UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
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Seattle, Washington 98101-3140

MAY - 7 2009

David G. Shaff, Administrator
Portland Water Bureau
1120 SW Fifth Ave, Room 600
Portland, Oregon 97204

Dear Mr. Shaff:

This letter is in regard to the conference call held April 22, 2009 with the technical members of your staff at the Portland Water Bureau and US Environmental Protection Agency (EPA) staff from EPA Region 10, EPA Technical Services Center and EPA Headquarters. The purpose of the call was to provide Portland Water Bureau with the results of EPA's review of Portland's *Cryptosporidium* monitoring and analysis protocol to be used in support of a variance, under Section 1415 of the Safe Drinking Water Act (SDWA), from the treatment technique requirements for *Cryptosporidium* as required by the Long Term 2 Enhanced Surface Water Treatment Rule (LT2EWSTR). The Portland Water Bureau informed EPA that it intended to pursue a variance from the treatment technique requirements of the LT2ESTWR as it applies to the Bull Run water supply in a letter dated July 23, 2008.

As you know a variance from the treatment technique requirements under Section 1415 of the SDWA requires a finding by EPA that the public water system has demonstrated that the treatment technique is not necessary to protect public health due to the nature of the raw water supply. The information necessary to support such a finding would include: water quality analytical results from sampling for the contaminant of concern and information concerning the quality of that data; information on the quality of the water source; and information on source protection and watershed conditions and controls [Section 1415(a)(1)(B) of the SDWA]. After receiving your proposal, EPA was in a better position to identify the information on the quality of the water, source protection and watershed conditions and controls that would be needed to support the variance.

With regard to water quality sampling for *Cryptosporidium*, the preamble to the LT2ESWTR (FR Vol 71, No 3) describes that an unfiltered water supply would need to show a raw water *Cryptosporidium* concentration below 0.075 oocysts/1000 L to support a variance from the LTESWTR requirements. The preamble further states that EPA has not identified an approach that is economically or technically feasible to demonstrate this level of *Cryptosporidium* to support granting a variance. This was stated in our letter dated April 8, 2008.

In undertaking this approach, your office proposed major modifications to the approved *Cryptosporidium* analysis Method 1622/23. Since this method is a performance based method; changes are allowed to be made as long as the results are equivalent to the

original method. Your current proposal does not contain enough data for us to determine equivalency. Also, EPA is not aware of any similar method modifications to the method by other public water systems or analytical laboratories that could be used in a comparative review of the quality of the data collected by the Portland Water Bureau using the modified method. Consequently, in order to consider allowing a variance, EPA requires additional water quality testing and quality control steps to ensure the data have sufficient quality to support the use of the modified method. The EPA comments and recommendations on the protocol presented on the conference call were intended to ensure a high level of confidence in the quality of data and information collected and submitted in support of the variance.

During the conference call your staff expressed concerns regarding the bulleted information that was provided. Below is a reiteration of that information with an expanded discussion that we hope you find helpful in understanding what additional work is needed for the agency to have a high level of confidence in the quality of data and information collected and submitted in support of the variance.

1. Portland should provide statistically valid data to demonstrate the efficacy of the proposed method before initiation of sampling. The information provided under the proposed protocol is limited and is not sufficient to demonstrate the efficacy of the modified method with a high degree of confidence. The degree of variability is substantial for Method 1622/1623 even when experimental conditions are held as constant as possible. Statistics are necessary to describe the variability of the method when analyzing for *Cryptosporidium* in raw source water.

2. The number of observations necessary for the experiments should be calculated using the variation in repeated matrix spike tests. Standard statistical practices for estimating measurement uncertainties should be incorporated, including the approach for determining the number of observations. A 90% confidence interval based on matrix spike samples should be used to determine the number of observations necessary for the study. The confidence interval will estimate the reliability of the method to detect oocysts.

