Water Quality Standards and Assessment

Highest Attainable Condition Discussion Draft Procedure for Municipalities

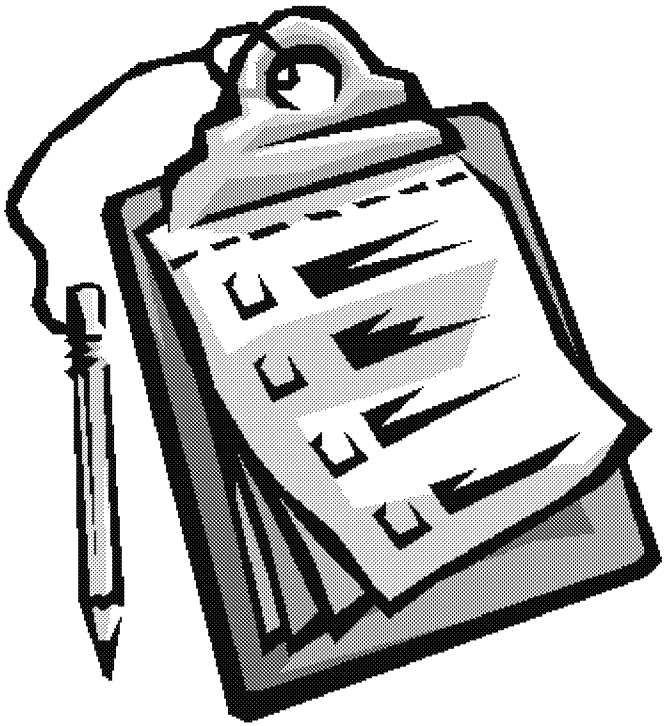
Presentation to Willamette Basin Mercury MDV Advisory Committee
January 24, 2019
DEQ Headquarters, Portland, OR

DEQ State of Oregon Department of Environmental Quality

ED_004376_00249656-00001

Topics

- Context
- Discussion draft HAC flowchart and procedures
- Determining environmental and economic feasibility



Highest Attainable Condition

2. Effluent condition with greatest pollutant reduction achievable

or

3. Effluent condition that optimizes current technology + pollutant reduction program

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Limits of treatment

TREATMENT TECHNOLOGY	VOLUME RANGE OF KNOWN USES	TREATMENT ABILITY
Activated sludge	Up to 25 MGD	3-50 ng/L
Activated sludge w/ Nutrient Removal or Filtration	Up to 25 MGD	1-10 ng/L
Membrane Filtration	Low volume	Bench scale to 0.26 ng/L
Ion Exchange	0.015 MGD (5-50 GPM)	1 ng/L
Precipitation and filtration	Low volume	Bench scale to 0.17 ng/l; full scale to 25 ng/l
Adsorption	Low volume	Bench scale to 0.08 ng/l; full scale to 300 ng/l

