



Office of Mayor Tom Potter
City of Portland

June 14, 2005

Dear Federal Partner:

Enclosed please find a summary of the City of Portland's assessment of the benefits and costs of the proposed Long Term 2 Enhanced Surface Water Treatment Rule and an explanation of why the City wants to work with EPA to avoid spending its limited local resources on water treatment approaches unlikely to provide significant measurable public health benefit.

This white paper is the result of an effort by a broad group of community stakeholders, including business groups, neighborhood associations, environmental organizations, and public health officials who have raised significant concerns about the costs and mandates of this proposed rule. This paper presents, along with a brief assessment, at least two options as examples of alternate compliance for your consideration.

I thank you for our initial meeting in May, and your willingness to work with us on this very important issue. My desire is that we craft a solution that respects the integrity of the LT2 rule and our mutual responsibilities to protect public health, but also addresses the reality of the cost-benefit situation at our local level. I look forward to the next steps of this process as we work towards finding an appropriate outcome for the City of Portland. Please contact my Deputy Chief of Staff, Austin Raglione (503-823-4799), with any questions or to discuss next steps.

Sincerely,

Tom Potter
Mayor of Portland

**Long Term 2 Enhanced
Surface Water Treatment Rule**

WHITE PAPER

**Tom Potter
Mayor of Portland**

June 2005

City of Portland

**Long Term 2 Enhanced Surface Water Treatment Rule
*White Paper***

TABLE OF CONTENTS

Portland’s Drinking Water Protection: History and Accomplishments 3
Cryptosporidium: Evidence and Results in Portland..... 5
The LT2 Rule and the City of Portland 8
Proposed Alternative Compliance Strategies..... 12
 Approach 1: Add New Risk Bins and a New Microbial Tool Box for Unfiltered Systems 12
 Approach 2: Modify the Other Demonstration of Performance Element of the Existing
 Microbial Tool Box to Apply to Unfiltered Systems..... 16
Conclusion 23
APPENDICES 24

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule *White Paper*

Portland's Drinking Water Protection: History and Accomplishments

The Bull Run watershed has been the primary source of drinking water for the City of Portland water since 1895. Raw water quality is exceptional and was a significant factor in selecting this source for the City in the 1880s. Source water protection has been ensured over the last century by strong City advocacy with its federal watershed management partners. As a result of decades of site-specific federal legislation, the watershed is reserved solely for producing drinking water, is closed to public access and animal grazing, and is required to be managed to protect water quality.

In accordance with the requirements of the 1996 Safe Drinking Water Act Amendments, the City completed a Source Water Assessment for the Bull Run Watershed in 2003.¹ The methodology used for the susceptibility analysis component of the source water assessment highlights three major factors that influence whether or not a particular drinking water source becomes contaminated:

- 1) the occurrence of a facility or land use that releases contamination,
- 2) the location of any such release, and
- 3) the hydrologic and/or soil characteristics in the watershed that allow the transport of the contaminants to the surface water body.

For the purposes of the Source Water Assessment, the Portland Water Bureau designated the entire 102-square mile Bull Run Watershed Management Unit drainage upstream of the intake as a sensitive area that could influence water quality. Within this area, there are no management-related sources of any regulated or unregulated contaminants. The Bull Run source has no facilities or land uses – past or present -- that constitute a source of contaminants to the water supply. Thus, the Bull Run has no susceptibility for anthropogenic sources of contamination.

The Bull Run supply consistently complies with all applicable state and federal regulations for source water under the SDWA. Since the 1991 effective date of EPA's Surface Water Treatment Rule, Portland has continuously met all the conditions necessary to remain unfiltered.

The exceedingly high quality of raw water from the Bull Run is validated by the results of required source water monitoring results for total and fecal coliform. Since 1999, in nearly 1800 samples, there have been no fecal coliform results over 20/100 mL and only two total coliform results over 100/100 mL.

¹ See: <http://www.portlandonline.com/shared/cfm/image.cfm?id=28215>

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule *White Paper*

In addition to performing consistently well on the filtration avoidance total and fecal coliform criteria, minimum treatment targets for the inactivation of *Giardia lamblia* have always been met and no waterborne disease outbreaks have been attributed to the Bull Run source. Annual sanitary surveys of the watershed have been conducted and no significant deficiencies have been identified. All other filtration avoidance requirements, including complying with regulations that are linked to the filtration avoidance determination, such as the Total Coliform Rule and the Stage 1 Disinfectants and Disinfection Byproducts Rule, have been continuously met as well.

The Source Water Assessment indicated that no further changes to the legislative-based protections for the Bull Run watershed are necessary at this time. Protections provided by existing legislation, administrative plans, and Forest Service and City policies collectively comprise a program that far exceeds the state's recommendations for a voluntary-based Drinking Water Protection Plan and arguably establish the Bull Run as one of the most effectively protected sources in the country.