3. Matrix spike samples should be collected from a full suspension of specific source water in the complete volume proposed for sampling collection (e.g, 200 L) and spiked with 100 oocysts. This information is necessary to assess the quality of the data submitted in light of the extent of the suggested method modification. Inorganic and organic debris can interfere with the concentration, separation, and examination of the sample for *Cryptosporidium* oocysts. Thorough evaluation of method results from source water analyses should provide sufficient data to identify potential method performance issues.

4. Sample locations should include any known or suspected "hot spots" in the source to supplement samples taken from the intake. This information is needed to

assess the overall quality of the raw water source as required for a variance under section 1415(a)(1)(B) of the SWDA which states:

A State which has primary enforcement response responsibility for public water systems may grant to one or more public water systems within its jurisdiction one or more variances from any provision of a national primary drinking water regulation which requires the use of a specified treatment technique with respect to a contaminant if the public water system applying for the variance demonstrates to the satisfaction of the State that such treatment technique is not necessary to protect the health of persons because of the nature of the raw water source of such system. A variance granted under this subparagraph shall be conditioned on such monitoring and other requirements as the Administrator may prescribe.

Additionally, Portland noted in its 2006 Source Water Assessment Report that the ... "only contaminants of concern for the Bull Run source are naturally microbial contaminants such as Giardia lamblia, Cryptosporidium, fecal coliform bacteria and total coliform bacteria. These organisms are found in virtually all freshwater ecosystems and are present in the Bull Run supply at very low levels.... Wildlife species such as deer, elk, cougar, bobcat, black bear, beaver, and muskrat are potential sources of microbial contaminants." The report goes on to state that a fence was constructed in the mid-1980's to prevent small wildlife from direct contact with the intake system; and it says that no additional measures could be taken "to control these natural sources of microbial contaminants."

Identification of potential "hot spots" near the inlets of major stream flows from migratory areas within the watershed, "draw down" areas around the reservoirs where wildlife graze during the summer months and samples from deeper areas in the reservoirs may be necessary to fully establish the quality of the raw water in the Bull Run raw water source. Results from previous studies and investigations could be considered when estimating the probability that a hot spot exists. EPA needs such an estimate to help determine if a treatment technique is not necessary to protect public health.

5. A process-based mathematical model should be used to better characterize *Cryptosporidium* concentration in the relevant source water, as well as oocyst loads generated within, and exported from the source. Models are frequently used by scientists in many disciplines to describe the essential aspects of an existing system in quantifiable terms. The model here will provide information needed to assess the overall quality of the water source as well as the effectiveness of source water protection and watershed conditions and controls. [A model based on Ferguson et al. 2007, supplemented with the EPA Office of Research and Development adaptations to make this approach more readily applicable to U.S. conditions is recommended. (For further information, contact Nicholas Ashbolt 513-569-7318 or Gene Whelan 706-355-8305) Ref: Ferguson, CM BFW Croke PJ Beatson NJ Ashbolt and DA Deere. Development of a

process-based model to predict pathogen budgets for the Sydney drinking water catchment. *Journal of Water and Health* 5.2:187-208, 2007.]

Results from previous studies and investigations could also be used to characterize *Cryptosporidium* concentrations in the source water as well as oocyst loads that may vary seasonally or spatially in the watershed.

EPA has strong reservations about the viability of the variance approach based on your current submission and also recommends that you continue to take steps to ensure compliance with LT2 treatment requirements. However, the Agency will continue to work with your staff to refine your monitoring proposal. Again, we have not identified an approach that is economically or technologically feasible for a public water system to demonstrate such a low level of *Cryptosporidium* to support granting a variance. The number of observations necessary to demonstrate whether or not your raw water Crypto levels are below .075 oocysts/1000L would be substantial and characterizing *Cryptosporidium* concentration in an individual source water has many factors that need to be taken into consideration including sources of oocysts entering the reservoir, fate and transport of the oocysts, and variable conditions of the reservoir. If you are still considering seeking a variance, I want to recommend that we maintain close communications. Please give me call, if you have additional questions.

Sincerely,

Marie Jennings, Manager
Drinking Water Unit

cc: Mike Bussell, EPA
Cynthia Dougherty
Paul Simon
Ronald Bergman