



Oregon Citizens' Utility Board

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July 11, 2017

To: Portland Utility Board (PUB)
cc: Gabe Solmer, Portland Water Bureau (PWB)
Todd Lofgren, Office of Commissioner Nick Fish
From: Janice Thompson, Oregon Citizens' Utility Board (CUB)
Re: Invited testimony regarding revocation of *Cryptosporidium* treatment waiver

CUB is still collecting information and assessing options to develop our recommendation on how the City of Portland should address the revocation of Oregon Health Authority's (OHA) *Cryptosporidium* treatment waiver. This memo, therefore, only discusses observations and questions currently under consideration by CUB. Also, the findings in this memo may change and new questions may be posed once all requested information has been thoroughly reviewed.

Groundwater Backup is Inadequate to Meet Summer Water Demand if a Forest Fire Causes a Turbidity Event that Shuts Down or Significantly Reduces Use of Bull Run Water

- PWB's groundwater well capacity ranges from 71 to 88 MGD (see Section C of the table on the last page) and is not adequate to meet the 122.8 MGD demand that is the recent five year average of summertime water use demand (see Section B on the last page). PWB has confirmed this observation.
- Thus far, turbidity events that have shut down or reduced use of Bull Run water have only occurred in the winter (see top of Section A of the table on the last page) and groundwater capacity is adequate to meet winter time water use demand (see Sections B and C on the last page.)
- The question, then, is what happens if a turbidity event that reduces or shuts down use of Bull Run water occurs during the summer when groundwater capacity cannot meet that season's water demand? Presumably, PWB would implement water use restrictions and the economic impact of such restrictions merit careful consideration when evaluating the cost of filtration treatment that addresses turbidity more effectively than UV treatment. Three follow up questions from CUB to PWB are:
 - What analysis has been done, by either PWB or another entity, of the economic costs of water use restrictions due to possible summer time water shortages?
 - What assessment has been done of possible equity disparities regarding the impact of water use restrictions?
 - How are possible water shortages addressed in agreements with wholesale customers?
- It is also important to note that water use in Portland has significantly decreased in the last decade. This means that effective water use reduction strategies in other parts of the country, such as lawn watering restrictions or bans, may not be as applicable in Portland.

(CUB's fire risk questions posed to PWB in our June 26 memo were not answered in time to be factored into this document so there may be changes or additions to the following information in future analysis by CUB.)

- Forest fires typically occur during the summer.

- A forest fire in the Bull Run Watershed could trigger a turbidity event due to increased runoff from burned ground, loss of the erosion control value of vegetation, possible landslides due to vegetation loss or damage, and/or ash.
- A fire does not have to be a catastrophic event to trigger significant turbidity. For example, I recall Mike Stuhr saying at the June 27 Council Work Session that a significant summertime turbidity event could result from even a small fire at a problematic location. There is evidence that it has been approximately 350 years since the last catastrophic fire in the Bull Run watershed. That relatively rare and infrequent event, however, must not be viewed as the only fire risk factor.
- UV treatment does nothing to address turbidity which means that treatment method does not address summer time turbidity risks due to forest fire.
- Filtration does address turbidity and provides significantly more protection than UV in addressing summer time turbidity risks due to forest fire.
- Filtration treatment facilities can be overloaded by extremely high turbidity levels; however, the likely response would be reduced production and not a complete shutdown of the filtration plant and use of Bull Run water. Reduced production during any season seems readily addressed by back up use of groundwater. Groundwater capacity if a filtration overload caused a shutdown during the winter should be adequate. A summer time filtration overload shutdown event would be more challenging, however, in terms of groundwater capacity. Nevertheless, there is zero likelihood that groundwater back up will be adequate to address any size turbidity event that affects Bull Run water availability if UV treatment is selected.

Fire Risk and Climate Change-Updated Assessment is Imperative

(CUB's fire risk questions posed to PWB in our June 26 memo were not answered in time to be factored into this document so there may be changes or additions to the following information in future analysis by CUB.)

