



To: Gail Shibley, J.D.
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Oregon Health Authority
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Portland, Oregon 97232

Dave Leland
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From: Jana Fussell
Hearing Officer
Oregon Health Authority
800 N.E. Oregon Street, Suite 930
Portland, Oregon 97232

Hearing Officer Report

Date of Hearing: December 14, 2011

Purpose of Hearing: To take public comments regarding the Oregon Health Authority, Public Health Division's Notice of Intent to Grant Variance In the Matter of Portland Water Bureau's Request for Variance Under 42 USC §300g-4(a)(1)(B). This document is dated November 29, 2011, and is hereafter referred to as the "NOI".

Hearing Officer: Jana Fussell

Oral Testimony Received: Four individuals provided oral testimony at the hearing. This testimony is briefly summarized as follows:

Dr. Theodora Tsongas:

Dr. Tsongas testified that she is an environmental health scientist with 35 years' experience evaluating the human health effects of contaminants in the environment and is familiar with drinking water issues. She stated that she is a member of the environmental health committee of Oregon Physicians for Social Responsibility and that she supports their comments. Dr. Tsongas expressed strong support for the NOI for two main reasons: (1) Due to the characteristics of the untreated source water from the Bull Run management unit, the required treatment is not necessary and so a variance would not pose an unreasonable risk to the public health; and (2) If the variance is denied, risk to public health could be increased because of increased human activity in the watershed. While she supports the draft conditions in the NOI regarding "watershed control, stewardship and protection", she does not support the draft conditions regarding monitoring as "water sampling methods should go beyond Method 1623 to include genotyping and verification." She expressed concern that "a detected oocyst not pathogenic to humans could trigger the construction of an unnecessary treatment plant with resulting risks to the watershed and causing unwarranted concern for a contaminant that is not a significant public health risk." Dr. Tsongas urged that the variance include recognition that "the LT2 Rule is flawed and the Method 1623 is outdated."

Regna Merritt

Ms. Merritt testified at the public hearing and later submitted written comments.

Testimony at the Public Hearing: Ms. Merritt represented that she was commenting on behalf of four organizations: Oregon Physicians for Social Responsibility, Oregon Wild, the Central Eastside Industrial Council, and the Hillside Neighborhood Association. She expressed strong support for the NOI. Ms. Merritt testified that requiring treatment of the Bull Run water source for *Cryptosporidium* is not necessary and that it provides a safe water supply. She opined that denial of a variance or revocation of an issued variance could increase the risk to the public health because there will then be increased pressure to open the unit to more uses such as logging, development and recreation which would increase the risk of contamination with more humans in the watershed. Like Dr. Tsongas, she strongly supports

the conditions in the NOI with the exception of the conditions regarding monitoring. She also expressed the hope that the “OHA acknowledges the flaws of 1623 and modifies the draft monitoring conditions.” In relation to 1(b)(A) and (C) of Section IV of the NOI, Ms. Merritt suggested that the language be modified to include the option to continue to allow Portland Water Bureau (“PWB”) to use 10 liter samples and she also recommended that testing only be required when the water source is actually being used to supply drinking water. In relation to (1)(b)(B) and (D) of Section IV of the NOI, she testified that the language should include a provision requiring a positive result to be confirmed by a second U.S. Environmental Protection Agency (“EPA”) approved lab. She also urged that genotyping be required for any positive test to determine the public health impacts or lack thereof. Ms. Merritt also requested a “correction” to Finding of Fact #39, Section II of the NOI. Ms. Merritt opined the 1977 Public Law 95-200 actually opened the watershed to logging and that it was not until 1996 that a general prohibition on logging was enacted.

Ms. Merritt’s Written Comments: Ms. Merritt submitted written comments that are attached to this report as “Exhibit #1”. Included in the comments are three appendixes. She represented that she is providing these comments on behalf of a large number of individuals and organizations including: herself and Dr. Tsongas for Oregon Physicians for Social Responsibility, Floy Jones for Friends of the Reservoirs, Kent Crawford for Portland Water Users Coalition Members, Scott Shlaes for Oregon Wild, Bob Sallinger for Audubon Society of Portland, Alex P. Brown for BARK, Franklin Gearhart for Citizens Interested in Bull Run, Inc., Ron Carley for Coalition for A Livable Future, Julia DeGraw for Food & Water Watch, David Delk for Alliance for Democracy, David Lorati for Central Eastside Industrial Council, Peter Stark for Hillside Neighborhood Associations, Jeffrey Boly for Arlington Neighborhood Association, Stephanie Stewart for Mt. Tabor Neighborhood Association – Land Use Committee, Anne Duffy for SE Uplift Neighborhood Coalition, and Rod Daggett and Maxine Wilkins for Eastside Democratic Club. In many respects, Ms. Merritt’s written comments mirror her earlier oral testimony. It offers a much more detailed analysis of why she believes that granting the variance is appropriate and why requested “modifications and additions to the OHA findings and changes to the OHA’s proposed order regarding conditions” are needed. Citing EPA’s August 2011 “Criteria for Regulatory Reviews” she opined that: “While the OHA has stated that

economic arguments cannot be used in determining whether or not a variance is granted, we believe that the OHA must consider cost and net benefits, performance objectives, alternative, innovation, flexibility, scientific and technological objectivity, and plan common sense while setting final conditions for the proposed variance.” Appendix C of Ms. Merritt’s submission discusses the impact that increased water bills could have on vulnerable populations.

Michael Morgan

Mr. Morgan testified that he lives in Portland. He opined that: “the possibility of cryptosporidium in the Bull Run source of Portland’s drinking water is not a problem.” In support of this statement, he cited six specific reasons that are detailed in his written testimony that is attached to this report as “Exhibit #2”. Mr. Morgan expressed concern that a treatment facility would introduce risks to the quality and safety of the water. He requested that the OHA “grant a variance from the LT2 treatment requirement for Bull Run drinking water with the least burdensome variance conditions.”

Jerzy Giedwoyn

Dr. Giedwoyn is a physician who has practiced in Portland since 1970. He testified that all of the cases of Cryptosporidiosis he has seen were imported from the south, from other states. He likened treatment to requiring every person to have a complete physical every day: it might be helpful but completely unnecessary and very expensive.

Other Comments: Fifteen additional individuals submitted written comments to the Oregon Health Authority within the time period allotted for public comment. These comments are briefly summarized as follows:

Sharon Neski

Ms. Neski wrote to express concern about “the proposed continuing monitoring program” which she finds to be “quite inadequate.” Ms. Neski noted that: “I love Portland water and I have no doubt that it is clean and safe, but a monitoring program should have the capability to do what it is set up to do.” Her written testimony is attached to this report as “Exhibit #3” and

it provides a detailed mathematical analysis of why she believes that the proposed monitoring program falls short of the mark.

Mary Saunders

Ms. Saunders wrote concerning “Rate-payers and Process/Bull Run Variance.” She opined that: “The variance cannot restore trust, but it is a step in a better direction.” Ms. Saunders’ written comments are attached to this report as “Exhibit #4”.

Diane Tweten

Ms. Tweten wrote to express concerns about actions of PWB citing, among other things, the cost of consultants and of covering the reservoirs. In relation to the NOI, she wrote that she finds “very little comfort in the ‘proposed variance.’” She noted that: “there have been no documented incidents from cryptosporidium in the Portland drinking water.” Ms. Tweten’s written comments are attached to this report as “Exhibit #5”.

Daniel Rhiger and Rahmana Eva Wiest

Mr. Rhiger and Ms. Wiest wrote to express their belief that the “Portland Water Bureau has more than adequately demonstrated that the required treatment is not necessary!!” They state their strong support “for the Oregon Health Authority’s general intent to grant a 10 year variance.” Their testimony also echoed many of the same themes as the testimony from Dr. Tsongas and Ms. Merritt:

(1) “We believe that a variance would not provide an unreasonable risk to public health. Indeed, denial of a variance may increase risk to public health. Construction of an additional treatment system could generate new risks to the Bull Run Management Unit and to public health.”

(2) They support the draft conditions regarding “watershed control, stewardship and protection.”

(3) They do not support the draft conditions regarding monitoring as “Water sampling methods should go beyond 1623 to include verification and genotyping as proposed by the PWB in its request for a variance. Otherwise,

a detected oocyst not pathogenic to humans could trigger the construction of an unnecessary treatment plant.”

(4) Mr. Rhiger and Ms. Wiest urged the OHA to “acknowledge the flaws of Method 1623 and modify the draft monitoring conditions.”

(5) They requested that: “the variance include recognition that LT2 Rule is flawed, Method 1623 is outdated and both are now in process of being reviewed and revised by the EPA.”

(6) They also requested “a correction in Finding #39 on page 11 of the NOI.”

Their written comments are attached to this report as “Exhibit #6”. They both emailed and sent comments by regular mail.

Erik Fernandez

Mr. Fernandez is Wilderness Coordinator for Oregon Wild. Like Mr. Rhiger and Ms. Wiest, he wrote to express his strong support for “Oregon Health Authority’s general proposal to grant a 10 year variance.” He opined that: “The Portland Water Bureau has demonstrated that the characteristics of the raw source water are such that the required treatment is not necessary.” Mr. Fernandez’s written comments are substantially similar to those submitted by Mr. Rhiger and Ms. Wiest and are attached to this report as “Exhibit #7”. Mr. Fernandez wrote that: “I support the OHA’s general intent to grant a variance to the PWB and request correction of the OHA finding as above, additions to the findings and changes to the OHA’s proposed order regarding mandated monitoring so as to go beyond Method 1623 to include genotyping and verification.”

Kathryn Notson

Ms. Notson emailed four written comments dated December 14, December 16, December 27 and December 30, 2011. These written comments are attached to this report as “Exhibit #8”.

In her December 14, 2011 comments, Ms. Notson cited the February 2003 article entitled “Comparison of Method 1623 and Cell Culture-PCR for Detection of *Cryptosporidium* ssp. in Source Waters.” She stated that this

report shows that oocysts were detected in 11 samples out of 186 samples resulting in a 24% viability rate and that the annual risk of infection ranges from 1:42 to 1:95 infections per year. Ms. Notson opined that: “The USEPA’s acceptable risk of infection from drinking water is 1:10,000 infections per year. It means that Portland’s untreated Bull Run surface water source water had more than 100-fold higher infection risk than the USEPA guideline.” She expressed concern about incidents of cryptosporidiosis and raised questions about how and when water samples are collected. Ms. Notson wrote that: “I support any conditions that the Drinking Water Program or the USEPA may apply to the Portland Water Bureau’s LT2ESWTR variance. It must be clear to all parties what will happen if the Portland Water Bureau detects any cryptosporidium parvum oocysts in the Bull Run watershed.” In her December 16, 2011 comments, Ms. Notson requested that a number of “corrections” be made to the NOI. These corrections and concerns are detailed in her written submission. Ms. Notson’s December 27, 2011 comments explored some of Portland’s history with open distribution reservoirs and in relation to the variance request opined, among other things, that: “The Portland Water Bureau doesn’t want to be penalized for one Cryptosporidium detection during a turbidity event.” She cited the time required to take action to switch over to Columbia South Shore Well Field ground water and wrote that: “There would still be time for contamination of the Bull Run source water to occur during a turbidity event while these closing and opening processes occur.” In her December 30, 2011 comments, she questioned the accuracy of Finding of Fact #26, Section II of the NOI.

Michael A. Bussell

Mr. Bussell is the Director of the Office of Water & Watersheds at the EPA, Region 10. Mr. Bussell provided background information on the Long Term 2 Enhanced Surface Water Treatment Rule or “LT2”, primacy requirements and the PWB request for a variance. His comments generally focused on four issues and drew the following conclusions:

(1) Quality Assurance Monitoring: “EPA recommends that matrix spike sampling and analysis be conducted at least monthly for the term of the variance.”

(2) Sample Volume: “EPA recommends that any variance conditions include the flexibility for Portland Water Bureau to collect source water samples in either 10 or 50 liter volumes.”

(3) Public Notification: “EPA encourages OHA to consider a public notification requirement for any oocyst detections.”

(4) Use of Improved Detection and Monitoring Methods: “Any variance granted by OHA should clarify that sampling must use the EPA-Approved Method which applies at the time samples are taken. In addition, any variance granted by OHA should encourage Portland Water Bureau to make use of improvements to Method 1623 as they become available.”

Mr. Bussell’s written submission explores the rationale for each of the four positions taken by his agency and are attached to this report as “Exhibit #9”.

Floy Jones

Ms. Jones provided comments on behalf of The Friends of the Reservoir (“FOR”). She detailed FOR’s extensive involvement with issues related to the proposed variance. She voiced FOR’s support for issuance of a variance but also noted that they further support “indefinite approval of the variance without onerous and unnecessary conditions attached such as requiring further costly extensive sampling.” Ms. Jones suggested testing the Bull Run source water at the intake no more than four times a month. She opined that: “Additional testing should not be required unless the conditions of the federally protected Bull Run watershed substantially change and EPA’s sampling methodology is significantly improved such that it distinguishes between harmless and harmful *Cryptosporidium*.” Ms. Jones comments explored FOR’s belief that the PWB “has more than adequately demonstrated that the character of the Bull Run Water source water is such that additional treatment is not necessary and that there is no unreasonable risk to public health in avoiding the installation of an additional treatment plant.” She also detailed FOR’s concerns about the EPA approved LT2 sampling method. Citing problems such as breaking bulbs, Ms. Jones stated that FOR believes that: “the greatest risk to Bull Run water safety would come not from infectious *Cryptosporidium* but from a requirement to install an unnecessary additional treatment plant.”

Ms. Jones' written comments are attached to this report as "Exhibit #10".

Helen Kennedy

Ms. Kennedy voiced her support for "OHA's general intent to grant a variance to the Portland Water Bureau" while opining that "there is a monitoring flaw that needs to be addressed." She wrote that: "The water sampling methods should be improved so that if an oocyst is detected that is NOT pathogenic to humans, the building of an unnecessary treatment plant can be averted a great expense to the rate payers of the PWB." Ms. Kennedy's written comments are attached to this report as "Exhibit #11".

Mary and John Sievertsen

The Sievertsens voiced their agreement with the comments of Oregon Physicians for Social Responsibility and requested that this organization's recommendations be considered. Their written comments are attached to this report as "Exhibit #12".

David G. Shaff

Mr. Shaff is the administrator of the PWB. He expressed pleasure with the NOI and stated that: "Portland recognizes and supports the purpose of OHA's proposed conditions to establish monitoring protocols, notification requirements and ensure ongoing protection of the Bull Run watershed as a drinking water source." Mr. Shaff's written comments are attached to this report as "Exhibit #13". Included are three attachments: (1) Attachment A is "intended to help achieve effective and practical implementation of the variance conditions." (2) Attachment B offers recommended corrections to what PWB believes to be factual errors in the draft variance findings. (3) Attachment C provides a review and response to the comments submitted by the EPA. These attachments provide detailed analyses and recommended language.

Scott Fernandez

Mr. Fernandez identified himself as having a M.Sc. biology/microbiology. He urged a "complete Waiver from LT2 added drinking water treatment and covering open reservoirs." His comments discussed the drinking water event

that happened in Milwaukee, Wisconsin in 1993 and he concluded that: “Hundreds of millions of dollars have been wastefully spent trying to prove a *Cryptosporidium* spp. drinking water public health problem exists in municipally treated surface water utilities and open reservoir facilities.” He opined that: “Ultimately the Variance process has provided little useful information with no expectation of a successful outcome because of continued use of flawed and scientifically unsupportable methodologies.” Mr. Fernandez’s written comments are attached to this report as “Exhibit #14”.

Anonymous Comment

The commentator agreed with issuing a variance to PWB but did not agree “with the quality and standards that the State (OHA) has set forth for the PWB in the listed provisions and ongoing monitoring requirements.” The commentator expressed concern about a “lack of transparency of who reviewed this in OHA” and opined: “This is important in my view as it appears the standard set are rather low, most items are either poorly thought-out, unclear, unspecific, and poorly crafted in addressing the elements regarding the monitoring of the Bull Run regarding *Cryptosporidium*.” The commentator’s written comments are attached to this report as “Exhibit #15” and provide a detailed critique of the conditions that are seen as exhibiting these flaws.

EXHIBIT 1

From: Regna Merritt
Sent: Tuesday, January 03, 2012 2:57 PM
To: pwb.treatment-variance@state.or.us; Dave Leland
Subject: Comments on OHA Proposal to Grant Variance

Hi Dave and All,
Will you please confirm receipt of these comments?
Thank you,
Regna

Regna Merritt
Oregon Physicians for Social Responsibility, EHC
--
Please contact me at



January 3, 2012

RE: Comments on Portland Water Bureau's Request for Variance Under 42 USC 300g-4(a)(1)(B) and OHA's Notice of Intent to Grant Variance

To Whom It May Concern,

We strongly support the stated intent of the Oregon Health Authority (OHA) to grant a variance to the Portland Water Bureau from requirements of the Long Term 2 Enhanced Surface Water Treatment Rule (LT2) to additionally treat Bull Run source water. However, we request modifications and additions to OHA findings and changes to the OHA's proposed order regarding conditions.

The Bull Run is the most highly protected watershed in the nation and, as such, is at very low or no risk for contamination by human-infectious *Cryptosporidium* and other diseases and pollutants transmitted by humans and animals. Confidence in government at all levels appears to be waning. Your decision to grant a variance to the City of Portland, along with reasonable and rational conditions, can prevent the waste of hundreds of millions of dollars and help restore trust in government to make decisions based on sound science and not on emotion or fear.

1) We strongly support the Oregon Health Authority's general intent to grant a ten year variance.

We believe the Portland Water Bureau (PWB) has more than adequately demonstrated that the characteristics of the untreated source water are such that the additional treatment is not necessary.¹

We note the following statements of fact:

a) "No outbreaks of cryptosporidiosis have ever been attributed to PWB drinking water as a source."

PWB Variance Request Section 5.4.1 p. 5-5

¹ Portland Water Bureau Treatment Variance Request, June 6, 2011, including Section 4 and Section 5 "Local Public Health Data and Public Health Workshop"

<http://www.portlandonline.com/water/index.cfm?c=54913&a=350654>

See Appendix A of these comments.

b) “Adding additional water treatment to Bull Run is not likely to result in a measurable decrease in the occurrence of reported cases of cryptosporidiosis based on the current conditions characterized in the Bull Run.”

PWB Variance Request Section 5.5.1 p. 5-9

PWB Public Health Expert Panel²

See Appendix A of these comments

c) “Water sampling data from Bull Run ... has demonstrated compliance with the EPA standard of a maximum contamination goal of zero oocysts for *Cryptosporidium*. This result is consistent with the view that there is very low or no risk for *Cryptosporidium* contamination of our highly protected and geographically isolated Bull Run water source...”

“My strong opinion, based on available water quality and epidemiologic information is that our current Bull Run water source, storage and handling systems provide us with a safe water supply.”³

Thomas T. Ward, MD⁴

We believe that a variance would not provide an unreasonable risk to public health. Indeed, denial of a variance may increase risk to public health.