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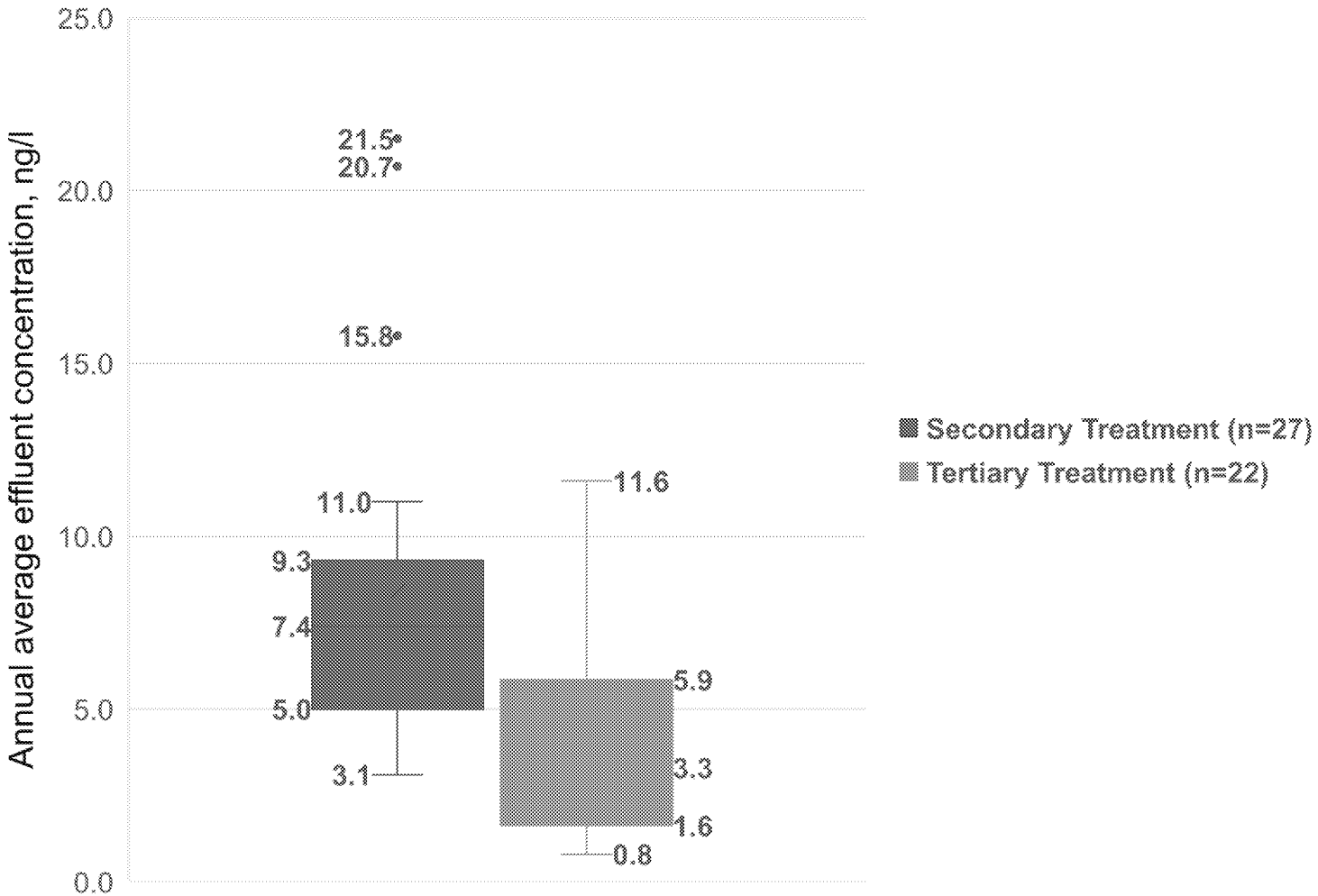
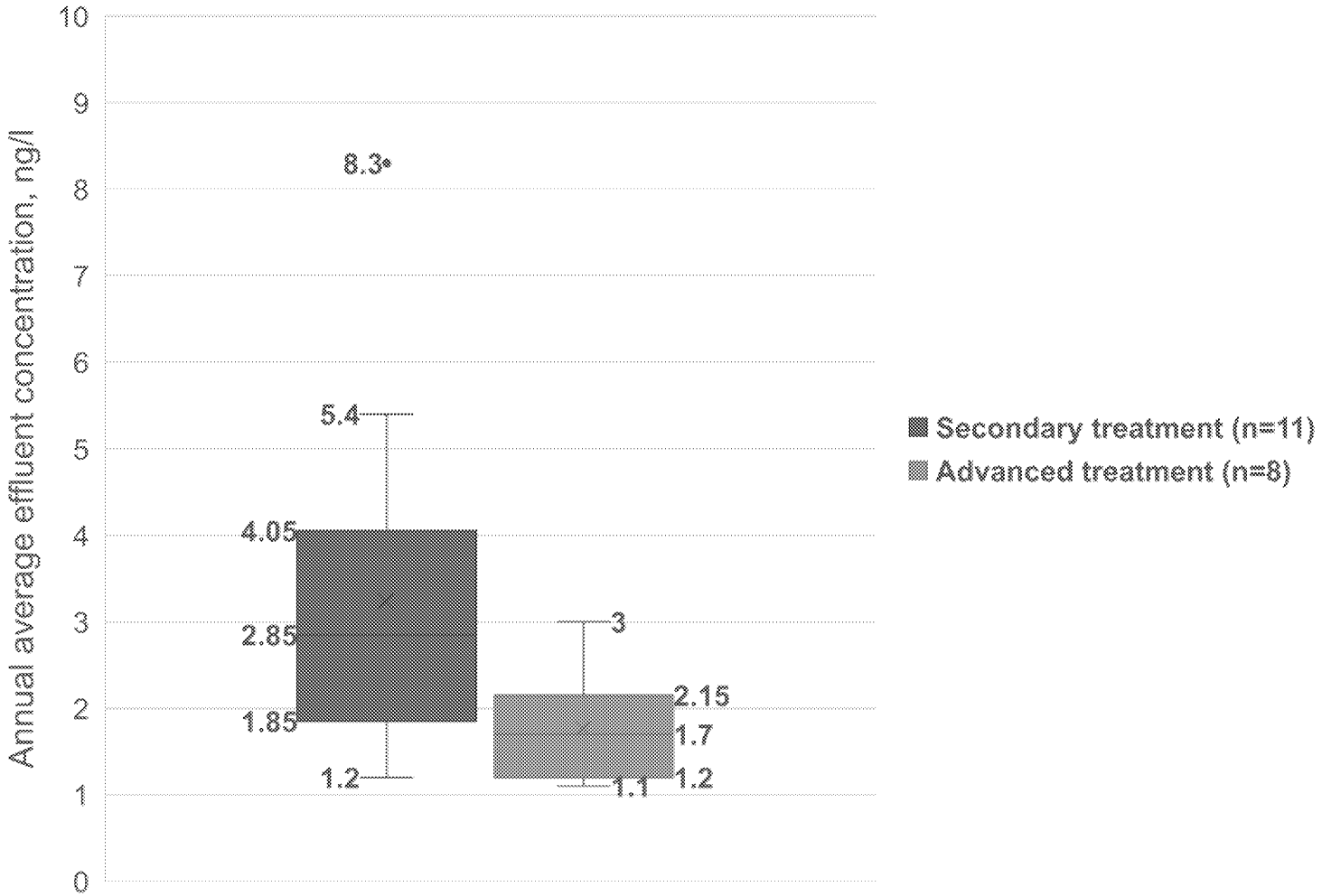
