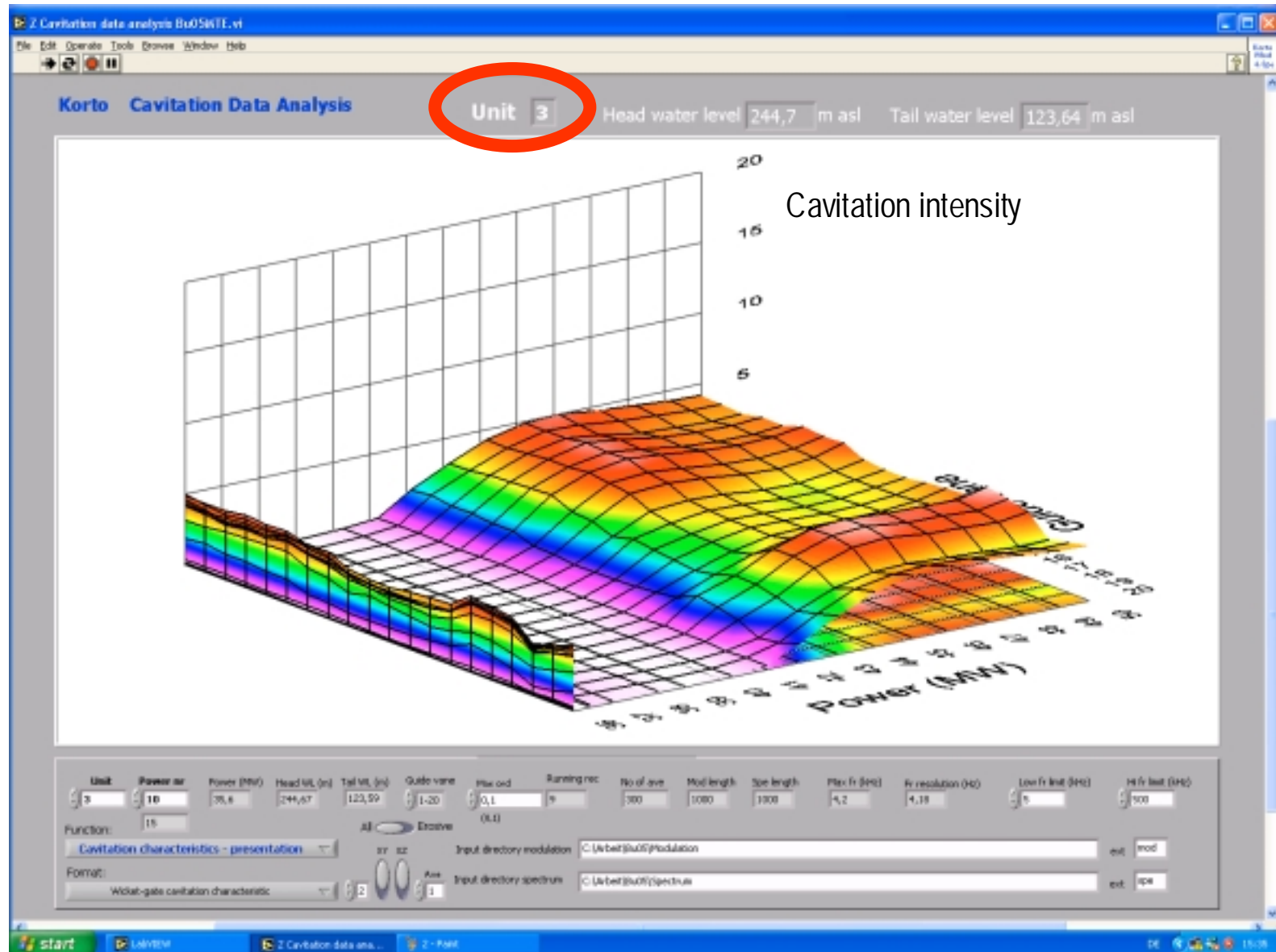
Note the high differences in the cavitation characteristics of the six turbines.