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule White Paper

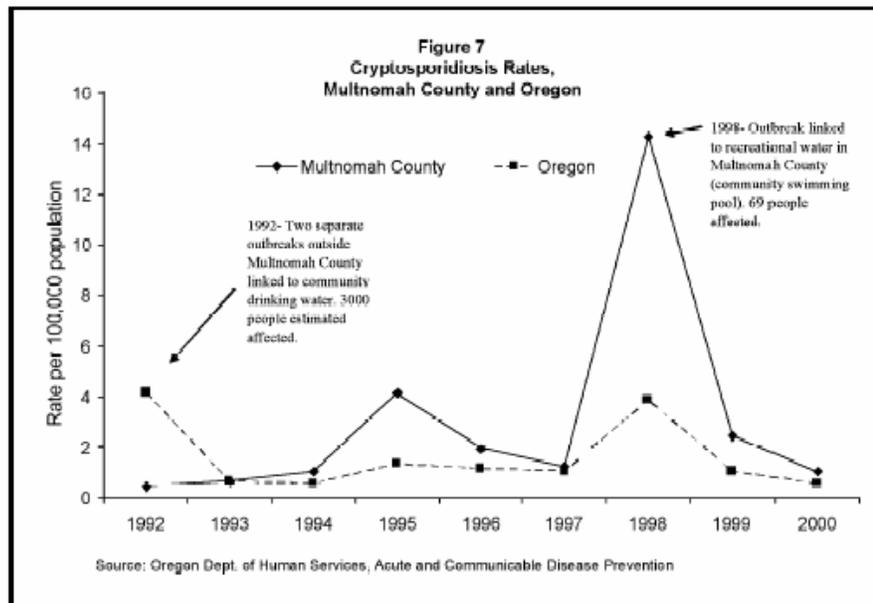
Cryptosporidium: Evidence and Results in Portland

Cryptosporidiosis has been a reportable disease in Oregon since at least the early 1990s. For the reporting period 1994 through 2003 the total number of cases in Oregon was 454, 51% of which occurred in Multnomah County. The state-wide Cryptosporidiosis rate from per 100,000 population **from all sources of exposure** is 1.4, while the Multnomah County rate **from all sources of exposure** is 3.6 per 100,000 population.²

In the drinking water section of its 2003 report “The Environmental Health of Multnomah County,” the issue was described as follows:

“*Cryptosporidium* is another parasite that may be found in a community water supply. Rates for this disease have remained fairly stable since 1992 (see Figure 7 below), and there is no indication that drinking water is contributing to a rise in this disease. There was a fairly large outbreak of about 70 people in 1998, but this has been attributed to a contaminated community swimming pool.”³

Since the Bull Run watershed is closed to human entry and use by domestic animals,



² See <http://www.dhs.state.or.us/publichealth/acd/crypto/agecase.cfm>

³ The Environmental Health of Multnomah County, 2003, page 24. For the complete report see <http://www.mchealth.org/enviroreport/envirohealth.pdf> -- Drinking Water is covered on pages 21 through 25.

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule White Paper

wildlife is the source of any *Cryptosporidium* that might make its way into the Bull Run source. Nearly 15 years of water testing indicate that *Cryptosporidium* is rarely detected in Bull Run water and when it is, it occurs at very low levels. Table 1 compares the results of the monitoring conducted for the Information Collection Rule with over 5 years of monitoring results using EPA improved methods and high volume samples.

| | Information Collection Rule/Supplemental Survey Data Set | Monitoring Results from January 2000 through August 2002 | Monitoring Results from September 2002 through March 2005 (Method 1623 HV) |
|---|--|--|---|
| Number of samples processed | 44 | 69 | 33 |
| Percent of samples where zero oocysts were detected | 82% | 91% | 100% |
| Highest number of oocysts detected in any sample | 3 | 3 | 0 |

These results show that *Cryptosporidium* oocysts cannot be detected in the great majority of all samples analyzed. **Since September 2002, no oocysts have been detected in the 33 samples analyzed.**

These results demonstrate that, even with the substantially improved methods and sampling protocols developed since the Information Collection Rule, no oocysts are present in the Bull Run source. It is worth noting that the since December 2002 through the most recent sampling in March and April this year, samples were collected and analyzed using the new protocols EPA has established for *Cryptosporidium* monitoring for the proposed Long Term 2 Enhanced Surface Water Treatment Rule, and no oocysts were detected in any of these samples.

In summary, state and local public health agencies are well aware of the problem of cryptosporidiosis in our community. They do a thorough job of tracking and investigating pathways of exposure to *Cryptosporidium* when outbreaks do occur. The

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule *White Paper*

rate of cryptosporidiosis disease in Multnomah County from 1992-2004 has been low—2.9 cases per 100,000 population per year overall and 2.1/100,000/year when well-defined outbreaks that are not attributable to local drinking water are excluded. State and local public authorities do not see exposure from Bull Run drinking water as a significant or even measurable source of exposure. Given these facts, it is reasonable to assert that the Portland water system is already achieving EPA's public health goal of no more than 1 case per 10,000 from drinking water and that the system requires no further treatment to ensure that this goal can continue to be reliably achieved.