If there were construction of another treatment system, there would be increased pressure to open the Bull Run Management Unit to logging, development and recreation. The argument: Why should these activities be prohibited if Portland’s water is additionally treated? While now there is only a theoretical risk of cryptosporidiosis originating in Bull Run water, that could change over the long-term if a variance is denied, or issued and then revoked. If either were to occur, there would be more humans in the watershed and it would be more likely to see an increase in *Cryptosporidium hominis*, total and fecal coliforms, pharmaceuticals, etc.

² Panel: Jeffrey Griffiths, MD Tufts University

Scott Meschke PhD Microbiology University of Washington

David Spath PhD Civil and Environmental Engineering Consultant, formerly of California Department of Health Services

Thomas Ward MD Oregon Health and Science University

Marylynn Yates PhD Microbiology University of California Riverside

Panel Resources: Gary Oxman, MD Tri-County Health Officer (Multnomah, Clackamas, and Washington counties)

Amy D. Sullivan, PhD, MPH Communicable Disease Services Program Manager, MCHD

³ From Letter of Dr. Thomas Ward to Portland City Council March 8, 2011

⁴ Co-Director of Oregon Health Science University Medical School Microbiology Course, Director of the OHSU Infectious Disease Fellowship Training Program, Professor of Medicine at OHSU, Board Director for the Research and Education Group (Portland’s HIV community clinical research consortium), past President of the Oregon Infectious Diseases Society.

in Bull Run drinking water.

The history of logging in the Bull Run watershed highlights the unpredictable nature of economically and/or politically driven decisions regarding logging management. (See **7**) of these comments.) Current good intentions do not preclude future bad decisions related to logging and recreation management that could result from a decision to not grant the variance or to revoke the variance.

Construction of an additional treatment system could generate other risks to the Bull Run Management Unit and to public health. These include, but are not limited to, increased risk of construction-related fire in the geographically isolated watershed, introduction of pathogens and invasive species with increasing numbers of workers carrying contaminants into the watershed, accidental release of mercury into drinking water conduits with use of a UV treatment plant, potential for vaporization of mercury in a Bull Run treatment plant and delivery of mercury into drinking water, potentially harming workers and the public ⁵, and/or changes in water chemistry with new, daily exposures to plastic polymers, aluminum, acrylamide, etc. ⁶

2) We support OHA's draft conditions regarding watershed control, stewardship and protection.

The Bull Run is the most highly protected watershed in the nation and, as such, is at very low or no risk for contamination by human-infectious *Cryptosporidium* and other diseases and pollutants transmitted by humans and animals. It is by maintaining and improving current restrictions on human entry, human activities and entry of domestic animals that we can continue to avoid transmission of human-infectious disease in Bull Run water.

3) We do not support OHA's draft conditions regarding monitoring.

Water sampling methods should go beyond Method 1623 to include verification (to include fully intact internal structure of an oocyst from a source infectious to humans), confirmation of infectivity, and genotyping. Otherwise, a single detection of an

⁵ "Balancing Risk versus Benefit in the Selection of Equipment for Portland's Bull Run UV Disinfection Facility" Bryan Townsend, Chad Talbot, Harold Wright, David Peters and Timothy Phelan April 2011 IUVA News Vol. 13 No. 1 pp. 22-29

Retrieved from <http://bojack.org/images/bullrunuvriskarticle.pdf>

⁶ Conventional Water Treatment: Coagulation and Filtration
Safe Drinking Water Foundation

http://www.safewater.org/PDFS/resourcesknowthefacts/Conventional_Water_Filtration.pdf

oocyst not pathogenic to humans could trigger the construction of an unnecessary treatment plant.

“Genotyping to determine whether any future detections of *Cryptosporidium* in the Bull Run source are human-infectious species is essential to determine the public health implications (if any).... 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 for terminating the variance 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 Monitoring Expert Panel ⁷

PWB Variance Request Section 6.3.2 p. 6-5

4) OHA should acknowledge the flaws of Method 1623 and modify the draft monitoring conditions.

It is irrational for OHA to rely solely on Method 1623 to determine when increased monitoring should commence and/or that a variance may be revoked when a single oocyst is detected. At present, this test fails to genotype and to distinguish between 1) *Cryptosporidium* that is infectious to humans and not infectious to humans and 2) *Cryptosporidium* that is viable and that which is not. Water quality experts are working very hard to convince the EPA to correct this flaw. (See Water Research Foundation/American Water Works Association expert White Paper⁸ and White Paper [summary](#)⁹.)

From the White Paper summary: “Currently, U.S. Environmental Protection Agency (USEPA) methods 1622 and 1623 are approved for determining the occurrence of *Cryptosporidium* in untreated source waters and these methods provide the basic framework for characterizing risk under the LT2ESWTR. Since the inception of the LT2ESWTR, significant advances in both parasite molecular genetics and laboratory diagnostic methods have dramatically improved and expanded our knowledge of *Cryptosporidium* biology, creating a new knowledge base for understanding the risks

⁷ On May 2 and 3, 2011 the PWB convened this panel to examine various monitoring concepts and programs and “to help develop and evaluate monitoring elements that PWB may be required to implement should OHA-DWP grant a variance.”

Panel: Jennifer Clancy PhD, Stephen Estes-Smargiassi MS, Eva Nieminski PhD, Paul Rochelle PhD, David Spath PhD

⁸ “Developing a Strategy to Increase the Value of Regulatory *Cryptosporidium* Monitoring: *Cryptosporidium* Detection Method Research Needs

White Paper Based on an Expert Workshop in Golden, Colorado, August 5–6, 2008

See <http://www.waterrf.org/ProjectsReports/PublicReportLibrary/4178.pdf>

⁹ Summary of above [Project 4178 Web-only] at

http://www.waterrf.org/ProjectsReports/ExecutiveSummaryLibrary/4178_NON_ExecutiveSummary.pdf

that these parasites pose to public health. It is probable that application of this knowledge and the laboratory tools that have been developed will help inform risk management decisions. A coordinated effort is needed to consolidate and apply this knowledge and the laboratory tools into a regulatory framework for the water industry..."

"This white paper includes the following:

1. A review of the current state of knowledge of *Cryptosporidium* biology, which is critical for the evaluation of tools for effectively assessing risk of exposure associated with drinking water.
2. A discussion of genotyping, cell culture, and sample preparation methodologies, including viability and infectivity determinations, in the context of their readiness and robustness for application into future frameworks.
3. A summary of advantages and disadvantages of the above methods with respect to ease of use, practicality, quality assurance and quality control (QA/QC) issues, potential interferences, detection limits, and resolution (for genotyping methods).
4. Identification of analytical developments in the areas of sample collection, concentration, purification, and molecular tools that show promise for *Cryptosporidium* analysis."

From a 2008 article entitled: "*The Risk of Cryptosporidiosis from Drinking Water*":

"The current methods of *Cryptosporidium* detection in untreated surface water (Method 1622 and 1623; USEPA, 2005) use an antibody based detection method to identify oocysts. This method only provides presence/absence detection of oocysts. The absence of sporozoites within the oocyst (determined by DAPI staining and/or DIC microscopy) suggests that the oocyst is not infectious but the presence of sporozoites does not mean that the oocyst is infectious to humans. An intact oocyst may not be *C. parvum* or *C. hominis* or the oocyst may be sufficiently damaged that it will not cause infection in humans. The detection of non-infectious oocysts or oocysts belonging to a species that is not infectious for humans could cause unwarranted concern for a contaminant that may not be a significant public health risk."¹⁰

¹⁰ *The Risk of Cryptosporidiosis from Drinking Water*, p. 5

Anne M. Johnson Microbiologist Metropolitan Water District of Southern California,
Paul A. Rochelle Microbiology Development Team Manager Metropolitan Water District of Southern California

George D. Di Giovanni Associate Professor Texas AgriLife Research Center, Texas A&M University System, El Paso, TX

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http://friendsofreservoirs.org/pipermail/reservoirs_friendsofreservoirs.org/attachments/20090903/efc4e349/attachment.pdf

We believe that OHA language should include confirmation by a second EPA-approved laboratory of any initial monitoring results from an EPA-approved laboratory that test positive for *Cryptosporidium*. Portland's Variance Request and the Monitoring Expert Panel¹¹ that convened to provide input on proposed monitoring conditions support this. Given the radical impact that detection of a single oocyst has on Portland's ability to maintain the variance, the panel advised PWB of the importance of establishing confirmation of any positive *Cryptosporidium* result at the raw water intake through a secondary independent laboratory.

We feel strongly that OHA language should include genotyping and determination of infectivity of any monitoring results that test positive for *Cryptosporidium* to determine the public health impacts or lack thereof. We believe that genotyping to determine whether any detections of *Cryptosporidium* in the Bull Run watershed are human-infectious species (from an oocyst with intact internal structure) would be essential to determine relevant public health implications, if any. Most cases of cryptosporidiosis are linked to two species of *Cryptosporidium*, *C. hominis* and *C. parvum*, which are associated with human and domesticated animal sources. (Both of these sources are generally prohibited in the Bull Run watershed and Bull Run Management Unit and these prohibitions are enforced.)

"Molecular epidemiology is being used increasingly to understand pathogen transmission patterns, detect outbreaks, and identify important risk factors and outbreak sources." ¹² If the Centers for Disease Control and Prevention (CDC) values and utilizes molecular epidemiologic tools, why should not the OHA include the use of the same tools in its conditions for monitoring Bull Run water?

"In addition, bolstering waterborne disease surveillance can promote prevention and control. For example, given that *Cryptosporidium* is the primary etiologic agent of recreational-water associated outbreaks and has the ability to cause communitywide outbreaks, CDC should systematically collect stool specimens and utilize molecular epidemiology tools to subtype isolates to help elucidate the epidemiology of cryptosporidiosis." ¹³

The value of molecular subtyping of *Cryptosporidium* isolates was underscored in Oklahoma in July, 2007 when it enabled public health officials to determine that two distinct outbreaks of cryptosporidiosis had occurred in neighboring counties during

¹¹ On May 2 and 3, 2011 the PWB convened this panel to examine various monitoring concepts and programs and "to help develop and evaluate monitoring elements that PWB may be required to implement should OHA-DWP grant a variance."

Panel: Jennifer Clancy PhD, Stephen Estes-Smargiassi MS, Eva Nieminski PhD, Paul Rochelle PhD, David Spath PhD

¹² CDC Morbidity and Mortality Weekly Report Surveillance Summaries , p. 4
Vol. 60 No. 12 September 23, 2011

¹³ Ibid p.29

the same month. This process distinguished between *C. hominis* and *C. parvum* infections originating in different recreational waters. “¹⁴ Without use of these tools, it might have been presumed that there was a single source and type of infection.

Given the sad state of the only EPA-approved method for sampling for *Cryptosporidium*, we do not support a MCL of zero and we do not believe that a single detect (which may or may not be infectious to humans) necessarily indicates a public health concern.

For the above reasons, we do not support a public notification requirement for a simple detection of an oocyst through current Method 1623. We cannot overstate: There is no reason to create public fear when “an intact oocyst may not be *C. parvum* or *C. hominis* or the oocyst may be sufficiently damaged that it will not cause infection in humans. The detection of non-infectious oocysts or oocysts belonging to a species that is not infectious for humans could cause unwarranted concern for a contaminant that may not be a significant public health risk.”¹⁵

Additionally, we believe that OHA language should include the option for the PWB to use ten liter samples. The ability to use 10 liter samples enables continuity of the intake *Cryptosporidium* monitoring data.

5) We request that the variance findings include an acknowledgement that Method 1623 is outdated, that the LT2 Rule is faulty, and both are now in the process of being reviewed and revised by the EPA. We also request that OHA proposed monitoring conditions be modified to reflect this information as well.

¹⁴ Ibid Appendix B: Descriptions of Select Waterborne Disease Outbreaks Associated with Recreational Water Use”, p. 36

¹⁵ *The Risk of Cryptosporidiosis from Drinking Water*, p. 5

Anne M. Johnson Microbiologist Metropolitan Water District of Southern California,
Paul A. Rochelle Microbiology Development Team Manager Metropolitan Water District of Southern California

George D. Di Giovanni Associate Professor Texas AgriLife Research Center, Texas A&M University System, El Paso, TX

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WQTC Conference Proceedings

a) Method 1623 is currently under review.

See “Notice of a Public Meeting on Long Term 2 Enhanced Surface Water Treatment Rule: Initiate Regulatory Review – Cryptosporidium Analytical Method Improvements and Update on Source Water Monitoring”¹⁶

b) Monitoring indicates *Cryptosporidium* threat is lower than thought.

*From American Water Works Association (AWWA) December 13, 2011*¹⁷

“At a stakeholder meeting Dec. 7 on the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2), the US Environmental Protection Agency presented preliminary data suggesting that *Cryptosporidium* is less prevalent in drinking water supplies than anticipated by the current rule...One agency conclusion is that the lower level of observed occurrence appears to be real and not due to a systematic change in recovery.” See Appendix B of these comments.

c) AWWA and others state significant concerns with Method 1623.

They and we want concerns addressed, including:

- “Consider... modifying the monitoring in a way that provides more value to water systems and informs health risk reduction.
 - Identify opportunities to reduce costs where possible.
 - Genotype positive samples, which would be informative.
 - Consider improved accuracy of the analytical method and the implications for treatment requirements, if USEPA is going to pursue improved oocyst recovery. “
- See Appendix B of these comments.

d) AWWA states significant concerns with the LT2 rule.

The flawed Method 1623 adversely affects the entire LT2 rule. Alan Robertson, AWWA director of regulatory relations has stated: “Pursuing changes to LT2ESWTR construct is akin to pulling a thread on a sweater in that changing one aspect of the rule rapidly impacts other elements of the rule construct in a cascade of interwoven dependencies.” See Appendix B of these comments.

e) The LT2 rule is currently under review.

“EPA plans to review the LT2 regulation as part of the upcoming Six Year Review process using the protocol developed for this effort. As part of the review, EPA would assess and analyze new data/information regarding occurrence, treatment, analytical

¹⁶ 76 FR 71560 <http://www.gpo.gov/fdsys/search/pagedetails.action?granuleId=2011-29776&packageId=FR-2011-11-18&acCode=FR>

¹⁷ American Water Works Association, *Streamline*, Volume 3, Number 28 December 13, 2011 See Appendix B of these comments.

methods, health effects, and risk from all relevant waterborne pathogens to evaluate whether there are new or additional ways to manage risk while assuring equivalent or improved protection...Also, EPA intends to explore best practices that meet the SDWA requirements to maintain or improve public health protection for drinking water, while considering innovative approaches for public water systems.”¹⁸ LT2 review is one of 16 early actions that are intended to yield in 2011 a specific step toward modifying, streamlining, expanding, or repealing a regulation or related program.¹⁹ “EPA plans to conduct this review expeditiously to protect public health while considering innovations and flexibility as called for in EO 13563.”²⁰

6) While the OHA has stated that economic arguments can not be used in determining whether or not a variance is granted, we believe the OHA must consider cost and net benefits, performance objectives, alternatives, innovation, flexibility, scientific and technological objectivity, and plain common sense while setting final conditions for the proposed variance.

Here we refer to the EPA’s August 2011 “**Criteria for Regulatory Reviews**”.²¹ Our comments here are shaped by those criteria. *President Obama’s Executive Order 13563* led the EPA to designate the review of the LT2 rule a priority and one of 16 “early actions” that are intended to yield, in 2011, a specific step toward modifying, streamlining, expanding or repealing a regulation or related program.²²

Least burden?

The proposed conditions have a huge impact on small and large businesses, and should be changed to reduce the impact while maintaining public health and environmental protection. Costs for proposed monitoring conditions are extremely high at a time when poverty and unemployment in our community are also extremely high. Ratepayers and business owners large and small are adversely affected. Their participation in our coalition is evidence of that.

Feasible alternatives to the proposed conditions exist that could reduce the

¹⁸ *Improving Our Regulations: Final Plan for Periodic Retrospective Reviews*, Section 2.1.9, p. 25
U.S. Environmental Protection Agency August 2011
<http://www.epa.gov/improvingregulations/documents/eparetrreviewplan-aug2011.pdf>

¹⁹ *ibid* Section 2.1, pp. 17-18

²⁰ *ibid* Section 2.1.9, p. 24

²¹ *ibid* Section 4.2, pp. 52-55

²² *ibid* Section 2.1, pp. 17-18

proposed burden on OHA and local governments without compromising public health and environmental protection.

Net benefits?

It is feasible to alter the proposed monitoring conditions to include verification and genotyping, for example, to achieve greater cost effectiveness while still achieving the intended public health and environmental results.

Performance objectives?

We believe the proposed monitoring conditions have complicated or time-consuming requirements, such as intensive monitoring, that may not be justified, and that there are feasible alternative compliance tools, such as the stewardship conditions combined with routine monitoring, verification and genotyping, that could relieve burden while maintaining public health and environmental protection. As previously stated, a single detection of an oocyst during routine monitoring should not trigger intensive monitoring, and a single detection of an oocyst during intensive monitoring should not trigger revocation of the variance. Genotyping, cell culture, and sample preparation methodologies, including viability and infectivity determinations, will likely improve performance objectives.

Alternatives to direct regulation?

We believe a feasible non-regulatory alternative exists to replace some or all of the proposed monitoring conditions while ensuring that public health and environmental objectives are still met.

Quantified benefits and costs / qualitative values?

Proposed conditions exacerbate existing impacts and create new impacts on vulnerable populations such as low-income or minority populations, children, or the elderly.

High impacts from rate increases associated with unnecessary LT2 project(s) in Portland will harm vulnerable populations. The LT2 regulation has already exacerbated existing rate impacts and created new impacts on vulnerable populations by forcing rate increases to pay millions of dollars for the design of a Bull Run source water treatment plant that we believe to be wasteful and unnecessary.

Further increases in utility rates lead to further reduction in services for low income citizens. (See Appendix C of these comments to read about potential impacts to vulnerable populations served by Sisters of the Road and the Portland Housing Authority, for example.)

The cost of building an additional source water treatment plant or paying for

excessive monitoring is of great concern at any time, but is particularly painful during these economic times. Portland and its residents have real and critical public health and safety needs that must be met. Additional treatment for Bull Run source water is not a true public health and safety need. (See Appendix A of these comments.) Additionally, we find that the proposed monitoring conditions are not based on a true public health and safety need.

There are feasible changes that could be made to proposed conditions to better protect vulnerable populations.

Benefits justify costs?

The benefits of OHA's proposed conditions do not justify the costs.

Innovation?

We believe there are feasible changes that could be made to the proposed conditions to promote economic or job growth without compromising public health or environmental protection.

New or less costly methods, technologies, and/or innovative techniques have emerged that would allow the Portland Water Bureau to achieve the intended public health and environmental results more effectively and/or efficiently. These include verification, genotyping, molecular techniques, cell cultures, and sample preparation methodologies, including viability and infectivity determinations.

Flexibility?

Conditions should allow for greater flexibilities to encourage innovative thinking and identify the least costly methods for compliance.

Scientific and technological objectivity?

The science of risk assessment has advanced such that the adverse impacts (including the high costs) of proposed monitoring conditions on affected populations such as low income communities, vulnerable populations, children and the elderly could be reduced more effectively than through methods proposed by OHA.