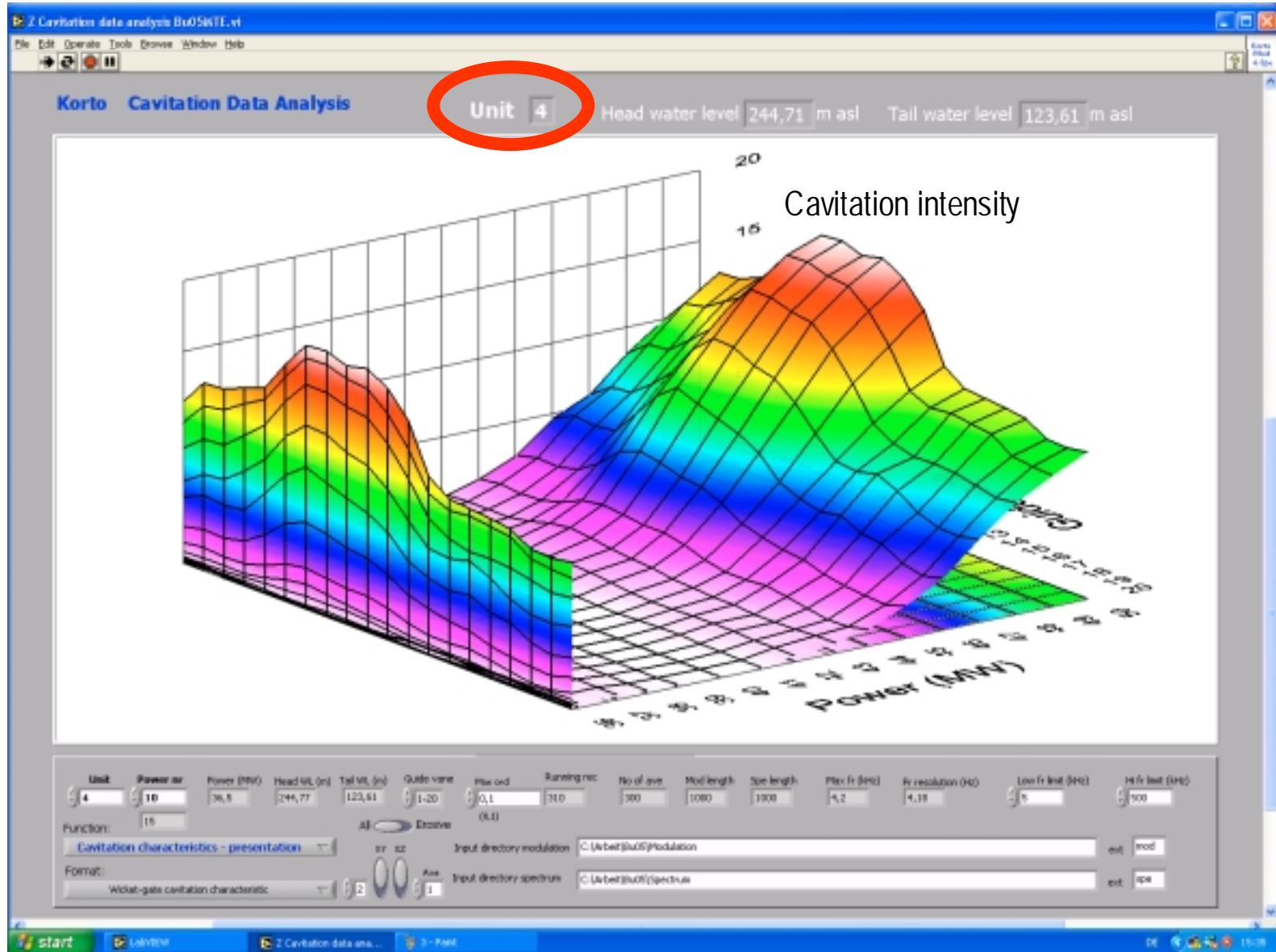
Optimisation



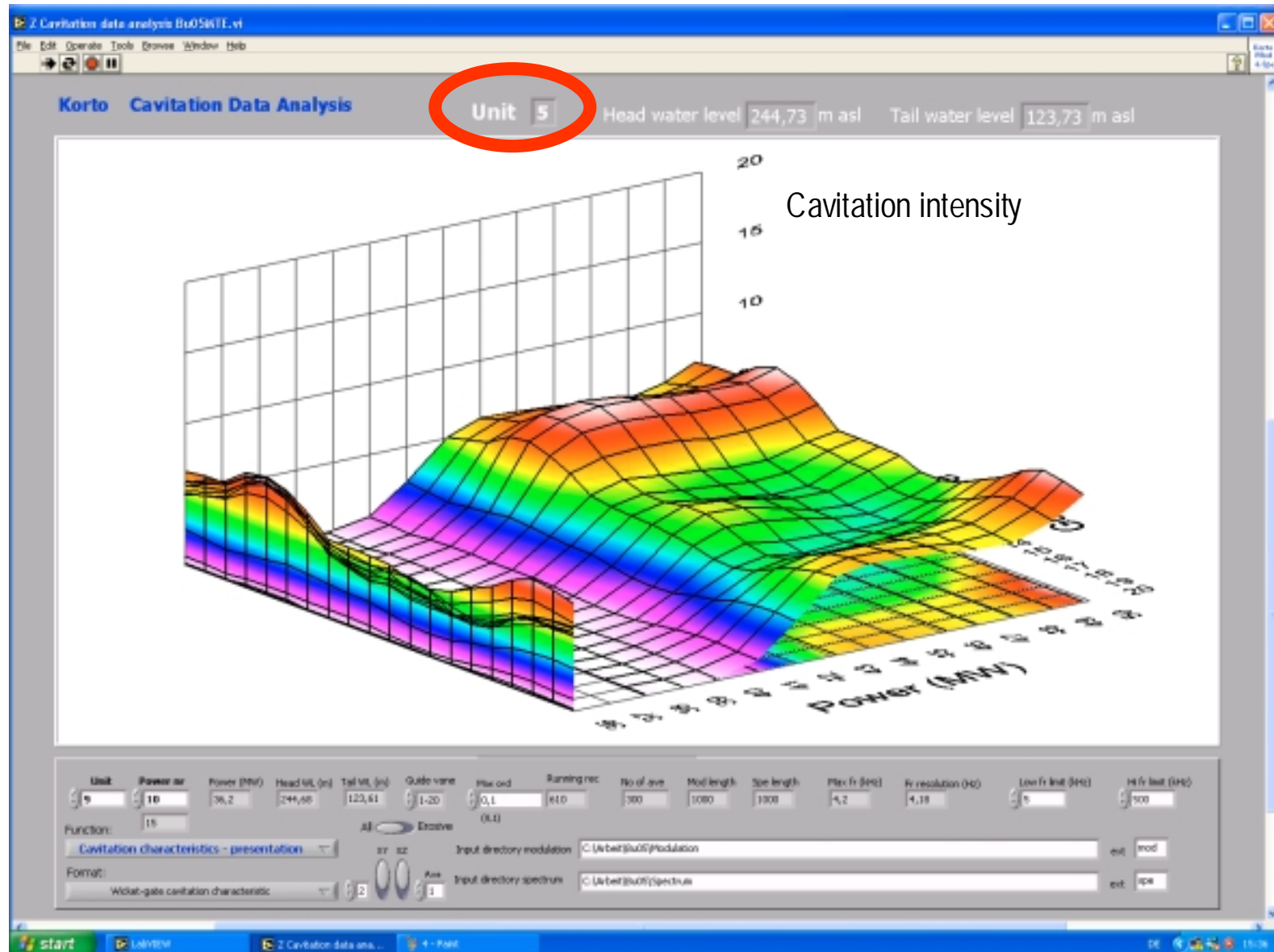
Optimisation