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule *White Paper*

The LT2 Rule and the City of Portland

In September 2000, following the EPA-led Federal Advisory Committee Act (FACA) process and the resulting Agreement in Principle, the City of Portland made a decision to move ahead with a process to evaluate treatment options for bringing the Bull Run source into compliance with the anticipated requirement to treat for *Cryptosporidium*. The Citizens Panel on Bull Run Treatment was convened in April 2001 and charged with evaluating four technologies that had been identified through the FACA process as applicable to the Bull Run source.

After 18 months of review, in September 2002 the panel concluded “the risk of disease from *Cryptosporidium* is relatively small for Bull Run users.” While it recognized its responsibility to be cautious in interpreting the evidence, the Panel believed that treatment would add only a small degree of safety to the Bull Run water supply – one that probably will not be measurable. The Panel based this belief on three findings:

- 1) the protected nature of the Bull Run watershed, which has eliminated human and bovine sources of *Cryptosporidium*,
- 2) monitoring results that reveal *Cryptosporidium* only at low levels, and
- 3) the absence of epidemiologic evidence of epidemic or endemic transmission of *Cryptosporidium* via Bull Run water.”⁴

As for the public health benefits of the proposed *Cryptosporidium* treatment requirement, Multnomah County Health Officer, Dr. Gary Oxman, an Ex Officio member of the Citizens Panel, has taken a strong stand on the benefits versus costs of the proposed rule. “There are lots of different things we could do in the community with \$60 million to get more measurable health impacts,” he said. “In terms of direct health benefit, it's hard to make the case that we're going to see any reduction in infectious diseases.”⁵

Portland’s citizens and elected officials do not and cannot support investing limited local resources in programs or projects that do not produce measurable results.

Combined utility bills in our community, which include charges for water, wastewater, and stormwater, have risen dramatically during the last decade to support the City’s continuing investments in addressing combined sewer overflows, which has driven Portland’s combined water-wastewater bill to the second highest in the nation.

The costs associated with the proposed treatment requirement are not trivial and are only a part of the costs for ongoing infrastructure maintenance and operation and

⁴ Report of the Citizens Panel on Bull Run Treatment, page 13, September 2002

⁵ The Oregonian, March 4, 2005

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule *White Paper*

capital improvement that Portland rate-payers will face in the years ahead. About 65% of the water system projected \$248 million five-year capital program is focused on capital maintenance and vulnerability reduction projects designed to ensure the water system provides reliable service to the Portland metropolitan area.

Figure 1 gives a good picture the substantial rate-payer impacts resulting from rapidly increasing water-wastewater bills. In real terms, Portland's residential customers have seen their combined utility bills increase by more than 80% in the last decade. During this time sewer and stormwater rates for residential and commercial customers have increased by 120%. Water rate increases for residential customers have been in the neighborhood of 50% while water rates for commercial residential have more than doubled.

Because Portland's residential and commercial utility customers have experienced such rapidly increasing rates, the Citizens Panel looked carefully at rate impacts in its evaluation. The panel members were especially concerned about affordability of combined utility rates for low-income residential customers and the economic impacts of rising combined utility bills for commercial, industrial and institutional customers.

Treatment options evaluated by the Citizens Panel included ultraviolet light, ozone disinfection, direct filtration and membrane filtration. Preliminary estimates for the capital costs for these options were prepared for the Citizens Panel process and ranged from a low of \$55 million for ultraviolet treatment to a high of \$245 million for membrane filtration when the associated supply and transmission costs are included. Annual operating costs for the treatment options are estimated to range between \$5.2 and \$8 million.^{6,7}

