Water Quality Standards

Willamette Basin Mercury Variance Rulemaking – Effectiveness of Treatment

November 1, 2018
DEQ Headquarters

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Presentation Objectives

- Committee members understand the capability of municipal wastewater treatment technologies to remove mercury.
- Committee members have the opportunity to provide information related to treatment efficiency.

Threshold questions

- Can point sources treat effluent to meet WQBELs needed to meet the water quality standard, 0.14 ng/l?
- What are typical municipal treatment system effluent levels?

TREATMENT TECHNOLOGY	VOLUME RANGE OF KNOWN USES	TREATMENT ABILITY
Membrane Filtration – Microfiltration (ceramic)	Unknown	Bench scale to 0.92 ng/L
Membrane Filtration – Ultrafiltration (polymer)	Unknown	Bench scale to 0.92 ng/L
Membrane Filtration – Reverse Osmosis	Low volume	Bench scale to 0.92 ng/L
Ion Exchange	0.015 MGD (5-50 GPM)	1 ng/L
Sludge Activation	5-25 MGD	3-50 ng/L
Sludge Activation w/ Nutrient Removal & Filtration	5-25 MGD	1-10 ng/L

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National studies of Hg in municipal effluent

- Washington HDR Study:
  - Secondary treatment – 9 to 66 ng/l
  - Secondary with filters – 2-10 ng/l
- California (2009-2015):
  - Most tertiary plants can treat to less than 4 ng/l
  - 92% of POTWs <12 ng/l as an annual average every year from 2009-2015
  - 61% of POTWs <4 ng/l as an annual average every year from 2009-2015
  - 13% of POTWs <1 ng/l as an annual average every year from 2009-2015
- Minnesota:
  - Average eff. concentration from major POTWs decreased from 3.6 ng/l (2008) to 1.6 ng/l (2017).

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WWTP Treatment in Oregon

Pre-treatment data from 2016

Treatment	Avg. influent conc. (ng/l)			Avg. effluent conc. (ng/l)			Avg. % removal		
	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.
Secondary	74.5	172	24	3.1	8.3	1.2	91.8	98.8	83.2
Advanced	75	97	48	1.4	2.2	1.1	97.6	97.0	98.0

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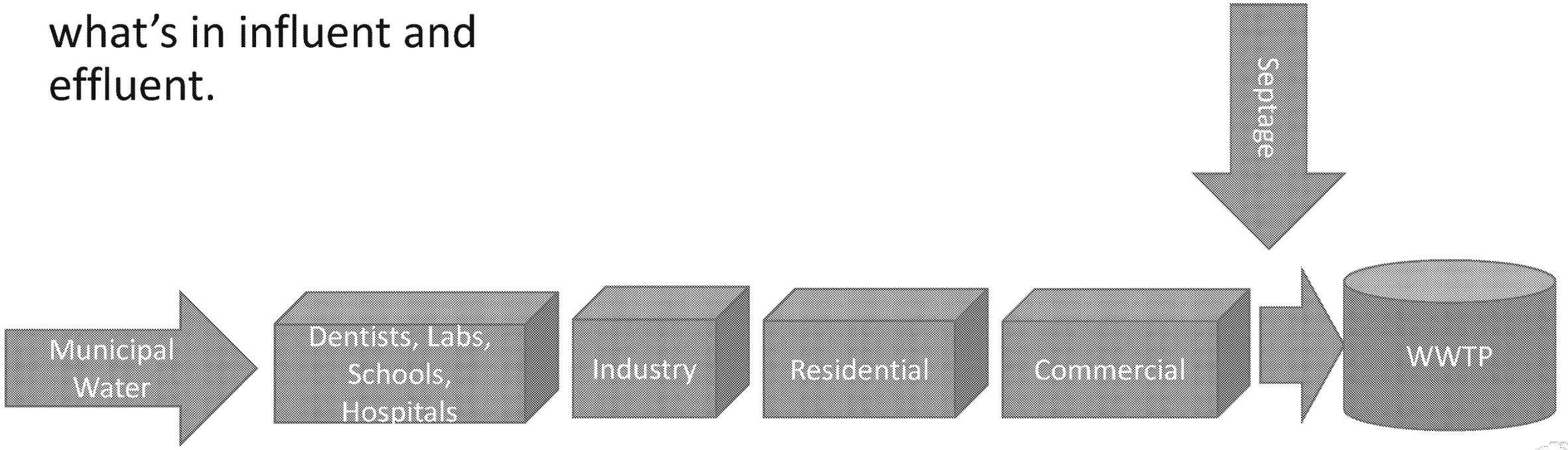
Source Reduction

- Source reduction can reduce what's in influent and effluent.