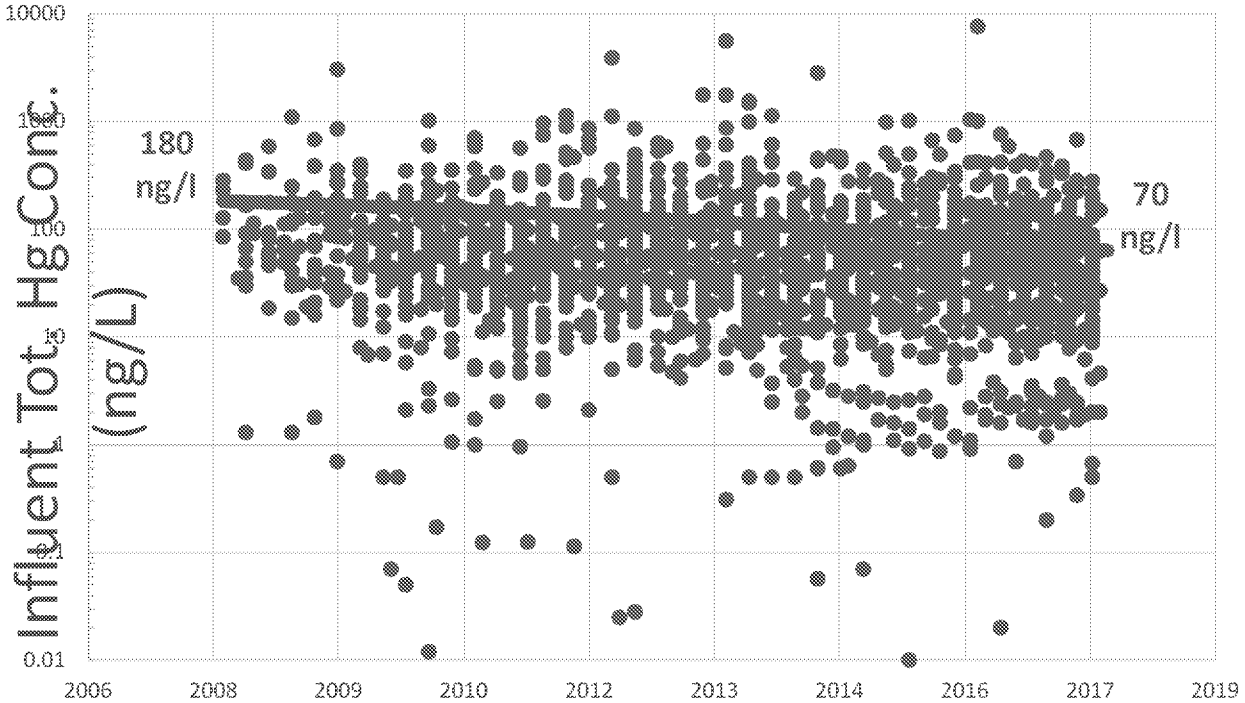
Avg. Tot. Hg Effluent Conc., Sacramento Delta WWTPs, 2004-5