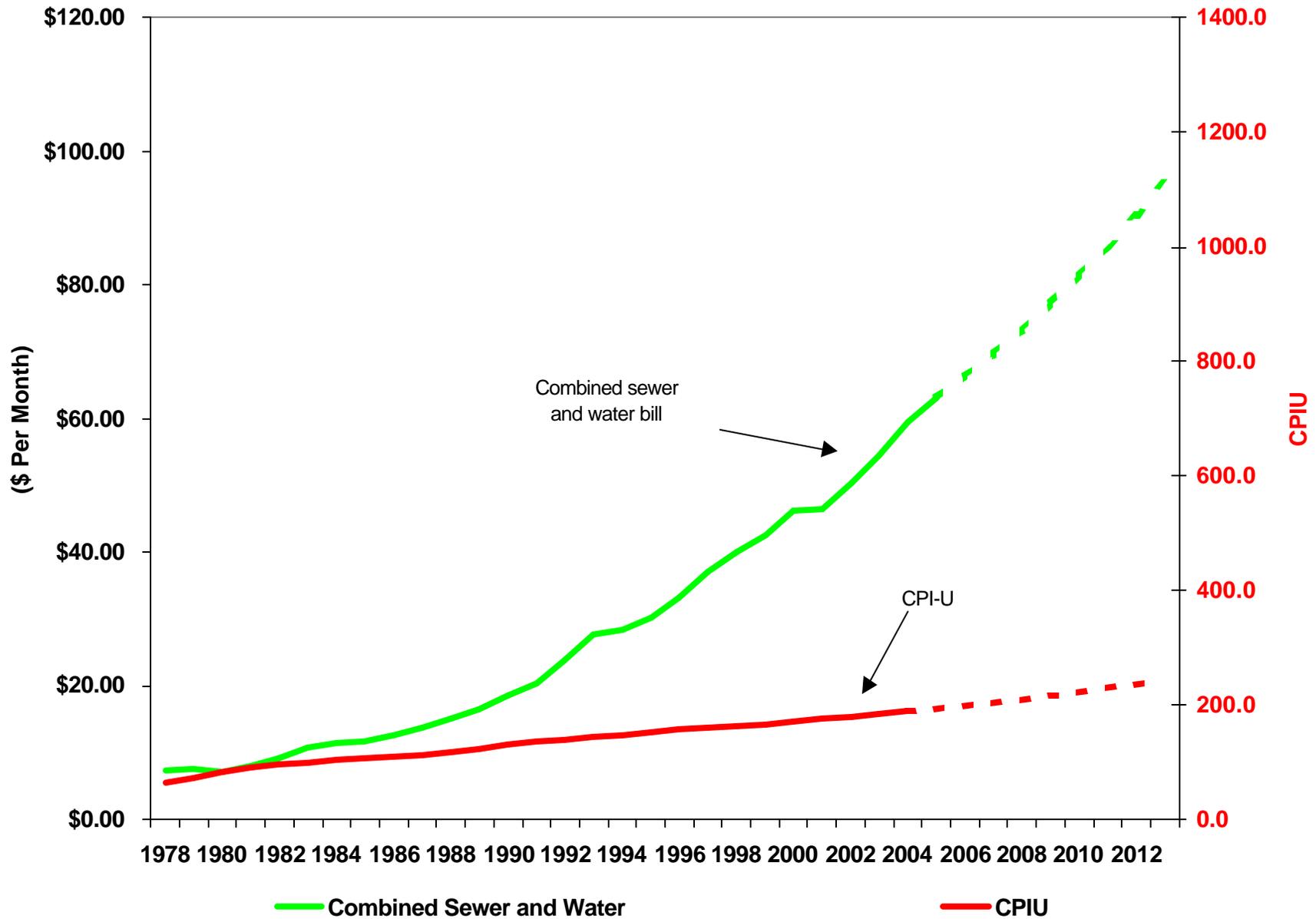
Estimated residential rate impacts of the options from capital spending ranged from about 7% (\$1 per month for UV) to 34% (\$5 per month for membrane filtration and associated transmission costs necessary to deliver water to the proposed facility).

⁶ All costs shown are in 2001 dollars

⁷ See page 19 of the Final Report of the Citizens Panel on Bull Run Treatment, September 2002

Figure 1

Water/BES Average Single Family Bill



City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule

White Paper

It is worth noting that there is considerable concern among Portland's community interests who have been actively engaged in looking at the implications of the proposed LT2 rule that both capital and operating costs for all the treatment options have been underestimated. One source that appears to validate this concern is New York's experience in developing UV for its Catskill-Delaware system. An initial estimate of about \$160 million for the Catskill-Delaware UV system was presented to EPA's Microbial and Disinfection Byproducts FACA in 2000. Based on further work in developing the system, it is currently estimated at about \$600 million.⁸

Portland's commercial and residential rate-payers cannot and should not accommodate additional rate increases without substantial justification that such increases will result in a necessary and demonstrable improvement in public health. Limited public resources can be better invested elsewhere to make significant headway on other public health problems.

Portland's citizens and elected officials feel confident in making this statement based on the conclusions of the Citizens Panel on Bull Run Treatment as well as the substantial comments from a range of interested parties that submitted comments to the federal docket during the August 2003-January 2004 public comment period on the Long Term 2 Enhanced Surface Water Treatment Rule. These include other large unfiltered drinking water systems and the American Water Works Association. Many comments pointed out that EPA's analysis of the benefits and costs was flawed and that compliance costs were systematically under-estimated while public health benefits were systematically over-estimated.

⁸ See page 1 of New York's comments at OW-2002-0039-0516

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule

White Paper

Proposed Alternative Compliance Strategies

In its initial meeting with EPA in May 2005, the City committed to providing some alternative compliance strategies for EPA to consider. Community stakeholders and the Portland Water Bureau have suggested a variety of options, which are grouped into two proposed approaches below. *These approaches are examples of alternative compliance for EPA's consideration*, and the City of Portland looks forward to feedback and further discussion of how any of these options could apply to our water system while still maintaining the integrity of the LT2 rule.

