**Drinking Water
Engineering and Science
Discussions**

Interactive comment on "Removal of both dissolved and particulate iron from groundwater" *by* K. Teunissen et al.

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General comments:

The paper is an applied study that addresses the effect of operating conditions of rapid filters on iron removal from ground water. The events described are switching on filters, as well as filter backwash. Furthermore, possible improvement measures such as pH increase are investigated.

The study has a character of applied research: A large part of the work study is done on full-scale equipment with limited control of the test conditions. Secondly, the results are presented as untreated time series, and not evaluated statistically.

The conclusions reached are not entirely new, but nevertheless worth pointing out.

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Interactive Discussion

Discussion Paper

The knowledge that changes in operating conditions negatively affect particle removal in rapid and slow sand filters has been embedded in engineering traditions for a long time. It is generally known that changes in hydraulic load should be avoided. Also, the "ripening" period in the beginning of a filter cycle is general knowledge. Many waterworks practice some kind of "filter to drain" routine during which the first filtrate after a backwash is led to drain or recycled to the intake.

Specific comments:

1) What about the manganese present in the water? I have experiences wells from which iron concentrations of 25 mg/l were easily oxidised and filterable in the lab, but the manganese, present below 0.5 mg/l, was difficult to remove.

2) p.97, line 13-15. What about the particle dynamics in the filters? It has been mentioned in the literature that particles may change during their passage through the filter. It is not easy to tell if it is the same particles that enter the filter that leave them. Small particles may aggregate into larger ones, and particles may be retained for a long time before leaving the filter. To answer such questions, experiments with defined, traceable particles would have to be performed. See for example

Persson, F., Långmark, J., Heinicke, G., Hedberg, T., Tobiason, J.E., Stenström, T.A. och Hermansson, M. (2005) Characterisation of the behaviour of particles in biofilters for pre-treatment of drinking water. *Water Research* 39(16), 3791–3800.

Technical comments:

1) The description of the study and the presentation of the results should be improved to make the paper more easily accessible for the reader. For example, add a schematic drawing of the full-scale treatment process and of the tested alternatives.

2) Improve figures 1 to 3 to make them comprehensible. Decrease the number of size classes depicted, make sure they look different in black and white print, make sure all

figures have units. Alternatively, show figures with treated (aggregated) data instead of time series.

3) Methods: The abbreviation "TILVS" should be defined.

4) Expression: Don't describe some influence with the word "significant" if no statistical testing was done.

5) Language: Use past tense to describe the work done in the study. Present tense gives the reader the idea that things are done regularly or all the time.

6) The scope of the paper is not that general, rather specific for the investigated waterworks. Therefore, include the name of the waterworks in the paper title. ".....at XY waterworks".

Interactive comment on Drink. Water Eng. Sci. Discuss., 1, 87, 2008.