



March 16, 2014

CDW Secretariat
Water, Air and Climate Change Bureau
Health Canada
3rd Floor, 269 Laurier Avenue West, A.L. 4903D
Ottawa, Ontario K1A 0K9

To: Committee on Drinking Water Secretariat

RE: Guidance for the pH of Drinking Water

CWWA's Drinking Water Quality Committee reviewed the proposed guidance on the pH of Drinking Water. Overall the Committee supports the conclusions of the document and appreciates the background information which compiles valuable scientific information on pH in drinking water in one document, and addresses the importance of pH in maintaining other aspects of the water treatment process.

Our Committee members did have some concerns with the document.

City of Calgary - From the proposed guideline technical document, it appears the rationale for the lower limit of 7.0 is based on the indirect impacts of lower pH levels (e.g. metals ingestion from corrosion products) rather than direct pH health impacts. The proposed guideline's logic and information agree with a previous distribution system piping corrosion study that recommended a stable and constant year-round pH of 7.9 +/- 0.1 be provided to target a Calcium Carbonate Precipitation Potential (CCPP) of 0 to 2 mg/L to create and maintain a strong, stable scale.

The City of Calgary reviewed their operation, spring runoff, where higher coagulant dosing is required, they saw treated water pH drop toward the current low limit of 6.5. The raising of the lower limit from 6.5 to 7.0 would essentially force the City to implement finished water pH adjustments for the seasonal excursions below 7.0 (spring runoff). In all likelihood other utilities will have similar challenges.

Another Committee member raised concerns about the interaction of pH and the ability of a water system to maintain disinfection residual. It has been his experience over several systems

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with moderate to high DOC treated water in summer/fall conditions that a pH reduction aids in both maintenance of free chlorine level at remote locations and in maintenance of aesthetic quality. As a result his experience has suggested that 8.5 is an upper limit for pH to ensure maintenance of adequate chlorine residual. This may be a consequence of the HOCl/OCl- chemical equilibrium and the greater disinfectant power of HOCl which is mentioned but the extension to distributed water quality maintenance appears absent. (This observation does not apply to chloraminated systems where the disinfectant activity is maintained essentially unchanged to pH 9 and higher.) While these have been the observations of our Committee member, he wasn't certain if this was a common experience. If it is, he suggested that the Guidance document be revised to include the advice that in some instances a pH no higher than 8.5 may be necessary to maintain disinfectant residual in chlorinated water.

CWWA also reviewed the comments submitted by Metro Vancouver, a member of the Association. We support the recommendations made in their submission.

Editorial Comments

We have the following editorial suggestions to improve the French text as submitted by one of our Committee members.

Thank you very much for your consideration,

Kara Parisien
Communications Coordinator,
Canadian Water and Wastewater Association

CONSULTATION ON A NEW GUIDELINE ABOUT pH in DRINKING WATER PREPARED BY THE DRINKING WATER COMMITTEE – HEALTH CANADA

I – BACKGROUND

The federal-provincial-territorial Committee on Drinking Water (CDW) requests comments on a new Guideline about pH in drinking water. The consultation period will end on March 16, 2015.

Being a member of the CWWA Drinking Water Committee, I have read the French version of the Guideline and I have prepared the present document to describe my comments and suggestions (1) on the Guideline itself as it has been published and (2) on the presentation of the Guideline document. My focus has been mainly on Part I and Part II (sections 4.0, 5.0, 6.0, 7.0, 9.0 and 10.0), which are linked more closely to my field of expertise, chemistry.

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II – ANALYSIS

II – 1 The Guideline itself as it has been published

I wish to congratulate the federal-provincial-territorial Committee on Drinking Water (CDW) for the document on pH which, in my opinion, presents a wealth of information that will be useful for the correct management of the quality of drinking water, mainly in chapters 6 and 7 which are about analytical methods for pH and treatment technologies where pH is a parameter that has an influence on their efficiency.