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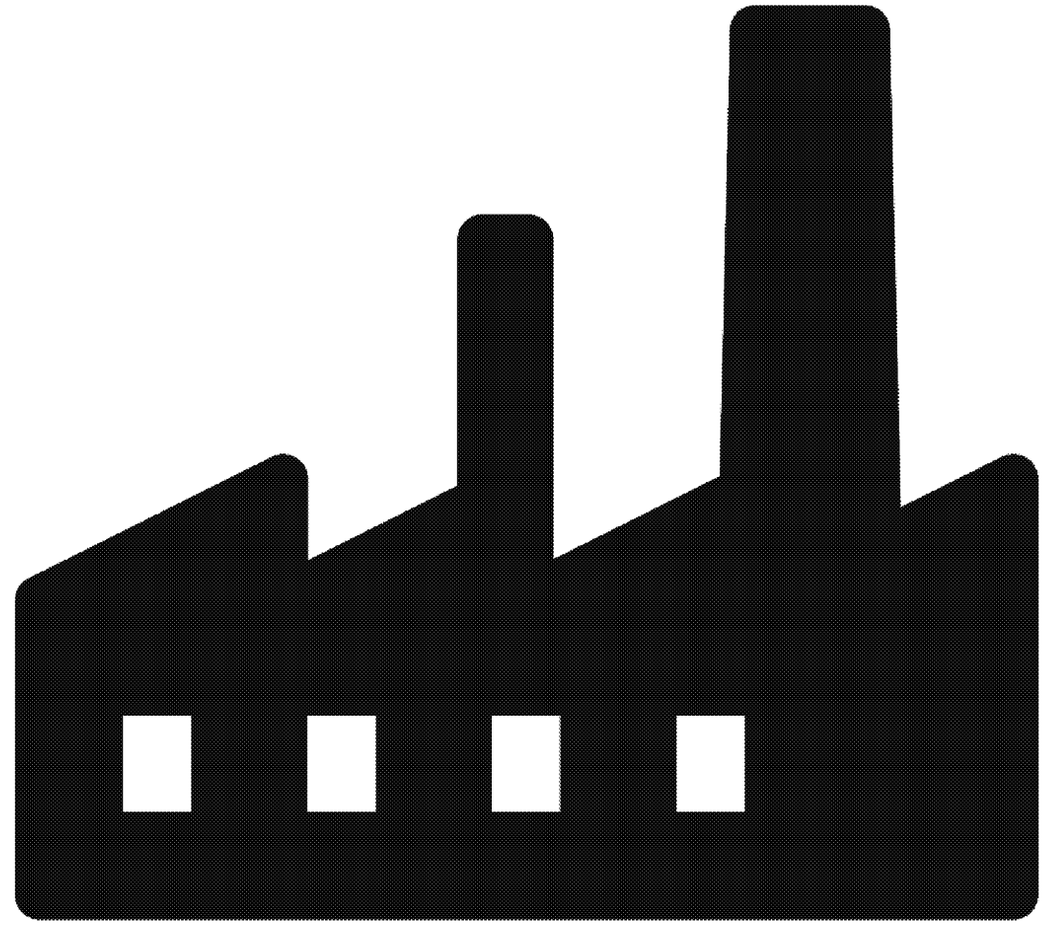
Industrial sources

DEQ has little data from industrial sources.

Can industrial dischargers provide data that would be relevant to discussion?



Conclusion

There is no technology that has been used to treat municipal wastewater at a large enough scale that can reliably treat to less than 1 ng/l.

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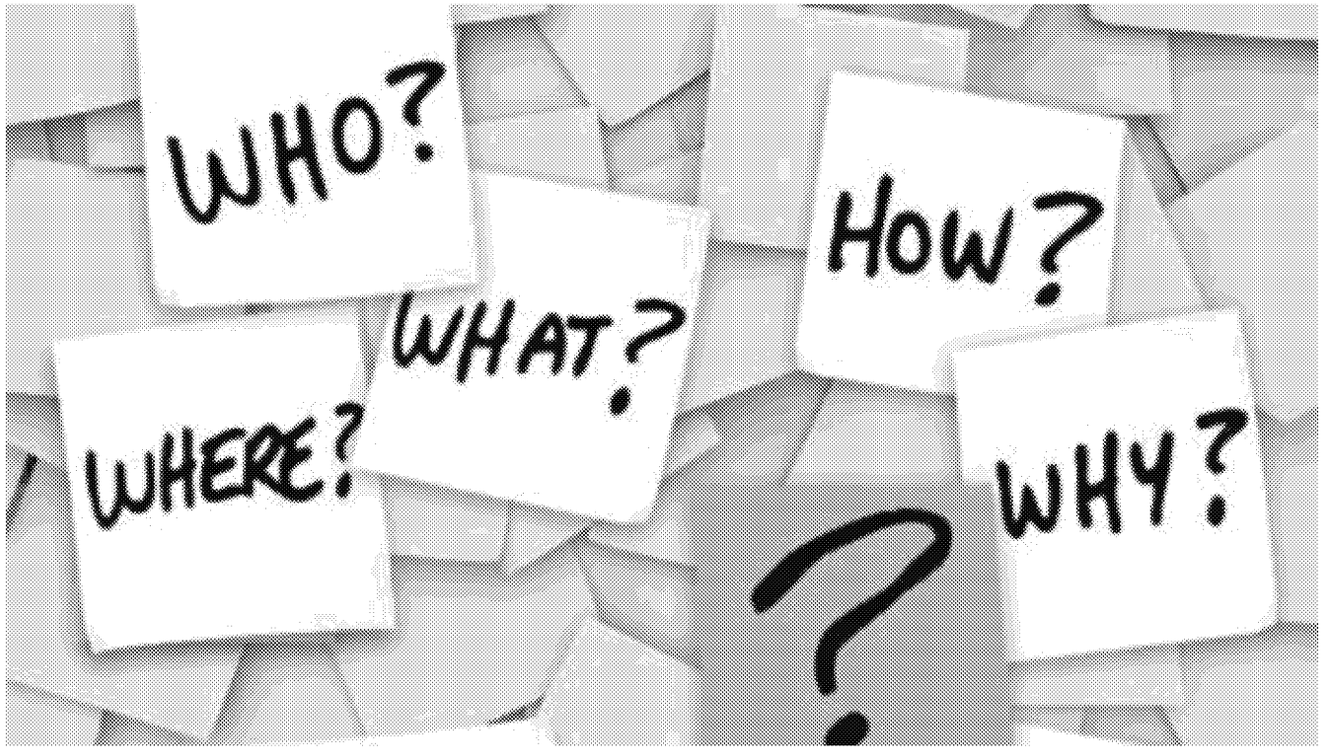
Questions



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