The underlying scientific data has changed since this LT2 regulation was finalized. These changes support revision to the rule and to the monitoring conditions proposed by OHA.

The monitoring conditions currently proposed by OHA are not supported by recent developments in the science. Method 1623 requires out-of-date methods that do not protect public health. (See **4**) and **5**) of these comments.)

7) We request a correction in Notice of Intent, Finding #39 on page 11.

It is important that decision-makers have an accurate appreciation of past decisions, policies, law and practices related to logging and human entry in the original Bull Run Reserve, the Bull Run watershed and the Bull Run Management Unit. Those who drink and use Bull Run water enjoy the results of unique protections and watershed controls.

The Bull Run water source has provided excellent and safe drinking water to residents of Portland and many other communities since 1895. The main Bull Run watershed has been closed to human entry for over 100 years. The fact that Bull Run continues to provide Portland families with clean drinking water over a century later is no accident-- it is the result of decades of hard work by citizen advocacy groups, elected officials and water providers. *Consistent water purity is a direct result of the watershed's isolation from human entry and development and the exclusion of livestock and domesticated animals.*

In 1892, President Harrison's proclamation established the Bull Run Reserve. Wary of waterborne diseases like cholera and typhoid, Portland residents turned away from contaminated water supplies in town and towards an isolated watershed that could be fully protected from human entry, human waste, development, domestic animals and their diseases.

In 1904, Congress adopted the Trespass Act, which through prohibitions on human entry and the grazing of domestic animals effectively kept logging, development and disease out of the Bull Run watershed. The protected area included a huge forested zone well beyond the ridgelines that define the drinking watershed. As noted by the PWB, "The original Reserve boundary included not only the 102-square-mile water-supply drainage, but an additional 117 square miles of land surrounding the drainage—a visionary action..."

In 1977, Congress passed Public Law (PL) 95-200, establishing the Bull Run Management Unit, shrinking the boundaries of the protected area, opening the Bull Run watershed to logging and opening the adjacent Little Sandy River watershed to human entry, recreation and logging. By 1993, more than 350 miles of roads--most to facilitate logging--were built in the main Bull Run watershed, causing sediment to flow into drinking water reservoirs. Some 37 percent of the Little Sandy watershed was clear-cut.

In the 1990's, when polluted run-off from road building and logging operations threatened to foul Bull Run water, citizens, conservationists, businesses and community organizations pushed the city of Portland to take a stand, stop these destructive projects, and work with Congress to once again protect the watershed and the forests surrounding it.

In 1996, we won passage of the Oregon Resources Conservation Act in Congress, which modified PL 95-200, adding a general prohibition on logging in the Bull Run watershed. With a decrease in the number of (loosely supervised) people entering the forest to plan, execute and mitigate logging sales, there was a parallel decrease in the risk of direct delivery of *C. hominis* to the drinking watershed.

In 2001, Congress adopted the Little Sandy Protection Act, expanding the size of the Bull Run Management Unit to include the Little Sandy watershed upstream of Aschoff Creek. It returned much of the “buffer” area south of the drinking watershed to the protected status originally established over 100 years earlier.

The Act stopped commercial and non-commercial logging. Slash burn fires, which often follow logging operations, ceased. The legislation prohibited all recreational use, including but not limited to campfires and use by equestrians, hikers, bikers, campers, hunters, and off highway vehicular riders. The closure of this “buffer” area dramatically reduced the risk of human-caused fire in the Little Sandy and the adjacent Bull Run main watershed.

It also greatly reduced potential for illegal entry into the main Bull Run watershed, substantially decreasing the potential for delivery of *C. hominis* to the drinking water supply.

Thank you for consideration of our comments. Today you have an historic opportunity to restore rationality to public health decisions and responsibility to our fiscal management. We strongly support a ten year variance for the City of Portland. We strongly request modifications to proposed conditions (as stated above) in recognition of the fact that the Bull Run is the most highly protected watershed in the nation and, as such, is at very low or no risk for contamination by human-infectious *Cryptosporidium* and other diseases and pollutants transmitted by humans and animals.

We strongly recommend that the OHA and the EPA focus agency expertise and precious, limited public resources on the safety of water found in unprotected, polluted, high-risk and medium-risk areas in Oregon, Region 10 and around the country.²³

Sincerely,

²³ CDC Morbidity and Mortality Weekly Report Surveillance Summaries
Vol. 60 No. 12 September 23, 2011
<http://www.cdc.gov/mmwr/pdf/ss/ss6012.pdf>

Regna Merritt and Theodora Tsongas, PhD for Oregon Physicians for Social Responsibility

Floy Jones for Friends of the Reservoirs

Kent Craford for Portland Water Users Coalition Members:

ALSCO, American Linen Division
American Property Management
Ashland Hercules Water Technologies
The Benson Hotel
BOMA Portland
Darigold
Harsch Investment
The Hilton Portland and Executive Tower
Mt. Hood Solutions
New System Laundry
Portland Bottling
SAPA Inc.
Siltronic Corp.
Sunshine Dairy Foods
Vigor Industrial
Widmer Brothers Brewing
YoCream

Scott Shlaes for Oregon Wild

Bob Sallinger for Audubon Society of Portland

Alex P. Brown for BARK

Franklin Gearhart for Citizens Interested in Bull Run, Inc.

Ron Carley for Coalition for A Livable Future

Julia DeGraw for Food & Water Watch

David Delk for Alliance for Democracy

David Lorati for Central Eastside Industrial Council

Peter Stark for Hillside Neighborhood Association

Jeffrey Boly for Arlington Neighborhood Association

Stephanie Stewart for Mt. Tabor Neighborhood Association - Land Use Committee

Anne Dufay for SE Uplift Neighborhood Coalition for:

North Tabor Neighborhood Association

Mount Tabor Neighborhood Association

Montavilla Neighborhood Association

Sunnyside Neighborhood Association

Buckman Neighborhood Association

Hosford Abernathy Neighborhood Association

Richmond Neighborhood Association

South Tabor Neighborhood Association

Foster Powell Neighborhood Association

Creston - Kenilworth Neighborhood Association

Brooklyn Neighborhood Association

Reed Neighborhood Association

Eastmoreland Neighborhood Association

Sellwood Moreland Neighborhood Association

Woodstock Neighborhood Association

Mount Scott Arleta Neighborhood Association

Brentwood Darlington Neighborhood Association

Ardenwald - Johnson Creek Neighborhood Association

Kerns Neighborhood Association

Laurelhurst Neighborhood Association

Rod Daggett and Maxine Wilkins for Eastside Democratic Club

Appendix A

PWB Public Health Expert Consensus Statement

On March 25, 2011, several public health experts ²⁴ participated in a workshop at the Portland Water Bureau. The purpose of the workshop was for the invited experts to formulate an opinion on the soundness of PWB's decision to seek a variance to the LT2 rule from a public health perspective. ²⁵ The panel discussed the data presented and asked questions of the PWB staff. After the workshop, eight consensus findings were developed by the panel based on the data presented.

1. Infectious disease surveillance in Multnomah County is excellent, at the top end of surveillance systems in the United States.
2. Availability of public health data is very good; it is comprehensive and targets sensitive population groups, such as persons with HIV/AIDS.
3. Based on the data presented, it appears that the majority of the reported cases of cryptosporidiosis in Multnomah County are sporadic in nature.
4. Based on the site-specific data for Multnomah County, there was no information which would suggest that drinking water has been a source of cryptosporidiosis. Reported rates of cryptosporidiosis are comparable to those seen elsewhere.
5. The Bull Run watershed is unique among watersheds. It is well-protected in ways that surpass that of other watersheds in the United States known to the panel, including those for other unfiltered utilities. Since human activity is highly restricted in the Bull Run watershed, it is most likely that any *Cryptosporidium* within the watershed is normally of animal origin.
6. The data collection effort the Water Bureau has undertaken for characterizing the amount of *Cryptosporidium* in the Bull Run watershed has been

²⁴ *Panel:*

Jeffrey Griffiths, MD Tufts University

Scott Meschke PhD Microbiology University of Washington

David Spath PhD Civil and Environmental Engineering Consultant, formerly of California Department of Health Services

Thomas Ward MD Oregon Health and Science University

Marylynn Yates PhD Microbiology University of California Riverside

Panel Resources:

Gary Oxman, MD Tri-County Health Officer (Multnomah, Clackamas, and Washington counties)

Amy D. Sullivan, PhD, MPH Communicable Disease Services Program Manager, MCHD

²⁵ See PWB Variance Request June 6, 2011 Section 5, p. 5-9

extremely thorough.

7. Based on the data set the Portland Water Bureau has gathered, the probability of exposure to *Cryptosporidium* via consuming Bull Run water is expected to be low. In the absence of human intrusion into the Bull Run watershed, the probability of exposure to *C. hominis*, which is almost solely found in humans, would be even lower.
8. Adding additional water treatment to Bull Run is not likely to result in a measurable decrease in the occurrence of reported cases of cryptosporidiosis based on the current conditions characterized in the Bull Run.

Appendix B

American Water Works Association December 13, 2011²⁶

Monitoring indicates Crypto threat lower than thought

At a stakeholder meeting Dec. 7 on the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2), the US Environmental Protection Agency presented preliminary data suggesting that *Cryptosporidium* is less prevalent in drinking water supplies than anticipated by the current rule.

The data come from the initial round of monitoring under LT2. The meeting was held to review LT2 monitoring requirements prior to the second round of monitoring required by LT2 and to evaluate the LT2 in the next Six-Year Review cycle.

USEPA requested input from stakeholders on one specific issue: requiring analytical method improvements that would increase average oocyst recovery by 20 percent—from 40 percent to 60 percent. Based on source water conditions, some samples would be much more significantly affected than others.

“Pursuing changes to LT2ESWTR construct is akin to pulling a thread on a sweater in that changing one aspect of the rule rapidly impacts other elements of the rule construct in a cascade of interwoven dependencies,” said Alan Roberson, AWWA director of regulatory relations. “For example, the change in the analytical method offered by EPA could result in an increased likelihood a water system would be required to install treatment based on the second round of monitoring and thus raise the question of whether bin boundaries [i.e., thresholds for additional treatment] should be shifted.”

USEPA presented preliminary, summary statistics from the LT2 first-round monitoring, most significantly:

- More water treatment plants had all non-detects than anticipated, with 51 percent of water treatment plants (WTPs) reporting no detection.
- The average concentration of oocysts was 0.016 rather than 0.053 oocysts/L as anticipated.

Additional data show

- There were more non-detects and conversely fewer detects than anticipated (93 percent of samples were non-detects).
- Fewer source waters than anticipated had mean concentrations greater than 0.075 oocysts/L — meaning that no additional treatment is required.
- As system size decreased, smaller systems were more likely to observe oocyst levels greater

²⁶ American Water Works Association, Streamline,
Volume 3, Number 28 December 13, 2011

than 0.075 oocysts/L.

One agency conclusion is that the lower level of observed occurrence appears to be real and not due to a systematic change in recovery. The agency has not decided how it will determine whether any changes are needed in the rule.

During the stakeholder meeting, USEPA pointed out several aspects of LT2ESWTR requirements:

- The current LT2ESWTR second round monitoring requirements do not provide for submittal of grandfathered data.
- The current LT2ESWTR treatment requirements do not specifically address what a system will have to do if Round 2 monitoring finds a lower level of *Cryptosporidium* oocysts in a water treatment plant's source water that would place a water treatment plant in a lower treatment regimen.

AWWA and other stakeholders brought up important concerns to be addressed:

- Consider either dropping Round 2 monitoring or modifying the monitoring in a way that provides more value to water systems and informs health risk reduction.
- Identify opportunities to reduce costs where possible.
- Genotype positive samples, which would be informative.
- Consider improved accuracy of the analytical method and the implications for treatment requirements, if USEPA is going to pursue improved oocyst recovery.

USEPA intends to release a redacted dataset from the Round 1 monitoring, but officials did not say when it will be released and what data will be withheld.

"AWWA will need to elicit additional discussion of LT2 Round 1 data analysis," said Roberson.

The agency anticipates a meeting in the spring of 2012 to discuss uncovered finished water storage and other LT2ESWTR topics.

Appendix C

High impacts from rate increases associated with unnecessary LT2 project(s) and/or onerous monitoring conditions in Portland will harm vulnerable populations

The LT2 regulation has already exacerbated existing impacts and created new impacts on vulnerable populations such as low-income or minority populations, children and the elderly. It has forced rate increases to pay millions of dollars for the design of a Bull Run treatment plant that we believe to be unnecessary.

A May 10, 2011 radio report by Joe Meyers illustrated the heavy impacts of potential doubling in water bills (including revenue to pay for construction and operation of a treatment plant for Bull Run source water and/or onerous monitoring conditions):

An increase in utility rates leads to a reduction in services for low income citizens.

Examples:

Dave Coffman: Sisters of the Road, Financial Manager

This organization runs a kitchen and has relatively high water use. Dave calculated that the projected increase in water rates would cost Sisters of the Road an additional \$4-5,000 per year, the equivalent of serving 50 meals per month to folks in need.

[Sisters Of The Road is about building community and creating systemic solutions to homelessness and poverty. Sisters Of The Road, Inc. was incorporated in 1979 as a nonprofit restaurant in Portland, Oregon, open to the public and providing nourishing meals at little or no cost or in exchange for labor. Program services include the Cafe, Systemic Change, and Workforce Development.]

Dianne Quast: Portland Housing Authority, Director of Real Estate Operations

“For our rental properties, (except for two) the Housing Authority directly pays both the water and sewer bills. At same time, we have caps on what we can increase rents to for most of our properties. So the result is going to be that we are going to see a reduction in other services, in capital improvements, and general maintenance to absorb the additional costs for utilities. And so it’s a huge hit.

We are a housing authority that houses people who are low income. That means that many of the people who come into our housing have an annual income of \$17,000 or less. They are people who don’t have a lot of discretionary money for spending. We try to provide them with decent and safe and affordable housing. So when these kinds of increases hit, it just makes our job that much more challenging.”

Received @
Dec. 14, 2011
hearing

I am Michael Morgan and I live in Portland.

I believe the possibility of cryptosporidium in the Bull Run source of Portland's drinking water is not a problem because of the following reasons.

1. The protected nature of the Bull Run watershed.
2. The length of time Portlanders have been drinking water from the watershed.
3. The results of sampling of wildlife scat in the watershed.
4. The results of the extensive sampling of Portland's drinking water and that of other utilities conducted by the American Water Works Association.
5. The statements made by Doctor Thomas Ward, an infectious disease expert at OHSU, in his March 8, 2011 letter to Portland City Commissioner Randy Leonard.
6. The statements made by Doctor Gary Oxman of the Multnomah County Health Department in a March 5, 2011 Oregonian article by Scott Learn and a May 2011 interview with KBOO Radio. The Oregonian article also stated that in more than two decades of monitoring, Multnomah County health officials say, there is no evidence of a single case of drinking water cryptosporidiosis in the Portland area.

And I fear that a treatment plant would introduce risks to the quality and safety of the water, so I am grateful to the Oregon Health Authority's Public Health Division for intending to grant a variance from the LT2 requirement to treat the water.

Furthermore I have read that the current LT2 sampling method is flawed and outdated and does not distinguish between live or dead, or infectious or noninfectious, cryptosporidium.

Given this, and that the Environmental Protection Agency is reviewing the LT2 Rule in response to Executive Order 13563, I would like to ask the Oregon Health Authority to grant a variance from the LT2 treatment requirement for Bull Run drinking water with the least burdensome variance conditions.

EXHIBIT 3

From: Sharon Neski
Sent: Friday, December 09, 2011 11:12 PM
To: pwb.treatment-variance@state.or.us
Subject: Cryptosporidium monitoring plan

To whom it may concern,

I was reading about the OHA's intent to grant the Portland Water Bureau's LT2 variance request. The proposed continuing monitoring program, however, seems quite inadequate. The point seems to be to demonstrate that the water supply is at or below 0.000075 cryptosporidium oocysts per liter. That concentration is equal to one single oocyst per 13,333 liters of water. The proposal of OHA to require the P. Water Bureau to collect 2 50-liter samples per week would require two and a half years to reach this volume. That kind of resolution seems bad enough, but the way probability works makes it worse. If we assume that the water source really does have cryptosporidium at a concentration of 0.000075 oocysts per liter, then one 50-liter sample has about a 0.375% chance of have an oocyst, or a 99.625% chance of not having an oocyst. Two 50-liter samples (one week) have a $99.625\% \times 99.625\% = 99.251\%$ chance of not having an oocyst. If what you want is to collect a bunch of water samples with no detections of the parasite until you are 90% confident that your conclusion that cryptosporidium oocysts are at 0.000075 per liter or lower is correct (i.e., the probability of not having an oocyst drops to 10%), then you need to collect samples for 5.9 years. To put different numbers to it, if the concentration of the parasite was actually twice what is acceptable (0.00015 oocysts/liter), you could sample for three years and still have a 10% chance of having no detections.

Even worse, this assumes a 100% detection rate. It sounds like the detection process has had a success rate of about 29%. That may be considered within an acceptable range, but it still affects the effectiveness of the proposed monitoring program. Using the hypothetical example above, of water with twice the acceptable concentration of the parasite, a person could sample for over ten years and still have a 10% chance of no detections (i.e., be 90% confident that the parasite concentration in the water doesn't exceed the limit). If the actual concentration were just 0.000075/liter, a person could sample for 20 years and still have a 10% chance of no detections.

I'm not sure what it means to say that, if there is a detection, then sampling must be doubled until the running annual average concentration drops to 0.000075/liter. It would take over one year before that concentration could be achieved. So it sounds like, if there is a detection, then monitor for a year at twice the frequency, and, if no further detections, then drop back down to 100 liters per week. It would be very frustrating for an oocyst trying to be noticed if it has to wait up to 20 years, then finally gets detected, only to get shelved.

If the point of the proposed monitoring program is to detect excessive concentrations of cryptosporidium oocysts before a potential outbreak occurs, then I would think it should have enough resolution to detect that concentration within a year, especially if the yearly concentrations can bounce up and down as much as it appears that they can. I love Portland water and I have no doubt that it is clean and safe, but a monitoring program should have the capability to do what it is set up to do.

Thank you.

Sharon

EXHIBIT 4

From: Mary Saunders
Sent: Sunday, December 11, 2011 4:17 PM
To: pwb.treatment-variance@state.or.us
Cc: [REDACTED]
Subject: Rate-payers and Process/Bull Run Variance

The situation which existed in 2003, for which I am inserting a link

http://www.portlandtribune.com/news/print_story.php?story_id=21873

still exists.

Many groups have been involved in this process, much testimony has been taken, and many post cards have been directed to national officials.

Local people have worked untold hours to have someone brave and independent enough to listen to independent science rather than to industry-interested science.

Industry-interests chanced to get a rule passed without sufficient public input.

When council members have felt threatened by this rule, trust has been broken between the council and citizens to a grave degree.

Many citizens have come to feel that the Council represents the interests of outside interests rather than the interests of local people.

The variance cannot restore trust, but it is a step in a better direction.