Moreover, it is important to inform those who are involved directly or indirectly in the supply of drinking water about pH and its link with other quality parameters, since it can require a complex decision making process depending on the quality of a raw water and/or the treated water and the characteristics of a distribution system. I especially appreciate the information about the importance of pH in various water treatment approaches and in the distribution system, including the pipes in buildings.

II – 2 The presentation of the Guideline document

While reading the French version of the Guideline and with all due respect, I have noted some « chemical errors » as well as many “technical weaknesses” and « editorial weaknesses » that have to be addressed and evaluated by the CDW to improve the final French version of the Guideline. Some should also be considered for the English version of the Guideline. I will present them (see attachment) as they were seen in the PDF document for the French Guideline and they will be identified accordingly (**Section, page, paragraph, line**, for example).

Again, I would prefer if the text used the word « stations » instead of the word « usines » as it is on page 3 section 3.1, parag. 1, line 6, for instance, and elsewhere in the text.

Again, I express the opinion that the family of words “réduire” and “réduction” are ambiguous because in the field of chemistry, they are the opposite of “oxyder” and “oxydation”. Therefore, I highly recommend that the family of words “diminuer” and “diminution” should be used in the text. There are many such modifications that should be brought to the text.

Finally, I would like to comment the « 7 » which is identified as the lower limit for pH at the very beginning of the Guideline. I question the choice of « 7 » instead of « 7.0 (7,0 in French) » because a value of 7 for pH is equivalent to a range of pH values from 6.6 to 7.4. Since the systems used to measure exact pH values will definitely indicate values with at least one significant number to the right of the « . » (« , » in French) (see section 4.2 in the Guideline), the message about the pH range would be clearer if the Guideline showed a range of « 7.0 to 10.5 (7,0 à 10,5 in French) ».

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Moreover, since a maximum value of 10.5 (10,5 in the French version) is used in the Guideline, the message is that pH values should be measured in such a way that a significant number is shown to the right of the « . » (« , » in French). In addition, since pH has to be measured regularly to detect changes during the water treatment and in the distribution system, it is absolutely essential to measure pH in such a way that a significant number to the right of the « . » (« , » in French) will be available in order to detect small, but important changes. It will then be possible to react rapidly, as it is mentioned in section 3.1 of the Guideline, where a maximum change of 0.2 (0,2 in French) for the pH should be allowed.

So, I recommend a modification of the « 7 » for « 7.0 » (7,0 in French) in the pH range description. May I mention that on page 7 (section 4.2, paragraph 3), a value of 1,0 for pH has been chosen in the text on line 6, a presentation I think is absolutely correct, considering the need for appropriate pH values in water management and in the proposal made above. Finally, it is interesting to note that « 7,0 » is used on the very last page of the French version of the Guideline (Conclusion, page 33) to describe the minimum value for pH.

If you accept my proposal, I also recommend that the pH value of 6 should be written 6,0 in Table B.2 of the French and modified accordingly in the English version.

III – CONCLUSION

I agree with the approach chosen by Health Canada to prepare that new Guideline about pH in drinking water which covers not only the water treatment challenges, but also water distribution and impacts in buildings. I hope my comments, suggestions and questions will help improve the final French version of the Guideline and the English version accordingly.

Pierre-André Côté, D. Sc., chimiste

February 6, 2015

Att: Table of comments, suggestions and questions

**COMMENTAIRES, SUGGESTIONS ET QUESTIONNEMENTS CONCERNANT LA
RECOMMANDATION SUR LE pH**

Section	Page	Parag	Ligne	Commentaire, suggestion ou questionnement
Objectif de la consultation	1	2	7	Remplacer « réduisant » par « diminuant » pour respecter l'emploi des termes de la famille « réduire » pour l'action chimique de « réduction ». Cette suggestion s'applique ici et ailleurs dans le document.
		3	3	... hc-sc.gc.ca
2.0	2	1	3	remplacer « réduire » par « diminuer », tel que proposé plus haut
		2	2	..., des procédés de traitement de l'eau et des considérations...
2.1		1	3et la capacité-tampon de l'eau... Cette suggestion s'applique ailleurs dans le document
			3	...carbone inorganique dissous....
2.2		1	2	...de façon significative
			4, ses impacts varient....
2.3		1	2-3	Remplacer le terme « tamponnage » par « capacité-tampon ». À titre d'exemple :... par une capacité-tampon adéquate ... ou encore: La capacité-tampon permet de diminuer l'impact possible ...
			5	... diminuera ...
2.4	3	1	4	...dans le réseau de distribution et dans la tuyauterie interne des bâtiments ...
3.1	3	1	6	... la station de traitement... Cette suggestion s'applique ailleurs dans le document.

