**Drinking Water
Engineering and Science
Discussions**

# *Interactive comment on* "Abnormal quality detection and isolation in water distribution networks using simulation models" *by* F. Nejjari et al.

**F. Nejjari et al.**

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This paper envisages detection and localization method to find abnormal water quality levels in a distribution network. Abnormal water quality localization method is based on chlorine measurements and chlorine sensitivity analysis of the nodes of distribution network. However it is not clear,

i) How to identify the location of chlorine injectors and chlorine sensors to be installed in the existing network?

We agree that this is an important aspect that could be tackled when designing the network in order to improve the detection performance so that the contamination risk

is minimized. However, in this paper it is assumed that the set of chlorine injectors and sensors are already installed in the network. Thus, this paper focuses on the development of an abnormal water quality localization methodology for a given set of sensors and identifying their location is beyond the scope of this paper. We are aware of the importance of sensor location in water distribution networks. In [1] a methodology was developed to determine the optimal placement of sensors in order to maximize the leakage detection and location. A conclusion drawn from this study was that the detection performance improves with the number of sensors, but there is an upper bound on the number of sensors necessary to maximize it. We are confident that this methodology could be also applied here to assure maximum water quality monitoring coverage.

ii) What should be the frequency of samples? Or, it is continuous monitoring?

In this work we suppose that signals are sampled every 10 min.

iii) What about mechanical and hydraulic reliability? Perhaps, it assumes the 100 % mechanical and hydraulic reliability, whereas, in certain situations it may not be true.

In our development we assume 100% mechanical and hydraulic reliability. We agree that these hypotheses should be clearly stated in the paper (e.g., no leaks are present; the equipment is working properly, etc.).

iv) Is the residual chlorine sufficient condition for reliability analysis?

Residual chlorine is a critical water quality index.

v) Will the methodology work for all types of distribution networks, viz. Dead end system, grid iron system, Ring system and radial system?

The methodology can be applied to other distribution networks provided that hydraulic and quality models are available.

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