Thank you for your attention to this matter,

Mary Saunders
NE Portland

EXHIBIT 5

From: diane tweten
Sent: Monday, December 12, 2011 6:05 PM
To: pwb.treatment-variance@state.or.us
Subject: Intent of Variance?

I have been following the issues regarding proposed changes to the Bull Run water system for a number of years and for a number of reasons, **I find very little comfort in the 'proposed variance'.**

1) The reservoirs are still being required to be covered without any supported true study or reason. Dr. Oxman stated in his 3/2010 statement at the PURB meeting that they don't appear to be dangerous; the case against them is weak; the problems with 'closed reservoirs' has been documented and admitted to by the EPA; it's not a good use of resources.....They are the most expensive part of the new rule which has been written by those who will benefit from the contracts that will result.

2) The money spent will mean there is even less to spend on replacing parts of the distribution system (still needing to be done and having a great backlog, at last count, 35,000 hours). I have heard of at least 2 incidents where people and their pets were made ill, possibly worse than would have happened from cryptosporidium, as a result of what was washed off of pipes that the residents were told 'should have been replaced 30 years ago'. Whereas, there have been **no documented incidents from cryptosporidium in the Portland drinking water.**

3) There have been discrepancies in the prediction of how much will be 'saved'. At meetings prior to the recent decision, David Shaff, said there would only be about 25% saved (meaning those doing work to support the variance would be paid an estimated \$75M). In articles recently, he said it would be \$68M saved. **If those wanting to build it, through their subcontractors, will be making from \$32M to \$75M,** monitoring the variance, it seems that their fees are being continued now that the design has wound down. Through the 'parallel path', they were allowed to reap design consulting fees whether it is built or not. They also control the process which will decide if the variance is allowed to run the 10 years or not. In fact, one of those on the 'team', David Evans & Assoc. was recently criticized regarding the Columbia River Crossing for huge fees that it was getting with little oversight in a WW article.

4) David Shaff remarked in a meeting recently that **none of the efforts planned currently that would go towards building the UV plant would be cancelled,** because there was no reason at this point. So, **exactly what does the variance mean.....anything???** Construction planned isn't being halted. The same people are allowed to be paid fees for a new venture. Very little will be saved, if any, because the most expensive part is still being pursued despite not having any real supporting data and money being tight. **Where is the savings???? How much can rates go down when nothing has really changed???**

For those who are paying attention, this is just more reason why those in charge of the process can't be trusted and are not concerned about 'public health' but only about helping certain consultants earn maximum profits at the public expense!!!

EXHIBIT 6

From: Daniel Rhiger
Sent: Tuesday, December 13, 2011 6:34 AM
To: pwb.treatment-variance@state.or.us
Subject: Comments

Sky in the Road

Daniel Rhiger and Rahmana Eva Wiest

[REDACTED]

[REDACTED]

Oregon Health Authority

Office of Environmental Public Health Drinking Water Program

800 NE Oregon Street, Suite 640

Portland, OR 97232

Dear Oregon Health Authority:

We are unable to attend the public hearing Wednesday, Dec. 14th because of a prior commitment. We support all of the cited arguments. In addition to the arguments presented, I would like to point out that covering the reservoirs takes away the natural benefit of the purifying action of the sunshine on the water. We have an incredible gift in the water and the watershed we have so far been wise enough to preserve and care for. The microbreweries all are behind keeping the water as it is now, because they know that the quality of the water will deteriorate if we are foolish enough to cover our reservoirs. As stated herein, Portland Water Bureau has more than adequately demonstrated that the required treatment is not necessary!!!

Sincerely, Dan Rhiger and Rahmana Eva Wiest

(regarding Portland Water Bureau's Request for Variance Under 42 USC 300g-4(a)(1)(B) and OHA's Intent to Grant Variance)

1) We strongly support the Oregon Health Authority's general intent to grant a 10 year variance.

- We believe the Portland Water Bureau has more than adequately demonstrated that*

the characteristics of the untreated source water are such that the required treatment is not necessary.

- We believe that a variance would not provide an unreasonable risk to public health. Indeed, denial of a variance may increase risk to public health.*

Construction of an additional treatment system could generate new risks to the Bull Run Management Unit and to public health. These include, but are not limited to, increased risk of construction-related fire in the geographically isolated watershed, introduction of pathogens and invasive species with increasing numbers of workers in the watershed, accidental release of solid mercury into drinking water conduits with use of a UV treatment plant, potential for vaporization and delivery of mercury into drinking water, etc. (See [“Balancing Risk versus Benefit in the Selection of Equipment for Portland’s Bull Run UV Disinfection Facility”](#))

Furthermore, with construction of another treatment system, there will be increased pressure to open the Bull Run Management Unit to additional logging, development and recreation. The argument: Why should these activities be prohibited if Portland’s water is additionally treated? While now there is only a theoretical risk of cryptosporidiosis originating in Bull Run water, that could change over the long-term if a variance is denied or issued and then revoked. With more humans in the watershed it is more likely that there will be an increase in *Cryptosporidium* hominis, total and fecal coliforms, pharmaceuticals, etc. in Bull Run drinking water.

2) We support OHA's draft conditions regarding watershed control, stewardship and protection.

3) We do not support OHA's draft conditions regarding monitoring.

Water sampling methods should go beyond 1623 to include verification and genotyping as proposed by the PWB in its request for a variance. Otherwise, a detected oocyst not pathogenic to humans could trigger the construction of an unnecessary treatment plant.

4) OHA should acknowledge the flaws of Method 1623 and modify the draft monitoring conditions. It is irrational for OHA to rely solely on Method 1623 to determine when increased monitoring should commence and/or that a variance may be revoked when a single oocyst is detected. At present, this test fails to genotype and to distinguish between 1) *Cryptosporidium* that is infectious to humans and not infectious to humans and 2) *Cryptosporidium* that is viable and that which is not. Water quality experts are working very hard to convince the EPA to correct this flaw before 2015. (See Water Research Foundation/American Water Works Association expert White Paper [here](#) and White Paper summary [here](#).) From a 2008 scientific article: "The detection of non-infectious oocysts or oocysts belonging to a species that is not infectious for humans could cause unwarranted concern for a contaminant that may not be a significant public health risk."¹

5) We request that the variance include recognition that LT2 Rule is flawed, Method 1623 is outdated and both are now in process of being reviewed and revised by the EPA.

6) We request a correction in Finding #39 on page 11 of NOI

Public Law 95-200, when originally passed in 1977, opened the Bull Run Management Unit to logging. Subsequent legislation passed in 1996 and 2001 modified PL 95-200 to prohibit logging in the Bull Run Watershed and then in the Little Sandy.

In summary: We support the OHA's general intent to grant a variance to the PWB and request correction of OHA finding as above, additions to the findings and changes to the OHA's proposed order regarding mandated monitoring so as to go beyond Method 1623 to include genotyping and verification.

¹ The Risk of Cryptosporidiosis from Drinking Water Anne M. Johnson Microbiologist Metropolitan Water District of Southern California, La Verne, CA Paul A. Rochelle Microbiology Development Team Manager Metropolitan Water District of Southern California, La Verne, CA George D. Di Giovanni Associate Professor Texas AgriLife Research Center, Texas A&M University System, El Paso, TX 2008 © American Water Works Association WQTC Conference Proceedings

EXHIBIT 7

From: Erik Fernandez
Sent: Monday, December 12, 2011 4:44 PM
To: pwb.treatment-variance@state.or.us
Subject: Bull Run Variance Comments

Please accept the following comments regarding the OHA proposal for a variance for Bull Run. I strongly support the Oregon Health Authority's general proposal to grant a 10 year variance.

The Portland Water Bureau has demonstrated that the characteristics of the raw source water are such that the required treatment is not necessary.

A variance would not provide an unreasonable risk to public health. If anything, denial of a variance may increase risk to public health.

Construction of an additional treatment system could generate new risks to the Bull Run Management Unit and to public health. These include, but are not limited to, increased risk of construction-related fire in the geographically isolated watershed, introduction of pathogens and invasive species with increasing numbers of workers in the watershed, accidental release of solid mercury into drinking water conduits with use of a UV treatment plant, potential for vaporization and delivery of mercury into drinking water, etc.

Furthermore, with construction of another treatment system, there will be increased pressure to open the Bull Run Management Unit to additional logging, development and recreation. The argument: Why should these activities be prohibited if Portland's water is additionally treated? While now there is only a theoretical risk of cryptosporidiosis originating in Bull Run water, that could change over the long-term if a variance is denied or issued and then revoked. With more humans in the watershed it is more likely that there will be an increase in *Cryptosporidium hominis*, total and fecal coliforms, pharmaceuticals, etc. in Bull Run drinking water.

I support OHA's draft conditions regarding watershed control, stewardship and protection.

I do not support OHA's draft conditions regarding monitoring.

Water sampling methods should go beyond 1623 to include verification and genotyping as proposed by the PWB in its request for a variance. Otherwise, a detected oocyst not pathogenic to humans could trigger the construction of an unnecessary treatment plant.

I suggest OHA acknowledge the flaws of Method 1623 and modify the draft monitoring conditions.

It is irrational for OHA to rely solely on Method 1623 to determine when increased monitoring should commence and/or that a variance may be revoked when a single oocyst is detected. At present, this test fails to genotype and to distinguish between 1) Cryptosporidium that is infectious to humans and not infectious to humans and 2) Cryptosporidium that is viable and that which is not. Water quality experts are working very hard to convince the EPA to correct this flaw before 2015. (See Water Research Foundation/American Water Works Association expert White Paper [here](#) and White Paper summary [here](#).) From a 2008 scientific article: "The detection of non-infectious oocysts or oocysts belonging to a species that is not infectious for humans could cause unwarranted concern for a contaminant that may not be a significant public health risk.”¹

I suggest the variance include recognition that the LT2 Rule is flawed, Method 1623 is outdated and both are now in process of being reviewed and revised by the EPA. <http://www.gpo.gov/fdsys/search/pagedetails.action?granuleId=2011-29776&packageId=FR-2011-11-18&acCode=FR1>

There should be a correction in Finding #39 on page 11 of NOI

Public Law 95-200, when originally passed in 1977, opened the Bull Run Management Unit to logging. Subsequent legislation passed in 1996 and 2001 modified PL 95-200 to prohibit logging in the Bull Run Watershed and then in the Little Sandy.

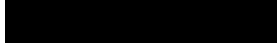
Conclusion: I support the OHA's general intent to grant a variance to the PWB and request correction of the OHA finding as above, additions to the findings and changes to the OHA's proposed order regarding mandated monitoring so as to go beyond Method 1623 to include genotyping and verification.

Erik Fernandez

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Oregon Wild is in Willamette Week's Give!Guide. Along with great incentives for all donors, supporters age 35 or under who give \$250 or more to Oregon Wild before Dec. 31st get a free pair of KEEN shoes! www.wweek.com/giveguide

Erik Fernandez
Wilderness Coordinator
Oregon Wild, formerly ONRC



Protecting Oregon's wildlands, wildlife, and waters as an enduring legacy since 1974.

EXHIBIT 8

From: Kathryn Notson
Sent: Wednesday, December 14, 2011 10:00 AM
To: pwb.treatment-variance@state.or.us
Subject: Portland Water Bureau LT2ESWTR treatment variance

[REDACTED]
December 14, 2011

Oregon Health Authority
Public Health Division
Office of Environmental Public Health
Drinking Water Program
800 N.E. Oregon St., Ste. 640
Portland, OR 97232-2187

RE: City of Portland Bull Run Watershed Surface Source Water
USEPA LT2ESWTR Variance Request submitted 6/6/2011

Dear Mr. David Leland:

I know the USEPA has cited the following Bull Run watershed *Cryptosporidium parvum* report in the August 11, 2003 and January 5, 2006 Federal Registers within the proposed and final Long Term 2 Enhanced Surface Water Treatment Rule:

“Comparison of Method 1623 and Cell Culture-PCR for Detection of *Cryptosporidium* spp. in Source Waters,” by Mark W. LeChevallier, et. al., Applied and Environmental Microbiology, February 2003, Vol. 69, No. 2, pgs. 971-979.

I know the state Drinking Water Program also referenced the same report in its Notice of Intent to Grant a Variance to the City of Portland Water Bureau for treatment of the Bull Run watershed surface source water.

This report shows that oocysts were detected in 11 samples out of 186 samples resulting in a 24% viability rate (pg. 975). There were two isolates noted in the report. One isolate differed from a “*C. parvum* bovine genotype at three nucleotide positions, but clustered with the bovine and murine genotypes. It is possible that this isolate represents a new genotype of *C. parvum* from a wild animal host.” The other “was identified as the *C. parvum* bovine genotype” (pg. 977). The annual risk of infection ranges from 1:42 to 1:95 infections per year (pg. 977). The USEPA’s acceptable risk of infection from drinking water is 1:10,000 infections per year. It means that Portland’s untreated Bull Run surface source water had more than 100-fold higher infection risk than the USEPA guideline.

The particular species the USEPA is most concerned about as a human pathogen is *Cryptosporidium parvum*. I noticed on the Acute and Communicable Disease Program web site the reported cases of *cryptosporidiosis* diagnoses has significantly increased in Clackamas, Multnomah, and Washington Counties from 2001-2011. Why was Dr. William Keene

concerned on March 23, 2005 when he knew five males were reported as diagnosed with *cryptosporidiosis* when he called the Drinking Water Program?

I know there have been other males who reside in southeast Portland who have been sickened with *cryptosporidiosis*. One was a man who resided in my neighborhood (South Tabor) who told me himself he was sickened with the disease. He did not know if he obtained contamination overseas or here. When David Shaff was interviewed by Emily Harris on the OPB's "Think Out Loud" radio program August 2009, a southeast Portland man posted a comment online on this program stating he was sickened with *cryptosporidiosis*. Another male commented online on the same program that he and two other co-workers were sickened in the April 1993 Milwaukee, WI *cryptosporidiosis* outbreak. The Portland Water Bureau posted a link to this program on their web site.

I know the Portland Water Bureau's Regulatory Compliance (Yone Akagi) division has a copy of the LeChevallier report. I've noticed this report has not been publically acknowledged by the Portland Water Bureau in spite of the fact they actively participated in the study.

Is there a correlation with peak streamflows recorded at U. S. Geological Survey's key gauging stations in the Bull Run watershed and the presence of *Cryptosporidium parvum* in the watershed? Is there also a correlation with the increased reported diagnoses of *cryptosporidiosis* in Clackamas, Multnomah, and Washington Counties over the last 10 years? Did the Portland Water Bureau collect water samples during peak streamflows vs. average streamflows in locations in the watershed where there are no automated water collection devices attached to USGS key gauging stations? I understand that the variance requires the Portland Water Bureau to collect water samples at the intake, but I don't know if the intake can be raised or lowered to a different water level. Does this make a difference in how and where the water samples are collected in order for the Portland Water Bureau to attempt to not detect *cryptosporidium parvum* oocysts in the Bull Run watershed?

I support any conditions that the Drinking Water Program or the USEPA may apply to the Portland Water Bureau's LT2ESWTR variance. It must be clear to all parties what will happen if the Portland Water Bureau detects any *cryptosporidium parvum* oocysts in the Bull Run watershed. Will the Portland Water Bureau's variance be revoked immediately or will they be allowed to retest a water sample verifying the presence of *cryptosporidium parvum* in the Bull Run watershed?

Sincerely,

Kathryn M. Notson

A black rectangular redaction box covering the signature area.

From: Kathryn Notson
Sent: Friday, December 16, 2011 9:59 AM
To: pwb.treatment-variance@state.or.us
Subject: OHA Intent to Grant Variance - Corrections



December 16, 2011

Oregon Health Authority
Public Health Division
Office of Environmental Public Health
Drinking Water Program
800 N.E. Oregon St., Ste. 640
Portland, OR 97232-2187

RE: City of Portland Bull Run Watershed Surface Source Water
USEPA LT2ESWTR Variance Request submitted 6/6/2011
Corrections to OHA's Intent to Grant a Variance

Dear Mr. David Leland:

The following corrections need to be made to OHA's Intent to Grant a Variance to the Portland Water Bureau for treatment of Bull Run source water:

- 1) pg. 3 No. 7 Portland Water Bureau has 19 wholesale water customers (cities and water districts) and not 16. Contact Jan Warner at (503) 823-7531 for verification. I understand that the City of Sandy, OR will eventually become the 20th wholesale water customer when an intertie is constructed.
- 2) pg. 7 No. 15 I understood that nitazoxanide was developed first for children then adults, unless there has since been another drug developed to treat adults.
- 3) pg. 8 No. 22 The Milwaukee, WI *cryptosporidiosis* outbreak occurred in April 1993, not 1992. It affected an estimated 403,000 people not 400,000 people.
- 4) pg. 10 No. 16 The LeChevallier Bull Run watershed *Cryptosporidium parvum* detected by the cell-culture method was two of 89 samples not 87 samples. (See pg. 975 of the report.)
- 5) pg. 10 No. 29 Was this sampling from September 2000 to November 2002 published in a peer reviewed journal or was this simply an internal Portland Water Bureau sampling period?
- 6) pg. 11 No. 40 Has this changed since 1996 as I understand the Portland Water Bureau has pursued land exchanges or land purchases within the BRMU to consolidate Portland Water Bureau holdings around the city infrastructure?
- 7) pg. 12 No. 46 Have you seen LIDAR produced by Oregon Geology and Mineral Industries of the Bull Run watershed topography? Have you seen aerial views of the Bull Run watershed? David Shaff showed me two images December 14, 2011 during the hearing period which would

be of interest to you if you haven't seen them.

8) pg. 15 The word "Method" was not capitalized in IV.(b)A. nor in IV.(b)C. when mentioning "Method 1623." The first letter was a lower case "m."

9) Appendix B, State: "ORS" was omitted in front of the word "Sections" in the first bullet point.

Sincerely,

Kathryn M. Notson

[REDACTED]

From: Kathryn Notson
Sent: Tuesday, December 27, 2011 12:35 PM
To: pwb.treatment-variance@state.or.us
Subject: Portland Water Bureau LT2ESWTR Treatment Variance

[REDACTED]

December 27, 2011

Oregon Health Authority
Public Health Division
Office of Environmental Public Health
Drinking Water Program
800 N.E. Oregon St., Ste. 640
Portland, OR 97232-2187

RE: City of Portland Bull Run Watershed Surface Source Water
USEPA LT2ESWTR Variance Request submitted 6/6/2011

Dear Mr. David Leland:

The Portland Water Bureau will request that you extend their reservoir decommissioning compliance schedule they signed with the USEPA March 25, 2009.

The only reason they will ask for a decommission compliance schedule extension to 2034 is because some Portland citizens believe that New York City received such an extension of 2028 or 2034 for their Hillview Reservoir. Some citizens want to keep the open distribution reservoirs in tact simply because of their historic value. However, in light of the City of Portland's history, I oppose any extension to their USEPA reservoir decommissioning compliance schedule. The Portland Water Bureau may try to "retire" open distribution reservoirs (take them off-line) as opposed to "decommissioning" them as they agreed to do.

