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February 8, 2012

Gail R. Shibley, JD, Administrator  
Oregon Health Authority  
Office of Environmental Public Health  
Drinking Water Program  
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Subject: Bull Run Variance – Comments regarding recent *Cryptosporidium* testing results

Dear Ms. Shibley:

In response to the reopening of the public comment period for the Bull Run variance, the Portland Water Bureau (PWB) would like to take this opportunity to provide the enclosed additional comments that address the recent *Cryptosporidium* testing results for your consideration. PWB previously submitted a detailed technical report to OHA on January 23, 2012 that included all of the available laboratory data and information and the surveillance activities that were undertaken as a response.

Thank you for your agency's continuing efforts on this matter. Please do not hesitate to contact me with any questions or follow-up.

Sincerely,

David G. Shaff, Administrator  
Portland Water Bureau

Enclosure

## Portland Water Bureau Comments on *Cryptosporidium* Testing Results

Following the December 30, 2011 detection of *Cryptosporidium* at the Bull Run raw water intake, PWB submitted a technical report to OHA-DWP reviewing all of the available laboratory data and information and the surveillance activities that were undertaken as a response.<sup>1</sup> PWB would like to take this opportunity to provide additional comments regarding the recent detection.

As confirmed by Multnomah County Health officials, PWB strongly believes that the isolated detection of one oocyst at the Bull Run raw water intake does not represent a public health threat. Nor is it indicative of a change in the Bull Run watershed conditions that supported OHA-DWP's Notice of Intent to grant Portland a variance from the surface water treatment requirements of the LT2 Rule. While any detection of *Cryptosporidium* at the Bull Run raw water intake prompts increased vigilance, its significance can only be determined in conjunction with all other available information. Since the currently available disease surveillance and watershed data do not support the existence of a public health threat or any significant changes in the conditions in Bull Run, PWB believes that the recent detection should have no bearing on OHA-DWP's intent to grant a variance.

PWB offers the following comments in support of its view on the recent detection:

### **Comment #1: The *Cryptosporidium* concentration at the Bull Run intake remains below the EPA threshold of 0.000075 oocyst/L.**

The detection of one *Cryptosporidium* oocyst at the Bull Run raw water intake represents an isolated event in 657 water samples totaling a volume of 15,882 L of water collected at the intake since PWB began intensive monitoring in support of the Variance Request in December 2009 (Table 1).<sup>2</sup> This means that the average *Cryptosporidium* concentration at the raw water intake is 0.000063 oocysts/L, which is below the threshold of 0.000075 oocysts/L established by EPA in the preamble of the LT2 rule as a criterion for a variance. Furthermore, the recent detection represents the first time that *Cryptosporidium* has been found at the raw water intake in nearly 10 years.<sup>3</sup>

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<sup>1</sup> PWB *Cryptosporidium* detections – review of supplementary data and follow-up investigations was submitted to OHA-DWP on January 23, 2012.

<sup>2</sup> Number of samples and total volume are based on laboratory results from the Bull Run raw water intake from December 14, 2009 through February 1, 2012.

<sup>3</sup> Prior to the current detection, no oocysts had been detected at the Bull Run raw water intake since August 12, 2002.

**Table 1:** Summary of PWB's *Cryptosporidium* Monitoring at the Bull Run Raw Water Intake - LT2 Variance Request and Interim Monitoring Periods

Monitoring Period	Date Range	Number of Intake Samples	Total Sample Volume (L)	Number of <i>Cryptosporidium</i> Oocysts
LT2 Variance Request	Dec. 14, 2009 - Dec. 6, 2010	449	10,271	0
Interim <sup>A</sup>	Dec. 7, 2010 - Feb. 1, 2012	208	5,611	1
<b>Total</b>		<b>657</b>	<b>15,882</b>	<b>1</b>
<b><i>Cryptosporidium</i> Concentration (# Oocysts/Intake Volume Since Dec. 14, 2009) = 0.000063 Oocysts/L</b>				

<sup>A</sup>PWB has sampled according to the interim monitoring plan since the end of the LT2 Variance Request monitoring period.

In response to the recent detection, PWB increased the monitoring frequency at the raw water intake to four times per week. Sample collection at the intake continued at this frequency during the recent switch to Portland's groundwater source prompted by elevated turbidity in the Bull Run source from January 21 through January 31, 2012. As of February 1, no further oocysts have been detected at the intake in 22 50-L samples collected since the positive result on December 30, 2011. The absence of any additional oocyst detections at the raw water intake despite the increased monitoring frequency provides confidence that the detection in late December was an isolated event, well within the expected bounds of a system with a very low level of *Cryptosporidium*.