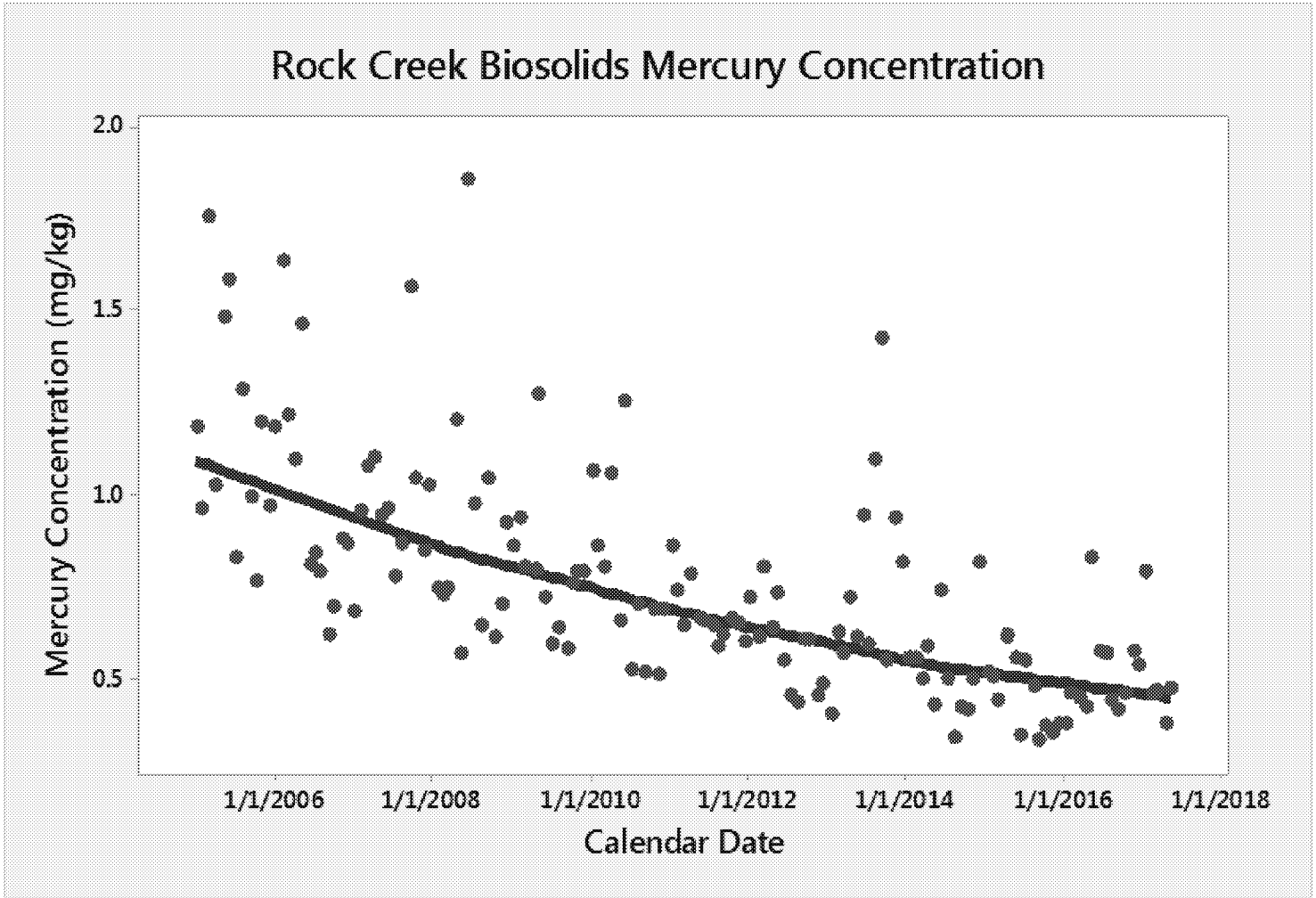
Oregon Pretreatment WWTPs, 2016



Effectiveness of source reduction

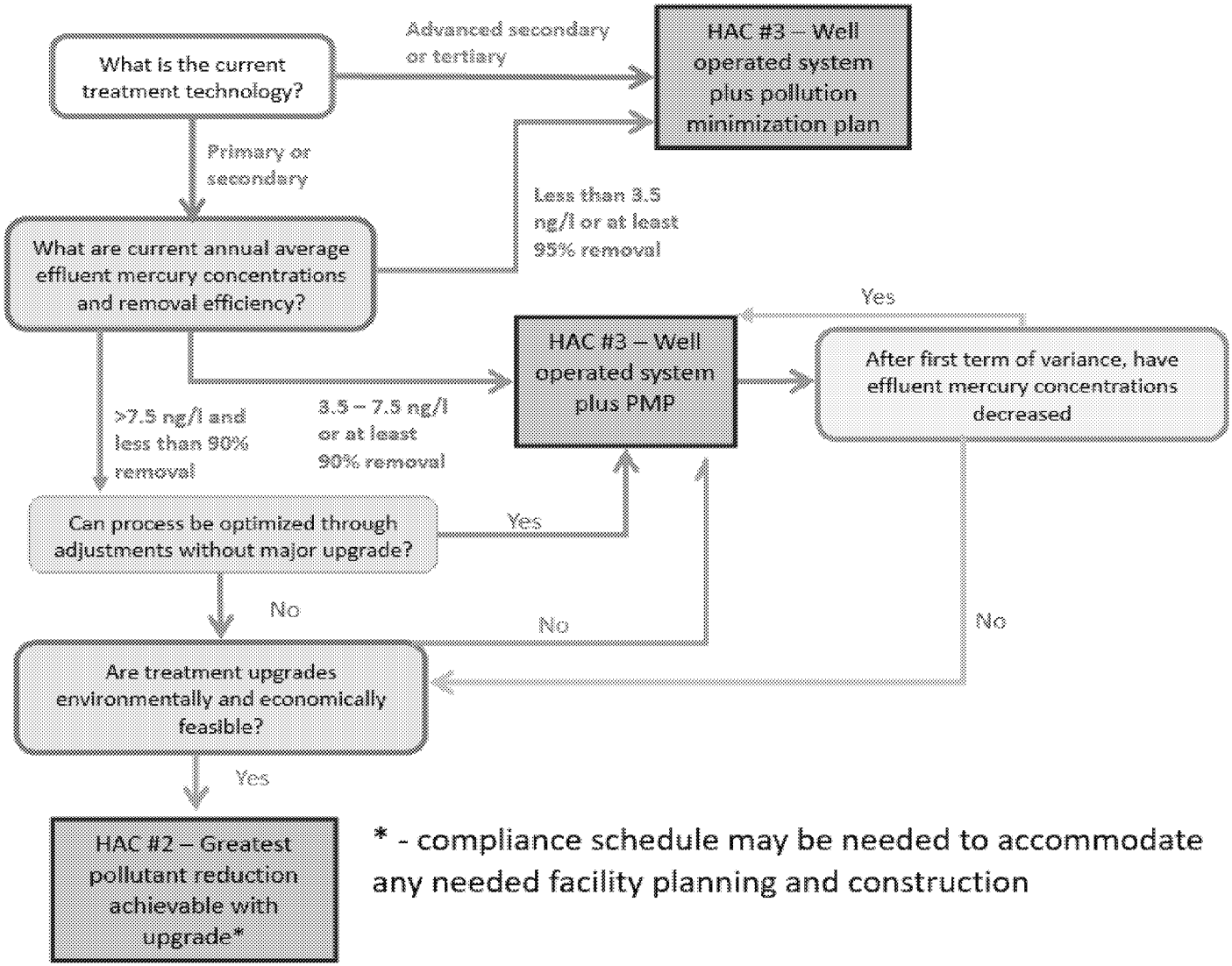


Effectiveness of source reduction



Conclusions

- Best proven treatment for mercury removal is advanced secondary or tertiary (1 – 3 ng/l)
- Some secondary systems also achieve low effluent concentrations, but some may not (1-21.5 ng/l)
- MMPs result in mercury reductions over time



* - compliance schedule may be needed to accommodate any needed facility planning and construction

Advanced systems

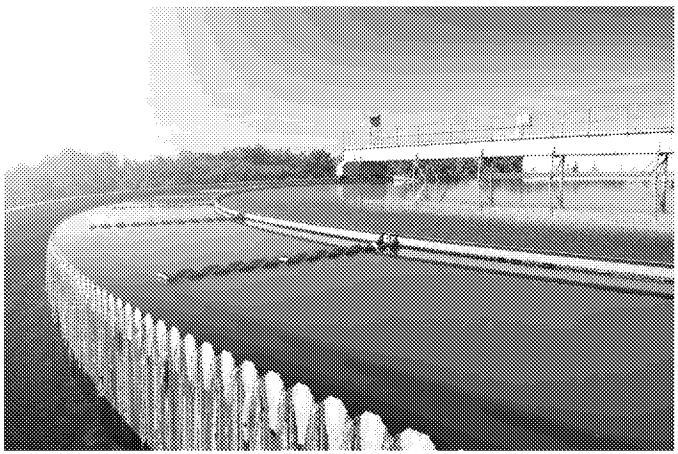
What is the current treatment technology?

