Portland City Council
Work Session

LT2 Variance Revocation: Next Steps

Portland Water Bureau
June 27, 2017
Goal

Obtain Council direction to address Oregon Health Authority's announced revocation of the Portland Water Bureau’s Cryptosporidium treatment variance.
Bull Run Watershed

• Portland’s primary water source
• Fed by gravity to the distribution system
• High-quality unfiltered supply with minimal treatment
• Watershed protection is the first line of defense in a multiple-barrier approach to public health protection
Existing Treatment Systems

- Watershed protection
- Chlorine and ammonia
- Corrosion control
Regulatory Landscape

• EPA – Long Term 2 Enhanced Surface Water Treatment Rule (LT2)
  • Designed to “reduce illness linked with the contaminant Cryptosporidium and other disease-causing microorganisms in drinking water.”
  • Requires treatment of Cryptosporidium in surface water utilities
  • Allows variance to treatment requirement if certain strict measures maintained
Cryptosporidium

- A microscopic parasite, resistant to chlorine
- Causes diarrheal disease cryptosporidiosis, symptoms can be severe
- Sources include human sewage, livestock, wildlife
Previous Council Response to LT2

• 2009: Bureau presents treatment options to Council, Council directs pursuing variance with UV treatment as a backup if variance denied

• 2012: Bureau successfully obtains variance based on rigorous testing and strict watershed protections

• 2012: Bureau completes design for UV, plans shelved
History of *Cryptosporidium* Sampling, 1990–2016

- 88 oocysts, inconsistent frequency & methods
- No oocysts, monthly samples
- 1 oocyst
- No oocysts, twice weekly sampling
- 19 oocysts

Variance Study
2017 Cryptosporidium Sampling

- January 6: 2 oocysts detected
- Demonstration Monitoring begins: Increased sampling to 5 times per week
- January – March: Total of 19 oocysts were found in 14 positive samples
- March 8: PWB notified OHA that it “would have to drastically increase the volume of water sampled and not detect additional oocysts in order to remain below the critical threshold.”
OHA Revokes Variance

- May 19, 2017: OHA revokes variance as of Sept. 22, 2017
- August 11, 2017: PWB must submit:
  - Selected *Cryptosporidium* treatment technology and schedule
  - Interim control measures and sampling schedule
- Variance is no longer an option
- Treatment will now be required
Treatment Context

• Short-term:
  • Regulatory Compliance (current)
  • Cost
  • Public Health

• Long-term:
  • Regulatory Compliance (current and future)
  • Cost
  • Public Health
  • Risk Reduction/Resilient system
System Resilience – Threats

- Watershed fire
- Earthquake
- Landslides
- Emerging contaminants
- Algae
- Climate Change
System Resilience – Continued Risk Reduction Efforts

• Seismic Plan (complete)
• Supply System Master Plan (ongoing)
Treatment Technologies

- Inactivation
  - Ultraviolet (UV) disinfection
  - Ozone
  - Chlorine dioxide

- Removal
  - Filtration
Current Treatment Uses

• ~76 surface water suppliers in the U.S. provide more than 100 million gallons per day (mgd). All use chlorine to disinfect.

  ▪ 1 is unfiltered with variance (Portland)
  ▪ 71 use filtration
  ▪ 4 are unfiltered with UV disinfection
UV Disinfection

UV light rays inactivate *Cryptosporidium* and prevent the microorganism from replicating and causing illness. Achieves LT2 compliance only. No other benefits.

Cost: $105M

Readiness: High
UV Disinfection
UV Disinfection

Victoria, British Columbia, Canada – 150 mgd UV treatment system

Portland Parks & Recreation has installed UV filters on all Portland City indoor pools.
Filtration

Solids, including Cryptosporidium, are removed from the raw water, either by settling through sand or charcoal or being pushed through a membrane.

Provides a more stable water quality and reduces vulnerability.

Cost: $350-500M

Readiness: Low
Direct Filtration

Solids are removed via sand or charcoal.

Clackamas River Water, Clackamas, Oregon; 30 mgd, direct filtration
Membrane Filtration

Raw water is forced through a fine membrane to remove very small particles.
Treatment Location Options

- Filtration–Lusted Hill
- UV–Headworks

To Portland

City of Sandy
Costs and Schedule

- UV Disinfection and planned facility upgrades simultaneously in 5 years = $105M.

- Filtration in 10-12 years = $350-500M
Rate Impacts

• To be determined
UV Benefits

- Least cost option
- Speed of construction (compliance in 5 years)
- Land use approvals in place
- Design completed and can be constructed with minimal update
UV Tradeoffs

- Does not address high turbidity
- Provides no additional supply
- Does not address future regulations
- Does not benefit system water quality
- Does not protect against loss of filtration waiver
Filtration Benefits

• Best pathogen protection
• Reduces disinfection byproducts
• Addresses high turbidity (fire or storms)
• Increases water supply
• Addresses toxic algae concerns
• Keeps sediment out of distribution system
• Reduces reliance on groundwater
• Addresses future regulations/emerging contaminants
Filtration Tradeoffs

• Most expensive
• Longer time to comply
• No planning or design; starting from scratch
• Higher maintenance costs:
  • Variance - $1M annually
  • UV - $2.5M annually
  • Filtration - $4M - $5.5M annually
Options

• Update existing UV Disinfection system design, hire Contractor, complete in 5 years

• Start planning for filtration system and negotiate longer compliance schedule (10-12) years
Decision Needed

• PWB needs direction to address the revocation of the Portland Water Bureau’s Cryptosporidium treatment variance

• **August 2, 2017**: Tentative Council Hearing for a Resolution granting PWB authority to respond to OHA

• **August 11, 2017**: Deadline to submit compliance schedule to OHA