During the interim monitoring period, PWB has continued to adhere to the highest data quality standards. Matrix spike samples are collected every four weeks to evaluate the performance of the method. This matrix spike frequency exceeds the minimum requirements of not less than 1 matrix spike per 20 field samples established by EPA Method 1623, providing added confidence in the on-going performance of the method. Matrix spike recovery results for *Cryptosporidium* during the LT2 Variance Request and interim monitoring period are summarized in Table 2. During both monitoring periods, the average *Cryptosporidium* recovery has remained within the EPA Method 1623 criteria of 13%-111%.

**Table 2:** Summary of PWB's Matrix Spike Recovery Results for *Cryptosporidium* at the Intake - LT2 Variance Request and Interim Monitoring Periods

Monitoring Period	Date Range	Number of Matrix Spike Samples	Average <i>Cryptosporidium</i> Recovery
LT2 Variance Request	Dec. 14, 2009 - Dec. 6, 2010	28	28.8%
Interim	Dec. 7, 2010 - Feb. 1, 2012	21	36.5%

**Comment #2: Multnomah County disease surveillance showed no unusual increase in the incidence of cryptosporidiosis associated with the recent detection.**

PWB contacted Multnomah County Health Department to review the recent available cryptosporidiosis disease surveillance data. The MCHD Communicable Disease Services Program Manager, Amy Sullivan, PhD, MPH, verified that there has not been a spike in cryptosporidiosis cases in Multnomah County and that there is no public health threat related to the December 30, 2011 detection of one oocyst at the raw water intake.

According to the Multnomah County Communicable Disease Reports, there were six case counts of cryptosporidiosis in December 2011 and five case counts from January 1-26, 2012. Dr. Sullivan confirmed that these levels are within the expected range based on historical data.<sup>4</sup>

**Comment #3: PWB and public health experts concur that the public health risk from consuming Bull Run water remains very low.**

PWB's Variance Request was based on monitoring results demonstrating that the risk of exposure to *Cryptosporidium* from Bull Run water is very low. As such, PWB is already meeting the stated public health goals of the Long Term 2 Enhanced Surface Water Treatment Rule (LT2 Rule). One oocyst detected during a monitoring program spanning over two years of intensive sampling (see Comment #1) does not represent a level of occurrence exceeding these public health goals.

As stated by participants of the Monitoring Expert Workshop convened by PWB on May 2 and 3, 2011:

*A single detection of a small number of Cryptosporidium oocysts should not automatically terminate eligibility for the variance since the public health consequences of an isolated detection are not measurable. A better trigger... would be based on monitoring results which demonstrate a continued presence of human-infectious Cryptosporidium or signs in the community of waterborne disease transmission.*

PWB requested that David Spath, PhD, one of the members of the Monitoring Expert Workshop and the Public Health Expert Panel, provide a public health assessment of the recent detection. Dr. Spath worked for the California Department of Health Services from 1972 to 2005 and was chief of the department's Division of Drinking Water & Environmental Management. Based on his assessment of the available information,

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<sup>4</sup> As of calendar year 2012, MCHD adopted a new case definition of cryptosporidiosis that may result in spurious increases in the number of reported cases. Despite this change, cryptosporidiosis levels reported for January 1-26, 2012 are comparable to levels reported for the same time period in previous years.

Dr. Spath concluded that the totality of monitoring results indicate that *Cryptosporidium* levels in Bull Run water continue to be very low and the public health risk associated with consuming Bull Run water, including the risk of *Cryptosporidium* exposure, remains negligible. Dr. Spath's assessment is included as Attachment 1.

PWB has informed OHA-DWP and Multnomah County Health Department (MCHD) officials of the initial lab results and follow-up monitoring results showing no additional detections. Neither agency indicated a concern regarding public health impacts. Portland drinking water consumers were not advised to take any precautions. PWB has been and will continue to be in consultation with the local health department as it continues to monitor at the raw water intake, pending a final order on the variance request.

**Comment #4: The conditions in Bull Run offer a unique level of public health protection.**

Due to the protected nature of the Bull Run watershed, wildlife represent the only potentially significant source of pathogens. Molecular characterizations of the *Cryptosporidium* genus have shown that with few exceptions most species and genotypes tend to be host-adapted and only a small number of species from this genus have been associated with human infections. Since wildlife are the only likely source of *Cryptosporidium* in the Bull Run watershed, it is unlikely that any oocyst detected at the raw water intake would be from one of the two *Cryptosporidium* species that are the causative agent for the overwhelming majority of reported human cases. This is in stark contrast to water systems whose source water is impacted by human and agricultural waste.

EPA Method 1623, while designed for monitoring the occurrence of oocysts in raw water, has significant limitations as a tool for characterizing public health risk since it is unable to distinguish between specific species of *Cryptosporidium*. The detection of *Cryptosporidium* oocysts by Method 1623 does not equate with the detection of an agent capable of causing an infection in humans after exposure to low levels via drinking water. PWB and many experts in the field of *Cryptosporidium* believe that caution should be employed when attributing public health significance to samples that test positive for *Cryptosporidium* by Method 1623 in the absence of genotyping information.