Advanced secondary or tertiary

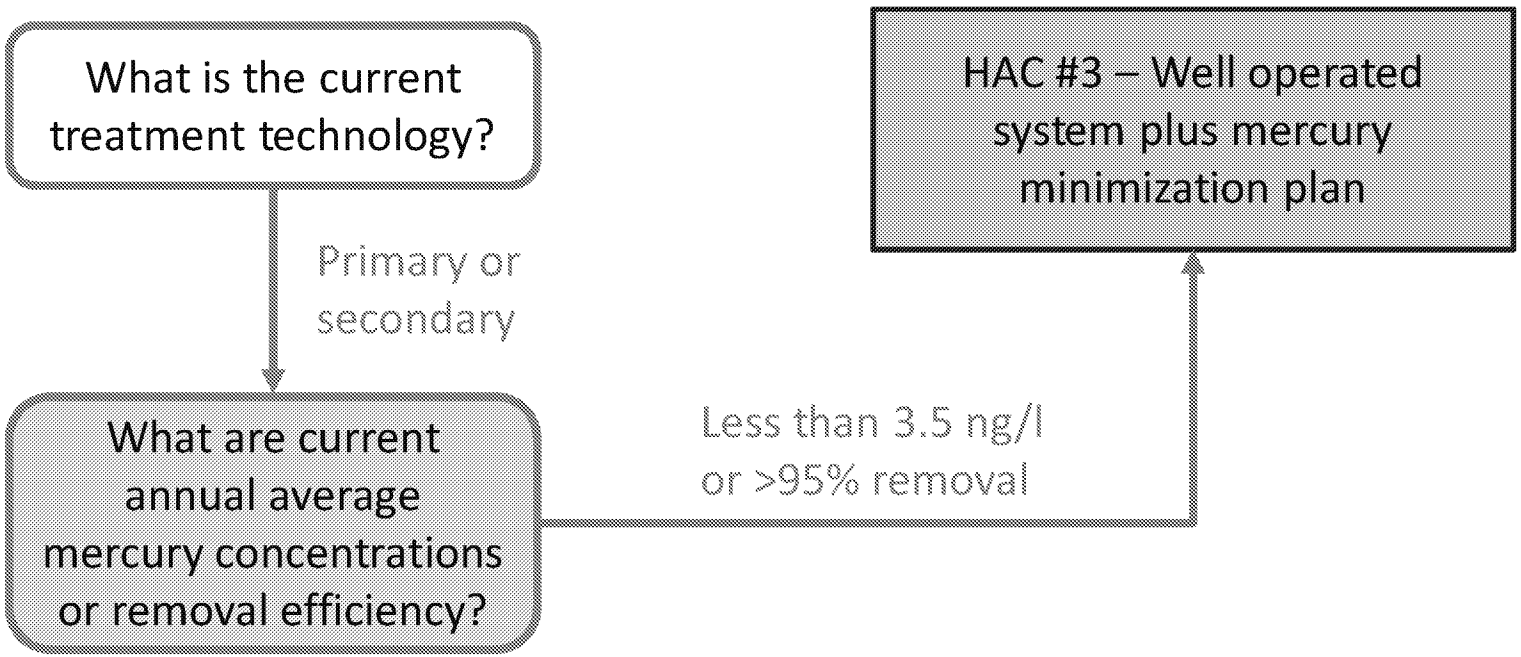
HAC #3 – Well operated system plus mercury minimization plan

Rationale

- No proven treatment that can achieve additional mercury reductions
- Revisit technology at HAC re-evaluation to determine if there are any technological advances that are environmentally and economically feasible.

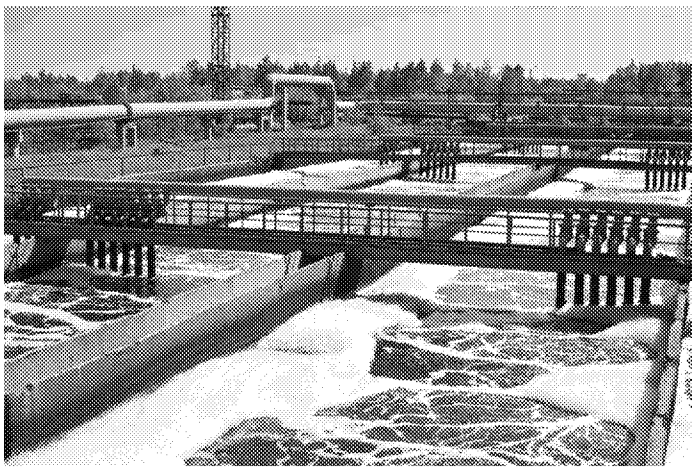


Other systems with very high treatment efficiency



Rationale

- Treatment upgrades will not appreciably remove additional mercury.
- Revisit technology at HAC re-evaluation to determine if there are any technological advances that are environmentally and economically feasible.