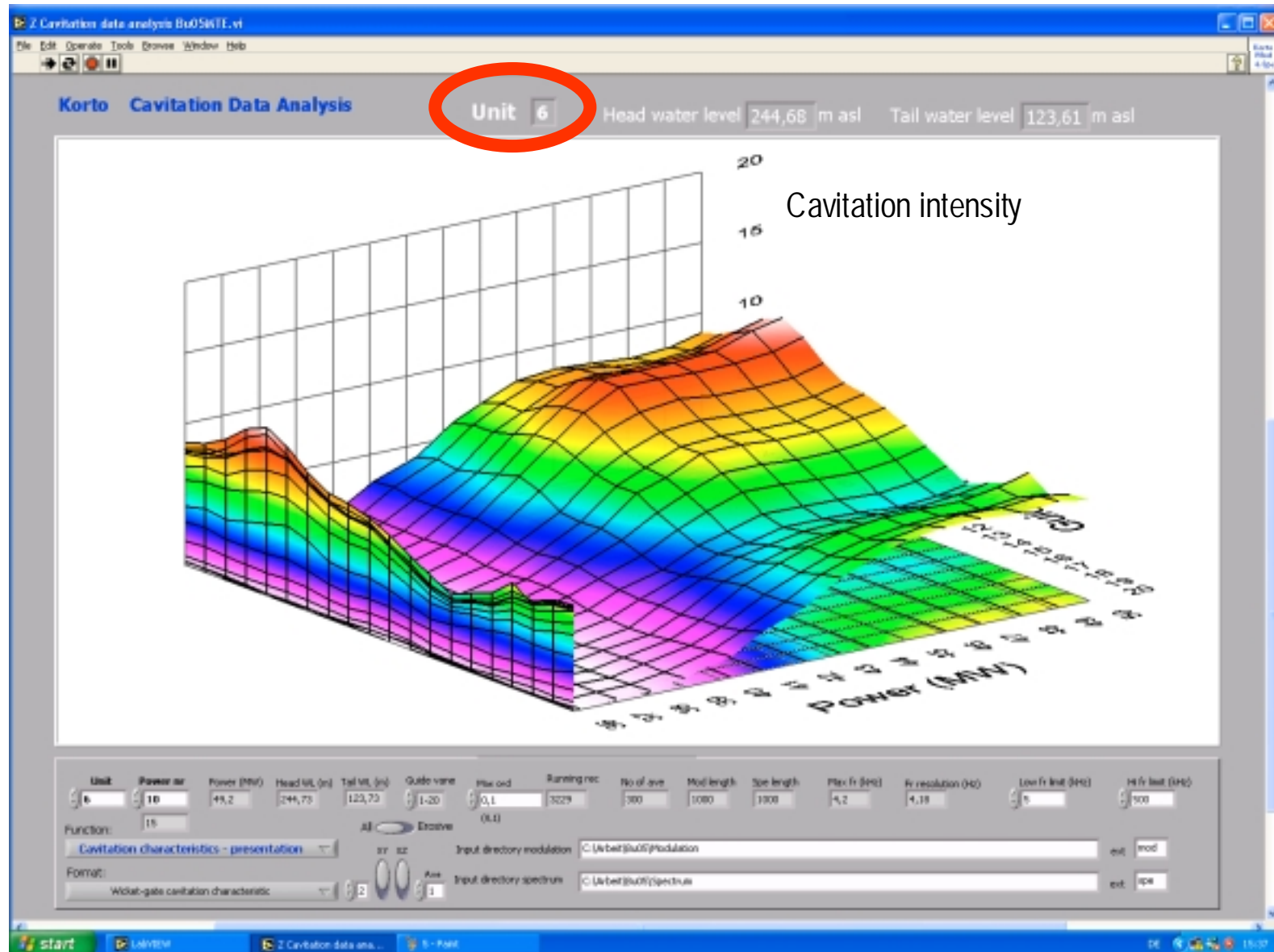
Optimisation



Optimisation



Optimisation



Optimisation

Total cavitation intensity in a turbine (%)

High differences in the threshold power values and the intensity itself enable useful operation optimisation.

Unit:

Unit power (MW)