- CUB finds the 2009 discussion of fire risks by the City Council to have been inadequate. However, even if that discussion was adequate, heightened attention to fire risk is now imperative due to advancements in the last eight years regarding evaluation of the impact of climate change on forest fires.
- For example, the following are excerpts from *Third Oregon Climate Assessment Report, January 2017, Oregon Climate Change Research Institute*, http://www.occri.net/media/1042/ocar3_final_125_web.pdf
 - Page 20: The 2015 fire season was the most severe in the Pacific Northwest's recorded history with more than \$560 million in fire suppression costs (Sexton et al., 2016).
 - Page 55: Under future climate change, wildfire frequency and area burned are expected to continue increasing in the Pacific Northwest (Barbero et al., 2015; Sheehan et al., 2015) (fig. 5.2).
- This climate change related fire risk information underscores the need for more thorough consideration of the need for treatment that addresses summer time turbidity events when groundwater supplies are inadequate to meet summer water demand.

Five Year UV Treatment Timeline vs Ten Year Filtration Treatment Timeline Should Not Be Governing Factor in Treatment Option Selection

- Implementation of UV treatment will take five years while implementation of filtration is expected to take ten years. CUB believes that choosing UV treatment rather than filtration

treatment should not be driven by the five year difference in implementation timelines. Our rationale for this belief is based on the following factors:

- The implementation schedule outlined in the LT2 rule when it was adopted in January 2006 included a compliance timeline of up to eight years. This compliance timeline included water testing requirements but no other interim mitigation steps. Of course, it is impossible to know, but it seems that a ten year implementation timeline for PWB to build a filtration plant could have passed muster with regulators after 2006 given the pristine nature of the Bull Run watershed. After all, OHA agreed to the *Cryptosporidium* treatment variance. To be clear, CUB doesn't think that seeking the *Cryptosporidium* treatment variance was inappropriate; rather this historical review is presented here as a counterpoint to thinking that a five year implementation timeline is essential.
- Testimony on June 27 by Dr. Paul Lewis, Multnomah County Health Officer, indicated no increased occurrences of *Cryptosporidium* related health problems linked to discovery of oocysts in water tests in early 2017. A brief conversation with Dr. Lewis indicated that the lack of any increased human disease despite the frequent detection of oocysts in January and February 2017 makes him confident that the longer timeline needed for filtration poses minimal additional risk to the public. However, CUB suggests further consultation with public health resources on this point.
- The PWB water testing regime required under the OHA variance (that would presumably continue during post-variance implementation) appears to be at least as rigorous as what was required during the LT2 compliance timeline.
- Between now and completion of a treatment plant, possible future discoveries of *Cryptosporidium* oocysts would likely occur during the winter when rainfall amounts and storm intensity are greater compared to other seasons. Such test results could be addressed by temporarily replacing or reducing use of Bull Run water with groundwater since that back up option is adequate to meet winter time water demand. This has been demonstrated during past turbidity events. In this context, though, it is more important to note that this effective use of groundwater was demonstrated by the 30 day shutdown of Bull Run water earlier this year due to the *Cryptosporidium* oocyst occurrences.
- There may be other reasons to select UV treatment rather than filtration but, barring any further information from PWB, the information above outlines the rationale for CUB's firm belief that the shorter UV treatment implementation timeline compared to the filtration treatment timeline should not be a governing factor in Portland's decision making process.

City Council Process Improvements

- The information in the prior section is such that CUB is considering sending a letter to OHA recommending that they give the City Council two additional months to make its treatment decision. This timeline adjustment would still allow Portland and OHA to sign a treatment agreement before the end of 2017. After all, that would have been the revocation timeline if the number of oocysts found earlier this year had only been reached after monitoring at the end of the 2017.
- Improvements in the input and analysis process by the City Council would be facilitated by an additional two months in the OHA revocation timeline. Of particular concern, is meaningful engagement with Portland's two public utility oversight groups; PUB, the

internal oversight entity, and CUB that provides outside, independent oversight. A major Blue Ribbon Commission recommendation was for the City Council to take steps beyond what could be put in ordinance to ensure that oversight entity input could be robust and timely. For example, this is why PUB and CUB participated in public utility budget work sessions.