Approach 1: Add New Risk Bins and a New Microbial Tool Box for Unfiltered Systems

Concerns have been raised that LT2 unfairly requires all unfiltered systems to add treatment technology when filtered systems are provided the opportunity to use LT2's Risk Bins and Microbial Tool Box to address site-specific risks. These options propose to address these issues by adding new Risk Bins and a Microbial Tool Box specifically for unfiltered systems.

Proposed New Risk Bins

1) Establish a Bin 1, 'no action' risk bin for unfiltered systems that demonstrate that no oocysts have been detected during the initial monitoring period (HV 1623), which in Portland's case has already concluded. An unfiltered Bin 1 system that demonstrates an absence of oocysts during initial monitoring and maintains state approval for its source water protection and watershed control programs would be considered in compliance with LT2.

2) Establish a Bin 2 for systems who demonstrate an average concentration < 0.075 oocysts using HV 1623. Placement in this bin requires that the system achieve one additional log of inactivation. These systems can use the new toolbox (described below) to achieve the 1 additional log of inactivation.

Unfiltered Systems Toolbox

Enhance the Microbial Toolbox as it applies to Unfiltered Systems by providing log credits for specific components of Watershed Protection/Enhancement in addition to treatment strategies. The FACA agreement articulated that "log credit" was not to be limited to "log removal" (*AWWA Comment, p. 9*). Therefore, EPA has the flexibility to award credit for specific Watershed Protection strategies that promote public health by

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule

White Paper

encouraging source water protection. Implementation of these tools would be the subject of future guidance by EPA.

The following tools are proposed for potential inclusion in the new Unfiltered Systems Toolbox:

1. SEWAGE VULNERABILITY -

Municipal, Agricultural, Industrial - gallons discharged

| <u>Risk:</u> | <u>log credit⁹</u> |
|--|-------------------------------|
| • Not measurable - complete elimination of discharge | 1.0 |
| • Low - discharge of treated sewage | 0.5 |

2. WATERSHED PROTECTION VULNERABILITY -

Human Entry, Cattle Grazing, Recreational Activity

| <u>Risk:</u> | <u>log credit¹⁰</u> |
|---|--------------------------------|
| • Not measurable - complete restriction | 1.0 |
| • Low – limited recreational and agricultural uses, no grazing | 0.5 |
| • Agricultural/domestic animal impact mitigation programs applied | |

3. WATERSHED ENHANCEMENT

For the Bull Run watershed: 86 miles of roads to be decommissioned, other actions to be negotiated with the state primacy agency

| | <u>log credit</u> |
|---|-------------------|
| • Road Decommissioning / Vegetative Strip Implementation: Log credit dependent on slope and soil type, early succession grasses ¹¹ | 1 – 3 |
| • No Logging for 10+ years ¹² | 0.5 |
| • Other Watershed Enhancement strategies that could be considered for credit: Tributary Erosion Control and Secured and Expanded Boundaries ¹³ | |

4. WATER STORAGE / RESERVOIR DETENTION TIME

Using flow-weighted average detention time

log credit¹⁴

⁹ Proposed Log Credit based on EPA/FACA discussions

¹⁰ Proposed Log Credit based on EPA/FACA discussions

¹¹ Proposed Log Credit based on *Atwill et al., Applied and Environmental Microbiology, Nov. 2002, as referenced in AWWA comment, pg. 33)*

¹² Proposed Log Credit Extrapolated from AWWA comment to EPA pp. 31,32

¹³ Suggest 0.5 to 1.0 credits for these, to be negotiated

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule

White Paper

- 60 day 1.0
- 21 day 0.5

5. SYSTEM TREATMENT

log credit¹⁵

Chlorine Followed By Ammonia (Chloramines)

0.5 - 1.0

6. OTHER DEMONSTRATION OF PERFORMANCE

Community stakeholders in Portland have raised ideas about other potential ways that Portland could further validate its source water protection program and confirm that additional treatment is not needed.

Portland is aware that the EPA is exploring the applicability of Hazard Analysis Critical Control Program (HACCP) to distribution system monitoring. Portland could work with the EPA to appropriately apply the HACCP framework to our system to serve as a pilot study for large unfiltered systems.

The HACCP program is a framework that could be used to document that source water, water in storage, and water throughout the distribution system continues to meet performance standards. Under this proposal, multiple checkpoints from the source water and throughout the distribution system would undergo continuous monitoring. This program creates the possibility of cleaner, safer water, not only by monitoring the source water, but allowing the early detection of problems in the distribution or storage systems, such as cross connections, backflow, or storage contamination.

HACCP principles could be implemented for a broad range of testing protocols, such as flow cytometry for organism detection as well as more traditional testing for chemical, microbial, and organics contamination, and testing for pH, turbidity, and conductivity.