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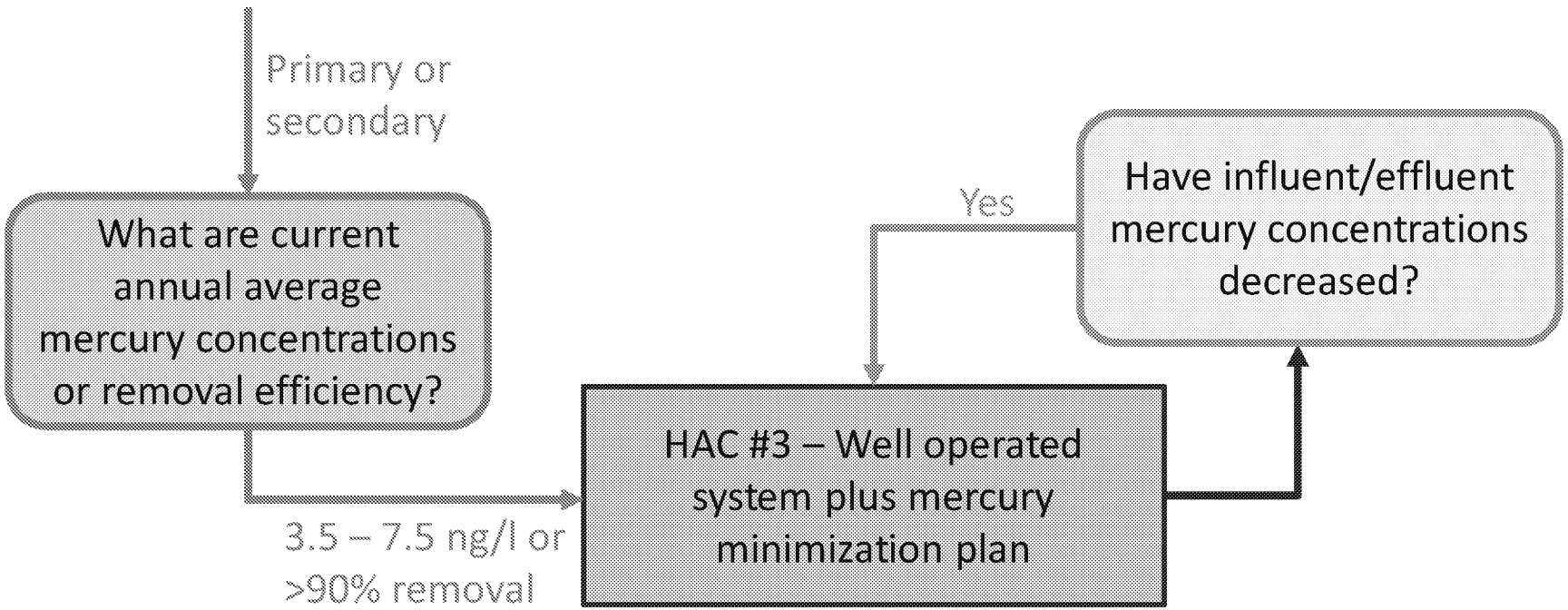
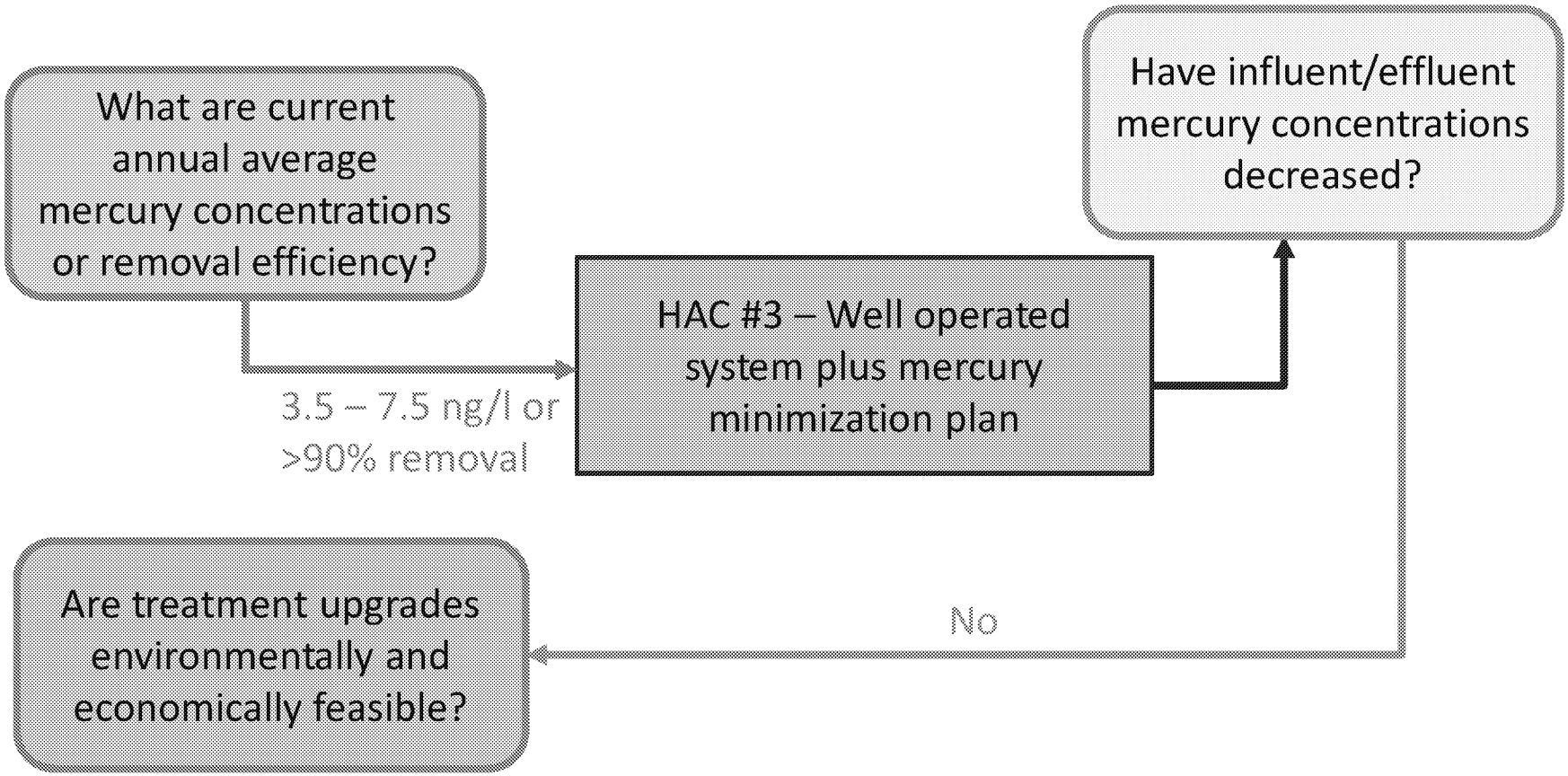
Systems with high treatment efficiency



Rationale

- Minimization plans effective and more environmentally and economically feasible than additional treatment.
- As long as minimization plans continue to decrease mercury levels, prevention/ source reduction is preferred over treatment.