The Portland City Council was told by the Oregon State Board of Health on November 28, 1969 to cover the open distribution reservoirs due to fecal contamination from birds. This was the result of a joint survey of Portland's municipal water supply done by the Oregon State Board of Health, Office of Public Health Engineering, and the Bureau of Water Hygiene, Environmental

Control Administration, Consumer Protection and Environmental Health Service of the federal Department of Health, Education, & Welfare, dated November 1969. The initial survey was conducted August-December, 1968. As a result, the Portland City Council passed Resolution 31165 on December 27, 1972 to cover all six open distribution reservoirs within a 12 year period to be completed by 1984-1985. (Mt. Tabor Park Reservoir 2 has since been decommissioned.) However, the Portland City Council rescinded that resolution with Resolution 31807 on December 29, 1976. Portland received a "provisionally approved" interstate carrier classification in 1972 under the U.S. Public Health Service Water Quality Standards of 1962. January 11, 1974, Portland received an "approved" interstate carrier status from the USEPA after 1) increasing reservoir cleaning, 2) improving disinfection methods, 3) increasing reservoir surveillance & fencing, & 4) increasing water quality monitoring, and 5) removing Mt. Tabor Park Reservoir 2 from service. (The City Council also claimed that the city couldn't afford to cover or bury the open distribution reservoirs. They intended to fight the USEPA through legal processes.)

During the first half of 1976, *Cryptosporidium* became known as a human pathogen as John Hopkins Medical School veterinary students discovered it sickened a 3 year old rural Tennessee girl.

I have looked at the Drinking Water Program public record twice. I noticed that your office has told the Portland Water Bureau repeatedly over the last 42 years to cover or bury the open distribution reservoirs and the Portland Water Bureau has not done as you requested. It is time that the Portland Water Bureau follow through with its promise and not seek another delay. There is no legitimate reason for them to delay decommissioning the open distribution reservoirs. The 2002 Open Reservoir Replacement Project was supposed to replace the Mt. Tabor Park Reservoir 5 with a 50 million gallon underground tank in the footprint of that reservoir and to replace the north reservoir cell of Mt. Tabor Park Reservoir 6 with a 20 million gallon underground tank in the footprint of that cell, and then the Portland Water Bureau was going to decommission the south reservoir cell of Mt. Tabor Park Reservoir 6. Instead, the 50 million gallon underground tank is now Powell Butte Reservoir 2, which is under construction, and a 25 million gallon underground tank will replace the Kelly Butte Reservoir, which is currently a 10 million gallon tank. Construction for the Kelly Butte Reservoir won't begin until July 1, 2012. It was supposed to start December 2011.

The Portland Water Bureau also wants to propose 1) validating or verifying any *Cryptosporidium* positive result detected using two different USEPA *Cryptosporidium* certified laboratories in order to be certain it isn't a false positive result, 2) genotyping any *Cryptosporidium* species which is detected, even if it's *Cryptosporidium parvum* or *hominis* species, and 3) determining whether the running annual average of *Cryptosporidium* concentration is to their advantage or detriment.

The Portland Water Bureau doesn't want to be penalized for one *Cryptosporidium* detection during a turbidity event. It takes two hours to close the intake in the diversion pool at the head works and it takes four hours to start the Columbia South Shore Well Field ground water. It takes 10-20 minutes to close a valve to divert water around the open distribution reservoirs. There would still be time for contamination of the Bull Run source water to occur during a turbidity event while these closing and opening processes occur.

The Portland Water Bureau experienced problems with spike matrix recovery of *Cryptosporidium* oocysts during mid-July through mid-November for the last three years. This

problem apparently didn't occur during the LeChavallier study of the Bull Run surface source water. There is no mention of it in the report.

Please examine this information carefully as you formulate your decision in granting the Portland Water Bureau an LT2ESWTR variance with conditions in consultation with the USEPA.

Sincerely,

Kathryn M. Notson
[REDACTED]

From: Kathryn Notson
Sent: Friday, December 30, 2011 4:26 PM
To: pwb.treatment-variance@state.or.us
Subject: OHA Intent to Grant Variance - Correction

[REDACTED]
December 30, 2011

Oregon Health Authority
Public Health Division
Office of Environmental Public Health
Drinking Water Program
800 N.E. Oregon St., Ste. 640
Portland, OR 97232-2187

RE: City of Portland Bull Run Watershed Surface Source Water
USEPA LT2ESWTR Variance Request submitted 6/6/2011
Corrections to OHA's Intent to Grant a Variance

Dear Mr. David Leland:

The following corrections need to be made to OHA's Intent to Grant a Variance to the Portland Water Bureau for treatment of Bull Run source water:

Pg. 9 No. 26 last sentence: "These recovery rates are within the acceptable range of 13 to 111 percent for Method 1623." Is the figure "111" correct? I thought if there was no *cryptosporidium* oocysts in the water sample to begin with and you spike it with 100 oocysts, that the recovery would be between 13 to 100 oocysts, not 111.

Sincerely,

Kathryn M. Notson
[REDACTED]

EXHIBIT 9

From: Marie Jennings
Sent: Thursday, December 22, 2011 2:17 PM
To: pwb.treatment-variance@state.or.us
Cc: David E Leland; Shibley Gail R
Subject: EPA Comments on NOI to grant PWB Variance

Please find attached comments from EPA regarding the NOI to grant the PWB variance.

(See attached file: PWB Variance Comments.12.22.11.pdf)

S. Marie Jennings
Manager, Drinking Water Unit
[REDACTED]

From: Marie Jennings
Sent: Friday, December 30, 2011 2:46 PM
To: David E Leland; Shibley Gail R
Cc: [REDACTED]
Subject: Page correction on EPA comments on NOI

Hi Dave and Gail

We have reordered and numbered the pages. Sorry for any inconvenience.

(See attached file: EPA's PWB Variance Comments.12.22.11 - corrected.pdf)

S. Marie Jennings
Manager, Drinking Water Unit
[REDACTED]



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 10

1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
WATER AND WATERSHEDS

December 22, 2011

Gail R. Shibley, J.D.
Administrator, Environmental Public Health
Oregon Health Authority
800 N.E. Oregon Street, Suite 640
Portland, Oregon 97232

**Re: Comments on Notice of Intent to Grant Safe Drinking Water Act Variance to
Portland Water Bureau**

Dear Ms. Shibley:

On November 29, 2011, the Oregon Health Authority issued a Notice of Intent to grant a variance to Portland Water Bureau from the *Cryptosporidium* treatment requirements of the Long Term 2 Enhanced Surface Water Treatment Rule (LT2). The Notice of Intent provided an opportunity for all interested persons to submit comments by January 3, 2012. The U.S. Environmental Protection Agency (EPA) submits the following comments for OHA's consideration.

Background

EPA promulgated the LT2 Rule in 2006, under the authority of the Safe Drinking Water Act¹, to protect public health from illness due to *Cryptosporidium* and other microbial pathogens in drinking water. Consuming water with *Cryptosporidium* can cause gastrointestinal illness, which may be severe and sometimes fatal for people with weakened immune systems (which may include infants, the elderly, and people who have AIDS).

Among other things, the LT2 Rule requires that unfiltered public water systems provide a specified level of *Cryptosporidium* inactivation, based on their mean *Cryptosporidium* levels, using chlorine dioxide, ozone or UV.² Section 1415(a) of the Safe Drinking Water Act allows for a variance from this requirement if it is determined 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."³

In 2009, EPA granted the State of Oregon interim primary enforcement responsibility for public water systems pursuant to section 1413 of the Safe Drinking Water Act.⁴ One of the primacy requirements is that a state has adopted drinking water regulations and variance requirements that are no less stringent

¹ 42 U.S.C. § 71 Fed. Reg. 654 (Jan. 5, 2006).

² 40 C.F.R. § 40 CFR 141.712(c).

³ 42 U.S.C. § 300g-4(a)(1)(B).

⁴ 42 U.S.C. § 300g-2.

than federal requirements. Oregon Administrative Rules include *Cryptosporidium* inactivation, treatment, and variance requirements that are no less stringent than federal requirements. In particular, OHA may grant a variance from the required use of a specified treatment technique “if the Authority determines that the use of a specified water treatment technique is not necessary to protect public health based on the nature of the raw water source for a public water system.”⁵ As such, Oregon has the authority to consider and rule on variance requests submitted on this basis.

On June 7, 2011, OHA received such a variance request from Portland Water Bureau, which serves over 532,000 people and uses the Bull Run watershed as its primary raw water source. Portland also provides wholesale water year-round to 16 other public water systems serving an additional 426,000 people in Multnomah, Washington, and Clackamas counties.⁶ According to this variance request, several characteristics of the Bull Run watershed contribute to a low prevalence of *Cryptosporidium* and treatment is therefore unnecessary.⁷

OHA’s November 29, 2011 Notice of Intent concludes that Portland Water Bureau has demonstrated to its satisfaction that “because of the nature of the raw water source, treatment for *Cryptosporidium* at the Bull Run watershed intake is not necessary to protect public health.”⁸ OHA’s Notice of Intent includes a Proposed Order granting the variance subject to specified conditions, including routine monitoring for *Cryptosporidium*.

EPA’s comments focus generally on four issues: quality assurance monitoring, sample volume, public notification and use of improved detection and monitoring methods.

Quality Assurance Monitoring

Recommendation: EPA recommends that matrix spike sampling and analysis be conducted at least monthly for the term of the variance.

Rationale: OHA’s Proposed Order requires that Portland Water Bureau conduct routine monitoring for *Cryptosporidium*, which “must consist of collecting at least two 50L samples each week, and analyzing the samples for *Cryptosporidium* using method 1623 from a laboratory approved by the EPA to utilize this method.”⁹ Method 1623 is an EPA-validated method for detecting *Cryptosporidium* and *Giardia* that is incorporated by reference in EPA’s LT2 regulations at 40 C.F.R. § 141.704.

Although the Proposed Order is silent on the issue of quality assurance monitoring, Method 1623 requires that each laboratory using the method operate a formal quality assurance program. Among other things, the quality assurance program must include an ongoing demonstration of laboratory capability and method performance using the matrix spike (MS) test.¹⁰ As OHA’s Notice of Intent explains, matrix

⁵ OAR 333-061-0045(13).

⁶ Oregon Health Authority, Notice of Intent to Grant Variance, November 29, 2011, at 3.

⁷ Portland Water Bureau Request for a Treatment Variance to the Long Term 2 Enhanced Surface Water Treatment Rule, June 2011.

⁸ OHA Notice of Intent at 14.

⁹ OHA Notice of Intent at 14-15.

¹⁰ Method 1623: *Cryptosporidium* and *Giardia* in Water by Filtration/IMS/FA, U.S. EPA, December 2005, at 13.

spike sampling is a quality control process designed to assure that if *Cryptosporidium* oocysts are present in water samples, the laboratory is able to detect them despite possible interference by the contents of the source water itself.¹¹ It essentially involves "spiking" a separate sample from the drinking water source with a fixed number of oocysts, then determining how many can be detected or recovered.¹² Method 1623 has set a minimum quality control acceptance criterion of 13% mean recovery in matrix spikes.¹³ Under certain circumstances, the laboratory may modify Method 1623 if the modifications are demonstrated to increase oocyst detection.¹⁴

With regard to the frequency of matrix spike sampling, Method 1623 requires that the laboratory analyze matrix spike samples "at a minimum frequency of 1 MS sample per 20 field samples from each source analyzed."¹⁵ By setting forth the minimum frequency required, Method 1623 specifically contemplates circumstances in which more frequent matrix spike sampling may be warranted. EPA believes that more frequent sampling is warranted here for the reasons below.

As noted above, OHA's Proposed Order requires that Portland Water Bureau collect 2 source water samples per week. This could result in MS sampling and analysis being conducted as seldom as once every 10 weeks, or approximately every 2½ months, under the Method 1623's minimum frequency requirement described above. More frequent matrix spike sampling and analysis is needed because of the known annual phenomenon affecting the Bull Run water matrix, which usually starts in late spring or early summer and lasts a minimum of 2-3 months, and during which the laboratory's ability to detect oocysts in Bull Run water decreases.¹⁶

Portland Water Bureau recognizes this phenomenon and has previously employed increased matrix spike sampling frequencies to address it.¹⁷ For example, after this change in the water matrix occurred in 2010, Portland's laboratory was able to detect only 2 out of 100 oocysts in one matrix spike sample when using Method 1623 without modification.¹⁸ Similar low recoveries occurred in other matrix spike sample analyses.¹⁹ However, because the laboratory was analyzing matrix spike samples approximately once per month and at times multiple times during the same month, they were better able to precisely determine when modifications to Method 1623 were necessary to detect oocysts present in the matrix spike sample.²⁰

In contrast, conducting matrix spike sampling and analyses only once every 2½ months could miss the period of this annual phenomenon entirely and fail to reveal these markedly decreased oocyst recoveries.

In other words, the annual change in the water matrix that makes oocysts harder to detect could happen without the laboratory knowing. The resulting average recovery would then be artificially high and appear to meet quality control acceptance criteria when true recoveries were much lower. In that circumstance, the laboratory would continue using Method 1623 or the current EPA-Approved Method

¹¹ OHA Notice of Intent at 9.

¹² Method 1623 at 15-19.

¹³ Method 1623 at 59.

¹⁴ Method 1623 at 13-15.

¹⁵ Method 1623 at 16, Section 9.1.8 (emphasis added).

¹⁶ PWB Request Appendix C at 105-106, 119.

¹⁷ PWB Request Section 3 at 7-8.

¹⁸ PWB Request Appendix C at 81.

¹⁹ PWB Request Appendix C at 82.

²⁰ PWB Request Section 3 at 8.

without modifications needed to better detect oocysts. This increases the chance that the laboratory would not be detecting *Cryptosporidium* oocysts that are in fact present and pose a public health risk.

In short, conducting matrix spike analysis at an adequate frequency is necessary to appropriately inform laboratory decisions to improve standard operating procedures, to better detect oocysts in the drinking water source. Similarly, because the matrix change phenomenon does not occur during the same months each year, the MS frequency must allow the laboratory to identify the phenomenon whenever it occurs and respond with appropriate method modifications. Finally, because the required sampling is being conducted to ensure that *Cryptosporidium* is not present in public drinking water – and to support a continuing conclusion that treatment is not necessary – ensuring that the method is performing adequately is critical to protecting public health. EPA therefore recommends that matrix spike sampling and analysis be conducted at least monthly for the term of the variance.

Sample Volume

Recommendation: EPA recommends that any variance conditions include the flexibility for Portland Water Bureau to collect source water samples in either 10 or 50 liter volumes.

Rationale: OHA's Proposed Order calls for sample volumes of 50 liters²¹. However, the Method 1623 modifications that Portland Water Bureau used in 2010 to meet matrix spike recovery requirements demonstrated improved recoveries at a sample volume of 10 liters.²² To our knowledge, no similar demonstration has been made for the modified method using a 50 liter sample volume. Method 1623 specifically allows for analysis of either 10 liter or 50 liter sample volumes²³. EPA therefore recommends that any variance conditions include the flexibility for Portland Water Bureau to collect source water samples in either 10 or 50 liter volumes.

Public Notification

Recommendation: EPA encourages OHA to consider a public notification requirement for any oocyst detections.

Rationale: OHA's Proposed Order requires that Portland Water Bureau notify OHA within 24 hours of any laboratory results that include any *Cryptosporidium* detections.²⁴ OHA is silent regarding whether the public would be notified at the time of an oocyst detection. EPA therefore encourages OHA to consider a similar public notification requirement for any oocyst detections.

Use of Improved Detection and Monitoring Methods

Recommendation: Any variance granted by OHA should clarify that sampling must use the EPA-Approved Method which applies at the time samples are taken. In addition, any variance granted by

²¹ OHA Notice of Intent at 14-15.

²² PWB Request Appendix C at 96-103.

²³ Method 1623 Section 12-2 at 36-38.

²⁴ OHA Notice of Intent at 15.

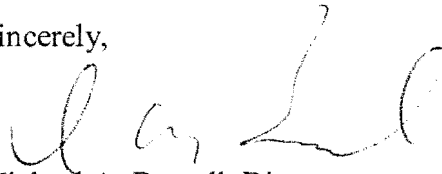
OHA should encourage Portland Water Bureau to make use of improvements to Method 1623 as they become available.

Rationale: As you may know, on December 7, 2011, EPA hosted a public meeting in Washington, DC, to discuss the analytical methods for *Cryptosporidium* and the source water monitoring data from the LT2 Rule. This meeting was held as part of the review of the LT2 rule under the six-year review process announced as part of EPA's Retrospective Review Plan under Executive Order 13563 in August 2011. At the meeting, EPA presented its evaluation of the LT2 rule *Cryptosporidium* source water monitoring data, new information on the performance of Method 1623, as well as the latest information on Method 1623 improvements.

As noted above, OHA's Proposed Order requires Portland Water Bureau to conduct routine sampling and to analyze *Cryptosporidium* samples using Method 1623. Given the ongoing review of LT2 requirements and Method 1623, any variance granted by OHA should clarify that sampling must use the EPA-Approved Method which applies at the time samples are taken. In addition, any variance granted by OHA should encourage Portland Water Bureau to make use of improvements to Method 1623 as they become available.

EPA appreciates this opportunity to comment on OHA's Notice of Intent to grant a *Cryptosporidium* treatment variance to Portland Water Bureau. If you have any questions, please feel free to call me at (206) 553-4198.

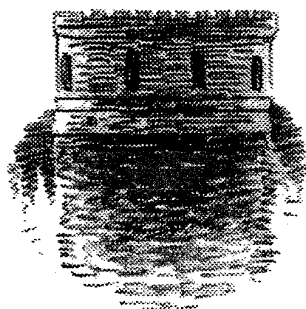
Sincerely,

A handwritten signature in black ink, appearing to read "Michael A. Bussell". The signature is fluid and cursive, with the first name being the most prominent.

Michael A. Bussell, Director
Office of Water & Watersheds

EXHIBIT 10

From: floy jones
Sent: Friday, November 18, 2011 4:26 PM
To: pwb.treatment-variance@state.or.us; David Leland
Subject: Bull Run treatment variance comment for the record



FRIENDS *of the* RESERVOIRS

Citizens joining to protect Portland's historic reservoirs and water system

3534 S.E. Main Street, Portland, OR 97214 www.friendsofreservoirs.org

www.lists.pdx.edu/mttabor

November 18, 2011

By Electronic Mail

To: Oregon Public Health Division
State Drinking Water Program

Re: Comment on Bull Run source water variance application

Friends of the Reservoirs support the issuance of a variance to the EPA LT2 Cryptosporidium regulation for Portland's Bull Run source water. We further support indefinite approval of the variance without onerous and unnecessary conditions attached such as requiring further costly extensive sampling. A variance condition requirement to test the Bull Run source water at the intake no more than four times per month would be protective of public health while still involving more testing than what is currently required of systems known to have sources of Cryptosporidium infectious to humans within their drinking watershed (i.e. Milwaukee, Wisconsin). Additional sampling should not be required unless the conditions of the federally protected Bull Run watershed substantially change and EPA's sampling methodology is significantly improved such that it distinguishes between harmless and harmful Cryptosporidium.