Modify the Two Disinfectant Requirement

EPA proposes to require that unfiltered systems use two disinfectants and that each disinfectant by itself meet the inactivation requirements for at least one regulated

¹⁴ Proposed Log Credit based on AWWA comment to EPA p. 26)

¹⁵ Proposed Log Credit based on "Cryptosporidium and Cryptosporidiosis", Foyer, CRC press, 1997, referencing Finch. MWH, 1996

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule

White Paper

pathogen. The justification for this is that multiple barriers are more effective than a single barrier.

Some community stakeholders maintain that a strong watershed control program is a substantial barrier in itself and satisfies the requirement for one of these barriers. Long retention time by itself is equivalent to a disinfection process with regard to *Cryptosporidium*. Downstream addition of one disinfectant (such as chloramines, in the case of Portland) should be recognized as satisfying this requirement.

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule

White Paper

Approach 2: Modify the Other Demonstration of Performance Element of the Existing Microbial Tool Box to Apply to Unfiltered Systems

As is the case for most water systems, the City of Portland's water treatment program is based on a multiple barrier approach. However, unlike many utilities where the barriers are physical removal through filtration and inactivation through disinfection, Portland's multiple barrier strategy combines a high degree of source water protection with disinfection. The underlying premise of Portland's 110 year-old strategy is that you don't have to worry about taking out of the water supply things that you don't allow to get into the water supply in the first place. And, arguably, the Bull Run watershed is among the top two or three most protected watersheds in the country if not the world.

One of the major innovations of Long Term 2 Enhanced Surface Water Treatment Rule (LT2) is that it is a risk-based rule. This innovation is designed to reduce the national cost of compliance by focusing on requiring treatment improvements on only those systems with significant identified risks.

Portland seeks the opportunity to fully develop this risk-based approach in determining treatment requirements for the Bull Run source. Although low levels of *Cryptosporidium* oocysts have been occasionally detected in the Bull Run source, Portland believes that it can specifically demonstrate that, due to the effectiveness of its watershed control program, additional treatment of the Bull Run source is not required to meet EPA's public health risk reduction goal. The City believes LT2's Microbial Toolbox provides a vehicle for it to evaluate real, site-specific risk.

The last item in the Microbial Toolbox is "Other Demonstration of Performance." The basic premise of this element is that water systems will be allowed to achieve compliance using approaches that can be shown to provide an equivalent level of public health protection. In its proposed rule EPA says:

"The purpose of the 'demonstration of performance' toolbox component is to allow a system to demonstrate that a plant, or a unit process within a plant, should receive a higher *Cryptosporidium* treatment credit than is presumptively awarded under LT2."¹⁶

EPA goes on to say that its proposal

"...allows a State to award a higher level of *Cryptosporidium* treatment credit to a system where the State determines, based on site-specific testing with a State-

¹⁶ Federal Register / Vol. 68, No. 154 / Monday, August 11, 2003 / Proposed Rules, page 47714

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule

White Paper

approved protocol that a treatment plant, or unit process within a plant, achieves a higher level of *Cryptosporidium* removal on an ongoing basis.”¹⁷

Although these quotes make specific reference to “treatment plants, or unit processes in plants,” in Portland’s case, source water protection is an integrated part of the City’s treatment process with a long history of successful, reliable performance. The City believes that it can use the Other Demonstration of Performance tool to validate the effectiveness of its source water protection program and demonstrate that additional treatment for the Bull Run source is not needed to achieve EPA’s public health risk reduction outcome.

Potential Approaches to Demonstrating Performance

The City believes that there are a variety of ways it might use the Other Demonstration of Performance element of the Microbial Toolbox to show that its public health protection programs are effective against Cryptosporidiosis. A specific concept for one approach that could be considered is presented here.

Should the proposed Long Term 2 Enhanced Surface Water Treatment Rule be modified to provide the opportunity the City seeks, its first task would be to partner with representatives of state and local public health agencies and, very likely, an academic institution to consider more fully study designs. The purpose of the effort would be to develop a credible study that would look at disease levels and potential sources of disease and determine what steps, if any, are needed to protect public health.

A Study Design Concept Focusing on the Importance of Infectivity in the Microbial Risk Assessment

The following is an example of how the City could focus its effort to demonstrate the performance of the Bull Run source water protection and watershed control programs. This demonstrated performance would be used as the basis for determining whether the City meets proposed modified requirements of the Long Term 2 Enhanced Surface Water Treatment Rule.

Based on the very low level of local occurrence of Cryptosporidiosis from all sources, the City believes, in general, that EPA’s microbial risk assessment substantially over-estimates the infectivity of *Cryptosporidium* oocysts found the natural environment and dramatically overestimates the level of disease in the Portland metropolitan area that results from consuming Bull Run water.