- Regarding CUB, meaningful involvement in the June 27 work session on this topic was not possible, though we did send a memo in advance outlining suggested questions and concerns. However, it was only feasible to send that memo on June 26.
- As stated in the introduction to this memo, CUB didn't receive requested information from PWB in time for meaningful analysis in preparation of this invited testimony to PUB and there are additional questions posed in this memo.
- CUB can provide analysis and recommendation in time for the Council's August 2 session. However, in our view that does not provide enough time for Council to make any meaningful adjustments in the resolution based on August 2 testimony, before the scheduled August 11 vote. After all, the Council vote is not on a "yes" or "no" question; rather it is on a "what to do" question of considerable complexity.
- Possible process improvements to ensure adequate input from the City's public utility oversight system include:
 - August 2 public hearing, followed by the second hearing in three to four weeks. This time frame allows more time for communication between the Council and its oversight partners as well as possible additional analysis by PWB and preparation of amendments.
 - August 2 public hearing, followed by a work session that includes CUB (and PUB if they are interested) with adequate time for our meaningful involvement, followed by a second hearing on a timeline that allows for preparation of possible amendments and additional analysis by PWB.
- Even if an OHA extension and the suggestions above are not feasible, City Council consideration of other options to ensure meaningful input from its own public utility oversight system is recommended

Hybrid Scenario: UV Treatment First Then Filtration in 25-30 Years and UV Plant Location

- CUB is troubled by the hybrid scenario to build a UV treatment facility in 5 years with subsequent replacement by a filtration plant in 25 to 30 years when a UV facility would require major renovation. We have three reasons for concern about this hybrid scenario:
 - As discussed in the previous section, the five year implementation time line should not be a governing factor in decision making.
 - It seems problematic to assume that there will be the political will to set aside dollars or direct that PWB's rate stabilization account be managed in a manner to enable expenditures in 15 to 20 years to begin filtration plant planning and design work. That timeline is needed for construction to be complete in 25 to 30 years and ensure a seamless transition from UV to filtration treatment. In other words, planning for a filtration plant can't begin when the UV facility requires its major overhaul in 25 to 30 years. CUB's pessimism about political will is unfortunate, but it is based on recognizing the challenging City Hall dynamics regarding treatment decision making and the vulnerability for current Council decisions to be reversed in the future. For example, the City Council in 2009 did not recommend setting aside dollars for treatment construction in the event that the *Cryptosporidium* treatment variance was

either revoked or not renewed. Finally, just as the current Council urging action by a future Council is challenging, effective monitoring of this kind of “do this in the future” approach is challenging for oversight groups.

- Meeting the five year timeline for UV treatment implementation at the estimated \$105 million cost is based on siting that facility at Headworks. There are valid reasons for that location linked to access at Headworks to all three conduits but more analysis of UV location options is prudent.
- If a UV treatment is to be a stepping stone to filtration treatment, the possible advantages of the UV plant in the Lusted Hill area compared to a Headworks location should be reviewed. This location assessment even seems prudent if UV only is selected by the current Council because a filtration plant might still be needed in the future in the event of a Bull Run fire at a location or severity such that there are major and ongoing turbidity issues. For these reasons, CUB has begun a draft pros and cons table below and requests an accuracy check and additional discussion on this topic from PWB.

UV at Headworks		UV at Lusted Hill/Outside of Watershed	
Pros	Cons	Pros	Cons
Site specific planning has been done	Higher cost of construction in Bull Run	Lower cost of construction compared to Bull Run, though there are still Multnomah County environmental considerations in Lusted area	No planning specific to Lusted Hill site has been done
Permits obtained			No permits obtained
Three conduits are accessible in one location and serve as clearwell		Moving conduits would be required for filtration plant, taking that step for UV plant would mean wholesale customers would begin payment earlier for that portion of capital improvement related to filtration plant	One or more conduits would need to be moved
Possible re-use of UV building but more details needed		At the conduit and clearwell construction portion of that additional \$125 million would be needed by the filtration plant so why not do this work earlier in terms of an earlier timing of when wholesalers contribution would begin	Cost increase compared to Headworks is \$125 million

- Implicitly, this hybrid scenario seems to concede that filtration treatment is the preferred approach. Temporarily setting aside financial considerations, CUB agrees with this implicit view on the superiority of filtration over UV treatment. This is due to filtration addressing a far broader range of risks, and generally providing improved system resiliency that will serve Portland water customers far into the future.
- In regard to the superiority of filtration over UV treatment it is worth noting that PWB’s 2009 compendium of answers to City Council treatment questions included filtration support statements from both the Water Managers Advisory Board (WMAB) and PUB’s precursor internal oversight group, the Public Utility Review Board (PURB):
 - WMAB supported “the recommendation for filtration of the Bull Run supply as a means of providing improved reliability and consistently high quality from this regional resource.”