Friends of the Reservoirs (FOR) has dedicated much of the last decade toward extensively researching the EPA LT2 rule, the rule development process, the LT2 Federal Advisory Committee, EPA's LT2 research methodologies, the rule's applicability to systems such as Portland's unfiltered Bull Run system, and the new scientific research that continues to call into question the validity of the LT2 regulation and EPA's estimates of risks and benefits. Friends of the Reservoirs reviewed the official comments to draft rule in 2003 including those from the American Water Works Association, the Large Unfiltered Working Groupⁱ, the National League

of Cities, Association of Metropolitan Water Agencies, New York City, Boston and scores of others who sharply criticized EPA's overestimation of risks and benefits and EPA's underestimation of costs. Dr. Valerie Hunter submitted comments on behalf of The Friends of the Reservoirs to the draft rule in 2003. FOR has extensively reviewed the entire official EPA LT2 record. Furthermore, FOR members spent many weeks at the Portland Water Bureau reviewing volumes of material associated with the PWB Montgomery, Watson, Harza Global consultant contract related to their involvement in the LT2 Federal Advisory Committee and other aspects of the LT2 regulation development process.ⁱⁱ FOR members continue to diligently review current related scientific research.

As documented in Portland's variance application Portland has more than adequately demonstrated that the character of the Bull Run source water is such that additional treatment is not necessary and that there is no unreasonable risk to public health in avoiding installation of an additional treatment plant. Rigorous extensive sampling of Bull Run source water as well as the natural characteristics of the federally protected Bull Run watershed clearly demonstrates that infectious *Cryptosporidium* is a non-issue with regard to Bull Run water. Not only is it the case that *Cryptosporidium* has not been found in extensive sampling of the source water but the failure to detect infectious *Cryptosporidium* in the extensive sampling of scat from wildlife demonstrates that the risk of *Cryptosporidium* oocysts entering the Bull Run system in sufficient quantity (or from infectious sources) to pose a risk to public health is extremely low. The absence of *Cryptosporidium* found in the massive one-year monitoring program is supported by monitoring since 2002. The available data on *Cryptosporidiosis* within Multnomah County shows no indication of any transmission from drinking water.

The EPA approved LT2 sampling method has long been widely criticized by municipalities, national professional associations and many others because the HV1623 methodology does not distinguish between harmless and harmful *Cryptosporidium*, dead or alive or infectious and non-infectious varieties. New scientific research has been underway for several years by the Water Research Foundationⁱⁱⁱ (White Paper attached for the record) to improve on EPA's LT2 sampling technology such that there is distinction between harmless and harmful *Cryptosporidium* with the purpose being to improve the value of sampling results and better informing the public on risks associated with *Cryptosporidium* in drinking water. New published scientific research supports that the risk to drinking water from *Cryptosporidium* is exponentially lower than EPA had estimated utilizing a Bayesian modeling system based on sampling results that failed to distinguish between harmless and harmful *Cryptosporidium*.

In their 2008 AWWA conference presentation, American Water Works Association Research Foundation study 3021 researchers made this statement regarding the EPA sampling method, "The detection of non-infectious oocysts or oocysts belonging to a species that is not infectious to humans could cause unwarranted concern for a contaminant that may not be significant public health risk (report attached for the record). Portland participated in this study sampling 7000 liters at the outlets of in town open reservoirs. No oocysts were detected. At the study's conclusion researchers found no *Cryptosporidium* in any of 19 utilities participating, a result that contradicts EPA's estimates of *Cryptosporidium* risks associated with drinking water and EPA estimates of the LT2 rule benefits. The researchers concluded that all utilities participating in the study already meet the goal of the rule (Study attached for the record).

Bull Run water purity has historically been and remains a strong community value for Portland citizens. FOR believe that the greatest risk to Bull Run water safety would come not from

infectious *Cryptosporidium* but from a requirement to install an unnecessary additional treatment plant. Installation of a UV radiation treatment plant would create new risks associated with mercury contamination of the water supply related to breaking bulbs, a problem documented at the UV Validation Facility located at the Columbia South Shore Well Field in Portland. Installation of a filtration plant introduces new risks from toxic chemicals, acrylamide, alum, iron salts, and other polymers, and risks current watershed protections. Alum alone is cause for concern.

The EPA LT2 rule is presently under review in response to an Executive Order directing agencies to revise or repeal unduly burdensome regulations. Obama's February 2011 Executive Order 13563 reinforces the principle that cost-benefit analysis and sound science should be the foundation of all agency actions. This review of the LT2 rule should result in significant modifications to the rule if new sound science is duly considered and EPA seeks to make this regulation less burdensome.

Given the complete absence of *Cryptosporidium* in Bull Run source water, the protective nature of the Bull Run watershed, and EPA's current 2011/12 review of the LT2 rule, the State of Oregon should minimally grant Portland a variance with the least burdensome variance conditions. A State or EPA issued administrative waiver from the LT2 rule is the preferred outcome.

Respectfully submitted,

Floy Jones On behalf of The Friends of the Reservoirs

ATTACHMENTS (4)

ⁱ Boston, San Francisco, Seattle, Tacoma and New York

ⁱⁱ Portland Water Bureau MWH regulatory support contract 31056, 1997-2003 Joe Glicker lead consultant

ⁱⁱⁱ Formerly known as the American Water Works Association Research Foundation (AwwaRF)

EXHIBIT 11

From: HTKenn
Sent: Monday, January 02, 2012 2:07 PM
To: pwb.treatment-variance@state.or.us
Subject: Portland Water Bureau comment

January 2, 2012

Oregon Health Authority
Office of Environmental Public Health
Drinking Water Program
800 NE Oregon Street, Suite 640
Portland, OR 97232

Dear OHA,

Of course I support the OHA's general intent to grant a variance to the Portland Water Bureau, but there is a monitoring flaw that needs to be addressed.

The water sampling methods should be improved so that if an oocyst is detected that is NOT pathogenic to humans, the building of an unnecessary treatment plant can be averted a great expense to the rate payers of the PWB.

It must be the responsibility of the OHA to employ modern methods of detection for the protection not only of the health of Oregon citizens, but to be fiscally responsible while doing so.

The PWB has a history of poorly managing its fiscal resources. Detection is the first step in prevention and often must be less resource intensive.

Thank you for your consideration.

Helen Kennedy

[REDACTED]

[REDACTED]

EXHIBIT 12

From: Mary Sievertsen
Sent: Tuesday, January 03, 2012 9:52 AM
To: pwb.treatment-variance@state.or.us
Subject:

We agree with Oregon Physicians for Social Responsibility that your variance plan is over all a good one but needs the added attention that they recommend. Please consider their input.

Thank You,
Mary & John Sievertsen

EXHIBIT 13

From: Richter, Ann

Sent: Tuesday, January 03, 2012 1:38 PM

To: 'pwb.treatment-variance@state.or.us'

Cc: Carrie L GENTRY; Shaff, David; Akagi, Yone; Campbell, Edward; Wanner, Chris; Giani, Rich; Richter, Ann

Subject: OHA Notice of Intent to Grant Variance - PWB comments

Dear Ms. Shibley:

On behalf of the Portland Water Bureau, please find PWB's comments on OHA's 11/29/2011 Notice of Intent to Grant a Variance in the attached document. I will also hand-deliver a hard copy of this document to the Drinking Water Program offices today.

Thank you for the opportunity to comment on OHA's Notice of Intent.

Sincerely,

Ann Richter

Environmental Specialist

Portland Water Bureau

[Redacted signature block]

Email:

www.portlandoregon.gov/water



Randy Leonard, Commissioner
David G. Shaff, Administrator

1120 SW 5th Avenue, Room 600
Portland, Oregon 97204-1926
Information: 503-823-7404
www.portlandonline.com/water



An Equal Opportunity Employer

January 3, 2012

Gail R. Shibley, JD, Administrator
Oregon Health Authority
Office of Environmental Public Health
Drinking Water Program
800 NE Oregon St, Suite 640
Portland, OR 97232

Subject: Notice of Intent to Grant the Portland Water Bureau a Variance to the Surface Water Treatment Requirements of the Long Term 2 Enhanced Surface Water Treatment Rule

Dear Ms. Shibley:

The Portland Water Bureau (PWB) is pleased with the Oregon Health Authority's (OHA) recent announcement that it intends to grant a variance to the City exempting it from the surface water treatment requirements of the Long Term 2 Enhanced Surface Water Treatment Rule (LT2). As documented in Portland's variance request, PWB believes the nature of the Bull Run raw water source and the ongoing stewardship thereof, when considered in combination with the results of rigorous water quality monitoring, clearly indicate that treatment for *Cryptosporidium* is not necessary to protect public health.

PWB has closely reviewed OHA's proposed conditions to establish monitoring protocols and notification requirements. PWB offers comments in Attachment A for your consideration. These comments are intended to help achieve effective and practical implementation of the variance conditions. PWB has also identified what it believes to be factual errors in the draft variance findings and offers recommended corrections in Attachment B. Finally, since OHA has informed PWB of comments on the Notice of Intent submitted by the Environmental Protection Agency, PWB provides a review and response to these comments in Attachment C.

OHA's decision marks the beginning of an unprecedented regulatory compliance process. Portland recognizes and supports the purpose of OHA's proposed conditions to establish monitoring protocols, notification requirements and ensure ongoing protection of the Bull Run watershed as a drinking water source. As it has for over two decades, the City anticipates working closely with OHA to ensure ongoing public health protection for Portland's drinking water customers as it collects and transmits relevant monitoring data and watershed information.

Thank you for your agency's efforts to date 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

Attachment A

Portland Water Bureau Comments on Oregon Health Authority Notice of Intent

GENERAL COMMENTS

For reasons discussed below the Portland Water Bureau (PWB) recommends that the draft monitoring conditions be slightly modified to improve their effectiveness.

PWB also believes that PWB, Oregon Health Authority (OHA), and the Multnomah County Health Department (MCHD) must closely coordinate their responses in the event *Cryptosporidium* is detected during regulatory monitoring. Therefore, PWB plans to work directly with OHA and MCHD to develop and refine protocols for incident response and public notification. This effort can build on the work conducted by PWB and MCHD during the yearlong variance sampling effort.

PWB will develop and implement a monitoring plan that conforms to OHA's final variance conditions. Additionally PWB will seek to conduct additional monitoring and research to provide relevant public health information regarding any *Cryptosporidium* that may be detected during the variance monitoring program. PWB strongly believes that the variance should be administered for the purpose of ensuring ongoing public health of Portland's drinking water customers and that several factors should inform any future decision regarding the variance. As described in Portland's Variance Request these include confirmation of positive samples, *Cryptosporidium* genotyping analysis, additional monitoring data from locations upstream of the raw water intake, additional wildlife research and scat monitoring data, and disease surveillance results within the Portland drinking water service area.

SPECIFIC COMMENTS

PWB offers the following specific comments on OHA's Notice of Intent (NOI).

Comment 1

RE: Proposed Order 1.(a)A.

OHA NOI Language

All current protections for the Bull Run Management Unit must remain in place.

PWB Proposed Substitute Language

All current City of Portland legal protections for the Bull Run Watershed Management Unit must remain in place. The City must also work with the State of Oregon, the United States Department of Agriculture Forest Service and the United States Department of Interior Bureau of Land Management to maintain the protections for the unit that fall outside of the City's jurisdiction.

Explanation

PWB proposes the substitute language for two reasons:

1) As described in PWB's September 9, 2011 response to OHA's follow-up questions regarding the variance request document, the Bull Run Watershed Management Unit (BRWMU) is currently protected by layers of overlapping federal, state and local laws, policies, agreements and administrative plans.

The City of Portland cannot dictate or guarantee the maintenance of federal or state legal, regulatory or administrative protections. As written, the NOI language could lead to a violation of the variance conditions and a loss of the variance due to actions by state and federal government agencies outside of the City's control.

2) The City may wish to modify its administrative policies to achieve other stewardship objectives that would not diminish overall protections against *Cryptosporidium*. The language proposed by PWB obligates the City to maintain City Code Section 21.36, as is, in order to maintain the variance. City Code Section 21.36 imposes the same tree-cutting restrictions in effect for federal lands within the BRWMU on City-owned land within and adjacent to it. In addition, the code imposes specific land use restrictions and public reporting notifications on the City. These protections are for broader purposes and are not focused on *Cryptosporidium* only. OHA's language could also be interpreted as restricting the City's ability to impose new and more rigorous administrative stewardship controls, in contract specifications or standard operating protocols that are for the purpose of improving protections against *Cryptosporidium*.

Comment 2

RE: Proposed Order 1.(a)C.

OHA NOI Language

Any human sewage (e.g. portable toilets) must be contained and must be kept at least 200 feet from any water body.

PWB Proposed Substitute Language

Any human sewage within the Bull Run water supply drainage must be contained within portable toilets or permanent sanitary facilities. In addition, contained human sewage must be kept at least 200 feet from any water body within the water supply drainage sharing a surface water connection with the Bull Run reservoirs, except when being transported for disposal outside the watershed.

Explanation

PWB supports a restriction on the location of sanitary facilities to keep them safely away from water bodies that could carry microbial contaminants to the water supply intake. As written, the NOI language is overly restrictive in that it could be interpreted to prohibit the necessary transport of portable sanitary facilities through the water supply drainage on the Bull Run road network that comes within 200 feet of the reservoirs and other water bodies. Additionally, the language would prevent the location of portable facilities at the Bull Run Lake parking area.

Proper sanitary facilities are necessary for the safety and hygiene of authorized staff and contractors of the PWB and its federal land management partners as well as for authorized visitors of these agencies on supervised tours. These facilities help protect the Bull Run raw water source from fecal contaminants. As documented in PWB's September 9, 2011 response to OHA-DWP, portable toilets

are located in three areas within the water supply drainage: Bear Creek House, Powerhouse 1, and the Bull Run Lake parking area during summer months. The facilities at Bear Creek House are located more than 200 feet from the nearest water body. The facilities at Powerhouse 1 and the Bull Run Lake parking area are located roughly 70 feet from Reservoir 1 and 100 feet from Bull Run Lake, respectively. PWB plans to relocate the portable toilet located at Powerhouse 1 to comply with the 200-foot buffer from the reservoir. No portion of the Bull Run Lake parking area is at least 200 feet away from the lake; however, as documented in Portland's Sampling Plan and Study (p.57), there is no surface water connection between Bull Run Lake and the Bull Run River. The lack of a surface water connection for transmitting microbial contamination was the reason this location was not selected for upstream water quality monitoring during the yearlong sampling conducted in support of the variance request.

Comment 3

RE: Proposed Order 1.(b)A.

OHA NOI Language

The PWB must conduct routine monitoring for *Cryptosporidium*. The monitoring must consist of at least two 50L samples each week, and analyzing the samples for *Cryptosporidium* using method 1623 from a laboratory approved by the EPA to utilize this method.

PWB Proposed Substitute Language

Whenever the Bull Run source is being used for drinking water, the PWB must conduct routine monitoring for *Cryptosporidium* at its raw water intake. The monitoring each week must consist of at least two 50-L samples, or alternatively five 10-L samples in lieu of any 50-L sample. An EPA-approved laboratory, using EPA Method 1623 or an approved modification, must analyze these samples.

Explanation

With the proposed substitute language PWB seeks to make three recommendations:

1. Monitoring should be required only when the Bull Run source is being used to supply drinking water.

PWB proposes that routine monitoring for *Cryptosporidium* at the raw water intake be required only when the Bull Run system is being used to serve water to the public. This would make *Cryptosporidium* monitoring consistent with fecal coliform and turbidity monitoring under the Surface Water Treatment Rule. See Oregon Administrative Rules 333-061-0036(5)(a)(A) and (B). PWB has a secondary groundwater supply and sometimes shuts down the Bull Run supply (e.g., during turbidity events). There is no reason to monitor the Bull Run supply when its water is not being served to customers.

2. OHA should allow samples to be collected in five 10-L volumes as an alternative to one 50-L volume.

EPA Method 1623 allows for analysis of either 10-L or 50-L sample volumes. Therefore, PWB should be allowed to substitute five 10-L samples for a 50-L sample.

In addition, the use of 10-L samples will allow PWB to use the ASI/PWB Precoat method that was developed to improve matrix spike recoveries during the seasonal period (mid-July to mid-November) when Bull Run raw water has been shown to interfere with oocyst recoveries. This method involves precoating Envirochek HV filters with a milk solution and eluting the filters with a modified elution solution. The ASI/PWB Precoat Method has only been validated for 10-L volumes of raw water. During the seasonal period when *Cryptosporidium* matrix spike recoveries for Bull Run raw water decrease, Portland collects and analyses five 10-L samples and anticipates continuing to use this method to ensure that high quality data supports the variance.

3. OHA, in consultation with EPA, should approve modifications that meet the performance-based criteria of EPA Method 1623.

PWB understands that EPA is in the process of considering revisions to EPA Method 1623 that have been shown to improve *Cryptosporidium* recovery for certain source water matrices, including the addition of sodium hexametaphosphate prior to elution. PWB is prepared to use a revised version of Method 1623 once a rule change has been made, but does not foresee that the addition of sodium hexametaphosphate will resolve the seasonal matrix effect in Bull Run water. PWB anticipates using the ASI/PWB Precoat modification in addition to any new requirements of the next version of EPA Method 1623 since the precoat modification has been demonstrated to improve recoveries during the seasonal matrix effect.

PWB is committed to achieving high data quality and plans to continue to study the seasonal matrix issues in Bull Run source water. In the future, PWB may develop and validate additional method modifications that demonstrate equivalent or superior results compared to EPA Method 1623 as written. PWB plans to submit the results of any future method modification validations to OHA for approval before using a new modification in its ongoing variance monitoring program. We note that Method 1623 is a performance-based method that allows modifications if specified criteria are met and that EPA encouraged the use of improvements to Method 1623 in its comments to OHA.

Comment 4

RE: Proposed Order 1.(b)C.

OHA NOI Language

Increased monitoring must consist of collecting at least four 50 liter samples weekly. Analysis of the samples for *Cryptosporidium* using method 1623 must be done by a laboratory approved by the EPA to utilize this method.

PWB Proposed Substitute Language

Increased monitoring must consist of collecting weekly at least four 50-L samples, or alternatively five 10-L samples in lieu of any 50-L sample. An EPA-approved

laboratory using EPA Method 1623, or an approved modification must analyze these samples.

Explanation

Same Explanation as for Comment 3.

Comment 5

RE: Proposed Order 1.(b)D.

OHA NOI Language

If, while on increased monitoring, another sample detects a presence of *Cryptosporidium*, OHA may revoke the variance. Revocation of the variance will include a schedule for the PWB to install treatment required by LT2.

PWB Proposed Substitute Language

If, during increased monitoring, another sample tests positive for *Cryptosporidium*, OHA may revoke the variance. Prior to revocation, OHA will allow PWB to provide relevant supplemental information to inform OHA's decision. Revocation of the variance will include a schedule for the PWB to install treatment required by LT2.

Explanation

PWB recommends that OHA consider relevant and available information before making a decision to revoke the variance.