¹⁷ Federal Register / Vol. 68, No. 154 / Monday, August 11, 2003 / Proposed Rules, page 47714

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule

White Paper

The potential implications of assessing the infectivity of *Cryptosporidium* oocysts found in nature on the risk of disease among consumers exposed to low levels of these organisms is significant. Although EPA concluded after evaluating the results of human feeding studies conducted in 1995 and 1999 that

“...the probability of infection at low *Cryptosporidium* concentrations may be about 20 times as great as previously estimated,”¹⁸

EPA also acknowledged that

“It is unknown how well the oocysts used in the feeding studies represent *Cryptosporidium* naturally occurring in the environment, and the analyses do not fully account for the variability in host susceptibility and the effect of previous infections.”¹⁹

Based on our understanding of the observed patterns of *Cryptosporidium* disease in our community, the City’s hypothesis is that organisms found in Bull Run are substantially less infective than those used for the human feeding studies. The City believes that the site-specific monitoring and testing program it has outlined below will document this fact. Site-specific data could then be used to repeat EPA’s risk analysis for the Portland system and establish more realistically the level of risk to local water consumers. The City will seek to “demonstrate the performance” of its source water protection and watershed control programs by performing a site specific risk analysis that documents that the risk of disease from the Bull Run source is less than or equal to 1 in 10,000 per year.

An example plan for establishing site-specific real risk for the Bull Run source would involve three parts:

1. Initiation of active disease surveillance in the Portland water service area. Elements of the program could include some or all of the following:
 - Mandatory reporting of Cryptosporidiosis (already required by the State).
 - Active surveillance for Cryptosporidiosis by, for example, enhanced laboratory reporting, creating a sentinel health care provider network, and performing epidemiological investigations of diarrhea.

¹⁸ Federal Register / Vol. 68, No. 154 / Monday, August 11, 2003 / Proposed Rules, page 47652

¹⁹ Federal Register / Vol. 68, No. 154 / Monday, August 11, 2003 / Proposed Rules, page 47652

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule

White Paper

- Consideration of applying or working with an already operating Hospital Syndromic Surveillance. This type of program involves daily collection of patients' reasons for seeking care from local hospitals (in this case, diarrhea); results are then evaluated to detect an unusual increase in the prevalence of illness.
2. Initiation of two kinds of intensive monitoring and testing any *Cryptosporidium* found in the watershed for *infectivity* using state of the art techniques such as cell culture and polymerase chain reaction techniques. This could involve water sample collection in Bull Run tributaries rather than at headworks, as well as collection and assessment of animal fecal material and stool sampling from trapped and anaesthetized animals, particularly larger animals such as bear, deer, elk, or cougar. The latter may have ranges larger than the Bull Run Management Unit and therefore be exposed to more infectious strains of *Cryptosporidium* than smaller animals that are likely to live their entire lives within the watershed.
 3. Evaluation through modeling of the hydrodynamics of the Bull Run supply to assess the influence of tributary contribution and/or reservoir short-circuiting on potential delivery of organisms of concern to the water system intake.

The City would propose to use the initial 3 years of the proposed LT2 compliance timeframe (which has been allocated for site specific monitoring) to implement the three types of site specific risk assessment efforts described above.

During the first 6 months of this period, the City's proposal would be reviewed, refined, and adopted by the State (and probably EPA).

The next 2 years would be dedicated to implementing the monitoring program. The final 6 months would be used to analyze the data and "demonstrate performance."

If the data collected and analyzed indicates that the City can achieve the desired level of public health risk reduction that EPA has established without additional treatment, the City's current treatment regimen would be deemed to be in compliance with the requirements of any final version of LT2.

Text of Proposed Modifications to the LT2 Language Needed to Provide the City with an Opportunity to Pursue its Demonstration of Performance Approach to Compliance

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule

White Paper

The text changes necessary to provide the opportunity the City of Portland seeks to demonstrate that the Bull Run source can achieve EPA's established public health risk level without treatment are actually relatively minor.

Changes would need to be made in two places: Section IV C 2 and Section IV C 17 would need to be amended as suggested below:

2. Watershed Control Program²⁰

a. What is EPA proposing today?

EPA is proposing a 0.5 log credit towards *Cryptosporidium* treatment requirements under the LT2ESWTR for systems that develop a State approved watershed control program designed to reduce the level of *Cryptosporidium*. The watershed control program credit can be added to the credit awarded for any other toolbox component. However, this credit is not available to unfiltered systems, as they are currently required under 40 CFR 141.171 to maintain a watershed control program that minimizes the potential for contamination by *Cryptosporidium* as a criterion for avoiding filtration. Unfiltered systems may establish site-specific performance of their watershed control program under the provisions of the Demonstration of Performance element of the Microbial Toolbox, by demonstrating that, as a result of the level of protection and control in its watershed, it meets the microbial risk reduction goal of no more than 1 instance of Cryptosporidiosis per 10,000 people served without treatment.

17. Other Demonstration of Performance²¹

a. What is EPA proposing today?