			11	...le temps de séjour ...
			13	...où des sources d'eau se mélangent.
		2	4	...et que les causes soient identifiées et corrigées.
		3	3	...devraient être diminuées au maximum.
	4	1	1	...des concentrations résiduelles de désinfectant. voir les tableaux de l'annexe B également
			2	...en vue de maintenir la qualité...
4.1	5	1	5	...est faiblement ionisée...
			5	... pour la réaction à l'équilibre ,....
			plus bas	relever le signe (-) de l'exposant pour OH
4.2	6	1	2	...l'un des essais
			plus bas	Ajuster les espaces dans l'équation de E
				revoir l' exposant de K dans l'explication de R; s'applique à mole plus bas Cette remarque s'applique à plusieurs endroits dans le document.
		2 et 4		Écrire : les « ions hydrogènes » de façon identique partout dans le texte.
5.2.1	10	3	13	uniformiser l'expression mg/L pour CID , car en page 24 elle est différente, par exemple; il en est de même dans la figure 3
5.2.4	12	1	8	que sont des « oxydes de carbonate »? La question s'applique aux deux versions.
	13	dernier	dernierne permettent pas de tenir compte de ces
5.2.5	13	1	9-10	...la matière organique naturelle... modifier dans la liste des acronymes également et partout dans le texte

			9	...le chlorure , le sulfate,...
5.3	14	1	5	Remplacer « de la piqûration » par « des piqûres »
6.0	14	1	8	...et minimiser ...
		2	5	...a également démontré ...
6.1	15	2	4	...et de minimiser...
		3	2	... de la MON ...
	16	2	5	...la manipulation des boues
			8	...formation de flocs moins....
			9-10	...et une perforation prématurée .
6.2.1	16	2	5	...le chlore gazeux ... tel que présenté dans le paragraphe qui suit d'ailleurs
		1	4	Je questionne le qualificatif de « physique » pour le pH tant en français qu'en anglais. Si l'on retourne à la section sur le pH, on y décrit un paramètre « chimique » qui implique la dissociation de l'eau.
	17	2	9	... d'inactivation ...
6.3	20	1	7	(sel de sulfate ou de chlorure)
6.5	22	1	2	La phrase devrait être: « Ces procédés changent l'état d'oxydation des constituants en une forme qui peut être plus facilement éliminée dans les étapes de traitement... »
6.6	23	1	5	...qui éliminent ...
			10	...le sulfate, le chlorure , le calcium....
6.8	24	1	8	À un pH supérieur à 9,3, l'ammoniac devient majoritairement neutre (non ionisé) et il peut facilement être éliminé par stripage. Cette remarque s'applique autant à la version française qu'anglaise.
6.9	24	2	6	... contacteurs

			7	...chaux broyée ...
7.1	25	2	4-6	remplacer « rejet » par relargage » cette remarque s'applique à d'autres endroits dans le document, d'autant plus que le terme « relargage est utilisé à la toute fin de la section 6.2.1 (page 18, au bas du dernier paragraphe) et dans la Conclusion, au bas de la page 32
		1	2(chaux hydratée)...
		4	1	Les augmentations de pH causées.....
7.2	25	2		uniformiser l'expression de concentration de la dureté; y-a-t-il besoin de placer un « de » dans « mg/L de... »?
		2	7	Enlever deux fois « Ohio » dans les formules chimiques et remplacer par les symboles appropriés
	26	3	2	...des incrustations
			4	...d'oxydants... l'apostrophe est inversée après le premier d!
	27	2	1	L'eau à faible pH, à faible alcalinité et à faible teneur en...

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