Attached please find supplemental testimony in the form of summarized key findings from current public health literature regarding the importance to children's health of reducing the levels of lead in water. The findings are grouped into four points demonstrating that

1. Even low levels of lead in blood – lower than the current VT standard – produce measureable negative health outcomes
2. Reducing water lead levels meaningfully reduces blood lead levels, thereby improving children's health
3. The 1991 Lead and Copper Rule (LCR) 15-ppb action level for water was never a health-based standard. Using it as such is inappropriate and inconsistent with current medical/public health knowledge.
4. Reducing water lead levels (WLLs) is cost-effective

Some of the findings respond directly to question the House Education Committee raised during the session in which I testified, including those regarding the relationship between water lead levels (WLLs) and blood lead levels (BLLs).

Other findings respond to testimony that was provided by others that was potentially misleading, particularly regarding the notion that the Lead and Copper Rule 15-ppb action level was ever considered as or intended to be a "safety level" for WLLs.

Finally, I have included findings that speak to the economics of remediating lead to various action levels, which is related to questions posed by Representative Elder in a follow-up conversation.

I have seen on the website that the Committee has taken up H.302 simultaneously, a bill that is considerably weaker in its protections for children's health and which I strongly oppose. I will submit comments on H.302 separately.

I appreciate your consideration of this material and posting of it for the full House Education Committee to consider. As an Addison County resident, a parent of school-aged kids, and an environmental scientist with relevant expertise, I encourage the Committee to do right by Vermont's children and quickly pass a health-protective and evidence-based bill. Vermont has an opportunity to lead the country on reducing children's lead exposure, as it already does in so many others areas of health and environment.

Best,
Molly

Molly S. Costanza-Robinson, Ph.D.
Professor of Environmental Chemistry
Middlebury College

Supplemental Testimony on
S.40 "An Act relating to testing and remediation
of lead in the drinking water of schools and child care facilities"

Molly Costanza-Robinson, Ph.D.
Professor of Environmental Chemistry, Middlebury College
Submitted to the Vermont House Education Committee
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Current evidence supports a 1 ppb action level for lead in drinking water

I submit the following supplemental testimony relaying key and current findings that respond to questions raised by the Education Committee and to statements made by others' who have testified. Ample evidence points to a 1-ppb action level for lead in water of schools and daycare facilities as the appropriate and feasible course of action for protecting the children of VT.

1. **Even low blood lead levels (BLLs) – those below the Vermont standard (5 μg/dL) – are demonstrably harmful to students and staff** (see references group 1)
   - The US National Institute of Environmental Health Science and others report that, after all other risk factors were accounted for, there is sufficient evidence that low BLLs – *even those below the Vermont standard* – are associated with decreased academic achievement, lower IQ scores, attention-related behavior problems, and antisocial behavior.
   - ~20% of ADHD among US children have been attributed to lead exposure.
   - 80% of the estimated 23 million IQ points lost to a 6-year cohort of U.S. children were lost by children who have BLLs *below the Vermont standard*, meaning even when meeting the Vermont BLL standard, children are experiencing measureable harm.
   - Maternal BLLs – even those below the Vermont standard -- are associated with low birth weight babies.
   - Lead is passed to infants through the placental barrier at high rates, and maternal BLLs as low as the VT standard are associated with cognitive delays in infants.

2. **Reducing water lead levels (WLLs) meaningfully reduces BLLs, thereby improving children's health** (see references group 2)
   - According to the Vermont Dept of Health, Vermont children's blood lead levels (BLLs) do not meet the Vermont standard of 5 μg/dL nor the CDC goal of having <2.5% of children with BLLs >5 μg/dL).[1] Between 2006 and 2009, the % of VT children with BLLs >5 μg/dL substantially decreased from ~20% to <10%, due to reductions in exposure to leaded paint/dust. In the last decade, however, progress on reducing BLLs in Vermont has slowed. ~5% of VT children still have BLLs >5 μg/dL, double the % sought by the CDC.
   - Water has been estimated to contribute 20% of total lead exposure, but up to 40% of BLLs due to higher absorption rates of lead from water as compared to other sources.
   - 5 months of exposure to WLLs of 1-ppb was estimated to increase BLLs in children (1-5 years old) by 35%.
   - In a recent EPA study, two water lead scenarios were considered. In a hypothetical scenario where water was the only source of lead to young children (2 to <6 years), it was estimated that WLLs up to 35 ppb lead would allow BLLs to still meet the CDC standard. In a realistic scenario, however, where all sources of lead exposure were considered, WLLs $\leq$3 ppb were required to

[1] The Vermont standard for blood lead levels (BLLs) in children is 5 μg/dL; the CDC uses the same value for its 97.5th percentile value, meaning that its goal is that <2.5% of children have BLLs ≥ 5 μg/dL

meet the CDC standard. A 3-ppb estimate for a health-based allowable WLL is conservatively *high* for at least two reasons: a) we know there are negative health effects for BLL < 5 μg/dL (see above) and b) most school children are exposed to a higher fraction of their total lead through water (less playing in the dirt and on floors; less hand-mouth behavior) than the 2-6 year olds modeled in the study.

