A general comments from the authros to the commenst of the referees

We like to thank the referees for the many good suggestions for improvement og specifically for correcting the language many places.

To meet some of the commenst, we would have had to extend the paper significantly – specifically those related to NOM characterization – which is a large area on its own. We will, however, take the comments into consideration and include some words about the characteristics of Norwegian NOM in the corrected paper.

## General comments on characterisszation of NOM and the use of colour as parameter (both referees):

We agree that NOM characterisszation could improve the scientific level of the paper. But to discuss the characterization of NOM at length is not possible within this scope and size limit of this paper. We will, however, introduce two references in the paper - that will clarify the question and guide the reader to a more comprehensive treatise:

Fabris, R., Chow, C.W.K., Drikas, M. and Eikebrokk, B. (2008) Comparison of NOM character in selected Australian and Norwegain drinking waters. Water Research 42, pp 4188 - 4196

Eikebrokk, B., Fabris, R., Drikas, M. and Chow, C. (2007) NOM Characteristics and Treatability by Coagulation. In Hahn, H.H., Hoffman, E. and Ødegaard, H.:Chemical Water and Wastewater Treatment IX. pp 207 - 219. IWA Publishing, London

In Norway there is a strong focus on the colour and in many of the experiments and full scale experiences that are referred to in the paper, only colour has been monitored.

We could, however, include a figure showing the typical correlation between colour and DOC in Norwegian raw water – for instance as the one shown below. But in treated water the correlation would, of course, depend on the treatment method in question and to go into this would be too much for this paper.

DOC = 0,124Colour + 1,0
$R^2 = 0,935$
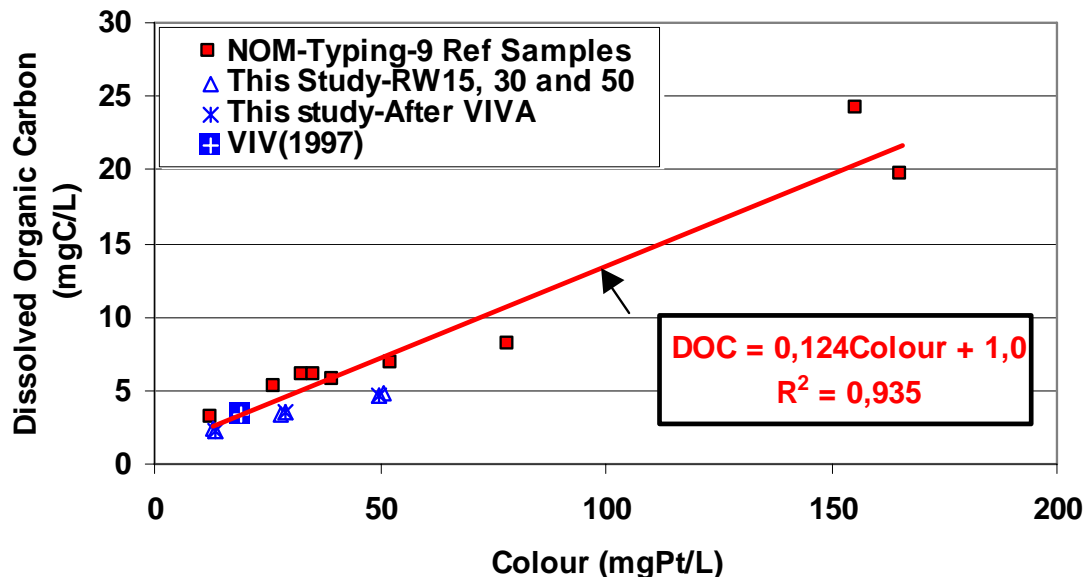
With respect to making a cost analysis, this is a far too big task and quite difficult to do.

To compare with other internationally used treatment techniques (which ones are not covered?) will also take another paper. The title of the paper is : "….. – Norwegian experiences".

Specific comments

<u>Comments from Siegers</u>

<u>Page 9 ch 3.2 :</u> Precise concentrations for cleaning steps – The plant is trying out different cleaning procedures. I am not sure that it can be expressed more precise than what has been done: *The plant is backwashed with treated (and chlorinated) water and chemical cleaning (75% phosphoric acid, soaking for 20 min and 15% sodium hypochlorite, soaking for 15 min) is performed every 8th backwash.*

<u>Page 10 line 18:</u> Cleaning protocol for MF-experiments.
Backwash water : Treated water (in practice: chlorinated treated water – no chlorination in experiments) followed by a short blast of air. The whole backwash sequence takes 10 sec. Backwash intervals: 1h. Between each experiments the membranes were cleaned using a chemical cleaning protocol based on soaking the membrane in citric acid solution (1%) and then sodium hypochlorite (3 mg/l)

We can write this into the paper, but it will, of course, increase the length and I am not sure it is vital info in an overview paper.

<u>Page 12, line 5-10</u>. I do not quite understand this comment. We could rewrite the sentence: *Besides the fact that GAC-filters gives a quicker start-up caused by the adsorption effect, the rate of biodegradation does not seem to be strongly influenced by the media selected, while the kinetic studies show that residence time is of importance.*

To become:
Even though granular activated carbon filters give a quicker start-up with regard to NOM removal caused by the adsorption effect, the rate of biodegradation does not seem to be strongly influenced by the media selected. Kinetic studies show, however, that residence time is of importance.

<u>Page 12, line 17.</u> Definition of "hygienic barrier" – In Norway a microbial hygienic barrier is defined as : 3 log removal of bacteria and virus, 2 log removal of parasites. With the dosages needed in ozonation/biofiltration plants, one is easily meeting the log removals for bacteria, virus and Giardia, but probably not for Crypto. It would take a lot of explaining to include this in the paper, so we shall rephrase "a good hygienic barrier" to "and it gives a good hygienic barrier effect because….."!

Page 13, line 23. Again the expression "hygienic barrier" is used in a general way – we haver tought of it as microbial hygienic barrier in this context – so we may add the word "microbial" for clarification.

Page 14, line 5 Reference for pore blocking. Many references could be used here, but the one we have ouselves is :

Kaastrup, E. and Halmø, T.M. (1989) Removal of aquatic humus by ozonation and activated carbon adsorption. In Suffet, M. and MacCarthy, P. Aquatic Humic Substances. Influence on Fate and Treatment of Pollutants, pp 697-726. Advances in Chemistry Series 219. American Chemical Society, Washington DC, 1989

We shall put his ref in.

All the other proposed specific comments from the referee Siegers as well as technical corrections are accepted and will be taken care of in the corrected paper

Comments from Bagloth

Many of the commentsd are suggestions for improved language and most of them will be dealt with in the corrected paper. Bagloth is asking for specific numbers for what is "high" respective "low" NOM-concentration. Where we find it natural, we will provide such numbers in the corrected text.

All the proposed technical corrections will be done in the corrected paper.

Hallvard Ødegaard
Trondheim
14.12.2009