The purpose of the “demonstration of performance” toolbox component is to allow a system to demonstrate that a source, plant, or a unit process within a plant, should receive a higher *Cryptosporidium* treatment credit than is presumptively awarded under the LT2ESWTR. For example, as described in section IV.A, plants using conventional treatment receive a presumptive 3 log credit towards the *Cryptosporidium* treatment requirements in Bins 2–4 of the LT2ESWTR. This credit is based on a determination by EPA that conventional treatment plants achieve an average *Cryptosporidium* removal of 3 log when in compliance with the IESWTR or LT1ESWTR. However, EPA recognizes that some conventional treatment plants

²⁰ Federal Register/Vol. 68, No. 154/Monday, August 11, 2003/ Proposed Rule, page 47682 - 83

²¹ Federal Register/Vol. 68, No. 154/Monday, August 11, 2003/ Proposed Rule, page 47714 -15

Long Term 2 Enhanced Surface Water Treatment Rule

White Paper

may achieve average *Cryptosporidium* removal efficiencies greater than 3 log. Similarly, some sources or systems may achieve *Cryptosporidium* reductions with certain toolbox components that are greater than the presumptive credits awarded under the LT2ESWTR, as described in this section (IV.C).

Where a system can demonstrate that a source, plant, or a unit process within a plant, achieves a *Cryptosporidium* reduction efficiency greater than the presumptive credit specified in the LT2ESWTR, it may be appropriate for the system to receive a higher *Cryptosporidium* treatment credit. Today's proposal does not include specific protocols for systems to make such a demonstration, due to the potentially complex and site specific nature of the testing that would be required. Rather, today's proposal allows a State to award a higher level of *Cryptosporidium* treatment credit to a system where the State determines, based on site-specific testing with a State-approved protocol, that a source, treatment plant or a unit process within a plant reliably achieves a higher level of *Cryptosporidium* removal on a continuing basis. Also, States may award a lower level of *Cryptosporidium* treatment credit to a system where a State determines, based on site specific information, that a source, plant or a unit process within a plant achieves a *Cryptosporidium* removal efficiency less than a presumptive credit specified in the LT2ESWTR.

Systems receiving additional *Cryptosporidium* treatment credit through a demonstration of performance may be required by the State to report operational data on a monthly basis to establish that conditions under which demonstration of performance credit was awarded are maintained during routine operation. The Toolbox Guidance Manual (USEPA 2003f) will describe potential approaches to demonstration of performance testing. This guidance is available in draft in the docket for today's proposal (<http://www.epa.gov/edocket/>).

Note that as described in section IV.C, today's proposal allows sources or treatment plants to achieve additional *Cryptosporidium* treatment credit through meeting the design and/or operational criteria of microbial toolbox components, such as combined and individual filter performance, presedimentation, bank filtration, two-stage softening, secondary filtration, etc. Sources or plants that receive additional *Cryptosporidium* treatment credit through a demonstration of performance are not also eligible for the presumptive credit associated with microbial toolbox components if the additional removal due to the toolbox component is captured in the demonstration of performance credit. For example, if a plant receives a demonstration of performance credit based on removal of *Cryptosporidium* or an indicator while operating under conditions of lower finished water turbidity, the plant may not also receive additional presumptive credit for lower finished water turbidity toolbox components. This demonstration of performance credit does not apply to the use of chlorine dioxide, ozone, or UV light, because today's proposal includes

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule

White Paper

specific provisions allowing the State to modify the standards for awarding disinfection credit to these technologies. As described in section IV.C.14, States can approve site-specific CT values for inactivation of *Cryptosporidium* by chlorine dioxide and ozone; as described in section IV.C.15, States can approve an alternative approach for validating the performance of UV reactors.

City of Portland

Long Term 2 Enhanced Surface Water Treatment Rule

White Paper

Conclusion

In creating the Microbial Toolbox, members of the EPA FACA wanted to include a variety of approaches to achieving compliance, and wanted to include some non-traditional strategies along with the more traditional measures. The microbial toolbox is intended to provide flexibility for systems to pick methods best suited to local conditions and ways to achieve compliance as cost effectively as possible.

The quality and level of protection of the Bull Run source of supply are unique among the hundreds of surface water sources in the country. The estimated cost of complying with LT2 as proposed, even by using the “low cost” option of adding UV disinfection, would still require Portland ratepayers to invest tens of millions of dollars for a benefit that is widely acknowledged to be immeasurable. The City believes it is prudent to pursue all available options prior to making any such low-value public investment with highly constrained local resources. Its position is that further development of an alternative compliance option, such as one suggested in this paper, is reasonable, credible, and highly likely to achieve the intended purpose of demonstrating that water consumers in Portland are adequately protected from *Cryptosporidium*.

APPENDICES

Community Letters of Support for Regulatory Relief from LT2

City of Portland Council Resolution, March 2, 2005

Historical Portland Correspondence on LT2