OHA proposes a regulatory compliance framework that relies heavily on analytical results from EPA Method 1623. Method 1623, while adequate for monitoring the occurrence of oocysts in raw water, has significant limitations as a tool for characterizing risk to public health. Method 1623 does not identify the species of *Cryptosporidium*, cannot determine the host species of origin, nor can it determine the viability or infectivity of detected oocysts. With Method 1623 there is also a potential for false positives caused by interfering organisms that have no relevance to public health.

PWB believes that relevant supplemental information will provide a more accurate representation of the level of risk if *Cryptosporidium* is detected at the raw water intake, and will improve the ability of PWB and OHA to assess the ongoing basis for a variance. Currently, two types of supplemental analyses—explained in detail below—can produce information relevant to the public health and regulatory assessment of *Cryptosporidium* detected at the Bull Run raw water intake using EPA Method 1623. As described in Section 6 of Portland's Variance Request, PWB believes maintaining and augmenting other monitoring and research programs including upstream monitoring, wildlife research, and disease surveillance within the Portland drinking water service area will provide other information relevant to any future decision regarding Portland's variance.

Visual Confirmation

In the immunofluorescent assay microscopy step of Method 1623, the analyst identifies objects on a microscopic slide that have features such as shape, color, and size that are specific to the genus *Cryptosporidium*. The benefits of immunomagnetic separation and antibodies specific for *Cryptosporidium* oocysts

have greatly enhanced the detection of oocysts against a cluttered background. Nonetheless, there are some organisms that are very close in size and staining characteristics to oocysts that may be incorrectly attributed as *Cryptosporidium*. Confirmation of oocysts by a second EPA-approved laboratory and genotyping analysis would decrease the likelihood of a false positive result.

Genotyping

The vast majority of human *Cryptosporidium* infections are caused by the two species *C. hominis* and *C. parvum*. The primary carriers for these two species are human and domesticated animal sources that are not of major concern in the Bull Run watershed. In a scenario in which *Cryptosporidium* is detected at the Bull Run raw water intake, the likely source would be wildlife that do not typically carry human pathogenic species. Most *Cryptosporidium* species that have been reported from wildlife are host-adapted and are not considered to be a public health risk. The use of a genotyping tool like the one recommended in the Water Research Foundation and EPA sponsored project, *Development and Standardization of a Cryptosporidium Genotyping Tool for Water Samples*, would provide supplementary information to Method 1623 that would greatly improve the quality of the monitoring data gathered for assessing risk and evaluating the nature of the raw Bull Run source water.

Comment 6

RE: Proposed Order 1.(b)E.

OHA NOI Language

The PWB must continue increased monitoring until the running annual average drops below 0.000075 oocysts/L. When this average is below 0.000075 oocysts/L, the PWB may resume routine monitoring.

PWB Proposed Substitute Language

The PWB must continue increased monitoring until the running annual average drops below 0.000075 oocysts/L. When this average is below 0.000075 oocysts/L the PWB may resume routine monitoring. Alternatively, PWB may resume routine monitoring before the running annual average drops below 0.000075 oocysts/L if OHA determines that additional relevant supplemental information demonstrates no public health concern.

Explanation

PWB supports an increase in monitoring if, during routine monitoring, any one sample tests positive for *Cryptosporidium* (as stated in Proposed Order 1.(b)B.). Increased monitoring may help to characterize the extent and nature of an occurrence of *Cryptosporidium*. However, as already discussed in Comment 5, Method 1623 is subject to false positives and cannot by itself adequately characterize the public health significance of any detected oocysts. Therefore, PWB is proposing that OHA: 1) consider additional relevant supplemental information for any positive sample that may trigger increased monitoring; and 2) allow PWB to return to routine monitoring if OHA determines that the weight of evidence suggests that the positive detection by Method 1623 does not represent a public health concern.

If *Cryptosporidium* is detected at the raw water intake, PWB plans to increase its monitoring, and at the same time will send the positive slide to a second independent EPA-approved laboratory for a visual confirmation of the original results. All confirmation results will be shared with OHA as relevant supplemental information. Samples confirmed by an independent laboratory as positive will be sent to a qualified laboratory for genotyping. All genotyping results will also be shared with OHA. This supplemental information is intended to inform OHA's decision about whether or not PWB can return to routine monitoring.

Comment 7

RE: Proposed Order 1.(d)

OHA NOI Language

The PWB must timely notify OHA of any circumstances that may impact any of the above conditions, including but not limited to land management decisions, environmental events or structural changes within or adjacent to the Unit.

PWB Proposed Substitute Language

The PWB must notify OHA in a timely manner of any circumstances the PWB is aware of that may affect any of the above conditions, including but not limited to land management decisions, environmental events or structural changes within or adjacent to the Bull Run Watershed Management Unit.

Explanation

PWB supports timely notification to OHA. The NOI language suggests that Portland would be responsible for reporting to OHA all circumstances described in the section and that the variance could possibly be revoked for a failure to do so even if the City was unaware of a particular circumstance. PWB's proposed substitute language seeks to clarify that PWB can only identify and communicate to OHA information, facts or substantial changes about which it is aware. For example, the City has no direct control over or authority to obtain information about private land holdings adjacent to the unit.

Comment 8

RE: Proposed Order 1.(e)

OHA NOI Language

The PWB must notify OHA within 24 hours of any laboratory results that include any *Cryptosporidium* detections.

PWB Proposed Substitute Language

The PWB must notify OHA within 24 hours of receiving information from the analyzing laboratory of any laboratory results that include any *Cryptosporidium* detections from the raw water intake.

Explanation

PWB's proposed language seeks to clarify that notification within 24 hours apply to results from the raw water intake only. Detections of *Cryptosporidium* from other watershed locations or matrices are not representative of the quality of the water

being served to customers and do not automatically represent a public health concern. PWB proposes that results from locations other than at the raw water intake be shared with OHA pursuant to the direction provided in Proposed Order 1(d).

Comment 9

RE: Proposed Order 2.

OHA NOI Language

This variance is valid for a period of ten (10) years, beginning on the date the Final Order is issued.

PWB Proposed Substitute Language

This variance is valid for a period of ten (10) years, beginning on the date the Final Order is issued. The requirements of the variance conditions begin on April 1, 2012.

Explanation

The NOI language suggests that the monitoring and other required conditions of the variance would become mandatory on the date the Final Order is issued, which OHA has indicated will be January 31, 2012. PWB's proposed substitute language seeks to clarify that the variance conditions would become mandatory regulatory compliance activities as of April 1, 2012 – the deadline established for compliance with the surface water treatment requirements in the Long Term 2 Enhanced Surface Water Treatment Rule.

Attachment B

Portland Water Bureau Requested Corrections to Oregon Health Authority Notice of Intent

Requested Correction 1

RE: OHA Introduction Item #17 and Finding of Facts #35

In both introduction item #17 (p. 4-5) and finding of facts #35 (p. 11), OHA states that in on-going PWB sampling conducted since the variance request was submitted, one *Cryptosporidium* oocyst from fecal material of a bobcat was detected. OHA references page 3 of PWB's September 2011 responses to OHA's questions as the source of this information.

PWB seeks to clarify that the stated concentration for the one bobcat sample that tested positive for *Cryptosporidium* is not correct and that there was no mention of the concentration for this sample in PWB's responses to OHA's questions submitted on September 9, 2011.

At the time that PWB submitted the responses to OHA's questions, PWB had not yet received a final report on the positive bobcat sample from Analytical Services, Inc. (ASI), its contract laboratory. Therefore, PWB did not include a reference to the concentration of oocysts found in the sample in its response to OHA's questions. Since then, PWB has received a final report from ASI on the results from genotyping and other analyses performed on this sample and the salient findings are summarized below.

- Scat sample #390, classified to be from a bobcat, was analyzed by ASI using immunofluorescent antibody testing after immunomagnetic separation.
- The sample contained approximately 6,900 *Cryptosporidium* oocysts per gram of fecal material.
- The sample tested positive for *Cryptosporidium* by polymerase chain reaction (PCR), indicating a wildlife-associated *Cryptosporidium* genotype or species not known to be human pathogenic.
- Based on DNA sequencing of three loci, the oocysts appear to be from a not previously reported wildlife-associated genotype or species.
- Cell culture and immunosuppressed mice infectivity trials resulted in no detectable infections.
- Dr. George Di Giovanni concluded: "Based on our current knowledge of *Cryptosporidium*, this isolate likely poses little to no threat to human health."

Requested Correction 2

RE: Finding of Facts #22

In finding of facts #22 (p. 8), OHA states that a massive outbreak in 1992 affected an estimated 400,000 persons in Milwaukee, Wisconsin. The Milwaukee outbreak referenced by OHA occurred in 1993.

Requested Correction 3
RE: Finding of Facts #28

In finding of facts #28 (p. 10), OHA states that two of 87 samples analyzed by cell culture-PCR method in the study by LeChevalier et al. (2003) were found to have a presence of *Cryptosporidium*. In this study 89 Bull Run water samples were analyzed by cell culture PCR, two of which tested positive for *Cryptosporidium* (Table 3, page 975).

Requested Correction 4
RE: Finding of Facts #30

In finding of facts #30 (p. 10), OHA states that *Cryptosporidium* recovery rates were not reported to OHA for the period of December 2002 and November 2004. PWB seeks to clarify that the recovery rates for the samples collected at the intake between December 2002 and November 2004 were provided to OHA in PWB's responses to OHA's questions submitted on September 9, 2011, page 9. The *Cryptosporidium* recovery for 12/17/2002 was 20%, and the recovery for 6/15/2004 was 57%.

Requested Correction 5
RE: Finding of Facts #34

In finding of facts #34 (p. 10), OHA states that recovery data for wildlife fecal samples collected in support of PWB's variance request were not provided to OHA. PWB seeks to clarify that mean scat recovery data were summarized by species in Portland's Request for a Variance in Appendix E, Item 1, Table 6 and Figure 2, pages E-18 and E-19.

Requested Correction 6
RE: Finding of Facts #39

In finding of facts #39 (p. 10), OHA states that the 1977 federal Bull Run Act (P.L. 95-200) had the effect of prohibiting the cutting of trees on federal land within the Bull Run Watershed Management Unit (BRWMU). PWB seeks to clarify that while this legislation did establish the BRWMU and specify the management objective for the unit as the production of "pure clear raw potable water" for the Portland metropolitan area, it did not have the effect of restricting tree cutting. The section of the legislation that is referenced in footnote 43 on page 11, and which contains language establishing tree-cutting restrictions on federal lands within the unit, was not part of the original 1977 law. This section was added to the law in 1996, and later amended in 2001, with the respective passage of the Oregon Resources Conservation and Little Sandy acts.

Attachment C

**Portland Water Bureau Comments on Environmental Protection Agency
Recommendations Submitted to the Oregon Health Authority on December 22, 2011**

On December 29th, 2011, the Oregon Health Authority (OHA) shared comments it had received to date on the Notice of Intent with the Portland Water Bureau (PWB). Included in the comments was a December 22nd, 2011 letter from Michael Bussell, Director of the Office of Water and Watersheds for the Environmental Protection Agency Region 10 (EPA) that contains four recommendations on the NOI.

The following is PWB's review and response to each of EPA's recommendations. In the case of EPA's first comment, PWB is suggesting new language in OHA's final order to clarify this issue. For EPA's second and fourth comments, PWB believes that modified language it has suggested in Attachment A, Comment 3 for Proposed Order 1.(b)A addresses these issues. For EPA's third comment, PWB believes that no modifications to the variance conditions language are necessary due to existing provisions within the federal Safe Drinking Water Act and Oregon Administrative Rules that adequately address the issue.

Comment 1

RE: Quality Assurance and Monitoring

EPA Recommendation

EPA recommends that matrix spike sampling and analysis be conducted at least monthly for the term of the variance.

PWB Comment

PWB supports the use of monthly matrix spike sampling and analysis to ensure the quality of the data generated by the variance monitoring program. PWB agrees that matrix spike analysis is necessary to inform laboratory decisions to improve standard operating procedures and to assure high data quality. Matrix spike analysis at an adequate frequency will also be a very important tool to detect the seasonal change in Bull Run water that interferes with oocyst recovery and to adopt method modifications that overcome this effect within an appropriate timeframe.

PWB Proposed New Language for Final Order

While conducting regulatory monitoring for *Cryptosporidium* per OHA's conditions, PWB shall collect and analyze matrix spike samples at least once per month.

Comment 2

RE: Sample Volume

EPA Recommendation

EPA recommends that any variance condition include the flexibility for Portland Water Bureau to collect source water samples in either 10 or 50 liter volumes.

PWB Comment

PWB supports the use of 10-L or 50-L sample volumes to meet the monitoring requirements of the variance. As stated by EPA, Method 1623 specifically allows for analysis of either 10-L or 50-L volumes. Furthermore, as explained in PWB's comments and proposed substitute language in regards to the Proposed Order 1.(b)A. (Attachment A, Comment 3), the ASI/PWB Precoat Method employed by PWB to improve performance during the seasonal period when the Bull Run raw water interferes with Method 1623 oocyst recovery has been validated for use with 10-L samples. PWB anticipates continuing to use the ASI/PWB Precoat Method during the seasonal matrix effect to ensure high quality data.

Comment 3

RE: Public Notification

EPA Recommendation

EPA encourages OHA to consider a public notification requirement for any oocyst detections.

PWB Comment

PWB does not believe a blanket requirement for public notification in the case of any detection of *Cryptosporidium* should be required. A random and minor detection of *Cryptosporidium* would not necessarily constitute a threat to public health and a premature notification could lead to unnecessary public fear and reaction. PWB understands, however, the importance of public notifications in which public health is at risk. As described in PWB's general comments in Attachment A, PWB plans to closely coordinate with OHA and the Multnomah County Health Department to develop and refine protocols for incident response and public notification in the event of a detection.

Additionally, PWB believes that a public notice requirement in the Final Order is unnecessary because the notice provisions of the Safe Drinking Water Act, 42 USC § 300g-3(c)(2)(C), and the existing Oregon Administrative Rules on Public Notice, OAR 333-061-0042, adequately describe OHA's authority to require public notification for a variety of situations, including those which present the potential for serious adverse effects on human health. Alternatively, if OHA concludes that the Order should contain a specified public notice requirement, PWB would suggest language that reaffirms the existing notice provisions, with a condition stated as follows: "Portland's operation under this variance is conditioned upon and subject to its obligation to issue public notices as directed by OHA pursuant to OAR 333-061-0042."

Comment 4

RE: Use of Improved Detection and Monitoring Methods

EPA Recommendation

Any variance granted by OHA should clarify that sampling must use the EPA-Approved Method which applies at the time samples are taken. In addition, any variance by OHA should encourage Portland Water Bureau to make use of improvements to Method 1623 as they become available.

PWB Comment

PWB supports EPA's recommendations, but also believes that any decision regarding the use of existing, modified, or new methods should be evaluated in terms of the benefits to the quality of data and information that will be available for assessing the continuation of a variance. As has been shown by EPA's and PWB's experiences, different surface waters may have characteristics that impact the performance of a specific method. Therefore, PWB has offered proposed substitute language in regards to the Proposed Order 1.(b)A. (Attachment A, Comment 3) that allows PWB the flexibility to adopt approved modifications to Method 1623 that have been shown to produce equivalent or superior results for the Bull Run matrix.

PWB has demonstrated its commitment to generating the highest quality data possible when it developed a modification to Method 1623 (ASI/PWB Precoat Method) to overcome seasonal low oocyst recoveries from the Bull Run matrix. PWB seeks to ensure that the language in the Final Order will not prevent PWB from continuing to use the precoat modification or to incorporate any performance improving modifications that are developed as PWB continues to study the Bull Run matrix effect.

PWB would also like to clarify that the use of an EPA-Approved Method for monitoring the occurrence of oocysts in the Bull Run source water should not prevent OHA from using information derived from other methods (e.g. genotyping analysis) to evaluate the broader question of whether the conditions in the Bull Run watershed continue to support public health.

EXHIBIT 14

From: scott
Sent: Tuesday, January 03, 2012 3:44 PM
To: pwb.treatment-variance@state.or.us; Scott
Subject: Variance comments- City of Portland

Good afternoon,

Please enter my public comments on the variance sought by the City of Portland.

Thank you,

Scott Fernandez M.Sc. biology/microbiology

Date: December 29, 2011

To: Oregon Health Authority

Subject: City of Portland Variance Request

The unfortunate 1993 drinking water event in Milwaukee, Wisconsin was a result of operator error and a catastrophic drinking water sewage exposure. However, those who were ill and those who died cannot lay blame on *Cryptosporidium* spp. as the sole etiological agent of disease in this sewage event. The primary assumption of *Cryptosporidium* spp. as the cause was erroneously based on identification from blocks of ice. EPA directs; frozen samples of *Cryptosporidium* spp. are to be rejected based on morphological irregularities and therefore inconclusive. The 403,000 person estimate of illness was later dismissed because of poor statistical methodology. Only several hundred showed alleged positive stools, confirming the numbers remain exaggerated. Commercial labs analyzing *Cryptosporidium* spp. samples in 1994 were determined to be inconsistent and therefore unreliable. Hundreds of millions of dollars have been wastefully spent trying to prove a *Cryptosporidium* spp. drinking water public health problem exists in municipally treated surface water utilities and open reservoir facilities. Yet not one of the EPA proposed benefits of this scientifically flawed regulation have come true. Since 1993 Milwaukee;

- No municipally treated surface water *Cryptosporidium* spp. outbreaks

- No deaths from municipally treated surface water systems (1994 Las Vegas deaths from *Cryptosporidium* spp. and drinking water were later redacted)
- No data demonstrating municipally treated drinking water endemic occurrence

All of the source water sampling, genotyping, cell culturing, scat analysis, etc., cannot bring to a logical conclusion the need for the EPA LT2 regulation. Individually and collectively these data variables are nothing more than assumptions based on estimates that are inconsistent, unreliable, and therefore scientifically unsupported. They are unable to demonstrate *Cryptosporidium* spp. as an inherent, let alone an emerging microbial public health problem from municipally treated surface drinking water.

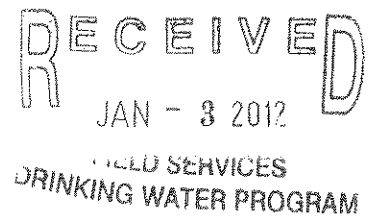
There is a decades long-standing disconnect between; surface drinking water *Cryptosporidium* spp. public health evidence, and the continued waste of money to find a drinking water public health problem that does not exist. This was confirmed even a decade ago by the Bull Run Treatment Panel that added water treatment would provide “no measurable benefit”.

Ultimately the Variance process has provided little useful information with no expectation of a successful outcome because of continued use of flawed and scientifically unsupportable methodologies. As the next step we must acknowledge the unnecessary and wasteful spending needs to stop and request a complete Waiver from LT2 added drinking water treatment and covering open reservoirs. It is now time to repeal the historically onerous and scientifically unsubstantiated EPA Long Term 2 Enhanced Surface Drinking Water Rule.

Sincerely,

Scott Fernandez M.Sc. biology/ microbiology

Portland



Comments:

1.

I agree with the State in the issuance of the Variance to the Portland Water Bureau (PWB).