As detailed in PWB's technical report, PWB attempted to genotype the positive sample at the intake (as well as the two positive samples collected from the South Fork of the Bull Run River at PWB Station 35 on 12/30/2012 and 1/5/2012). None of the samples amplified by polymerase chain reaction (PCR) and thus they were not able to be genotyped. PWB is researching options that may improve the genotyping success rate of its Method 1623 samples so that the most relevant information is available for making public health decisions.

**Comment #5: PWB effectively implemented its proposed monitoring and management response strategies to protect public health.**

As a condition of the variance, PWB proposed monitoring and management responses to a positive result intended to maintain exceptional public health protection against *Cryptosporidium*. During the recent detection, PWB effectively implemented the proposed response strategies providing confidence in PWB's capacity and willingness to respond to a positive result in a manner that is protective of public health.

Upon learning of the positive result at the Bull Run raw water intake, PWB immediately contacted OHA-DWP and MCHD to provide all available information of relevance for evaluating the public health significance of the *Cryptosporidium* detection. PWB has continued to provide OHA-DWP regular updates of monitoring results at the intake and throughout the watershed. A technical report reviewing all of the available laboratory data and information and the surveillance activities that were undertaken as a response was submitted to OHA-DWP and MCHD.

PWB increased the monitoring frequency at the intake to four times per week to better determine if the positive result was an isolated event or represented cause for concern.<sup>5</sup> PWB will continue to collect samples at the raw water intake at a frequency of four times per week until OHA-DWP issues a final order on the variance request.

PWB also responded with additional surveillance to investigate any potential causes for the positive sample and to provide additional information that could be used by PWB, OHA-DWP, and MCHD to evaluate the significance of the detection at the intake. Surveillance activities included the collection of additional water samples at locations in the watershed upstream of the intake to identify the extent of the presence of *Cryptosporidium* in the watershed. Since oocysts were only detected in upstream samples from the South Fork basin, additional surveillance activities were focused on this area of the watershed. Additional surveillance activities consisted of stream water quality monitoring, scat monitoring, and an inspection of the South Fork basin for any unusual conditions.

PWB's monitoring and management responses, as put into practice during the recent detection, have been effective at providing assurance that the recent detection of one oocyst at the raw water intake does not represent a significant deviation from the conditions in the Bull Run watershed that support public health in the absence of treatment for *Cryptosporidium*. PWB will continue to work with OHA-DWP and MCHD to refine these practices to ensure the highest on-going level of protection for PWB's drinking water customers.

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<sup>5</sup> According to PWB's interim sampling plan, the monitoring frequency at the intake would be increased if the total oocyst concentration was above 0.000075 oocysts per liter (oocysts detected/liters assayed since December 2009). However, PWB made the change to increased monitoring to be consistent with OHA's proposed variance conditions as outlined in the November 29, 2011 Notice of Intent.

287 Purdue Avenue  
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February 1, 2012

Yone Akagi  
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Dear Ms. Akagi,

This is in response to your request for a public health assessment of the recent finding of a *Cryptosporidium* oocyst at the Bull Run raw water intake. That finding indicated a single *Cryptosporidium* oocyst was present in a 50 liter sample taken on December 30, 2011. Subsequent samples (12) taken at the intake from December 31 through January 18, 2012 were all negative.

Although the positive finding may be unsettling, it should not be considered unexpected. As the Public Health Panel, of which I was a member, convened by the Portland Water Bureau concluded, the probability of exposure to *Cryptosporidium* via consuming Bull Run water is expected to be low. As indicated by that conclusion, the Panel did not believe that there was no potential risk of exposure to *Cryptosporidium* associated with consuming Bull Run water; nor did it conclude that there was not the possibility of *Cryptosporidium* being present. Rather the Panel felt that the risk was not significant and additional treatment measures taken to further reduce very low levels of *Cryptosporidium* would not have meaningful public health results.

I believe that the overall monitoring results support the Panel's conclusions. Taken as a whole, the results indicate that *Cryptosporidium* levels are very low in Bull Run water. Most important is the fact that there were no additional *Cryptosporidium* detections at the intake subsequent to the December 30th detection even though water quality conditions (high turbidity) were worse than at the time of the positive sample. Certainly if there were significant levels of *Cryptosporidium* in Bull Run water, they would have been detected during that time period.

In conclusion, my assessment is that even with the recent *Cryptosporidium* finding the totality of the monitoring results indicate that *Cryptosporidium* levels in Bull Run water continue to be very low and the public health risk associated with consuming Bull Run water has not changed. In addition, the increased monitoring conducted subsequent to the finding was critical to providing a complete picture of the potential risk of *Cryptosporidium* exposure during the period of declining Bull Run water quality. The Portland Water Bureau should be commended for that response.

If you have any additional questions, please do not hesitate to contact me.



David P. Spath, PHD