- In the realistic scenario for 2-6 year olds in which all sources of lead were considered, the EPA estimates that having WLLs of 15-ppb would yield 97.5th percentile BLLs that fail the CDC standard. In contrast WLLs of 1-ppb would result in BLLs that meet the CDC standard.

The 1991 Lead and Copper Rule (LCR) 15-ppb action level for water was never a health-based standard. Using it as such is inappropriate and inconsistent with current medical/public health knowledge. (see references group 3)

- The 1991 LCR action level for water was implemented as a screening tool for the performance of a utility's water infrastructure corrosion control efforts, not to determine consumer exposure.
- In 1991, the EPA did not define a maximum contaminant level (MCL) for lead – a level at which no known or anticipated adverse effects on health occur and which allows an adequate margin of safety – because implementation of the best <u>municipal supply-side treatment options</u> (anticorrosion) *available in 1991* alone was not expected to achieve an MCL. They did not want to publish a safety level that could not be met under the best supply-side treatment options.
- The EPA recognized that additional aspects of the water system (i.e., besides only supply-side anti-corrosion efforts) needed to be addressed in order to deliver safe water. Unfortunately, federal attempts to address other aspects of the water system have failed. Most notably, the Lead Contamination Control Act (LCCA) of 1988 required states to test and remediate water in schools for lead, but states pushed back, and the requirement was ruled unconstitutional in 1998 (ACORN v. Edwards). Delivering safe water in schools became voluntary.
- Since 1991, additional factors have lowered the action level that is feasible; most notably, the 2011 Reduction of Lead in Drinking Water Act amended the SDWA and lowered the maximum allowable lead content in "lead-free" plumbing materials by 33-fold (from 8% to an average of 0.25%). With the new plumbing materials and effective lead filters that are now available, meeting a lower action level is feasible (see testimony, Costanza-Robinson Feb 26, 2019).
- Since 1991, we have learned more about the harms to children due to even lower BLLs and have learned more about the relationship between BLLs and water lead levels (WLLs), such that any cost-benefit analysis conducted at that time is out of date and inconsistent with current medical/public health knowledge.
- Adopting the federal action level for the sake of regulatory consistency, as others have recommended in their testimony, would not support the health protective goal of S.40 for all the reasons reviewed above. Importantly, the federal 15-ppb action level is defined at the 90th percentile, such that 9% of outlets tested could exceed 15 ppb and the system would still meet the action level. Indeed, the concentration of lead in the highest 9% of water samples is immaterial and could take on any value whatsoever -- 500 ppb, 1000 ppb, or 5000 ppb – and not exceed the action level. Calling for regulatory consistency amounts to accepting the possibility of not only irreversible cognitive decrements and behavioral issues in Vermont's children but also the possibility of acute lead poisoning.

Reducing water lead levels (WLLs) is cost-effective (see references group 4)

- Reducing children's lead exposure is most cost-effective because the benefits (or harms) will compound over a full lifetime. Targeting schools and daycare centers for lead reduction is a strategic investment.

- Established costs associated with lead exposure include mental and physical health care, educational costs (special education services, disruption to classrooms), decreased lifetime earnings associated with lower IQ (and decrease in potential tax revenues), decreased work/productivity due to ADHD, increased criminal activity, among much else.
- Considering only lifetime income loss due to lead-induced IQ decrements (and no other health or societal costs, see above)
    - WLLs ≥3.7 ppb are estimated to be the "breakeven point" for installing filters and maintaining them for the 70-year lifetime of an individual. In other words, a highly conservative cost estimate suggests that for WLL > 3.7 ppb, it costs society *more* to do nothing than it does to install filters. Considering the many other demonstrated costs of lead exposure, society saves money by reducing WLLs to below 3.7 ppb.
    - Doing nothing about WLLs at 15 ppb results in an estimated lifetime income loss of $8141 per child; in contrast, installing a filter and maintaining it for that same 70-year lifetime is estimated to cost $2026 per child. Allowing 15-ppb WLL results in a conservative net loss of $6115 per child relative to remediating to a 1-ppb action level.
- For children <6 years old in the 2003-2006 national cohort, estimated lifetime economic losses due to BLLs in the 2-10 μg/dL range are $165-233 billion.

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