I do not agree with the quality and standards that the State (OHA) has set forth for the PWB in the listed provisions and ongoing monitoring requirements. I do not agree with Oregon not disclosing who reviewed or came up with this conditions, even PWB provided the backgrounds of those that contributed for the Variance Application, so it would be prudent for OHA to do the same of the reviewers. Actually it should be public knowledge of who the OHA staff contributors were and who if any experts outside of OHA were consulted to inform them. This is important in my view as it appears the standard set are rather low, most items are either poorly thought-out, unclear, unspecific, and poorly crafted in addressing the elements regarding the monitoring of the Bull Run regarding Cryptosporidium.

It is unclear how OHA came to their list of provisions and ongoing monitoring, OHA provides no support information to justify their approach. By the standards set it is unclear if the OHA staff tasked with forming the list of provisions and on-going monitoring has sufficient understanding of ecological processes that influence fate and transport of pathogens in natural environments, this is key given that the foundation of PWB's argument is that the ecology of the Bull Run provides as much risk mitigation for Cryptosporidium as a UV or Filtration Plant. The lack of transparency of who reviewed this in OHA is a bit baffling. In contrast PWB provided a full list of those that contributed in its effort. If Gail Shibley was the only reviewer as she is the only signee, then this is of great concern as Ms. Shibley has no apparent formal education or practical experience in these matters.

It would be in the OHA's best interest to revise its proposed list of provisions and conditions because this is the first time in the History of the Drinking Water Act that a Variance has been given to a large unfiltered surface water system from a treatment rule requirement based solely on the nature of the raw water source. I will provide my comments after each section of the OHA's proposed, these comments will be numbered and grey highlighted.

1. The PWB's variance request IS GRANTED, subject to the following conditions:

(a) Watershed control and stewardship

A. All current protections for the Bull Run Management Unit must remain in place.

2. (This provision needs to be re-thought and re-written. This provision is something that is out of the control of PWB, the protections are State and Federally mandated and these may get revised in the future by those entities. The provisions will likely become stricter but the protection would change so according to how this is written since there was a

change even if “positive” in reducing the sources of fecal contamination that would mean PWB is in violation and could lose its variance based on a change.)

B. The PWB must inspect the locations of possible human intrusion at least annually and must make all reasonable efforts to eliminate potential unauthorized entry.

3a. (The minimum set criteria proposed by the OHA of having PWB perform a single yearly inspection to identify and quantify human intrusion along the watershed drainage boundary is insufficient. If one references the PWB’s variance application Chapters 2, and 4, as well as Appendix G.1,2 and F. The PWB is very mute for the most part on human intrusion. If building a case it is not the data you provide it is what you avoid presenting, and instead of PWB saying we only found x-number of non-authorized people during x-year, to make the point of how good their protection surveillance was they instead say nothing, other than human entry is regulated and that x,y,z activities are prohibited. This should raise a flag for OHA to be very specific and prescriptive about this subject given it is human infectious cryptosporidium that is of most concern to protect human health. I would propose that OHA ask for at least 3 inspections along routes and areas where intrusion is known to occur, employing both classic tracking techniques (or remote photo monitoring) as well as set transect monitoring where areas of known intrusion have detailed field data collected. Areas where this in-depth monitoring would likely make the most sense are areas close to the Pacific Crest Trail, or other trail routes and road entrances. This would likely then be followed by a general annual walk the whole parameter of the watershed or part of the watershed as deemed by the OHA.)

3b. (Overall the second section of the statement is too general to be of any constructive use, as OHA has not provided a definition of what “reasonable effort” means. To rectify this the OHA should set what the minimum level of effort it sees as “reasonable” otherwise it is extremely subjective. The State really needs to consider the minimums, as a regulated entity usually only does the bare minimum. Does the OHA mean reasonable effort to equate to, one part time staff ranger checking the watershed, one round the clock staff coverage etc, what about electronic surveyence. In short be specific and set the minimum.)

C. Any human sewage (e.g., portable toilets) must be contained and must be kept at least 200 feet from any water body.

4. (This statement needs much work and thought. It is clear the intent of OHA is to limit exposure of contaminated fecal material into the water but this blanket statement needs critical review. Does OHA mean that any portable toilet can never be within 200 ft of a waterbody? If so which ones, in the Bull Run, in the drainage area feeding a fixed point in the Bull Run, ones that are hydrologically connected, what about locations on very steep slopes etc. Also, does this mean all portable toilets, or just those that are not in transport but are in a fixed “in-use“ designation? How is OHA going to know this information? If

the OHA is not going to commit to random checks of the PWB to ensure this, if not then how does OHA want this information? What should be reported, at what frequency, in what manner etc? If none of these issues get resolved then the OHA is just going to trust the PWB will comply and this does not seem to be in the best spirit of limiting risk and exposure for an accidental spill. For that matter OHA is not even asking for spills to be reported. I encourage the OHA should revisit this topic.)

D. The PWB must inspect the fence around the diversion pool at least annually, and the fence must be kept intact.

5. (I suggest including verb age regarding the intent of the fence, if it is meant to keep out animals, then PWB should show by monitoring that it is successful in doing so.)

E. The PWB must document the results of these inspections in its Annual Watershed Report submitted to OHA each year.

6. (OHA really needs to be specific about what it is they are asking PWB to report on and what needs to be in the report.

b. on-going monitoring

A. The PWB must conduct routine monitoring for *Cryptosporidium*. The monitoring must consist of collecting at least two 50L samples each week, and analyzing the sample for *Cryptosporidium* using method 1623 from a laboratory approved by the EPA to utilize this method.

7.(OHA needs to re-consider this statement as it unintentionally limiting and restrictive beyond what it appears OHA's intent is. First, OHA is telling PWB to collect at least two 50 liter samples. Is OHA concerned about the volume per sample or volume of water assayed per day as PWB as already demonstrated that individual 50 liter samples per the 1623 method is infeasible for several months a year and still comply with method performance recovery goals of 13% for *Cryptosporidium*. The way OHA has wrote this excludes individual samples of less than 50 liters which would then mean if PWB collects a individual sample volumes smaller than 50 Liters it is in violation, thus a simple rewrite of asking for at least 50 liters of raw water volume to be assayed using the 1623 method moves away from single sample size minimums to minimum total combined assay volumes. Second, OHA restricts the type of method the PWB could use for 10 years, this is not a good idea as it excludes improvements to protozoan detections and novel EPA approved methods that are equal or better than Method 1623, it even restricts methods that could be available through the EPA process known as the Alternative Test Proceedure. I suggest OHA rewrite this to allow for advances to microbial testing for methods to be used that pass the Alternative Test Proceedure process or similar processes, other-wise OHA could be making PWB use a test that become obsolete.)

B. If any one sample detects a presence of *Cryptosporidium*, the monitoring frequency must be increased.

8. (I suggest that OHA re-examine the PWB approach to utilizing PCR to help determine

if elevated monitoring frequency is needed, if the sample is confirmed human infectious or not quantifiable (DNA analysis is in-conclusive) then yes increase monitoring is warranted, if however that the sample is confirmed to be not human infectious via DNA analysis at x-percent confidence then no increased monitoring is needed.)

C. Increased monitoring must consist of collection at least four 50 liter samples weekly. Analysis of the samples for Cryptosporidium using Method 1623 must be done by a laboratory approved by the EPA to utilize this method.

9.(See comment 8 about minimum sample size volumes. In review of the PWB proposal, is it OHA's intent to just have 200 liters collected in a week, or does OHA want that volume distributed throughout the week. This is an important question regarding sample design and what the goal OHA wants fulfilled. Does OHA want PWB to sample like they did during their initial data gathering stage of 50 liters of volume a day assayed over 4 days in a week as described in the variance application CH 3.2.2, or just 200 liters in total and not caring if that occurs all in one day or not?)

D. If, while on increased monitoring, another sample detects a presence of Cryptosporidium OHA may revoke the variance. Revocation of the variance will include a schedule for the PWB to install treatment required by LT2.

10. (I think it would do the OHA well to consider how may revoke a variance and shall revoke a variance is conducted. Will OHA have a open public commit period, require a special study etc? It would go a long way if OHA could propose some sort of frame work at the beginning versus doing it on the fly.)

E. The PWB must continue increased monitoring until the running annual average drops below .000075 oocysts/L. When this average is below .000075 oocysts/L .the PWB may resume routine monitoring.

11.(OHA needs to re-check its math against its intent and mentioned concentration goals. Does OHA want a running average, overall average, or yearly only average?

Second as written OHA's request does not make much sense, when you check against the frequency listed in part C of b. ongoing monitoring there appears to be a mismatch.

$0.000075 \text{ oocysts/Liter} = 1 \text{ oocysts per } 13,333 \text{ liters of water assayed}$ is the goal.

Collection of 4 sample volumes at 50 liters only equals to a total of 10,400 liters assayed in a year which results in a concentration of higher than requested of

$0.000096 \text{ oocysts/Liter}.$

So OHA needs to be clear about what it wants. Does the OHA want the annual running average to be below .000075, which means more samples are needed so greater than 4 50 liter volumes is needed in a week, or not? It appears OHA has not really looked at the nuts and bolts of this issue.)

(c.) The PWB must allow OHA or its designee, upon request, access to the watershed, laboratory result and pertinent documents in order to determine compliance with these conditions or for special studies.

12.(This seems fine, but OHA must realize that "special studies" will require more than

just PWB to sign off as being okay to do in the Bull Run Watershed Management Unit per the protections and legal status.

There are other issues with OHA "special studies" one is will OHA actually do any, and two what happens if the results from these special studies is contrary to what PWB presented. OHA gives no indication that there will be any action as a result of these studies, so it seems this provision is meaningless.)

(d.) The PWB must timely notify OHA, Environmental Public Health, Drinking Water Program of any circumstances that may impact any of the above conditions, including but not limited to land management decisions, environmental events or structural changes within or adjacent to the Unit.

13. (I would suggest the OHA to spend much more time quantifying what it is they mean and what they want, as this statement is extremely general. One can infer the intent of OHA is that they want PWB to keep studying their watershed, and areas nearby that might impact *Cryptosporidium* presence in the drinking water but do not give any specifics, so OHA leaves this widely open to interpretation when there should be little. Frankly it is very disappointing that OHA that is tasked with ensuring public health is asking less of PWB in terms of ongoing monitoring, reporting and analysis than what the DEQ asks within Watershed Management Plans for surface water protection and salmon recovery. I would suggest that OHA read the variance section PWB provided regarding expert consultation about what should be done as a start point, and then consult with experts in the field of fecal source tracking.)

14.

(OHA needs to pin down what the minimums are in this statement they have provided as well as provide definitions for those terms. What does OHA mean by adjacent ? Does OHA mean adjacent to be a 3mile buffer about the watershed drainage boundary, or by the Unit boundary? OHA needs to be specific in what they want, does size of impact area adjacent to the Bull Run affect this requirement, I.e does OHA consider impact scaleable or not? If one uses the 3-mile buffer , then the area affected by the Dollar fire would not be considered, is this the intent?)

15. (OHA needs to list what conditions they want PWB to notify them about, as a minimum does OHA want PWB to monitor wildlife, if not why not as that is a component of the argument PWB provided in its "low prevalence" as found in Variance application Chapter 4.2. Perhaps it would be helpful to point out that PWB provided no actual empirical studies of wildlife prevalence within the Bull Run. Perhaps, OHA accepts that the PWB only conducted a "rigorous literature review" (Variance application Chapter 4.2.1) by those knowledgeable of the watershed areas. But can OHA really believe itself and pass a red faced test, by saying that this rigorous literature review based on studies conducted in different states, or 10 years ago, or anecdotally with no actual hard observations within the study area be sufficient for what the actual number of animals (fecal sources) is now and therefore *cryptosporidium* loading each year for the

next 10 years is appropriate? Does OHA want the public to believe that animal populations never change in the watershed from year to year and will not for the next ten years when there is ample literature evidence that small mammal populations can change quite significantly over long and short terms (Tkadlec & Zejda 1998, Huitu et al 2003, Krebs & Myers 1974)? Does this pass scientifically prudent reasoning and methodology of testing a Hypothesis, is this protecting human health? NO, the approach submitted by OHA is a lost opportunity to build upon a good start, and in essence if OHA does not ask for additional wildlife monitoring it will go against scientific thinking of hypothesis checking, and instead accept static reasoning, in metaphor would be like burying one's head in the sand.

16.

(OHA demonstrates lack of understanding regarding the cyclical nature of pathogenesis within populations. Just as wildlife populations vary according to cyclical patterns, so do pathogens within animal populations (this includes humans, and wildlife). PWB has already provided this information in Variance application Chapter 4.2.3.2 with the following references (Craig et al 2007, Atwill et al 1997, Atwill et al. 2004). So OHA by not asking PWB to set forth a logical monitoring program for fecal sources, completely misses the mark, and therefore blinds itself to changes to both fecal sources and pathogen profiles of those sources. If a significant shift of the pathogen profile occurs in the watershed animal population, resulting in *Cryptosporidium* becoming either an endemic pathogen, or a cyclical pathogen which undergoes spikes, how will OHA ensure the health of the served population? Is it better to not know that changes are occurring or to know as much as you can so you can prepare a served population that they may need to boil their water to protect themselves? By leaving the ecological monitoring un-specified, and undefined leaves risk undefined and unknown, hopefully this is not OHA's intent.)

17.

(It is concerning that OHA does not include distributed pathogen monitoring described by PWB as "upstream sites" in the Variance application Chapter 4.4. By omitting additional monitoring throughout the watershed, OHA is asking to be blind to changes to the watershed relying only in the intake raw water samples, I submit this is an incorrect approach. Instead OHA should advocate continued sampling and quantification of pathogen fate and transport throughout the watershed. Without some sort of requirement for an integrated watershed sampling approach OHA seems to advocate PWB to go into the future with no plan on risk mitigation, and to be reactive to situations as they arise, this does not seem to promote reduced risk, only shows the OHA can live with uncertain risk. Given than it would take some time to get a treatment system on board in case big changes occur in the pathogen profile of the raw water, wouldn't it be in the best interest for OHA to ask PWB to be proactive and a bit more prescriptive in detecting changes in watershed/ environmental conditions versus reactive?)

18.

(OHA clearly seems to be unconcerned that the monitoring program as set forth might miss pulses of pathogens introduced during storm events, or other events (See figure 3-6 where PWB shows that Giardia pulsed through the system during a large storm event), and seemingly buys into the Poisson argument that pooling samples across a year to come up with the average daily concentration is equal to that of collecting all the necessary volume on a certain day to achieve that annual average on that particular day and then doing that repeatedly throughout the year. In other words, assaying 50 liters of volume on any day gives you a detection limit of .02 oocysts/Liter for that day's volume, but if you take lots of these samples throughout the year somehow this equals the desired annual target average, but that does not equal 0.000075 oocysts/Liter on any given day. So while I disagree with the approach that EPA and OHA takes on this, it is what their risk assessments have used, but OHA must realize that the detection limitation is real on a daily scale and that on any given day the average concentration can be up to that detection limitation of .02 oocysts/Liter, but has no information for days in which samples were not collected. This should be flagged as a big hole as there is no treatment barrier to ensure pulses of Cryptosporidium are not occurring. It is acknowledged that it is impractical to continuously sample, but there are other avenues available to monitoring. But first, OHA has to recognize that the sampling program is insufficient in monitoring the daily concentration of Cryptosporidium in the drinking water that would be reflective of concentration existing at a UV or Filtration treatment plant. One way to address this would be to monitor for the presence of the pathogen in a human surveillance program of served populations. This would be achieved by actively monitoring the incidence of Cryptosporidium within sensitive/targeted populations that consume drinking water. By directing PWB to participate with Multnomah County to conduct an active surveillance system that would provide much more information than is currently available through the passive system in place. While the system as described by PWB in its Variance application found in Chapter 5.3 is termed "active" it is only a passive system, in that the County health only actively seeks data and is not generating data, it is passive in that it in-itself is not directly "actively" acquiring data for a certain element, so it is a bit of a misnomer that I trust OHA is able to comprehend. And while the surveillance system as described may be good when compared to other health agency monitoring programs, it is insufficient given there is no standardized diagnostic methodology process for patients that seek medical attention for symptoms of diarrheal pathogens. The current system is still subject to physician discretion, and can be heavily influenced by the medical culture among different health agencies within the region and could be cost benefit based. Another problem with passive surveillance is it becomes less powerful when patients seek medical attention when they have multiple symptoms and or health issues, so it is only by sheer chance that a stool analysis (which by the way is very coarse in detection of Cryptosporidium) would be run and if run how does that medical group address medical coding, and how does coding priority handled in a report to the County? PWB is mute on

this fact. Basically a passive system only gives general trends of pathogens for those that actually seek medical assistance and for those pathogens that are near the top of the list for multiple case persons. The benefits of an active system would be that it targets groups, not just sensitive populations like immo-comprised individuals in the Multnomah HIV group, a targeted approach would also include monitoring of underserved populations via using standardized processes and coding methodology. OHA should direct PWB and Multnomah County to form an ongoing communication pathway, institute an active monitoring program, and when spikes of Cryptosporidiosis occurs in the population, this should trigger a change in the raw water monitoring for this pathogen until the County determines through its investigation that the spike in Cryptosporidiosis is not from drinking water.)

19.

(It is very disturbing that OHA seems completely unconcerned with seasonal changes in the Method 1623 recovery. I believe OHA should require that the PWB check the performance recovery "Matrix spike samples" of whatever variant of Method 1623 it is using at a period of not less than monthly. Otherwise, using the minimum sample frequency and performance checks as described in Method 1623, of 1 Matrix spike per 20 field samples, PWB could go 2 and half months between performance checks. This is unacceptable and raises a question if OHA actually has understood the data presented in PWB's own data set, or that of the method employed, in that recoveries could approach zero and that these changes in recovery can happen rather suddenly (Appendix C-pg29 Figure 3) . OHA needs to address this so that there is confidence in the field data.)

20.

(It seems interesting that the PWB did not offer up that human infectious Cryptosporidium has been detected in its raw water in the not so distant past, does OHA not acknowledge this, even though literature states otherwise (LeChevallier et al 2003) ?

21.

(Again, While I agree PWB has stated a case for a Variance, and I support OHA granting the variance, the other all conditions proposed are very poor in quality)

EMIL TKADLEC, JAN ZEJD (1998) Small rodent population Fluctuations: The effects of age structure and seasonality *Evolutionary Ecology* 1998, 12, 191±210

Otso Huitu · Kai Norrdahl · Erkki Korpimäki (2003)
Landscape effects on temporal and spatial properties
of vole population fluctuations
Oecologia 135:209–220

Hoffmann, R.S. (1958) The role of reproduction and mortality in population Fuctuations of voles (*Microtus*).
Ecol. Monogr. 28, 79-109.

Krebs, C.J. and Myers, J.H. (1974) Population cycles in small mammals. *Adv. Ecol. Res.* 8, 267-399.

LeChevallier, Mark, G. Di Giovanni, J. Clancy, Z. Bukhari, S. Bukhari, J. Rose, J. Sobrinho, M. Frey (2003) Comparison of Method 1623 and Cell Culture-PCR for detection of *Cryptosporidium* spp. In *Source Waters. Appied and Enviro. Microbio.*