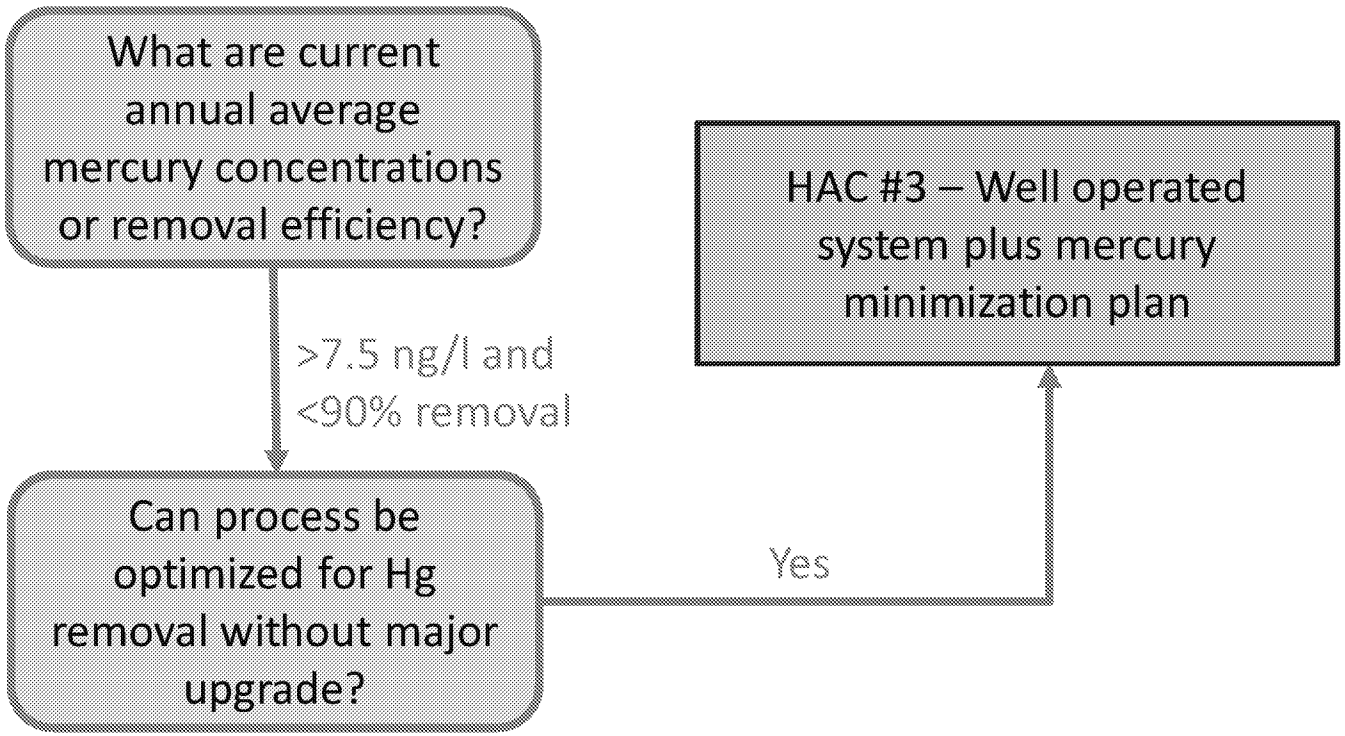
Systems with high treatment efficiency and ineffective MMPs



Rationale

- If minimization is ineffective, the facility needs to evaluate if treatment upgrades will achieve better outcomes.

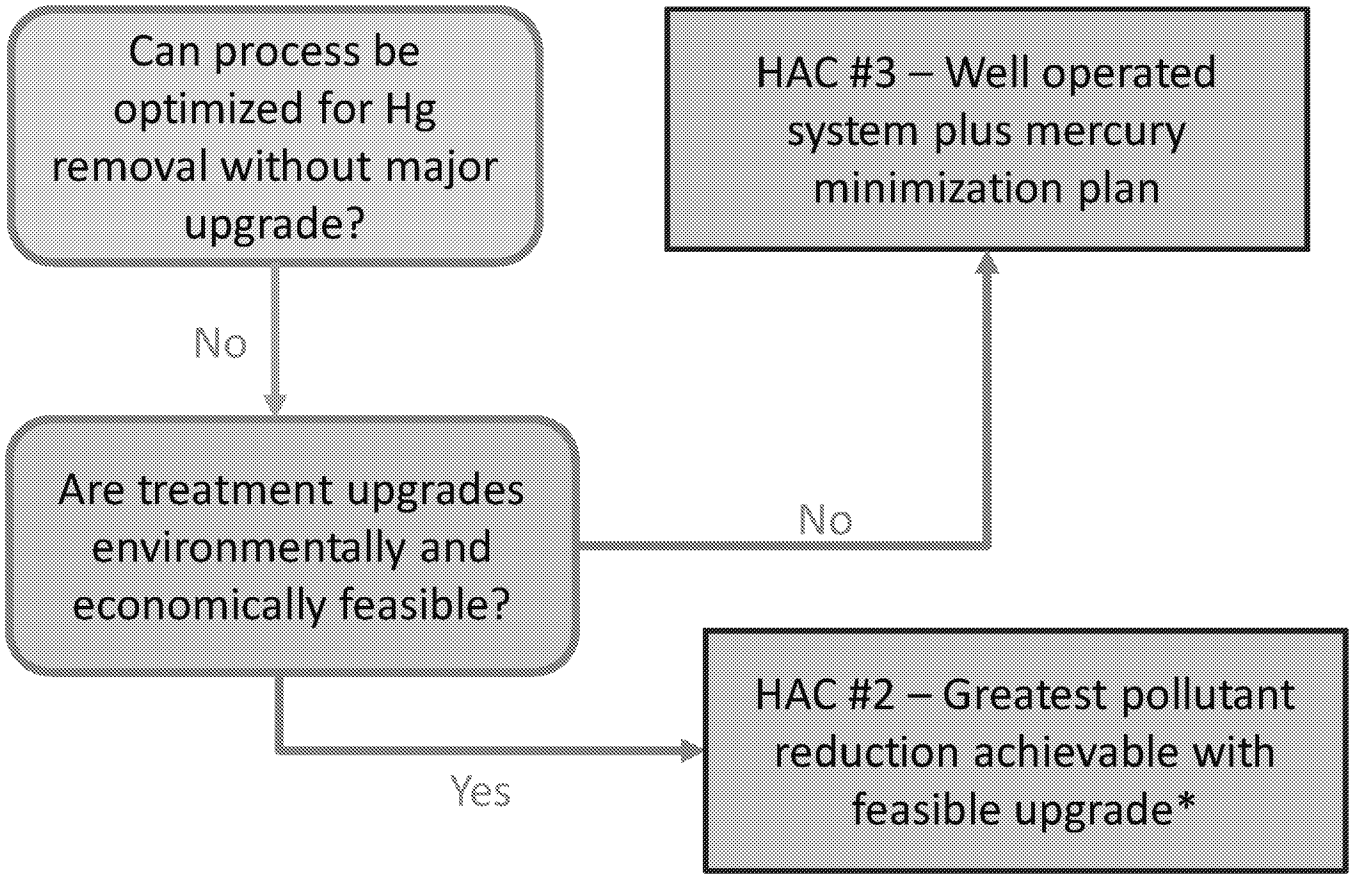
Systems with moderate mercury removal efficiency



Rationale

- Optimization may be more environmentally and economically feasible than treatment upgrade.
- May require compliance schedule with interim effluent limit that is adjusted after optimization is online.