- PURB supported the parallel track approach of seeking a *Cryptosporidium* treatment variance while beginning treatment design work. Regarding treatment they said: “We concur with the 2002 Citizen Treatment Panel in favoring filtration as the treatment technique.”
- In general, serious consideration should be given to not paying even \$105 million for a relatively short-lived UV treatment plant, if the plan is to replace it with a filtration facility.

Rate Impacts Analysis

CUB has not had time for detailed review of rate impact analysis done by PWB of UV treatment only, filtration at \$500 million, or UV plus which assumes UV located at Headworks. Initial thoughts though are:

- It is prudent to assess the financial impacts of the high estimate for the filtration plant, but seeing the rate projections at the low estimate of \$350 million is also requested.
- Is it possible to build the filtration plant in stages? Discussion of this possibility either in combination with UV treatment on a permanent basis or as a stepping stone from UV to treatment only using filtration is requested.
- Pending the requested discussion with PWB of CUB’s draft pros and cons table outlined above, CUB may also seek a rate impact analysis of a UV plus at Lusted.

Groundwater and Total Water Use Data from PWB - Compiled by CUB

Section A - GW USE HISTORY				
Reasons for GW use	dates	total days	total volume in BG* (billion gallons)	range of daily production in MGD (million gallons per day)
<u>Bull Run turbidity</u>	Feb 25 1986	22	1.20	21-84
(flood and turbidity)	Feb 7 1996	8	0.50	4.9-86.6
(rain on snow)	Dec 28 1998	5	0.35	29-93.6
(flood and turbidity)	Nov 25 1999	19	1.50	19-89
(not full Bull Run shutdown)	Jan 29 2004	4	0.04	18.4
	Nov 7 2006	14	1.10	27.8-92.2
	Nov 13 2008	9	0.65	27.4-96
	Jan 16 2011	17	1.30	8.5-88.7
(landslide in Jan 2012 = two turbidity spikes that caused a shutdown in Jan & reduced conduit flow in Feb. This landslide inspected by air in 2016 & no signs of further large-scale sediment movement)	Jan 21 2012	11	0.82	18-83.6
	Feb 23 2012	5	0.22	23.6-52.4
<u>Landslide - conduit damage</u>	Nov 28 1995	27	0.07	5.1-29.8
<u>Supply augmentation</u>	July 20 1985	19	0.38	21
	Sept 4 1987	88	0.53	28-86
	Aug 7 1990	23	0.22	4.7-14
	Aug 17 1992	45	1.50	17-30
	Aug 2 1994	73	2.50	2-36
	Sept 4 1996	27	0.70	13-31
	Aug 9 2000	41	1.70	10-36
	Oct 8 2001	12	0.44	6.9-45.8
	July 22 2003	63	3.70	20.8-72.6
	July 27 2004	29	1.01	36.5
	Aug 14 2006	78	3.58	4.5-72
	June 25 2007	60	1.44	7.7-87.1
	Sept 28 2007	13	0.43	18.3-36.4
	Sept 28 2009	31	1.10	36
	July 16 2015	112	5.30	21-68.5
<u>Maintenance Operation</u>	Aug 18 2008	6	0.003	4.7-6.4
	Aug 5 2009	7	0.03	4-5
	Aug 9 2010	6	0.03	4.1-5.4
	Aug 9 2011	6	0.03	0-22.3
	Aug 6 2012	18	0.03	0-5
	July 30 2013	7	0.03	0-5
	July 25 2016	17	0.28	2.8-18.4
<u>Augmentation during Conduit Repair and Maintenance Operation</u>	July 1 2014	9	0.12	0-27.8
	June 11 2015	19	0.49	9-51
<u>Crypto and maintenance</u>	Feb 13 2017	30	2.39	33-83
*approximate values until 2011				

**Section B
WINTER & SUMMER
TOTAL WATER USE**

**Section B -1
winter (Nov-Mar)
flow average
84.8 MGD
5 year average
FY 10-11 - FY 14-15**

**Section B -2
summer (June-Sept)
flow average
122.8 MGD
5 year average
FY 10-11 - FY 14-15**

source: Table 3
FY 2014-15 Statistical
Summary

**Section C
Cumulative GW
Production Well Yields
Reliable Rate of Use
30 day yield- 88 MGD
30-90 day yield - 80 MGD
90-151 day yield - 71 MGD**
source: Table 21
FY 2014-15 Statistical
Summary

Source: PWB Development and Use of Groundwater - <https://www.portlandoregon.gov/water/article/344756>
Winter 2012 event description is from December 2016 Annual Watershed Control Program Report