Systems with moderate treatment mercury removal efficiency



Rationale

- Justification for variance:
  - "…cannot be remedied or create more environmental harm to correct than leave in place."
- Rationale for well-operated system & MMP
  - Point sources are very small (~1%) of mercury load in Willamette; limited benefit to waterbody.
  - Advanced treatment uses more energy and requires waste disposal
  - Advance treatment may be much more expensive
- In limited cases, additional treatment may be warranted or may be needed to address multiple pollutants.

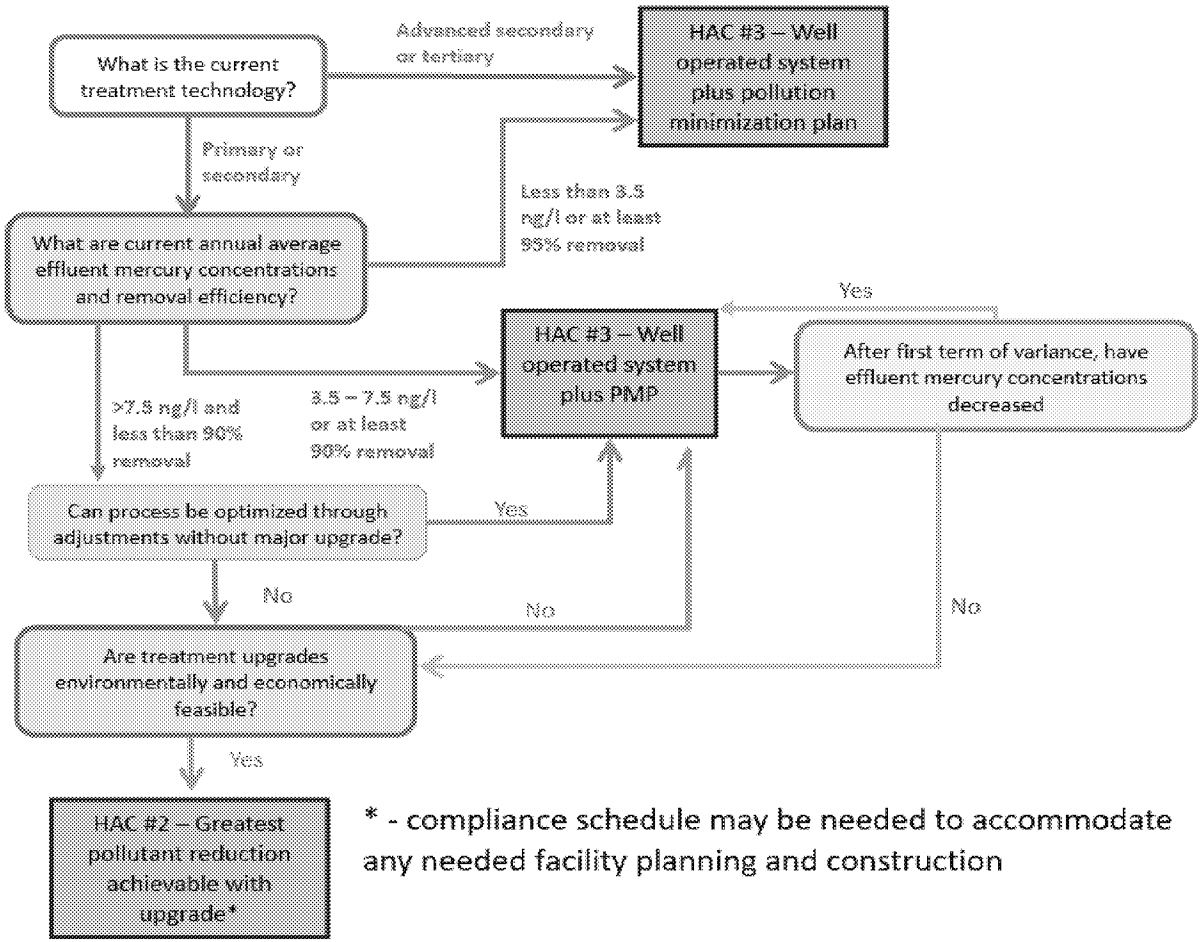
Environmental feasibility

Treatment Option	Estimated mercury effluent conc.	Estimated annual mass load savings (based on 1 mgd flow)	Energy costs (compared to current operations)	GHG and other emissions	Disposal impacts (compared to current technology)
Current treatment	8 ng/l	0	No change	No change	None
Current treatment plus MMP	5 ng/l	4.1 grams	No change	No change	No change
Advanced secondary	3 ng/l	6.9 grams	XX Mwh/year	XX lbs. CO_2	Additional disposal of biosolids

Economic feasibility

- Different than “Factor 6”
  - Making progress toward standard, but not attainment.
  - EPA guidance regarding “substantial and widespread economic harm” not fully applicable, but may be useful.

Comments and discussion



* - compliance schedule may be needed to accommodate any needed facility planning and construction

Documents can be provided upon request in an alternate format for individuals with disabilities or in a language other than English for people with limited English skills. To request a document in another format or language, call DEQ in Portland at 503-229-5696, or toll-free in Oregon at 1-800-452-4011, ext. 5696; or email deqinfo@deq.state.or.us.